Western Cape Government
Environmental Affairs and Development Planning

Blinde River Estuary Draft Estuarine Management Plan

2021

DOCUMENT DESCRIPTION

Document title and version:

Blinde River Estuary Draft Estuarine Management Plan 2021

Project Name:

Western Cape Estuarine Management Framework and Implementation Strategy

Client:

Western Cape Government, Department of Environmental Affairs and Development Planning

Royal HaskoningDHV reference number:

MD1819

Authority reference:

EADP 1/2015

Developed by:

Coastwise Consulting & Royal HaskoningDHV

Acknowledgements:

Western Cape Government Environmental Affairs & Development Planning

Directorate: Biodiversity and Coastal Management

Sub-Directorate: Coastal Management

Email: coastal.enquiries@westerncape.gov.za

Date:

2021

This document should be referenced as:

Western Cape Government (2021). Blinde River Estuary Draft Estuarine Management Plan (2021). Western Cape Department of Environmental Affairs and Development Planning.

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 Blinde 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 Draft EMP is to provide the Vision of the future desired state of the Blinde River estuary strategic objective and guide the management of human activities in and around the system by setting out s, 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 Blinde River estuary is defined in the 2018 National Biodiversity Assessment (NBA) (SANBI, 2019) as a small temporarily closed estuary located within the warm temperate biogeographic region of South Africa, on the western margin of Dana Bay within the greater Mossel Bay Local Municipality, Garden Route District. The size of the estuary, as defined by the estuarine functional zone (EFZ), is approximately 1.75 ha, extending over a length of approximately 650 m.

Vision and Objectives

The following vision for the Blinde River estuary was proposed and supported at a public meeting held on 27 August 2018 in Mossel Bay:

The Blinde River estuary: the protected, beautiful, and unspoilt gem of Dana Bay

Strategic objectives, performance indicators and priorities for the Blinde River estuary are as follows:

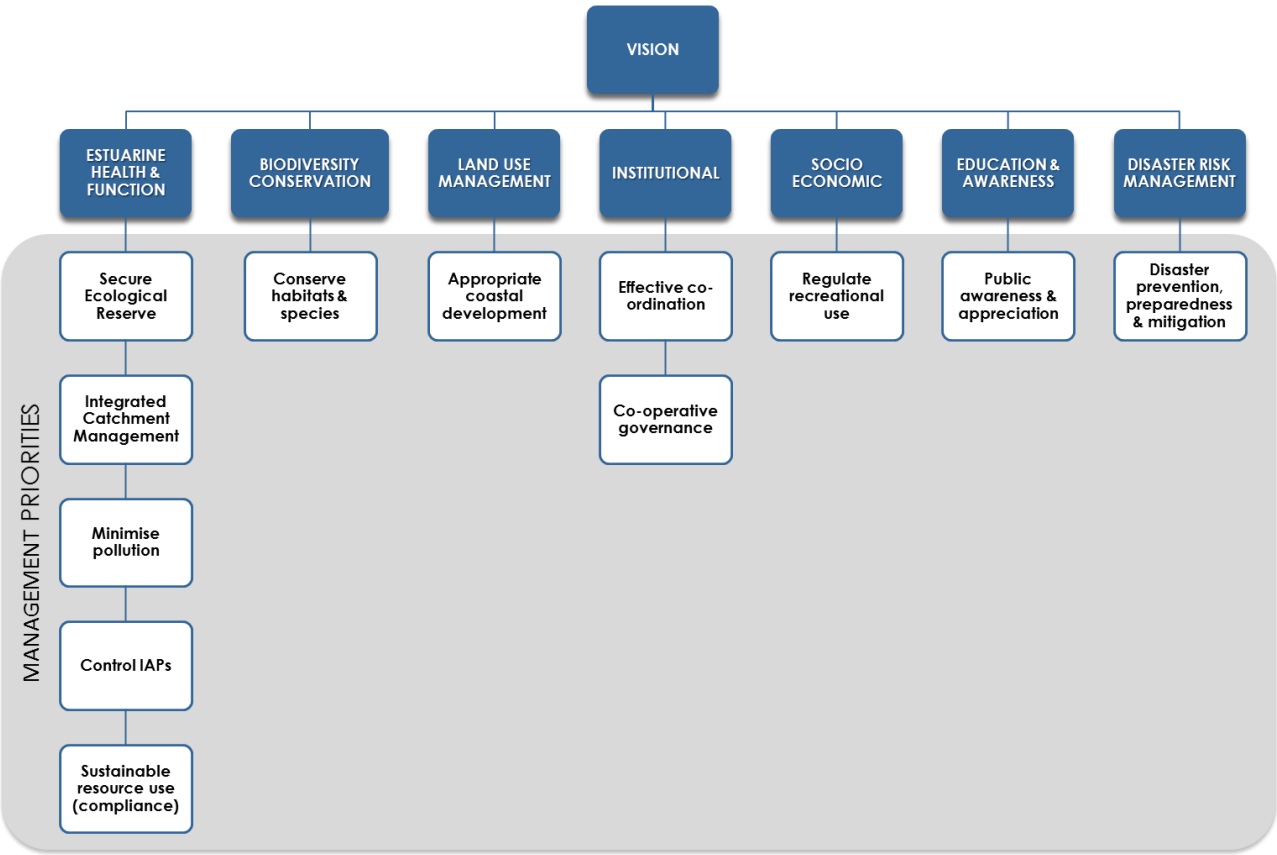
	Sector / Category	Strategic Objective	Performance Indicator(s)	Priority
1	Estuarine Health and Function	The ecological health and natural functioning of the Blinde River estuary maintained and safeguarded, living resources are sustainably	• Maintain (or improve) C ecological condition • Ecological Reserve secured and implemented • Ongoing catchment water quality monitoring	**HIGH**

		managed and estuary nursery function protected	• Effective catchment management and maintenance of good water quality • Effective functioning and sustainable discharge from PetroSA waste water treatment works • Pollution reduced • Invasive alien plant infestations under control • Healthy biological communities • Sustainable resource use	
2	Biodiversity Conservation	The biodiversity of the Blinde River estuary is conserved	• EMP incorporated into the Gouritz Cluster Biosphere Reserve (GCBR) Management Plan • Level of conservation status attained (e.g. conservation servitude) • Spatial zonation plan is adopted and enforced	**MEDIUM**
3	Land-use and Infrastructure Planning and Development	Impacts associated with developments and proposed changes in land-use, including infrastructure and agriculture, are minimised	• 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 • Reduced negative impacts from agricultural activities	**MEDIUM**
4	Institutional and Management Structures	The Blinde River estuary is managed well through effective co-operative governance	• EMP is seamlessly incorporated into the Mossel Bay IDP and SDF • Ongoing commitment from relevant authorities • Regional estuary advisory forum is established and meets regularly • Estuarine bylaws or regulations are gazetted	**HIGH**
5	Socio-economic Considerations	Socio-economic benefits are regulated to ensure sustainable use of the Blinde River estuary and its resources	• Resources utilised within legal limits • Illegal activities controlled • Public access retained • Integrity of estuarine habitats is improved	**LOW**
6	Education & Awareness	Members of society are sensitive to and aware of the value and importance of the Blinde River estuary	• Increase in number of research projects • Signage erected and information disseminated • Awareness programme developed and successfully	**LOW**

			implemented on an on-going basis	
7	Disaster Risk Management	Potential risks that could impact the Blinde River estuary are reduced (inclusive of climate change impacts)	• Disaster Management Plan implemented • Spill Contingency plan in place	**HIGH**

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

Spatial zonation of activities on an estuary is necessary to avoid user conflict and to guide sustainable utilization of resources without degradation of the estuarine environment. A single zonation type is proposed for the Blinde River estuary, namely, a Quiet/Nature Access Zone. As a Quiet Zone, limited activities are encouraged in the EFZ, which are fortunately governed by the small size of the system, and these activities are directed toward accessing and appreciating nature. The primary purpose of this zone is to manage and direct low impact use and interaction so as to minimise impacts on this sensitive coastal environment.

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.

In the context of the Blinde River estuary, general baseline information is lacking. There are no monitoring programmes (e.g. water quality, fish or birds, etc.) in place for the Blinde estuary apart from visual observations by Dana Bay Conservancy members. A minimum set of monitoring requirements is recommended to ascertain i) the current state; ii) future pressures on the estuary; and/or iii) any improvement or reductions therein.

Currently there is no compliance monitoring taking place on the Blinde River estuary and a basic compliance monitoring programme is proposed.

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. While it does not specify the required resources (human and financial) required for effective management of the estuary, it does provide for their prioritisation. 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.

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 Blinde River Estuary EMP. I**t 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.** However, the Blinde River estuary also falls within the Gouritz Cluster Biosphere Reserve, where CapeNature is legally responsible for the management thereof. Thus, management of the Blinde River estuary could benefit from a joint agreement (or delegation) between these two entities.

While the establishment of an Estuary Advisory (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 proposed, one incorporating the Blinde, Twee Kuilen, Bayview and Hartenbos, and Maalgate estuaries (and their associated EAFs, where they exist). The EAF should be chaired by the RMA and should aim to meet on a quarterly basis.

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.

In 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:

- Level of conservation status obtained, and community involvement extended to include the estuary;
- Effective functioning and sustainable discharge from both the WWTW as well as Mossdustria maintained; 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.

TABLE OF CONTENTS

TABLE OF FIGURES

LIST OF TABLES

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
CSIR	Council for Scientific and Industrial Research
DALRRD	Department of Agriculture, Land Reform and Rural Development (formerly DAFF)
DAFF	Department of Agriculture, Forestry and Fisheries (now DEFF/ DALRRD)
DEA	Department of Environmental Affairs (now DEFF)
DEA&DP	Western Cape Government's Department of Environmental Affairs and Development Planning
DEFF	Department of Environment, Forestry and Fisheries (formerly DEA/ DAFF)
DIN	Dissolved Inorganic Nitrogen
DIP	Dissolved Inorganic Phosphorous
DM	District Municipality
DMA	Disaster Management Act (Act No. 57 of 2002)
DO	Dissolved Oxygen
DST	Department of Science and Technology
DWS	Department of Water and Sanitation
EAF	Estuary Advisory Forum
EcoSpecs	Ecological Specifications
EFZ	Estuarine Functional Zone
EIA	Environmental Impact Assessment
EMFIS	Estuarine Management Framework and Implementation Strategy
EMP	Estuarine Management Plan(s)
GCBR	Gouritz Cluster Biosphere Reserve
GDP	Gross Domestic Product
HWM	High Water Mark
I&APs	Interested and affected parties
IAP(s)	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 Planning Act (Act No. 3 of 2014)
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)
NEM: WA	National Environmental Management: Waste Act (Act No. 59 of 2008)
NEMA	National Environmental Management Act (Act No. 107 of 1998)
NEMP	National Estuarine Management Protocol (2013)
NTU	Nephelometric Turbidity Units
NWA	National Water Act (Act No. 36 of 1998)
PAES	Protected Area Expansion Strategy
RDM	Resource Directed Measures
RMA	Responsible Management Authority

RQO(s)	Resource Quality Objectives
SAHRA	South African Heritage Resources Agency
SAR	Situation Assessment Report
SDF	Spatial Development Framework
SUDS	Sustainable Drainage Systems
SWOT	Strengths, Weaknesses, Opportunities and Threats analysis
TPC	Threshold of Potential Concern
TPS	Town Planning Scheme
WC BRA	Western Cape Biosphere Reserves Act (Act No. 6 of 2011)
WfW	Department of Environment Forestry and Fisheries: Working for Water
WQ	Water Quality
WRC	Water Research Commission
WUA	Water Users Association
WUL	Water Use Licence
WWTW	Wastewater 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 be managed in a co-ordinated and efficient manner, and in accordance with the 2013 National Estuarine Management Protocol (hereafter referred to as the NEMP), the National Coastal Management Programme (CMP) and 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 Blinde River estuary (Figure 1) developed under the auspices of the Western Cape EMFIS.

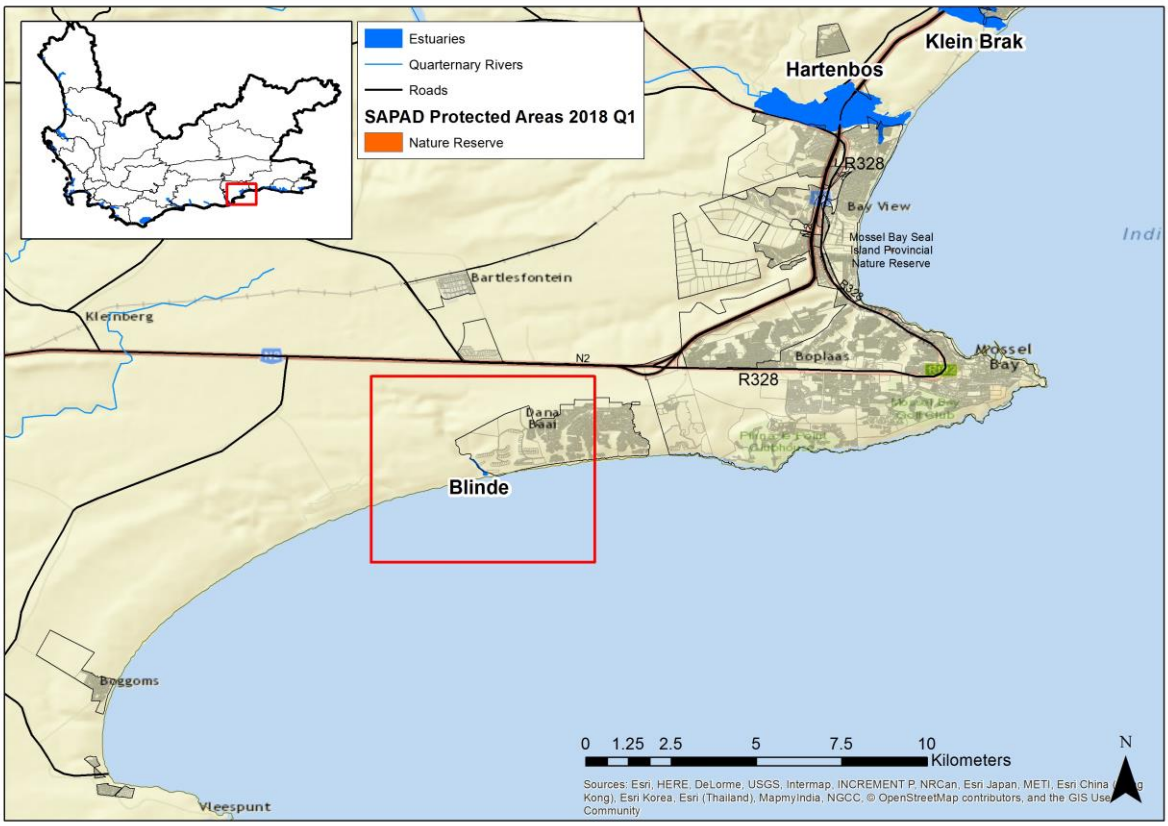


Figure 1: Location of the Blinde River estuary within the Mossel Bay Local Municipality

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 bring conducted at five-yearly intervals.

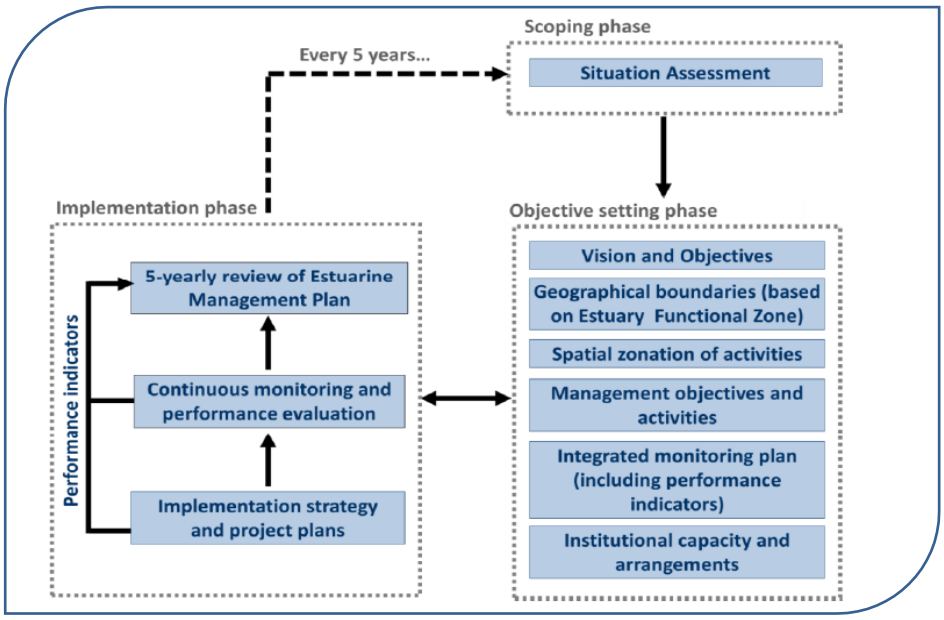


Figure 2: A framework for integrated estuarine management in South Africa

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 Blinde 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 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 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 Blinde River estuary. They collectively describe the desired future state and provide the overarching logical framework for the action plans;
- **Section 5** prescribes the **management priorities** and **associated activities,** 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 Blinde River estuary is defined in the 2018 National Biodiversity Assessment (NBA) (SANBI, 2019) as a small temporarily closed estuary, located within the warm temperate biogeographic region of South Africa, on the western margin of Dana Bay within the greater Mossel Bay Local Municipality (LM), Garden Route District. The size of the estuary, as defined by the estuarine functional zone (EFZ), is approximately 1.75 ha, extending over a length of approximately 650 m. The geographical boundaries of the Blinde River estuary, delineating the EFZ, are provided in Table 1 and illustrated in Figure 3.

Table 1: Geographical boundaries of the Blinde River estuary

Downstream boundary:	-34.210421° S, 22.013116° E (estuary mouth)
Upstream boundary:	-34.205703° S, 22.008674° E (head of estuary)
Lateral boundaries:	Approximated by the 5 m above Mean Sea Level (amsl) contour along each bank

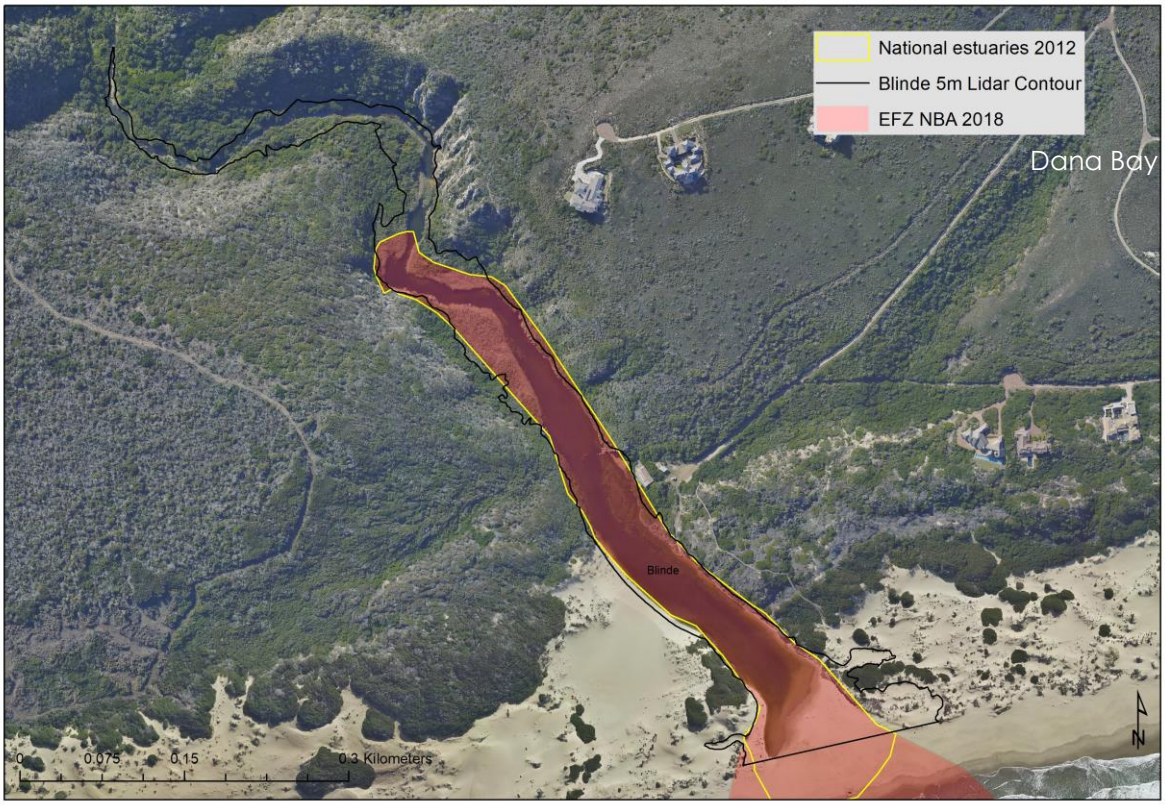


Figure 3: Geographical boundaries of the Blinde River estuary EFZ showing the 5 m topographical contour and 2018 NBA (SANBI 2019) EFZ boundary

3 SYNOPSIS OF THE SITUATION ASSESSMENT

The Blinde River estuary is situated in the Mossel Bay Local Municipality and is defined in the 2018 National Biodiversity Assessment (NBA) (SANBI, 2019) as a small temporarily closed estuary

Catchment Characteristics

The Mossel Bay municipality contains eight types of geological formations. Two of the three biodiversity hotspots that have been identified in South Africa occur within the Mossel Bay local municipal boundaries and include the Cape Floristic region and the Succulent Karoo region. Other land use consists of cultivated commercial dry land, planted grassland, thicket, bushland, bush clumps, high and low fynbos, shrubland and urban area.

Abiotic Function

The Blinde River estuary is a relatively small (1.75 ha), perched system that drains a steep-sided incised valley leading to a predominantly closed mouth. The estuary remains closed for most of the year except during a flood, but wash-over from the sea can occur during high tides or storm events. Very little information is known about the hydrology and water quality of this system. It has been recorded that the system is enriched with inorganic nutrients and is supported by the supersaturated readings of dissolved oxygen (DO) taken in 1994.

Biotic Function

There is a paucity of scientific data on the Blinde River estuary with no data available for microalgae, invertebrates and bird populations. The estuary is in good condition from a vegetation perspective although surrounded by dense stands of the invasive Acacia cyclops. Other macrophytes that are observed at the estuary included dune vegetation occurring at the sandy areas at the mouth and coastal shrub habitat on the banks near the holiday house situated at the estuary.

Limited information of fish species present in the estuary are available. While there is no significant fishing pressure in the system, what little there is, unfortunately depletes the system as it is very small and closed for long periods.

Ecological Health Status, Importance, and Recommended Future State

The overall ecological health of the Blinde River estuary is in a Category C. In terms of conservation importance, the estuary is not one of the national priority estuaries requiring formal protection and it is deemed to be of "Average to Low importance" due to its small size.

Important Ecosystem Goods and Services

Estuaries typically provide a range of services that have economic or welfare value. Apart from providing the regulating services of climate regulation and disturbance regulation, it is apparent that the Blinde River estuary provides important ecosystem services input to structure and composition of biological communities such as

maintenance of fish populations and aesthetic qualities of the area which makes it attractive for recreational, religious or cultural activities.

Impacts or Potential Impacts to estuary

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

- Environmental hazards – drought, floods and climate change impacts;
- Water quality and quantity issues – Industrial activities have impacted on the river water chemistry by increased input of inorganic nutrients. Thus, enriching the water quality creating a favourable environment for macroalgae blooms impacting on the aquatic species resources;
- Flow modification - Fresh water inflow to the estuary has decreased, impacting on the mouth breaching regime. The decreased time of mouth closure will result in an increase fresh water in the estuary potentially changing the aquatic diversity within the estuary; and
- Exploitation of natural resources – Recreational fishing and bait collection will put pressure on the available stock and can lead to a decline in the natural proliferation of species due to the estuary being closed for long periods.

Socio-economic Context

The Mossel Bay LM has an estimated total population of 94 135 people and has an average growth rate of 2.24 % (StatsSA 2011; Stats SA 2016). Population density of the Mossel Bay LM is low with an estimated 47 persons/km^2. Of those aged 20 years and older, 40 % have completed matric, and 8 % have some form of higher education, while 3 % have no form of schooling (Stats SA 2016). There are 31 765 households in the Mossel Bay LM, of which 84 % have access to piped water within their dwellings. Electricity for lighting is provided to approximately 96 % of all households (Stats SA 2016). Approximately 28 926 people are economically active (both employed and unemployed but looking for work), with an overall unemployment rate of 22.9 %, and a youth unemployment rate of 29.9 % (StatsSA 2011; Stats SA 2016). Approximately 52.8 % of the population is poor, i.e. earning an average household income of less than R38 200, of which 17.4 % receive no income at all (Stats SA 2016).

The Blinde River estuary and its catchment falls within Ward 11 of the Mossel Bay LM and is located west of Dana Bay. Ward 11 has a total population of 6 379 people (Stats SA 2016). Sixty one percent of the population is aged between 18 and 64 years (Stats SA 2016). Fifteen percent of Ward 11 of the Mossel Bay LM population do not earn an income, and 48 % are employed, of which 76 % are employed in the informal sector (Stats SA 2016).

The Mossel Bay LM contributed R5.20 billion (or 17.5 %) to the Garden Route District Municipality (DM) Gross Domestic Product (GDP) of R29.65 billion as at the end of 2015 (Mossel Bay IDP 2017). Growth averaged 3.2 % over the period 2005-2015 which is marginally lower that Garden Route DM which has an average of 3.5 % (Mossel Bay IDP 2017). Based on 2015 values, the community services sector was the largest and most important economic sector within Mossel Bay LM, accounting for 58.5 % of the Municipality's GDP in 2015(Mossel Bay IDP 2017). The General government and

community, social and personal services sector contributed the second most to the GDP with 15.4 %, followed by the manufacturing sector with 14.6 % (Mossel Bay IDP 2017). The sector that contributed the least to the Mossel Bay LM economy was the construction sector with a contribution of 4.1 % of the total GDP (Mossel Bay IDP 2017).

The direct and indirect benefits derived from estuarine ecosystem services are manifested directly or indirectly in tangible income and employment. The Blinde River estuary which forms part of the larger surroundings of Dana Bay holds unique conservation importance to the residents of Dana Bay. Being isolated because of the steep topographical layout it will benefit from the environmental conservation actions from the Dana Bay conservancy which includes conservation of endemic plants and animals.

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 National Estuarine Management Protocol. The Protocol provides national policy and ensures alignment by providing a national vision and objectives for achieving effective integrated management of estuaries, amongst other things. The Protocol identifies the responsible management authority per estuary, in this instance the DEA&DP. 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 Blinde River estuary was undertaken. One of the strengths of the system is its natural beauty. Other strengths include its location adjacent an existing estate and municipal buy-in. Opportunities include proposed removal of alien invasive vegetation and custodianship as part of the urban conservancy.

In respect to weaknesses, these include the lack of visible law enforcement, water quality impacts as well as access restrictions. The biggest threats to the system are potential industrial pollution emanating from PetroSA at Mossdustria as well as the continued water abstraction.

Information Gaps and Recommendations

Gaps have been identified in respect to hydrology, sediment dynamics, pollution sources, fish fauna, macrophytes and birds in the Blinde River estuary. It is recommended that details studies are undertaken for the identified information gaps. The implementation of the proposed long-term monitoring plan will improve the availability of abiotic and biotic data which in turn can be applied to the EMF.

4 LOCAL 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 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), which 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 Blinde River estuary was proposed and supported at a public meeting held on 27 August 2018 in Mossel Bay[1]:

The Blinde River estuary: the protected, beautiful, and unspoilt gem of Dana Bay

Although the brief, the vision summarises the following aspects of the estuary that are valued and need to be preserved or enhanced:

- The sense of place and natural beauty of the estuary;
- Its unaltered state, inferring natural functioning and processes and unimpacted biodiversity;
- The desire to protect the estuary against negative impacts, and
- The sense of ownership for the estuary by the Dana Bay community.

[1] Minutes of the stakeholder meeting for the Blinde River estuary, 27 August 2018, Mossel Bay Town Hall, Mossel Bay

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.

Strategic objectives for the Blinde River estuary are proposed and align with the following identified sectors or categories of issues:

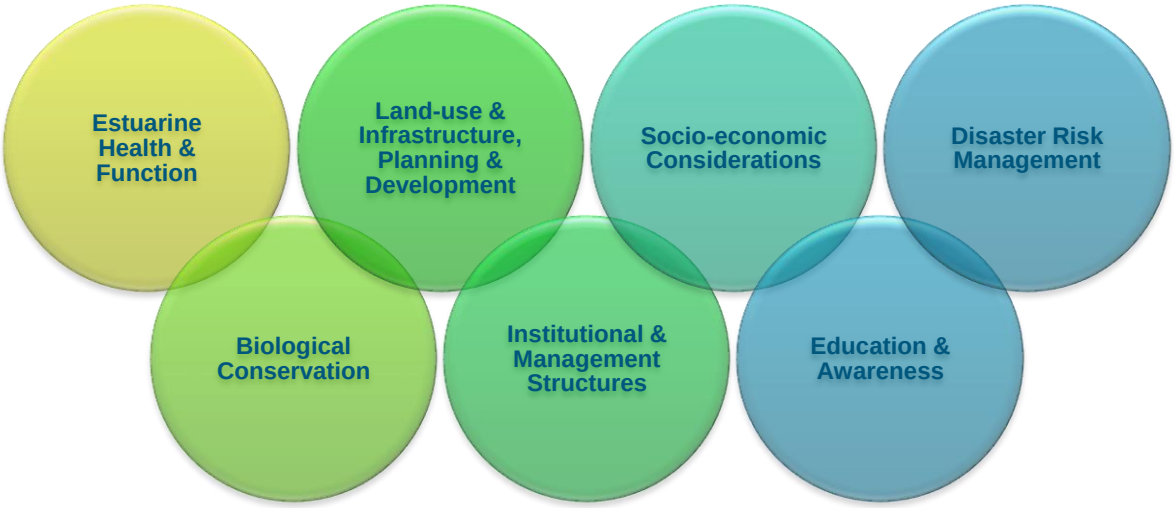


Figure 4: Sectors or categories of issues relevant to the management of the Blinde River estuary

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

Table 2: Strategic Objectives for management of the Blinde 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 Blinde River estuary maintained and safeguarded, living resources are sustainably managed and estuary nursery function protected	• Maintain (or improve) C ecological condition • Ecological Reserve secured and implemented • Ongoing catchment water quality monitoring • Effective catchment management and maintenance of good water quality • Effective functioning and sustainable discharge from PetroSA wastewater treatment works • Pollution reduced	**HIGH**

			• Invasive alien plant infestations under control • Healthy biological communities • Sustainable resource use	
2	Biodiversity Conservation	The biodiversity of the Blinde River estuary is conserved	• EMP incorporated into the Gouritz Cluster Biosphere Reserve (GCBR) Management Plan • Level of conservation status attained (e.g. conservation servitude) • Spatial zonation plan is adopted and enforced	**MEDIUM**
3	Land-use and Infrastructure Planning and Development	Impacts associated with developments and proposed changes in land-use, including infrastructure and agriculture, are minimised	• 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 • Reduced negative impacts from agricultural activities	**MEDIUM**
4	Institutional and Management Structures	The Blinde River estuary is managed well through effective co-operative governance	• EMP is seamlessly incorporated into the Mossel Bay IDP and SDF • Ongoing commitment from relevant authorities • Regional estuary advisory forum is established and meets regularly • Estuarine bylaws or regulations are gazetted	**HIGH**
5	Socio-economic Considerations	Socio-economic benefits are regulated to ensure sustainable use of the Blinde River estuary and its resources	• Resources utilised within legal limits • Illegal activities controlled • Public access retained • Integrity of estuarine habitats is improved	**LOW**
6	Education & Awareness	Members of society are sensitive to and aware of the value and importance of the Blinde River estuary	• Increase in number of research projects • Signage erected and information disseminated • Awareness programme developed and successfully implemented on an on-going basis	**LOW**
7	Disaster Risk Management	Potential risks that could impact the Blinde River estuary are reduced (inclusive of climate change impacts)	• Disaster Management Plan implemented • Spill Contingency plan in place	**HIGH**

5 PRIORITY MANAGEMENT OBJECTIVES AND ASSOCIATED ACTIVITIES

After the review of the background information, as well as after conducting stakeholder engagement, a SWOT analysis of the Blinde River estuary under the current management practices was prepared.

Table 3: SWOT Analysis

STRENGTHS *(highlights, uniqueness?)*	**WEAKNESSES** *(what could you improve?)*
• Community Involvement due to the Dana Bay Conservancy • Conservancy for natural beauty • Natural environment – Beaches • Location adjacent existing estate/ urban development • Loggerhead turtle nesting site • Municipal buy-in • Banner of Gouritz Cluster Biosphere Reserve	• Lack of visible law enforcement • Periodic impacts on water quality • Low natural runoff and flow modification • Limited extractive use possible • Restricted access to the estuary • Lack of biological information
OPPORTUNITIES *(Opportunities for positive change)*	**THREATS** *(what could prevent the EMP from working?)*
• Deforestation of alien vegetation • Education and Awareness around Nature Conservancy • Custodianship as part of urban conservancy	• Industrial threat and potential pollution events related PetroSA and other industry • Climate Change • Rising Sea Levels • Invasive alien vegetation in the catchment • Negative trajectory of change

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 Blinde River estuary is provided in Figure 5 below.

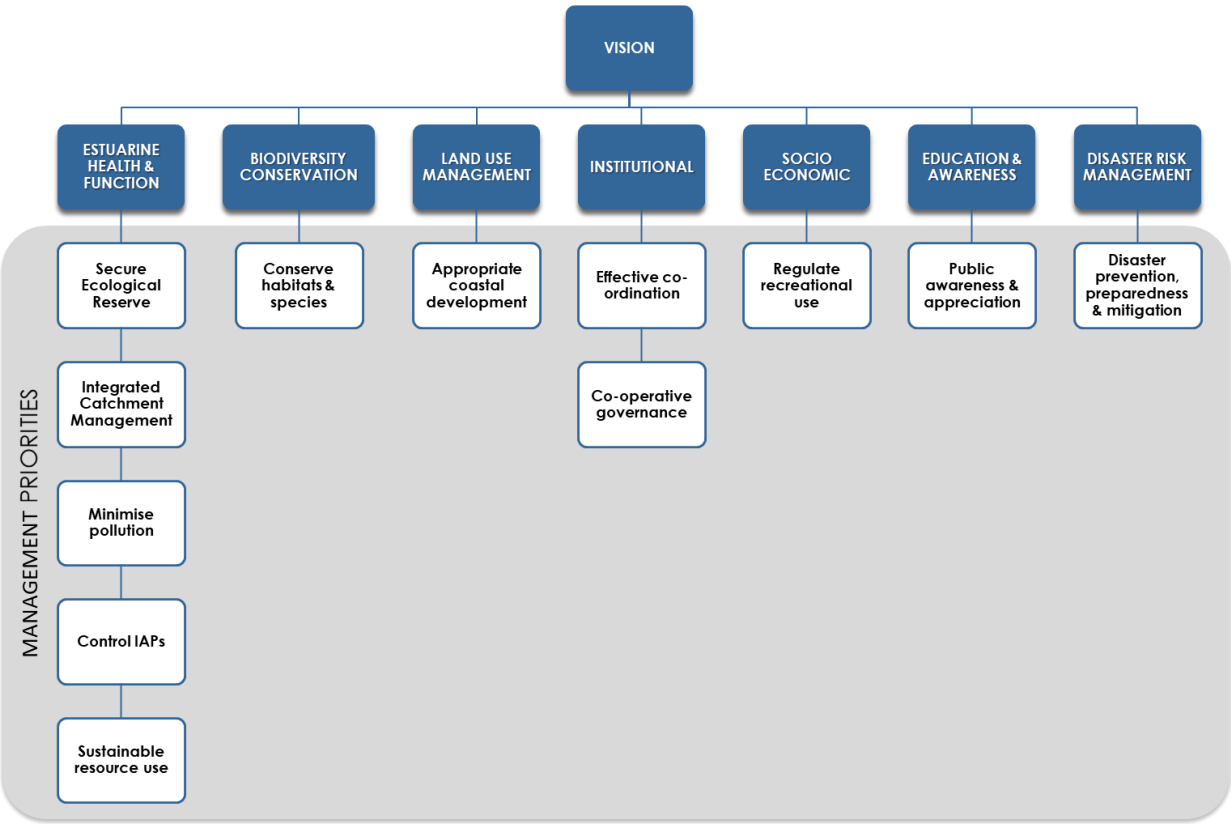


Figure 5: Summary of priority management objectives per management sector

5.1 Estuarine Health and Function

<u>Strategic Objective 1</u>: The ecological health and natural functioning of the Blinde 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 and 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)	• Meetings held and correspondence written • Recommended reserve(s) signed off • Baseflow is restored • Maintain (or improve) C ecological condition	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	• Meetings held and correspondence written • Water resource classified • Baseflow is protected	HIGH	BGCMA, RMA
c.	Implement and document Department of Environment, Forestry and Fisheries (DEFF) and DWS policy to not allow effluent discharge to the estuary (including the PetroSA Wastewater Treatment Works (WWTW), septic tanks, conservancy tanks, industrial & livestock effluent etc.)	NWA	• Direct discharge of effluent to estuary strictly prohibited • Upstream discharges monitored	HIGH	RMA, DWS, DEFF, Mossel Bay Local Municipality (LM), PetroSA
d.	Monitor natural mouth dynamics (in partnership with neighbouring landowners	NWA (RDM)	• Mouth state documented • Photographic database generated	HIGH	RMA, Dana Bay Conservancy

	and other Interested and affected Parties (I&APs))				
e.	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	• Estuary impacts identified • Mitigation measures established • Status and trends of indicator species determined • Annual report submitted to DEFF and EAF • Data incorporated into EMP 5-year review • PetroSA water quality data made available to RMA	MEDIUM	RMA (supported by e.g. GCBR, CapeNature, Department of Science and Technology (DST), Council for Scientific and Industrial Research (CSIR)
f.	Catchment water quality to be summarised and reported on (including input from PetroSA/ Mossdustria)	NWA	• Annual report submitted to RMA and EAF	LOW	DWS, BGCMA, Mossel Bay, PetroSA (Mossdustria)
g.	Undertake seasonal (summer/winter) monitoring of fish and bird populations, including indicator species, taking RQOs into account	NWA (RDM), National Environmental Management: Biodiversity Act (NEM:BA), Marine Living Resources Act (MLRA)	• Indicator species identified • Species list and abundance data produced and reported on • Databases developed • Monitoring reports compiled and submitted • Data incorporated into EMP 5-year review	HIGH	RMA (supported by e.g. GCBR, CapeNature, DST, CSIR)
h.	Undertake full Resource Directed Measures (RDM) monitoring every 3 years	ICMA, NWA	• 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.	EMP included in catchment management strategy, and catchment classification systems and processes	NWA	• EMP integrated into Breede-Gouritz Catchment Management Strategy (BGCMS) • Estuary acknowledged as sensitive end-points	LOW	BGCMA
b.	Catchment land use map developed and updated annually	NWA, Conservation of Agricultural resources act (CARA)	• Updated land use map produced every year • Potential sources of pollution identified	MEDIUM	DEFF (Land Care)
c.	Land use and effluent management included in the Catchment Management Strategy (CMS)	NWA	• CMS reduces pollution from agricultural practises and industry, and identifies other sources of pollution (land use and effluent) to the estuary and provides mitigation strategies	LOW	BGCMA
d.	Water use plan updated on an annual basis	NWA	• Updated water use plan produced every year	LOW	DWS (Resource protection)
e.	SDF and environmental overlay updated as and when required	Municipal Systems Act (MSA)	• Updated SDF and overlays produced	MEDIUM	Mossel Bay LM

Management Objective 1.3: Minimise pollution by addressing activities that lead to poor water quality					
a.	Undertake quarterly basic water quality monitoring taking Resource Quality Objectives (RQOs) into account	NWA	• Estuary Water Quality (WQ) database maintained to facilitate long term database • Annual report compiled and provided to EAF • EMP informed by monitoring results going forward	HIGH	Mossel Bay LM, DWS, BGCMA
b.	Investigate and identify sources of pollution and take steps to remedy or mitigate	NWA, ICMA	• Pollution sources identified • Mitigation measures developed and implemented • Improved water quality variables	HIGH	Mossel Bay LM
c.	Control activities, monitor and control all discharges (i.e. stormwater management systems, septic tank seepages, effluent discharges).	MSA, NWA, ICMA	• Patrols undertaken by appropriate municipal dept. • Blocked systems reported, inappropriate activities halt and reported • Mitigation / clean-up undertaken • Identity and prosecute offenders	HIGH	Mossel Bay LM
d.	Ensure PetroSA WWTW operating to design specifications	NWA, MSA National Environmental Management: Waste Act (NEM: WA)	• WWTW functioning within specifications • No discharge of untreated effluent to river course • No pollution events in estuary	HIGH	DWS, Mossel Bay LM, PetroSA
g.	Ongoing monitoring by PetroSA of legal discharges of treated wastewater released		• Compliance reports submitted to DWS, RMA and EAF • Discharge compliant with license standards	HIGH	PetroSA/Mossdustria
e.	Ensure estuary is included municipal wastewater management plan (Mossdustria)		• Estuary recognised in management plan	HIGH	Mossel Bay

			• Assimilative capacity of estuary not exceeded • Specific measures/management guidelines in place to conserve downstream ecosystems • No ecological issues related to poor water quality (e.g. algal blooms, fish kills)		
f.	Implement waste management plan	NEM: WA	• Waste management plan implemented • Clean-up operations undertaken after peak visitor periods • Improved water quality variables	HIGH	Mossel Bay
h.	Enforce sustainable farming practices (e.g. reduce the application of inorganic fertilisers)	NWA, CARA	• Engagement with famers in catchment initiated • Best practice methods promoted and implemented • Improved water quality variables	MEDIUM	Department of Agriculture, Land Reform and Rural Development (DALRRD), GCBR
i.	Enforce best practice guidelines in respect to sustainable urban drainage systems (SUDS)	MSA, NWA, ICMA	• 1-day training for officials convened and attended • SUDS applied by building control and technical services	MEDIUM	Mossel Bay LM
Management Objective 1.4: Control the spread and densification of invasive alien plant species					
a.	Identify and prioritise infested areas	CARA, NWA	• Priority areas identified • Appropriate methods of control determined	MEDIUM	RMA, DEFF: Working for Water (WfW), CapeNature/ GCBR
b.	Develop and implement invasive alien species eradication programme	CARA, NWA	• IAPs eradication programme implemented • Increased area of IAPs removed	MEDIUM	RMA, GCBR, DEFF: WfW

Management Objective 1.5: Ensure sustainable resource use through an effective level of compliance management					
a.	Determine status of fish and bait stocks in Blinde River estuary, including recruitment patterns	MLRA	• Research undertaken • Data generated, and results reported on • Data incorporated into EMP 5-year review	HIGH	DEFF (supported by e.g. CapeNature, DST, CSIR)
b.	Quantify extractive resource use activities on the estuary (fishing, bait harvesting) through relevant monitoring programmes (e.g. roving creel surveys, compliance patrols)	MLRA	• Monitoring programme developed and implemented • Monthly counts of number of harvesters • Increased patrols and monitoring conducted • Improved fish and invertebrate populations • Research projects commissioned • Reports submitted to DEFF for information purposes	MEDIUM	CapeNature/DEFF, Dana Bay Conservancy
c.	Deploy human resources for ad hoc compliance and enforcement in respect to MLRA	MLRA		LOW	CapeNature/DEFF

5.2 Biodiversity Conservation

<u>Strategic Objective 2</u>: The biodiversity of the Blinde River estuary is conserved.

Table 5: Management Objectives and Actions for Conservation

	Proposed Activity/Action	Relevant Legislation	Performance Indicator	Priority	Responsibility
Management Objective 2.1: Ensure the conservation of estuarine habitats and indigenous species					
a.	Incorporate Blinde EMP into GCBR Plan	ICMA, Western Cape Biosphere Reserves Act (WC BRA)	• EMP included in management plans for the Gouritz Cluster Area	MEDIUM	RMA, CapeNature, GCBR
b.	Lobby GCBR to establish an estuarine division to ensure commitment to estuarine matters in the region	WC BRA	• Estuarine division established, and estuarine co-ordinator appointed	MEDIUM	RMA, GCBR, CapeNature
c.	Investigate appropriate conservation status (e.g. conservation servitude, municipal nature reserve)	National Environmental Management: Protected Areas Act (NEM: PAA), ICMA	• Conservation methods investigated and implemented • Area designated as municipal NR or conservation servitude and published	MEDIUM	RMA, GCBR, CapeNature
d.	Identify species and habitats of concern and generate specific management guidelines	NWA (RDM), NEM: BA, MLRA	• Species/habitat management guidelines developed • Data incorporated into EMP 5-year review	HIGH	RMA (supported by e.g. GCBR, CapeNature, DST, CSIR)

e.	Adopt, implement and enforce spatial zonation plan	ICMA, Land Use Planning Act (LUPA)	• EFZ controls enforced and offenders prosecuted • Reduced illegal activities • Reduced habitat loss/degradation and disturbance, and inappropriate behaviour • Improved fish and invertebrate populations	HIGH	Mossel Bay LM, GCBR
f.	Engage with landowners and stakeholders to encourage environmental custodianship/ stewardship on adjacent properties.	National Environmental Management Act (NEMA) (Duty of Care)	• Meeting with adjacent landowners convened • Signed agreements with landowners • Degraded areas rehabilitated • Integrity of estuarine margin improved	LOW	GCBR, Dana Bay Conservancy

5.3 Land-use and Infrastructure Planning and Development

<u>Strategic Objective 3</u>: 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 in and around the Blinde River estuary, considering ecosystem services and sense of place					
a.	RMA to adopt and incorporate EMP and spatial zonation plan into all municipal and relevant government department planning documents and processes (e.g. municipal IDP, SDF, zoning scheme & overlay, Water Use Licence (WUL) Applications, Environmental Impact Assessment (EIA) Applications)	MSA, LUPA, NEMA, ICMA	• EMP included in all relevant planning documents • EFZ respected as a no development area	HIGH	Mossel Bay LM, All authorities
b.	Incorporate Blinde EMP and spatial zonation into GCBR Management Plan	ICMA, WC BRA	• EMP included in management plan for GCBR • Engagement with GCBR	HIGH	GCBR, Mossel Bay LM
c.	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	NEMA, LUPA, ICMA, etc	• All developments comply with environmental legislation and environmental best practice / risk aversion approach • No permanent development, infilling or land transformation of EFZ • Transgressors prosecuted • Corrective action undertaken	HIGH	DEA&DP, Mossel Bay LM

			• Reduced risk of degradation, transformation and disturbance to the estuary		
d.	Develop and publish estuarine bylaws or regulations to support spatial zonation	MSA, ICMA	• Bylaws developed and gazetted	MEDIUM	Mossel Bay LM
e.	Use EAF as source of I&APs for EIAs	MSA, LUPA, ICMA, NEMA	• EAF partakes in development planning affecting the estuary • Impacts on the estuary are mitigated/prevented	HIGH	RMA, Mossel Bay LM, Garden Route DM, DEA&DP

5.4 Institutional and Management Structures

<u>Strategic Objective 4</u>: The Blinde 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 adopts and incorporates the EMP and the spatial zonation plan into planning documents	MSA, LUPA, NEMA, ICMA	• EMP and zonation plan adopted by RMA • EMP included in all relevant planning documents	HIGH	RMA
b.	Undertake needs analysis and identify skills shortages	ICMA, WC BRA	• Needs and shortages identified • Motivation for acquisition drafted and approved • Equipment purchased and maintained	HIGH	RMA
c.	Implement skills development, training or co-opt additional members / secondment for estuarine management	ICMA, WC BRA	• 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	• Project champions identified • Networks established, and contacts database compiled • Regular email correspondence	HIGH	RMA

e.	Source support and additional budget, and confirm budget allocation annually	ICMA, MSA, LUPA, NWA	• An action plan for securing future funding drafted and approved • Funding secured for 5-year cycle	HIGH	All authorities
f.	Constitute and maintain a fully functional, regional EAF (or utilise other applicable forum) to facilitate co-operative governance	ICMA, MSA, LUPA, NWA	• EAF constituted (Membership includes representatives of government and stakeholders/civil society) • Regional EAF meets on a quarterly basis • Meetings are minuted	HIGH	RMA
g.	Identify and invite missing stakeholders/ interest groups to partake in regional EAF	ICMA	• Networks established • Stakeholder database developed and regularly updated	HIGH	RMA
h.	RMA 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	• RMA attendance at critical forum meetings • Meetings are minuted	HIGH	RMA
i.	Monitor and report on the progress of EMP actions and achievements on annual basis	ICMA	• Feedback received from participating agencies • Annual reporting to DEFF and EAF • Action plans updated as and when required	MEDIUM	RMA
j.	Undertake formal 5-year review as prescribed by the NEMP, with involvement of EAF	ICMA	• 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)	• 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	• 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	• 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, WC BRA	• 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, WC BRA	• 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

<u>Strategic Objective 5</u>: Socio-economic benefits are regulated to ensure sustainable use of the Blinde River estuary and its resources.

Table 8: Management Objectives and Actions for Socio-economic Considerations

	Action	Relevant Legislation	Performance Indicator	Priority	Responsibility
Management Objective 5.1: Regulate recreational use of the estuary					
a.	Adopt, demarcate and enforce spatial zonation plan	ICMA,	• EFZ controls enforced and offenders prosecuted • Reduced habitat loss/degradation and disturbance, and inappropriate behaviour	HIGH	RMA
b.	Provide and maintain reasonable access to the Blinde River estuary and coastline	ICMA	• Controlled access provided by adjacent properties • Boardwalks and access points well maintained	MEDIUM	Landowners/ estates, Mossel Bay LM
c.	Informative signage, indicating zonation and allowable activities, to be placed at strategic points for all users/visitors	ICMA,	• Key public spaces / access points identified • Signage created and erected	LOW	RMA, Dana Bay Conservancy
d.	Develop and implement an effective communication strategy for users / landowners (particularly to report on pollution events and estuary condition)	ICMA, MLRA	• Strategy developed • Effective network and contact list established • Cell phone link set up • Peaks season patrols • Investigative surveys/ questionnaires undertaken	LOW	RMA, Dana Bay Conservancy

5.6 Education & Awareness

<u>Strategic Objective 6</u>: Members of society are sensitive to and aware of the value and importance of the Blinde 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.	Develop and effective education and awareness programme for residents and visitors to Dana Bay	ICMA	• Education & awareness programme developed and implemented at schools and through interest groups • Increased educational opportunities at group gatherings, community meetings, conferences etc.	MEDIUM	RMA, GCBR, Dana Bay conservancy
b.	Source and/or commission educational and informative material including signage, posters, pamphlets and webpage design	ICMA	• Signage created and erected Posters and pamphlets erected/ disseminated • Dana Bay estuaries webpage operational	MEDIUM	RMA, GCBR, Dana Bay conservancy
c.	Engage and educate estuary users	ICMA	• Reduction in illegal activities • Reduced habitat loss/degradation and disturbance, and inappropriate behaviour • Informative surveys/talks undertaken	LOW	GCBR, Dana Bay Conservancy

5.7 Disaster Risk Management

<u>Strategic Objective 7</u>: Potential risks that could impact the Blinde River estuary are reduced (inclusive of climate change impacts)

Table 10: Management Objectives and Actions for Disaster Management

	Action	Relevant Legislation	Performance Indicator	Priority	Responsibility
Management Objective 7.1: Disaster prevention, preparedness and mitigation					
a.	Ensure that all proposed developments adhere to the full suite of relevant environmental legislation, particularly the coastal management line and associated development controls	NEMA, ICMA, etc	• All developments comply with environmental legislation and environmental best practice / risk aversion approach • No permanent development, infilling or land transformation of EFZ • Transgressors prosecuted • Corrective action undertaken • Reduced risk of degradation, transformation and disturbance to the estuary	HIGH	Mossel Bay LM, RMA, DEA&DP
b.	Maintain a risk assessment portfolio and identify areas of potential concern (catchment and marine pollution, flooding, erosion, etc.)	Disaster Management Act (DMA) (Act 57 of 2002) NEM: WA, NEMA, ICMA, NWA	• Risk assessment portfolio compiled • Key areas identified	MEDIUM	RMA, Mossel Bay LM, Garden Route DM, PetroSA
c.	Implement the reported Mossdustria/PetroSA disaster management plan		• Mossdustria Disaster Management Plan accessed and implemented • Number of disasters recorded • Record of executed mitigation measures • Reduced degradation/damage to estuary	HIGH	PetroSA, WC Dept of Local Gov: Disaster Management

d.	Develop and implement contingency plans, linked to the larger Mossdustria/PetroSA disaster management plan, to address specific sources of pollution (oil spill, chemical spill and other industrial/ toxic substances.)	NWA, ICMA, DMA	• Identify specific sources of pollution in addition to industrial input • Contingency plans developed and approved • Contingency plan to include a health incident evacuation plan, identifying actions, timing and responsible agencies and actors. • Mitigation / clean-up undertaken • Investigation initiated, and enforcement actions undertaken	MEDIUM	RMA, Mossel Bay LM, DWS, DEFF, PetroSA, WC Dept of Local Gov: Disaster Management
e.	Enforce the 'Polluter pays' principle and timeous and appropriate rehabilitation of damaged areas	NEMA	• Transgressors prosecuted • Corrective action undertaken and degraded areas rehabilitated	MEDIUM	Mossel Bay, DEA&DP

6 PROPOSED SPATIAL ZONATION

6.1 Introduction

Spatial zonation of activities on an estuary is necessary to avoid user conflict and to guide sustainable utilization 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 and the limited diversity of available habitats, it is suggested that the entire estuary be managed as a single zonation type, where limited disturbance and harvesting of the marine living resources is permitted.

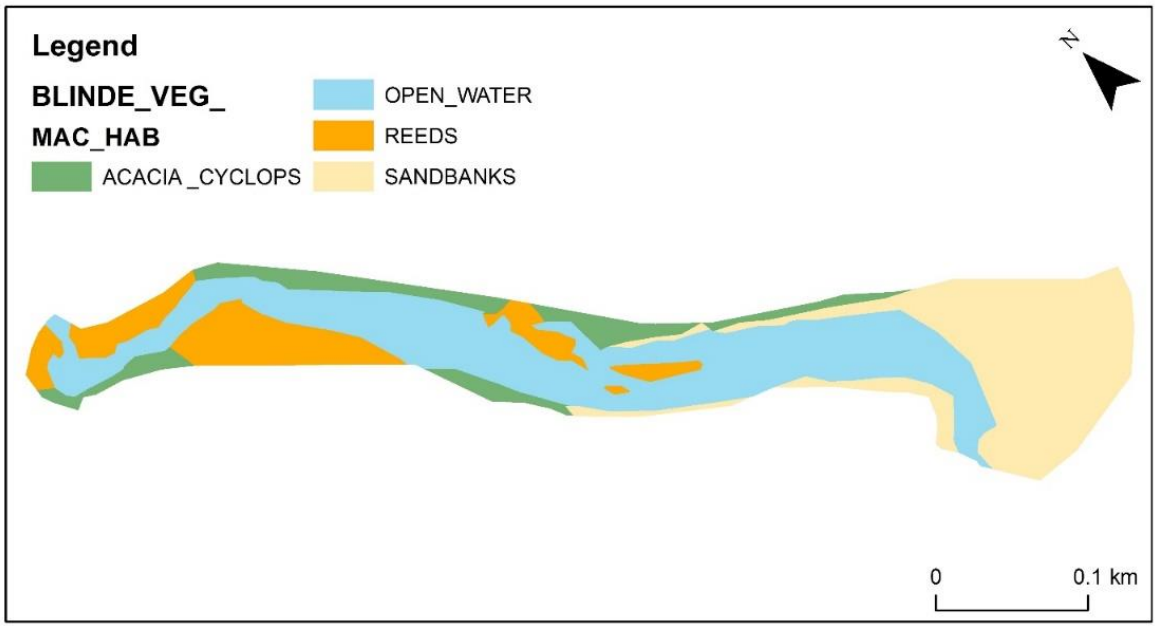


Figure 6: Habitats identified in the Blinde River estuary

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 -*

a) that is permanently or periodically open to the sea;
b) 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
c) *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 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 District (formally Eden), as per draft delineations recommended in the Coastal Set-back / Management Lines for the Garden Route District project (WCG, 2015), the CPZ is informed by a coastal risks zone approximated by the **10 m Above Mean Sea Level (amsl) contour or 1:100yr 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 Blinde River estuary are illustrated in Figure 7.

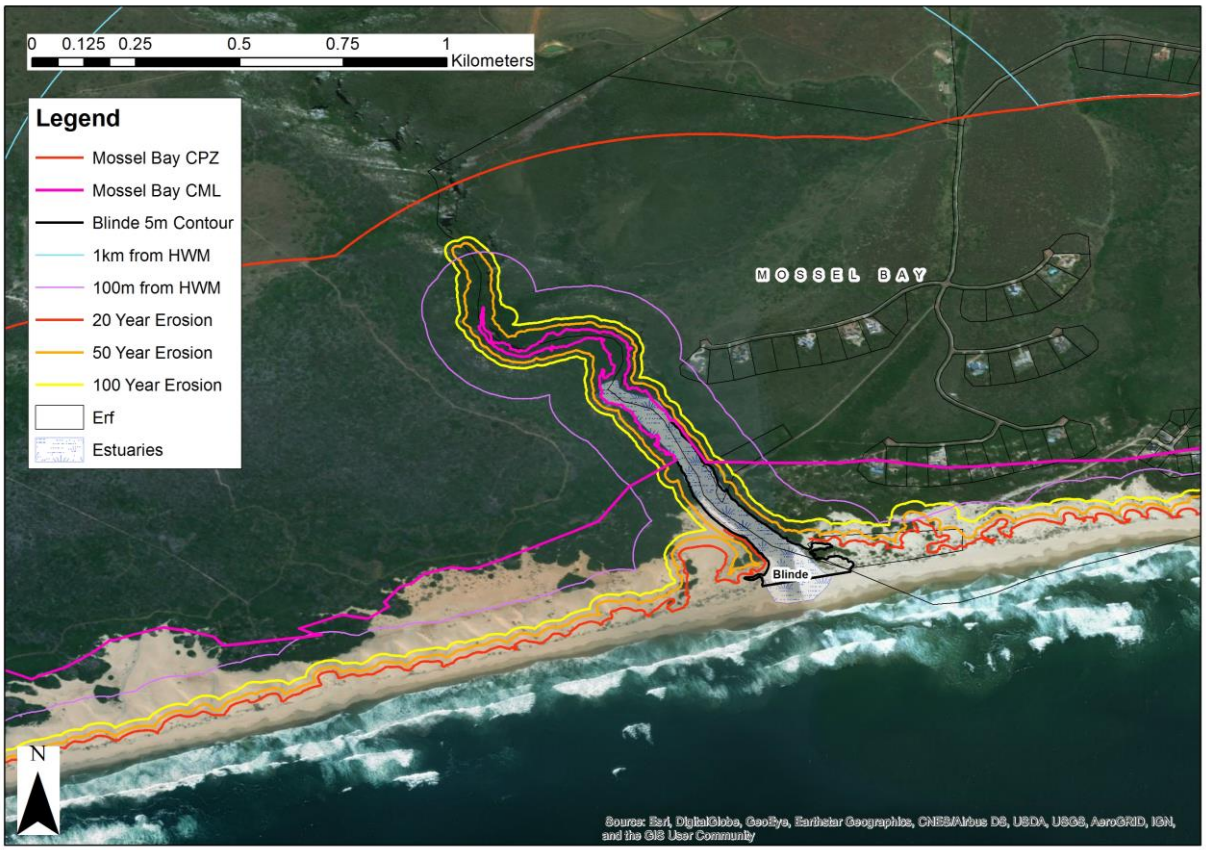


Figure 7: Coastal boundaries of the Blinde River estuary and risk projections (WCG, 2015)

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 regulations[2] 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 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

[2] 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)

activity, as read within the context of that activity. The competent authority in the Western Cape is DEA&DP or the DEFF.

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 Mossel Bay Municipal Town Planning Scheme (Mossel Bay LM, 2018) (Figure 8) and activities occurring in and/or adjacent to the Blinde River estuary (Table 11).

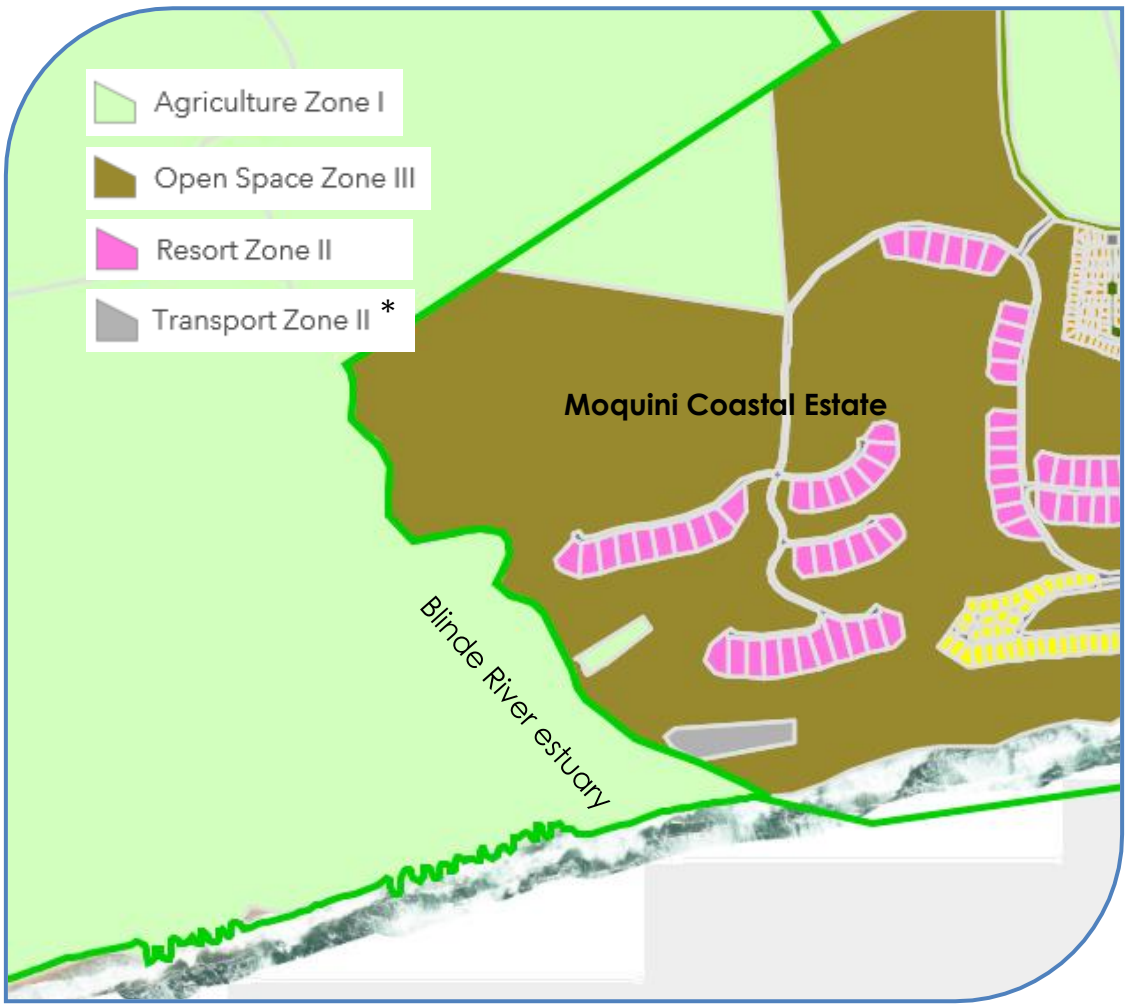


Figure 8: Extract of the Mossel Bay Municipality Town Planning Scheme (Mossel Bay LM, 2018)

Table 11: Current zonations and activities occurring in and/or adjacent to the Blinde River estuary

LAND USE	DESCRIPTION
Open Space Zone III	• The Eastern portion of the EFZ of the Blinde River estuary falls within the Moquini Coastal estate, the majority of which is zoned as Open Space Zone III (Mossel Bay LM, 2018). • The Mossel Bay zoning scheme controls state that the "objective of this zone is to provide for the conservation of natural resources in areas that have not been proclaimed as nature areas (non-statutory conservation), in order to sustain flora and fauna and protect areas of undeveloped landscape including woodlands, ridges, wetlands and the coastline" (Mossel Bay LM, 2017). • Consent uses include environmental facilities; freestanding base telecommunication station; harvesting of natural resources; rooftop base telecommunication station; tourist facilities and utility service.
Agriculture Zone 1: Agriculture	• The Western portion of the EFZ of the Blinde River estuary is zoned as agriculture 1. • The Mossel Bay zoning scheme controls state that the "objective of this zone is to promote and protect agriculture on farms as an important economic, environmental and cultural resource. Limited

	provision is made for non-agricultural uses to provide rural communities in more remote areas with the opportunity to increase the economic potential of their properties, provided these uses do not present a significant negative impact on the primary agricultural resource" (Mossel Bay LM, 2017).
Resort Zone II	• Existing and proposed development within the Moquini Coastal estate is zoned as Resort Zone II. • The Mossel Bay zoning scheme controls state that the "objective of this zone is to reserve a zoning for existing resorts situated outside the urban edge, approved in terms of Section 8 of the Land Use Planning Ordinance, 1985" (before this Scheme By-Law came into effect). This zoning allows for holiday housing with resort shop being a consent use.
*** Transport Zone II**	• A beach parking area was formerly provided for under this zonation. However, the area has been removed and rehabilitated to coastal dune habitat and no longer exists3.
Gouritz Cluster Biosphere Reserve: Buffer Zone	• The Blinde River estuary falls within a very narrow Buffer Zone adjacent between the transition area west of the Dana Bay urban area (GCBR, 2017). As a buffer zone, this area is to be used for cooperative activities compatible with sound ecological practices, including environmental education, recreation, ecotourism, and applied and basic research
ACTIVITIES	**DESCRIPTION**
Fishing	Assumed Limited fishing
Bait harvesting	Assumed Limited sand prawn pumping
Swimming	Assumed swimming associated Moquini Coastal Estate and Hotel
Beach-based recreational activities	Sunbathing, picnicking etc. on the expansive beach / sand bar as well as on banks of estuary below the Hotel

[3] Minutes of the stakeholder meeting for the Blinde River estuary, 27 August 2018, Mossel Bay Town Hall, Mossel Bay

Figure 9: Development adjacent the Blinde River estuary within its EFZ (Mossel Bay LM, 2018)

6.4.1 Proposed spatial zonation

A single zonation type is proposed for the Blinde River estuary, namely, a Quiet/Nature Access Zone. As a Quiet Zone, limited activities are encouraged in the EFZ, which are fortunately governed by the small size of the system, and these activities are directed toward accessing and appreciating nature. The primary purpose of this zone is to manage and direct low impact use and interaction so as to minimise impacts on this sensitive coastal environment.

Allowable activities in this zone are to be managed as per Table 12 below. Formal development or construction activities are to be regulated according to the EIA Regulations and any future controls emanating from the Provincial determination of coastal management lines.

Table 12: Zonation prescriptions for the Blinde River estuary

	CONDITIONS OF USE	RELEVANT LEGISLATION	RESPONSIBLE AUTHORITY	ENFORCEMENT
QUIET / NATURE ACCESS	• Guided or unguided nature observation • Day hiking trails and/or short trails • Bird hides, canoeing, mountain biking & rock-climbing where appropriate • Vehicle access on designated routes, with controlled pedestrian access from parking areas or adjacent development zones using designated paths • No off-road vehicle accesses • On water - only non-motorised vessels permitted (e.g. canoeing) • No ad hoc construction of jetties and slip ways • No additional development within the EFZ • No accommodation, camping or fires • Fishing/ harvesting subject to the possession of an appropriate permit • No clearing of indigenous vegetation for access or views	MLRA Regulations LUPA, Municipal Town Planning Scheme (TPS), Bylaws	Mossel Bay LM	Mossel Bay LM, DEFF/ CapeNature

*Based on CapeNature protected area zonation scheme

6.4.2 Areas requiring rehabilitation

Little intervention is required along the Blinde River estuary in terms of rehabilitation, apart from invasive alien vegetation removal.

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

PetroSA has authorisation to discharge treated wastewater to the Blinde River[4]. As part of this authorisation, water quality monitoring is conducted on the affected river reach. Data is available on request, especially in relation to pollution events. Ad hoc water quality testing of the Blinde River estuary is conducted as and when the need arises.

There are no known monitoring programmes (e.g. water quality, fish or birds, etc.) in place for the Blinde estuary apart from visual observations by Dana Bay Conservancy members.

7.1.2 Recommended Resource Monitoring Programmes

In the context of the Blinde River estuary, general baseline information is lacking. The recommended baseline monitoring requirements to improve the confidence of the reserve determination as developed through Gouritz Water Classification Study (DWS, 2015) are listed in Table 13(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 14 (Appendix 1). The purpose of recommended long-term monitoring programme, is also to test for compliance with the Ecological Specifications and Thresholds of Potential Concern and to continuously improve understanding of ecosystem function.

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 this case a Category C.

[4] Minutes of the stakeholder meeting for the Blinde River estuary, 27 August 2018, Mossel Bay Town Hall, Mossel Bay

Thresholds of potential concern (TPCs) 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 C for the Blinde River estuary, are presented in Table 15 (Appendix 2) (DWS, 2015, 2018).

A basic monitoring programme should be established by the RMA for the Blinde River estuary according to the Reserve Determination methods. The programme should seek to address the monitoring priorities as soon as possible and various components can be monitored by the Dana Bay Conservancy (See Section 8.3).

A contact list of relevant agencies and officials/persons should be disseminated to the ratepayers' association to facilitate timeous reporting of any pollution incidents or illegal activities, in the absence of patrollers.

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.

7.2.1 Current compliance monitoring

Currently there is no compliance monitoring taking place on the Blinde River estuary.

7.2.2 Recommended compliance monitoring

In respect to the implementation of this EMP, compliance monitoring will be the responsibility of the DEFF, and will be undertaken according to legislation and policies applicable and by means of law enforcement and compliance monitoring protocols.

It is recommended that a scheduled compliance/law enforcement programme be developed, beginning with frequent patrols to ascertain degree and timing of estuary use (e.g. holiday periods), and then modified based on the findings.

Compliance monitoring should include:

- Number of fishers;
- Number of harvesters;
- Species targeted and catch volume;
- Gear utilised; and
- Number of offences, arrests and convictions for contravening regulations stipulated in the Marine Living Resources Act (No 18 of 1998).

In respect to water abstraction in the catchment, the number of registered water users and the volume of water being abstracted should also be monitored in accordance with the respective water use permits/licenses and the ecological reserve determination, under the National Water Act. This form of compliance monitoring falls within the ambit of DWS.

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 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 16 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 10 displays the key role players that should be included in its management.

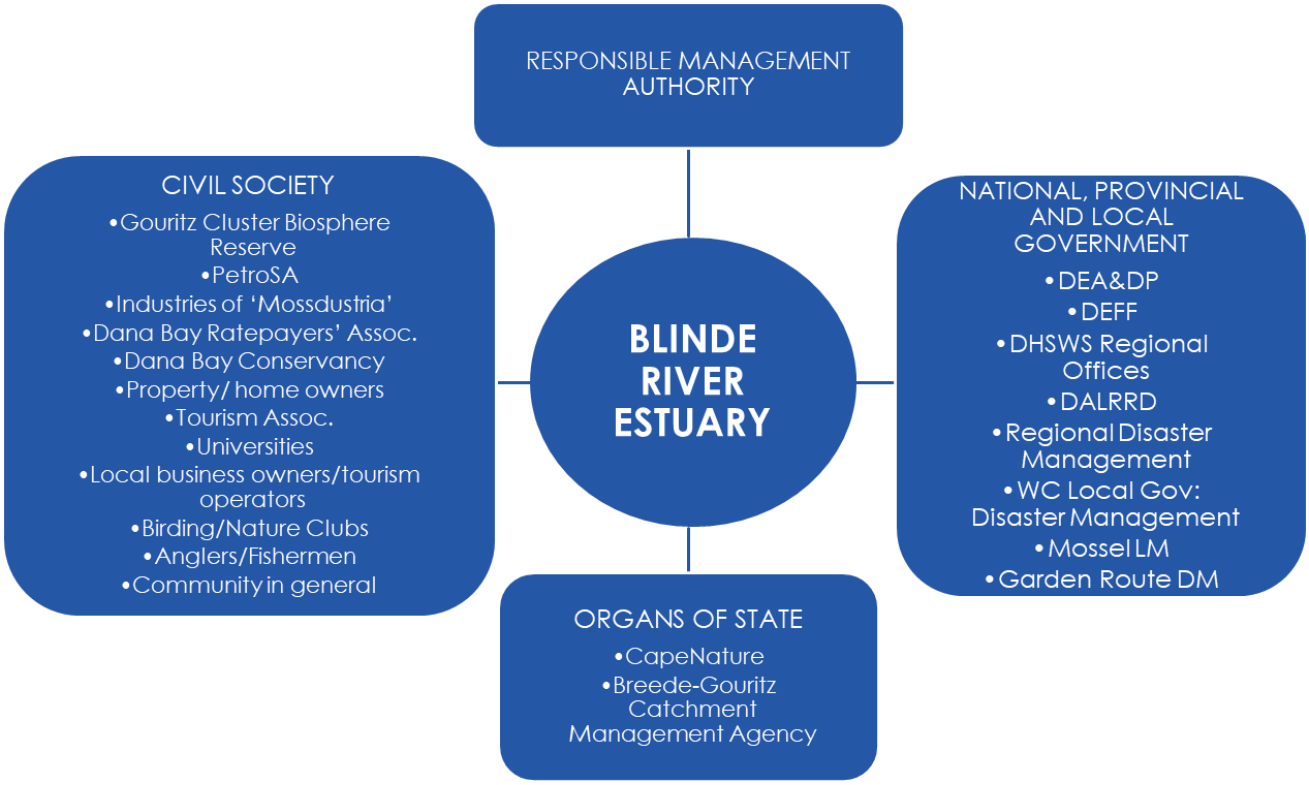


Figure 10: Key role players for the management of the Blinde River estuarine system

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 Blinde River Estuary EMP. I**t 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. However, the Blinde River estuary also falls within the Gouritz Cluster Biosphere Reserve, where CapeNature is legally responsible for the management thereof. Thus, management of the Blinde River estuary could benefit from a joint agreement (or delegation) between these two entities.

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 Mossel Bay LM and the Department of Water and Sanitation (DWS) will monitor water quality, while the Department of Environment, Forestry and Fisheries (DEFF) 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.

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

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 DEFF 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 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 proposed, one incorporating the Blinde, Twee Kuilen, Bayview, and Hartenbos estuaries (and their associated EAFs, where they exist). The EAF should be chaired by the RMA and should aim to meet on a quarterly basis.

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 (i.e. Dana Bay community through the Conservancy) will play an invaluable role in providing "on the ground" assistance, local insight and support to the various authorities as well as to the RMA, in respect to the Blinde River estuary, such

as basic water quality monitoring, fishing surveys, and bird counts. Additional support can be solicited from adjacent conservancies, such as Fransmanshoek Conservancy, who undertake voluntary patrols to inspect fishermen's catches and undertaken roving creel surveys[5].

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 Mossel Bay Local Municipality as RMA; responsible for providing key municipal services, as well as the provision of management, technical and legislative support;
- The Garden Route District Municipality: 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 DEFF, DWS (via the regional office), Department of Agriculture, Land Reform and Rural Development (DALRRD) and the Department of Science and Technology (DST); and
- Organs of State: CapeNature, CSIR, South African Heritage Resources Agency (SAHRA) (if heritage assets identified).

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 DEFF is generally responsible for national standardisation of estuarine management and approval of provincially-compiled EMPs. 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;

[5] Minutes of the stakeholder meeting for the Blinde River estuary, 27 August 2018, Mossel Bay Town Hall, Mossel Bay

- The Western Cape Provincial Coastal Committee: Responsible for facilitating co-management and effective governance and provincial co-ordination of estuarine management; and
- The 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 in Appendix 3 for ease of reference. This template can also be utilised to facilitate the implementation of other projects proposed in the EMP, e.g. water quality monitoring programme.

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:

- Level of conservation status obtained, and community involvement extended to include the estuary;
- Effective functioning and sustainable discharge from both the WWTW as well as Mossdustria maintained; 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

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 and Sanitation (DWS), 2015. *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.

GCBR (2017). Gouritz Cluster Biosphere Reserve Zonation map. Accessed August 2018. URL < https://gouritz.com/wp-content/uploads/2019/02/GCBR_Zonation_Map-compressed.pdf>.

Mossel Bay Local Municipality (LM), (2016). Mossel Bay Local Municipality Draft fourth generation Integrated Development Plan 2017 - 2022

Mossel Bay Local Municipality (LM), (2017). Mossel Bay Local Municipality Zoning Scheme Regulation.

Mossel Bay Local Municipality (LM), (2018). https://mbm-gis.maps.arcgis.com. Accessed 3 August 2018

Mossel Bay Municipality 2017-2022 Draft Fourth Generation Integrated Development Plan (IDP).

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.

StatsSA, (2011). Mossel Municipality. Key Statistics from the 2011 National Census. Statistics South Africa. URL: http://www.statssa.gov.za/?page_id=993&id=mossel-bay-municipality. Accessed 27 November 2018.

Stats SA, (2016). Mossel Bay Municipality Community Survey data 2016. URL https://wazimap.co.za/profiles/ward-10403011-mossel-bay-ward-11-10403011/. Accessed 27 November 2018.

WCG (2015). Coastal Management (Set-back) Lines for the Eden (now Garden Route) District, 31 March 2015. Western Cape Government Environmental Affairs and Development Planning.

APPENDIX 1: RECOMMENDED MONITORING PROGRAMMES

Table 13: Generic baseline surveys to improve confidence in the preliminary reserve determination of estuaries (Priority components are highlighted) (DWS, 2015)

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 models – refer to Newman and Watling, 2007)	Once-off.	Entire estuary, including depositional areas (i.e. muddy areas).

Monitoring action	Temporal Scale (frequency and timing)	Spatial Scale (Number of stations)
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 m2 grid (five replicates per site). Establish the species concerned (*C. kraussi* or *U. africana*) using a prawn pump. Collect sediment samples using the grab for	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)
particle size analysis and organic content (at same sites as zooplankton) (preferably link with sediment dynamics).		
Fish		
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. 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. 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. Gill net sampling can be replaced by a large mesh seine (44 mm stretch mesh, 100 m x 2 m). 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.	Once-off, in spring/ summer and autumn/ winter.	Larger system (> 5 km): 10 - 15 stations along length of estuary) (~ length/10). Small systems (< 5 km): 3 - 5 stations (mouth, mid, top).
Birds		
Undertake count of all water birds.	Once-off.	Entire estuary.

Table 14: Generic long-term monitoring programme for estuaries (Priority components are highlighted) (DWS, 2015)

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.	At station near head of estuary.
Hydrodynamics		
Record water levels. Smaller systems (small in situ probe).	Continuous.	Near mouth.
Aerial photography (or using high resolution satellite imagery i.e. 5 x 5 m pixel size, e.g. Google Pro or BirdEye).	Every three 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 three 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 three years.	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.	At station near 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 three station covering all zones).
Inorganic nutrient concentrations (together with above).	Every three years (high flow and low flow) or when significant change in WQ expected.	Along entire length of estuary (at least three station covering all zones).
Measure pesticides/herbicides and metal accumulation in sediments.	Every three – six years, if results show contamination.	Entire estuary, including depositional areas (i.e. muddy areas).

Monitoring action	Temporal Scale (frequency and timing)	Spatial Scale (Number of stations)
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.	Every three 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.	Every three years, 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).	Every two years, in mid-summer	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)
Intertidal invertebrate hole counts using 0.25 m2 grid (five replicates per site). Establish the species concerned *(C. kraussi* or *U. africana*) using a prawn pump. Collect sediment samples using the grab for particle size analysis and organic content (at same sites as zooplankton) (preferably link with sediment dynamics).		
Fish		
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. 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. 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. Gill net sampling can be replaced by a large mesh seine (44 mm stretch mesh, 100 m x 2 m). 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.	Twice annually, spring/ summer and autumn/ winter.	Larger system (> 5 km): 10 - 15 stations along length of estuary) (~ length/10). Small systems (< 5 km): 3 - 5 stations (mouth, mid, top).
Birds		
Undertake count of all water birds.	Every two years, mid-summer.	Entire estuary.

APPENDIX 2: ECOLOGICAL SPECIFICATIONS

Table 15: EcoSpecs and Thresholds of Potential Concern for the Blinde Estuary (Category C) (DWS, 2015; 2018)

ECOLOGICAL COMPONENT	ECOSPECS	THRESHOLDS OF POTENTIAL CONCERN
Hydrology	• Maintain flow regime (small system needs most flows)	• MAR does not vary by more than 10% from present • Floods (indicated by 1:10 year event) do not reduce by more than 5% from present • Base flows do not differ by more than 5% from present

Month	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual
MMR/MAR (%Nat)	69.6	69.9	67.8	65.6	64.8	68.7	69.3	68.7	69.0	69.9	70.7	70.3	69.2

Hydrodynamics	• Maintain connectivity with the marine environment to create the required habitat for birds, fish, macrophytes, microalgae and water quality	• Closed mouth state increase/decrease by 10% from present • Presence of semi-closed mouth state with continuous outflow to sea. • Average water depth < 0.5 m (to be confirmed by monitoring) • Rate of change in water level > 30% 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	• Salinity > 20 (expected range 5-15) • Dissolved oxygen (DO) < 5 mg/ℓ in estuary • Turbidity > 10 Nephelometric Turbidity Units (NTU) in low flow • Secchi depth: to bottom • DIN > 100 µg/ℓ (average) • DIP > 20 µg/ℓ (average) • ≥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 Western Indian Ocean (WIO) Region guidelines (UNEP/Nairobi Convention Secretariat and CSIR, 2009)

ECOLOGICAL COMPONENT	ECOSPECS	THRESHOLDS OF POTENTIAL CONCERN
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) (system expected to experience significant fluctuation in bathymetry between flood and extended closed periods)
Microalgae	• Maintain low/median phytoplankton/benthic microalgae biomass • Prevent formation of phytoplankton blooms	• Phytoplankton> 3.5 µg/ℓ (median) • Benthic microalgae > 23 mg/m2 (median) • Phytoplankton > 20 µg/ℓ and/or cell density >10 000 cells/ml (once-off)
Macrophytes	• Maintain distribution of macrophyte habitats • Prevent the spread of reeds into open water • Prevent an increase in nutrients and macroalgal blooms • Prevent the spread of invasive trees (e.g., Acacia spp.) in the riparian zone	• 20% change in the macrophyte area. (Reeds currently cover 0.04 ha.) • Reeds occupy > 0.5 ha • Macroalgal blooms cover > 50% of the open water area • Presence of invasive aquatic macrophytes e.g., Azolla, water hyacinth • Invasive trees cover > 50% of riparian zone
Invertebrates	• Establish presence/absence of sand prawn Callichirus kraussi on sand banks in lower estuary • Establish presence/absence of the copepod Pseudodiaptomus hessei or estuarine congeneric in the zooplankton of the estuary	• If present populations deviate from average baselines (as determined in first three visits) by more 30%

ECOLOGICAL COMPONENT	ECOSPECS	THRESHOLDS OF POTENTIAL CONCERN
Fish	• Fish assemblage should comprise the five estuarine association categories in similar proportions (diversity and abundance) to that under the reference. Numerically, assemblage should comprise: • Ia estuarine residents (50-80% of total abundance) • Ib marine and estuarine breeders (5-20%) • IIa obligate estuarine-dependent (10-20%) • IIb estuarine associated species (5-15%), • IIc 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., G.aestuaria, & Hyporamphus capensis). • Category IIa obligate dependents should be well represented by at least two large exploited species (i.e., L. lithognathus, Lichia amia). • REI (River Estuary Interface) species dominated by both Myxus capensis and G. aestuaria.	• Ia estuarine residents < 50% • Ib marine and estuarine breeders < 10% • IIa obligate estuarine-dependent < 10% • IIb estuarine associated species < 5% • IIc marine opportunists < 20% • III marine vagrants > 5% • IV indigenous fish < 1% • V catadromous species <1%
Birds	• Maintain population of original groups of birds present on the estuary	• 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 and/or birds counted for three consecutive summer or winter counts

APPENDIX 3: PERFORMANCE MONITORING PLAN

Table 16: Recommended Performance Monitoring Plan for the management of Blinde 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	• Recommended reserve(s) signed off and implemented • Sustained base flow to estuary • Water resource utilisation plan developed • Effective regulation of water use • Natural mouth dynamics • Maintained (or improved) C ecological condition • Monitoring on the state of the catchment and estuary • Ecological monitoring programmes in place	• Twice a year for DWS • Twice a year	NWA	DWS, BGCMA, RMA, Mossel Bay LM, Dana Bay Conservancy
1.2 Ensure estuary requirements are integrated into catchment processes to ensure healthy water quality	• Critical catchment maps updated • Effective catchment management • Good catchment water quality preserved • Active involvement of PetroSA/ Mossdustria	• Twice a year	NWA, NWA, MSA, CARA, NEM:BA, NEM; PAA	DWS, BGCMA, DEFF, Mossel Bay LM, PetroSA, Mossdustria
1.3 Minimise pollution by addressing activities that lead to poor water quality	• Water quality (WQ) monitoring programme implemented • Control of all polluting discharges • Effective functioning and sustainable discharge from wastewater treatment works • Environmental best practice irt agriculture is implemented and enforced	• Quarterly for WQ monitoring programme • Twice a year	NWA, CARA	RMA, Mossel Bay LM, DEFF, GCBR
1.4 Control the spread and densification of invasive alien plant species	• IAPs Detailed maps of invasive vegetation produced and priority areas identified • IAPS eradication programme implemented • Increased area / tonnes of IAPs removed	• Annually	CARA, NWA	DEFF, RMA, DEFF: WfW, GCBR

MANAGEMENT OUTPUT	PERFORMANCE INDICATOR	TEMPORAL SCALE (frequency)	RELEVANT LEGISLATION	RESPONSIBLE AUTHORITY
1.5 Ensure sustainable resource use through an effective level of compliance management	• Level of extractive use established • Increased patrols and monitoring conducted • Ecological monitoring programme (fish and birds) developed • Reduced habitat degradation and inappropriate behaviour/activities • Improved fish and invertebrate populations • Reduction in illegal activities	• Twice a year	ICMA, MLRA	DEFF, CapeNature, GCBR, Dana Bay Conservancy
2. BIODIVERSITY CONSERVATION				
2.1 Ensure the conservation of estuarine habitats and indigenous species	• EMP included in management plan for GCBR • Spatial zonation plan adopted, implemented and enforced • Signage created and erected in key public spaces • Conservation area/servitude established • Appropriate regulations and bylaws are gazetted and enforced to protect fauna and flora • Reduced habitat degradation and inappropriate behaviour/activities • Participation of landowners and stakeholders	• Twice a year	ICMA, NEMA, MLRA, LUPA, NEM: PAA, NEM:BA	CapeNature, GCBR, DWS, Dana Bay Conservancy
3. LAND USE AND INFRASTRUCTURE DEVELOPMENT PLANNING				
3.1 Ensure appropriate and sustainable coastal development in and around the Blinde River estuary, considering ecosystem services and sense of place	• Blinde EMP included in all relevant planning documents • EMP included in management plan for GCBR • 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	• Annually	ICMA, LUPA	GCBR, Mossel Bay LM, DEA&DP and applicable authorities

4. INSTITUTIONAL AND MANAGEMENT STRUCTURES				
4.1 Ensure effective co-ordination of estuarine management responsibilities	• Blinde EMP adopted and incorporated into GCBR management plan • Regional Estuarine management function established in RMA • 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	• Quarterly	ICMA, MSA, NEMA, LUPA, NWA	RMA, Mossel Bay LM, Garden Route DM, applicable authorities
4.2 Define and enable co-operative governance	• 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	• Annually	MSA, NWA, ICMA, NEMA, WC BRA, CARA	All applicable authorities
5. SOCIO-ECONOMIC CONSIDERATIONS				
5.1 Regulate extractive use of the estuary	• EFZ demarcated with markers and signage erected, both are maintained • EFZ controls enforced and offenders prosecuted • Signage erected • Reasonable access provided and maintained • Communication strategy developed for estuary users/landowners	• Annually	ICMA, WC BRA, MLRA	RMA, DEFF, Dana Bay Conservancy
6. EDUCATION AND AWARENESS				
6.1 Promote high levels of public awareness and appreciation of the value of estuaries	• Education & awareness programme developed and implemented • Educational signage erected, and information disseminated • Mossel Bay estuaries webpage operational	• Every 3 years	ICMA	RMA, GCBR, Mossel Bay LM, Dana Bay Conservancy

	• Reduced habitat loss/degradation and disturbance, and inappropriate behaviour • Reduced illegal fishing activities			
7. DISASTER RISK MANAGEMENT				
7.1 Disaster prevention and preparedness	• All developments and activities are legally compliant • Risk assessment portfolio compiled, and key areas identified • Mossdustria Disaster Management Plan accessed and implemented • Spill contingency plan developed and approved	• Annually	DMA, NEM: WA, NEMA, ICMA, NWA	RMA, Mossel Bay LM, Garden Route DM, DWS, PetroSA, WC Dept of Local Gov: Disaster Management

APPENDIX 4: PROJECT 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:
Scheduling	

TASK	TIME (months)								
	1	2	3	4	5	6	7	8	9
1									
2									
3									
4									

Milestone/interim performance indicator

MILESTONE	INTERIM PERFORMANCE INDICATOR	DUE DATE
1		
2		
3		

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. • 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	

HUMAN RESOURCE	WEEKS PER TASK			
	1	2	4	4
Staff member 1				
Staff Member 2				
Service provider				

Financial resource plan

TASK	COST (ZAR)
1	
2	
3	
4	
TOTAL	

Source: DEA (2015)