

EASTERN CAPE BIODIVERSITY CONSERVATION PLAN 2018

DRAFT FOR PUBLIC COMMENT

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LIST OF ACRONYMS AND ABBREVIATIONS

BCP - Biodiversity Conservation Plan
 CA – Conservation Area
 CBA – Critical Biodiversity Area
 CBD – Convention for Biological Diversity
 CDC – Coega Development Corporation
 CR – Critically Endangered
 CSIR – Council for Scientific and Industrial Research
 DEA – Department of Environmental Affairs (National authority)
 DEDEAT – Department of Economic Development and Environmental Affairs (Provincial authority)
 DM – District Municipality
 EA – Environmental Authorisation
 EAP – Environmental Assessment Practitioner
 ECBCP - Eastern Cape Biodiversity Conservation Plan
 ECBSAP – Eastern Cape Biodiversity Strategy and Action Plan
 ECPTA – Eastern Cape Parks and Tourism Agency
 EIA – Environmental Impact Assessment
 EMF – Environmental Management Framework
 EMP – Environmental Management Plan
 EN – Endangered
 EPWP – Extended Public Works Programme
 ESA – Ecological Support Area
 ICMA – National Environmental Management: Integrated Coastal Management Act
 IDP – Integrated Development Plan
 LM – Local Municipality
 LT – Least threatened
 LUPO – Land Use Planning Ordinance
 MAR – Mean Annual Runoff
 NBSAP - National Biodiversity Strategy and Action Plan
 NEMA – National Environmental Management Act
 NEMBA – National Environmental Management: Biodiversity Act
 NEMPAA – National Environmental Management: Protected Areas Act
 NFEPA – National Freshwater Ecosystem Priority Areas
 NGI – National Geo-spatial Information
 NNR – No Natural Habitat Remaining
 ONA – Other Natural Area
 PA – Protected Area (as per NEMPAA)
 PAN – Protected Area Network
 PE – Protected Environment (as per NEMPAA)
 PES – Present Ecological Status
 SA VEGMAP – South African Vegetation Map
 SANBI – South African National Biodiversity Institute
 SANParks – South African National Parks Board
 SAPAD – South African Protected Area Database
 SDF – Spatial Development Framework
 SEA – Strategic Environmental Assessment
 SPLUMA – Spatial Planning and Land Use Management Act
 SQ – Sub-quaternary catchments
 STEP – Subtropical Thicket Ecosystem Programme
 SWSA – Strategic Water Source Areas
 VU – Vulnerable
 WEF – Wind Energy Facility
 WULA – Water Use Licence Application

PART A INTRODUCTION AND OBJECTIVES

Contents of this report:

Part A: Introduction

Part B: Biodiversity Profile

Part C: Map of Critical Biodiversity Areas

Part D: Guidelines for land use planning and decision-making

Part E: Other measures for effective management of biodiversity in the Eastern Cape Province

Part F: Monitoring, review and amendments

Part G: GIS data

A separate technical report, with details pertaining to analyses and spatial layer metadata, is available as part of the series of reports produced by DEDEAT.

1 BACKGROUND TO THE EASTERN CAPE & BIODIVERSITY CONSERVATION PLANNING

1.1 The Eastern Cape

The Eastern Cape, located on the south-eastern seaboard of South Africa, is the second largest province in South Africa covering approximately 169,000km² (Figure 1). The Eastern Cape is bordered by KwaZulu-Natal Province and Lesotho and the Free State Province in the north, the Northern Cape Province in the north-west and Western Cape Province in the south-west. It is divided into 2 Metropolitan Municipalities and 6 District Municipalities and 31 Local Municipalities. Major cities include Bhisho/King Williams Town, Port Elizabeth, Grahamstown, Graaf Reinet, Cradock, Mthatha, Aliwal North, Queenstown, Lusikisiki and Port St Johns.

From a biodiversity perspective, the Eastern Cape enjoys significant diversity with ecosystems types from at least 6 biomes including: Nama-Karoo to lush sub-tropical forest along the Wild Coast. Each biome supports/hosts a suite of taxonomic groups that in turn play important functional roles within the ecosystem.

The Eastern Cape is considered the economically poorest province in South Africa. This is reflected in the poverty indices and is intensified by the lack of services and infrastructure, especially in the former homelands of Transkei and Ciskei. The provincial economy is otherwise well-developed in the south-west and central portions, while large areas of the eastern portion of the Province remain largely under-developed.

1.2 Revision of ECBCP2007 and current approaches to Biodiversity Planning in South Africa

A complete revision of the first Eastern Cape Biodiversity Conservation Plan (ECBCP2007) was undertaken in this assessment. Some of the many good reasons for this include an updated landcover map, changes to Provincial borders, a large body of environmental and biodiversity data that has been generated over the past 10 years; and the development of approximately 29 other spatial biodiversity products for parts of the Province that require integration. In addition, significant strides have been made with respect to refining the spatial representation of biodiversity pattern and biodiversity processes, as well as establishing standardised minimum requirements for spatial biodiversity planning that ensure a level of consistency throughout the country (SANBI, 2017). The ECBCP2018 will replace the ECBCP2007 in its entirety.

The Eastern Cape Biodiversity Conservation Plan (ECBCP2018) was developed in line with the principles and methods gazetted in the National Environmental Management: Biodiversity Act No 291 of 2009, “Guideline regarding the determination of Bioregions and the Preparation of and publication of Bioregional Plans”.



Figure 1 Map of the Eastern Cape

The ECBCP2007 identified a number of important issues that required consideration for the long-term planning of biodiversity conservation in the Eastern Cape Province. These are to some degree still relevant and include (with revision):

- High unemployment and poverty in portions of the Province will force decision-makers to make trade-offs between socio-economic demand and environmental considerations.
- Private reserves (proclaimed and un-proclaimed) contribute significantly to conservation, and therefore need to be formally engaged and included in conservation decision-making.
- Community-based natural resource management and spatial planning has not been taken-up as rapidly as anticipated and has resulted in significant loss of natural resources, especially in the communal areas such as the former Transkei. The long-term benefits of this type of land use management have not been realised and has not become a high priority.
- The high human population densities in the communal areas and the uneven distribution of land are resulting in negative environmental impacts, especially in the Grassland Biome.
- The poor skills, and capacity and resource allocation to biodiversity and conservation objectives is hampering the implementation of priority strategies and actions.
- Highly threatened biomes are under-represented in the Provincial protected area network.
- The Biodiversity Economy (eco-tourism, commercialisation of indigenous species, etc.) is largely under-developed in the communal areas of the Province. The wealth of biodiversity in the Province provides an excellent resource base to fully capitalise on the opportunity for sustainable economic development, especially in impoverished rural communities.

The focus of biodiversity planning in South Africa is on managing land use and spatial planning for sustainable development opportunities at the landscape level with emphasis on retaining or enhancing ecosystem function, especially as a climate change adaptation measure. Although biodiversity is afforded some protection in the Protected Area Networks (PANs), the majority of biodiversity is located in the matrix outside of the PAN on privately-owned or communal property. Biodiversity planning assessment is therefore focussed on areas outside of the PAN, within multiple-use production landscapes.

The current approach to biodiversity planning, which takes into account both biodiversity pattern and processes, identifies areas that:

1. Achieve national and provincial biodiversity targets.
2. Seek to avoid land use conflict where possible.
3. Retain landscape level ecological function and connectivity as an important component of the Provincial climate change adaptation strategy.

2 PURPOSE AND OBJECTIVES OF A BIODIVERSITY CONSERVATION PLAN

2.1 What is a Biodiversity Conservation Plan?

A Biodiversity Conservation Plan (BCP) is a tool that guides and informs **land use and resource-use planning and decision-making** by a full range of sectors whose policies, programmes and decisions impact on biodiversity, in order to preserve long-term functioning and health of priority areas known as Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs). A BCP is based on a systematic biodiversity planning approach, which is clearly outlined in the guidelines for bioregional planning (NEMBA Guidelines No 291 of 2009) and the technical guidelines for CBA maps (SANBI, 2017).

In summary, a BCP produces a map of important biodiversity areas, outside of the Protected Area network, that require management intervention through land use guidelines, in order to retain biodiversity pattern and processes. The types of information used to inform this map include distribution mapping of biodiversity features and setting targets, mapping landcover and landuse and mapping the Protected Area network. The process followed to “build” a CBA map is explained in more detail in Part C. The components of a BCP include:

1. A map of Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), also known as a CBA map, for both terrestrial and freshwater realms.
2. A Biodiversity Conservation Plan handbook which includes a biodiversity profile and land use guidelines.
3. GIS files and metadata.
4. A technical report outlining in detail the analyses and processes undertaken.

2.2 Purpose of a Biodiversity Conservation Plan

It is important to take note of the Purpose and Objective of a BCP to correctly interpret, apply and implement a BCP. A BCP is not itself a multi-sectoral tool, but is **the biodiversity sectors input that should be integrated into other planning processes**.

The primary intention of NEMBA Chapter 3 is to facilitate conservation and management of biodiversity in “**biodiversity priority areas**” or **priority areas for conservation**, outside of the Protected Area network, at a landscape level. The BCP may be used as a precursor for further refined mapping in Bioregional Plan designs undertaken at more localised scales (e.g. District or Local Municipalities).

Therefore, the **purpose of the BCP is to provide a map of these important biodiversity areas** and develop associated land use management guidelines to inform:

1. Cross-sectoral spatial planning at all levels of government, relevant to sectors whose policies, actions and decisions impact on biodiversity

2. Environmental assessment and authorisations
3. Natural resource management and protected area expansion programmes

Note: A BCP is limited in its purpose and use and is designed for a specific set of uses and users. Other management tools designed to achieve biodiversity conservation objectives include:

- Eastern Cape Protected Area Expansion Strategy
- Strategic Environmental Assessments
- Environmental Management Frameworks

2.3 Aim and Objective

The aim of a BCP is, very simply, to eliminate further loss or degradation of biodiversity priority areas and ecological support areas.

The objectives of a BCP are to:

1. Identify the minimum spatial requirements needed to maintain a living landscape that continues to support all aspects of biodiversity and retains/maintains essential ecological infrastructure. This is achieved through area-based targets representing biodiversity pattern AND ecological processes.
2. Serve as the primary source of biodiversity information for land use planning and decision-making.
3. Inform conservation and restoration action in key biodiversity areas.

3 LEGAL CONTEXT AND FRAMEWORK

South African biodiversity and environmental management is supported by well-established legal, policy and planning tools at all levels of government, which creates an enabling environment for the development and implementation of Biodiversity Planning.

3.1 International Conventions

South Africa is a ratified signatory of, and therefore party to, the Convention for Biological Diversity (CBD) and as such has contracting and reporting obligations. South Africa has developed (2005) and updated (2015) its National Biodiversity Strategy and Action Plan (NBSAP) in compliance with CBD contracting obligations. The NBSAP is discussed further in the section 3.2.6 below.

3.2 National legislation and policy

The following National legislation and policy forms the framework supporting the development of BCPs.

3.2.1 *The Constitution (No. 108 of 1996)*

The Constitution, in the broadest terms, speaks to environmental health and a requirement for sustainable development in terms of the Bill of Rights (Section 24): *“Everyone has the right (a) to an environment that is not harmful to their health or well-being and (b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that (i) prevent pollution and ecological degradation, (ii) promote conservation; and (iii) secure ecological sustainable development and use of natural resources while promoting justifiable economic and social development”*.

This provides the necessary directive to develop appropriate environmental planning tools and implement appropriate management plans and programmes.

3.2.2 *National Environmental Management Act (No. 107 of 1998 as amended)(NEMA)*

In addition to the NEMA principals, which forms the foundation for environmental management in South Africa, NEMA Chapter 5 Section 24(2)(e) makes provision for the MEC to: *“Prepare compilations of*

information and maps that specify the attributes of the environment in particular geographical areas, including sensitivity, extent, interrelationship and significance of such attributes which must be taken into account by every organ of state change by law with authorising, permitting or otherwise allowing the implementation of a new activity, or with considering, assessing and evaluating an existing activity."

3.2.3 National Environmental Management: Biodiversity Act (No. 10 of 2004 as amended) (NEMBA)

NEMBA provides the legal framework for integrated and co-ordinated management, conservation and sustainable use of biodiversity. Through NEMBA a number of planning and management tools have been introduced, including: Threatened or Protected Species Regulations, Listed of Threatened Ecosystems, Alien and Invasive Species Regulations, and Bioregional Planning Guidelines. Chapter 3, Section 40-42 of NEMBA outlines the procedure for the development and publishing of Bioregions and Bioregional Plans.

3.2.4 National Environmental Management: Protected Areas Act (No. 57 of 2003) (NEMPAA)

NEMPAA governs the network of proclaimed protected areas which formally contribute towards the conservation of biodiversity and natural landscape features. NEMPAA provides the framework for the management of all formal protected areas proclaimed under the Act by: setting roles and responsibilities (e.g. management authorities) and determining reporting requirements (management plans).

3.2.5 National Environmental Management: Integrated Coastal Management Act (No. 24 of 2008) (ICMA)

The NEM Integrated Coastal Management Act (ICMA) coordinates and consolidates aspects of coastal management including, but not limited to, the definition of the components of the coastal zone, procedures for the demarcation of coastal boundaries and estuary management. With particular reference to the ECBCP2018 is the provision made by ICMA for Estuary Management Plans (Section 34) and Coastal Management Programmes (Section 44-50).

3.2.6 National Biodiversity Strategy and Action Plan – 2015 (NBSAP)

The National Biodiversity Strategy and Action Plan (NBSAP, 2015) provides South Africa and relevant agencies with a high-levelled "road map" for strategic actions that are required in order to effect meaningful biodiversity management, with the primary vision of "conserving, managing and sustainably utilising biodiversity, now and in the future". The NBSAP (2015) has identified six core biodiversity management strategies termed "Strategic Objectives" (SOs) and have further developed these in terms of key outcomes and associated activities. In terms of the NBSAP (2015) Strategic Objective 6 outlines the requirement for "*effective knowledge foundations, including indigenous knowledge and citizen science, to support the management, conservation and sustainable use of biodiversity*". Outcome 6.3 of this objective involves the "*Identification of geographic priority areas for the management, conservation and restoration of biodiversity assets and ecological infrastructure, based on best available science*" of the NBSAP.

The development and revision of the Eastern Cape Biodiversity Conservation Plan fulfils activity 6.3.3 of this outcome in respect of "Updating Provincial Biodiversity Plans".

3.2.7 National Environmental Management: Environmental Impact Assessment Regulations (2016 or as amended)

In terms of the Environmental Impact Assessment (EIA) Regulations (2016), Listing Notice 3 contains a list of geographical areas that trigger the need for Environmental Authorisation (EA) for specific activities. This notice specifically makes reference to "Critical Biodiversity Areas" as identified in systematic biodiversity plans adopted by the competent authority" in the Eastern Cape. The CBAs mapped in the ECBCP2018 will be considered as the Systematic Biodiversity Plan for the Eastern Cape, thus contributing to listing of

geographical areas in which certain activities require an EA.

Note: Although the approach used to review the ECBCP2018 is fundamentally based on Bioregional Planning methods (following the guidelines and aligning with the technical guidelines) the ECBCP2018 does not fulfil all the consultative requirements of a Bioregional Plan. As such it will be gazetted as “Systematic Biodiversity Conservation Plan”.

3.2.8 Additional legislation relevant to the Eastern Cape Biodiversity Conservation Plan (2018)

In addition to the core environmental/biodiversity legislation, other Acts and policies pertaining to spatial planning and land use applications, that are also relevant to biodiversity planning, are summarised in Table 1 below.

Table 1 Additional key legislation, policies and plans relevant to biodiversity conservation planning in the Eastern Cape

Year	Document/Act
Legislation	
1934	Townships Ordinance 33 of 1934 (governing urban areas in the former Transkei)
1970	Mountain Catchment Areas Act (No.63 of 1970)
1970	Subdivision of Agricultural Land Act (No. 70 of 1970)
1974	Cape Nature and Environmental Conservation (Ordinance 19 of 1974)
1987	Ciskei Nature Conservation Act 1987
1987	Land Use Regulation Act (No. 15 of 1987) (governing former Ciskei)
1983	Conservation of Agricultural Resources Act (No. 43 of 1983)
1998	National Forest Act (No. 84 of 1998)
1985	Land Use Planning Ordinance (Ordinance 15 of 1985) (governing former old Cape Province)
1992	Transkei Environmental Conservation Decree (No. 9 of 1992)
1998	National Water Act (No.36 of 1998)
1999	National Heritage Resources Act (No 25 of 1999)
2000	Municipal Systems Act (No. 32 of 2000)
2002	Mineral and Petroleum Resources Development Act (No. 28 of 2002)
2003	National Environmental Management: Protected Areas Act (No. 57 of 2003, as amended)
2004	National Environmental Management: Air Quality Act (No. 39 of 2004)
2008	National Environmental Management: Waste Act (No. 59 of 2008, as amended)
2010	Eastern Cape Parks and Tourism Agency Act (No. 2 of 2010)
2013	Spatial Planning and Land Use Management Act (No 16 of 2013)
Conventions, Policies and Plans	
1971	Convention on Wetlands (Ramsar Convention)
1973	Convention on Trade in Endangered Species of Wild Fauna and Flora (CITES)
1994	United Nations Framework Convention on Climate Change (UNFCCC)
2011	National Freshwater Ecosystem Priority Areas (Nel <i>et al.</i> , 2011)
2015	National Biodiversity Strategy and Action Plan
Under revision	Eastern Cape and National Protected Area Expansion Strategy

4 INTENDED USERS AND USES

4.1 Who should use the ECBCP2018?

The ECBCP2018 should be used by all sectors involved with land use planning and decision-making in the Eastern Cape. This extends to entities that need to use the ECBCP2018 to meet legislative requirements, as well as planners, programmes and developers who would find it useful to inform planning processes.

The main users of the ECBCP should include (See Table 2):

- District and Local Municipalities
- Other National and Provincial development sectors
- National and Provincial Extended Public Works Programmes
- Environmental Assessment Practitioners
- Competent Authorities
- Developers or land owners considering development applications or changes in land use

4.2 How should the ECBCP2018 be used?

As previously mentioned, the ECBCP2018 should be used for a range of land use planning and decision-making processes. These include (see Table 2 for summary):

Proactive planning (using the ECBCP2018 to plan forward):

- Provincial and Municipal planning departments through integration of CBAs, ESAs and the land use guidelines into Spatial Development Frameworks (SDFs), Integrated Development Plans (IDPs) and other relevant sector plans.
- Any department or organ of state conducting a Strategic Environmental Assessment (SEA) or developing an Environmental Management Framework (EMF).
- Any department or organisation developing zoning schemes or other planning under SPLUMA/LUPO
- Inform scope of work and biodiversity specialist input requirements into the Environmental Impact Assessment (EIA) process.
- Identifying land of high biodiversity value that should be considered in the Eastern Cape Protected Areas Expansion Strategy.
- Identifying land that is of high biodiversity value or that is critical for ecosystem function and which is in need of restoration for improved function of ecosystem infrastructure and service delivery.

Reactive decision-making (using the plan to assess development proposals):

- Decision-making on applications for Environmental Authorisations
- Relevant agricultural land use applications
- Water-use licence applications (WULAs)
- Authorisation for prospecting and mining

Table 2 below summarises who should use the ECBCP2018 and how.

Table 2 Summary of who should use the ECBCP2018 and how

User	Application	Specific uses
District and Local Municipalities	Proactive planning	Informing spatial and development planning through integration as a sectoral plan in SDFs, IDPs and other relevant municipal sector plans.
Other National and Provincial development sectors (e.g. National and Provincial Dept. of	Proactive planning	Informing development planning and decision-making.

User	Application	Specific uses
Environmental Affairs, Dept. of Agriculture, Forestry and Fisheries, Dept. of Co-operative Governance and Traditional Affairs)		
National and Provincial Extended Public Works Programmes	Proactive planning	Assisting planning and prioritisation of areas for restoration and conservation.
Developers or land owners contemplating changes in land use	Proactive planning	Informing appropriate development, layout and design of proposed land use changes by considering sensitive biodiversity and habitat.
Environmental Assessment Practitioners	Reactive assessment and decision-making	Informing the scope of work for EIAs and biodiversity specialist impact assessments.
Competent Authorities (DEA, DEDEAT, DMR, DWS)	Reactive assessment and decision-making	Informing decision-making/permitting/authorisation.

Although the ECBCP2018 is based on the most accurate, recent and available science, gaps in biodiversity knowledge and, in some cases, outdated mapping products, the following must be taken into account:

- The ECBCP2018 cannot be used to the exclusion of other environmental/biodiversity planning initiatives.
- Biodiversity Sector Plans/Bioregional Plans, developed at a finer scale, must be aligned with ECBCP2018 and adopted by the Department of Economic Development and Environmental Affairs. District Municipalities may develop such plans, which if adopted, must be gazetted.
- The ECBCP2018 cannot replace onsite surveys and assessments for land use or application authorisation in terms of NEMA EIA Regulations.

5 PREVIOUSLY PUBLISHED BIOREGIONAL PLANS AND OTHER ENVIRONMENTAL PLANS

Two localised biodiversity plans have already been developed in the Eastern Cape, namely the Nelson Mandela Bay Metropolitan Bioregional Plan (2014 as revised) and the Coega Development Corporation Open Space System (2014).

The development of both plans involved a fine scale biodiversity assessment, detailed expert input and stakeholder engagement and are legally enforced and implemented by the responsible agencies. Since it is not desirable for the ECBCP2018 CBAs and ESAs to be in conflict with the CBAs in either of these two existing plans, they have been incorporated without modification into the ECBCP2018. It must be noted, however, that as a consequence, the ECBCP2018 is unable to meet specific biodiversity targets.

In addition to the two above-mentioned biodiversity plans, an additional 29 biodiversity-related plans developed for different parts of the Eastern Cape were reviewed. These are listed in the Table 3. The ECBCP2018 sought to align with the outcomes proposed in the various plans by weighting the selection of CBAs and ESAs in favour of important areas identified in these plans.

For further details regarding how each biodiversity spatial plan was utilised in the CBA mapping process, refer to the ECBCP Technical Report.

Table 3 List of additional plans

Date	Name of plan
2007	Eastern Cape Biodiversity Conservation Plan
2010	Garden Route Critical Biodiversity Map
2014	Kouga-Tsitsikamma Wind Energy Ecological Assessment
2003	Subtropical Thicket Ecosystem Programme: conservation priority map
2002/3	Succulent Karoo Ecosystem Plan: Geographic Priorities
2008	Maloti Drakensberg Trans-frontier Biodiversity Implementation Areas
2010	Alfred Nzo DM Environmental Management Plan
2008	Coastal Environmental Management Framework (Kei Mouth to Cannon Rocks)
2015	Wild Coast Environmental Management Plan
2012	Addo Elephant National Park: identified CBAs and ESA
2014	Coega Industrial Development Zone Open Space Management System
2015/16	Shale-gas Strategic Environmental Assessment
2015	Eastern Cape Protected Area Expansion Strategy
2010	National Protected Areas Expansion Strategy
2016	Northern Cape Conservation Plan
2012	KZN Biodiversity Spatial Plan
2016	Western Cape Biodiversity Sector Plan Spatial Assessment
2017	Free State Biodiversity Sector Plan
2010	Plantation Forestry Biodiversity Screening Tool (ASGISA)
2011	Climate Change Adaptation Corridors in KZN and the Eastern Cape
2017	KZN Strategic Water Source Areas
2013	National Strategic Water Source Areas
2011	Rapid Biodiversity Assessment for land adjacent to Mkambati Nature Reserve
2011	National Biodiversity Assessment Ecosystem Based Adaptation
2012	Gouritz Cluster Biosphere Reserve
2008	Baviaanskloof Mega-reserve
2015	Alfred Nzo DM Climate Change Response Strategy
2017	Southern Drakensberg Assessment
2016	Important Bird and Biodiversity Areas
2007	Buffalo City Metropolitan Municipality Conservation Plan

PART B BIODIVERSITY PROFILE AND DESCRIPTIONS

6 INTRODUCTION

6.1 What is Biodiversity and why is it important?

Biodiversity is the term used to describe the variety of life forms with a defined area (biodiversity pattern), as well as the ecological and evolutionary processes that enable biodiversity to persist (ecological process areas). Biodiversity underpins all life on Earth. Biodiversity can be described at a landscape level (as ecosystem processes), a species level and at a genetic level. Ecosystems can be defined as a “biologically complex network of interacting and interconnected organisms and their physical environment that function as a unit”.

Biodiversity is a measure of ecosystem health and is the building block to healthy ecosystems, which function as the necessary infrastructure that provide ecosystems services to surrounding communities. Typical, and often vital, ecosystem services that communities rely on include:

- Provision of clean water
- Protection from natural disasters, e.g. flood regulation, dunes against storm surges
- Rangelands for grazing
- Soil formation for cultivation
- Herbal medicine
- Food: indigenous plants and animals
- Building materials: timber, thatching
- Fuel
- Cultural, spiritual and education
- Nutrient recycling

Ecosystem Infrastructure is the network of natural landscapes which, when maintained, facilitate continued delivery (and growth) of ecosystem services. When ecosystem infrastructure is degraded, either through loss of biodiversity or a disruption in ecological processes, the consequences are most severely felt by poor communities, who depend almost entirely on natural resources and ecological services for their survival.

The biodiversity and ecosystems of the Eastern Cape, which has the potential to be a rich source of natural solutions for the socio-economic needs/demands of the province, are vulnerable and require co-ordinated land use planning intervention across all sectors in order to protect them.

7 BIODIVERSITY OF THE EASTERN CAPE PROVINCE

7.1 Biophysical features

The Eastern Cape largely owes its noteworthy biodiversity to the significant variability in rainfall, average temperatures, geology and altitude.

7.1.1 *Mean Annual Rainfall*

The rainfall pattern in the Eastern Cape is highly variable (300-1000mm per annum) and can be described as ranging from semi-arid in the west, to sub-tropical in the north-east/south-west (Figure 2), influenced mainly by the distance from the ocean. The south-west portion receives a significant winter rainfall, while the rest of the Province is characterised by predominantly summer rainfall. The high rainfall areas (as identified in the National and Eastern Cape Strategic Water Source Areas) are associated with mountain ranges and escarpments.



Figure 2 Mean Annual Rainfall for the Eastern Cape Province

7.1.2 Mean Annual Temperatures

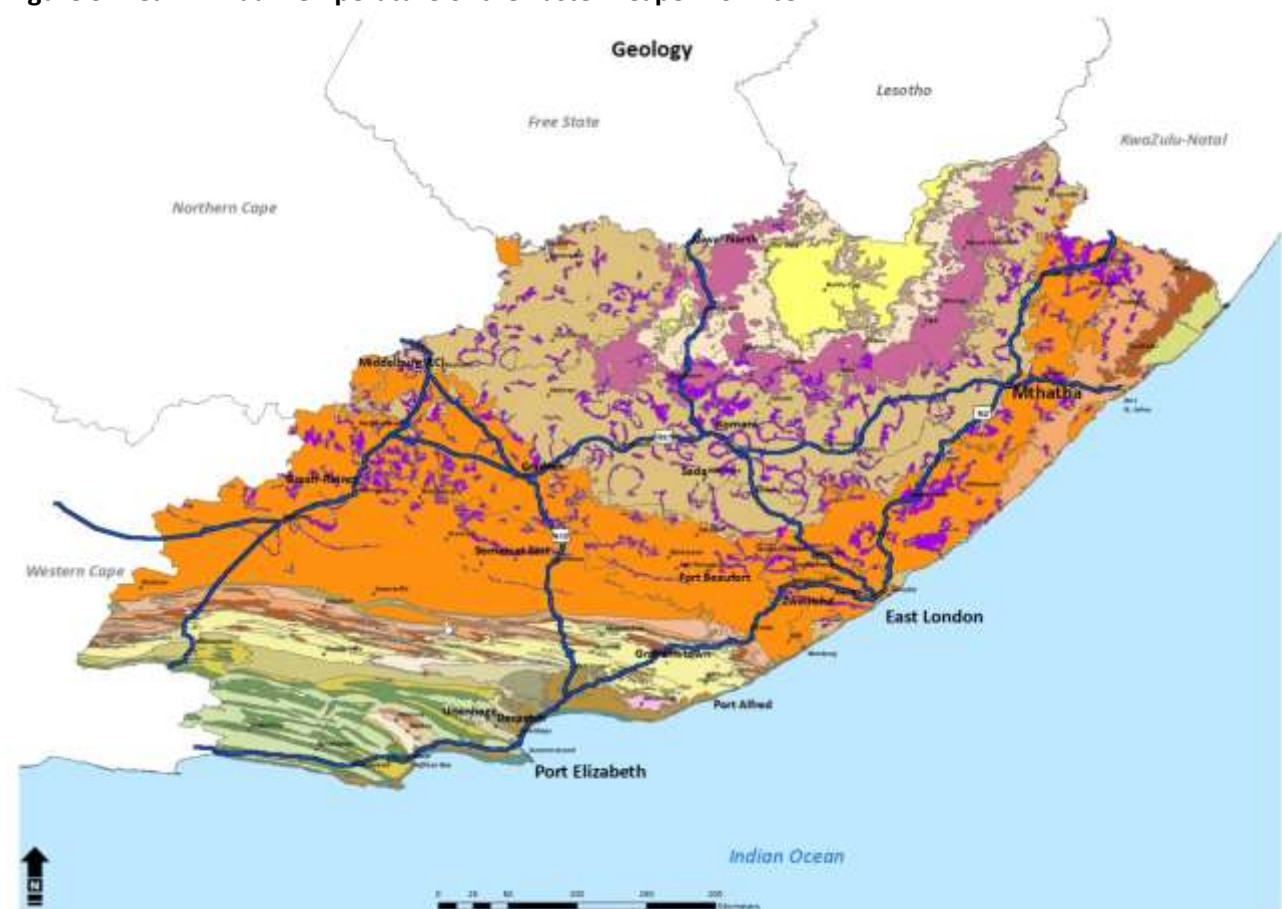
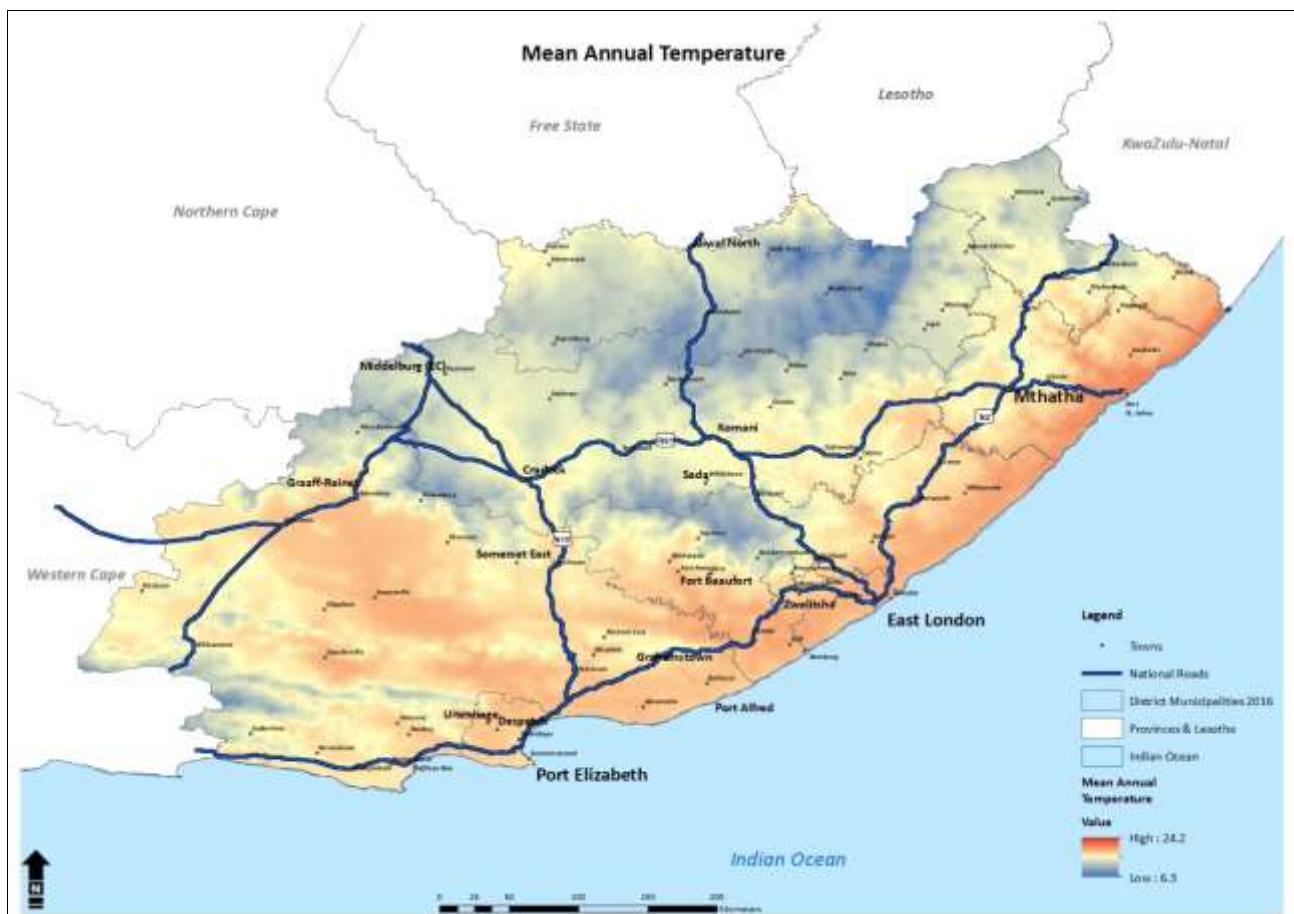
Temperature ranges in the Eastern Cape is highly variable (Figure 3), ranging from moderated, cool, ocean-influenced annual temperatures along the coastline to more extreme seasonal temperature ranges inland and above the escarpments, where snowfall on mountain ranges in winter is frequent.

7.1.3 Eastern Cape Geology and Soils

The geology of the Eastern Cape consists of sediments of the Cape Supergroup and Karoo Supergroup. The Cape Supergroup, the first deposit, is characterised by sandstones, quartzites and shales. This geology covers large areas in the south and north of the Province, but of particular relevance to biodiversity are the diverse shales and sandstone associated with the Fynbos and Thicket Biomes as well as the isolated sandstone outcrop in the Pondoland (Figure 4), where many endemic species are located.

The Karoo Supergroup was deposited above the Cape Supergroup and is made up of Dwyka, Ecca and Beaufort Groups. Most of the Eastern Cape geology is characterised by the mudstone and silt stone of the Beaufort Group

The Drakensberg and Stormberg group was formed later by basaltic lava, resulting in the prominent outcrop in the north and forming basaltic soils. Not all magma reached the surface and formed intrusions into the Karoo Supergroup rocks (Karoo dolerite, Figure 4). An example of once such intrusion is known as the Insizwa Complex, which holds specific interest from a biodiversity perspective (Dolerite soils in Figure 5). This intrusion, and the associated soils, has been shown to consist of high concentrations of nickel, copper and chromium which may yield unique species that have adapted to these conditions.



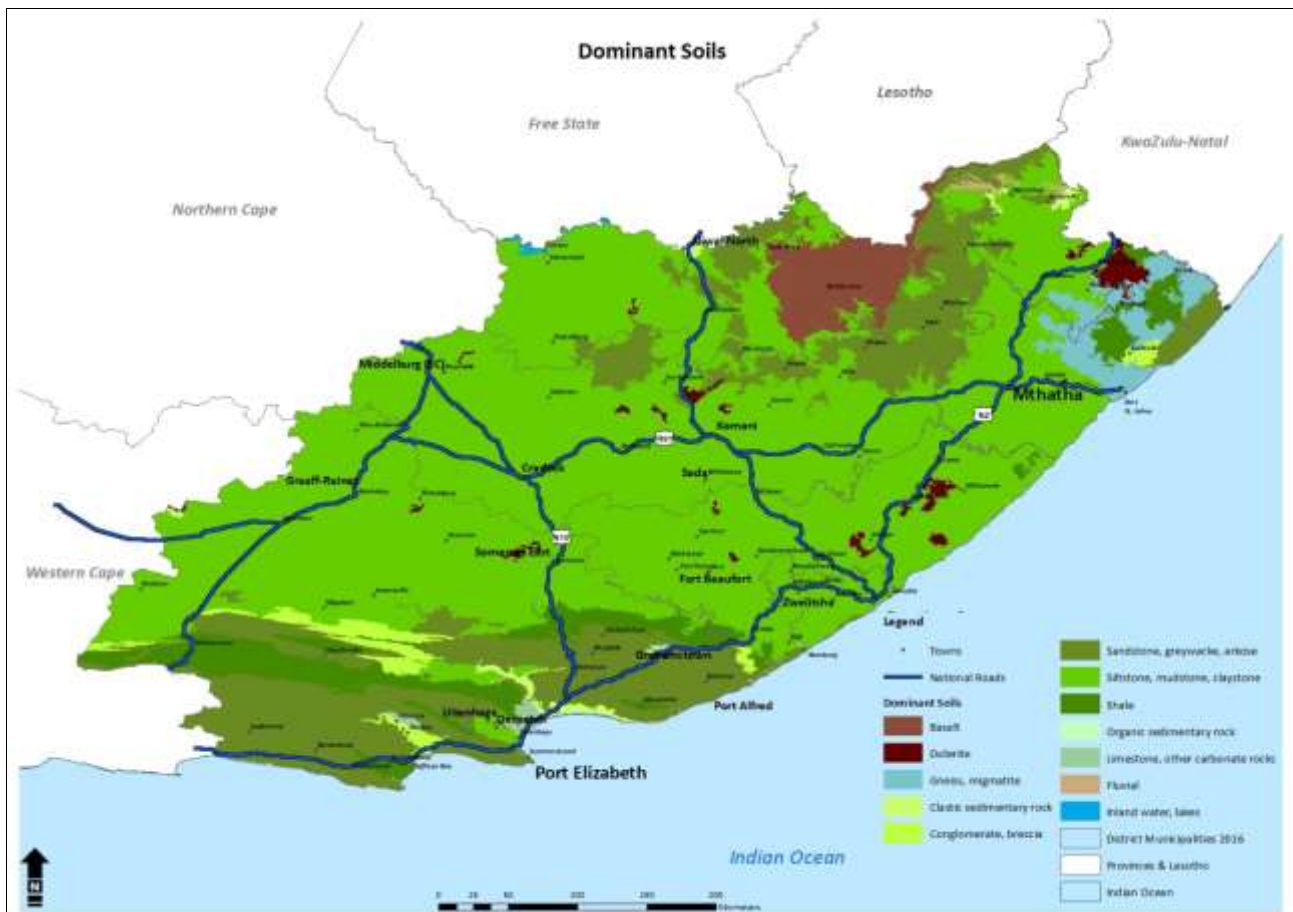


Figure 5 Soils of the Eastern Cape Province

7.1.4 Topography

The topography of the Eastern Cape is also highly variable starting at 2500m above sea-level in the high alpine mountains of the Drakensberg to subtropical mangrove swamps along the Wild Coast (Figure 6).

Travelling from the south coast (Jeffery's Bay) the topography is punctuated by east-west mountain ranges namely, the Groot Winterhoek and Zuurburg Mountain range. Proceeding further north and east the topography levels out before it reaches the Sneeuwberg and Amatola Mountain Ranges which forms part of the Great Escarpment, after which the landscape levels out on the high veld towards Aliwal North.

From the east coast (Coffee Bay to Port St Johns), three "step-up" escarpments are associated with unique biodiversity. The coast is characterised by deeply incised valleys that that experience a step-up approximately 10km from the ocean. Continuing further inland, the next escarpment step, forming part of the Great Escarpment, occurs along a north-east/south-west band associated with Mount Ayliff, Mount Frere, Tsolo and across to Cala. The last escarpment step is associated with the Stormberg and Southern Drakensberg range.

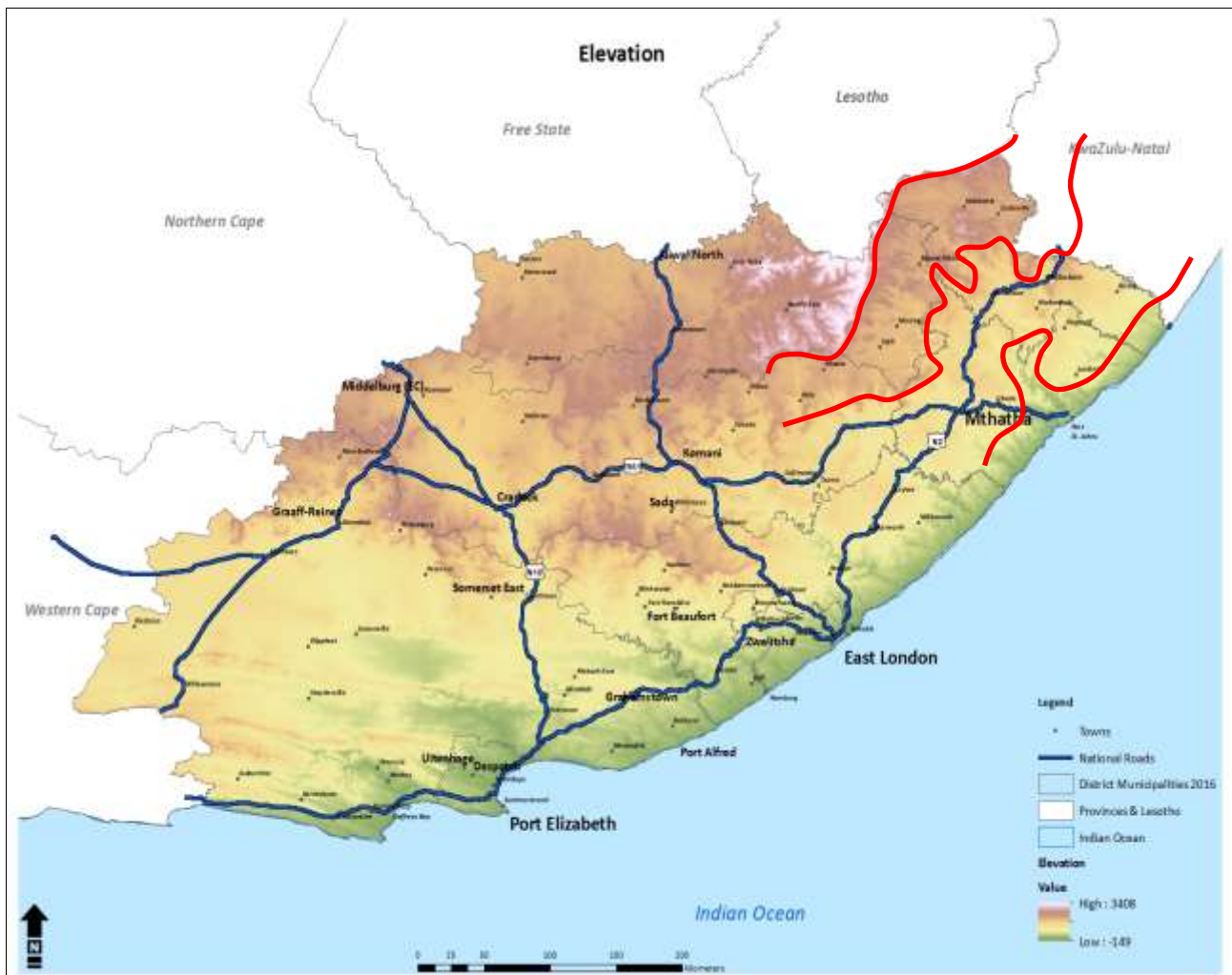


Figure 6 Topography of the Eastern Cape Province (red line indicating step-up escarpments)

7.2 Global importance biodiversity in the Eastern Cape

The global relevance of the biodiversity in the Eastern Cape can be described in terms of biodiversity hotspots. An initiative, driven by Conservation International, set out to map biodiversity hotspots globally. In order to fully appreciate the value of being classified as hotspot, one needs to consider the qualifying criteria:

1. The area/"spot" must have at least **1500 endemic** (occurring no-where else) plant species; and
2. It must have **30% or less** of its original natural vegetation remaining (i.e. under severe threat).

Cumulatively, the 35 identified global hotspots cover approximately 2.5% of the earth land, but represent more than 50% of the world's endemics plant species and nearly 43% of bird, mammal, reptile and amphibian endemic species. **The Eastern Cape supports three global hotspots** (Figure 7). These include:

1. The Maputoland-Pondoland- Albany Hotspot covers more than half of the Province from the east coast and inland along the Great Escarpment. This hotspot is ecologically complex, including considerable variation in climate, altitude and biome types.
2. The very small portion of the Succulent Karoo Hotspot is mapped in the south-western portion of the Province. The unique plant biodiversity of the Succulent Karoo is shaped by extreme habitats (rugged mountains, semi-arid conditions and coastal dunes systems). Succulent and bulbous species have evolved as habitat specialists, confined to limited range and specific soil types.

3. The Cape Floristic Region is mostly seated within the Western Cape, with its most eastern leg extending into the Eastern Cape as far as Port Elizabeth. The Cape Floristic Region is one of six floral kingdoms in the world, characterised by having the highest concentration of species in the world and boasting between 9000-9500 plant species, 70% of which are endemic.

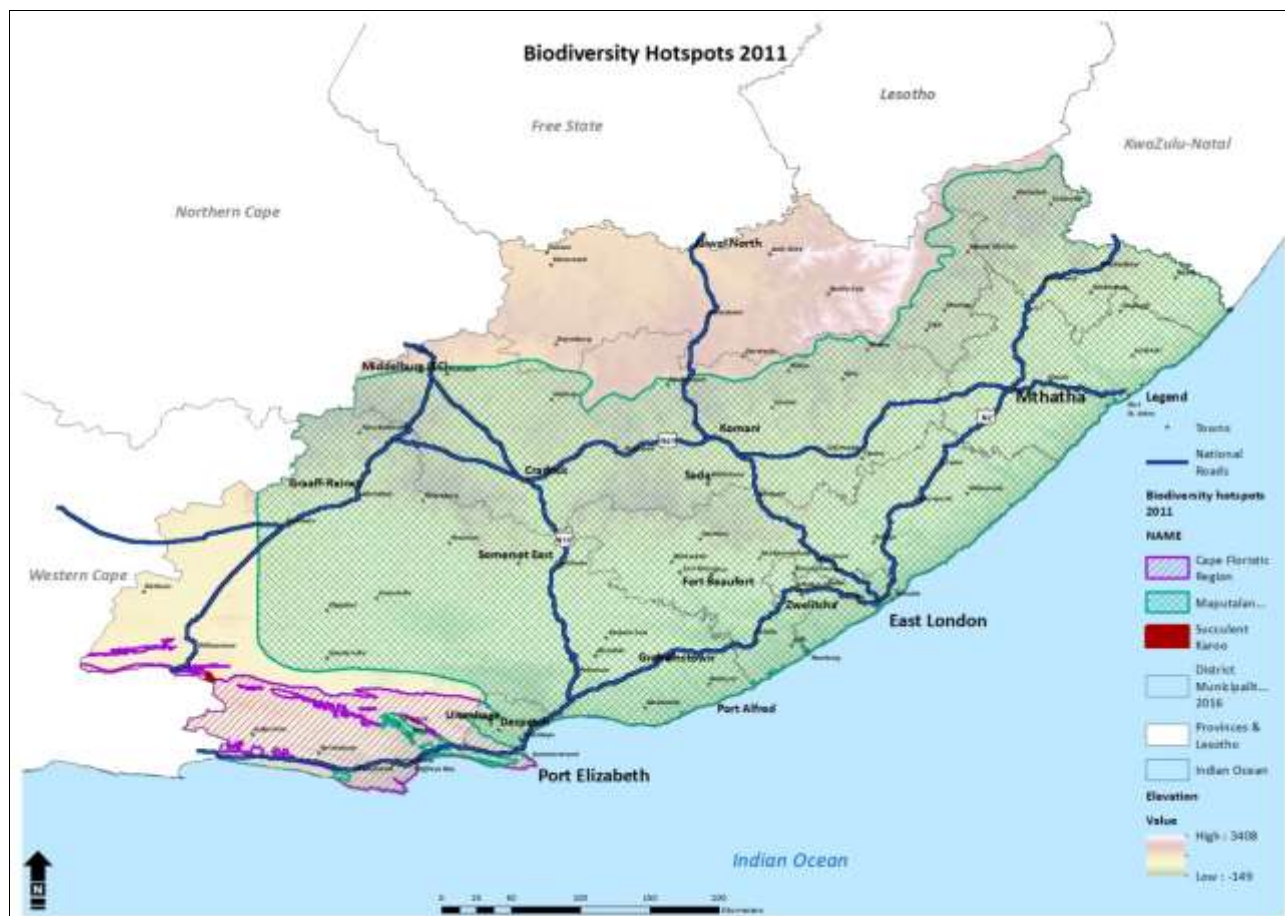


Figure 7 Biodiversity Hotspots of the Eastern Cape

7.3 National Importance of the Eastern Cape Biodiversity

A further definition of an ecosystem is a collection of communities of both living and non-living things that are interrelated. Coastal forest is an example of a terrestrial ecosystem which is a vegetation type hosting a set of faunal taxonomic groups within a climatic envelop on specific geological formation. This may be extended to aquatic systems such as wetlands or estuaries. Ecosystems may be defined at different scales. Groups of ecosystems that share common characteristics, such as species structure/composition/climate, are called biomes.

7.3.1 Biomes

The South African Vegetation Map (Mucina and Rutherford, 2006 & 2012) divides South Africa into nine biomes (Table 4). Out of all the provinces in South Africa, the Eastern Cape is home to no less than eight of these biomes. It is important to stress that these biomes support habitat specialists that are largely limited by the range of the biome.

Table 4 Biomes of South Africa

Biome type	Present in the Eastern Cape
Fynbos Biome	Yes
Succulent Karoo Biome	Yes
Desert Biome	No

Biome type	Present in the Eastern Cape
Albany Thicket Biome	Yes
Forest Biome	Yes
Grassland Biome	Yes
Indian Ocean Coastal Belt	Yes
Nama-Karoo Biome	Yes
Savanna Biome	Yes

7.4 Regional importance of biodiversity in the Eastern Cape

7.4.1 Vegetation types and threat status

According to the South African Vegetation Map (Mucina and Rutherford, 2012) and the Forest Classification (Von Maltitz, 2003), the Eastern Cape boasts 97 vegetation types (Table 5 and Figure 8).

Table 5 Number of vegetation types, number of threatened vegetation types and endemic vegetation types of the Eastern Cape based on the SA VEGMAP 2012

Biome	No. of vegetation types	No. of threatened vegetation types	No. of endemic vegetation types
Albany Thicket	13	5	7
Azonal vegetation	16	4	1
Forest	9	1	1
Fynbos	19	6	4
Grassland	23	10	5
Indian Ocean Coastal Belt	2	1	0
Nama-Karoo	6	0	2
Savanna	3	3	0
Succulent Karoo	3	0	1

The threat status of the Eastern Cape vegetation types has been re-assessed to incorporate the 2014 landcover of the Province. The threat is classified as Critically Endangered (CR), Endangered (EN), Vulnerable (VU), and Least Threatened (LT). The threat status in Table 6, excludes degraded areas from assessment as they are deemed as “not intact” and provides a conservative representation of the level of threat (Figure 9). When compared to this same assessment conducted in 2007, a total of 13 vegetation types have been elevated to a higher threat status (Table 6). Four vegetation types, all located in the Fynbos biome, have a down-graded status classification. However, it is important to note that their status is still threatened.

An additional vegetation mapping product, developed by the Subtropical Thicket Ecosystem Programme (STEP), is also relevant. The STEP vegetation map, undertaken at a much finer scale than the SA vegetation map, was also re-assessed against the 2014 landcover for Province for the updated threat status of respective vegetation components (Figure 10) within the Thicket Biome.

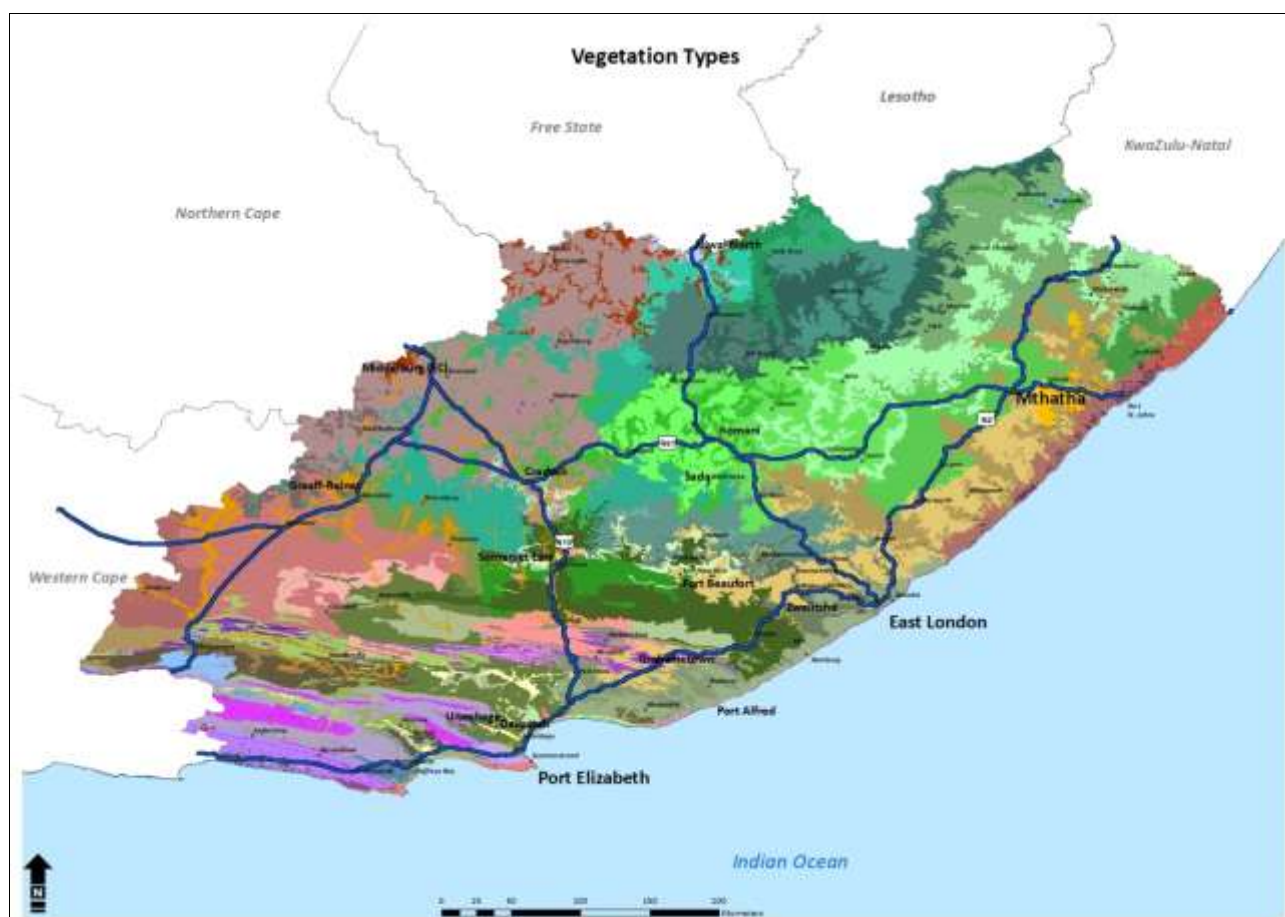


Figure 8. Vegetation types of the Eastern Cape (integrated DAFF inventory and SA VEGMAP2012)

Table 6 Threatened vegetation types of the Eastern Cape analyses using updated integrated landcover

Threatened Vegetation types	2007 (based on 2000 landcover)	2017 (based on 2014 landcover)
Basotho Montane Shrubland	CR	CR
Cape Inland Salt Pans	VU	CR
Dry Coast Hinterland Grassland	LT	CR
Garden Route Shale Fynbos	CR	CR
Mabela Sandy Grassland	VU	CR
Midlands Mistbelt Grassland	EN	CR
Ngongoni Veld	EN	CR
Albany Alluvial Vegetation	EN	EN
East Griqualand Grassland	EN	EN
Eastern Coastal Shale Band Vegetation	CR	EN
Humansdorp Shale Renosterveld	CR	EN
Moist Coast Hinterland Grassland	LT	EN
Mthatha Moist Grassland	EN	EN
Transkei Coastal Belt	VU	EN
Albany Coastal Belt	LT	VU
Algoa Sandstone Fynbos	EN	VU
Bhisho Thornveld	LT	VU
Buffels Thicket	VU	VU
Camdeboo Escarpment Thicket	VU	VU

Threatened Vegetation types	2007 (based on 2000 landcover)	2017 (based on 2014 landcover)
Cape Lowland Freshwater Wetlands	LT	VU
Eastern Valley Bushveld	LT	VU
Forest IV1: Eastern Mistbelt Forests	LT	VU
Langkloof Shale Renosterveld	EN	VU
Lesotho Mires	LT	VU
Senqu Montane Shrubland	VU	VU
Sundays Noorsveld	VU	VU
Sundays Thicket	VU	VU
Tsitsikamma Sandstone Fynbos	VU	VU
Tsomo Grassland	VU	VU
Zastron Moist Grassland	VU	VU

7.4.2 Listed Threatened Ecosystems

NEMBA provides for the listing of threatened or protected ecosystems in South Africa. In 2011 DEA gazetted a list of Threatened Ecosystems for South Africa (No. 1002 of 2011). The following threatened ecosystems which require protection and conservation are relevant to the Eastern Cape (Figure 11):

- Langkloof Shale Renosterveld (CR)
- Albany Alluvial Vegetation (EN)
- Humansdorp Shale Renosterveld (EN)
- Kobonqaba Forest Complex (EN)
- Mangrove Forest (EN)
- Mount Thesiger Forest Complex (EN)
- Algoa Sandstone Fynbos (VU)
- Eastern Coastal Shale Band Vegetation (VU)
- Eastern Scarp Forest (VU)
- Garden Route Shale Fynbos (VU)
- Midlands Mistbelt Grassland (VU)
- Mthatha Moist Grassland (VU)
- Ngongoni Veld (VU)
- Pondoland Scarp Forest (VU)
- Swamp Forest (VU)
- Transkei Coastal Forest (VU)

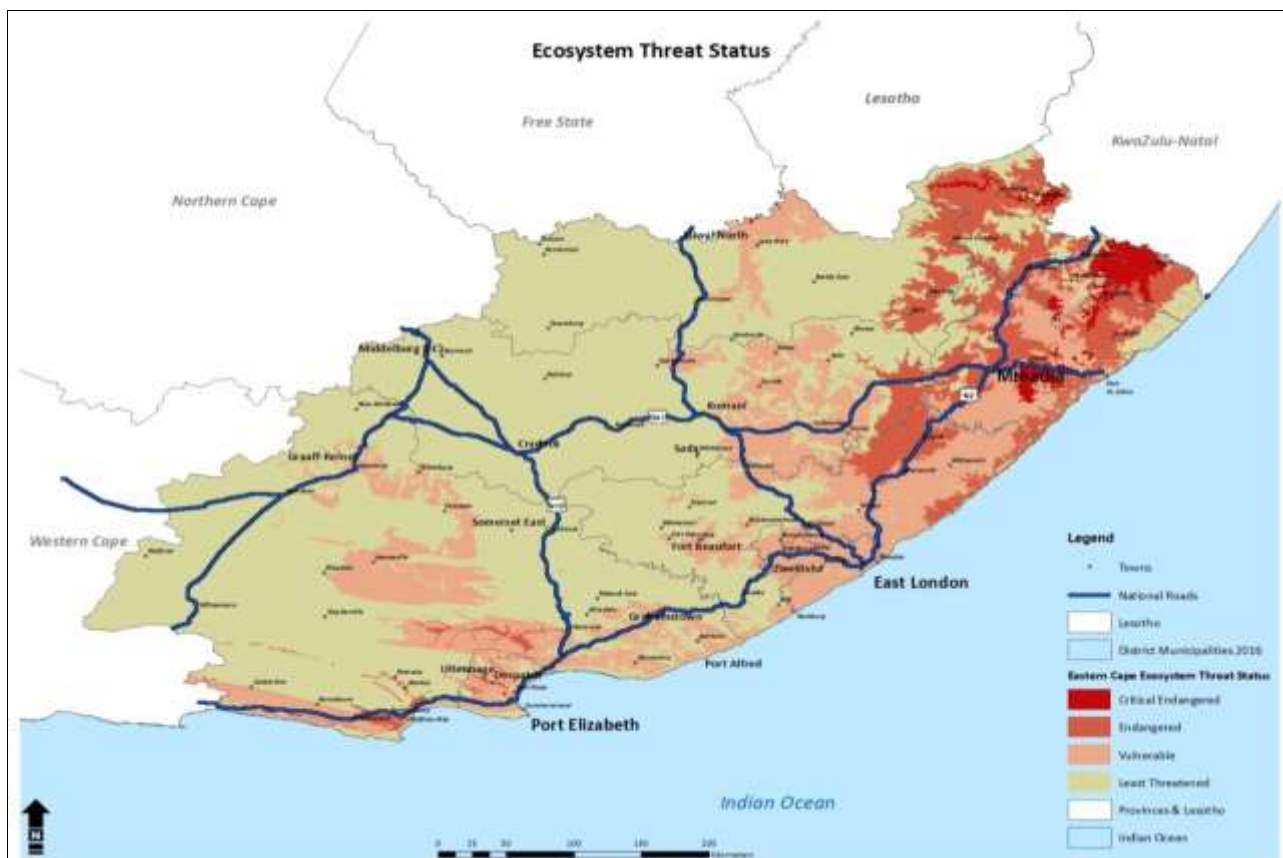


Figure 9 Threatened Vegetation types of the Eastern Cape (based on the integrated 2014 land cover for the Province)

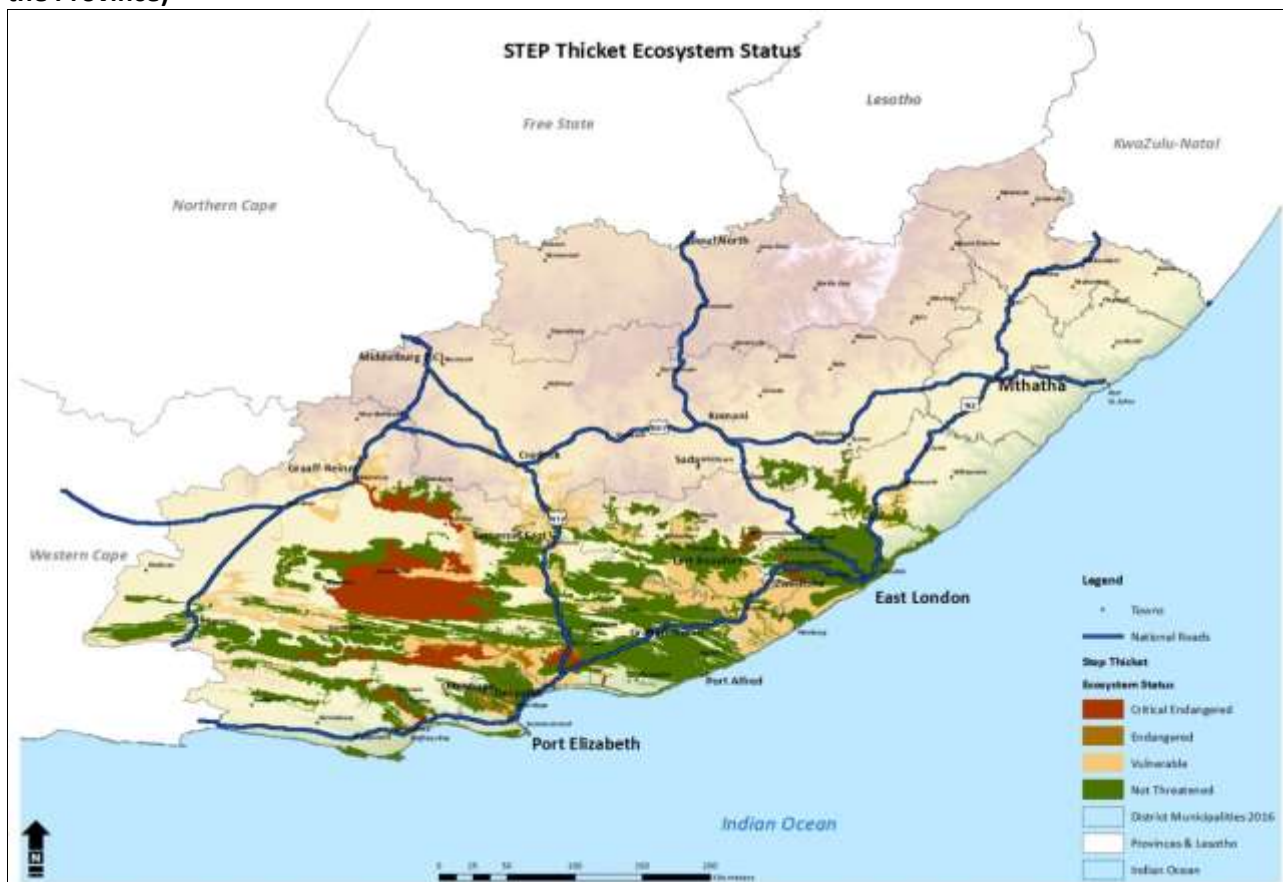


Figure 10 Threatened STEP vegetation types (based on the integrated 2014 land cover for the Province)

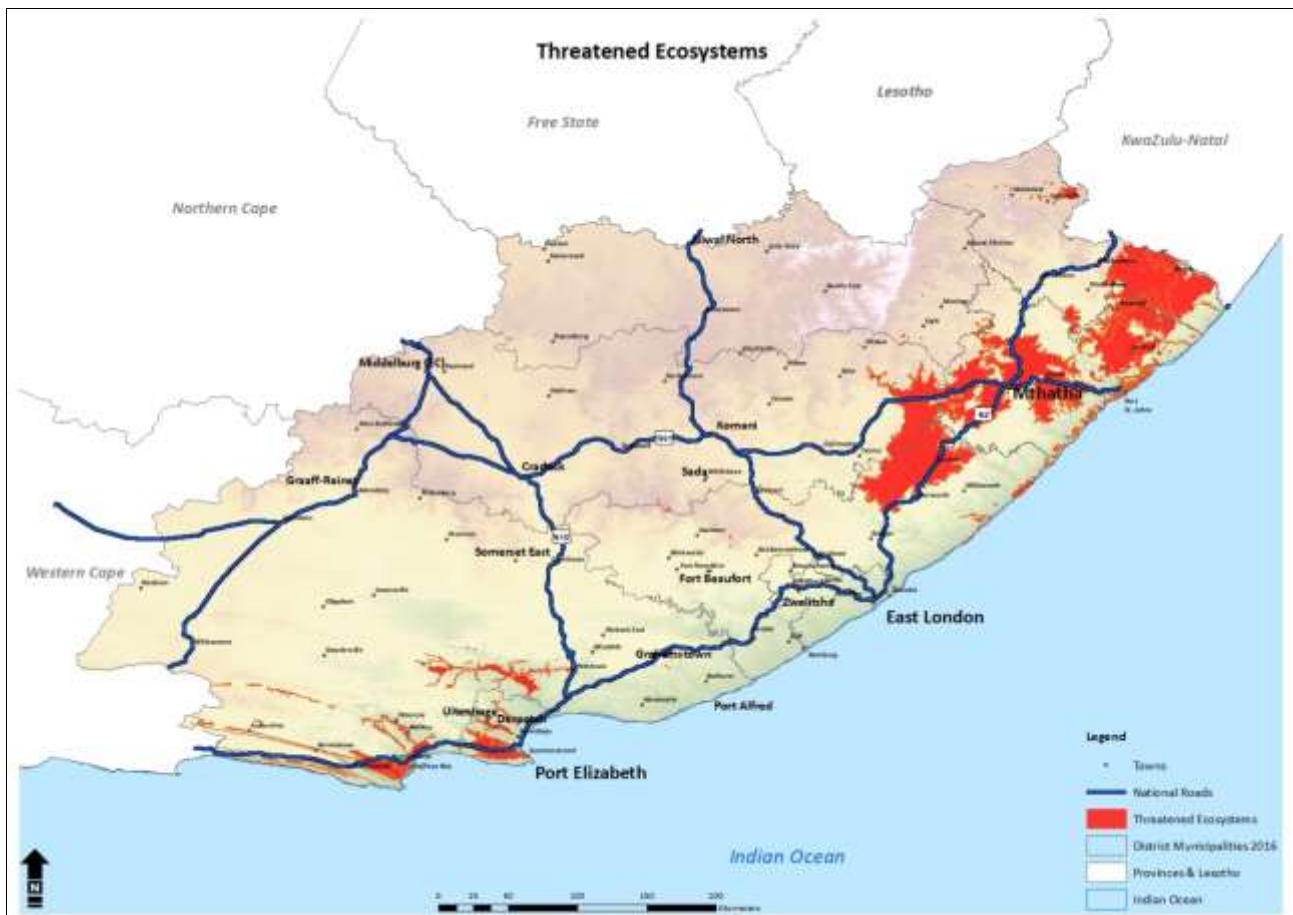


Figure 11 Listed Threatened Ecosystems (NEMBA No. 1002 of 2011)

7.4.3 Levels of Protection

The levels of ecosystem in the Eastern Cape have been assessed in terms of the area of each ecosystem (vegetation type) that is formally conserved against the conservation target that needs to be achieved. The percentages, measured as a percentage of the conservation target achieved are classed into:

- Well protected (100% and more)
- Moderately protected (50-99%)
- Poorly protected (5-49%)
- Not protected (0-5%)

From Figure 12 below, it is evident that some of the Eastern Cape's most critically endangered, endangered and vulnerable ecosystems are afforded no form of protection at all.

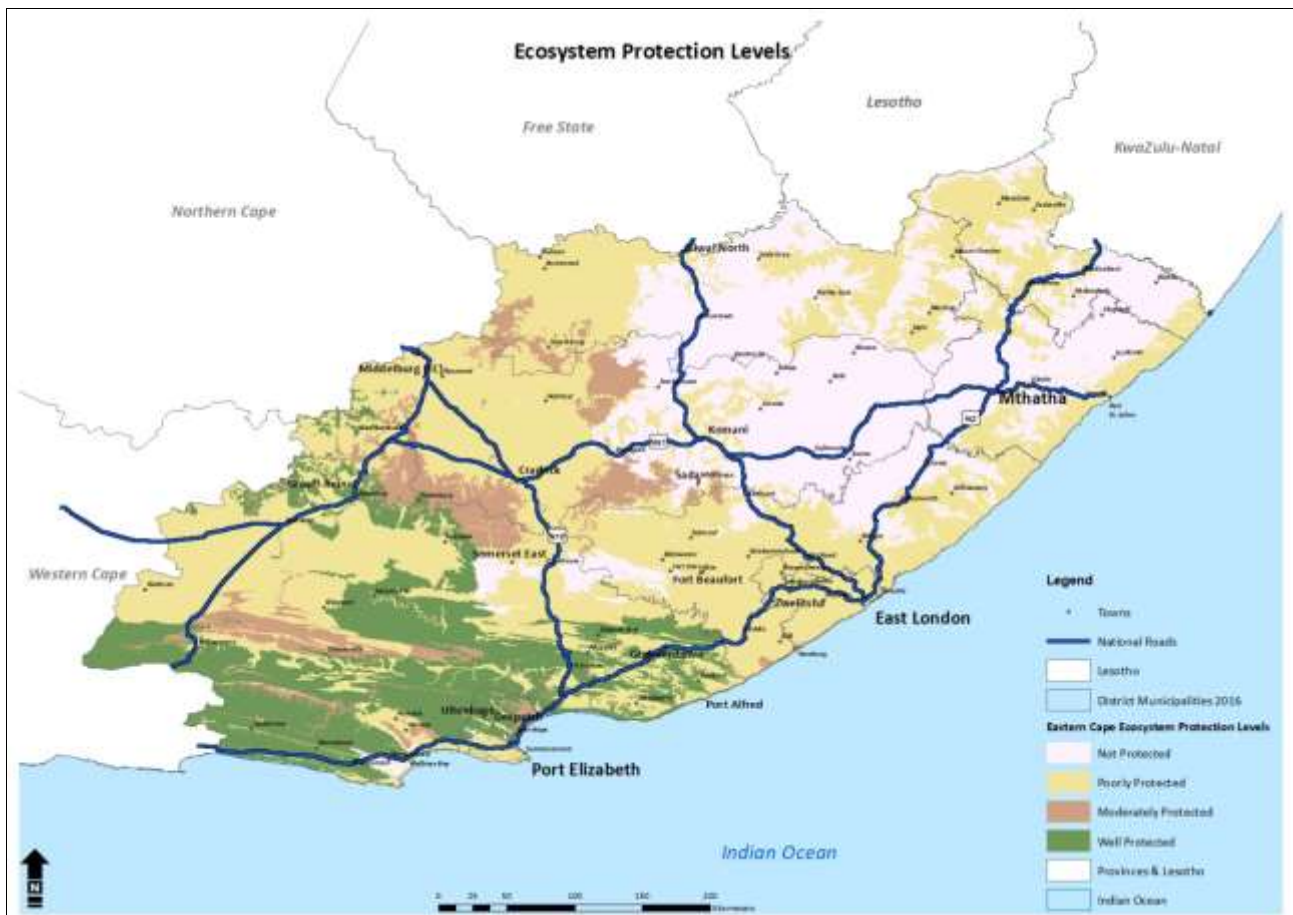


Figure 12 Levels of protection of the Eastern Cape ecosystems (2018)

7.4.4 Freshwater Ecosystems

River systems

River systems contribute significantly toward the health and wealth of the Eastern Cape. Access to water plays a pivot role, not only in terms of sustaining life, but also creating opportunities for livelihoods. The majority of the east and south flowing rivers in the Eastern Cape flow from source to sea. The west and north flowing rivers drain into the Orange River system.

The Eastern Cape has a number of relatively large river systems fed by varying catchment areas, namely, from north to south:

- Orange
- Mtamvuna
- Mzimvubu
- Mthatha
- Mbashe
- Great Kei
- Buffalo
- Fish
- Sundays
- Gamtoos
- Krom

Some of these rivers systems, such as the Mzimvubu, Buffalo and Gamtoos Rivers, are fed by upper catchments which experience a disproportionately high rainfall and are considered as “water factories”. These areas, termed Strategic Water Source Areas (SWSAs), have been identified at a National level and are the focus of management initiatives to keep SWSA catchments intact to ensure enhanced downstream water quality and quantity.

A myriad of smaller catchments along the entire coastline drain into minor systems that discharge to the sea.

Wetlands

Wetlands provide not only the necessary habitat for a unique set of hydrophilic species, but also provide a number of ecosystem services. Wetlands act as water purifiers by removing nutrients and screening sediment. They also function to regulate water flow and act as buffers during flood event, while holding water during droughts. Wetlands are also important for the numerous species that depend on these habitats for breeding, completing life-cycles and foraging. There a number of noteworthy wetland systems/complexes in the Eastern Cape:

The Cedarville Umzimvubu Wetland Complex is located immediately north and east of Cedarville in the north of the Province. It is a floodplain wetland, fed by the upper reaches of the Umzimvubu River and is measured at over 5,000ha in extent. The wetland system is characterised by oxbow lakes, depressions and valley bottom wetlands, creating a variable habitat supporting a rich diversity of fauna and flora. Wattled Crane and possibly Crowned Crane, utilise these wetlands.
The Ugie Oxbow Wetlands are located in between plantation forestry in the vicinity of Ugie. They are characterised by small oxbow/vacated wetlands, but are not characterised by the same extent or variety of wetland types and flow regimes as the Umzimvubu Wetland Complex.
The Kabeljous Rivier Dune bypass wetland , located between Jeffery’s Bay and the Gamtoos River mouth, is a unique feature. The wetland appears to have been formed by a catchment blindly ending behind a dune system (rather than discharging out to sea). At this point the wetland is assumed to be fresh/brack. The wetland follows the foredune, running parallel to the ocean until it merges with the Kabeljous River. At this point, the wetland system is influence by ocean tides, making it estuarine in character.
The Karst Wetlands occur on the limestone/karst geological formation around the Motherwell and Coega Industrial Development Zone. These wetlands are considered important due to their unique species composition. Karst formations are also important ground water resources.
The Transkei Coastal Wetlands occur along the coast from the Great Kei River extending along the coastline. These are small wetlands, often formed as depressions but may also occur as small flood-plains, located within 100m of the ocean immediately behind and adjacent to the foredunes. The depression wetlands, which are not regularly flushed, typically accumulate salts from ocean sprays and have high salinity levels. Floodplains are fresh, but may still be exposed to sea-spray. While coastal depressions may be limited to salt-tolerate species (halophytes), floodplain wetlands are typically associated with high plant biodiversity.

7.4.5 Coastal Ecosystems

The Eastern Cape has the longest stretch of coastline of all the provinces in South Africa approximately 800km in length. In addition to the coastline’s exemplary beauty and pristine conditions, the coastal habitat constitutes a major ecological corridor and important area for climate change adaptation, buffering landward areas from impacts of sea-level rise and storm surges. The ecological components of the coastline include beach habitat (such as sandy beaches and rocky shores), active (shifting) dunes systems, foredunes and vegetated dune ecosystems.

The Eastern Cape coastal ecological zone is divided into five distinct biogeographical units, each reflecting a different suite of habitat and species. These zones are (from south to north): Tsitsikamma Coastal Cliffs; St

Francis Dune Fynbos-Thicket Mosaic; Albany Coastal Belt; Indian Ocean Coastal Belt; and, Pondoland Coastal Belt (R Cowling, see Technical Report).

The coastline is dissected by 210 estuaries (including some micro-estuaries), a number of which support unique and endemic fish species, and also play an important role as nurseries for marine species.

7.4.6 Special Habitats and Ecosystems

In addition to the vegetation-type terrestrial ecosystems described above, additional features in the Eastern Cape deserve elevated conservation status due to their biodiversity importance. These include:

- The Cedarville Wetland Complex, which is currently seeking Ramsar status
- The Cape Vulture colonies and roost sites
- Insizwa (Mt Ayliff) heavy metal geological features
- Shifting and Holocene dune systems
- The network of forests throughout the Eastern Cape
- Kabeljous Dune wetland system
- The rivers systems that support Fish Sanctuaries throughout the Eastern Cape
- Karst/Limestone landscapes (wetlands and groundwater)

7.4.7 Species of special concern

Significant areas in the Eastern Cape are under-surveyed and new species are continuously being discovered (for full species lists, refer to the Technical Report). A summary of some of the key taxonomic groups is discussed below.

Plants	
There are approximately 7400 species	
<p>The Eastern Cape supports about 7400 species representing 321 families. Of these, 258 species are threatened and 121 are considered to be of high conservation value. These include:</p> <ul style="list-style-type: none"> • 24 Critically Endangered species • 10 Critically Endangered Possibly Extinct species • 62 Endangered species • 139 Vulnerable species • 23 Declining species • 18 Critically Rare species • 103 Rare species <p>Four species have been confirmed as extinct. These include:</p> <ul style="list-style-type: none"> • <i>Brachystelma schoenlandianum</i> Schltr. • <i>Ceropegia bowkeri</i> Harv. subsp. <i>bowkeri</i> • <i>Xysmalobium baurii</i> N.E.Br. • <i>Helichrysum outeniquense</i> Hilliard 	
MAMMALS:	
Approximately 175 number of species	
<p>The majority of large mammals in the Eastern Cape are enclosed in nature/game reserves and only roaming Kudu and resident Mountain Reedbuck and Bushbuck (to name a few) still persist naturally in their original distribution ranges. Of the big cats only Leopard, in very small numbers, may still occur in their natural range, especially along mountain ranges. Smaller fauna are more prolific, but under-surveyed throughout the Province. The knowledge in terms of distribution of important threatened species such as the Samango Monkey, Golden Mole species and Tree hyrax is not complete.</p> <p>The 20-30 bat species that occur in the Eastern Cape and are widely distributed. A number of key roost sites, critical for breeding and therefore the continued persistence of at least 4 species, have been</p>	

identified.
BIRDS: Approximately 630 species
The avifauna of the Eastern Cape is as diverse, with approximately 630 species recorded in the Province, 450 of which are either resident or regular visitors. Approximately 80 of these species are classified as Red Listed (Taylor, Peacock & Wanless, 2015). These comprise 3 Critically Endangered; 20 Endangered; 28 Vulnerable and 28 Near-threatened species. Relatively few bird species are true provincial endemics, probably due to the Provinces' central position within South Africa longitudinally and its biomes and vegetation types being represented in other provinces. Testimony to the importance of the Eastern Cape for birds, are the 13 Important Bird & Biodiversity Areas located within the Province.
FRESHWATER FISH: Approximately 50 species
There are approximately 13 endemic fish species in the Eastern Cape, 10 of which are threatened. Fish are a vital component of aquatic system and play an important role in the trophic cycle, not only just within the water, but also a food sources for terrestrial animals (birds, mammals and man). There are a number of fish sanctuaries throughout the Province, which are important for the conservation of threatened fish species.
REPTILES: Approximately 115 species
The Eastern Cape is home to 115 species of snake, gecko, skink, tortoise, chameleon, monitor and lizard. Reptiles tend to be habitat specialists and many of these species are associated with specific habitat types such as: rocky outcrops, Forest, Thicket, Mesic Succulent Thicket and riparian areas.
AMPHIBIANS: Approximately 74 species
Of the amphibians in Eastern Cape 16% are threatened. In almost all cases, threatened species are also endemic (18% of the species) to the Province. The species in this group are important indicators of environmental health since the life-cycle of species are often intricately linked to environmental cues and conditions.
INVERTEBRATES: BUTTERFLIES Approximately 900 species of butterfly
Although a rough (and conservative) estimate of the number of butterflies is useful, one must bear in mind that this group constitutes one (Lepidoptera) of 29 orders used to classify insects. Approximately 20% of the butterfly species in the Eastern Cape are endemic (187), three are Endangered and seven are Vulnerable.
TERRESTRIAL MOLLUSCS: Unknown number of species
This taxonomic group is probably the mostly poorly represented in terms of survey data and taxonomic revision. Solely based on museum records, the Eastern Cape has approximately 70 endemic mollusc species (some of which have not been identified) all of which can be considered threatened by habitat destruction.

8 LANDCOVER AND BIODIVERSITY PRESSURES IN THE EASTERN CAPE PROVINCE

8.1 Landcover, land use and resources use patterns in the Eastern Cape Province

8.1.1 Land cover

Approximately 69% of the land in the Eastern Cape is in a natural, un-degraded state (Figure 13). The term "Natural" is an aggregated classification used in this assessment which includes the following categories from the latest National Geo-spatial Information (NGI) landcover map (GTI 2013/14): Bare ground and all vegetation categories (grassland, indigenous forest, shrubland, Thicket/dense bush, Woodland/Open bush). It should be noted that degraded land makes up a further 12% of the land cover of the Province.

The landcover proportions per District Municipality (DM) in the Province reveal a more dire condition (Table 7) where the Alfred Nzo DM only has 34% of its land remaining in a natural state, while OR Tambo DM only has 38% remaining.

Table 7 Percentage of area remaining in natural state (including degraded landcover) in the Eastern Cape and Municipalities

District Municipalities	Natural Area in Sq Km	Total Area of DM in Sq Km	Percentage of Natural Area Remaining within the Municipality
Alfred Nzo	7173	13031	55
Amathole	18198	24900	73
Buffalo City Metro	2209	3243	68
Sarah Baartman	62105	66497	93
Chris Hani	36296	42543	85
Joe Gqabi	26387	30251	87
Nelson Mandela Bay Metro	1726	2245	77
O.R. Tambo	7116	14671	49
Total Area	161209	197381	82



Figure 13 2014 Integrated Landcover of the Eastern Cape

8.1.2 Land and resource use

Loss of habitat remains the single most important cause of biodiversity loss in the terrestrial environment. Habitats in the Eastern Cape are lost through a number of mechanisms, including but not limited to: alien plant invasion, erosion, cultivation, over-grazing and settlement development (Figure 13).

Rural settlement and resource use

The communities in rural areas of the Eastern Cape are intricately linked to their environment as a means of survival. Economic and social development is a response to the desperate need to rectify social and economic inequalities in the Province, especially in the rural communities. However, inappropriate development, not aligned with environmental sustainability criteria, may ultimately lead to the collapse of vital ecological infrastructure services that supports rural communities, who are highly dependent on natural resources for their survival. Therefore, careful development planning and design, aimed at alleviating socio-economic pressure, must ensure that ecosystems are maintained for the continued use by the communities that depend on them.

The pressure on biodiversity and ecological processes in the densely populated rural areas of the OR Tambo DM and the Alfred Nzo DM are compounded by landscape fragmentation and unsustainable resource use.

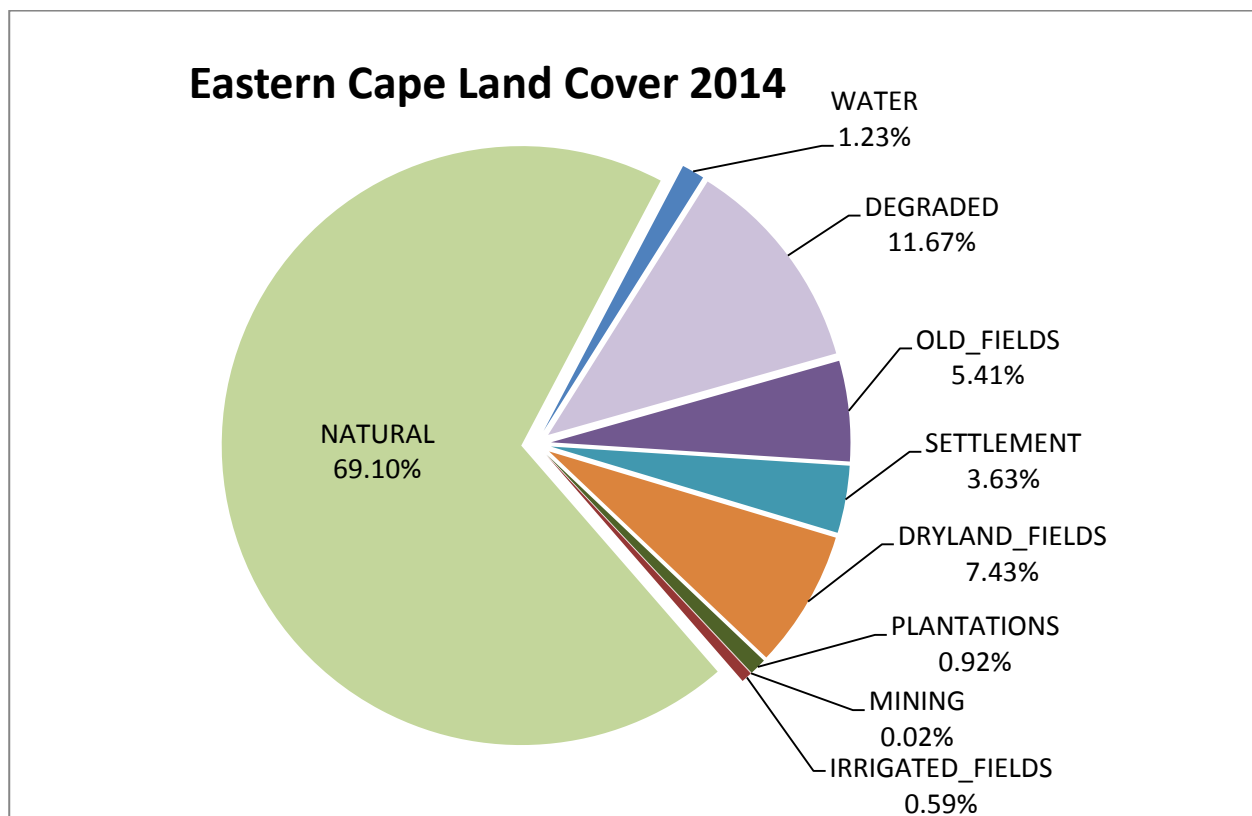


Figure 13 Landcover and landuse in the Eastern Cape (revise this or table PP)

Agriculture and afforestation

The largest “land-using” sector in the Eastern Cape is cultivation agriculture, which includes irrigated and dry crops, pastures, plantations, orchards, groves, etc. An estimated 14% of the Province is currently or was historically engaged in cultivation agriculture. The intensity of the practice varies from subsistence to commercial. Subsistence farming practices in the former homelands follow a pattern of rotation cultivation. This has, to a large degree, contributed towards the “Old fields” landcover category. These “Old fields” are prime focus areas for restoration, especially in threatened ecosystems.

An afforestation strategy (Forestry 2030 Roadmap) developed by the Department of Agriculture, Forestry and Fisheries (DAFF) aims to establish 100,000ha of plantation forest in the Eastern Cape. The areas of high forest potential need to be carefully selected in order to minimise further impact on already threatened biodiversity and ecosystems.

8.2 Threats to Biodiversity

The impacts on biodiversity are experienced as:

1. Changes in biodiversity composition/structure and direct loss of biodiversity; and
2. Changes/disruptions to ecosystem function, e.g. water pollution/sedimentation and landscape fragmentation, which can be described as a state in which equilibrium has been lost.

At an ecosystem level, functionality is affected by connectivity through the landscape. When connectivity is disrupted, it results in ecosystem fragmentation which may ultimately cause ecosystem collapse.

Different ecosystems differ in their ability to buffer and recover from disruption and degradation therefore their ability to retain connectivity. For example, Mesic Thicket ecosystems that are notoriously poor at self-regeneration will remain fragmented and degraded over decades and may never fully recover functionality without restorative intervention.

Freshwater aquatic ecosystems experience compounded pressures through terrestrial and in-channel activities:

1. Terrestrial land use activities (e.g. soil erosion, settlement and sedimentation),
2. Passive recipients of pesticides, heavy-metals, faecal coliforms and landfill pollutants, many of which bio-accumulate in the system; and
3. Active discharge of industrial and domestic waste water, litter-filled stormwater, etc.

8.2.1 Pressure at taxonomic levels

At the taxonomic level, impacts can be narrowed down to very specific pressures experienced at a species level. An assessment was conducted as part of this assessment (D. Berliner, see Technical Report) to determine specific land uses that are impacting relevant taxonomic groups.

Plants
<p>As expected the highest ranking threat affecting most Red Data plant species in the Eastern Cape is habitat loss, (which includes the irreversible conversion of natural vegetation for infrastructure development, urban expansion, crop cultivation, timber plantations and mines). This is followed by habitat degradation (includes threats such as overgrazing, inappropriate fire management, too frequent, too infrequent or out of season fires. These threats cause a disturbance and breakdown of essential ecosystem processes.</p> <p>Invasive alien plant species outcompeting indigenous plant species is another severe threat.</p> <p>When each of the threats exerted on plant species was assessed against the number of species that were affected by them, results indicate that consumptive resource use affects more species, than any other threat. This includes harvesting and over-grazing. Harvesting pressure for the trade in medicinal plants for local and international trade is unsustainable.</p>
MAMMALS:
<p>Bats in the Eastern Cape are highly susceptible to habitat loss. The most significant impact is currently habitat that is being lost to agriculture. Two species, Wahlberg's Epauletted Fruit bat and Egyptian Rousette bat, are most vulnerable to habitat loss. Wind energy facilities will affect all bat species and areas of high bat diversity should be avoided or managed for minimised mortality.</p> <p>Smaller mammals naturally occurring in the Province are subjected to severe habitat fragmentation and</p>

hunting pressure in rural communal lands. For example, private nature/game reserves within the Makana Local Municipality severely restrict the movement of mammal species, effectively fragmenting the landscape, and directly causing the loss of animals by electrocution.
BIRDS:
The threats facing the birds of the Eastern Cape are similar to those threatening much of the biodiversity of the Province. Habitat conversion in its various forms, along with habitat fragmentation, is the most pervasive threat negatively affecting many bird species in the Province. The largest identified contributor to this threat for birds is commercial agriculture. This is followed by modification of natural processes, in particular, fire regimes and climate change related impacts. Wind energy facilities have also been identified as direct threats to the majority of threatened bird species due to collision mortality for the majority of threatened bird species.
REPTILES:
Amphibians and reptiles are declining globally due to habitat loss and degradation, pressure from alien invasive species, environmental pollution, disease, unsustainable use and global climate change In temperate zones, lizards and other reptiles are thought to be highly vulnerable to climate change. Their reproduction is closely tied to narrow windows of time in the spring and summer when temperature and moisture regimes are suitable. In the Eastern Cape, changes to the fire regime has been identified as a important threat to all species
FISH:
As with most species habitat loss is a significant threat facing the fish of the Eastern Cape. Habitat fragmentation/disruption by damming/channelisation as well as habitat modification/degradation with reference to water quality and base flow (due to abstraction) are significant threats for fish biodiversity. Alien fish species, such as bass, carp and trout are considerable threats to all indigenous fish species.
AMPHIBIANS:
Due to the semi-aquatic life-cycle of most species, and their semi-permeable skins, amphibians are especially vulnerable to pollutants and changes to water availability such as water abstraction. Amphibians are particularly sensitive to changes in rainfall and temperature; hence climate-change impacts to natural processes are likely to affect this group significantly. The Amatola Toad, Hogsback frog, Hewitt's Ghost Frog and the Kloof Frog are specifically vulnerable to logging and deforestation.
INVERTEBRATES: BUTTERFLIES
Butterflies are vulnerable to a wide range of threats, which may affect them directly (such as pesticides), or any stage of their life-cycle or that of their food plants. The most significant threat to butterflies in the Eastern Cape is the loss of habitat, fragmentation of important dispersal corridors, loss of host plants due to herbivory and alien plant invasion, changes to fire regimes and establishment of alien ants that may impact various stages of a butterfly's life-cycle.

9 CLIMATE CHANGE PRESSURE

The existing pressures exerted on the biodiversity and ecological processes are likely to intensify with progression of climate change manifestations in the Eastern Cape. Changes in temperature and rainfall will have a disruptive effect on all ecosystems, threatening collapse.

In terms of biodiversity, it is expected that biome shifts in response to changes in climatic conditions will occur. Biome modelling allows an assessment of biomes that may be under threat and those that may remain reasonably stable. The nature of these shifts has been modelled at a finer scale (Figure 14, Guo *et al.*, 2017) for southern Africa. In this assessment, the constraints that geology places on the ability for biomes to expand into new areas, was highlighted. It also assessed the biome loss, if one assumes no biome expansion and the results indicate that Albany Thicket and Indian Coastal Belt, in the Eastern Cape are possibly most susceptible to being lost.

Intervention in both climate change stable and vulnerable biomes is critical for the maintenance of the ecosystems within them, and hence also the ability of the ecosystem to provide services that alleviates climate change impacts.

Nine biomes are located within the boundaries of the Eastern Cape. The Grasslands, Thicket and Indian Coastal Belt biomes have been shown to be the most vulnerable/threatened ecosystem. Changes in plant structure and composition and changes in hydrological regimes will affect taxonomic groups that depend on these habitats. For example, birds and amphibians that are habitat dependent, associated shifts in distribution and extinctions are expected. It is therefore important to develop an understanding of the potential resilience of an ecosystem/biome to withstand and adapt (absorb and re-organise) to climate change in a manner which retains ecological integrity and function.

Maintaining healthy, functioning ecosystems is an important adaptation strategy that enhances the ability of natural systems to build resilience against climate change impacts. To increase natural resilience it is imperative to develop an integrated approach to biodiversity conservation, poverty alleviation and development.

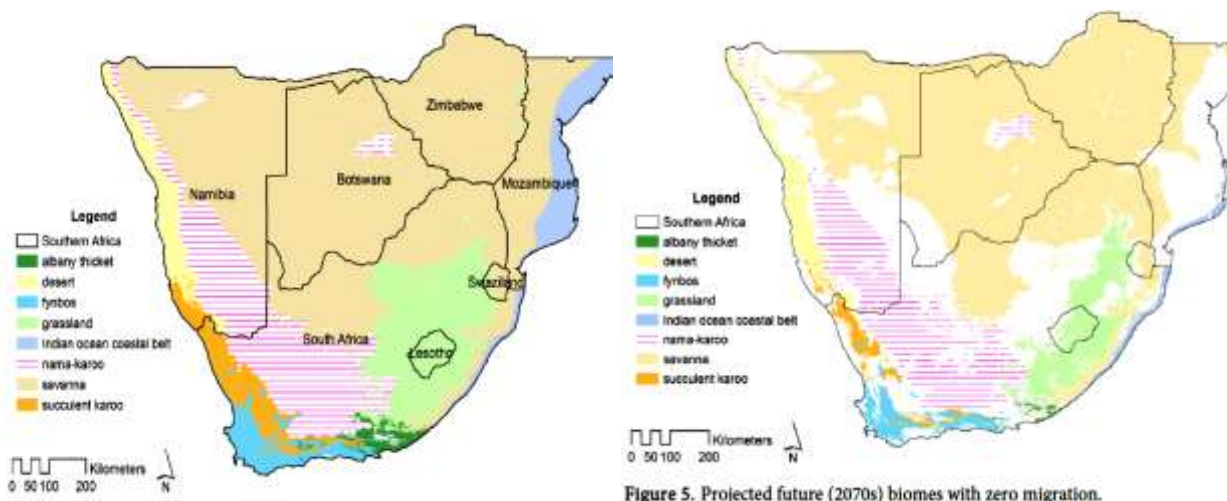


Figure 14 Current biome distribution (left) and future projected (2070's) biome distribution assuming no expansion of species into new areas due to geological constraints (taken directly from Guo, *et al.*, 2017)

PART C SPATIAL ASSESSMENT AND MAP PRODUCTS

10 DESCRIPTION OF THE MAP CATEGORIES AND CRITERIA

The following section provides an overview of the process adopted for developing the Eastern Cape Biodiversity Conservation Plan (ECBCP2018). More detailed technical information regarding data inputs and analyses is available in the ECBCP2018 Technical Report.

10.1 Spatial assessment and mapping categories

10.1.1 Systematic Biodiversity Planning process

Important and unique biodiversity is not uniformly distributed throughout the landscape. A spatial biodiversity planning exercise **prioritises** and maps information about biodiversity pattern and ecological processes, current and future land use, and the protected area network.

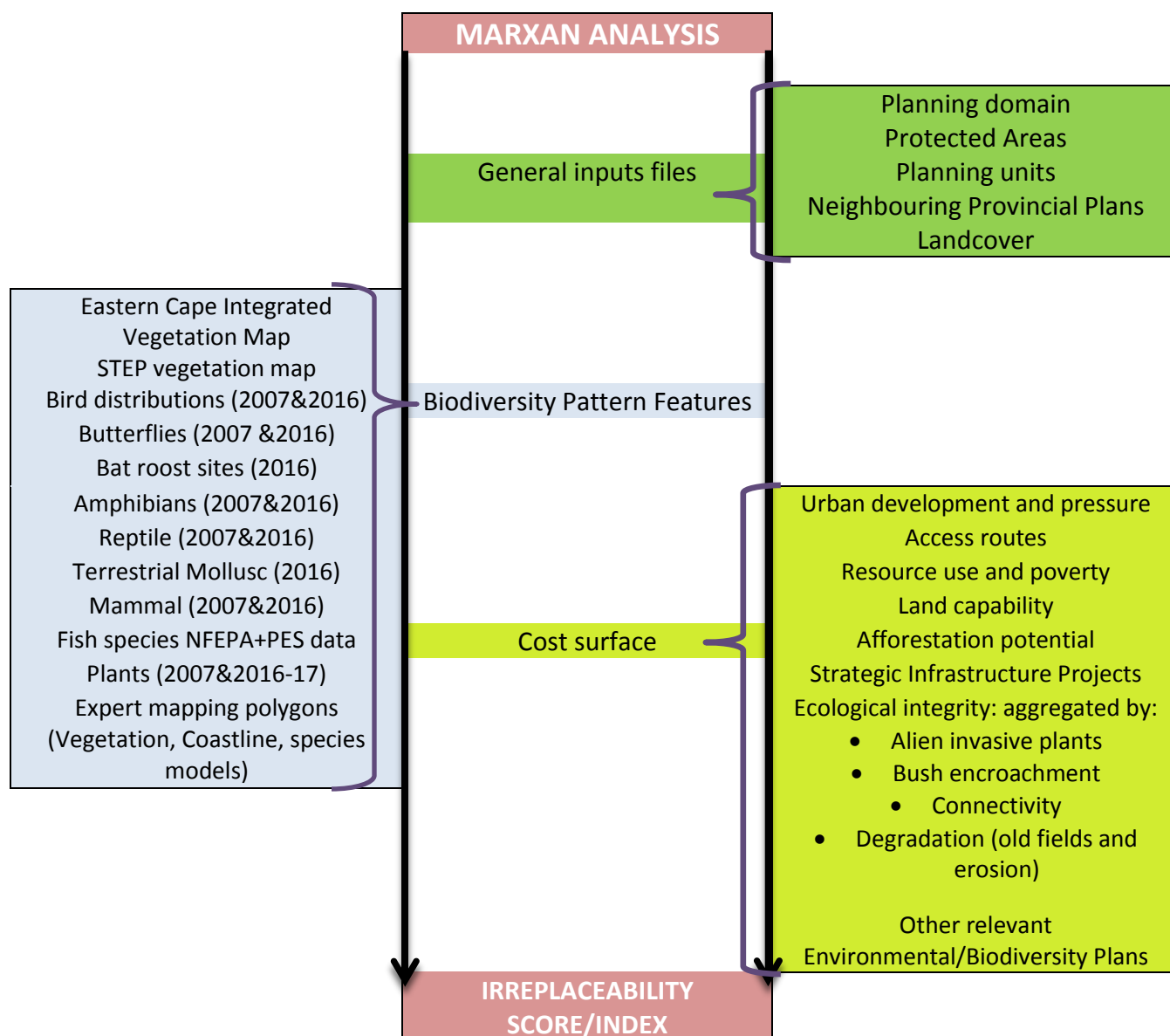
The following set of questions (Table 8) provide the basis for the steps that are undertaken in the systematic biodiversity planning process.

Table 8 Questions that drive the Systematic Biodiversity Planning Process

Question	Systematic Biodiversity Planning Process: Steps taken
Where in the landscape does biodiversity occur?	Biodiversity information was collected from a number of sources. A team of Eastern Cape biodiversity experts was engaged to screen and review data, add data, and provide expert distribution mapping. The biodiversity information was based on the best available science.
How much conservation/protection is required in order to ensure the persistence of that biodiversity?	A Protected Area network map was developed for the Eastern Cape by collating the South African Protected Area Database (SAPAD) with Eastern Cape Parks & Tourism Agency and the National Protected Area Expansion Strategy databases. Protected Areas in other provinces that were located within 10km of the Eastern Cape boundary were also taken into consideration.
Where are the best places to achieve the conservation/protection?	<p>Firstly, the condition of the Eastern Cape was mapped in order to determine what areas were in a natural state and what condition they are in. In this step, as much mapping about the landcover that was available was integrated into a single consolidated landcover map.</p> <p>Secondly, a set of criteria were developed to prioritise important biodiversity and ecological process areas. Examples of these include:</p> <ul style="list-style-type: none"> • CBA: Special habitats, priority forest clusters, priority wetlands, fish sanctuaries, areas of high irreplaceability; and • ESA: Climate change resilient and stable areas, strategic water source areas, best design sites for landscape connectivity <p>(See Table 9 for full description)</p> <p>Thirdly, an assessment of current and future land use pressure was undertaken to determine where conflict may occur, and where possible, to avoid this conflict while still achieving biodiversity targets.</p>
How should the areas be managed?	A set of land use guidelines are developed based on the management objective of each CBA category.
How should this information be communicated and used?	Uptake and implementation of the ECBCP2018 is crucial for the necessary conservation of the remaining biodiversity in the Eastern Cape. The CBA maps and the handbook (this report) have been developed to guide users.

Conservation Contribution

A sites' contribution to achieving conservation targets is computed using a software programme called MARXAN. MARXAN calculates the likelihood that a site will be required to achieve a particular conservation target based on information regarding the occurrence of biodiversity features at the site, the conservation targets set for those features, the relative contribution of the surrounding sites, and, the "cost" of competing pressures on biodiversity at the site. The primary input data for this analysis is information on the distribution of biodiversity in the Province. Detailed material describing how these layers were used is provided in the Technical Report. A brief summary of biodiversity features that were incorporated into the MARXAN analysis is provided below:



10.1.2 Mapping categories used in the CBA maps

It is important to note that separate Terrestrial and Aquatic CBA layers were generated in this planning process. The terrestrial and aquatic CBA maps categories include:

- Protected Areas;
- Critical Biodiversity Areas;
- Ecological Support Areas;

- Other Natural Areas; and
- No Natural Habitat remaining.

These categories, and the spatial and biodiversity information used to develop them, are described further in Table 9 below.

Protected and Conservation Areas

For the purposes of this spatial assessment Protected Areas were limited to “State owned” reserves that are formally protected. This includes National (managed by SANParks), Provincial (managed by Eastern Cape Parks and Tourism Agency) and municipal reserves. A few reserves have not been formally proclaimed under any legislation, but are zoned as such and are recognised as *de facto* Protected Areas.

Conservation Areas were limited to formal (or in process of formalisation) privately owned reserves protected through NEMPAA and DAFF forest reserves along the Wild Coast.

Critical Biodiversity Areas (CBAs)

CBA areas are selected to meet biodiversity targets for species, ecosystems and ecological processes. These include:

- Critically Endangered and Endangered Ecosystems;
- Critical linkage points (bottle-necks or pinch-points) in the corridor network; and
- All areas required to meet biodiversity targets and to ensure future persistence of species, ecosystems and special habitats.

CBAs are areas of high biodiversity value and should therefore be maintained in a natural state, with no further loss of habitat.

Ecological Support Areas (ESAs)

ESAs are areas NOT essential for meeting biodiversity targets, but are **essential** in terms of the terrestrial assessment for ensuring landscape connectivity between CBAs, strengthening climate change resilience, and proper function of ecosystem infrastructure for delivery of ecosystem services. From a terrestrial perspective, ESAs may include riparian areas, coastal corridors, ridges, etc. In terms of the aquatic assessment, ESAs extend into catchments that are essential for the maintenance of CBA rivers and wetlands.

ESAs need to be maintained in a functional, if not natural, state.

Other Natural Areas (ONAs)

ONAs are areas in a natural or near natural state that have not been identified as priority areas in the current plan. ONAs still support biodiversity and deliver ecosystem services.

No Natural habitat Remaining (NNR)

NNR areas that are heavily, permanently, modified and are no longer considered natural. Although some biodiversity and ecological function may be retained, irreversible impacts on biodiversity mean that they cannot contribute towards targets.

Table 9 CBA map categories and criteria used to inform these spatially

Map Category	Criteria headings	Description of all criteria
PROTECTED AREAS	Protected Areas	Biosphere Reserves.
		World Heritage Sites.
		State Owned - SANParks, ECPTA or Municipal.
		Protected Environments.
		Marine Protected Areas.
CONSERVATION AREAS	Conservation Areas	Private Nature Reserves.
		Private Nature Reserves (proclamation in progress).
		DAFF forest reserves.
TERRESTRIAL CBAs and ESAs		
CBA 1	Critical Patches	Critically Endangered and Endangered ecosystems (SA VEG MAPs), Remaining extent of Listed Threatened Ecosystems, National Forest Inventory including critically endangered/high priority forest patches and priority forest clusters
	Irreplaceable Sites	Irreplaceable Sites (selection frequency>80%) – planning units were selected to meet targets for: (1) vegetation types, (2) species points and (3) expert areas.
	Special habitats	Bat roost sites and 500m radius.
		Cape Vulture breeding colonies (1000m buffer) and roost sites (500m buffer).
		Bearded Vulture nests (500m buffer).
		Critical pinch-points in corridor network.
CBA 2	Forest	All other forests.
	MARXAN analysis	Best Design Sites (selection frequency<80%) - Planning Units selected to meet targets for: (1) vegetation types, (2) species points, (3) expert areas.
	Special habitats	Selected cliffs buffered by 100m.
		Cape Vulture immediate home range (5km buffer around nest and roost sites).
		Bearded Vulture home range (10km buffer).
ESA 1	Forest	CBA1 forest patch 500m buffer.
	Special habitats	Cliff buffers 500m.
	Ecological Corridor	Other sites required to complete the ecological corridor network.

Map Category	Criteria headings	Description of all criteria
	Eastern Cape corridors	Best Design Corridor Sites - Planning units selected to meet 60% targets for vegetation types.
		Nodes used for corridor network analysis.
	Ecological infrastructure	Climate change refugia.
		Coastal functional zone.
		Climate change resilience.
ESA 2	Where there is no natural habitat remaining in an area that would have been designated as a CBA 1, CBA 2 or ESA1, it is designated as an ESA 2	
ONA	All remaining natural areas not included in the above CBA or ESA categories	
NNR	These are areas that are considered to have been irreversibly modified or impacted and which do not contribute to maintain biodiversity or ecological processes. These include: settlement areas, croplands, mining areas, forest plantation, derived from the Eastern Cape 2017 Integrated Land Cover Map	
AQUATIC CBAs and ESAs		
CBA 1	Critical Rivers (main stem)	Main stem rivers of high irreplaceability plus a 32 metre buffer. This includes fish sanctuaries and free flowing / flagship rivers.
	Critical Wetlands	Umzimvubu Wetland Complex, Karst/Limestone wetlands, additional oxbow wetlands, dune and dune bypass wetlands
	Critical Estuaries	Estuaries with a National Biodiversity Assessment (2011) ranking field "core = 1".
	Important Rivers (DWA main stem)	Main stem river lines plus 32 metre buffer that fall within fish corridors and other selected catchments (wetland clusters) to achieve connectivity, best design sites.
CBA 2	Wetlands	All remaining wetlands.
	Estuaries	CBA 1 estuary buffer 100m.
		CBA 2 estuaries (all other estuaries).
ESA 1	Rivers and River buffer	CBA1 rivers 1000m buffer.
		All other rivers plus 32m buffer.
	Catchments	All catchments that drain into CBA 1 and CBA 2 rivers.
	Wetland buffers	100m buffer around all wetlands.
		Wetland clusters that overlap given 500m buffer.
	Modelled Wetlands	Modelled stream channel and valley bottoms plus a 32m buffer.
	Estuary buffers	CBA 2 estuary buffer 100m.
		ESA estuary buffer 100m.

Map Category	Criteria headings	Description of all criteria
	Strategic Water Source Areas	Strategic surface water source areas based on the CSIR national MAR calculation. Identified at the level of sub-SQ4.
	Ground water source areas	Karst-Limestone landscape.

11 CRITICAL BIODIVERSITY AREAS AND ECOLOGICAL SUPPORT AREAS MAPS

The terrestrial and aquatic CBA maps were developed in line with the Guidelines for Bioregional Plans (DEA, 2009) and the Technical Guidelines (SANBI, 2017).

The Terrestrial CBA map and the Aquatic CBA maps developed in the current assessment replace, in their entirety, the ECBCP2007 maps. The extent of each CBA category is provided in Table 10. (This will only be calculated once the CBA map has undergone public comment and the CBA map has been revised and finalised).

Table 10 The extent of Critical Biodiversity Area categories in the Eastern Cape (not yet calculated: will only be available after public comment)

CBA Map category	Extent (area in Ha)	% Extent
Protected Areas		
Conservation Areas		
Critical Biodiversity Area 1		
Critical Biodiversity Area 2		
Ecological Support Area 1		
Ecological Support Area 2		
Other Natural Areas		
No Natural Habitat Remaining		
Total		

Figure 15 – 32 below presents the Terrestrial and Aquatic CBA maps for the Eastern Cape and per District/Metropolitan Municipality.

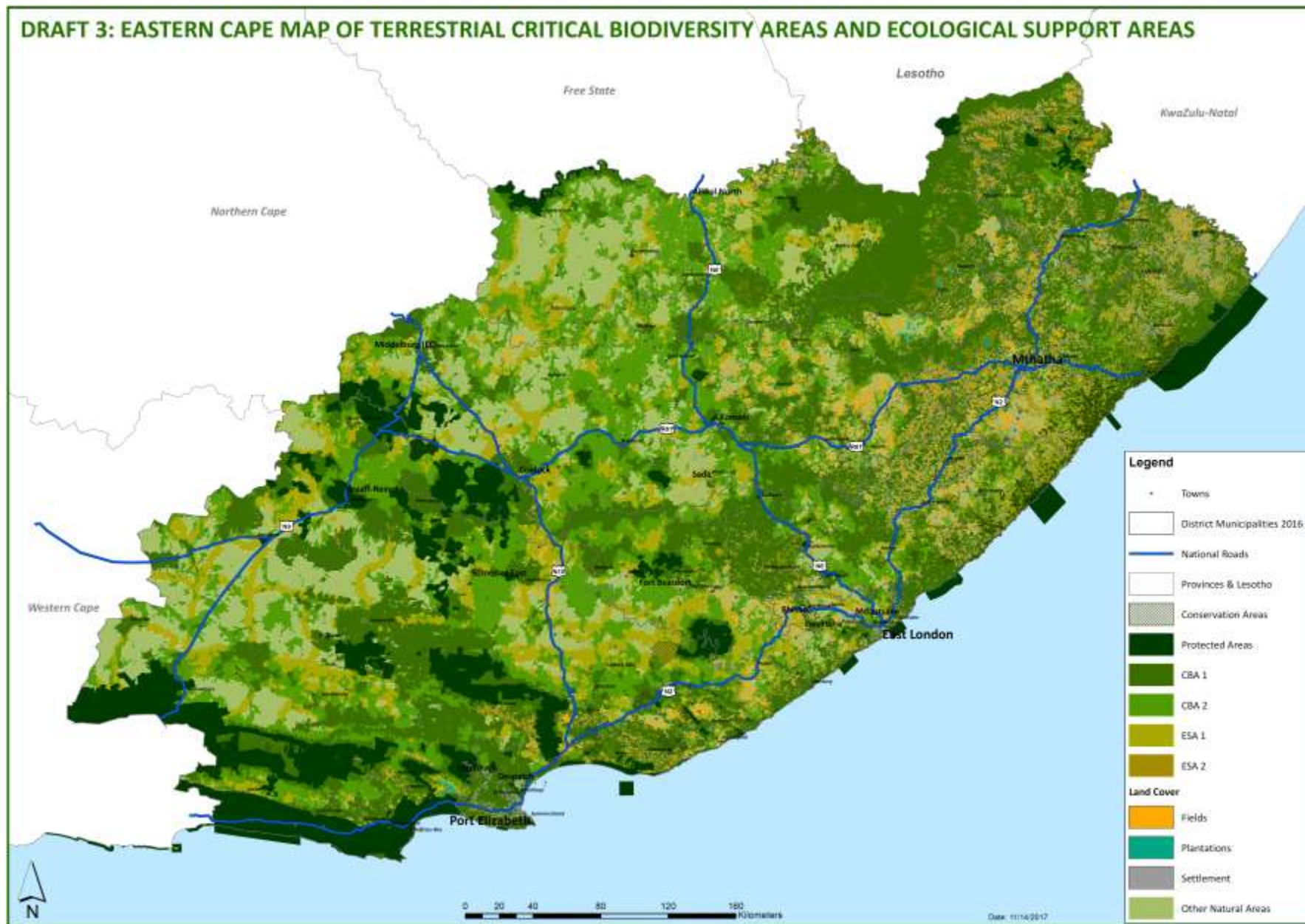


Figure 15 Terrestrial CBA map of the Eastern Cape

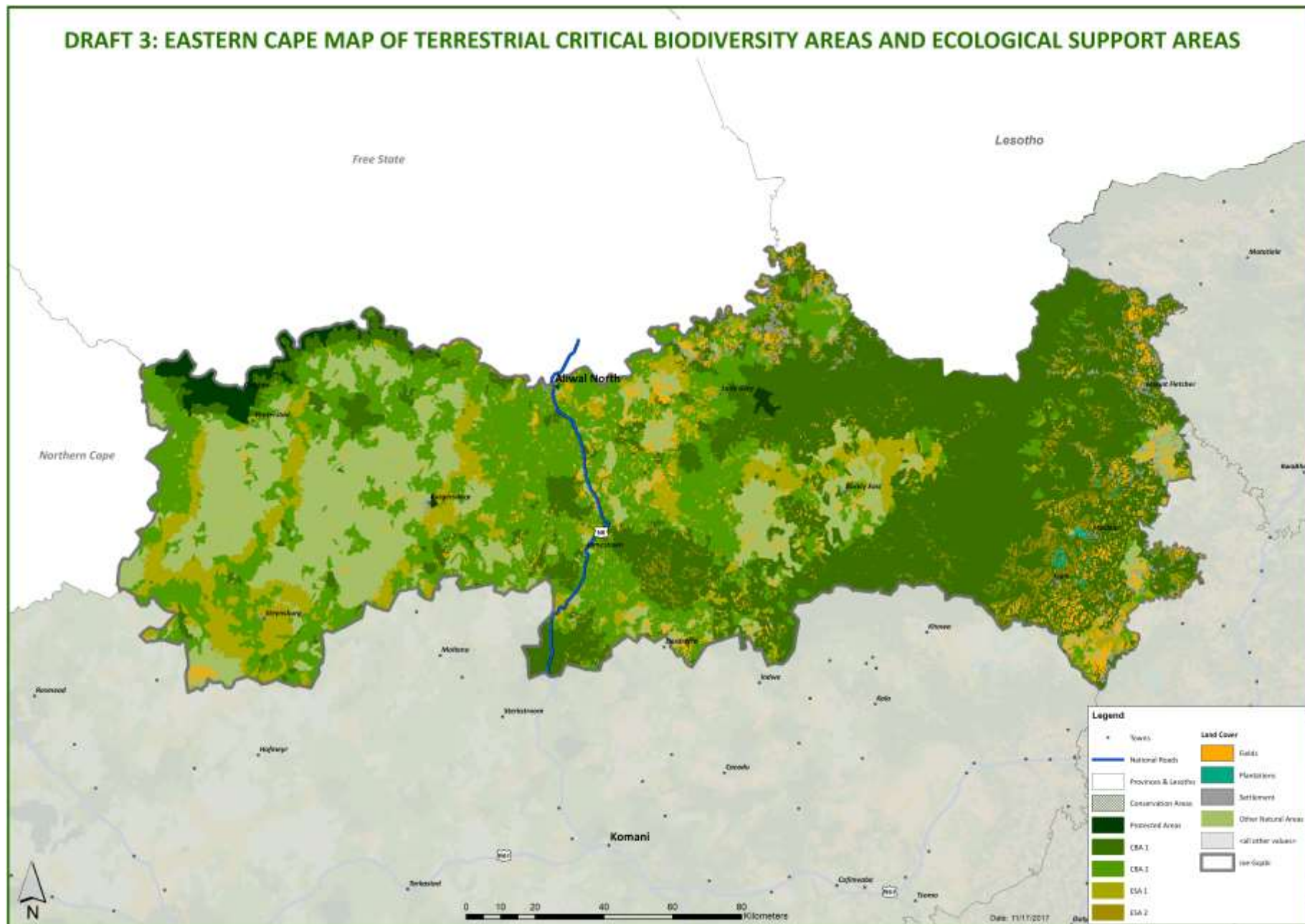


Figure 16 Terrestrial CBA map of the Joe Gqabi District Municipality

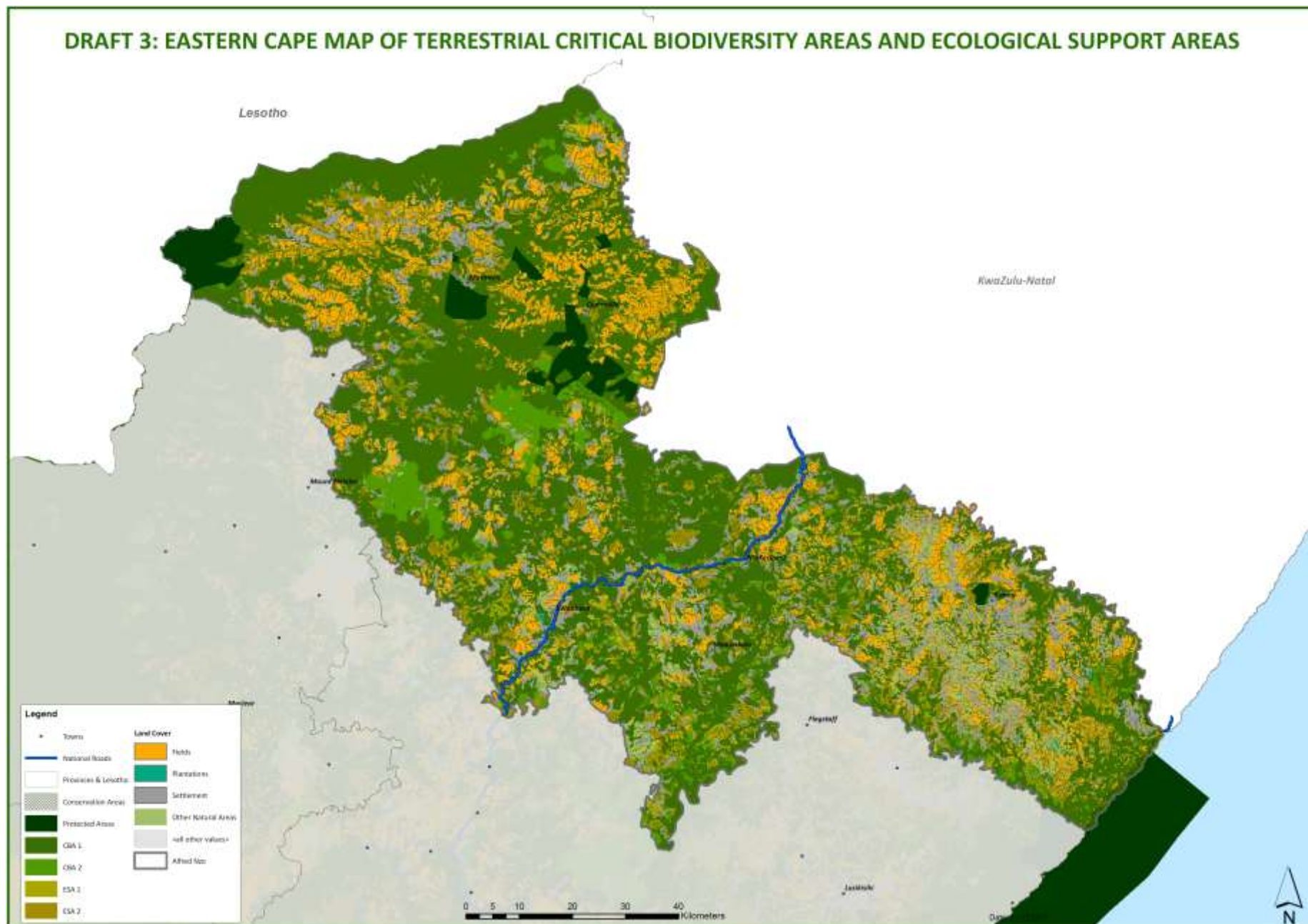


Figure 17 Terrestrial CBA map of the Alfred Nzo District Municipality

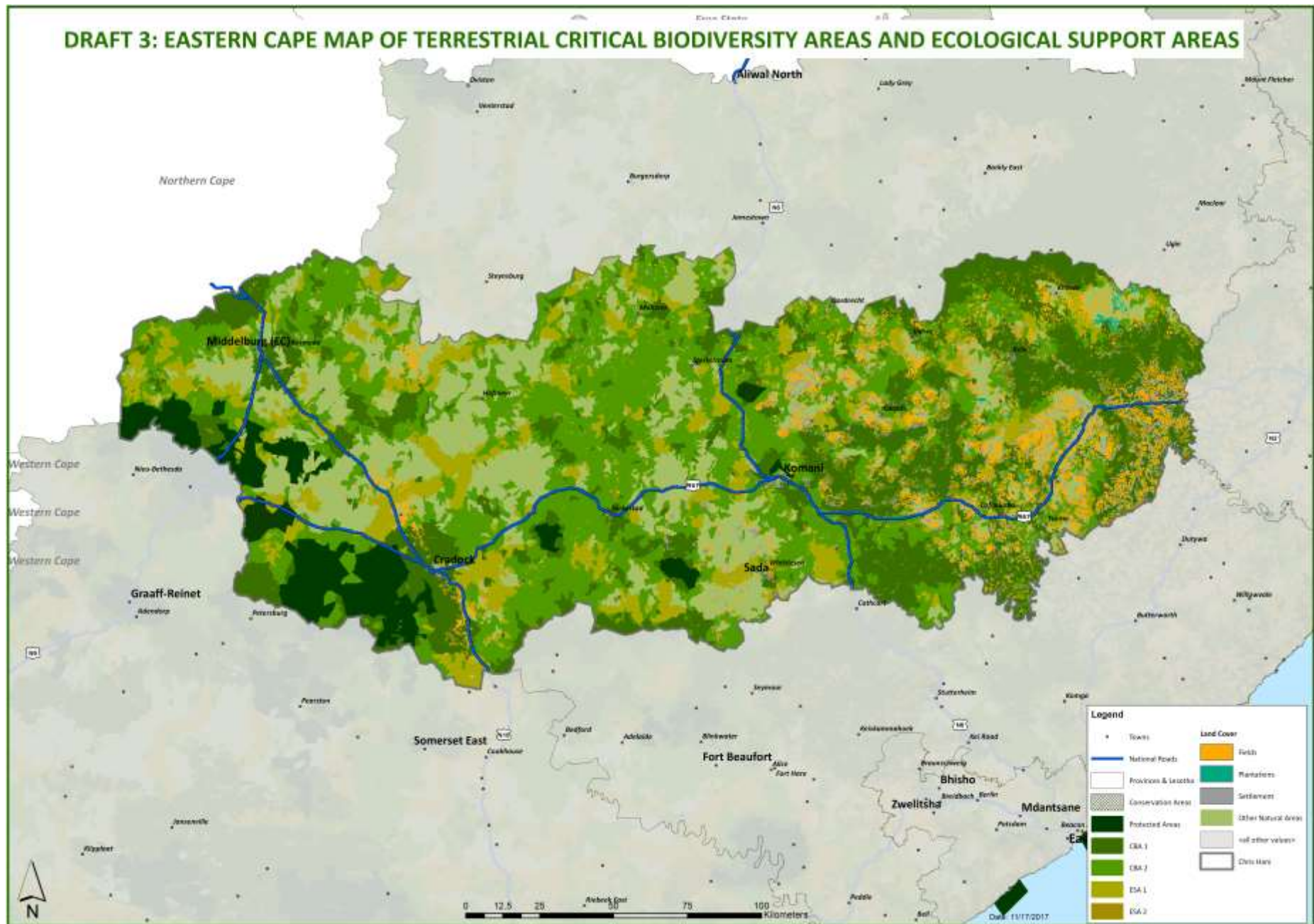


Figure 18 Terrestrial CBA map of the Chris Hani District Municipality

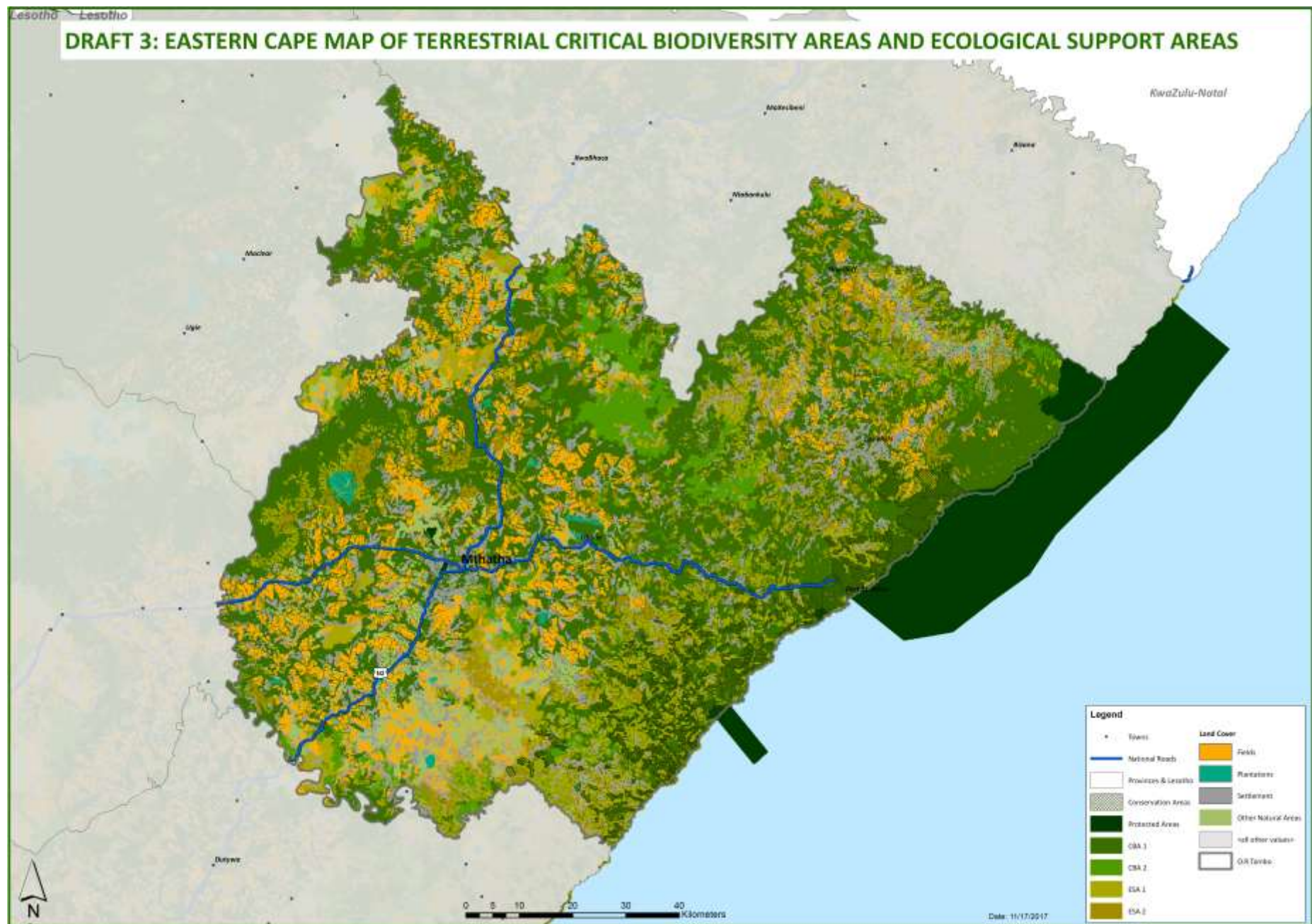


Figure 19 Terrestrial CBA map of the OR Tambo District Municipality

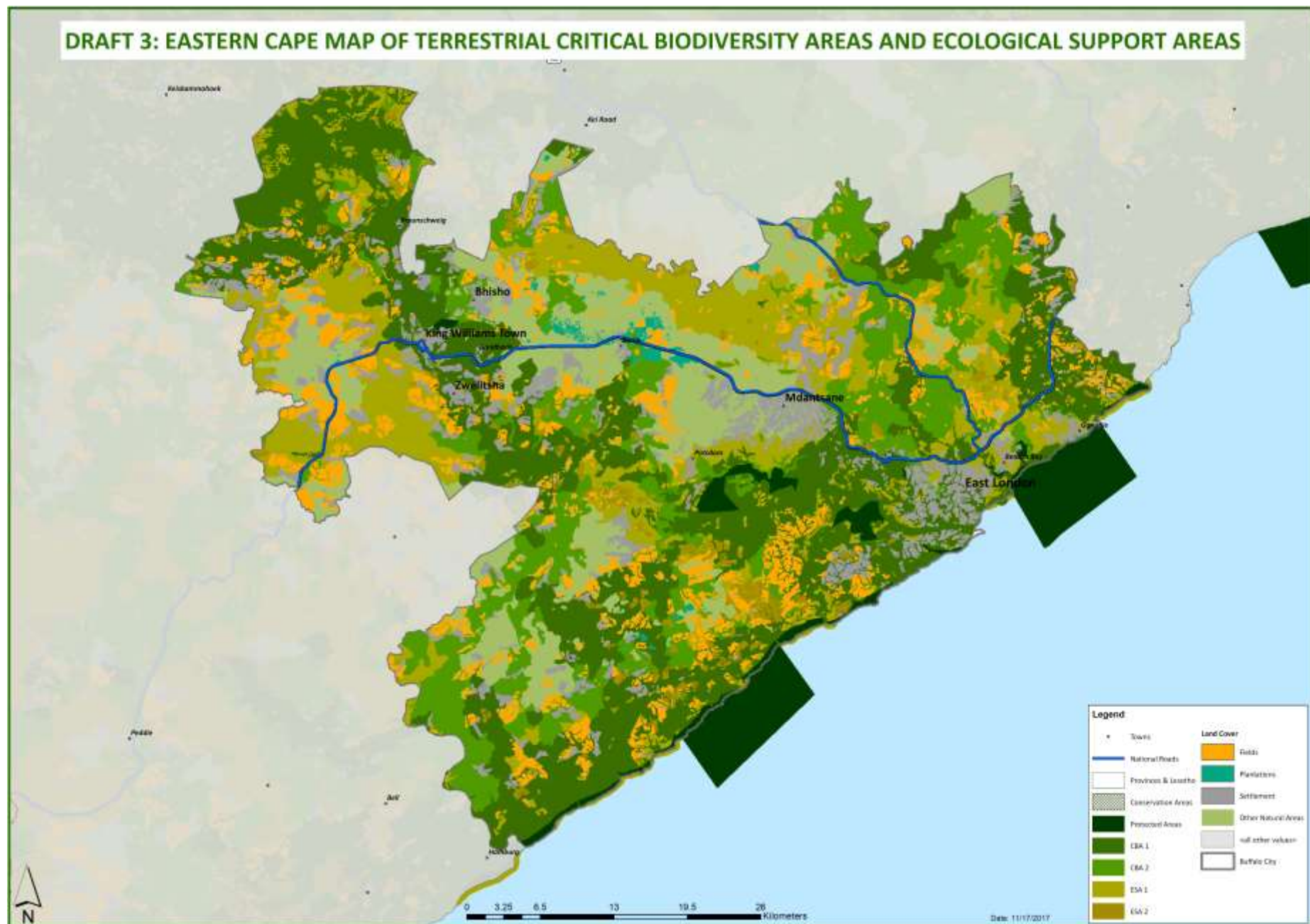


Figure 21 Terrestrial CBA map of the Buffalo City Metropolitan Municipality

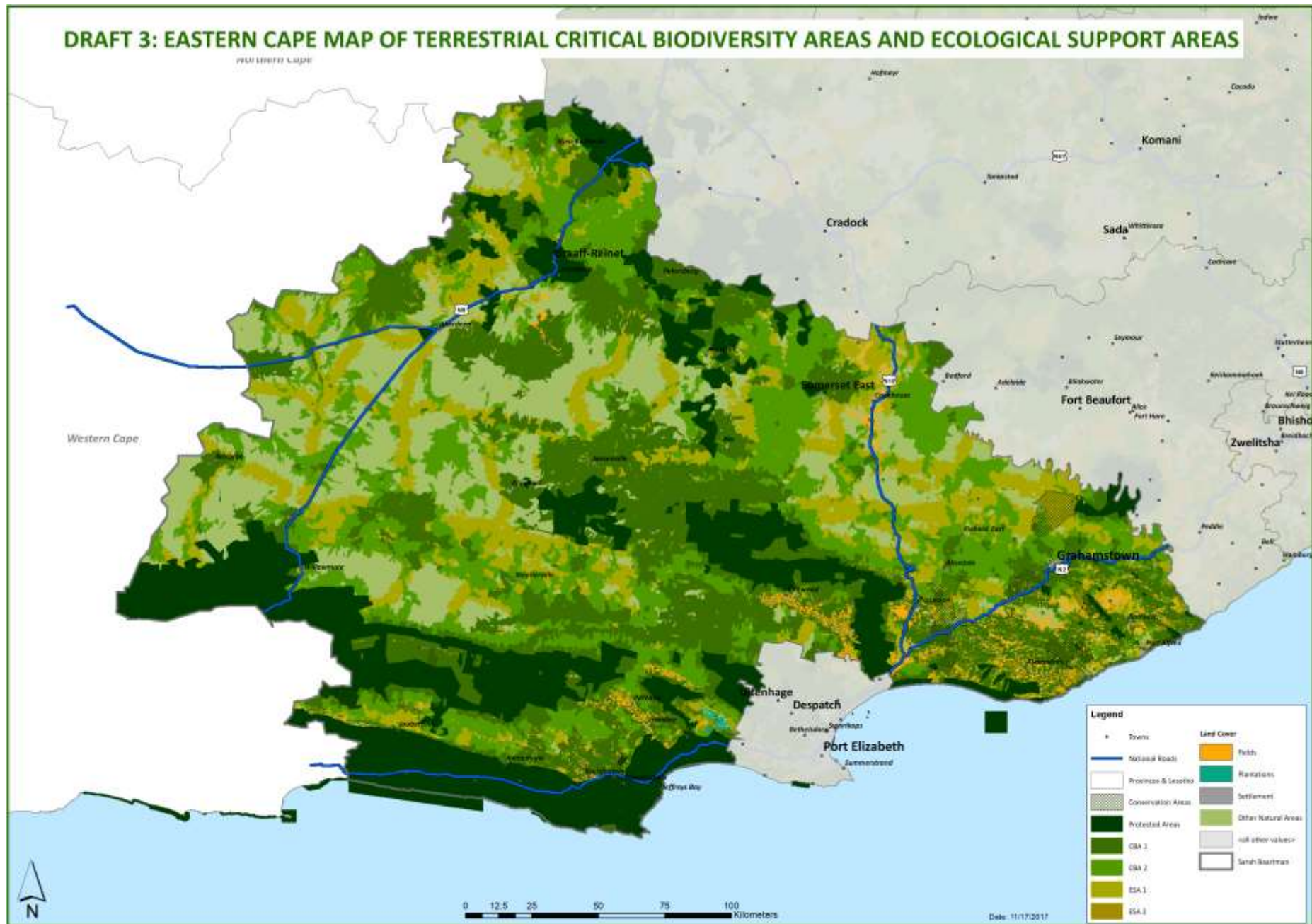


Figure 22 Terrestrial CBA map of the Sarah Baartman District Municipality

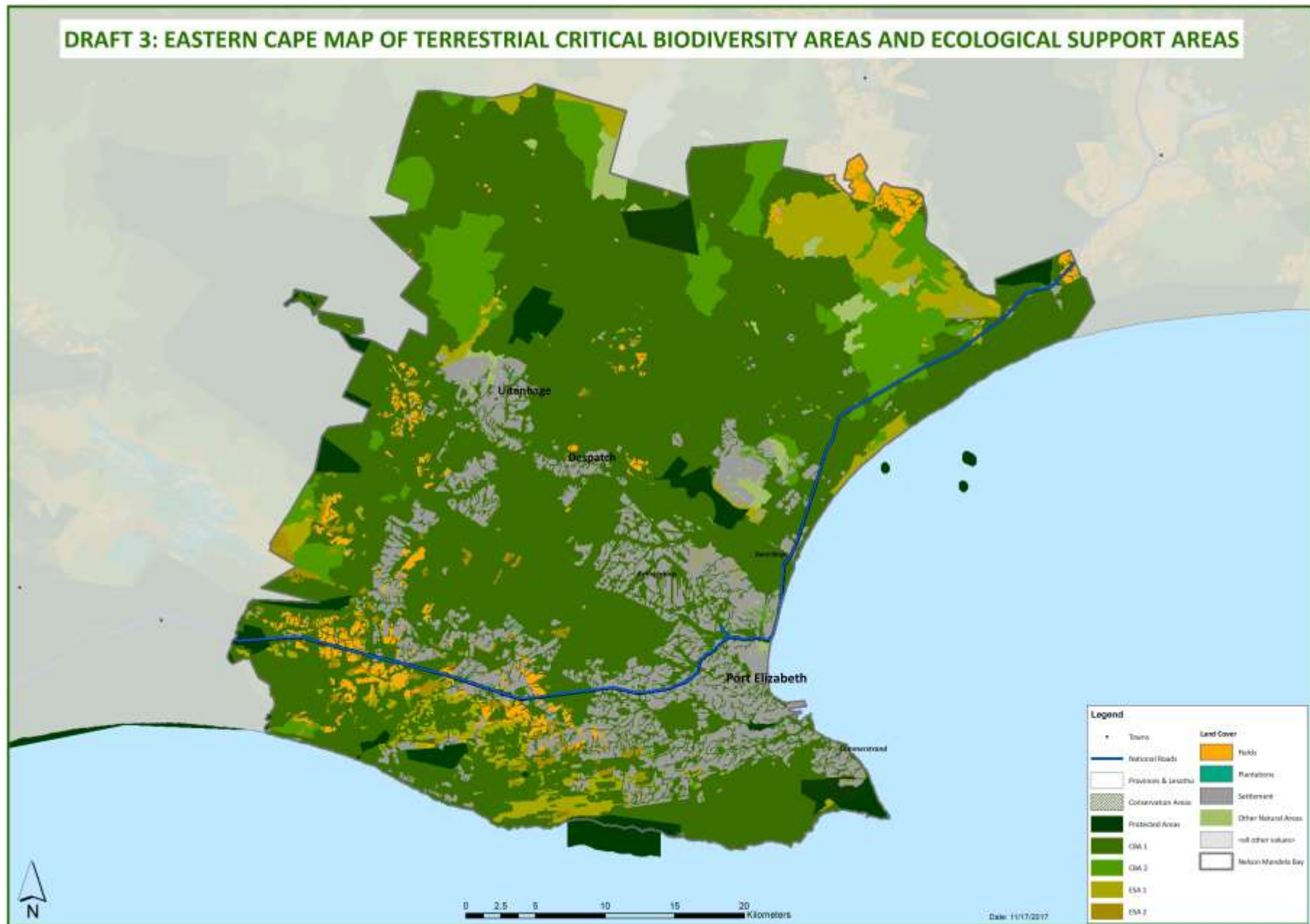


Figure 23 Terrestrial CBA map of the Nelson Mandela Bay Metropolitan Municipality



Figure 24 Aquatic CBA map of the Eastern Cape

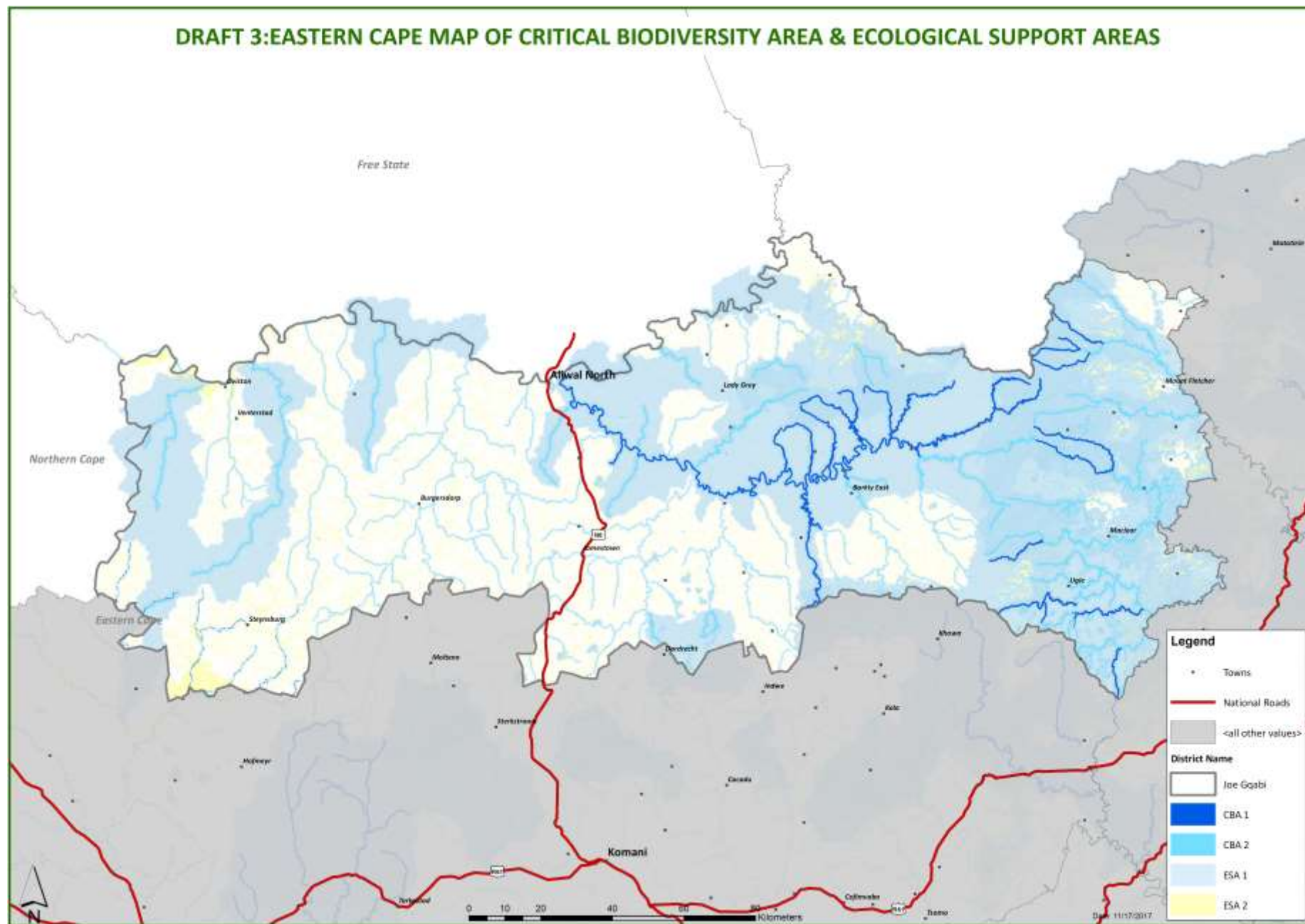


Figure 25 Aquatic CBA map of the Joe Gqabi District Municipality

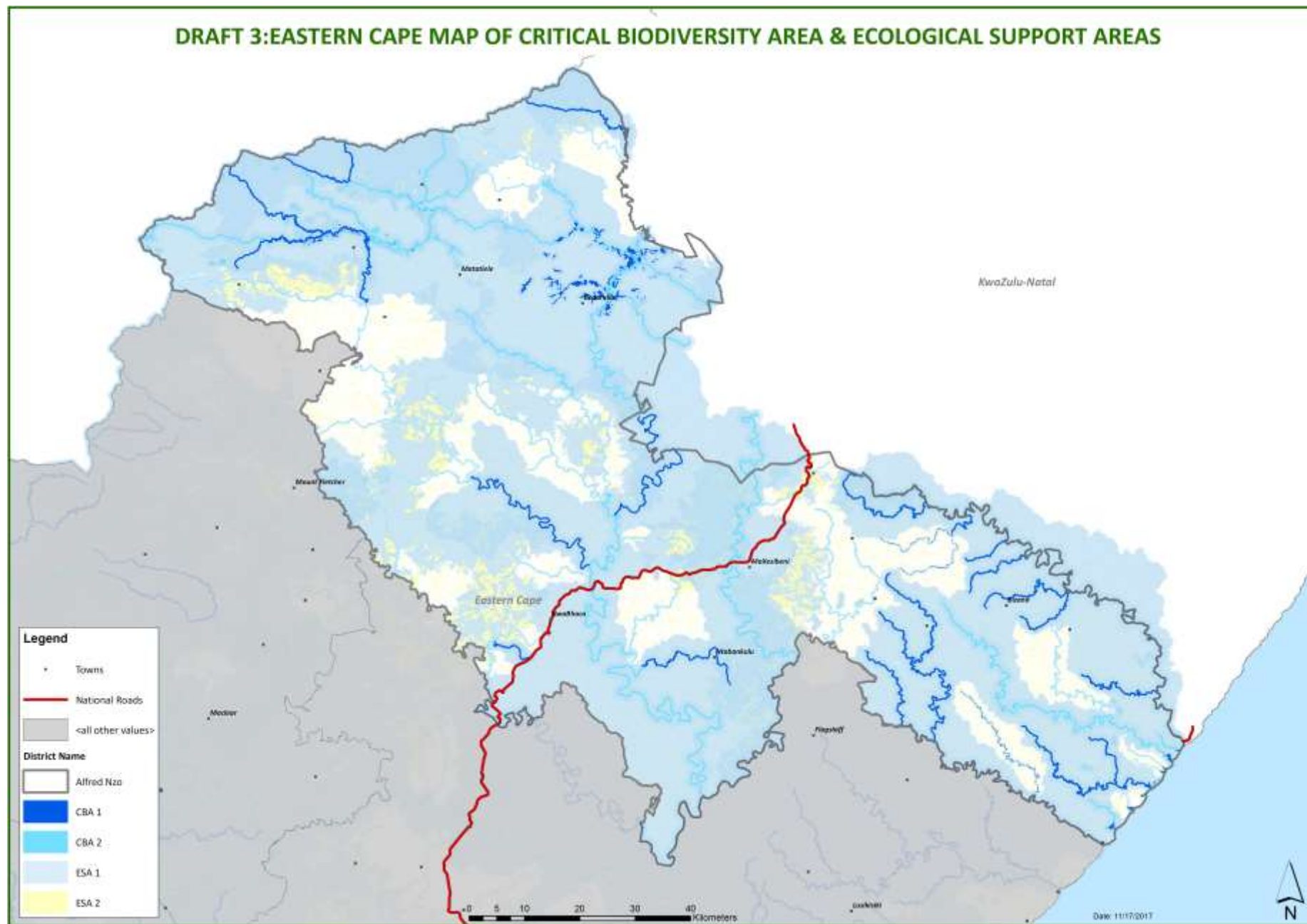


Figure 26 Aquatic CBA map of the Alfred Nzo District Municipality

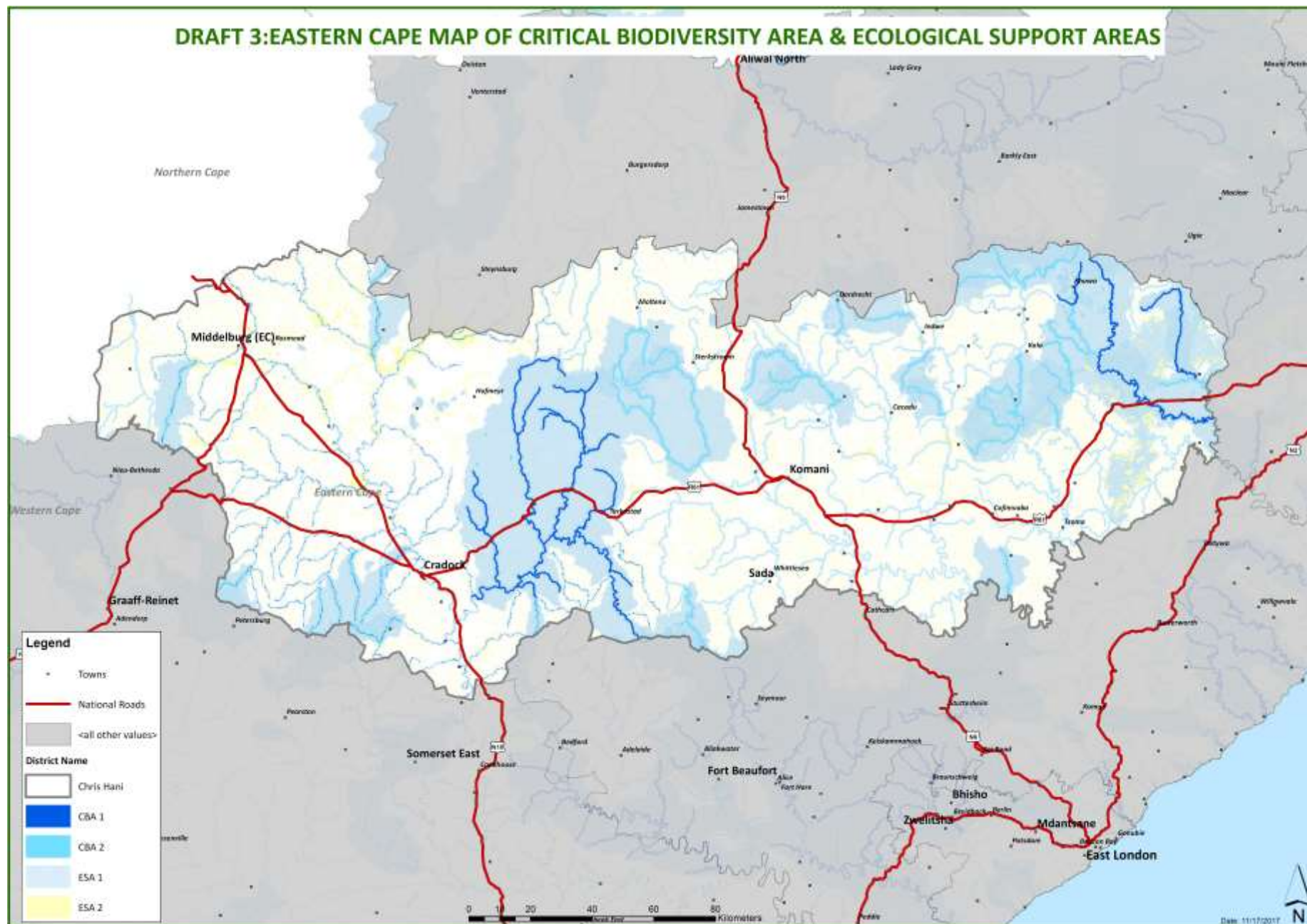


Figure 27 Aquatic CBA map of the Chris Hani District Municipality

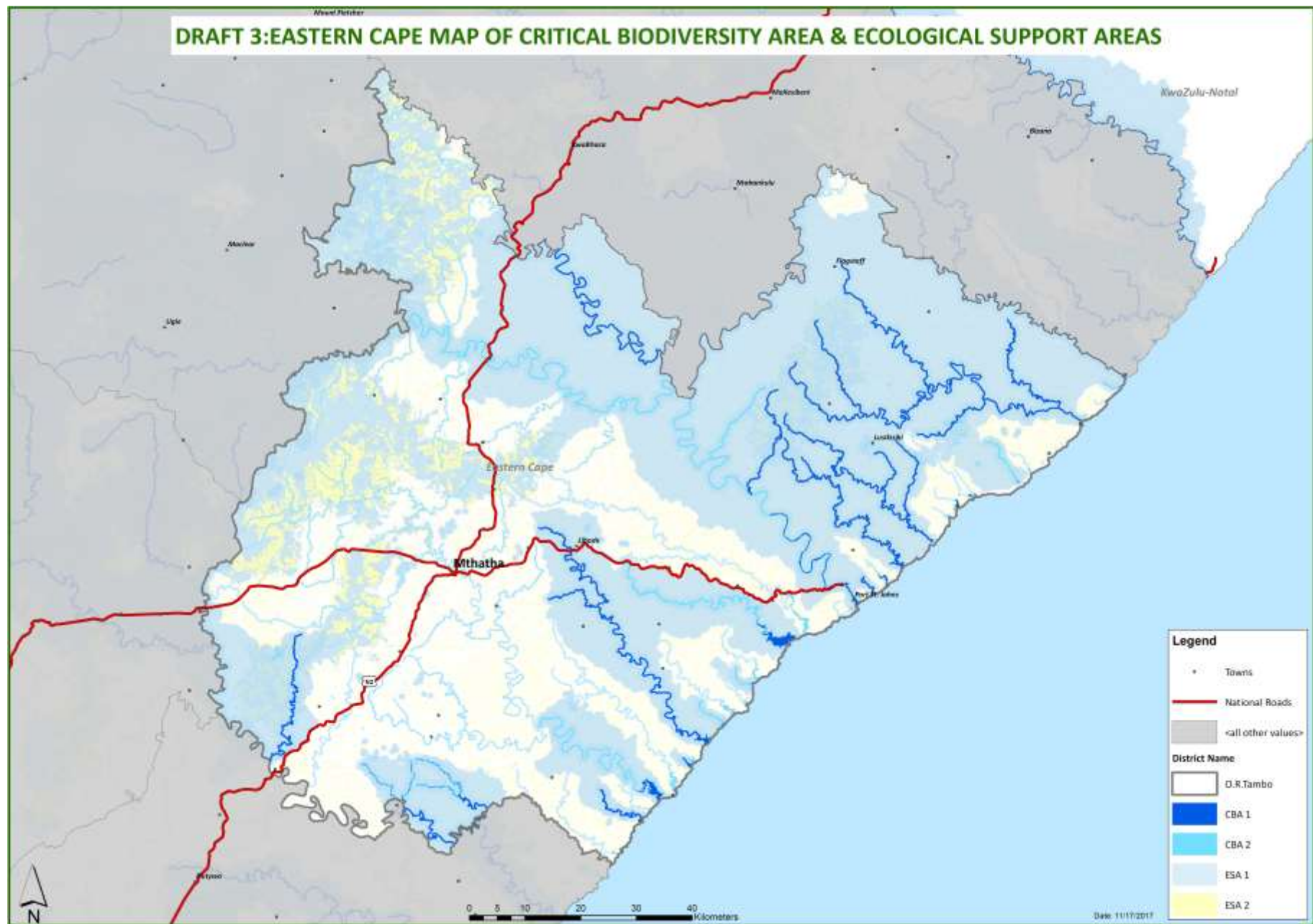


Figure 28 Aquatic CBA map of the OR Tambo District Municipality

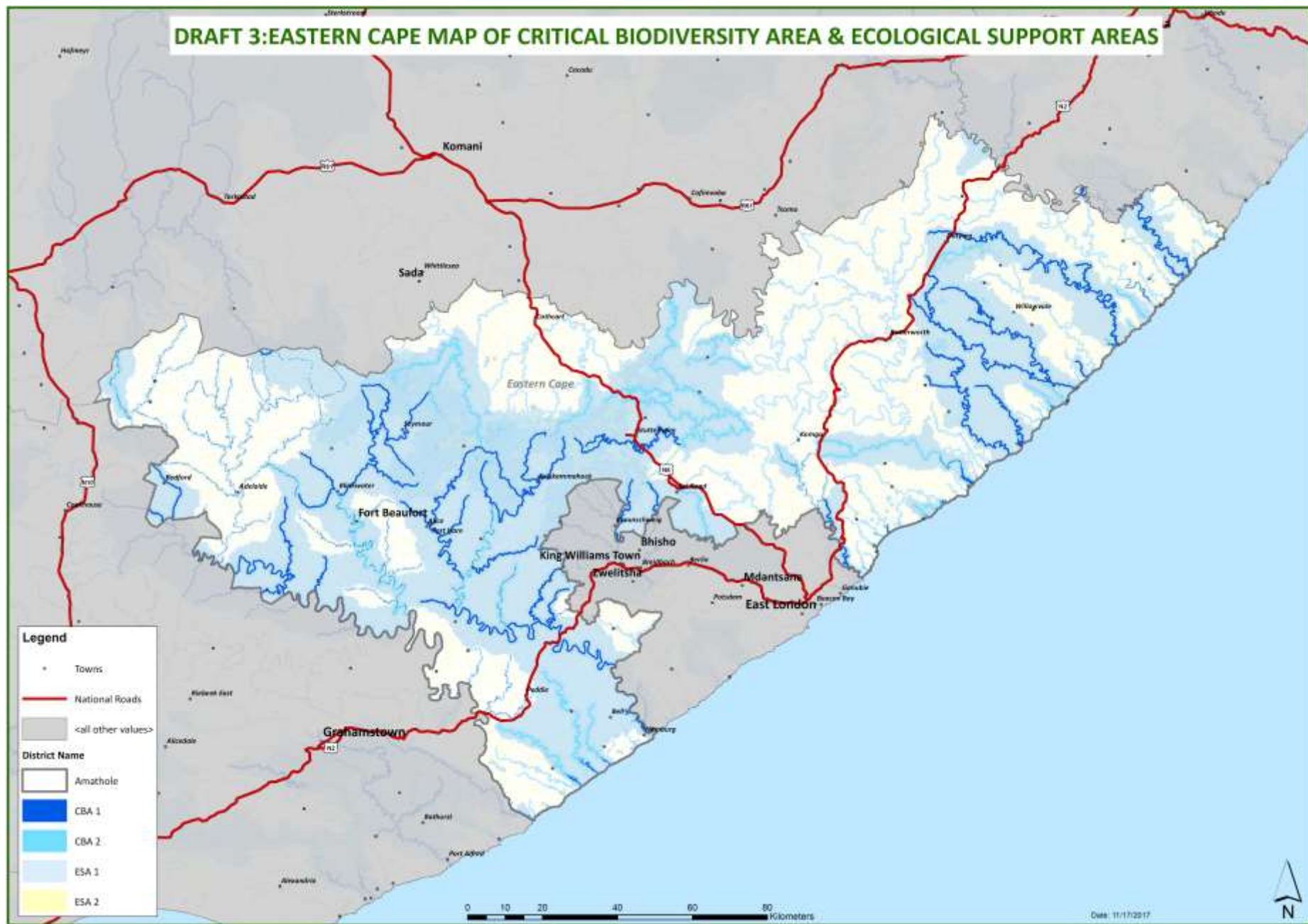


Figure 29 Aquatic CBA map of the Amathole District Municipality



Figure 30 Aquatic CBA map of the Buffalo City Metropolitan Municipality

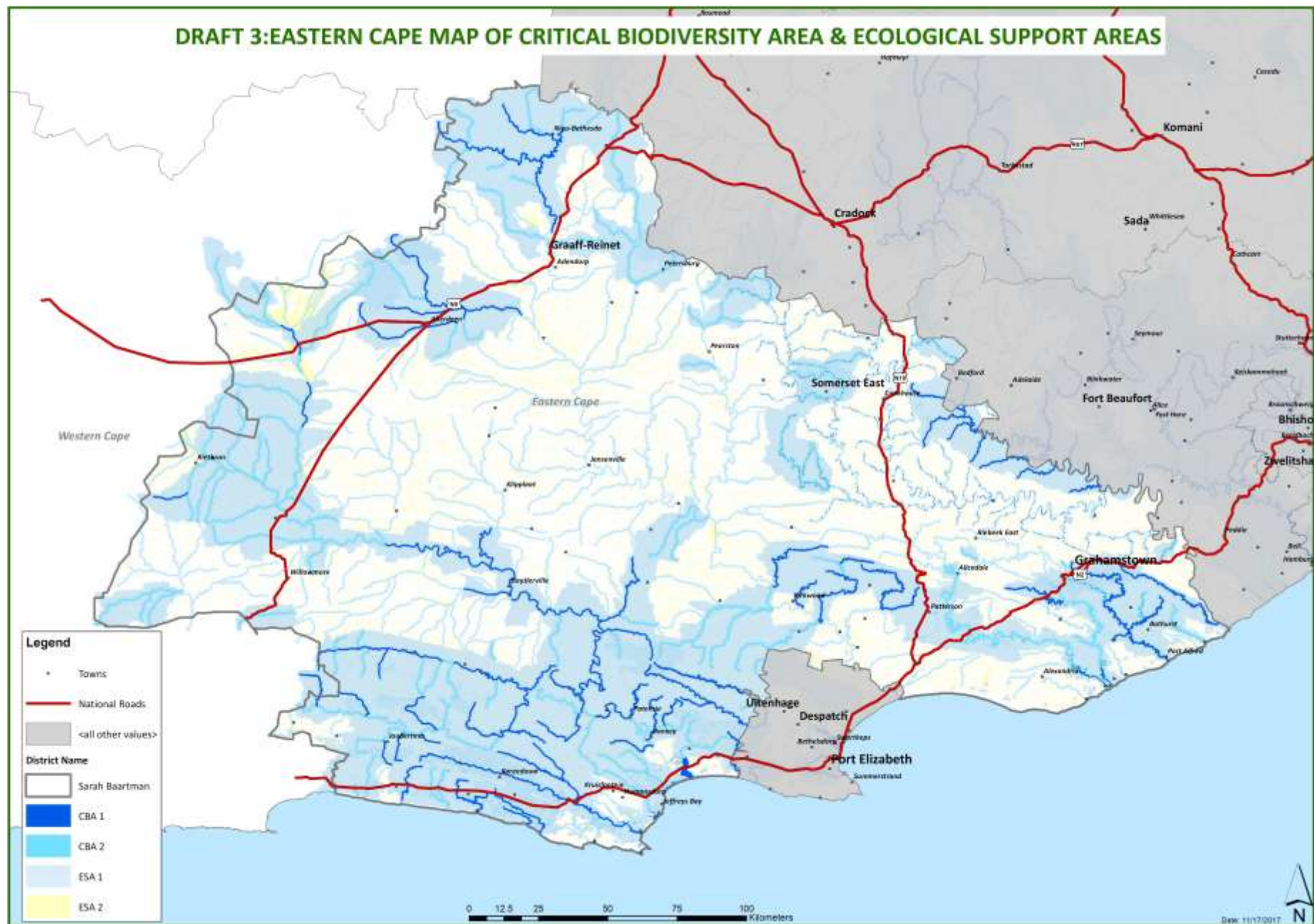


Figure 31 Aquatic CBA map of the Sarah Baartman District Municipality

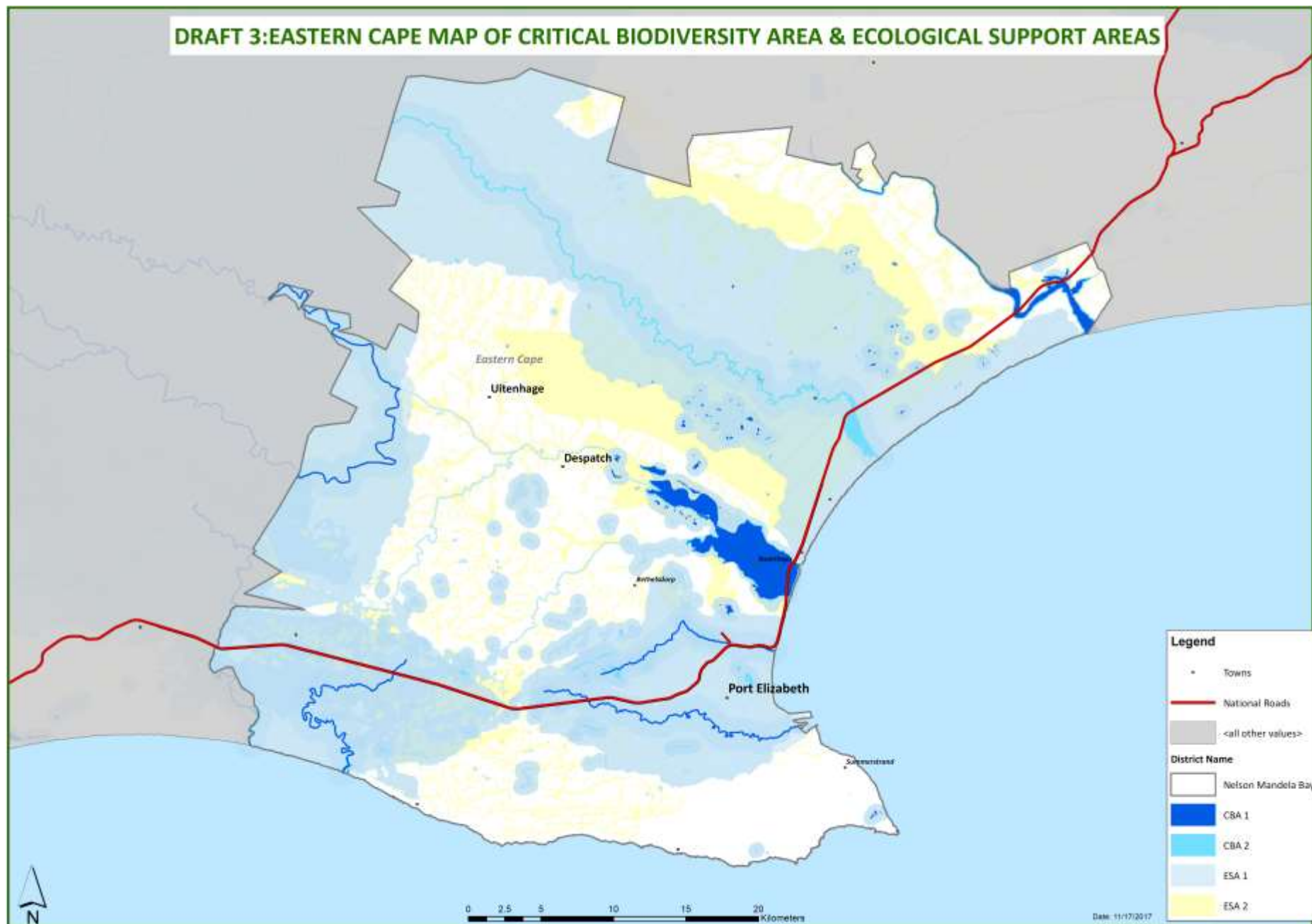


Figure 32 Aquatic CBA map of the Nelson Mandela Bay Metropolitan Municipality

PART D GUIDELINES FOR LAND USE PLANNING AND DECISION-MAKING

12 LAND USE GUIDELINE TABLES: TERRESTRIAL AND AQUATIC

The land use guidelines for the CBA map categories have been informed by:

1. Land management objectives
2. Anticipated impacts associated with land uses

12.1 Desired State and Management Objectives

Once a CBA map is produced, the next question may be: so what does this mean and how it is implemented? The first step is to define and describe in detail what the desired state of each map category should be. The second step is to develop a set of management objectives required to achieve the desired state (Table 11).

Table 11 Linking CBA categories to management objectives.

CBA Map Category	Desired State	Land management objective
Protected Areas	Natural	Maintain in natural or near-natural state: Protected Areas must be kept in a natural state, with a management plan focussed on maintaining or improving the state of biodiversity.
Conservation Areas	Natural	Maintain in natural or near-natural state: Conservation Areas are defined by protected area management plan. Since a management plan may not be in place or enforced, these conservation areas have been included into the CBA network and the land use recommendations contained herein there apply.
Critical Biodiversity Area 1	Natural	Maintain in natural or near-natural state that secures the retention of biodiversity pattern and ecological processes: For areas classified as CBA1, the following objectives must apply: <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. 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.
Critical Biodiversity Area 2	Natural	Maintain in natural or near-natural state that secures the retention of biodiversity pattern and ecological processes: For areas classified as CBA2, the following objectives must apply: <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

CBA Map Category	Desired State	Land management objective
		<p>the loss of a CBA2 area will require re-assessment and may elevate these to a CBA 1 category.</p> <ul style="list-style-type: none"> 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 vary in 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> <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	<p>Manage land to optimise sustainable utilisation of natural areas.</p>

12.2 Description of land use types and activities

A range of various land use types and activities have been linked to SPLUM land use for the purposes of facilitating the integration of the CBA map and land use guidelines into other spatial planning products such as Spatial Development Frameworks. These land uses are described in more detail in the box below.

Environmental Conservation
<p>Environmental Conservation is where land uses are primarily involved with conservation activities. These include:</p> <ul style="list-style-type: none"> Conservation management activities in formal protected areas and informal conservation areas managed for biodiversity (wildlife (game) production and recreational/educational tourism); Low-intensity eco-tourism activities (such as hiking trails).

<p>Subject to appropriate controls, planning and management, these land use activities can be accommodated in CBAs and ESAs. It is the preferred land use in CBAs, ESAs and some ONAs.</p> <p>This land use zone corresponds to the SPLUMA scheduled land use purpose ‘conservation’. This land use activity provides for the following:</p> <ul style="list-style-type: none"> • Protection of the natural environment and natural processes for their cultural, historic, scientific, scenic, biodiversity, habitat or economic. • Sustainable delivery of ecosystem services to the community.
<p>Tourism</p> <p>The Tourism and Accommodation land use covers broad range of tourist and recreational facility types, inclusive of tourism, recreation and accommodation facilities. Tourism and Accommodation is divided into two sub-categories depending on the level of intensity of development and types of activities involved:</p> <p>Low impact tourism, recreation and accommodation</p> <p>This includes low impact facilities that include camp sites and “rondavels” or traditional homestead structures, hiking trails, ablutions, gift/coffee shops, cultural centres. Sustainable rural tourism, rural businesses and communities that provide for the rural recreational and leisure needs of urban and rural dwellers, could be allowed in PAs, CBAs and ESAs provided that the development is in keeping with the management objective of the PA, CBA or ESA and is subject to the appropriate biodiversity related controls being in place.</p> <p>The SPLUMA land use purpose for this activity would be ‘Residential’, but would require a municipal zoning scheme equivalent to ‘Low density Special/Resort Zone’.</p> <p>High-impact tourism facilities</p> <p>This includes developments such as lodges, hotels, large resorts, golf courses and estates. High-impact tourism and accommodation facilities should only be considered in ESA2 or ONAs. In all cases, the current state of ESA 2 areas must be maintained (e.g. pineapple field converted to golf-course would maintain connectivity in the landscape). The location of infrastructure must be placed outside of natural areas (CBAs, ESAs and ONAs), must be clustered and be located adjacent to existing urban development.</p> <p>The SPLUMA land use purpose for this activity would be ‘Residential’, but would require a municipal zoning scheme equivalent to ‘Special/Resort Zone’.</p>
<p>Municipal commonage</p> <p>The municipal commonage provides for the implementation of the Municipal Commonage Policy of the National Government and the relevant municipality, and to promote and facilitate local agri-economic development. This land use corresponds to the SPLUMA scheduled land use purpose ‘agriculture’ and is often used for extensive unmanaged grazing which is not compatible with land management objectives, but may (under management) be permitted in ESAs and ONAs.</p> <p>Commonage is typically covered by natural vegetation. These areas therefore have the potential to contribute towards biodiversity conservation if managed appropriately and be instrumental for retaining ecological connectivity across landscapes.</p>
<p>Rural residential</p> <p>The rural residential land use type includes a range of residential and recreational activities. It is divided into two sub-types described below.</p> <p>Low density rural housing and eco-estates</p> <p>This land use type is associated with low density residential and eco-estate development. Low density is defined here as covering 0.1% or less of a property. It makes provision for <i>rural</i> housing development such as low-density, lifestyle estates, multi-ownership of reserves, eco-estates (but excluding golf estates). Land</p>

uses in this zone can be compatible in CBAs and ESAs, although impacts should be carefully assessed and managed.

The SPLUMA land use purpose would be 'Residential', but would require a municipal zoning scheme equivalent of 'low density/special/resort'.

Traditional/Communal and medium-high density rural development

This land use type may range in density from low to medium density and describes *rural* housing development. Low-medium density is defined here as a development footprint (including gardens and parking areas) covering between 1-10% of a designated area/property. It includes infrastructure associated with rural landscapes, including the villages and gardens (but excluding subsistence agriculture). This land use type may result in impacts not in keeping with the land use management objectives of CBAs, but may be considered in ESAs on a case-by-case basis and under specific authorisation conditions.

The following conditions should be observed for all rural development applications:

- Intensive recreational developments such as golf and polo estates, which result in significant habitat loss and which represent urban development outside the urban edge, are not compatible with CBA management objectives.
- Any infrastructural developments in CBAs should be avoided with respect to Traditional Communal Areas (Existing) and Rural Communal Settlements (New).
- Rural residential development (houses and infrastructure) within CBAs, ESAs and ONAs can be MUST be clustered into distinct residential precincts.
- Residential developments within ESAs must consider the functionality of the ESA, which may be related to connectivity and their role as biodiversity corridors. In these cases residential houses and infrastructure should not disrupt or fragment the corridor, or establish impermeable fences or boundaries to disrupt movement of fauna.

High density urban residential development

Urban residential development is described as the use of land primarily for human habitation, and comprises a dwelling house, group housing, hotels, hostels or flats. This land use zone corresponds to the SPLUMA scheduled land use purpose 'residential' associated with municipal zoning scheme equivalent of medium to high density (such as Residential 1 or 2).

Urban residential land uses are generally not compatible with the land management objectives of PAs, CBAs or ESAs, and should only be considered, subject to the necessary authorisations, in ONAs or areas with No Natural Habitat Remaining.

Other urban influences

Other Urban Influences is a collective term for a number of urban related activities defined by SPLUMA purpose for: commercial (light industrial), educational, institutional, business and recreation and mixed used developments. In all cases, the land uses allowed in these zones are not compatible with PAs, CBAs or ESAs, and should only be considered (subject to the necessary authorisations) in ONAs or areas with No Natural Habitat Remaining.

Agriculture

Agricultural activities includes a range agriculture types including:

- Extensive livestock and game ranching (where 'extensive' means at low stocking rates over large areas, with minimal additional food supplementation).
- Arable land, including cultivation of irrigated and dryland crops, woodlots, orchards and multi-cropping systems.
- Agricultural infrastructure, including agri-industrial facilities, agri-villages, buildings, houses, sheds and intensive animal production facilities.

This land use zone corresponds to the SPLUMA scheduled 'agricultural' land use purpose.

Many agricultural activities may impact on, and are largely incompatible with, biodiversity conservation

objectives. They may even accelerate degradation by causing habitat loss, soil erosion and hydrological changes. Their impacts vary from moderate to severe depletion of natural biota and disturbance of ecosystem functioning. However, agriculture can also contribute to the overall functionality of a landscape by maintaining connectivity necessary for the movement and foraging of animals.

Extensive Game and Livestock Production

Extensive Livestock and Game Ranching is the utilisation of large areas of natural (unimproved) rangelands with the commercial objective of producing livestock or game animals (excluding feedlots and game breeding farms). This land use is considered to be compatible with biodiversity objectives of some PAs (such as Protected Environments), CBAs and ESAs, under certain conditions, including:

- A biodiversity and veld condition assessment should underpin the calculation of carrying capacity.
- Game and livestock stocking rates should not exceed the recommended carrying capacity. Overgrazing, which results in a loss or degradation of an ecosystem, is in conflict with NEMA principals and is governed by Section 28 of NEMA which regulates the 'Duty of care and remediation of environmental damage'.
- Give preference to stocking game species that fall within their natural distribution range in the province.
- Sensitive habitats and species-rich areas should be set-aside for the purposes of biodiversity conservation.
- Ecologically and economically sustainable management is applied.

Game Breeding

Game breeding is the subdivision of grazing veld into small camps (less than 100 ha) using fencing that does not allow free movement of naturally occurring wildlife (e.g. small mammals, reptiles, etc.). Game breeding involves supplemental feeding of animals allowing stocking rates in excess of recommended carrying capacities and is considered a form of feedlot production. The forms of fencing used create impenetrable barriers to wildlife movement in the landscape.

Game breeding should not be permitted in CBAs or ESAs as it is not compatible with the land management objectives for these categories.

Feedlots and agri-processing

Feedlots and agri-processing facilities are intensive farming operations include high animal densities and almost exclusive supplemented feeding and include: piggeries, broiler houses, dairies, aquaculture and livestock feedlots. These facilities produce waste streams that require treatment and disposal and should be operated in line with authorisation conditions. Since pollution may be felt beyond the direct footprint of the land use activity itself, this land use activity may impact on ecosystem functionality.

None of the above agricultural activities are compatible with land management objectives for CBAs. With respect to the terrestrial assessment, ESAs may be considered with imposed restrictions, but should not be considered for in aquatic ESAs associated with CBA rivers. ESA2, ONAs or NNRs may be permissible under specific conditions in.

PAs such as Protected Environments may incorporate some of these activities.

Cultivation

A number of different types of cultivation have been aggregated into this land use type and is fundamentally used to describe any earth-turning activity or a replacement of natural vegetation, including:

- Irrigated crop cultivation
- Dryland crop cultivation (e.g. orchards, pastures, groves, plantation forestry)

Cultivation is not considered compatible with the land management objectives of PAs (with some exceptions in Protected Environments), CBAs and ESA1. Cultivated fields may be categorised as ESA2 as

arable land does contribute to an ESA objective by providing foraging habitat and corridors for movement for animals.
Open space
Open space areas, either public or private, are sites easily accessible for recreational purposes and activities for local and designated communities. These include parks, botanical gardens and other open spaces as well as corridor linkages between open areas for passive recreational purposes.
This land use may correspond to either of SPLUMAs scheduled land use purposes under 'Public' or 'Community'.
The land use could potentially be compatible with some of the management objectives of CBAs and ESAs if it secures significant areas of natural habitat and manages human activities within them.
Low, high and general industry
This zone encompasses industrial land use activities, such as low impact industry, general industry and high impact industry. This land use zone corresponds to the SPLUMA scheduled 'Industrial' land use purpose. These land uses are not biodiversity compatible and should not be located in PAs, CBAs or ESAs. ONAs may be considered for low impact and general industry, subject to appropriate authorisations and management. High impact industry should be located in areas with No Natural Habitat Remaining.
Transport Services
This zone accommodates transportation service functions and land uses such as airports, railway stations, petro-ports and truck stops, bus and taxi ranks and other transport depots. This land use zone corresponds to the SPLUMA scheduled 'Transport' land use purpose.
All the land uses allowed in this zone are not compatible with PAs, CBAs and most ESAs, and should only be considered in some ONAs, subject to the necessary authorisations, or in areas with No Natural Habitat Remaining where it is certain they will not impact on priority biodiversity areas.
Roads and railways
Roads and railways includes all existing and future planned linear infrastructure, such as hardened roads and railways. This land use zone corresponds to the SPLUMA scheduled 'transport' land use purpose. These land uses are not consistent with the land management objectives of CBAs and ESAs. In cases where technical options are limited, these activities may only take place in CBAs and ESAs under specific conditions of authorisation and contingent on biodiversity offsets.
Transportation infrastructure could be permissible in ESAs and ONAs under conditions of authorisations and other relevant approvals.
The transportation network must be designed to: <ul style="list-style-type: none"> • Avoid impacts (direct or indirect) on CBAs and ESAs, especially connectivity of the landscape and local corridors. • Transport infrastructure should not be located in sensitive areas such as wetland or forest buffers, and should avoid the relevant 1:100 flood-lines.
Other utilities
'Other utilities' describes a range of services such as water and sewage treatment works, associated pipeline reticulation, and other linear infrastructure including canals and power lines. Utility land uses fall within the 'Government' land use purpose of SPLUMA where it is defined as "use of land by national, provincial or municipal government to give effect to its governance role." This may, in some cases, be extended to parastatal companies such as water service boards and Eskom. The different types of utilities have been discussed separately below.
Linear Structures: Pipelines, Canals, Catchment Transfers and Power Lines
These activities include: large bulk water transfer schemes and catchment transfers, power lines, canals, pipelines (including oil and gas).
Activities involving <u>catchment transfers and canals</u> will affect flow regimes in rivers and wetlands. For this

reason, they are not compatible with the land management objectives for CBA rivers.

Power lines, substations and pipelines can be compatible with the land management objectives of CBAs, and ESAs provided that appropriate design (above-ground pipelines, below-ground power lines, etc) and routing is informed by expert specialist studies, and that strict conditions, such as limited vegetation clearing, bird collision avoidance, etc., are enforced.

These activities are permissible in ESA2 and ONAs, subject to the necessary environmental authorisations and other relevant approvals

Water projects and power stations

Activities involving water damming will affect flow regimes in rivers, wetlands and estuaries. For this reason, they are not compatible with the land management objectives for CBA rivers. Small scale damming of river systems in free-flowing/flagship rivers or upstream and instream of fish sanctuaries should not be permissible.

Power stations are accompanied by the need for significant volumes of water and the generation of wastewater (thermal and chemical pollution) and air pollution emissions. This land use activity is therefore undesirable in CBAs and ESAs. Considering the need for water, avoiding ESA rivers, coastline buffers or estuarine buffers may not be feasible.

In both cases, infrastructure located within CBAs, must be accompanied by biodiversity offsets that must be implemented.

Waterworks and Waste Water Treatment Works (WWTW)

This category includes installations serving rural and urban areas including water and wastewater treatment and includes associated reticulation infrastructure e.g. pump stations and pipelines. Water and WWTWs should not be located in CBAs or ESAs. WWTWs may have significant impacts on water quality and discharge of effluent into Aquatic CBA 1 rivers is therefore not permissible. They should be located in ONAs or heavily modified areas, subject to the appropriate authorisations.

Renewable Energy

Renewable energy generation in the Eastern Cape mainly includes wind and solar (photovoltaic-PV). Other types of renewable energy generation include smaller biomass conversion (biogas and gasification) and biodiesels from recycled oils.

Although the footprint of wind energy facilities is relatively small, the impact on bird and bat biodiversity may be considerable. Since the CBA map has been informed by these taxonomic groups it will reflect important areas for birds and bats. Considering that wind energy facilities are subject to the South African best practice guidelines for the monitoring of both taxonomic groups, wind energy facility may be considered in CBAs and ESAs in line with monitoring recommendations for birds and bats. Consideration of development, subject to expert studies of other biodiversity, in CBAs will require the development and implementation of biodiversity offsets.

Solar PV facilities are area-hungry activities possible requiring considerable landscaping and the clearance of indigenous vegetation. Even if vegetation is left intact, the change in sunlight regime may result in vegetation loss or alteration of the natural species composition. This activity is, therefore, not appropriate in CBAs or ESA1s. In some cases, it may be acceptable to utilise ESA2s and ONAs, provided that maintained connectivity and ecosystem function is demonstrated in the development design.

Other renewable energy technologies

Technologies such as biogas (reactors), gasification and biodiesel plants are typically undertaken on relatively small development footprints. The main impacts that need to be managed relate to air emissions and waste streams. These technologies are, therefore, not compatible with CBA land management

objectives, especially with respect to CBA rivers. ESA2 and ONAs may be considered, provided that the relevant authorisations have been secured.
Quarry and mining
<p>The quarrying and mining zone includes all forms of mineral extraction and is sub-divided into two sub-categories:</p> <ul style="list-style-type: none"> • Prospecting and underground mining; • Quarrying and opencast mining (includes strip mining, surface mining, dumping and dredging); and • Associated mining infrastructure: residential areas, waste dumps, settling ponds and disposal sites, urban waste sites and landfill sites. <p>This land use zone corresponds to the SPLUMA scheduled 'mining' land use purpose.</p> <p>None of the activities in this zone are compatible with biodiversity conservation and they should not be located in any PA, CBA or ESA. They should only be located in areas with No Natural Habitat Remaining, or in some ONAs, and then should be subject to all relevant authorisations and the proviso that they will not impact negatively on neighbouring biodiversity priority areas.</p> <p>The following additional conditions should be observed:</p> <ul style="list-style-type: none"> • Buffer widths should be determined using available policy and guidelines for all biodiversity features present; and • Any environmental management plan should align with the Mining and Biodiversity Guidelines (2014).

12.3 Recommended land use guidelines

A range of land uses/purpose types have been assessed in terms of the anticipated impacts against the management objectives for each CBA category. The assessment for terrestrial and aquatic ecosystems (Table 12 and 13) is structured around the following types of responses with respect to the level of acceptance for each land use type/purpose:

1. Yes (Y): This is an appropriate land use activity, it is unlikely to compromise biodiversity, the activity is in line with, and may contribute to, the management objective, the land use activity is permissible
2. Restricted (R): the activity may compromise the integrity of biodiversity, it may not be in line with management objectives, it will require detailed specialist assessment, it will require restrictive conditions (e.g. reduced footprint, clustering, located only on previously cleared land, etc), may require biodiversity offsets or set-asides
3. Not appropriate (N): this activity will result in destruction/degradation of important biodiversity and/or ecological support areas, it is not in line with management objectives, it will require detailed specialist assessment, unless compelling reasons why should this activity should not be authorised for development, severe restrictive conditions will apply, the activity will require a biodiversity offset (default: use the National Offset Policy with site specific input from experts until the Eastern Cape Offset Policy and guideline is developed)
4. Management required (M): selected activities may not result in further degradation or disruption of biodiversity or ecological infrastructure or processes. Provided that these activities are formally managed throughout the life of the activity, the development and implementation of a management plan, these activities are deemed permissible acceptable.

Table 12 Matrix of recommended land use management guidelines for Terrestrial based activities in the Eastern Cape

LAND USE TYPE	ASSOCIATED LAND USE ACTIVITIES	SPLUMA Land use purpose	PA/CA	CBA1	CBA2	ESA1	ESA2	ONA	NNR
Environmental conservation	Conservation management, low-intensity eco-tourism and sustainable consumptive activities.	Conservation.	Y	Y	Y	Y	Y	Y	N
Tourism and accommodation	Low impact tourism/recreation and accommodation.	Special/low density residential (tourism) including lodges, hotels, etc.	R	R	R	Y	Y	Y	-
	High impact tourism: Resorts	Low-medium density residential: human habitation, hotels.	N	N	N	N	R	R	Y
Municipal commonage	Local agri-economic development.	Agriculture	N	N	N	M	M	Y	N
Rural residential	Low density rural housing and eco-estates.	Low density residential; human habitation: housing, hotels, flats, clubs, hostels, rooms to let, eco-estates.	N	N	R	R	R	R	Y
	Traditional/communal areas and Rural Settlement (e.g. golf estates)	Low-high density residential; Human habitation: housing, hotels, flats, clubs, hostels, rooms to let.	N	N	N	R	R	R	Y
Residential	High density urban residential development (urban and business development).	Medium-high density residential; human habitation: housing, hotels, flats, clubs, hostels, rooms to let.	N	N	N	N	N	R	Y
Other urban influences	An amalgamation of land use zones, including institutional, Urban influence, mixed use and business.	Commercial: light industrial.	N	N	N	N	N	R	Y
		Educational: Instruction/teaching.	N	N	N	N	N	R	Y
		Institutional: charitable	N	N	N	N	N	R	Y

LAND USE TYPE	ASSOCIATED LAND USE ACTIVITIES	SPLUMA Land use purpose	PA/CA	CBA1	CBA2	ESA1	ESA2	ONA	NNR
		institutions (hospitals, nursing homes, clinics, etc).							
		Business: retail	N	N	N	N	N	R	Y
		High density residential: human habitation: housing, hotels, flats, clubs, hostels, rooms to let.	N	N	N	N	N	R	Y
		Recreation: Entertainment, leisure, sports and amusement	N	N	N	N	N	R	Y
Agriculture	Extensive livestock and game farming.	Agriculture.	M	Y	Y	Y	Y	Y	-
	Game breeding.		N	N	N	N	R	Y	-
	Intensive animal farming (feedlot, dairy, piggery, poultry and aquaculture).		N	N	N	N	R	Y	-
	Cultivation (dryland and irrigated).		N	N	N	R	Y	Y	-
	Agri-processing.		N	N	N	N	R	Y	Y
Open space	Public or private open-space, including recreational areas, parks, etc.	Public: open space, parks, gardens, recreation sites, sports fields and religious gatherings.	R	R	R	R	Y	Y	Y
		Community: non-profit community places of import/use.	R	R	R	R	Y	Y	Y
Low, high and general industry	Low, high and general impact industry.	Industrial: heavy industrial: manufacture.	N	N	N	N	N	R	R
Transport services	Transport service land uses (airports, railway stations, truck/bus/taxi stops, petrol stations).	Transport: taxi ranks, bus bays, railway, roads and streets.	N	N	R	R	R	R	Y

LAND USE TYPE	ASSOCIATED LAND USE ACTIVITIES	SPLUMA Land use purpose	PA/CA	CBA1	CBA2	ESA1	ESA2	ONA	NNR
Roads and railways	Existing and planned linear infrastructure such as hardened road and railways, including activities and buildings associated with construction and maintenance.		N	R	R	R	R	R	Y
Other utilities	Linear engineering structures (pipelines, canals, powerlines).	Government: use of land by national, provincial or municipal government to give effect to its governance role: water, sewerage pipelines, Eskom power lines.	N	R	R	R	R	R	Y
	Small-scale infrastructure (WWTW and substations).		N	N	R	R	Y	Y	Y
	Large-scale infrastructure (bulk water transfer schemes and water projects and power stations).		N	N	N	N	N	R	Y
	Renewable energy: PV.		N	N	N	N	R	R	Y
	Renewable energy: wind.		N	N	R	R	R	R	Y
	Alternative renewable energy: biogas, gasification, biodiesel plants		N	N	N	N	R	R	Y
Quarrying and mining	Prospecting and underground mining.	Mining.	N	N	R	R	R	R	-
	Quarrying and open-cast mining (surface mining, dumping and dredging).		N	N	N	N	N	R	-
	Hydraulic fracturing (fracking).		N	N	N	R	R	R	

Table 13 Matrix of recommended land use management guidelines for Aquatic based activities in the Eastern Cape

				Instream Rivers and Wetlands		Catchments and buffers		
LAND USE TYPE	ASSOCIATED LAND USE ACTIVITIES		PA/CA	CBA1	CBA2	ESA1	ESA2	ONA
Environmental conservation	Conservation management, low-intensity eco-tourism and sustainable consumptive activities	Conservation	Y	Y	Y	Y	Y	Y
Tourism and accommodation	Low impact tourism/recreation and accommodation	Special/low density (residential (tourism) = lodges, hotels etc.	N	Y	Y	Y	Y	Y
	High impact: golf estates, lodges, resorts, hotels	Low-medium density Residential: human habitation, hotels	N	N	N	R	R	R
Rural residential	Low density rural settlement and eco-estates	Low density residential: Human habitation: housing, hotels, flats, clubs, hostels, rooms to let	N	N	R	R	Y	Y
	Traditional areas and Rural communal Settlement	Low-high density residential: human habitation: housing, hotels, flats, clubs, hostels, rooms to let	N	N	R	R	Y	Y
Residential	Medium-high density settlement (urban and business development).	Medium-high density residential: human habitation: housing, hotels, flats, clubs, hostels, rooms to let	N	N	N	N	R	R
Agriculture	Extensive livestock and game farming.	Agriculture	M	Y	Y	Y	Y	Y
	Game breeding.		N	N	N	N	R	M/R
	Intensive animal farming (feedlot, dairy, piggery, poultry, aquaculture).		N	N	N	N	R	M/R
	Cultivation of virgin soil (dryland and irrigated)		N	N	N	N	M/R	M/R
	Agri-processing		N	N	N	N	R	M/R
Other utilities	Other linear engineering structures (roads, railways, pipelines, canals, power lines)	Government: use of land by national, provincial or municipal government to give effect to its governance role: water, sewerage pipelines, Eskom power lines	N	R	R	M/R	M/R	M/R
	Small-scale infrastructure (WWTW and substations)		N	N	N	N	R	R

				Instream Rivers and Wetlands		Catchments and buffers		
LAND USE TYPE	ASSOCIATED LAND USE ACTIVITIES		PA/CA	CBA1	CBA2	ESA1	ESA2	ONA
	Large-scale infrastructure (water projects and power stations)		N	N	N	N	R	R
	Renewable energy: PV		N	N	N	N	R	R
Quarrying and mining	Prospecting and Underground mining	Mining	N	N	N	N	R	R
	Quarrying and open-cast mining (surface mining, dumping and dredging)		N	N	N	N	R	R
	Hydraulic fracturing (fracking)		N	N	N	N	R	R

13 SPECIFIC RECOMMENDATIONS FOR PARTICULAR SITES INDICATED ON THE MAP:

This section describes land use management in specific areas shown on the CBA map with comment on specific land uses.

13.1 Threatened Vulture species in the Eastern Cape and wind energy facilities

The assessment and management of impacts of wind energy on birds must be conducted according endorsed and adopted “Birds & Wind Energy Best Practice Guidelines: Best Practice Guidelines for Assessing & Monitoring the Impacts of Wind-energy Facilities on birds in southern Africa” developed by BirdLife South Africa and the Endangered Wildlife Trust (Jenkins *et al.*, 2015). A species specific guideline also exists for Verreaux’s Eagle: “Verreaux’s Eagle and Wind Farms: Guidelines for impact assessment, monitoring and mitigation” (BirdLife SA, 2017). At least two other species specific guidelines are in preparation for the Cape Vulture and the Black Harrier. It is unclear when these will be finalised. Impact assessments in the Province should in all cases comply with endorsed and adopted guidelines as they become available.

Two threatened vulture species are of particular concern with respect to wind energy facilities (WEFs), namely **Cape Vultures** and **Bearded Vultures**, which are Endangered and Critically Endangered (in Southern Africa), respectively.

Bearded Vultures

While the distribution of the Southern African population of Bearded Vulture falls mainly in the Maloti-Drakensberg Mountains of Lesotho, the range extends along the southern Drakensberg into northern areas of the Eastern Cape. The population of Bearded Vulture is declining and there is a very real probability of the species becoming locally extinct. WEFs are considered an additional threat to the remaining Southern African population. The species is associated with a 10km range around nesting sites (*pers. comm* Dr. Sonja Krüger). Therefore, a 10km buffer around all known nesting sites should be restricted from Wind Energy Facility development and will not be endorsed by DEDEAT (Figure 33).

Cape Vultures

The interface between Cape Vulture and wind energy facilities (WEF) in South Africa lies almost entirely within the Eastern Cape (since relatively few wind farms are proposed elsewhere in its range). In the absence of clear available guidance on how to manage Cape Vulture interaction with wind energy facilities, and acknowledging that the wind energy industry has the potential to contribute towards the socio-economic development of the province, it is important for DEDEAT to provide, at the very least a basis for decision-making (with the provision to update this position in the light of future research outcomes, adopted guidelines and the up-coming Cape Vulture Biodiversity Management Plan).

Information and inputs from Boshoff and Minnie (2011), and more recent supporting research conducted by Pfeiffer *et al.*, (2015) generated by satellite tracking the birds, supports the implementation of 50km restriction buffer of WEF facilities around colonies. It is therefore proposed that the most important breeding colonies, where breeding productivity is the best, are identified and selected for priority conservation and that a 50km radius be applied to these colonies, which are demarcated as undesirable and restricted areas for WEF activities. This does not imply that other breeding colonies or roosts are not important or are less sensitive. Databases from a number of contributors were collated. These include:

- Unpublished data from D. Allan (2013);
- Boshoff & Minnie, 2011;
- Input from K. Webster (VulPro) (2017);
- Roost location data from J. Venter & M. Pfeiffer (2016);
- A. Boshoff (ECBCP2007); and
- Unpublished data from J. Smallie (2017).

From this data, seven (7) of the most important breeding colonies that jointly account for upwards of 60% of the provinces breeding population of Cape Vulture were selected, based on consistent data from across the various datasets (Figure 33). These include: Karmmelkspruit, Msikaba; Colleywobbles; Mlengana; Dungu; Tembukazi and Ngozi. Additional colonies may be added to this list as data becomes available.

DEDEAT will not endorse WEF activities in these selected areas pending detailed long-term monitoring which demonstrates an acceptably low risk to Cape Vulture in accordance with relevant best practice guidelines.

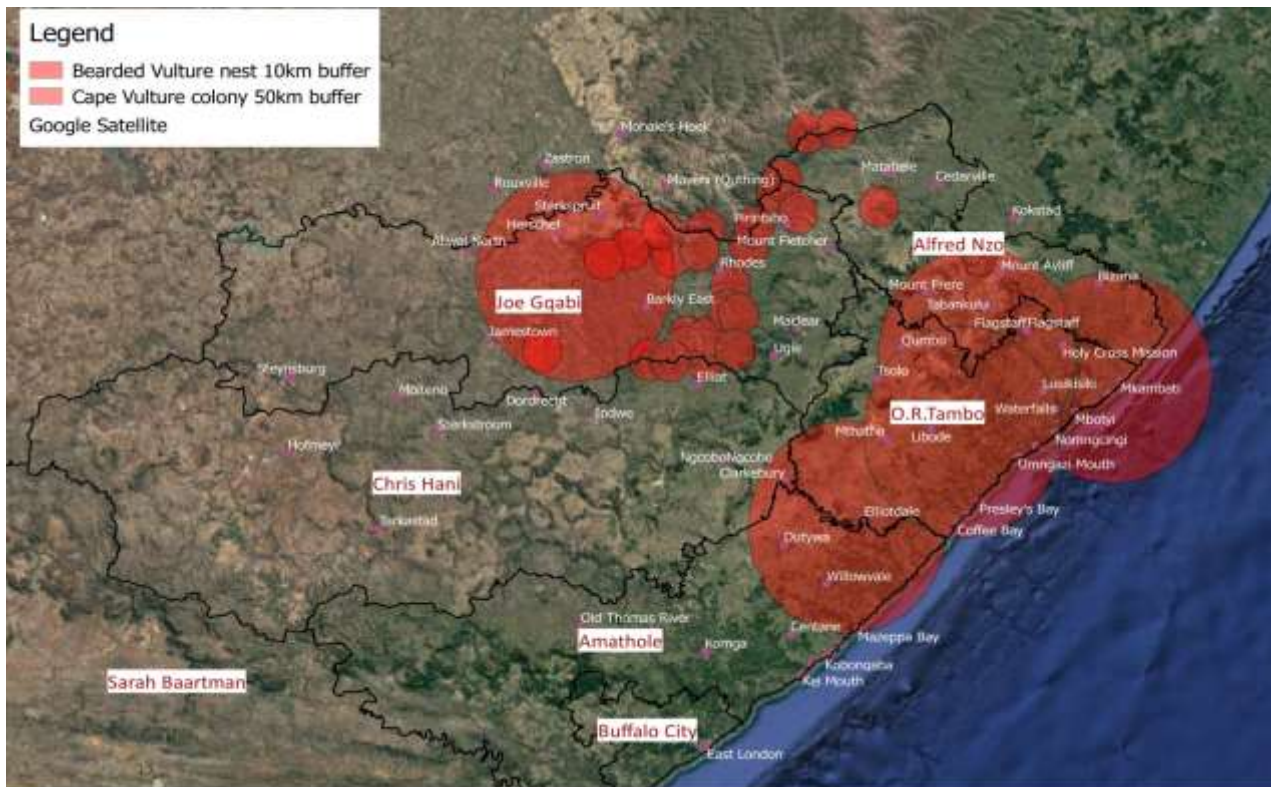


Figure 33 Important vulture nest and colony sites and restricted WEF buffers (small circles = Bearded Vulture, large circles = Cape Vulture)

13.2 Estuary Management

A mechanism to manage estuarine ecosystems is provided for in the NEM: Integrated Coastal Management Act. The process of developing an Estuary Management Plan involves fine-scale mapping and assessment, as well as the engagement of all relevant stakeholders. Estuary Management Plans integrate the biodiversity value, ecosystem function, as well as the ecosystem services rendered that cater for socio-economic needs, and the specific (land use) management requirements of Estuary Management Plans must, therefore, be upheld and implemented.

13.3 Strategic Water Source Areas

At the time of writing this report, effort to delineate strategic water source areas at a finer scale for the purposes of gazettement under Section 24 of NEMA as “Restricted Areas”, was being explored. This may have implications for land use in these areas.

13.4 Coastal Development

Three coastal management tools have been developed in the Eastern Cape namely, the:

- Coastal Environmental Management Framework (EMF), which assessed the portion of coast from the Cannon Rocks to Kei Mouth (2012)
- Wild Coast Environmental Management Plan (EMP), which assessed the portion of coast from Kei Mouth to the Mzimkulu Estuary (2014)
- Amatole District Municipality Coastal Management Programme (2016)

Although the Coastal EMF is not gazetted, land use guidelines and zoning were developed. The Wild Coast EMP underwent significant community engagement and provides zoning scheme in terms of development nodes along the coast in an effort to make provision for socio-economic development and infrastructure in selected, delineated nodes. In both cases, assessment and decision-making must ensure alignment with these coastal management tools.

PART E OTHER MEASURES FOR EFFECTIVE MANAGEMENT OF BIODIVERSITY IN THE EASTERN CAPE PROVINCE

14 ADDITIONAL CONSIDERATIONS AND RESOURCES

14.1 Decision-making for sustainability in the Eastern Cape

Despite being the second largest province in South Africa, boasting impressive biodiversity statistics, the Eastern Cape is also considered the one of the poorest in the country and is in need of real solutions to the socio-economic crisis. Authorising agencies may therefore be required to make decisions that compromise natural resources in favour of socio-economic benefits such as poverty alleviation and job creation. An important goal is to achieve social, economic and environmental **sustainability**, which is core to the success of any initiative, plan, project or programme.

Decision-makers and planners need to be clear about what is meant by sustain able and must be able to justify their decisions based on sustainability criteria. The word “sustain” has two meanings that bear relevance. “Sustain” is to: strengthen, support, and assist. It also means to: endure or withstand. In all aspects of social, economic and environmental assessment and decision-making, these questions should be asked:

1. Will this strengthen, support and assist social needs?
2. Will this strengthen, support and assist economic development?
3. Will this strengthen, support and assist conservation goals and initiatives?

As importantly:

4. Is there social **desire** and social **investment**?
5. Is there economic **desirability** and are there sufficient supporting **economic resources**?
6. Has provision been made for the renewable use and management of natural resources and is the land use compatible with principles of **maintaining biodiversity and ecological integrity** for delivery of ecosystem services?

14.2 Eastern Cape Biodiversity Strategy and Action Plan

The Eastern Cape Biodiversity and Action Plan (ECBSAP) has been developed in conjunction with, and is therefore informed by, the ECBCP2018. The ECBSAP makes use of the thematic and spatial biodiversity issues raised through BCP development process, and through stakeholder and expert engagement, and creates a framework for strategic intervention to address these.

The ECBSAP is a separate report which has aligned with National Biodiversity Strategy and Action Plan Strategic Objectives. This tool develops priority actions that need to be undertaken for improved biodiversity management in the Eastern Cape and assigns roles and responsibilities all levels relevant stakeholders, such as National DEA, Provincial DEDEAT, District and Local municipalities, neighbouring provincial conservation authorities, research agencies and institutions, etc. A key aspect of the ECBSAP is the linkage made between priority issues and interventions and existing programmes (e.g. Protected Area Expansion Strategy, Extended Public Work Programme, Foundational Biodiversity Information Programme) that should be leveraged, supported, assisted to promote biodiversity management in the Eastern Cape.

14.3 National and Eastern Cape Protected Areas Expansion Strategy

There are a number of ways to manage or conserve important biodiversity, which includes the legal protection of these areas under NEMPAA. A national strategy was developed to facilitate the expansion of the protected area network and achieve connectivity between existing protected areas. Each province has used this framework, and conducted further refinements to these areas, to inform the Eastern Cape

Protected Areas Expansion Strategy. Eastern Cape Parks and Tourism Agency (ECPTA) has embarked on a stewardship programme to secure 70,000 of important biodiversity sites for long-term conservation by 2019.

14.4 Spatial Development Frameworks (SDFs) and Integrated Development Plans (IDPs)

14.4.1 Using the ECBCP2018 in developing SDFs

Municipal SDFs are a spatial representation of the IDP and current land uses. It also presents the desired pattern of land use and provides strategic guidance on the spatial arrangement of these land uses. The SDF does this by dividing the landscape into spatial planning categories (including conservation). An important aspect of the ECBCP implementation is to ensure that the CBA map is used to inform several components of the SDF, including:

- Demarcation of urban edge
- Appropriate zonation schemes
- Urban open space systems
- Policy guidelines for land use management systems.

14.4.2 Using the ECBCP2018 in developing IDPs

The IDP integrates multi-sectoral planning at the relevant municipal/government level, which provides the mechanism for implementation of such plans. An IDP may include an Integrated Environmental Management Plan to ensure compliance with environmental legislation. Components of an Integrated Environmental Management Plan usually include:

- State of Environment Reporting (informed by CBAs and ESAs)
- Assessment of biodiversity and ecosystems (including CBAs and ESAs)
- Socio-economic needs of the populace
- Identification of environmental programmes and plans, including CBAs and ESAs
- Action plans, for integration into the IDP, for projects such as remediation/restoration and sustainable resource use opportunities.

PART F MONITORING, REVIEW AND AMENDMENTS

15 INTRODUCTION

The loss or modification of natural environments due to ongoing changes in land use, as well as changes in distribution or knowledge of biodiversity, may impact on the identified network of Critical Biodiversity Areas (CBA) and Ecological Support Areas (ESA). This highlights the importance of monitoring, evaluation and revision of the ECBCP.

All government and municipal plans (including IDPs and SDFs) are monitored, evaluated and updated in order to:

- Establish implementation success of the plan,
- Measure effectiveness of the plan in terms of biodiversity conservation objectives,
- identify and resolve challenges by developing response strategies
- Incorporate new information

The ECBCP2018 will be gazetted in terms of the Biodiversity Act. Provisions in the Act and the guidelines for bioregional plans stipulate that plans are monitored and reviewed on at least a five-yearly cycle. It is therefore recommended that formal monitoring, reviewing and updating of the ECBCP2018 takes place to ensure that the CBA Map and associated maps remain current and useful to land use planning and decision-making.

The Eastern Cape Department of Economic Development, Environment Affairs and Tourism (DEDEAT) are primary responsible agents for the implementation, monitoring, reviewing of the ECBCP2018. The following activities will be undertaken by DEDEAT:

- Monitor implementation of the ECBCP2018 by municipalities through municipal SDF Steering Committees and IDP Forums.
- Review of, and if necessary revision of, the underlying systematic biodiversity plan at least every five years.
- Update the ECBCP at least every five years.

16 MONITORING

DEDEAT will be required to monitor, and then evaluate, the successful implementation of the ECBCP2018 in terms of the following:

- Effective implementation of the ECBCP2018 by municipalities and other relevant users.
- Ensuring the review and update of the ECBCP2018 when necessary.
- Gathering of data on the monitoring indicators.
- Compiling a monitoring and evaluation report for the ECBCP2018 implementation.

The purpose of the ongoing monitoring is to:

1. Evaluate the implementation of the ECBCP2018 i.e. is the ECBCP2018 being used a key informant in SDFs and other planning initiatives?
2. Evaluate the outcomes or impact. i.e. by implementing the ECBCP2018, are the biodiversity objectives, such as reduced loss of important species/habitat, being achieved?

The following indicators for monitoring the implementation mechanism of the ECBCP2018 are therefore proposed:

- Percentage and area (hectares) of CBAs and ESAs that are under some form of conservation management (including both formal protection and conservation stewardship agreements).
- Number of biodiversity management plans for threatened species
- Number of threatened ecosystems gazetted

- Number of District level Biodiversity Sector/Bioregional Plans developed
- Assessment of how many SDFs have been informed by ECBCP2018 or relevant Bioregional Plan

The following indicators for monitoring the outcomes or impact of the ECBCP2018 are proposed:

- Number and type of development applications for environmental authorisations that occur within CBAs and ESAs
- Number of successful environmental authorisation approvals in CBAs and ESAs
- Changes in threat status or ecological status (PES score of rivers) of ecosystems
- Percentage and area (hectares) of CBAs and ESAs that have been severely modified due to various land use changes (e.g. plantation forestry)
- Percentage and area (hectares) of CBAs and ESAs that have been rehabilitated to a satisfactory ecological condition that is consistent with the land management objective

17 REVIEWING

The ECBCP should be reviewed and updated (where necessary) at least every five years by DEDEAT in accordance with the published guidelines for Bioregional Planning (NEMBA 291 of 2009). The review process should examine:

- Progress of implementation of the ECBCP2018 (as measured by the implementation of monitoring indicators from Section 16 above).
- The biodiversity impact of the ECBCP2018 (as measured by the biodiversity monitoring indicators from Section 16 above).
- The need (or lack thereof) for an update of the underlying systematic biodiversity plan. Although the update of a systematic biodiversity plan is a data intensive and time consuming process, due to the rapidly changing landscape in the Eastern Cape it will be necessary.
- The need (or lack thereof) for an update of the other components of the Biodiversity Sector Plan (e.g. land use guidelines; monitoring indicators and processes).
- The need (or lack thereof) to update the Eastern Cape Biodiversity Strategy and Action Plan to respond to the findings of the review of the ECBCP.

18 UPDATING

The ECBCP should be updated at no longer than five-year intervals. Ideally, this should be timed to precede the revision cycle for both the Eastern Cape Spatial Development Framework (ECSDF) and the ECEIP.

Notwithstanding the above, a preliminary assessment indicates that the following data improvements will be required as part of the update:

- i. An integrated vegetation map;
- ii. Recent land cover map;
- iii. Protected area and conservation area map; and
- iv. Inventories of all taxon groups with emphasis on mammals, molluscs, reptiles, amphibians, invertebrates (e.g. butterflies) and plants.

PART G GIS DATA

The following Geographic Information System (GIS) data files created for the ECBCP2018 area available to users:

Table 14 Geographic Information System (GIS) data files

File name	File type	Important fields	Description	Source
ECBCP2018_PACA_u35s	Vector shapefile	EC_1_protected_areas_BiosphereReserves	The 2017 Map of Protected Areas and Conservation Areas	Desmet <i>et al.</i> , 2017
		EC_2_protected_areas_WHS		
		EC_3_protected_areas_State_owned		
		EC_4_protected_areas_Protected Environments		
		EC_5_protected_areas_MPAs		
		EC_6_conservation_areas_private_nature_reserves		
		EC_7_conservation_areas_private_nature_reserves_DEFACTO		
		EC_8_conservation_areas_Forest_Reserves_DAFF		
ECBCP2018_Estuary_u35s	Vector shapefile	E_CBA1_EC_All_Estuaries	The 2017 Map of Estuaries	Desmet <i>et al.</i> , 2017
		EC_All_Estuaries		
ECBCP2018_Freshwater_u35s	Vector shapefile	W_CBA1_EC_FreshwaterMARXAN_Rivers_20170619	The 2017 Map of Aquatic Critical Biodiversity Areas and Ecological Support Areas	Desmet <i>et al.</i> , 2017
		W_CBA1_EC_FreshwaterMARXAN_River_Buffer1km		
		W_CBA2_EC_FreshwaterMARXAN_SQ4		
		W_CBA3_EC_IntegratedWetlands		
		W_CBA3_EC_IntegratedWetlands_buffer100m		
		W_CBA4_StrategicWaterAreas		
		W_CBA5_EC_Groundwater_Karst		
		W_CBA6_EC_ModelledWetlands		
ECBCP2018_Terrestrial_CBA_u35s	Vector shapefile	W_CBA7_EC_Wetland_Clusters	The 2017 Map of Terrestrial Critical Biodiversity Areas and Ecological Support Areas	
		Bat_Roosts_Buffer500m_CBA		Desmet <i>et al.</i> , 2017
		EC_BeardedVulture_CBA_ESA		
		EC_cliffs_SRTMarc_CBA_ESA		
		EC_MARXAN_CBA_ESA		
		EC_STEP_CR_EN_Remnant_polygons_CBA		
		EC_ThreatenedEcosystems_SAvveg_STEP_CBA		
		ForestPatchEC_Integrated_CBA_ESA		
		CC_EBA_ESA		
		CoastalEcologicalZone_ESA		

File name	File type	Important fields	Description	Source
ECBCP2018_Context_u35s	Vector shapefile	EC_Biodiversity_Spatial_Framework2017	Spatial areas used for the planning process	Desmet <i>et al.</i> , 2017
		EC_Coastal_Ecological_Zone_u35s		
		EC_Cores_Biome_CC_refugia_u35s		
ECBCP2018_EC_VegMap	Vector shapefile	EC_VegMap_Ecosystem_Status	A revised vegetation map for the Eastern Cape developed for this project.	Desmet <i>et al.</i> , 2017
	Vector shapefile	EC_STEP_Thicket_Veg2003_u35s	STEP vegetation map	
ECBCP_Integrated_Landcover2014	Esri GRID	Lc_int2014	A 30m land cover for the Eastern Cape derived from the integration of GTI 2013-2014 Land cover with ARC erosion dongas, SANBI “old fields”, STEP degradation layer and Lechmere-Oertel land cover mapping.	GeoTerralmage 2013-2014 and Desmet <i>et al.</i> , 2017

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