

**Development of an Environmental Management
Framework for the Ugu District:**

Biodiversity Assessment



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FURTHER INFORMATION

Much of the information presented in this report was prepared as part of the Biodiversity Sector Plan (BSP) for the Ugu District (Macfarlane et.al., 2013a). Additional information in the form of Geographical Information Systems (GIS) shapefiles used to prepare the Critical Biodiversity Areas Maps referred to in this status quo report, together with the original BSP report and associated guidelines can be obtained by contacting data@kznwildlife.com.

EXECUTIVE SUMMARY

This report sets out the findings of a specialist biodiversity assessment, commissioned as one of a number of technical reports aimed at informing the development of an Environmental Management Framework for the Ugu District.

The first section of the report provides an overview of legislation governing management of biodiversity nationally and regionally. This serves to highlight the plethora of environmental legislation available to support the protection of biodiversity with a specific focus on outlining practical implications for municipalities in the context of development planning. Despite this legal framework, significant progress is needed in order to effectively integrate biodiversity imperatives with spatial planning and decision making. This highlights the importance of this study to help entrench biodiversity issues within the broader planning context.

A biophysical overview of the Ugu District is provided as a background to understanding biodiversity patterns within the study area. This includes an overview of current transformation and dominant land uses that have caused biodiversity loss within the district. The status quo of biodiversity in the study area is then presented in a structured manner by focussing on a number of indicators. The following highlights are worth noting in this regard:

- **Maputaland-Pondoland Albany biodiversity 'hotspot':** The importance of the area is emphasised by noting the location of the municipality within this regional 'hotspot' which, despite significant (~70%) transformation, is still recognised for its unusually high levels of endemism.
- **Status of vegetation types:** High levels of transformation in the study area have contributed to five vegetation types being classified as critically endangered and a further three vegetation types being classified as endangered. Together, these vegetation types account for 58% of the study area while 24% of vegetation types are vulnerable, while only 17% are classified as least threatened.
- **Alien invasive plants:** Large sections of the Ugu District are affected by alien invasive plant species with the highest densities reported to the south and west of the study area. Current and potential future expansion of affected areas poses a significant risk to remaining untransformed areas.
- **River ecosystems:** Most rivers including the two major perennial rivers are reported as being in good condition (A/B class). A number of the smaller rivers are more heavily modified and classified as moderately (C class) to heavily (D class) impacted. While detailed information is lacking for some of the smaller rivers, surrounding land cover suggests that many of these systems are "not intact", including a large number of discrete, short river systems flowing into the Indian Ocean.
- **Wetland ecosystems:** An estimated 67% of wetland areas have been subject to transformation, significantly affecting the ecosystem services derived from these resources. While no critically endangered wetland types were identified in the provincial assessment, more than 50% of wetlands fall within an endangered wetland vegetation type. The national assessment paints a worse picture with many wetland vegetation groups classified as critically endangered in the study area.
- **Estuaries:** Estuaries are heavily impacted with only 20% of estuaries in a Good or Excellent condition. Of the remainder, 30% area reportedly in a Poor condition while the remaining 50% are in Fair condition.
- **Species status:** A wide range of threatened fauna and flora species occur in the Ugu District. This includes at least 6 species regarded as critically endangered with a further 22 species that are endangered.
- **Level of protection:** Less than 2% of the study area falls within formally protected areas which is significantly lower than international and national benchmarks.
- **Management of protected areas:** A recent assessment suggests that existing protected areas all fall below the recommended minimum standard with an average management effectiveness score of close to 60%. Some areas are also subject to significant pressures which also threaten to compromise protected area objectives.

The importance of areas for biodiversity conservation are then presented in the form of a Critical Biodiversity Area (CBA) map based on the outputs of the recent Biodiversity Sector Plan (BSP) prepared for the Ugu District. The CBA map indicates areas of terrestrial land, aquatic features as well as marine areas which must be safeguarded in their natural state if biodiversity is to persist and ecosystems are to continue functioning. The

CBA map aims to guide sustainable development in the District by providing a synthesis of biodiversity information to decision makers and serves as the common reference for all multi-sectoral planning procedures, advising which areas can be developed in a sustainable manner, and which areas of critical biodiversity value should be protected against biodiversity threats and impacts such as development.

Focal areas for management have also been identified by prioritizing CBA areas identified in the BSP. This was done by spatially integrating information on threat and biodiversity importance to identify areas with high biodiversity value and potentially subject to high levels natural and anthropogenic threats. The resultant map should serve to focus conservation efforts of Ezemvelo KwaZulu-Natal Wildlife, Municipalities and other biodiversity stakeholders with an interest in conserving priority conservation areas.

Key issues affecting biodiversity within the study area have also been highlighted. Key drivers include demand for land for economic and social development, agricultural activities, subsistence living areas and climate change. These, together with a range of other drivers continue to exert pressure on the remaining areas of untransformed habitat that not only provide habitat for a range of important species, but provide a range of goods and services to people living in and around the study area. These pressures and resultant impacts have given rise to the status quo and will lead to further biodiversity losses if not addressed through appropriate directed actions. A range of responses have therefore been proposed in order to ensure that biodiversity concerns are addressed and that society's basic rights to an environment which is not harmful to their health or well-being and to have the environment protected for the benefit of present and future generations are upheld.

Finally, a range of monitoring indicators are suggested as a means of monitoring the state of the environment within the study area. These monitoring indicators should ideally be assessed on a regular basis in order to monitor how effectively biodiversity aspects are being addressed in the district.

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DEFINITION OF TERMS

Biodiversity	The wide variety of plant and animal species occurring in their natural environment (habitats). The term encompasses different ecosystems, landscapes, communities, populations and genes, as well as the ecological and evolutionary processes that allow these elements of biodiversity to persist over time.
Biodiversity offsets	<p>The measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development after appropriate prevention and mitigation measures have been taken. The goal of biodiversity offsets is to achieve no net loss and preferably a net gain of biodiversity on the ground with respect to species composition, habitat structure, ecosystem function and people's use and cultural values associated with biodiversity.</p> <p>In terms of the draft KwaZulu-Natal Biodiversity Conservation Management Bill (2009), a biodiversity offset in relation to development or land transformation, means the compensation given by a developer for the loss of or harm to biodiversity where other mitigation options have been exhausted and such offset should be commensurate with the residual negative impact on biodiversity.</p>
Biodiversity pattern	Term used to define the way in which components of biodiversity are arranged spatially.
Biodiversity Priority Map (or CBA Map)	A map that indicates priority areas for safeguarding to ensure the continued existence of biodiversity and its ecological processes.
Bioregional Plans	Bioregional plans are one of a range of tools provided for in the National Environmental Management: Biodiversity Act (NEMBA) that can be used to facilitate biodiversity conservation in priority areas outside the protected area network.
Catchment	The area where water from atmospheric precipitation becomes concentrated and drains down-slope into a river, lake or wetland. The term includes all land surface, streams, rivers and lakes between the source and a key drainage point.
Catchment Management Association/Agency	Associations or agencies established to delegate the water resource management and protection from central government to the catchment level in terms of the National Water Act (1998).
Critical Biodiversity Area (CBA)	Biodiversity features, habitats or landscapes that include terrestrial, and aquatic and marine areas that are considered critical for (i) meeting national and provincial biodiversity targets and thresholds (ii) safeguarding areas required to ensure the continued existence and functioning of species and ecosystems, including the delivery of ecosystem services; and/or (iii) conserving important locations for biodiversity features or rare species. Conservation of these areas is crucial, in that if these areas are not maintained in a natural or near-natural state, biodiversity conservation targets cannot be met.
Community	A collection of interacting species that occur in the same geographic area.
Connectivity	Connectivity refers to the ability of connective corridors to sustain ecosystem processes common to linked patches (opposite of fragmentation).
Conservation	The safeguarding of biodiversity and its processes (often referred to as Biodiversity Conservation).
(Biodiversity) Conservation Targets	A systematic conservation plan relies on the definition of conservation targets (quantitative expressions of a region's conservation goals), which define how much of each biodiversity feature (e.g. habitat types, species), and biodiversity processes, should be included within the planning domain boundaries (EKZNW, 2013).
Delineation	Refers to the technique of establishing the boundary of a resource such as a wetland or riparian area.
Dynamic ecosystems	Ecosystems that are highly mobile (e.g. Aeolian features such as mobile sand dunes) or prone to change (e.g. estuary mouths, floodplains, areas undergoing soil erosion).
Ecosystem	An ecosystem is essentially a working natural system, maintained by internal ecological processes, relationships and interactions between the biotic (plants & animals) and the non-living or abiotic environment (e.g. soil, atmosphere). Ecosystems can operate at different scales, from very small (e.g. a small wetland pan) to large landscapes (e.g. an entire water catchment area).

Ecological corridors	<p>Habitat, ecosystems or undeveloped areas that physically connect habitat patches. Smaller, intervening patches of surviving habitat can also serve as "stepping stones" that link fragmented ecosystems by ensuring that certain ecological processes are maintained within and between groups of habitat fragments.</p> <p>Landscape-level corridors are primarily located along ridgelines and have been identified in an effort to maintain key environmental gradients. These altitudinal and bio-geographic corridors were created in KZN to facilitate evolutionary, ecological and climate change processes to create a linked landscape for the conservation of species in a fragmented landscape. Provincial in scale, these corridors attempt to establish linkages from the Drakensberg Highlands to the eastern sea-board (in an east-west fashion) as well as along the bio-geographical gradients which run in a north-south direction within the KZN Province. These are equivalent to macro-ecological corridors (EKZNW, 2013).</p> <p>Local-level corridors are developed at a District scale to create fine scale links within the landscape that facilitates ecological processes and ensure persistence of critical biodiversity features (EKZNW, 2013). These supplementary local ecological linkages have been identified with input from local stakeholders.</p>
Ecosystem Goods and Services	<p>The goods and benefits people obtain from natural ecosystems. Various different types of ecosystems provide a range of ecosystem goods and services. Terrestrial ecosystems such as natural forests for instance, provide for carbon sequestration and the air we breathe. Likewise, aquatic ecosystems such as rivers and wetlands provide water supply, flood attenuation and habitat for a range of aquatic biota. Biodiversity and associated ecosystem services are well-known to contribute significantly to the local and regional economy, and ultimately, the persistence of biodiversity, as well as health and wellbeing of human populations.</p>
Ecological Infrastructure (EI)	<p>Functional landscapes that provide ecological goods and services to society. These areas are not necessarily required to meet conservation targets but are important to promote water security, assist disaster relief (e.g. flooding), prevent soil loss and in maintaining or improving key services such as clean water for domestic and recreational use.</p>
Ecosystem status	<p>Describes the condition of an area's biodiversity relative to past, present and future threats, and is an indicator of the level of safeguarding required for the continued existence of a particular biodiversity asset. Ecosystem status of terrestrial ecosystems is based on the degree of habitat loss that has occurred in each ecosystem, relative to two thresholds: one for maintaining healthy ecosystem functioning, and one for conserving the majority of species associated with the ecosystem. As natural habitat is lost in an ecosystem, its functioning is increasingly compromised, leading eventually to the collapse of the ecosystem and to loss of associated species.</p>
Ecological processes	<p>The operations and interactions which occur within natural ecosystems that enables them to function as healthy and functional systems. The conservation of ecological processes is essential for the maintenance of biodiversity. Examples of ecological processes include pollination, nutrient cycling and disturbance (e.g. fire).</p>
Ecological Support Area (ESA)	<p>Areas required to support and sustain the ecological functioning of the critical biodiversity areas.</p> <p>These are functional but not necessarily entirely natural features, habitats or landscapes. ESAs include all terrestrial and aquatic areas that are largely required to ensure ecological connectivity is provided across the landscape thereby promoting biodiversity conservation and ecosystem functioning. They also include key areas within largely transformed landscape features that nevertheless contribute to the persistence of key threatened species. ESAs are not essential for meeting biodiversity representation targets/thresholds but which nevertheless play an important role in supporting the ecological functioning of critical biodiversity areas and/or in delivering ecosystem services and buffering protected areas and other CBAs from land use impacts.</p>
Ecological Support Area: Species Specific	<p>Areas required for the persistence of specific species. Although these areas are frequently transformed, a change in current land use, to anything other than rehabilitated land, would most likely result in a loss of that feature from the area identified (Escott, <i>et.al.</i>, 2013).</p>
Ezemvelo KZN Wildlife (EKZNW)	<p>Ezemvelo KwaZulu-Natal Wildlife - the local conservation authority for the Province of KwaZulu-Natal.</p>
Endemic	<p>Refers to a plant, animal species or a specific vegetation type which is naturally restricted to a particular defined region (not to be confused with indigenous). A species of animal may, for example, be endemic to South Africa in which case it occurs naturally anywhere in the country, or endemic only to a specific geographical area within the country, which means it is restricted to a given area and is found nowhere else in the country naturally.</p>
Features and processes	<p>The spatial delineation of features such as species and habitats, and processes such as macro ecological corridors, fronts and eddies, mapped for use within a conservation plan (EKZNW, 2013a).</p>
Fragmentation [of habitat]	<p>The fragmenting or breaking-up of a continuous habitat, ecosystem, or land-use type into smaller pieces or fragments.</p>

Freshwater Ecosystem Priority Areas	Freshwater Ecosystem Priority Areas (FEPAs) are strategic spatial priorities for conserving freshwater ecosystem and supporting sustainable use of water resources. The National Freshwater Ecosystem Priority Areas Project (Driver <i>et al.</i> , 2011) determined FEPAs through a process taking into account systematic biodiversity planning and expert inputs, using a range of criteria dealing with maintenance of key ecological processes and the conservation of ecosystem types and species associated with rivers, wetlands and estuaries.
Function/functioning/functionality	Used here to describe natural systems working or operating in a healthy way, as opposed to in a dysfunctional way, which means working poorly or in an unhealthy way.
Habitat	The general features of an area inhabited by animal or plant which are essential to its survival (i.e. the natural "home" of a plant or animal species).
Indigenous	Naturally occurring or "native" to a broad area, such as South Africa in this context.
Intact ecosystems/environments	Used here to describe a natural environment that is not badly damaged, and is still operating healthily.
Invasive alien species	Invasive alien species means any non-indigenous plant or animal species whose establishment and spread outside of its natural range threatens natural ecosystems, habitats or other species or has the potential to threaten ecosystems, habitats or other species.
Marine Protected Areas	<p>Sanctuary Area (A) – this zone aims to maintain biodiversity and ecological processes and to provide visitors with natural/spiritual/educational experiences in the marine environment. There is no extractive resource use except limited traditional subsistence harvesting in specified areas.</p> <p>Restricted Zone (B) – this zone aims to conserve biodiversity and ecological processes and to provide visitors with a very exclusive high quality nature based outdoor experience in a marine environment. Certain activities such as catch and release pelagic fishing are permitted.</p> <p>Controlled Zone (C) – this zone aims to restore and maintain the natural environment and ecological processes whilst providing an affordable, comfortable, informative, safe, enjoyable and sustainable outdoor recreational experience in a relatively unspoilt marine environment. This zone allows for a small amount of extractive resource use including pelagic fishing according to a fish list in certain MPAs.</p>
Mitigate	To take actions to reduce the impact of a particular development or threat.
Natural Biodiversity Area	Areas identified as Natural Biodiversity Areas (NBAs) represent the natural and/or near natural environmental areas (i.e. non- hard transformed areas, such as concrete) not identified within the optimisation software output. It is important to note that whilst these areas are not highlighted in MINSET and MARXAN analysis, this lack of selection should not be misinterpreted as reflecting areas of no biodiversity value. Whilst it is preferred that development be focussed within these areas, this still has to be conducted in an informed and sustainable manner. Important species and ecosystem services can still be associated with these PUs and should be accounted for in the EIA process. They are not highlighted as the analyses highlight the 'choice' areas from a biodiversity point of view only. Should one or more of the CBA2 and CBA3 sites be utilised for development, it is obvious that the target for whatever feature(s) where located within that PU will no longer be met. Ideally, the analyses would have to be re-run to calculate the next optimal solution and it is from this biodiversity 'reserve' that the next optimal selection will be made (Escott, <i>et.al.</i> , 2013).
National Threatened Ecosystems	National Threatened Ecosystems are provided for in the National Environmental Management: Biodiversity Act (Act 10 of 2004), these areas represent threatened and protected ecosystems categorised according to one of four categories (Critically Endangered, Endangered, Vulnerable and Protected Ecosystems). Within this Act, it is stated that Critically Endangered Ecosystems must be considered as part of Critical Biodiversity Areas (Escott, <i>et.al.</i> , 2013).
Pristine	Unspoiled, used here to describe the natural environment in its undisturbed state.
Precautionary principle	As incomplete or inadequate data is generally the norm in conservation and resource management actions, in the face of uncertainty about the workings of ecosystems and the effects of our actions on such systems, we should always take a risk-averse and cautious approach (in the context of development and human activities that could potentially impact on the natural environment), especially when long-term or irreversible consequences are more likely to occur.
Protected Area	Limited here to formally Protected Areas declared under NEM:PAA. Such areas form the backbone of the conservation network and are critical in their contribution to the achievement of conservation objectives in the Province.
Red Data Book or Red List	Provides information on the status of threatened species: critically endangered species are most at risk of extinction, followed by endangered and vulnerable species.
Riparian area/riparian habitat/riparian zone	Includes the physical structure and associated vegetation within a zone or area adjacent to and affected by surface and subsurface hydrologic features such as rivers, streams, lakes or drainage ways and are commonly associated with alluvial soils. Vegetation species commonly have a composition and structure that is distinct from those of adjacent lands (NWA, 1998).
SANBI	South African National Biodiversity Institute, established in terms of the NEM:BA.

Sustainable development	Development that meets the needs of both present and future development, equitably. In terms of the National Environmental Management Act No. 107 of 1998, "(sustainable) development is the integration of social, economic and environmental factors into planning, implementation and decision-making so as to ensure that development serves present and future generations."
Systematic conservation plan	An approach to conservation that prioritises actions by setting quantitative targets for biodiversity features such as broad habitat units or vegetation types. It is premised on conserving a representative sample of biodiversity pattern, including species and habitats (the principle of representation), as well as the ecological and evolutionary processes that maintain biodiversity over time (the principle of persistence).
Threatened ecosystem	As defined in terms of ecosystem status in the NSBA, 2005: Critically Endangered, Endangered, Vulnerable and Near Threatened categories. Threatened ecosystems are to be listed in terms of the NEMBA, using these same categories.
Transformation (habitat loss)	Refers to the destruction and/or clearing of an area of its indigenous vegetation, resulting in loss of natural habitat. In many instances, this can and has led to the partial or complete breakdown of natural ecological processes.
Water course	Means a river or spring; a natural channel in which water flows regularly or intermittently; a wetland, lake or dam into which, or from which, water flows; and any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks (National Water Act, 1998).
Water Management Area	A WMA or Water Management Areas is an area established as a management unit in the National Water Resource Strategy within which a catchment management agency will conduct the protection, use, development, conservation, management and control of the country's water resources. The National Water Act (Act 36 of 1998) requires that water will be managed at regional or catchment level within defined WMAs.
Water Production Area	Areas of net water production. Keeping these areas in a natural/near natural condition will ensure the continued regular and regulated supply of water to the downstream system (Escott, <i>et.al.</i> , 2013).
Wetland	Refers to land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil (NWA, 1998).

ABBREVIATIONS USED

BSP	Biodiversity Sector Plan
CBA	Critical Biodiversity Area
DEA	Department of Environmental Affairs (formerly DEAT)
DEAT	Department of Environmental Affairs & Tourism (now DEA)
DWA	Department of Water Affairs (formerly DWAF)
EI	Ecological Infrastructure
EIA	Environmental Impact Assessment: EIA regulations promulgated under section 24(5) of NEMA and published in Government Notice R.543 in Government Gazette 33306 of 18 June 2010
EKZNV	Ezemvelo KwaZulu-Natal Wildlife: as defined in Act 9 of 1997 to be the KZN Nature Conservation Service
EMF	Environmental Management Framework: EMF regulations promulgated under NEMA and published in Government Notice R.547 in Government Gazette 33306 of 18 June 2010
EMP	Environmental Management Plan
EGSA	Ecosystem Goods and Services Area
ESA	Ecological Support Area
ESCP	Estuarine Systematic Conservation Plan

FEPA	Freshwater Ecosystem Priority Area
FSCP	Freshwater Systematic Conservation Plan
GIS	Geographical Information Systems
IDP	Integrated Development Plan (developed in terms of the Municipal Systems Act)
KZN	Province of KwaZulu-Natal
MinSet	Specific areas prioritised for biodiversity management by EKZNW in order to achieve the minimum biodiversity conservation targets within the KwaZulu-Natal province
MPA	Marine Protected Area
NBA	Natural Biodiversity Area
NEMA	National Environmental Management Act No.107 of 1998
NFEPA	National Freshwater Ecosystem Priority Areas
NEM:BA	National Environmental Management: Biodiversity Act No.10 of 2004
NEM:PAA	National Environmental Management: Protected Areas Act
NGO	Non-governmental organisation
PA	Protected Area: as defined in the Area's identified for formal protection under the National Environmental Management Protected Areas Act, 2003 (Act 57 of 2003, NEMPAA).
PES	Present Ecological State
PU	Planning Unit
SANBI	South African National Biodiversity Institute
SDF	Spatial Development Framework (as required by the Municipal Systems Act for each Municipality)
SEA	Strategic Environmental Assessment
SoER	State of Environment Report
TSCP	Terrestrial systematic conservation plan
UDM	Ugu District Municipality
WMA	Water Management Area
WWTW	Waste Water Treatment Works (Sewage Works)

1. INTRODUCTION

1.1 What is “biodiversity” and why is it important?

The term 'Biodiversity' is used to describe the wide variety of plant and animal species occurring in their natural environment or 'habitat'. The term encompasses different ecosystems, landscapes, communities, populations and genes as well as the ecological and evolutionary processes that allow these elements of biodiversity to persist over time. “Biodiversity pattern” refers to the way in which components of biodiversity are arranged, while “biodiversity process” relates to the series of actions and interactions occurring between biodiversity components (which serve to maintain biodiversity) and are commonly termed 'ecological processes'.

South Africa's biodiversity provides an important basis for economic growth and development. Keeping our biodiversity intact is vital for ensuring the on-going provision of ecosystem services, such as the production of clean water through good catchment management. Loss of biodiversity puts aspects of our economy and quality of life at risk and reduces socioeconomic options for future generations as well. In essence, sustainable development is not possible without it.

1.2 Background to this consultancy

Land-use planning and decision-making is obliged to take biodiversity considerations into account and to ensure decisions are informed by the most up to date information. In this regard, EMFs are part of the suite of integrated environmental management (IEM) tools that can be used to support informed decisions regarding the management of impacts on the environment that arise out of human activities and developments. The primary objectives of EMFs include:

- Supporting informed and integrated decision-making by making significant and detailed information about an area available before activity proposals are generated;
- Contributing to environmental sustainable development by anticipating potential impacts and by providing early warnings in respect of thresholds, limits and cumulative impacts, and by identifying already existing impacts to be addressed;
- Supporting the undertaking of environmental impact assessment in the area by indicating the scope of potential impacts and information needs that may be necessary for environmental impact assessment;
- Supporting the process of delineating geographic areas within which additional specific activities are to be identified in terms of NEMA; and
- Supporting the process of delineating geographical areas within which activities listed in terms of NEMA may be excluded by identifying areas that are not sensitive to the potential impacts of such activities.

In developing an EMF, one of the initial steps required is the compilation of information necessary to document the status quo and sensitivity of the environment. Fortunately, a Biodiversity Sector Plan (BSP) has recently been drafted for the Ugu District (Macfarlane *et. al.*, 2013a). This plan is intended to be the primary biodiversity informant for a range of multi-sectoral planning and decision-making procedures, including Environmental Management Frameworks. Given our involvement in developing the BSP, Mott MacDonald (Pty) Ltd. approached Eco-Pulse Consulting to assist in compiling a status quo report on biodiversity for the project area and in providing further specialist biodiversity input into the project.

1.3 Scope of work

The status quo phase of the project is the component where the baseline conditions within the Municipality, at the time of the study, are reported on. The objective of the initial phase was therefore to determine the existing situation and to provide a spatial representation of the Municipality's environment from a biodiversity perspective. Given this background, the specific focus of the status quo assessment is summarized in the following scope of work:

- To define the legal framework for management of terrestrial biodiversity;
- To objectively assess the importance of untransformed land for biodiversity conservation within the Ugu District Municipality;
- To engage with key biodiversity stakeholders and undertake field inspections in order to capture and refine priority conservation areas;
- To compile biodiversity maps which adequately represent the importance of untransformed land for biodiversity conservation;
- To provide additional input on biodiversity issues and management to support the development of the EMF.

Further tasks reported on in this report, include spatially representing ecological sensitivities across the area and identifying focal areas for management and recommendations to prevent further unacceptable biodiversity loss in future.

1.4 Project team

Details of project team members involved in the project are indicated below in Table 1:

Table 1. Details of team members

Team Member	Qualifications	Details
Douglas Macfarlane (Eco-Pulse)	BSc (Agric) MSc	Doug has an MSc in Environment and Development and a BSc. Agric in Wildlife Science and is a registered Natural Scientist in the field of Ecological Science. He is a principal consultant at Eco-Pulse with a broad range of biodiversity-related expertise having worked on a diverse array of strategic projects including the drafting of a Biodiversity Sector Plan for the Ugu District. Doug was the project leader and was responsible for compiling this report and guiding the mapping process.
Mr John Richardson (Terratest (Pty) Ltd)	BSc(Honours)	John graduated from the School of Applied Environmental Sciences at the University of KwaZulu-Natal, Pietermaritzburg and has completed both an undergraduate and post-graduate degree (Hons.) in Geographical Sciences (Geography and Environmental Management). He is an environmental consultant, specialising in the field of Geographic Information Systems. John's role was to assist in the compilation, review and analysis of GIS data necessary to prepare map products as part of this report.

1.5 Acknowledgements

The information presented in this report has been largely drawn from the Ugu BSP with permission from Ezemvelo KZN Wildlife for whom the BSP was developed. The contributions of other team members who assisted in developing the BSP including Adam Teixeira-Leite (Eco-Pulse Consulting), Marita Thornhill (Thorn-Ex cc), Felicity Elliot and Boyd Escott (Ezemvelo KZN Wildlife) is therefore greatly acknowledged. Special thanks also to David Styles, Alex Skene, Geoff Nichols, Roger Uys, Matt Williams, Tony Abbott, Piet Massyn, Rob Scott-Shaw and Elsa Pooley for taking the time to assist in identifying local-level conservation priority areas.

1.6 General description of the study area

The word "Ugu" in isiZulu means "Coast", which describes perfectly the location of the Ugu District Municipality (UDM) on the southern KwaZulu-Natal (KZN) coastline between Scottburgh in the north-east and Port Edward in the south. The UDM (DC 21) is one of the ten districts of KZN and shares borders with the Eastern Cape Province in the south along with the following three KZN District municipalities: Sisonke to the west, UMgungundlovu to the north and eThekweni Metro to the north-East (Figure 1). The UDM is approximately 5, 000 km² in extent and comprises six Local Municipalities, as summarised in Table 2 below.

Table 2. Details of Local Municipalities falling within the study area.

Local Municipality	Area (km ²)	% of District	Main Towns
uMzombe	1259.0	25	St. Faiths, Umzombe
Vulamehlo	959.9	19	Dududu, Braemar
uMdoni	251.5	5	Umzinto, Scottburgh, Mtwalume
uMuziwabantu	1089.8	22	Harding, Weza
Hibiscus Coast	839.1	16	Hibberdene, Port Shepstone, Port Edward
eZingoleni	648.2	13	Paddock, Izingolweni
Totals	5, 047.5	100	

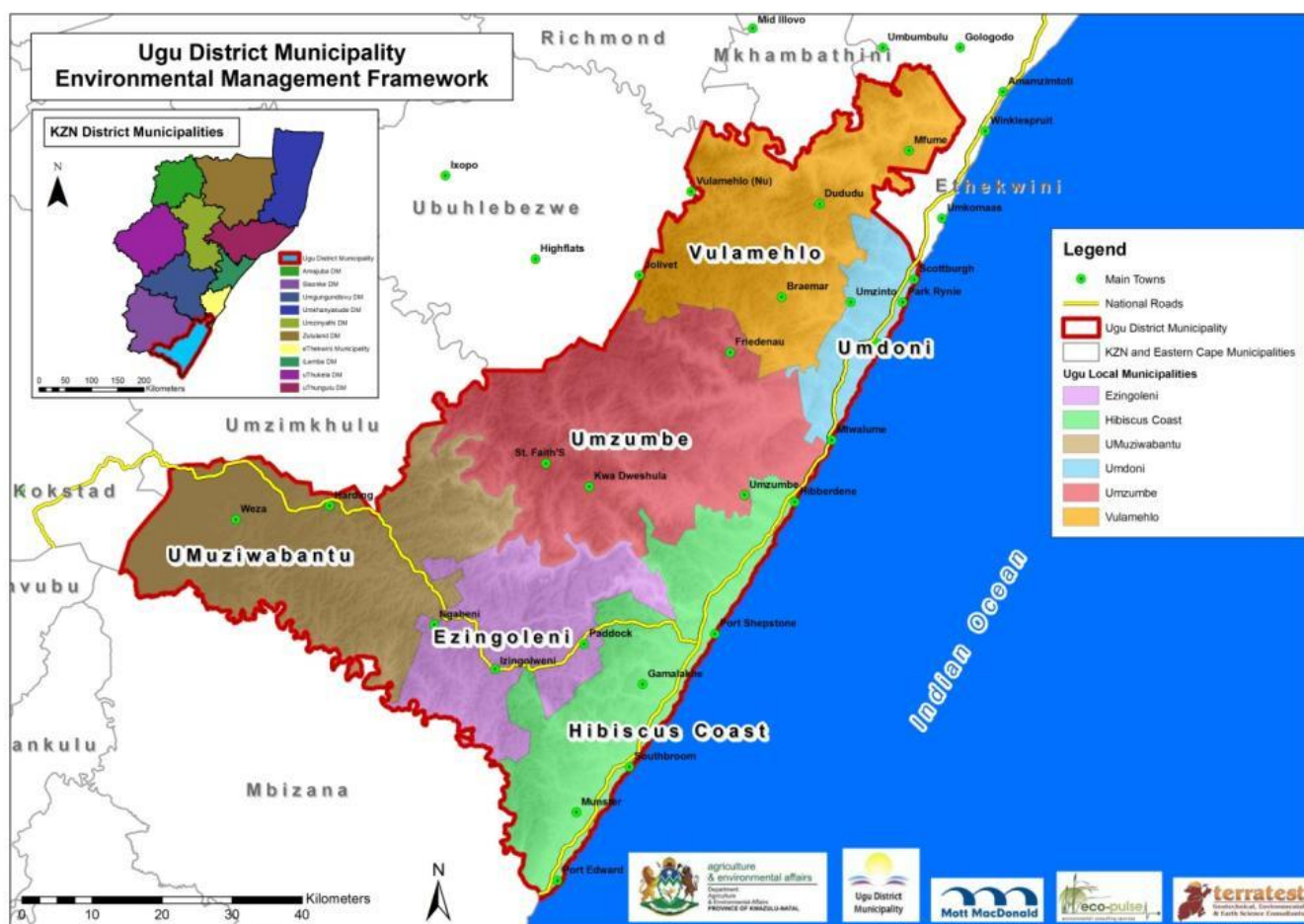


Figure 1. Regional map of the Ugu District Municipality showing local municipalities within the UDM and the surrounding Districts.

The town of Port Shepstone, which is located in the Hibiscus Coast LM, is the administrative centre of the District, with other main nodes of activity located within the primary coastal corridor and including towns such as Scottburgh, Hibberdene, Shelly Beach, Margate and Port Edward (Ugu District Municipality, 2010/11). The main inland centers are predominantly administrative (service satellites) and include towns such as Dududu, Umzinto, St Faiths and Harding.

2. METHODOLOGY FOLLOWED

2.1 Legal review

The first task associated with this study was to document the legal framework within which the use, conservation and management of biodiversity must be undertaken. This involved a review of current legislation pertaining to biodiversity with a specific focus on identifying key pieces of legislation with a bearing on biodiversity. Given the importance of making legislation more understandable to users, the implications for the Municipality and future development in the Ugu District have also been emphasised.

2.2 Providing a biophysical overview of the area

Biodiversity pattern and process is directly linked with and responds to a range of climatic, landscape and edaphic factors. Given the importance of these factors, a summary of relevant information, together with supporting maps, were prepared to provide a biophysical overview of the Ugu District.

2.3 Assessment of present state

The primary focus of the status quo report is to report back on the present state of biodiversity within the District. In doing so, emphasis has been placed on identifying and reporting on appropriate indicators that provide a perspective on the present state of biodiversity in the Ugu District. Further details of the approach taken in evaluating a range of different components is summarised below.

2.3.1 *Regional conservation context*

An overview of the regional conservation context was provided by emphasizing the occurrence of the Municipality within the Maputaland-Pondoland Albany biodiversity 'hotspot'. This highlights the significance and state of a broader region which has been subject to significant levels of transformation.

2.3.2 *Evaluating the present state of terrestrial ecosystems*

Perhaps one of the most useful measures of present state is the threat status of vegetation types and the degree to which different vegetation types have been transformed in the study area. With respect to threat status, this was informed by both the national and provincial vegetation maps and associated threat status assessments. The level of transformation in the district was then simply assessed by calculating the extent of

each vegetation type impacted by transformation using Ezemvelo KZN Wildlife's transformation layer¹. The level of alien plant infestation provides another useful measure of the present state (and future threat) and was reported on using data from a recently completed national survey.

2.3.3 Evaluating the present state of aquatic ecosystems

As with terrestrial ecosystems, there is a range of information available on aquatic ecosystems at both a regional and national level. From a river perspective, present state was assessed by extracting information on present state from a recent national assessment aimed at identifying aquatic freshwater priority areas (CSIR, 2010). Wetlands were reported on using data on threat status derived from this same national assessment but supplemented with provincial-level data which uses a different wetland classification (typing) system. Levels of wetland loss were also crudely assessed by calculating levels of transformation using Ezemvelo KZN Wildlife's transformation layer.

The present state of estuarine systems was also informed by a recent national assessment (Turpie & Van Niekerk, 2012) that placed estuaries into condition classes ranging from poor to excellent. No assessment was undertaken on the marine environment as this area effectively falls outside of the Ugu District boundary, with little information readily available.

2.3.4 Reporting on threatened species

The threat status of species is an important indicator of threat both locally, nationally and internationally. A list of threatened species was therefore generated for the study area to highlight those species requiring specific conservation action. For reporting purposes, this list was based simply on lists of known animal and plant species locations in KZN extracted from Ezemvelo KZN Wildlife's species databases.

2.3.5 Assessing the level and effectiveness of biodiversity protection

This aspect was assessed by first calculating the extent of areas secured through appropriate legal mechanisms based on the protected area coverage for the province. While such areas may be demarcated as protected areas, this does not necessarily mean that biodiversity within these areas is fully secure. For this reason, appropriate indicators of management effectiveness and pressures facing protected areas were extracted from a recent management effectiveness assessment of land-based protected areas in KwaZulu-Natal (Carbutt and Goodman, 2010).

¹ GIS Coverage: EKZNV (2008)

2.4 Mapping the importance of areas for biodiversity conservation

The importance of areas for biodiversity conservation has been highlighted through the recent development of a Biodiversity Sector Plan (BSP) for the Ugu District (Macfarlane *et. al.*, 2013a). This process included the development of a biodiversity profile of the region that aimed to spatially identify and delineate key areas of regional biodiversity significance and importance for the conservation of biodiversity in order to guide sustainable development within the District. This process incorporated biodiversity planning criteria and mapping principles from other examples where biodiversity sector plans have already been developed (e.g. uThukela and Zululand Districts in KZN; Saldanha Bay, Bergrivier, Cederberg and Matzikama Municipalities in Western Cape; Ekurhuleni Metropolitan Municipality in Gauteng and the Namakwa District in Northern Cape). Table 3 below summarizes the key biodiversity land management categories/classes which have most significance for biodiversity planning and management at the municipal level. The land use/management categories used in the biodiversity mapping are consistent with those being developed and applied regionally by EKZNW and nationally by the South African Biodiversity Institute (SANBI) (Escott, *et. al.*, 2013).

Table 3. Descriptions of the various CBA map categories for the Ugu BSP.

CBA MAP CATEGORY	DEFINITION
Protected Areas	Protected Areas are limited to formally Protected Areas declared under NEM:PAA. Such areas form the backbone of the conservation network and are critical in their contribution to the achievement of conservation objectives in the Province.
CBA: Critical Biodiversity Areas	Critical Biodiversity Areas (CBAs) are features, habitats or landscapes that include terrestrial, aquatic and marine areas that are considered critical for (i) meeting national and provincial biodiversity targets and thresholds (ii) safeguarding areas required to ensure the continued existence and functioning of species and ecosystems, including the delivery of ecosystem services; and/or (iii) conserving important locations for biodiversity features or rare species. Conservation of these areas is crucial, in that if these areas are not maintained in a natural or near-natural state, biodiversity conservation targets cannot be met.
ESA: Ecological Support Areas	Ecological Support Areas (ESAs) are functional but not necessarily entirely natural features, habitats or landscapes. ESAs include all terrestrial and aquatic areas that are largely required to ensure ecological connectivity is provided across the landscape thereby promoting biodiversity conservation and ecosystem functioning. They also include key areas within largely transformed landscape features that nevertheless contribute to the persistence of key threatened species. ESAs are not essential for meeting biodiversity representation targets/thresholds but nevertheless play an important role in supporting the ecological functioning of critical biodiversity areas and/or in delivering ecosystem services and buffering protected areas and other CBAs from land use impacts.
EI: Ecological Infrastructure	Ecological Infrastructure (EI) includes functional features, habitats or landscapes that provide important ecological goods and services to society. These areas are not necessarily required to meet conservation targets but are important to promote water security, assist disaster relief (e.g. flooding), prevent soil loss and in maintaining or improving key services such as clean water for

CBA MAP CATEGORY	DEFINITION
	domestic and recreational use. Whilst Ecosystem Goods and Services can be derived from non-natural land-use practices, only naturally-derived EI is reflected in this context. These areas represent the optimal service areas where services are naturally optimised, and do not include areas of soft transformation that may provide one or more services but to the detriment of other services.
Other Natural Areas	All other natural areas not already included in the above categories.
Transformed	Areas with no significant natural vegetation remaining and therefore are attributed to having a low biodiversity value. Include transformed lands such as areas under cultivation (intense agriculture), forestry plantations, mining, urban landscapes, infrastructure and dams.

A particular focus of this assessment was to refine the local priorities coverages initially drafted during the BSP process. This entailed meeting with two further botanists, Tony Abott and David Styles to ensure that their specialist knowledge of the area was appropriately captured. A field trip was also undertaken to obtain a fuller perspective of the study area and to ground-truth some of the priority areas identified. Time was then allocated to refining priority areas in GIS through interrogation of available aerial photography and satellite imagery for the study area. Readers are encouraged to consult the Biodiversity Sector Plan directly for further information on the methodology used and the range of information which was used to develop the CBA maps produced.

2.5 Identification of focal areas for management

While the BSP outputs provide a useful indication of the sensitivity of untransformed land in the municipality, it is not particularly useful in prioritizing areas for conservation action. Given the low levels of current protection and the urgent need to initiate measures to secure remaining critical biodiversity areas, a GIS based prioritization exercise was therefore undertaken to help focus conservation efforts. This task was completed for Ezemvelo KZN Wildlife as part of the BSP process but with additional refinements based on the new data acquired with funding obtained for this EMF assessment.

In order to undertake this prioritization, a range of available spatial information on Critical Biodiversity Areas (CBAs) was integrated into a single composite map reflecting the relative importance of these priority areas for biodiversity conservation. Datasets used in the assessment included national, regional and local priorities which were rated in terms of their importance using a simple pair-wise analysis.

A map of threats was then compiled that identified the relative level of threats facing biodiversity in the study area. This was informed by available spatial datasets reflecting both natural (e.g. erosion susceptibility and alien plant infestation levels) and landscape-level anthropogenic threats (e.g. settlement plans, high potential agricultural land, etc.).

These two datasets were then integrated into a single map that highlights CBA areas of greatest need of conservation action (Figure 2). The resultant map was then interrogated and interpreted in order to inform

conservation efforts. Further details of the specific methodology applied in undertaking this assessment is provided in a stand-alone report entitled "Prioritizing areas for conservation action in the Ugu District" (Macfarlane *et al.*, 2013b).

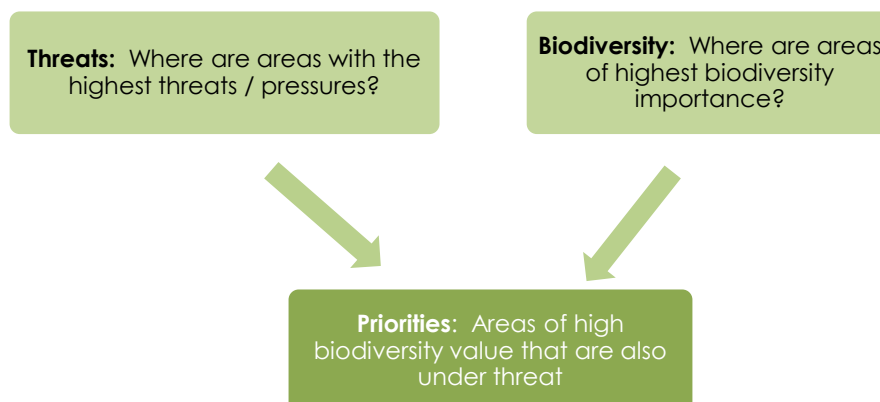


Figure 2. Outline of the approach followed in developing a priorities map for the study area.

It is important to note here, that this approach was applied only to terrestrial CBA features and as such reflects priorities for the protection and management of terrestrial biodiversity. CBA maps developed for aquatic, estuarine and marine components do however provide a useful indication of priority areas for protection and management of these resources.

2.6 Identification of key environmental issues and recommended responses

The Drivers Pressures State Impact Response Framework (DPSIR) is a general system used to organise data to enable the analysis of environmental problems. The framework assumes cause-effect relationships between the social, economic and environmental components of a system. These include:

- Driving forces of environmental change – “Driving forces” refer to the needs of an individual or society;
- Pressures on the environment – “Pressures” result from human activities which are designed to meet society’s needs;
- State of the environment – “State” refers to the condition of the environment resulting from the pressures applied in meeting a need;
- Impacts on the environment – “Impacts” refers to the consequences of changes in the state of environment for sustainability and human well-being; and
- Response of government institutions and society – “Responses” refer to the actions necessary to prevent negative environmental impacts.

This reporting framework was used to identify key issues affecting the state of biodiversity in the Ugu District and to identify priority responses for addressing concerns identified. This was informed by field observations and available documentation for the study area.

2.7 Identification of indicators for monitoring

This step entailed the identification of potential indicators for monitoring the changes in the status quo of biodiversity. This was informed by a range of indicators used in state of the environment reporting and in the identification of additional indicators that are relevant at district level scale.

3. LEGAL FRAMEWORK

The need to protect and manage biodiversity is underpinned by a plethora of international, national and local policy and legislation. A summary of the main legal / policy instruments is provided Table 4, below while a fuller review is provided in **Annexure 1**.

Table 4. Summary of key policy and legislation applicable to biodiversity management.

Level	Legislation/Policy	Description
International	The Convention of Biological Diversity (Rio de Janeiro, 1992).	The purpose of the Convention on Biological Diversity is to conserve the variability among living organisms, at all levels (including diversity between species, within species and of ecosystems). Primary objectives include (i) conserving biological diversity, (ii) using biological diversity in a sustainable manner and (iii) sharing the benefits of biological diversity fairly and equitably.
	The Convention on Wetlands of International Importance, especially as Waterfowl Habitat (Ramsar, Iran, 1971)	The purpose of the Ramsar Convention is the protection of wetlands especially for their value as habitat to waterfowl. The convention advocates for the wise use of wetlands and their sustainable utilization for the benefit of mankind in a way compatible with the maintenance of the natural properties of the ecosystem.
	United Nations Convention to Combat Desertification	The Convention aims to combat desertification and mitigate the effects of droughts through national action programmes and supportive international partnerships.
	New Partnership for Africa's Development (NEPAD)	The New Partnership for Africa's Development (NEPAD) is an overarching vision and policy framework for the African Union. NEPAD's three main long term objectives are to eradicate poverty, accelerate growth and stop the marginalization of Africa in the globalization process.
	The World Summit on Sustainable Development (WSSD)	The main outcomes of the Summit were the Johannesburg Declaration and the Johannesburg Plan of Implementation which was laid out as an action plan. The Implementation Plan asserts that "poverty eradication, changing unsustainable patterns of production and consumption and protecting and

Level	Legislation/Policy	Description
		managing the natural resource base of economic and social development are overarching objectives of, and essential requirements for, sustainable development".
	Agenda 21	Agenda 21 is an action plan that provides a framework for implementing sustainable development. The document comprises some 40 chapters which each set out a "basis for action", "objectives" and specific "activities". It includes chapters on issues such as environmental degradation and poverty.
National	South African Constitution 108 of 1996	The Constitution is the supreme law of the land and includes the Bill of rights which is the cornerstone of democracy in South Africa and enshrines the rights of people in the country. It includes the right to an environment which is not harmful to human health or well-being and to have the environment protected for the benefit of present and future generations through reasonable legislative and other measures.
	National Environmental Management Act 107 of 1998	This is a fundamentally important piece of legislation and effectively promotes sustainable development and entrenches principles such as the 'precautionary approach', 'polluter pays' principle, and requires responsibility for impacts to be taken throughout the life cycle of a project NEMA provides the legislative backing (Including Impact Assessment Regulations) for regulating development and ensuring that a risk-averse and cautious approach is taken when making decisions about activities.
	National Environmental Management: Biodiversity Act No 10 of 2004	The Biodiversity Act provides for the management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act. The intention of this Act is to protect species and ecosystems and promote the sustainable use of indigenous biological resources. It addresses aspects such as protection of threatened ecosystems and imposes a duty of care relating to listed alien invasive species. The South African National Biodiversity Institute is established by this Act and is responsible for coordinating and implementing programs.
	National Environmental Management: Protected Areas Act 57 of 2003	This Act provides for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes. It also seeks to provide for the sustainable utilization of protected areas and to promote participation of local communities in the management of protected areas.
	National Forest Act 84 of 1998	The protection, sustainable management and use of forests and trees within South Africa are provided for under the National Forests Act (Act 84 of 1998). Government Gazette No 26731 of August 2004, and any later revisions as released, provides a list of tree species protected under the National Forests Act.
	Conservation of Agricultural Resources Act 43 of 1967	The intention of this Act is to control the over-utilization of South Africa's natural agricultural resources, and to promote the conservation of soil and water resources and natural vegetation. The CARA has categorised a large number of invasive plants together with associated obligations of the land owner, including the requirement to remove categorised invasive plants and taking measures to prevent further spread of alien plants.

Level	Legislation/Policy	Description
	National Environmental Management: Integrated Coastal Management Act 24 of 2008	The purpose of this Act is to establish a system of integrated coast and estuarine management in order to promote the conservation of the coastal environment, and maintain the natural attributes of coastal landscapes and seascapes. It also aims to ensure that the development and use of natural resources within the coastal zone is socially and economically justifiable and ecologically sustainable.
	National Water Act 36 of 1998	The Act not only provides for the protection of water quality, but also for the management and protection of freshwater ecosystems, the biological and physical habitat which comprises the water resource, and associated and freshwater biodiversity. The National Water Act also provides the legal tool for the controlled use of land associated with water resources.
	Local Government: Municipal Systems Act No 32 of 2002	The Local Government: Municipal Systems Act is rooted in Local Agenda 21 (Pierce et al., 2005) and provides direction to municipalities in respect of their developmental and service delivery responsibilities.
Provincial	Natal Nature Conservation Ordinance 15 of 1974 & KwaZulu-Natal Nature Conservation Act 29 of 1992	Makes extensive provision for protected areas (including private nature reserves) and protection of flora and fauna.

4. BIOPHYSICAL OVERVIEW OF THE DISTRICT

4.1 Climate

The Ugu District experiences a warm sub-tropical climate, with most rainfall being experienced during the spring and summer months (October to March). The highest rainfall is typically experienced over December and January of any year. Climatic conditions vary greatly between the coast and inland, with conditions and temperatures associated with the coastal areas being moderated by the effects of the warm Indian Ocean. The mean annual precipitation along the coast ranges from 776mm/annum to 899mm/annum for the coastal towns of Port Shepstone and Port Edward respectively. For inland areas, precipitation is generally lower, with rainfall at Harding being about 712mm/annum. Figure 3 indicates the Mean Annual Precipitation (MAP) for the District, showing clearly the precipitation range, with notably higher MAP experienced along the coast compared with areas inland.

High temperatures experienced during the summer season in particular, cause the potential for evaporation to be high across South Africa in general, which plays a significant role in reducing the volume of rainfall/moisture available for use by the environment. Average daily temperatures range from 9°C to 22°C during winter (July)

and between 21°C and 27°C in summer (February) for the coastal areas. Inland areas experience a lower temperature range which varies from 5°C to 19°C during winter (July) and between 21°C to 25°C during summer (February)².

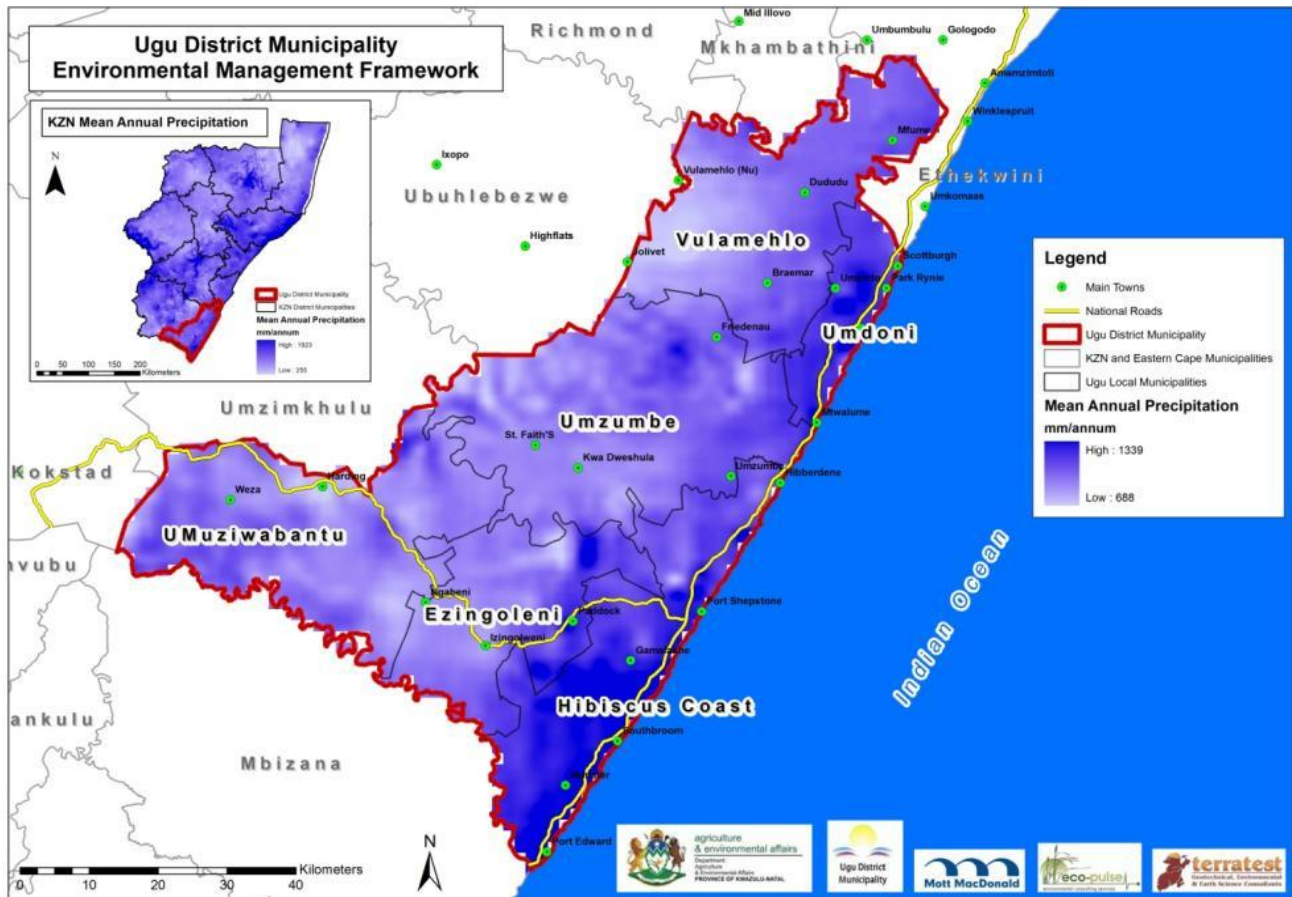


Figure 3. Mean Annual Precipitation (MAP) for the Ugu District³.

4.2 Landscape and Topography

The coastline of the Ugu District extends for roughly 112 kilometres between the towns of Scottburgh in the north and Port Edward in the south. Elevations across the District range from 0m (sea level) along the coastline to altitudes of nearly 1500m a.m.s.l further inland near Harding/Weza in the west. The general topography along the coastline is relatively gentle, changing dramatically as one proceeds inland towards the plateau, with undulating river valleys, deep gorges and steep hillslopes generally encountered. North facing slopes are characteristically warmer and drier than South facing slopes, which tend to be cooler and wetter, commonly providing favourable conditions for supporting indigenous forest vegetation in higher rainfall areas. Valley sides often exceed gradients of 40 %, and cliff faces are common within many of the river valleys. The general slope

² Source of information: <http://www.saexplorer.co.za/south-africa/climate>

³ GIS Coverage: South African Atlas of Agrohydrology and Climatology, 2001

of the land is between 1:5 and 1:6 and is susceptible to soil erosion where it is not carefully managed (Ugu District Municipality, 2010/11).

A digital elevation model (20m resolution DEM) of the District (shown in Figure 4) highlights the variation in topography within the District. The lowest variation in topography is associated with Local Municipalities (LMs) situated along the coastal belt, and include the Hibiscus Coast LM and Umdoni LM. The remaining four LMs are associated with a relatively moderate variation in topography, with the uMuziwabantu LM in the western section of the District containing areas with the highest regional elevations.

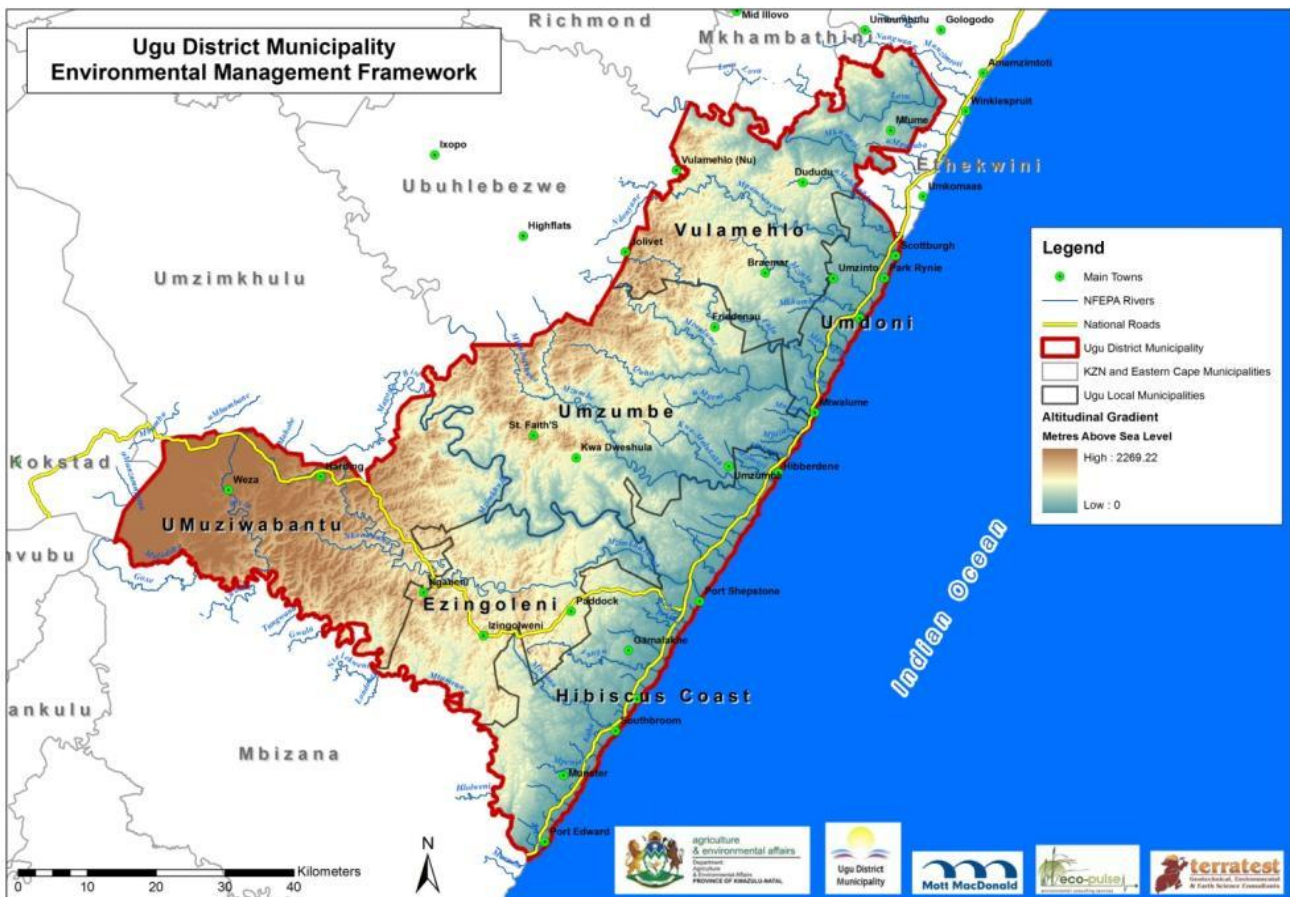


Figure 4. Digital elevation model of the Ugu District⁴.

⁴ GIS Coverage: derived from a 20m DEM of KZN

4.3 Geology and Geomorphology

The underlying geology of the Ugu District Municipality comprises a range of geological forms (Figure 5). Details of the geological groups are included in Table 5, below.

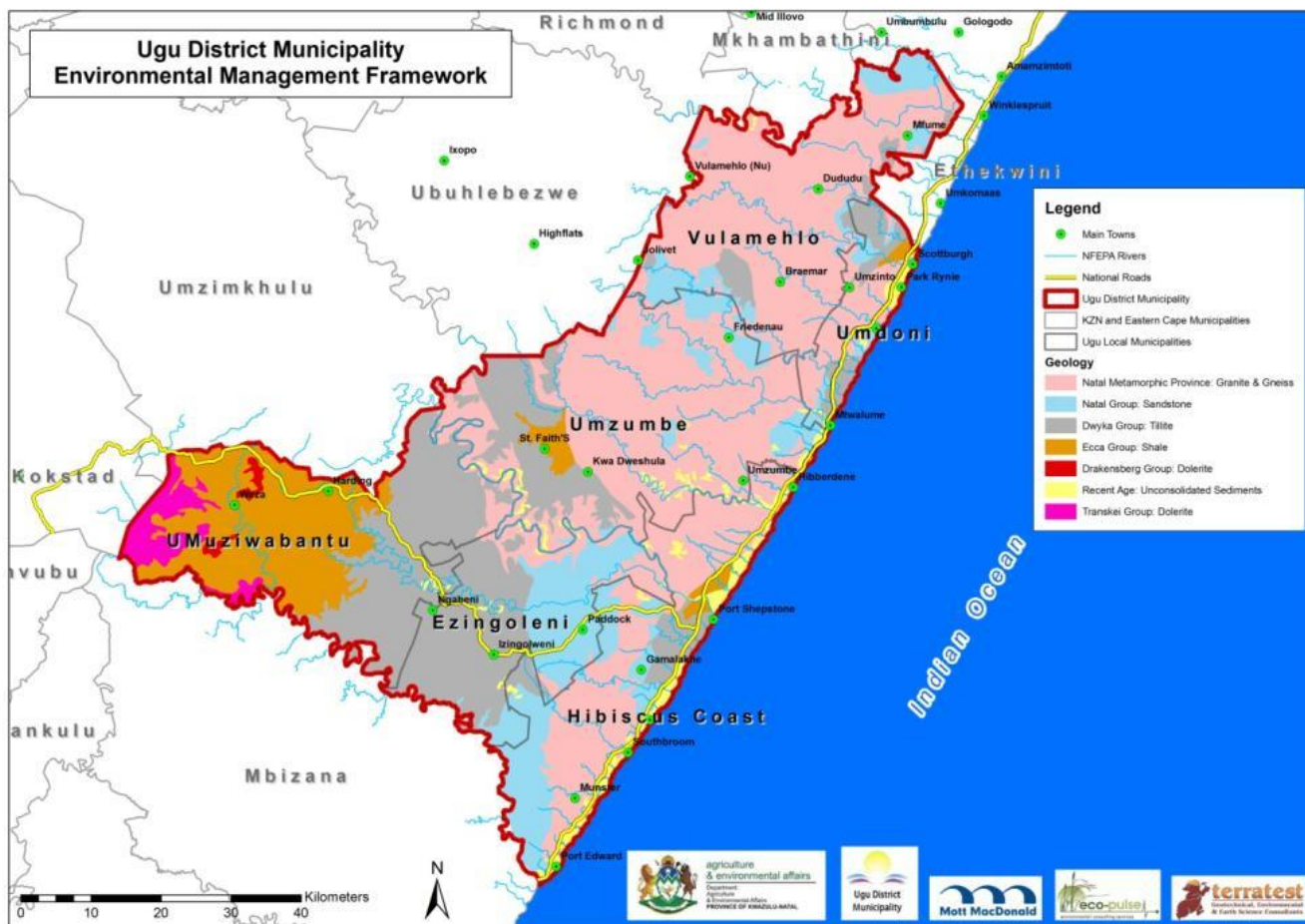


Figure 5. Geological Map of the Ugu District.

Table 5. Geological map of the Ugu District

Group	Description and Location ⁵
Natal Metamorphic Province (1000 Ma)	Comprising Granite and Gneiss which occur along the coastline just south of Port Shepstone to Scottburgh in the north-east and inland towards Pietermaritzburg.
Cambrian to Ordovician Natal Group (490 Ma)	Natal Group Sandstones exhibiting structures that indicate sediments were transported and deposited by rivers. Fine-grained sandstones form resistant sandstone cliffs, giving rise to the table top topography seen at Oribi Gorge near Port Shepstone.
Dwyka Group (300 Ma)	The rocks overlying the Natal Group comprise a thick unit of Tillite that was deposited in a glacial environment by retreating ice sheets. Dwyka Tillite occurs south of the Mkomazi River, inland from

⁵ Source of geological information: Ugu District Municipality IDP (2010) and online at <http://www.geology.ukzn.ac.za/GEM/kzngaeol/kzngaeol.htm>

Group	Description and Location ⁵
	the Mtwalume River to the Ifafa River, south of the Mzimkhulu River and north of the Mtentweni River. Tillite is mostly a very fine-grained, blue-grey rock comprised of clay matrix with inclusions (or clasts) of many other rock fragments. Tillite has a slight to moderate erosion rating.
Ecce Group (250 Ma)	Minor outcrops of Middle Ecce Shales and other Shales occur across the coastline. They have soils that are moderately productive with slight to moderate erosion levels.
Drakensberg Group (180 Ma)	Dolorite outcrops occur along the Mzumbe coast and in the vicinity of the Damba River. The soils are usually non-structured clay formations with loam.
Unconsolidated sediments (recent age)	Unconsolidated sediments of recent age occurring as a series of large coast-parallel dune complexes developed from Aeolian (wind-blown) deposits occurring along most of the coastline. Includes alluvial deposits found within estuaries and along river flood plains, providing soils that are organic-rich and therefore highly productive, ranging from sandy through loamy to clay deposits. As a result, many river floodplains characterised by alluvial soils are largely subject to extensive agricultural development pressure.

4.4 Land use and transformation

Land use in the district comprises a mosaic of agricultural land under sugarcane, commercial forestry (mainly *Pinus sp.*), banana and macadamia farms (particularly in the south), small holdings, urban centres, natural areas and degraded natural landscapes criss-crossed by transportation and telecommunication infrastructure. This has led to extensive transformation of the natural landscape particularly along the coastal zone which is well developed with hard and bulk infrastructure as well as numerous tourism destinations (Figure 6). A summary of primary land-uses and their contribution to habitat transformation is provided in Table 6.

The spatial pattern of development is constituted of three main development corridors: the primary corridor is the coastal spine of transport infrastructure and there are two secondary inland corridors - one following the national road from Port Shepstone through Harding and the other one starting from Scottburgh through Jolivet to the southern Drakensberg. Tertiary corridors include the St Faiths route, which transcends Umzumbe Local Municipality, and the route linking Scottburgh, Dududu, Mkhunya and the Sisonke District (Ugu District Municipality, 2010/11). Light industry is focused around Port Shepstone, the Marburg area and Margate airport (Ugu District Municipality, 2010/11). In terms of local mining operations, limestone is mined on a large scale within the marble delta at the confluence of the uMzimkhulu and UMzimkhulwana Rivers (Ugu District Municipality, 2010/11), with a mix of legal and illegal sand mining activities occurring along many of the coastal rivers.

Another striking feature in the UDM is the extent to which sugar cane and smallholdings penetrate inland of the coastal zone (Ugu District Municipality, 2010/11). Infestation with alien invasive plant species is also a major threat to the natural environment and to various other aspects of the local economy including food security as they also invade agricultural and grazing lands (See Section 5.2.2).

Table 6. Primary land-uses contributing towards transformation of natural habitat in the Ugu District.

Land use type	Extent (Ha)	Extent (%)
Agriculture	74 469	14.8%
Mining	273	0.1%
Subsistence (rural)	78 964	15.6%
Urban infrastructure	27 753	5.5%
Forestry	46 945	9.3%
Other	1 527	0.3%
Total	229930	45.5%

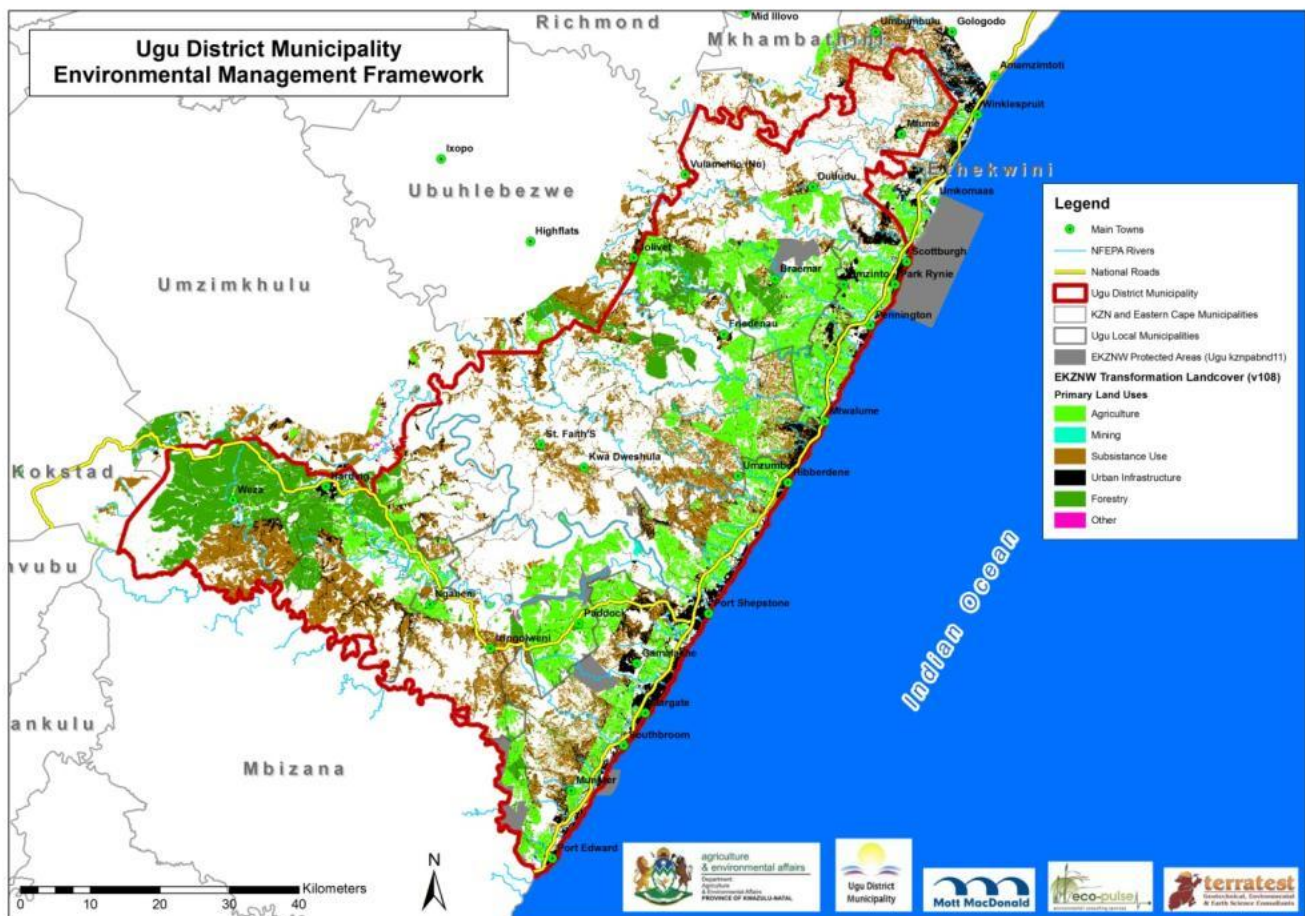


Figure 6. Map indicating the extent of primary land-uses across the Ugu District⁶.

⁶ GIS Coverage: EKZNW, 2008a

5. STATUS QUO OF BIODIVERSITY

5.1 Regional Conservation Context

The Ugu District is situated within the Maputaland-Pondoland Albany biodiversity 'hotspot', which includes much of the east coast of South Africa from the Eastern Cape Province up towards Mozambique in the north-east. The biodiversity "hotspot" comprises six of South Africa's eight vegetation types and has unusually high levels of endemism: sand forest, three types of thicket, six types of bushveld, and five types of grassland. All are restricted to the Maputaland-Pondoland Albany biodiversity hotspot. The area is also known for its remarkable succulent flora.

Today, only **one quarter of this hotspot's vegetation remains untransformed**, largely due to the impacts of local urbanisation, resort and golf course development, agriculture, forestry, illegal wildlife harvesting for medicines and trade, firewood harvesting, soil erosion, overgrazing, bush encroachment and invasive alien plant species⁷. This emphasizes the importance of conserving the remaining areas of untransformed natural habitat in the region and Ugu District in particular.

Box 1

BIODIVERSITY 'HOTSPOTS'

A Biodiversity 'Hotspot' is a region that has at least 1,500 species of endemic plants (species that only occur in that region) and that has lost at least 70% of its original vegetation. Interestingly, an estimated 25% of vertebrate species are found in hotspots and nowhere else on the earth. Globally, there are 34 biodiversity hotspots, home to more than 1.9 billion people, many of whom depend directly on healthy lands for their livelihoods and well-being. South Africa has three of these hotspots: The Cape Floral Kingdom; Succulent Karoo and Maputaland-Pondoland Albany hotspots. (Source of information: http://cap.org.za/oid/downloads/south_african_hotspots.pdf).



Map showing the extent of the Maputaland-Pondoland Albany biodiversity 'hotspot'.

⁷ http://cap.org.za/oid/downloads/south_african_hotspots.pdf

5.2 Terrestrial ecosystems

5.2.1 Vegetation types

A range of vegetation types extend across the UDM and are grouped within three biomes, namely the Indian Ocean Coastal belt, Savannah biome inland of the coastal belt, and a small section of the grassland biome west of Harding and extending north towards Kokstad. Transformation has significantly impacted in the extent of remaining natural habitat, particularly along the coast and in higher lying inland regions (Figure 7).

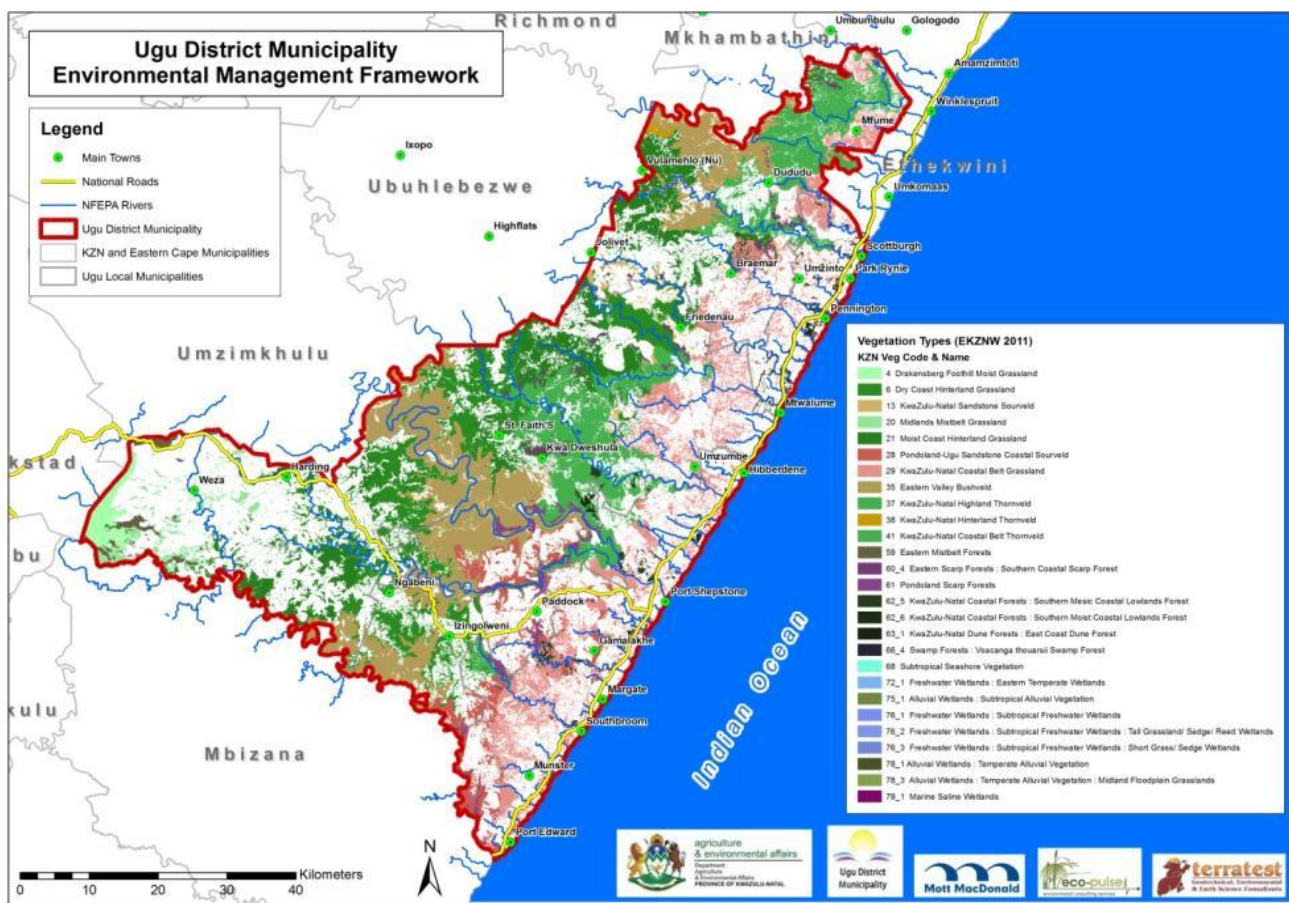


Figure 7. Map showing vegetation types after transformation⁸.

A list of the vegetation types occurring in the UDM and their threat status is tabulated in Table 7, below. This table highlights the high levels of transformation of natural vegetation cover within the District, estimated roughly at 45.5% transformation/loss of natural habitat⁹. Of particular significance, is the range of vegetation types currently classified as critically endangered, and endangered due to excessively high levels of transformation. Together, these vegetation types account for 58% of the study area while 24% of vegetation types are Vulnerable and only 17% classified as least threatened. The status of vegetation types is presented

⁸ GIS Coverage: EKZNW, 2012a

⁹ This is based on the 2008 transformation layer (EKZNW, 2008).

spatially in Figure 8 and highlights the importance of remaining intact vegetation along the coastal belt in particular.

Table 7. Details of terrestrial vegetation types occurring within the UDM¹⁰.

KZN Vegetation Name	Historical Area (Ha)	Extent (%) of DM	Extent Remaining (Ha)	% lost within DM
<i>Critically Endangered</i>	177755	35.5%	67310	
KwaZulu-Natal Coastal Belt Grassland	124673	24.9%	45294	63.7%
KwaZulu-Natal Coastal Forests : Southern Mesic Coastal Lowlands Forest	4467	0.9%	3830	14.3%
KwaZulu-Natal Coastal Forests : Southern Moist Coastal Lowlands Forest	1882	0.4%	1646	12.5%
KwaZulu-Natal Dune Forests : East Coast Dune Forest	286	0.1%	192	32.9%
KwaZulu-Natal Sandstone Sourveld	9202	1.8%	2375	74.2%
Pondoland-Ugu Sandstone Coastal Sourveld	37245	7.4%	13973	62.5%
<i>Endangered</i>	115459	23.0%	45081	
Eastern Mistbelt Forests	3005	0.6%	2353	21.7%
Midlands Mistbelt Grassland	32948	6.6%	5494	83.3%
Moist Coast Hinterland Grassland	79506	15.9%	37234	53.2%
<i>Vulnerable</i>	122010	24.4%	83019	
Drakensberg Foothill Moist Grassland	4869	1.0%	4003	17.8%
Dry Coast Hinterland Grassland	63896	12.8%	38935	39.1%
KwaZulu-Natal Coastal Belt Thornveld	53245	10.6%	40081	24.7%
<i>Least Threatened</i>	85828	17.1%	77847	
Eastern Scarp Forests : Southern Coastal Scarp Forest	3110	0.6%	2952	5.1%
Eastern Valley Bushveld	65870	13.1%	59629	9.5%
KwaZulu-Natal Highland Thornveld	11152	2.2%	9764	12.4%
KwaZulu-Natal Hinterland Thornveld	474	0.1%	466	1.7%
Pondoland Scarp Forests	4888	1.0%	4712	3.6%
Subtropical Seashore Vegetation	334	0.1%	324	3.0%
Total	501052	100.0%	273257	45.5%

¹⁰ GIS Coverage: EKZNW, 2008 & 2012a

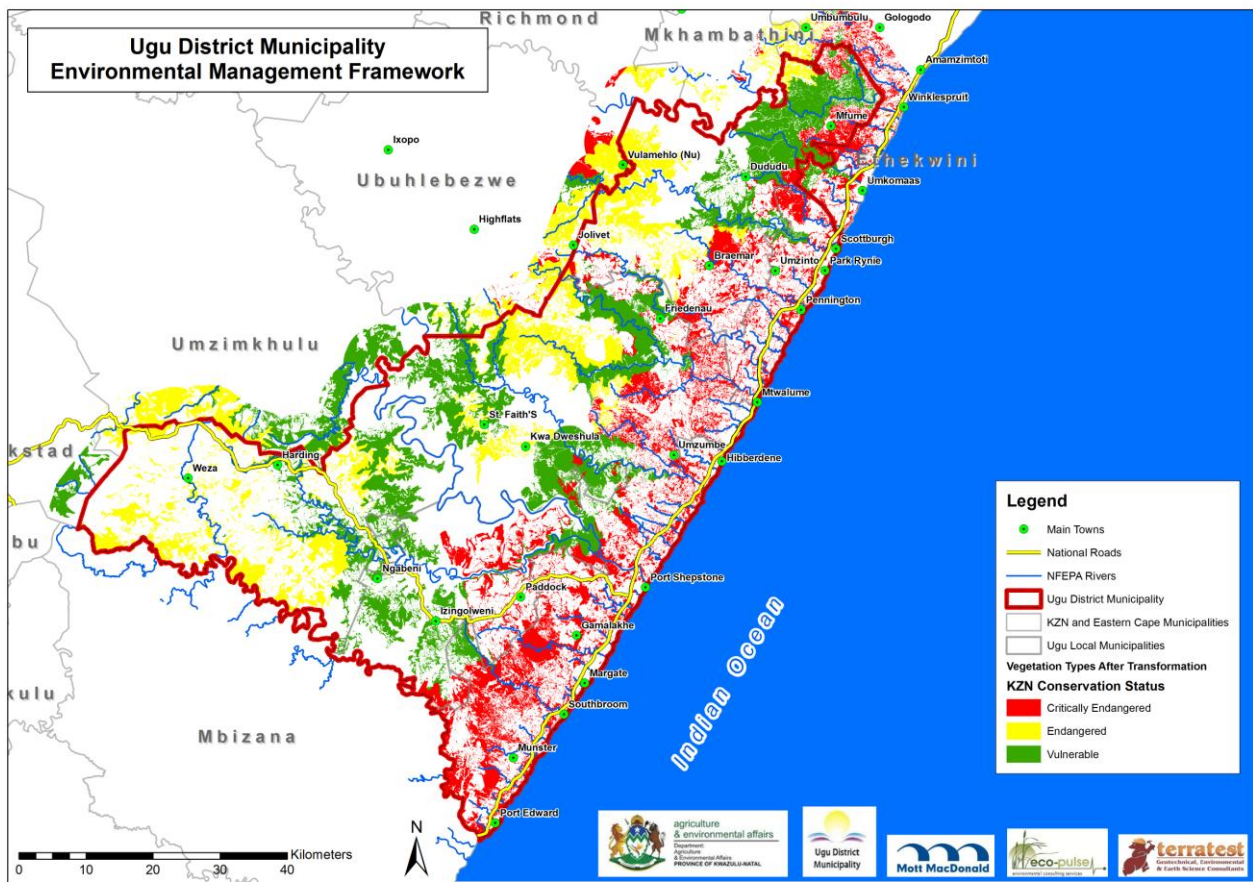


Figure 8. Map showing the threat status and extent of vegetation types after transformation¹¹.

A national process has also been undertaken to identify and list threatened ecosystems. Threatened Ecosystems are those ecosystems (in this case defined as a vegetation type) that are currently under threat of being transformed by other land uses. The first national list of threatened terrestrial ecosystems for South Africa was gazetted on 9 December 2011 (National Environmental Management: Biodiversity Act: National list of ecosystems that are threatened and in need of protection, G 34809, GoN 1002, 9 December 2011). The Biodiversity Act (Act 10 of 2004) provides for listing of threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), vulnerable (VU) or protected.

¹¹ GIS Coverage: EKZNW, 2012a

Box 2

THREATENED ECOSYSTEMS IN UGU

The purpose of listing threatened ecosystems is primarily to reduce the rate of ecosystem and species extinction by preventing further degradation and loss of structure, function and composition of threatened ecosystems (SANBI, 2011). There are four main types of implications of listing ecosystems:

- Planning related implications which are linked to the requirement in the Biodiversity Act (Act 10 of 2004) for listed ecosystems to be taken into account in municipal IDPs and SDFs;
- Environmental authorisation implications in terms of NEMA and the EIA regulations;
- Proactive management implications in terms of the National Biodiversity Act; and
- Monitoring and reporting implications in terms of the Biodiversity Act.

With the most highly threatened ecosystems (Critically endangered ecosystems shown in “Red” in Figure 7) being located along the Ugu coastal strip (by far the most intensively developed area within the UDM), this has significant implications for future development and planned expansion of land use activities within the coastal zone. Environmental Authorisation for example is required for certain development/land use activities in terms of NEMA, with the current EIA Regulations comprising three lists of activities that require environmental authorization.

According to the draft list of threatened ecosystems (SANBI, 2011), a total of 16 threatened ecosystems occur within the Ugu District, covering almost half of the district area (Table 8 and Figure 9). Of these ecosystems, three are considered critically endangered (12% of cover), six are endangered (6% of cover) and the remaining seven are considered to be vulnerable (30% of cover).

Table 8. Threatened ecosystem types and extent of cover occurring within the district¹².

ECOSYSTEM STATUS	EXTENT	
	Ha	%
Critically Endangered	59,491	12
Interior South Coast Grasslands	51,513	10.2
Margate-Pondoland-Ugu Sourveld	2,903	0.6
Southern Coastal Grasslands	5,075	1.0
Endangered	29,887	6
Bazini Forest Complex	963	0.2
KZN Sandstone Sourveld	2,038	0.4
Ntlimbankulu Forest	714	0.1
Oribi-Port Edward-Ugu Sourveld	20,201	4.0
Sihleza	743	0.1

¹² GIS Coverage: SANBI, 2011

ECOSYSTEM STATUS	EXTENT	
	Ha	%
Southern Weza State Forest	5, 228	1.0
Vulnerable	150, 842	30
Eastern Scarp Forest	922	0.2
Harding East	1, 371	0.3
Harding West	834	0.2
KZN Coastal Belt	60, 816	12
Midlands Mistbelt Grassland	3, 652	0.7
Ngongoni Veld	82, 322	16.3
Pondoland Scarp Forest	925	0.2
Total Extent Threatened	240, 220	48%

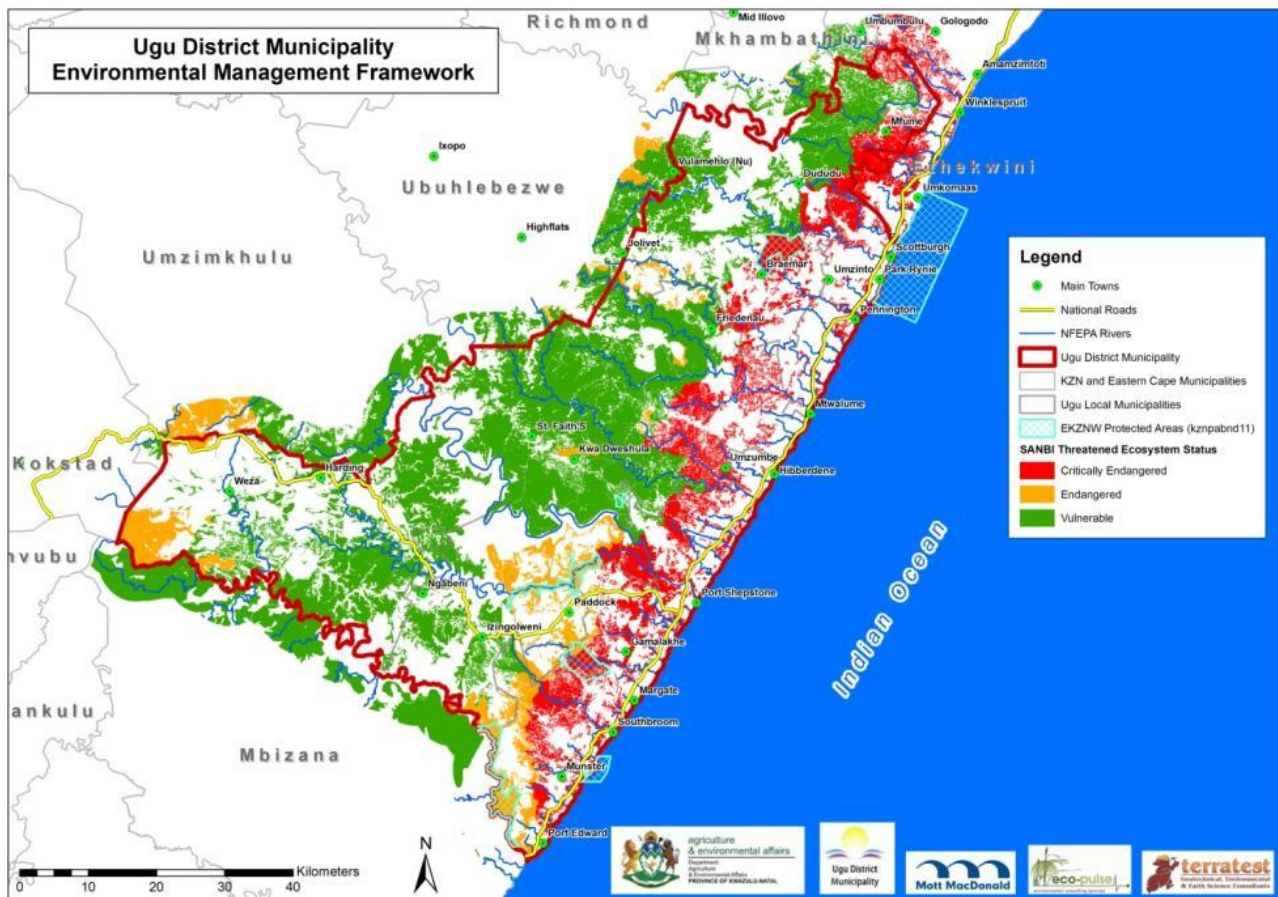


Figure 9. Map showing the status of un-transformed threatened ecosystems in the Ugu District¹³.

¹³ GIS Coverage: SANBI, 2011

5.2.2 Alien invasive plants

Invasive alien plants are species that have become established in an area beyond their natural distribution range following introduction by humans, and whose spread threatens ecosystems, habitats or species with environmental or economic harm. Such spread is placing pressure on remaining untransformed land, and even with current efforts by expanded public works programmes such as Working for Water, is likely to contribute further to biodiversity losses. Not only do alien invasive plants threaten biodiversity but they also have serious socio-economic impacts including threats to water security, reduced productivity of rangelands increased fire risk and impacts on crop agriculture (Driver *et al.*, 2012).

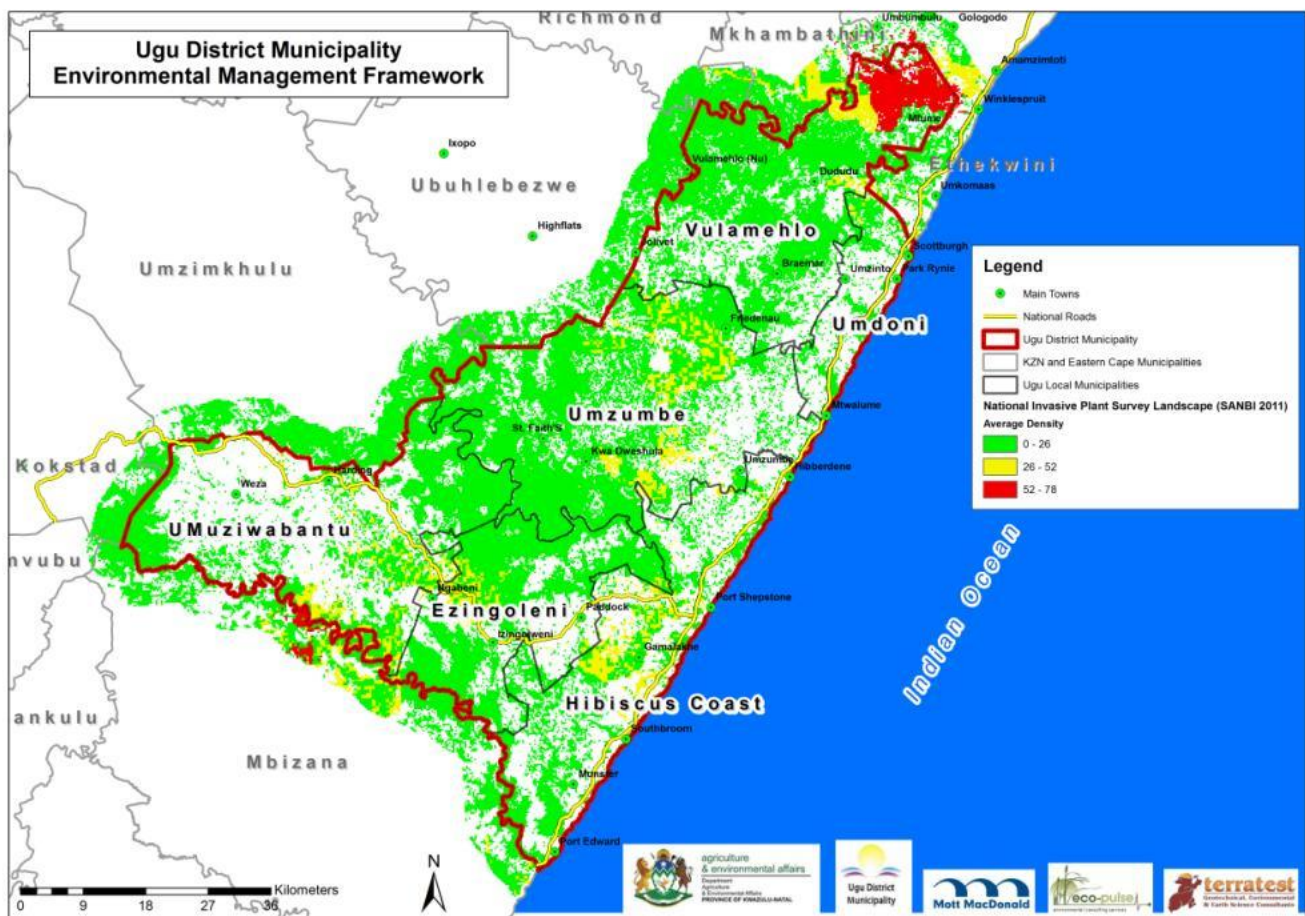


Figure 10. Map showing the density of 27 established invasive plant species or groups of species in South Africa, as surveyed in the National Alien Plant Survey 2010¹⁴.

A National Invasive Alien Plant (IAP) Survey project was recently completed by the Working for Water Programme and implemented by the Agricultural Research Council (Kotze, *et al.*, 2010). The project objective was to establish and implement a cost effective, objective and statistically sound IAP monitoring system for South Africa, Lesotho and Swaziland at a quaternary catchment level. While the dataset developed is at quite a coarse scale, it still provides a useful indication of the extent and total average density (%) of alien invasive

¹⁴ GIS Coverage: Kotze *et al.*, 2010

species across the study area (Figure 10). This shows that infestation levels are of greatest concern in the eastern parts of the district, with infestations exceeding 50% in some areas. Some of the most problematic species identified in the survey include:

- *Chromolena odorata* which is arguably the most problematic alien invasive plant species in the Ugu District with particularly high densities in the northeastern parts of the study area near Mfume where densities exceed 40% in places;
- *Eucalyptus* species which is also widespread across the study area and is typically associated with areas of higher rainfall;
- *Senna didymobotryawhich* is another problematic species with moderate infestation levels across large sections of the district;
- *Solanum mauritanium* is not as widespread as other species and is often associated with plantation forestry areas, with some of the highest densities recorded in the Braemar area;
- Wattle species although widespread generally occur in low densities except in the Harding to Izongolweni area where moderately high infestations are common;
- *Cereus jamacaru* is also somewhat problematic, with highest infestations recorded in the Dududi and Vulamehlo areas;
- *Caesalpinia decapetula* infestation levels are typically low but with high densities along the mid-reaches of the Mtamvuna River valley.

While infestations are reportedly quite low across much of the study area, these levels are set to increase unless focussed and ongoing actions are taken to contain and address the further spread of alien plants in the district.

5.3 Aquatic ecosystems

Aquatic ecosystems comprise the living organisms and the non-living components of the water system, and include rivers, wetlands, lakes, ground water, estuaries and the marine environment. These systems are usually inter-related, meaning that activities impacting on one part of an ecosystem (such as the headwaters of a river catchment) can have consequences elsewhere (e.g. wetlands downstream). For reporting purposes we have however focused separately on rivers, wetlands and estuarine systems.

5.3.1 Rivers

The major perennial rivers such as the Mtamvuna and Mzimkhulu have formed prominent steep-sided river valleys that extend a considerable distance inland to drain the western inland regions of the District. These two rivers are also free flowing (lacking significant impoundments) which is significant given the levels of impoundment in most South African rivers. Apart from these large rivers, a network of smaller perennial rivers drain the eastern portions of the district while a number of relatively short rivers are concentrated along the coastline (Figure 11). The sub-quaternary catchments for the Mzimkhulu, Mtamvuna and portions of the Mtwalume catchment have been identified as National Freshwater Ecosystem Priority Areas (NFEPA) which are a priority for meeting national aquatic conservation targets (CSIR, 2010).

Despite the current levels of transformation across the district, the NFEPA data suggest that most rivers including the two major perennial rivers are still in reasonably good condition (A/B class). A number of smaller rivers such as the iLovu, Mbizana, Mzinto and Vungu rivers are more heavily modified and classified as moderately (C class) to heavily (D class) impacted. Further details of the current status of rivers are provided in (Table 9). While this information suggests that rivers are generally in a reasonable condition, it does not account for many of the shorter rivers, particularly those entering the Indian Ocean for which data on river condition was not readily available¹⁵.

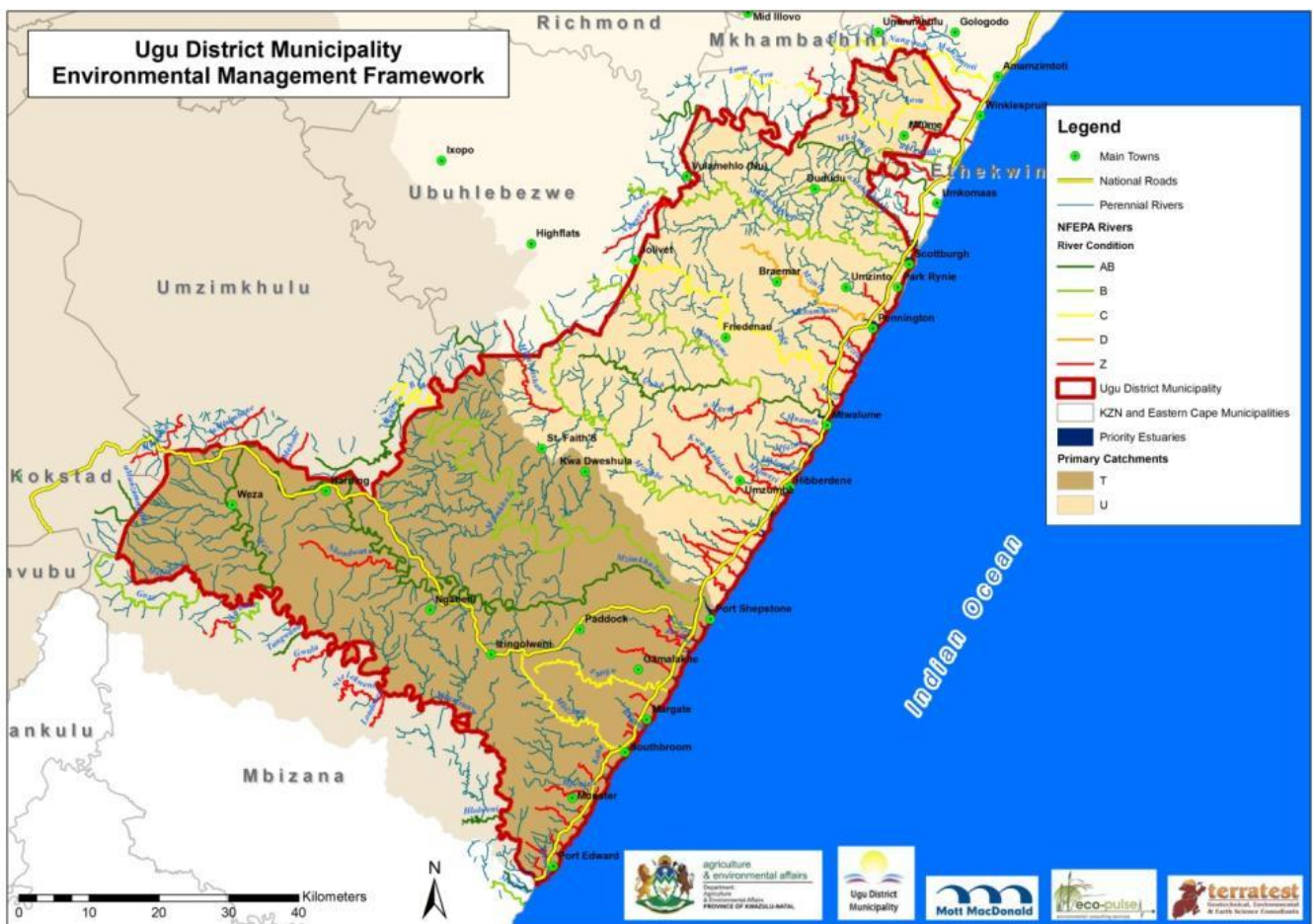


Figure 11. Map showing major perennial rivers, NFEPA rivers (CSIR, 2010) and primary catchments in the Ugu District. Note that rivers classified as being in a “Z” category are “not intact” according to surrounding land use.

¹⁵ The condition of on many of the smaller river systems was not available as part of the NFEPA project. It is worth noting however that most of the short rivers leading into the Indian Ocean were modeled as “not intact” according to surrounding landuse as reflected by a “Z” condition rating.

Table 9. Details and status quo of major rivers in the Ugu District¹⁶.

Major River Name	Type	River Length (km)	River Condition (NFEPA)	Free Flowing River (NFEPA)
aMahlongwa	Perennial	33.6	B	Yes
iFafa	Perennial	64.1	C	No
Goxe	Perennial	1.5	B	Yes
iLovu	Perennial	37.5	C	No
Mbizana	Perennial	32.1	C	No
Mkomazi	Perennial	69.2	A/B	Yes
Mpambanyoni	Perennial	73.2	B	Yes
Mtamvuna	Perennial	144.1	B	Yes (Flagship FFR)
Mtwalume	Perennial	59.1	A/B	No
Mzimkhulu	Perennial	130.5	B	Yes (Flagship FFR)
Mzimkhulwana	Perennial	141.9	A/B	No
Mzinto	Perennial	35.8	D	No
Mzumbe	Perennial	75.4	B	Yes
uMgababa	Perennial	6.4	B	No
Vungu	Perennial	32.6	C	No
Weza	Perennial	43.0	A/B	Yes (Flagship FFR)

5.3.2 Wetlands (freshwater)

The distribution of freshwater wetlands in the Ugu district is strongly linked with climate, with most wetlands occurring in higher rainfall areas. High densities of wetlands therefore occur along the coast (especially along the stretch between Umzumbe and Scottburgh) with fewer wetlands located inland, the exception being those within the forestry areas around Weza/Harding in the western parts of the District as well as north of Braemar in the north-east (Figure 12).

Wetlands in the Ugu District are generally heavily degraded as a result of intensive urban/housing developments along the coastal zone, formal agricultural practices including sugarcane farming and forestry as well as informal housing and associated subsistence cultivation. Details of the different wetland vegetation types and associated levels of transformation based on EKZNW's latest vegetation map are presented in Table 10, below. This suggests that an estimated 67% of freshwater wetland habitat in the District had been transformed. This figure could even be higher based on additional desktop mapping undertaken as part of the BSP process. Another classification of wetlands was applied as part of the National Freshwater Ecosystem Priority Areas project (CSIR, 2010). This suggests that levels of transformation are such that wetland vegetation groups in the district fall into either the endangered or critically endangered categories as indicated in Figure 12.

¹⁶ GIS Coverage: CSIR (2010c)

Table 10. Details of wetland vegetation types occurring within the UDM¹⁷.

Wetland vegetation type	Historical Area (Ha)	Extent (%) of DM	Extent Remaining (Ha)	% lost within DM	Threat Status
Alluvial Wetlands : Subtropical Alluvial Vegetation	1187.2	0.01	64.7	94.50%	EN
Marine Saline Wetlands	631.8	0.09	459.5	27.30%	EN
Alluvial Wetlands : Temperate Alluvial Vegetation : Midland Floodplain Grasslands	4.8	0	4.3	9.40%	LT
Freshwater Wetlands : Subtropical Freshwater Wetlands : Short Grass/ Sedge Wetlands	70.1	0.01	57.2	18.40%	LT
Freshwater Wetlands : Subtropical Freshwater Wetlands : Tall Grassland/ Sedge/ Reed Wetlands	17.1	0	2.5	85.10%	LT
Alluvial Wetlands : Temperate Alluvial Vegetation	991.2	0.08	390.6	60.60%	VU
Freshwater Wetlands : Eastern Temperate Wetlands	4.1	0	1.9	52.00%	VU
Freshwater Wetlands : Subtropical Freshwater Wetlands	137.1	0.01	25.8	81.20%	VU
Total	3043.4 ha	20.0%	1006.5 ha	67%	

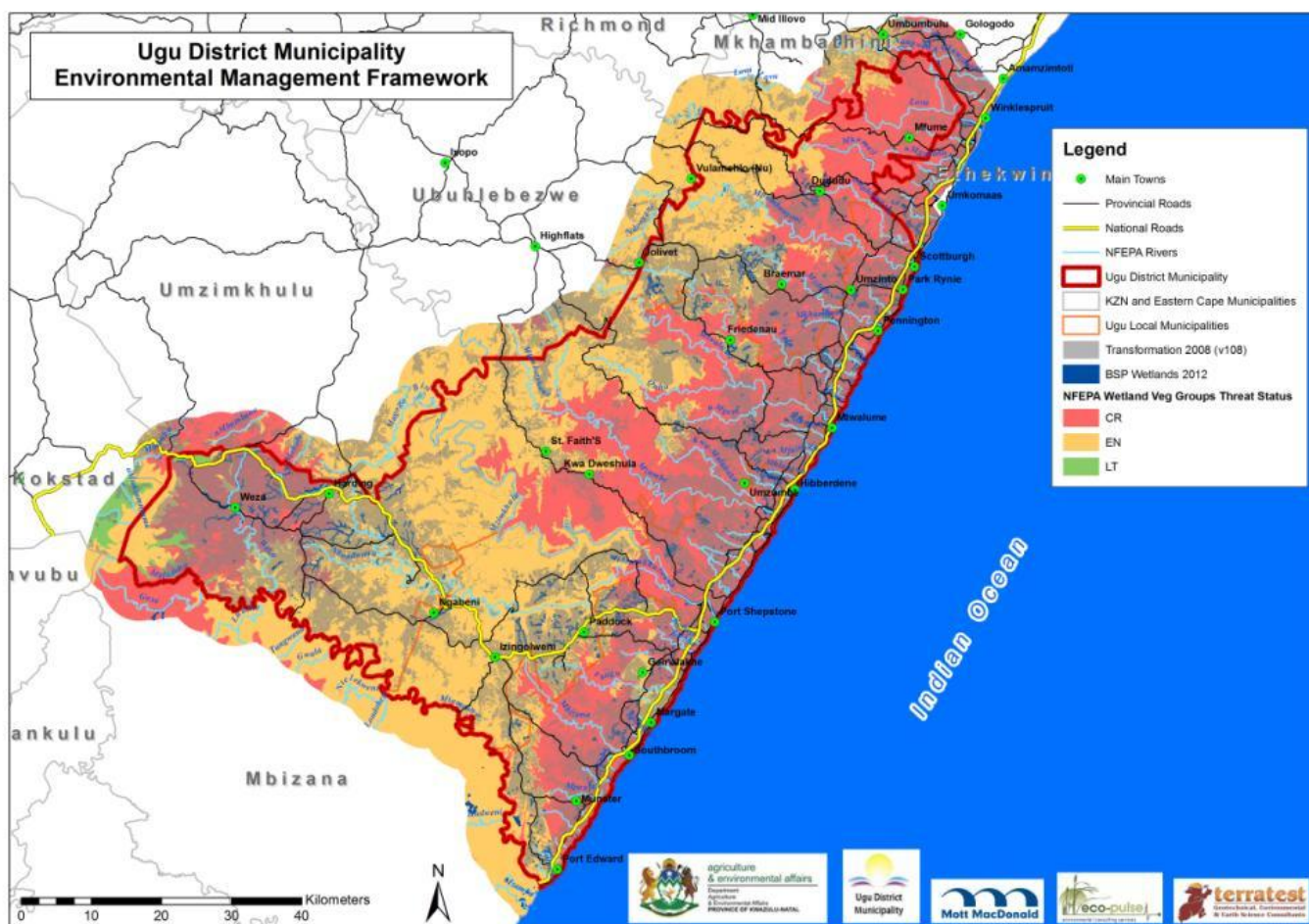


Figure 12. Map showing the threat status of wetland vegetation groups and associated location of wetland systems¹⁸.

¹⁷ GIS Coverage: EKZNW, 2011g

5.3.3 Estuaries

A total of forty estuaries are located within the Ugu District along the ca. 112km stretch of coastline between Scottburgh and Port Edward (Figure 13). The estuaries range in size from 0.01 ha to 72 ha and are all of the 'Temporarily closed estuary' type with the exception of the Mzimkhulu estuary which is classed as a 'Permanently open' estuary (it must noted however that although it is classified as permanently open, in recent years it closes up quickly (due to anthropogenic disturbances) and is thus artificially maintained as an open estuary . The Kaba, Ku-Boboyi and Zolwane have been flagged as FEPAs (Fresh Water Priority Areas) as part of the recent National Biodiversity Assessment.

According to the South African National Biodiversity Assessment for 2011 (Turpie & Van Niekerk, 2012), 30% of estuaries in the study area are in Poor condition while a further 50% are in Fair condition (Table 11). Seven of the 40 estuaries are currently regarded as being in Good condition while only the Mtamvuna is currently regarded as being in an Excellent condition. This highlights the need for both catchment wide and local conservation efforts to improve the condition of these important ecosystems.

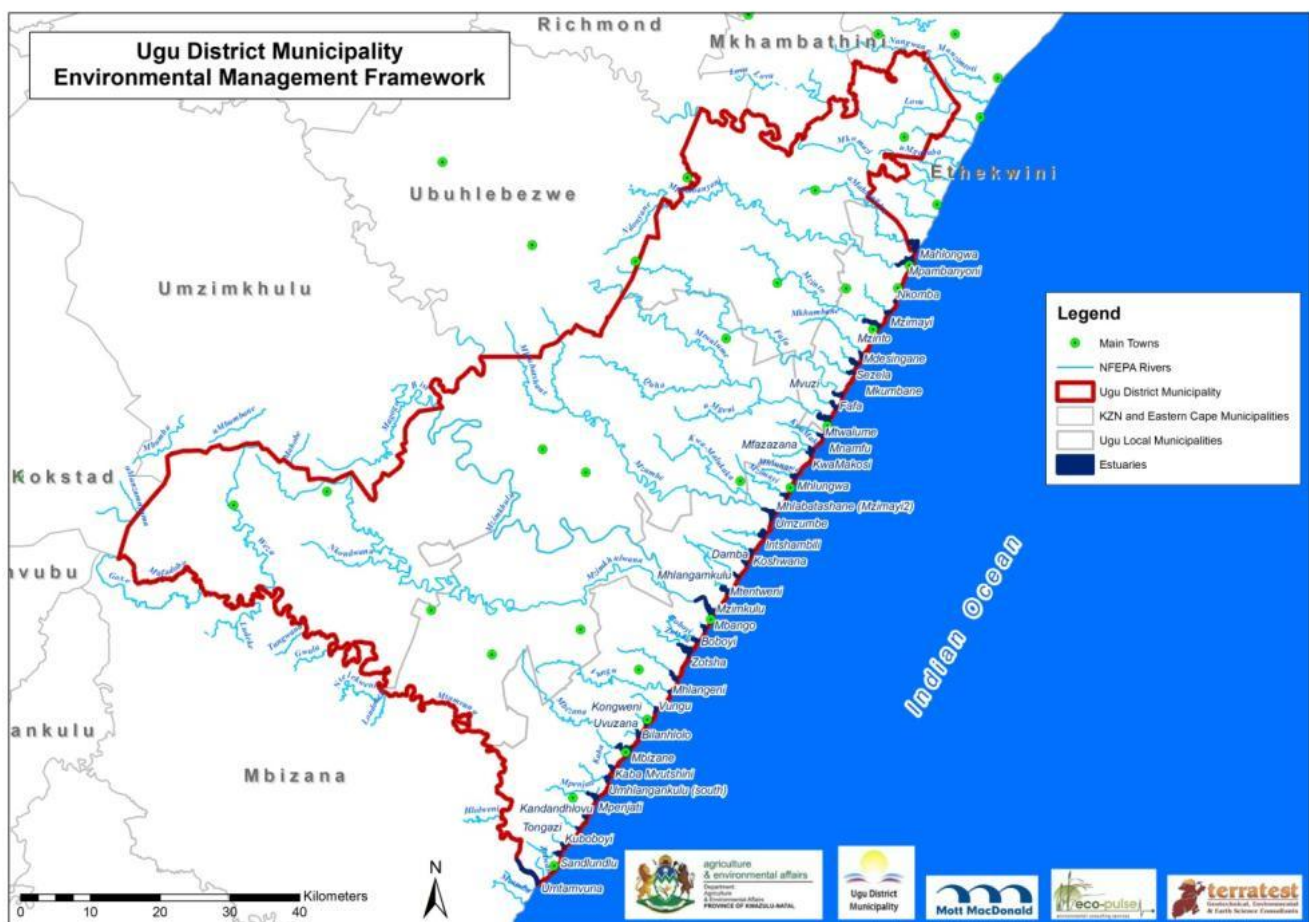


Figure 13. Map showing the location of estuaries along the Ugu Coastline¹⁹.

¹⁸ GIS Coverage: CSIR, 2010e, EKZNW, 2011g & Eco-Pulse (2012b)

¹⁹ GIS Coverage: EKZNW (2012c)

Table 11. Details of estuaries in the Ugu District.

Estuary Name	Type	Condition (Turpie & Van Niekerk, 2012).	EKZN Priority Estuary
Bilahlolo	Temporarily closed	Fair	Yes
Boboyi	Temporarily closed	Fair	Yes
Damba	Temporarily closed	Good	Yes
Fafa	Temporarily closed	Good	Yes
Intshambili	Temporarily closed	Good	-
Kaba	Temporarily closed	Poor	Yes (also NFEPA)
Kandandhlovu	Temporarily closed	Fair	Yes
Kongweni	Temporarily closed	Poor	Yes
Koshwana	Temporarily closed	Poor	Yes
Ku-Boboyi	Temporarily closed	Poor	Yes (also NFEPA)
Kwa-Makosi	Temporarily closed	Fair	Yes
Mbango	Temporarily closed	Fair	Yes
Mbizana	Temporarily closed	Poor	Yes
Mdesingane	Temporarily closed	Fair	Yes
Mfazazana	Temporarily closed	Fair	Yes
Mhlabatshane	Temporarily closed	Fair	-
Mhlangamkulu	Temporarily closed	Fair	Yes
Mhlangeni	Temporarily closed	Poor	-
Mhlungwa	Temporarily closed	Poor	-
Mkumbane	Temporarily closed	Fair	Yes
Mnamfu	Temporarily closed	Fair	Yes
Mpambanyoni	Temporarily closed	Poor	Yes
Mpenjati	Temporarily closed	Fair	Yes
Mtamvuna	Temporarily closed	Excellent	Yes
Mtentweni	Temporarily closed	Fair	Yes
Mtwalume	Temporarily closed	Poor	Yes
Mvutshini	Temporarily closed	Fair	Yes
Mvuzi	Temporarily closed	Fair	Yes
Mzimayi	Temporarily closed	Poor	Yes
Mzimkulu	Permanently open	Poor	Yes
Mzinto	Temporarily closed	Fair	Yes
Mzumbe	Temporarily closed	Poor	Yes
Sandlundlu	Temporarily closed	Good	Yes
Sezela	Temporarily closed	Fair	Yes
Tongazi	Temporarily closed	Good	Yes
Umhlangankulu	Temporarily closed	Fair	Yes
Uvuzana	Temporarily closed	Fair	Yes
Vungu	Temporarily closed	Fair	Yes
Zolwane	Temporarily closed	Good	Yes (also NFEPA)
Zotsha	Temporarily closed	Good	Yes

5.4 Species of special concern – flora & fauna

This section is not intended to represent a comprehensive review of the species of fauna and flora found within the district. Rather, it presents a summary of existing available information on threatened species and species of special conservation concern and significance based on records as provided by Ezemvelo KZN Wildlife (see Annexure 2 & 3 for species lists). The conservation status of species for all taxa groups is indicated using categories²⁰ determined by the IUCN or International Union for Conservation of Nature (SANBI, 2009 & IUCN, 2011). This system is designed to determine the relative risk of extinction, with the main purpose of the IUCN Red List to catalogue and highlight those taxa that are facing a higher risk of global extinction.

The results of this classification are presented in Table 12 and provide another useful indicator of the threats being placed on the natural environment. This shows that at least 6 critically endangered species are located within the study area with an additional 22 endangered species. The number of vulnerable, near threatened and rare species is higher with a total of 180 species of conservation listed on Ezemvelo KZN Wildlife's database. Given that large areas of the Municipality have not been well sampled by specialists, the actual number of threatened species is likely to be considerably higher.

Table 12. Summary of the threat status of species of conservation concern in UDM²¹.

CLASS	SUMMARY OF STATUS					
	Critically Endangered	Endangered	Vulnerable	Near threatened	Rare	Total
Plants	1	15	49	22	20	107
Mammals	1	1	4	3	Nil	9
Birds	2	2	17	23	Nil	44
Amphibians	1	2	1	1	Nil	5
Reptiles	Nil	Nil	1	Nil	Nil	1
Invertebrates	1	2	2	Nil	3	8
Fish	Nil	Nil	1	Nil	5	6
Total	6	22	75	49	28	180

²⁰ IUCN Categories (2011):

CR – Critically Endangered: extremely high risk of extinction in the wild

EN – Endangered: very high risk of extinction in the wild

VU – Vulnerable: high risk of extinction in the wild

NT – Near Threatened: does not currently qualify for a Threatened category but is close to qualifying for or is likely to qualify in one of those categories in the near future

²¹ GIS Coverage: EKZNW, 2011e, EKZNW, 2011f

Box 3

SPECIES OF SPECIAL CONCERN - BLUE SWALLOW

The Blue Swallow (*Hirundo atrocaerulea*) is a rare and localised intra-African migrant, regarded as Critically Endangered in South Africa. Residing in areas of high rainfall with short montane grassland, the population is facing extinction if their breeding and non-breeding habitats cannot be urgently secured according to the Endangered Wildlife Trust's (EWT) Threatened Grassland Species Programme, which has taken on the task of reversing the rapid decline of this threatened species. According to the EWT, four known regional populations of Blue Swallow have already become extinct in South Africa in the past decade, with the South African population currently consisting of fewer than 38 known breeding pairs, with 35 of these situated in KwaZulu-Natal. The total global population is estimated to be 1 000 breeding pairs, although this data is currently being reviewed.

The EWT consider a focus on the conservation of their habitat and long-term monitoring to determine population trends is essential, and that if such radical intervention is not initiated, the Blue Swallow is likely to be completely extinct in South Africa within the next decade.



Blue Swallow chicks (source: <http://www.graphicmail.co.za/new/viewnewsletter2.aspx?SiteID=27316&SID=14&NewsletterID=378647>)

5.4.1 Plants

The District is home to a variety of plant species, many of which are threatened (Annexure 2). *Turraea streyi* (Dainty leaved Honey-suckle Bush) is the only recorded critically endangered plant species in the UDM. An additional 15 plant species are regarded as endangered (SANBI, 2009). A wide range of additional species currently fall into lower threat categories with a total of 107 species currently listed as species of conservation concern (Table 12).

5.4.2 Mammals

Of the mammals occurring in the UDM, only the Rough-haired golden mole (*Chrysoxalax villosus dobsoni*) is considered Critically Endangered. Oriibi (*Ourebia ourebi*) is an Endangered species and an additional four species are considered Vulnerable (Annexure 3).

5.4.3 Birds

Bird species using the area include the Critically Endangered Blue Swallow (*Hirundo atrocaerulea*) and Wattled Crane (*Bugeranus carunculatus*). Two additional species, the Cape Parrot (*Poicephalus robustus*) and Spotted Ground-thrush (*Zoothera guttata*) are considered Endangered, while an additional 17 species considered Vulnerable also occur in the study area (Annexure 3).

5.4.4 Amphibians

There are at least 3 noteworthy species of frogs occurring in UDM. The Mistbelt Moss Frog (*Anhydrophryne ngongoniensis*) is classified as

Critically Endangered in South Africa. Two additional species, the Kloof frog (*Natalobatrachus bonebergi*) and Long-toed frog (*Leptopelis xenodactylus*) are Endangered.

5.4.5 Reptiles

While a wide range of reptile species occur within the UDM, the Southern African Rock Python (*Python sebae natalensis*) is the only known threatened species (classified as Vulnerable).

5.4.6 Invertebrates

Three rare butterfly species including the bicoloured skipper, Pondo Charaxes and Whitish Amakosa Rocksitter have been recorded in the UDM. The Trumpet-mouthed hunter snail (*Gulella salpinx*) also occurs here and is considered Critically Endangered. Other important invertebrate species include the Keyhole hunter snail (*Gulella claustralis*) and Strong black millipede (*Doratogonus infragilis*), both classified Endangered species (Annexure 3).

5.4.7 Fish

A range of threatened fish species occur in the UDM. Three goby species, together with the freshwater mullet (*Myxus capensis*) are regarded as Rare while the Duckbill sleeper (*Butis butis*) is classified as Vulnerable.

5.5 Protected areas

5.5.1 Extent of formally protected areas

Protected Areas (PAs) fulfil a number of critical functions within the landscape, most notably they function as the cornerstones of biodiversity conservation and ecological sustainability, biodiversity representivity, climate change adaptation, provision of ecosystem goods and services, and socioeconomic (particularly rural) development (Dudley 2008; DEA 2009). It is therefore not surprising that protected areas are seen as one of the most important mechanisms for protecting biodiversity.

Internationally, the Convention on Biological Diversity (CBD) commits governments to protecting a minimum of 10% of each habitat type by 2010. South Africa's current protected area network falls far short of sustaining biodiversity and ecological processes with only approximately 6% of our land surface set aside and managed as protected areas. This flat target of 10% is relatively arbitrary, with no compelling ecological rationale. In the South African context, with our globally exceptional levels of biodiversity richness, we need a higher level of protection (DEAT & SANBI, 2008).

At present, a total of seven terrestrial formally Protected and two marine Protected Areas (Aliwal Shoal & Trafalgar) occur within the Ugu District (Table 13). These range in extent from 17 ha (Skyline Nature Reserve) to over 12, 000 ha (Aliwal Shoal Marine Protected Area). Terrestrial protected areas cover a meagre 8883.1 hectares, representing only a small fraction (1.76%) of the land surface within the District (Figure 14). This figure is clearly well below international benchmarks and is grossly inadequate to protect the diversity of species, habitats and processes within the District.

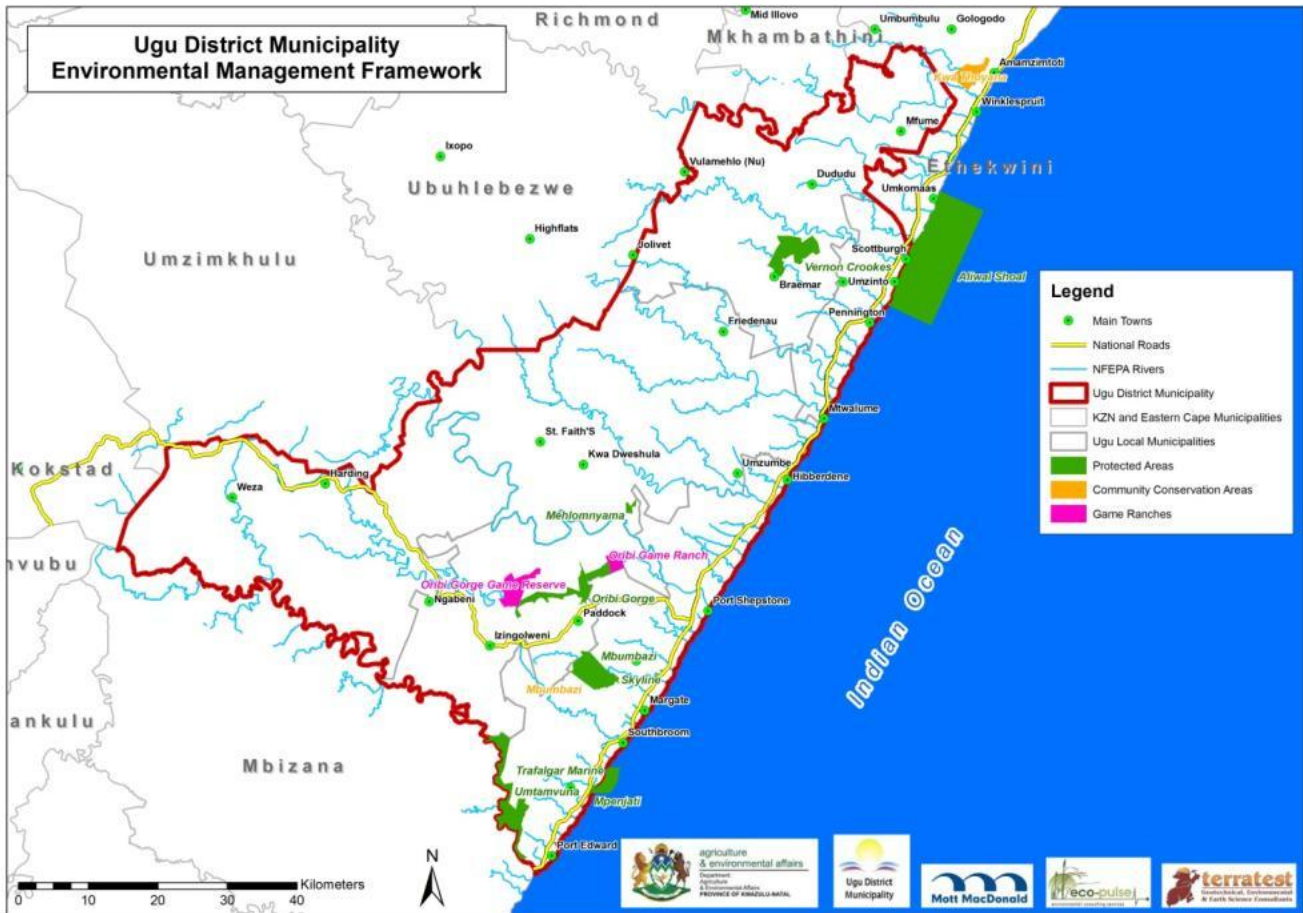


Figure 14. Map showing the location of formally Protected Areas and other conservation areas in the Ugu District²².

²² GIS Coverage: EKZNW (2010d), EKZNW (2012b), EKZN (2011d)

Table 13. Formal Protected Areas within the Ugu District.

Site	Date Proclaimed	Extent (Ha)
Terrestrial Protected Areas		
Oribi Gorge Nature Reserve	Formally Proclaimed (1950)	1745.7
Skyline Nature Reserve	Formally Proclaimed (1986)	17.1
Mbumbazi Nature Reserve	Formally Proclaimed (1986)	2022.9
Mehlomnyama Nature Reserve (Managed by DWA)	Formally Proclaimed (1908)	160.6
Umtamvuna Nature Reserve	Formally Proclaimed (1971)	2653.0
Vernon Crookes Nature Reserve	Formally Proclaimed (1973)	2188.9
Mpenjati Nature Reserve	Established by EXCO Resolution (1985)	94.9
Total		8883.1 (1.76%)
Marine Protected Areas		
Aliwal Shoal Marine Protected Area	Formally Proclaimed (2004)	12461.5
Trafalgar Marine Reserve	Formally Proclaimed (1979 ²³)	~552

While a number of informal conservation areas also exist, these areas are not formally protected by law and therefore provide little assurance of long-term protection. These areas include community conservation areas, privately-owned reserves and game ranches. Further efforts are clearly required to expand the existing formal conservation estate with opportunities for building on existing biodiversity commitments shown by landowners through these informal conservation initiatives.

Protected area expansion planning has been undertaken at both a National and Regional level to help direct conservation programs (Figure 15). Unfortunately these plans have led to little formal action on the ground apart from the conceptual development of a Big 5 Reserve associated with the Mzimkhulu priority area identified in the national plan²⁴ (Tony Abott, *pers. comm.*). Priority areas are also quite different with little alignment between the existing plans. It is hoped that the outcomes of the BSP will help to provide further focus for future conservation efforts.

²³ Based on Marine Living Resources Act, 1998 (Act number 18 of 1998).

²⁴ The Mzimkhulu priority area is located between Ngubeni in the west and St Faiths and KwaDweshula in the east (orange area highlighted in Figure 15).

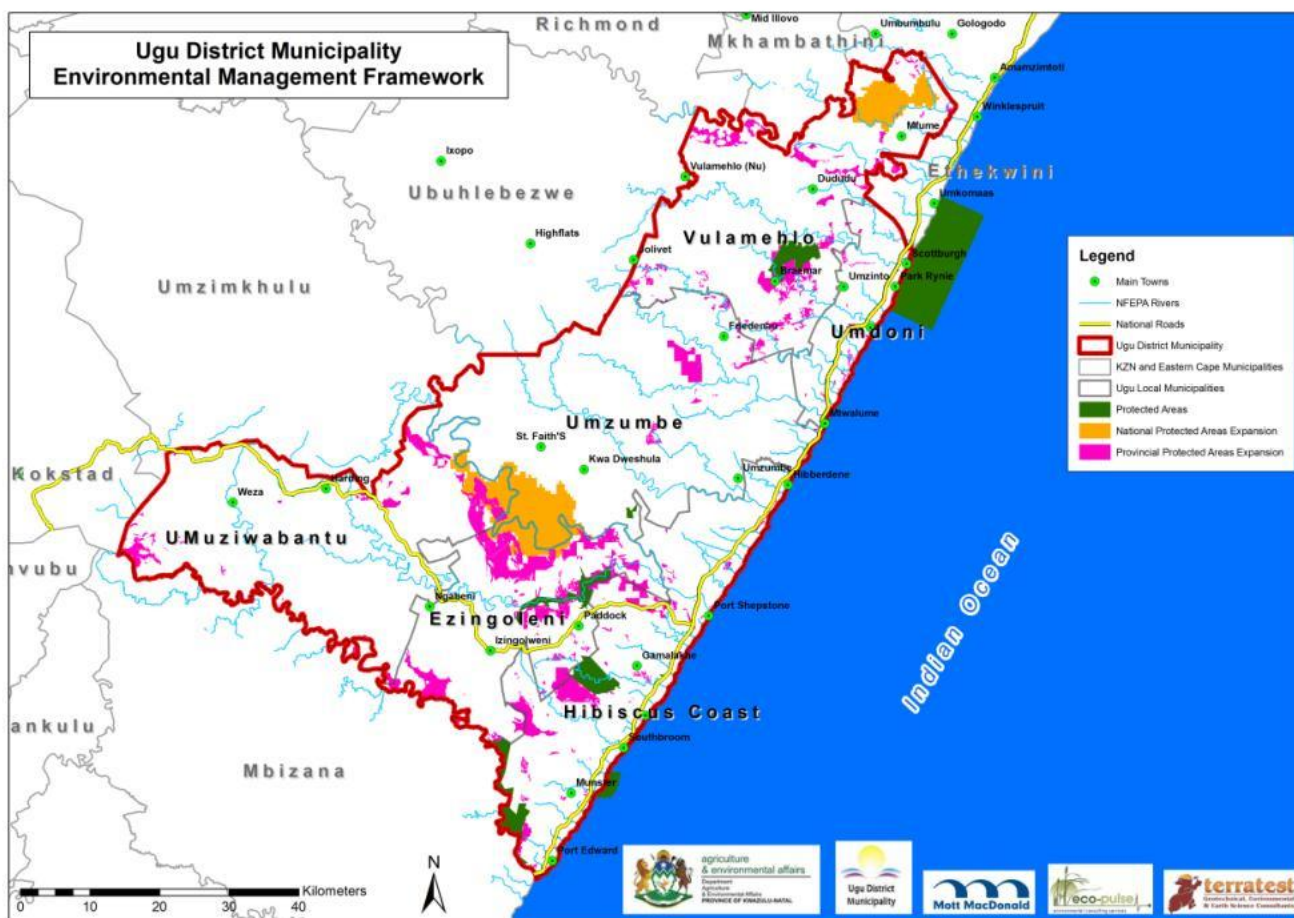


Figure 15. Map showing priority areas identified for protected area expansion²⁵.

5.5.2 Management effectiveness and pressures facing protected areas

An assessment of the management effectiveness of protected areas managed by EKZNW was undertaken in 2010 (Carbutt and Goodman, 2010). This assessment was based largely on the Management Effectiveness Tracking Tool (METT) developed by WWF and the World Bank (WB) in 2007²⁶. The results of the assessment are summarised in Table 14, below. This clearly shows that all the sites assessed fell short of the 77% minimum standard which was set by the Management Effectiveness Task Team with sites ranging in scores from 53% to

²⁵ GIS Coverages: SANParks (2010) & EKZNW, (2010a)

²⁶ The METT is a rapid, site-level, qualitative assessment tool based on an expert scoring approach that evaluates six elements of PA management namely establishing the context of existing values and threats, followed by adequate planning and the allocation of adequate resources (inputs), and as a result of management actions (processes), eventually produces products (outputs) that result in impacts that can be measured against set objectives (outcomes).

64%. This suggests that further efforts are required to improve management of existing protected areas and so ensure that the few biodiversity assets within such areas receive the protection required²⁷.

The level of pressure²⁸ facing different protected areas is also worth noting (Table 14). Of particular relevance, is the very high pressure associated with Umtamvuna Nature Reserve which ranked highest in the Province. This suggests that special attention needs to be given to this area to ensure that these pressures are appropriately mitigated and managed.

Table 14. Summary results of the METT assessment (Carbutt and Goodman, 2010).

Site	Extent (Ha)	Effectiveness (%)	Pressure ²⁹
Oribi Gorge Nature Reserve	1745.7	60	Medium
Skyline Nature Reserve	17.1	63	Medium
Mbumbazi Nature Reserve	2022.9	53	Medium
Mehlomnyama Nature Reserve (Managed by DWA)	160.6	No data	No data
Umtamvuna Nature Reserve	2653.0	60	Very High
Vernon Crookes Nature Reserve	2188.9	59	Low
Mpenjati Nature Reserve	94.9	64	High

²⁷ Note that EKZNW have indicated that significant improvements in management effectiveness have been noted during the 2013 survey. This report is currently in draft form and is not available for public dissemination (Felicity Elliott, *pers.comm.*).

²⁸ Pressures are forces, activities, or events that have already had a detrimental impact on the integrity of the PA over the past five years (i.e. that have diminished biological diversity, inhibited regenerative capacity, and/or impoverished the area's natural resources). Pressures include both legal and illegal activities, and may result from direct and indirect impacts of an activity (Carbutt and Goodman, 2010).

²⁹ Note that these classes were based on combined pressure ratings reflected in Appendix 14 of the METT assessment report.

6. MAPPING THE IMPORTANCE OF AREAS FOR BIODIVERSITY CONSERVATION

An overview of the importance of areas for biodiversity conservation in the Ugu District is presented in the form of a Critical Biodiversity Areas (CBA) map for the Ugu District (Figure 16). This, together with other supporting maps presented here was based on the mapping prepared as part of the Draft Biodiversity Sector plan for the area (Macfarlane *et. al.*, 2013a) but refined through further stakeholder interaction and field verification (See **Annexure 6**).

The CBA map indicates areas of terrestrial land, aquatic features as well as marine areas which must be safeguarded in their natural state if biodiversity is to persist and ecosystems are to continue functioning. The CBA map aims to guide sustainable development in the District by providing a synthesis of biodiversity information to decision makers and serves as the common reference for all multi-sectoral planning procedures, advising which areas can be developed in a sustainable manner, and which areas of critical biodiversity value ("Critical Biodiversity Areas" or CBAs) and their support zones ("Ecological Support Areas" or ESAs) should be protected against biodiversity threats and impacts. ESAs, whilst not necessarily required to meet conservation targets, are important in maintaining ecological processes and system functioning of their associated CBAs.

An additional category, termed "Ecological Infrastructure" or EI (also referred to as "Ecosystem Goods and Services Areas" or EGSAs) identifies areas of natural or near-natural features, habitats or landscapes that have been highlighted as being particularly important in providing high levels of ecosystem service delivery, e.g. water production areas, key flood mitigation areas, etc. This category forms a subset of the larger matrix identified on the map as "Other Natural Areas". These are natural, near-natural vegetation and functional habitats or landscapes not yet classified as one of the above categories (i.e. CBAs, ESAs, or EI), but that should be recognized as being important in maintaining and supporting ecological processes and ecosystem service delivery, and should also be safe-guarded where possible. Whilst these Other Natural Areas are sufficiently extensive at this stage that they may withstand some loss through conversion of their natural state and undergo development, it is possible however that these areas will eventually be reclassified as Critical Biodiversity Areas in the future as development pressures increase.

Protected Areas (PAs) are restricted to formally proclaimed areas under the National Environmental Management: Protected Areas Act (2003) that forms the backbone of the conservation network. These areas are critical in their contribution to the achievement of conservation objectives in the Province.

The CBA map also identifies “Transformed Areas” that have been irreversibly transformed by land uses such as agriculture, forestry and urban infrastructural development, with no significant natural vegetation remaining and therefore are attributed to having a low biodiversity value³⁰.

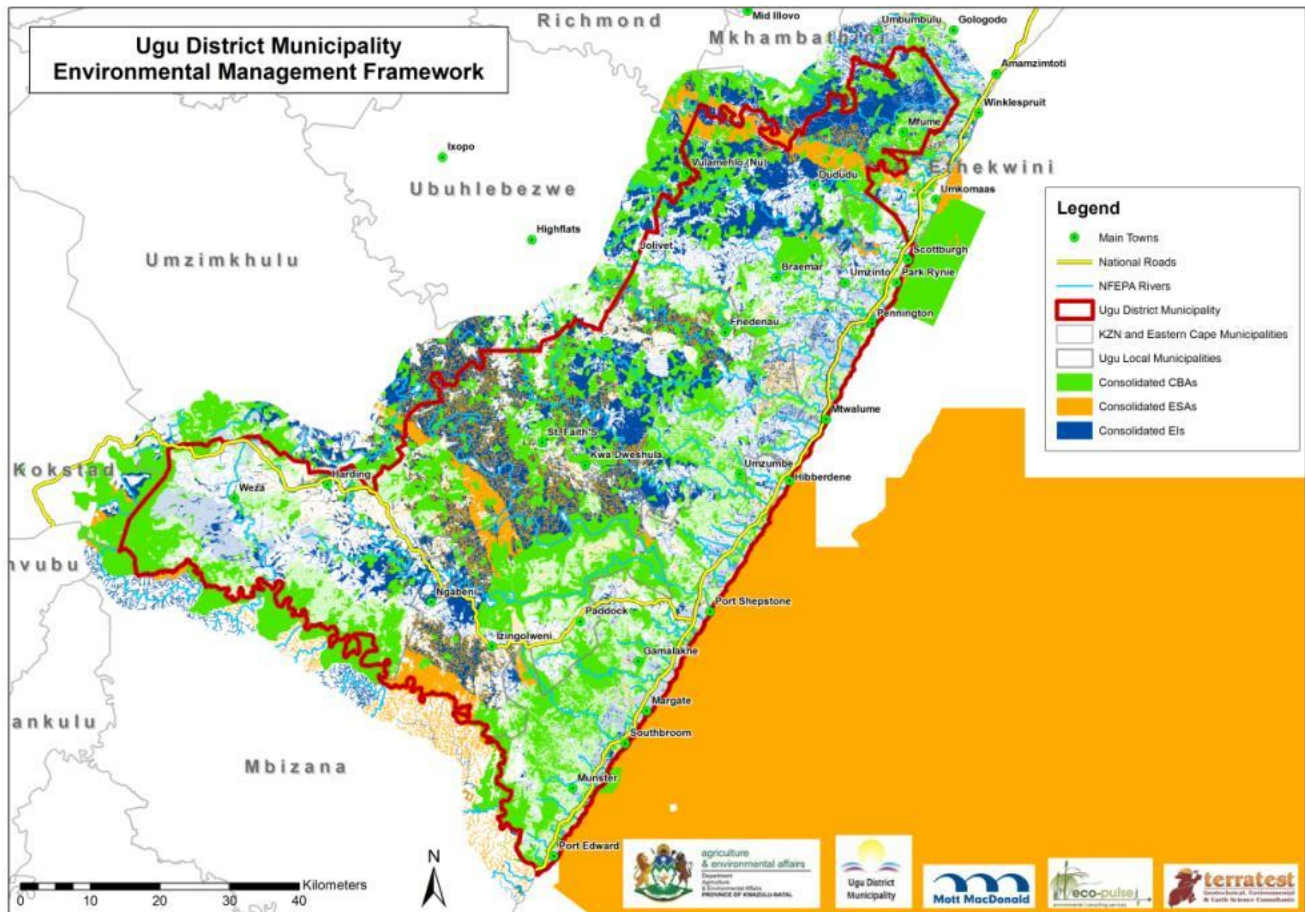


Figure 16. Draft Critical Biodiversity Areas Map of the Ugu District Municipality³¹ showing CBAs, ESAs and EI.

This map emphasizes the importance of remaining patches of untransformed land in the Ugu District. Of particular significance from a development perspective is the significance of remaining habitat fragments along the coastal belt and immediate interior.

³⁰ Note that some transformed areas still provide important secondary habitat for species (e.g. Oribi utilise sugarcane lands & pastures) and may support species movement. While not specifically displayed here, such areas are indicated in the supporting spatial datasets.

³¹ Note that this map is still in draft form and will be finalised as part of the Biodiversity Sector Plan for the District to better align with emerging National best practice mapping guidelines.

6.1 Critical Biodiversity Areas (CBAs)

Critical Biodiversity Areas or CBAs include features, habitats and landscapes that are considered to be most important for biodiversity conservation and securing the preservation of important ecosystem functioning and processes. Terrestrial, aquatic, estuarine and marine CBAs are indicated in Figure 17 and discussed separately in more detail below.

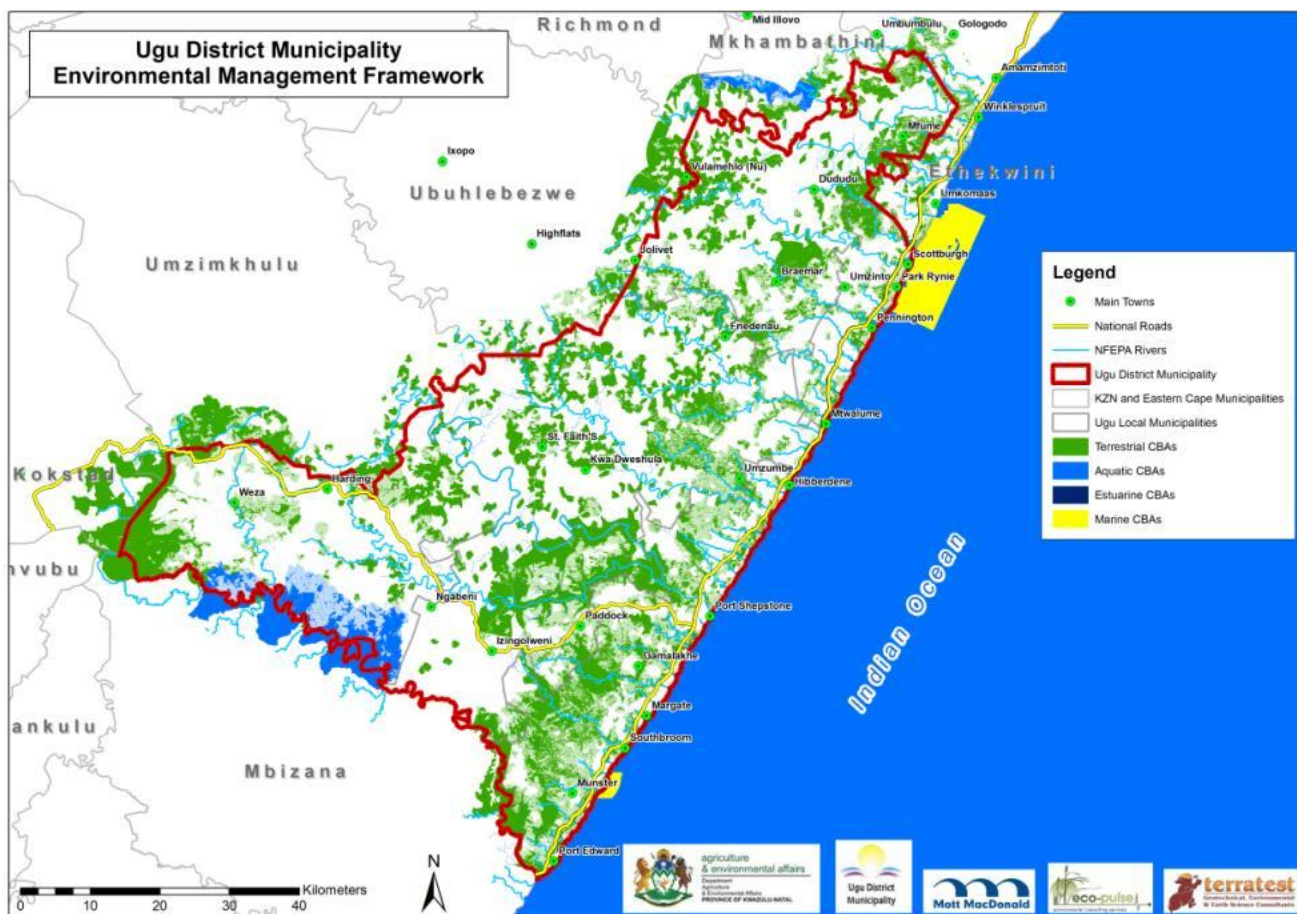


Figure 17. Composite CBA Map showing terrestrial, aquatic, estuarine and marine Critical Biodiversity Areas (CBAs) for the Ugu District Municipality.

6.1.1 Terrestrial CBAs

Terrestrial CBAs describe terrestrial areas within the District which are of particularly high conservation significance. Protected Areas and sites of conservation importance are automatically included in the CBA network by virtue of their formal protection status. Additional datasets used to classify and derive the terrestrial CBA layer included Critical Biodiversity Areas (formally Biodiversity Priority Areas) defined in the EKZNW Terrestrial

Systematic Conservation Plan, irreplaceable linkages using the coverage of Landscape Ecological corridors for the Province³² and terrestrial features/areas identified as critically important for terrestrial conservation efforts based on input from local experts in the District. Further details of the GIS spatial data used have been listed in Annexure 4, with the methodology used to derive the terrestrial CBA dataset found in Annexure 5.

6.1.2 Aquatic CBAs

Aquatic Critical Biodiversity Areas or aquatic CBAs describe freshwater aquatic environments and areas (i.e. rivers and wetlands) within the District which are considered to be of particularly high conservation significance. Protected Areas and sites of conservation importance are automatically included in the CBA network by virtue of their formal protection status. The location and extent of priority wetlands and rivers according to the National Freshwater Ecosystems Priority Areas (NFEPA) Project (CSIR, 2010), other aquatic ecosystems situated within priority catchments based on the Freshwater Systematic Conservation Plan³³ and aquatic features/areas identified as critically important for terrestrial conservation efforts based on input from local experts in the District were among the main data sources used to derive this layer. Further details of the GIS spatial data used have been listed in Annexure 4, with the methodology used to derive the aquatic CBA dataset found in Annexure 5.

6.1.3 Estuarine CBAs

Estuarine CBAs have been identified separately from aquatic and marine CBAs and describe estuarine environments within the District which are considered to be of particularly high conservation significance. The location and extent of priority estuaries identified in the Estuarine Systematic Conservation Plan³⁴ and nationally identified priority NFEPA estuaries identified in the 2011 South African Biodiversity Assessment (Turpie & Van Niekerk, 2012) were used to derive this layer and further details on the methodology employed can be found in Annexure 5.

6.1.4 Marine CBAs

Marine CBAs describe marine environments within the District which are considered to be of particularly high conservation significance. The location and extent of Marine CBA areas identified in the KwaZulu-Natal Marine Systematic Conservation Plan³⁵ was used to derive this layer and further details on the methodology used to can be found in Annexure 5.

³² GIS Coverage: EKZNW, 2009

³³ GIS Coverage: EKZNW, 2007

³⁴ GIS Coverage: EKZNW, 2012c

³⁵ GIS Coverage: EKZNW, 2011i

6.2 Ecological Support Areas (ESAs)

Ecological Support Areas (or ESAs) are supporting zones that play an important role supporting the ecological functioning of critical biodiversity areas and/or in delivering ecosystem services and buffering protected areas and other CBAs from land use impacts. ESAs include Landscape and Local ecological corridors that allow for connectivity along altitudinal gradients between the coast and inland, west-east corridors along the coastal belt and linkages between CBAs. They also include key areas within largely transformed landscape features that nevertheless contribute to the persistence of key threatened species. Terrestrial, aquatic, estuarine and marine ESAs are indicated in Figure 18 and discussed separately in more detail below.

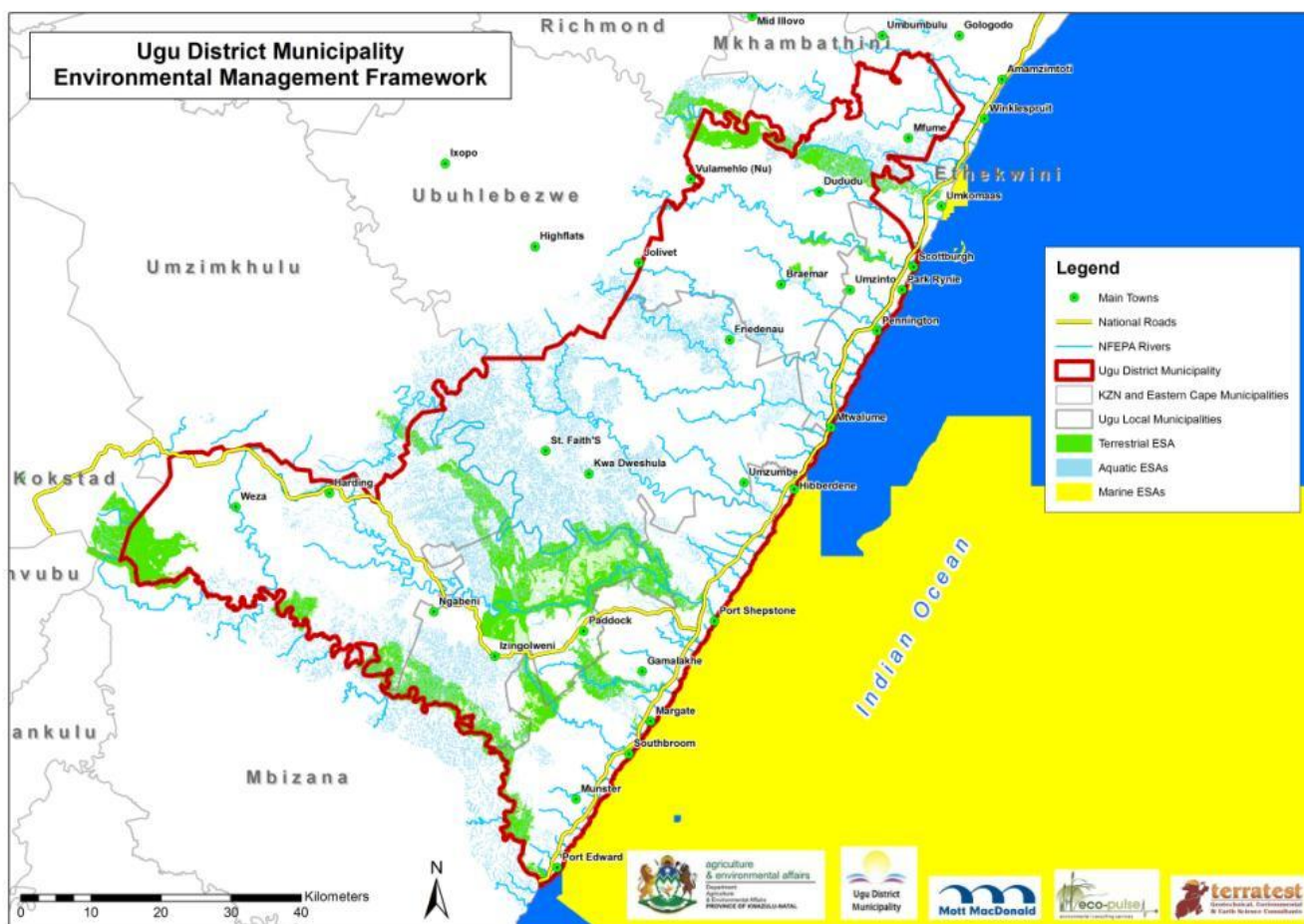


Figure 18. Composite ESA Map showing terrestrial, aquatic, estuarine and marine Ecological Support Areas (ESAs) for the Ugu District Municipality

6.2.1 Terrestrial ESAs

Terrestrial Ecological Support Areas (ESAs) describe terrestrial areas within the District which are of particular importance in maintaining linkages between CBAs and other important biodiversity features using the EKZNW

Landscape corridors coverage³⁶ and Local corridor linkages important for species movement³⁷. Species specific ESAs were also derived through consultation with experts in the District³⁸ and include largely transformed landscape features that are regarded as important for the persistence of key species in the District (e.g. Oribi that utilize land that has been transformed for agricultural production). Further details of the GIS spatial data used to derive the terrestrial ESA dataset have been listed in Annexure 4, with the methodology used to derive the dataset found in Annexure 5.

6.2.2 Aquatic ESAs

Aquatic Ecological Support Areas (ESAs) describe aquatic (and terrestrial areas) within the District which are of particular importance in supporting and protecting aquatic CBAs and other important aquatic ecosystems identified for the Ugu District. Aquatic ESAs include defined buffer zones around key CBA wetlands and rivers defined for the District using the National Freshwater Ecosystems Priority Areas (NFEPA) Project wetland and river coverage's³⁹ in combination with the priorities identified in the Freshwater Systematic Conservation Plan for the Province⁴⁰. Further details of the GIS spatial data used to derive the aquatic ESA dataset have been listed in Annexure 4, with the methodology used to derive the dataset found in Annexure 5.

6.2.3 Estuarine ESAs

Estuarine Ecological Support Areas (ESAs) were defined as all other (non-priority) estuaries that have not been mapped as Estuarine CBAs within the District, as identified in the Estuarine Systematic Conservation Plan for the Province⁴¹ and the National Freshwater Ecosystems Priority Areas (NFEPA) Project wetland coverage⁴².

6.2.4 Marine ESAs

Marine Ecological Support Areas (ESAs) were defined as all process layers and species pathways identified in the KwaZulu-Natal Marine Systematic Conservation Plan⁴³.

³⁶ GIS Coverage: EKZMW, 2009

³⁷ GIS Coverage: Eco-Pulse & Afzelia, 2012

³⁸ GIS Coverage: Eco-Pulse, 2012a

³⁹ GIS Coverage: CSIR, 2010a, CSIR, 2010c

⁴⁰ GIS Coverage: EKZMW, 2007

⁴¹ GIS Coverage: EKZMW, 2012c

⁴² GIS Coverage: CSIR, 2010a

⁴³ GIS Coverage: EKZMW, 2011i

6.3 Ecological Infrastructure (EI)

Ecological Infrastructure (EI) includes functional features, habitats or landscapes that provide important ecological goods and services to society (i.e. water security, disaster relief, preventing soil loss and in maintaining or improving key services such as clean water for domestic and recreational use). Whilst Ecosystem Goods and Services can be derived from non-natural land-use practices (such as erosion control by lawn), only naturally-derived EI is reflected in this context, because it typically provides a significantly higher number of benefits/co-benefits, such as biodiversity support. Terrestrial and aquatic Ecological Infrastructure (EI) indicated in Figure 19 and discussed separately in more detail below.

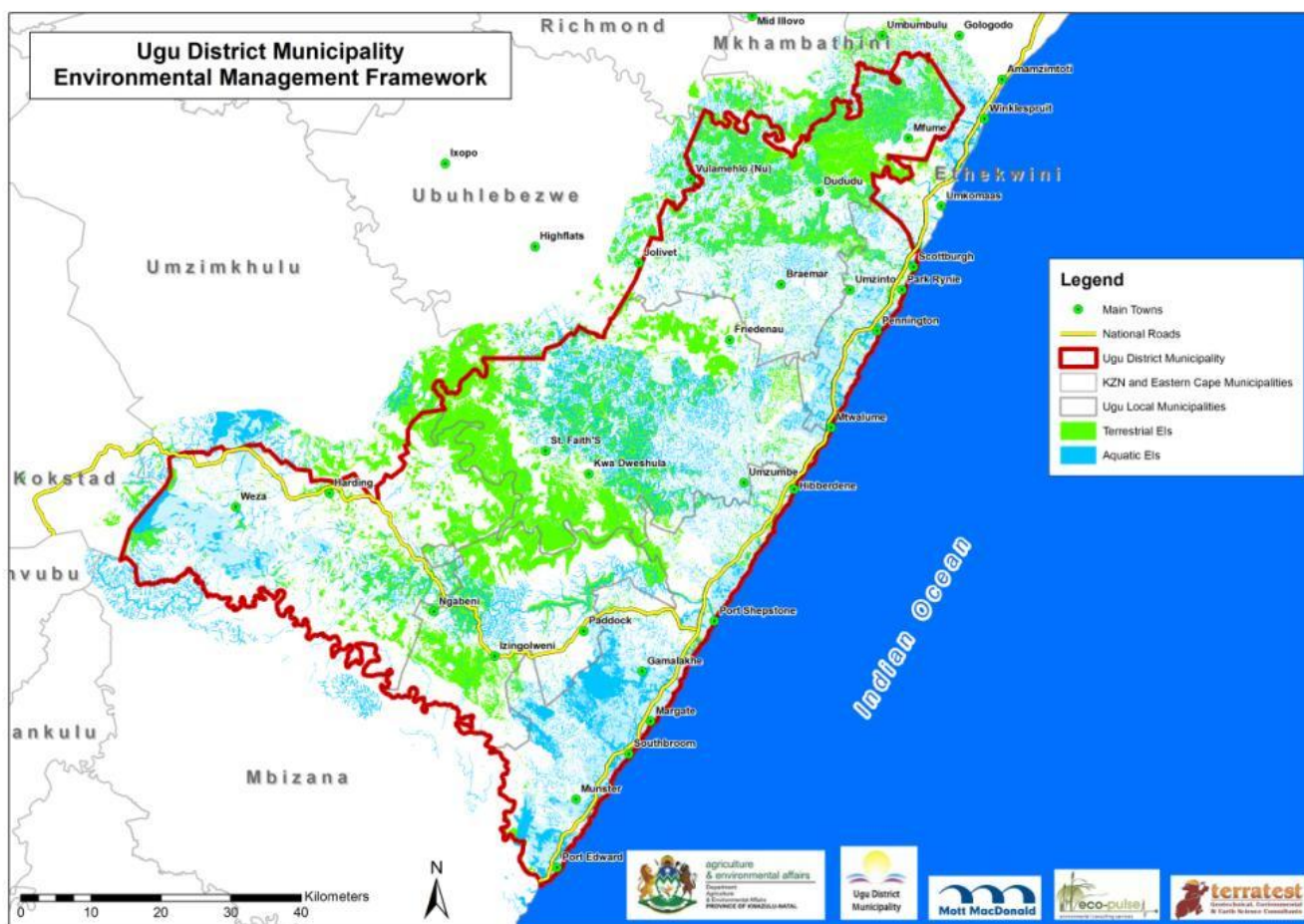


Figure 19. Composite EI Map showing terrestrial, aquatic, estuarine and marine Ecological Infrastructure (EI) for the Ugu District Municipality.

6.3.1 Terrestrial EI

Terrestrial Ecological Infrastructure (EI) has been defined for the District by classifying all remaining natural and near-natural land within the District that has not been classified as either a CBA or ESA, using the Transformation coverage for the Province⁴⁴. The Admiralty Reserve⁴⁵ has also been included as a Terrestrial EI as this zone is seen as being important for environmental (biodiversity conservation - particularly dune vegetation) and social (tourism & recreation) reasons. High erosion risk areas⁴⁶ within the District were also identified and classified as terrestrial EI due to the high potential for soil erosion and loss of productive land in these areas if not properly managed. Further details of the GIS spatial data used to derive the terrestrial EI dataset have been listed in Annexure 4, with the methodology used to derive the dataset found in Annexure 5.

6.3.2 Aquatic EI

Aquatic Ecological Infrastructure (EI) has been defined for the District firstly by classifying all remaining wetlands and rivers that have not been classified as either a CBA or ESA, but are nevertheless considered important in providing ecological goods and services to society. Other areas that are considered important in terms of ecological goods and services were also mapped as aquatic EI and included Important Water Yield Areas/Catchments⁴⁷ and NFEPA Water Supply Areas⁴⁸ which are regarded as strategic water supply areas for the Province and at a National level respectively. In addition, specific buffer zones around remaining rivers and wetlands have also been assigned as these are recognized as providing a range of functions to assist in reducing impacts to river and wetland systems when appropriately managed. Further details of the GIS spatial data used to derive the aquatic EI dataset have been listed in Annexure 4, with the methodology used to derive the dataset found in Annexure 5.

⁴⁴ GIS Coverage: EKZNW, 2008

⁴⁵ GIS Coverage: Provincial Planning and Development Commission, 2008

⁴⁶ GIS Coverage: Le roux et al., 2008

⁴⁷ GIS Coverage: EKZNW, 2011h

⁴⁸ GIS Coverage: CSIR, 2011

7. IDENTIFICATION OF FOCAL AREAS FOR CONSERVATION ACTION

The identification of areas for conservation action was restricted to an analysis of terrestrial priorities as outlined in the terrestrial CBA map. This was based on the rationale that focal areas should be identified on the basis of conservation value and threat posed by natural and anthropogenic factors. A map indicating relative levels of threat across the study area was therefore generated based on available information (Figure 20). This clearly highlights focal areas of planned development along the coastal zone and associated with planned nodal and agricultural development in the St. Faith's and Kwa Dweshula areas.

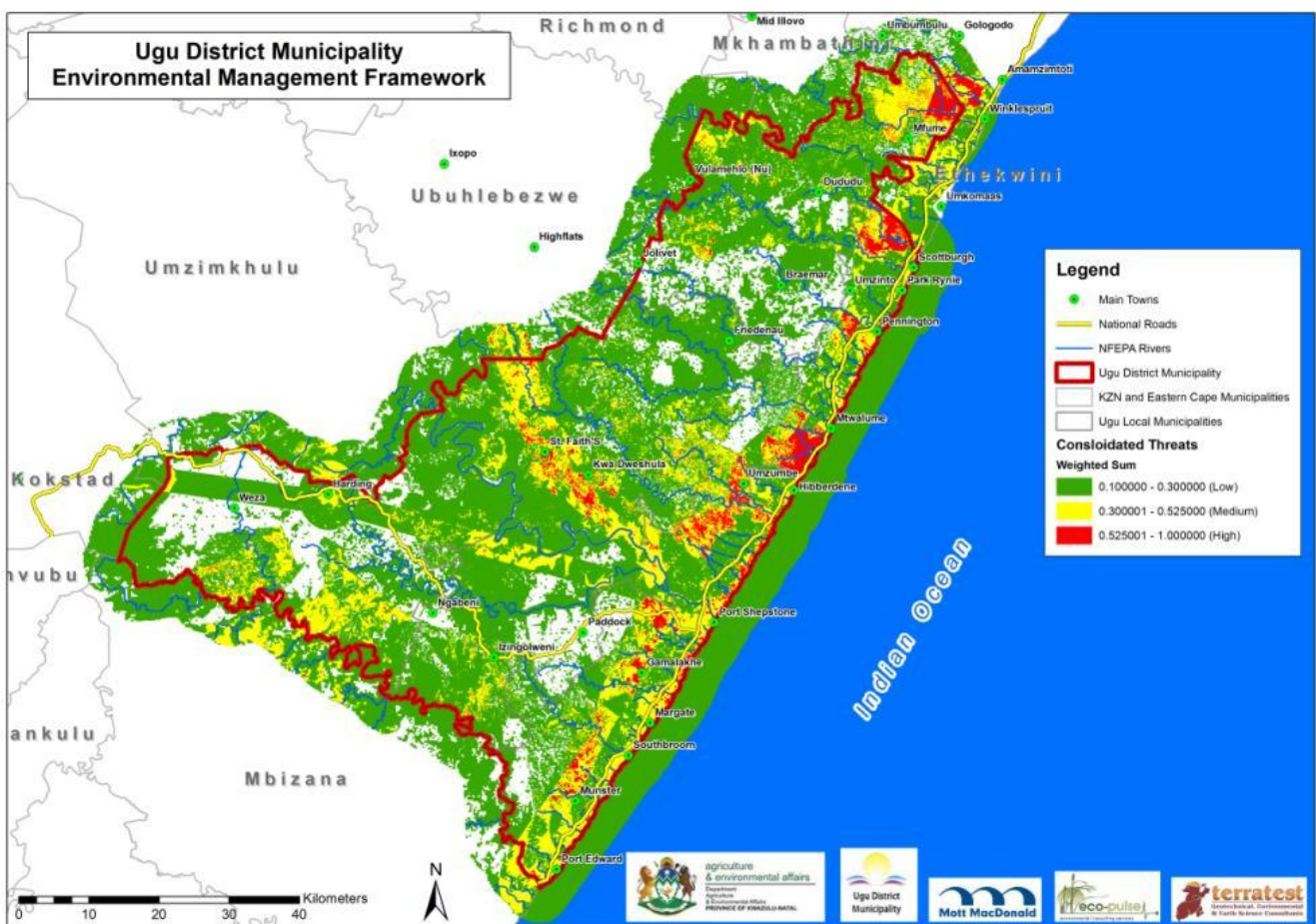


Figure 20. Map indicating relative levels of threat to biodiversity in the study area.

Focal areas for terrestrial biodiversity conservation action were then identified by integrating information on biodiversity importance and threats facing biodiversity (Figure 21). While the assessment highlights a wide range of habitat fragments requiring urgent conservation action, it is also useful in identifying some significant priority areas for conservation action. A brief description of these focal areas is included in Table 15, below. It is important to note however that this map should not detract from the sensitivity map produced as part of the BSP that effectively portrays critical areas for biodiversity conservation.

Table 15. Focal priority areas for conservation action identified.

Focal Area	Description
1	Weza/Ngeli complex: Opportunity to formally secure a large area of priority grasslands and forests supporting important biodiversity. The complex also falls within an important water yield area.
2	Umzimkhulu / Oribi Flats priority conservation area: Encompassing threatened grassland areas and intact sections of the Umzimkhulu Valley, this is a logical extension of the Oribi Gorge Nature Reserve.
3	Port Edward hinterland: Remaining remnants of Critically Endangered KwaZulu-Natal Coastal Belt Grassland.
4	Gamalakhe focal area: Some of the largest untransformed areas of critically endangered KwaZulu-Natal Coastal Belt Grassland. Opportunities to expand Mbumbazi Nature Reserve.
5	Mbumbazi / Oribi Gorge linkages: Intact forest and grassland habitat north of Mbumbazi with valley lines extending towards Oribi Gorge Nature Reserve.
6	Weza/Harding grasslands: Remaining areas of intact grassland supporting important threatened species.

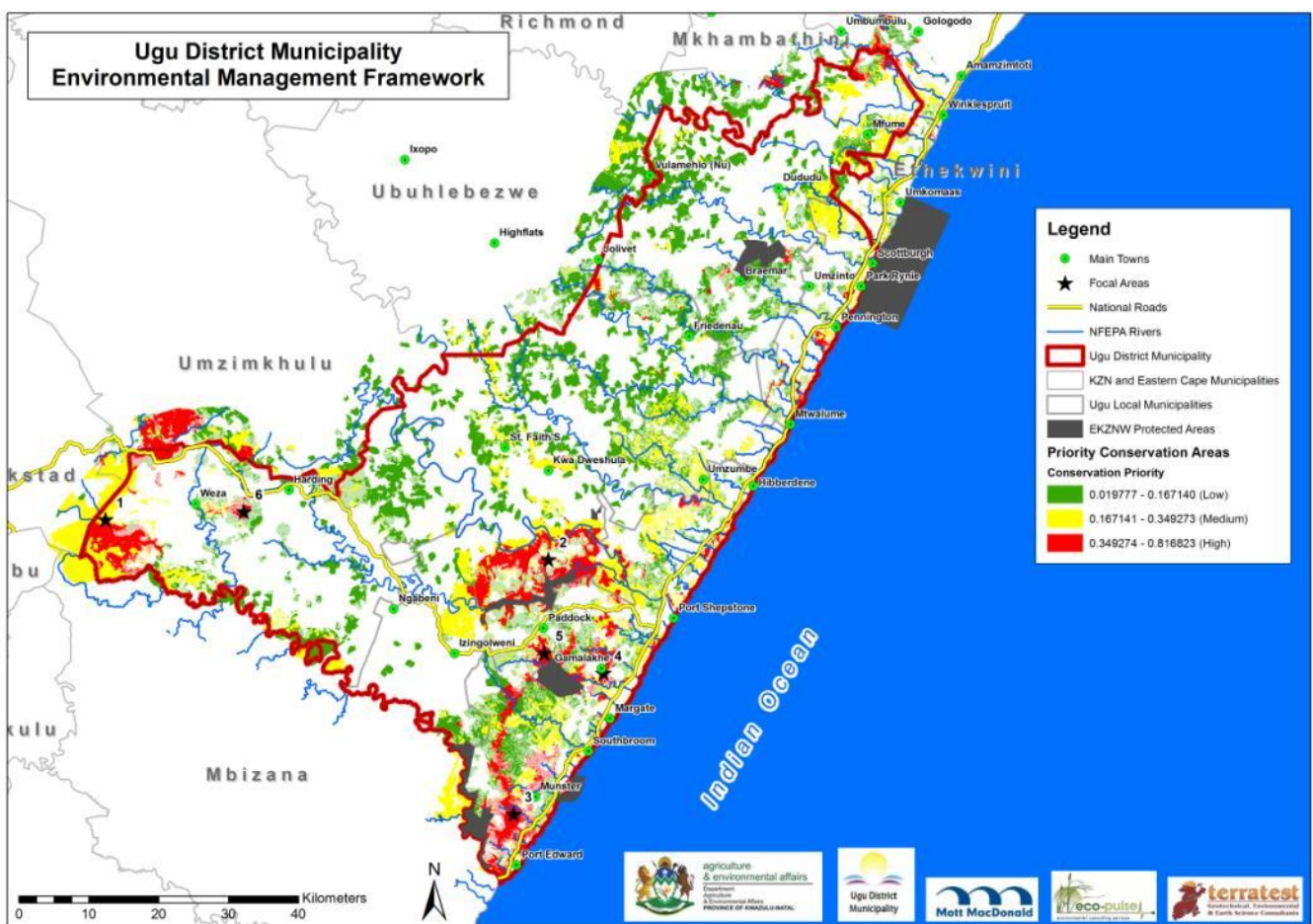


Figure 21. Map indicating the prioritization of terrestrial CBA areas for conservation efforts and specific focal areas identified.

8. KEY ENVIRONMENTAL ISSUES

The current state of biodiversity, as reflected in this report, is a result of a range of driving forces and pressures that have affected the natural environment. In order to understand these aspects, it is useful to first consider current land uses which have contributed towards habitat transformation and the opportunities for further expansion and development of untransformed land. A summary of transformed land classes is illustrated in Figure 22, below.

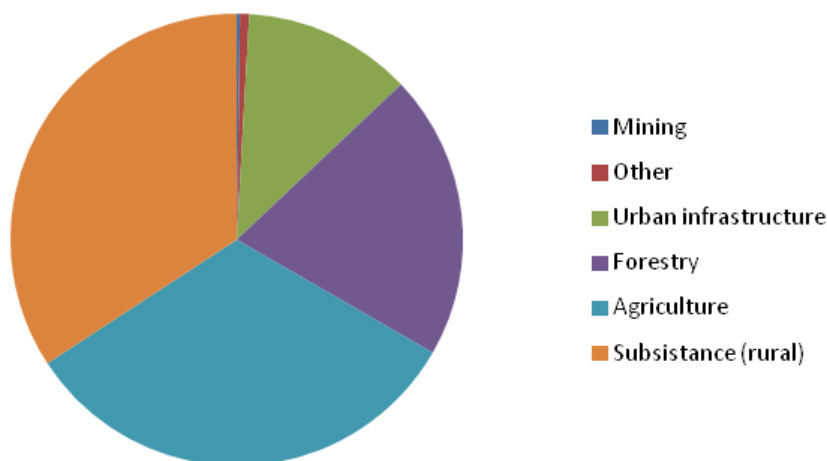


Figure 22. Breakdown of transformation classes in the Ugu District.

This shows that agriculture and forestry have contributed significantly to transformation across the Ugu District. Further opportunities for agricultural expansion in land with moderate to high agricultural potential is very limited however, with most arable areas already under production. Impacts associated with irrigation and runoff from cropping areas will remain an ongoing threat, particularly to downstream water resources. While forestry activities are unlikely to expand further, existing plantations will continue to influence ecosystem function, including changes to hydrology and increased soil erosion.

Subsistence living areas are associated primarily with rural settlements and are typically characterized by active or historic cultivation and heavy grazing pressure. These areas primarily occur on interior land that is under tribal tenure (Ingonyama Trust). The areas are also associated with rural settlements patterns which tend to congregate towards the coast. Subsistence use of land is associated with high levels of poverty, high levels of unemployment, limited access to basic services and a land allocation system that are not yet aligned with local government planning frameworks. It is also associated with a variety of activities that may be a concern to biodiversity. This includes over-exploitation of natural resources for livelihoods (e.g. energy, medicinal plants and animals) and overgrazing by livestock which can cause land degradation through compaction and erosion. Ongoing activities around subsistence living areas are therefore a threat to biodiversity objectives. The uncontrolled expansion of rural settlements is also a concern and it is very likely that the area of land that is used for subsistence will expand in the future. This may become a significant threat if expansion encroaches into CBAs and is not subject to typical town planning and environmental authorization processes.

Urban infrastructure is currently located primarily along the coast and around existing town nodes. High levels of human activity, demand for land and infrastructure development place high demands on the remaining natural areas that fall within this context. Threats of further habitat degradation, particularly of remaining grassland areas are exacerbated by a reduction in fire frequency, which with high levels of alien invasive plants places remaining areas at risk. Socio-economic planning is also focused around existing development nodes (e.g. Provincial Spatial Economic Development Strategy) with priorities including the provision of basic services and infrastructure and refurbishment and expansion of existing infrastructure (with a particular focus along the coastal strip) (KwaZulu-Natal Provincial Government, 2006). Local plans are aligned with regional priorities and are focused on upgrading residential and rural areas across much of the study area (ZAI, Quartex and Fuze, 2011).

Based on an understanding of historic change, observations from field work and a review of a range of reports available for the Ugu District, a breakdown of the key issues affecting biodiversity in the study area is included in Table 16 below.

Table 16. Summary of aspects affecting the status and management of biodiversity within the project area.

Aspect	Comments and observations
<p>Driving forces of environmental change</p>	<p>The main factors driving biodiversity loss within the study area include:</p> <ul style="list-style-type: none"> • Land for economic and social development: Nodes and focal areas for economic intervention have been identified at provincial and local scales. This includes and conflicts with areas critical for biodiversity protection such as the coastal zone which has already been subject to high levels of transformation. The demand for infrastructure upgrading and development will place increased pressure on biodiversity within targeted areas. • Agricultural produce: While most areas of high potential agricultural land have already been transformed, further expansion and intensification will contribute to further biodiversity losses in these areas. Activities are likely to be concentrated particularly in the Port Shepstone – St Faiths – Ixopo corridor which has been identified as a priority corridor for provincial intervention (KwaZulu-Natal Provincial Government, 2006). • Subsistence living areas: Population growth, continued demands for natural resources and limited control of land allocation and associated transformation will continue to drive impacts on biodiversity around rural parts of the district. • Climate change: Changes in rainfall and temperature patterns could have a potentially significant long-term effect on biodiversity. This is likely to be exacerbated in a fragmented landscape where species are unable to respond to changing conditions by migrating to more suitable habitats. • Demand for water: Continued population growth and development is resulting in an increasing demand for water. This will drive increased abstraction and the need for hard infrastructure such as dams to meet demand requirements. • Tourism activities: Continued promotion of tourism in the area poses both risks and challenges. Demand for increased facilities and accommodation are likely to continue to drive development, particularly along the coastal zone. The desire of tourists to be able to experience areas of natural beauty and a clean environment are however positive incentives to protect critical areas and address impacts that detract from tourism value

Aspect	Comments and observations
<p>Pressures on the environment</p>	<p>(e.g. poor water quality).</p> <p>Human activities within the study area have resulted in a number on pressures on biodiversity within the study area. These include:</p> <ul style="list-style-type: none"> • Urban and infrastructure development: The demand for land for development makes untransformed land a natural target for development, particularly within development nodes. This will increase pressure on natural habitat and associated biota. • Alien invasive plants: Disturbance, climate change and the introduction of alien species has contributed to the high levels of alien invasive plants in sections of the study area. This results in habitat transformation with a resultant impact on species composition and linkage between habitats. • Agriculture: Demand for agricultural produce including sugarcane, timber and food crops is likely to place increasing pressure on untransformed land, particularly within priority agricultural nodes and corridors. • Fragmentation: Infrastructure development and degradation of natural habitats reduces the ability of species to move between areas of suitable habitat in the landscape. This reduction in connectivity has a negative effect on the viability of species populations, increasing the likelihood of local extinctions and increasing genetic isolation of existing populations. • Illegal hunting: Hunting with dogs, particularly in areas adjacent to rural settlements is known to have a significant effect on mammal populations. Species such as the oribi are particularly prone to such activities and have already experienced a considerable decline in population numbers. • Burning practices: Burning practices can have a significant impact on biodiversity. This is perhaps most significant for plants, which are unable to respond to changing fire frequencies by moving to different areas. Animal species are also affected by the effect that burning frequency has on the availability of factors such as food and cover availability. In the study area, uncontrolled, annual fires are a threat in areas adjacent to rural settlements. Burning at a time of year which is out of synchrony with the growing and flowering pattern of many species can also have a detrimental effect. In other situations (e.g. along the coast), infrequent burning results in a build-up of dead plant material, which in time results in a loss of fire-dependant species, and typically to bush encroachment and invasion by alien invader plants. • Illegal plant harvesting/collection: The demand for medicinal plants for traditional medicine remains high amongst rural communities. A range of grassland plants and indigenous trees are targeted by medicinal plant collectors. This is a known threat to a number of plant species occurring within the study area. • Poor waste management practices: Industrial pollution, poor waste water management and illegal dumping of waste affect the suitability of habitat for a range of plant and animal species. • Sand winning and quarrying: The demand for building materials has led to significant impacts on both terrestrial and riparian areas. With a growing demand, pressures associated with these areas are likely to increase.
<p>State of the environment</p>	<p>A significant loss of natural habitat and associated biota has occurred within the study area due to the range of historic pressures. Aspects that provide an indication of current state include:</p> <ul style="list-style-type: none"> • Maputaland-Pondoland Albany biodiversity 'hotspot': The importance of the area is

Aspect	Comments and observations
	<p>emphasised by noting the location of the municipality within this 'hotspot' which, despite significant (~70%) transformation, is still recognised for it's unusually high levels of endemism.</p> <ul style="list-style-type: none"> • Status of vegetation types: High levels of transformation in the study area have contributed to five vegetation types being classified as critically endangered and a further three vegetation types being classified as endangered. Together, these vegetation types account for 58% of the study area while 24% of vegetation types are Vulnerable and only 17% classified as least threatened. • Alien invasive plants: Large sections of the Ugu District are affected by alien invasive plant species with highest densities reported to the south and west of the study area. Current and potential future expansion of affected areas poses a significant risk to remaining untransformed areas. • River ecosystems: Most rivers including the two major perennial rivers are reported as being in good condition (A/B class). A number of the smaller rivers are more heavily modified and classified as moderately (C class) to heavily (D class) impacted. While detailed information is lacking for some of the smaller rivers, surrounding land cover suggests that many of these systems are "not intact" including a large number of discrete, short river systems flowing into the Indian Ocean • Wetland ecosystems: An estimated 67% of wetland areas have been subject to transformation, significantly affecting the ecosystem services derived from these resources. While no critically endangered wetland types were identified in the provincial assessment, more than 50% of wetlands fall within an endangered wetland vegetation type. The national assessment paints a worse picture with many wetland vegetation groups classified as critically endangered in the study area. • Estuaries: Estuaries are heavily impacted with only 20% of estuaries in a Good or Excellent condition. Of the remainder, 30% area reportedly in a Poor condition while the remaining 50% are in Fair condition. • Species status: A wide range of threatened species occur in the Ugu District. This includes at least 6 species regarded as critically endangered with a further 22 species that are endangered. • Level of protection: Less than 2% of the study area falls within formally protected areas which is significantly lower than international and national benchmarks. • Management of protected areas: A recent assessment suggests that existing protected areas all fall below the recommended minimum standard with an average management effectiveness score of close to 60%. Some areas are also subject to significant pressures which also threaten to compromise protected area objectives.
<p>Impacts on the environment</p>	<p>A range of impacts to biodiversity are evident in the study area. The following key impacts are worth noting:</p> <ul style="list-style-type: none"> • Transformation: Large areas of the study area have already been transformed through urban and agricultural development. This transformation has resulted in considerable loss of habitat and associated ecosystem goods and services derived from these areas. • Fragmentation: Development has led to the creation of islands of untransformed land within a mosaic of transformed land – this is particularly evident in highly developed agricultural landscapes and near development zones. • Connectivity: Connectivity between areas of natural habitat has declined with increasing levels of transformation. This has been improved to some extent in some forestry areas

Aspect	Comments and observations
	<p>through the withdrawal of timber from riparian areas and wetlands.</p> <ul style="list-style-type: none"> • Drainage of wetlands: Sugarcane cultivation has resulted in widespread drainage and transformation of wetland areas. Such impacts are also evident in rural and peri-urban areas where wetland areas are targeted for food production or drained to reduce flooding risks. Such activities have significantly undermined the ability of wetlands to provide a range of ecological goods and services such as flood attenuation, sediment trapping and water quality enhancement. • Water quality: A range of activities have had a negative impact on water quality with associated impacts to water resources as reflected by the poor condition of some rivers and a large proportion of estuaries in the study area. • Stream flows: Plantation forestry has had a considerable impact on river flows in upper catchment areas whilst water for irrigation and domestic supply also reduce water availability. Urban development and land degradation has also increased flooding risks with associated impacts to aquatic resources and human infrastructure. • Weed infestation: This is a common problem in the study area, with a range of alien invasive plants replacing natural vegetation. • Fire management: Poor fire management has led to a reduction in grassland condition in large areas within the study area.
<p>Responses needed</p>	<p>Based on an understanding of the status quo and drivers and pressures and the affect on the environment, the following responses are regarded as critical in order to better manage biodiversity within the study area:</p> <p>Integrating biodiversity into municipal and development planning:</p> <p>It is critical that information on biodiversity priorities be clearly communicated to key stakeholders in order to improve decision making. A range of actions are necessary to address this issue:</p> <ul style="list-style-type: none"> • Active marketing of the BSP and EMF and interaction with municipalities and key sectors (e.g. agriculture) is required in order to facilitate it's uptake into relevant planning processes. • BSP and EMF information should be widely disseminated to inform development planning. • Inclusion of CBA areas in Listing Notice 3 by designating CBA areas as sensitive / geographic areas. • Alignment of zonation plans with land-use compatibility guidelines included in the BSP. • Development of local Bye-laws to promote appropriate environmental screening and planning of new developments in sensitive areas. <p>Protection and management of critical biodiversity areas:</p> <p>Given the critical levels of transformation in the District and pressures on remaining land, efforts are urgently required to secure and manage critical biodiversity areas. The following responses are recommended in this regards:</p> <ul style="list-style-type: none"> • Improved management of existing protected areas by addressing shortfalls identified in the METT assessments. • Implementation of biodiversity stewardship initiatives in priority areas under private or communal ownership (See focal areas identified). While EKZNW is driving this programme, the CEPF partnership fund provides a potential opportunity for NGOs to secure funding to initiate stewardship activities within priority areas. • Work closely with the traditional authorities, the Nkonyama Trust Board, and other

Aspect	Comments and observations
	<p>supportive government departments to find ways to integrate biodiversity conservation into decision making (e.g. land allocation) within traditional areas.</p> <ul style="list-style-type: none"> • Support species-led programs to protect threatened species (e.g. cranes, blue swallows, and oribi). • Biodiversity offsets should also be considered as a means to secure conservation of priority areas, particularly along the coastal zone. • Development of a Metropolitan Open Space System (MOSS), particularly within development nodes along the coast could provide additional opportunities to provide some level of protection to remaining priority areas and should be explored. • Actively encourage Working on Fire teams to assist in burning of priority grassland areas within CBA areas. • Improved Law enforcement, particularly in the case of illegal activities. <p>Rehabilitation of degraded areas:</p> <p>While degraded areas are not necessarily areas of highest biodiversity value, they often pose a threat to critical biodiversity areas. A range of actions can support rehabilitation efforts including:</p> <ul style="list-style-type: none"> • Prepare and implement an invasive plant species monitoring, control and strategic eradication plan on Municipal land. • Support and promote broader strategic alien invasive plant clearing in conjunction with local landowners and Working for Water. • Implementation of Land Care initiatives aimed at rehabilitating degraded lands to either be productive for agricultural use or enhancing their biodiversity value. • Addressing coastal management concerns through Working for the Coast initiatives. • Capacity building and empowerment, particularly in rural areas where overgrazing is a concern. <p>Protection of water resources:</p> <p>Water resources provide critical ecosystem goods and services which are likely to increase in importance as population pressure increases and climate change affects local rainfall patterns. Recommended responses include:</p> <ul style="list-style-type: none"> • Rehabilitation of wetlands should be actively encouraged⁴⁹ and opportunities to initiate a new Working for Wetland (or similar) project in the area should be explored. • Future developments should be excluded from flood lines and designed to minimize potential impacts to water resources through appropriate mitigation measures (e.g. establishment of suitable buffer zones). • Storm water management should be integrated into existing and future development designs in order to prevent further flood risks and impacts to aquatic resources. • Industrial and waste discharges should be closely monitored. • Efforts to reduce impacts of waste water works on water resources should be prioritized. • Increased municipal engagement with Catchment Management Fora. <p>Coastline management:</p> <p>Given the importance of the coastline for both biodiversity and tourism, it is critical that appropriate strategies are implemented to safeguard this resource. These include:</p>

⁴⁹ In the case of new developments, opportunities to actively improve the functioning of wetlands should be explored and implemented where possible.

Aspect	Comments and observations
	<ul style="list-style-type: none"> • Develop and implement a municipal coastal management programme and monitoring forum for managing the coastal zone within the municipality. • Development and implementation of estuary management plans is required. • Managing sand mining operations within sustainable limits to avoid unacceptable reductions in sediment inputs to rivers, estuaries and the marine environment.

9. MONITORING INDICATORS

Monitoring indicators can be useful tools to track the effectiveness of efforts made to address biodiversity priorities and to track trends in the status of biodiversity. A list of potential monitoring indicators relevant at a district level have therefore been proposed here and could be used to track progress made towards meeting biodiversity objectives (Table 17). Such indicators would ideally be included in district level reporting (e.g. state of the environment reporting).

Table 17. List of indicators considered, highlighting those regarded as most appropriate for monitoring at the district level. Indicators already reported on in this report are highlighted in green.

Aspect	Indicator	Priority
Protected areas	Area (hectares) and % of district under 'formal protected area' status	High
	Management effectiveness of formally protected areas within the district	High
	Number and area of new formally protected areas secured (this reporting period)	Medium
	Area (hectares) and % of district under 'local protected area' status (e.g. MOSS, municipal park, recreational areas etc)	Medium
	% of municipal budgets allocated to the provision of and maintenance of municipal parks and recreation areas	Medium
	Number of Municipal employees responsible for environmental management and enforcement	Low
Ecosystem status	Area (hectares) and threat status of vegetation types remaining within the district	High
	Level of transformation (%) of each vegetation type	High
	Condition of rivers within the district	High
	Condition of wetlands within the district	High
	Condition of estuaries within the district	High
Species status	Threatened and extinct species per taxonomic group	High
	Population trends of selected species (e.g. oribi, cranes)	Medium
	Endemic Species per taxonomic group	Low
Rehabilitation of degraded areas	Levels of infestation of alien invasive plants across the district	High
	Number of Working for Water projects active in the district/coverage	Medium
	Area of invasive alien plants cleared by Working for Water (this reporting period)	Medium
	Average annual budget spent by Working for Water on alien plant control	Medium
	Number of local municipalities with a formal Invasive Species Monitoring, Control and Eradication Plan	Medium
	Area of invasive alien plants cleared by municipal programs (this reporting period)	Medium

Aspect	Indicator	Priority
	Number of Land Care projects active in the district/coverage	Medium
	Number of Working on Fire teams deployed in the district/coverage	Medium
	Number of Working on the Coast initiatives in the district/coverage	Low
Protection of water resources	Number and area of wetlands being rehabilitated by Working for Wetlands projects in the study area	Medium
	Status of Waste Water Treatment Works (Blue drop report)	High
	Number and % of estuaries with estuary management plans	High

10. CONCLUSION

This report clearly sets out the legal context of biodiversity within the study area and highlights the important role that the municipality and other supporting stakeholders have to ensure that societies basic rights to an environment which is not harmful to their health or well-being and to have the environment protected for the benefit of present and future generations are upheld.

The status quo presented in this report shows that historic levels of transformation and land use have resulted in dramatic impacts to the environment, particularly along the coastal zone and higher rainfall areas. As a consequence, levels of transformation are such that a large number of ecosystems are now endangered or critically endangered and stand out as amongst the most critical areas in the country for biodiversity protection. This has significantly compromised ecological infrastructure and the goods and services available to society, which will significantly affect our ability to adapt and respond to global pressures such as climate change and water quality deterioration. This has also resulted in widespread species declines, with species such as the Blue Swallow (*Hirundo atrocaerulea*) now on the verge of extinction.

Unfortunately, efforts to protect and manage biodiversity in the region are falling far short of the mark. Less than 2% of the land surface is formally protected, and even within these areas the management effectiveness thereof is below par. While opportunities for protection and improved management still remain, drivers such as social and economic develop, agricultural expansion, alien invasive plants and deteriorating water quality will continue to erode the remaining environmental assets.

There is therefore a critical and obvious need to take steps to expand the protected areas network in order to secure areas critical for biodiversity conservation. Some focal areas to inform such actions have been highlighted in this report and should be used to inform conservation efforts. Implementation is however likely to require some innovative thinking and targeted funding and investment, given the high cost and demand for land, particularly along the coastal zone.

A range of other responses have been proposed, including the urgent need to integrate biodiversity into strategic planning. This is not going to be an easy process however as biodiversity imperatives effectively stand in the way of economic and social development aspirations. Constructive engagements between sectors and

well-informed trade-offs are therefore going to be required in order to strike a balance between societal needs and environmental objectives in the study area.

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Note: References for GIS Coverages cited as footnotes in the document are detailed in Annexure 4.

12. ANNEXURES

Annexure 1. Detailed outline of legislation relating to biodiversity conservation

1. International

1.1. Convention on Biological Diversity

The Convention on Biological Diversity (CBD) is an international treaty which provides a holistic approach to the conservation and sustainable use of biological diversity. The CBD was signed by over 150 nations at the Rio Summit in 1992 and came into force on 29 December 1993. South Africa ratified the agreement on 2 November 1995. The convention has three main objectives:

- To conserve biological diversity
- The use biological diversity in a sustainable fashion
- To share the benefits of biological diversity fairly and equitably

The Convention sets out general measures for conservation and sustainable use of biodiversity (Article 6) and also details requirements for both in-situ (Article 8) and ex-situ (Article 9) conservation. While important elements of this convention have now been entrenched in national legislation, key sections of this convention highlight foundational principles for the protection and sustainable use of terrestrial biodiversity that are equally applicable at the national and local scale.

Key sections	Section number	Administering Authority	Other relevant stakeholders	Implications for development
Measures for conservation and sustainable use of biodiversity: Develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity or adapt for this purpose existing strategies, plans or programmes which shall reflect, inter alia, the measures set out in this Convention relevant to the Contracting	Article 6	• DEA	<ul style="list-style-type: none"> • SANBI • Ezemvelo KZN Wildlife 	Municipalities should be aware of the Convention on Biodiversity however the National Environmental Management: Biodiversity Act No 10 of 2004 gives effect to the key sections

Key sections	Section number	Administering Authority	Other relevant stakeholders	Implications for development
Party concerned				contained in the CBD.
Identification and monitoring: Identify components of biological diversity important for its conservation and sustainable use and monitor, through sampling and other techniques, these components of biological diversity.	Article 7	• DEA	<ul style="list-style-type: none"> • SANBI • Ezemvelo KZN Wildlife • SAEON • NGOs 	
In-situ conservation: Establish a system of protected areas or areas where special measures need to be taken to conserve biological diversity.	Article 8	• DEA	<ul style="list-style-type: none"> • Ezemvelo KZN Wildlife • SANBI 	
Ex-situ conservation: Adopt measures for the ex-situ conservation of components of biological diversity	Article 9	• DEA	<ul style="list-style-type: none"> • Ezemvelo KZN Wildlife • SANBI 	
Sustainable use of biological diversity: Integrate consideration of the conservation and sustainable use of biological resources into national decision-making	Article 10	• DEA	<ul style="list-style-type: none"> • Ezemvelo KZN Wildlife • SANBI 	
Incentive measures: Adopt economically and socially sound measures that act as incentives for the conservation and sustainable use of components of biological diversity.	Article 11	• DEA	<ul style="list-style-type: none"> • Ezemvelo KZN Wildlife • SANBI • Ministry of Finance 	
Research and Training: Establish and maintain programmes for scientific and technical education and training in measures for the identification, conservation and sustainable use of biological diversity and its components and provide support for such education and training for the specific needs of developing countries	Article 12	• DEA	<ul style="list-style-type: none"> • Ezemvelo KZN Wildlife • SANBI • NGOs e.g. WESSA • Universities 	
Public Education and Awareness: Promote and encourage understanding of the importance of, and the measures required for, the conservation of biological diversity, as well as its propagation through media, and the inclusion of these topics in educational programmes.	Article 13	• DEA	<ul style="list-style-type: none"> • Ezemvelo KZN Wildlife • SANBI • NGO's e.g. WESSA, EWT • Universities 	
Impact Assessment and Minimizing Adverse Impacts: Introduce appropriate procedures requiring environmental impact assessment of its proposed projects that are likely to have significant	Article 14	• DEA	<ul style="list-style-type: none"> • Provincial environment departments e.g. DAEA • Ezemvelo KZN Wildlife 	

Key sections	Section number	Administering Authority	Other relevant stakeholders	Implications for development
adverse effects on biological diversity with a view to avoiding or minimizing such effects and, where appropriate, allow for public participation in such procedures				
Access to Genetic Resources: Each Contracting Party shall endeavour to create conditions to facilitate access to genetic resources for environmentally sound uses by other Contracting Parties and not to impose restrictions that run counter to the objectives of this Convention	Article 15	<ul style="list-style-type: none"> DEA 	<ul style="list-style-type: none"> Ezemvelo KZN Wildlife SANBI 	
Access to and Transfer of Technology Provide and facilitate access to and transfer of technology	Article 16	<ul style="list-style-type: none"> DEA 	<ul style="list-style-type: none"> Ezemvelo KZN Wildlife SANBI 	

1.2. The Convention on Wetlands of International Importance, especially as Waterfowl Habitat

The Convention on Wetlands of International Importance, called the Ramsar Convention, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. The broad Ramsar Convention requirements are namely: the maintenance of the ecological character of listed Ramsar wetland sites, the wise use of all wetlands, the establishment of nature reserves at wetlands and international cooperation where appropriate to the management of the site. At the centre of the Ramsar philosophy is the “wise use” concept which is at its heart the conservation and sustainable use of wetlands and their resources, for the benefit of humankind (Ramsar, 1971). As a signatory to the convention, South Africa is required to formulate and implement their planning so as to promote the conservation and wise use of wetlands, including those designated as Ramsar sites. Although there are currently no designated Ramsar sites in the study area, local initiatives within the study area can contribute towards achieving some of the goals set by the convention.

Key sections	Section number	Administering Authority	Other relevant stakeholders	Implications for development
Each Contracting Party shall designate suitable wetlands within its territory for inclusion in a List of Wetlands of International Importance	Article 2(1)	<ul style="list-style-type: none"> DEA 	<ul style="list-style-type: none"> Working for Wetlands Provincial conservation agencies SANBI 	Municipalities should be aware of the Ramsar convention and their obligations with regards to any listed

Key sections	Section number	Administering Authority	Other relevant stakeholders	Implications for development
			<ul style="list-style-type: none"> DWA 	wetlands in their area.
The Contracting Parties shall formulate and implement their planning so as to promote the conservation of the wetlands included in the List, and as far as possible the wise use of wetlands in their territory.	Article 3(1)	<ul style="list-style-type: none"> DEA 	<ul style="list-style-type: none"> Working for Wetlands Provincial conservation agencies Municipalities DWA 	
Each Contracting Party shall promote the conservation of wetlands and waterfowl by establishing nature reserves on wetlands, whether they are included in the List or not, and provide adequately for their wardening.	Article 4(1)	<ul style="list-style-type: none"> DEA 	<ul style="list-style-type: none"> Working for Wetlands Provincial conservation agencies Municipalities DWA 	Municipalities should identify important wetlands within their jurisdiction and promote the conservation of these wetlands.
The Contracting Parties shall encourage research and the exchange of data and publications regarding wetlands and their flora and fauna.	Article 4(2)	<ul style="list-style-type: none"> DEA 	<ul style="list-style-type: none"> Working for Wetlands Provincial conservation agencies Municipalities NGOs & Universities DWA 	If a municipality commissions any work regarding wetlands in their area, this information should be sent to SANBI for inclusion on the national wetlands database in the interests of upholding this section of the Ramsar convention.
<p>There shall be established a Conference of the Contracting Parties to review and promote the implementation of this Convention.</p> <p>The Contracting Parties shall ensure that those responsible at all levels for wetlands management shall be informed of, and take into consideration, recommendations of such Conferences concerning the conservation, management and wise use of wetlands and their flora and fauna.</p>	<p>Article 6(1)</p> <p>Article 6(3)</p>	<ul style="list-style-type: none"> DEA 	<ul style="list-style-type: none"> Working for Wetlands DWA 	Municipalities should ensure that staff responsible for environmental (wetland) management, contact the relevant DEAT representative to facilitate the transfer of any information arising out of environmental conferences.

1.3. United Nations Convention to Combat Desertification

The United Nations Convention to combat desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa was adopted in Paris in 1994 and came into force on 26 December 1996. South Africa ratified the Convention on 30 September 1997. The Convention aims to combat desertification and mitigate the effects of droughts through national action programmes and supportive international partnerships. While this convention is not directly relevant to activities in the study area, any initiatives supporting conservation and sound management of land resources will effectively contribute towards the aim of this convention.

Key sections	Section number	Administering Authority	Other relevant stakeholders	Implications for development
Achieving this objective will involve long-term integrated strategies that focus simultaneously, in affected areas, on improved productivity of land, and the rehabilitation, conservation and sustainable management of land and water resources, leading to improved living conditions, in particular at the community level.	Article 2(2)	<ul style="list-style-type: none"> DEA 	<ul style="list-style-type: none"> DAFF Provincial Agricultural and Environment Departments DWA Working for Water Municipalities 	South Africa has responded to the UN Convention to Combat Desertification by developing a National Action Plan. The aim of the NAP is to implement at current and future policies that affect natural resource management and rural development, and establish partnerships between government departments, overseas development agencies, the private sector and NGOs. Municipalities should take cognizance of the NAP when developing their various planning instruments including EMFs and IDPs.
In preparing and implementing national action programmes, the affected country Parties of the region may consider conservation and sustainable use of biodiversity in accordance with the provisions of the Convention on Biological Diversity	Article 4(j)	<ul style="list-style-type: none"> DEA 	<ul style="list-style-type: none"> DAFF Provincial Agricultural and Environment Departments DWA Working for Water Municipalities 	
Affected country Parties of the region may include, in their national action programmes, measures relating to land use patterns, management of water resources, soil conservation, forestry, agricultural activities and pasture and range management, management and conservation of wildlife and other forms of biological diversity	Article 6(b&c)	<ul style="list-style-type: none"> DEA 	<ul style="list-style-type: none"> DAFF Provincial Agricultural and Environment Departments DWA Working for Water Municipalities 	
National action programmes shall also include measures to conserve natural resources ensuring integrated and sustainable management of natural resources, including vegetation cover and wildlife, forests, water	Article 8(3)(b)(i)	<ul style="list-style-type: none"> DEA 	<ul style="list-style-type: none"> DAFF Provincial Agricultural and Environment Departments DWA 	

Key sections	Section number	Administering Authority	Other relevant stakeholders	Implications for development
resources and biological diversity.			<ul style="list-style-type: none"> Working for Water Municipalities 	

1.4. New Partnership for Africa’s Development (NEPAD)

The New Partnership for Africa's Development (NEPAD) is an overarching vision and policy framework for the African Union. It was adopted by the Heads of State and Government Implementation Committee established at the Organization of African Unity (OAU) Summit in Lusaka, Zambia, in July 2001. NEPAD's three main long term objectives are to eradicate poverty, accelerate growth and stop the marginalization of Africa in the globalization process. NEPAD identifies eight priority areas including political, economic and corporate governance; agriculture; infrastructure; education; health; science and technology; market access and tourism; and environment. The Action Plan of the Environment Initiative provides an environmental policy framework for addressing environmental issues in Africa and is organised in clusters of programmatic areas covering the following priority sectors:

- Combating land degradation, drought and desertification
- Conserving Africa's Wetlands
- Preventing, Control and Management of Invasive Alien Species
- Conservation and sustainable use of marine, coastal and freshwater resources
- Combating Climate Change in Africa
- Cross-Border Conservation or Management of Natural Resources

Biodiversity is considered within all of these programmes with the overall objective of promoting the sustainable use of Africa natural resources; strengthening public and political support to sub-regional and regional environmental initiatives.

1.5. The World Summit on Sustainable Development (WSSD)

The World Summit on Sustainable Development or Earth Summit took place in Johannesburg in 2002. The main outcomes of the Summit were the Johannesburg Declaration and the Johannesburg Plan of Implementation which was laid out as an action plan. The Implementation Plan asserts that "poverty eradication, changing unsustainable patterns of production and consumption and protecting and managing the natural resource base of economic and social development are overarching objectives of, and essential requirements for, sustainable development". Although aspects of biodiversity are incorporated throughout the Implementation Plan, Section 44 specifically addresses biodiversity issues and is presented in some detail, together with other relevant sections in the table below.

Key sections	Section number	Administering Authority	Other relevant stakeholders	Implications for development
Implement programmes to address, where appropriate, deforestation, erosion, land degradation, loss of biodiversity, disruption of water flows and retreat of glaciers;	42(b)	<ul style="list-style-type: none"> DEA 	<ul style="list-style-type: none"> SANBI Ezemvelo KZN Wildlife Provincial environment and agriculture departments e.g. DAEA DWA Municipalities 	Municipalities should be aware of the WSSD Implementation Plan although the responsibility thereof lies with DEA. Many provisions contained in national legislation will contribute to the overall implementation of the plan and compliance with legislation at all levels will assist in achieving the objectives of this plan.
<p>The Convention on Biological Diversity is the key instrument for the conservation and sustainable use of biological diversity and the fair and equitable sharing of benefits arising from use of genetic resources. A more efficient and coherent implementation of the three objectives of the Convention and the achievement by 2010 of a significant reduction in the current rate of loss of biological diversity will require the provision of new and additional financial and technical resources to developing countries, and includes actions at all levels to:</p> <ul style="list-style-type: none"> Integrate the objectives of the Convention into global, regional and national sectoral and cross-sectoral programmes and policies Promote the ongoing work under the Convention Encourage effective synergies between the Convention and other multilateral environmental agreements Implement the Convention and its provisions Promote the wide implementation and further development of the 	44	<ul style="list-style-type: none"> DEA 	<ul style="list-style-type: none"> SANBI Ezemvelo KZN Wildlife Provincial environment and agriculture departments e.g. DAEA DWA Municipalities 	

Key sections	Section number	Administering Authority	Other relevant stakeholders	Implications for development
<p>ecosystem approach</p> <ul style="list-style-type: none"> • Promote concrete international support and partnership for the conservation and sustainable use of biodiversity • To effectively conserve and sustainably use biodiversity • Provide financial and technical support to developing countries to enhance indigenous and community-based biodiversity conservation efforts • Strengthen national, regional and international efforts to control invasive alien species • Recognize the rights of local and indigenous communities who are holders of traditional knowledge, innovations and practices • Encourage and enable all stake holders to contribute to the implementation of the objectives of the Convention • Promote the effective participation of indigenous and local communities in decision and policy -making concerning the use of their traditional knowledge • Encourage technical and financial support to developing countries to develop and implement national sui generis systems and traditional systems • Promote the wide implementation of and continued work on the Bonn Guidelines on Access to Genetic Resources • Negotiate an international regime to promote and safeguard the fair and equitable sharing of benefits arising out of the utilization of genetic resources • Encourage successful conclusion of existing processes under the auspices of the Intergovernmental Committee on Intellectual Property and Genetic Resources • Promote practicable measures for access to the results and benefits arising from biotechnologies based upon genetic resources • Promote discussions with regard to the relationships between the Convention and agreements related to international trade and intellectual property rights • Promote the implementation of the programme of work of the Global Taxonomy Initiative • Invite all States that have not already done so to ratify the Convention, the Cartagena Protocol on Biosafety to the Convention 33 and other 				

Key sections	Section number	Administering Authority	Other relevant stakeholders	Implications for development
biodiversity - related agreements				
Facilitate and coordinate the implementation of sustainable forest management at the national, regional and global levels, thus contributing, inter alia, to the conservation and sustainable use of forest biodiversity	45(b)	<ul style="list-style-type: none"> DEA 	<ul style="list-style-type: none"> DWA Ezemvelo KZN Wildlife SANBI Provincial environmental agencies 	
Support the conservation of Africa's biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources	70(e)	<ul style="list-style-type: none"> DEA 	<ul style="list-style-type: none"> SANBI Ezemvelo KZN Wildlife 	

1.6. Agenda 21

Agenda 21 is an action plan that provides a framework for implementing sustainable development. The document comprises some 40 chapters which each set out a "basis for action", "objectives" and specific "activities". It includes chapters on issues such as environmental degradation and poverty (Glazewski, 2000). Chapter 28 of Agenda 21 calls upon local authorities to develop and implement a local plan for sustainability – a Local Agenda 21. South Africa has been particularly active in implementing Local Agenda 21. Key sections of the action plan are highlighted in the table below and highlight some of the key challenges for sustainable development.

Key sections	Section number	Administering Authority	Other relevant stakeholders	Implications for development
Population and Sustainability: Growing populations and unsustainable living is placing increasing pressure on natural resources.	Chapter 5	<ul style="list-style-type: none"> DEA 	<ul style="list-style-type: none"> Municipalities Ezemvelo KZN Wildlife Provincial environmental departments NGOs Provincial agricultural departments ORI 	Agenda 21 is given effect through local plans for sustainability. Municipalities should be aware of the objectives covered in this policy document and ensure that they are addressed in their local planning instruments.
Managing land sustainably: This chapter addresses finding more effective ways of using land and natural resources	Chapter 10			
Sustainable mountain development: Mountains are important storehouses of biodiversity and impact the lives of half the world's population.	Chapter 13			
Conservation of biological diversity: Ecosystem services are identified as	Chapter 15			

Key sections	Section number	Administering Authority	Other relevant stakeholders	Implications for development
important to human survival on the planet. The decline in biodiversity is recognized as a serious threat to human survival.				

2. National

2.1. South African Constitution 108 of 1996

The Constitution of South Africa was approved by the Constitutional Court on 4 December 1996 and took effect on 4 February 1997. It is the supreme law of the land and includes the Bill of rights which is the cornerstone of democracy in South Africa and enshrines the rights of people in the country. It is important from an environmental perspective not only because it includes the environmental right, but also because it sets out the administrative framework and prescribes the functions with which national, provincial and local spheres of government are tasked.

Key sections	Section number	Administering Authority	Other relevant stakeholders	Implications for development
Everyone has the right to an environment which is not harmful to their health or well-being and to have the environment protected for the benefit of present and future generations through reasonable legislative and other measures that: <ul style="list-style-type: none"> • prevent pollution and ecological degradation • promote conservation • secure ecologically sustainable development and use of natural resources, while promoting justifiable economic and social development. 	24	<ul style="list-style-type: none"> • DEA 	<ul style="list-style-type: none"> • All government departments • Private sector • Individuals 	Municipalities must ensure that the environmental right is upheld in their area of jurisdiction and that no activities that they undertake or manage infringe on this right.
A municipality must structure and manage its administration and budgeting and planning processes to give priority to the basic needs of the community, and to promote the social and economic development of the	153	<ul style="list-style-type: none"> • DEA 	<ul style="list-style-type: none"> • Municipalities 	Municipalities must ensure that their structures and processes are designed to prioritize basic human needs and

Key sections	Section number	Administering Authority	Other relevant stakeholders	Implications for development
community; and participate in national and provincial development programmes				social and economic development.
Concurrent legislative competence to national and provincial government for most functions relevant to the environment. With the exception of "national parks, national botanical gardens and marine resources" (which are exclusively a national competence) both national and provincial spheres of government have designated authority to administer laws and create mechanisms which promote and regulate the environment.	Schedule 4 and 5	<ul style="list-style-type: none"> • DEA 	<ul style="list-style-type: none"> • National government departments • Provincial government departments 	Although municipalities are not afforded legislative competence with respect to the environment, they should ensure that any activities which they undertake meet the requirements set out by national and provincial government in this regard.

2.2. National Environmental Management Act 107 of 1998

The National Environmental Management Act (NEMA) was passed in November 1998 and came into force in January 1999. The Act includes a set of environmental principles which further concretise the environmental right contained in the Constitution. The 18 Principles and 8 sub-principles address a wide range of aspects and apply to all organs of state including local government. This includes the need to minimize disturbance of ecosystems and loss of biological diversity and to pay particular attention to sensitive, vulnerable, highly dynamic or stressed ecosystems in management and planning procedures.

Key sections	Section number	Administering Authority	Other relevant stakeholders	Implications for development
Development must be socially, environmentally and economically sustainable	2(3)	<ul style="list-style-type: none"> • DEA 	<ul style="list-style-type: none"> • All organs of state • Public 	Development planning must take environmental matters into consideration. Any individual developments must also uphold the principles set out in NEMA.
That the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and	2(4)(a)(i)	<ul style="list-style-type: none"> • DEA 	<ul style="list-style-type: none"> • All organs of state • Public 	

Key sections	Section number	Administering Authority	Other relevant stakeholders	Implications for development
remedied				
That the use and exploitation of non-renewable natural resources is responsible and equitable, and takes into account the consequences of the depletion of the resource;	2(4)(a)(v)	<ul style="list-style-type: none"> DEA 	<ul style="list-style-type: none"> All organs of state Public 	
That negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented are minimised and remedied.	2(4)(a)(viii)	<ul style="list-style-type: none"> DEA 	<ul style="list-style-type: none"> All organs of state Public 	
The environment is held in public trust for the people. the beneficial use of environmental resources must serve the public interest and the environment must be protected as the people's common heritage	2(4)(o)	<ul style="list-style-type: none"> DEA 	<ul style="list-style-type: none"> All organs of state Public 	
Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure.	2(4)(r)	<ul style="list-style-type: none"> DEA 	<ul style="list-style-type: none"> All organs of state Public 	
Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment.	28(1)	<ul style="list-style-type: none"> DEA 	<ul style="list-style-type: none"> Landowners Municipalities Ezemvelo KZN Wildlife Provincial environmental departments 	NEMA imposes 'duty of care' on all landowners, including municipalities, to ensure that the environment is not polluted or degraded in any way.
Every person is entitled to have access to information held by the State and organs of state which relates to the implementation of this Act and any other law affecting the environment and to the state of the environment and actual and future threats to the environment, including any emissions to water, air or soil and the production. Handling,	31(1)(a)	<ul style="list-style-type: none"> DEA 	<ul style="list-style-type: none"> All organs of state Public NGOs 	All people have the right to information. This means that municipalities are able to access environmental information held by other state departments but equally

Key sections	Section number	Administering Authority	Other relevant stakeholders	Implications for development
transportation, treatment, storage and disposal of hazardous waste and substances;				that anyone may access environmental information held by the local municipality.
Notwithstanding the provisions of any other law, no person is civilly or criminally liable or may be dismissed, disciplined prejudiced or harassed on account of having disclosed any information, if the person in good faith reasonably believed at the time of the disclosure that he or she was disclosing evidence of an environmental risk and the disclosure was made in accordance with subsection (5)	31(4)	<ul style="list-style-type: none"> DEA 	<ul style="list-style-type: none"> Public NGOs Ezemvelo KZN Wildlife Municipalities 	NEMA protects whistleblowers.
Any person or group of persons may seek appropriate relief in respect of any breach or threatened breach of any provision of this Act	32(1)	<ul style="list-style-type: none"> DEA 	<ul style="list-style-type: none"> Public NGOs Ezemvelo KZN Wildlife Municipalities 	Legal standing is extended to almost any person, including municipalities in the interests of protecting the environment.
The Minister and every MEC and municipality, may enter into environmental management co-operation agreements with any person or community for the purpose of promoting compliance with the principles laid down in this Act.	35(1)	<ul style="list-style-type: none"> DEA 	<ul style="list-style-type: none"> Provincial environment departments Ezemvelo KZN Wildlife Municipalities Landowners Public 	Municipalities may enter into an environmental management co-operation agreement with any person for the purpose of promoting the environmental principles set out in NEMA.

Other regulations under NEMA

Chapter 5 of NEMA addresses integrated environmental management and requires that any activities which may significantly affect the environment must be considered, investigated and assessed and obtain authorization from the competent authority (in KwaZulu-Natal this may either be DAEA or DEA) prior to implementation. Environmental Impact Assessment (EIA) regulations were promulgated in terms of Chapter 5 of NEMA and were published on 19 April 2006 in Government Notice No. R. 385.

The regulations included two schedules. Schedule 1 lists activities which are subject to a basic environmental assessment (BEA). Activities listed under Schedule 2 are automatically subject to environmental scoping and impact assessment. The regulations have subsequently been amended in 2010 through Government Notice R.543 in Government Gazette 33306 of 18 June 2010. The new Environmental Impact Assessment (EIA) regulations came into effect on 2 August 2010 and seek to streamline the EIA process. It also introduces an approach where impacts associated with the sensitivity of the receiving environment are treated with more care – this is achieved through the introduction of a listing notice dedicated to activities planned for predefined sensitive areas.

Listing notice one (1) stipulates the activities requiring a basic assessment report (BAR). These are typically activities that have the potential to impact negatively on the environment but due to the nature and scale of such activities, these impacts are generally known. Listing notice two (2) identifies the activities requiring both scoping and an Environmental Impact Report (EIR) these are typically large scale or highly polluting activities and the full range of potential impacts need to be established through a scoping exercise prior to it being assessed.

Listing notice three (3) contains activities that will only require an environmental authorisation through a basic assessment process if the activity is undertaken in one of the specified geographical areas indicated in that listing notice. Geographical areas differ from province to province. These sensitive/geographic areas were identified and published for each of the nine (9) Provinces. In KwaZulu-Natal (KZN) the Critical Biodiversity Areas (CBA) being identified through the Biodiversity Sector Planning process (Macfarlane *et. al.*, 2013a) is one of the sensitive layers against which several activities are listed, and which would require environmental authorisation if the project falls within the CBA identified areas. This KZN CBA layer, is at this time, not being utilised in the LN3, however it is intended that the KZN Critical Biodiversity Areas be presented to the MEC of the Department of Agriculture, Environment Affairs and Rural Development for future adoption and utilisation as a geographic area

New Environmental Management Framework Regulations were also published in Government Notice R.547 Government Gazette 33306 of 18 June 2010. Rather than forming part of the EIA regulations, the amendment to the Act now recognizes EMFs as an environmental instrument in its own right as reflected by these standalone EMF regulations.

2.3. National Environmental Management: Biodiversity Act No 10 of 2004

The Biodiversity Act provides for the management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act. The Act appoints the State as the trustee of South Africa's biodiversity and binds all national, provincial and local spheres of government. The Act also establishes the South African Biodiversity Institute (SANBI).

Key sections	Section number	Administering Authority	Other relevant stakeholders	Implications for development
The Minister may, by notice in the Gazette- a) issue norms and standards for the achievement of any of the objectives of this Act, including for the- (i) management and conservation of South Africa's biological diversity and its components; (ii) restriction of activities which impact on biodiversity and its components	9(1)(a)	<ul style="list-style-type: none"> DEA 	<ul style="list-style-type: none"> Provincial conservation authorities Municipalities 	Municipalities will need to take cognizance of any norms and standards published by the Minister under NEMBA. Ezemvelo KwaZulu-Natal Wildlife should be contacted in respect of the latest norms and standards for biodiversity.
The Minister- (a) must prepare and adopt a national biodiversity framework within three years (b) must monitor implementation of the framework; (e) must review the framework at least every five years; and (d) may, when necessary, amend the framework. The national biodiversity framework must identify priority areas for conservation action and the establishment of protected areas The national biodiversity framework may determine norms and standards for provincial and municipal environmental conservation plans	38(1) 39(c)	<ul style="list-style-type: none"> DEA 	<ul style="list-style-type: none"> Provincial conservation authorities Municipalities 	Although the Minister of Environmental Affairs is required to prepare and adopt a national biodiversity framework, the framework is applicable at the local level as it provides for an integrated, co-ordinated and uniform approach to biodiversity management by organs of state in all spheres of government (Section 39(1)(a)). Furthermore, it may also determine norms and standards for provincial and municipal environmental conservation plans

Key sections	Section number	Administering Authority	Other relevant stakeholders	Implications for development
	39(2)			(Section 39(2)). This includes areas identified in the national protected area expansion plan.
The Minister or the MEC for environmental affairs in a province may, by (a) determine a geographic region as a bioregion for the purposes of this Act if notice in the Gazette that region contains whole or several nested ecosystems and is characterised by its landforms, vegetation cover, human culture and history; and (b) publish a plan for the management of biodiversity and the components of biodiversity in such a region.	40(1)	<ul style="list-style-type: none"> DEA 	<ul style="list-style-type: none"> Provincial conservation authorities 	A municipality may request the Minister to determine a region as a bioregion (Section 40(2) (b)) and at the Ministers request, participate in the preparation of a bioregional plan (Section 40(4)). The biodiversity framework and any bioregional plans must be aligned with the municipal integrated development plans (Section 48(1)(b)). A Biodiversity Sector Plan is currently being prepared for the Municipality and will act as a critical input into this process.
Any person, organisation or organ of state desiring to contribute to biodiversity management may submit to the Minister for his or her approval a draft management plan for (a) an ecosystem- (i) listed in terms of section 52; or (ii) which is not listed in terms of section 52 but which does warrant special conservation attention; (b) an indigenous species- (i) listed in terms of section 56; or which is not listed in terms of section 56 but which does warrant special conservation attention (c) a migratory species to give effect to the Republic's obligations in terms	43(1)	<ul style="list-style-type: none"> DEA 	<ul style="list-style-type: none"> SANBI Provincial conservation authorities Municipalities NGOs e.g. WESSA, EWT Landowners 	Municipalities may submit biodiversity management plans.

Key sections	Section number	Administering Authority	Other relevant stakeholders	Implications for development
of an international. agreement binding on the Republic				
The Minister may enter into a biodiversity management agreement with any person, organisation or organ of state identified in terms of section 43(2), or any other suitable person, organisation or organ of state, regarding the implementation of a biodiversity management plan, or any aspect of it.	44	<ul style="list-style-type: none"> • DEA 	<ul style="list-style-type: none"> • SANBI • Provincial conservation authorities • Municipalities • NGOs e.g. WESSA • Landowners 	Municipalities may enter into biodiversity management agreements.
<p>The Minister may, by notice in the Gazette, publish a national list of ecosystems that are threatened and in need of protection.</p> <p>(b) An MEC for environmental affairs in a province may, by notice in the Gazette, publish a provincial list of ecosystems in the province that are threatened and in need of protection.</p>	52(1)	<ul style="list-style-type: none"> • DEA 	<ul style="list-style-type: none"> • SANBI • Provincial conservation authorities • Municipalities • NGOs e.g. WESSA • Landowners • Developers 	<p>According to the draft list of threatened ecosystems (SANBI, 2011), a total of 16 threatened ecosystems occur within the Ugu District, covering almost half of the district area. This has significant implications for future development and planned expansion of land use activities within the district. Environmental Authorisation for example is required for certain development/land use activities in terms of NEMA, with the current EIA Regulations comprising three lists of activities that require environmental authorisation:</p> <ul style="list-style-type: none"> ▪ Listing Notice 1: activities that require a basic assessment (R544 of 2010); ▪ Listing Notice 2: activities that require scoping and environmental impact report (EIR); and ▪ Listing Notice 3: activities that require

Key sections	Section number	Administering Authority	Other relevant stakeholders	Implications for development
				<p>a basic assessment in specific identified geographical areas only.</p> <p>According to Activity 12 in Listing Notice 3, the clearance of 300m² or more of vegetation within any listed critically endangered or endangered ecosystem will trigger at least a basic assessment in terms of the EIA regulations. Note that a basic assessment report in terms of the EIA regulations is triggered only in remaining natural habitat within each ecosystem and not in portions of the ecosystem where natural habitat has already been irreversibly lost.</p>
<p>The Minister may, by notice in the Gazette, identify any process or activity in a listed ecosystem as a threatening process.</p>	<p>53(1)</p>	<ul style="list-style-type: none"> • DEA 	<ul style="list-style-type: none"> • SANBI • Provincial conservation authorities • Municipalities • NGOs e.g. WESSA • Landowners • Developers 	<p>Any person wishing to undertake a threatening process in a listed ecosystem will need to obtain the necessary authorizations.</p>
<p>The Minister may, by notice in the Gazette, publish a list of-</p> <p>(a) critically endangered species, being any indigenous species facing an extremely high risk of extinction in the wild in the immediate future;</p> <p>(b) endangered species, being any indigenous species facing a high risk of extinction in the wild in the near future, although they are not a critically endangered species;</p>	<p>56(1)</p>	<ul style="list-style-type: none"> • DEA 	<ul style="list-style-type: none"> • SANBI • Provincial conservation authorities • Municipalities • NGOs e.g. WESSA • Landowners • Developers 	<p>Any person wishing to disturb a threatened or protected species will need to obtain a permit from Ezemvelo KwaZulu-Natal Wildlife.</p>

Key sections	Section number	Administering Authority	Other relevant stakeholders	Implications for development
(c) vulnerable species, being any indigenous species facing an extremely high risk of extinction in the wild in the medium-term future, although they are not a critically endangered species or an endangered species; and protected species, being any species which are of such high conservation value or national importance that they require national protection, although they are not listed in terms of paragraph (a), (b) or (c).				
A person may not carry out a restricted activity involving a specimen of a listed (2) The Minister may, by notice in the Gazette, prohibit the carrying out of any (a) which is of a nature that may negatively impact on the survival of a listed threatened or protected species and (b) which is specified in the notice, or prohibit the carrying out of such activity without a permit issued in terms of Chapter 7.	57(1)	<ul style="list-style-type: none"> DEA 	<ul style="list-style-type: none"> SANBI Provincial conservation authorities Municipalities NGOs e.g. WESSA Landowners Developers 	Any person wishing to disturb a threatened or protected species will need to obtain a permit from Ezemvelo KwaZulu-Natal Wildlife
65. (1) A person may not carry out a restricted activity involving a specimen of an alien species without a permit issued in terms of Chapter 7	65(1)	<ul style="list-style-type: none"> DEA 	<ul style="list-style-type: none"> SANBI Provincial conservation authorities Municipalities NGOs e.g. WESSA Landowners Developers 	A permit is required from Ezemvelo KwaZulu-Natal Wildlife if undertaking a restricted activity involving an alien species. If a permit is issued, the Act requires that the permit holder comply with any conditions of the permit.
The Minister may, by notice in the Gazette, publish a list of those alien species in respect of which a permit mentioned in section 65(1) may not be issued	67(1)	<ul style="list-style-type: none"> DEA 	<ul style="list-style-type: none"> SANBI Provincial conservation authorities Municipalities NGOs e.g. WESSA Landowners Developers 	A person may not carry out a restricted activity in terms of alien species published on this list.

Key sections	Section number	Administering Authority	Other relevant stakeholders	Implications for development
A person who is the owner of land on which a listed invasive species occurs must- (a) notify any relevant competent authority, in writing, of the listed invasive (b) take steps to control and eradicate the listed invasive species and to prevent it (c) take all the required steps to prevent or minimise harm to biodiversity	73(1)	<ul style="list-style-type: none"> DEA 	<ul style="list-style-type: none"> SANBI Provincial conservation authorities Municipalities NGOs e.g. WESSA Landowners Developers 	The Act imposes 'duty of care' on all landowners regarding alien species and requires that steps are taken to control and eradicate listed invasive species. In the event of a landowner failing to comply with this requirement, the competent authority may issue a directive. Failing compliance with the directive the Competent authority may implement the directive and recover all costs.
All organs of state in all spheres of government must prepare an invasive species monitoring, control and eradication plan for land under their control, as part of their environmental plans in accordance with section 11 of the National Environmental Management Act.	76(2)(a)	<ul style="list-style-type: none"> DEA 	<ul style="list-style-type: none"> All organs of State including Municipalities 	Municipalities are required to prepare an invasive species monitoring, control and eradication plan for land under their control.
No person may, without a permit issued in terms of Chapter 7- 10 (a) engage in bioprospecting involving any indigenous biological resources; or (b) export from the Republic any indigenous biological resources for the purpose of bioprospecting or any other kind of research.	81(1)	<ul style="list-style-type: none"> DEA 	<ul style="list-style-type: none"> SANBI Provincial conservation authorities Municipalities NGOs e.g. WESSA Landowners Researchers Any person engaging in bioprospecting activities 	A permit is required if a person wishes to engage in bioprospecting activities.

Other authorizations under the NEMBA

Chapter 7 of the Biodiversity Act addresses permits and stipulates that authorization may be required in respect of the following activities:

- Disturbance or harm of listed threatened or protected species or ecosystems;
- Restricted activities regarding alien species and invasive species;
- Bioprospecting involving indigenous biological resources;
- The export of indigenous biological resources for bioprospecting or any other type of research.

2.4. National Environmental Management: Protected Areas Act 57 of 2003

This Act provides for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes. It also seeks to provide for the sustainable utilization of protected areas and to promote participation of local communities in the management of protected areas. While the Act is primarily focussed on the proclamation and management of formally protected areas, the following aspects are particularly relevant at the municipal level:

- When preparing a management plan for a protected area, the management the authority concerned must consult municipalities, other organs of state, local communities and other affected parties which have an interest in the area;
- Management plans for protected areas must take into account any applicable aspects of the integrated development plan of the municipality in which the protected area is situated;
- While commercial and community activities may be permitted within protected areas, these are subject to the management plan for the specific protected area;
- No prospecting and mining activities may take place in a protected area without written permission from the Minister and the Cabinet Minister member responsible for minerals and energy affairs.

National Forests Act 84 of 1998

The National Forests Act came into effect on 1 April 1999 and is the primary Act dealing with forests and trees. The purpose of the Act is to protect and promote the sustainable management and use of forests for environmental, economic, educational, recreational, cultural, health and spiritual purposes. While few indigenous forests occur in the study area, some important tree species may occur, which require special management.

Key sections	Section number	Administering Authority	Other relevant stakeholders	Implications for development
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Key sections	Section number	Administering Authority	Other relevant stakeholders	Implications for development
The principles are that— (a) natural forests must not be destroyed save in exceptional circumstances (c) forests must be developed and managed so as to conserve biological diversity, ecosystems and habitats	3(3)	<ul style="list-style-type: none"> DWA 	<ul style="list-style-type: none"> Ezemvelo KZN Wildlife Provincial environmental departments Municipalities Other organs of State 	The Act details a number of other principles however these two are the most important from a biodiversity perspective. Municipalities must ensure that the relevant principles are applied when undertaking any activities.
An organ of State applying these principles must— (a) take into account the differences between natural forests, woodlands and plantations; (b) recognise that conservation of biological diversity within plantations should be promoted in a way which is consistent with the primary economic purpose for which the plantation was established;	3(2)	<ul style="list-style-type: none"> DWA 	<ul style="list-style-type: none"> Ezemvelo KZN Wildlife Provincial environmental departments Municipalities Other organs of State 	Municipalities should be aware of the differences between natural forests, woodlands and plantations and promote appropriate conservation of biodiversity in each of these forest types.
No person may cut, disturb, damage or destroy any indigenous, living tree in, or remove or receive any such tree from, a natural forest except in terms of— (u) a license issued under subsection (4) or section 23; or (b) an exemption from the provisions of this subsection published by the Minister in the Gazefre on the advice of the Council.	7(1)	<ul style="list-style-type: none"> DWA 	<ul style="list-style-type: none"> Ezemvelo KZN Wildlife Provincial environmental departments Municipalities Landowners Public 	No person may disturb or damage a tree in a natural forest without a license. In terms of the Act the Minister may declare any group of indigenous trees to be a forest by way of a notice in the government gazette. A license should be obtained from DWA.
The Minister may— (a) declare a State forest or a part of it; (b) purchase or expropriate land under section 49 and declare it: or (c) at the request or with the consent of the registered owner of land outside a State forest, declare it, as a specially protected area. No person may cut, disturb, damage or destroy any forest produce in, or remove or receive any forest produce from, a protected area.	8(1)	<ul style="list-style-type: none"> DWA 	<ul style="list-style-type: none"> Ezemvelo KZN Wildlife Provincial environmental departments Municipalities Landowners Public 	No person, including a municipality, may disturb or remove any forest produce from a protected area without special permission or a license. A license should be obtained from DWA.

- the cultivation of land;
- hunting and fishing;
- the use of a State forest for recreational, educational, cultural or spiritual
- purposes where there is no right to such use under section 19; and
- the use of a State forest for any other purpose, if it is consistent with the sustainable management of the forest

A license should be obtained from the Department of Water Affairs and Forestry.

2.5. Conservation of Agricultural Resources Act 43 of 1967

The Conservation of Agricultural Resources Act is the chief statute addressing agricultural resources in South Africa but does not apply to land in urban areas. The purpose of the Act is to control the utilization of the natural agricultural resources of the Republic in order to conserve the soil, water sources and vegetation and the combating of weeds and invader plants.

Key sections	Section number	Administering Authority	Other relevant stakeholders	Implications for development
The Minister may by regulation declare any plant to be a weed or an invader plant for the purposes of this Act, either throughout the Republic or in one or more areas therein.	2(3)	<ul style="list-style-type: none"> • National DAFF 	<ul style="list-style-type: none"> • Provincial Departments of Agriculture • DEA • Working for Water • Working for Wetlands • DWA • Landowners • Ezemvelo KZN Wildlife • Provincial environmental departments • Municipalities 	Regulations have been published in respect of alien invader species. These are categorised into Category 1, 2, and 3 invader plants and weeds and each have associated control measures. Municipalities should familiarize themselves with these categories and ensure that they comply with the regulations.
In order to achieve the objects of this Act the Minister may prescribe control measures which shall be complied with by land users to whom	6(1)	<ul style="list-style-type: none"> • National DAFF 	<ul style="list-style-type: none"> • Provincial Departments of Agriculture • DEA 	Municipalities may be required to comply with control measures

Key sections	Section number	Administering Authority	Other relevant stakeholders	Implications for development
<p>they apply.</p> <p>Such control measures may relate to:</p> <p>(g) the utilization and protection of the vegetation</p> <p>(l) the control of weeds and invader plants</p> <p>(m) the restoration or reclamation of eroded land or land which is otherwise disturbed or denuded</p> <p>(o) the construction, maintenance, alteration or removal of soil conservation works or other structures on land</p>	6(2)		<ul style="list-style-type: none"> • Working for Water • Working for Wetlands • DWA • Landowners • Ezemvelo KZN Wildlife • Provincial environmental departments • Municipalities 	prescribed by the Minister in respect of vegetation, alien invasives, and the restoration of degraded land.
<p>The executive officer may by means of a direction order a land user to comply with a particular control measure which is binding on him on or with regard to the land specified in such direction, or if it is in the opinion of the executive officer essential in order to achieve the objects of this Act, to perform or not to perform any other specified act on or with regard to such land.</p>	7(1)	<ul style="list-style-type: none"> • National DAFF 	<ul style="list-style-type: none"> • Provincial Departments of Agriculture • DEA • Working for Water • Working for Wetlands • DWA • Landowners • Ezemvelo KZN Wildlife • Provincial environmental departments • Municipalities 	
<p>If the Minister is of opinion that it is necessary for the restoration or reclamation of the natural agricultural resources of any land in order to achieve the objects of this Act, he may expropriate that land.</p>	14(1)	<ul style="list-style-type: none"> • National DAFF 	<ul style="list-style-type: none"> • Provincial Departments of Agriculture • DEA • Working for Water • Working for Wetlands • DWA • Landowners • Ezemvelo KZN Wildlife • Provincial environmental departments • 	The Minister may expropriate land for the restoration or reclamation of agricultural resources.

Other authorizations under the CARA

The Conservation of Agricultural Resources Act requires that authorization is obtained to undertake any of the following activities:

- Cultivate any virgin soil
- Cultivate any land with a slope greater than 12%
- Drain or cultivate any vlei, marsh or water sponge
- Cultivate any land within the flood area of a water course or within 10m outside the flood-area of a water course
- Divert run-off from a water course, or
- Burn veld (Armstrong, 2008)

CARA is administered by the National Department of Agriculture, through its Directorate Land Use and Soil Management (D:LUMS). They should be contacted with respect to obtaining licenses.

2.6. National Environmental Management: Integrated Coastal Management Act

The purpose of this Act is to establish a system of integrated coast and estuarine management in order to promote the conservation of the coastal environment, and maintain the natural attributes of coastal landscapes and seascapes. It also aims to ensure that the development and use of natural resources within the coastal zone is socially and economically justifiable and ecologically sustainable. The following aspects are particularly relevant at the municipal level:

- The State, in its capacity as the public trustee of all coastal property, must ensure that coastal public property is used, managed, protected, conserved and enhanced in the interest of the whole community and take appropriate measures to conserve and protect such areas;
- Every Municipality whose area includes coastal property must within 4 years of the commencement of the Act (2012), make by-laws that designate strips of land as coastal access in order to ensure public access to coastal property;
- Municipalities have a range of responsibilities with regard to coastal access land, including signage, control of use etc.;
- Coastal set-back lines will be established in which development restrictions will apply. Municipalities are required to ensure that such lines are delineated on maps that form part of its zoning scheme;
- Estuaries must be managed in accordance with the National estuarine management protocol. Responsible authorities (may include Municipalities) are then required to develop and implement appropriate estuarine management plans;

- District Municipalities may establish a coastal committee to promote integrated coastal management and coordinate effective implementation of the Act;
- Coastal Municipalities are required to prepare and adopt a municipal coastal management programme within 4 years of the commencement of the Act (2012) for managing the coastal zone;
- Coastal planning schemes may be formed and enforced as part of land use schemes adopted by the Municipality;
- A coastal planning scheme may be established and implemented within the coastal zone by the Municipality or other responsible agent;
- The municipality may make by-laws to assist in the administration of its coastal management programme.

2.7. The National Water Act 36 of 1998

The National Water Act 36 of 1998 repealed and replaced over one hundred previous acts dealing with water. The purpose of the Act is to ensure that the nation's water resources are used, developed, conserved, managed and controlled in ways which ensure that basic human needs are met, equitable access to water is promoted and aquatic ecosystems and their biological diversity is adequately protected. While directed primarily to water resources, this has implications for a range of biota that utilize both aquatic and terrestrial habitats.

Key sections	Section number	Administering Authority	Other relevant stakeholders	Implications for development
An owner of land, a person in control of land or a person who occupies or uses the land on which—(a) any activity or process is or was performed or undertaken; or (b) any other situation exists, which causes, has caused or is likely to cause pollution of a water resource, must take all reasonable measures to prevent any such pollution from occurring, continuing or recurring.	19(1)	<ul style="list-style-type: none"> • DWA 	<ul style="list-style-type: none"> • DAEA • Provincial conservation authorities • Municipalities • NGOs e.g. WESSA • Landowners 	The NWA imposes 'duty of care' on all landowners, including Municipalities, to ensure that water resources are not polluted. The Act defines pollution as the direct or indirect alteration of the physical, chemical or biological properties of a water resource.
Subject to subsection (6), a catchment management agency may recover all costs incurred as a result of it acting under subsection (4) jointly and severally from the following persons: Any person who is or was responsible for or who directly or indirectly contributed to, the pollution or the potential pollution, the owner of the land at the time when the pollution or the potential pollution occurred or that owner's successor in-title, the person in	19(5)(c)	<ul style="list-style-type: none"> • DWA 	<ul style="list-style-type: none"> • DAEA • Provincial conservation authorities • Municipalities • NGOs e.g. WESSA • Landowners 	In the event of such pollution occurring, a CMA may recover all costs incurred for rectifying the pollution from the person who caused the pollution or landowner (including Municipalities) at the time the pollution

Key sections	Section number	Administering Authority	Other relevant stakeholders	Implications for development
control of the land or any person who has a right to use the land at the time when the activity or the process is or was performed or undertaken; or the situation came about.				occurred. The Act stipulates that local government may be represented on a CMA.
Subject to subsection (4) the Minister may make regulations— regulating or prohibiting any activity in order to protect a water resource or instream or riparian habitat;	26(g)	<ul style="list-style-type: none"> DWA 	<ul style="list-style-type: none"> Any organ of State who owns land including Municipalities Provincial conservation authorities Landowners 	Municipalities will need to comply with any regulations made by the Minister in respect of protection of water resources. The Department of Water Affairs and Forestry should be contacted with regards to such regulations.

Other authorizations under the NWA

Chapter 4 of the National Water Act addresses the use of water and stipulates the various types of licensed and unlicensed entitlements to the use water. The Act details permissible uses of water in Schedule 1. These include:

- Taking water from any water resource to which the person has lawful access for domestic use in their household;
- Taking water for use on land owned or occupied by that person, for domestic use, small gardening or the watering of livestock;
- Storing and using run-off water from a roof;
- Taking water for human consumption or fire-fighting in emergency situations;
- Using water for recreational purposes;
- Discharging waste or waste water into a canal, sea outflow or other conduit; controlled by another person authorised to undertake the purification, treatment or disposal of waste.

In addition to these, General Authorisations (GAs) have been published under GNR 398 of 26 March 2004. Any uses of water which do not meet the requirements of Schedule 1 or the GAs, require a license which should be obtained from the Department of Water Affairs and Forestry.

2.8. Local Government: Municipal Systems Act No 32 of 2002

The Local Government: Municipal Systems Act is rooted in Local Agenda 21 (Pierce et al., 2005) and provides direction to municipalities in respect of their development responsibilities.

Key sections	Section number	Administering Authority	Other relevant stakeholders	Implications for development
A municipality exercises its legislative or executive authority by promoting a safe and healthy environment;	11(2)(l)	<ul style="list-style-type: none"> Local government 	<ul style="list-style-type: none"> Public Ezemvelo KZN Wildlife NGOs Provincial environmental departments KZN CoGTA 	Municipalities must ensure that in undertaking their activities they ensure the promotion of a safe and healthy environment.
Municipal services must be environmentally sustainable;	73(2)(d)	<ul style="list-style-type: none"> Local government 	<ul style="list-style-type: none"> Public Ezemvelo KZN Wildlife NGOs Provincial environmental departments KZN CoGTA 	All municipal services must be environmentally sustainable.
A tariff policy must reflect at least the following principles, namely that the economical, efficient and effective use of resources, the recycling of waste, and other appropriate environmental objectives must be encouraged:	74(1)(h)	<ul style="list-style-type: none"> Local government 	<ul style="list-style-type: none"> Public Ezemvelo KZN Wildlife NGOs Provincial environmental departments KZN CoGTA 	A municipality may develop a tariff system which promotes appropriate environmental objectives.
When a municipality has in terms of section 77 to decide on a mechanism to provide a municipal service in the municipality or a part of the municipality, or to review any existing mechanisms it must first assess— the direct and indirect costs and benefits associated with the project if the service is provided by the municipality through an internal mechanism, including the expected effect on the environment and on human health,	78(1)(a)	<ul style="list-style-type: none"> Local government 	<ul style="list-style-type: none"> Public Ezemvelo KZN Wildlife NGOs Provincial environmental departments KZN CoGTA 	Municipalities must assess the impact of their services on the environment.

Key sections	Section number	Administering Authority	Other relevant stakeholders	Implications for development
well-being and safety:				
The Minister may for the purposes of this Chapter make regulations or issue guidelines in accordance with section 120 to provide for or regulate the following matters: incentives and penalties to encourage— (i) the economical, efficient and effective use of resources when providing services; (ii) the recycling of waste; and (iii) other environmental objectives;	94(1)(e)	<ul style="list-style-type: none"> Local government 	<ul style="list-style-type: none"> Public Ezemvelo KZN Wildlife NGOs Provincial environmental departments KZN CoGTA 	Municipalities will need to comply with any regulations or guidelines issued by the Minister in respect of any environmental objective including the recycling of waste.

3. Provincial

3.1. KwaZulu-Natal Nature Conservation Management Act (No. 9 of 1997)

The KwaZulu-Natal Nature Conservation Management Act provides for the establishment of control and monitoring bodies and mechanisms related to nature conservation including the KwaZulu-Natal Nature Conservation Service (Ezemvelo KZN Wildlife).

The Act is supplemented by the KwaZulu-Natal Nature Conservation Amendment Acts (No. 5 of 1999 and No. 7 of 1999). These Acts prescribe laws relating to the protection of fauna and flora within the province however until such time as regulations necessary to supplement these Amendments Acts have been finalised, law enforcement provisions detailed under the KwaZulu-Natal Nature Conservation Ordinance 15 of 1974 and KwaZulu-Natal Nature Conservation Act 1992 remain. Once the 1999 Amendment Act is put into operation, the above-mentioned Ordinance and Nature Conservation Act 1992, will be repealed.

Key sections	Section number	Administering Authority	Other relevant stakeholders	Implications for development
An animal listed in	51	<ul style="list-style-type: none"> Ezemvelo 	<ul style="list-style-type: none"> Municipalities 	Any person must ensure that they

Key sections	Section number	Administering Authority	Other relevant stakeholders	Implications for development
<ul style="list-style-type: none"> • Fourth schedule is a specially protected indigenous animal • Fifth schedule is a protected indigenous animal <p>No person may capture, harm, hunt, purchase, release, sell or translocate a specially protected indigenous animal or protected indigenous animal except under a permit issued by the Conservation Service.</p>	52	KwaZulu-Natal Wildlife	<ul style="list-style-type: none"> • Landowners • Public 	obtain a permit from EKZNW should they need to disturb a specially protected indigenous animal or protected indigenous animal whilst undertaking their activities.
<p>An plant listed in</p> <ul style="list-style-type: none"> • Sixth schedule is a specially protected indigenous plant • Seventh schedule is a protected indigenous plant <p>No person may gather, export, import, introduce, purchase, sell, relocate, or translocate a specially protected indigenous plant or protected indigenous plant except under a permit issued by the Conservation Service.</p>	58 59	<ul style="list-style-type: none"> • Ezemvelo KwaZulu-Natal Wildlife 	<ul style="list-style-type: none"> • Municipalities • Landowners • Public 	Any person must ensure that they obtain a permit from EKZNW should they need to disturb a specially protected indigenous plant or protected indigenous plant whilst undertaking their activities.

4. Local

The Councils of the Local and District Municipality are able to publish local By-laws in terms of section 156 of the Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996), and in conjunction with section 11 of the Local Government: Municipal Systems Act, 2000 (Act No. 32 of 2000). Details of available by-laws were not interrogated as part of this assessment but may well have a bearing on biodiversity conservation in the Ugu District.

Annexure 2: List of Red data plant species that are known/likely to occur within the Ugu District Municipality (EKZNW, 2011e).

TAXON NAME	COMMON NAME	RED DATA LIST STATUS (SANBI, 2009)
<i>Alberta magna</i>	Natal Flamebush	Near Threatened
<i>Aloe linearifolia</i>		Near Threatened
<i>Aloe thraskii</i>	Dune Aloe	Near Threatened
<i>Apodytes abbotii</i>		Near Threatened
<i>Asclepias schlechteri</i>		Endangered
<i>Aspalathus gerrardii</i>		Vulnerable
<i>Aspidonepsis cognata</i>	Large Suncup	Rare
<i>Begonia dregei</i>	Dwarf Wild Vbegonia	Endangered
<i>Begonia homonyma</i>	Large-leaved Wild Begonia	Endangered
<i>Bowiea volubilis</i>		Vulnerable
<i>Brachystelma gerrardii</i>		Endangered
<i>Brachystelma molaventi</i>		Vulnerable
<i>Brachystelma tenellum</i>		Vulnerable
<i>Bulbophyllum scaberulum</i>		Vulnerable
<i>Cassipourea flanaganii</i>		Endangered
<i>Catha abbotii</i>		Endangered
<i>Ceropegia rudatisii</i>		Endangered
<i>Clivia gardenii</i>	Major Garden's Clivia, Natal Drooping Clivia	Vulnerable
<i>Clivia miniata</i> var. <i>miniata</i>	Clivia, Bush Lily, St John's Lily,	Vulnerable
<i>Crassula obovata</i> var. <i>dregeana</i>	Stonecrop	Vulnerable
<i>Crassula sarmentosa</i> var. <i>integrifolia</i>		Rare
<i>Crassula streyi</i>		Rare
<i>Craterostigma nanum</i> var. <i>nanum</i>		Vulnerable
<i>Crinum moorei</i>	Moore's Crinum, Natal Lily, Ngome Lily	Vulnerable
<i>Cryptocarya myrtifolia</i>	Myrtle Quince, Wild Camphor	Vulnerable
<i>Cryptocarya wyliei</i>		Near Threatened
<i>Curtisia dentata</i>		Near Threatened
<i>Dahlgrenodendron natalense</i>		Endangered
<i>Dierama pumilum</i>		Vulnerable
<i>Dierama tysonii</i>		Rare
<i>Dioscorea brownii</i>		Vulnerable
<i>Disa montana</i>		Rare
<i>Disa oreophila erecta</i>		Rare
<i>Disa similis</i>		Rare
<i>Disa tysonii</i>		Rare
<i>Encephalartos caffer</i>	Eastern dwarf cycad	Near Threatened
<i>Erica abbotii</i>		Vulnerable
<i>Eriosema dregei</i>		Near Threatened

TAXON NAME	COMMON NAME	RED DATA LIST STATUS (SANBI, 2009)
<i>Eriosema populifolium populifolium</i>		Vulnerable
<i>Eriosema umtamvunense</i>		Vulnerable
<i>Eriosemopsis subanisophylla</i>		Vulnerable
<i>Eucomis bicolor</i>	Forest Pineapple Flower	Near Threatened
<i>Eugenia erythrophylla</i>		Near Threatened
<i>Eugenia simii</i>		Vulnerable
<i>Eugenia umtamvunensis</i>		Endangered
<i>Eugenia verdoorniae</i>		Near Threatened
<i>Eulophia streptopetala</i>		Vulnerable
<i>Euphorbia woodii</i>	Wood's Euphorbia	Vulnerable
<i>Ficus bizanae</i>		Vulnerable
<i>Gasteria croucheri</i>	Variegated Aloe	Vulnerable
<i>Geranium ornithopodioides</i>		Endangered
<i>Gerrardanthus tomentosus</i>		Vulnerable
<i>Habenaria woodii</i>		Vulnerable
<i>Haemanthus deformis</i>	Dwarf Haemanthus	Near Threatened
<i>Helichrysum tenax</i> var. <i>pallidum</i>		Rare
<i>Hesperantha ingeliensis</i>		Rare
<i>Huernia hystrix</i> var. <i>parvula</i>	Porcupine Huernia, Toad Plant	Vulnerable
<i>Impatiens flanaganiae</i>	Mrs Flanigan's Impatiens	Vulnerable
<i>Kniphofia coddiana</i>	Cod's Poker	Near Threatened
<i>Kniphofia drepanophylla</i>		Vulnerable
<i>Kniphofia littoralis</i>		Near Threatened
<i>Kniphofia triangularis obtusiloba</i>	Mandarin Poker	Rare
<i>Knowltonia bracteata</i>		Vulnerable
<i>Leucadendron spissifolium natalense</i>	Natal Spear-leaved Conebush	Near Threatened
<i>Leucadendron spissifolium oribinum</i>	Oribi Spear-leaved Conebush	Vulnerable
<i>Lotononis bachmanniana</i>		Near Threatened
<i>Manilkara nicholsonii</i>		Endangered
<i>Maytenus abbotii</i>		Endangered
<i>Maytenus oleosa</i>		Rare
<i>Monsonia grandifolia</i>		Endangered
<i>Phylica natalensis</i>		Vulnerable
<i>Phymaspermum villosum</i>		Rare
<i>Plectranthus ernstii</i>		Near Threatened
<i>Plectranthus oribiensis</i>	Silver-leaved Spur Flower	Rare
<i>Podalyria velutina</i>	Hairy Podalyria;	Near Threatened
<i>Polystachya ottoniana</i>	Tree Orchid	Vulnerable
<i>Polystachya pubescens</i>	Hairy-lipped Polystachya	Vulnerable
<i>Protea subvestita</i>		Vulnerable
<i>Pseudosalacia streyi</i>		Vulnerable
<i>Pseudosclopia polyantha</i>		Vulnerable

TAXON NAME	COMMON NAME	RED DATA LIST STATUS (SANBI, 2009)
<i>Psoralea abbotii</i>		Vulnerable
<i>Putterlickia retrospinosa</i>		Near Threatened
<i>Raspalia trigyna</i>		Rare
<i>Rhus acocksii</i>	Rock Red Currant	Near Threatened
<i>Rhus rudatisii</i>		Endangered
<i>Rhynchosalyx lawsonioides</i>		Near Threatened
<i>Schizoglossum montanum</i>		Rare
<i>Schizoglossum rubiginosum</i>		Vulnerable
<i>Schizoglossum singulare</i>		Vulnerable
<i>Scilla natalensis</i>	Large blue scilla, blue hyacinth, Blue Squill	Vulnerable
<i>Senecio dregeanus</i>		Vulnerable
<i>Siphonochilus aethiopicus</i>	Natal Ginger, Wild Ginger	Rare
<i>Struthiola anomala</i>	Berg Struthiola	Vulnerable
<i>Syncolostemon bolusii</i>		Rare
<i>Syncolostemon ramulosus</i>	Round-leaved Pink Plume	Vulnerable
<i>Syzygium pondoense</i>		Rare
<i>Tephrosia bachmannii</i>		Vulnerable
<i>Tephrosia pondoensis</i>		Vulnerable
<i>Thunbergia venosa</i>		Rare
<i>Tridactyle bicaudata bicaudata</i>	Tree Orchid	Vulnerable
<i>Tridactyle bicaudata rupestris</i>	Tree Orchid	Vulnerable
<i>Turraea streyi</i>	Dainty-leaved Honeysuckle Bush	Critically Endangered
<i>Wahlenbergia pinnata</i>		Near Threatened
<i>Watsonia bachmannii</i>		Vulnerable
<i>Watsonia inclinata</i>		Vulnerable
<i>Watsonia mtamvunae</i>		Vulnerable
<i>Watsonia pondoensis</i>		Endangered
Total Critically Endangered		1
Total Endangered		15
Vulnerable		49
Total Near-Threatened		22
Total Rare		20
Overall Total Plants		107

Annexure 3: List of Red Data fauna, and including other species of significance, that are known/likely to occur within the Ugu District Municipality (EKZNW, 2011f).

Scientific Name	Common Name	Red Data List Status (IUCN, 2011)
BIRDS		
<i>Alcedo semitorquata</i>	Half-collared Kingfisher	Near Threatened
<i>Anthropoides paradiseus</i>	Blue Crane	Vulnerable
<i>Anthus brachyurus</i>	Short-tailed Pipit	Vulnerable
<i>Balearica regulorum</i>	Grey Crowned Crane	Vulnerable
<i>Bradypterus sylvaticus</i>	Knysna Warbler	Vulnerable
<i>Bucorvus leadbeateri</i>	Southern Ground-Hornbill	Vulnerable
<i>Bugeranus carunculatus</i>	Wattled Crane	Critically Endangered
<i>Campethera notata</i>	Knysna Woodpecker	Near Threatened
<i>Caprimulgus natalensis</i>	Swamp Nightjar	Vulnerable
<i>Ciconia episcopus</i>	Woolly-necked stork	Near Threatened
<i>Ciconia nigra</i>	Black Stork	Near Threatened
<i>Circus maurus</i>	Black Harrier	Near Threatened
<i>Circus ranivorus</i>	African Marsh-Harrier	Vulnerable
<i>Falco biarmicus</i>	Lanner falcon	Near Threatened
<i>Falco peregrinus</i>	Peregrine falcon	Near Threatened
<i>Gyps coprotheres</i>	Cape vulture	Vulnerable
<i>Halcyon senegaloides</i>	Mangrove Kingfisher	Vulnerable
<i>Hirundo atrocaerulea</i>	Blue Swallow	Critically Endangered
<i>Leptoptilos crumeniferus</i>	Marabou stork	Near Threatened
<i>Lioptilus nigricapillus</i>	Bush Blackcap	Near Threatened
<i>Microparra capensis</i>	Lesser Jacana	Near Threatened
<i>Morus capensis</i>	Cape Gannet	Vulnerable
<i>Neotis denhami</i>	Stanley's Bustard	Vulnerable
<i>Nettapus auritus</i>	African Pygmy-Goose	Near Threatened
<i>Pelecanus onocrotalus</i>	Great White Pelican	Near Threatened
<i>Pelecanus rufescens</i>	Pink-backed Pelican	Vulnerable
<i>Phalacrocorax capensis</i>	Cape Cormorant	Near Threatened
<i>Phoenicopterus ruber</i>	Greater Flamingo	Near Threatened
<i>Podica senegalensis</i>	African Finfoot	Vulnerable
<i>Poicephalus robustus</i>	Cape Parrot	Endangered
<i>Polemaetus bellicosus</i>	Martial eagle	Vulnerable
<i>Procellaria aequinoctialis</i>	White-chinned Petrel	Near Threatened
<i>Sagittarius serpentarius</i>	Secretarybird	Near Threatened
<i>Sarothrura affinis</i>	Striped flufftail	Vulnerable

Scientific Name	Common Name	Red Data List Status (IUCN, 2011)
<i>Schoenicola brevirostris</i>	Broad-tailed Warbler	Near Threatened
<i>Smithornis capensis</i>	African Broadbill	Near Threatened
<i>Spheniscus demersus</i>	African Penguin	Vulnerable
<i>Stephanoaetus coronatus</i>	African Crowned Eagle	Near Threatened
<i>Sterna caspia</i>	Caspian Tern	Near Threatened
<i>Thalassarche chlororhynchos</i>	Atlantic Yellow-nosed Albatross	Near Threatened
<i>Tyto capensis</i>	African Grass-Owl, Grass Owl	Vulnerable
<i>Vanellus melanopterus</i>	Black-winged Lapwing/Plover	Near Threatened
<i>Zoothera gurneyi</i>	Orange Ground-Thrush	Near Threatened
<i>Zoothera guttata</i>	Spotted Ground-Thrush	Endangered
MAMMALS		
<i>Cercopithecus albogularis labiatus</i>	Sykes' monkey	Vulnerable
<i>Chrysospalax villosus dobsoni</i>	Rough-haired golden mole	Critically Endangered
<i>Dendrohyrax arboreus arboreus</i>	Tree Hyrax	Vulnerable
<i>Leptailurus serval serval</i>	Serval	Near Threatened
<i>Otomops martiensseni icarus</i>	Large-eared free-tailed bat	Vulnerable
<i>Ourebia ourebi</i>	Oribi	Endangered
<i>Philantomba monticola bicolor</i>	Blue duiker	Vulnerable
<i>Rhinolophus clivosus</i>	Geoffroy's horseshoe bat	Near Threatened
<i>Rhinolophus darlingi</i>	Darling's horseshoe bat	Near Threatened
REPTILES		
<i>Python sebae natalensis</i>	Southern African Python	Vulnerable
AMPHIBIANS		
<i>Afrivalus spinifrons</i>	Natal leaf-folding frog	Vulnerable
<i>Anhydrophryne ngongoniensis</i>	Mistbelt moss frog	Critically Endangered
<i>Leptopelis xenodactylus</i>	Long-toed tree frog	Endangered
<i>Natalobatrachus bonebergi</i>	Kloof frog	Endangered
<i>Strongylopus wageri</i>	Plain stream frog	Near Threatened
INVERTEBRATES		
<i>Abantis bicolor</i>	Bicoloured Skipper	Rare
<i>Charaxes pondoensis</i>	Pondo Charaxes	Rare
<i>Chlamydephorus dimidius</i>	Snake-skin hunter slug	Vulnerable
<i>Doratogonus fragilis</i>	Strong black millipede	Endangered
<i>Durbania amakosa albescens</i>	Whitish Amakosa Rocksitter	Rare
<i>Gulella claustralis</i>	Keyhole hunter snail	Endangered
<i>Gulella salpinx</i>	Trumpet-mouthed hunter snail	Critically Endangered
<i>Opisthopatus roseus</i>	Rose-red Velvet Worm	Vulnerable
FISH		
<i>Butis butis</i>	Duckbill sleeper	Vulnerable
<i>Croilia mossambica</i>	Burrowing goby	Rare
<i>Glossogobius biocellatus</i>	Sleepy goby	Rare
<i>Hypseleotris cyprinoides</i>	Golden Sleeper	Rare

Scientific Name	Common Name	Red Data List Status (IUCN, 2011)
<i>Myxus capensis</i>	Freshwater mullet	Rare
<i>Redigobius dewaali</i>	Checked goby	Rare

Annexure 4: List of spatial (GIS) information used to inform the mapping procedures and biophysical description for the Ugu District Municipality Biodiversity Sector Plan and this project.

	Name of Layer	Source/Copyright holder	Report Reference
General Mapping	Mean Annual Precipitation	Schulze, R.E. Water Research Commission.	(South African Atlas of Agrohydrology and Climatology (2001)
	KZN Transformation layer 2008	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.	EKZNW (2008)
	KZN Land cover 2008 dataset	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.	EKZNW (2008a)
	Spot 5 (2010) Imagery	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.	EKZNW (2010)
Terrestrial Features	IBA coverage 2012	Birdlife South Africa (on-line at www.birdlife.org)	BirdLife SA (2012)
	Coverage compiled based on stakeholder contributions, incorporating local knowledge and expert input from specialists with a working experience of fine scale information and priorities within the District, including untransformed land, species locations, wetlands and other sites of significance.	Eco-Pulse Environmental Consulting Services cc. Hilton, South Africa.	Eco-Pulse (2013)
	Provincial Threatened Ecosystems	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.	EKZNW (2008b)
	EKZNW Macro ecological corridors (now referred to as "Landscape Corridors)	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.	EKZNW (2009)
	Provincial Protected Areas Expansion Strategy	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.	EKZNW, (2010a)

Name of Layer	Source/Copyright holder	Report Reference
KZN Potential stewardship sites	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.	EKZNW (2010b)
KZN Sites of Conservation Significance	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.	EKZNW (2010c)
KZN Game ranches	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.	EKZNW (2010d)
KZN Community conservation areas	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.	EKZNW (2010e)
KZN Natural heritage sites	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.	EKZNW (2010f)
Terrestrial Systematic Conservation Plan covering KwaZulu-Natal	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.	EKZNW (2011a)
KZN Conservancies	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.	EKZNW (2011b)
KZN Living cultural heritage sites	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.	EKZNW (2011c)
KZN Community conservation areas	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.	EKZN (2011d)
Known Plant Species Locations in KZN	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.	EKZNW (2011e)
Known Animal Species Locations in KZN	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.	EKZNW (2011f)
2012 Vegetation Types of KwaZulu- Natal	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.	EKZNW (2012a)

Name of Layer	Source/Copyright holder	Report Reference
2012 Protected Areas Coverage of KwaZulu-Natal <i>(National, Provincial and Municipal Protected Areas and private nature reserves)</i>	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.	EKZNW (2012b)
High Erosion Risk Areas	Institute for Soil, Climate and Water, Agricultural Research Council, Private Bag X79, Pretoria 0001, South Africa	Le Roux <i>et al</i> (2008)
National Threatened Ecosystems	South African National Biodiversity Institute	SANBI (2011)
NPAES: National Protected Areas Expansion Strategy	South African National Parks (SANPARKS) Agency. South Africa.	SANParks (2010)
Admiralty Reserve	Provincial Planning and Development Commission, South Africa.	Provincial Planning and Development Commission (2008)
Aquatic Features	Coverage compiled based on stakeholder contributions, incorporating local knowledge and expert input from specialists with a working experience of fine scale information and priorities within the District, including untransformed land, species locations, wetlands and other sites of significance.	Eco-Pulse Environmental Consulting Services cc. Hilton, South Africa.
	Eco-Pulse desktop wetlands layer 2012 <i>(Additional wetlands coverage mapped at a desktop level using SPOT 5 2009 imagery)</i>	Eco-Pulse Environmental Consulting Services cc. Hilton, South Africa.
	2007 FSCP: Freshwater Systematic Conservation Plan covering KwaZulu-Natal	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.
	2011 Wetland coverage of KwaZulu-Natal	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.
	Water yield areas of KwaZulu-Natal	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.

	Name of Layer	Source/Copyright holder	Report Reference
	Quaternary Catchments	Department of Water Affairs	DWA
	NFEPA Wetlands layer	National Freshwater Ecosystem Priority Areas Project. Centre for Scientific Research. Pretoria, South Africa.	CSIR (2010a)
	NFEPA Wetland Clusters	National Freshwater Ecosystem Priority Areas Project. Centre for Scientific Research. Pretoria, South Africa.	CSIR (2010b)
	NFEPA Rivers layer	National Freshwater Ecosystem Priority Areas Project. Centre for Scientific Research. Pretoria, South Africa.	CSIR (2010c)
	NFEPA River FEPAs	National Freshwater Ecosystem Priority Areas Project. Centre for Scientific Research. Pretoria, South Africa.	CSIR (2010d)
	NFEPA Water Supply Areas	National Freshwater Ecosystem Priority Areas Project. Centre for Scientific Research. Pretoria, South Africa.	CSIR (2011)
	KZN Rivers (1: 50 000 scale)	NGI	NGI (2011)
	KZN Priority Wetlands	Macfarlane <i>et al.</i> (2011)	Macfarlane <i>et al.</i> (2011)
Marine & estuarine Features	KwaZulu-Natal Marine Systematic Conservation Plan 2011 V1.0 (SEA Plan). Unpublished GIS Coverage.	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.	EKZNW (2011i)
	ESCP: Estuarine Systematic Conservation Plan for KwaZulu-Natal	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.	EKZNW (2012c)

Annexure 5: Criteria used in the identification and mapping different CBA map categories (Macfarlane *et. al.*, 2013a)

IDENTIFICATION OF PRIORITY TERRESTRIAL AREAS

	Name of Layer	Source/Copyright holder	Report Reference
General Mapping	Mean Annual Precipitation	Schulze, R.E. Water Research Commission.	(South African Atlas of Agrohydrology and Climatology (2001)
	KZN Transformation layer 2008	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.	EKZNW (2008)
	KZN Land cover 2008 dataset	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.	EKZNW (2008a)
	Spot 5 (2010) Imagery	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.	EKZNW (2010)
Terrestrial Features	IBA coverage 2012	Birdlife South Africa (on-line at www.birdlife.org)	BirdLife SA (2012)
	Coverage compiled based on stakeholder contributions, incorporating local knowledge and expert input from specialists with a working experience of fine scale information and priorities within the District, including untransformed land, species locations, wetlands and other sites of significance.	Eco-Pulse Environmental Consulting Services cc. Hilton, South Africa.	Eco-Pulse (2013)
	Provincial Threatened Ecosystems	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.	EKZNW (2008b)
	EKZNW Macro ecological corridors (now referred to as "Landscape Corridors)	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.	EKZNW (2009)
	Provincial Protected Areas Expansion Strategy	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.	EKZNW, (2010a)
	KZN Potential stewardship sites	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.	EKZNW (2010b)

Name of Layer	Source/Copyright holder	Report Reference
KZN Sites of Conservation Significance	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.	EKZNW (2010c)
KZN Game ranches	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.	EKZNW (2010d)
KZN Community conservation areas	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.	EKZNW (2010e)
KZN Natural heritage sites	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.	EKZNW (2010f)
Terrestrial Systematic Conservation Plan covering KwaZulu-Natal	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.	EKZNW (2011a)
KZN Conservancies	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.	EKZNW (2011b)
KZN Living cultural heritage sites	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.	EKZNW (2011c)
KZN Community conservation areas	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.	EKZN (2011d)
Known Plant Species Locations in KZN	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.	EKZNW (2011e)
Known Animal Species Locations in KZN	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.	EKZNW (2011f)
2012 Vegetation Types of KwaZulu- Natal	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.	EKZNW (2012a)
2012 Protected Areas Coverage of KwaZulu-Natal <i>(National, Provincial and Municipal Protected Areas and private nature reserves)</i>	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.	EKZNW (2012b)

Name of Layer	Source/Copyright holder	Report Reference
High Erosion Risk Areas	Institute for Soil, Climate and Water, Agricultural Research Council, Private Bag X79, Pretoria 0001, South Africa	Le Roux <i>et al</i> (2008)
National Threatened Ecosystems	South African National Biodiversity Institute	SANBI (2011)
NPAES: National Protected Areas Expansion Strategy	South African National Parks (SANPARKS) Agency. South Africa.	SANParks (2010)
Admiralty Reserve	Provincial Planning and Development Commission, South Africa.	Provincial Planning and Development Commission (2008)
Aquatic Features	Coverage compiled based on stakeholder contributions, incorporating local knowledge and expert input from specialists with a working experience of fine scale information and priorities within the District, including untransformed land, species locations, wetlands and other sites of significance.	Eco-Pulse Environmental Consulting Services cc. Hilton, South Africa. Eco-Pulse (2013)
	Eco-Pulse desktop wetlands layer 2012 <i>(Additional wetlands coverage mapped at a desktop level using SPOT 5 2009 imagery)</i>	Eco-Pulse Environmental Consulting Services cc. Hilton, South Africa. Eco-Pulse (2012)
	2007 FSCP: Freshwater Systematic Conservation Plan covering KwaZulu-Natal	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa. EKZNW (2007)
	2011 Wetland coverage of KwaZulu-Natal	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa. EKZNW (2011g)
	Water yield areas of KwaZulu-Natal	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa. EKZNW (2011h)
	Quaternary Catchments	Department of Water Affairs DWA
	NFEPWA Wetlands layer	National Freshwater Ecosystem Priority Areas Project. Centre for Scientific Research. Pretoria, South Africa. CSIR (2010a)
	NFEPWA Wetland Clusters	National Freshwater Ecosystem Priority Areas Project. Centre for Scientific Research. Pretoria, South Africa. CSIR (2010b)

	Name of Layer	Source/Copyright holder	Report Reference
	NFEPA Rivers layer	National Freshwater Ecosystem Priority Areas Project. Centre for Scientific Research. Pretoria, South Africa.	CSIR (2010c)
	NFEPA River FEPAs	National Freshwater Ecosystem Priority Areas Project. Centre for Scientific Research. Pretoria, South Africa.	CSIR (2010d)
	NFEPA Water Supply Areas	National Freshwater Ecosystem Priority Areas Project. Centre for Scientific Research. Pretoria, South Africa.	CSIR (2011)
	KZN Rivers (1: 50 000 scale)	NGI	NGI (2011)
	KZN Priority Wetlands	Macfarlane <i>et al.</i> (2011)	Macfarlane <i>et al.</i> (2011)
Marine & estuarine Features	KwaZulu-Natal Marine Systematic Conservation Plan 2011 V1.0 (SEA Plan). Unpublished GIS Coverage.	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.	EKZNW (2011i)
	ESCP: Estuarine Systematic Conservation Plan for KwaZulu-Natal	Ezemvelo KwaZulu-Natal Wildlife: Biodiversity Conservation Planning Division, Pietermaritzburg, South Africa.	EKZNW (2012c)

IDENTIFICATION OF PRIORITY AQUATIC AREAS

AQUATIC CBAs: Aquatic CBAs within the Ugu District were mapped and defined according to the following:		
CRITERIA	DESCRIPTION	COVERAGE
Flagship Free-Flowing Rivers	Flagship free-flowing rivers (1: 50 000 river features buffered by 100m ⁵⁰).	NFEPA Rivers (CSIR, 2010c)
Perennial rivers within FSCP "Earmarked" catchments	Perennial rivers (1: 50 000 perennial river features buffered by 20m ⁵¹) within FSCP "earmarked" catchments".	FSCP: Freshwater Systematic Conservation Plan (EKZNW, 2007)
FEPA Fish Sanctuary Areas	FEPA fish sanctuaries.	River FEPAs (CSIR, 2010d)
KZN Priority Wetlands	Wetlands previously identified by Begg (1989) and recognised as priority wetlands in KZN. ⁵²	Macfarlane <i>et al.</i> (2011)
All wetlands within FSCP "Earmarked" catchments	All mapped wetlands within FSCP "earmarked" catchments".	NFEPA Wetlands (CSIR, 2010a) Additional wetlands mapped (Eco-Pulse, 2012) FSCP: Freshwater Systematic Conservation Plan (EKZNW, 2007)

⁵⁰ See Footnote 49

⁵¹ See Footnote 51

⁵² Note that in the cases of extensive, degraded wetland systems, priority intact areas should be identified as CBA areas while remaining areas should be classified as ESAs.

Unique / Important aquatic features	Aquatic features/areas identified as critically important for aquatic conservation efforts by stakeholders, local organisations and specialists from the District. This includes features such as critical roost sites, and priority wetland areas.	Eco-Pulse (2013)
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AQUATIC ESAs: Aquatic ESAs within the Ugu District were mapped and defined NFEPA (CSIR, 2010) according to the following:		
CRITERIA	DESCRIPTION	COVERAGE
Buffer zones adjacent CBA Rivers	Buffers around primary CBA Rivers (80m outside 20m buffer ⁵³).	NFEPA Rivers (CSIR, 2010c) Freshwater/Aquatic systematic conservation plan (EKZNW, 2007).
Non-perennial rivers and associated buffers within FSCP “earmarked” catchments	Buffers around non-perennial rivers associated with “earmarked” catchments in FSCP (50m ⁵⁴).	FSCP: Freshwater Systematic Conservation Plan (EKZNW, 2007)
FEPAs Rivers	FEPAs river systems (1: 50 000 river features buffered by 20m ⁵⁵)	NFEPA Rivers (CSIR, 2010c)
Top 10 free flowing rivers (excluding CBA flagship rivers)	Top 10 provincial free-flowing rivers (1: 50 000 river features buffered by 100m ⁵⁶) excluding CBA flagship rivers	NFEPA Rivers (CSIR, 2010)
Buffer zones adjacent other important rivers	Buffers around mainstem rivers within catchments associated with Fish Sanctuaries, Fish Support Areas and Rehab FEPAs (100m ⁵⁷).	River FEPAs (CSIR, 2010d)
Buffer zones adjacent tributaries of important Rivers	Buffers around tributaries (perennial & non-perennial) within catchments associated with FEPAs Rivers, Fish Sanctuaries, Fish Support Areas and Rehab FEPAs (50m ⁵⁸).	River FEPAs (CSIR, 2010d)

⁵³ NFEPA guidelines suggest that a minimum 100m buffer should be applied at a planning scale to reduce water quality impacts on NFEPA wetlands and rivers as a result of adjoining landuses. Refer to section 5.7.5 (*Delineation of buffers for rivers and wetlands*) of the NFEPA Implementation Manual (Driver *et al.*, 2011) and the NFEPA Technical Report (Nel, *et al.*, 2011) for more information on buffers.

⁵⁴ See Footnote 54

⁵⁵ 20m was applied as a standard buffer along mainstem rivers to better represent the river and associated riparian habitat. The width of 20m was also informed by the accuracy of the river coverage relative to the actual location of the river as indicated from Satellite imagery.

⁵⁶ See Footnote 49

⁵⁷ See Footnote 49

⁵⁸ Buffer zones are known to provide a range of functions and assist in reducing impacts to river and wetland systems. While clear buffer zone guidelines are still to be developed, the larger the buffer zone, the greater the protection afforded to the receiving water

Buffer zones adjacent CBA wetlands	Buffers around all CBA wetlands (100m ⁵⁹).	NFEPA Wetlands (CSIR, 2010a) Additional wetlands mapped (Eco-Pulse, 2012) FSCP: Freshwater Systematic Conservation Plan (EKZNW, 2007)
FEPA wetlands	FEPA wetlands	NFEPA Wetlands (CSIR, 2010a)
NFEPA Wetland Clusters	Wetlands forming part of FEPA wetland clusters together with ecological corridors (500m buffers) applied around these wetlands.	NFEPA Wetland Clusters (CSIR, 2010b)
AQUATIC EI: Additional key aquatic EI within the Ugu District was mapped and defined according to the following:		
CRITERIA	DESCRIPTION	COVERAGE
Important water yield areas/catchments	These catchments are characterised by high runoff rates and therefore contribute significantly towards stream flow and water security. Management of such areas is particularly important in view of potential impacts of climate change where increased water scarcity is a real possibility.	EKZNW (2011h)
NFEPA Water Supply Areas	Areas identified by NFEPA as having (a) high water yield, and/or (b) high groundwater recharge. These can be regarded as strategic water supply areas of the country.	NFEPA Water Supply Areas (CSIR, 2011)

resource. A buffer zone of 50m has been applied to tributaries of CBA rivers in order to support the conservation of these critical downstream water resources.

⁵⁹ See Footnote 49

Annexure 6: Locally identified priority areas.

Priority areas identified in consultation with local biodiversity stakeholders are indicated in Figure 24, below. Details of the different features included are summarized in the table below, including an indication of the confidence of the data. Attribute data relevant to each mapped feature is housed by Ezemvelo KZN Wildlife.

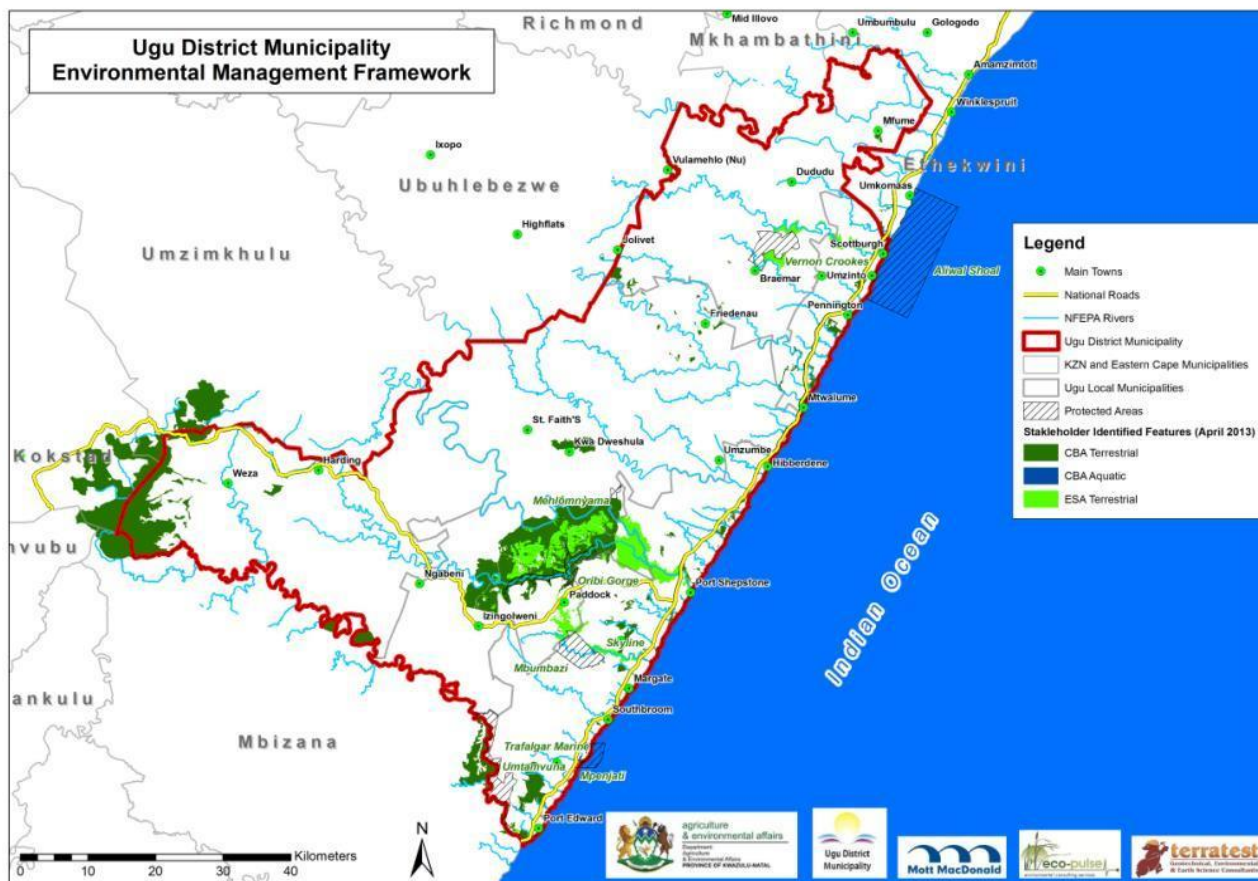


Figure 23. Map showing the location of priority areas identified through local stakeholder consultation⁶⁰.

Id	Description	Type	Contributor	CBA Category	Field check?	Confidence
1	Mbumbazi plateau: Intact Pondoland-Ugu Sandstone Coastal Sourveld grassland plateau bordering onto Mbumbazi PA.	Priority grassland	Alex Skene	CBA-Ter	No	Medium
2	Umtentweni Forest: Important intact KZN Coastal Forest.	Priority forests	Alex Skene	CBA-Ter	Yes	Medium
3	St Georges Park: Coastal Dune Forest owned by Dept Education.	Priority forests	Alex Skene	CBA-Ter	No	Medium
4	Mzimkhulu Plateau Grassland: Intact Grassland plateau north of Mzimkhulu	Priority grassland	Alex Skene	CBA-Ter	Yes	High
5	Vungu River corridor: Link from Mbumbazi priority conservation areas near the coast.	Ecological corridor	Alex Skene	ESA-Ter	Yes	Medium
6	The Wolds: KZN Coastal Belt Grassland patch.	Priority grassland	Alex Skene/Geoff Nichols	CBA-Ter	No	Medium
7	The Wolds: Nadau grasslands and forests.	Priority grassland and forests	Alex Skene/Geoff Nichols	CBA-Ter	No	Medium

⁶⁰ Site IDs have been excluded due to the sensitivity of some of this information.

Id	Description	Type	Contributor	CBA Category	Field check?	Confidence
8	Royston Hall: Steep terrain with interesting dry forests. <i>Olyra latifolia</i> in damp areas.	Priority forests	Alex Skene/Geoff Nichols	CBA-Ter	Yes	Low
9	Jolivet - Sandstone Sourveld Grassland with a good population of Critically Endangered <i>Satyrrium rhodanthum</i> (orchid)	Threatened species	David Styles / Eco-Pulse	CBA-Ter	No	High
10	Jolivet - Largely intact Scarp Forest. Range of local endemics potentially present.	Priority forests	David Styles / Eco-Pulse	CBA-Ter	No	Medium
11	Friedenau grassland: Reasonable quality KZN Sandstone Sourveld with endemics and red listed species (requires verification)	Priority grassland	David Styles / Eco-Pulse	CBA-Ter	No	Medium
12	Ifafa KwaZulu-Natal Coastal Belt Grassland. Good condition with range of rare and red-listed species present.	Priority grassland	David Styles / Eco-Pulse	CBA-Ter	No	High
13	Hillioo grasslands: Pondoland - Ugu Coastal Sourveld grassland in reasonable condition with rare and endemic species present.	Priority grassland	David Styles / Eco-Pulse	CBA-Ter	No	High
14	Baboyi / Zotsha: Grassland, Swamp Forest and Coastal Forest areas.	Priority forest and grasslands	David Styles / Eco-Pulse	CBA-Ter	No	Medium
15	Mzimkhulu Gorge Plateau: Only known locality for Vulnerable local endemic <i>Brachystelma tenellum</i> .	Priority grassland	David Styles / Eco-Pulse	CBA-Ter	No	High
16	Ekubo Estate. KZN Coastal Belt Grasslands in good condition.	Priority grassland	David Styles / Eco-Pulse	CBA-Ter	No	High
17	Port Edward Hinterland (Includes Seaview Farm): Largely intact Pondoland - Ugu Coastal sourveld. Many threatened and endemic species.	Priority grassland	David Styles / Eco-Pulse	CBA-Ter	No	Medium
18	Clanshal scarp forest: Very good quality with threatened plant species present.	Priority forests	David Styles / Eco-Pulse	CBA-Ter	No	High
19	Mahlongwa River scarp forest: Very good quality with threatened plant species present.	Priority forests	David Styles / Eco-Pulse	CBA-Ter	No	Medium
20	Mahlongwana River scarp forest: Very good quality with threatened plant species present.	Priority forests	David Styles / Eco-Pulse	CBA-Ter	No	Medium
21	Mahlongwa grasslands: Moderate condition Coastal Belt Grassland.	Priority grassland	David Styles / Eco-Pulse	CBA-Ter	No	Medium
22	Friedenau grassland: Reasonable quality KZN Sandstone Sourveld with endemics and red listed species (requires verification)	Priority grassland	David Styles / Eco-Pulse	CBA-Ter	No	Medium
23	Mbiyane grassland: Reasonable quality KZN Sandstone Sourveld with endemics and red listed species (requires verification)	Priority grassland	David Styles / Eco-Pulse	CBA-Ter	No	Medium
24	Ngwijini grassland: Reasonable quality KZN Sandstone Sourveld with endemics and red listed species (requires verification)	Priority grassland	David Styles / Eco-Pulse	CBA-Ter	No	High
25	The Sheepwalk grassland: Reasonable quality KZN Sandstone Sourveld with endemics and red listed species (requires verification)	Priority grassland	David Styles / Eco-Pulse	CBA-Ter	No	Medium
26	Kwankulankulu grassland: Reasonable quality KZN Sandstone Sourveld with endemics and red listed species (requires verification)	Priority grassland	David Styles / Eco-Pulse	CBA-Ter	No	Medium
27	Bavian Kerantz grassland: Reasonable quality KZN Sandstone Sourveld with endemics and red listed species (requires verification)	Priority grassland	David Styles / Eco-Pulse	CBA-Ter	No	Medium
28	Mgezankamba grassland: Reasonable quality KZN Sandstone Sourveld with endemics and red listed species (requires verification)	Priority grassland	David Styles / Eco-Pulse	CBA-Ter	No	Medium
29	KwaGulambane grassland: Reasonable quality KZN Sandstone Sourveld with	Priority grassland	David Styles / Eco-Pulse	CBA-Ter	No	Medium

Id	Description	Type	Contributor	CBA Category	Field check?	Confidence
	endemics and red listed species (requires verification)					
30	Rosslea Estates grassland: Reasonable quality KZN Sandstone Sourveld with endemics and red listed species (requires verification)	Priority grassland	David Styles / Eco-Pulse	CBA-Ter	No	Medium
31	Mfumbe grassland: Reasonable quality KZN Sandstone Sourveld with endemics and red listed species (requires verification)	Priority grassland	David Styles / Eco-Pulse	CBA-Ter	No	Medium
32	Nsali grassland: Reasonable quality KZN Sandstone Sourveld with endemics and red listed species (requires verification)	Priority grassland	David Styles / Eco-Pulse	CBA-Ter	No	Medium
33	Nsali grassland: Reasonable quality KZN Sandstone Sourveld with endemics and red listed species (requires verification)	Priority grassland	David Styles / Eco-Pulse	CBA-Ter	No	Medium
34	Priority grassland fragments: Desktop delineated grassland fragments	Priority grassland	Eco-Pulse	CBA-Ter	No	Low
35	Umdlanga Rocky grasslands: Largely intact Pondoland-Ugu Sandstone Coastal Sourveld and Coastal Forests.	Priority grassland and forests	Eco-Pulse	CBA-Ter	Yes	High
36	Sihleza Forest and grasslands: Large Eastern Mistbelt Forest and associated Midlands Mistbelt Grassland.	Priority forest and grasslands	Eco-Pulse	CBA-Ter	No	Medium
37	Vernon Crookes Buffer Zone: Largely untransformed land alongside Nature Reserve.	Ecological corridor	Eco-Pulse	ESA-Ter	Yes	Medium
38	TC Robertson Nature Reserve: Grassland fragments with recreational areas.	Nature Reserve	Elsa Pooley	CBA-Ter	No	Low
39	South Port grassland: Good condition KZN Coastal Belt Grassland in patch in forest - heavily used by porcupine eating bulbous plants.	Priority grassland	Geoff Nichols	CBA-Ter	No	Medium
40	The Valleys: Largely intact forest area	Priority forests	Geoff Nichols	CBA-Ter	No	Medium
41	Bendigo Nature Reserve: Swamp forest	Priority forests	Geoff Nichols	CBA-Ter	Yes	High
42	Anerley camp: Barringtonia swamp forest/wetland bordering the Domba River and estuary.	Priority forests	Geoff Nichols	CBA-Aqua	Yes	High
43	Armadale forest and grasslands: Largely intact coastal forest with associated grassland fragments - crowned eagles also present.	Priority forest and grasslands	Geoff Nichols	CBA-Ter	Yes	Medium
44	Bendigo swamp forest: Largely intact swamp forest area.	Priority forests	Geoff Nichols	CBA-Ter	No	Medium
45	Injanbili Green Wedge: Largely untransformed fragments of forest and grasslands.	Priority forest and grasslands	Geoff Nichols	CBA-Ter	Yes	Medium
46	Mdesinga forests: Swamp and coastal forests associated with the Mdesinga River and extending along the coastline.	Priority forests	Geoff Nichols	CBA-Ter	No	Low
47	Lynton Hall: Remnant coastal forests associated with the Mtwalume and Fafa Rivers (Condition questionable).	Priority forests	Geoff Nichols	CBA-Ter	Yes	Low
48	Ellingham forest - Park Rynie: Coastal forest and fragments of KZN Coastal Belt Grassland	Priority forests	Geoff Nichols	CBA-Ter	No	Medium
49	Ellingham forest - Park Rynie: Coastal forest and fragments of KZN Coastal Belt Grassland	Priority forests	Geoff Nichols	CBA-Ter	No	Medium
50	Mzimkhulwana Cycad area: Grassland and forests with important cycads	Threatened species	Geoff Nichols	CBA-Ter	No	High
51	Lower Umzinto forest: Rare trees and animals Tree Hyrax, African Crowned Eagle, <i>Dahlgrenodendron natalense</i>	Priority forests	Geoff Nichols	CBA-Ter	No	Medium
52	Henderson Fraser Farm Grassland: Intact grassland fragment within forest patch.	Priority grassland	Geoff Nichols	CBA-Ter	No	Medium

Id	Description	Type	Contributor	CBA Category	Field check?	Confidence
53	Henderson Fraser Farm Grassland: Intact grassland fragment within forest patch.	Priority grassland	Geoff Nichols	CBA-Ter	No	Medium
54	Timbankhulu forest and grasslands: Important forest (and associated intact buffer zone) with a range of threatened species.	Priority forests	Geoff Nichols / David Styles	CBA-Ter	Yes	High
55	Ecological corridor along Mpabanyoni River: Emadhlange Park in the KwaBhakajana area is a tribal resource that might be able to link Vernon Crookes	Ecological corridor	Geoff Nichols/Eco-Pulse	ESA-Ter	No	Medium
56	Tigershole: Forest and grassland fragments with Pondoland endemics	Priority forest and grasslands	Geoff Nichols/Roger Uys	CBA-Ter	Yes	Medium
57	Umtentweni conservancy along Mzimkhulu Estuary: Includes high biodiversity value areas such as KZN Coastal forests	Local Conservancy	Matt Williams	CBA-Ter	Yes	Medium
58	Red Desert Nature Reserve: Included in EKZNW Biodiversity Stewardship Programme	Planned Nature Reserve	Matt Williams / Tony Abott	CBA-Ter	Yes	High
59	Red Desert to Umtamvuna Corridor: Plan to create corridor linking Red Desert NR to Umtamvuna NR	Ecological corridor	Matt Williams/Tony Abott	ESA-Ter	No	Medium
60	Kongweni Conservancy: Riverine forest and grassland remnants.	Local Conservancy	Paddy Norman	CBA-Ter	No	Medium
61	Mbizane River Reserve: Coastal riverine forest.	River Reserve	Paddy Norman	CBA-Aqua	No	Medium
62	Fredericka Nature Reserve: Intact dune forest.	Priority forests	Paddy Norman	CBA-Ter	No	High
63	Iphithi Nature Trail: Includes largely intact forests and wetlands.	Priority forests	Paddy Norman	CBA-Ter	No	Medium
64	Black Lake: Coastal dune forest with fossilised trees around interesting wetland feature.	Priority wetland	Paddy Norman	CBA-Aqua	No	Medium
65	Uplands grasslands: Pondoland-Ugu Coastal Sourveld grasslands with threatened and endemic plant species. Potentially NB butterfly site.	Priority grassland and forests	Paddy Norman / David Styles	CBA-Ter	Yes	High
66	Mbizana Nature Reserve: Coastal forest.	Nature Reserve	Paddy Norman/Eco-Pulse	CBA-Ter	No	Low
67	Mzumkhulwana ecological corridor: Potential connection between Oribi Nature Reserve and priority areas along the coastline.	Ecological corridor	Paddy Norman/Eco-Pulse	ESA-Ter	Yes	Medium
68	KwaGamalakhe grasslands: Important Pondoland-Ugu Sandstone Coastal Sourveld with protea colony (<i>Wichman izocha</i>) and coastal forest.	Priority grassland	Piet Massyn	CBA-Ter	Yes	High
69	Kaba Reed Beds: Extensive reed beds and barn swallow roost site Kaba river/estuary.	Barn swallow roost site	Piet Massyn	CBA-Aqua	No	Medium
70	Sunnyvale Blue Swallows site: Critical Blue Swallow site (Guy Payn)	Threatened species	Piet Massyn	CBA-Ter	Yes	High
71	Westlands Blue Swallows site: Critical Blue Swallow site (Brian Armor)	Threatened species	Piet Massyn	CBA-Ter	No	Medium
72	Ramsgate Grassland: KwaZulu-Natal Coastal Belt Grasslands. Exceptional grassland habitat with local plant endemics & possible dwarf chameleon site.	Priority grassland	Piet Massyn / David Styles	CBA-Ter	No	Medium
73	Trafalgar Valley: Important intact grasslands, wetlands and coastal forests within the KZN Coastal Belt Grasslands.	Priority grassland, forest & wetlands	Piet Massyn / Tony Abott	CBA-Ter	No	Medium
74	Uvongo River Municipal Nature Reserve: Includes important KZN Coastal Forest and endemic Pondoland trees.	Nature Reserve	Piet Massyn / Tony Abott	CBA-Ter	No	Medium

Id	Description	Type	Contributor	CBA Category	Field check?	Confidence
75	Umzinto grassland patch: Intact priority KZN Coastal Belt Grassland patch in Coastal Forest.	Priority grassland	Rob Scott-Shaw	CBA-Ter	No	Medium
76	Mzikazi plateau: Good quality KZN Sandstone Sourveld with endemics and threatened species (Requires verification).	Priority grassland	Rob Scott-Shaw	CBA-Ter	No	High
77	Pinedale grasslands: Intact Pondoland-Ugu Sandstone Sourveld Grassland - NB coastal connection along N2	Priority grassland	Rob Scott-Shaw	CBA-Ter	Yes	High
78	Ramsgate grassland: Priority KZN Coastal Belt grassland - Future Nature Reserve	Priority grassland	Rob Scott-Shaw/Eco-Pulse	CBA-Ter	No	Medium
79	Rennies Beach grassland: Priority Pondoland-Ugu Coastal Sourveld grasslands & wetlands alongside Red Desert Nature Reserve.	Priority grassland	Rob Scott-Shaw/Eco-Pulse	CBA-Ter	Yes	High
80	Mfume mission station grasslands: Intact KZN Coastal Belt Grasslands.	Priority grassland	Rob Scott-Shaw/Eco-Pulse	CBA-Ter	No	Medium
81	KwaNkunkulu Grasslands: Intact KZN Sandstone Sourveld south of Sutherland farm	Priority grassland	Rob Scott-Shaw/Eco-Pulse	CBA-Ter	No	Medium
82	"The Falls" Grasslands: Pondoland-Ugu grassland remnant	Priority grassland	Rob Scott-Shaw/Eco-Pulse	CBA-Ter	No	Low
83	Ken Gaze farm: Priority Pondoland-Ugu Coastal Sourveld grasslands. Includes important endemic species.	Priority grassland	Rob Scott-Shaw/Tony Abott	CBA-Ter	Yes	High
84	Umtumvuna State Forest: Important state forest (Pondoland Scarp Forest) along Umtumvuna River. Also provides cross municipal linkage.	Priority forest & linkage	Roger Uys	CBA-Ter	Yes	High
85	Umdoni grasslands: Largely intact KZN Coastal Belt Grasslands	Priority grassland	Roger Uys	CBA-Ter	No	High
86	Mzimkhulu Vulture Roost sites: 2km Buffer around known vulture roost sites.	Vulture priority areas	Roger Uys	CBA-Ter	No	Medium
87	Oribi to Mbumbazi ecological corridor: Connection between Oribi Gorge and Mbumbazi Nature Reserve.	Ecological corridor	Roger Uys	ESA-Ter	Yes	Low
88	Oribi to Mbumbazi ecological corridor: Connection between Oribi Gorge and Mbumbazi Nature Reserve.	Ecological corridor	Roger Uys	ESA-Ter	No	Low
89	Oribi: Compatible transformed land within Umzimkhulu priority conservation area	Species-specific ESA	Roger Uys	ESA-Ter	No	Medium
90	Ncadu plateau grasslands: Intact Pondoland-Ugu Sandstone grassland.	Priority grassland	Roger Uys	CBA-Ter	No	High
91	Mhlangamkhulu Estuary: Priority Barn Swallow roosting site	Barn swallow roost site	Roger Uys	CBA-Aqua	Yes	High
92	Zotsh Estuary: Priority Barn Swallow roosting site	Barn swallow roost site	Roger Uys	CBA-Aqua	Yes	High
93	Fairview Estate: Largely intact KZN Coastal Belt Grassland and associated swamp forest. Threatened plant species potentially present.	Priority grassland and forests	Roger Uys / David Styles	CBA-Ter	Yes	High
94	Umzimkhulu priority conservation area: Includes Lake Eland and other grasslands and forest fragments around Oribi George.	Priority Conservation Area	Roger Uys / Paddy Norman	CBA-Ter	No	Medium
95	Ngeli forest: Priority forest with Cape parrot & baboons - includes associated intact grassland areas.	Priority forest and grasslands	Roger Uys/Eco-Pulse	CBA-Ter	No	Medium
96	WEZA grasslands: Intact Drakensberg Foothill Moist Grassland and Midlands Mistbelt Grassland with associated forest fragments.	Priority grassland	Roger Uys/Eco-Pulse/Tony Abott	CBA-Ter	No	Medium
97	Umdoni Park, Pennington: Rare trees and animals Tree Hyrax, African Crowned Eagle,	Priority forests	Roger Uys/Geoff	CBA-Ter	No	Medium

Id	Description	Type	Contributor	CBA Category	Field check?	Confidence
	<i>Dahlgrenodendron natalense</i> .		Nichols			
98	Cwake valley: Largely untransformed areas with grasslands, scarp forest and attractive gorges (within old sugarcane estate).	Priority grassland and forests	Tont Abott	CBA-Ter	No	Medium
99	Williams grasslands: Priority intact coastal grassland and wetlands. Includes a range of endemic (e.g. Orchids) and threatened species.	Priority grassland	Tony Abott	CBA-Ter	Yes	High
100	Pondo Memorial area: Intact valley bushveld and includes large cycad populations (<i>E. natalensis</i> & <i>E.gellinkii</i>)	Threatened species	Tony Abott	CBA-Ter	No	High
101	Bheka Mapondo Store: <i>E. ghellinkii</i> (coastal form) population	Threatened species	Tony Abott	CBA-Ter	No	High

Annexure 7. Photos taken during the field verification exercise.

A map indicating the location of photos taken during the field verification exercise is provided below (Figure 25). Photos, together with a brief description are included in the table below.

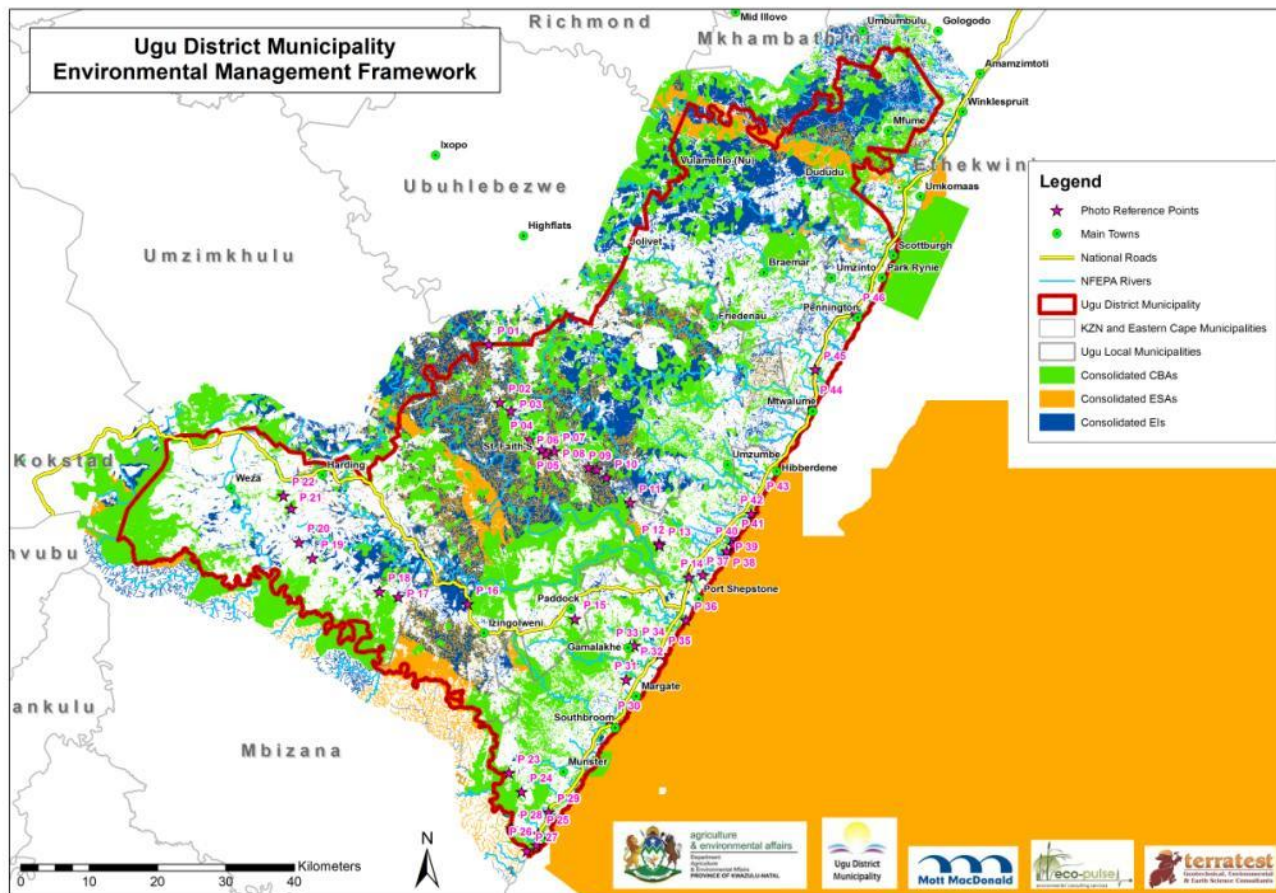



















Figure 1. Map showing the location of priority areas identified through local stakeholder consultation.

<p>P 01 View over typical traditional land tenure area.</p>	<p>P 02 View west towards the Mzimkhulu Valley.</p>

	<p>P 03 View towards Mzimkhulu Valley showing extensive areas of old lands.</p>		<p>P 04 Ribbon development along ridgeline (road construction).</p>
	<p>P 05 Typically disturbed valley in traditional land tenure area.</p>		<p>P 06 View towards Timbankulu forest and associated grasslands.</p>
	<p>P 07 Major disturbance of river during road upgrading - no environmental controls present.</p>		<p>P 08 View towards Timbankulu forest (along ridge in background of photo).</p>

	<p>P 09</p> <p>Largely intact grasslands east of Tinbankulu forest.</p>		<p>P 10</p> <p>Extensive invasion of slopes by alien invasive plant species.</p>
	<p>P 11</p> <p>View towards priority grassland on plateaux North of the Mzimkhulu Valley.</p>		<p>P 12</p> <p>Typical landscape context in the sugarcane / cultivation belt.</p>
	<p>P 13</p> <p>View over corridor linkage from Mzimkhulu River towards Oribi George on the Mzimkhulwana.</p>		<p>P 14</p> <p>View North up the lower reaches of the Mzimkhulu Valley.</p>



	<p>P 15 View over a portion of Tigershole Valley - much of this area is heavily invaded.</p>		<p>P 16 View East towards Oribi flats and Umzimkhulu priority conservation area identified.</p>
	<p>P 17 View West towards the Mtamvuna Valley.</p>		<p>P 18 Historic cultivation typical of many traditional land tenure areas.</p>
	<p>P 19 Typical Forestry land use with limited natural areas remaining.</p>		<p>P 20 View West over a small grassland patch prioritized in the KZNW terrestrial Conservation Plan.</p>

	<p>P 21 View West over large grassland fragment (Identified as a CBA 1 in KZNW's terrestrial Conservation Plan.</p>		<p>P 22 View over priority grassland area (Blue swallow site).</p>
	<p>P 23 View West towards the Mtamvuna Nature Reserve.</p>		<p>P 24 View over intact grasslands in the Mtamvuna Nature Reserve.</p>
	<p>P 25 View over isolated intact coastal grassland fragments near Port Edward town.</p>		<p>P 26 View over priority grasslands and seepage wetlands associated with Rennies property.</p>

	<p>P 27 View over the Mtamvuna River towards the planned Red Desert Nature Reserve.</p>		<p>P 28 View over the Umtamvuna Gorge.</p>
	<p>P 29 View over intact grassland areas (Port Edward Hinterland).</p>		<p>P 30 View towards Mbizana Nature Reserve (Coastal forest). Sand winning is noticeable in the foreground.</p>
	<p>P 31 Uplands grasslands near Margate airport.</p>		<p>P 32 View up the Vungu River and associated ecological corridor (requires rehabilitation).</p>

			
<p>P 33</p>	<p>View South over the KwaGamalakhe grasslands.</p>	<p>P 34</p>	<p>View North over intact Umhlanga rocky grasslands and associated forest habitat.</p>
			
<p>P 35</p>	<p>Typical agricultural landscape (here dominated by banana cultivation) along the coastal zone.</p>	<p>P 36</p>	<p>Largely intact wetlands and associated habitats (associated with the Baboyi estuary) - Estuarine CBA.</p>
			
<p>P 37</p>	<p>View East over Intact coastal forest, Umtumtweni.</p>	<p>P 38</p>	<p>View over priority reed beds (barn swallow roost) forming part of the Mhlangamkhulu Estuary.</p>

	<p>P 39 Intact forest area forming part of the Bendigo Nature Reserve.</p>		<p>P 40 Mangrove forests associated with the Damba estuary, Anerley.</p>
	<p>P 41 Intact forests just inland of Banana Beach.</p>		<p>P 42 View over the Intshambili estuary (Estuarine CBA).</p>
	<p>P 43 View towards Fairfield Estate.</p>		<p>P 44 Mtwalume Estuary.</p>

			
<p>P 45</p>	<p>View up the Fafa valley and associated forest (alien plant infestation levels are high along much of the riparian zone).</p>	<p>P 46</p>	<p>View up over the Mzinto River system.</p>