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I, Anton Bredell, Minister of Local Government, Environmental Affairs and Development Planning, hereby approve the Sout (Noord) River Estuary Estuarine Management Plan for implementation.

Anton Bredell

Minister of Environmental Affairs and Development Planning

Date:

Disclaimer

The Estuarine Functional Zone depicted in this estuarine management plan will be subject to change based on new data published from time to time.



EXECUTIVE SUMMARY

The National Environmental Management: Integrated Coastal Management Act (Act 24 of 2008) (ICMA) was developed to facilitate the sustainable use and management of South Africa's coastline and coastal and estuarine resources. The ICMA requires that estuaries within South Africa are managed in a co-ordinated and efficient manner, and in accordance with the National Estuarine Management Protocol (NEMP), the National Coastal Management Programme (CMP) and the Western Cape CMP, which lay out specific objectives for management of the South African coastline, including estuaries. This document represents the first-generation Estuarine Management Plan (EMP) for the Matjies River estuary developed under the auspices of the Western Cape Estuarine Management Framework and Implementation Strategy (EMFIS), a strategic project emanating from the provincial CMP, specifically priority area 7.

The purpose of this EMP is to provide the Vision of the future desired state of the Matjies River estuary and guide the management of human activities in and around the system by setting out strategic objectives, management priorities and detailed management strategies with actions/activities. The co-ordination of the implementation of the EMP vests with the responsible management authority (RMA) as per the NEMP.

Geographical Boundaries

The Matjies River estuary is defined in the 2018 National Biodiversity Assessment (NBA) (SANBI, 2019) as a small temporarily closed estuarine system situated in the Annex Arch Rock Private Nature Reserve approximately 1 km east of Keurboomstrand, in the Bitou Local Municipality, in the Garden Route District of South Africa's Western Cape Province. The size of the estuary, as defined by the estuarine functional zone (EFZ), is approximately 2.5 ha, extending over a length of 0.6 km.

Vision and Objectives

The following Vision for the Matjies River estuary was proposed at a public meeting held in November 2017 in Stormsriver and agreed to at a second meeting held in August, 2018.

The Matjies River estuary is a natural and functional system, preserved for current and future generations

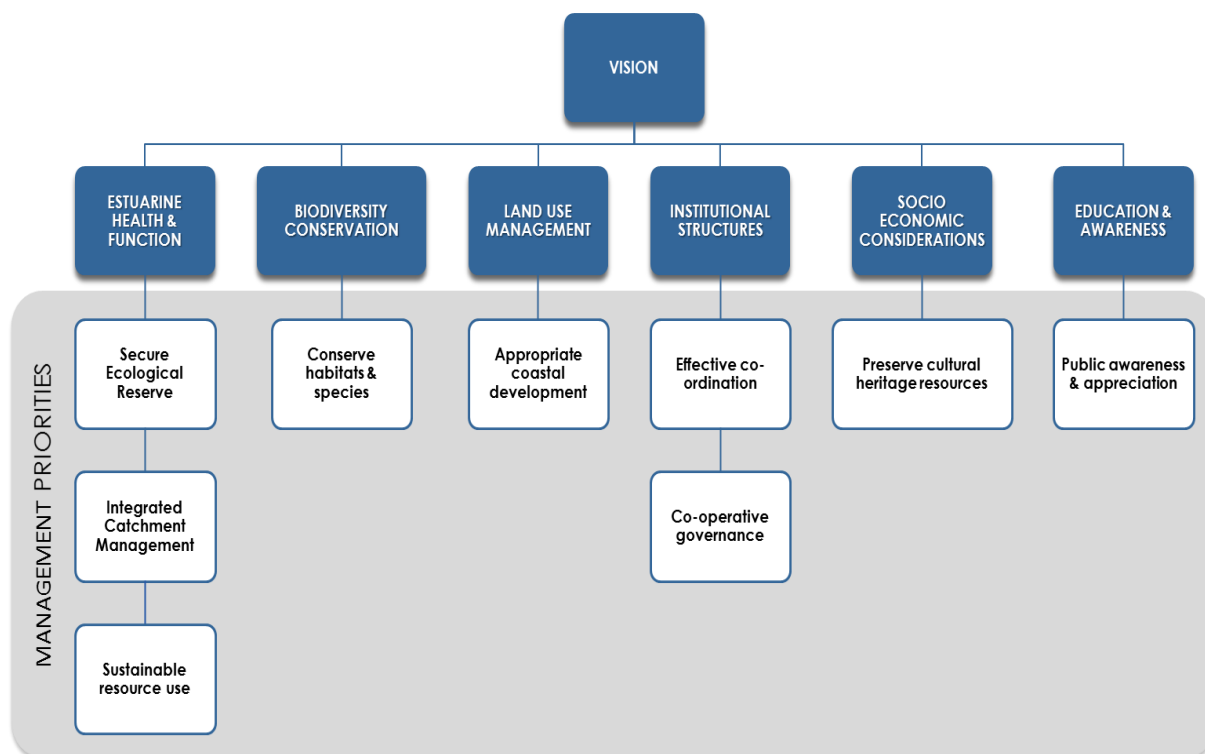
The Strategic objectives for the Matjies River estuary are as follows:

Sector / Category	Strategic Objective	Performance Indicator(s)	Priority
1 Estuarine Health and Function	The ecological health and natural functioning of the Matjies River estuary maintained and safeguarded	<ul style="list-style-type: none">• Maintain a B ecological condition• Ecological Reserve secured and implemented• Effective catchment management and maintenance of good water quality	MEDIUM

			<ul style="list-style-type: none"> • Ongoing flow and water quality monitoring programmes in place • Invasive alien plant infestations managed • Resources utilised within legal and sustainable limits • Illegal activities controlled • Healthy biological communities 	
2	Biodiversity Conservation	The biodiversity of the Matjies River estuary is conserved	<ul style="list-style-type: none"> • EMP incorporated into the Garden Route Biosphere Reserve (GRBR) • EMP incorporated into the Bitou LM IDP and SDF • Spatial zonation plan is adopted and enforced 	LOW
3	Land-use and Infrastructure Planning and Development	Impacts associated with developments and proposed changes in land-use, including infrastructure and agriculture, are minimised	<ul style="list-style-type: none"> • EMP included in all relevant planning documents • All development and land use changes surrounding and within the EFZ comply with environmental legislation and environmental best practice / risk aversion approach • Any additional transformation of estuary margins prevented 	LOW
4	Institutional and Management Structures	The Matjies River estuary is managed well through effective co-operative governance	<ul style="list-style-type: none"> • EMP is seamlessly incorporated into the Bitou IDP and SDF • Regional estuary advisory forum is established and meets regularly • Ongoing commitment from relevant authorities • Estuarine bylaws or regulations are gazetted 	HIGH
5	Socio-economic Considerations	Socio-economic benefits are regulated to ensure sustainable use of the Matjies River estuary and its resources	<ul style="list-style-type: none"> • Cultural heritage resources are protected and facilities maintained • Employment of local communities 	MEDIUM
6	Education & Awareness	Members of society are sensitive to and aware of the value and importance of the Matjies River estuary	<ul style="list-style-type: none"> • Increase in number of research projects • Signage erected and information disseminated • Awareness programme developed and successfully implemented on an on-going basis 	LOW

Priority management objectives and associated activities

An illustrative overview of the priority management objectives is provided below. Detailed action plans were developed for each of these priority areas.



Proposed spatial zonation

In general, spatial zonation of activities on an estuary is used to prevent user conflict and to guide sustainable utilisation of resources without degradation of the estuarine environment. A single zonation type is proposed for the Matjies River estuary, namely a Quiet Zone, based on the South African National Parks (SANParks) zonation plan, given the conservation nature of the surrounding land use and similarity between the Matjies and the neighbouring Sout (Oos) River estuary (Garden Route National Park) in terms of use. Estuaries are included in this zone to preclude infrastructure development and excessive tourist impacts. Therefore, limited activities are encouraged within the Matjies EFZ, which are fortunately governed by the small size of the system.

Integrated monitoring plan

Monitoring is a crucial aspect of the adaptive estuarine management planning process as the generated data will be used to inform and update management decisions. Three broad categories of monitoring are incorporated into an integrated monitoring plan, namely resource monitoring, compliance monitoring and performance monitoring.

There are no known resource or ecological monitoring programmes (e.g. water quality, fish or birds, etc.) in place for the Matjies River estuary. There is also no compliance monitoring taking place on the Matjies River estuary due to the remoteness and small size of the estuary. A minimum set of ecological monitoring requirements is recommended to ascertain i) the current state; ii) future pressures on the estuary; and/or iii) any improvement or reductions therein, as well as basic compliance monitoring programme

A performance monitoring plan is used by the RMA, and/or identified implementing agents, to assess the effectiveness with which planned management activities contained in the EMP are being performed and ultimately to gauge progress in achieving the vision and objectives. This component utilises the performance indicators included for the various actions, specifically the management priorities, and includes a temporal scale or the frequency of the collection of the performance data and the targets that should be achieved.

Institutional Capacity and Arrangements

This EMP should be regarded as a strategic plan that can guide the detailing of management actions and identification of implementing agents/ authorities that are mandated to implement certain actions. While it does not specify the required resources (human and financial) required for effective management of the estuary, it does provide for their prioritisation. Co-management and effective governance is a vital aspect to the efficient and effective estuarine management and key role players in the management of the Matjies River estuary are identified.

The 2021 NEMP identifies the **Department of Environmental Affairs & Development Planning (DEA&DP) (provincial environmental department)**, or its assigned representative, as the RMA responsible for the co-ordination of the implementation of the Matjies River Estuary EMP. **It is noted that the NEMP allocates such responsibilities to the DEA&DP (provincial environmental department) unless agreement / or until agreement is reached with the respective body to undertake the coordination of the implementation process. Ultimately, the role of the RMA must be designated through formal signed agreement.**

The entire Matjies River estuary also falls within the Annex Arch Private Nature Reserve. Thus, a co-management agreement will need to be established with the land owner. The Matjies River estuary also falls within the Garden Route Biosphere Reserve (GRBR), which may thus also be included as a co-management authority.

Effective implementation of this EMP requires the augmentation of capacity with the recommended appointment of a regional estuarine management co-ordinator (EMC) within DEA&DP. This individual will play a critical co-ordinating role for all other implementing agencies and municipal departments. Specific implementation actions identified in this EMP remain the responsibility of mandated government agencies as well as respective departments within the RMA.

While the establishment of an Estuary Advisory Forum (EAF) for each estuary is no longer a requirement in the NEMP, the Western Cape Government still support their establishment and recommend that private entities and non-government organisations continue to play a supporting role in the implementation of this EMP. While an individual EAF is not recommended, the establishment of a regional EAF is suggested, one incorporating the Matjies and Keurbooms estuaries, which at present are all under the jurisdiction of the Bitou LM.

Finally, key government departments and organs of state are identified, and a template provided for the conversion of the priority actions into detailed project plans, which must be prepared and adopted into the respective departmental implementation strategies.

-
- A watching brief is kept over this privately protected estuary;
 - Any transformation of the EFZ prevented;
 - Potential livelihood opportunities related to the cultural heritage resources (cave and middens) investigated while still ensuring their continued protection;
 - Local buy-in from Bitou LM, residents of Keurboomstrand and business owners for custodianship of estuary in support of land owners; and
 - The DEA&DP to consider the appointment of a Regional estuarine management co-ordinator/champion within either DEA&DP or CapeNature, to support the RMA.

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ACRONYMS AND ABBREVIATIONS

amsl	Above mean sea level
BGCMA	Breede-Gouritz Catchment Management Agency
CARA	Conservation of Agricultural Resources Act (Act No. 43 of 1983)
CBA	Critical Biodiversity Area
CFR	Cape Floristic Region
CMA	Catchment Management Agency
CML	Coastal Management Line
CMP	Coastal Management Programme
CMS	Catchment Management Strategy
CPZ	Coastal Protection Zone
CSIR	Council for Scientific and Industrial Research
DAFF	Department of Agriculture, Forestry and Fisheries (now DFFE)
DEA	Department of Environmental Affairs
DEA&DP	Western Cape Government's Department of Environmental Affairs & Development Planning
DFFE	Department of Forestry, Fisheries and Environment
DEFF: WfW	Department of Environment, Forestry and Fisheries: Working for Water
DIN	Dissolved Inorganic Nitrogen
DIP	Dissolved Inorganic Phosphorous
DM	District Municipality
DO	Dissolved Oxygen
DSL	Development Setback Line
DST	Department of Science and Technology
DWAF	Department of Water Affairs and Forestry (now DWS)
DWS	Department of Water and Sanitation
EAF	Estuary Advisory Forum
EFZ	Estuarine Functional Zone
EIA	Environmental Impact Assessment
EMC	Estuarine management Co-ordinator
EMFIS	Western Cape Estuarine Management Framework & Implementation Strategy
EMP	Estuarine Management Plan(s)
GDP	Gross Domestic Product
HWM	High Water Mark
I&APs	Interested & Affected Parties
IAPs	Invasive Alien Plants
ICM	Integrated Coastal Management
ICMA	National Environmental Management: Integrated Coastal Management Act (Act No. 24 of 2008)
IDP	Integrated Development Plan
LM	Local Municipality
LUPA	Land Use Management Act
MAR	Mean Annual Runoff
MEC	Member of the Executive Council
MLRA	Marine Living Resources Act (Act No. 18 of 1998) as amended
MOU	Memorandum of Understanding
MSA	Municipal Systems Act (Act No. 32 of 2000)
NBA	National Biodiversity Assessment
NEM: BA	National Environmental Management: Biodiversity Act (Act No. 10 of 2004)
NEM: PAA	National Environmental Management: Protected Areas Act (Act No. 57 of 2003)
NEMA	National Environmental Management Act (Act No. 107 of 1998)
NEMP	National Estuarine Management Protocol
NHRA	National Heritage Resource Act
NTU	Nephelometric Turbidity Unit
NWA	National Water Act (Act No. 36 of 1998)
PAES	Protected Area Expansion Strategy
PPP	Private-Public Partnerships

RDM	Resource Directed Measures
REC	Recommended Ecological Category
REI	River Estuary Interface
RMA	Responsible Management Authority
RQO(s)	Resource Quality Objectives
SAHRA	South African Heritage Resource's Agency
SANParks	South African National Parks
SAR	Situation Assessment Report
SDF	Spatial Development Framework
SWOT	Strengths, Weaknesses, Opportunities and Threats analysis
TPC	Threshold of Potential Concern
TPS	Town Planning Scheme
WQ	Water Quality
WRC	Water Research Commission
WUA	Water Users Association
WUL	Water Use Licence
WWTW	Waste Water Treatment Works

1 INTRODUCTION

1.1 Background

The National Environmental Management: Integrated Coastal Management Act (Act 24 of 2008) (ICMA) was developed to facilitate the sustainable use and management of South Africa's coastline and coastal and estuarine resources. The ICMA requires that estuaries within South Africa are managed in a co-ordinated and efficient manner, and in accordance with the National Estuarine Management Protocol (hereafter referred to as the NEMP), the National Coastal Management Programme (CMP) and the Western Cape CMP, which lay out specific objectives for management of the South African coastline, including estuaries.

In response to the directive issued under the ICMA and the NEMP, the Western Cape Government, and specifically the Provincial Department of Environmental Affairs and Development Planning (DEA&DP), commissioned the development of the Western Cape Estuarine Management Framework and Implementation Strategy (EMFIS), a strategic project emanating from the provincial CMP, specifically priority area 7, to facilitate the consistent development and implementation of Estuarine Management Plans (EMPs) in the Western Cape Province.

This document represents the first generation EMP for the Matjies River estuary developed (Figure 1) under the auspices of the Western Cape EMFIS.

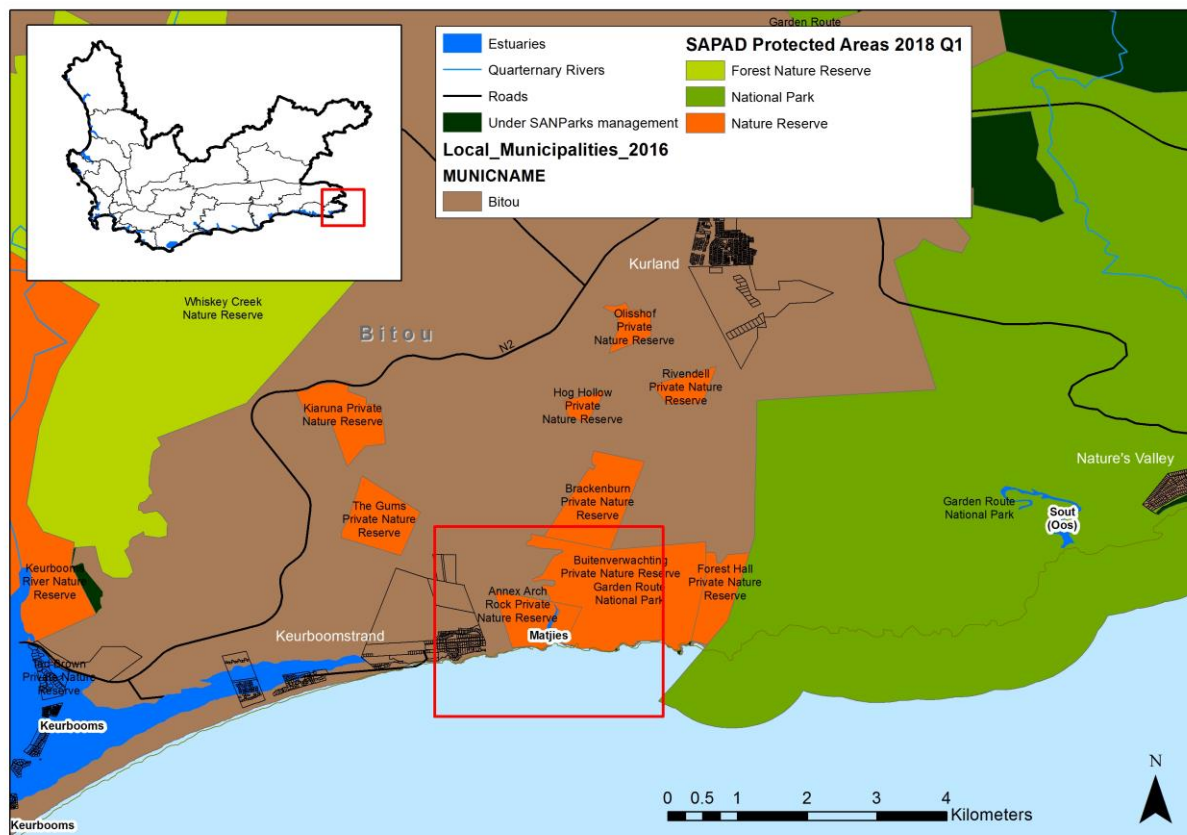


Figure 1: Location of the Matjies River estuary within the Bitou Local Municipality

1.2 Purpose of the EMP

The development of an EMP is a three-phase process, as illustrated in Figure 2, comprising an initial scoping phase, followed by an objective setting phase, and finally an implementation phase. An adaptive management approach should be adopted during the latter phase with detailed reviews being conducted at five-yearly intervals.

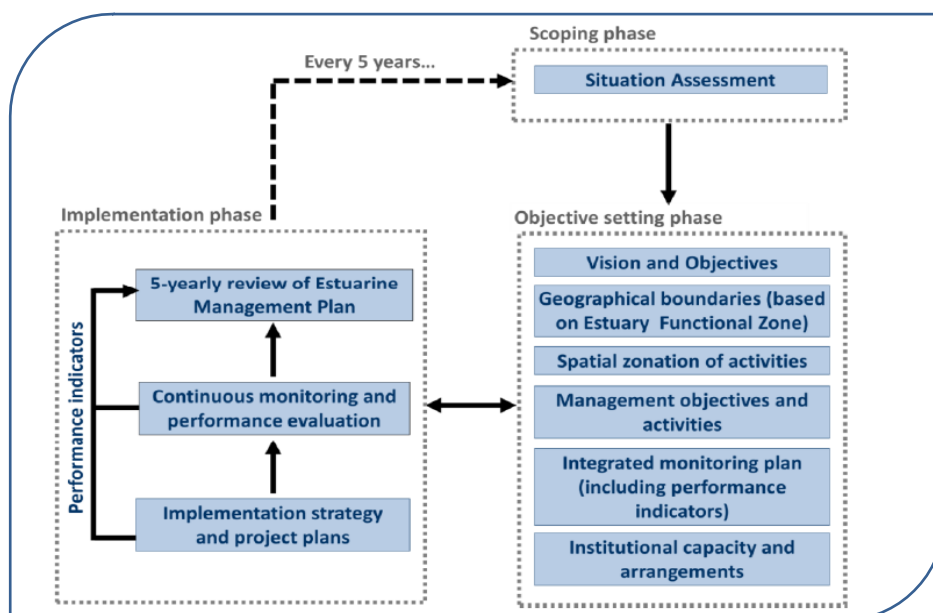


Figure 2: A framework for integrated estuarine management in South Africa

This report constitutes the second objective and core component of the estuarine management planning process, namely the EMP. The purpose of this component is to provide the Vision of the future desired state of the Matjies River estuary and guide the management of human activities in and around the system by setting out strategic objectives, management priorities and detailed management strategies with actions/activities.

Estuarine management is by definition not only focused on the Estuarine Functional Zone (EFZ) but inclusive of coastal hinterland and marine influences, shoreline status, catchment management, climate change and human development impacts such as tourism, recreation and agriculture, amongst many others. This EMP is the primary document for use by the identified Responsible Management Authority (RMA) to facilitate coordination of the identified management interventions to ultimately ensure the longevity of the estuarine system concerned. This is also the critical reference document for the incorporation of estuarine management into the municipal Integrated Development Planning (IDP) and Spatial Development Framework (SDF) processes.

1.3 Mandate and responsibilities of the RMA

The co-ordination of the implementation of the EMP vests with the RMA as per the NEMP. One of the strategic objectives of this EMP is to promote and facilitate the cooperative

governance relationship between the RMA and an existing or new estuary advisory forum (EAF), or any other supporting structures or organisations with estuarine-related duties and functions.

The designated RMA is responsible for the development of the EMP and the overall co-ordination of the actions of other implementing agencies, and not necessarily the implementation actions themselves. Section 7.3 of the NEMP indicates that:

"...management actions...shall be translated into project plans by the responsible government department that is responsible for certain aspects of estuary management (as per legislative mandates..."

Specifically, the RMA responsibilities are described by the NEMP as:

Section 5: *"...authorities are **responsible for the development of EMPs and coordination of the implementation process...**"*

Section 5(e): *"The identified responsible management authority to develop the EMP needs to **budget accordingly for the development of these plans.**"*

Section 8(1): *"The responsible management authority developing an EMP must **actively engage all the relevant stakeholders** including government departments, non-government organisations and civil society in the development and implementation of the EMP."*

Section 9.1(1) and 9.2: *"...it **must obtain formal approval** for the EMP..." and "Once approved...the EMP shall be... **Integrated..**" and "**incorporated** into into the Provincial Coastal Management Programme."*

The responsible body contemplated in Section 33(3)(e) of the ICMA who develops an EMP must:

- a) follow a public participation process in accordance with Part 5 of Chapter 6 of the ICMA; and
- b) ensure that the EMP and the process by which it is developed are consistent with:
 - i) the 2013 NEMP; and
 - ii) the National CMP and with the applicable provincial CMP and CMP referred to in Parts 1, 2 and 3 of Chapter 6 of the ICMA;
- c) If applicable, ensure that relevant legislation is enacted to implement the EMP; and
- d) Submit an annual report to the Minister on the implementation of the EMP, the legislation and any other matter.

Coordination of the implementation actions by the RMA and its strategic partners can be supported by an EAF representing all key stakeholder groups on the estuary.

1.4 Structure of Report

This report is structured as follows:

- **Section 2** introduces the estuary and details the **geographical boundaries** of the estuary, i.e. the management area to which this EMP applies;
- **Section 3** provides a synopsis of the **situation assessment**, thereby providing context to the vision, strategic objectives and management objectives and management priorities;
- **Section 4** presents the **local vision and strategic objectives** as informed by the stakeholders, for the management of the Matjies River estuary. They collectively describe the desired future state and provide the overarching logical framework;
- **Section 5** prescribes the **management priorities and associated**, i.e. the required actions to be undertaken within the next 5 years, captured as individual action plans. This EMP contains refined or detailed management objectives accompanied by action plans to facilitate implementation, and in this manner, serves to mobilise and co-ordinate all relevant government departments, institutions and other role players to undertake specific actions within their mandate or sphere of influence;
- **Section 6** describes the various components and zones included in the proposed **spatial zonation** of the estuary;
- **Section 7** set out the **integrated monitoring plan** encompassing resource monitoring, compliance monitoring, as well as performance monitoring in respect to achieving the objectives of the EMP;
- **Section 8** details the **institutional capacity and proposed arrangements** that are required to implement the actions contained in the plan, including key role players and participating institutions, and the recommended projects provided for in the action plans; and
- **Section 9** details key **recommendations** and **concludes** the plan.

2 GEOGRAPHICAL BOUNDARIES

The Matjies River estuary is defined in the 2018 National Biodiversity Assessment (NBA) (SANBI, 2019) as a small temporarily closed estuarine system, situated in the Annex Arch Rock Private Nature Reserve approximately 1 km east Keurboomstrand, in the Bitou Local Municipality, in the Garden Route District of South Africa's Western Cape Province. The size of the estuary, as defined by the estuarine functional zone (EFZ), is approximately 2.5 ha, extending over a length of 0.6 km. The geographical boundaries of the Matjies River estuary, delineating the EFZ, are provided in Table 1 and Figure 3.

Table 1: The geographical boundaries of the Matjies River estuary

Downstream boundary	-34.002375° S; 23.469934° E (Estuary mouth)
Upstream boundary	-33.997071° S; 23.469632° E (Head of estuary)
Lateral boundaries	Approximated by the 5 m above Mean Sea Level (amsl) contour along each bank

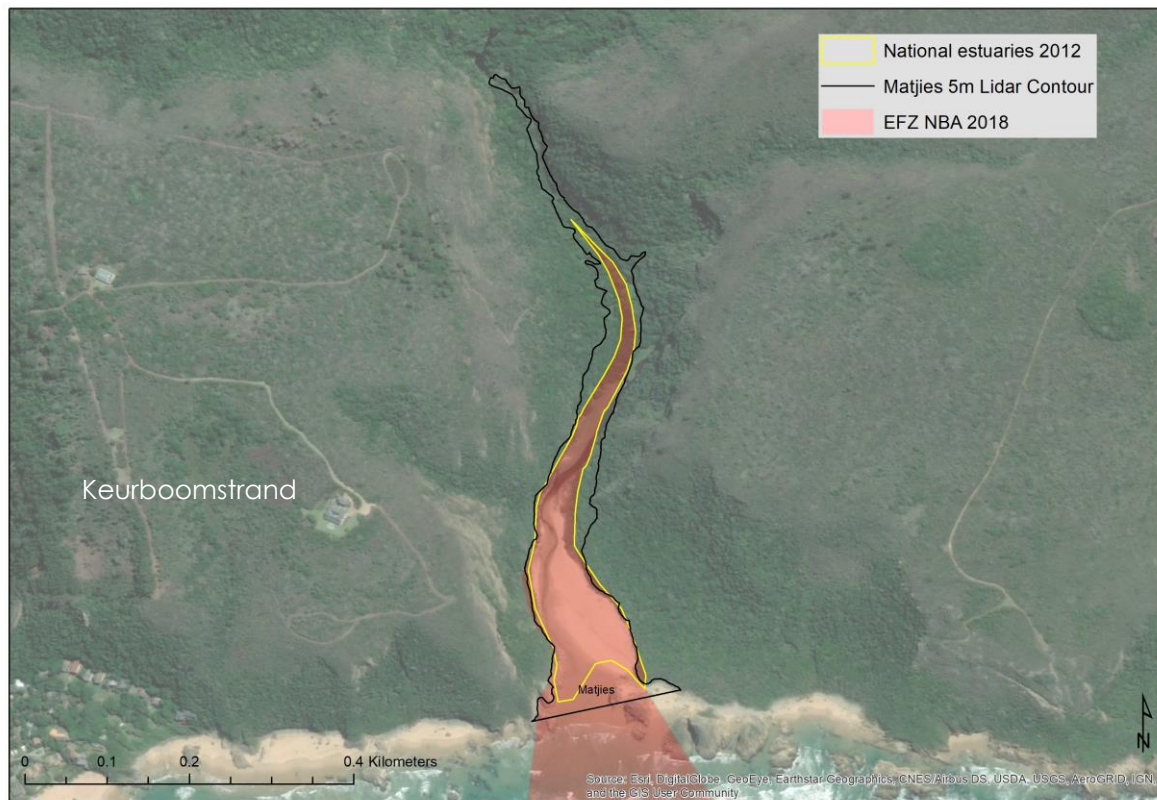


Figure 3: Geographical boundaries of the Matjies River estuary EFZ showing the 5 m amsl contour and 2018 NBA (SANBI 2019) EFZ boundary

3 SYNOPSIS OF THE SITUATION ASSESSMENT

Introduction

The Matjies River estuary is defined in the 2018 National Biodiversity Assessment (NBA) (SANBI, 2019) as a small temporarily closed estuarine system situated in the Annex Arch Rock Private Nature Reserve approximately 1 km east of Keurboomstrand, Bitou Local Municipality (LM). The estuary is black water system that is small and short, approximately 0.6 km in length with a maximum width of 0.1 km at the mouth, totalling approximately 2.5 ha in extent. The estuary is in good health but information pertaining to the estuary is poor.

In accordance with the South African National Estuarine Management Protocol (NEMP), an estuarine management plan is being prepared for the Matjies River estuary, following the prescribed estuarine management planning process. This is being conducted under the auspices of the Western Cape Estuarine Management Framework and Implementation Strategy (EMFIS) commissioned by the Western Cape Department of the Environmental Affairs and Development Planning. This document, the Situation Assessment Report, documents the status quo of the Matjies River estuary and is the first outcome of the project for this system. It will serve as the platform for the development of the estuarine management plan.

Estuary Management Planning Process

The National Environmental Management: Integrated Coastal Management Act (ICMA) was developed to facilitate the sustainable use and management of South Africa's coastline, coastal and estuarine resources. The Western Cape EMFIS has been commissioned in order to co-ordinate and integrate estuarine management in the Western Cape Province and thereby optimise the ecological, social and economic value of these systems on an equitable and sustainable basis. The EMFIS has prioritised, amongst other key actions, the development of specific EMPs, in this instance the Matjies River EMP. The development of this EMP takes cognisance of and is written in accordance with the National Guidelines for the Development and Implementation of Estuarine Management Plans. The development of an EMP is preceded by a scoping phase with the compilation of a SAR reflecting the current state of all aspects which could affect management of the specific estuary.

Purpose of the Situation Assessment Report

The information collection component of the Matjies River EMP, the Situation Assessment Report (SAR), has gathered and interpreted the information that will, together with the empirical data gathered on site, serve as the basis for the development of a vision and applicable management objectives for the Matjies River estuary.

Catchment Characteristics

The Matjies River estuary falls within the Bitou LM, which experiences a warm and temperate climate. Average daily temperatures range from 10°C in winter to 22°C in summer. Highest rainfall occurs during the month of August (average 80 mm), while the lowest rainfall occurs in February (average 28 mm).

The underlying geology of the Matjies River estuary is dominated by sandstone (Arenites) of the Table Mountain Group and shales of the Bokkeveld Group, both belonging to the Cape Supergroup.

Bitou has one of the largest percentages of formally protected land of any municipality in South Africa, some 50% of the municipality is formally protected under the jurisdiction of SANParks and CapeNature. These areas include the Garden Route National Park and comprises mountains, inland plateaus, a coastal corridor and a marine reserve. The remaining 50% of the municipal area is made up of extensive agriculture (veld management and stock farming), intensive agriculture (crop farming), and to a lesser extent wetland and river corridors, Critical Biodiversity Areas and urban development.

The estuary is characterised by steep slopes in the upper section and broadens about 300 m from the mouth. The highly dynamic lower reaches of the estuary meander within the constraint of rocky headlands that are about 100 m apart. The rocky headlands at the mouth of the estuary and steep rocky banks limit estuarine habitat.

Abiotic Function

The Matjies River is a small coastal river with its catchment lying to the north and east of Keurboomstrand. The catchment area is 24 km². There are approximately 14 km² of indigenous forest, 0.3 km² of afforestation (cultivated) and 1.4 km² of irrigation in the catchment. The mouth of the estuary is predominantly open. The total river length is 13.4 km, with the major tributary the Buffels River. The natural Mean Annual Runoff (MAR) is estimated at 5.1×10^6 m³. The natural MAR has decreased to 4.27 million m³ in its present state (16 % reduction).

No quantitative data is available on sediment dynamics and estuarine morphology of the Matjies River estuary. Anecdotal information indicate that the system comprises mostly of a sandy substrate. The estuary is highly incised and subjected to large floods, resulting in a naturally unstable sediment regime. Sediment processes are expected to be similar the reference condition, but some reduction in floods may have increased sediment stability in the estuary.

The Matjies is a typical black water oligotrophic, acidic system. The pH in the Matjies River estuary is expected to remain within the range 7.0 to 8.5. The lower ranges being associated with the fresher (upper) reaches and higher ranges with the more saline (lower) reaches.

The Matjies River estuary should generally be well-oxygenated (>7 mg.l⁻¹) because the estuary is shallow, does not appear to carry a heavy load of organic matter and is flushed rapidly during the fresh phase. Turbidity in the Matjies River estuary is generally expected to be low. However, during periods of higher freshwater inflow, turbidity levels can be expected to increase throughout the estuary. Water Quality is largely similar to the reference conditions; however, some nutrient enrichment is expected as a result of catchment practises.

Biotic Function

The estuary is generally dominated by coarse marine sediment episammic diatoms are likely to dominate the benthic microalgae. Rocky headlands at the mouth of the estuary and steep rocky banks limit estuarine habitat.

The dominant habitat in the estuary was reeds and other prominent species were *Juncus kraussii*, *Stenotaphrum secundatum* and *Cotula coronopifolia*. The grass *Sporobolus virginicus* and the sedge *Ficinia nodosa* occurred at the mouth of the estuary. Filamentous macroalgae may be present during intermittently closed and closed phases.

There are no available data on the zooplankton of the Matjies River estuary. No larger invertebrates were observed. A total of nine fish species from five families, have been recorded from the Matjies River estuary. Two of these species are dependent on estuaries for breeding purposes. Three marine species are dependent on estuaries as nursery areas. A further two marine species are at least partially dependent on estuaries as nursery areas.

Ecological Health Status, Importance, and Recommended Future State

The overall ecological health of the Matjies River estuary is in a B Category (i.e. Largely natural with a few modifications). The Matjies River estuary is not a national priority estuary in terms of the National Estuaries Biodiversity Plan and was deemed to be of low to average importance. The Recommended Ecological Category for the Matjies River estuary is a Category B. This is in alignment with the more recent 2018 NBA (SANBI 2019). This means that the management of the estuary will aim to maintain its present health. Key interventions required to achieve the Recommended Ecological Category of a B include maintaining base flows in the dry season; and maintain good water quality in the system

Important Goods and Services

Estuarine habitats and the species they contain provide a host of important ecosystem services e.g. nursery function, freshwater flows to the marine environment, carbon sequestration, flood regulation, storm protection, safe bathing areas, and estuarine plants as food, fuel and building resources. The rating of all these services for the Matjies River estuary is low. The low scores do not necessarily mean damaged/limited functioning of the estuary but in the case of the Matjies, its remote location means very few humans rely on the system's benefits.

Impacts and Potential Impacts

The environmental processes, activities and developments that pose a threat to the Matjies River estuary include the following:

- *Environmental hazards* – drought, floods and climate change impacts;
- *Land-use and infrastructure development* – a small dam upstream of the estuary, contributing to evaporative losses, and abstraction for irrigation; and
- *Water quality and quantity issues* – As above for landuse, interbasin transfer from Sout to Matjies River, and treated effluent discharges may cause pollution.

Socio-economic Context

The Matjies River estuary and its catchment falls within the Bitou LM, which has a total estimated population of 59 157 and an average growth rate of 5.22%, making up approximately 9.67% of the total population of the Garden Route District Municipality (DM).

Of the population aged 20 years and older, 2% have no form of schooling. There are 21 914 households in the Bitou LM, of which 61% have access to piped water within their dwellings. Electricity for lighting is provided to 97% of all households. Approximately 23 599 people are economically active, with an overall unemployment rate of 30.1%, and a youth unemployment rate of 37.9%. Approximately 26% of the population earns an average household income of less than R38 200 per annum, while a further 18.1% receive no income at all.

The Matjies River estuary and its catchment falls within the developed (some 27.2 % of households are informal / shacks, while most (64 %) are formal houses) Ward 1 of the Bitou LM, which has a total population of 6 298 people. The Ward is made up of Covie, Natures Valley, Kurland, Craggs and Keurbooms, and contains the most informal settlements in the Municipal area.

At the end of 2015, the Bitou LM contributed 7.3 % (R 2 189 billion) to the Garden Route DM Gross Domestic Product (GDP), and GDP growth of 3.6 % annum over the period of 2005 – 2015. The municipal economy is based on wholesale and retail trade, catering and, accommodation; construction; finance, insurance, real estate and business services; community, social and personal services; and the agriculture and fisheries sectors, and all of these are driven by tourism, as the main economic driver. An important objective for the Bitou LM is diversification of the economy as it is largely based on tourism. The Municipality aims to increase opportunities for permanent residency, improve IT platforms, road and air travel infrastructure.

The direct and indirect benefits derived from estuarine ecosystems services are manifested directly or indirectly in tangible income and employment. There are no known subsistence communities that rely on the natural resources of the Matjies River estuary for their livelihoods or income generation. The Matjies River estuary holds socio-economic value in terms of tourism value, specifically the Annex Arch Private Nature Reserve and the Matjies River Cave, an important heritage site.

Legislative Instruments and relevant Strategies, Plans and Policy Directives

The legislative framework specific to estuarine management is the Integrated Coastal Management Act and the accompanying NEMP. The NEMP provides national policy and ensures alignment by providing a national vision and objectives for achieving effective integrated management of estuaries, amongst other things. The NEMP identifies the responsible management authority per estuary, in this instance, **the provincial environmental department unless agreement, or until agreement, is reached with the respective municipality to undertake the coordination of the implementation process.**

Key legal instruments that are applicable to estuarine management are then described, and include national, provincial and local management documents.

Opportunities and Constraints

A Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis for the management of the Matjies River estuary was undertaken. The main strength is that the estuary falls within the Annex Arch Private Nature Reserve, i.e. the system is conserved however the details of its status and management need to be confirmed. There is little surrounding development and the estuary is in a good ecological state, and provides critical habitat estuarine dependant fish species. The system also carries important cultural heritage value as the Matjies River cave/rock shelter is located on the western cliff face at the estuary mouth, harbouring one of the largest shell middens dating back 11 000 years. In terms of opportunities, the major impacts on the system are flow-related and thus potentially reversible and there is local buy-in from Bitou LM, residents of Keurboomstrand and business owners for custodianship of estuary, which will assist with upholding the health of the system, increasing public awareness and potentially increasing ecological information through monitoring. The main management weakness is the fact that reduced freshwater input is reaching the estuary due to abstraction for irrigation and afforestation, resulting in increased mouth closures. Other major weaknesses and threats include nutrient enrichment as a result of catchment practises, limited information on the status of the nature reserve and the potential for further water resource development.

Information Gaps and Recommendations

Information pertaining to the Matjies River estuary is poor. It is recommended that a regular monitoring programme be put in place for the estuary, and research be conducted on specific aspects, namely hydrology, macrophytes, fish and birds. Ecological monitoring should be undertaken according to the recommended monitoring programme to fulfil the necessary data requirements for the estuary. In addition, all data generated through regional and local projects and monitoring programmes should be sourced, collated and stored at a central repository (i.e. at SANParks) to build up long –term datasets to facilitate adaptive estuarine management.

4 VISION & OBJECTIVES

4.1 Vision

The Vision for an estuary should be inspirational, representing a higher level of strategic intent and aligned with the strategic objectives of the 2013 NEMP, Western Cape CMP and the greater Cape Floristic Region (CFR). The National Vision and Vision of the Estuaries of the CFR are as follows:

The estuaries of South Africa are managed in a sustainable way that benefits the current and future generations

The estuaries of the CFR will continue to function as viable systems which are beautiful, rich in plants and animals, attract visitors, sustain our livelihoods and uplift our spirits

The 2016 Western Cape Provincial Coastal Management Programme (PCMP), identifies estuarine management as one of its nine priority areas and sets out the goal for the Western Cape as:

Co-ordinated and integrated estuarine management which optimises the ecological, social and economic value of these systems on an equitable and sustainable basis

The following Vision for the Matjies River estuary was proposed at a meeting of stakeholders held in November 2017 in Stormsriver¹ and agreed to at a second meeting in August, 2018².

The Matjies River estuary is a natural and functional system, preserved for current and future generations

The vision highlights the following aspects of the estuary that are valued and need to be preserved or enhanced:

- The natural state of the system, inferring natural functioning and processes and unimpacted biodiversity; and

¹ Minutes of the Matjies, Sout (Oos) and Groot (Wes) Stakeholder meeting, November 2017, SANParks Offices, Stormsriver

² Minutes of the stakeholder meeting for the Matjies, Sout (Oos) and Groot (Wes) estuaries, 30 August 2018, SANParks Offices, Storms River

- The desire to preserve the longevity of estuary against negative impacts and unsustainable use.

4.2 Strategic Objectives

Objectives are qualitative statements of the values derived from the vision and typically reflect the overarching issues. They should answer the following question, “How will you know when you have achieved the Vision?”. The strategic objectives inform the development of the detailed management strategies that are carried forward as plans of action.

The strategic objectives for the Matjies River estuary were discussed at the stakeholder meeting. Based on the feedback received from the participants, the strategic objectives for the Matjies River estuary align with the following identified sectors or categories of issues:

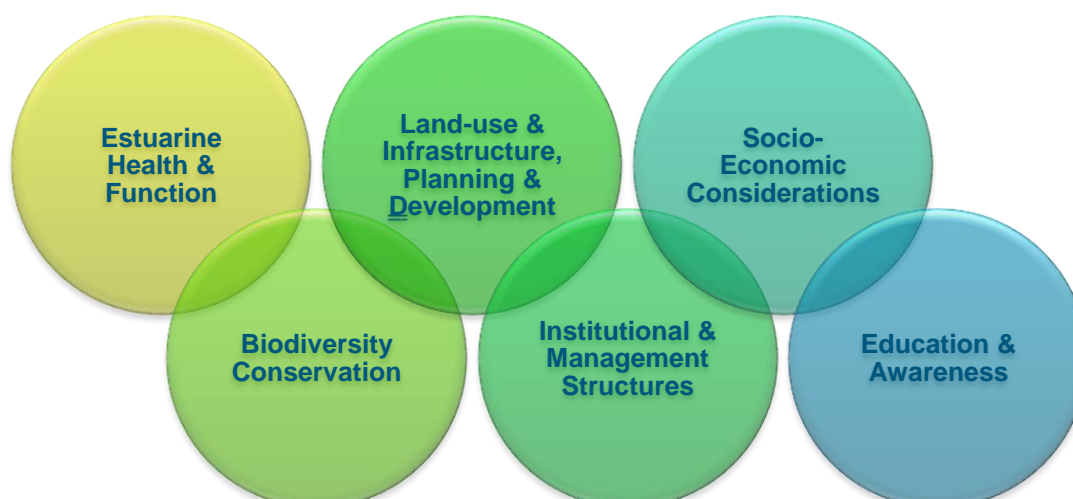


Figure 4: Sectors or categories of issues relevant to the management of the Matjies River estuary

According to these categories, the strategic objectives for the Matjies River estuary are as follows:

Table 2: Strategic Objectives for management of the Matjies River estuary, their indicators and level of priority

	Sector / Category	Strategic Objective	Performance Indicator(s)	Priority
1	Estuarine Health and Function	The ecological health and natural functioning of the Matjies River estuary maintained and safeguarded, living resources are sustainably	<ul style="list-style-type: none"> • Maintain a B ecological condition • Ecological Reserve secured and implemented • Effective catchment management and 	MEDIUM

		managed and estuary nursery function protected	<p>maintenance of good water quality</p> <ul style="list-style-type: none"> • Ongoing flow and water quality monitoring programmes in place • Healthy biological communities • Invasive alien plant infestations managed • Resources utilised within legal and sustainable limits • Illegal activities controlled 	
2	Biodiversity Conservation	The biodiversity of the Matjies River estuary is conserved	<ul style="list-style-type: none"> • EMP incorporated into the Garden Route Biosphere Reserve (GRBR) • EMP incorporated into the Bitou LM IDP and SDF • Spatial zonation plan is adopted and enforced 	LOW
3	Land-use and Infrastructure Planning and Development	Impacts associated with developments and proposed changes in land-use, including infrastructure and agriculture, are minimised	<ul style="list-style-type: none"> • EMP included in all relevant planning documents • All development and land use changes surrounding and within the EFZ comply with environmental legislation and environmental best practice / risk aversion approach • Any additional transformation of estuary margins prevented 	LOW
4	Institutional and Management Structures	The Matjies River estuary is managed well through effective co-operative governance	<ul style="list-style-type: none"> • EMP is seamlessly incorporated into the Bitou IDP and SDF • Regional estuary advisory forum is established and meets regularly • Ongoing commitment from relevant authorities • Estuarine bylaws or regulations are gazetted 	HIGH
5	Socio-economic Considerations	Socio-economic benefits are regulated to ensure sustainable use of the Matjies River estuary and its resources	<ul style="list-style-type: none"> • Cultural heritage resources are protected and facilities maintained • Employment of local communities 	MEDIUM
6	Education & Awareness	Members of society are sensitive to and aware of the value and importance of the Matjies River estuary	<ul style="list-style-type: none"> • Increase in number of research projects • Signage erected and information disseminated • Awareness programme developed and successfully implemented on an on-going basis 	LOW

5 PRIORITY MANAGEMENT OBJECTIVES AND ASSOCIATED ACTIVITIES

After the review of the background information, as well as after conducting stakeholder engagement, a Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis of the Matjies River estuary under the current management practices was prepared.

Table 3: SWOT Analysis

STRENGTHS <i>(highlights, uniqueness?)</i>	WEAKNESSES <i>(what could be improved?)</i>
<ul style="list-style-type: none"> • System is located in a remote area, with little surrounding development • System is located within a Private Nature Reserve • Good ecological state (category B) • Estuarine dependant fish species present as well as marine immigrant species • Lower portion of estuary is a priority ecological support area, main channel is a critical aquatic biodiversity area and mouth is an ecological support area 2. • The Matjies River cave/rock shelter located on the Western cliff face at the estuary mouth • One of the largest shell middens dating back 11 000 years 	<ul style="list-style-type: none"> • Freshwater input to the estuary has been reduced due to abstraction for irrigation and afforestation • 16% reduction in mean annual runoff from present state • Increased mouth closure • The estuary is highly incised and subject to large floods • Water quality is expected to exhibit nutrient enrichment as a result of catchment practises. • System not identified to meet biodiversity targets and seen to have low to average importance • Lack of detail in respect to private nature reserve status and management
OPPORTUNITIES <i>(Opportunities for positive change)</i>	THREATS <i>(what could prevent the EMP from working?)</i>
<ul style="list-style-type: none"> • Estuary should be managed to uphold its present good state of health (i.e. not deteriorate) • High quality of the natural environment denotes potential opportunities for local socio-economic development; recreation, tourism, bird watching • Major impacts are flow-related and thus potentially reversible • Local buy-in from Bitou LM, residents of Keurboomstrand and business owners for custodianship of estuary • Increased public awareness • Monitoring & scientific research • Updating of available ecological data 	<ul style="list-style-type: none"> • Implications of the dam located upstream of the estuary • The system could be targeted for further water resource development. • Climate change and loss of aquatic ecosystem

The management objectives detailed below were informed by the SWOT analysis and critical issues identified as part of the scoping phase. They represent the focus areas for the 5-year cycle of this EMP. An illustrative overview of the priority management objectives for the Matjies River estuary is provided in Figure 5 below.

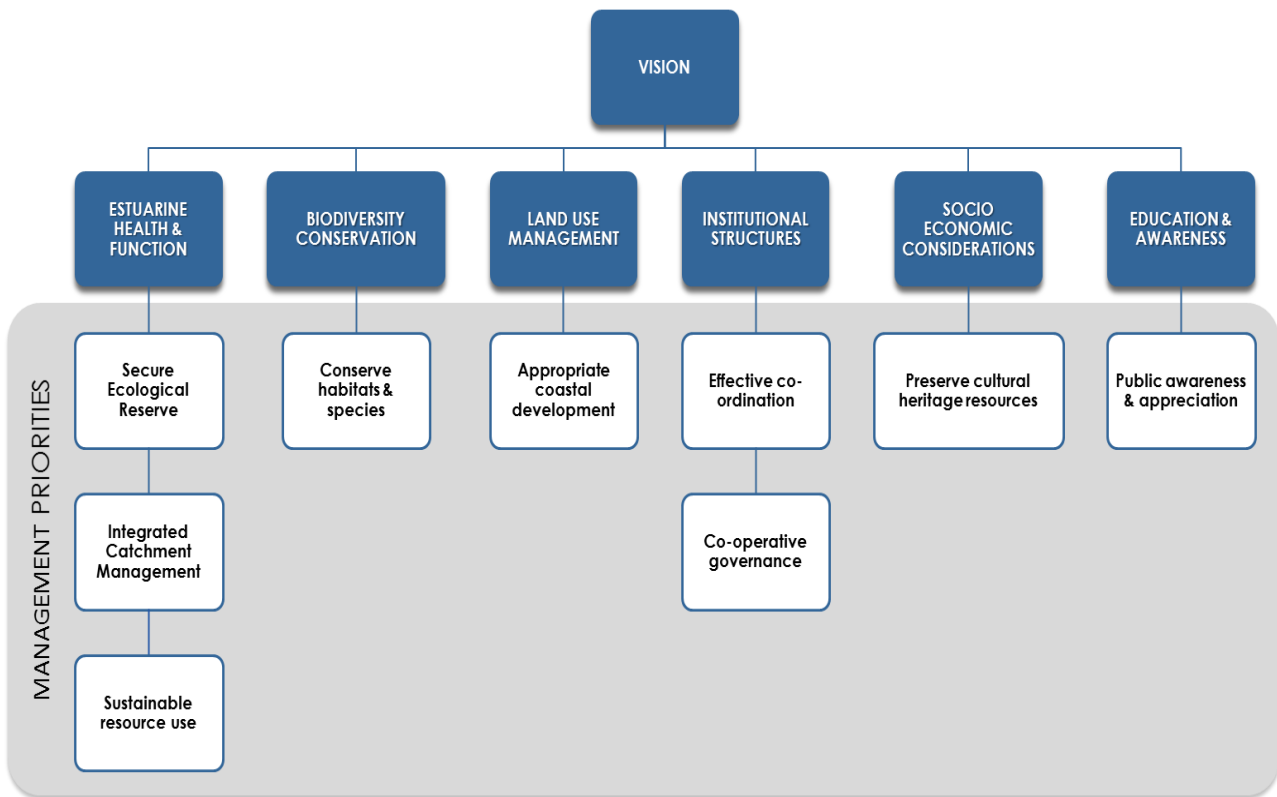


Figure 5: Summary of priority management objectives per management sector

5.1 Estuarine Health and Function

Strategic Objective 1: The ecological health and natural functioning of the Matjies River estuary is maintained and safeguarded, living resources are sustainably managed and estuary nursery function protected

Table 4: Management Objectives and Actions for Estuarine Health and Function (includes water quantity and quality as well as utilisation of living resources)

Action	Relevant Legislation	Performance Indicator	Priority	Responsibility
Management Objective 1.1: Secure adequate quantity and quality of freshwater input to improve and maintain ecosystem health and functioning				
a. Lobby Department of Water & Sanitation (DWS) Minister to sign off the recommended freshwater reserves, ensuring that the minimum flow requirement (specifically baseflow) for the estuary is restored	National Water Act (NWA)	<ul style="list-style-type: none"> • Meetings held and correspondence written • Recommended reserve(s) signed off • Baseflow is restored • Ecological condition maintained as B 	HIGH	Breede-Gouritz Catchment Management Agency (BGCMA), Responsible Management Agency (RMA)
b. Once classification study signed off, follow up on implementation of water resource classification process	NWA	<ul style="list-style-type: none"> • Meetings held and correspondence written • Water resource classified • Baseflow is protected 	HIGH	BGCMA, RMA
c. Install flow gauging probe in the catchment above the estuary to monitor off-take/diversion of flow to the estuary	NWA	<ul style="list-style-type: none"> • Determination of the importance of the Matjies completed • Flow gauging probe installed • Data generated 	If Matjies identified as priority estuary	DWS, Department of Environment, Forestry and Fisheries (DFFE), BGCMA
d. Implement and document DFFE and DWS policy to not allow effluent discharge to the estuary (including Waste Water Treatment	NWA	<ul style="list-style-type: none"> • Discharge of effluent strictly prohibited 	HIGH	Bitou Local Municipality (LM)

	Works (WWTW), septic tanks, conservancy tanks, industrial & livestock effluent etc.)				
e	Monitor natural mouth dynamics (in partnership with neighbouring land owners and other Interested and Affected Parties (I&APs))	NWA (RDM)	<ul style="list-style-type: none"> • Mouth state documented • Photographic database generated 	HIGH	RMA
f.	Undertake basic water quality monitoring twice a year taking Resource Quality Objectives (RQOs) into account	NWA	<ul style="list-style-type: none"> • Estuary Water Quality (WQ) database maintained to facilitate long term database • Biannual report compiled and provided to EAF • EMP informed by monitoring results going forward 	HIGH	Bitou LM
g.	Assess extent of invasive species in EFZ and implement mitigation measures where necessary	Conservation of Agricultural Resources Act (CARA)	<ul style="list-style-type: none"> • Invasive Alien Plants (IAPs) coverage mapped • Key species and hotspots identified • Mitigation measures determined and implemented 	LOW	RMA, BGCMA, Department of Agriculture, Land Reform and Rural Development (DALRRD), DFFE: Working for Water (WfW)
h	Monitor and report on the status of the estuary annually (inclusive of estuarine stresses and impacts, and monitoring of identified indicator species to assess ecosystem functionality)	NWA	<ul style="list-style-type: none"> • Estuary impacts identified • Mitigation measures established • Status and trends of indicator species determined • Annual report submitted to DFFE and EAF • Data incorporated into EMP 5-year review 	MEDIUM	RMA (supported by e.g. SANParks, Department of Science and Technology (DST), Council for Scientific and Industrial Research (CSIR)
i.	Catchment water quality and quantity to be summarised and reported on	NWA	<ul style="list-style-type: none"> • Annual report submitted to RMA and EAF 	LOW	DWS, BGCMA

j.	Undertake seasonal (summer/winter) monitoring of fish and bird populations, taking RQOs into account	NWA (RDM), National Environmental Management: Biodiversity Act (NEM:BA), Marine Living Resources Act (MLRA)	<ul style="list-style-type: none"> Species list and abundance data produced Databases developed Monitoring reports compiled and submitted Data incorporated into EMP 5-year review 	HIGH	RMA (supported by e.g. SANParks, DST, CSIR)
k.	Undertake full Resource Directed Measures (RDM) monitoring every 3 years	ICMA, NWA	<ul style="list-style-type: none"> Required basic monitoring undertaken Data produced and reported on Data incorporated into EMP 5-year review 	LOW	DWS, BGCMA, RMA (funding from Water Research Commission (WRC), DST)
Management Objective 1.2: Ensure estuary requirements are integrated into catchment processes to ensure healthy water quality					
a.	Catchment land use map developed and updated annually	NWA, CARA	<ul style="list-style-type: none"> Updated land use map produced every year Potential sources of pollution identified 	MEDIUM	DALRRD (Land Care)
b.	Land use and effluent management included in the Catchment management Strategy (CMS)	NWA	<ul style="list-style-type: none"> CMS identifies sources of pollution (land use and effluent) to the estuary and provides mitigation strategies 	LOW	BGCMA
c.	Water use plan updated annually	NWA	<ul style="list-style-type: none"> Updated water use plan produced every year 	LOW	DWS (Resource protection)
d.	Municipal SDF and environmental overlay updated annually	Municipal Systems Act (MSA)	<ul style="list-style-type: none"> Updated SDF and overlays produced 	MEDIUM	Bitou LM
Management Objective 1.3: Ensure sustainable resource use through an effective level of compliance management					
a.	Assess, regulate and quantify extractive resource use activities on the estuary through relevant monitoring programmes (e.g. roving creel surveys, compliance patrols)	MLRA	<ul style="list-style-type: none"> Monitoring programme developed and implemented Monthly counts of number of harvesters/fishers 	LOW	SANParks/DFFE

b.	Deploy human resources for ad hoc compliance and enforcement in respect to MLRA	MLRA	<ul style="list-style-type: none"> • Ad hoc patrols and monitoring conducted • Improved fish and invertebrate populations • Research projects commissioned • Reports submitted to DFFE 	LOW	SANParks/DFFE
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5.2 Biodiversity Conservation

Strategic Objective 2: The biodiversity of the Matjies River estuary is conserved.

Table 5: Management Objectives and Actions for Biodiversity Conservation

Proposed Activity/Action		Relevant Legislation	Performance Indicator	Priority	Responsibility
Management Objective 2.1: Ensure the conservation of estuarine habitats and indigenous species					
a.	Ensure the GRBR Plan incorporates priority issues highlighted in the Matjies EMP	ICMA, Western Cape Biosphere Reserves Act (WC BRA)	<ul style="list-style-type: none"> • EMP key issues included in management plans for the Garden Route Area 	MEDIUM	RMA, SANParks, GRBR
b.	Lobby GRBR to establish an estuarine division	WC BRA	<ul style="list-style-type: none"> • Estuarine division established, and estuarine co-ordinator appointed • Commitment to estuarine matters in the region ensured 	MEDIUM	RMA, GRBR, SANParks
c.	Investigate special management area or other relevant conservation status (e.g. municipal nature reserve or conservation servitude)	NEM: PAA, ICMA	<ul style="list-style-type: none"> • Conservation methods investigated and implemented • Conservation status designated and published 	MEDIUM	RMA, SANParks
d.	Adopt, implement and enforce spatial zonation plan	ICMA, Land Use Planning Act (LUPA)	<ul style="list-style-type: none"> • EFZ controls enforced and offenders prosecuted • Reduced illegal activities • Reduced habitat loss/degradation and disturbance, and inappropriate behaviour • Improved fish and invertebrate populations 	HIGH	Bitou LM

e.	Engage with landowners and stakeholders to encourage environmental custodianship/ stewardship on adjacent properties.	National Environmental Management Act (NEMA), (Duty of Care)	<ul style="list-style-type: none"> • Meeting with adjacent land owners convened • Signed agreements with land owners • Degraded areas rehabilitated • Integrity of estuarine margin improved 	LOW	RMA
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5.3 Land-use and Infrastructure Planning and Development

Strategic Objective 3: Impacts associated with developments and proposed changes in land-use, including infrastructure and agriculture, are minimised.

Table 6: Management Objectives and Actions for Land-use and Infrastructure Planning and Development

Action	Relevant Legislation	Performance Indicator	Priority	Responsibility
Management Objective 3.1: Ensure appropriate and sustainable coastal development adjacent to the Matjies River estuary, considering ecosystem services and sense of place				
a. RMA to adopt and facilitate implementation of the EMP by incorporating the EMP and spatial zonation plan into the IDP, SDF, zoning scheme & overlay, Water Use Licence (WUL) Applications, Environmental Impact Assessment (EIA) Applications	MSA, LUPA, NEMA, ICMA	<ul style="list-style-type: none"> • EMP included in all relevant planning documents • EFZ respected as a no development area 	HIGH	RMA, all authorities
b. Ensure that all proposed developments adhere to the full suite of relevant environmental legislation, specifically the coastal management line, coastal protection zone, and associated development controls (i.e. ensure no development in the EFZ)	NEMA, LUPA, ICMA, etc.	<ul style="list-style-type: none"> • All developments comply with environmental legislation and environmental best practice / risk aversion approach • No permanent development in, infilling or land transformation of EFZ • Transgressors prosecuted • Corrective action undertaken • Reduced risk of degradation, transformation and disturbance to the estuary 	HIGH	DEA&DP, Bitou LM
c. Develop and publish estuarine bylaws or regulations to support spatial zonation	MSA, ICMA	<ul style="list-style-type: none"> • Bylaws developed and gazetted 	MEDIUM	Bitou LM

d.	Incorporate Matjies EMP and spatial zonation into GCBR Management Plan	ICMA, WC BRA	<ul style="list-style-type: none"> • EMP included in management plan for GRBR • Engagement with GRBR 	MEDIUM	GCBR, Bitou LM
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5.4 Institutional and Management Structures

Strategic Objective 4: The Matjies River estuary is well managed through effective co-operative governance.

Table 7: Management Objectives and Actions for Institutional and Management Structures

Action	Relevant Legislation	Performance Indicator	Priority	Responsibility
Management Objective 4.1: Ensure effective co-ordination of estuarine management responsibilities				
a. RMA to adopt and facilitate implementation of the EMP by incorporating the EMP and spatial zonation plan into all planning documents	MSA, LUPA, NEMA, ICMA	<ul style="list-style-type: none"> EMP and zonation plan adopted by RMA EMP included in all relevant planning documents 	HIGH	RMA
b. Undertake needs analysis and identify skills and equipment requirements	ICMA,	<ul style="list-style-type: none"> Needs and shortages identified Motivation for acquisition drafted and approved Equipment purchased and maintained 	HIGH	RMA
c. Implement skills development, ongoing training or co-opt additional members / secondment for estuarine management	ICMA,	<ul style="list-style-type: none"> Motivation for training drafted and approved Staff attend relevant accredited training courses Memorandum of understanding (MOU) to be developed for secondments 	HIGH	RMA
d. Develop good communication protocols and processes with implementing agents (The RMA to develop working relationships with mandated department & agreements need to be developed to address each management action)	ICMA	<ul style="list-style-type: none"> Project champions identified Networks established, and contacts database compiled Regular email correspondence 	HIGH	RMA

e.	Ensure that EMP is maintained, enforced and budgeted for annually	ICMA, MSA, LUPA, NWA,	<ul style="list-style-type: none"> • Additional support and budget sourced • An action plan for securing future funding drafted and approved • Funding secured for 5-year cycle 	HIGH	All authorities
f.	Maintain/support a fully functional, regional EAF or utilise other applicable forum) to facilitate co-operative governance	ICMA, MSA, LUPA, NWA,	<ul style="list-style-type: none"> • EAF constituted (Membership includes representatives of government and stakeholders/civil society) • Regional EAF meets on a quarterly basis • Meetings are minuted 	HIGH	RMA
g.	Estuarine Management Co-ordinator (EMC) present on critical forums to ensure that estuarine issues are tabled, e.g. Catchment Management Agencies (CMA), Water Users Associations (WUA), Agriculture groups etc.	ICMA	<ul style="list-style-type: none"> • EMC attendance at critical forum meetings • Meetings are minuted 	HIGH	DEA&DP
h.	Monitor, review and report on the progress of EMP actions and achievements on annual basis	ICMA	<ul style="list-style-type: none"> • Feedback received from participating agencies • Annual reporting to DFFE and EAF by EMC • Action plans updated as and when required 	MEDIUM	RMA, DEA&DP
i.	Undertake formal 5-year review as prescribed by the 2013 NEMP, with involvement of EAF	ICMA	<ul style="list-style-type: none"> • Motivation for updated drafted and approved • Funding confirmed • Terms of reference drafted • Consultants appointed • Plan updated 	LOW	RMA

Management Objective 4.2: Define co-operative governance arrangements

a.	Identify and implement procedures to ensure cooperative governance between all government departments with a mandate to act	ICMA, Inter-governmental relations Act (Act 13 of 2005)	<ul style="list-style-type: none"> • Roles and responsibilities defined and accepted via MOUs signed between RMA and spheres of government and participating agencies • Regional EAF meets on a quarterly basis • Meetings are minuted • Active collaboration of various implementing agents 	HIGH	All authorities
b.	EAF to monitor performance of RMA in respect to implementation of plan	ICMA	<ul style="list-style-type: none"> • Authorities to provide formal feedback on mandated activities • Regional EAF meets on a quarterly basis 	MEDIUM	All authorities, All stake-holders
c.	Individual agencies to identify and address training needs, with possible secondment to address training and capacity shortfalls	ICMA	<ul style="list-style-type: none"> • Motivation for training drafted and approved • Staff attend relevant accredited training courses • MOU to be developed for secondments 	MEDIUM	All authorities
d.	Individual agencies to allocate resources, create and fill posts (including project champions), and acquire necessary infrastructure, resources and equipment of fulfil their mandates	MSA, NWA, ICMA, NEMA,	<ul style="list-style-type: none"> • Need and Desirability investigation undertaken • Motivation for acquisition drafted and approved • Equipment purchased and maintained • Project champion(s) for allocated management actions • Staff appraisals in terms of management actions and projects 	MEDIUM	All authorities

			(performance management system implemented)		
e.	Mandated authorities and participating agencies to confirm budget allocations for mandated activities/actions	MSA, NWA, ICMA, NEMA,	<ul style="list-style-type: none"> • Formal feedback from authorities on mandated activities • Motivation for budget drafted and approved • Funding secured for 5-year cycle 	LOW	All authorities

5.5 Socio-economic Considerations

Strategic Objective 5: Cultural heritage resources and potential sustainable livelihoods associated with the Matjies River estuary are supported and conserved

Table 8: Management Objectives and Actions for Cultural Heritage Resources

Proposed Activity/Action		Relevant Legislation	Performance Indicator	Priority	Responsibility
Management Objective 5.1.1: Preserve and manage all cultural heritage resources					
a.	Maintain and build on the inventory of heritage resources (middens, caves) associated with and in close proximity to the Matjies River estuary	National Heritage Resource Act (NHRA)	<ul style="list-style-type: none">• Information gathered, and inventory developed• Heritage assets mapped• Cultural Heritage Plan developed and implemented• Site-specific management guidelines and maintenance plans developed for all sites• Heritage sites managed by an appointed custodian• Private-public partnerships (PPP) established	HIGH	RMA, Bitou LM, South African Heritage Resources Agency (SAHRA)
b.	Identify and map tangible heritage resources	NHRA		HIGH	RMA, Bitou LM, SAHRA
c.	Develop and implement a Cultural Heritage Management Programme with site specific guidelines, and maintenance plan(s)	NHRA		HIGH	RMA, Bitou LM
d.	Appoint a custodian of the Matjies cultural heritage sites through PPP	NHRA		HIGH	RMA, Bitou LM, SAHRA
Management Objective 5.2: Develop and regulate local livelihoods associated with the estuary					
a.	Investigate and implement opportunities for employment of local communities associated with the heritage site (e.g. tour guides, maintenance staff, etc.)	MSA	<ul style="list-style-type: none">• Target communities identified• Employment opportunities identified• Training of personnel	MEDIUM	RMA, Bitou LM, SANParks, SAHRA

5.6 Education & Awareness

Strategic Objective 6: Members of society are sensitive to and aware of the value and importance of the Matjies River estuary.

Table 9: Management Objectives and Actions for Education & Awareness

Action		Relevant Legislation	Performance Indicator	Priority	Responsibility
Management Objective 6.1: Promote high levels of public awareness and appreciation of the value of estuaries					
a.	Source and/or commission educational and interpretative material including signage, posters, pamphlets and webpage design	ICMA	<ul style="list-style-type: none"> Posters and pamphlets erected/disseminated Estuary information included in Matjies River cave webpages 	MEDIUM	RMA
b.	Informative signage, indicating zonation and allowable activities to be placed at strategic points for all users/visitors	ICMA	<ul style="list-style-type: none"> Signage created and erected Reduced risk of degradation, transformation and disturbance to the estuary 	LOW	RMA
c.	Engage and educate estuary users (including fishers/harvesters)	ICMA	<ul style="list-style-type: none"> Reduction in illegal activities Reduced habitat loss/degradation and disturbance, and inappropriate behaviour Informative surveys/talks undertaken 	LOW	RMA

6 PROPOSED SPATIAL ZONATION

6.1 Introduction

Spatial zonation of activities on an estuary is necessary to avoid user conflict and to guide sustainable utilisation of resources without degradation of the estuarine environment. The spatial zonation plan provides a means of geographically transposing the aims of the management objectives, where applicable, and is typically informed by the following (DEA, 2015):

- The geographical boundary of the estuary also indicating important habitats (e.g. floodplain, open water, reed beds, sandflats, etc.);
- The surrounding land uses and existing infrastructure;
- Areas designated for the conservation and protection of biodiversity;
- Appropriate buffers in which land use and development are strictly controlled and monitored; and
- Zones where certain types of activities (recreational, commercial, industrial, harvesting etc.) are permissible and others not permissible.

6.2 Habitat zones

A habitat sensitivity analysis is the baseline which guides the differentiation of the various zones, specifically identifying:

- threatened, ecologically important habitats as no-go or minimal disturbance zones;
- those areas which can support controlled, sustainable exploitation of marine living resources; and
- those where various forms and levels of appropriate water-based recreation are acceptable.

The habitat map shown in Figure 6 is used as the baseline for the identification of sensitive estuarine habitats and informs the zonation of activities. While there is no development within the EFZ, the legislated boundaries and buffer zones are still applicable.

Given the small size of the estuary, limited diversity of available habitats and extremely limited use, it is suggested that the entire estuary be managed as a single zonation type (See Section 6.4.2 below).

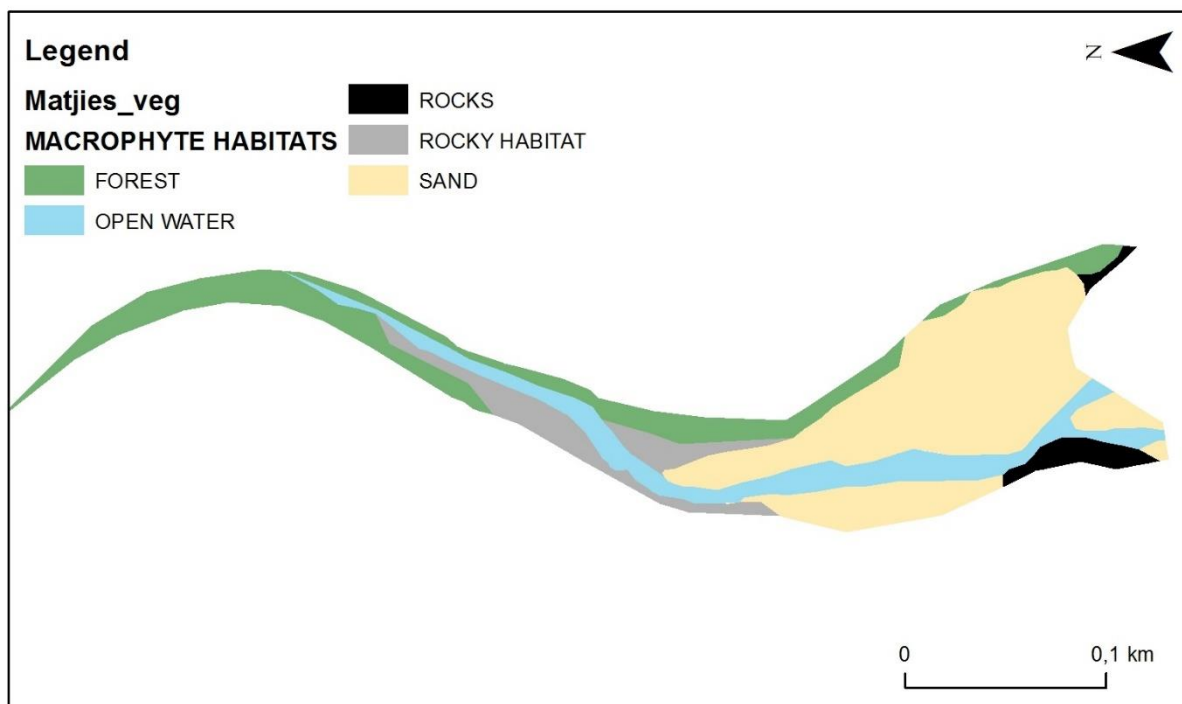


Figure 6: Habitats identified in the Matjies River estuary

6.3 Legislated Coastal Boundaries and Buffer Zones

6.3.1 Estuarine Functional Zone

The ICMA defines an estuary as “a body of surface water -

- that is permanently or periodically open to the sea;
- in which a rise and fall of the water level as a result of the tides is measurable at spring tides when the body of surface water is open to the sea; or
- in respect of which the salinity is higher than fresh water as a result of the influence of the sea, and where there is a salinity gradient between the tidal reach and the mouth of the body of surface water”.

Similarly, the National Water Act (NWA) defines an estuary as “a partially or fully enclosed water body that is open to the sea permanently or periodically, and within which the seawater can be diluted, to an extent that is measurable, with freshwater drained from land”.

However, the 2018 National Biodiversity Assessment provides a more detailed definition of an estuary, that is: “a partially enclosed permanent water body, either continuously or periodically open to the sea on decadal time scales, extending as far as the upper limit of tidal action, salinity penetration or back-flooding under closed mouth conditions. During floods an estuary can become a river mouth with no seawater entering the formerly estuarine area or, when there is little or no fluvial input, an estuary can be isolated from the sea by a sandbar and become fresh or even hypersaline” (SANBI 2019).

The EFZ is defined by the 2014 Environmental Impact Assessment (EIA) Regulations (as amended in 2017) (GN 324) as *"the area in and around an estuary which includes the open water area, estuarine habitat (such as sand and mudflats, rock and plant communities) and the surrounding floodplain area"*, as defined by the 5 m topographical contour (referenced from the indicative mean sea level). The 2013 NEMP acknowledges the EFZ as the geographical boundary of estuaries in South Africa. In practice, it is found that the 5 m topographic contour approximates the EFZ for most estuaries in South Africa. It is consequently commonly used to delineate the EFZ in the absence of specific biophysical assessments. Where biophysical information is available, the EFZ can be delineated according to the presence of estuarine vegetation or features such as wetlands that are directly supportive of the estuary. This approach informed the EFZ used in the 2018 NBA (SANBI, 2019) (refer to Figure 3).

6.3.2 Coastal Protection Zone and proposed Coastal Management Line

The Integrated Coastal Management (ICM) Act defines a default **Coastal Protection Zone (CPZ)** which, in essence, consists of a continuous strip of land, starting from the High Water Mark (HWM) and extending 100 m inland in developed urban areas zoned as residential, commercial, or public open space, or 1 000 m inland in areas that remain undeveloped or that are commonly referred to as rural areas. It also includes certain sensitive or at-risk land such as estuaries, littoral active zones and protected areas.

The Provincial Member of the Executive Council (MEC), in consultation with the Local Municipalities, is required to refine and formally adopt the CPZ. A process is currently underway to formally establish a CPZ for the Western Cape Coastline. In accordance with provisional delineation of the CPZ for estuaries in the Garden Route DM (formerly Eden DM), as per draft delineations recommended in the Coastal Set-back / Management Lines for the Eden District project (WCG, 2015), the CPZ is informed by a coastal risks zone approximated by the **10 m amsl contour or 1:100-year floodline** around an estuary, whichever is wider.

The ICMA also provides for the establishment of a **Coastal Management Line (CML)**, designed to limit development in ecologically sensitive or vulnerable areas, or an area where dynamic natural processes pose a hazard or risk to humans. A CML, as envisaged by the amended ICM Act, is informed by the projections of risk emanating from dynamic coastal processes such as sea level rise or erosion, information on ecological or other sensitivities adjacent to the coast, as well as the location and extent of existing development and existing executable development rights. The CML is a continuous line, seawards of which lies:

- Areas of biophysical or social sensitivities such as sensitive coastal vegetation identified as priority conservation areas and formal protected areas;
- those areas that should be left undeveloped, or only be granted appropriately restricted development rights, due to a high risk from dynamic coastal processes; or
- coastal public property.

In estuaries, the CML is delineated by the 5 m amsl contour or 1:100-year floodline, whichever is wider, to differentiate a zone where formal development should be discouraged. The coastal boundaries for the Matjies River estuary are illustrated in Figure 7.

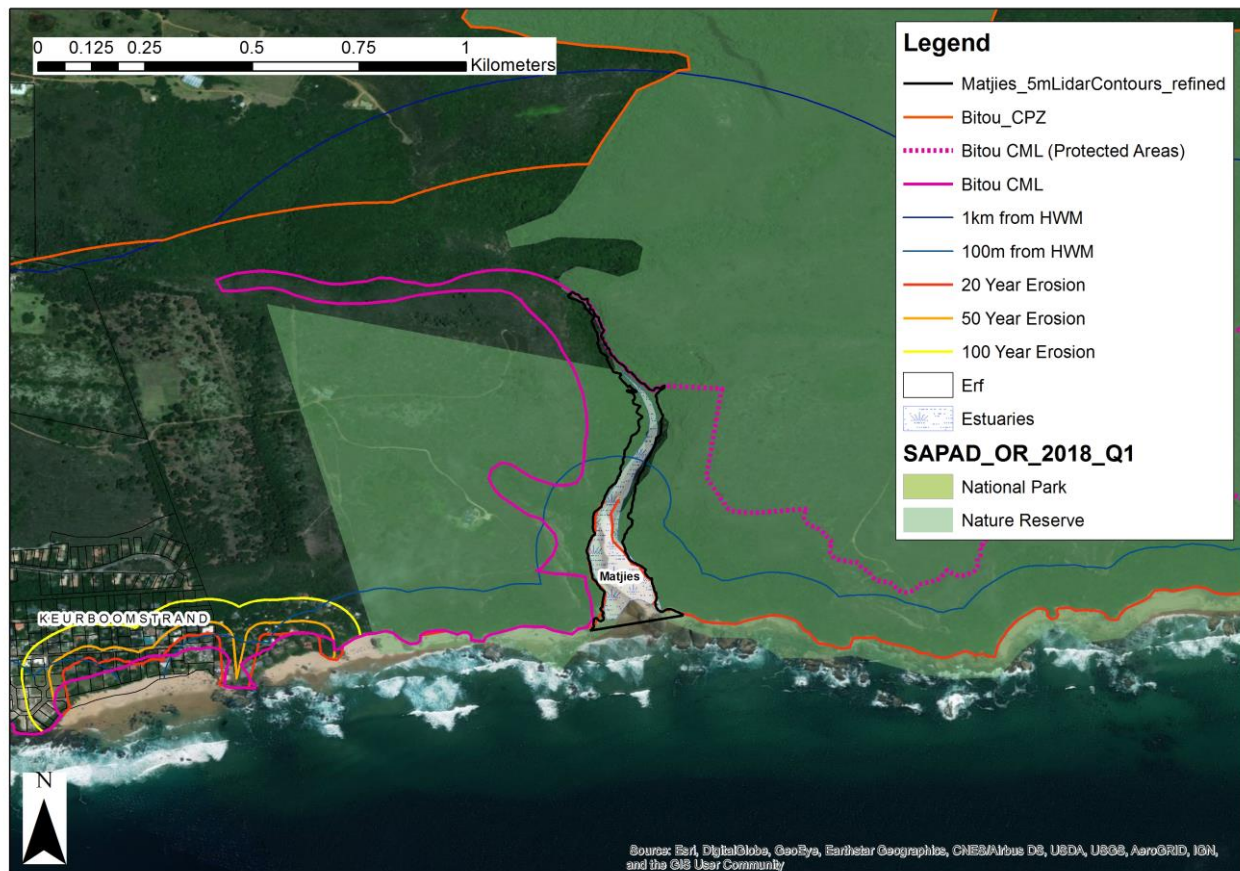


Figure 7: Coastal boundaries of the Matjies River estuary and risk projections (WCG, 2015)

6.3.3 Environmental Impact Assessment regulatory line

In respect of the EIA regulatory scheme, an additional line called the Development Set-Back Line (DSL) needs to be differentiated as it relates to the 'development set-back' referred to in the EIA regulations³ rather than the coastal management lines described in the ICM Act. However, as part of the on-going process of defining coastal management lines for the Western Cape, it is currently **proposed that the CML, as defined under ICMA, also be used as the DSL.**

Reference to development set-backs is found in the EIA Listing Notices that list a range of activities that require different levels of environmental impact assessment and the issuing of an environmental authorisation prior to being undertaken.

Typically, an activity would be listed in the form of a range of thresholds which, if exceeded, trigger the need for an environmental impact assessment in the form of a Basic Assessment

³ The Environmental Impact Assessment Regulations, 2014 (as amended in 2017), published under Government Notice No. 326 in Gazette No. 40772 of 4 April 2017, in terms of sections 24(5) and 44 of the National Environmental Management Act, 1998 (Act No. 107 of 1998)

or EIA. In some cases, however, a development set-back line is used as spatial reference to include or exclude activities. The EIA regulations indicate that: *“development setback” means a setback line defined or adopted by the competent authority*. This implies that if such a setback is defined, the setback delineation replaces the default parameters for an activity, as read within the context of that activity. The competent authority in the Western Cape is DEA&DP or the National Department of Environment, Forestry and Fisheries.

The EIA regulations also refer to whether a development is in front or behind the line – for a coastal development set-back this equates to any development seaward of the line being ‘in front of’, whilst landward of the line being ‘behind’.

An important further point to note is that the development set-backs are usually linked to the presence of urban built-up areas. The regulations indicate that *““urban areas” means areas situated within the urban edge (as defined or adopted by the competent authority), or in instances where no urban edge or boundary has been defined or adopted, it refers to areas situated within the edge of built-up areas”*. These exclusion areas create *de facto* islands in the area below the DSL, within which the specifically excluded EIA triggers don’t apply.

The Western Cape Government, as designated competent authority, considers the area below/seaward of existing development as falling outside of the ‘built-up area’. Therefore, any exclusions based on a listed activity taking place within the built-up area would not apply to this strip of coastal land, and the prescriptions for environmental assessments related to the particular activity will apply. For example, the beach in front of seafront houses is not considered ‘built-up’ and environmental authorisations will be required to execute any listed activities on that beach.

6.4 Zonation of Activities

6.4.1 Current zonations and uses

The table below lists the surrounding land use types as per the Bitou Municipal Town Planning Scheme and activities occurring in and/or adjacent to the Matjies River estuary (

Table 10). The Matjies River estuary and its EFZ falls entirely within a private nature reserve entitled, the Annex Arch Private Nature Reserve. It is identified in the Bitou LM SDF (Core 1c – critical biodiversity areas falling outside Core 1a and 1b) falling outside the urban edge.

Table 10: Current zonations and activities occurring in and/or adjacent to the Matjies River estuary

LAND USE	DESCRIPTION
Open Space Zone 3: Private Nature Reserve	The Matjies EFZ falls within an area zoned as Private Nature Reserve, namely the Annex Arch Private Nature Reserve, which straddles the estuary. While the land on either side of the estuary is zoned Nature Reserve, the water course/body is not included.
Residential (single residential 1)	While not directly adjacent to the EFZ, the town of Keurboomstrand's residential erven zoned as single residential 1 abut the open space zone 3
Terrestrial Buffer Zone	The Matjies EFZ falls within the Terrestrial Buffer Zone of the Garden Route Biosphere Reserve, adjacent to the developed area of Keurboomstrand (UNESCO, 2018)
ACTIVITIES	DESCRIPTION
Walking/hiking	Hiking associated with Matjies Cave/Annex Arch Private nature reserve
Fishing	Possible limited beach-based fishing
Bait collection	Possible limited sand prawn pumping
Swimming	Possible limited swimming

6.4.2 Proposed spatial zonation

A single zonation type is proposed for the Matjies River estuary, namely a Quiet Zone, based on the SANParks zonation plan (SANParks, 2012), given the conservation nature of the surrounding land use and similarity between the Matjies and the neighbouring Sout (Oos) River estuary (Garden Route National Park) in terms of use. Estuaries are included in this zone to preclude infrastructure development and excessive tourist impacts (SANParks, 2012). Therefore, limited activities are encouraged within the Matjies EFZ, which are fortunately governed by the small size of the system.

In terms of the general characteristics of a 'Quiet Zone', the area which generally retains a natural appearance and character, is undeveloped and without roads (i.e. on pedestrian access only). In open water areas, only non-motorised boats are permitted (SANParks, 2012).

The conservation objective is to maintain the zone in a generally natural state, with the proviso that limited impacts on biodiversity patterns and processes are allowed in order to accommodate recreational and tourism objectives. The aesthetic / recreational objectives for the zone specify that activities which impact on the appearance and character of the area should be restricted, though the presence of larger numbers of visitors (e.g. Matjies River cave) and the facilities they require, may impact on the feeling of "wildness" found in this zone ((SANParks, 2012).

Allowable activities in this zone are to be managed as per Table 11 below. Formal development or construction activities are to be regulated according to the EIA Regulations and any controls related to the Bitou LM CML.

General controls and best practice, which would apply to all activities within the EFZ include:

- No development within the EFZ;
- No clearing of indigenous vegetation for access or estuary views;
- No construction of jetties and slip ways, and
- Removal/control of invasive alien vegetation.

Table 11: Zonation prescriptions for the Matjies River estuary

CONDITIONS OF USE	RELEVANT LEGISLATION	RESPONSIBLE AUTHORITY	ENFORCEMENT
<ul style="list-style-type: none"> • Permissible activities: hiking; walking; rock climbing; bird watching; canoeing/paddling (non-motorised vessels) • Permissible facilities: Hiking trails; footpaths; management tracks; bird hides • Access: <ul style="list-style-type: none"> ◦ Mainly on foot, non-motorised access to specific facilities ◦ No tourist access by vehicle ◦ No off-road vehicle access ◦ No accommodation • Fishing/ harvesting subject to the possession of an appropriate, valid permit 	MLRA Regulations LUPA, Municipal Town Planning Scheme (TPS), Bylaws,	Bitou Bay LM	RMA, Bitou Bay LM DFFE

6.4.3 Areas requiring rehabilitation

Little intervention is required along the Matjies estuary in terms of rehabilitation, apart from invasive alien vegetation management along the banks and in the catchment, and management of tourism impacts associated with the Matjies River rock shelter/cave archaeological site.

7 INTEGRATED MONITORING PLAN

According to the standards for estuarine management, management actions should be based on sound scientific evidence. Thus, monitoring is a crucial aspect of the adaptive estuarine management planning process as the generated data will be used to inform and update management decisions. However, the collection, processing and interpretation of such data, particularly ecological data, are generally costly and time-consuming and often require considerable scientific expertise.

In the context of estuarine management, there are three broad categories of monitoring which should be incorporated into an integrated monitoring plan, namely resource monitoring, compliance monitoring and performance monitoring (DEA, 2015). These components are discussed in the following sections.

7.1 Resource Monitoring

7.1.1 Current Resource Monitoring

There are no known ecological monitoring programmes (e.g. water quality, fish or birds, etc.) in place for the Matjies River estuary.

There have been claims of the presence of *E.coli* bacteria in the Matjies River estuary⁴. However, these claims are unsubstantiated and water quality monitoring will need to be undertaken to verify this.

7.1.2 Recommended Resource Monitoring Programmes

In the context of the Matjies River estuary, general information is limited. The recommended baseline monitoring requirements to improve the confidence of the reserve determination as developed through Gouritz Water Classification Study (DWS, 2015), are provided Table 12 in Appendix 1. The recommended long-term monitoring requirements to ascertain impacts of changes in freshwater flow, and current and future impacts on the estuary and/or any improvement or reductions therein are listed in Table 13. The purpose of recommended long-term monitoring programme is also to test for compliance with Ecological Specifications (Ecospecs) and Thresholds of potential concern (TPCs) and to continuously improve understanding of ecosystem function.

A basic monitoring programme should be established by Bitou LM for the Matjies River estuary according to the Reserve Determination methods. The programme should seek to address the highlighted priorities as soon as possible and various components can be monitored by the Keurboomstrand Conservancy.

⁴ Minutes of the stakeholder meeting for the Matjies, Sout (Oos) and Groot (Wes) estuaries, 30 August 2018, SANParks Offices, Storms River

7.1.3 Resource Quality Objectives / Ecological Specifications

Resource Quality Objectives (RQOs) or Ecological Specifications (EcoSpecs) are clear and measurable specifications of ecological attributes (in the case of estuaries - hydrodynamics, sediment dynamics, water quality and different biotic components) that define a specific ecological category, in the case of the Matjies River estuary, a Category B (DWS, 2015).

Thresholds of potential concern are defined as measurable end points related to specific abiotic or biotic indicators that if reached (or when modelling predicts that such points will be reached) prompts management action. In essence, TPCs should provide early warning signals of potential non-compliance to ecological specification (i.e. not the point of 'no return'). The EcoSpecs, as well as the TPCs, representative of a Category B for the Matjies River estuary, are presented in Table 14 (Appendix 2) (DWS, 2015; 2018).

7.2 Compliance Monitoring

Compliance monitoring refers to the monitoring of the character and intensity of uses/activities and developments within an estuary/EFZ. Such monitoring is usually prescribed in relevant legislation, regulations, policies, standards, guidelines and or permits and license agreements (DEA, 2015). The purpose of this form of monitoring is to test whether activities are compliant with the established limits and objectives as well as to detect growing pressures on resources.

Currently there is no compliance monitoring taking place on the Matjies River estuary due to the remoteness and small size of the estuary.

In respect to the implementation of this EMP, compliance monitoring in terms of marine living resource use will be the responsibility of the DFFE, and will be undertaken according to legislation and policies applicable and by means of law enforcement and compliance monitoring protocols.

7.3 Performance Monitoring (Review & Evaluation)

A performance monitoring plan is used by the RMA, and/or identified implementing agents, to assess the effectiveness with which planned management activities contained in the EMP are being performed and ultimately to gauge progress in achieving the vision and objectives. This component utilises the performance indicators included for the various actions, specifically the management priorities, and includes a temporal scale or the frequency of the collection of the performance data and the targets that should be achieved.

Ultimately the EMP must be holistically reviewed every 5 years from the date it was adopted, ideally in line with the review cycles of the applicable IDP, SDF and/or CMP. This review is the responsibility of the RMA. According to the 2013 NEMP, this review should include an assessment of:

-
- The effectiveness of the EMP and success with meeting the objectives (i.e. the performance monitoring plan);
 - Environmental changes at a local or a wider scale that could affect the estuarine resources or the implementation of the EMP; and
 - Changes (if any) to legislation, land-use planning, goals or policies that may require the EMP to be amended.

This review may involve revisiting the SAR to determine the progress or changes that have come about because of the EMP in terms of the objectives that were originally set. It may also require the EMP to be amended, including a revision of the objectives, amendments to the management actions, and/or monitoring protocols. Ideally, representatives and experts in the major sectors (e.g. water quantity and quality, land-use and infrastructure planning and development), should evaluate the efficiency of the EMP in the context of their mandate or area of expertise. Public participation will be required before the amended EMP can be approved.

Table 15 in Appendix 3 provides the performance monitoring plan relative to the proposed management priorities.

8 INSTITUTIONAL CAPACITY & ARRANGEMENTS

It is essential that this EMP is regarded as a strategic plan that can guide the detailing of management actions and identification of implementing agents. Therefore, it does not specify the required resources (human and financial) required for effective management of the estuary. It does, however, offer a schedule or phased planning approach that incorporates capacity building and implementation at the local level over a five-year period. It is crucial that champions/project leaders/teams are identified who will be responsible for the formulation of detailed project plans and the implementation thereof.

8.1 Key Role Players

Co-management and effective governance have been identified as vital aspects of efficient and effective estuarine management. Figure 8 displays the key role players that should be included in its management.

8.2 Responsible Management Authority

The 2021 NEMP identifies the **Department of Environmental Affairs & Development Planning (DEA&DP) (provincial environmental department)**, or its assigned representative, as the RMA responsible for the co-ordination of the implementation of the Matjies River Estuary EMP. **It is noted that the NEMP allocates such responsibilities to the DEA&DP (provincial environmental department) unless agreement / or until agreement is reached with the respective body to undertake the coordination of the implementation process. Ultimately, the role of the RMA must be designated through formal signed agreement.**

The entire Matjies River estuary also falls within the Annex Arch Private Nature Reserve. Thus, management of the Matjies River estuary must include consultation with the landowners of the nature reserve (i.e. a co-management agreement) and a co-management agreement will need to be established with the land owner. The Matjies River estuary also falls within the Garden Route Biosphere Reserve (GRBR), which may thus also be included as a co-management authority.

Effective implementation of this EMP requires the augmentation of capacity with the recommended appointment of a regional estuarine management co-ordinator (EMC) within DEA&DP. This individual will play a critical co-ordinating role for all other implementing agencies and municipal departments.

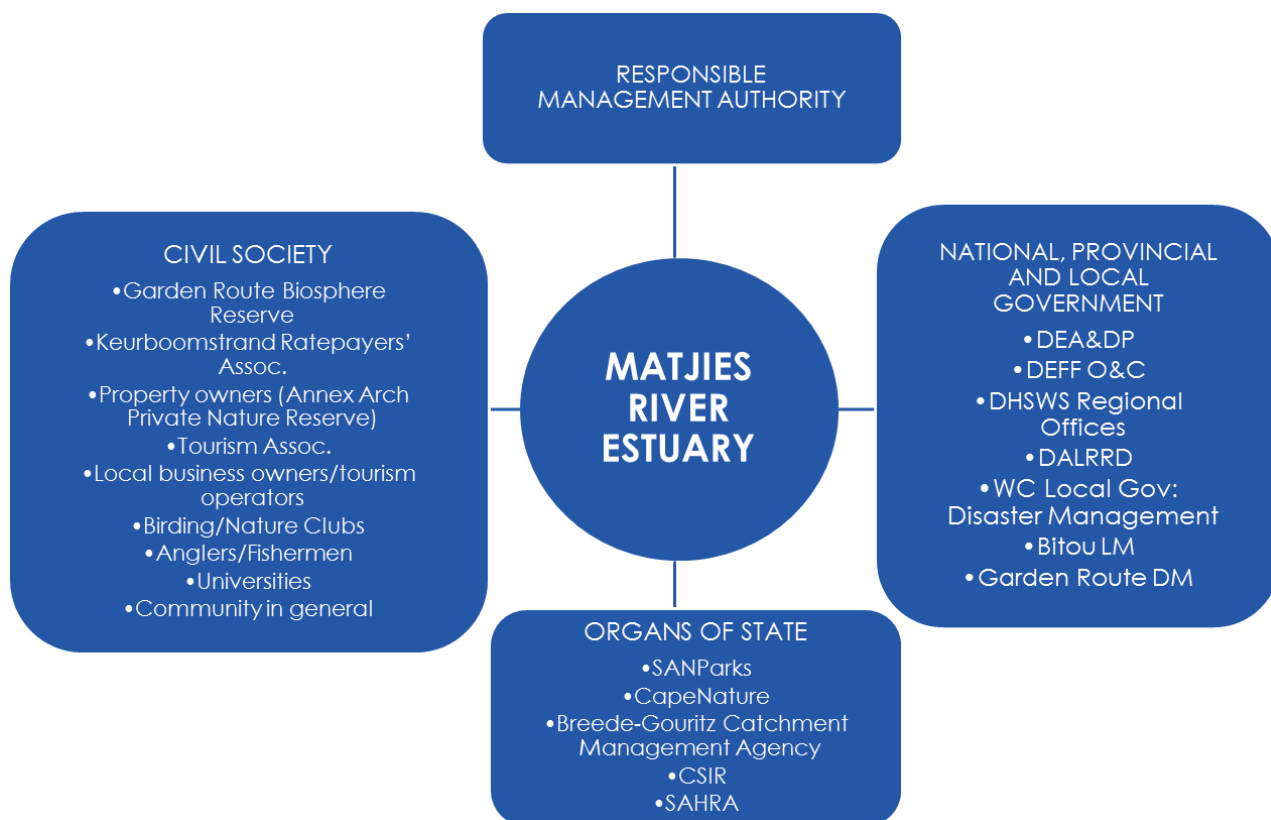


Figure 8: Key role players for the management of the Matjies river estuarine system

Specific implementation actions identified in this EMP remain the responsibility of mandated government agencies as well as respective departments within the RMA. As an example, the DWS will monitor water quality, while the DFFE will ensure compliance with matters related to fisheries. It is crucial that champions/project leaders/teams are identified who will be responsible for the formulation of detailed project plans and the implementation thereof.

Progress towards achieving the objectives set out in this EMP should be reviewed on an annual basis by the RMA and communicated to stakeholders as well as to DEA&DP and DFFE via an annual report. This EMP will need to be revisited and updated after five years to reflect goals that have been achieved and to accommodate changing priorities.

8.3 Estuary Advisory Forum

While the establishment of an EAF for each estuary is no longer a requirement in the 2013 NEMP, the Western Cape Government still support their establishment and recommend that private entities and non-government organisations continue to play a supporting role in the implementation of this EMP. While an individual EAF is not recommended, the establishment of a collective EAF is suggested, incorporating the Matjies and Keurbooms estuaries (as preferred at the stakeholder meeting⁵), which at present are under the jurisdiction Bitou LM.

⁵ Minutes of the stakeholder meeting for the Matjies, Sout (Oos) and Groot (Wes) estuaries, 30 August 2018, SANParks Offices, Storms River

Government departments should be represented on this regional EAF by delegates mandated by the respective department to do so. Each government representative on the EAF will be tasked to convey recommendations to his/her department and report back to the EAF on behalf of the department. Moreover, representatives from the authority/ies who have executive powers within the specific sector should also be present. This ensures that recommendations are executed, and resources are made available for priority tasks or activities. This also streamlines the flow of information and decreases the turnaround time of required interventions.

The various local members of the EAF will play an invaluable role in providing on the ground, local insight and support to the various authorities as well as to the RMA.

8.4 Government Departments and Organs of State

The key to successful implementation of this EMP is the commitment and contribution of all spheres of government to the process, including:

- The Bitou Local Municipality; responsible for providing key municipal services, as well as the provision of management, technical and legislative support;
- The Garden Route DM: Responsible for health and safety issues relating to water and sanitation, disaster management as well as the provision of management and technical support;
- Western Cape Government departments: Responsible for legislatively mandated responsibilities as well as support, including compliance, funding, research and monitoring;
- Relevant National government departments, especially DFFE, DWS (via the regional office), DALRRD; Department of Science and Technology (DST); and
- Organs of State: SANParks, BGCMA, CapeNature, CSIR, SAHRA.

A crucial element towards achieving the vision and objectives of this plan, now and in future, is to ensure that the responsible authorities and their constituent departments, fulfil their roles and responsibilities as identified within the EMP. In terms of practical implementation of the EMP, each responsible government department is required to produce internal project plans linked the identified management actions, and in line with their legislative mandates. Funding and staff resources will need to be sourced within each respective sector department and/or institute. Alternatively, departments may fund other entities to undertake their necessary functions on their behalf.

The DFFE is generally responsible for national standardisation of estuarine management and approval of provincially-compiled estuarine management plans. Direct involvement in individual estuaries will occur via existing forums for intergovernmental coordination. These forums will have the estuarine management on their agendas, and include:

- The Garden Route Municipal Coastal Committee: Responsible for facilitating co-management, effective governance and district level co-ordination of coastal and estuarine management issues; and

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- Western Cape Provincial Coastal Committee: Responsible for facilitating co-management and effective governance and provincial co-ordination of estuarine management; and
 - Western Cape Estuaries Task Team: Responsible for facilitating provincial co-ordination of estuarine management.

8.4.1 Project Plans for Implementation

Effective implementation of this EMP requires the conversion of the priority actions into detailed project plans, which must be prepared and adopted into the respective departmental implementation strategies. A template for such project plans is provided in the EMP Development Guideline (DEA, 2015) and is attached as Appendix 4 for ease of reference. This template can also be utilised to facilitate the implementation of other projects proposed in the EMP.

9 RECOMMENDATIONS AND CONCLUSION

The following items/issues are considered critical towards the ultimate achievement of the vision and should be immediately addressed and/or receive greatest effort in respect to human/financial resources:

- A watching brief is kept over this privately protected estuary;
- Any transformation of the EFZ prevented;
- Potential livelihood opportunities related to the cultural heritage resources (cave and middens) investigated while still ensuring their continued protection;
- Local buy-in from Bitou LM, residents of Keurboomstrand and business owners for custodianship of estuary in support of land owners; and
- The DEA&DP to consider the appointment of a Regional estuarine management co-ordinator/champion within either DEA&DP or CapeNature, to support the RMA.

In conclusion, this plan adopts the principle of adaptive management and presents an integrated and holistic approach to addressing not just the impacts but also the social and economic drivers that affect estuarine health. The actions proposed in this EMP reflect an ongoing process of implementation and should accommodate potential amendment due to changing circumstances. They are the first steps of a long-term process designed to secure ongoing and sustainable improvements to the current situation.

10 REFERENCES

- Bitou Municipality (2017). Bitou Local Municipality Integrated Development Plan 2017-2022. Bitou Local Municipality.
- CapeNature (2012). Kogelberg Nature Reserve Complex Management Plan 2013-2018.
- Department of Environmental Affairs (DEA), (2013). National Environmental Management Integrated Coastal Management Act 2008 (Act No. 24 of 2008): National Estuarine Management Protocol (NEMP).
- Department of Environmental Affairs (DEA) (2015). Guidelines for the Development and Implementation of Estuarine Management Plans in terms of the National Estuarine Management Protocol. Department of Environmental Affairs, Cape Town.
- Department of Water Affairs and Forestry (DWAF) (2007). Ecological Reserve Determination studies for the water resources of the K70a Quaternary Catchment (Rivers, Estuaries and Groundwater), Southern Cape Matjies River Estuary Rapid Reserve Determination Study – Technical Report.
- Department of Water and Sanitation (DWS) (2015). Reserve Determination Studies for Surface Water, Groundwater, Estuaries and Wetlands in the Gouritz Water Management Area: Estuaries RDM Report – Desktop Assessment, Volume 1. Prepared by the Council for Scientific and Industrial Research (CSIR) for Scherman Colloty and Associates cc. Report no. RDM/WMA16/04/CON/0613, Volume 1.
- Department of Water and Sanitation (DWS) (2015b). Reserve Determination Studies for the Selected Surface Water, Groundwater, Estuaries and Wetlands in the Gouritz Water Management Area: Monitoring Report. Prepared by Koekemoer Aquatic Services and Scherman Colloty & Associates cc.. Report no. RDM/WMA16/00/CON/1213.
- Department of Water and Sanitation (DWS) (2018). Determination of Water Resources Classes and Resource Quality Objectives in the Breede-Gouritz Water Management Area: Outline of Resource Quality Objectives Report. Report No: RDM/WMA8/00/CON/CLA/0717.
- South African National Biodiversity Institute (SANBI) (2019). National Biodiversity Assessment 2018: The status of South Africa's ecosystems and biodiversity. Synthesis Report. South African National Biodiversity Institute, an entity of the Department of Environment, Forestry and Fisheries, Pretoria. pp. 1–214.
- SANParks (2012). Garden Route National Park Management Plan. South African National Parks.
- StatsSA, (2011). Bitou Municipality. Key Statistics from the 2011 National Census. Statistics South Africa. URL: http://www.statssa.gov.za/?page_id=993&id=bitou-municipality Accessed 20 November 2018.

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- StatsSA, (2016). Bitou Municipality Community Survey data 2016. URL: <https://wazimap.co.za/profiles/municipality-WC047-bitou> . Accessed 20 November 2018.
- UNESCO (2018). Garden Route Biosphere Reserve zonation. URL: http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/SC/images/Garden_Route_Zonation.jpg . Accessed 20 November 2018.
- Western Cape Government (WCG) (2015). Coastal Management (Set-back) Lines for the Eden District, 31 March 2015. Western Cape Government Environmental Affairs and Development Planning.

APPENDIX 1: RECOMMENDED MONITORING PROGRAMMES

Table 12: Generic baseline surveys to improve confidence in the reserve determination of estuaries (Priority components are highlighted) (DWS, 2015b)

Monitoring action	Temporal Scale (frequency and timing)	Spatial Scale (Number of stations)
Hydrology		
For larger systems record river inflow at head of estuary (smaller systems hydrology to be simulated every 10 years).	Continuous.	Install recorder near head of estuaries.
Hydrodynamics		
Record water levels Large system (permanent recorder DWS levelled to mean sea level). Smaller systems (small in situ probe).	Continuous.	Near mouth.
Aerial photography (or using high resolution satellite imagery i.e. 5x5 m pixel size, e.g. Google Pro or BirdEye).	Once-off.	Entire estuary.
Sediment dynamics		
Monitoring berm height using appropriate technologies.	Quarterly.	Mouth.
Bathymetric surveys: Series of cross section profiles and a longitudinal profile collected at fixed 500 m intervals, but in more detail in the mouth including the berm (every 100 m). Vertical accuracy at least 5 cm.	Once-off.	Entire estuary.
Collect sediment grab samples (at cross section profiles) for analysis of particle size distribution and organic content (and ideally origin, i.e. microscopic observations).	Once-off.	Entire estuary.
Water quality		
Electrical conductivity, pH, inorganic nutrients and organic content (e.g. Total P and Kjeldahl N) in river inflow (preferably also suspended solids and temperature).	Monthly (as in DWS monitoring programme).	Include monitoring station near head of estuary.
Salinity and temperature profiles (and any other in situ measurements possible e.g. pH, DO, and turbidity).	Quarterly, preferably for two years.	Along entire length of estuary (at least three stations covering all zones).
Inorganic nutrient concentrations (together with above).	Quarterly, preferably for two years.	Along entire length of estuary (at least three stations covering all zones).
Measure pesticides/herbicides and metal accumulation in sediments (for metals investigate establishment of distribution	Once-off.	Entire estuary, including depositional areas (i.e. muddy areas).

Monitoring action	Temporal Scale (frequency and timing)	Spatial Scale (Number of stations)
models – refer to Newman and Watling, 2007)		
Microalgae		
Record relative abundance of dominant phytoplankton groups, i.e. flagellates, dinoflagellates, diatoms, chlorophytes and blue-green algae. Chlorophyll-a measurements taken at the surface, 0.5 m and 1 m depths, under typically high and low flow conditions using a recognised technique, e.g. spectrophotometer, HPLC or fluoroprobe. Intertidal and subtidal benthic chlorophyll-a measurements (four replicates each) using a recognised technique, e.g. sediment corer or fluoroprobe.	Quarterly preferably for two years.	Along length of estuary minimum five stations.
Macrophytes		
Map area covered by different macrophyte habitats using recent imagery. Conduct field survey to record total number of macrophytes habitats, identification and total number of macrophytes species, number of rare or endangered species, or those with limited populations. Assess extent of invasive species in EFZ. Where there are salt marsh areas greater than 1 ha measure % plant cover along elevation gradient. Sediment samples collected along the transect and analysed in the laboratory for sediment moisture, organic content, EC, pH and redox potential. In the field measure depth to water table and ground water salinity	Once-off, in summer.	Entire estuary (mapping). Where there is salt marsh (minimum three transect sites).
Invertebrates		
Collect duplicate zooplankton samples at night from mid-water levels using WP2 nets (190 µm mesh) along estuary Collect sled samples (day) at same zooplankton sites for hyper benthos (190 µm) Collect grab samples (five replicates) (day) from the bottom substrate in mid-channel areas at same sites as zooplankton (each sample to be sieved through 500 µm). Intertidal invertebrate hole counts using 0.25 m ² grid (five replicates per site). Establish the species concerned (<i>C. kraussi</i> or <i>U. africana</i>) using a prawn pump.	Quarterly, preferably for two years.	Minimum of three sites along length of entire estuary. For hole counts –three sites in each of muddy or sandy areas.

Monitoring action	Temporal Scale (frequency and timing)	Spatial Scale (Number of stations)
Collect sediment samples using the grab for particle size analysis and organic content (at same sites as zooplankton) (preferably link with sediment dynamics).		
Fish		
<p>Record species and abundance of fish, based on seine net and gill net sampling. Sampling with a small beam trawl for channel fish should also be considered.</p> <p>Seine net specifications: 30 m x 2m, 15 mm bar mesh seine with a 5 mm bar mesh with a 5 mm bar mesh 5 m either side and including the cod-end.</p> <p>Gill nets specifications: Set of gill nets each panel 30 m long by 2 m deep with mesh sizes of 44 mm, 48 mm, 51 mm, 54 mm, 75 mm, 100 mm and 145 mm.</p> <p>Gill net sampling can be replaced by a large mesh seine (44 mm stretch mesh, 100 m x 2 m).</p> <p>Trawl specification: 2 m wide by 3 m long, 10 mm bar nylon mesh in the main net body and a 5 mm bar in the cod-end.</p>	Once-off, in spring/summer and autumn/winter.	<p>Larger system (> 5 km): 10 - 15 stations along length of estuary (~ length/10).</p> <p>Small systems (< 5 km): 3 - 5 stations (mouth, mid, top).</p>
Birds		
Undertake count of all water birds.	Once-off.	Entire estuary.

Table 13: Recommended long-term monitoring programme for the Matjies Estuary (priority components are highlighted) (DWS, 2015b)

ECOLOGICAL COMPONENT	MONITORING ACTION	TEMPORAL SCALE	SPATIAL SCALE
Hydrology	Record river inflow at head of estuary	Continuous	Head of estuary
Hydrodynamics	Record water levels using small in situ probe	Continuous	Near mouth
	Aerial photography (or using high resolution satellite imagery i.e. 5x5 m pixel size, e.g. Google Pro or BirdEye)	Every 3 years	Entire estuary
Sediment dynamics	Monitoring Berm height using appropriate technologies	Quarterly	Mouth
	Bathymetric surveys: Series of cross section profiles and a longitudinal profile collected at fixed (e.g. 300-500 m intervals) but in more detail in mouth including berm (every 100 m). Vertical accuracy at least 5 cm	Every 3 years (and after large resetting event)	Entire estuary
	Set sediment grab samples (at cross section profiles) for analysis of particle size distribution (and ideally origin, i.e. microscopic observations)	Every 3 years	Entire estuary
Water quality	Electrical conductivity, pH, inorganic nutrients and organic content (e.g. TP and Kjeldahl N) in river inflow (<i>preferably also suspended solids and temperature</i>)	Monthly continuous (as in DWS monitoring programme)	Just above head of estuary
	Salinity and temperature profiles (and any other in situ measurements possible e.g. pH, DO, turbidity)	Seasonally, annually	Along entire length of estuary (at least 3 station covering all zones)
	Inorganic nutrient concentrations (together with above)	High flow/low flow surveys, every 3 years or when significant change in WQ expected	Along entire length of estuary (at least 3 station covering all zones)
	Measure pesticides/herbicides and metal accumulation in sediments (for metals investigate establishment of distribution models – see Watling and Newman, 2007)	Once off, then every 3 – 6 years, if results show contamination	Entire estuary, including depositional areas (i.e. muddy areas)

ECOLOGICAL COMPONENT	MONITORING ACTION	TEMPORAL SCALE	SPATIAL SCALE
Microalgae	<p>Record relative abundance of dominant phytoplankton groups, i.e. flagellates, dinoflagellates, diatoms, chlorophytes and blue-green algae. Chlorophyll-a measurements taken at the surface, 0.5 m and 1 m depths, under typically high and low flow conditions using a recognised technique, e.g. spectrophotometer, HPLC, fluoroprobe.</p> <p>Intertidal and subtidal benthic chlorophyll-a measurements (4 replicates each) using a recognised technique, e.g. sediment corer or fluoroprobe.</p>	Quarterly for 1 st two years and then low flow surveys every 3 years	Along length of estuary minimum 5 stations
Macrophytes	<p>Map area covered by different macrophyte habitats using recent imagery. Conduct field survey to record total number of macrophytes habitats, identification and total number of macrophytes species, number of rare or endangered species, or those with limited populations. Assess extent of invasive species in EFZ.</p> <p>Where there are salt marsh areas greater than 1 ha measure % plant cover along elevation gradient. Sediment samples collected along the transect and analysed in the laboratory for sediment moisture, organic content, EC, pH and redox potential. In the field measure depth to water table and ground water salinity</p>	Every 3 years in summer	<p>Entire estuary (mapping)</p> <p>Where there is salt marsh (minimum 3 transect sites)</p>

ECOLOGICAL COMPONENT	MONITORING ACTION	TEMPORAL SCALE	SPATIAL SCALE
Invertebrates	<p>Collect duplicate zooplankton samples at night from mid-water levels using WP2 nets (190 um mesh) along estuary</p> <p>Collect sled samples (day) at same zooplankton sites for hyper benthos (190 um)</p> <p>Collect grab samples (5 replicates) (day) from the bottom substrate in mid-channel areas at same sites as zooplankton (each sample to be sieved through 500 um).</p> <p>Intertidal invertebrate hole counts using 0.25 m² grid (5 replicates per site).</p> <p>Establish the species concerned (<i>Callichirus kraussi</i> or <i>Upogebia Africana</i>) using a prawn pump.</p> <p>Collect sediment samples using the grab for particle size analysis and organic content (at same sites as zooplankton) (<i>preferably link with sediment dynamics</i>)</p>	Quarterly for 1 st two years and then Every 2 years mid-summer	<p>Minimum of 3 sites along length of entire estuary</p> <p>For hole counts – three sites in each of muddy or sandy areas,</p>
Fish	<p>Record species and abundance of fish, based on seine net and gill net sampling. Sampling with a small beam trawl for channel fish should also be considered.</p> <p>Seine net specifications: 30 m x 2 m, 15 mm bar mesh seine with a 5 mm bar mesh with a 5 mm bar mesh 5 m either side and including the cod-end</p> <p>Gill nets specifications: Set of gill nets each panel 30 m long by 2 m deep with mesh sizes of 44 mm, 48 mm, 51 mm, 54 mm, 75 mm, 100 mm and 145 mm</p> <p>Gill net sampling can be replaced by a large mesh seine (44 mm stretch mesh, 100 m x 2 m)</p> <p>Trawl specification: 2 m wide by 3 m long, 10 mm bar nylon mesh in the main net body and a 5 mm bar in the cod-end</p>	Twice annually Spring/ summer and autumn/ winter	3-5 stations (mouth, mid, top)
Birds	Undertake count of all water birds	Every 2 years mid-summer	Entire estuary

APPENDIX 2: ECOLOGICAL SPECIFICATIONS

Table 14: EcoSpecs and Thresholds of Potential Concern for the Matjies Estuary (Category B) (DWS, 2015; 2018)

ECOLOGICAL COMPONENT		ECOSPECS								THRESHOLDS OF POTENTIAL CONCERN				
Hydrology		• Maintain flow regime (small system needs most flows)								• Varies more than 10% of MAR. • Inflow < 0.03 m³/s for more than 27% of the time over a 5-year period. • Inflow < 0.1 m³/s for more than 55% of the time over a 5-year period.				
Month	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual	
MMR/MAR (%Nat)	73.9	73.8	69.1	68.0	65.0	67.9	67.9	68.4	65.8	66.8	71.6	74.1	70.5	
Hydrodynamics		• Maintain marine connectivity to create the required habitat for birds, fish, macrophytes, microalgae and water quality								• Closed mouth state varies by > 10% from present. • Average water depth < 1.0 m. • Average water level change by more than 20% from present.				
Water quality		• Salinity distribution not to cause exceedance of TPCs for fish, invertebrates, macrophytes and microalgae • Turbidity and dissolved oxygen not to cause exceedance of TPCs for biota • Dissolved inorganic Nitrogen (DIN)/dissolved inorganic phosphate (DIP) concentrations not to cause exceedance of TPCs for macrophytes and microalgae • Concentrations of waterborne pathogens should be maintained in an Acceptable category for full contact recreation • Toxic substances not to cause exceedance of TPCs for biota								• Average Salinity > 20 for more than 20% of the time (indicative of flow reduction). • Average Salinity < 5 for more than 20% of the time (indicative of extended closure). • Dissolved Oxygen (DO) < 5 mg/L in estuary. • Turbidity > 10 NTU in low flow. • Secchi: To bottom. • DIN > 100 µg/L once-off. • DIP > 20 µg/L once-off. • ≥185 Enterococci/100 ml) • ≥500 E. coli/100 ml • Concentrations in water column exceed target values as per SA Water Quality Guidelines for Coastal Marine Waters (DWAf, 1995). • Concentrations in sediment exceed target values as per WIO Region guidelines (UNEP/Nairobi Convention Secretariat and CSIR, 2009).				
Sediment dynamics		• Flood regime to maintain the sediment distribution patterns and aquatic habitat (instream physical habitat) so as not to exceed TPCs for biota • Changes in sediment grain-size distribution patterns not to cause exceedance of TPCs in benthic invertebrates • Change in average sediment composition and characteristics • Change in average bathymetry								• Average sediment composition (% fractions) along estuary change from baseline (to be measured) by 30% (per survey). • Average depth along main channel change from 30% of baseline (to be determined) (significant fluctuation in bathymetry between flood and extended closed periods is expected within system).				
Microalgae		• Maintain low/median phytoplankton/ benthic microalgae biomass								• Phytoplankton> 3.5 µg/l (median)				

ECOLOGICAL COMPONENT	ECOSPECS	THRESHOLDS OF POTENTIAL CONCERN
	<ul style="list-style-type: none"> Prevent formation of phytoplankton blooms 	<ul style="list-style-type: none"> Benthic microalgae > 11 mg/m² (median) Phytoplankton > 20 µg/l and/or cell density > 10 000 cells/ml (once-off)
Macrophytes	<ul style="list-style-type: none"> Maintain distribution of macrophyte habitats Prevent an increase in nutrients and macroalgal blooms Control the spread of invasive plants (e.g., <i>Acacia</i> spp.) in the riparian zone 	<p>Greater than 20% change in the area covered by macrophytes (reeds and sedges currently cover 0.2 ha).</p> <p>Macroalgal blooms cover > 50% of the open water area during closed mouth conditions.</p> <p>Invasive plants cover > 5% of total habitat.</p>
Invertebrates	<ul style="list-style-type: none"> Establish presence/absence of sand prawn <i>Callichirus kraussi</i> on sand banks in lower estuary Establish presence/absence of the copepod <i>Pseudodiaptomus hessei</i> or estuarine congeneric in the zooplankton of the estuary 	<p>If present populations deviate from average baselines (as determined in first three visits) by more 30%</p>
Fish	<ul style="list-style-type: none"> Fish assemblage should comprise the five estuarine association categories in similar proportions (diversity and abundance) to that under the reference. Numerically, assemblage should comprise: <ul style="list-style-type: none"> Ia estuarine residents (50-80% of total abundance) Ib marine and estuarine breeders (5-20%) Ila obligate estuarine-dependent (10-20%) Ilb estuarine associated species (5-15%), Ilc marine opportunists (20-80%) III marine vagrants (not more than 5%) IV indigenous fish (1-5%) V catadromous species (1-5%) Category Ia species should contain viable populations of at least two species (e.g., <i>G. aestuaria</i>, & <i>Hyporhamphus capensis</i>). Category Ila obligate dependents should be well represented by at least two large exploited species (i.e., <i>L. lithognathus</i>, <i>Lichia amia</i>). REI (River Estuary Interface) species dominated by both <i>Myxus capensis</i> and <i>G. aestuaria</i>. 	<p>Ia estuarine residents < 50%</p> <p>Ib marine and estuarine breeders < 10%</p> <p>Ila obligate estuarine-dependent < 10%</p> <p>Ilb estuarine associated species < 5%</p> <p>Ilc marine opportunists < 20%</p> <p>III marine vagrants > 5%</p> <p>IV indigenous fish < 1%</p> <p>V catadromous species < 1%</p>
Birds	<ul style="list-style-type: none"> Maintain population of original groups of birds present on the estuary 	<p>Number of birds in any group, other than species that are increasing regionally such as Egyptian geese, drops below the baseline median (determined by past data and or initial surveys) number of species</p>

ECOLOGICAL COMPONENT	ECOSPECS	THRESHOLDS OF POTENTIAL CONCERN
		and/or birds counted for three consecutive summer or winter counts

APPENDIX 3: PERFORMANCE MONITORING PLAN

Table 15: Recommended Performance Monitoring Plan for the management of Matjies River estuary

MANAGEMENT OUTPUT	PERFORMANCE INDICATOR	TEMPORAL SCALE (frequency)	RELEVANT LEGISLATION	RESPONSIBLE AUTHORITY
1. ESTUARINE HEALTH AND FUNCTION				
1.1 Secure adequate quantity and quality of freshwater input to improve and maintain ecosystem health and functioning	<ul style="list-style-type: none"> Recommended reserve(s) signed off and implemented Sustained base flow Flow gauging station installed Natural mouth dynamics Monitoring on the state of the catchment and estuary Ecological monitoring programme (fish and birds) developed IAPs controlled through eradication programme Ecological condition maintained as B 	<ul style="list-style-type: none"> Twice a year for DWS Twice a year 	NWA	DWS, BGCMA, RMA, Bitou LM
1.2 Ensure estuary requirements are integrated into catchment processes to ensure healthy water quality	<ul style="list-style-type: none"> Critical catchment maps updated Effective catchment management Good catchment water quality preserved 	<ul style="list-style-type: none"> Twice a year 	NWA, MSA, CARA, NEM: BA, NEM: PAA	DWS, BGCMA, DALRRD, Bitou LM
1.3 Ensure sustainable resource use through an effective level of compliance management	<ul style="list-style-type: none"> Level of extractive use established Increased patrols and monitoring conducted Reduced habitat degradation and inappropriate behaviour/activities Improved fish and invertebrate populations Reduction in illegal activities 	<ul style="list-style-type: none"> Twice a year 	ICMA, MLRA	DFFE, SANParks
2. BIODIVERSITY CONSERVATION				
2.1 Ensure the conservation of estuarine habitats and indigenous species	<ul style="list-style-type: none"> EMP key issues included in management plan for the GRBR Conservation status designated Spatial zonation plan adopted, implemented and enforced Signage created and erected in key public spaces 	<ul style="list-style-type: none"> Twice a year 	ICMA, NEMA, MLRA, LUPA, NEM: PAA, NEM:BA, WC BRA	SANParks, GRBR, DWS,

MANAGEMENT OUTPUT	PERFORMANCE INDICATOR	TEMPORAL SCALE (frequency)	RELEVANT LEGISLATION	RESPONSIBLE AUTHORITY
	<ul style="list-style-type: none"> • Appropriate regulations and bylaws are gazetted and enforced to protect fauna and flora • Reduced habitat degradation and inappropriate behaviour/activities • Stewardship agreements signed; participation of land owners and stakeholders 			
3. LAND USE AND INFRASTRUCTURE DEVELOPMENT PLANNING				
3.1 Ensure appropriate and sustainable coastal development in and around the Matjies River estuary, considering ecosystem services and sense of place	<ul style="list-style-type: none"> • Matjies EMP included in all relevant planning documents • EMP included in management plan for the GRBR • Bylaws developed and gazetted • No new development, infilling or land transformation in the EFZ • Inspections undertaken, transgressors prosecuted, and remedial actions implemented • Regional EAF partakes in development planning affecting the estuary 	<ul style="list-style-type: none"> • Annually 	ICMA, LUPA	GRBR, Bitou LM, DEA&DP and applicable authorities
4. INSTITUTIONAL AND MANAGEMENT STRUCTURES				
4.1 Ensure effective co-ordination of estuarine management responsibilities	<ul style="list-style-type: none"> • RMA is designated, commitment secured from affected municipalities • Matjies EMP adopted and incorporated into the GRBR management plan • Regional estuarine management function established and EMC appointed • RMA official(s) are well-trained and knowledgeable • Regional EAF constituted and chaired by RMA • Good communication and working relationship established with implementing agencies • Regional EAF supported and meets on quarterly basis • Stakeholder database maintained • Annual reporting undertaken by RMA • Funding secured for 5-year cycle 	<ul style="list-style-type: none"> • Quarterly 	ICMA, MSA, NEMA, LUPA, NWA	RMA, Bitou LM, Garden Route DM, DEA&DP, and other applicable authorities

MANAGEMENT OUTPUT	PERFORMANCE INDICATOR	TEMPORAL SCALE (frequency)	RELEVANT LEGISLATION	RESPONSIBLE AUTHORITY
4.2 Define and enable co-operative governance	<ul style="list-style-type: none"> • MOUs signed between RMA and spheres of government and participating agencies • Active collaboration of various institutions, private and civil stakeholders • Individual agencies knowledgeable and with capacity and resources to carry out mandated actions • Formal review of EMP every 5 years 	<ul style="list-style-type: none"> • Annually 	MSA, NWA, ICMA, NEMA, WC BRA, CARA	All applicable authorities
5. SOCIO-ECONOMIC CONSIDERATIONS				
5.1 Preserve and manage all cultural heritage resources	<ul style="list-style-type: none"> • Heritage resources mapped and inventory maintained • Cultural Heritage Management Programme developed • Custodian of Matjies cultural heritage site appointed 	<ul style="list-style-type: none"> • Annually 	NHRA, MSA	RMA, Bitou LM, SAHRA
5.2 Develop and regulate local livelihoods associated with the estuary	<ul style="list-style-type: none"> • Employment of local communities 	<ul style="list-style-type: none"> • Annually 	NHRA, MSA	RMA, Bitou LM, SAHRA
6. EDUCATION AND AWARENESS				
6.1 Promote high levels of public awareness and appreciation of the value of estuaries	<ul style="list-style-type: none"> • Education & awareness programme developed and implemented • Educational signage erected, and information disseminated • Bitou estuaries webpage operational • Reduced habitat loss/degradation and disturbance, and inappropriate behaviour • Reduced illegal fishing activities 	<ul style="list-style-type: none"> • Every 3 years 	ICMA	RMA, GRBR, Bitou LM

APPENDIX 4: PROJECT PLAN TEMPLATE

ACTION	Describe the action to be undertaken																																																											
COMPLETION DATE	Provide date of expected completion																																																											
PERFORMANCE INDICATOR																																																												
Requirements stipulated in policy and legislation																																																												
Available methods, protocols and best practice-guides																																																												
Spatial zonation consideration (e.g. limits/targets)																																																												
Detailed work plan	Task 1: Task 2: Task 3: Task 4:																																																											
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Responsibilities for different tasks	E.g. Identify specific departments, personnel and/or service providers responsible for execution of this action																																																											
Monitoring and reporting plan	E.g. <ul style="list-style-type: none"> Define data and information to measure in order to monitor performance indicator/s Specify frequency at which data/information should be collected/monitored Where and when to report on progress 																																																											
Human resource plan	<table border="1"> <thead> <tr> <th rowspan="2">HUMAN RESOURCE</th><th colspan="4">WEEKS PER TASK</th></tr> <tr> <th>1</th><th>2</th><th>4</th><th>4</th></tr> </thead> <tbody> <tr> <td>Staff member 1</td><td></td><td></td><td></td><td></td></tr> <tr> <td>Staff Member 2</td><td></td><td></td><td></td><td></td></tr> <tr> <td>Service provider</td><td></td><td></td><td></td><td></td></tr> </tbody> </table>	HUMAN RESOURCE	WEEKS PER TASK				1	2	4	4	Staff member 1					Staff Member 2					Service provider																																							
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Source: DEA (2015)

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