Draft

Orange River Mouth Ramsar Site Strategic Estuarine Management Plan

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environmental affairs

Department:
Environmental Affairs
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Key Stakeholders:

A wide range of stakeholders have contributed towards the development of this management plan. Their contributions are greatly appreciated.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ABBREVIATIONS AND ACRONYMS

a.m.s.l.	Above mean sea level
ARTP	/Ai/Ais-Richtersveld Transfrontier Park
ARTP-JMB	/Ai-/Ais-Richtersveld Transfrontier Park Joint Management Board
BCC	Benguela Current Commission
BCLME SAP IMP Project	Benguela Current Large Marine Ecosystem Strategic Action Programme Implementation Project
CDP	Concept Development Plan
CML	Coastal Management Lines
CPA	Community Property Association
CSIR	Council for Scientific and Industrial Research
CWAC	Coordinated Waterbird Counts
EFR	Ecological Flow Requirement
EIA	Environmental Impact Assessment
EMP	Estuarine Management Plan
ESA	Early Stone Age
HDI	Historically Disadvantaged Individual
IBA	Important Bird Area
ICM Act	National Environmental Management: Integrated Coastal Management Act, 2008 (Act No.24 of 2008)
IDP	Integrated Development Plan
LOR TFCA	TFCA along the lower parts of the Orange River
LSA	Late Stone Age
MSA	Middle Stone Age
NACOMA	Namibian Coast Conservation and Management Project
NA-DOT	Namibian Department of Tourism
NA-MAWF	Namibian Ministry of Agriculture, Water and Forestry
NAMDEB	NAMDEB Diamond Corporation (Pty) Ltd
NA-MET	Namibian Ministry of Environment and Tourism
NA-MET-DOT	Namibian Ministry of Environment and Tourism, Directorate of Tourism
NA-MET-DPWM	Namibian Ministry of Environment and Tourism, Directorate of Parks & Wildlife Management
NA-MET-DRSPM	Namibian Ministry of Environment and Tourism, Directorate of Regional Services & Park Management
NA-MFMR	Namibian Ministry of Fisheries and Marine Resources
NA-MME	Namibian Ministry of Minerals and Energy

NAMWATER	Namibia Water Corporation Ltd.
NA-SPAN	Strengthening Protected Area Network
NC-DENC	Northern Cape Department of Environment & Nature Conservation
NDCA	Namibia's Directorate of Civil Aviation
NEMPAA	National Environmental Management: Protected Areas Act
NGO	Non-governmental Organisation
NTB	Namibia Tourism Board
NTB	Namibia Tourism Board
ORASECOM	Orange-Senqu River Commission
ORM	Orange River Mouth
ORMIMC	Orange River Mouth Interim Management Committee
PWC	Permanent Water Commission
RDM	Resource Directed Measures
RQO	Resource Quality Objectives
SACAA	South African Civil Aviation Authority
SA-DAFF	South African Department of Agriculture, Forestry & Fisheries
SA-DEA	South African Department of Environmental Affairs
SA-DEA-O&C	South African Department of Environmental Affairs - Oceans & Coast Branch
SA-DEA-B&C	South African Department of Environmental Affairs- Biodiversity and Conservation Branch
SA-DED	South African Department of Economic Development
SA-DMR	South African Department of Mineral Resources
SA-DOT	South African Department of Tourism
SA-DPW	South African Department of Public Works
SA-DWS	South African Department of Water Sanitation
SAEON	South African Environmental Observation Network
SANBI	South African National Biodiversity Institute
SANParks	South African National Parks
SATB	South African Tourism Board
SDF	Spatial Development Framework
SKEP	Succulent Karoo Ecosystem Programme
TFCA	Transfrontier Conservation Area
the Protocol	National Estuarine Management Protocol
UNDP/GEF	United Nations Development Programme / Global Environmental Facility
UNOPS	United Nations Office for Project Services
VNJIA	Vioolsdrift and Noordoewer Joint Irrigation Authority
WESSA	Wildlife and Environmental Society of South Africa
WftCoast	Working for the Coast
WfWetlands	Working for Wetlands
ZP	Zonation Plan

CHAPTER 1: INTRODUCTION

1.1 Location and extent

The Orange River Mouth Ramsar site is situated between the towns of Oranjemund and Alexander Bay and forms the border between South Africa and Namibia. The estuary has an area of approximately 2,500 ha. It is a delta type river mouth, comprising a channel system between sand banks, a tidal basin, the river mouth and the salt marsh on the south bank (Figure 1). The extent of tidal exchange extends as far as the Ernest Oppenheimer Bridge, approximately 13 km upstream.

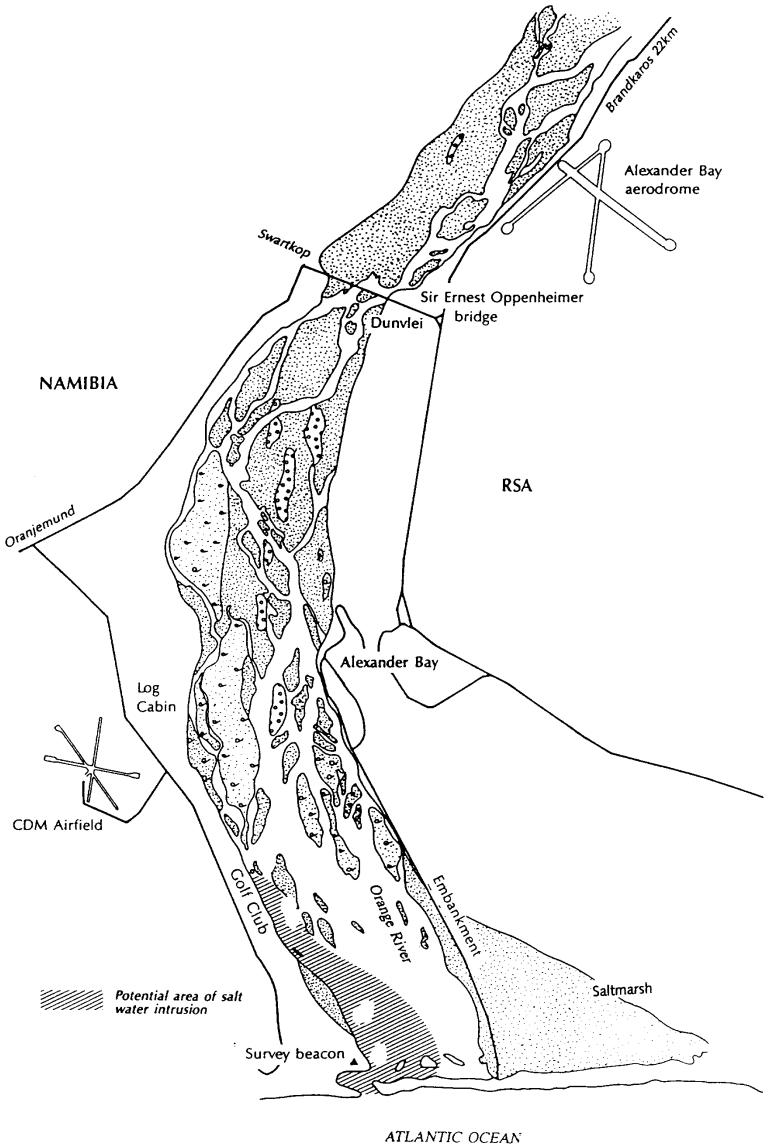

Figure 1 Map of the Orange River Mouth (CSIR, 2011a).

The area designated as a Ramsar site comprises the estuary of the Orange River before it reaches the Atlantic Ocean, between the river mouth and the Ernest Oppenheimer Bridge that links the border towns of Oranjemund and Alexander Bay. While the exact boundaries of the Ramsar site are somewhat unclear, the

South African Section of the site (Site No. 526) covers approximately 2000 ha's while the remaining 500 ha falls within Namibia (Site No. 744).

In 1995 the South African portion of the site was placed on the Montreux Record of the Ramsar Convention following considerable degradation of the salt marsh component of the system. This was the result of a combination of impacts, both at and upstream of the estuary.

1.2 Catchment context

The Orange River Mouth forms part of the Orange-Senqu River Basin (or catchment), the largest river basin in Africa south of the Zambezi, covering an area of approximately 0.9 million km^2 (Maré 2007). The basin stretches over four countries - South Africa, Lesotho, Botswana and Namibia, with the Orange River itself forming part of the border between South Africa and Namibia. The two main tributaries are the Senqu and the Vaal rivers. The headwaters of the Senqu rise in the Maluti mountain range in Lesotho Highlands, while the other main tributary, the Vaal River, rises on the eastern highveld escarpment in north-east South Africa (Earle *et al.* 2005). At the confluence of the Senqu and Vaal rivers, the Orange River flows in a westerly direction to the west coast entering the Atlantic Ocean through the Orange River Estuary (Figure 2). A smaller tributary, the Fish River, joins the Orange River in the lower Orange catchment.

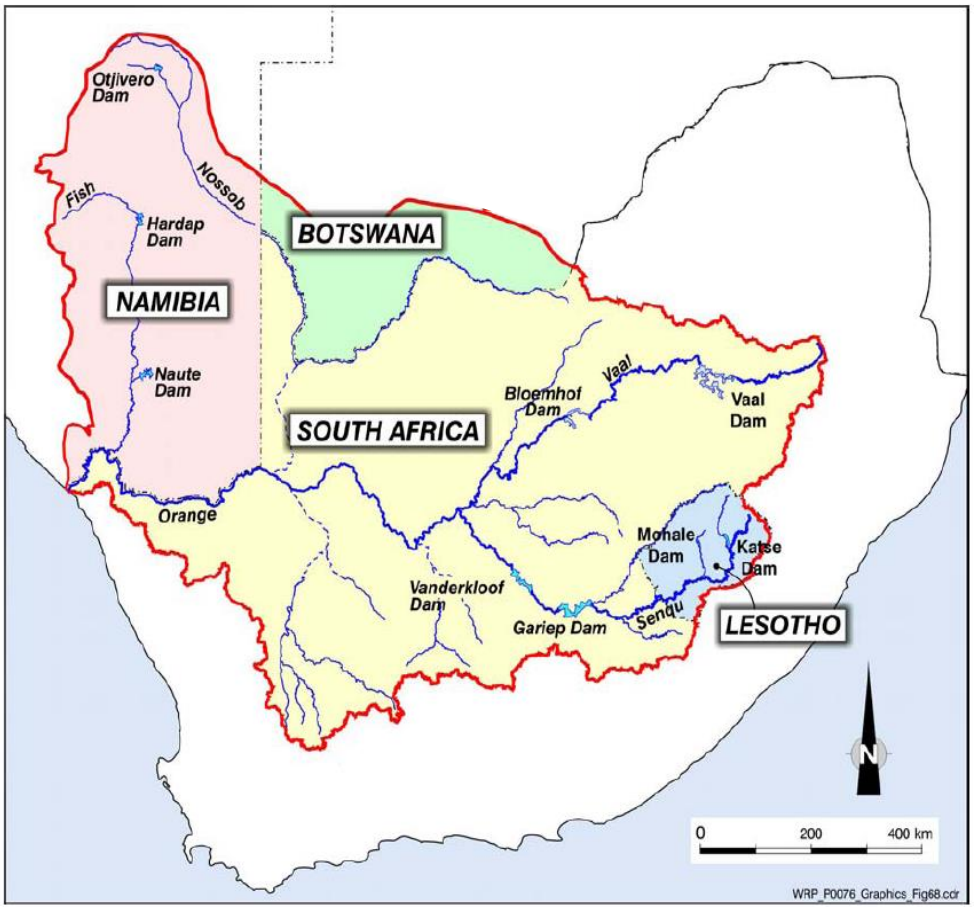

Figure 2 Orange-Senqu catchment or river basin (Source: Maré 2007)

The basin plays host to one of the most industrially developed parts of Africa (the region around Johannesburg) and supports a range of commercial and subsistence farming activities. Water demand in the catchment is therefore very high, resulting in substantial changes in natural river flows, particularly in the Lower Orange River with resultant impacts on the estuary.

1.3 History[1]

Archaeological evidence shows that early man frequented the shores of the Orange River from about 1.5 million years ago onwards. As a linear oasis, the Orange River served as a route from inland to the coast during the Early Stone Age (ESA, 1.5 million to 200 000 years ago), the Middle Stone Age (MSA, about 200 000 to 40 000 years ago) and the Later Stone Age (LSA, 40 000 years ago to the present).

The first written historical account of the lower Orange River was made in 1486, when three ships sent by the King of Portugal called at the ORM (or Angra das Voltas, as it was then called) under the command of Barthlomew Dias. The first prospecting operations in the area are recorded as early as 1685. An increase in activity took place during the Namibian copper rush in the 1850s. During this period, Mr James Alexander operating the Kodos copper mine (approximately 10km from Sendelingsdrift) from 1854 transported copper on barges during high flows to Alexander bay for shipment to the sea (Alexkor, 2009). The colonial boundary of the Cape Colony was extended to the Orange River in 1847; however it was only in the early 1900s when diamonds were discovered that the government showed any interest in utilizing the area.

The ORM also served as an access point to the open sea when on 22 October 1886 Adolf Luderitz and his companion, Steingroewer, set off for Luderitz via the river mouth. After the discovery of diamonds in 1908, the lower Orange River was subject to intense prospecting activities.

Until this time the area was inhabited by the Nama people who were semi-nomadic pastoralists. They have used the area for purposes of habitation, cultural and religious practices, grazing, cultivation, hunting, fishing, water “trekking” and harvesting, and exploitation of natural resources.

In 1908 the first diamonds were discovered along the west coast of southern Africa at Kolmanskop near Lüderitz. This led to the subsequent prospecting at the Orange River Mouth where rich deposits were discovered at Alexander Bay in 1926. These deposits proved so rich that in 1927 the Government prohibited all further diamond prospecting on state owned land in Namaqualand and started mining operations at Alexander Bay. Later diamonds were also discovered and mined elsewhere along the vast coastline, including areas in Namibia just north of the Orange River Mouth (Alexkor, 2009).

In order to limit access to the area, the Nama people were dispossessed of their right of ownership and their beneficial occupation of the Namaqualand coastal area by a series of legislative and executive actions. Amongst others these included the Precious Stones Amendment Act (Act 27 of 1907 (Cape)) and the Precious Stones Act (Act 44 of 1927). Under these Acts during the 1930s, members of the Nama people who lived in the village of Dunvlei were forced to move their homes off this land. In 1957 the Nama people also lost the right to exercise their rights of access, seasonal grazing and watering of stock on Farm 1 (the present day Alexander Bay and the ORM). Some others were forcibly removed from a settlement at Kortdoorn in 1961, and were moved to Arries inside the Richtersveld reserve. The community was denied access to the mining area and a corridor

[1] Note that much of the information for this section of the management plan comes from the draft management plan for the proposed Orange River Mouth Nature Reserve (DENC, 2009).

of farms was created around the declared mining reserve and along the riverbank. The State alluvial Diggings was taken over from the Government and transformed into the Alexander Bay Development Corporation (Alexkor) in 1989.

On the Namibian front, the German government created the Sperrgebiet in 1908 in its colony of German South West Africa, giving sole rights for mining to the *Deutsche Diamantengesellschaft* ("German Diamond Company"). Access to this stretch of the coast was prohibited through an exclusion policy with access strictly limited to mining operations.

Following South Africa's accession to the Ramsar convention the Orange River Mouth was designated as a Ramsar site by South Africa in 1991. After Namibia ratified the Ramsar Convention in 1995, the designated area was enlarged and the Namibian part of the wetland was immediately designated as well. This was not the result of a formal international agreement between Namibia and South Africa; both countries simply proposed their respective parts of the area under the Ramsar Convention (Verschuuren, 2007).

In the same year, the area was put on the Montreux record because part of it had been seriously degraded. The Orange River Mouth Interim Management Committee (ORMIMC) was established in 1995 and has served as an advisory body to the respective competent authorities. The ORMIMC has been the driving force behind current initiatives at the central government level in South Africa to rehabilitate the area, to remove it from the Montreux record, to get the area protected under South African law, and to draft a management plan for the Ramsar site. Despite these initiatives however, active management of the Ramsar site has been limited and has resided largely in the hands of the mining companies Alexkor and NAMDEB (jointly owned by Debeers and Namibian Government) located on the South African and Namibian sides of the estuary respectively. This situation has recently changed with the proclamation of the Sperrgebiet National Park in Namibia that includes the Namibian section of the Orange River Mouth and the settlement of a land claim on the South African section which has now been handed over to the Richtersveld community.

1.4 Socio-economic context[2]

The area around the Orange River Mouth is very sparsely populated and access to the coast and estuary is controlled by diamond mining concession holders NAMDEB (Pty) Ltd in Namibia and Alexkor Ltd in South Africa (Richtersveld Municipality 2009, Skov *et al.* 2009). The town of Oranjemund is situated on the northern bank of the estuary and has a population of 7 500 (NAMDEB, 2012). The town was previously owned by the mining company with access restricted to employees of NAMDEB, their relatives and persons with pre-application. Alexander Bay, with a population of approximately 1,453 was also a privately owned mining town on the south bank of the estuary, and was until recently, inaccessible to anyone not working on or directly associated with Alexkor Ltd. Following a successful land claim by the Richtersveld community, the town is no longer a high-security area and permits are no longer required to access the town. Access to the Orange-Senqu Estuary from the south bank is now also permitted, but as few people are aware of this fact, so tourism in this area is almost non-existent. South of Alexander Bay, the nearest town is Port Nolloth, with a population of 8,652 persons, where mining, fishing and mariculture are listed as the main economic activities (Richtersveld Municipality, 2009). Fish processing establishments in both Port Nolloth and Luderitz are reported to be struggling due to poor catches. Diamond resources in the area have been significantly depleted and both NAMDEB and Alexkor

[2] Information presented here comes primarily from a report to the UNDP-GEF Orange-Senqu Strategic Action Programme (2010): Scoping a Ridge to Reef Approach: Interactions between the Orange-Senqu and the Benguela Current

are scaling down their operation dramatically[3]. Aligned with this, has been the process of converting the town of Oranjemund into a formally proclaimed town and the recent election of a Town Council. Tourism, although low key at present, is a growing industry and looked towards as a future alternative to mining and fishing.

In summary, the direct socio-economic benefits from the estuary are currently very limited to recreational use of the area by residents and visitors to Alexander Bay and Oranjemund, who use the area for passive recreation (walking, camping, picnicking) and recreational angling. Biophysical changes to the estuary have almost certainly had some impact on use, but in the greater scheme of things this will have been negligible. However, in future, with the downscaling in mining activity and reduction in commercial fish catches, it is expected that emphasis will shift towards ecotourism as the major economic activity in the region. In line with this the Namibian portion of the Ramsar site has been included in the recently established Sperrgebiet National Park in Namibia while plans are also in an advanced stage to have the South African section of the site formally protected. A corresponding growth in the importance and use can thus also be expected.

1.5 Values of the Orange River Mouth Ramsar Site

The values of a place are those remarkable attributes that exemplify it and are largely the reason that it has been proclaimed as a Ramsar site. From a Ramsar perspective, the following criteria were fulfilled upon designation[4]:

- It is an example of a specific type of wetland, rare or unusual in the appropriate biogeographical region.
- It supports an appreciable assemblage of rare, vulnerable or endangered species or subspecies of plant and animal, or an appreciable number of any one or more of these species.
- It regularly supports substantial numbers of individuals from particular groups of waterfowl, indicative of wetland values, productivity or diversity.
- It regularly supports 1% or more of the individuals in a population of one species or subspecies of waterfowl.

Further details of the specific values that are important at the site are summarised in Table 1, below. These values are important in planning and management, as they represent the ecological aspects of the Ramsar site that must be protected[5].

[3] Although the land based operations are scaling down, NAMDEB has applied for extension of licenses till 2050. The current strategic business plan makes provision for mining until 2020/ 2023 when the current licenses expire. The future strategic focus areas include the diamond resources located in the marine environment. Mining of these resources will ensure the mining stretches to 2050 and beyond (NAMDEB, pers. comm.).

[4] Despite the sites listing on the Montreux Record, a re-evaluation of the Orange River estuary in terms of the new Ramsar criteria, concluded that the Ramsar site still meets several of the criteria for which it was originally established and at least one new criterion (Anderson in Van Niekerk et al 2008).

[5] For further details on the key values and services provided by the Ramsar site, readers are encouraged to read the situational assessment (CSIR, 2011) which contains further information.

Table 1. Key values associated with the Orange River Mouth Ramsar site.

Value	Description
Conservation importance	The Orange River Mouth is regarded as the 2nd most important estuary in South Africa in terms of conservation importance after the Knysna Estuary. In Namibia it represents one of four globally important coastal wetlands (the others being Walvis Bay lagoon, Sandwich Harbour and the Kunene River mouth[6]).
Representivity	It is an example of a rare and unusual wetland type on the arid and semi-arid coastline of western southern Africa.
Migration corridor and breeding ground for birds	The site provides a sizeable area of sheltered shallow water used either for breeding purposes or as a stopover on migration routes. It is regarded as one of the most important coastal wetlands in southern Africa in terms of the number of birds supported, at times supporting more than 20,000 waterbirds (of 50-57 species), and is consequentially also recognized as an Important Bird Area[7].
Support of threatened species	It supports an appreciable assemblage of threatened bird species.
Supporting appreciable populations of particular species of waterfowl	The Orange River Mouth supports more than 1% of the world population of three species of waterbirds that are endemic to southern Africa, namely the Cape Cormorant, Hartlaub's Gull and Damara Tern, and more than 1% of the southern African populations of six species of waterbirds, namely the Black-necked Grebe, Lesser Flamingo, Chestnut-banded Plover, Curlew Sandpiper, Swift Tern and Caspian Tern.
Provision of fish nursery habitat	The estuary supports a high diversity and abundance of estuarine dependant and marine fish species and being one of very few estuaries along this coastline is believed to provide an important role in linking fish populations among Angola, Namibia and South Africa.
Grazing area for game and livestock	While not as significant as the values referred to above, the flood plain provides important source of grazing for both domestic and wild stock in an extremely arid environment.
Eco-cultural tourism values	The Orange River Estuary offers valuable tourism opportunities for communities in the area that can contribute to the long-term economic viability of the region.
Fisheries values	The Orange River Mouth is regarded as making an important contribution towards fisheries on the west coast. Current use within the estuary comprises recreational shore-angling and limited recreational boat fishing.

1.6 Management planning framework

The development and implementation of this Estuarine Management Plan (EMP) is governed by the section 34 of the National Environmental Management: Integrated Coastal Management Act (Act No. 24 of 2008) ("ICM Act") together with the National Estuarine Management Protocol ("the Protocol"). The Protocol states that where an estuary crosses a state boundary, the Department in collaboration with the responsible authority of the affected state/s must develop the EMP in consultation with relevant government departments of the affected states. Also, section 34 (1) (b) (i & ii) states that the EMP must be consistent with the Protocol and National Coastal Management Programme (NCMP). This EMP has taken into consideration all the requirements of the ICM Act and the Protocol. In terms of the NCMP requirements, the Department must develop EMPs for estuaries assigned to national government. The Orange River Mouth estuary is one of the estuaries assigned to the Department for EMP development. It also considered the requirements of the Ramsar Convention on Wetlands to ensure coordinated and effective management of this ecosystem. During the implementation of this plan, it is also required in terms of section 34(1) (d) that the responsible management authority must submit an annual report to the Minister on the implementation of the estuarine management plan.

[6] Walvis Bay and Sandwich Harbour are both Ramsar sites while the Kunene River is an IBA (Rod Braby, *pers. comm.*)

[7] IBAs are places of international significance for the conservation of birds at the global, regional (continental) and sub-regional (southern African) level.

Chapter 6, Part 5 of the ICM Act outlines the process of consultation and public participation, this EMP must undergo.

The development of this EMP followed a three-step process that involves a scoping phase (Situation Assessment Report), objecting setting phase and the development of the implementation phase.

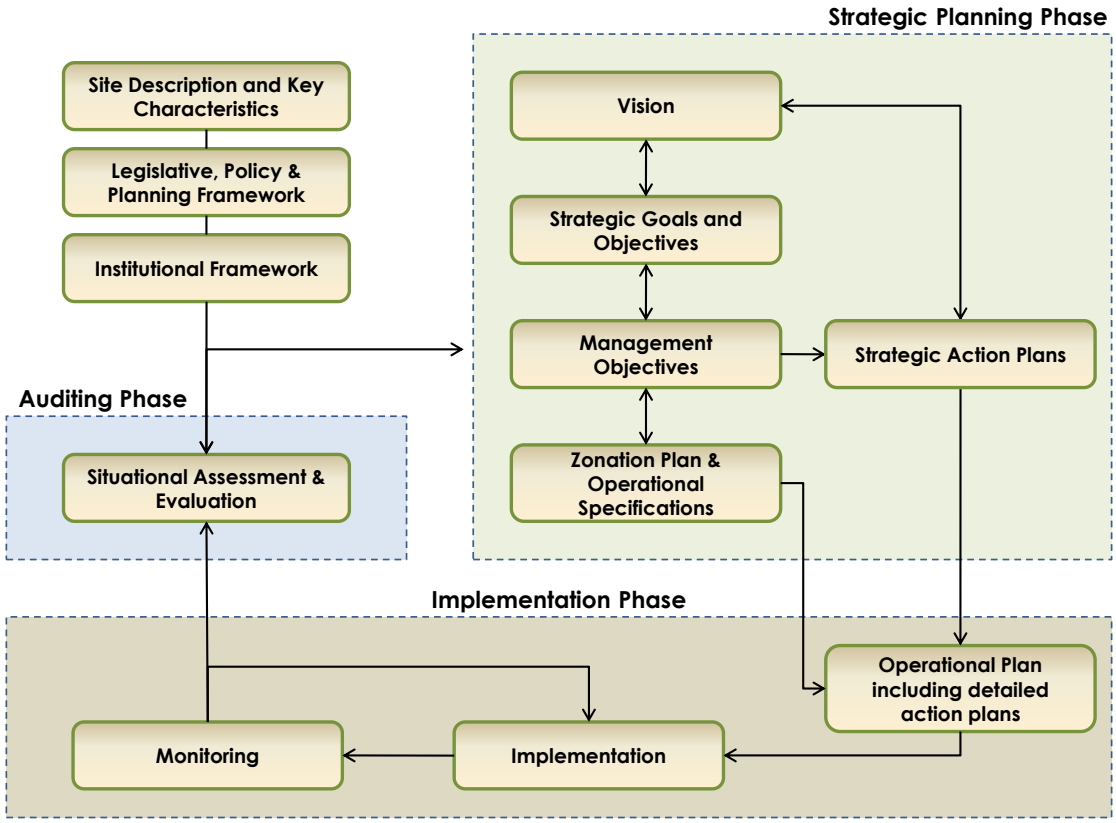

Figure 3 Framework for the development and implementation of the management plan.

The auditing phase involves the compilation of existing information about the site and includes a detailed description of the site based on existing information. This also involves an evaluation aimed at identifying threats and issues that needed to be addressed as part of the management planning process[8].

The strategic planning phase builds on the information gathered during the situational assessment. The initial focus is to collaboratively develop a vision for the future management of the site with stakeholders. Once a vision has been established, this is unpacked through the development of strategic goals and objectives. Management objectives are then developed to address key issues raised during the situational assessment with supporting strategic action plans. Zonation plans and operational specifications are also developed as far as possible to further inform management and monitoring. This information is packaged in the form of a strategic management plan for the site aimed at providing a sound foundation for the protection, development and management of the Ramsar site over the next five years.

[8] This assessment was initiated early in 2011 and is captured as a separate document (CSIR, 2011a). Additional input from stakeholders was subsequently obtained during stakeholder meetings held in South Africa in August and November 2011. These issues were then reviewed by key Namibian stakeholders on 20th September 2012 and refined through subsequent interactions including another workshop held on 21st February 2013.

Once the strategic planning phase has been completed this then feeds into the implementation phase. Here, operational plans (annual plan of operation) are developed by relevant role players together with more detailed action plans and associated budgets. Once approved, these plans are then implemented and outcomes monitored accordingly.

1.7 Purpose of this plan

This strategic management plan is intended to be high-level, strategic five year document that provides the direction for the management of the Orange River Mouth Ramsar site. The purpose of the strategic management plan is to:

- Facilitate cooperative management of the Ramsar site amongst stakeholders through the development of a shared vision and strategic objectives for the future management of the site.
- Provide for the formal establishment of a governance structure that will oversee the implementation of the plan.
- Provide the primary strategic tool for management of the Orange River Ramsar site, informing the need for specific programmes and operational procedures.
- Enable stakeholders to manage and use the Orange River Mouth Ramsar Site in such a way that its values and the purpose for which it was declared are protected.
- Provide a basis for integrating site management into broad-scale landscape and ecosystem planning.
- Provide motivations for budgets and future funding and providing indicators that available funds are spent correctly.
- Build accountability into the management of the Orange River Mouth Ramsar Site.
- Provide for capacity building, future thinking and continuity of management.

Integration with other planning initiatives

Note: The Strategic Management Plan for the Orange River Mouth Ramsar Site is NOT an isolated plan! To be effective and sustainable the Management Plan must be embedded in overarching international, national, regional and local plans. At the international level, this requires close interaction with existing institutional structures and plans. This includes the Orange River Integrated Water Resources Management Plan of the Orange-Senqu River Commission (ORASECOM) and the Lower Orange River TFCA. At the regional level, this plan needs to be integrated into and aligned with conservation and land-use planning such as regional Land Use Management Plans in South Africa and the Sperrgebiet National Park Management Plan in Namibia. At the local level the Orange River Mouth Ramsar Site Management Plan must be embedded in the district and local level municipal spatial and economic planning. Ensuring strategic alignment of these plans will be critical in ensuring the effective management of the Orange River Mouth Ramsar site.

1.8 Planning approach

The preparation and successful implementation of this strategic management plan must be based on an adaptive management approach. This involves a structured, iterative process in which decisions are made using the best available information, with the aim of obtaining better information through monitoring of performance (Figure 4). In this way, decision making is aimed at achieving the best outcome, whilst accruing the information needed to improve future management. Adaptive management can lead to the revision of a part or if necessary the whole management plan. Indeed, active review and refinement of the plan is encouraged as long as updates are clearly identifiable and communicated to relevant stakeholders.

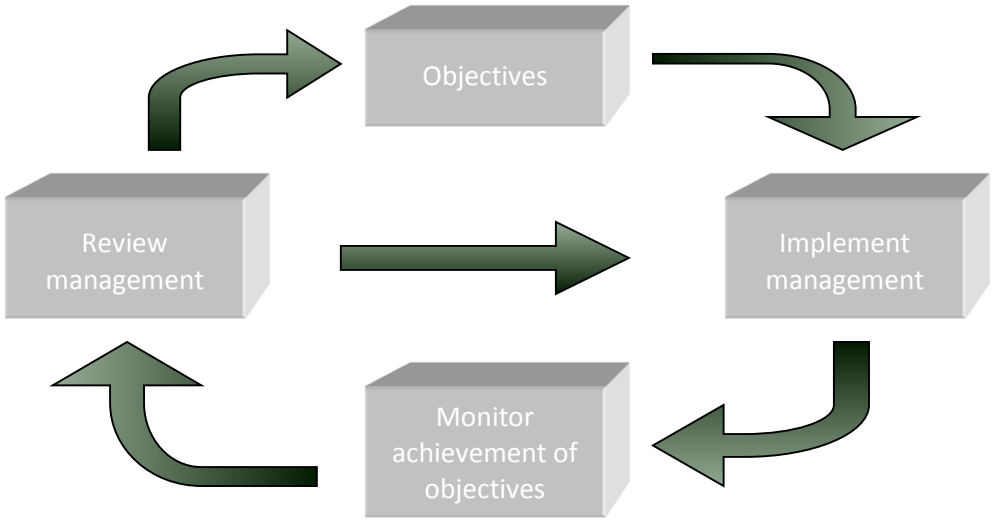

Figure 4 The adaptive management cycle.

Adaptive management enables those responsible for managing the site to:

- Learn through experience;
- Take account of, and respond to, changing factors that affect the Ramsar site;
- Continually develop or refine management processes;
- Demonstrate that management is appropriate and effective.

This strategic management plan, including all its supporting documentation, should therefore be viewed as a "living" document to which stakeholders are continuously contributing and refining through implementation.

CHAPTER 2: EXECUTIVE SUMMARY OF THE SITUATION ASSESSMENT REPORT

The situational assessment undertaken sets a backdrop for management planning within the Orange River Mouth Ramsar Site (CSIR, 2011a). A key focus of this assessment was the identification of issues and challenges that require management attention and the provision of preliminary recommendations for integration into the management plan. Following further consultation, additional issues have been raised that also need to be addressed in the management plan. The key issues identified have been packaged into the following three thematic areas:

- *Institutional: "establishing institutions and management tools to secure better management"*
- *Ecological: "protecting natural value";*
- *Socio-economic: "Integrated and empowered community";*
  "Fair standard of living for all"; and
  "Sharing values".

A brief description of the issues (including threats and challenges) identified are outlined below. Key issues have then been highlighted in accompanying text boxes and formed the starting point for developing supporting management objectives and action plans.

2.1 Institutional Aspects

2.1.1 *Boundaries of site*

In managing a site of this nature, it is important that the site boundaries adequately incorporate important wetland and estuarine features and that such boundaries are clearly established and communicated between relevant parties. In the case of the Orange River Mouth Ramsar site, it is clear that a number of important sections of the Orange River, floodplain and mouth have not been incorporated into the Namibian side of the Ramsar site (Figure 5). This is a concern, given that management of such areas (together with an appropriate buffer zone) should be addressed as part of the management plan. This also has implications for zoning and management of the adjoining Oranjemund town lands that extend up to the Ramsar boundary (See Section 2.2.8).

There are also substantial differences between the Ramsar boundaries as defined by each country (Figure 5). Details regarding the extent of the estuary have also been refined following designation of the site. Research now suggest that the head of tidal influence extends approximately 3km above the Sir Ernest Oppenheimer bridge, therefore extending beyond the existing boundaries of the Ramsar site (CSIR, 2011a). New legislation in South Africa now defines the lateral boundaries of an estuary based on the 5m a.m.s.l. contour, suggesting that it would be preferable to extend the boundaries of the Ramsar site accordingly. This consideration has been incorporated into the proposed boundary of the protected area on the South African Side which also extends upstream to include close to 25km of riparian habitat (Figure 5). The Ministry of Environment and Tourism in Namibia have also previously expressed a desire to expand the Ramsar boundary to include Pink Pan and to extend further up the River. No formal action has been taken however due to the proclamation of Oranjemund town and demarcation of town boundaries (Kenneth Uiseb, *pers.comm.*).

Given existing differences in Ramsar boundaries, the desire to extend the Ramsar site on the Namibian side and the need to align this management plan with the proposed management plan for the protected area on the South African side, there is a clear need to collaboratively review and refine the boundary of the Ramsar site.

Access control is another issue of concern that will need to be addressed. This is of particular concern on the South African side where the lack of fencing or formal access control affects the ability to monitor and control access to the site. Access to the Namibian section of the site is currently controlled by NAMDEB, with a limited number of visitors. This is set to change however with the declaration of Oranjemund as a town which could place greater pressure on the Ramsar site. At present, there is no signage or demarcations to indicate the boundary of the Ramsar site / Sperrgebiet National Park. There is also no signage or guidelines outlining any access or use restrictions that may be applicable in various areas.

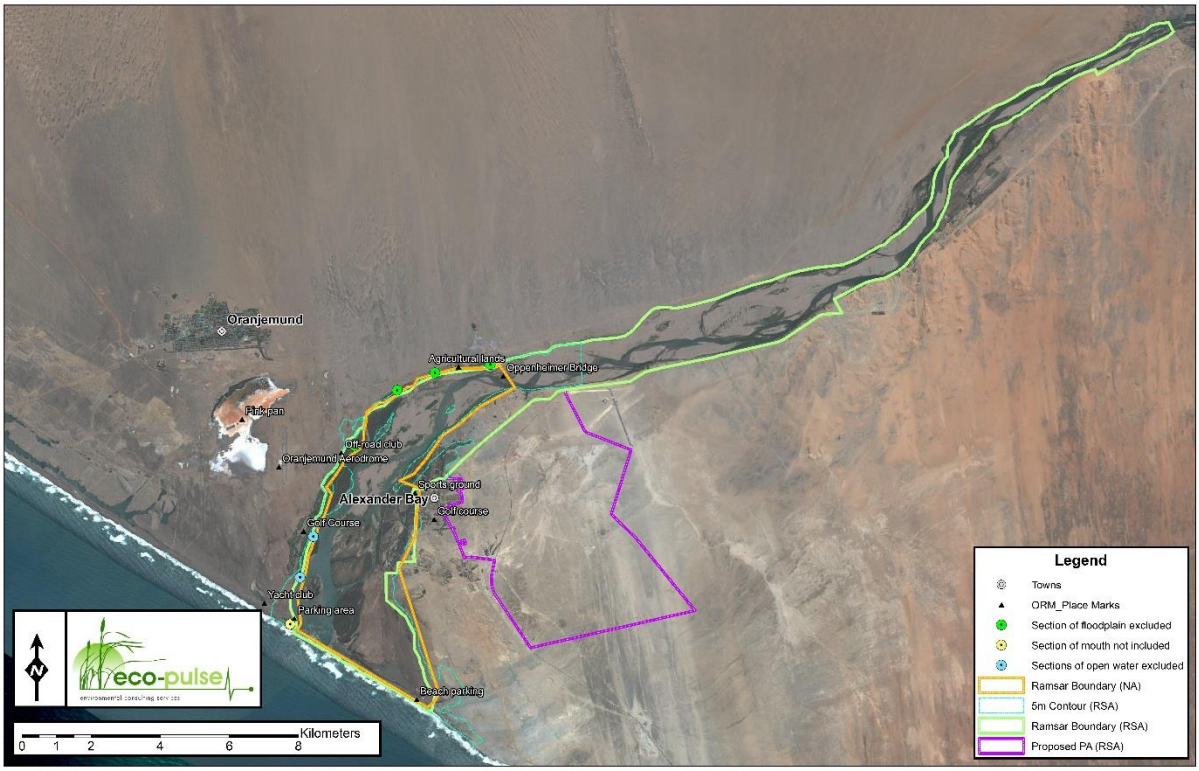

Figure 5 Map indicating existing boundary demarcations and areas where the boundary does not incorporate important features.

Key issues:

- The boundary of the Ramsar site is inconsistent, does not adequately incorporate important estuary and floodplain features and is poorly aligned with protected area boundaries.
- Access to the site is not adequately monitored and controlled.

2.1.2 *Ownership and protection status*

The establishment of formal protected areas on wetlands has been flagged as a priority by Ramsar (Ramsar, 2008). This issue has received considerable attention by the contracting parties with the Namibian portion now formally protected while plans to formally proclaim the South African section are at an advanced stage.

The South African Section of the Ramsar was previously owned and managed by Alexkor who have managed the Ramsar site on an ad hoc basis for many years. Following a land claim by the Richtersveld community the community was reinstated with the right to ownership of the land on the South African section of the Ramsar site. In collaboration with the Northern Cape Department of Environment and Nature Conservation (DENC), a proposal has been put forward to have the Ramsar site and adjoining areas declared as a Nature Reserve. Formal acceptance of this proposal and proclamation is still pending but is likely to pave the way for more effective management of the site.

The wetland on the Namibian side of the Ramsar site forms part of a large protected area— Sperrgebiet National Park excluding only the town lands of Oranjemund transferred to the Namibian government after

restoration to its original condition (MET, 2006). The Ministry of Environment and Tourism (MET) are therefore now formally responsible for the management of the Namibian section of the Ramsar site[9].

Key issues:

- Formal protection of the South African side of the Ramsar site is required to better secure management of the area.

2.1.3 *Availability of staff and funding to effectively manage the site*

A key constraint to effective management of the Ramsar site is availability of staff and funding to implement the management plan. The Namibian section of the Ramsar site falls within the Sperrgebiet National Park, with an associated management structure and budgets to manage the area. While structures are in place, availability of staff and resources are currently limited which is a challenge to current management of the area.

While some management actions have been implemented on the South African side through partnerships such as the Working for Water and Working for Wetlands Programmes, there is currently no formal staff structure or budget available for managing the South African section of the Ramsar site. This will change if formal proclamation of the site as a protected area goes ahead as the provincial conservation agency (DENC) will then allocate the necessary staff and budget to manage the site. An interim strategy is however required to ensure that the momentum gained through the management planning process is not lost.

Key issues:

- There are insufficient resources and capacity to coordinate and implement effective management of the Ramsar site.

2.1.4 *Evaluating management performance and revision of the plan*

Regular review of management activities and progress made towards the implementation of the management plan is essential for adaptive management (See Section 1.9.1). A system of review therefore needs to be implemented that allows stakeholders to obtain feedback on management activities and to influence future planning activities (See Section 8.1).

Key issues:

- There is a need to ensure regular review of management activities and revision of management planning.

2.1.5 *Institutional structures to oversee management of the Ramsar site*

Local and international experience indicates that the most fundamental pitfall in achieving sustainable use and biodiversity protection in estuaries is the fragmentation of the responsibility of management among the different national, provincial and local-government agencies (CSIR, 2003). This has certainly been a stumbling

[9] Note though that if the Ramsar boundary is modified, sections of the site may intersect with areas under the management of Oranjemund.

block in the case of the Orange River Mouth despite historic efforts to address some of the management challenges at the site.

At present, the most important cooperative institution in this case is the Orange River Mouth Interim Management Committee (ORMIMC). As the name indicates it was supposed to be an interim committee, but has been attending to matters at the ORMW since early 1995. The Committee typically meets twice a year serves as an advisory body to the respective competent authorities. At this stage, the Committee has no formal legal basis, although it is frequently mentioned in policy documents, such as the South African National Environmental Management and Implementation Plan (Verschuuren, 2007). All stakeholders involved in the area are invited to attend Committee meetings —i.e., various divisions of the Namibian Ministry of Environment and Tourism, the Namibian Ministry of Agriculture, Water and Forestry, the Namibian Ministry of Fisheries and Marine Resources, various divisions of the South African Department of Environmental Affairs and Tourism, the South African Department of Water Affairs, the Northern Cape Provincial Department of Nature Conservation, the Alexkor and NAMDEB mining companies, the Richtersveld community, the Richtersveld municipality, the South African Coastal Working Group NGO, the South African National Biodiversity Institute's Working for Wetlands Programme, and estuarine researchers of South Africa's University of Port Elizabeth. It is however clear that despite generally good attendance from the South African side, support from Namibian delegates has been waning while representation from local government and local communities has been largely absent. This is a real concern given the trans-boundary nature of the Ramsar site and that ownership of the South African section of the Ramsar site now resides with the local community.

With the Namibian side of the Ramsar site now included within the Sperrgebiet National Park, future management of this area will be undertaken by the Namibian Ministry of Environment and Tourism (MET) and their associated management committee. A proposal has also been tabled for the Northern Cape Provincial Department of Environment and Nature Conservation (DENC) to establish a management committee on the South African side once the site receives formal protection status. This would be complemented by an Orange River Mouth Nature Reserve Advisory Committee (including community representatives) responsible for inputs into development aspects of the proposed reserve and impacts on the surrounding region. A similar liaison forum is required to ensure that key Namibian stakeholders such as the local Oranjemund Municipality are appropriately consulted to promote cooperative management of the site.

While such institutions could provide a useful basis for management, they would not provide the appropriate framework for trans-boundary collaboration. This is particularly important given that there is a specific provision in the Ramsar Convention stating that for trans-boundary wetlands, parties must consult with one another about implementing obligations arising out of the agreement (Ramsar, 2010a). As such, there is still a need for a mechanism for trans-boundary collaboration and feedback to ensure cooperation and alignment w.r.t. the management of the Ramsar site. Following discussions with stakeholders, it was suggested that the ORMIMC be retained until such time as alternative institutional arrangements are established on the South African side and to support broader collaboration and stakeholder input. Namibian delegates have however expressed concerns with the location of meetings (typically in South Africa) and the fact that the committee has no formal legal standing. There is also a lack of involvement by high level officials that hampers decision making at the local level. Existing institutional arrangements therefore need to be refined to make way for more effective engagement and collaboration in future.

In this respect, suggestions have been made that the existing twinning agreement between the Northern Cape Government and the Karas Region, signed in 1999 may be a useful vehicle to promote collaborative management. The purpose of the agreement was to promote and strengthen cooperation between the province and South Africa and the Karas region of Namibia. In 2006, provincial government and the Karas

regional council agreed on specific areas of cooperation which included aspects relating to tourism and conservation (Northern Cape Provincial Government, 2006). Interestingly, this included the development of a joint management strategy for the Orange River mouth. While challenges with implementation have hampered progress being made however, this still provides a potential vehicle to facilitate further cooperative governance.

Key issues:

- Although the ORMIMC has been established there is a need to improve and formalise trans-boundary collaboration.
- Appropriate institutional arrangements are required to facilitate active involvement of local stakeholders in decision making.

2.1.6 *Institutional arrangements to ensure integration into river basin management*

Recognizing the fact that wetlands usually are only a part of a bigger catchment area and, for their conservation, largely dependent on the quality of the entire catchment area there has been a strong push by Ramsar to ensure that wetland management is integrated into river basin management. To achieve this integration, the Ramsar Convention Bureau and the Secretariat of the Convention on Biodiversity have joined hands in a River Basin Initiative. In 2005, the 9th COP adopted a resolution that laid down practical guidelines for the integration of wetland management into river basin management. The guidelines focus upon: (1) improving the communication between the wetland management sector and the water management sector; (2) improving the cooperation between the water sector and the wetlands sector through cooperative governance, for instance, by formally harmonizing policy and legislation or by other, less far-reaching forms of cross-sectoral cooperation; and (3) upgrading wetlands management to the river basin level (Ramsar, 2010b).

In the case of the ORM, the following structures are already in place:

- Permanent Water Commission (PWC), to act as a technical advisor for the competent authorities in both countries on transfrontier water-related issues.
- Vioolsdrift and Noordoewer Joint Irrigation Authority to administer a joint irrigation scheme. This scheme allows both countries to divert water from the Orange River for irrigation purposes.
- A multilateral agreement on the management of a transboundary river basin in southern Africa is the 2000 treaty through which all Orange River riparian states (Botswana, Lesotho, Namibia, and South Africa) established the Orange-Senqu River Commission (ORASECOM). The Council of this Commission serves as a technical advisor to the authorities of the states involved on matters relating to the development, utilization, and conservation of the water resources of the river system.

The importance of developing a common understanding of how the freshwater Orange River system and marine Benguela Current interact and influence each other has also been recognized. This has prompted further cooperation between two United Nations Development Programme–Global Environment Fund (UNDP-GEF) projects on environmental concerns – the Orange-Senqu Strategic Action Programme supporting ORASECOM and the Benguela Current Large Marine Ecosystem Strategic Action Programme Implementation Project supporting the BCC.

In order to ensure that the management objectives for the Orange River Mouth Ramsar site (and associated marine ecosystem are supported and not undermined due to decisions taken in the catchment area, it is essential that a solid, communicative, and open relationship is maintained with these organizations.

Key issues:

- There is a potential for management objectives to be undermined if not clearly communicated to and supported by institutions responsible for management of the Orange River basin.

2.1.7 *Linkages with existing Transfrontier Conservation Area initiatives*

The establishment of Transfrontier Conservation Areas (TFCA's) is currently being implemented across the southern African region as a major dynamic conservation initiative. This initiative, which constitutes some of the most ambitious conservation projects in the world today, has been hailed as a step in the right direction for Africa's eco-tourism development. These projects aim to establish large conservation areas through the integration of public and private conservation initiatives and also through the development of cross-border tourism linkages, ensuring sustainable benefits to local communities through socio-economic upliftment and the promotion of peace and stability in the region.

The establishment of TFCA's is an exemplary process of partnerships between governments, NGOs, communities and the private sector. While the main players are the relevant governments and implementing agencies, donors and NGOs also greatly contribute towards these initiatives. TFCA's in South Africa are facilitated by the Department of Environmental Affairs (DEA) and MET in Namibia.

In a 2002 inventory on potential TFCA's in the SADC region, two areas along the Lower Orange River (LOR) were identified, namely the /Ai-/Ais-Richtersveld option and that of the Trans-Gariep region near Onseepkans. The former option, in being supported by existing protected areas, has triggered TFCA action and on 1 August 2003 the Heads of State of the two partner countries (South Africa and Namibia) signed a Treaty to form a TFCA. The /Ai-/Ais-Richtersveld Transfrontier Park (ARTP) was established and a Joint Management Board (JMB) consisting of representatives from Namibia and South Africa constituted (Marsh *et al*., 2009).

In addition to the existing TFCA, a Lower Orange River TFCA (LORTFCA) has been proposed that covers the transboundary region from the north of the Sperrgebiet National Park in Namibia southwards to the town of Garies in South Africa, and then inland in the shape of a large triangle (Annexure 1) converging roughly at the Augrabies Falls National Park (AFNP) (ARTP Joint Management Board, 2009). While this is only a conceptual plan, the overarching objective of this initiative is to manage the contact zone between South Africa and Namibia and unlock the eco-tourism potential (Marsh *et al*., 2008). While this TFCA does not specifically include the ORM Ramsar site, proposed activities would serve to support conservation and tourism development in the area.

Here, it is worth noting that many of the institutions represented on the ARTP Joint Management Board are involved in other transboundary initiatives including water resource management, regional growth and development, wetland management and cultural conservation. As such the ARTP JMB is becoming a co-ordinating mechanism through which transfrontier aspects beyond the Transfrontier Park are being discussed (ARTP Joint Management Board, 2009). They are therefore well placed to support activities associated with management and future development opportunities associated with the Orange River Mouth Ramsar site.

Key issues:

- There is potential for greater collaboration with the LOR TFCA initiative to support management objectives.

2.1.8 *Addressing requirements necessary to remove the site from the Montreux Record*

The South African section of the Orange River Mouth Ramsar site (Site No.526) has remained on the Montreux Record since 1995. According to the Ramsar Convention, The Contracting Party in whose territory the site is located must take swift and effective action to prevent and/or remedy the ecological changes. The Scientific and Technical Review Panel (STRP), another institution under the Ramsar Convention, is available to advise the Contracting Party, through the Bureau, on the restoration of the degraded site. Within the STRP, an Expert Working Group on Wetland Restoration is available to provide information on wetland restoration (Ramsar, 2010a).

Actions identified in this management plan are largely designed to ensure that all practical measures are implemented to address impacts and in so doing remove the site from the Montreux record.
In order to motivate for the removal of the site from this list, some key indicators should be identified and monitored to track recovery of the system. This should at least include monitoring of the saltmarsh habitat and utilization of the area by waterbirds. Following successful rehabilitation of the area a motivation can be submitted to Ramsar to remove the site from the Montreux record.

Key issues:

- The South African section of the Ramsar site (Site No.526) is on the Montreux Record – actions are required to remedy the ecological changes of the estuary.

2.1.9 *Compliance with standing Ramsar obligations*

Apart from the general requirements to ensure sound management of the Ramsar site, there are also a number of standing obligations that need to be met by contracting parties which are best addressed by local management bodies. One of these obligations is to verify and where necessary update the information Sheets on Ramsar Wetlands every six years (i.e. every second meeting of the Conference) and to provide the secretariat with updated sheets if necessary. During the intervening period, urgent information on changes at listed sites should be conveyed to the Bureau using the existing mechanisms of regular, day to day contacts and the triennial National Reports (Ramsar, 2010). Close liaison with the relevant National Contact Points is therefore necessary to ensure that communication between Ramsar and the contracting parties is maintained.

Key issues:

- Current Ramsar information sheets need to be updated prior to the next conference of parties.
- Regular contact with the national Ramsar contact point(s) is required.

2.2 Ecological Aspects

The South African section of the Orange River Mouth Ramsar site was placed on the Montreux Record in 1995 following the collapse of the salt marsh habitat, a particularly important area for birds and fish recruitment. The present ecological state (PES) of the estuary was more formally assessed in 2003 using the Estuarine Health Index. This was done as part of the determination of the preliminary ecological reserve for the estuary at a rapid level (DWAF 2003) and indicated that the Orange River Estuary was in a largely modified state (as reflected by a D+ Ecological Category). When taking into account constraints associated with management and rehabilitation of the area, the Best Attainable State (BAS) for the estuary was recommended as an Ecological Category C (moderately modified), which could largely be achieved by mitigating modification related to the non-flow related activities (DWAF, 2003). Further details of threats and issues that need to be addressed in the management plan in order for the present state of the estuary to be improved in line with this recommendation are outlined in this section of the report.

2.2.1 *Flows reaching the Orange River Mouth and nearshore coastal environment*

The Orange River has become highly regulated by virtue of more than 20 major dams and numerous weirs within its catchment. As a consequence, river inflows to the Orange River Estuary have been markedly reduced from reference, with only an estimated 44% of natural flows still reaching the system (DWAF, 2003). Abstraction and regulation has also resulted in a marked reduction in the variability in river inflows from a pronounced seasonal flow to a nearly even flow distribution throughout the year. Surplus water releases for the generation of hydropower has resulted in the elimination of water deficits in the lower reaches of the river and the mouth now remains open almost permanently. The lack of mouth closure and associated back-flooding is regarded as particularly problematic as it is during such occurrences that flows into the saltmarsh area typically occur (CSIR, 2011a).

In summary:

- The occurrence and magnitude of large floods has been significantly reduced. Floods in the Orange system normally occur during the summer months.
- The occurrence and magnitude of smaller floods with return periods of 1:1 year to 1:10 years, also during the summer months, has been greatly reduced. This results in a considerable reduction in the occurrence of flooding of the salt marsh near the mouth during the summer months. Such floods would probably have lasted for periods of a few weeks at a time.
- The occurrence of periods of very low flow during the winter months, causing mouth closure and back-flooding in the past, has been significantly reduced, because of almost continuous releases from the dams. These releases are undertaken for the generation of electricity and for irrigation purposes.

This situation is likely to be exacerbated in future through increased demand for water by catchment users and through climate change. With respect to the latter, a recent climate modelling study concluded that a) the western half of South Africa could experience a 10% decrease in runoff by the year 2015 (including the middle Orange, the Nossob, the Fish and the lower Orange sub-basins); b) The year when a 10% decrease in runoff occurs, moves progressively later (to 2060) as one moves from the western to eastern halves of southern Africa; and c) 12 – 16% decrease in outflow could occur at the Orange-Senqu river mouth by 2050 (ORASECOM 2008).

Given the importance of this estuary and commitments to the Ramsar Convention, it is important that the ecological integrity of the mouth is maintained or improved through the determination, implementation and monitoring of Environmental Flow Requirements (EFRs). The need for better accuracy and precision of information to inform water management becomes even greater as the resource gets more limited. For EFRs to be implemented, more accurate gauging of how much water actually reaches the mouth is required. In response, South Africa and Namibia are busy establishing three new gauging stations in the Lower Orange River to accurately measure low flows. The new gauging stations will make it easier to ensure that the required amounts of water for supporting the environment in the Lower Orange River are left in the river (UNDP-GEF Orange-Senqu Strategic Action Programme, 2011).

Changes in the volumes and seasonality of freshwater reaching the nearshore coastal environment surrounding the estuary, along with inputs of nutrients, sediment and detritus, have most likely also influenced both abiotic (e.g. sediment transport, erosion and nutrient cycling) and biotic processes (e.g. recruitment) in this area (UNDP-GEF Orange-Senqu Strategic Action Programme, 2010). Further offshore, impacts associated with changes in river dynamics are probably restricted to deposition of sediment on the shelf which in turn may have affected abundance, distribution and recruitment success of some commercially important fish species and their prey to a limited extent. Based on the potential importance of these interactions, an assessment of the role of freshwater inflows and associated fluxes in the coastal and shelf marine ecosystems of the Orange River Mouth and the potential effects of changes in the freshwater-related fluxes into these ecosystems is strongly recommended (CSIR, 2011a).

A more detailed ecological reserve study aimed at specifically addressing flow requirements for the mouth and nearshore marine environment that takes into account the existing constraints is therefore required. A terms of reference was compiled by ORASECOM to initiate such a process, and is currently underway and should help to improve the case for improved catchment management (UNDP-GEF Orange-Senqu Strategic Action Programme, 2011). Such a study can then be used to also inform the development of more refined operational specifications through the determination of Resource Quality Objectives (RQOs). The process of setting RQOs seeks to balance the need to protect the water resource and use the water resource. The outcomes of the process are clear measurable ecological objectives against which management of the estuary can be assessed and managed. Once established, these provide the framework for monitoring and reporting (operational specifications) that could be incorporated into the management plan.

In the interim, there is still a need to influence decision-makers to amend the operating rules of dams, especially Vanderkloof, in order to simulate historical flow regimes, especially the sustained low winter flows required to close the mouth. A closer resemblance of future flow regimes at the estuary to historical patterns will result in the occasional flooding of the saltmarsh, opening and closing of the mouth and establishment of a larger area of mud-flats, all of which will result in additional feeding habitats for birds (CSIR, 2011a).

Another issue of potential concern are plans for further dam development and irrigation schemes in the catchment. These include new dams in Lesotho, the Neckertal Dam on the Fish River[10] and the Vioolsdrift Dam on the Lower Orange. It is essential that the cumulative effect of these dams is taken into account during the planning phase and that opportunities to design operating rules to improve the variability and timing of flows entering the Orange River estuary are investigated. Here, current feasibility planning of the Vioolsdrift Dam[11] is

[10] The Neckertal Dam on the Fish River is to be constructed near Keetmanshoop to provide irrigation water and facilitate social upliftment of local communities. Once completed, it will be the largest dam in Namibia.

[11] Note: In 2002, the PWC initiated the Lower Orange River Management Study (LORMS), a pre-feasibility study to improve the management of the Lower Orange River and to provide for future developments along the border between Namibia

particularly important as such a dam would be close enough to the estuary to manage flows in such a way that they have a positive benefit on the estuary.

Key issues:

- Insufficient information on flows in the lower Orange River and ecological flow requirements for the Orange River Mouth Estuary and nearshore marine environment.
- Existing operating rules of dams are not conducive to improved estuary conditions.
- Future dam developments in the catchment pose risk and opportunities for the Ramsar site.

2.2.2 *Water quality entering the estuary*

The status of the water quality in the lower Orange River is generally assessed to be moderately modified to strongly affected because of fragmentation and flow regulation. Although the general water quality of the lower Orange River is still fairly good, it is deteriorating but is still regarded as acceptable for agricultural, domestic, recreational, and industrial use. Major water quality related issues and concerns are summarised as blackfly outbreaks, increased loads of salts (salinity), and eutrophication (nutrient over-enrichment) (ARTP Joint Management Board, 2009).

In the long-term, increased pressures are expected from population increases and development in the Orange River catchment and will increase the pollution levels, which will probably necessitate additional measures and strategies to maintain acceptable water quality in the river. Although management of the Orange River is the responsibility of the two water affairs departments of Namibia and South Africa whose activities are co-ordinated through the Permanent Water Commission (PWC) and in the larger catchment that of the countries involved in ORASECOM, it is critical that the ORM institutional structures participate in these processes to ensure that the ecological integrity of the estuary as well as the objectives of this plan are considered and recognized.

Key issues:

- There is a need to assess and address the threat of further water quality deterioration.

2.2.3 *Management of the mouth*

Observed positions of the estuary mouth from 1937 to 1990, obtained from aerial photographs and topographical surveys indicate that the mouth can be located at the northern bank or the southern bank of the estuary (CSIR, 2011a). The location of the mouth is believed to have a major influence on the salinity of the water reaching the salt marsh on the south bank near the mouth. When the location of the mouth is at the southern position, considerable amounts of seawater enter the area at spring tides (CSIR, 2011a).

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and South Africa. The LORMS study recommended as one of the main measures for improved availability of water resources in the Lower Orange River that a large dam be constructed at Vioolsdrift. Such a dam would first be a re-regulating structure that would minimize and optimize the required releases from the large storage dams upstream, in order to meet the Environmental Flow Requirements (EFRs) of the Orange River mouth and to make additional water available in the joint border area. The same dam might also be the larger storage facility required to catch and make available the water from the floods from upstream releases and from runoff in the lower catchment. Terms of Reference for the feasibility study of the Vioolsdrift Dam were finalised in May 2011 and includes requirements for determining EFR

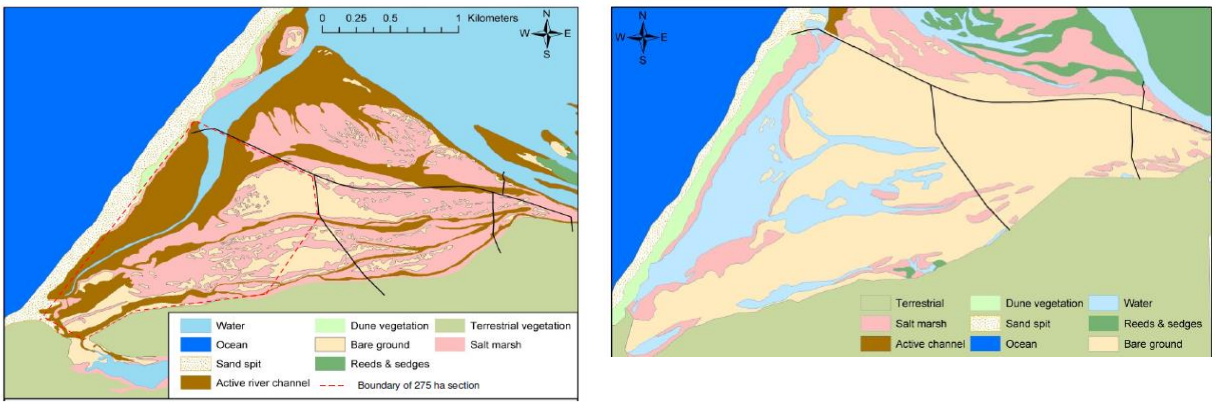
The location of the mouth has been strongly influenced by the position where the mouth was breached (artificially or natural). Artificial breachings were alternatively undertaken on the north and south sides of the river by NAMDEB and Alexkor respectively. Mouth opening was undertaken using dredgers to cut through the sand berm and began soon after the mine opened and continued until 1968 when higher base flows maintained by the Vanderkloof Dam reduced the frequency of mouth closures. The opening was done mainly to reduce the impacts of floods and to maintain the quality of the water supplied to the towns and mines from the groundwater in the alluvial aquifer beneath the floodplain. Ongoing manipulation of the frontal dunes takes place to maintain access for fishing and to prevent mouth movement. These activities have contributed to reducing the extent and duration of flooding of the salt marsh, an important process to provide water to, and as a means to decrease high salinities in the salt marsh regions. Indeed, mouth closure may be the only mechanism for inundating the elevated saltmarsh areas in the Orange River Estuary in future due to the reduction in major flood events (Van Niekerk *et al.* 2003, Van Niekerk *et al.* 2008). Preliminary guidelines for managing the mouth have been compiled and should be reviewed and refined to inform future management (See Annexure 2).

Key issues:

- Careful management of the mouth is necessary to facilitate recovery of the saltmarsh habitat and to optimise fish nursery functions.

2.2.4 *Dykes and road infrastructure development in and around the estuary*

The first dykes were constructed in 1974 to protect Alexkor agricultural land from flooding. The dykes cut off two flood channels that used to extend southwards into the salt marsh (CSIR, 1991) thus reducing flood flow to the salt marsh. At present sewage oxidation ponds exist within these non-operational channels. An extension of the dyke along the southern river bank towards the mouth mainly served to provide vehicular access to the beach. This section of dyke is elevated to approximately 3 m + MSL, i.e. about 1.5 m above the adjacent salt marsh (CSIR, 1991). These measures initially cut off major flood and tidal channels from the river. These alterations to the estuary (indicated in black lines in the figure below) are believed to be one of the primary reasons for the collapse of the saltmarsh habitat on the South African section of the Ramsar site as illustrated in Figures 6a and 6b (Bornman *et al*., 2005).



volumes and other flow characteristics and determining to what extent these can be met through outlet works (Guido van Langenhove [*pers.comm*].

Figure 6a. Vegetation cover of the Orange River Mouth Floodplain in 1938.

Figure 6b. Vegetation cover of the Orange River Mouth floodplain in 1997.

This situation was improved marginally in June 1995, when a channel through the causeway was opened near the mouth. Despite this, flow to the salt marsh is still restricted, preventing the wetland from being periodically flushed by fresh water from the Orange River during times of flood and by backflooding during winter months when the natural closure of the mouth would allow for fresh water to flood the wetland.

This periodic flushing of the wetland by fresh water is necessary in order to leach salt from the soil which builds up over time as result of high tides and heavy seas pushing salt water into the wetland. This restriction has probably contributed to the significant die-back of marsh vegetation. The causeway prevented any such flushing taking place, to the extent that the salinity of the soil increased to such a degree that the salt marsh had all but disappeared on the southern side of the causeway (Eco-Africa, 2006).

In response to the need to address these impacts, a Working for Wetlands project was initiated in 2005. The project was designed in two phases. Interventions designed as part of the initial phase of the project were designed to improve the flow of water into the wetland during backflooding (induced or natural) and then back out again, allowing it to take salts with it, rather than stagnating and re-depositing them in the wetland (Eco-Africa, 2006). This included the planned excavation of four breaches in the causeway to allow for water to flow/drain through it at strategic points. The next phase of the project entailed the creation of additional breaches and canals to further improve the flow of water into, and the drainage of water out of the wetland. The objective being to ensure that by the time artificial control over flooding/backflooding does take place, the necessary breaches and channels are in place to ensure the desired effects are achieved (Eco-Africa, 2006). While much of the work was carried out, the two uppermost breaches were not made due to the need to first rehabilitate the oxidation ponds currently being used by Alexkor. Subsequent to rehabilitation activities, many of the trenches have become filled with windblown dust. While the existing planning documents produced provide a sound basis from which to inform further rehabilitation planning (See text box for latest recommendations), this needs to be reviewed in the light of learnings from previous rehabilitation and activities. The option of using machinery for excavating the main breaches should also be considered as this is a much more cost-effective option than manual labour. This needs to be balanced with the need for employment opportunities for local communities.

Another aspect that will also need to be considered is the potential implications of increased flooding on infrastructure (e.g. sports field) and land uses around Alexander Bay town. These aspects will need to be adequately scoped prior to breaching of the upper sections of the causeway.

Dykes were also constructed by NAMDEB on the north bank in 1974 and reinforced in 1988 (CSIR, 1991), to protect the golf course from flooding. The effects of these dykes are regarded as less significant as flows are not cut off to any significant wetland habitat.

Key issues:

- The causeway and other infrastructure need to be removed / breached to facilitate recovery of the degraded saltmarsh area.

Preliminary recommendations for addressing impacts of existing impacts (CSIR, 2011)

Preliminary recommendations are to remove reaming remnants of the causeway and enlarge and deepen the existing breach in the causeway close to the mouth. During spring high tide, large volumes of water are forced through the breach. Outflow takes place more slowly through the restricted opening, causing pooling of water on the floodplain. Deposition of fine sediment in the channel restricts neap tidal flow and results in pools of water on the floodplain. The causeway could also be breached east of the existing breach (at the old water level recorder) to facilitate drainage of the floodplain.

Culverts were installed in the causeway approximately 700 m to the east of the first breach (Figure 7). These culverts need to be removed and the breach enlarged and deepened. Care should be taken not to destroy the intact salt marsh north of the causeway, as this area will function as an important source of seed material to the desertified floodplain through the breach.

The existing breach in the northeast should also be enlarged and deepened. A channel should be excavated from this breach to past the causeway (south-north orientated) connecting the gravel road to the main causeway. Care must be taken that this channel follows the course of the old river channels. It might be possible to breach the causeway to the west of the existing breach and also excavate a channel to one of the old channels. This will connect the northeast section to the salt marsh lagoon in the southwest and will provide relatively freshwater to the floodplain. It is important that the breaches close to the mouth be large enough that this additional water can flow out and not accumulate on the floodplain.

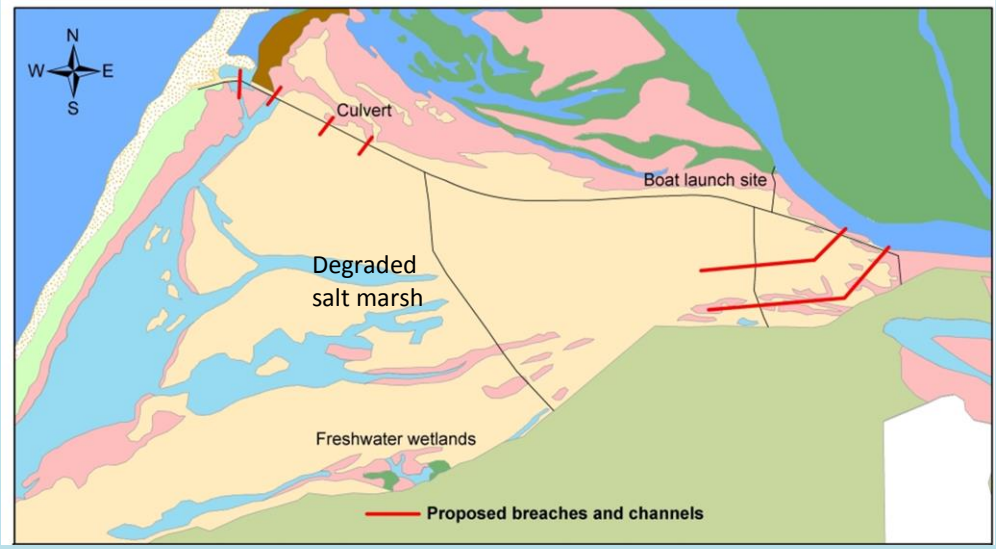


Figure 7. Suggested locations to breach the causeway and excavate channels (Bornman *et al.*, 2005).

2.2.5 *Mining operations impacting on the wetland area*

Apart from road infrastructure discussed above, a number of other mining-related impacts have negatively impacted on the ecological integrity of the Ramsar site. Within the site itself, sewage oxidation ponds were constructed to help treat wastewater from Alexander Bay. This was done using existing channels of the Orange River and isolating them from the surrounding region by means of dykes.

Construction of a new wastewater works (currently pending environmental authorization) will replace the need for these ponds, paving the way for breaching of the upper sections of the causeway. As part of the EIA for the

new waste water works, the following mitigation measures were proposed and will need to be adhered to when rehabilitating the existing oxidation ponds (Doug Jeffery Environmental Consultants, 2011):

- The existing oxidation ponds need to be dried;
- The excess dried sludge needs to be stabilised with lime;
- The treated sludge will be used to rehabilitate old mine heaps and mined areas, in line with DWA's Guidelines for the permissible use of sewerage sludge;
- The wall of the pond that acts as an overflow for the oxidation ponds must be removed as well as the tyres on the wall;
- The oxidation ponds must be flattened using embankment material and spoil from excavations of the new oxidation pond system.

Alexkor have also constructed a number of slimes dams to the south of the salt marsh. Fine material (from these slimes dams and overburden removal in the region) is transported by wind into the salt marsh. Saline seepage water from the HMS Plant was also historically discharged into the peripheral salt marsh (resulting in hypersalinity). The excess of fine material and influences on salinity have contributed to the die-back of marsh vegetation. Management of these impacts is therefore important if successful rehabilitation of the salt marsh is to take place. Preliminary recommendations include planting of vegetation around the perimeter of the desertified marsh to restrict influx of windblown dust and the placement of organic mulches (e.g. reed and sedge wracks) in barren areas. Further guidelines for rehabilitation are included in Alexkor's EMP (Alexkor, 2008) and should be applied to these areas. Alexkor's EMP also emphasizes the need to identify priority areas for rehabilitation to achieve objectives of the Land Use Plan. Given the importance of rehabilitation of the Ramsar site as part of the conservation and tourism strategy, prioritization of rehabilitation in areas currently impacting on the salt marsh is therefore required.

Key issues:

- Existing oxidation ponds need to be removed and rehabilitated prior to breaching of the upper section of the causeway.
- Windblown sediments from mining operations and seepage of saline water from slimes dams needs to be addressed to facilitate recovery of the degraded saltmarsh area.

2.2.6 *Research and monitoring*

This management plan has been developed based on current understanding of the functioning of the estuary and its associated values. There are gaps in this understanding, and there will be an ongoing need to improve understanding through research and monitoring.

Increasing use by visitors, surrounding development, changes in freshwater supply from the catchment, and climate and sea-level change can also impact on the health and ecological functioning of the estuary, as well as its value at different spatial scales. Monitoring and research is therefore essential to enable the respective agencies responsible for management of the Orange River Mouth to adapt management plans, operational plans and activities to changing circumstances.

Recommended protocols for monitoring the health of the Orange River Mouth are included in Chapter 8. These have based on the monitoring recommendations proposed by the CSIR (2003) following a rapid reserve determination process. These recommendations have been incorporated into the terms of reference for the

proposed environmental flows study which was initiated in 2012 (UNDP-GEF Orange-Senqu Strategic Action Programme, 2011). Apart from acquiring good baseline information, this will serve to highlight future monitoring requirements and establish baseline conditions from which "Ecological Specifications" and "Thresholds of Potential Concern" (TPC) can be refined.

Apart from the priority research and monitoring needs identified, it is also important to create a supportive environment to encourage visiting scientists to undertake research activities at the site. Such research should preferentially involve applied research to support priority information and management needs but may include basic or interest research identified by outside researchers.

Key issues:

- There is a need to promote scientific research and disseminate results to better understand the functioning of the estuary.
- Research and monitoring is required to improve baseline data and assess changes in the ecosystems responses to management activities.

2.2.7 *Fishing and boating*

Recreational angling is the dominant fishing method in the Orange River estuary, with approximately one tonne of line-fish caught annually. The catch mainly comprises silver and dusky kob, white and west coast steenbras, and elf. Cast-netting and illegal gill-netting also take place within the estuary, the latter accounting for an estimated five to 10 tonnes per annum. Both target harders, but other species are caught in limited quantities (Matthews, 2012). Commercial line-fishing is not permitted in estuaries according to South Africa's Marine Living Resources Act of 1998, but there is a small Port Nolloth-based fishery operating in the coastal waters south of the mouth (Matthews, 2012).

Fishing effort at the Orange River Mouth has been exacerbated in recent years (particularly on the South African side) following relaxation of access controls and lack of monitoring and enforcement of existing legislation. While fishing effort is lower on the Namibian side, there is also very little policing with no locally based fishing inspectors. There do however appear to be opportunities to improve the situation by working together with responsible authorities and through working more closely with fishing clubs. Provision is also made for "Honorary Fisheries Inspectors" to be appointed in Namibia which could allow local conservation officials or other regulating agencies to assist with monitoring and enforcement. It is also worth noting that there are differences in generic catch quotas for fisherman on the South African and Namibian sides of the estuary. These should ideally be reviewed in line with the importance of the estuary as a fish nursery area.

Apart from the direct impact of fishing on fish stocks, use of boats is also permitted in the estuary. While very few boats are used at present, stakeholders have raised complaints that these are often used indiscriminately and cause undue disturbance of bird populations[12]. Future tourism development could also see greater use of the estuary as a launch site for sea fishing and other tourist activities. The need for appropriate controls on boating activities has therefore been proposed.

[12] Birds are disturbed by anthropogenic activities but have different tolerances to human disturbance. Levels of disturbance are likely to depend on factors such as boat density, distance, speed and time of day (Bellefleur *et al*., 2009).

Key issues:

- There is a need to harmonise bag and size limits and improve control of angling activities to prevent over-exploitation of fish stocks.
- Appropriate controls on boating are required to prevent undue disturbance to waterbirds and other associated impacts.

2.2.8 *Off-road driving*

Due to insufficient law enforcement and monitoring, off-road driving has not been well controlled along the beach on the South African side, leading to disturbance of natural dune vegetation. This needs to be addressed to prevent further degradation of the area, particular if further use of the site is to be promoted.

While impacts to coastal dune vegetation are not such a significant an issue on the Namibian side, an off-road club is located directly alongside the floodplain and utilize sections of the floodplain for driving. While impacts are currently limited, this has the potential to impact negatively on natural vegetation and to detract from other tourism activities. It is therefore important that the impacts of these activities are carefully assessed and considered when developing a zonation plan for the Ramsar site (See Section 2.3.7).

Vehicular driving in the coastal area is regulated under the Control of Use of Vehicles in the Coastal Area Regulations (GN R 496 of 27 June 2014) (the "ORV Regulations"). These regulations were promulgated under the South African National Environmental Management: Integrated Coastal Management Act. Vehicular driving in the coastal area is only legally permitted in certain instances in terms of these regulations. Therefore, the EMP's zonation will be aligned with the ORV Regulations and off-road driving will be managed in accordance with the ORV Regulations.

Key issues:

- Off-road driving is leading to degradation of the coastal dunes and could negatively impact floodplain vegetation.

2.2.9 *Road network*

The existing road network is not designed for tourist access and is having a negative impact on sections of the Ramsar site. Apart from the obvious issues related to the causeway on the South African side, the road network on the Namibian side is also problematic from an ecological perspective. Towards the coast, the roads run directly alongside the river which has caused bank collapse in places with new tracks being created when flooding occurs. Regular vehicle traffic in this area is also likely to affect use of this area by birds and to detract from the tourism value of the area. A range of additional roads are also located east of the off-road club and running parallel to the main tar road to Oranjemund. These were supposed to have been rehabilitated following the airport upgrade but appear to be being used for off-road driving activities. These activities will now be managed in line with the ORV Regulations. Any unlawful off-road driving will be referred to law enforcement officials. Rationalization of the road network is therefore recommended in order to limit environmental impacts whilst enhancing recreational and tourism use.

Key issues:

- The existing road network should be rationalized to limit impacts on estuarine habitat and associated biota.

2.2.10 *Livestock grazing*

Livestock are currently owned by communities on the South African section of the Ramsar site. These animals (principally cattle and goats) regularly graze in the Ramsar site and frequently cross over the river into the Namibian section of the site. Livestock compete with indigenous herbivores and detract from the tourism value of the site. It is also important to note that Sperrgebiet National Park Management Plan (MET, 2012a), does not make provision for domestic animals in the Park and such may be destroyed if within the Park borders. This policy needs to be discussed and harmonized with that to be implemented on the South African side in order to improve mechanisms to manage and effectively exclude livestock grazing from the Ramsar site.

Key issues:

- Livestock grazing needs to be appropriately managed as domestic animals detract from the tourism value of the site and compete for valuable grazing resources.

2.2.11 *Waste management*

While access and use of the Ramsar site is limited, there are a number of areas where users congregate and where waste management is required. These include areas such as picnic sites, viewpoints, parking areas and fishing points. While bins are provided at some of these localities, there is a need to ensure that waste is regularly removed from the site. Building rubble is also used from time to time for erosion control of the river banks and has led to waste being washed into estuarine vegetation in the past.

Key issues:

- Appropriate mechanisms of waste management and removal are required to limit waste accumulation.

2.2.12 *Disturbance by aircraft*

Airstrips are located both at Oranjemund and Alexander Bay and as such, interaction between birds and flights can be anticipated. In this regard, key concerns relate to bird strikes affecting flight safety and disturbance to birds using the Ramsar site. Negative effects to birds associated with such disturbance reportedly include increased energy consumption, lower food intake and resting time and in consequence an impaired body condition (Komenda-Zehnder *et al*., 2003). An extensive study commissioned by the international bird strike committee indicated that disturbance by aircraft can be reduced significantly if minimum flight altitudes of 450 m above ground level are implemented. These restrictions will also minimize the probability of aircraft provoking a takeoff of waterbirds, which decreases bird strike hazard over open water (Komenda-Zehnder *et al*., 2003).

Existing documentation from the Directorate of Civil Aviation in Namibia (2009) does address the need to avoid flying over the ORM Ramsar site[13]. The following detail is included in the local air traffic regulations:

- "Pilots are requested to avoid overflying the Ramsar Nature site from the Orange River mouth to the Border Bridge.
- Sporadic large bird activities due to proximity to Riverine Ramsar site and Coastal Environment. Pilots to exercise caution.
- The Orange River Mouth has also been flagged as an area of bird migration. No aircraft to fly within these areas between the ground and 3000 feet."

These restrictions appear appropriate but there is a need to ensure that pilots are aware of these requirements and to ensure that similar restrictions are applied to aircraft on the South African side.

Key issues:

- Appropriate restrictions are required to prevent unnecessary disturbance of biota as a result of aircraft activities.

2.2.13 *Invasion by alien invasive species*

Biological invasion by certain alien plants, animals and microbes is well-recognized as a key threat to biodiversity. With ongoing and increasing levels of human movement and the transport of goods, the size and severity of this threat continues to increase globally. The most effective form of management for this threat is preventing the introduction of alien species into countries, regions and parks. However, management of existing populations of already invasive species is equally necessary.

The biggest threat for the Orange River Mouth in terms of Alien Invader Species is in the form of Alien Invader Plants. A number of exotic plants with invasive potential have been recorded in the Ramsar site and include wild tobacco (*Nicotiona glauca*), Port Jackson (*Acacia saligna*), rooikrans (*Acacia cyclops*), and bluegum (*Eucalyptus camaldulensis*). Wild tobacco is arguably the most significant threat having established along large sections of the floodplain. Pampas grass (*Cortaderia selloana*) has also been identified as a concern, occurring along river banks as well as in the old channels now cut off from the river by the dyke around the town.

While some alien plant control has already been undertaken on the South African side by Working for Wetlands, the required follow-ups have not been undertaken as initially agreed with Working for Water. Some alien plant control has also been initiated on the Namibian side (principally clearing of wild tobacco) although efforts have not been widespread and have not been followed up in a systematic manner.

A systematic approach in terms of alien plant control in the Ramsar site is however essential if alien plants are to be kept in check. The most effective control method for a specific species and situation, taking into consideration the objective for control in the specific case, should be used. This is usually a combination of mechanical and chemical methods, and biological control, where applicable. The single most important aspect of success with alien invader plant control is well planned follow-up operations. For this to be possible, invader plant control should be budgeted over the long term so as to ensure that programmes can be maintained.

[13] Note that the need to determine aerial zonation, heights and no-flying zones has also been recognised as a priority for inclusion in the zonation and tourism plan for Sperrgebiet National Park (MET, 2012c).

Key issues:

- Alien invasive plants need to be controlled in order to maintain and improve integrity of estuarine vegetation.

2.2.14 *Waterbird populations*

One of the requirements of contracting parties under the Ramsar Convention is to endeavour to achieve an increase in waterfowl populations on appropriate wetlands. Waterbird numbers have declined significantly however since the first surveys, with the reason mainly being the present absence of large numbers of Common Terns and Cape Cormorants (Anderson *et al.* 2003).

The maximum number of waterbirds recorded during the 1980s was 21 512 individuals in January 1980 and between 20 563 and 26 653 individuals in December 1985. Since then there has been a significant decline in waterbird numbers, a situation primarily accounted for by the decline in Cape Cormorant and Common Tern *Sterno hirundo* populations. This decline was initially believed to be linked to food shortages, which resulted in poor recruitment to Cape Cormorant colonies, although some young birds have immigrated to other colonies to the north and south. The food shortage was linked to a range of environmental perturbations including the 1995 warm-water event or 'Benguela Niño' in Namibian waters, fluctuations in anchovy abundance, and the eastward displacement of sardine in South African waters. Cape Cormorant colonies in South Africa were also reduced by outbreaks of avian cholera. This species subsequently began breeding in large numbers at Sandwich Harbour in Namibia, some 600 kilometres north of the Orange River mouth[14], which implies that disturbance by humans and availability of roost sites might have played a role in their abandonment of the Orange River estuary (Matthews, 2012).

Without the large numbers of Cape Cormorants and Common Terns, the important number of 20 000 waterbirds, one of the criteria used for the original designation of the ORM as a Ramsar site, cannot be attained. The maximum number of waterbirds recorded at the ORM since being listed on the Montreux Record were 9 240 in July 2000 and the maximum number of different species recorded in December 1995 were 64.

Proposed rehabilitation activities will hopefully provide the habitat necessary to start attracting larger number of waterbirds to the Orange River Mouth in future. Ongoing and more focused monitoring of waterbirds, particularly in the degraded saltmarsh area will be an important indicator of the success of any rehabilitation activities. Opportunities for enhancing available roosting and breeding sites for certain species, such as Great White Pelicans, terns and cormorants should also be investigated.

Key issues:

- Actions are required to enhance habitat for focal bird species and address threats to existing populations.

[14] It has also been postulated that the large number of ponds created along the coast from mining activities may also be attracting birds which would otherwise have utilised the Orange River Mouth. This theory has not been tested through any formal bird counts in these areas which could help to provide further useful insights.

2.2.15 *Status and condition of Pink Pan*

Pink pan is a hypersaline wetland feature directly north of the existing Ramsar site and located between Oranjemund and Oranjemund airport (Figure 8). It was reportedly named due to its characteristic pinky colour of the water. Given the uniqueness of this feature and its proximity to the Ramsar site, suggestions have been made by stakeholders to include this feature together with smaller pans located near the Yacht club as part of the Ramsar site[15].

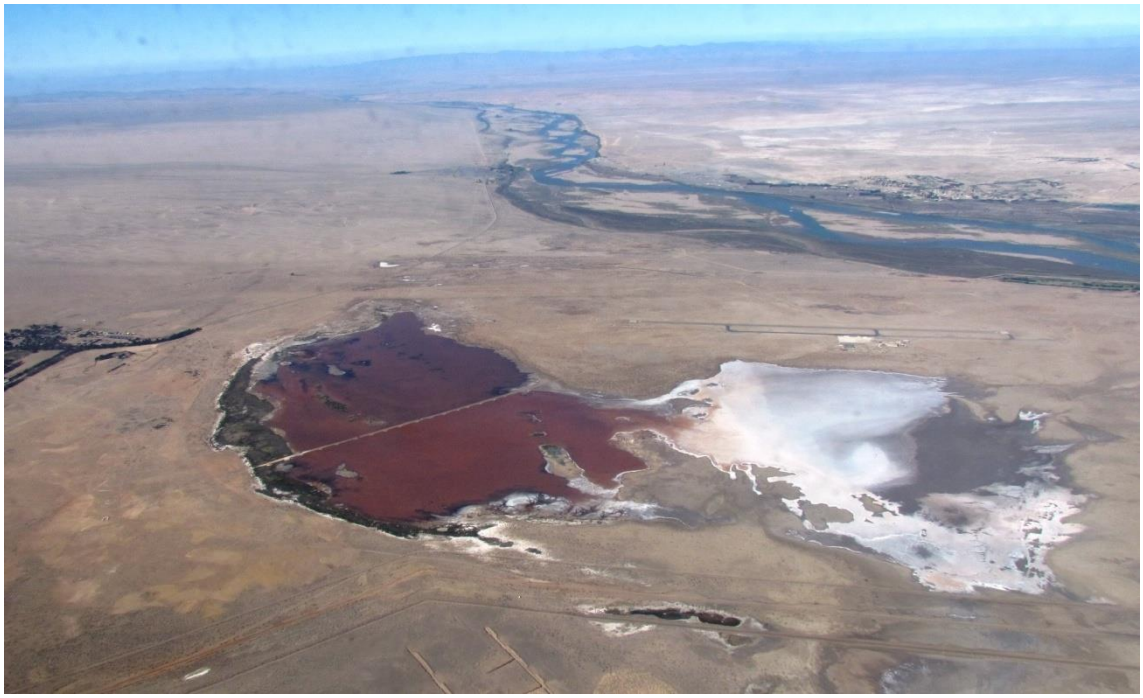


Figure 8 View over "Pink Pan" with Oranjemund on the left and the Orange River in the background.

While little information is available about this wetland feature, it is reportedly an important refuge for several Red Data bird species and is used by flamingos which move between the Ramsar site, dredge ponds along the coast in mined out areas and Pink Pan (Pallett, J., 2009). Previous bird surveys have however shown that this area supports relatively fewer birds than adjoining sections of the Ramsar site (Anderson *et al*., 2003).

Discussions with local stakeholders suggest that the size of the pan is increasing. This could be due to saltwater intrusion associated with coastal mining activities which could result in a significant change to the natural dynamics of this wetland (NACOMA, 2010). Stakeholders also raised concerns regarding the impacts of wastewater that is apparently also discharged into this wetland[16]. Given the apparent importance of this wetland, the impacts of such activities should be assessed and be used to inform future management of this area.

[15] This would be in line with Namibia's Draft wetland Policy (MET, 2004) which has the expansion of the protected areas network to include vulnerable wetlands as well as functional units of each wetland type as one of its goals.

[16] NAMDEB have confirmed that no wastewater is intentionally discharged into the pan. There is however a pipe that runs over the area that transports the treated waste water from the sewage farm. The water is transported with the aim to water the tree belt around the golf course. The pipe has leaked in the past put this was reportedly not in the Pink Pan area. These pipelines are old however and if not maintained could result in leakages into the area (NAMDEB, pers. *comm*.).

Key issues:

- Saltwater intrusion and wastewater inputs may be affecting the size and habitat characteristics of the adjoining Pink Pan wetland system.

2.2.16 *Implementation of management prescriptions and practices*

In order to ensure effective management of the Ramsar site it is important to develop a management classification system and to then subdivide areas into management units. This will help to inform the identification of habitats or areas requiring specific management intervention (e.g. ecotones, rivers, wetlands) for which specific management guidelines can then be developed. Once developed, these guidelines should then be used to inform annual planning operations.

Key issues:

- There is a need to identify and implement appropriate management prescriptions and practices.

2.3 Socio-Economic Aspects

2.3.1 *Sustainable tourism*

At a regional level, the ARTP/CA – Integrated Regional Tourism Plan (Peace Parks Foundation, 2005) study has shown that the region has the potential opportunity to offer a unique product, in terms of pristine diversity and un-spoilt arid environment. This opportunity consists of the combination of the eco-tourism product (fauna, flora, geology, scenery etc.) with the recreational & cultural-tourism product (Peace Parks Foundation, 2005). Tourism has subsequently become a major focus of the LOR TFCA initiative, with one of the primary objectives of this initiative being to "open up new socio-economic development opportunities for local communities in tourism, by marketing and developing the TFCA as a regional destination that offers visitors a variety of nature and culture-based attractions as well as accessible cross-border linkages and tour routes". This provides an ideal opportunity to link tourism development in the Ramsar site with an existing initiative where both local and regional matters are being addressed.

Despite the Orange River Mouth not falling within the existing TFCA boundary, Oranjemund and Alexander Bay have been identified as development nodes to support the unlocking of the tourism potential in the area (Annexure 3). Trailheads leading through the Orange River Mouth Ramsar site together with information bill boards welcoming visitors to and providing TFCA information are already proposed in both these towns (ARTP JMB, 2009). The town of Alexander Bay and Oranjemund will also be logical access points into the Sperrgebiet National Park when this is opened for tourism activities. Issues related to access through diamond-mining areas will however need to be resolved before tourism is permitted in this area.

The Sperrgebiet Tourism Development Plan seeks to promote tourism development opportunities in this newly proclaimed protected area (MET, 2012c). The Ramsar site falls within the Oranjemund Coastal / Orange River Tourism Development Area (TDA). This report suggests that the tourism value of this TDA is the lowest in the Sperrgebiet National Park with the exception of the Ramsar site at the mouth of the Orange River which has high tourism value for specialist bird watching tourists. The plan further emphasizes that the lower reaches of the Orange River do not have high tourism value from a river rafting / canoeing perspective which is

adequately catered for in the upper reaches of the river around Noordoewer. The high intensity agriculture and mining on both banks of the river as well as the roads that follow the river course on both banks of the river are also seen to preclude any quality tourism experiences along that section of the river. As such, the purpose of the TDA is seen as acting "as a south west gateway into the Sperrgebiet National Park , a service zone from which the TDA and Sperrgebiet National Park can be serviced and a recreation zone for local inhabitants."

Details of existing attractions, access, awareness and amenities together with identified constraints are summarized below:

Attractions

Apart from regional-level attractions, local attractions identified in the Orange River Mouth Conservation and Tourism Development Plan (CSIR, 2001) includes:

- Mouth of South Africa's longest and largest river;
- North western most corner of South Africa;
- Golfing & other sports facilities;
- Fishing (both freshwater and marine species e.g. smallmouth and largemouth yellowfish, white steenbras, mullet etc.);
- Bird watching (Barlow's Lark and many marine species roosting such as Cape Cormorant);
- Diamond mining tours (require security clearance);
- Historical and cultural background;
- Agricultural activities, i.e. the oyster farm, ostrich farm, etc.
- Geology of area, and
- Fauna & flora (game in areas south of the river mouth, lichen fields, etc)

The constraints which were identified and would need to be dealt with are also similar and include:

- Pastoral utilization may pose negative impacts on the environment and tourism.
- Infrastructure like power lines and public roads through the area may have a potential negative visual impact.
- The Orange River Wetland is a main and critical vein of life and is ecologically degraded.
- Present and previous mining activities cause a negative visual impact and are a threat to fauna and flora.
- Corridors for critical game movement and migration patterns from winter to summer rainfall areas & varying habitats are extremely limited. In an arid environment nutritional value of the veld type is the primary factor in determining game densities.

Access

Current access is seen as an important factor contributing to the relatively low usage of the area. Road access is good via the R382 road from Port Nolloth and can also be seen as the gateway to the larger Richtersveld area and Trans Frontier Conservation Area. Existing airstrips are to be found at Upington, Springbok, Alexander Bay and Oranjemund. There are currently very limited schedule flights to most of these destinations; however the existence of these airstrips provides the infrastructure to deal with potential higher demand (Peace Parks Foundation, 2005). The need to strengthen local or international markets for tourism by applying for Alexander Bay Airport to regain national status has been identified as a priority in the local municipalities SDF (Richtersveld Municipality, 2009). Opportunities for linking Oranjemund and Lüderitz are also being investigated and could significantly increase use of the area.

Amenities

At a regional level, current amenities are limited in performance and function. On the Namibian side of the TFCA, all amenities are focused on the region of the park which accesses the fish River Canyon above Ai Ais hot springs. In this area hiking and scenic attractions are the focus of available amenities. There are no amenities available in the remainder of the park. The South African side of the park has limited amenities scattered through the Richtersveld National Park. Most of these facilities are aimed at campers and 4x4 travellers. The Orange River between Vioolsdrift and Sendelingsdrift is utilised for organized canoe trips (Peace Parks Foundation, 2005).

Current amenities within Alexander Bay and Oranjemund are also limited with few accommodation options. In Alexander Bay, the only accommodation available is in Alexkor's guest houses, located in the centre of town. Rehabilitation of infrastructure associated with Delwerscamp took place between 1997 and 2000. The existing infrastructure is proposed as the entrance, admin offices and accommodation for visitors to the Ramsar site. The buildings (apparently owned by the Municipality) are not in use at present and are in a poor state of repair.

Guesthouses are available in Oranjemund and include those operated and used by NAMDEB and a limited number of private concerns. The area along the river and mouth offers a few camping sites and picnic facilities (Hohenfels - 15 km upstream) and an area near the yacht club, which are mainly utilised by locals (CSIR, 2001). Other recreation facilities are the Oranjemund Yacht Club, Oranjemund Golf Club, Oranjemund Off-road Club and Oranjemund Riding Club (MET, 2012c).

Constraints which need to be dealt with include:

- Refurbishment of existing infrastructure and / or development of new accommodation options.
- The communities that have access to DEA's 'Poverty Relief Funding' for tourism facilities lack the capacity and infrastructure to optimize the opportunity.
- The range and dimension of products is limited. Currently activities are limited to hiking, 4x4 trails, camping and canoeing.

Further opportunities identified in the Sperrgebiet Tourism development plan (MET, 2012c) include:

- Bird watching facilities: The establishment of bird hides and other bird watching facilities at appropriate places in the Ramsar site.
- Campground on Orange River: The establishment of a campground on the Orange River that provides an overnight stop for predominantly South African self-drive tourists at a location close to but outside of Oranjemund.
- Recreation facilities: Permitting the establishment of recreation facilities either in the town or if not within land controlled by the Sperrgebied National Park for use by local people.
- Park Gateway Complex: A Park Gateway Complex at a strategic location along the road that runs parallel to the Orange River.
- Oranjemund Tourism Development Plan: For Oranjemund to establish a tourism development plan for the town. The purpose of the plan would be to provide an alternative economy less dependent on diamond mining.

Awareness

Awareness of the area is generally very low, particularly amongst the national and international markets. The destination is best known to the 4x4 fraternities and hikers as an area of pristine, relatively inaccessible

wilderness. The destination is not promoted as part of a travel package by tour operators as is done for many of the other destinations in both South Africa and Namibia. The region does not currently feature in this scheme as it is perceived as being too remote to other destinations (Peace Parks Foundation, 2005).

Constraints which need to be dealt with include:

- The area falls outside main established Southern African tourism zones, routes and destinations that enjoy high awareness in the total tourism sector (including internationally).
- Overall project marketing is fragmented without a consolidated base.
- Individual product marketing is mostly of a low-level nature.
- The product lacks linkages and the perception of this result in the destination being considered inaccessible and remote.
- The region already hosts established eco-tourist attractions in the Richtersveld National Park and the Kalahari Gemsbok National Park. Further potential has been identified based on the desert, mountain and ocean scenery, as well as the bird life hosted in the estuary, but a major marketing campaign would have to be mounted.

From this assessment, it is clear that tourism opportunities and associated economic activities do exist in the area. For expansion to take place, actions will need to focus on making the most of existing opportunities and addressing some of the most pressing constraints. This will require:

- Regional integration with other tourism-related initiatives with a focus on upgrading the regional road network, developing and providing the necessary tourism infrastructure (accommodation, attractions etc.) and improving the connectivity with the Richtersveld National Park.
- Exploiting and developing unique opportunities associated with the Orange River and associated estuary.
- Developing and marketing a tourism image for the area[17].

It is also worth noting that the importance of collaboration has previously been emphasized by the Northern Cape Provincial Government of South Africa and the Regional Council of Karas in engagements relating to the implementation of the twinning agreement that was signed in 1999. In the area of tourism and conservation, it was resolved to ensure that work should be done to ensure ease of movement of tourists between the two respective regions through improved customs and immigration arrangements, and the improvement of border posts. Furthermore it was agreed that “Emphasis should be placed on the economic potential of tourism in the areas of cultural and eco-tourism, for the benefit of our disadvantaged communities. Joint marketing strategies will be embarked on through the respective tourism promotion agencies, and focus will be given to the consolidation of work already done on the Orange River Mouth Ramsar Site and the Richtersveld Ai-Ais Transfrontier Park." (New Era, 2006). Despite these commitments, much clearly needs to be done to improve tourism infrastructure and associated marketing of the area.

While broad plans are available at a regional level, neither Alexander Bay or Oranjemund have developed focused tourism plans. While successful tourism in these towns requires a strong regional perspective, and the creation of real and working institutional and physical linkages between existing initiatives, a focused tourism plan is still regarded as necessary to inform local tourism development. This would need to address issues such as facilities and infrastructural requirements together with marketing strategies to raise awareness about

[17] See further suggestions for improving tourism in Alexkor’s EMP (Alexkor, 2008). This also includes an updated post-mining land use plan for the area which re-emphasises the preservation of the Ramsar site but includes additional detail regarding priority tourism-recreation nodes and facilities.

offerings in the area. The need for local beneficiation has also been highlighted as a key issue by stakeholders and will need to be appropriately integrated into decision making.

Key issues:

- A focussed tourism development plan is required to grow tourism activities associated with the Ramsar site[18].
- There is a need to improve existing tourist and recreational facilities and activities.
- Marketing strategies need to be implemented to encourage tourists to visit the area.
- There is a need to ensure that tourism-related benefits accrue to local target communities.

2.3.2 *Environmental Interpretation and Education*

The Ramsar site offers an ideal opportunity to educate the general public on matters related to wetland and broader conservation matters. This includes the broader Sperrgebiet National Park and LOR Transfrontier Conservation Area. For this to materialise, appropriate facilities and educational material will need to be developed and made available.

Key issues:

- There is an opportunity to promote educational activities at the site.

2.3.3 *Zonation within the Ramsar site*

While management of the Orange River Mouth Ramsar site is directed primarily towards the maintenance of important ecological attributes, a range of activities currently take place within the site. If not carefully managed, these, together with future planned activities, could undermine conservation objectives and negatively affect future tourism plans for the site.

In this regard, it is also important to note that areas of cultivated land (previously used as part of a dairy farming enterprise) are located downstream of the main causeway within the South African section of the Ramsar site. Although not actively used for agriculture, some subsistence use of this area takes place. During preliminary consultation, local community members expressed their concern with losing this area if the causeway is breached as proposed. While the community have agreed in principle to proclamation of the area, it is essential that this issue is addressed prior to proclamation.

On the Namibian side, a zonation plan has been developed for Sperrgebiet National Park (MET, 2012). This plan has been based primarily on coarse-scale patterns of plant endemism which effectively classifies the entire region as sensitive (NACOMA, 2009). It does however identify a range of zones and activities applicable to different areas within the Park. In this plan, the Orange River Mouth Ramsar site is zoned as a "habitat / species management area" with a focus on conservation through active management intervention and delivering sustainable benefits to people within sustainable practices (MET, 2012). The upstream floodplain has been zoned as a "protected landscape / seascape" with lower levels of restriction for public access and use.

[18] Note that Oranjemund, OTM Co. has apparently commissioned a tourism report, highlighting a possible five star hotel, campsites, a mine tour, industrial/mining history facilities, and an environmental academy, for which no interest was expressed (NACOMA, 2009). Such ideas would need to be integrated into the tourism development plan for the area.

A zonation plan is an effective means of managing various activities within the Ramsar site and managing existing land use conflicts. While the broad Sperrgebiet Zonation plan is a useful step in this direction, it was developed at a very course scale and does not adequately address use within the Ramsar site . There is also a need to harmonize management and use of the site across borders. A fine-scale zonation plan that integrates requirements of relevant stakeholders has therefore been drafted for the site. This does however still need to be discussed and refined with further stakeholder input.

Key issues:

- Potential conflict between conservation and community land use objectives could undermine the proclamation process on the South African side.
- There is a need to review and refine the draft zonation plan to manage activities within the Ramsar site.

2.3.4 *Land use planning around the Ramsar site*

Since 2004, the second and third editions of the Ramsar Handbooks on the management of wetlands promulgate the concept of integrated management by stating that wetland management plans must be integrated into the public development planning system at the local, regional, or national level. According to this Handbook, "the integration of site management plans into spatial and economic planning at the appropriate level will ensure implementation, public participation, and local ownership." It is further recommended that when the Ramsar site itself does not include a buffer zone, it is generally appropriate for management planning purposes to identify and establish such a buffer zone around the core wetland area defined within a Ramsar site or other wetland. The buffer zone should be that area surrounding the wetland within which land use activities may directly affect the ecological character of the wetland itself, and the objective for land use within the buffer zone should be one of sustainable use through ecosystem management, consistent with the maintenance of the ecological character of the wetland (Ramsar, 2010).

The Integrated Coastal Management Amendment Act provides for the establishment of a coastal management lines (s25). One of the objectives of coastal management lines is protect the coastal protection zone. The establishment of coastal management lines (CMLs) seeks to address a variety of coastal hazards and resultant socio-economic vulnerabilities in order to reduce/mitigate the associated risks (to property, human life, economic opportunities etc). While these objectives may not be achieved by the establishment of one finite CML, the Integrated Coastal Management Act makes provision for more than one CML to be established with the purpose of achieving/addressing different coastal management objectives e.g. one CML might specifically be to mitigate the effects of anticipated erosion, while another may impose a development control such as height of buildings allowed to preserve the scenic landscape. The ICM Act requires that a local municipality within whose area of jurisdiction a coastal management line has been established must delineate the coastal management line on a map or maps that form part of its zoning scheme in order to enable the public to determine the position of the coastal management line in relation to existing cadastral boundaries. This will also enable the implementation of the land use controls that coastal management lines cater for.

The ICM Act establishes the coastal protection zone (s16 and s17) (the "CPZ"). The CPZ consists of several elements, but those directly relevant to the Orange River Mouth estuary are outlined in sections 16(1)*(d)* to *(i)* and section 17 of the Act]. This is important because section 62 of the ICM Act requires that an organ of state that is responsible for implementing national, provincial or municipal legislation that regulates the planning or development of land must, in a manner that conforms to the principles of co-operative governance contained

in Chapter 3 of the Constitution, apply that legislation in relation to land in the coastal protection zone in a way that gives effect to the purposes for which the protection zone is established as set out in section 17
Also, the Provincial MEC in consultation with the Local Municipalities may determine and adjust the boundary of CPZ; and take into consideration the composition of CPZ as outlined on section 16)

In the case of the Orange River Mouth, application of 100m and 1km buffer zones is proposed in line with the approach generally taken by South African legislation and will serve as a basis for (i) identifying the focus areas in which park management and scientists should respond to EIA's, (ii) serving as the basis for integrating long term protection of the Ramsar Site into the spatial development plans or frameworks of municipalities (SDF/IDP) and other local authorities. In this regard, the coastal protection zone established in terms of sections 16 and 17 of the ICM Act will be utilised to inform the land use planning for the area under section 62 of that Act. In terms of EIA response, the zones serve largely to raise red-flags and do not remove the need for carefully considering the exact impact of a proposed development[19]. In particular, they do not address activities with broad regional aesthetic or biodiversity impacts.

While acknowledging the importance of conservation efforts, the SDF for the Richtersveld Municipality (Richtersveld Municipality, 2009 & 2012) identifies access to fertile areas along the Lower Orange River as a priority, while also identifying aquaculture as a potential alternative income source. In this regard, the river upstream of Alexander Bay has been identified as an agricultural activity corridor (Richtersveld Municipality, 2012) which is in direct conflict with plans to secure this area under formal conservation. Future industrial development is also proposed in Oranjemund (Richtersveld Municipality, 2012). A range of activities therefore pose a threat to future conservation and tourism plans for the area and will need to be addressed to ensure that future developments do not undermine the important attributes of the Ramsar site. Careful zonation between industry, tourism and conservation will therefore be essential to optimise the town's potential and to limit impacts to the Ramsar site.

On the Namibian side, Government and NAMDEB have been working towards proclaiming the Oranjemund Town as a fully-fledged municipality. To this end, the Oranjemund Town Management Committee (OTM Co.) made good progress in establishing the basic regulatory framework for land use development for what is to become a proclaimed town, with the surveying of the town, and submission to and approval by the Surveyor-General of two plans which zone the town itself, and sub-divide the townlands into 16 portions[20]. To facilitate future expansion, seven extensions have been proposed. As of December 2008, four extensions had been submitted and two approved (NACOMA, 2009). A town council has since been selected (replacing the OTM Co.) and the town has been formally proclaimed.

[19] Note that all development activities falling within Sperrgebiet National Park require assessment, management and monitoring to ensure the least impact and guarantee sustainability. This includes a range of activities for which formal EIA's are required (MET, 2012a).

[20] Under the Namibian Town Planning Ordinance, all scheduled local authorities are required to prepare a Town Planning Scheme for their area of jurisdiction. The two land use plans drafted and approved by the Surveyor-General by the Oranjemund Town Management Committee (OTM Co.), could be seen to approximate a Town Planning Scheme. As a statutory instrument, a scheme serves as a land use control and/or facilitation plan, and typically indicates the permitted land uses or the restrictive conditions applying to particular zones of land (industrial, commercial, residential, etc.). The formulation and amendment of schemes is politically inflected, as municipal councils have the power to make proposals with regard to zoning categories or to suggest changes to the schemes. In accordance with the ordinance, however, the evaluation and amendment of Town Planning Schemes are carried out by the Namibian Planning Advisory Board (NAMPAB). On NAMPAB's advice, the Minister of Regional and Local Government and Housing (MRLGH) approves town planning schemes through a notice in the Government Gazette (NACOMA, 2009).

A concern however is that the newly surveyed boundaries of Oranjemund Town extend right up the edge of the Ramsar site, and include some floodplain and estuary features (See Section 2.1.1). While the draft EMP for the town recognizes the importance of these areas (NACOMA, 2010), there is however a risk that future management and development of these areas could have a negative impact on the Ramsar site. At present, zonation of areas alongside the floodplain has not been determined while areas from the golf course to the mouth are classified as Private Open Space.

It is also worth noting that Oranjemund, OTM Co. recently commissioned an Agricultural report assessing possibilities for irrigated and greenhouse farming along the Orange River, particularly the cultivation of mushrooms (NACOMA, 2009). Plans are also apparently afoot to revive irrigated cropping along the river just below the Namibian Customs Office.

Key issues:

- There is a risk of future land use planning activities around the site undermining the ecological and aesthetic character of the area.

2.4 Summary of key management issues and challenges

The following section outlines the key management issues and challenges facing the Orange River Mouth Ramsar site that have been identified during the situational assessment and refined through a series of stakeholder workshops. Issues have been prioritized through stakeholder input[21] to inform implementation planning using the prioritization scale provided in Table 2, below.

Table 2. Rating scale used to prioritize issues identified for management action.

Rating	Description
1. Critical	A critical issue which if not addressed would prevent effective management of the site or have negative consequences in the short term (<1 year).
2. Important	An important issue which needs to be addressed to improve management of the site in the medium term (1 – 5 years) and which if delayed could result in negative impacts or prevent progress being made.
3. Desirable	An issue which would be worth pursuing if resources are available but which is not essential for effective management of the site in the medium term. Addressing the issue is however regarded as desirable in the longer term (5 – 10 years).

Table 3. Summary of key issues and relevance to respective countries.

Thematic Area	No	Key issue that must be addressed	Relevance		Priority Rating
			SA	NA	
Institutional	I1	The boundary of the Ramsar site is inconsistent, does not adequately incorporate important estuary and floodplain features and is poorly aligned with protected area boundaries.			1
	I2	Access to the site is not adequately monitored and controlled.			2
	I3	Formal protection of the South African side of the Ramsar site is required to better secure management of the area.			1

[21] Initial prioritization was done at a meeting on 17th November 2011, attended principally by South African stakeholders. This was then refined at a subsequent meeting with Namibian stakeholders on 20th September 2012.

	I4	There are insufficient resources and capacity to coordinate and implement effective management of the Ramsar site.			1
	I5	There is a need to ensure regular review of management activities and revision of management planning.			2
	I6	Although the ORMIMC has been established there is a need to improve and formalise trans-boundary collaboration.			2
	I7	Appropriate institutional arrangements are required to facilitate active involvement of local stakeholders in decision making.			1
	I8	There is a potential for management objectives to be undermined if not clearly communicated to and supported by institutions responsible for management of the Orange River basin.			1
	I9	There is potential for greater collaboration with the LOR TFCA initiative to support management objectives.			2
	I10	The South African section of the Ramsar site (Site No.526) is on the Montreux Record – actions are required to remedy the ecological changes of the estuary.			1
	I11	Current Ramsar information sheets need to be updated prior to the next conference of parties.			2
	I12	Regular contact with the national Ramsar contact points is required.			2

Thematic Area	No	Key issue that must be addressed	Relevance		Priority Rating
			SA	NA	
Ecological	E1	Insufficient information on flows in the lower Orange River and ecological flow requirements for the Orange River Mouth Estuary and nearshore marine environment			2
	E2	Existing operating rules of dams are not conducive to improved estuary conditions.			3
	E3	Future dam developments in the catchment pose risks and opportunities for the Ramsar site.			1
	E4	There is a need to assess and address the threat of further water quality deterioration.			2
	E5	Careful management of the mouth is necessary to facilitate recovery of the saltmarsh habitat and to optimise fish nursery functions.			2
	E6	The causeway and other infrastructure need to be removed / breached to facilitate recovery of the degraded saltmarsh area.			1
	E7	Existing oxidation ponds need to be removed and rehabilitated prior to breaching of the upper section of the causeway.			1
	E8	Windblown sediments from mining operations and seepage of saline water from slimes dams needs to be addressed to facilitate recovery of the degraded saltmarsh area.			2
	E9	There is a need to promote scientific research and disseminate results to better understand the functioning of the estuary.			2
	E10	Research and monitoring is required to improve baseline data and assess changes in the ecosystems responses to management activities.			1
	E11	There is a need to harmonise bag and size limits and improve control of angling activities to prevent over-exploitation of fish stocks.			2
	E12	Appropriate controls on boating are required to prevent undue disturbance to waterbirds and other associated impacts.			1
	E13	Off-road driving is leading to degradation of the coastal dunes and could negatively impact floodplain vegetation.			2
	E14	The existing road network should be rationalized to limit impacts on estuarine habitat and associated biota.			2
	E15	Livestock grazing needs to be appropriately managed as domestic animals detract from the tourism value of the site and compete for valuable grazing resources.			2
	E16	Appropriate mechanisms of waste management and removal are required to limit waste accumulation.			1
	E17	Appropriate restrictions are required to prevent unnecessary disturbance of biota as a result of aircraft activities.			3
	E18	Alien invasive plants need to be controlled in order to maintain and improve integrity of estuarine vegetation.			1
	E19	Actions are required to enhance habitat for focal bird species and address threats to existing populations.			3
	E20	Saltwater intrusion and wastewater inputs may be affecting the size and habitat characteristics of the adjoining Pink Pan wetland system.			2
	E21	There is a need to identify and implement appropriate habitat management prescriptions and practices.			2

Thematic Area	No	Key issue that must be addressed	Responsibility		Priority Rating
			SA	NA	
Socio-Economic	SE1	A focused tourism development plan is required to grow tourism activities associated with the Ramsar site.			2
	SE2	There is a need to improve existing tourist and recreational facilities and activities.			3
	SE3	Marketing strategies need to be implemented to encourage tourists to visit the area.			3
	SE4	There is a need to ensure that tourism-related benefits accrue to local target communities.			3
	SE5	There is an opportunity to promote educational activities at the site.			2
	SE6	Potential conflict between conservation and community land use objectives could undermine the proposed proclamation of a protected area on the South African side.			1
	SE7	There is a need to review and refine the draft zonation plan to manage activities within the Ramsar site.			2
	SE8	There is a risk of future land use planning activities around the site undermining the ecological and aesthetic character of the area.			2

CHAPTER 3: VISION AND MISSION

The Vision and Mission statements for the Orange River Mouth Ramsar Site was developed at the South African led Stakeholder Workshop held on 16th and 17th August 2011 and refined following further discussion with Namibian stakeholders on 20th September, 2012. This was informed by an understanding of the mandate for managing the site (Legal & Ramsar obligations), other related visions (See Box below) and the aspirations of different stakeholder groups. The following Vision Statement was developed for the Orange River Mouth Ramsar Site:

Vision:
A healthy trans-boundary Ramsar site providing opportunities for all.

In order to achieve the vision and to support the maintenance and enhancement of values of the site the following Mission has been developed to guide future management:

Mission:
To restore, manage and maintain the estuary in order to enhance the ecological values that qualify the Orange River Estuary as a Ramsar site whilst providing opportunities through sustainable socio-economic initiatives.

Other visions supporting or informing management of the Orange River Mouth

It is useful to contextualise this vision and mission for the Orange River Mouth with that of other relevant policy guidance and existing initiatives. These are briefly summarised here.

Ramsar: In terms of the Ramsar Convention, Contracting Parties are expected to "*formulate and implement their planning so as to promote the conservation of the wetlands included in the List and as far as possible the wise use of wetlands in their territory*". Wise use is defined as "*the maintenance of their ecological character, achieved through the implementation of ecosystem approaches within the context of sustainable development*". Contracting parties are therefore expected to manage the Ramsar Sites so as to maintain the ecological character of each site and, in so doing, retain the ecological and hydrological functions which ultimately provide its products, functions and attributes.

Sperrgebiet National Park: The objectives of the park are aligned with the Mission of the Ministry of Environment and Tourism which is, "*To promote biodiversity conservation in the Namibian environment through the sustainable utilization of natural resources and tourism development for the maximum social and economic benefit of its citizens*". This is fleshed out in the management plan through a range of specific objectives ranging from conserving and wisely managing the landscapes, ecosystems, character and biological diversity of the Sperrgebiet National Park to promoting and supporting appropriate land and natural resource uses that are compatible with park objectives (MET, 2012a).

ORASECOM: The Parties to the agreement agree to, inter alia: *". . .utilise the resources of the River System in an equitable and reasonable manner with a view to attaining optimal and sustainable utilisation thereof, and benefits there from, consistent with adequate protection of the River System," "....take all appropriate measures to prevent the causing of significant harm to any other Party," and "...individually and jointly take all measures that are necessary to protect and preserve the River System from its sources and headwaters to its common terminus.".* This includes the *"...estuary of the River System, including the marine environment, taking into account generally accepted international rules and standards,".* This commitment provides a useful basis from which to engage around catchment management issues that could have a negative impact on the Orange River Mouth.

Lower Orange River TFCA: The overall aim of LOR TFCA is, *"to promote a culture of peace and cooperation between Republics of Namibia and South Africa, focussed on the local communities residing in the target area, by unlocking ecotourism potential through the active co-management of shared unique biodiversity, cultural and tourism resources in a suitable manner".*

CHAPTER 4: GOALS & OBJECTIVES

While the vision is an inspirational, higher-level statement of strategic intent, goals and objectives answer the question: *"How will you know when you have achieved the Vision and Mission?"* The importance of setting objectives for each important feature of the ecological character of the site and for all other important features related to the functions and values of the site, including socio-economic, cultural and educational values has been emphasized (Ramsar Secretariat, 2010).

A structured objectives hierarchy has been used to convert vision and mission into a series of Strategic Goals and Objectives for each of the three thematic areas identified. Strategic objectives provide a framework for achieving strategic goals and at the same time integrating sectoral operational objectives. Their development involves a process of understanding key issues and challenges and then analyzing the strategic goals to determine how they can be attained and at another level how operational objectives can be packaged to reach the strategic objectives.

Management objectives form the next level of the hierarchy and set the framework for converting the strategic objectives into a series of practical management measures or actions to improve site management. Whilst

these objectives may change over time, they provide a key focus for improve management of the Orange River Mouth Ramsar site in the short to medium term. Details of strategic goals and objectives together with management objectives for the site are outlined in Table 4, below.

Table 4. Overview of strategic goals, objectives together with supporting management objectives identified for the site.

THEMATIC AREA: INSTITUTIONAL		
Strategic Goal	**Strategic Objective**	**Management Objective**
1: To establish viable institutional arrangements that promotes collaboration and accountability between all relevant stakeholders.	1.1: To improve the formal conservation status and associated protection and management of the Orange River Mouth Ramsar site	To collaboratively review and update the boundary of the Ramsar site so that it incorporates relevant features.
		To ensure that access control to the Ramsar site is improved.
		To ensure that the South African section of the Ramsar site obtains formal protection status under NEMPAA
		To ensure adequate staffing and budget allocations to implement the management plan.
		To regularly monitor implementation of the management plan
	1.2: To develop institutional arrangements to support the implementation of well-coordinated actions towards improved management and wise use of the Orange River Mouth Ramsar site	To improve trans-boundary collaboration in the management of the Ramsar site.
	1.3: To ensure appropriate communication and collaboration with local communities, stakeholders and regional initiatives.	To ensure active participation of stakeholders in the management of the Ramsar site.
		Ensure regular engagement with relevant river management institutions to ensure that management objectives are supported and not undermined by catchment-related decisions.
		To foster good working relationship with the LOR TFCA initiative
	1.4: To ensure that Ramsar obligations are addressed and communicated to the Ramsar Secretariat.	Implement appropriate actions to ensure that the Ramsar site is timeously removed from the Montreux Record.
		To ensure that the Ramsar information sheet is regularly updated in line with Ramsar expectations.
		To regularly liaise with the Ramsar contact point regarding management of the site.

THEMATIC AREA: ECOLOGICAL		
Strategic Goal	**Strategic Objective**	**Management Objective**
2. To ensure ecological restoration, management and maintenance of the Orange River Mouth Ramsar site so as to maximize its functional integrity (C+ Ecological Category).	2.1: To ensure that catchment management activities do not undermine local conservation efforts.	To ensure that the availability of flow information in the lower Orange River is improved and flow requirements are established so as to better manage flows into the estuary and associated marine environment.
		To influence decision-makers to amend the operating rules of dams, especially Vanderkloof dam.
		To ensure adequate input into relevant development applications in the catchment to ensure that risks and opportunities are adequately addressed in project design.
		To ensure that water quality impacts are effectively managed to prevent deterioration of the Orange River Mouth.
	2.2: To implement directed management interventions to ensure recovery of the degraded salt marsh area.	To manage the Orange River Mouth so as to facilitate recovery of the system and optimise fish nursery functions.
		To improve flows into the degraded salt marsh area in order to promote rehabilitation of the degraded salt marsh habitat.
		Remove and rehabilitate oxidation ponds

THEMATIC AREA: ECOLOGICAL		
Strategic Goal	**Strategic Objective**	**Management Objective**
		To limit impacts from adjacent mining operations through appropriate rehabilitation strategies.
	2.3: To actively promote research and ongoing monitoring to inform management activities.	To improve understanding of ecosystem functioning through appropriate research and monitoring, to support management practices
		To collect baseline data and undertake follow-up monitoring necessary to evaluate responses of the ecosystem to management activities.
	2.4: To ensure that recreational, resource use and other activities are adequately controlled in line with conservation objectives	To ensure that fishing efforts are monitored and controlled within acceptable limits.
		To ensure that boating activities do not have a negative effect on bird population s or undermine other ecological attributes.
		To minimise impacts on coastal dunes and floodplain vegetation by controlling off-road driving.
		To rationalise and maintain a road network that is ecologically acceptable and provides adequate accessibility for recreational and tourism activities.
		To ensure that livestock grazing is appropriately managed in line with the conservation and socio-economic objectives of the Ramsar site.
		To ensure that waste is limited and regularly removed from the site.
		Disturbance to birds and wildlife is limited by applying appropriate restrictions to aircraft flying in the vicinity of the Ramsar site.
	2.5: To ensure that estuarine and associated wetland habitats are managed in such a way that the ecological functioning and habitat value of these areas is maintained or enhanced.	To maintain the site largely free of alien invasive plants
		To ensure the effective management and conservation of waterbird species.
		To ensure that potential impacts on the nearby Pink Pan are appropriately mitigated and managed.
		To maintain natural ecosystem patterns and processes through the development and implementation of appropriate management prescriptions and practices, so as to ensure optimum biodiversity

THEMATIC AREA: SOCIO-ECONOMIC		
Strategic Goal	**Strategic Objective**	**Management Objective**
3. To promote nature-based recreation and tourism, sustainable resource use and stimulate local social and economic benefits.	3.1: To promote local beneficiation by growing and actively marketing a range of nature-based recreation and ecotourism products.	To develop and implement a Tourism Development Plan to guide the systematic development of nature-based tourism products in the ORM Ramsar site
		Strive to attract greater tourism interest through the provision of additional tourism & recreation activities.
		To develop and implement a marketing strategy for the ORM Ramsar Site.
		Encourage involvement of local communities and HDIs in the utilization and service provision of tourism & recreation products in the Ramsar site.
	3.2: To promote environmental education and awareness.	To promote conservation through appropriate education and awareness initiatives.
	3.3: To ensure that use both within and around the Ramsar site is controlled and managed in line with other strategic objectives.	To ensure that any potential land use conflicts are resolved prior to proclamation.
		To manage activities within the Ramsar site in line with management objectives.
		To mainstream biodiversity into land use planning and decision making.

CHAPTER 5: PRELIMINARY ZONATION PLAN

The draft Zonation Plan (ZP) has been developed to regulate utilisation of the estuary, and reduces conflict between different user groups. The ZP also reduces conflicts between users and the environment by protecting sensitive habitats and by ensuring sustainable use of the estuary. The ZP therefore considers the site boundaries, the subdivision of the estuary into different management zones, and also the regulation of activities by providing the conditions for use of the estuary as operational specifications.

5.1 Boundaries applicable to the ZP

The first consideration is the boundaries within which the ZP operates. Here, it is important to note that the boundary of the Ramsar site is inconsistent and needs to be refined (See Section 2.1.1). For preliminary zonation purposes, a decision was therefore taken to develop a preliminary zonation plan to areas falling within the estuarine functional zone or core area as defined by the 5m topographical contour. As such, the estuarine boundary adopted for zonation purposes is defined as follows:

- Downstream boundary: The estuary mouth (28º38'30"S, 16º27'45"E)
- Upstream boundary: Head of tidal influence some 2km upstream of the Sir Ernest Oppenheimer Bridge, approximately 11.5 km upstream of the mouth (28°33'50.59"S, 16°31'21.25"E).
- Lateral boundaries: 5 m contour above MSL along the banks.

5.2 Review of sensitivity criteria

In developing a zonation plan, it is important to obtain a sound overview of the biophysical attributes of estuary and the sensitivity of different areas to human use. Where sensitive features exist, appropriate restrictions then need to be put in place to ensure that activities do not undermine existing conservation and functional values. On the contrary, in less sensitive areas, there is potentially greater scope for more intensive use.

A base map of estuarine vegetation was compiled as part of a recent study to determine the environmental flow requirements of the lower Orange-Senqu River (Veldkornet and Adams, 2013). This provides an overview of vegetation attributes across the site and serves to highlight areas of sensitive estuarine vegetation (Figure 1). The most sensitive areas include intertidal and supratidal salt marsh habitat. Vegetation occurring along the frontal dunes is also regarded as sensitive to disturbance. More robust areas include areas dominated by sand, terrestrial vegetation or characterised by more robust reeds and sedges.

The estuary also provides important habitat for a range of biota, some of which are sensitive to disturbance or over-exploitation. An overview of the sensitivity of important attributes is summarised below:

- **Birds**: The waterbirds that inhabit the Orange River estuary are dependent on macrophytes (for food, and roosting and breeding habitat) and invertebrates and fish for food. Braided islands and channels create sheltered shallow water areas frequented by herons, ducks, egrets and waders. Reed beds provide habitat for warblers and other roosting or reedbed-dwelling passerines. Fringing reeds also provide perches for the variety of kingfishers (Anon. 2002 in Anderson *et. al.*, 2003). While the need to formally identify key waterbird breeding and roosting areas, especially for Damara Tern, Caspian Tern, Hartlaub's Gull and Cape Cormorants has been highlighted (Anderson *et. al.*, 2003), existing information suggests that the following areas are most important for bird populations:

- *Saltmarsh on the South African side*: A large proportion of waterbirds has consistently been counted in this area (12.1–37.3% of birds counted).
- *North bank, adjacent islands and beach on the Namibian side*: Large populations of birds have also been consistently counted in this area (24.5–44.9% of birds counted).

The most sensitive areas are probably the islets in the mouth area have been identified as important breeding areas for Cape Cormorants.

- **Fish populations**: The Orange River Estuary functions as a viable nursery area and refuge for juvenile and adult estuarine fish species. As such, fishing effort needs to be managed so as not to over-exploit existing fish populations.
- **General wildlife**: Given historic levels of disturbance and degradation, the habitat value for wildlife is limited on the South African side. Large areas of intact habitat do remain north of the golf course on the Namibian side. These extensive areas of reeds, sedges and supratidal salt marsh provide important habitat for wildlife including large populations of gemsbok. This area should therefore ideally be retained as a wildlife sanctuary with limited disturbance.

The location of key areas identified as sensitive to human disturbance are indicated in Figure 9, below. This includes the area of degraded salt marsh which will hopefully recover once factors limiting recovery have been addressed.

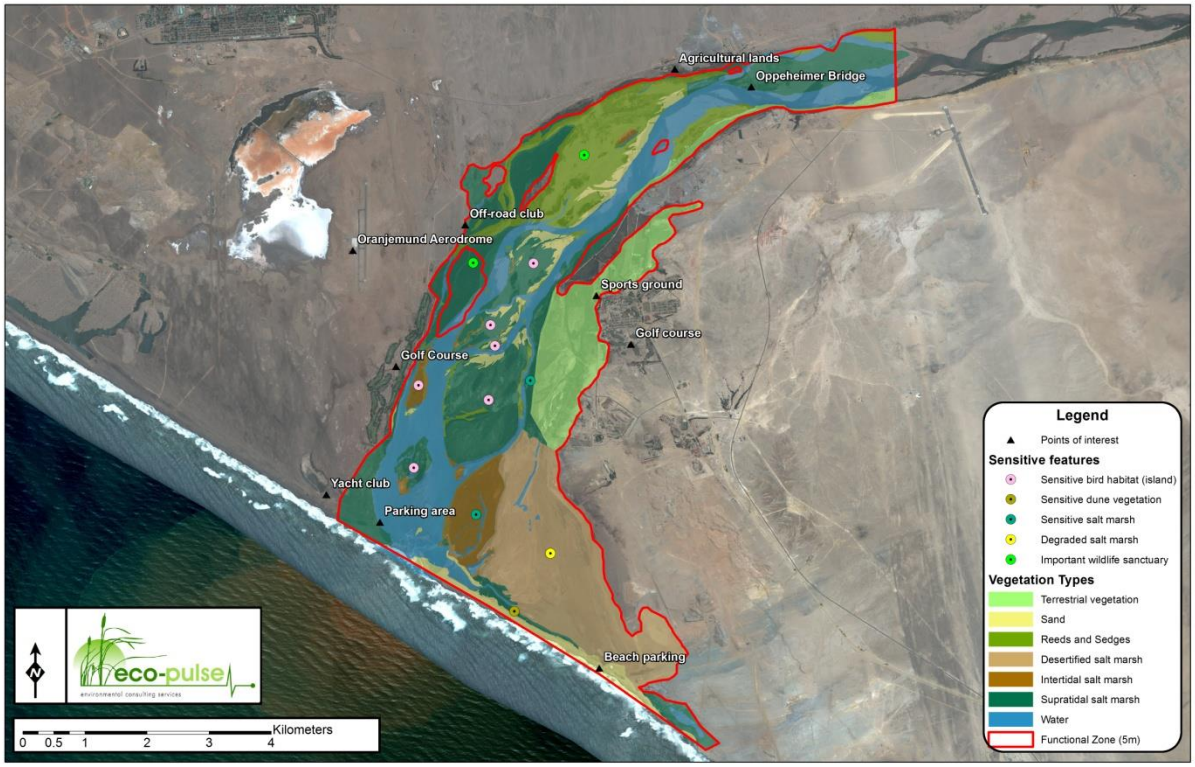


Figure 9 Vegetation map and location of sensitive features considered during the zonation process.

5.3 Overview of existing uses and proposed control measures

In developing the ZP, cognisance has been given to existing and potential future types of human uses of the estuary. These are briefly summarised in Table 5, below, together with concerns / potential impacts associated with these uses. Control measures that are to be implemented to manage these activities are also summarised in the table below. This includes the implementation of the ZP and additional supporting control measures.

Table 5. Range of human uses and control measures considered in the development of the ZP.

Use	Concerns / potential impacts	Control measures to be implemented
Recreational shore angling	• Over-fishing can negatively affect nursery functions provided by the estuary; • Disturbance of roosting terns and cormorants (on berm and islands); • Pollution associated with litter and sanitation.	• Permits are required for recreational angling; • No access / fishing from sensitive islands or salt marsh habitats is permitted; • Monitoring and enforcement of angling regulations including bag limits; • Provision and regular clearing of waste bins in common fishing points.
Recreational boating	• Disturbance of birds and wildlife; • Noise (motorised craft); • Damage to aquatic vegetation; • Boat engine emissions; • Decreased human safety; • Shoreline erosion.	• Motorised boating is restricted to specific zones; • No motorised boating within 50m of islands; • No jet skis are permitted; • No skiing is permitted; • All motorised boats to be registered with local conservation office (MET/DENC).
Gill netting	• Uncontrolled gill netting can have a negative impact on fish stocks.	• No gill netting is permitted.
Bait collection[22]	• Over-exploiting of bait stocks including harders; • Disturbance of sensitive areas.	• Permits are required for all bait collection activities (including use of cast nets); • Monitoring and enforcement of bait collection regulations including catch limits.
Off-road driving	• Disturbance of roosting terns and cormorants on berm; • Damage to vegetation; • Disturbance of birds and wildlife; • Disturbance to other recreational users.	• Off-road driving will be allowed in accordance with the ORV Regulations. Those persons who are eligible to apply for permits to drive in the coastal area will be informed and required to apply for a permit to drive in the coastal area.
Livestock grazing	• Competition for limited grazing areas; • Negative impact on wilderness character of the area.	• No livestock grazing is permitted within the estuary functional zone. • Any livestock may be forcibly removed from the site.
Pets (cats and dogs)	• Disturbance of wildlife • Predation on birds and eggs	• No pets are permitted within the estuary functional zone.
Hunting of ducks and geese	• Direct impact on bird populations; • Disturbance of birds and wildlife; • Safety risk to other recreational users.	• No hunting is permitted.
Camping and picknicking	• Pollution (litter and noise); • Disturbance of indigenous vegetation.	• Camping is restricted to designated areas; • Environmental impact assessment /

[22] Note: No information exists as to the species or extent of bait collection in the estuary.

Use	Concerns / potential impacts	Control measures to be implemented
		screening to be undertaken prior to establishment of any new sites.
Walking	• Trampling of sensitive habitat; • Disturbance of birds and wildlife	• No public access to sensitive areas (e.g. salt marsh) is permitted; • Access to bird breeding islands is not permitted; • Controlled access for management / research purposes is permitted.
Development of tourism infrastructure	• Direct disturbance to vegetation; • Access to and disturbance of birds and wildlife populations; • Affect on sense of place; • Management of waste (including effluent).	• Infrastructure must be aligned with any endorsed tourism development plan; • Environmental impact assessment / screening must be undertaken prior to construction of any new infrastructure.
Agricultural activities	• Direct impact on vegetation and biodiversity.	• Agricultural use is restricted to designated zones outside the estuary functional zone; • Rehabilitate old agricultural lands.

5.4 Delineation of Management Zones

The Orange River Mouth has been subdivided into 5 zones based on an understanding of the sensitivity of estuarine attributes and use by local stakeholders (Figure 10). Each of these zones are briefly summarised below and forms the basis upon which estuary-based activities will be regulated:

- ***Zone A: Coastal dunes and frontal estuary:***

  Boundaries This zone extends from the beach in front of the parking area on the Namibian side to east of the parking area on the South African side. The zone also extends inland from the coastal dunes up until the start of the golf course on the Namibian side.

  Description: This is a high intensity use zone for angling and recreational activities including motorised boating. Restrictions are aimed at preventing undue impacts on birds and sensitive habitats without unduly constraining existing recreational activities.

- ***Zone B: Sensitive islands and salt marsh habitats***:

  Boundaries: This zone encompasses islands located within the main channel which are important for birds together with associated open water areas and fringing sensitive salt marsh habitat. It also includes sensitive salt marsh habitat on the South African side known to provide important habitat for bird populations.

  Description: Activities are restricted to in this zone to ensure that impacts and disturbance to sensitive bird roosting / nesting areas and sensitive salt marsh habitats are minimised.

- ***Zone C: Peripheral estuarine zones:***

  Boundaries: This zone extends from the parking area on the Namibian side, north along the river banks up to the edge of the estuary functional zone upstream of the Oppenheimer Bridge. It then extends south along the South African side up until the start of the degraded salt marsh habitat. This zone includes open water areas upstream of the last main island which is located between the off-road club in the west and sports grounds to the east.

  Description: This zone includes largely intact estuarine vegetation and provides important habitat for wildlife. While access and low-intensity recreational usage is permitted, off-road driving is not permitted unless it is authorised in terms of the ORV Regulations.

- ***Zone D: Rehabilitation zone:***

  Boundaries: This zone includes old lands and degraded salt marsh associated with the South African section of the estuary.

  Description: This zone is the focus of rehabilitation efforts which includes removal of causeways, rationalization of road infrastructure and removal of waste water infrastructure. Activities within this zone need to be managed so as not to undermine rehabilitation efforts.

- ***Zone E: Riparian zone***

  Boundaries: This zone encompasses riparian habitat upstream of the estuary and is defined based on the extent of the revised Ramsar Boundary for South Africa[23]. Areas of active cultivation have been explicitly excluded.

  Description: This zone incorporates the river banks, riparian and instream habitat of the Orange River. It is characterised by largely natural vegetation although some areas have been impacted by historic farming and operations and encroachment by alien invasive plants.

- ***Zone F: Terrestrial rehabilitation zone***

  Boundaries: This zone includes terrestrial areas on the South African side which are located outside of the estuarine zone but within the revised Ramsar Boundary for South Africa.

  Description: This area has been disturbed by historic mining and farming operations with low ecological value.

- ***Zone G: Off-road driving club:***

  Boundaries: This zone is limited to the extent of the existing off-road club and motor-cross track on the Namibian side.

  Description: This area is substantially disturbed and has been used historically for a range of off-road driving activities. Ongoing use for these activities is permitted but is not permitted in adjoining areas. For the South African side of the estuary, off-road driving will only be allowed where it has been authorised in terms of the ORV Regulations.

- ***Zone H: Unclassified estuarine zone***

  Boundaries: This zone includes estuarine areas (within the 5m contour) but which fall outside of the revised Ramsar Boundary for South Africa.

  Description: This zone includes a range of features which have divergent charachteristics. The boundary of adjacent zones should be re-aligned in revisions of the zonation plan to better address management of these areas.

[23] Note that the boundary is poorly aligned with the edge of the riparian zone on the Namibian side and should ideally be re-drawn to reflect a more ecologically meaningful delineation.

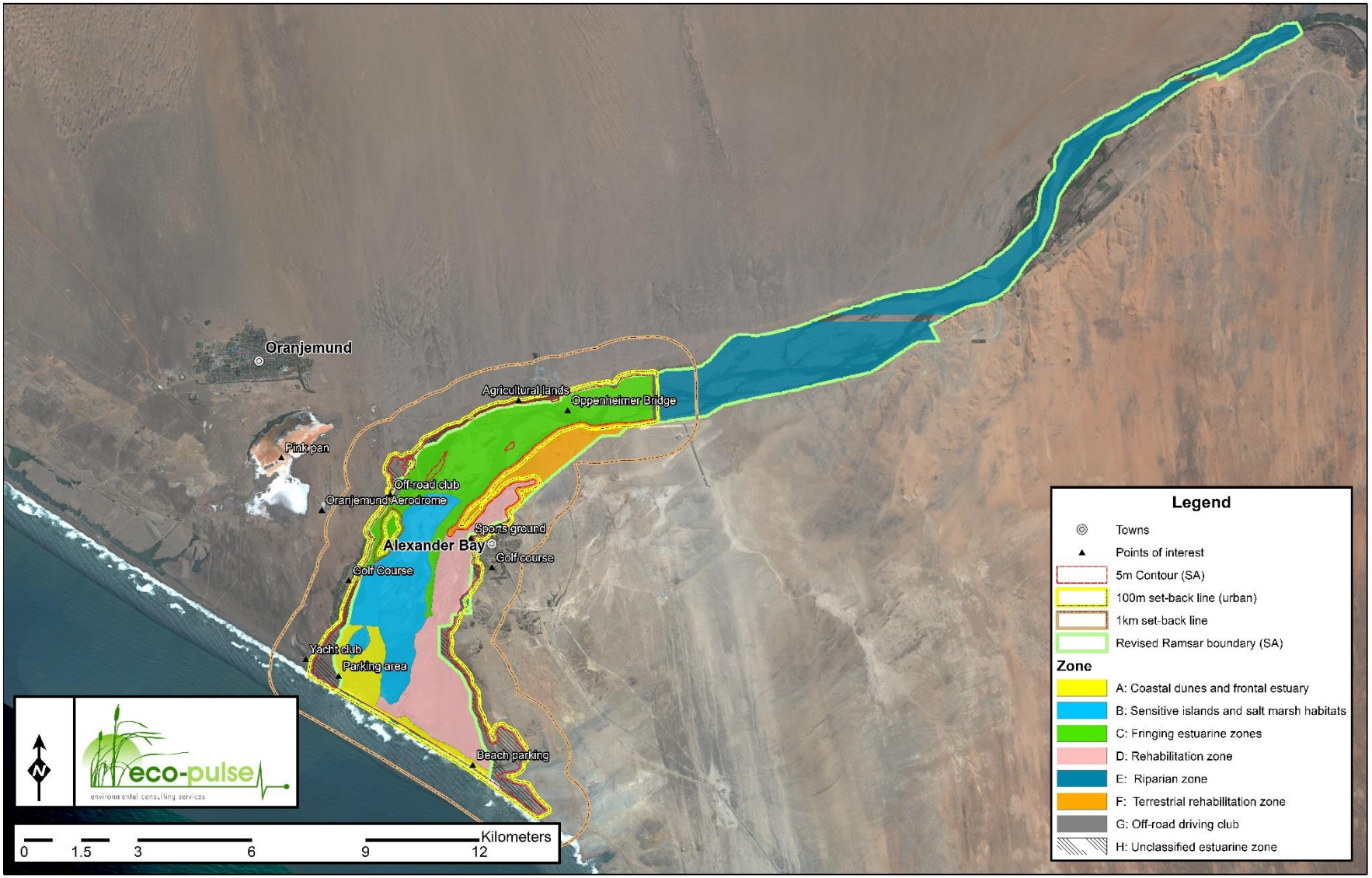


Figure 10 Preliminary zonation plan for the Orange River Estuary.

5.5 Operational specifications

The Operational Specifications of the ZP identify and describe the various management zones of the Ramsar site, and also provide details on the management requirements of these zones. Restricted activities in the various zones are summarised in Table 6.

Recreational use management areas:

A. Living Resource Use Areas:

i. **No shore angling (Zone B)**
   No fishing from the shore is permitted in this zone
   - **Rationale**: Restrictions on shore angling have been imposed on this zone due to the importance of islands for bird roosting and nesting. This follows reports of at least 831 pairs of Cape Cormorants aborting their breeding attempt after people disturbed the birds on the islands (Williams 1986 in Anderson *et.al.*, 2003).

   Angling and bait collection from non-motorised watercraft is still permitted in this zone.

ii. **Bait collecting - invertebrates (Zones A - E):**
   No spatial restrictions other than access restrictions to sensitive areas. No bait collecting permitted without the necessary permit.

iii. **Bait collecting – cast nets (Zones A - E):**
   No spatial restrictions other than access restrictions to sensitive areas. No line fish species to be kept. No limit on mullet.

iv. **Spear fishing, gill netting (Zones A - H):**
   Not allowed.

v. **Hunting (Zones A - H):**
   Not allowed.

vi. **Livestock grazing (Zones A - H):**
   Not allowed.

B. Non-living Resource Use Areas:

vii. **Motorised boating (Zone A)**
   Motorised boating is only permitted in this zone. All boating activities must comply with relevant safety regulations and be in possession of the necessary boating permit.
   Rationale: Current motorised boating activities are largely confined to the frontal estuary (Zone A). Noise and disturbance associated with motorised boating poses a threat to birds and may reduce breeding success. Boating may also cause bank erosion. As such, access for boating is restricted to the lower reaches of the estuary.

viii. **Off-road driving**
   off-road vehicle driving will only be allowed where it is authorised in terms of the ORV Regulations.

ix. **Walking (Zones A - H):**
   No restrictions although cognisance must be taken not to unduly disturb wildlife, particularly roosting or nesting birds.

x. **Swimming (Zones A - H):**
   No restrictions.

xi. **Paddling (Zones A - H):**
   No restrictions.

xii. **Wind-driven watercraft (wind sailing, sailing boats: (Zones A - H):**
No restrictions.

xiii. **Jetski craft (Zones A - H):**
Not allowed.

xiv. **Camping (Zone C & E):**
Not permitted except for designated camping sites in Zone C and E.

C. Biodiversity Areas (Figure 10):

xv. **Sensitive salt marsh (Zone B & C):**
This includes areas of intertidal and supratidal salt marsh that are sensitive to disturbance. Access to these areas is prohibited apart from via formal paths that exist in these areas.

xvi. **Sensitive bird habitat (Zone B):**
The islands and salt marsh on the South African side are known to provide important habitat for birds, with highest counts typically associated with these areas. Zonation has been developed to limit disturbance to these areas and includes no-go areas for motorised boating and prohibition of shoreline angling from islands where roosting and nesting is known to occur.

xvii. **Vegetation along frontal dunes (Zone A):**
Vegetation established along the frontal dunes on the South African side serves to stabilise the dunes and prevent erosion. An access road passes along the back of the dune and through this area of sensitive vegetation. Vehicles must stay on the existing track to avoid impacting on sensitive vegetation.

xviii. **Rehabilitation zone (Zone D & F):**
This zone includes areas of recovering natural vegetation, old lands and degraded salt marsh habitat. Given management aims to rehabilitate this area, activities must be managed so as not to compromise rehabilitation efforts. Rehabilitation efforts must also be undertaken in such a manner as to limit impacts on already recovering areas and to maximise rehabilitation potential.

Table 6. Summary of restricted activities in Zones A – H. Filled (colour blocked) cells indicate the zone affected by the restricted activity. Where cells are subdivided, activities are pertinent to a limited area within that particular zone (and not the entire zone). See Section on Operational Specifications for more detail.

Restricted Activities	Zone							
	A: Coastal dunes and frontal estuary	B: Sensitive islands and salt marsh habitats	C: Fringing estuarine zones	D: Rehabilitation zone	E: Riparian zone	F: Terrestrial rehabilitation zone	G: Off-road driving club	H: Unclassified estuarine zone
No shore angling		■				N/A	N/A	
No motorised boating		■	■	■	■	N/A	N/A	
No jetskis	■	■	■	■	■	N/A	N/A	■
No off-road driving	■	■	■	■	■	■		■
No motorbikes or quad bikes	■	■	■	■	■	■		■
Sensitive salt marsh: No trampling		■	■	■		N/A	N/A	N/A
Sensitive bird habitat: No disturbance		■				N/A	N/A	
No livestock grazing	■	■	■	■	■	■	■	■
No pets allowed	■	■	■	■	■	■	■	■
No hunting	■	■	■	■	■	■	■	■
No camping	■	■	■	■	■	■	■	■
No agricultural activities	■	■	■	■	■	■	■	■
No public access (mining area)	■			■				■

CHAPTER 6: DETAILED MANAGEMENT ACTION PLANS

Action plans provide detail on specific actions required to facilitate the achievement of management objectives identified. The tables below provide details on the critical activities (actions), outcomes, responsibilities, phasing and indicative resource requirements. Leading institutions should ensure that activities are included in their annual work plans while supporting institutions should take note that they may be called upon to assist the leading institutions in undertaking management activities identified.

6.1 Action Plan for the Institutional Thematic Area

Strategic Goal 1: To establish viable institutional arrangements that promotes collaboration and accountability between all relevant stakeholders.											
Strategic Objective 1.1: To improve the formal conservation status and associated protection and management of the Orange River Mouth Ramsar site											
ID	**Key Issue**	**Management Objective**	**Management Activities**	**Output / Outcome**	**Leading Institutions**	**Supporting Institutions**	**Priority**	**Duration**	**Deadline**	**Indicative budget**	**Possible Funding Sources**
I2	The boundary of the Ramsar site is inconsistent, does not adequately incorporate important estuary and floodplain features and is poorly aligned with protected area boundaries.	To collaboratively review and update the boundary of the Ramsar site so that it incorporates relevant features.	Review and refine the Ramsar boundary including required buffer zones.	Revised boundary agreed to by South Africa and Namibia.	NA-MET (DRSPM) SA-DEA	NC-DENC Local Municipalities Richtersveld CPA NAMDEB ALEXCOR NACOMA	High	2 years	2015-2017	BCC	Internal subsistence budgets of relevant departments
			Notify Ramsar Secretariat of any changes to the Ramsar boundary.	Ramsar Secretariat notified of any changes to the boundary of the site.	NA-MET SA-DEA	NC-DENC	Medium	1 month	2016	N/A	Internal subsistence budgets of relevant departments
I3	Access to the site is not adequately monitored and controlled.	To ensure that access control to the Nature Reserve is improved	Erect a fence around the perimeter of the South-African section of the Protected Area.	South African section of site adequately fenced	NC-DENC		Medium	6 months	September - 2016	R 200 000	
			Construct main access gate at Delwerscamp facility.	Main access gate constructed	NC-DENC		Medium	3 months	September - 2016	R 100 000	NC-DENC Operational budget
			Ensure that access and use restrictions are communicated through appropriate demarcations and signage.	Signage clearly communicates access and use restrictions.	NA-MET NC-DENC	SA-DEA	Low	6 months	September - 2016	R 100 000	Government Departments Alexkor / NAMDEB / DEBMARINE

I1	Formal protection of the South African side of the Ramsar site is required to better secure management of the area.	To ensure that the South African section of the Ramsar site obtains formal protection status under NEMPAA	Review and revise the consent to place notice of intention to declare.	Notice revised with input from Richtersveld Community & legal advisors.	NC-DENC (Legal Services)	Richtersveld CPA	High	1 month	April - 2016	N/A	Internal NC-DENC budget
			Obtain formal approval of the "Consent to Declare" from all required stakeholders (Landowners, communities & government departments).	Notice signed by all relevant stakeholders	NC-DENC	Stakeholders SA-DEA	High	3 months	June - 2016	N/A	Internal NC-DENC budget
			With endorsement from DEA, publish a "Notice of intent to Declare" the site in the Government Gazette.	Notice published in Government Gazette and in at least two national newspapers and local	NC-DENC	SA-DEA	High	1 month	July - 2016	N/A	Internal NC-DENC budget
			Consider comments on gazette notice and prepare responses to I&APs and Minister	Comments and response document submitted to I&APs and Minister	NC-DENC	SA-DEA	High	3 months	December - 2016	N/A	Internal NC-DENC budget
			Preparation and publication of the "Proclamation Notice" in the Government Gazette.	Notice published in Government Gazette.	NC-DENC	SA-DEA	High	2 months	March - 2016	N/A	Internal NC-DENC budget
I4	There are insufficient resources and capacity to coordinate and implement effective management of the Protected area	To ensure adequate staffing and budget allocations to implement the management plan.	Second / appoint an interim Operational Manager to spearhead efforts to have the South African section of the site to initiated proper operational management of the site	Secondment / Appointment of Interim Operational Manager	NC-DENC/ SA-DEA	DEA	High	3 months	July - 2016	R 20 000 / month	WWF/SA-DEA
			Develop and approve a proposed staffing allocation for the South African section of the Protected Area.	Approved staffing structure and budget for the site.	NC-DENC	Richtersveld CPA/SA-DEA	High	6 months	July 2016	N/A	Internal funding from relevant departments
			Establish an office in the South African Section of the Protected Area, preferably at Delwerskamp	Office secured and occupied. Existing office can be upgraded	NC-DENC	Richtersveld Municipality DEA	High	6 months	July - 2016	100 000 pa	SA-DEA NC-DENC

			Develop and approve an operational budget to support implementation of this management plan and any subsequent protected area management plan.	Approved operational budget for the management of the site.	NC-DENC	Richtersveld CPA DEA	High	Ongoing	April - 2016	N/A	Internal funding from relevant departments
				Annual operational budgets available in line with management requirements.	NC-DENC/ NA-MET	DEA	High	Ongoing	2015 - 2017	N/A	Internal funding from relevant departments
			Ensure that an appropriate staff complement is appointed and retained in order to manage the protected area.	Staff members appointed and retained with appropriate responsibilities for the Protected area	NC-DENC	SA-DEA Richtersveld CPA	High	Ongoing	2016 - 2019	?	NC-DENC operational budget
					NA-MET		High	Ongoing	2016 - 2019	?	NA-MET operational budget
			Ensure that adequate funding is obtained to acquire necessary equipment and undertake the necessary management actions for the site.	Funding obtained is sufficient to implement the management plan.	NC-DENC	SA-DEA Richtersveld CPA	High	Ongoing	2015 - 2019	Informed by annual budget	NC-DENC operational budget
					NA-MET		High	Ongoing	2015 - 2019	Informed by annual budget	NA-MET operational budget
I5	There is a need to ensure regular review of management activities and revision of management planning.	To regularly monitor implementation of the management plan	Annual reporting to confirm that the site is being managed in accordance with the requirements of the plan.	Annual assessment of management effectiveness of protected area (including use of METT) tabled and presented to stakeholders.	NA-MET NC-DENC (Co-management body)	DEA	Medium	1 month	2015 - 2018	N/A	Internal budgets of relevant departments.
			Review of the strategic management plan.	Situational Assessment including a review of management effectiveness.	NA-MET	SA-DEA NC-DENC	Medium	3 months	2017	R 150 000	Relevant Government Departments Alexkor / NAMDEB / DEBMARINE

Strategic Objective 1.2: To develop institutional arrangements to support the implementation of well-coordinated actions towards improved management and wise use of the Orange River Mouth Protected Area											
ID	**Key Issue**	**Management Objective**	**Management Activities**	**Output / Outcome**	**Leading Institutions**	**Supporting Institutions**	**Priority**	**Duration**	**Phasing**	**Indicative budget**	**Possible Funding Sources**
I6	Although the ORMIMC has been established, trans-boundary collaboration can be improved	To improve trans-boundary collaboration in the management of the Protected Area	Formal discussions to be held between Namibia and South Africa to better collaborate in management	Bilateral agreement on structures including defined role for ORMIMC to collaborate in managing the ORM	NA-MET NC-DENC SA-DEA		High	6 months	2015	R 50 - 100 000	BCLME SAP IMP Project
			Resolve outstanding issues and list the site as a trans-boundary	Outstanding issues resolved	NA-MET SA-DEA	NC-DENC	High	15 month	2016	N/A	Internal funding from relevant departments
			Notify Ramsar Secretariat of intent to designate the ORM as transboundary site	Ramsar Secretariat notified	SA-DEA NA-MET	NC-DENC	High	24 months	2015- 2017	N/A	Internal funding from relevant departments
			Review and if necessary revise institutional structures to cater for better trans-boundary collaboration.	Formal institutional arrangements for trans-boundary collaboration agreed to and recognised by both countries.	NA-MET SA-DEA	NC-DENC	High	6 months	2016	N/A	Internal funding from relevant departments
			Regular meetings to be arranged to discuss trans-boundary issues.	Good attendance at meetings (held at least annually) by designated officials from both Namibia and South Africa.	NA-MET SA-DEA	NC-DENC	High	Ongoing	2015 - 2019	N/A	Internal funding from relevant departments

1.3: To ensure appropriate communication and collaboration with local communities, stakeholders and regional initiatives.											
ID	**Key Issue**	**Management Objective**	**Management Activities**	**Output / Outcome**	**Leading Institutions**	**Supporting Institutions**	**Priority**	**Duration**	**Phasing**	**Indicative budget**	**Possible Funding Sources**
I7	Appropriate institutional arrangements are required to facilitate active involvement of stakeholders in decision making.	To ensure active participation of stakeholders in the management of the Protected Area.	Implement appropriate institutional arrangements to actively involve landowners in management decisions	Institutional arrangements and supporting agreements formalised with landowners	NC-DENC	SA-DEA Richtersveld CPA	High	N/A	Complete	N/A	Internal funding from relevant departments
				Regular engagement with the landowners on management aspects.	NC-DENC	SA-DEA SA-DWA SA-DPW	Medium	Ongoing	2015 - 2019	N/A	Internal funding from relevant departments
			Implement supporting institutional arrangements to facilitate active involvement with local stakeholders, the private sector, NGOs and governmental departments.	Regular engagement with stakeholders.	NA-MET NC-DENC	All stakeholders	Medium	Ongoing	2015 - 2019	N/A	Internal funding from relevant departments
I8	There is a potential for management objectives to be undermined if not clearly communicated to and considered by institutions responsible for management of the Orange River basin.	Ensure regular engagement with relevant river management institutions to ensure that management objectives are considered and not undermined by catchment-related decisions.	Ensure that relevant contact points are identified and maintained in each institution.	Appropriate contacts with relevant institutions identified	NA-MET SA-DEA SA-DWA	ORASECOM PWC VNJIA	High	6 months	2016	N/A	Internal funding from relevant departments
			Ensure regular communication and engagement with contact points to ensure alignment between Ramsar and catchment management./ Orange river basin	Regular engagement on matters relevant to the management of the Orange River Mouth	NA-MET NA - MAWF SA-DEA SA-DWA JMB – joint management board DMR	ORASECOM PWC VNJIA	High	Ongoing	2015 - 2019	N/A	Internal funding from relevant departments
I9	There is potential for greater collaboration with the LOR TFCA initiative to support management objectives.	To foster good working relationships with the LOR TFCA initiative.	Engage with ARTP JMB to pursue opportunities for support, particularly in relation to tourism development opportunities.	Contacts made and maintained with active support from ARTP JMB.	NA-MET SA-DEA/ NC-DENC	ARTP JMB	Medium	Ongoing	2015 - 2019	N/A	Internal funding from relevant departments

Strategic Objective 1.4: To ensure that Ramsar obligations are addressed and communicated to the Ramsar Secretariat.											
ID	**Key Issue**	**Management Objective**	**Management Activities**	**Output / Outcome**	**Leading Institutions**	**Supporting Institutions**	**Priority**	**Duration**	**Phasing**	**Indicative budget**	**Possible Funding Sources**
I10	The South African section of the Protected Area (Site No.526) is on the Montreux Record – actions are required to remedy the ecological changes of the estuary.	Implement appropriate actions to ensure that the Protected Area is timeously removed from the Montreux Record.	Identify a clear suite of actions being undertaken to address ecological impacts and communicate these to the South African contact point.	Actions for addressing ecological impacts communicated to South African contact point.	SA-DEA		High	6 months	2016	N/A	Internal funding from relevant departments
			Identify monitoring indicators and associated monitoring activities being implemented to track ecological responses to proposed management actions.	Monitoring programme communicated to South African contact point.	SA-DEA		High	6 months	2016	N/A	Internal funding from relevant departments
			Compile a report indicating actions taken and submit to the Ramsar Secretariat.	Report motivating the withdrawal of the site from the Montreux record submitted to the Ramsar Secretariat.	SA-DEA/ NC-DENC		Medium	3 months	December - 2016	N/A	Internal funding from relevant departments
I11	Current Ramsar information sheets need to be updated prior to the next conference of parties.	To ensure that the Ramsar information sheet is regularly updated in line with Ramsar expectations.	Update Ramsar information sheet in line with new Ramsar guidelines.	Updated Ramsar information sheet submitted timeously to the Ramsar Secretariat.	NA-MET SA-DEA / NC-DENC		Low	3 months	December - 2015	N/A	Internal budgets of relevant departments.
I12	Regular contact with the national Ramsar contact point is required.	To regularly liaise with the Ramsar contact point regarding management of the site.	Maintain regular contact with National Ramsar contact point.	Good working relationship maintained with National Ramsar Contact Point.	NA-MET SA-DEA	NC-DENC	Low	Ongoing	2015 - 2019	N/A	Internal budgets of relevant departments.

6.2 Action Plan for the Ecological Thematic Area

Strategic Goal 2. To ensure ecological restoration, management and maintenance of the Orange River mouth Protected Area so as to maximize its functional integrity (C+ Ecological Category).											
Strategic Objective 2.1: To ensure that catchment management activities do not undermine local conservation efforts.											
ID	**Key Issue**	**Management Objective**	**Management Activities**	**Output / Outcome**	**Leading Institution**	**Supporting Institution**	**Priority**	**Duration**	**Phasing**	**Indicative budget**	**Possible Funding Sources**
E1	Insufficient information on flows in the lower Orange River and ecological flow requirements for the Orange River Mouth Estuary and nearshore marine environment.	To ensure that the availability of flow information in the lower Orange River is improved and flow requirements are established so as to better manage flows into the estuary and associated marine environment.	Construct a new gauging weir on the Lower Orange River	Improved flow information for the lower Orange River.	SA-DWS	ORASECOM	High	1 year	2016	Unknown	Already being financed
			Undertake an EFR study for the Orange River Estuary.	Baseline data collection including hydrodynamics, water quality, microalgae, macrophytes, invertebrates, fish and birds.	ORASECOM	BCLME SAP IMP Project SA-DWS DEA DAFF SAOEN SANBI BirdLife Municipality	High	1 year	Complete	R 750 000	Existing initiative: UNDP-GEF Orange-Senqu Strategic Action Programme
				Goods and services assessment of the Orange River Mouth.			Medium	6 months	March - 2016		
				EFR requirements corresponding to the present ecological state and future desired state			High	6 months	Marcy - 2016		
			Undertake an EFR study on flow requirements for the marine environment.	Assessment of the role of freshwater inflows and associated fluxes in the coastal and shelf marine ecosystems of the Orange River Mouth and the potential effects of changes in the freshwater-related fluxes into these ecosystems.	ORASECOM	BCLME SAP IMP Project	Medium	1 year	March - 2016		
				Setting up and running			Medium	1 year	May - 2016		

				a mathematical model to numerically model the foot print of the Orange River (both flow and sediment) on the nearshore marine environment and determining associated EFR requirements.							
E2	Existing operating rules of dams are not conducive to improved estuary conditions.	To influence decision-makers to amend the operating rules of dams, especially Vanderkloof dam.	Focussed interaction with decision makers to adjust operating rules of dams in the catchment to better serve estuarine requirements.	Operational rules of dam(s) in the catchment adjusted to better meet estuarine requirements.	SA-DWS NA-MET	PWC ORASECOM NC-DENC SA-DEA NA-DWA	Medium	Ongoing	2015-2019	N/A	Operational budgets
E3	Future dam developments in the catchment pose risks and opportunities for the Protected Area.	To ensure adequate input into relevant development applications in the catchment to ensure that risks and opportunities are adequately addressed in project design.	Liaise regularly with ORASECOM, PWC and Vioolsdrift and Noordoewer Joint Irrigation Authority in order to stay up to date with planned activities in the catchment.	Management authorities fully aware of any activities with a potential negative impact on the Protected Area.	SA-DEA/ NC-DENC NA-MET SA-DWS	ORASECOM PWC VNJIA NAMWATER NA-MAWF	Medium	adhoc	2015 - 2019	N/A	Operational budgets
			Identify and actively participate in any projects that can have a significant impact on the ecological integrity of the Protected Area (e.g. Neckertal & Vioolsdrift studies).	Focussed input into project design to ensure that risks to the ORM are adequately addressed.	SA-DEA/ NC-DENC NA-MET	ORASECOM PWC VNJIA NA-MAWF SA-DWS	High	On-going but mindful of project timelines	2015 - 2019	N/A	Operational budgets
E4	There is a need to assess and address the threat of further water quality deterioration.	To ensure that water quality impacts are effectively managed to prevent deterioration of the Orange River Mouth.	To proactively liaise with responsible government structures to address pollution risks.	Risks of water quality deterioration identified and managed through appropriate actions.	SA-DWS NA-MAWF	ORASECOM, PWC SA-DEA NC-DENC	Medium	Ongoing	2015 - 2019	N/A	Operational budgets

Strategic Objective 2.2: To implement directed management interventions to ensure recovery of the degraded saltmarsh area.											
ID	**Key Issue**	**Management Objective**	**Management Activities**	**Output / Outcome**	**Leading Institution**	**Supporting Institution**	**Priority**	**Duration**	**Phasing**	**Indicative budget**	**Possible Funding Sources**
E5	Careful management of the mouth is necessary to facilitate recovery of the saltmarsh habitat and to optimise fish nursery functions.	To manage the Orange River Mouth so as to facilitate recovery of the system and optimise fish nursery functions.	Collaboratively review and refine preliminary mouth management guidelines.	Revised mouth management guidelines.	SA-DEA NA-MET DENC	SA-DWS NA-DWA NA-MFMR CSIR SAEON	High	3 months	2016	R 50 000	Relevant Government Departments
			Implement guidelines for mouth management regarding the timing, conditions and methods for artificially breaching and closing the estuary mouth.	Mouth management optimised in line with management objectives.	SA-DEA / NC-DENC NA-MET	Alexkor NAMDEB	Medium	Ongoing	2015 - 2019		Operational budgets
E6	The causeway and other infrastructure need to be removed / breached to facilitate recovery of the degraded saltmarsh area.	To improve freshwater flows into the degraded saltmarsh area in order to promote rehabilitation of the degraded salt marsh habitat.	Refine rehabilitation plan based on learnings from previous rehabilitation activities and the need to also address social concerns.	Revised rehabilitation plan to address barriers to flows.	SA-DEA / NC-DENC	WfWetlands Alexkor WftCoast	High	3 months	March - 2016	R 100 000	Working for Wetlands
			Obtain relevant authorizations to proceed with rehabilitation.	Authorisation for proposed rehabilitation activities obtained.	Alexkor SA-DEA SA-DWS	NC-DENC WfWetlands	High	6 months	September 2016	R 50 000	Alexkor
			Implement rehabilitation actions to improve freshwater flows into the saltmarsh area.	Rehabilitation plan implemented	SA-DEA (NRM) / NC-DENC	Alexkor WFWetlands WftCoast	High	1 Year	March - 2016	R 22Million	DEA Alexkor / Working for Wetlands
E7	Existing oxidation ponds need to be removed and rehabilitated prior to breaching of the upper section of the causeway.	Remove and rehabilitate oxidation ponds	Obtain authorisation for proposed new sewage works and proposed rehabilitation of oxidation ponds.	Authorisation for new sewage works obtained.	Alexkor	DEA/ NC-DENC	High	3 months	Complete	N/A	Alexkor - legal requirement
			Remove walls on oxidation ponds and flatten oxidation ponds to facilitate flow of water through the area.	Area reshaped to facilitate more natural flows through the area.	Alexkor	DEA/ NC-DENC	High	3 months	March - 2016	N/A	Alexkor - legal requirement
E8	Windblown sediments from	To limit impacts from adjacent mining	Identify specific actions to problems of sand and salt	EMP updated to include specific	Alexkor	NC-DENC	Medium	6 months	September - 2016	R 50 000	Alexkor

	mining operations and seepage of saline water from slimes dams needs to be addressed to facilitate recovery of the degraded saltmarsh area.	operations through appropriate rehabilitation strategies.	input risks posed by mining activities on the salt marsh.	actions designed to address risks to the salt marsh.							
			Implement and monitor management actions to minimise the problem	Management actions successfully implemented and refined as necessary.	Alexkor	NC-DENC	Medium	18 months	September 2016	R 100 000	Alexkor

Strategic Objective 2.3: To actively promote research and ongoing monitoring to inform management activities.

ID	Key Issue	Management Objective	Management Activities	Output / Outcome	Leading Institution	Supporting Institution	Priority	Duration	Phasing	Indicative budget	Possible Funding Sources
E9	There is a need to promote scientific research and disseminate results to better understand the functioning of the estuary.	To improve understanding of ecosystem functioning through appropriate research and monitoring, to support management practices.	Identify research needs	Register of projects developed and implemented Reports of research	NA-MET NC-DENC SA-DEA SA-DWS SA-DST SA-DAFF	Research Institutes and Universities	Medium	Ongoing	2015 - 2019	N/A	Research Institutes and Universities
			Engage local research institutes and universities to collaborate on priority research projects		NA-MET NC-DENC SA-DWS SA-DEA SA-DST SA-DAFF	Research Institutes and Universities	Medium	Ongoing	2015 - 2019	N/A	
			Solicit research funding and support		NA-MET NC-DENC SA-DWS SA-DAFF SA-DST SA-DEA	Research Institutes and Universities	Medium	Ongoing	2015 - 2019	N/A	
E10	Research and monitoring is required to improve baseline data and assess changes in the	To collect baseline data and undertake follow-up monitoring necessary to evaluate responses of the ecosystem to	Determine Resource quality objectives for the Orange River Estuary based on the EFR study.	Resource quality objectives established.	SA-DWS NA-MAWF NC:DENC	ORASECOM DEA	High	6 months	March - 2017	R 75 000	UNDP-GEF Orange-Senqu Strategic Action Programme
			Develop a long-term monitoring programme to	Long-term monitoring program developed	ORASECOM/ DWS	NA-MET NC-DENC	Medium	3 months	December 2017	R 10 000	Committed funding: UNDP-GEF Orange-

	ecosystems responses to management activities.	management activities.	assess the efficacy of environmental flows and other management interventions			BCLME SAP IMP Project Research Institutions DEA- DAFF					Senqu Strategic Action Programme Peter Ramollo – Mr Swart
			Collaboratively agree on a pragmatic monitoring programme.	Agreed monitoring programme	SA-DEA / NC-DENC NA-MET	SA-DWA NA-MAWF	Medium	3 months	March 2017	N/A	Relevant Departments
			Secure commitment, funding & support from relevant organizations for the implementation of the monitoring programme	Funding secured for implementation of the monitoring plan	NA-MET SA-DEA / NC-DENC	SA-DWA NA-MAWF SAEON	Medium	3 months	March 2017	N/A	Medium
			Undertake regular monitoring to assess the degree to which resource quality objectives are being met.	Database of monitoring activities maintained and evaluated against operational specifications.	SA-DEA / NC-DENC SA-DWA NA-MAWF DAFF	NA-MET SAEON Research institutions	Medium	Ongoing	2016 - 2019	?	All respective institution
			Monitor recovery of saltmarsh and assess the need for further management intervention.	Rehabilitation monitored and the need for further interventions identified.	SA-DEA / NC-DENC SAEON	SAEON WfWetlands	Medium	Ongoing	2016 - 2019	R 50 000 pa	SAEON
Strategic Objective 2.4: To ensure that recreational, resource use and other activities are adequately controlled in line with conservation objectives											
ID	**Key Issue**	**Management Objective**	**Management Activities**	**Output / Outcome**	**Leading Institution**	**Supporting Institution**	**Priority**	**Duration**	**Phasing**	**Indicative budget**	**Possible Funding Sources**
E11	There is a need to harmonise bag and size limits and improve control of angling activities to prevent over-exploitation of fish stocks.	To ensure that fishing efforts are monitored and controlled within acceptable limits	Review and align fish offtake quotas based on an improved understanding of the importance of the mouth as a fish nursery area	Bag limits/ offtake Regulations aligned between SA & Namibia Examine the need of no-take area in the Protected Area	SA-DAFF NA-MFMR NC-DENC	Research Institutes	Medium	3 months	March - 2017	R 50 000	Research grants / BCLME SAP IMP Project
			SA-DAFF and SAP to provide	Increased presence	NC-DENC	SA-DEA /	Medium	6 months	2015 - 2019	?	SA-DAFF & SAPD

			staff and to undertake additional patrols on the Orange River estuary with a view to better control fishing activities, particularly during holiday periods	and visibility of Enforcement staff	DAFF SAPD						DENC
			Find practical ways of improving monitoring and enforcement of fishing activities on the Namibian side.	Increased monitoring of fishing activities	NA-MFMR	NA-MET NAMPOL	Medium	1 year	March - 2016	N/A	Operational budgets
			Monitoring and enforcement of applicable legislation and adherence to best practice guidelines	Improved compliance with legal requirements	SA-DAFF NA-MFMR	NC-DENC NA-MET	High	Ongoing	2015 - 2019	N/A	Operational budgets
E12	Appropriate controls on boating required to prevent undue disturbance to waterbirds and other associated impacts.	To ensure that boating activities do not have a negative effect on bird populations or undermine other ecological attributes.	Review zonation plan in light of boating activities and potential conflict with important bird areas.	Boating activities appropriately considered and integrated into final zonation plan.	SA-DEA NC-DENC NA-MET-DPWM NA-MFMR	Richtersveld CPA, Regional Councillors, Oranjemund Municipality	Medium	6 months	March - 2016	N/A	DPWM, SKEP, Local Government
			Design and implement a permitting system to control boating activities.	Boats permitted and understand restrictions of use.	NC-DENC NA-MET		Medium	6 months	September - 2016	N/A	Operational budgets
E13	Off-road driving is leading to degradation of the coastal dunes and could negatively impact floodplain vegetation.	To minimise impacts on coastal dunes and floodplain vegetation by controlling off-road driving. On the South African side, off-road driving will only be allowed where it is authorised in terms of the ORV Regulations.	Law enforcement officials & EMI's to be appointed and designated to do law enforcement - monitor beach driving without necessary permits.	Beach driving activities appropriately controlled Consider appropriate launch sites/legitimate activities	SA-DEA SA-DAFF NA-MET Engage with Nam.	SA-DEA / NC-DENC NA-MET	High	Ongoing	2015 - 2019	N/A	Operational budgets
			Review zonation plan to ensure that off-road driving restrictions are appropriately integrated.	Off-road driving activities considered and integrated appropriately into final zonation plan.	NC-DENC NA-MET-DPWM	Richtersveld CPA, Regional Councillors, Oranjemund Municipality, SKEP	Medium	6 months	March - 2017	N/A	DPWM, SKEP, Local Government
			Work with the off-road club to implement zonation plan.	Impacts of off-road driving on sensitive	NA-MET	Off-road Club Oranjemund	Medium	Ongoing	2015 - 2019	N/A	Operational budgets

				areas are within acceptable levels.		Municipality NAMDEB					
E14	The existing road network should be rationalized to limit impacts on estuarine habitat and associated biota.	To rationalise and maintain a road network that is ecologically acceptable and provides adequate accessibility for recreational and tourism activities.	Review existing road network and identify what changes are necessary to improve the status quo.	Road network reviewed and changes clearly identified and prioritized.	SA-DEA / NC-DENC NA-MET	Local Municipalities NAMDEB	Medium	6 months	March - 2016	N/A	Operational budgets
			Rationalise and maintain a network of usable roads in the Protected Area.	Road network rationalised in line with strategic priorities.	SA-DEA / NC-DENC NA-MET	Local Municipalities Alexkor NAMDEB	Medium	Ongoing	2016 - 2017	R 50 000 p.a.	Operational budgets Alexkor, NAMDEB
E15	Livestock grazing needs to be appropriately managed as domestic animals detract from the tourism value of the site and compete for valuable grazing resources.	To ensure that livestock grazing is appropriately managed in line with the conservation and socio-economic objectives of the Protected Area.	Harmonise policies on livestock access and control.	Policies between SA and Namibia harmonised.	SA-DEA / NC-DENC NA-MET	Richtersveld CPA	Medium	6 months	March - 2017	N/A	Operational budgets
			Actively manage domestic livestock in line with access and control policies. No domesticated animals	Domestic livestock appropriately managed.	SA-DEA / NC-DENC NA-MET	Richtersveld CPA	Medium	Ongoing	2015 - 2017	N/A	Operational budgets
E16	Appropriate mechanisms of waste management and removal are required to limit waste accumulation.	To ensure that waste is limited and regularly removed from the site.	Ensure that dust bins are provided at appropriate localities.	Bins located at strategic locations.	NA-MET Local Municipalities	DENC	High	6 months	March - 2016	R 20 000	Alexkor NAMDEB
			Ensure that waste is regularly removed from the site.	Waste is well managed.	NA-MET SA-DEA / NC-DENC	Alexkor NAMDEB Local Municipalities	High	Ongoing	2015 - 2019	N/A	Operational budgets
E17	Appropriate restrictions are required to prevent unnecessary disturbance of biota as a result of aircraft	Disturbance to birds and wildlife is limited by applying appropriate restrictions to aircraft flying in the vicinity of the Protected Area.	Review and if necessary incorporate flight restrictions for flights on the South African side.	SA flight restrictions clearly documented.	SA-DEA / NC-DENC	SACAA	Low	6 months	March - 2016	N/A	Operational budgets
			Raise awareness amongst pilots of these restrictions through appropriate communication mechanisms.	Pilots aware of flight restrictions over Protected Area.	SA-DEA / NC-DENC NA-MET NDCA	SACAA Air Namibia Deb-Marine	Low	Ongoing	2015 - 2019	N/A	Operational budgets

	activities.										
Strategic Objective 2.5: To ensure that estuarine and associated wetland habitats are managed in such a way that the ecological functioning and habitat value of these areas is maintained or enhanced.											
ID	**Key Issue**	**Management Objective**	**Management Activities**	**Output / Outcome**	**Leading Institution**	**Supporting Institution**	**Priority**	**Duration**	**Phasing**	**Indicative budget**	**Possible Funding Sources**
E18	Alien invasive plants need to be controlled in order to maintain and improve the integrity of estuarine vegetation.	To maintain the site largely free of alien invasive plants.	Assess the current distribution and density of alien invasive plants in the Protected Area.	Map and supporting document indicating the extent and intensity of alien plan infestations.	NA-MET NC-DENC SA- DEA	Working for Water	High	6 months	March 2017	R 30 000	Operational budgets Working for Water Working for Wetlands
			Prioritise activities according to current available budget, including follow up	APOs produced to address alien plant control issues.	NA-MET NC-DENC SA-DEA	Working for Water	Medium	Ongoing	2015 - 2019	N/A	Operational budgets
			Implement removal programmes for priority species and areas	Progress against APO	NA-MET NC-DENC	Working for Water	Medium	Ongoing	2015 - 2019	R100 000 p.a.	Operational budgets Working for Water Working for Wetlands
			Regular monitoring of alien plant infestations undertaken to inform planning and management.	Biannual monitoring reports indicating the location and intensity of alien plant infestations.	NA-MET NC-DENC	Working for Water	Low	Ongoing	2015 - 2019	R30 000 alternate years	Operational budgets Working for Water
E19	Actions are required to enhance habitat for focal bird species and address threats to existing populations.	To ensure the effective management and conservation of waterbird species.	Compile, maintain and expand bird species lists, including species of special concern	Updated species list	NA-MET NC-DENC SA-DEA	NAMDEB Research Institutes Universities NGO's (e.g. Birdlife SA)	High	Ongoing	2015 - 2019	N/A	Operational budgets
			Develop and implement bird surveys of selected taxa and monitoring programmes for selected species of special concern	Monitoring results	NA-MET NC-DENC	NAMDEB Research Institutes Universities NGO's (e.g. Birdlife SA)	High	Ongoing	2015 - 2019	N/A	Research grants NAMDEB
			Develop and implement management prescriptions for particular species, where required.	Management prescriptions identified and implemented	NA-MET NA-MFMR NC-DENC	Research Institutes and Universities and NGO's	Medium	Ongoing	2015 - 2019	N/A	Operational budgets
E20	Saltwater	To ensure that	Undertake a study to	Conservation value of	NAMDEB	NA-MET	High	6 months	December -	R 100 000	NAMDEB

	intrusion and wastewater inputs may be affecting the size and habitat characteristics of the adjoining Pink Pan wetland system.	potential impacts on the nearby Pink Pan are appropriately mitigated and managed.	understand and assess the conservation value of Pink Pan and associated wetlands.	the pan assessed and adequately described.					2017		
			Assess the potential impacts of saltwater intrusion and wastewater inputs on the ecological character of Pink Pan	Potential impacts assessed and mitigation / rehabilitation measures identified.	NAMDEB	NA-MET	High	6 months	December - 2017	R 100 000	NAMDEB
			Take appropriate steps to secure appropriate management of Pink Pan and associated wetlands if appropriate.	Actions taken to address any negative impacts.	NAMDEB	NA-MET	High	1 year	March - 2017	Unknown	NAMDEB
E21	There is a need to identify and implement appropriate management prescriptions and practices.	To maintain natural ecosystem patterns and processes through the development and implementation of appropriate management prescriptions and practices, so as to ensure optimum biodiversity.	Develop a management classification system: Subdivide areas into management units and assign management classes.	Map and descriptions of management classes.	DEA NA-MET NC-DENC		Medium	6 months	June – 2017 (To feed into zonation plan)	R 50 000	NACOMA NAMDEB Foundation
			Identify habitats or areas requiring specific management intervention (e.g. ecotones, rivers, wetlands) and develop guidelines for their management.	Management guidelines developed and indicated on APOs	DEA NA-MET NC-DENC		Medium	3 months	March - 2017	R 50 000	NACOMA NAMDEB Foundation refer to EWR study vegetation map

6.3 Action Plan for the Socio-Economic Thematic Area

Strategic Goal 3. To promote nature-based recreation and ecotourism, sustainable resource use and stimulate local social and economic benefits.											
Strategic Objective 3.1: To promote local beneficiation by growing and actively marketing a range of nature-based recreation and tourism products.											
ID	**Key Issue**	**Management Objective**	**Management Activities**	**Output / Outcome**	**Leading Institution**	**Supporting Institutions / Initiatives**	**Priority**	**Duration**	**Phasing**	**Indicative budget**	**Possible Funding Sources**
SE1	A focussed tourism development plan is required to grow tourism activities associated with the Protected Area.	To develop and implement Tourism Development Plan to guide the systematic development of nature-based tourism products in the ORM Protected Area.	Develop and endorse a long-term strategic approach to tourism development and income generation linked with regional initiatives.	Strategy and support programme for tourism development and income generation in the Protected Area.	NA-MET-DPWM SA-DOT Department of Economic Development and Tourism	SA-DEA NA-DOT, SKEP, NA-MME, Landowners, Municipalities, Tour Operators, Local Communities	High	1 year	March - 2017	R 200 000	SA-DOT SKEP DPWM SATB Alexkor NAMDEB
			Link closely with existing initiatives aimed at growing the tourism market in the area, in particular the LORTFCA initiative.	Liaison & cooperation forums established and maintained.	NA-MET-DPWM SA-DOT	LORTFCA ARTP-JMB NA-DOT Municipalities SA-DEA NCTA	High	Ongoing	2015 - 2019	N/A	Operational budgets
SE2	There is a need to improve existing tourist and recreational facilities and activities.	Strive to attract greater tourism interest through the provision of additional tourism & recreation activities.	Motivate to improve and develop tourism & recreation infrastructure and activities in accordance with recommendations in Tourism Development Plan.	Business plans compiled to lobby for funds to finance upgrading and development of priority facilities.	Richtersveld CPA Concessionaires, NA-MET-DPWM	Municipalities SA-DEA SA-DENC / NC-DENC	High	Ongoing	2015 - 2019	>R 500 000	NAMDEB foundation, Alexkor, SA-DEA-O&C
SE3	Marketing strategies need to be implemented to encourage tourists to visit the area.	To develop and implement a marketing strategy for the ORM Protected Area.	Develop a marketing strategy for the Protected Area to promote the area and tourism products.	Integrated Marketing Strategy for the area	NA-NTB SA-DOT NA-DOT	SA-DEA / NC-DENC SATB Local Municipalities Peace Parks NAMDEB SAN Parks Richtersveld	High	1 year	March - 2017	>R 100,000	NAMDEB Foundation NTB SATB

						CPA Concessionaires					
			Implement marketing strategy	Improved marketing of the area as a tourist destination	NTB SA-DOT NA-DOT	SA-DOT NA-MET-DPWM Richtersveld CPA	High	Ongoing	2015 - 2017	R 50 000 p.a.	NTB SATB NAMDEB Foundation DOT
			Monitor visitor usage statistics	Regular summary of visitor statistics	NA-MET-DPWM NC-DENC	Concessionaires, Immigration offices	Low	Ongoing	2015 - 2017	N/A	Operational budgets
SE4	There is a need to ensure that tourism-related benefits accrue to local target communities.	Encourage involvement of local communities and HDIs in the utilization and service provision of tourism & recreation products in the Protected Area.	Ensure that local communities and HDIs are made aware of opportunities for the provision of tourism & recreation activities	Local community members informed of opportunities for provision of tourism & recreation activities	NA-MET-DPWM SA-DEA / NC-DENC	Municipalities Richtersveld CPA	High	Ongoing	2015 - 2017	N/A	Operational budgets NACOMA SA-DEA
			Ensure that procurement policies favouring local communities and HDIs are implemented.	Local community members are actively involved in tourism initiatives.	NA-MET-DPWM NC-DENC	Municipalities Richtersveld CPA	Medium	Ongoing	2015 - 2017	N/A	Operational budgets
Strategic Objective 3.2: To promote environmental education and awareness.											
ID	**Key Issue**	**Management Objective**	**Management Activities**	**Output / Outcome**	**Leading Institution**	**Supporting Institutions / Initiatives**	**Priority**	**Duration**	**Phasing**	**Indicative budget**	**Possible Funding Sources**
SE5	There is an opportunity to promote educational activities at the site.	To promote conservation through appropriate education and awareness initiatives.	Identify, prioritise and implement actions necessary to support education and awareness.	Education and awareness programs successfully implemented.	NA-MET-DPWM SA-DEA / NC-DENC	NA-MET-DPWM NAMDEB Richtersveld CPA SKEP Concessionaires	Medium	Ongoing	2015 -2019	N/A	Operational budgets NACOMA SA-DEA
Strategic Objective 3.3: To ensure that use both within and around the Protected Area is controlled and managed in line with other strategic objectives.											
ID	**Key Issue**	**Management Objective**	**Management Activities**	**Output / Outcome**	**Leading Institution**	**Supporting Institutions / Initiatives**	**Priority**	**Duration**	**Phasing**	**Indicative budget**	**Possible Funding Sources**
SE6	Potential conflict between conservation	To ensure that any potential land use conflicts are resolved prior to proclamation.	Hold a workshop with the CPA to formally present the proposal for proclamation and associated implications to the	Support for proclamation and the management plan	SA-DEA / NC-DENC	Richtersveld CPA	High	1 month	Complete	N/A	Operational budgets

	and community land use objectives could undermine the proclamation process on the South African side.		Richtersveld CPA								
			Consult with local communities (Alexander Bay, Eksteen fontein, Kuboes & Lekkersing & Sandrif) to clearly explain implications of proclamation and to resolve any land use conflicts.	Potential land use conflicts resolved prior to proclamation.	SA-DEA / NC-DENC	Richtersveld CPA	High	2 months	Complete	N/A	Operational budgets
SE7	There is a need to review and refine the draft estuary zonation scheme to manage activities within the Ramsar site.	To manage activities within the Protected Area in line with management objectives.	Review and refine the draft zonation plan for the site in consultation with interested and affected stakeholders.	Zonation updated and finalised with stakeholder inputs.	SA-DEA NC-DENC NA-MET-DPWM	Richtersveld CPA, Local Municipalities SKEP NA-MME NAMDEB	Medium	6 months	March - 2016	R 100 000	NA-MET-DPWM SKEP Local Government NACOMA NAMDEB
			Manage activities within the site through implementation of the zonation plan.	Activities compliant with zonation plan.	SA-DEA / NC-DENC NA-MET-DPWM	NA-MME NAMDEB	High	Ongoing	2016 - 2017	N/A	Operational budgets
SE8	There is a risk of future land use planning activities around the site undermining the ecological and aesthetic character of the area.	To mainstream biodiversity into land use planning and decision making	Engage with Oranjemund Municipality and NAMDEB to see if the boundary of the town can be adjusted to better account for the Protected Area and associated buffer zone.	To minimise potential development conflicts that could undermine strategic management objectives.	NC-MET	NACOMA Planning Consultants Oranjemund Municipality	High	6 months	March - 2016	N/A	Operational budgets
			Engage with municipalities to ensure that IDPs, SDFs and other planning frameworks incorporate biodiversity priorities	Integration of biodiversity priorities into IDPs & SDFs of Local and District Municipalities.	SA-DEA / NC-DENC NA-MET-DPWM	Municipalities Richtersveld CPA NAMDEB NA-MME Alexkor	Medium	Ongoing	2015 - 2019	N/A	Operational budgets
			Engage with all relevant land use planning processes within the buffer zone to ensure that biodiversity priorities and	Comments submitted as an interested and affected party for	SA-DEA / NC-DENC NA-MET-DPWM	NA-MET NA-MME Municipalities Richtersveld	High	Ongoing	2015 - 2017	N/A	Operational budgets

			objectives are addressed (including EIA's)	EIA's within the buffer zone.		CPA NAMDEB Alexkor					
			Establish a network with relevant authorities and parties to ensure that management authorities are timeously notified of land use change and development applications that may negatively impact on the possible conservation outcome within the buffer zone area. Monitor compliance with environmental authorisations where appropriate.	Records available. Networks established.	SA-DEA / NC-DENC NA-MET-DPWM	Municipalities Richtersveld CPA Alexkor NAMDEB	High	Ongoing	2015 - 2019	N/A	Operational budgets

CHAPTER 7: MONITORING AND EVALUATION PROGRAMMES

It is essential to know, and to be able to demonstrate to others, that the management objectives and operational targets are being achieved. Contracting parties of the Ramsar convention have therefore been strongly encouraged to include within management plans a regime for regular and rigorous monitoring to detect changes to ecological character (Ramsar, 2010). Monitoring in this sense needs to include two aspects (i) to manage potential changes in the ecological character of the site and (ii) to report back on implementation of the management plan (Ramsar, 2010).

7.1 Monitoring implementation of the management plan

Ramsar guidelines suggest that regular review of management activities should be undertaken to ensure that the site is being managed appropriately (Ramsar, 2010). Based on these guidelines, the following monitoring procedure is proposed:

Annual review

The short-term review should be designed to confirm that a site is being managed in accordance with the requirements of the plan. Given the trans-boundary nature of the Ramsar site, it is suggested that both South Africa and Namibia compile an annual report of management activities in line with the management plan and that this be presented for discussion at an annual meeting between the two countries and open to broader stakeholder participation. This should ideally take place before any budget planning of key institutions to ensure that any key actions requiring funding can be incorporated into budgeting for the year ahead. The Management Effectiveness Tracking Tool outlined below provides a potential framework for reporting purposes.

The Management Effectiveness Tracking Tool

The Management Effectiveness Tracking Tool (METT) ([http://assets.panda.org/downloads/mett2_final_version_july_2007.pdf]) is designed to track and monitor progress towards worldwide protected area management effectiveness. It is aimed at being cheap and simple site level tool to use by park staff, while supplying consistent data about protected areas and management progress over time.

The Tracking Tool aims to:
- Identify progress on management effectiveness of protected areas;
- Provide baseline data on a protected area portfolio and assist with reporting and accountability;
- Identify portfolio trends and priorities for the development of appropriate tools and policies;
- Identify key management issues in a specific protected area and how to resolve these issues; and
- Identify appropriate follow-up steps, particularly at the site level.

This tool is being implemented by various provincial conservation agencies across South Africa as a means of annual monitoring and is recommended for application in this site.

Major review or audit

The purpose of undertaking a performance review of implementation of the management plan should be to:

- Assess whether or not a site is being managed at least to the required standard;
- Confirm, as far as possible, that management is effective and efficient; and
- Ensure that the status of the site features is being accurately assessed.
- Assist in determining the focus for plans of operation and the setting of appropriate time frames and budgets by different parties.

The audit process is best, though not always necessarily, carried out by external auditors. It is a constructive process which should identify any problems or concerns and seek to provide recommendations for resolving any issues Ramsar, 2010). Given the need for revision of this strategic plan on a 5-yearly basis, it is recommended that this audit be undertaken as part of the situational assessment required in preparation for an updated strategic plan in 2016.

Table 7. Schedule for annual and major reviews.

Focus	Monitoring Action	Timing
1. **Annual Review**	Short-term review to confirm that a site is being managed in accordance with the requirements of the plan.	Annually (2015 – 2019)
2. **Major review / audit**	Performance review as part of the situational assessment necessary in preparation for the revision of the strategic plan.	2019

7.2 Monitoring of ecological aspects

Despite a number of studies on various components of the Estuary, there is no regular monitoring taking place in the estuary apart from regular CWAC counts. Baseline information for fish and birds is reasonably good while baseline information on aspects such as microalgae, macrophytes and invertebrates is either lacking or extremely limited. In response to this need, a research study on environmental flows for the Orange River Mouth is being commissioned by ORASECOM. This study will serve to significantly improve baseline information on the present ecological state of the site and provide clarity on the need for future monitoring (See text box below for further details).

Objectives and expected outcomes of the research study on environmental flows for the Fish River and Orange River Mouth (UNDP-GEF Orange-Senqu Strategic Action Programme, 2011)

This Research Project on environmental flows shall:

- Focus on the Fish River and the Orange-Senqu downstream of its confluence with the Fish, including a particular focus on the Orange-Senqu River Mouth.
- Engage stakeholders.
- Develop and implement a baseline monitoring programme covering flow-related biophysical parameters. The monitoring programme shall cover a wide range of flow conditions in at least one full hydrological cycle.
- Document monitoring results in an environmental flows database.
- Research and assess non-flow related impacts.
- Describe the Present Ecological State.
- Define (at the "intermediate" level of detail, where applicable) environmental flows that would be required to maintain a range of ecological state at selective site(s) in the Fish and the Lower Orange as well as at the Orange-Senqu River Mouth.
- Recommend attainable and satisfactory environmental flows for application.
- Design a long-term monitoring programme to assess the efficacy of environmental flows and other management interventions.
- Cooperate with and provide specific inputs to related projects, namely the Vioolsdrift and Neckertal Dam projects, as well as the Orange-Senqu River Mouth Management Plan.

Until such time as a formal monitoring programme has been established, monitoring of key components, particularly in relation to the degraded salt marsh area is required (to track effectiveness of rehabilitation actions). Minimum recommended monitoring actions are provided in Table 8, below. These have been based on CSIR recommendations (CSIR, 2003) and were then refined through further stakeholder engagement.

Table 8. Interim monitoring programme for the site.

Ecological Component	Monitoring Action	Temporal Scale (Frequency and when)	Spatial Scale (No. Stations)	Responsibility
Birds	Undertake CWAC counts of all water-associated birds. All birds should be identified to species level and total number of each counted.	Winter (July) and summer (mid-January to mid-February) survey yearly	Entire estuary (Include focussed counts for degraded salt marsh area)	NC-DENC & NA-MET
Fish	Fish sampling using seine-nets to sample small and juvenile fish and gillnets to sample adults are the appropriate gear.	At least twice a year when the saltmarsh area is inundated.	Degraded salt marsh area	NC-DENC
Macrophytes	Map main macrophyte communities using aerial photos and GPS	Annually	Degraded salt marsh area	DENC (SAEON)
	Permanent transects (a fixed monitoring station that can be used to measure change in vegetation in response to changes in salinity and inundation patterns)	Annually	Degraded salt marsh area	DENC (SAEON)
	Fixed point photography	Monthly during rehabilitation phase	Fixed points with a view over the degraded salt marsh area (taken from the causeway)	DENC (SAEON)
Water Quality	Water quality measurements on system variables [conductivity,	Quarterly	Oppenheimer Bridge	SA-DWA / NA-DWA

Ecological Component	Monitoring Action	Temporal Scale (Frequency and when)	Spatial Scale (No. Stations)	Responsibility
	temperature, pH, dissolved oxygen, turbidity, suspended solids], inorganic nutrients [e.g. nitrate, ammonium and reactive phosphate], *E.coli* and, if possible, toxic substances in river water entering at the head of the estuary			
Hydrodynamics	Observations on the state of the mouth. The time at which the observation was made and the state of the tide must also be recorded, ideally at low tide.	Daily observation when the mouth is nearly closed or closed.	Estuary mouth	DENC (SAEON)

7.3 Monitoring of tourism activities

Given the importance of tourism as a vehicle for social upliftment in the region, monitoring of tourism activities and revenue generated is recommended. Some possible measures that should be considered include:

- **Visitor statistics**: Compiling statistics of visitor usage to available facilities would help to better understand the range of tourists using the Ramsar site. This would provide a useful measure for any marketing measures taken and, if correct information is collated, could help to inform future development planning in the area.
- **Recreational activities:** It would be useful to monitor the number of people making use of the Ramsar site for various activities.

While there are currently no means of compiling such statistics, this is suggested as an activity in the management plan.

CHAPTER 8: REFERENCES

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