

QINIRA ESTUARY MANAGEMENT PLAN

DRAFT FOR STAKEHOLDER COMMENT



November 2021

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LIST OF ACRONYMS AND ABBREVIATIONS

BCMM	Buffalo City Metropolitan Municipality
CBA	Critical Biodiversity Area
CMA	Catchment Management Agency
CMSs	Catchment Management Strategies
CSIR	Council for Scientific and Industrial Research
DEDEAT	Department of Economic Development, Environmental Affairs & Tourism
DFFE	Department of Forestry, Fisheries and Environment
DSoE	Desired State of the Environment
DWS	Department of Water and Sanitation
ECBCP	Eastern Cape Biodiversity Conservation Plan
EI	Ecological Importance
EFZ	Estuarine Functional Zone
EMP	Estuary Management Plan
ES	Ecological Sensitivity
EZI	Estuarine Zone of Influence
GIS	Geographic Information Systems
GN	Government Notice
ICMA	Integrated Coastal Management Act
IDP	Integrated Development Plan
IEMP	Integrated Environmental Management Plan
MAR	Mean Annual Runoff
MASL	Meters Above Sea Level
MLRA	Marine Living Resources Act
MOSS	Municipal Open Space System
NBA	National Biodiversity Assessment
NEMA	National Environmental Management Act
NEM: AQA	National Environmental Management: Air Quality Act
NEM: BA	National Environmental Management; Biodiversity Act
NEM: PAA	National Environmental Management: Protected Areas Act
NEM: WA	National Environmental Management; Waste Act
NEMP	National Estuarine Management Protocol
NEM	National Environmental Management
NFEPA	National Freshwater Ecosystem Priority Areas
NHRA	National Heritage Resources Act
NFA	National Forests Act
NWA	National Water Act
PES	Present Ecological State
RQO	Resource Quality Objectives
SAIAB	South African Institute for Aquatic Biodiversity
SAR	Situation Assessment Report
SANBI	South African National Biodiversity Institute
SANParks	South African National Parks
SANLC	South African National Land Cover
SQR	Sub-Quaternary Region
WMA	Water Management Area
WRC	Water Research Commission
WSDP	Water Services Development Plan

ACKNOWLEDGEMENTS

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- DEDEAT
 - Compliance and Enforcement
 - Biodiversity
 - Coastal and Biodiversity
 - Environmental Quality Management
- BCMM
 - Integrated Environmental Management Planning (IEMP) Unit
 - Environmental health
 - Development planning
 - Councilor Ward 28
- DFFE: Oceans & Coast - Estuaries Management
- Department of Water and Sanitation - Reserves
- DFFE: Forestry
- DFFE: Fisheries
- Eastern Cape Parks and Tourism Agency
- Qinira Estuary Group
- Beacon Bay Ratepayers Association
- East London Museum
- Coastal & Environmental Services (CES)

1 INTRODUCTION

1.1 BACKGROUND

Estuaries are partially enclosed coastal bodies of water that form at the interface between rivers and the sea. They are either permanently or periodically connected to the ocean, thus providing unique habitats for a range of species (Potter *et al.*, 2010; Adams *et al.*, 2016). These highly productive ecosystems play an important role in maintaining biodiversity which underpins the provision of a wide range of ecosystem goods and services, including the maintenance of viable commercial fisheries, protection of exposed coastlines, filtering and detoxification of runoff, carbon sequestration, provision of food and raw materials, amongst many others (Barbier *et al.*, 2011).

In South Africa, estuarine ecosystems contribute R4.2 billion to the economy per annum. They are popular nodes for human settlement, tourism and recreational activities due to their high productivity, sheltered nature, and scenic appeal (Van Niekerk *et al.*, 2019). However, urban expansion and development, coupled with the over utilization of resources and increased recreational activities, has resulted in the degradation of water quality, flow reduction, change in sediment and flow dynamics and the subsequent alteration of the natural ecological functioning and integrity of these ecosystems. These impacts severely compromise the provision of ecosystem goods and services derived from these dynamic systems which has resulted in the loss of R700 million per annum to the South African economy in terms of fishery benefits, loss of biodiversity and the overexploitation of resources. These losses have major implications for society (Van Niekerk *et al.*, 2019).

The need for an integrated, coordinated and efficient approach to the management of South Africa's estuaries was identified with the promulgation of the National Environmental Management: Integrated Coastal Management Act (NEM: ICMA) (Act No. 24 of 2008), hereafter referred to as the ICM Act. The ICM Act mandated the requirement for the development of a National Estuarine Management Protocol (NEMP) within four (4) years of the commencement of the ICM Act.

According to the National Biodiversity Assessment (NBA, 2018), estuaries are the most threatened ecosystem types in South Africa. Approximately 86% of the 22 estuarine types occurring in South Africa are threatened, with 9% classified as Critically Endangered, 45% classified as Endangered and 32% classified as Vulnerable. Approximately 63% of South Africa's estuarine area is significantly modified with important ecological processes under severe pressure resulting in the loss of productivity, food security, fisheries livelihood, property values and recreational enjoyment (Van Niekerk *et al.*, 2019).

The findings of the NBA (2011 version), together with the increased awareness of the degradation of South African estuarine ecosystems, resulted in the promulgation of the Natural Estuarine Management Protocol (NEMP) in 2013 and since updated in 2021 (GN R. 533 of 2021). The purpose of the Protocol is to:

- Determine a strategic vision and objectives for achieving effective integrated management of estuaries;
- Set standards for the management of estuaries;
- Establish procedures or provide guidance regarding how estuaries must be managed and how the management responsibilities are to be exercised by different organs of state and other parties;
- Establish procedures or provide guidance regarding how estuaries must be managed and how the management responsibilities are to be exercised by different organs of state and other parties;

- Establish minimum requirements for estuarine management plans;
- Identify who must prepare estuarine management plans and the process to be followed in doing so; and
- Specify the process for reviewing estuarine management plans to ensure that they comply with the requirements of the ICM Act.

The NEMP (2021) identifies the need and minimum requirements for the development of Estuarine Management Plans (EMPs) and also delegates responsibility to the relevant authorities and agencies in an attempt to help align and coordinate estuarine management at a local level. The NEMP identifies three (3) phases in the development of an EMP. These phases include:

1. Scoping Phase - which includes initial stakeholder engagement and the development of the Situation Assessment Report.
2. Objective Setting Phase - where:
 - a. Vision and objectives for estuary management are identified;
 - b. Geographical boundaries of the estuary are delineated and graphically represented;
 - c. Spatial zonation of activities is determined;
 - d. Management objectives and activities are described;
 - e. An Integrated monitoring plan is developed; and
 - f. Institutional capacity and arrangements are discussed.
3. Implementation Phase - which is based on:
 - a. The development of an implementation strategy and project plans;
 - b. Continuous monitoring and performance evaluation, based on performance indicators, and
 - c. Review of the EMP every five years.

This report fulfils the requirements of Phase 2 – the objective phase.

1.2 PURPOSE OF THE QINIRA EMP

The overall purpose of the Qinira EMP is to give effect to both the ICM Act and the NEMP (2021) with respect to achieving the National strategic vision and objectives for estuaries through the effective implementation of the following management standards:

- Adopt best practice in terms of use, management and protection of estuaries based on principles of ecological sustainability and cooperative governance;
- Consider the predicted impacts of climate change and management of potential disasters including pollution events;
- Promote the integration of land use planning and natural resource management outcomes with estuarine management outcomes;
- Develop management actions based on sound scientific evidence and where lacking, the precautionary approach should prevail;
- Manage estuaries so as to avoid, minimise or mitigate significant negative impacts that include but are not limited to reduced water flows and loss of habitat or species;
- Maintain ecological category of an estuary as determined in the most recent NBA in order to meet biodiversity targets, and to take into account the recommended extent of protection and recommended ecological health category; and
- Classify and set the Ecological Reserve and Resource Quality Objectives (RQO) of an estuary taking into account the current ecological health status, recommended extent of protection and recommended ecological category in order to meet the biodiversity targets as set in the most recent NBA.

The Qinira EMP has been developed in three phases:

- Situation Assessment Phase (separate report); and
- Estuarine Management Plan (EMP) (current report); and
- Implementation Plan (ongoing).

The EMP has been developed through a public consultative process, which included public workshops and direct engagement with key stakeholders.

The Situation Assessment Report (SAR) provided the baseline assessment to inform the EMP and aided in the development of the local vision for the Qinira Estuary and the identification of management objectives and priorities, and should be read in conjunction with this EMP.

The contents of the Qinira EMP complies with the legislated minimum requirements as described in Section 2 of the Natural Estuarine Management Protocol (NEMP) (GN R. 533 of 2021).

The Protocol stipulates the following minimum requirements for an EMP, namely to include:

- Geographic description and map of estuary based on Estuarine Functional Zone.
- An executive summary or synopsis of the SAR.
- Local vision and objectives giving effect to strategic vision and objectives of protocol.
- List of management objectives and activities (also identifying relevant legal instruments and responsible authorities).
- Details of intended spatial zonation of estuary specifying activities that may, or may not, take place in different sections of the estuary.
- Detailed integrated monitoring plan with list of performance indicators to gauge progress with achieving vision and objectives.
- Details of the institutional capacity and arrangements required for management.

2 SYNOPSIS OF THE SITUATION ASSESSMENT REPORT

The following provides a synopsis of the Qinira Estuary Situation Assessment Report (SAR) as required in terms of the NEMP (2021).

2.1 LEGISLATIVE INSTRUMENTS AND RELATED STRATEGIES AND PROGRAMMES

Various National and Provincial legislation and policy is relevant to the management of estuaries in South Africa, and also specific to the Qinira Estuary (such as various BCMM by-laws and various environmental sector plans). The legislation and policies relevant to the management of the Quinera Estuary are summarised in the SAR.

The National Environmental Management: Integrated Coastal Management Act (NEM: ICMA) (Act No. 24 of 2008) is the key legislation relevant to the planning and the control of activities within the coastal zone, including estuaries, and is particularly relevant to the current Qinira EMP.

The following BCMM policies, plans and by-laws are relevant to the Qinira EMP are described in the SAR.

Environmental

- Integrated Environmental Management Plan (IEMP) (2006);
- Integrated Coastal Zone Management Plan (2006);
- Sanitation Policy and Strategy (2007);
- Conservation Plan and Municipal Open Space System (2011);
- Climate Change Strategy (2014);
- Integrated Waste Management Plan (2019);
- Mapping of Vulnerable Coastal Areas (2019);
- Invasive Alien Species Monitoring, Control & Eradication Plan (2019);
- Environmental Education and Awareness Programme (2021).

By-laws

- Public Open Space By-law (2004);
- Water Services By-law (2011); and
- Environmental Health B-law (2010).
- Estuary Boating Management By-law (uncertain date);
- Boat Licensing By-law – Estuary (uncertain date); and
- Public Safety By-law (uncertain date).

Wider municipal plans

- Integrated Development Plan;
- Spatial Development Framework;
- Qinira Local Spatial Development Framework;
- Bonza Bay Local Spatial Development Framework (2019); and
- Water Services Development Plan.

2.2 CATCHMENT CHARACTERISTICS

This section of the SAR describes the catchment characteristics of the Qinira Estuary including the following:

- Geology and geomorphology;
- Climate and runoff;
- Land-use;
- Management of the catchment;
- Water use and water quality monitoring;
- Water resource (surface and groundwater); and
- River status.

Figure 2.1 below shows the surface water features within the Qinira catchment area.

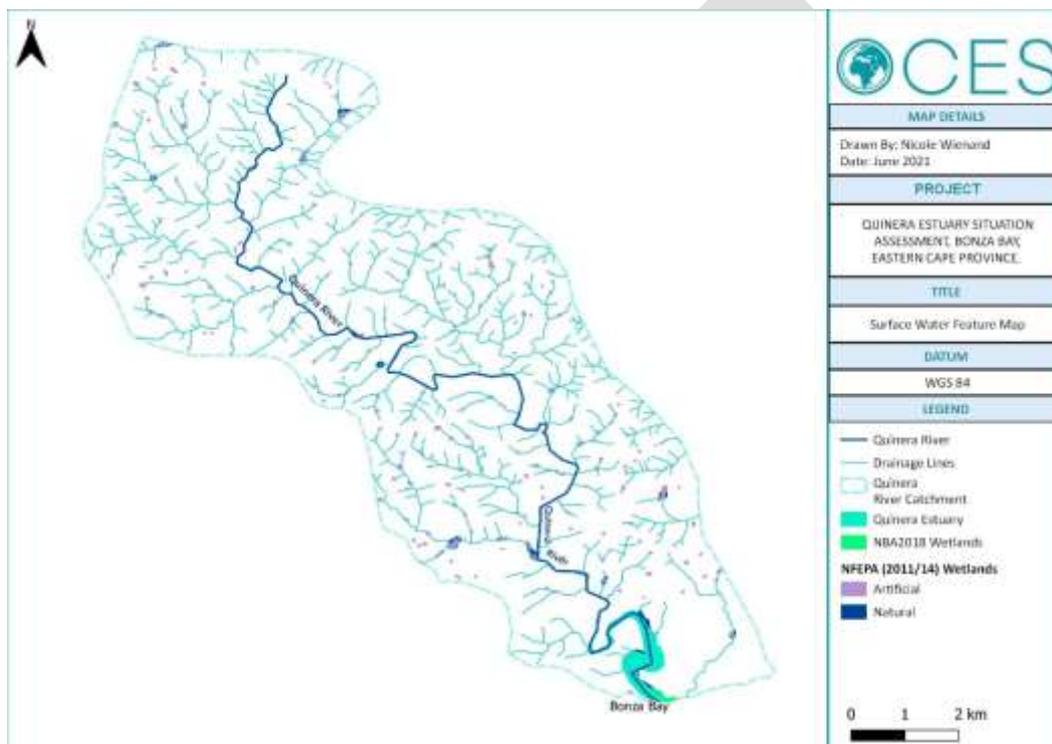


Figure 2.1: Surface Water Features within the Qinira River Catchment area.

2.3 OVERVIEW OF ECOLOGICAL FUNCTION AND STATE OF THE ESTUARY

This section of the SAR describes the ecological function and status of the Qinira Estuary.

2.3.1 Present Ecological Status

Figure 2.2 below shows the Qinira River State in terms of the Present Ecological Status (PES) in the R30F Quaternary Catchment.

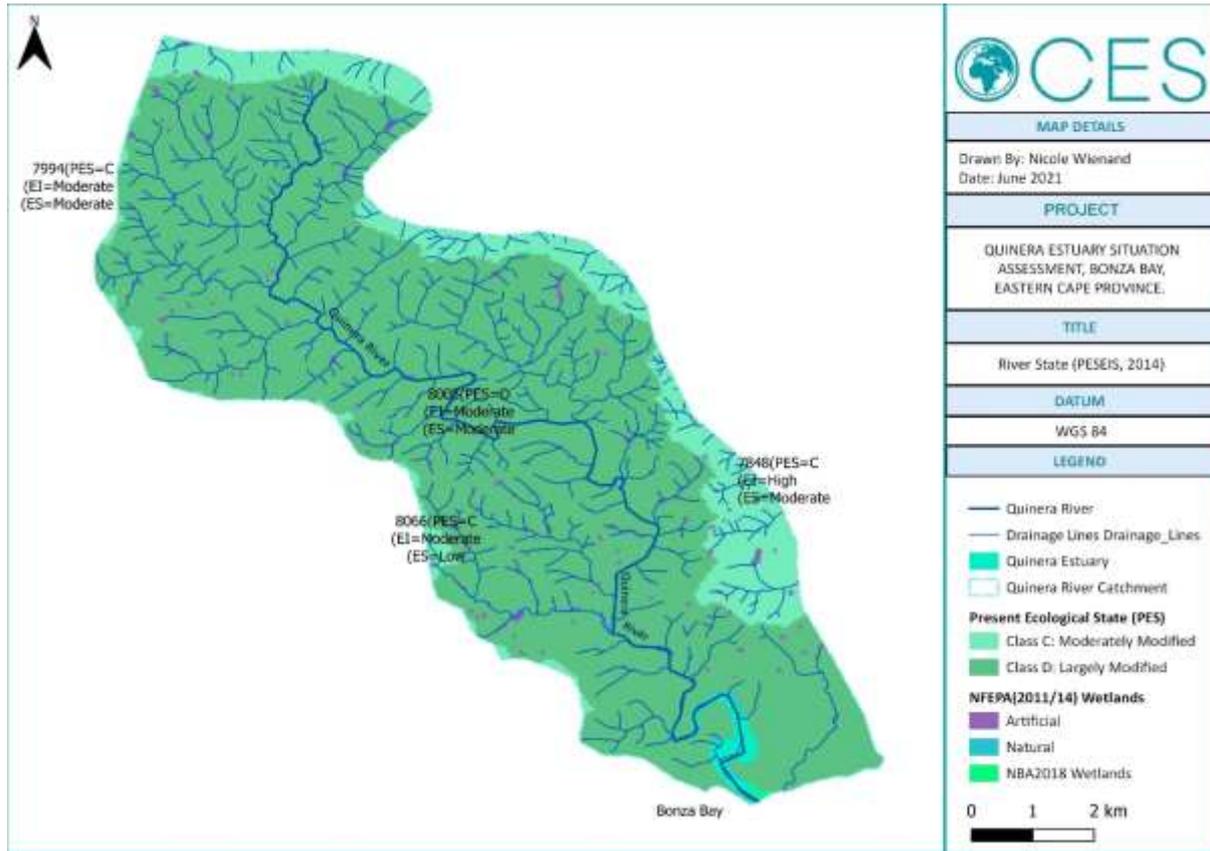


Figure 2.2: River State in terms of the Present Ecological Status in the R30F Quaternary Catchment.

2.3.2 Estuarine Functional Zone (EFZ)

The term *Estuarine Functional Zone (EFZ)* is used to describe the geographic boundary which encompasses the quantifiable common structural and functional characteristics of an estuary. As part of the Estuarine Component of the National Biodiversity Assessment, the EFZ is described as “encapsulating not only the estuary water body but also supporting physical and biological processes and habitats necessary for estuarine function and health”.

The EFZ has been generally determined to extend from the lateral boundaries of an estuary to the 5 m contour. The mouth of an estuary demarcates the downstream boundary while the limit of tidal variation or salinity penetration, whichever penetrated the furthest, determines the upstream boundary.

For the Qinira Estuary, the EFZ correlates with the 5 m topographical contour (Figure 2.3). This includes any open water areas, estuarine habitat (sand and mudflats, rocks and plant communities) and floodplain areas.

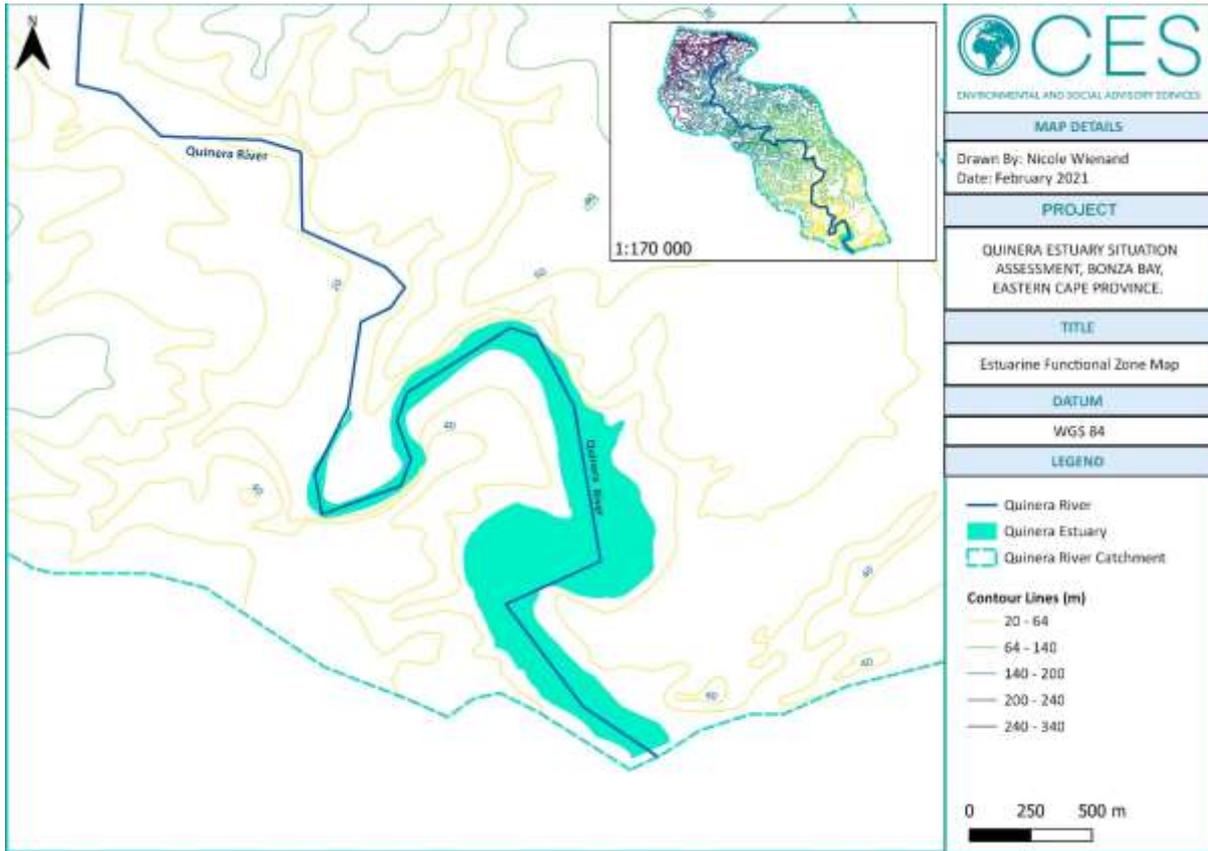


Figure 2.3: Qinira Estuarine Functional Zone (EFZ) as indicated by the 5 m contour data.

2.3.3 Estuarine Zone of Influence (EZI)

With increased human development and settlement within the coastal zone, estuarine health is often linked to human activity. According to the South African Environmental Observation Network (SAEON, 2021) the Qinira Estuary is subject to low, anthropogenic impact. The level of both fishing effort and pollution is considered moderate, while habitat loss is classified as low.

However, based on current observations, human impacts are ever increasing due to expanded residential and commercial development within the catchment. Commercial development in Meisies Halt and Floridale areas (such as car dealerships) are expanding at a rapid rate.

While there is limited industrial activity, agriculture (including commercial annual crop farming and old fallow land and fields) is widespread throughout the middle and upper reaches of the Qinira River. Numerous artificial dams are situated along the length of the River. The lower reaches of the River, particularly along the western side of the Qinira Estuary, is largely built up and consists mainly of high density residential housing developments.

The eastern side of the estuary is less developed with limited low-density residential development.

Figure 2.4 below indicates the major sources of surface water input into the estuary. There are approximately sixty-five (65) non-perennial (drainage) streams that enter the Qinira River and Estuary.

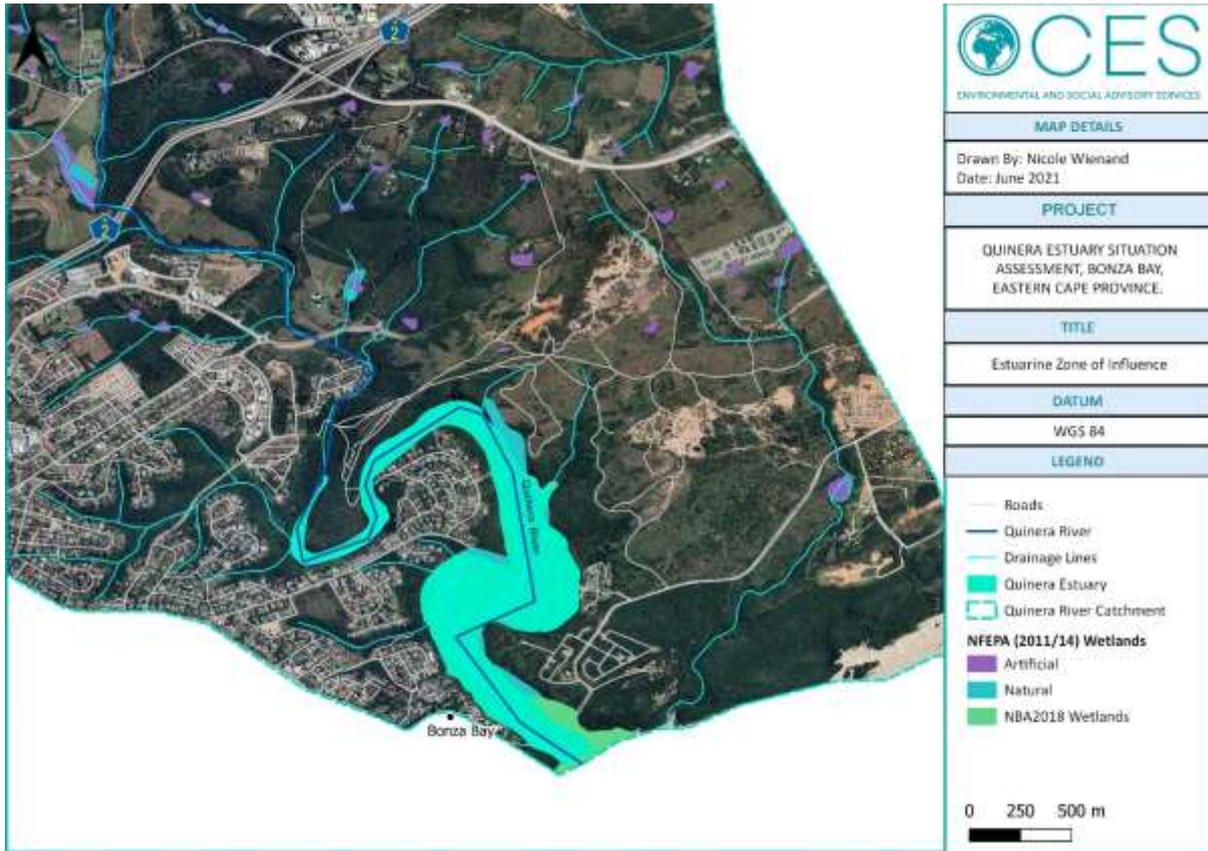


Figure 2.4: Estuarine Zone of Influence (EZI) of the Qinira River and Estuary.

2.3.4 Existing and future infrastructure and development

The SAR provides a description of the following infrastructure relevant to the EFZ and EZI.

- Dams;
- Waste management facilities;
- Other minor infrastructure (jetties, car parks, launch sites, etc);
- Open space;
- Current development; and
- Proposed future development.

Current development

It is clear that urban development within the Qinira River and Estuary catchment has increased significantly over the past 20 or so years, particularly to the west.

The east of the estuary has limited development, mostly located toward the estuary mouth, including Shadow Park and other residential developments.

Future development

Planned future development in BCMM is reflected in Spatial Development Framework (SDF) plans. These planning frameworks are critical in the allocation of resources for the development of infrastructure for the provision of services such as water, sanitation, roads, electricity, etc.

There are three SDFs that are relevant to the Qinira EMP:

- BCMM-wide SDF (2020);
- Qinira Local SDF (2005); and

- Bonza Bay Local SDF (2019).

Figure 2.7 below shows the relevant future proposed spatial planning for the Qinira area, where **it is critical to note** that the relatively undeveloped east bank of the Qinira Estuary is earmarked for infill with mixed density residential development. Various developers have already produced plans for significant infill development to the east of the Estuary.

An application for sand mining on the eastern side of the Qinira Estuary was also recently approved (June 2021).

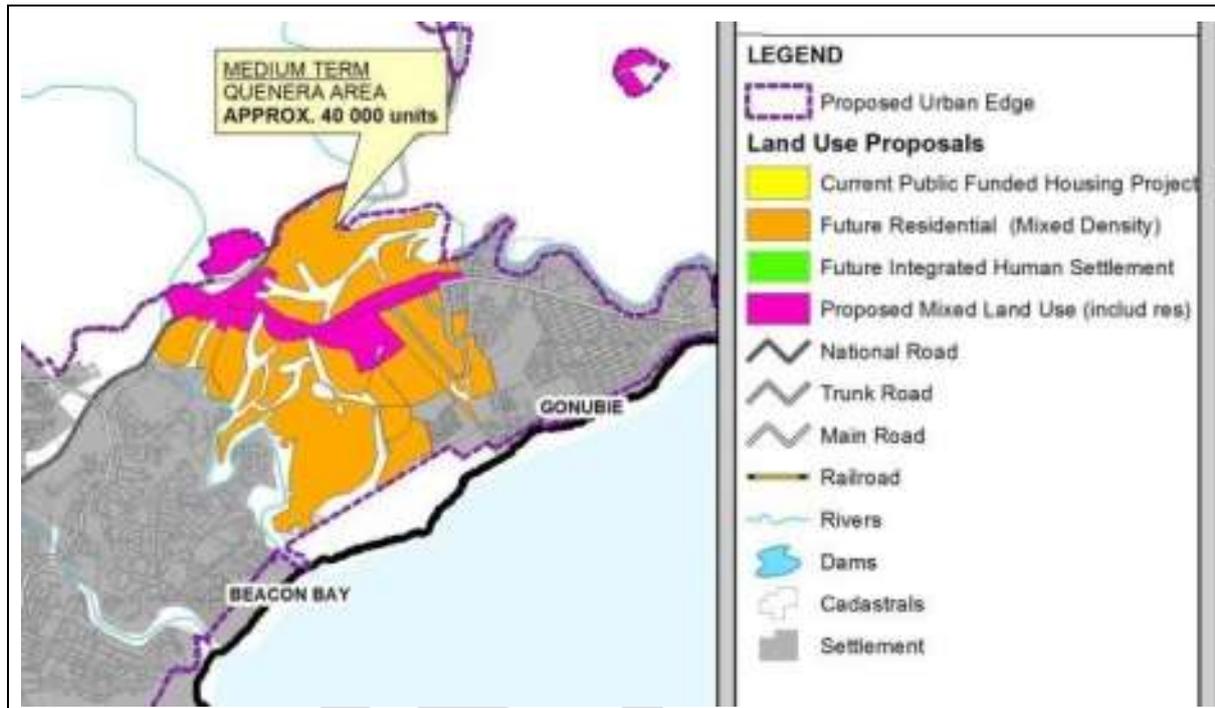


Figure 2.7: BCMM-wide SDF for the Qinira Estuary area (2020).

It is likely that future infill development on the east of the Qinira River and Estuary will pose significant risks to the ecological functioning of the estuary. Some risks would include:

- Contamination of estuary from stormwater run-off and sewer overflows as is occurring to the west currently;
- Loss of floral estuarine terrestrial (e.g. estuarine thicket) and associated habitats and faunal biodiversity (e.g. birds) due to clearing for development;
- Increased pressure on aquatic biodiversity (e.g. fish) due to fishing or other harvesting activities such as bait;
- Pressure on coastal forests due to collection of firewood particularly during the festive season;
- Increased sedimentation of the estuary due to runoff;
- Increased pressure on the health of the estuary due to increased recreational usage of the estuary particularly during the festive season; and
- Construction, disturbance and other illegal activities within the EFZ

2.3.5 Ecological Health Status

National Biodiversity Assessment (2018) – Technical Report Vol.3: Estuarine Realm

According to the findings of the NBA (2018) Technical Report, the overall health status of the Qinira Estuary was Categorised as **Class B/C**, where:

- **Class B** indicates a **largely natural system** with few modifications and a small change in natural habitats and biota but the ecosystem functions and processes are **essentially unchanged**; while
- **Class C** indicates a **moderately modified system** with a loss and change of natural habitat and biota but the basic ecosystem functions and processes are still **predominantly unchanged**.

The broader Biodiversity Importance was categorised as **“Important”**.

The suggested restoration measures needed to improve estuary conditions and productivity included the following:

- Manage/reduce stormwater and drainage from flood plain;
- Improve river water quality;
- Improve mouth management; and
- Remove/reduce fishing pressure/ bait collection.

According to the NBA (2018) Estuarine Ecosystem Threat Status and Protection Level, there are two high level indicators for assessing the state of South Africa’s biodiversity:

- **Ecosystem threat status** indicates the degree to which ecosystems are still intact or alternatively losing vital aspects of their structure, function and composition.
- **Ecosystem protection level** indicates whether ecosystems are adequately protected or under-protected.

Based on the findings of the NBA (2018), the Ecosystem Threat Status of the Qinira Estuary is classified as **Vulnerable** while the Ecosystem Protection Level is classified as **Moderate** (Table 2.1 below).

Table 2.1: Ecosystem Threat Status and Protection Level for the Qinira Estuary.

Est ID	NAME	Ecosystem type	NBA 2019 Ecosystem Threat Status	NBA 2019 Ecosystem Protection Levels
11 6	Qinira / Quinirha / Quinera	Warm Temperate - Large Temporarily Closed	Vulnerable	Moderate

2.3.6 Eastern Cape Biodiversity Conservation Plan (ECBCP) – 2019

The ECBCP (2019) provides a map of important biodiversity areas, outside of the Protected Areas Network (PEN), which can be used to inform land use and resource-use planning and decision making.

The aim of the ECBCP was to map biodiversity priority areas through a systematic conservation planning process. The main outputs of the ECBCP include Protected Areas (PA), Critical Biodiversity Areas (CBA), Ecological Support Areas (ESA), Other Natural Areas (ONA) and No Natural Habitat Remaining (NNR) for both terrestrial and aquatic ecosystems.

The ECBCP (2019) has the following implications for the Qinira Estuary EMP:

- The EFZ of the Qinira Estuary falls within a Protected Area, the Qinira Nature Reserve (see Figure 2.10 below).
- The EFZ of the Qinira Estuary falls within an Aquatic CBA 1 (see Figure 2.11 below).
- A large area within the EZI to the east of the Qinira Estuary that is designated as CBA 2 mostly due to the following ECBCP criteria:
 - Four protected bird species;
 - One protected plant species; and
 - Identified as a climate change refuge.

Table 2.2 provides the Desired State and Land Management Objectives per ECBCP (2019) for the various CBA Map categories.

Table 2.2: ECBCP Desired State and Land Management Objectives.

CBA Map Category	Desired State	Land management objective
Protected Areas	Natural	<p>Maintain in natural or near-natural state:</p> <p>Protected Areas must be kept in a natural state, with a management plan focussed on maintaining or improving the state of biodiversity.</p>
Critical Biodiversity Area 1	Natural	<p>Maintain in natural or near-natural state that secures the retention of biodiversity pattern and ecological processes:</p> <p>For areas classified as CBA1, the following objectives must apply:</p> <ul style="list-style-type: none"> • Ecosystem and species must remain intact and undisturbed. • Since these areas demonstrate high irreplaceability, if disturbed, biodiversity targets will not be met. • Important: these biodiversity features are at, or beyond, their limits of acceptable change. <p>If land use activities are unavoidable in these areas and depending on expert opinion of the condition of the site, a Biodiversity Offset must be designed and implemented.</p>
Critical Biodiversity Area 2	Natural	<p>Maintain in natural or near-natural state that secures the retention of biodiversity pattern and ecological processes:</p> <p>For areas classified as CBA2, the following objectives apply:</p> <ul style="list-style-type: none"> • Ecosystem and species must remain intact and undisturbed. • There is some flexibility in the landscape to achieve biodiversity targets in these areas. It must be noted that the loss of a CBA2 area will require re-assessment and may elevate these to a CBA 1 category. • These biodiversity features are at risk of reaching their limits of acceptable change. <p>If land use activities are unavoidable in these areas, and depending on the condition of the site, set-aside areas must be designed in the layout and implemented. If site specific data confirms that biodiversity is significant, unique or that a CR or EN species is present, Biodiversity Offsets must be implemented.</p>
Ecological Support Area 1	Functional	<p>Maintain ecological function within the localised and broader landscape</p> <p>For areas classified as ESA1, the following objectives apply:</p> <ul style="list-style-type: none"> • These areas are not required to meet biodiversity targets, but they still perform essential roles in terms of connectivity, ecosystem service delivery and climate change resilience • These systems may be varying condition and maintaining function is the main objective, therefore: <ul style="list-style-type: none"> ○ Ecosystems still in natural, near natural state should be maintained. ○ Ecosystems that are moderately disturbed/degraded should be restored.
Ecological Support Area 2	Functional	<p>Maintain as much ecological functionality as possible</p> <p>For areas classified as ESA2, the following objectives apply:</p>

CBA Map Category	Desired State	Land management objective
		<ul style="list-style-type: none"> • These areas have already been subjected to some form of modification (e.g. cultivation) • These areas are not required to meet biodiversity targets, but they may still perform <i>some</i> function with respect to connectivity, ecosystem service delivery and climate change resilience • Objective is to maintain remaining function, therefore: <ul style="list-style-type: none"> ○ Areas should be maintained in current state. ○ Where possible/practical, restore to natural state.
Other Natural Areas and No Natural Habitat Remaining	Production	Manage land to optimise sustainable utilisation of natural areas.

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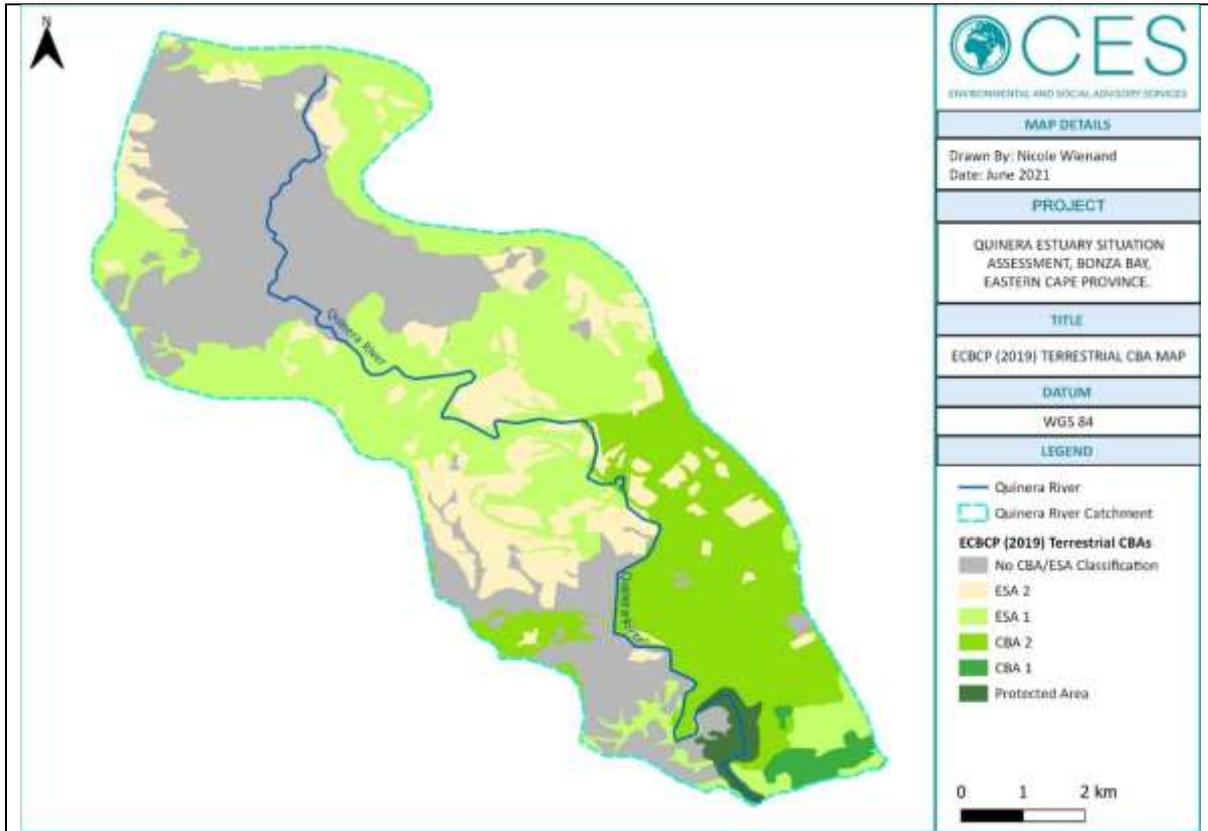


Figure 2.10: ECBCP (2019) Terrestrial CBA Map of the Qinira River Catchment area.

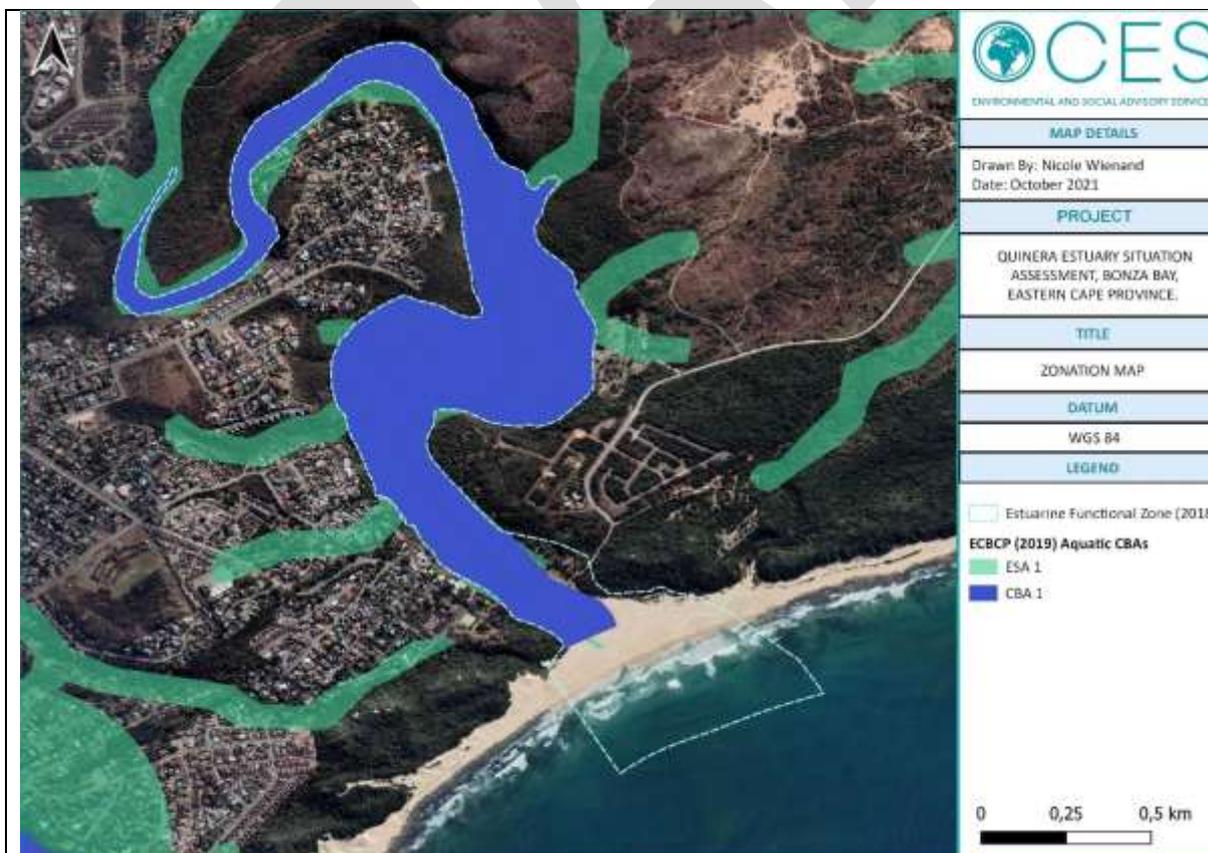


Figure 2.11: ECBCP (2019) Aquatic CBA Map of the Qinira River Catchment area.

The establishment of the Qinira Nature Reserve was gazetted in 1988 (see Figures 2.12 and 2.13 below) and appears in the National Protected Areas Database and, therefore, appears to be formally protected in terms of the Protected Areas Act.

1358	The Province of the Cape of Good Hope Official Gazette	4560	18 November 1988
PROVINSIALE KENNISGEWINGS		PROVINCIAL NOTICES	
<p>Die volgende Provinsiale Kennisgewings word vir algemene inligting gepubliseer.</p> <p>B. A. VAN DER VYVER, PROVINSIALE SEKRETARIS</p> <p>Provinsiale Gebou, Waalstraat, Kaapstad.</p>		<p>The following Provincial Notices are published for general information.</p> <p>B. A. VAN DER VYVER, PROVINCIAL SECRETARY</p> <p>Provincial Building, Wale Street, Cape Town.</p>	
P.K. 984/1988	18 November 1988	P.N. 984/1988	18 November 1988
BEACONBAAI MUNISIPALITEIT: STIGTING VAN PLAASLIKE NATUURRESERVATE		BEACON BAY MUNICIPALITY: ESTABLISHMENT OF LOCAL NATURE RESERVES	
<p>Kennis geskied hiermee ingevolge artikel 7(5) van die Ordonnansie op Natuur- en Omgewingsbewing, 1974 (Ordonnansie 19 van 1974), dat die Administrateur goedkeuring verleen het vir die stigting van twee plaaslike natuurreservate deur die Munisipaliteit Beaconbaai in die reggebied van genoemde Munisipaliteit op grond wat by sodanige Munisipaliteit berus, wat bekend sal staan as die "Quenera-Natuurreservaat" en die "Nahoon-Natuurreservaat" en waarvan die grense is soos aangedui op kaarte gelasseer in die kantoor van die Hoof Direkteur: Natuur- en Omgewingsbewing, Dorpstraat, Kaapstad, en die kantoor van die Munisipaliteit van Beaconbaai.</p>		<p>Notice is hereby given in terms of section 7(5) of the Nature and Environmental Conservation Ordinance, 1974 (Ordinance 19 of 1974), that the Administrator has granted approval for the establishment of two local nature reserves by the Beacon Bay Municipality in the area of jurisdiction of the said Municipality on land vested in such Municipality, which will be known as the "Quenera Nature Reserve" and the "Nahoon Nature Reserve" and the boundaries whereof are as indicated on diagrams filed in the office of the Chief Director: Nature and Environmental Conservation, 1 Dorp Street, Utilitas Building, Cape Town, and the office of the Municipality of Beacon Bay.</p>	

Figure 2.12: Gazetting of Qinira Nature Reserve in 1988.

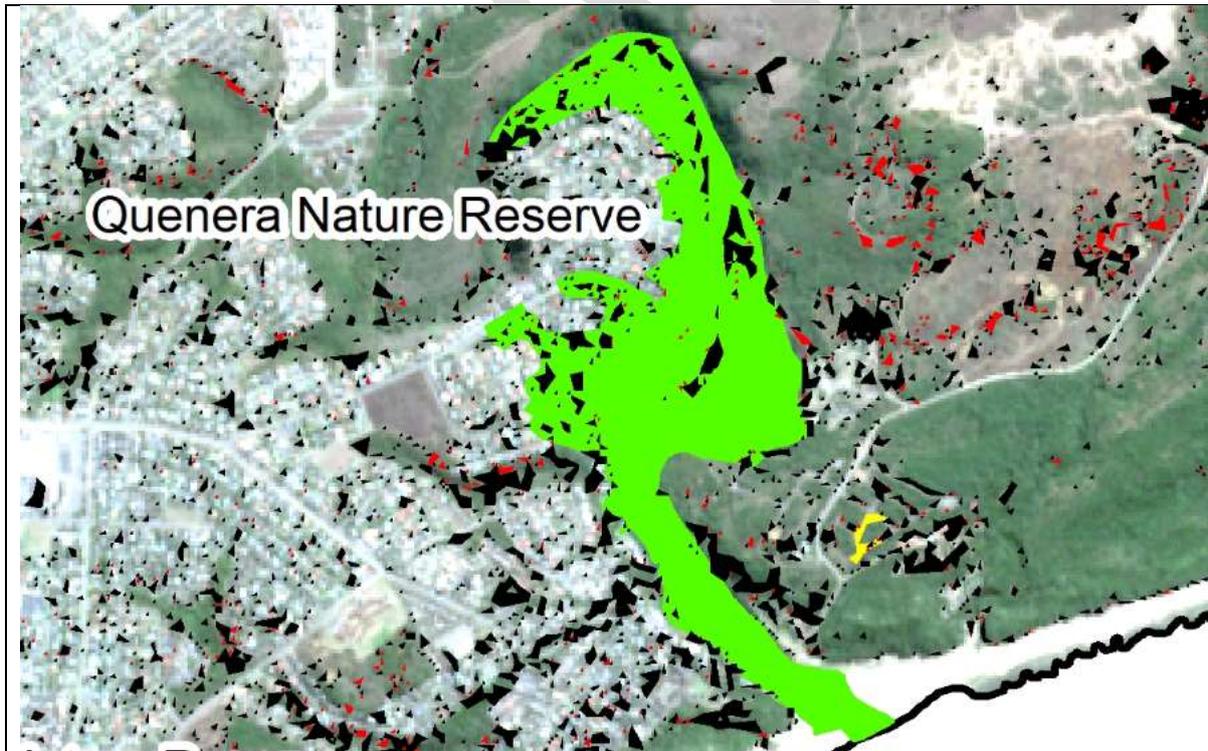


Figure 2.13: The extent of the formally proclaimed Qinira Nature Reserve.

The NEM: Protected Areas Act (2003) Regulations for the Proper Administration of Nature Reserves (2012) is applicable to the management of this protected area.

Terrestrial Vegetation

The CSIR (1993) report on the Qinira Estuary (as part of a synopsis on the Nahoon, Qinira and Gqunube estuaries), provided a detailed vegetation assessment that has not changed much since then (see Figure 2.14). The dominant vegetation type is described as Xeric Transitional Thicket comprising the following main indicator species: *Euphorbia triangularis*, *E. tetragona*, *Cussonia spicata* (cabbage tree), *Diospyros scabrida* (monkey plum), *Scutia myrtina* (cat-thorn) and *Olea europaea* (wild olive) and *Canthium spinosum*.

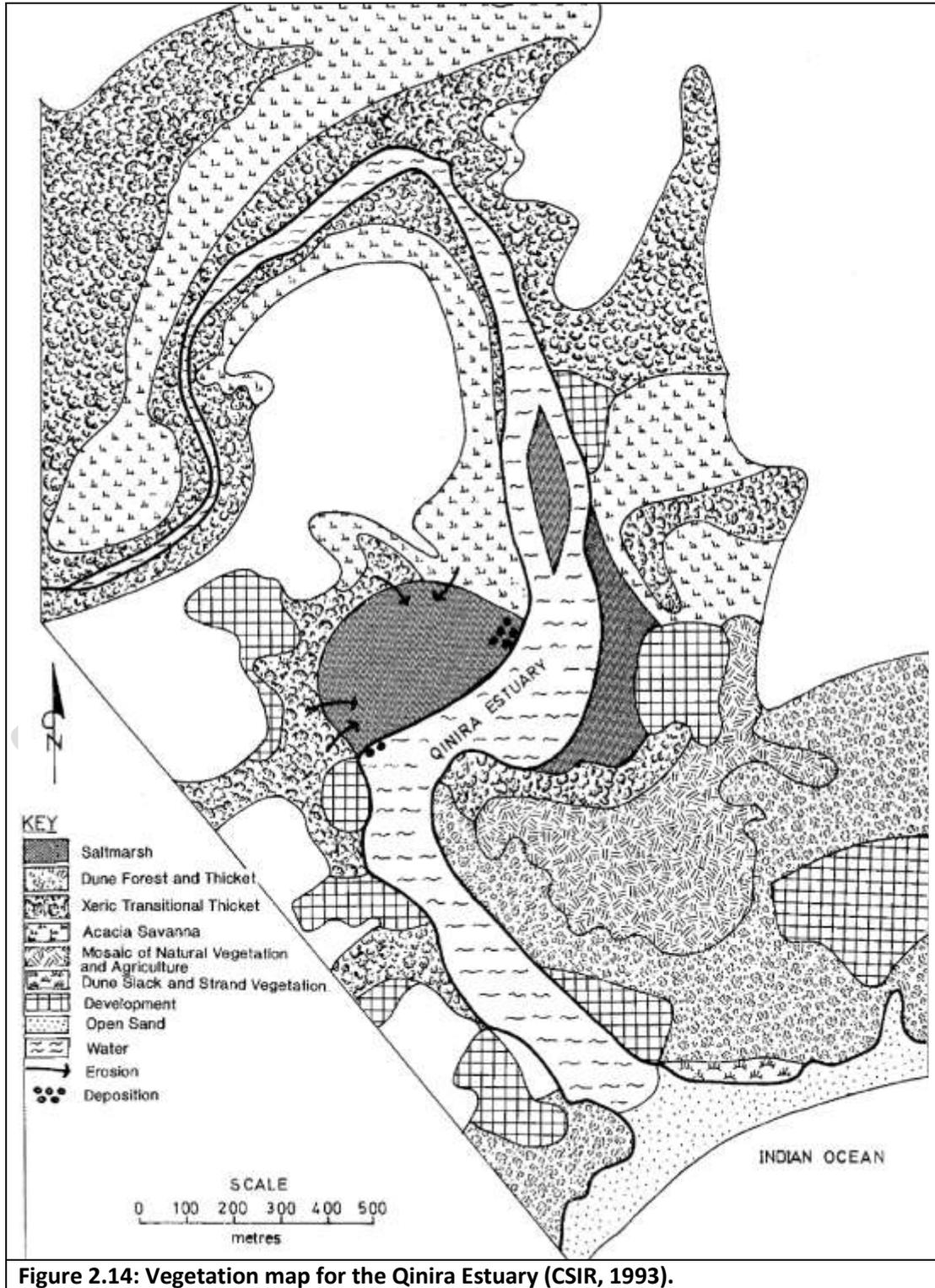


Figure 2.14: Vegetation map for the Qinira Estuary (CSIR, 1993).

2.4 ABIOTIC FUNCTION

This section of the SAR provides an overview of the abiotic or physical habitat features of the Qinira Estuary including:

- Hydrology;
- Hydrodynamics and mouth condition;
- Water chemistry (salinity, nutrients, turbidity, toxins); and
- Sediment processes.

2.4.1 Hydrodynamic and Mouth State

The hydrodynamic and mouth state of an estuary is influenced by a range of factors, the most important of which is flow dynamics. A reduction in baseflows generally leads to an increase in mouth closure while an increase in baseflows can lead to more open conditions. According to a number of sources, the Qinira Estuary is classified as a Temporary Closed System (Whitfield and Baliwe, 2013; Van Niekerk *et al.*, 2015; Van Niekerk *et al.*, 2018). The mouth of the estuary is closed by a sand bar which is breached during increased freshwater inflows or storm surges.

According to the WRC (2018), the Hydrodynamic health (mouth state) of the Qinira Estuary is classified as **Class A/B**.

It is important to note that construction of bridges, culverts, and causeways can significantly reduce flows within the Qinira Estuary which could have significant negative impacts on the mouth state and the natural functioning of a system.

The CSIR (1993) synthesis report on the Qinira Estuary (as part of a synopsis on the Nahoon, Qinira and Gqunube estuaries), reports a gradual accumulation of sediment during periods of low flows resulting in the closure of the mouth. These sediments are removed periodically during flooding events.

Tables 2.2 and 2.3 below provide a summary of the status of the Qinira Estuary mouth based on Google Earth images going back to 2014.

Table 2.2: Summary of the status of the Qinira Estuary mouth since 2014.

YEAR	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2004												TIDAL
2013												SEMI
2014			SEMI	CLOSED			CLOSED		CLOSED			
2015				SEMI	SEMI	OPEN		OPEN			OPEN	OPEN
2016		SEMI		CLOSED	CLOSED			SEMI		SEMI		
2017	CLOSED	CLOSED		CLOSED	CLOSED			CLOSED		OPEN		
2018		OPEN		OPEN	SEMI	CLOSED				BREACH		CLOSED
2019		CLOSED			SEMI	SEMI	SEMI	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
2020	CLOSED	SEMI	SEMI	OPEN	OPEN		SEMI	SEMI	CLOSED	CLOSED	CLOSED	BREACH
2021	OPEN		CLOSED	OPEN				CLOSED	SEMI		OPEN	

Table 2.3: Summary of the status of the Qinira Estuary mouth since 2014.

MOUTH STATUS	EVENTS	%
CLOSED	21	42%
SEMI-OPEN	16	32%
OPEN	12	24%
TIDAL	1	2%
TOTAL	50	100%

Breaching of the estuary mouth

There have been two recorded breaching events of the estuary mouth in the past 10 years:

- October 2018; and
- November 2020.

An illegal breaching also took place in November 2021.

The CSIR Report (1993) also notes that the Estuary had been breached in 1992 to avoid flooding of properties and to remove pollution from the Estuary.

The DEDEAT has indicated that it will not permit any further breaching events without an approved Mouth Manipulation Management Plan (MMMP).

2.5 BIOTIC FUNCTION

This section of the SAR provides an overview of the biotic or biological habitat features of the Qinira Estuary including:

- Flora – terrestrial and aquatic; and
- Fauna - Invertebrates, reptiles, amphibians, fish, birds and mammals.

2.6 CLIMATE CHANGE

The NEMP (2021) specifically requires that climate change is considered in the development of an EMP. The following provides a summary of the information included in the SAR.

The Intergovernmental Panel on Climate Change’s (IPCC) Sixth Assessment Report (AR6) on climate change released the “The Physical Science Basis” report in 2021. Some key conclusions relevant to the Qinira EMP include that:

- Global surface temperature will continue to increase until at least mid-century under all emissions scenarios considered.
- Global warming of 1.5°C and 2°C will be exceeded during the 21st century unless deep reductions in CO₂ and other greenhouse gas emissions occur in the coming decades.
- Continued global warming is projected to further intensify the global water cycle, including its variability, global monsoon precipitation and the severity of wet and dry events.
- Many changes due to past and future greenhouse gas emissions are irreversible for centuries to millennia, especially changes in the ocean, ice sheets and global sea level.

Particularly with respect to sea-level rise, it is predicted that by 2300, sea-levels can rise as much as seven (7) MSL metres and even as high as 15 metres MSL if greenhouse gas emissions are not curtailed.

According to the South Africa’s Third National Communication (2018), a warmer and drier future is predicted for the Eastern Cape but the province will experience cycles of dry years and wet years.

Temperatures will rise consistently by 1.5 °C higher than recent averages between 2040 and 2060. The impact of these warming temperatures will be increased frequency and length of hot spells in summer, as well as decreased frequency and duration of cold spells in winter.

Increased ocean temperatures in the warm Agulhas current will produce intense local convective storm systems, resulting in heavy rain and flooding along the coast and coastal mountains. Associated storm surge superimposed on rising sea-levels begins to impact coastal infrastructure, much of which is associated with tourism.

In summary, the impacts of climate change on estuaries include:

- Changes in precipitation and associated runoff with the following consequences for estuaries:
 - Modifications in the extent of saline water intrusion;
 - Shifts in the frequency and duration of estuary mouth closure;
 - Decrease or increase in nutrients fluxes;
 - Changes in the magnitude and frequency of floods and related sediment deposition/erosion cycles); and,
 - Changes in the dilution and or flushing of pollutants;
- Rising temperatures from both the land and sea impacting on estuarine processes and biotic distribution;
- Sea level rise and related impact on salinity and mouth state;
- Changes in ocean circulation patterns; and
- Increase in frequency and intensity of coastal storms also impacting on salinity and mouth state.

In the case of KwaZulu-Natal (and possibly also the Eastern Cape) the major driver of change is increased runoff into the numerous small, perched temporarily open/closed estuaries (such as the Qinira Estuary), which will result in more open mouth conditions, a decrease in retention time and a related decrease in primary productivity and nursery function.

Specifically referring to the Eastern Cape, it is suggested that estuaries will show some shifts in mouth states, nutrient supply, salinity distribution and ultimately production (e.g. fisheries), the most obvious impacts of climate change along these coastal regions will be the change in temperature (nearshore and land), associated species range expansions or contractions and changes in community structure. It is further projected that there will be an increase in the frequency and magnitude of large floods as well as the duration and intensity of droughts. An increase in the magnitude of floods can cause deeper scouring of mouth regions, thereby increasing tidal amplitude and exposure of subtidal habitats and communities.

The effect of sea level rise, and related increase in tidal prisms, will be less apparent for perched estuaries such as the Qinira.

The far-future climate change scenarios pose severe consequences for South Africa's estuaries. Their relative small size and low runoff make them extremely vulnerable to climatic and hydrological climate change stressors - stream flow reduction, temperature increases and associated evaporation. All the coastal regions will be subjected to extreme change under these projections. In addition, estuary mouth closure will become prevalent along the entire coastline with some systems not connecting to the coast on decadal scales.

The occurrence of hyper-salinity (>35) will become ubiquitous in most permanently open systems and a large number of open systems may close in the future. Some smaller estuaries may dry out in their entirety. Thus, while trajectory is clear, much research still needs to be done to establish the extent to which individual systems will respond to such drastic change – making extreme prediction without more rigorous investigations will only be interpreted as alarmist.

Adaptation

The ability to predict the response of estuaries to climate change and to plan mitigation and adaptation strategies is still hindered by a lack of good prediction tools and the lack of a fundamental understanding of many of the effects of climate variability on the physical, chemical and biological characteristics of the aquatic domain. We are limited by the availability of both data (e.g. long-term

flow data, temperature data, mouth conditions, wave height, species data) and models (e.g. flow changes, linking hydrological regimes to ecosystem processes and large-scale ocean current changes).

At the same time, this uncertainty around forecasting change should not be seen as an obstacle to understanding and developing adaptive mechanisms to reduce the effects of climate change on estuarine resources such as the Qinira Estuary. Increasing the ability or resilience of ecosystems to deal with extreme events such as droughts or floods is an important opportunity to adapt to future climate change.

The resilience of an estuary is influenced by the intactness of its catchment and estuarine functional zone. The processes underpinning goods and services, such as the assimilation and cycling of nutrients in estuaries, also needs to be protected if resilience is to be maintained. For example, developments within the estuarine functional zone will reduce the resilience of the system to extreme flooding, as little lateral movement would be possible. A way to ensure resilience of estuaries such as the Qinira, is the determination and implementation of the Estuarine Ecological Water Requirements (Reserve) and the protection and / or rehabilitation of the Estuarine Functional Zone (EFZ) since healthy estuaries equate to estuaries resilient to change (van Niekerk and Turpie 2012).

The BCMM Climate Change Strategy (2014) assessed the local risks of climate change impacts on various BCMM functions and sector plans at the municipal level.

The potential sea-level rise in BCMM up to 2100 could range from about two to 7 metres MSL depending on exposure and emission scenarios. And where the main threat to coastal areas include:

- Loss of coastal infrastructure and coastal ecosystems from increased coastal erosion and inundation from sea level rise, storm surge and flooding events with direct threats to human life.
- Threats to low lying coastal settlements from coastal inundation.
- Increased frequency and intensity of coastal storms and associated impacts.

Adaptation responses

The following sector specific adaptation responses are recommended that are relevant to the Qinira EMP.

Biodiversity

- Promote conservation of open space and biodiversity refuges along water courses and along the coastline.
- Rehabilitate river and estuary banks.

Coastal Zone Management

The coastal management programme should consider the following:

- Coastal vulnerability mapping.
- Shoreline management plans.
- More stringent set-back lines.
- Prohibiting building in flood-prone areas.

Housing and Sustainable Human Settlements

- Avoid zoning or locating any form of housing in locations that are vulnerable to climatic change impacts and severe weather events such as flooding, sea-level-rise and tidal surges.

Spatial Planning

- Establish buffer zones prone climate change risks such as flooding and sea level rise.
- Retain natural barriers (e.g. coastal dune systems)

- Demarcate zones of sensitive, vulnerable, highly dynamic and stressed ecosystems in the BCMM area – by ecosystem type (e.g. wetland, dunes etc.)

Water and Sanitation Services

- Locate infrastructure in areas less susceptible to climate change impacts

The following is recommended for BCMM:

- Enforce the coastal buffer zone as defined in the National Environmental Management: Integrated Coastal Management Act (Act 24 of 2008) immediately, and prevent any further development within 100 m of the high water mark or 10 mamsl contour (whichever is closest to the shoreline), until detailed coastal set-back lines have been developed.
- Enforce the estuary zonation development plans and estuary set-back development lines.
- Strictly monitor (and preferably prevent) future development below the 6.5 mamsl swash contour and 4.5 m estuary/river flood contour, as well as on any undeveloped portions of foredune or natural tidal estuary habitat.

2.7 ECOSYSTEM GOODS AND SERVICES

Estuaries are complex ecological systems that provide many essential goods and services that are reflected in a wide range of human uses and values and that rely on the healthy ecological functioning of an estuarine ecosystem. It is important to consider the value of estuarine goods and services since this will provide both context and motivation for the need to conserve and protect these important natural assets.

The NBA (2018) identifies the following main estuary benefits:

- **Contribution to livelihoods** through provision of **living resources** that are harvested for nutrition, energy and raw material purposes.
- **Contribution to marine fishery values** through provision of **nursery areas** for the maintenance and productivity of marine fish populations.
- **Contribution to the amelioration of climate change damages** through **sequestration of carbon** from the atmosphere.
- **Contribution to recreation, tourism and property values** as a result of ecosystem **attributes** that lend aesthetic beauty and are attractive for recreational activities.
- **Contribution to sense of wellbeing** through the knowledge of their contribution to the continued **existence** of nature and biodiversity.

2.7.1 Threats to Ecological Functioning

The nature of the threats that impact the provision of these ecological goods and services are described in Table 2.5 below.

Table 2.5: The threats to ecosystem goods and services provided by the Qinira Estuary.

ECOSYSTEM SERVICES	THREATS
Provisioning services	
Production of food	Illegal or unsustainable fishing and gill netting, and bait collection pose a threat to maintain the resource populations within the Qinira Estuary for future direct and indirect users.
Regulation and maintenance services	
Regulation of waste assimilation processes	<p>The ongoing flow of the following liquid and solid point source and non-point source waste streams poses a threat to the aquatic health of the Qinira Estuary and health of users of the Estuary and the ability to assimilate these wastes in future:</p> <ul style="list-style-type: none"> • Ongoing and frequent sewage spills and overflows due to sewerage infrastructure failure. • Illegal dumping. • Runoff from the garden waste landfill site. • Stormwater discharges from roads. • Pool backwashing.
Storing and cycling nutrients	Both the threats indicated above relating to water quality and loss of terrestrial biodiversity due to urban expansion, also pose a threat to the ability of the Qinira Estuary to store and recycle nutrients.
Gaseous composition of the atmosphere and climate regulation	Loss of biomass through loss of vegetation due to urban expansion and development, and encroachment into public open space within the EFZ and EZI poses a threat to ability of the Qinira Estuary to improve air quality and ability to contribute to climate change mitigation and adaptation.
Maintaining hydraulic cycles and shoreline protection	<p>Recently approved sand mining east of the Qinira Estuary and ongoing illegal sand mining, poses the threat of increased sediments entering the Estuary, also contributing to closure of the Estuary Mouth.</p> <p>Urban expansion and failure to formally protect open spaces and establish development buffers surrounding the Estuary poses the threat of erosion and sedimentation of the Estuary.</p>
Habitat and ecological community services	
Provision of habitat structure	<p>The following ongoing activities pose a threat to the integrity of the ecology of the Qinira Estuary and habits:</p> <ul style="list-style-type: none"> • Illegal and unsustainable fishing and bait collection. • Inappropriate land use and zoning decisions. • Poor water quality. • Habitat destruction due to urban expansion. • Invasive alien plant species (both terrestrial and aquatic, e.g. water hyacinth). • Illegal harvesting of forest species for firewood. • Continued hunting poses a threat to birds and small mammals such as ducks, Dassies, Blue Duiker, etc. • Illegal construction and vegetation clearing within the EFZ.

ECOSYSTEM SERVICES	THREATS
Resilience	Urban expansion and failure to formally protect open spaces and establish development buffers poses the threat of missing opportunities for climate change mitigation (carbon sequestration) and adaptation (provide biodiversity refuges).
Genetic resources	Urban expansion and failure to formally protect open spaces and establish development buffers poses the threat of losing important genetic resources.
Cultural services	
Cultural and spiritual heritage	Urban expansion and failure to formally protect open spaces and establish development buffers may pose a threat to cultural and heritage resources.
Aesthetic and scenic value	Urban expansion and failure to formally protect open spaces and establish development buffers may pose a threat to aesthetic and scenic resources.
Access to the coastal zone	Inadequate access control and facilities (e.g. ablutions, waste receptacles, etc.) may pose a threat to promoting safe and healthy enjoyment of the coastal environment.
Recreation and tourism	Threats to recreation include: <ul style="list-style-type: none"> • Poor water quality • Human health and safety • Littering • Destruction of forest for firewood • Lack of facilities (e.g. ablutions) • Lack of control over illegal activities (e.g. damaging forests) • Crime, particularly over the festive season and other holidays.
Cognitive benefits (e.g. education and research)	<ul style="list-style-type: none"> • Lack of capacity and interest of research institutions in conducting research on the Estuary.
Non-use benefits (e.g. intrinsic value of an estuary).	<ul style="list-style-type: none"> • Lack of future planning (e.g. control of urban expansion and protected habitats). • Ineffective monitoring, control and enforcement of illegal activities.

2.8 OPPORTUNITIES AND CONSTRAINTS FOR CONSIDERATION IN THE EMP

The opportunities and constraints that have been identified with respect to the effective implementation of the Qinira Estuary management objectives are described in Table 2.6 bellow.

Table 2.6: Opportunities and constraints.

OPPORTUNITIES	CONSTRAINTS
Conservation of living and non-living resources	
<ul style="list-style-type: none"> • Ensure the formal protection of BCMM open space within the Estuarine Functional Zone and even the wider EZI. 	<ul style="list-style-type: none"> • An Ecological Reserve for the Qinira Estuary has yet not been determined. • There is a lack of recent updated Qinira Estuary specific biotic data, with specific reference to birds, fish, invertebrates, mico-algae and macrophytes. • Current monitoring programmes do not include biological monitoring.
Social	
<ul style="list-style-type: none"> • Provide improved facilities for recreational users such as ablutions, access points, etc. • Provide safe and clean environment for social gatherings. 	<ul style="list-style-type: none"> • Ability to police crowded recreational areas. • Illegal dumping and littering during festive season in particular.
Management of water quality and quantity	
<ul style="list-style-type: none"> • Ensure improved water quality and safer conditions for users of the Estuary. • Involvement of local communities working together with BCMM to curb the increasing destruction to sanitation infrastructure. 	<ul style="list-style-type: none"> • No recent water quality data for the Qinira Estuary is available. Therefore, it is difficult to determine the actual present state of the Estuary. • The large majority of impacts affecting the Qinira Estuary are non-point sources of pollution and infrastructure, which occur within the catchment area. This has practical impacts on the implementation of the EMP, where implementation responsibilities may fall outside of the mandate of the implementing agents. • Sanitation infrastructure that is installed by the BCMM is regularly stolen, vandalised, damaged or destroyed by surrounding communities. • Sanitation infrastructure often does not cope with flows resulting in overflows of raw sewage.
Land use and infrastructure planning and development	
<ul style="list-style-type: none"> • Ensure that future spatial planning and development avoids sensitive areas within the vicinity of the Estuary. 	<ul style="list-style-type: none"> • The Qinira Estuary has in the past been affected by urban expansion and infrastructure development mostly to the west of the estuary. There will be increased future pressure for urban expansion to the east of the estuary where land has been earmarked for mixed urban infill development.
Climate change	
<ul style="list-style-type: none"> • Establish an estuary system that contributes to climate change mitigation and adaptation in BCMM. 	<ul style="list-style-type: none"> • Lack of awareness of the important role that estuaries play in adapting to and mitigating against climate change.

OPPORTUNITIES	CONSTRAINTS
Education and awareness	
<ul style="list-style-type: none"> • Increase scientific knowledge about the Estuary. • Involvement of local schools in creating awareness of the Estuary. • Increase awareness in communities about Estuary. • Include Qinira Estuary in BCMM’s Environmental Education Programme. • Cooperation with local press. 	<ul style="list-style-type: none"> • Lack of financial resources and effective mechanisms for engaging with and informing communities of the importance of estuaries in BCMM.
Integrated management	
<ul style="list-style-type: none"> • The BCMM IEMP Unit is well placed to provide integrated management of estuaries in BCMM. • Establish a Qinira Estuary Management Forum that effectively coordinates the implementation of the management objectives. 	<ul style="list-style-type: none"> • There is difficulty with regards to monitoring, capacity and enforcement within municipal structures, especially with respect to the enforcement of by-laws.
Compliance and enforcement	
<ul style="list-style-type: none"> • Review coastal by-laws to incorporate management issues relating to the Qinira Estuary. • Regulators can apply the mechanisms that already they have at their disposal (e.g. DEDEAT Environmental Management Inspectorates, DFFE Fisheries Compliance Officers, BCMM Environmental Officers). 	<ul style="list-style-type: none"> • There is difficulty with regards to monitoring, capacity and enforcement within BCMM structures, especially with respect to the enforcement of by-laws.
Mouth Management	
<ul style="list-style-type: none"> • Develop and approve an Estuary Mouth Maintenance Plan. 	<ul style="list-style-type: none"> • An estuary mouth breaching management plan has not been developed or adopted thus placing low lying residential properties at risk of inundation.

2.9 RECOMMENDATIONS TO ADDRESS MAJOR INFORMATION GAPS

The major information gaps pertaining to the SAR and recommendations to address the information gaps are provided in Table 2.7 below.

Table 2.7: Major information gaps.

Major Information Gaps	Recommendations to address gaps
There is a lack of recent water quality data specific to the Qinira Estuary.	Water quality data for the estuary and tributaries feeding into the Qinira Estuary must be obtained from BCMM Scientific Services, BCMM Environmental Health, etc.
There is a lack of biotic data specific to the Qinira Estuary.	Research institutions, BCMM Scientific Services BCMM Environmental Health and the EL Museum must assist in providing relevant information where available. Information gaps should be prioritised in the Qinira EMP as research opportunities.
The Ecological Reserve and Resource Quality Objectives for the Qinira Estuary have not been determined.	The Ecological Reserve and Resource Quality Objectives for the Qinira River Estuary must be determined by DWS. A desktop Reserve was determined in 2010.
There is no estuary mouth maintenance management plan.	An estuary mouth maintenance management plan should be developed and approved by DEDEAT.

3 GEOGRAPHICAL BOUNDARIES

The Qinira Estuary forms at the interface between the Qinira River and the Indian Ocean at Bonza Bay within the Buffalo City Metropolitan Municipality (BCMM) in the Eastern Cape Province. The estuary is classified as a Temporary Closed System (Van Niekerk *et al.*, 2019) and is characterised by wind mixing processes and the absence of a tidal prism (Whitfield, 1992).

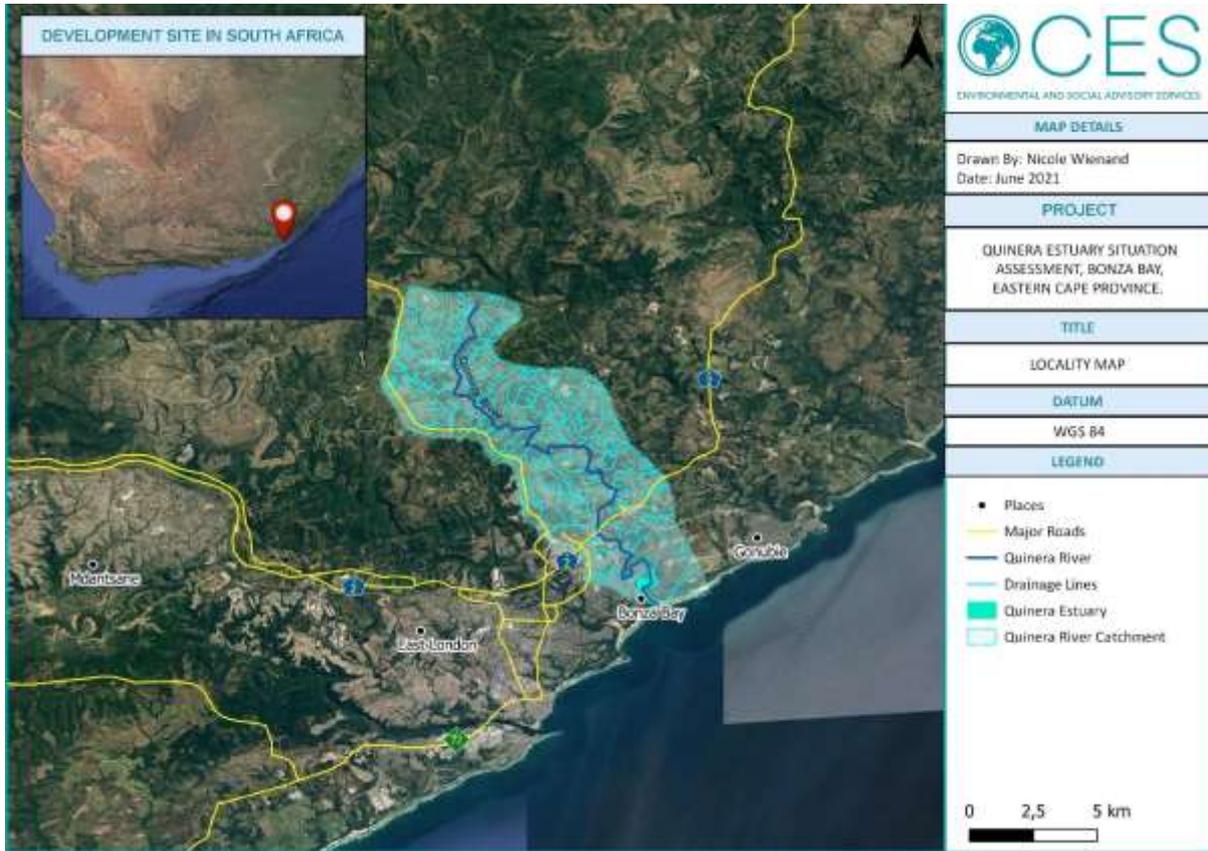


Figure 3.1: Locality map of the Qinira River within the R30 Tertiary Catchment.

The Qinira Estuary falls within Ward 28 of the BCMM, while the Qinira River passes through Ward 28, 15 and 50 of the Metro. The total catchment area for the Qinira Estuary is approximately 209 km² and constitutes the R30F Quaternary Catchment (Figure 3.1), making it one of the smaller catchments along the Eastern Coastal Belt. There are no major tributaries connecting to the Qinira River, however, there are a number of drainage lines (non-perennial rivers) which directs runoff into the Qinira River.



Figure 3.2: Wards within the Qinira River Catchment Area.

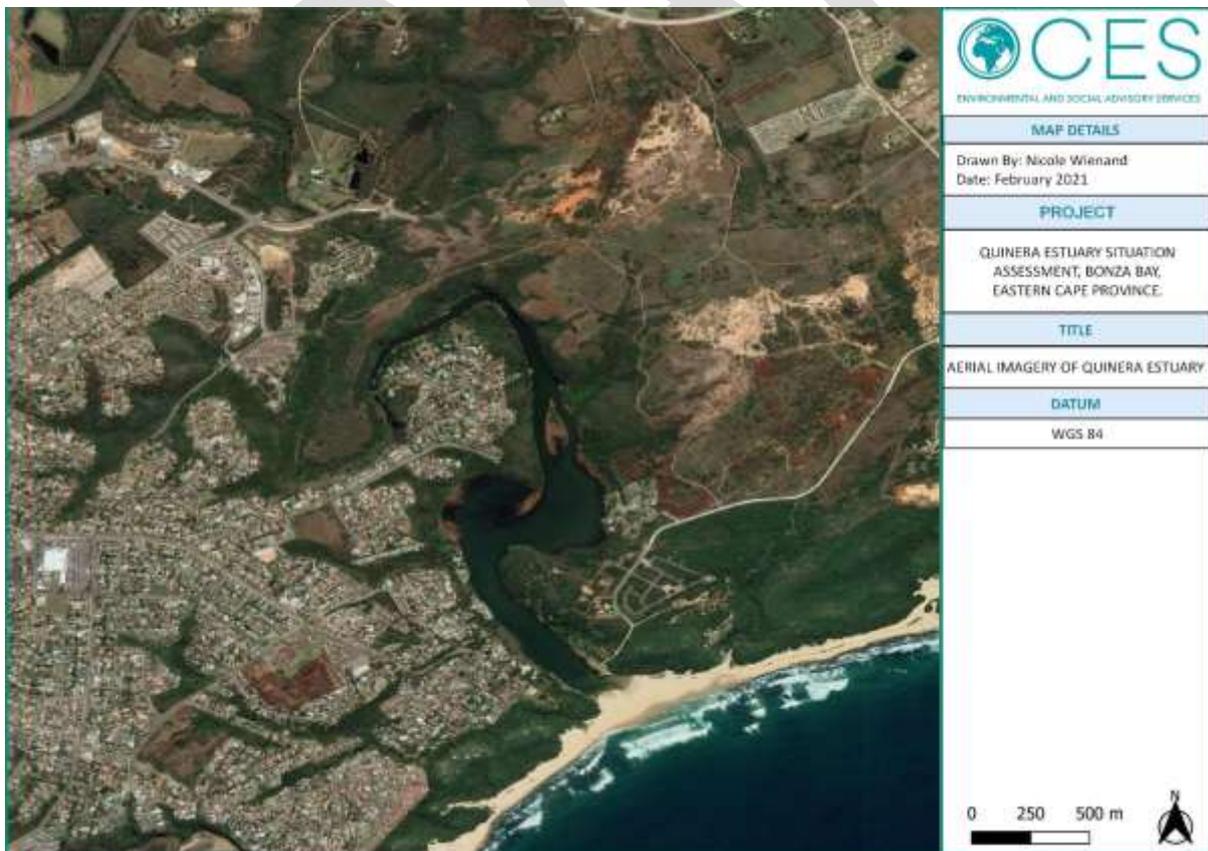


Figure 3.3: Aerial Image of the Qinira River and Estuary located near Bonza Bay.

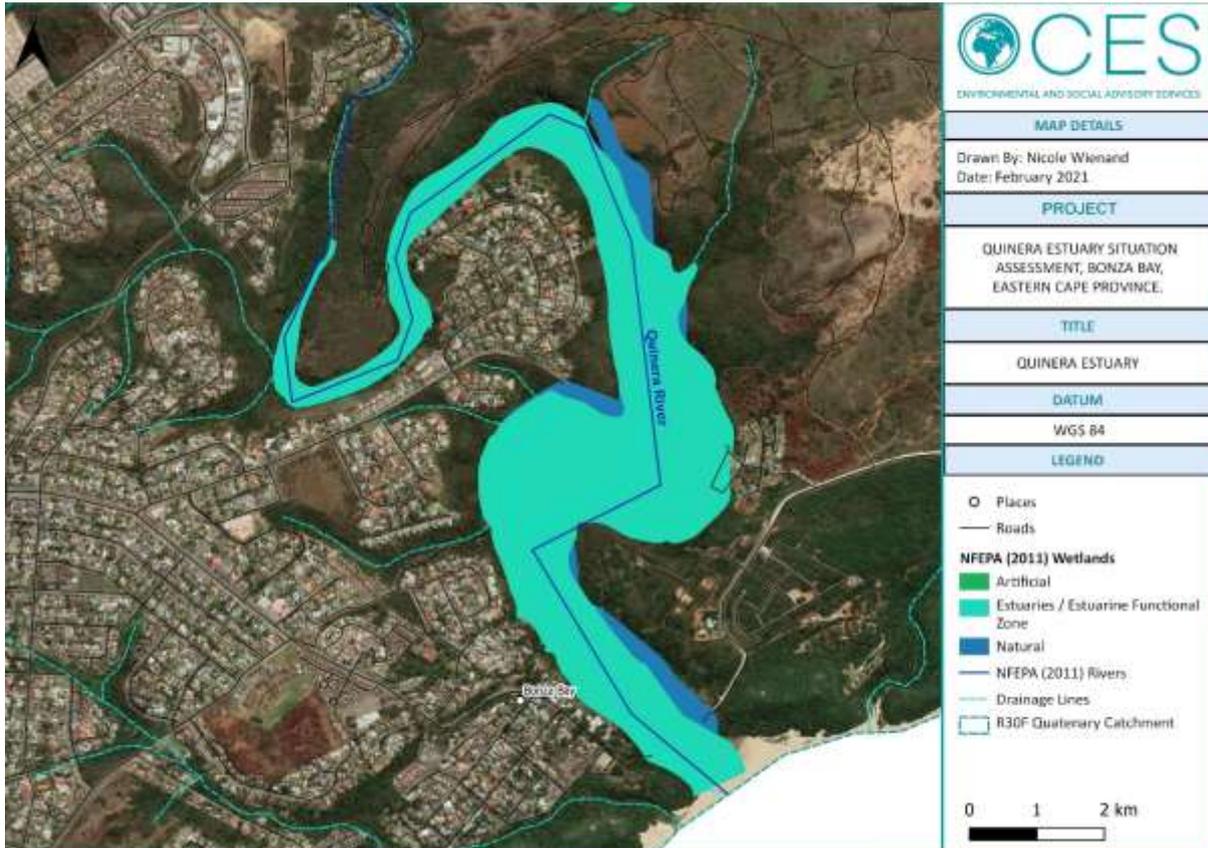


Figure 3.4: Close-up aerial Image of the Qinira River and Estuary.

4 LOCAL VISION AND OBJECTIVES

The SAR provides a good basis for setting a realistic and achievable vision and list of objectives for the Qinira Estuary based on:

- Limits of acceptable change and carrying capacity;
- Current/potential goods and services provided by the estuary;
- Current/potential threats to the estuary; and
- Opportunities and constraints that the socio-ecological system provides.

Effective governance arrangements must be proposed, within the ambit of existing legislation and mandates that are in line with the National strategic vision and objectives stipulated in the NEMP (2021).

The objectives should generally be qualitative statements of the values defined in the local vision and should consider among others:

- The conservation and utilisation of living resources (taking into account the priority conservation list of estuaries identified in the 2018 National Biodiversity Assessment and subsequent updates.) and non-living resources;
- Social issues;
- Management of water quality and quantity;
- Land use and infrastructure planning and development;
- Climate change;
- Education and awareness; and
- Compliance and enforcement.

The local vision and objectives must be aligned with the strategic vision and objectives of the NEMP. This must be demonstrated by stating the relevant strategic objectives of the Protocol that are relevant to the estuary, together with the related local objective/s that will give effect to them.

4.1 VISION

According to NEMP (2021), the vision for the Qinira Estuary should reflect the desired state of the estuary and should provide the starting point for the identification of management objectives for the Estuary. The vision for the Qinira Estuary has been developed through stakeholder input and their expectations for the overall outcome of the effective management of the Qinira Estuary. From the stakeholder input, the following vision for the Qinira Estuary has been proposed:

Vision Statement

An ecologically resilient estuary that is clean and safe for all users, who utilise the resources in a responsible manner, where recreation is encouraged and equitable access is facilitated. All users of the estuary acknowledge that they are custodians of and are accountable for the estuary and, through the development of partnerships and integrated management of the estuary, ensure its long term sustainability.

4.2 OBJECTIVES

In order to achieve the vision for the Qinira Estuary, the following objectives have been identified that describe specific outcomes that aim to achieve the vision. The objectives have been framed around the management objective themes recommended by the NEMP (2021).

Conservation of living and non-living resources

- 1) Conserve and protect the remaining terrestrial habitat within the Estuarine Functional Zone and also where possible, the Estuarine Zone of Influence of the Qinira Estuary.
- 2) Maintain the ecological functioning and improve the health of the Qinira Estuary.
- 3) Determine the ecological reserve of the Qinira Estuary.
- 4) Develop and approve a Qinira Estuary mouth maintenance management plan (MMMP).

Social

- 5) Provide reasonable and safe public access and recreation facilities and conditions within the Qinira Estuary.

Management of water quality and quantity

- 6) Update and implement water quality monitoring programmes within the Qinira Estuary and develop and implement estuary water quality mitigation measures.

Land use and infrastructure planning and development

- 7) Monitor and facilitate responsible urban and commercial expansion, and infrastructure development within the Estuarine Functional Zone and Estuarine Zone of Influence of the Qinira Estuary.

Climate change

- 8) Promote resilience and adaptation to the effects of climate change and the sequestration of carbon through biomass conservation within the Estuarine Functional Zone and Estuarine Zone of Influence of the Qinira Estuary.

Education and awareness

- 9) Promote education and awareness of the Qinira Estuary.
- 10) Facilitate research opportunities within the Qinira Estuary.

Integrated management

- 11) Develop partnerships for the integrated management of the Qinira Estuary.

Compliance and enforcement

- 12) Strengthen compliance monitoring and enforcement of activities within the Estuarine Functional Zone and Estuarine Zone of Influence of the Qinira Estuary.

5 MANAGEMENT OBJECTIVES, ACTIONS AND PRIORITIES

The following 12 management objectives, actions and priorities have been developed for the Qinira Estuary based on the opportunities and threats identified during the Situation Assessment as well as from the local vision and objectives for the estuary (previous section).

DRAFT

PROPOSED ACTION	ECOLOGICAL IMPACTS/SOCIO-ECONOMIC CONSEQUENCES	RELEVANT LEGISLATION	RESPONSIBLE AUTHORITY/IMPLEMENTING AGENTS	PERFORMANCE INDICATOR	ESTIMATED COST	EXPECTED DURATION	PRIORITY
Management Objective 1: Conserve and protect the remaining terrestrial habitat within the Estuarine Functional Zone and also where possible, the Estuarine Zone of Influence of the Qinira Estuary.							
1.1 - Secure formal protection of the remaining terrestrial environmental within the Estuarine Functional Zone (EFZ) and where possible the Estuary Zone of Influence (EZI) and consider incorporation of this area into the existing Qinira Nature Reserve.	Loss of indigenous estuarine vegetation and important conservation areas within the EFZ and EZI.	Protected Areas Act BCMM by-laws Regulations for the Proper Administration of Nature Reserves (2012)	BCMM (IEMP) DEDEAT	Formal protection status of remaining terrestrial environment within or immediately adjacent to the Estuarine Functional Zone is achieved (including BCMM open space).	BCMM funded mandate.	5 year	HIGH
Management Objective 2: Maintain the ecological functioning and improve the health of the Qinira Estuary.							
2.1 - Rehabilitate riparian vegetation where necessary.	Loss of indigenous estuarine vegetation due to displacement by alien species.	Biodiversity Act	BCMM (IEMP)	Riparian vegetation rehabilitated.	BCMM funded mandate.	On-going	LOW
2.2 - Control alien vegetation along the banks and within the estuary and within EFZ and EZI. Align with the BCMM Alien Species Management Plan.	Loss of indigenous estuarine vegetation.	Biodiversity Act BCMM Policy	BCMM (IEMP)	Removal of alien species.	BCMM funded mandate. R1 million for projects.	On-going	MEDIUM
2.3 - Protect natural vegetation within the EFZ and EZI (forest and thicket) due to urban expansion.	Loss of indigenous estuarine vegetation due to planned future development expansion and encroachment into open space, particularly east of the Estuary	Biodiversity Act Forest Act BCMM Policy	BCMM (IEMP and Development Planning) DEDEAT (EQM) DFFE (Forestry)	Number of new Environmental Authorizations approved within the EZI. Number of biodiversity offset	BCMM funded mandate.	On-going	HIGH

PROPOSED ACTION	ECOLOGICAL IMPACTS/SOCIO-ECONOMIC CONSEQUENCES	RELEVANT LEGISLATION	RESPONSIBLE AUTHORITY/IMPLEMENTING AGENTS	PERFORMANCE INDICATOR	ESTIMATED COST	EXPECTED DURATION	PRIORITY
				projects for developments located in CBA2 areas within the EZI.			
Management Objective 3: Determine the ecological reserve of the Qinira Estuary.							
3.1 – DWS to determine the Ecological Reserve and water Resource Quality Objectives (RQO) for the Qinira River and implement the resulting management recommendations.	Insufficient water resource with poor water quality entering the Qinira Estuary thus compromising the health and ecological integrity of the aquatic ecosystem.	Water Act	DWS	Ecological Reserve Assessment and Resource Quality Objectives Reports made available.	R500,000 for reserve determination	On-going	HIGH
Management Objective 4: Develop and approve a Qinira Estuary mouth maintenance management plan.							
4.1 - Develop and implement an estuary mouth maintenance management plan approved by DEDEAT.	Inappropriate breaching can lead to impacts on the hydrological and ecological functioning of the estuary.	ICM Act BCMM Policy	DEDEAT (Biodiversity) BCMM (IEMP) BCMM Open Space Management Committee	Qinira Estuary Mouth Maintenance Management Plan developed and approval by DEDEAT.	R200,000 for MMMP	2022	HIGH
Management Objective 5: Provide reasonable and safe public access and recreation facilities and conditions within the Qinira Estuary.							
5.1 - Identify inappropriate access to the Qinira Estuary used by members of the community.	Certain locations along the estuary may not be suitable for high volume public access and recreation use, such as the east bank, and can cause damage to sensitive environments.	ICM Act	BCMM (IEMP)	Identification of inappropriate access to the Qinira Estuary. BCMM Open Space Management Committee meetings held.	BCMM funded mandate.	1 year	MEDIUM

PROPOSED ACTION	ECOLOGICAL IMPACTS/SOCIO-ECONOMIC CONSEQUENCES	RELEVANT LEGISLATION	RESPONSIBLE AUTHORITY/ IMPLEMENTING AGENTS	PERFORMANCE INDICATOR	ESTIMATED COST	EXPECTED DURATION	PRIORITY
5.2 - Establish safe and secure access to the Qinira Estuary for members of the community and ensure adequate facilities are provided (e.g. access and ablutions).	Unsafe public access and poor public behaviour and crime (muggings) could pose a risk to community safety and security.	ICM Act BCMM by-laws	BCMM (IEMP, Metro Police)	Established safe and secure access to the Qinira Estuary and control poor public behaviour and reduction in crime. Provision of facilities such as ablutions, parking, braai areas, etc. Placement of educational signage.	BCMM funded mandate. R2 million for facilities and signage.	2 years	HIGH
5.3 – Implement measures to reduce littering and destruction of coastal forest trees particularly during the festive season.	Destruction of forest and littering.	Waste Act Forest Act BCMM by-laws	BCMM (IEMP & Waste) DFFE (Forestry) BCMM Open Space Management Committee	Reduced littering. More litter receptacles placed at appropriate locations. Anti-littering signage placed.	BCMM funded mandate. R500,000 for facilities and signage.		HIGH
Management Objective 6: Update and implement water quality monitoring programmes within the Estuarine Functional Zone and the Estuarine Zone of Influence of the Qinira Estuary.							
6.1 - Develop and implement a water monitoring programme with a view to meeting Resource Quality Objectives (s16 NWA) that incorporates both physical and biological monitoring of point and non-	Poor water quality of the Qinira Estuary may not meet RQO's and can pose a risk to water users and impact on the ecological functioning	Water Act ICM Act BCMM by-laws	BCMM (IEMP, Environmental Health & Scientific Services) DWS DFFE (O&C)	Development and implementation of a coordinated water quality and biological monitoring programme that includes water RQO's.	BCMM and DWS funded mandates.	On-going	HIGH

PROPOSED ACTION	ECOLOGICAL IMPACTS/SOCIO-ECONOMIC CONSEQUENCES	RELEVANT LEGISLATION	RESPONSIBLE AUTHORITY/IMPLEMENTING AGENTS	PERFORMANCE INDICATOR	ESTIMATED COST	EXPECTED DURATION	PRIORITY
<p>point sources of pollution, including:</p> <ul style="list-style-type: none"> – BCMM waste-water reticulation system and pollution monitoring. – BCMM Water Services Development Plan (Stormwater Management). – DWS Green Drop programme. 	of the Estuary (e.g. eutrophication).						
6.2 - Review the BCMM Environmental Health Pollution Monitoring Programme relating to the potential illegal discharge of effluent into the Qinira River and Estuary via stormwater and make recommendations for improved monitoring protocols. Also, identify major sources of pollution of the Qinira River and Estuary including “high-risk” industries in the upper catchment potentially contributing significantly to pollution of stormwater inflows that affect meeting water RQO’s.	Activities that take place within the EFZ and the EZI (catchment) impact the water quality of the Estuary and compromise ability to meet water RQO’s.	Health Act ICM Act Water Act BCMM by-laws	BCMM (IEMP, Environmental Health & Scientific Services) DWS	Updated Trade Effluent Monitoring Programme and identification of major sources of pollution represented spatially including “high-risk” industry sources and engagement by BCMM officials.	BCMM funded mandate.	1 year	HIGH
6.3 - Identify potential methods where pollution and solid waste can be prevented	Solid waste enters the Qinira Estuary in the catchment, particularly	Waste Act BCMM by-laws	BCMM (IEMP, waste) DEDEAT to assist.	Opportunities to prevent pollution and waste entering the	BCMM funded mandate.	On-going	HIGH

PROPOSED ACTION	ECOLOGICAL IMPACTS/SOCIO-ECONOMIC CONSEQUENCES	RELEVANT LEGISLATION	RESPONSIBLE AUTHORITY/IMPLEMENTING AGENTS	PERFORMANCE INDICATOR	ESTIMATED COST	EXPECTED DURATION	PRIORITY
from entering the Qinira Estuary.	the upper catchment, negatively affect water quality.			Qinira Estuary identified and documented.			
6.4 - Publish an annual monitoring report that provides a summary of the results of the combined monitoring programmes and RQO's.	Lack of monitoring information does not promote the effective implementation of the EMP to be assessed. Lack of awareness of RQO's and risks associated with water quality.	Water Act	BCMM (IEMP and Scientific Services) DEDEAT (C&E)	Reduced amount of pollution entering the Qinira Estuary and improved water quality. Publishing of annual water quality monitoring results.	BCMM funded mandate.	Annual	HIGH
Management Objective 7: Monitor and facilitate responsible urban and commercial expansion, and infrastructure development within the Estuarine Functional Zone and the Estuarine Zone of Influence of the Qinira Estuary.							
7.1 - Delineate coastal management lines (in terms of ICM Act s25).	Inappropriate development, especially in the EFZ, could result in the unnecessary loss of estuarine habitats.	ICM Act SPLUMA BCMM by-laws	BCMM (IEMP and Development Planning) DEDEAT Biodiversity)	Coastal management lines delineated and included in BCMM SDF.	BCMM funded mandate. R500,000 additional	1 year	MEDIUM
7.2 - Ensure that all future developments comply with the relevant environmental legislation, regulations (e.g. EIA) and BCMM by-laws.	Inappropriate development could result in conflict with the legislation aimed at protecting the estuarine environment.	NEMA EIA Regulations (2014) ICM Act BCMM by-laws	BCMM (IEMP & Development Planning) DEDEAT (EQM)	Proof of Environmental Authorisations for new developments.	No budget implication	On-going	HIGH
7.3 - Ensure that all recommendations of the Qinira EMP are integrated into the BCMM SDF, IDP, WSDP	Degradation of the health and ecological functioning of the Qinira Estuary due to	Municipal Systems Act ICM Act BCMM by-laws	BCMM (IEMP, Development Planning and Water Services)	Inclusion of Qinira EMP into the BCMM SDF and WSDP.	No budget implication	On-going	HIGH

PROPOSED ACTION	ECOLOGICAL IMPACTS/SOCIO-ECONOMIC CONSEQUENCES	RELEVANT LEGISLATION	RESPONSIBLE AUTHORITY/ IMPLEMENTING AGENTS	PERFORMANCE INDICATOR	ESTIMATED COST	EXPECTED DURATION	PRIORITY
and all other planning documents.	failure to implement EMP recommendations.						
7.4 - All commercial/ industrial stakeholders that are located within the EZI must develop and implement Environmental Management Programmes (EMPr's), which must be audited on an annual basis.	Unmonitored activities that directly impact the estuary could result in the unnecessary loss of habitat and degradation of the health of the estuary.	Municipal Systems Act SPLUMA Waste Act	BCMM (IEMP, Environmental Health & Scientific Services)	Development of Environmental Management Programmes (EMPr's) by high risk industries within the EZI.	BCMM funded mandate.	On-going	MEDIUM
Management Objective 8: Promote resilience and adaptation to the effects of climate change and carbon sequestration through biomass conservation.							
8.1 - Consider the effects of sea level rise associated with climate change by adopting the exclusion and precautionary climate change coastal management lines.	Inappropriate development in high risk areas with regards to climate change induced sea-level rise could result in the loss and destruction of homes and infrastructure	ICM Act BCMM Policy	BCMM (IEMP & Development Planning) DEDEAT (Biodiversity & Air Quality)	Climate change set back lines delineated in BCMM SDF.	BCMM funded mandate.	On-going	MEDIUM
8.2 – Promote the Qinira Estuary as a refuge for biodiversity conservation and biomass accumulation.	Lack of refuges may lead to biodiversity extinctions.	ICM Act Biodiversity Act Protected Areas Act BCMM by-laws Regulations for the Proper Administration of Nature Reserves (2012)	BCMM (IEMP & Development Planning) DEDEAT (Biodiversity & Air Quality)	Proclamation of key biodiversity areas within the EFZ and EZI (e.g. open space adjacent to the EFZ).	BCMM funded mandate. R2 million additional for proclamation applications and surveys.	On-going	HIGH
Management Objective 9: Promote education and awareness of the Qinira Estuary.							

PROPOSED ACTION	ECOLOGICAL IMPACTS/SOCIO-ECONOMIC CONSEQUENCES	RELEVANT LEGISLATION	RESPONSIBLE AUTHORITY/ IMPLEMENTING AGENTS	PERFORMANCE INDICATOR	ESTIMATED COST	EXPECTED DURATION	PRIORITY
<p>9.1 – Align Qinira Estuary environmental awareness with the BCMM environmental programme (BCMM IEMP Unit) focussing on the Qinira Estuary, including:</p> <ul style="list-style-type: none"> – Local businesses, especially concerning impacts of pollution and waste on the estuary. – Local communities and schools regarding the impact of day-to-day activities on the estuary, including outings up the estuary. – BCMM officials, councillors and ward committees especially concerning impacts of municipal activities on the estuary. – Ensure BCMM programme includes estuary management. 	Lack of understanding of the importance of estuaries results in a low level of civil custodianship of the Estuary.	ICM Act BCMM Policy	BCMM (IEMP) DEDEAT (Biodiversity) EL Museum	Inclusion of estuary awareness into BCMM’s Environmental Education and Awareness Programme, educational materials developed, workshops completed and increased number of school visits to the Qinira Estuary.	BCMM funded mandate. R1 million for additional education programmes and awareness materials.	On-going	HIGH
9.2 - Establish appropriate educational signage at the public access points leading to the estuary.	Lack of awareness of the importance of estuaries will result in a low level of civil custodianship of the Estuary.	ICM Act	BCMM (IEMP) DEDEAT (Biodiversity) EL Museum DFFE: Working for the Coasts	Educational signage at the public access points to the Qinira Estuary.	BCMM funded mandate.	1 year	HIGH

PROPOSED ACTION	ECOLOGICAL IMPACTS/SOCIO-ECONOMIC CONSEQUENCES	RELEVANT LEGISLATION	RESPONSIBLE AUTHORITY/ IMPLEMENTING AGENTS	PERFORMANCE INDICATOR	ESTIMATED COST	EXPECTED DURATION	PRIORITY
9.3 - Develop closer partnerships with the EL Aquarium and the EL Museum on promoting awareness concerning the Qinira Estuary.	Lack of coordination with regard to the education of communities on the importance of estuaries will result in a low level of civil custodianship of the Estuary.	ICM Act BCMM by-laws	BCMM (IEMP, EL Aquarium and EL Museum) DEDEAT (Biodiversity)	IEMP Unit, EL Aquarium and EL Museum participate in the Qinira Estuary Management Forum.	BCMM funded mandate.	On-going	MEDIUM
Management Objective 10: Facilitate research opportunities within the Qinira Estuary.							
10.1 - Enhance and promote collaboration with research institutions regarding access to existing information and identification of research opportunities.	Lack of coordination and integration of research conducted on the Qinira Estuary information gaps reduced understanding of the ecological importance and functioning of the Estuary.	ICM Act	DEDEAT (Biodiversity) BCMM (IEMP) Research institutions	Access to existing information facilitated. Increased number of research projects being initiated in the Qinira Estuary.	No budget implications	On-going	MEDIUM
Management Objective 11: Develop partnerships for the integrated management of the Qinira Estuary.							
11.1 – Establish a Qinira Estuary Management Forum.	Lack of coordinated management and monitoring of the Qinira Estuary negatively impacts the ability to promote the health and ecological functioning of the Estuary.	ICM Act NEMA BCMM Policy	DEDEAT (Biodiversity) BCMM (IEMP, EL Aquarium and EL Museum)	Establishment of Qinira Estuary Management Forum. Regular Qinira Estuary Management Forum meetings held.	DEDEAT funded mandate BCMM funded mandate.	1 year	HIGH
11.2 - Incorporate estuarine management into the BCMM Coastal Protection Unit's mandate which is a process	Lack of coordinated management and monitoring of the health and ecological	ICM Act BCMM Policy BCMM by-laws	BCMM (IEMP) DEDEAT (Biodiversity)	BCMM Coastal Protection Unit actively implementing the Qinira EMP.	BCMM funded mandate.	On-going	HIGH

PROPOSED ACTION	ECOLOGICAL IMPACTS/SOCIO-ECONOMIC CONSEQUENCES	RELEVANT LEGISLATION	RESPONSIBLE AUTHORITY/IMPLEMENTING AGENTS	PERFORMANCE INDICATOR	ESTIMATED COST	EXPECTED DURATION	PRIORITY
being undertaken by BCMM IEMP Unit in conjunction with DEDEAT.	functioning of the Qinira Estuary will lead to ineffective implementation of the EMP.						
Management Objective 12: Strengthen compliance monitoring and enforcement of activities within the Estuarine Functional Zone and the Estuarine Zone of Influence of the Qinira Estuary.							
12.1 - Develop a strategy for the coordinated compliance monitoring and law enforcement with regards to the implementation of the Qinira EMP, including Environmental Management Inspectors (EMIs).	Lack of coordination of compliance monitoring of activities that take place around the Qinira Estuary resulting in the health of the estuary being compromised	NEMA ICM Act Waste Act Marine Living Resources Act Forestry Act Water Act BCMM by-laws	BCMM (IEMP) DEDEAT (C&E) SAPS, Community Policing Forum (CPF), DFFE (Forestry) DFFE (Fisheries) DFFE (Oceans & Coasts)	Compliance plan developed and implemented.	Various unded mandates.	On-going	HIGH
12.2 - Conduct compliance awareness program for all users of the Qinira Estuary.	Illegal activities taking place within the Qinira Estuary will continue, compromising the health and ecological functioning of the Estuary.	NEMA ICM Act Waste Act Marine Living Resources Act Forestry Act Water Act BCMM by-laws	BCMM (IEMP) DEDEAT (C&E)	Compliance awareness programmes conducted with Estuary Management Forum, CPF and BCMM Ward Councillors.	BCMM funded mandate. R500,000 additional for awareness programmes.	On-going	HIGH
12.3 – Update BCMM by-laws relevant to estuarine management in BCMM to be in line with ICM Act.	Lack of clear by-laws will result in inappropriate activities taking place within the Qinira Estuary will continue, compromising the health and	ICM Act BCMM by-laws	BCMM (IEMP) DEDEAT (Biodiversity)	Updated BCMM by-laws.	BCMM funded mandate. R500,000 additional for updating by-laws	On-going	HIGH

PROPOSED ACTION	ECOLOGICAL IMPACTS/SOCIO-ECONOMIC CONSEQUENCES	RELEVANT LEGISLATION	RESPONSIBLE AUTHORITY/IMPLEMENTING AGENTS	PERFORMANCE INDICATOR	ESTIMATED COST	EXPECTED DURATION	PRIORITY
	ecological functioning of the Estuary.						

DRAFT

6 PROPOSED ZONATION OF ACTIVITIES

The development of zonation plans, particularly within aquatic environments, is becoming an important component of any integrated environmental management (IEM) plan. Spatial planning tools aim to assist in finding cohesion between the demand for growth and development of infrastructure and the need for biodiversity conservation. With regards to estuarine management, the process of zonation is defined as “a process of analysing and allocating the spatial and temporal distribution of human activities and conservation areas in an estuary to achieve the vision and objectives”. Zonation and spatial planning typically allows for:

- Partitioning of activities within an estuary and its catchments thus permitting their existence without one activity precluding or conflicting with another.
- Identifying sensitive and small habitat fragments for protection.
- Focussing management activities in specific areas.
- Guiding future land/water uses and development activities in the area.

The zonation plan for the Qinira Estuary was developed by incorporating the vision and management objectives in order to achieve the desired state of the Estuary. Table 7.1 below provides a summary of the zonation activities.

Table 7.1: A summary of the zonation activities within the Qinira River Estuary.

ZONATION/ USE	CONDITION OF USE	RELEVANT LEGISLATION	RESPONSIBLE AUTHORITY TO CONSULT	RESPONSIBLE AUTHORITY TO ENFORCE
Heritage	Compliance with NHRA regulations	National Heritage Resources Act	South African Heritage Resources Agency (SAHRA)	SAHRA
Protected Area	Compliance with protected areas management plan stipulations and zonation	Protected Areas Act Regulations for the Proper Administration of Nature Reserves BCMM By-laws	DEDEAT (Biodiversity)	BCMM (IEMP)
Recreation Area	Water quality guidelines for coastal environment: recreational use.	Health Act National Water Act BCMM By-laws	DWS DFFE (O&C)	BCMM (IEMP)
Urban development	Compliance with municipal Spatial Development Frameworks	Municipal Systems Act SPLUMA	BCMM (IEMP and Development Planning)	BCMM (IEMP and Development Planning)
	Environmental Authorization	NEMA EIA Regulations (2014 as amended)	DEDEAT (EQM)	DEDEAT (EQM) BCMM (IEMP and Development Planning)
	Compliance with Provincial and municipal Biodiversity Conservation Plans.	Biodiversity Act	DEDEAT (Biodiversity)	DEDEAT (EQM) BCMM (IEMP and Development Planning)

ZONATION/ USE	CONDITION OF USE	RELEVANT LEGISLATION	RESPONSIBLE AUTHORITY TO CONSULT	RESPONSIBLE AUTHORITY TO ENFORCE
	Permit required for removal of protected indigenous trees or forest.	National Forest Act	DFFE (Forestry)	DFFE (Forestry)
Public access	Compliance with the ICM Act.	ICM Act	DFFE: O&C DEDEAT (Biodiversity)	BCMM (IEMP)
Water quality monitoring and Resource Quality Objectives	Compliance with the DWS Water Quality Guidelines.	National Water Act National Health Act	DFFE (O&C) DWS BCMM (Scientific Services)	DFFE (O&C) DWS BCMM (Environmental Health)
100 metre Coastal Protection Zone and EIA Trigger	Compliance with the ICMA: Purpose of the Coastal Protection Zone.	ICMA Section 16 & 17	DFFE (O&C) DEDEAT (Biodiversity)	BCMM (IEMP and Development Planning)
	Environmental Authorization for activities located within 100 metres of high water mark.	NEMA EIA Regulations 2014 as amended	DEDEAT (EQM)	DEDEAT (EQM)

The proposed zonation of activities is represented by the following four maps.

ZONATION MAP	CONDITION OF USE
Figure 7.1	
<ul style="list-style-type: none"> Estuarine Functional Zone (EFZ) – 5 metre contour 	<ul style="list-style-type: none"> No development or disturbance. No removal of indigenous vegetation. No discharge of stormwater or effluent without a Coastal Water Discharge Permit. Fishing and collecting bait requires permit and within applicable bag limits. No hunting of any kind. Breaching of mouth according to approved Mouth Maintenance Management Plan. No motorised craft and no jet skis. No open fires except in designated picnic areas. No jetties without a coastal lease.
<ul style="list-style-type: none"> Coastal Protection Zone – 100 metre from HWM 	<ul style="list-style-type: none"> Activity requires Environmental Authorization. Application for Environmental Authorization must require a specialist Estuarine Impact Assessment.
<ul style="list-style-type: none"> Existing public access 	<ul style="list-style-type: none"> Appropriate access is safe and with required facilities (e.g. ablutions)

ZONATION MAP	CONDITION OF USE
<ul style="list-style-type: none"> Proposed water quality monitoring points. 	<ul style="list-style-type: none"> Collection of water samples for water quality analysis. Water quality standards must be met.
Figure 7.2	
<ul style="list-style-type: none"> Protected areas – existing 	<ul style="list-style-type: none"> Manage protected areas in line with Regulations for the Proper Administration of Nature Reserves and BCMM by-laws.
<ul style="list-style-type: none"> Open space – proposed protected areas 	<ul style="list-style-type: none"> Formerly proclaim open space as protected area and manage protected areas in line with Regulations for the Proper Administration of Nature Reserves and BCMM by-laws.
Figure 7.3	
<ul style="list-style-type: none"> Terrestrial Critical Biodiversity Areas (CBA 1 and 2) 	<ul style="list-style-type: none"> No development in a CBA 1. Activity in a CBA 2 requires Environmental Authorization and a specialist Biodiversity/Estuarine Impact Assessment.
Figure 7.4	
<ul style="list-style-type: none"> Aquatic Critical Biodiversity Areas (CBA 1 and 2) 	<ul style="list-style-type: none"> No development in a CBA 1. Activity in a CBA 2 requires Environmental Authorization and a specialist Biodiversity/Estuarine Impact Assessment.

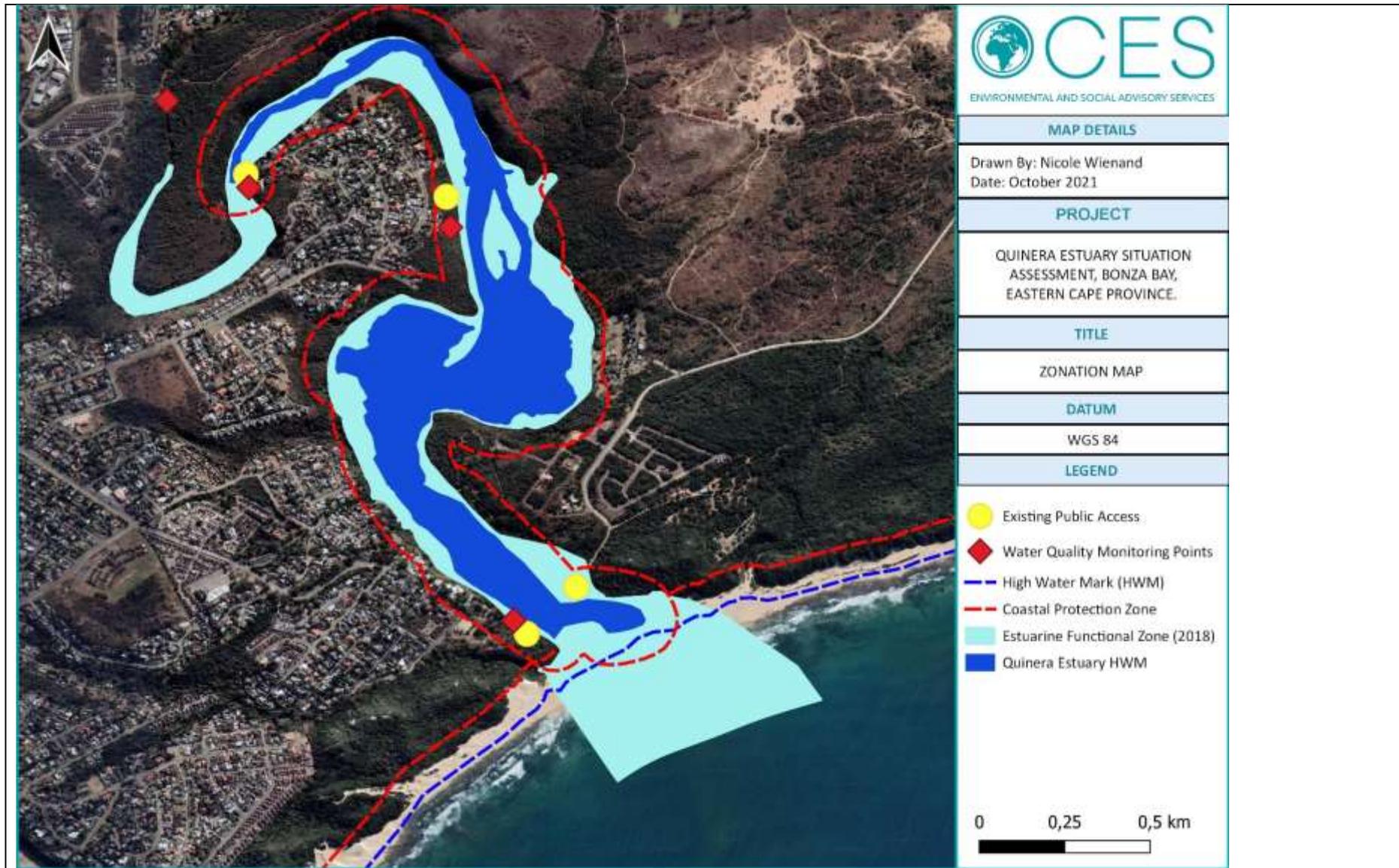


Figure XXX: Zonation map for Qinira Estuary Estuarine Functional Zone and Coastal Protection Zone.

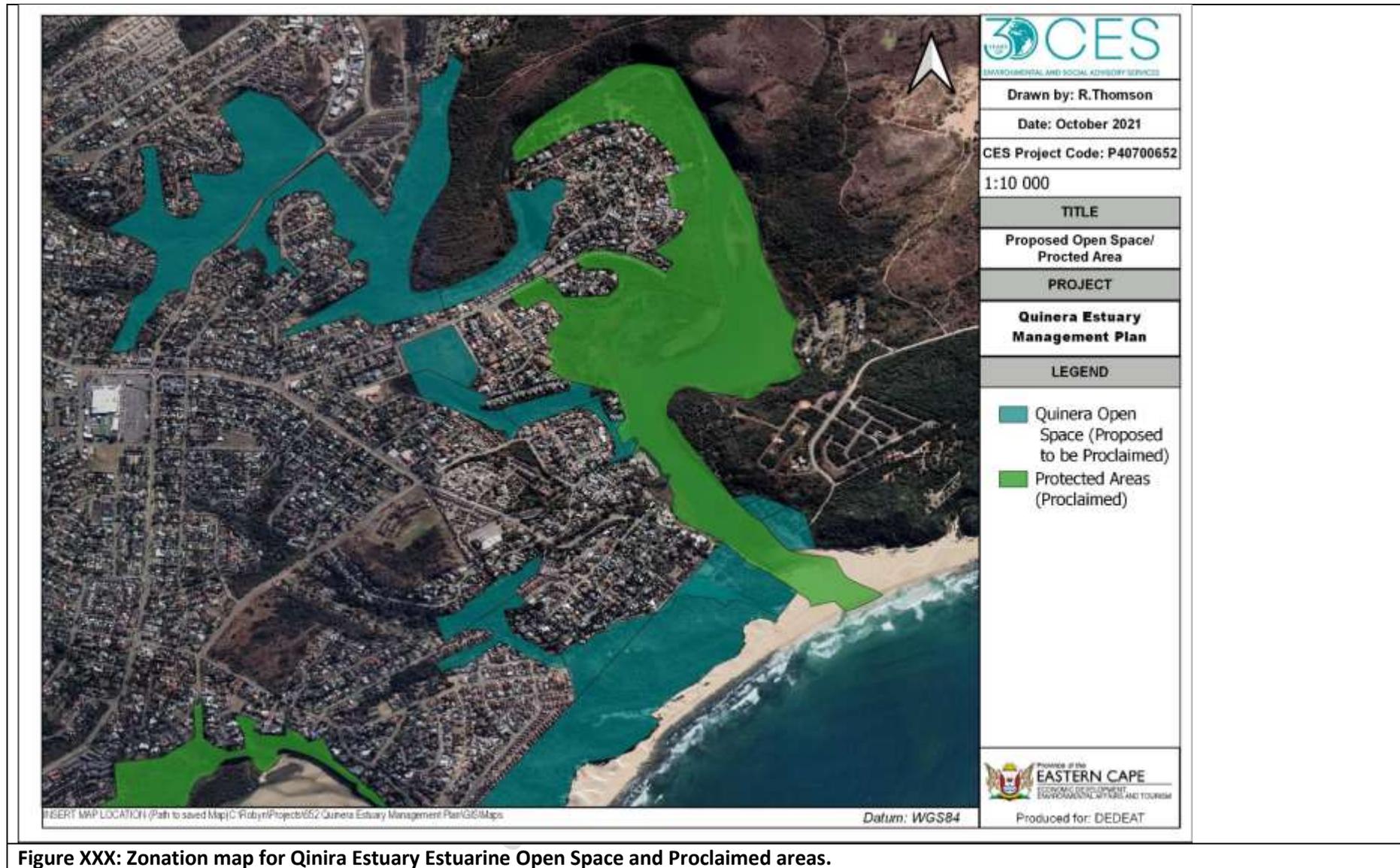


Figure XXX: Zonation map for Qinira Estuarine Open Space and Proclaimed areas.

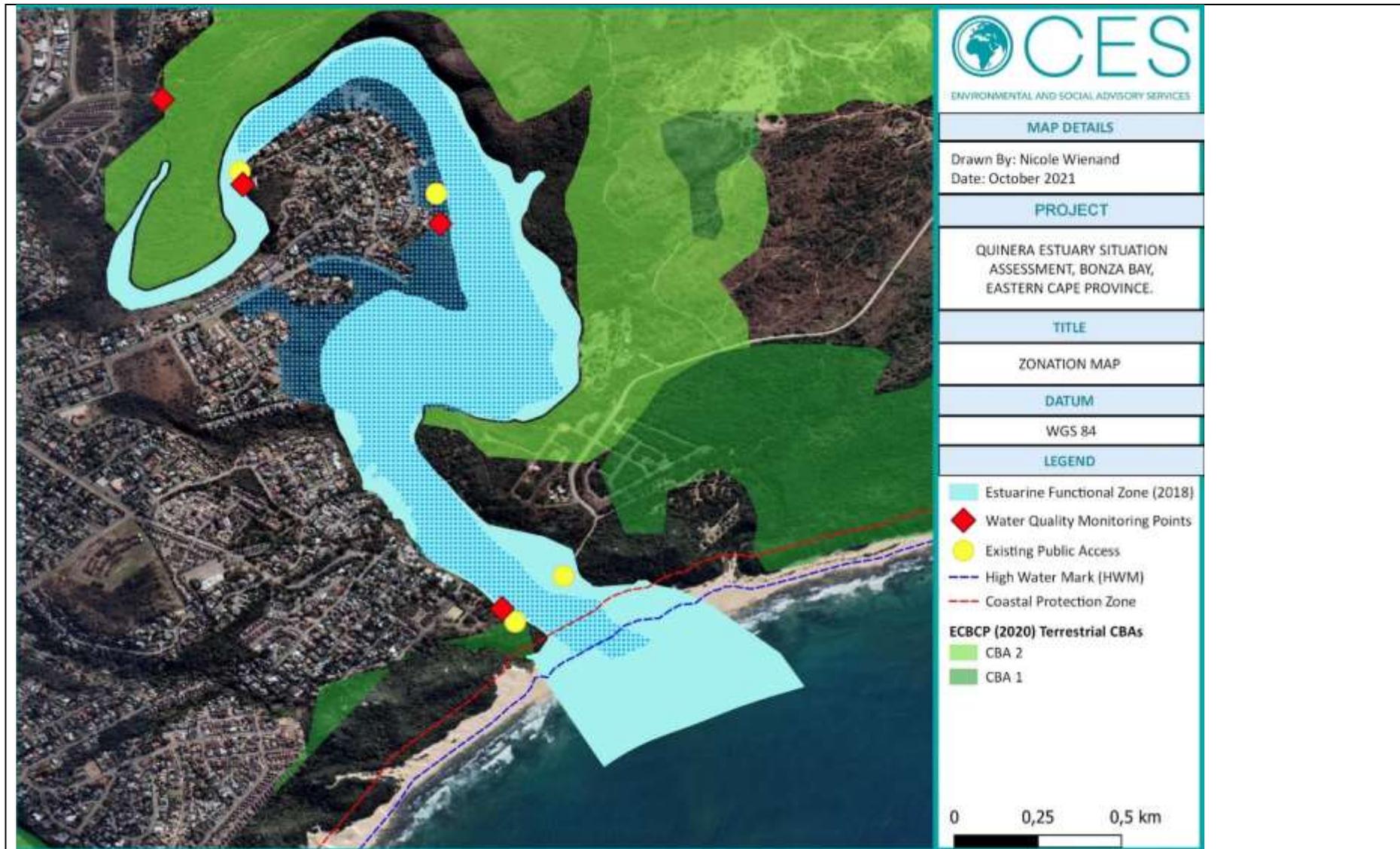


Figure XXX: Zonation map for Qinira Estuary terrestrial Critical Biodiversity Areas.

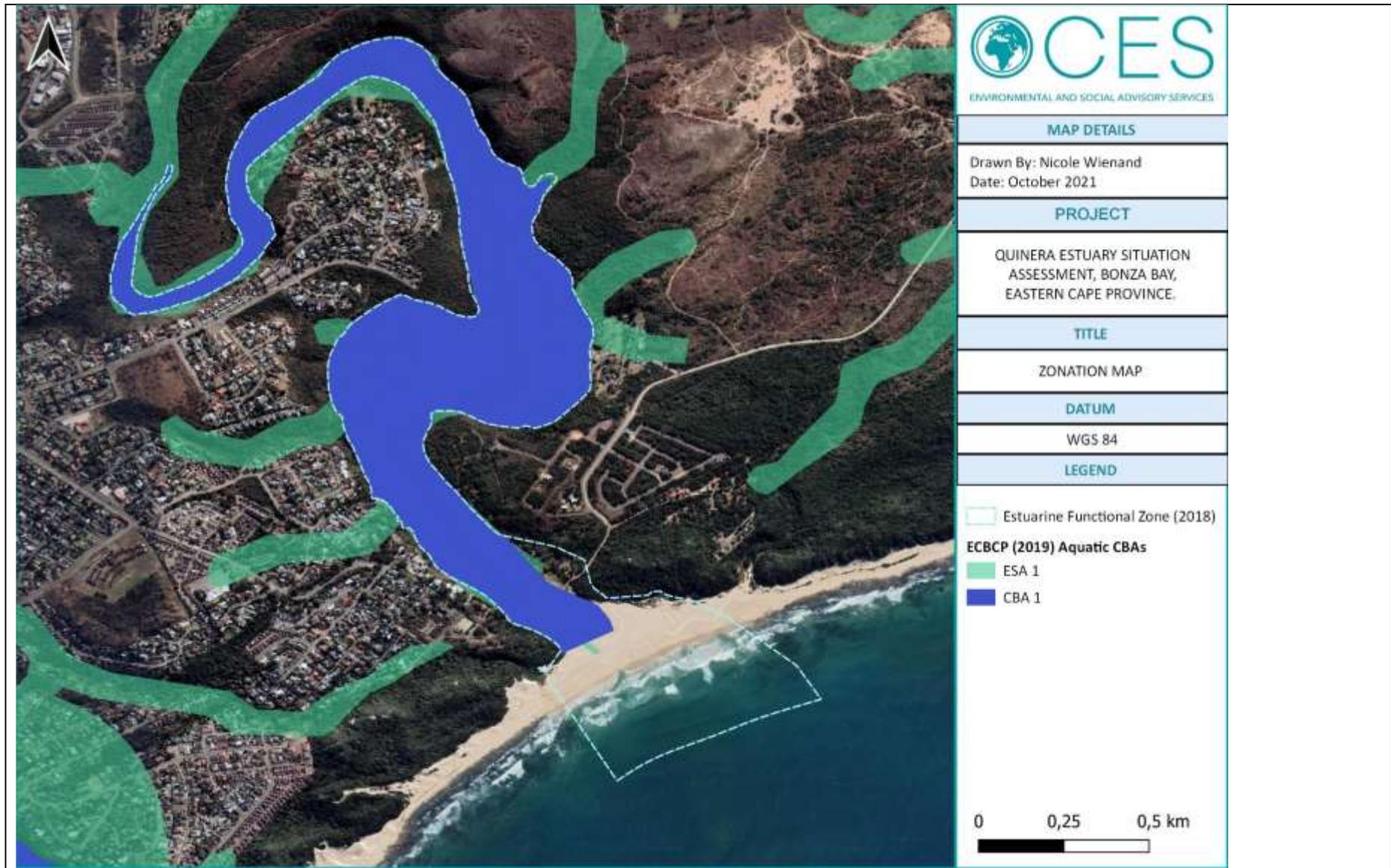


Figure XXX: Zonation map for Qinira Estuary aquatic Critical Biodiversity Areas.

7 INTEGRATED MONITORING PLAN

The integrated monitoring plan for the Qinira Estuary comprises of three primary categories. These categories include:

- Resource monitoring
- Compliance monitoring
- Performance monitoring

7.1 RESOURCE MONITORING

The resource monitoring component is aimed specifically towards the monitoring of ecological indicators. The ecological indicators are used to monitor the ecological state of the Qinira Estuary. The requirements for the monitoring of the ecological indicators of the Qinira Estuary have been guided by the Methods for the Determination of the Ecological Water Requirements Reserve for Estuaries (DWS, 2013). Abiotic and biotic components were selected from this guideline. An annual report should be produced that summarises the result from the monitoring programme. This report should be made available to the public.

The following ecological components were extracted from the Management Objectives and their respective actions.

Table 7.1: Qinira EMP Resource Monitoring.

ECOLOGICAL COMPONENT	INDICATOR	SPATIAL/TEMPORAL SCALE	TARGET	RESPONSIBLE AUTHORITIES
Water Quality: freshwater inflows.	Inflow volumes are less than the recommendation or unseasonal change in sediment dynamics or mouth dynamics.	Flow gauging station above head of estuary, data logged daily.	Recommended inflow according to Reserve determination.	DWS
Water Quality: frequency and duration of episodic events.	Type of event and duration.	The estuarine area whenever events occur.	No target applicable.	BCMM (IEMP and Scientific Services)
Water Quality: changes in bathymetry.	Depth profile of estuary at selected sites.	Water body within the EFZ.	Every three years or after significant episode.	BCMM (IEMP)
Water Quality: frequency and location of fish and invertebrate kills; macro- and micro-algal blooms; non-natural floating objects and surface contaminants; bad odours.	Observe occurrence and location of these events.	Designated estuarine area, observations during normal activity.	Register of occurrence and location.	BCMM (IEMP)
Water Quality: bacterial contamination.	Total coliform counts.	Water body within EFZ, weekly or at least bi-weekly samples and	80% of samples over time should be < 100	BCMM (IEMP, Environmental Health and

ECOLOGICAL COMPONENT	INDICATOR	SPATIAL/TEMPORAL SCALE	TARGET	RESPONSIBLE AUTHORITIES
		when bad odours or sewage spills are reported.	counts/100ml and < 2000 counts per 100ml in 95% of samples.	Scientific Services)
Water Quality: concentration of water quality parameters in the estuary and river inflow.	All water quality parameters, e.g. oxygen, nutrients, turbidity and heavy metals.	Several stations along the estuary, including at the river inflow, mouth and at the head of the estuary, weekly or at least b-weekly.	DWS: Water quality guidelines for the natural marine environment and recreational use. Resource Quality Objectives	BCMM (IEMP, Environmental Health and Scientific Services) DWS
Alien vegetation.	Area of cover.	Riparian region within the EFZ, aerial photographs every 5 years.	< 10% of riparian area infested with alien vegetation.	BCMM (IEMP) DEDEAT (Biodiversity)
Maintenance of fish populations.	Catch per unit effort (CPUE).	Water body within the EFZ, on-going for catch reports, fisheries survey every 5 years.	Fish population target has not yet been determined.	BCMM (Aquarium) DEDEAT (Biodiversity) DFFE (Fisheries) EL Museum
Maintenance of estuarine habitats within formally protected areas (proposed incorporation of EFZ areas).	Proportion of habitat types under protection.	Designated estuarine protected areas, annotated maps of aerial photos every five years.	100% of protected habitats.	BCMM (IEMP) DEDEAT (Biodiversity)
Protect line fish and bait organism populations by preventing illegal fishing and bait collection.	Number of arrests and prosecutions.	Water body within the EFZ.	Strictly regulated and increase in arrests and prosecutions.	BCMM (Aquarium) DFFE (Fisheries) SAPS BCMM Metro Police CPF

7.2 COMPLIANCE MONITORING

The compliance monitoring component aims to monitor the effectiveness of the implementation of the EMP by assessing the intensity and nature of the activities occurring within the Qinira Estuary and will identify activities that are not compliant with the relevant legislation, policies and guidelines as described in the EMP.

The following uses/activities have been extracted from the Management Objectives and their respective actions.

Table 7.2: Qinira EMP Compliance Monitoring.

USE/ACTIVITY	INDICATOR	TEMPORAL SCALE	TARGET	RESPONSIBLE AUTHORITIES
Ensure sanctity of existing and proposed future estuary Protected Areas through compliance monitoring.	Incidence of non-compliance.	Designated Protected Areas within the EFZ, regular patrols within estuarine protected area.	No non-compliances	DEDEAT BCMM (IEMP)
Ensure carrying capacity of the estuary is not exceeded. (carrying capacity not determined)	Number of recreational users in each sector.	Designated EFZ, may be limited to specific zones based on type of activity, twice per month outside of peak periods, weekly during peak periods.	No exceedances of carrying capacity – carrying capacity to be determined, particularly during the high season.	BCMM (IEMP)
Improve law enforcement capacity of BCMM and DEDEAT officials with regards to water quality, unauthorised development, Marine Living Resources Act, etc.	Incidence of non-compliance and conviction rate.	EMP Management Area, improved capacity for enforcement within 2 years of adoption of EMP.	Reduced incidences of non-compliance and elevated conviction rate of transgressors.	BCMM (Metro Police) DEDEAT (C&E) DFFE (Fisheries) SAPS
Compliance with Environmental Authorisations (EA) issued as a result of an EIA process.	Incidence of non-compliance.	EMP Management Area, initiate upon adoption of the EMP.	No incidences of non-compliance with EAs.	BCMM (IEMP) DEDEAT (EQM and C&E)
Maintenance of demarcated buffer zones, Coastal Management Lines (CMLs), coastal development setback lines and Critical Biodiversity Areas (CBAs).	Compliance with legislation applicable to various zones.	EFZ, <i>ad hoc</i> visual monitoring during normal daily activities.	Reduction in infringements within various sensitive zones.	BCMM (IEMP and Development Planning) DEDEAT (Biodiversity)
Prohibit any development within the EFZ.	No new developments within the EFZ.	Within the designated EFZ, initiate upon adoption of the EMP.	No new developments within the EFZ.	DEDEAT (EQM and Biodiversity) BCMM (IEMP and Development Planning)
Ensure all existing activities and livelihoods dependent on the estuary are	Compliance with legislation and planning and management frameworks	Within the designated EFZ, within 2 years of implementation of the EMP	No non-compliances with legislation by existing activities/livelihoods	DEDEAT (C&E) BCMM (IEMP) DFFE (Fisheries)

USE/ACTIVITY	INDICATOR	TEMPORAL SCALE	TARGET	RESPONSIBLE AUTHORITIES
compliant with existing legislation.				

7.3 PERFORMANCE MONITORING

The performance monitoring component is important when assessing the effectiveness of the overall implementation of the Qinira EMP. The performance monitoring component will assess the effectiveness of the implementation of the EMP by determining whether the actions associated with each Management Objective have been achieved or not. The performance indicator allocated to each action will form the basis of the performance monitoring component.

A summary of the integrated monitoring plan has been provided that indicates the activity/output, the indicator, the temporal scale, the target and the responsible authority. The summary for each monitoring component is provided below.

*Red – HIGH Priority, ORANGE – MODERATE Priority, GREEN – LOW Priority.

*Temporal Scales and Targets only assigned to HIGH Priority Management Outputs. As MODERATE Priority Management Outputs become actionable, these can be adequately assigned.

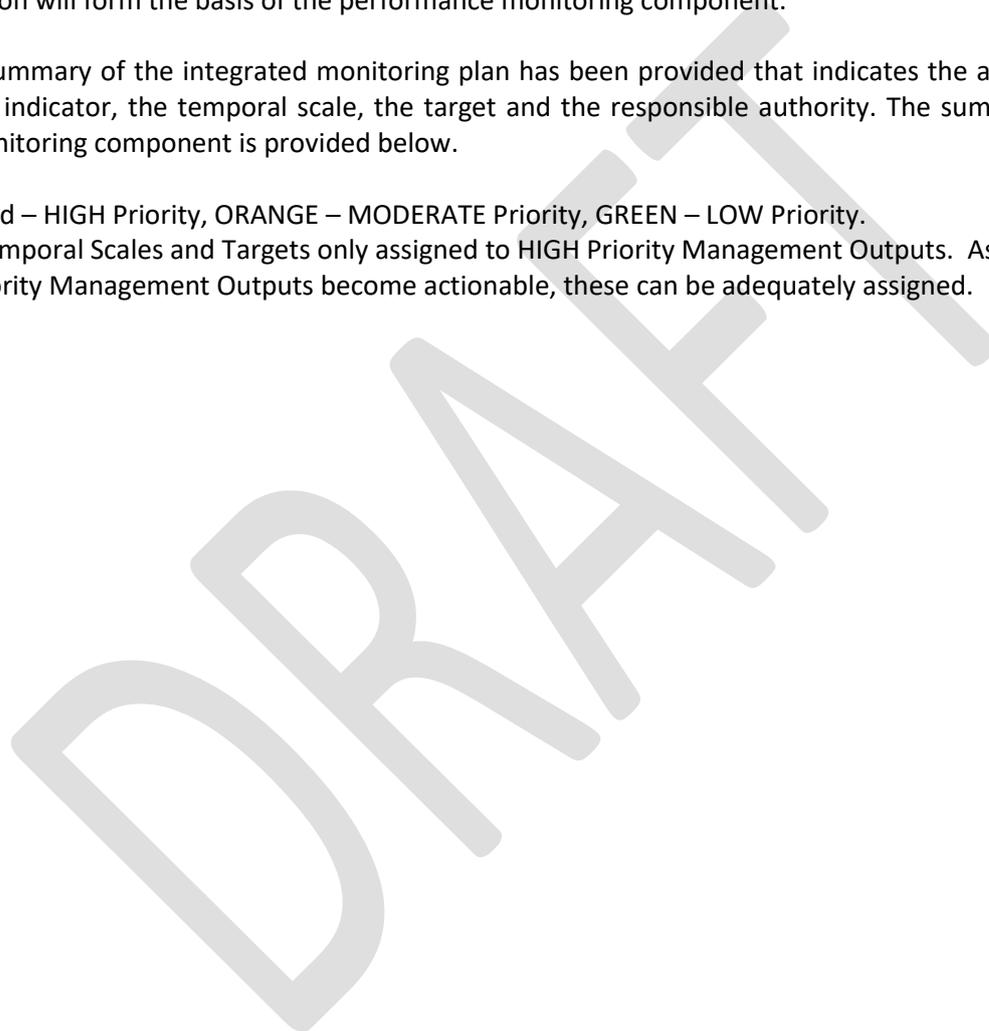


Table 7.3: Qinira EMP Performance Monitoring.

PROPOSED ACTION (outputs)	PRIORITY	PERFORMANCE INDICATOR	TEMPORAL SCALE	TARGET	RELEVANT LEGISLATION	RESPONSIBLE AUTHORITY/ IMPLEMENTING AGENTS
1.1 - Secure formal protection of the remaining terrestrial environmental within the Estuarine Functional Zone (EFZ) and possibly also the Estuary Zone of Influence (EZI) and consider incorporation of this area into the existing Qinira Nature Reserve.	HIGH	Formal protection status of remaining terrestrial environment within or immediately adjacent to the Estuarine Functional Zone is achieved (including BCMM open space).	None	5 year	Protected Areas Act BCMM by-laws	DEDEAT (Biodiversity) BCMM (IEMP)
2.3 - Protect natural vegetation within the EFZ and EZI (forest and thicket) from urban expansion.	HIGH	Number of new Environmental Authorizations approved within the EZI and EZI. Number of biodiversity offset projects for developments located in CBA2 areas within the EZI.	Annual	On-going	Biodiversity Act Forest Act BCMM Policy	BCMM (IEMP) DEDEAT (Biodiversity) DFFE (Forestry)
3.1 – DWS to determine the Ecological Reserve and water Resource Quality Objectives (RQO) for the Qinira River and implement the resulting management recommendations.	HIGH	Ecological Reserve Assessment and Resource Quality Objectives Reports made available.	None	On-going	Water Act	DWS
4.1 - Develop and implement an estuary mouth maintenance management plan approved by DEDEAT.	HIGH	Qinira Estuary Mouth Maintenance Management Plan with criteria for artificial mouth manipulation. Approval of such a plan by the Competent Authority.	None	2022	ICM Act BCMM Policy	DEDEAT (Biodiversity) BCMM (IEMP) Private property owners.
5.2 - Establish safe and secure access to the Qinira Estuary for members of the community and ensure adequate facilities are provided (e.g. access and ablutions).	HIGH	Established safe and secure access to the Qinira Estuary and control poor public behaviour and reduction in crime.	None	On-going	ICM Act BCMM by-laws	BCMM (IEMP, Metro Police)

PROPOSED ACTION (outputs)	PRIORITY	PERFORMANCE INDICATOR	TEMPORAL SCALE	TARGET	RELEVANT LEGISLATION	RESPONSIBLE AUTHORITY/ IMPLEMENTING AGENTS
5.3 – Implement measures to reduce littering and destruction of coastal forest trees particularly during the festive season.	HIGH	Reduced littering. More litter receptacles placed at appropriate locations. Anti-littering signage placed.	None	On-going	Waste Act Forest Act BCMM by-laws	BCMM (Waste)
6.1 - Develop and implement a water monitoring programme with a view to meeting Resource Quality Objectives (s16 NWA) that incorporates both physical and biological monitoring of point and non-point sources of pollution, including: – BCMM waste-water reticulation system and pollution monitoring. – BCMM Water Services Development Plan (Stormwater Management). DWS Green Drop programme.	HIGH	Development and implementation of a coordinated water quality and biological monitoring programme that includes water RQO's.	Annual/ monthly/ weekly	Start 2022	Water Act ICM Act BCMM by-laws	BCMM (IEMP, Environmental Health & Scientific Services) DWS DFFE
6.2 - Review the BCMM Environmental Health Pollution Monitoring Programme relating to the potential illegal discharge of effluent into the Qinira River and Estuary via stormwater and make recommendations for improved monitoring protocols. Also, identify major sources of pollution of the Qinira River and Estuary including “high-risk” industries in the upper catchment potentially contributing significantly to pollution of stormwater inflows that affect meeting water RQO's.	HIGH	Updated Trade Effluent Monitoring Programme and identification of major sources of pollution represented spatially including “high-risk” industry sources and engagement by BCMM officials.	None	2022	Health Act ICM Act Water Act BCMM by-laws	BCMM (IEMP, Environmental Health & Scientific Services) DWS
6.3 - Identify potential methods where pollution and solid waste can be prevented from entering the Qinira Estuary.	HIGH	Opportunities to prevent pollution and waste entering the Qinira Estuary identified and documented.	None	2023	ICM Act Water Act Waste Act BCMM by-laws	BCMM (IEMP, waste) DEDEAT to assist.

PROPOSED ACTION (outputs)	PRIORITY	PERFORMANCE INDICATOR	TEMPORAL SCALE	TARGET	RELEVANT LEGISLATION	RESPONSIBLE AUTHORITY/ IMPLEMENTING AGENTS
6.4 - Publish an annual monitoring report that provides a summary of the results of the combined monitoring programmes and RQO's.	HIGH	Reduced amount of pollution and solid waste entering the Qinira Estuary. Publishing of annual water quality monitoring results.	Annual	2022	ICM Act Water Act Waste Act BCMM by-laws	BCMM (IEMP and Scientific Services)
7.2 - Ensure that all future developments comply with the relevant environmental legislation, regulations (e.g. EIA) and BCMM by-laws.	HIGH	Proof of Environmental Authorisations for new developments.	None	On-going	NEMA EIA Regulations (2014) ICM Act BCMM by-laws	BCMM (IEMP & Development Planning) DEDEAT
7.3 - Ensure that all recommendations of the Qinira EMP are integrated into the BCMM SDF, IDP, WSDP and all other planning documents.	HIGH	Inclusion of Qinira EMP into the BCMM SDF.	None	2022	Municipal Systems Act ICM Act	BCMM (IEMP, Development Planning and Water Services)
8.2 – Promote the Qinira Estuary as a refuge for biodiversity conservation and biomass accumulation.	HIGH	Proclamation of key biodiversity areas within the EFZ and possibly the EZI (e.g. open space adjacent to the EFZ).	None	5 years	ICM Act Biodiversity Act ECBCP	BCMM (IEMP)
9.1 – Align Qinira Estuary environmental awareness with the BCMM environmental programme (BCMM IEMP Unit) focussing on the Qinira Estuary, including: <ul style="list-style-type: none"> – Local businesses, especially concerning impacts of pollution and waste on the estuary. – Local communities and schools regarding the impact of day-to-day activities on the estuary, including outings up the estuary. – BCMM officials, councillors and ward committees especially concerning impacts of municipal activities on the estuary. 	HIGH	Inclusion of estuary awareness into BCMM's environmental education and awareness programme, educational materials developed, workshops completed and increased number of school visits to the Qinira Estuary.	None	On-going	ICM Act BCMM Policy	BCMM (IEMP) DEDEAT EL Museum

PROPOSED ACTION (outputs)	PRIORITY	PERFORMANCE INDICATOR	TEMPORAL SCALE	TARGET	RELEVANT LEGISLATION	RESPONSIBLE AUTHORITY/ IMPLEMENTING AGENTS
Ensure BCMM programme includes estuary management.						
9.2 - Establish appropriate educational signage at the public access points leading to the estuary.	HIGH	Educational signage at the public access points to the Qinira Estuary.	None	2022	ICM Act BCMM Policy	DFFE: Working for the Coast
11.1 – Establish a Qinira Estuary Management Forum.	HIGH	Establishment of Qinira Estuary Management Forum. Regular Qinira Estuary Management Forum meetings held.	None	2022	ICM Act NEMA BCMM Policy	BCMM and DEDEAT to assist
11.2 - Incorporate estuarine management into the BCMM Coastal Protection Unit’s mandate which is a process being undertaken by BCMM IEMP Unit in conjunction with DEDEAT.	HIGH	BCMM Coastal Protection Unit actively implementing the Qinira EMP.	None	2022	ICM Act BCMM Policy BCMM by-laws	BCMM (IEMP) DEDEAT to assist
12.1 - Develop a strategy for the coordinated compliance monitoring and law enforcement with regards to the implementation of the Qinira EMP, including Environmental Management Inspectors (EMIs).	HIGH	Compliance plan developed and implemented.	None	2022	NEMA ICM Act Waste Act Marine Living Resources Act Forestry Act Water Act BCMM by-laws	BCMM, DEDEAT, SAPS, Community Policing Forum (CPF), DFFE (Forestry DFFE (Fisheries) DFFE (Oceans & Coasts)
12.2 - Conduct compliance awareness program for all users of the Qinira Estuary.	HIGH	Compliance awareness programmes conducted.	None	On-going	NEMA ICM Act Waste Act Marine Living Resources Act Forestry Act Water Act BCMM by-laws	DEDEAT BCMM (IEMP)

PROPOSED ACTION (outputs)	PRIORITY	PERFORMANCE INDICATOR	TEMPORAL SCALE	TARGET	RELEVANT LEGISLATION	RESPONSIBLE AUTHORITY/ IMPLEMENTING AGENTS
12.3 – Update BCMM by-laws relevant to estuarine management in BCMM to be in line with ICM Act.	HIGH	Updated BCMM by-laws.	None	On-going	ICM Act BCMM by-laws	BCMM (IEMP) DEDEAT (Biodiversity)
2.2 - Control alien vegetation along the banks and within the estuary and within EFZ and EZI. Align with the BCMM Alien Species Management Plan.	MEDIUM	Removal of alien species.	None	On-going	Biodiversity Act BCMM Policy	BCMM (IEMP)
5.1 - Identify inappropriate access to the Qinira Estuary used by members of the community.	MEDIUM	Identification of inappropriate access to the Qinira Estuary.		1 year	ICM Act	BCMM (IEMP)
7.1 - Delineate coastal management lines (in terms of ICM Act s25).	MEDIUM	Coastal management lines delineated and included in BCMM SDF.	None	2023	ICM Act Spatial Planning and Land Use Management Act (SPLUMA) BCMM by-laws	DEDEAT BCMM (IEMP)
7.4 - All commercial/ industrial stakeholders that are located within the EZI must develop and implement Environmental Management Programmes (EMPr's), which must be audited on an annual basis.	MEDIUM	Development of Environmental Management Programmes (EMPr's) by high risk industries within the EZI.	None	2023	Municipal Systems Act SPLUMA Waste Act	BCMM (IEMP, Environmental Health & Scientific Services))
8.1 - Consider the effects of sea level rise associated with climate change by adopting the exclusion and precautionary climate change coastal management lines.	MEDIUM	Climate change set back lines delineated in BCMM SDF.	None	On-going	ICM Act BCMM Policy	BCMM (IEMP & Development Planning) DEDEAT (Biodiversity)
9.3 - Develop closer partnerships with the EL Aquarium and the EL Museum on promoting awareness concerning the Qinira Estuary.	MEDIUM	IEMP Unit and EL Museum participate in the Qinira Estuary Management Forum.	None	On-going	BCMM by-laws	BCMM (IEMP)
10.1 - Enhance and promote collaboration with research institutions regarding access to existing information and identification of research opportunities.	MEDIUM	Access to existing information facilitated.	None	On-going	ICM Act	BCMM (IEMP) DEDEAT (Biodiversity) Research institutions

PROPOSED ACTION (outputs)	PRIORITY	PERFORMANCE INDICATOR	TEMPORAL SCALE	TARGET	RELEVANT LEGISLATION	RESPONSIBLE AUTHORITY/ IMPLEMENTING AGENTS
		Increased number of research projects being initiated in the Qinira Estuary.				
2.1 - Rehabilitate riparian vegetation where necessary.	LOW	Riparian vegetation rehabilitated.	None	On-going	Biodiversity Act	BCMM (IEMP)

DRAFT

8 INSTITUTIONAL CAPACITY AND ARRANGEMENTS

Effective institutional structures and arrangements are crucial for the successful implementation and coordination of activities as set out in the Qinira EMP. The NEMP (2021) requires that the EMP includes details on the institutional capacity and arrangements that will be required for managing the various elements of the EMP, taking into account different departmental mandates.

8.1 INSTITUTIONAL ARRANGEMENTS IN TERMS OF ICM ACT

Chapter 5 of the ICM Act establishes a statutory framework for institutional arrangements to ensure integrated and coordinated coastal management including the establishment of:

Government branch	Agency
National Coastal Committee	DFFE: O&C
Provincial Coastal Committees	DEDEAT
Municipal Coastal Committees	BCMM

8.2 MANDATORY ROLES AND RESPONSIBILITIES IN TERMS OF ICM ACT

The following mandatory roles and responsibilities are particularly relevant to the current Qinira EMP in terms of the ICM Act.

National government

- Management of coastal public property
- National Estuarine Management Protocol
- Environmental authorizations for coastal activities
- Discharge of effluent into coastal waters

Provincial government

- The management of the coastal protection zone
- Establishment of coastal management lines
- Marking coastal boundaries on zoning maps
- Consultation and public participation
- Co-ordination of actions between provinces and municipalities

Local government

- Access to coastal public property
- Coastal management line demarcation on zoning maps
- Determining and adjusting coastal boundaries of coastal access land
- Marking coastal boundaries on zoning maps
- Consultation and public participation
- Implementation of land use legislation in coastal protection zone

8.3 OTHER MANDATORY ROLES AND RESPONSIBILITIES

8.3.1 Municipal

The organisational structure of the BCMM includes departments whose mandates include implementation and monitoring of the Qinira EMP. A number of directorates within the BCMM organisational structure will have a role in the Implementation of the Qinira EMP. These directorates include:

- Directorate of development and spatial planning – Development Planning;
- Directorate of infrastructure – Water, Wastewater and Scientific Services;
- Directorate of municipal services – Parks: Coastal and Inland; Community Amenities, Solid Waste Management; and
- Directorate of Health, Public Safety and Emergency Services – Municipal Health Services: Coastal; Environmental Health Support Programmes; Integrated Environmental Strategic Management.

BCMM By-laws and regulations

BCMM has promulgated the following by-laws that are relevant to the Qinira EMP.

- Public Open Space By-law (2004);
- Water Services By-law (2011); and
- Environmental Health B-law (2010).
- Estuary Boating Management By-law (uncertain date);
- Boat Licensing By-law – Estuary (uncertain date);
- Public Safety By-law (uncertain date);
- Building Regulations; and
- Town planning Regulations.

Environmental plans

BCMM has also adopted the following environmental and wider municipal plans that are also relevant to the Qinira EMP:

- Integrated Environmental Management Plan (IEMP) (2006);
- Integrated Coastal Zone Management Plan (2006);
- Sanitation Policy and Strategy (2007);
- Conservation Plan and Municipal Open Space System (2011);
- Climate Change Strategy (2014);
- Integrated Waste Management Plan (2019);
- Mapping of Vulnerable Coastal Areas (2019);
- Invasive Alien Species Monitoring, Control & Eradication Plan (2019); and
- Environmental Education and Awareness Programme (2021).

Wider municipal plans

- Integrated Development Plan;
- Spatial Development Framework;
- Qinira Local Spatial Development Framework;
- Bonza Bay Local Spatial Development Framework (2019); and
- Water Services Development Plan.

Infrastructure development (land-based)

BCMM is also largely responsible for the implementation of legislation in terms of coastal infrastructure development. BCMM has officials, such as building inspectors that check for compliance with building regulations and approve building plans.

Recreational water quality

The National Health Act requires that every metropolitan and district municipality to ensure that appropriate municipal health services are effectively and equitably provided in their respective areas.

This is understood to include water quality monitoring (in terms of health risks) in water resources (e.g. estuaries) used for recreational purposes. The DFFE continuously encourages the local authorities to monitor recreational waters to ensure that water quality remains safe for public health. Existing regulations, norms and standards, or guidelines applying to recreational water quality (beaches) include:

- Water quality guidelines for the coastal environment: Recreational Use.

8.3.2 Provincial

The Department of Economic Development and Environmental Affairs and Tourism (DEDEAT) form part of the Eastern Cape Provincial Government and includes the following two main branches:

- Economic Development Management; and
- Environmental Management

Environmental Management

The following core functions of the DEDEAT may be relevant to the implementation of the Qinira EMP.

1. Policy coordination and environmental planning

Establish legislation, policies, programmes, procedures and systems that effectively empower and support the core functional programmes.

Functions under this area include:

- Intergovernmental coordination, spatial and development planning;
- Legislative development;
- Research and development support;
- Environmental information management; and
- Climate change management.

2. Compliance and enforcement

Ensure that environmental legislation is effectively used to protect the environment and its resources from unlawful and unsustainable exploitation and negative impact.

Functions under this area include:

- Environmental quality management compliance and enforcement; and
- Biodiversity management, compliance and enforcement..

3. Environmental quality management

Promote a safe and healthy environment through effective environmental impact assessment, air quality management, waste and pollution management for the people of the Eastern Cape.

Functions under this area include:

- Impact management;
- Air quality management; and
- Pollution and waste management.

4. Biodiversity management

Conserve the diversity of landscapes, ecosystems, habitats, biological communities, populations, species and genes and promote conservation and sustainable use of natural resources in the Eastern Cape.

Functions under this area include:

- Biodiversity and protected area planning and management
- Conservation agencies and services
- Coastal management.

5. Environmental empowerment services

Empower and capacitate the external stakeholders of the Department to meaningfully participate in and contribute to effective environmental management.

Functions under this area include:

- Environmental capacity development and support; and
- Environmental communication and awareness raising.

8.3.3 National

The Department of Forestry, Fisheries and the Environment (DFFE) is mandated to give effect to the right of citizens to an environment that is not harmful to their health or wellbeing, and to have the environment protected for the benefit of present and future generations. To this end, the department provides leadership in environmental management, conservation and protection towards sustainability for the benefit of South Africans and the global community.

The DFFE includes the following Branches that may be relevant to the implementation of the Qinira EMP:

- **Biodiversity and conservation;**
- Chemicals and waste management;
- Climate change and air quality;
- Environmental programmes;
- **Fisheries management;**
- **Forestry management;**
- Regulatory compliance; and
- **Oceans and coasts.**

DFFE Oceans and Coasts

Oceans & Coasts (OC) deals with the promotion, management and strategic leadership on oceans and coastal conservation in South Africa.

Functions

The key focus areas in driving oceans and coastal environment conservation are:

- The establishments of management frameworks and mechanisms for the ocean and coastal environment;
- The strengthening of national science programmes for integrated oceans and coastal management;
- The Development of and contribution to effective knowledge and information management for the sector; and
- The participation and support to international agreements and bodies supportive of SA environmental and sustainable development priorities.

DFFE Biodiversity and Conservation

Biodiversity and conservation deals with the establishment, management and maintenance of ecologically representative national and cross-border systems of protected areas.

Functions

Key focus areas include:

- Establishment, development and management of comprehensive, ecologically representative and effectively managed regional network of trans-frontier conservation areas;
- Establishment, development and safeguarding of the integrity of World Heritage Sites as well as implementation of world Heritage Convention in South Africa;
- Strengthen governance of the protected areas system in South Africa in line with national imperatives and international obligations;
- Establishment and development of a comprehensive and ecologically representative national network of protected areas that safeguards key ecological processes across the landscape and provides resilience against climate change;
- Development and implementation of policy and legislation relating to and monitoring performance of protected areas; and
- Manage strategic, administration, logistical and financial support to the Chief Directorate.

DFFE Fisheries

The purpose of the fisheries management branch is to promote the development, management, monitoring and sustainable use of marine living resources and the development of South Africa's fisheries sectors. There are six sub-programmes driven within the branch, namely:

- Aquaculture and Economic Development;
- Fisheries Research and Development;
- Marine Resource Management and
- Monitoring, Control and Surveillance,
- Fisheries Operations Support and
- Financial Management.

DFFE Fisheries Management

Fisheries management is governed under the MRLA by DFFE Fisheries.

DFFE Forestry Management

Land-based coastal resources (e.g. coastal forests and mangroves) are governed under the National Forest Act governed by DFFE Forestry.

Department of Water and Sanitation (DWS)

Freshwater flows (quantity and water quality) to coastal zone

The freshwater flow (both related to quantity and quality) are governed by the Department of Water and Sanitation under the NWA. Chapter 3 of the NWA deals with the protection of water resources, including classification and determination of Reserve (estuaries remains classified as water resources under this Act). In addition, Section 21 lists a number of activities that are classified as water uses requiring authorisation from the Minister (DWS), some of which still apply to uses in estuaries.

Existing regulations, norms and standards, or guidelines applying to freshwater flows to the coastal zone include:

- General Authorisations (2004) under NWA (Section 39) pertaining to the exception of applying for a licence for use of freshwater, as well as disposal of wastewater into a water resources under specified conditions;
- Methods for the determination of ecological water requirements for estuaries (DWA 2008 and future updates thereof); and
- Determination of freshwater requirements of the marine environment of South Africa: A proposed framework and initial assessment.

A summary of the activities specific to the implementation of the Qinira EMP and the responsible authority required to implement them has been provided below:

ACTIVITY	RESPONSIBLE AUTHORITIES	LEGISLATION
Management of the Qinira Estuary.	BCMM (IEMP)	ICM Act
Water quality monitoring within the catchment	DWS BCMM (IEMP, Environmental Health & Scientific Services)	National Water Act NEMA
Water quality monitoring within the Estuary.	DWS BCMM (IEMP, Environmental Health & Scientific Services)	National Water Act ICM Act
Ecological Reserve and Resource Quality Objectives determination	DWS	National Water Act ICM Act
Protected Areas	BCMM (IEMP & Development Planning) DEDEAT (Biodiversity) ECPTA	Protected Areas Act National Forestry Act Regulations for the Proper Administration of Nature Reserves
Development of housing and infrastructure in the coastal zone	BCMM (IEMP & Development Planning) DEDEAT (EQM and Biodiversity) DFFE (O&C)	NEMA EIA Regulations 2014 ICM Act
Solid waste management	DEDEAT (waste) BCMM (waste)	Waste Act Municipal Services Act
Hazardous waste management	DEDEAT (waste) BCMM (waste)	Waste Act Air Quality Act EIA Regulations 2014
Subsistence/recreational fishing, bait collection	DFFE (Fisheries) BCMM (IEMP)	Marine Living Resources Act
Spatial planning	BCMM (IEMP & Development Planning)	Spatial Planning and Land Use Management Act
Enforcement	BCMM, DEDEAT, SAPS, CPF	EIA regulations 2014 ICM Act National Water Act Waste Act

9 IMPLEMENTATION PLAN

From the above Management Objectives and assigned actions, the following Action Plans should be developed once the Qinira EMP has been approved by the MEC.

Table 9.1: Qinira EMP proposed Action Plans.

ACTON PLANS	IMPLEMENTING AGENT	RELEVANT TOOLS
Conserve and protect the remaining terrestrial habitat within and adjacent to the Estuarine Zone of Influence of the Qinira Estuary.	BCMM (IEMP)	Regulations for the Proper Administration of Nature Reserves
Update and implement water quality monitoring programmes within the Qinira Estuary and develop and implement estuary water quality mitigation measures to meet Resource Quality Objectives.	DWS BCMM (IEMP, Environmental Health and Scientific Services)	DWS Water quality guidelines
Monitor and facilitate responsible urban and commercial expansion, and infrastructure development within the Estuarine Zone of Influence of the Qinira Estuary.	BCMM (IEMP and Development Planning) DEDEAT (EQM)	BCMM Spatial Development Framework
Provide reasonable and safe and secure public access to the Qinira Estuary.	BCMM (IEMP)	BCMM By-laws BCMM Open space Management Committee
Promote education and awareness of the Qinira Estuary.	BCMM (IEMP)	BCMM Environmental Education and Awareness Programme. DFFE O&C - Working for Coasts
Develop partnerships for the integrated management of the Qinira Estuary.	BCMM (IEMP) DEDEAT (Biodiversity)	Qinira Estuary Management Forum
Facilitate research opportunities within the Quinera Estuary.	DEDEAT (Biodiversity)	NA
Strengthen compliance monitoring and enforcement of activities within the Estuarine Zone of Influence of the Qinira Estuary.	BCMM (IEMP) DEDEAT (C&E) DFFE (Forestry) DFFE (Fisheries)	NA
Update BCMM by-laws relevant to estuarine management in BCMM to be in line with ICM Act.	BCMM (IEMP)	NA

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APPENDIX A: STAKEHOLDERS

LIST OF STAKEHOLDERS

In terms of the Protection of Personal Information Act (2021) (POPIA) contact details of stakeholders have been omitted.

ORGANIZATION	NAME
Project Steering Committee	
DEDEAT	Xolani Nikelo (Chair)
DEDEAT	Phumla Mzazi Geja
DEDEAT	Loyiso Nondlebe
DEDEAT	Neliswa Piliso
BCMM: IEMP Unit	Nomthandazo Hanise
ECPTA	Ayaka Peter
DFFE: O&C	Tabisile Mhlana
DHSWS	TBC
BCMM	
IEMP Unit	Jane Gallo
Environmental health	Dr Luyanda Madikizela
Water services	Nosiphiwo Mlotywa
Water services	Mkhuseli Nongogo
Development planning	Raymond Foster
Amenities - beaches	Allan Zeeland
Amenities - Aquarium	Siani Tinley
Amenities - beaches	Keshav Panday
Scientific Services	Deanne Karshagen
Sanitation	Francois Gay
BCMM Ward Committee	
Councilor Ward 28	ClIr Marion Mackley and ClIr Frederick Pohl
Ward 28 committee member	Hendrik Smit
Ward 15 - Nompumelelo township	ClIr Bopi
DEDEAT	
Enforcement	Dr Div De Villiers
Coastal and Biodiversity	Ricky Hannan
Coastal and Biodiversity	Leigh-Ann Kretzmann
Environmental Quality Management	Hlomela Hanise
DFFE: Oceans & Coast	
Estuaries Management	Mbulelo Doplo
Marine & Coastal Research	Gerhard Cilliers
DFFE: Forestry	
Research and GIS Unit Head	Mcoseleli Jakavula
Permits	Thobani Vetsheza
Forestry	Dorothy Jagers
DFFE: Fisheries	
	Lungile Nodwala
	Mphakamsi Fifane

ORGANIZATION	NAME
ECPTA	
	Ayaka Peter
DHSWS - Reserves	
	Lebohang Matlala
	Mkevu Mnisi
ECPHRA	
EC Heritage	Mzikayise Zote
EC Heritage	Sello Mokhanya
OTHER STAKEHOLDERS	
Qinira Estuary Group	Stef Kriel
	Patrick Dalglish
Developments	
• Pirates Creek	Guy Kunhardt
• Herron's Nest	Jan Coetzer
Border Kei Chamber of Business	Drayton Brown
ECDC	Rory Haschick
WESSA	Mike Denison
BirdlifeSA	Daniel Marnewick
Beacon Bay Ratepayers Association	Frederick Pohl
Fishing Club	Unable to identify
Birding Club	Ian Field
RESEARCH GROUPS	
NMU	Prof Janine Adams
East London Museum	Kevin Cole and Dr Phil Whittington
University of Fort Hare	Prof Niall Vine
Rhodes University	Prof Cliff Jones
CSIR	Dr Lara van Niekerk