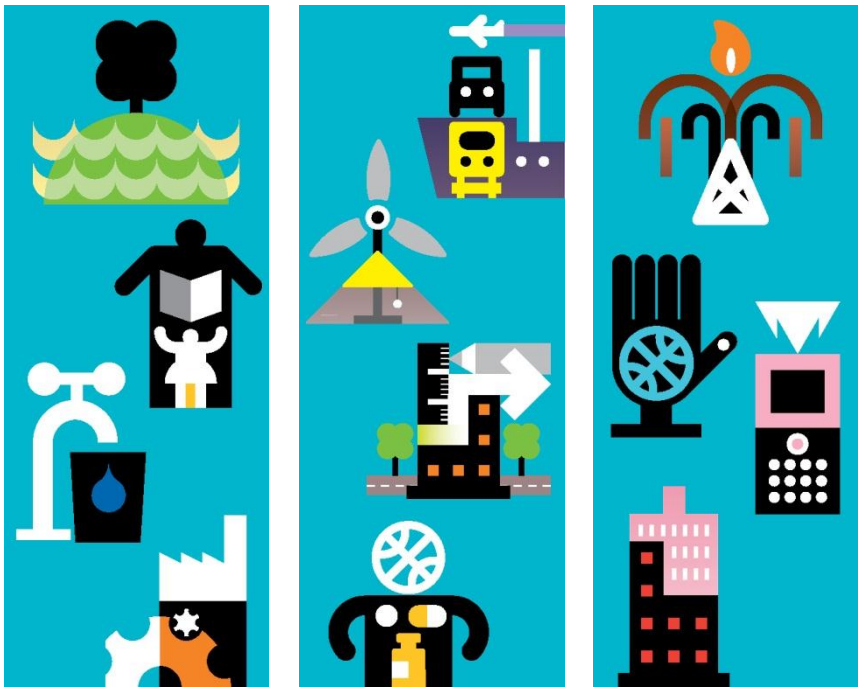

Ugu District Municipality Environmental Management Framework

Final Status Quo Report

September 2013

Ugu District Municipality

Mott MacDonald

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Executive Summary

The Ugu District Municipality (DM), in conjunction with the KZN Department of Agriculture and Environmental Affairs (DAEA), has appointed Mott MacDonald to produce an Environmental Management Framework (EMF) on their behalf. An EMF is a robust, strategic environmental management decision-support tool with a strong spatial focus. This phase of the EMF, the Status Quo phase, is an important phase, which outlines the baseline conditions in the Ugu district. It essentially forms the foundation(s) on which future plans/phases are based.

The products of the Status Quo phase of the EMF are:

- A report describing the presiding socio-economic and bio-physical environmental conditions and governance in the Ugu district, as well as a suite of specialist studies;
- Recommendations of individual specialists; and
- GIS Maps accompanied by raw spatial data.

Main body of the report:

A broad legislative and institutional overview was provided for the environmental sector, highlighting some of the key departmental mandates as they relate to the biophysical and socio-economic environment.

Key national, provincial and local planning documents were outlined, showing that the nation's ambitious developmental goals are filtering down to the local level – placing increased responsibility on local officials, including environmental officials.

A summary of the specialist reports and key maps is included in the Status Quo Report, while the various stand-alone Specialist Reports are included in Appendices E-M of the report. A brief description of the findings and recommendations of the various specialist studies is included below.

Biodiversity:

The study showed 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. Levels of transformation are such that a large number of ecosystems are now critically endangered and stand out amongst the most critical areas in the country for biodiversity protection. This has considerably compromised ecological infrastructure and the goods and services available to society, which will significantly affect the district's ability to adapt and respond to pressures such as climate change and water quality deterioration. This has also resulted in widespread species decline.

Less than 2% of the land surface area is formally protected, which is below par. While opportunities for protection and improved management still remain, socio-economic drivers such as agricultural expansion, the spread of alien invasive plants and deteriorating water quality will continue to erode the remaining environmental assets. Dynamic management interventions have been outlined in the report to tackle these issues in various ways.

Preliminary responses recommended to better manage biodiversity within the Ugu district:

- Integrating biodiversity into municipal and development planning: It is critical that information on biodiversity priorities be clearly communicated to key stakeholders in order to improve decision making;

- Protection and management of critical biodiversity areas: 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;
- Rehabilitation of degraded areas: While degraded areas are not necessarily areas of highest biodiversity value, they often pose a threat to critical biodiversity areas;
- Protection of water resources: 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; and
- Coastline management: Given the importance of the coastline for both biodiversity and tourism, it is critical that appropriate strategies are implemented to safeguard this resource.

Agriculture:

There is a well-developed commercial agricultural sector and a poorly developed small holding sector in the rural areas of the district. The majority of land in the Ugu DM that can be used for different forms of agricultural production in the district has already been identified and/or is being utilised. An exception to this may be in the drier areas where there may be good soils and associated production conditions, but these can only be realised with water (if available) for irrigation purposes. The key agricultural activities taking place in the district at the present time include: sugar cane production and milling; timber production and pulp processing; bananas for local and international markets; macadamia nuts for local and international markets; limited coffee production for local consumption and livestock for commercial and subsistence (beef, dairy, poultry, piggeries and goats).

There is potential for the diversification of sub-tropical fruit production in the Ugu DM, which could include commercial production of citrus, mangoes, litchis and medicinal plants. The commercial viability of extending these fruit crops into rural areas on an outgrower basis would need to be investigated further as part of an update of the agricultural plan for Ugu.

The following recommendations are noted:

- Identify areas that could be used for agricultural production in future without further destruction or loss to remaining eco-systems goods and services deriving from the biodiversity of the District;
- Areas where agriculture had compromised biodiversity should be seriously considered for rehabilitation;
- Arable land under 12% slope should be retained for agricultural production, irrespective of landownership;
- Areas suited to sub-tropical fruit production (slopes up to 25%) should be protected from other forms of development;
- Natural grasslands need to be assessed from both a biodiversity and an agricultural perspective to establish condition and carrying capacity. Where grasslands are in a favourable condition and it does not compromise eco-services production, livestock and/or game production could be considered on a commercial and/or subsistence basis, but subject to strict management conditions;
- Areas identified as too steep for timber and sugar (> 40%) should be reclaimed and rehabilitated in conjunction with the biodiversity sector plan findings;
- Land identified for commercial timber production should be defined by the DWA permitting system to protect the water production potential of catchments. Different species of timber can be produced on slopes ranging from 0-40%, hence all lands identified for other forms of agriculture could potentially be

used for timber. In the interests of biodiversity and water production, timber production should not be permitted on slopes in excess of 30%, land lost to timber in the 30-40% slope range should be considered for rehabilitation to indigenous land cover; and
- There is major opportunity in all the drainage lines of the district for the initiation and on-going management of alien vegetation clearing and rehabilitation of these areas under indigenous vegetation cover to optimise eco-services production and in the process establish sustainable green job opportunities for local people.

Water Resources:

The majority of the catchments within the Ugu DM are in good ecological state and have a low level of anthropogenic impact, although highly impacted on by invasive alien vegetation. The geohydrological units underlying the Ugu DM are classified as secondary aquifers. Generally, borehole yields can be expected to be satisfactory, except for low yield areas. Groundwater quality is generally good, and recharges depending on elevation and precipitation.

Geology:

The various types of geology (which influences soil production) as well as risk types (hazards) in the Ugu DM were identified. The geology types are: Tillite, Mudstone, Shale, Dolerite, Gneiss, Arenite and Berea Formation. Geological risks in Ugu include: collapsible soils, heaving/shrinking soils, landslide risks and unstable slopes. Despite the above findings/knowledge available, fine scale site investigations are a primary requirement prior to development in the area due to the possibility of geological risks being present at the more detailed level.

It is recommended that site specific geotechnical investigations would still need to be conducted prior to any development taking place due to the study providing a general overview, and not specific to individual locations.

Resource Economics:

In terms of land assets (i.e. land cover types) of Ugu, these produce a wide variety of ecosystem services, including those within the built environment. The assets in rural areas are in relatively good condition in comparison to those in the coastal areas due to lower levels of transformation. Similarly, assets in close proximity to settlement areas are generally in poorer condition than those further away.

A wide range of ecosystem services are supplied by the land cover types within the Ugu Municipal Area, including: carbon storage / sequestration, crops, fruits & vegetables, flood attenuation, land-based recreation, temperature moderation, fibre & poles, waste assimilation and soil stability / retention. These services are delivered at high levels due to the landscape assets inherent in Ugu.

The following recommendations are noted:
- More participation is required from the specialists, as well as local stakeholders in the next phase;
- The transformation of natural and agricultural assets or land cover types may reduce the range of ecosystem services supplied, while changes in condition, size and connectivity may reduce service supply levels; and

- Services with low supply levels will need to be carefully managed as these generate high risk to society.

Air Quality:

There is a broad mix of land uses in the study area, which results in varied air quality across the area, whereby emissions vary for rural versus developed/ urban areas as a result of the type of emissions sources. Agricultural and some rural areas are responsible for emissions related to biomass burning while the more urbanised areas have higher industrial and transport related emissions. The bulk of industrial emissions emanates from Port Shepstone. In terms of management of air quality in Ugu and its local municipalities, up-skilling and increased capacity are required within local municipal structures.

The following recommendations are noted:

- There are a number of gaps in the information currently available that need to be addressed (e.g. improving on the limited ambient air quality monitoring data available and obtaining more information on emitters);
- In terms of the institutional framework, there is a need to address the gaps in the District's air quality management capacity, improve the licensing function and increase collaboration between all stakeholders; and
- Developments likely to result in high emissions should not take place near ecologically and/ or socially sensitive receptors. Alternative fuel sources need to be investigated to reduce negative health impacts typically suffered by informal communities as a result of compromised indoor air.

Heritage:

A significant number of unidentified and poorly documented historical and cultural resources occur, as well as resources that have been recorded but for which geographic coordinates are unavailable at present. These consist of memorials, places of worship (churches, mosques and temples), cemeteries, open spaces, areas of political significance and areas of past economic significance, to mention but a few. Few comprehensive and accurate records exist for heritage resources in the area, which has limited mapping opportunities and spatial planning for this EMF. A series of recommendations are put forth in the full report to address this.

The following recommendations are noted:

- Establishment of Metro and/or District Heritage Forums: In order to adequately address the conservation of heritage resources within the Ugu DM, it is strongly recommended that Amafa and the municipality create a functioning District Heritage Forum, as required in terms of Section 29 of the KwaZulu-Natal Heritage Act, 2008 (Act No. 4 of 2008);
- Heritage resource identification and grading: An extensive public participation program should be undertaken to identify sites of cultural and historical significance;
- Development of management plans: Amafa and the District Heritage Forum should compile integrated site management plans for all Provincial and Heritage Landmarks, places of conflict and other significant heritage resources;
- Database development: A national database for all heritage resources, SAHRIS, has been developed by the South African Heritage Resources Agency and is continually updated. Existing resources such

as oral histories and Heritage Impact Assessments (HIAs) submitted as part of the Environmental Impact Assessment process should be uploaded to the SAHRIS database;

- Heritage Impact Assessments: HIAs, including Archaeological Impact Assessments, should be carried out in all areas identified for development; and
- Urban conservation: Buildings and structures should be assessed in terms of their various values, including their contribution to streetscapes and townscapes. All buildings with heritage significance are protected by heritage legislation, not only those older than sixty year, however such significance must be in the public interest.

Town Planning:

North-south linkages within the rural areas are weak and currently limit the potential for additional routes other than the N2 along the coastline. Developing these north-south linkages (from Harding to St Faiths; Oribi Flats through Umzinto to Odidini, and from Umgayi through Kenterton past Dududu) will dramatically improve accessibility within the district.

This coastal belt currently hosts the majority of formal residential property, tourism activity, retail and manufacturing activities. There will be further development pressure in this zone and therefore it is essential to ensure that development is undertaken sustainably.

Traditional settlements have poor accessibility and contain very few and/or badly maintained linkages to the existing road network. The major traditional settlements are surrounded by commercial agriculture, and opportunities exist to not only create linkages between communities and commercial farmers, but also to develop capacity within rural communities to undertake small-scale farming.

Large scale-commercial agriculture will remain a primary focus of the Ugu district. The EMF should ensure that high potential agricultural land that can have a major benefit for local communities and commercial farming is protected.

Landscape Character Assessment:

While a large portion of Ugu district comprises cultivated land (such as plantations and sugarcane), several prominent steep slopes, ridges and mountains in Ugu still possess natural aesthetic value. The district is home to the famous Oribi Gorge Nature Reserve and the largest town is Port Shepstone. Other major conservation or protected areas include Umtamvuna, Mbumbazi, Vernon Crookes and two unnamed reserves located along the Ngele escarpment. An investigation into the general topography of the region, the terrain morphology, the broad land cover and land use patterns, and a visual assessment aimed at determining the visual exposure within the district, provides us with zones with similar characteristics, to delineate zones and to provide management guidelines (where applicable) for each zone.

Mapping, conclusion and way forward:

A series of maps was produced for the status quo phase, which are presented in this report and will part of the spatial GIS component of the EMF. These, in addition to the written material of the status quo phase, will be used to inform the next key phases, namely the Desired State, the Environmental Management Zones and the Strategic Environmental Management Plan.

1 Introduction

1.1 Overview

The Ugu District Municipality (Ugu DM), in conjunction with the National Department of Environmental Affairs (DEA) and Provincial Department of Agriculture and Environmental Affairs (DAEA), has appointed Mott MacDonald to develop an Environmental Management Framework (EMF) for their district. This arises from the need for more informed, strategic conservation and development planning for the Ugu DM to ensure sustainable social, economic and environmental development in future. The development of an EMF will assist the Ugu DM in executing sound environmental governance, particularly in development planning and conservation.

According to the DEA (1998), a key function of an EMF is to proactively identify areas of potential conflict between development proposals and critical/sensitive environments. Guideline 6 of the Integrated Environmental Management Guideline Series (DEA, 2012) defines an EMF as:

"The study of the biophysical and socio-cultural systems of a geographically defined area to reveal where specific land uses may best be practiced and to offer performance standards for maintaining appropriate use of such land."

A key component of this is a complementary GIS tool, which inter alia integrates multiple baseline layers into a single facet map, making it a user-friendly, interactive decision-support tool.

1.2 EMF Project Objectives

The preparation of an EMF for the Ugu DM intends to assist with:

- Identification of sensitive and important biophysical and socio-cultural attributes in the district and mechanisms for the protection thereof;
- Identification of areas more suitable for development with fewer environmental constraints;
- Creation of a robust spatial decision support tool, which will guide effective environmental governance and identify restricted use areas in the landscape;
- Provision of an appropriate policy and spatial context for the adjudication of development applications and development planning for the Ugu DM and its six Local Municipalities;
- Acceleration of the decision-making process for Basic Assessments and full Scoping and Environmental Impact Assessments;
- Expediting turn-around times on environmental queries brought to the DM;
- Proactive planning of future development by developers; and
- Overall facilitation of sustainable development.

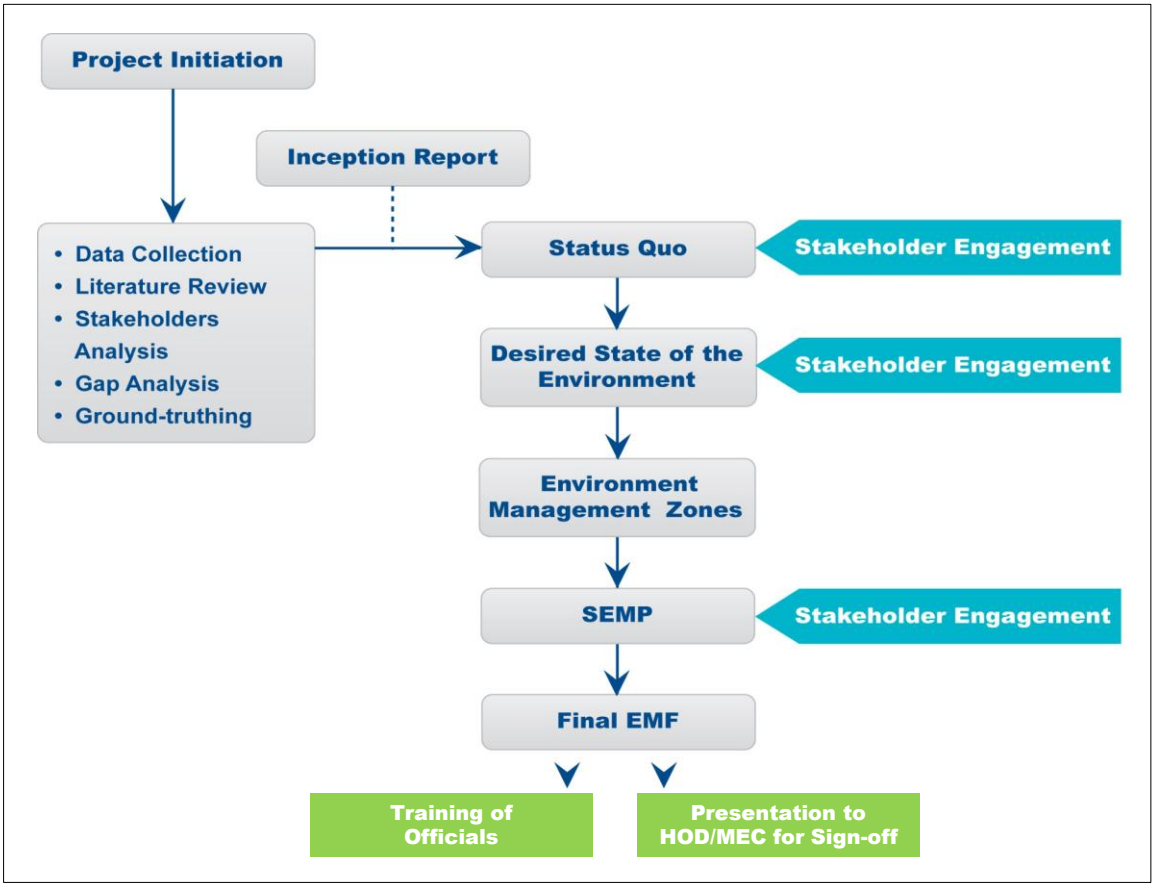
It should be noted that, although the content of an EMF is prescribed by law, the nature of each EMF will be determined by the context of the area for which it is undertaken, and the content of each EMF will vary accordingly (Guideline 6, 2012). The context is typically defined by the following key factors:

- The types, nature and scale of environmental attributes; and
- The type of development pressures experienced.

1.3 EMF Process

The overall EMF process is best portrayed by the flow diagram below.

Figure 1.1: EMF Process flow chart



An EMF is made up of 5 key phases (Figure 1.1) namely:

1. Status Quo: data collection, literature review, stakeholder analysis, gap analysis, ground-truthing;
2. Desired State of the Environment;
3. Environmental Management Zones;
4. Strategic Environmental Management Plan; and
5. Final Environmental Management Framework.

On completion of the EMF, the document is presented to the HOD/MEC to be signed off, and municipal staff and training for users of the Ugu EMF on the use of the GIS tool is undertaken.

Throughout the EMF project, stakeholder engagement is carried out through direct and indirect interventions at appropriate stages. Stakeholders are however encouraged to engage with the project team at any time during the EMF process. Similarly, the Project Steering Committee (PSC) is engaged throughout the project, via meetings and workshops, and via electronic means of correspondence. This report describes the status quo of the environment within the Ugu DM and represents the first phase of the Ugu EMF.

1.4 Purpose of the Status Quo Phase

The Status Quo Phase of the EMF is a critical element to the overall product, as it baselines environmental, cultural and socio-economic features, attributes, opportunities and constraints existing on the ground. The Status Quo Phase forms the foundation of the EMF process. Its purpose is to describe in detail the existing environment and socio-economic conditions in the Ugu DM, as well as any presiding opportunities and constraints. Its purpose is also to detail the legislative environment within which all natural assets (e.g. water resources, grasslands and heritage sites) are managed.

Once complete, the status quo informs the various EMF phases going forward. Stakeholder engagement at this stage is vital, as this serves to inform stakeholders of the project details and ensures that information held by stakeholders is included in the status quo database.

1.5 Stakeholder Engagement during Status Quo Phase

1.5.1 Identification of Interested and Affected Parties

A stakeholder database was created by identifying stakeholders from the private and public sectors, civil society and communities.

The list primarily comprises of the following:

- Government (local and district municipal representatives, councillors, provincial DAEA, national DEA, Department of Water Affairs (DWA) Ezemvelo KwaZulu-Natal Wildlife (EKZNW), utility-based service providers, etc.);
- Traditional authorities (Amakhosi) and community representatives;
- Nongovernmental Organizations (NGOs), Non-profit Organizations (NPOs) and Community-Based Organizations (CBOs);
- Chamber of Commerce and Chamber of Business;
- The general public/civil society; and
- Environmental organizations such as the Wildlife and Environment Society of South Africa (WESSA), Endangered Wildlife Trust (EWT) and Conservancies.

1.5.2 Advertisements and Distribution of Background Information Documents

The process of introducing the public to the EMF process began with an advertisement of the project. An English advertisement was placed in the South Coast Fever and Upper Fever (local) newspapers on 24

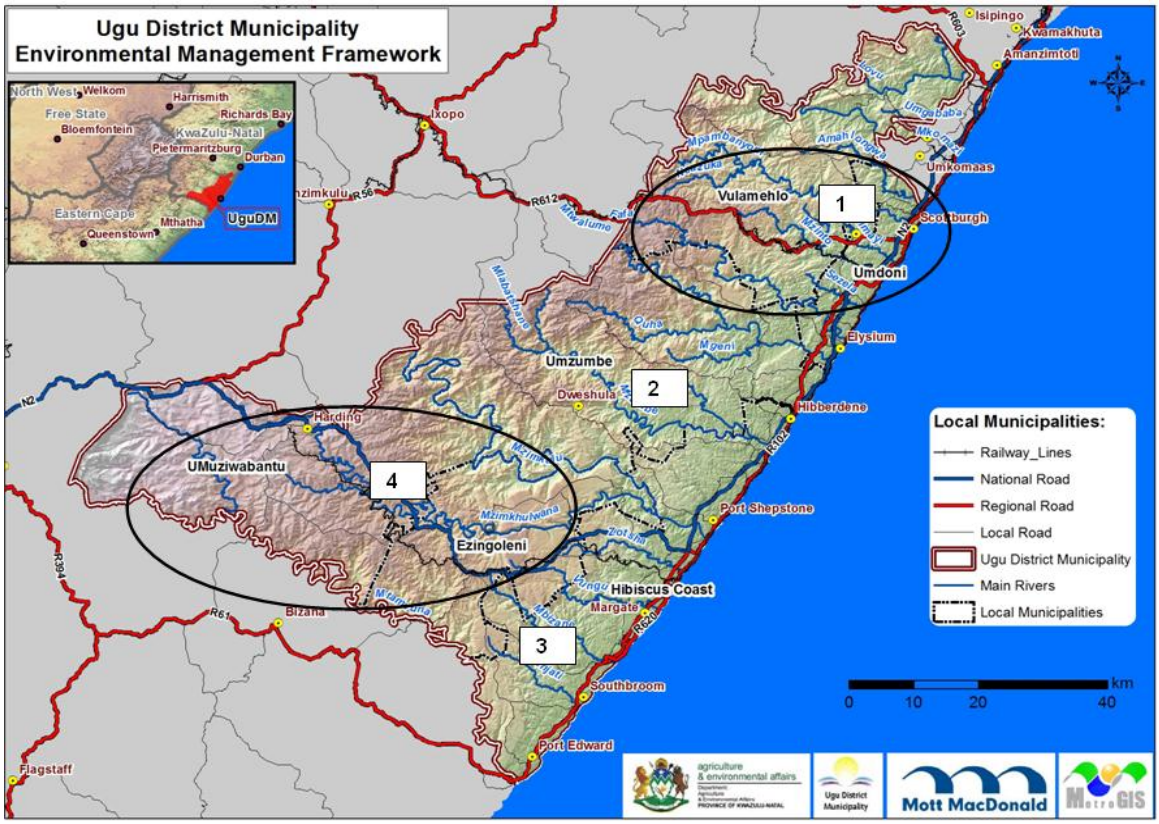
January 2013, while an isiZulu advertisement was placed in the Ilanga (regional) newspaper on 24 January 2013.

Similarly, Background Information Documents (BIDs) were compiled in both English and isiZulu and were emailed to all stakeholders on the stakeholder database on 29 January 2013. The purpose of the BID document was to introduce the public to the EMF and to explain the process and intent of the EMF in a simplified, reader-friendly format. The BID document was also part of the emailed invitation to stakeholders to public workshops.

1.5.3 Workshops

During the Status Quo Phase, a series of public workshops was held on 7 and 8 February 2013 at four representative locations throughout the district (Figure 1.2).

Figure 1.2: Grouping of local municipalities for public workshops



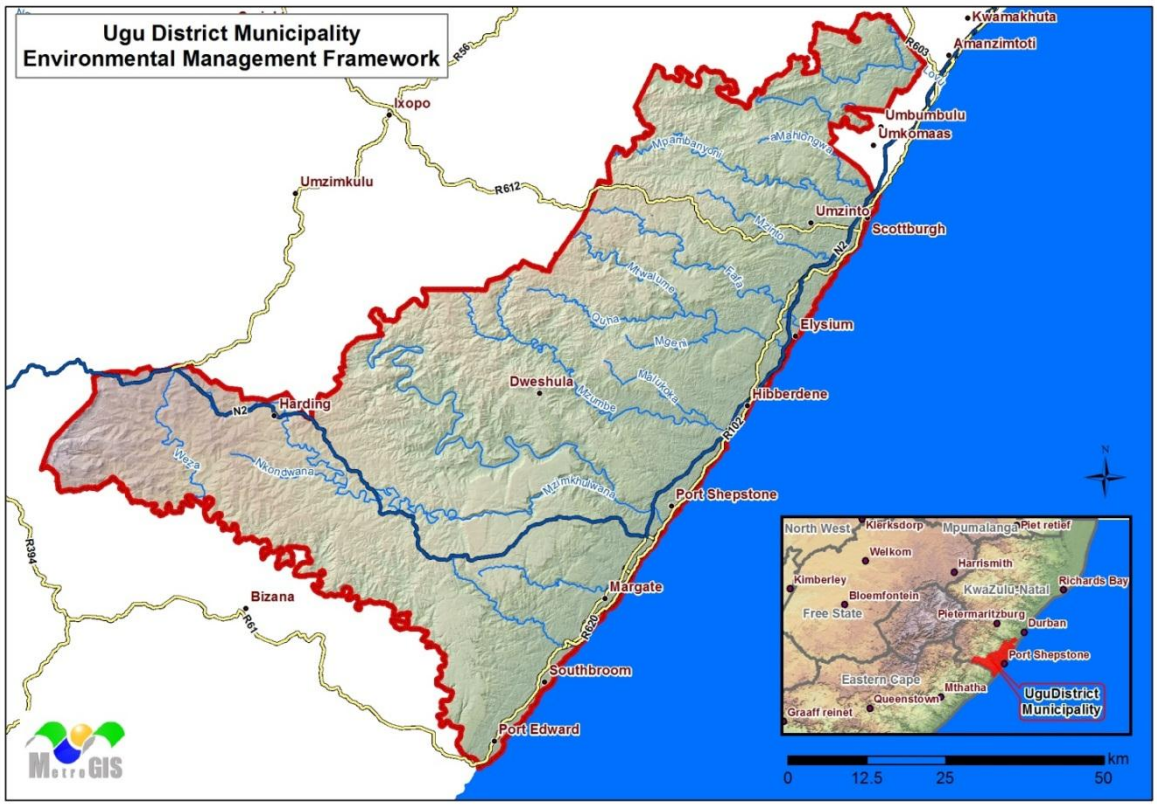
Source: Mott MacDonald (2013)

2 Study Area

2.1 Overview

The Ugu DM (DC21) (Figure 2.1) is one of the eleven (11) district municipalities (10 districts and one metro) within the province of KwaZulu-Natal (KZN). It is situated approximately 50 km from Durban and is located at the most southern tip of the province's coastline. It has a coastline stretching for ± 112 km from the Mtamvuna River in the south to the town of Scottburgh in the north. The Ugu DM is bordered by the Indian Ocean on the east, the Eastern Cape Province on the south, the eThekwini Metropolitan Municipality on the north and the Umgungundlovu and Sisonke District Municipalities on the west. It is 5,044 km^2 in extent - constituting 5.3% of the province's land area.

Figure 2.1: Physical Map of the Ugu District Municipality

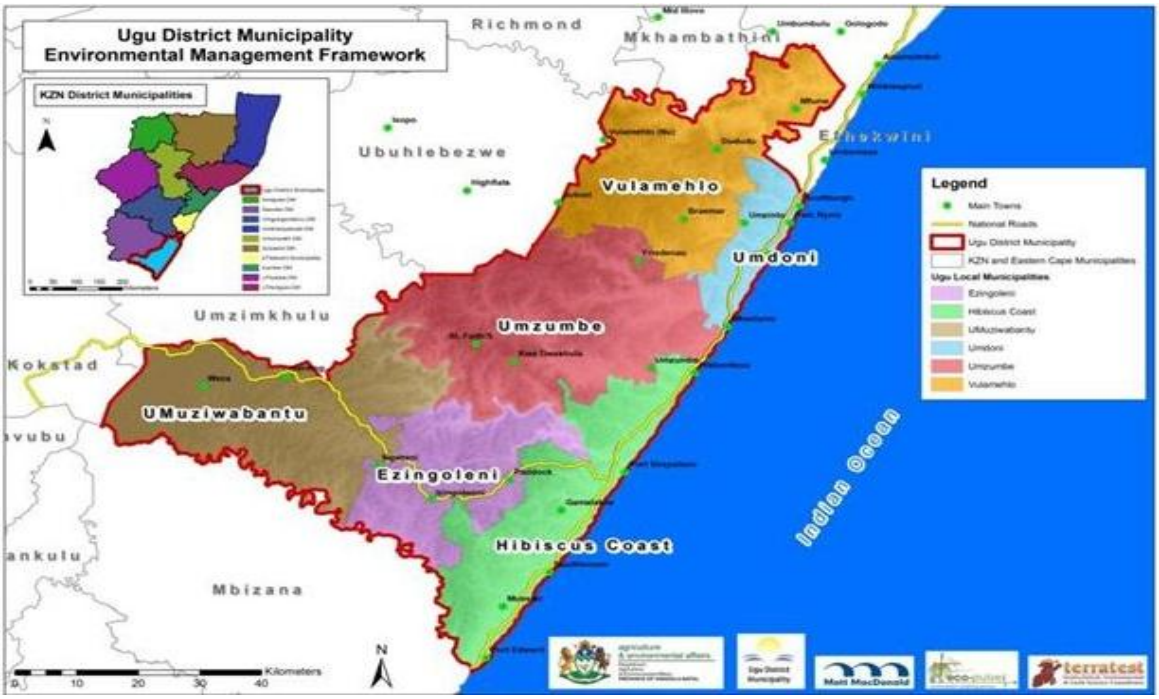


Source: MetroGIS (2013)

The district has a well-developed coastal belt with good access to infrastructure and an inland region of largely rural populations with relatively limited infrastructure, as well as commercial agricultural and subsistence farming. Its main economic sectors are agriculture, tourism, mining/quarrying and manufacturing. The Ugu DM is situated within a summer rainfall region, experiencing warm, sub-tropical climatic conditions. Coastal and inland climates vary significantly, as coastal temperatures are moderated by the warm Indian Ocean.

The municipality consists of eighty one (81) municipal wards and forty two (42) traditional authorities. These make up six (6) local municipalities (LMs), namely Hibiscus Coast, Ezinqoleni, Umdoni, Umuziwabantu, Umzumbe and Vulamehlo (UDM, 2011/2012) (Figure 2.2). The Umzumbe Municipality, Hibiscus Coast Municipality and Umdoni Municipality are coastal municipalities; the Hibiscus Coast Municipality and Umdoni Municipality are generally considered more urban in nature, whereas the remaining four municipalities are more rural in nature.

Figure 2.2: The six local municipalities of Ugu District including main towns

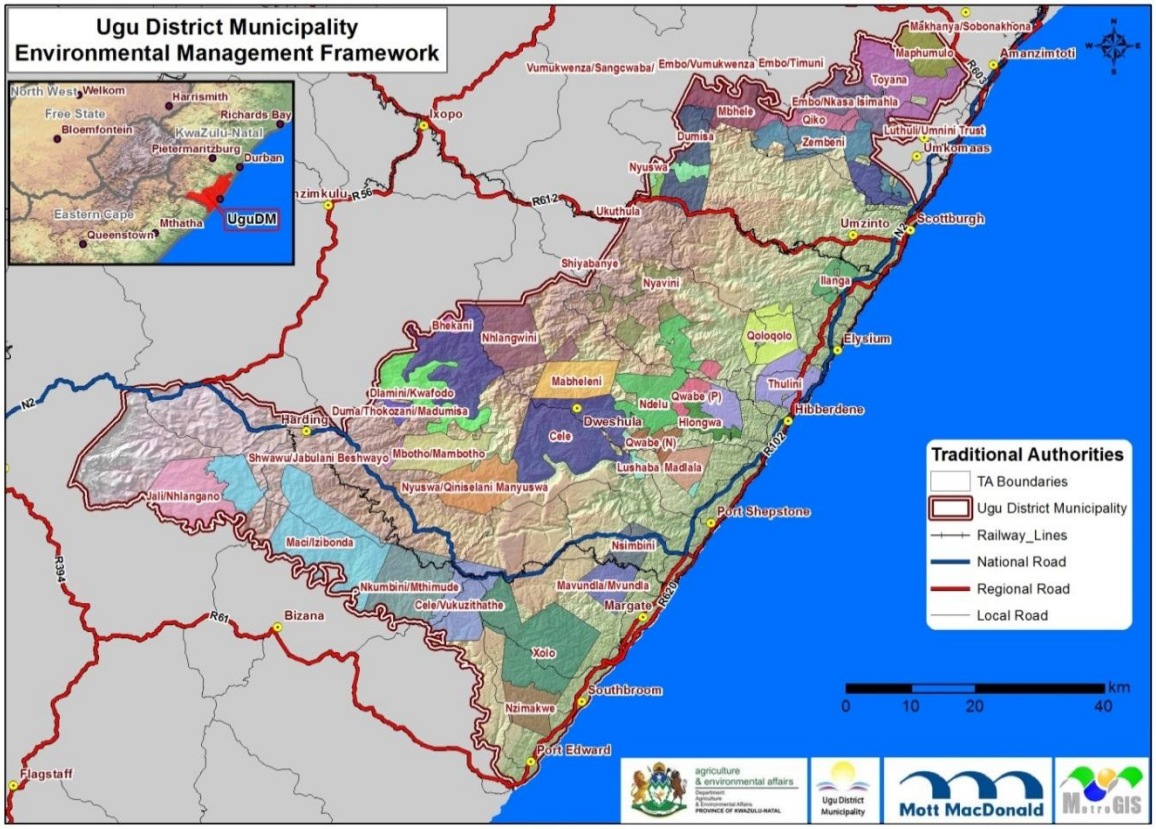


Source: Eco-pulse (2013)

2.2 Land Use Management

Traditional authority areas (Figure 2.3) make up approximately 50% of the Ugu DM - specifically the inland rural LMs (CoGTA, 2011). Natural areas and subsistence farming dominate this area. Only a small part of the traditional authority area is dedicated to commercial farming, which predominantly takes place on privately owned land.

Figure 2.3: Areas under Traditional Authority in the Ugu DM

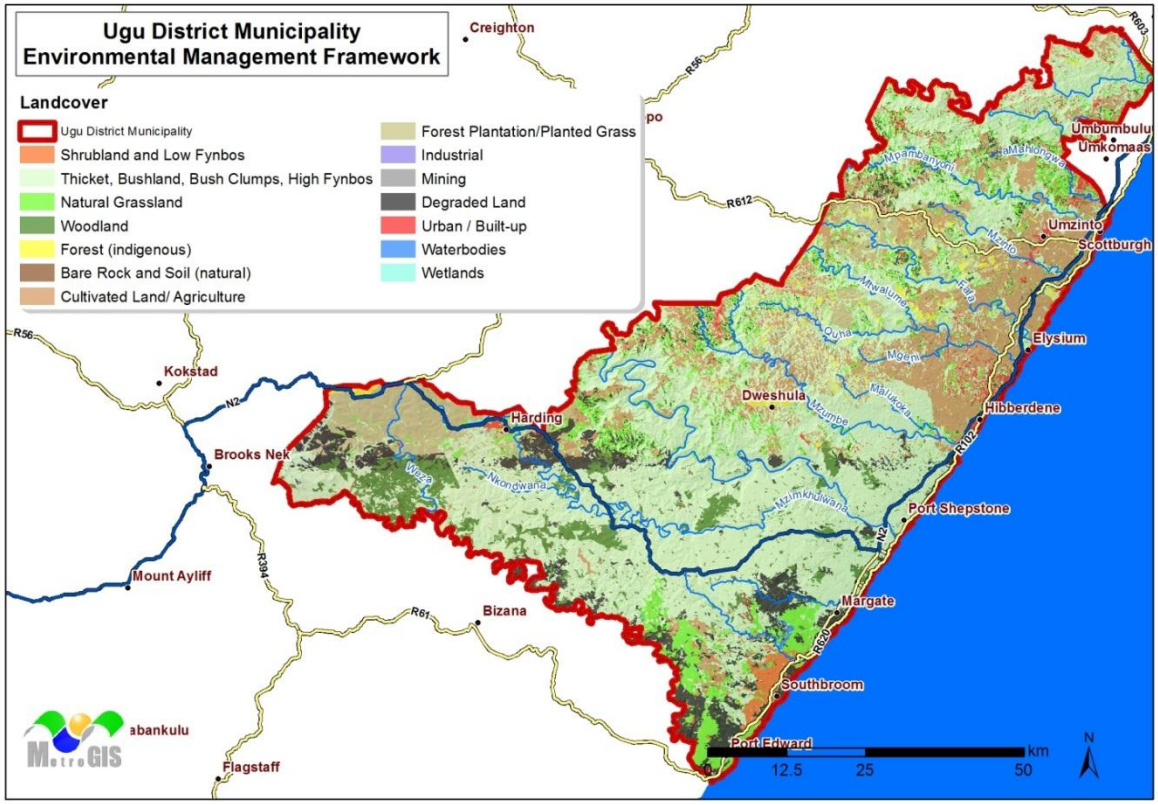


Source: MetroGIS (2013)

Areas along the coast have well developed infrastructure including transport, electricity, water and sanitation as well as areas of great aesthetic value. As a result, ribbon development has taken place along the N2 highway with the inland rural areas away from the N2 highway being less developed (Figure 2.4).

With respect to commercial farming, the main agricultural activity within the Ugu DM is crop farming, with sugar cane and bananas being the main crops produced. The district produces one fifth of all bananas consumed in South Africa, as well as vegetables, tea, coffee and macadamia nuts. Poultry, cattle and goat farming occur on a limited scale

Figure 2.4 Land Use Map for the Ugu District Municipality



Source: MetroGIS, 2013

Timber production also takes place within the Ugu DM. Timber farming produces pine, gum and wattle, which are processed by about 200 small sawmills. Commercial plantations are situated within the high rainfall areas including Harding, the northern part of Vulamehlo LM and the central areas of the Umzumbe LM and Ezinqoleni LM. A number of small-scale growers occur within the traditional authority areas.

Manufacturing hubs within the Ugu DM include Park Rynie, Umzinto and Sezela within the Umdoni LM, Port Shepstone, Izotsha, Uvongo, Shelly Beach and Manaba within Hibiscus Coast LM, and Harding within the Umuziwabantu LM. Manufacturing includes, but is not limited to, furniture, textile and clothing, and cement and brick production.

Ugu DM has the only 'marble' delta within the KZN province, mined for cement and calcium carbonate. This 'marble' delta is located adjacent to and within the Oribi Gorge Nature Reserve. In addition to the mining of calcium carbonate, sand winning occurs within the rivers of the Ugu DM.

2.2.1 Water Management Areas

The Ugu DM falls within the Mvoti–Mzimkulu Water Management Area (WMA), which comprises of ten (10) major river catchments. Four (4) of these catchments occur within the Ugu DM, namely the Mkomazi, Mtamvuna, Mtwalume and Mzimkhulu catchments (DWA, 2004).

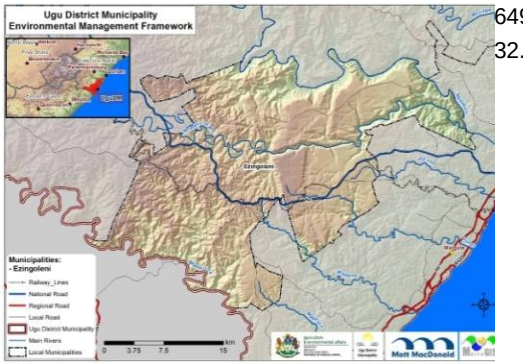
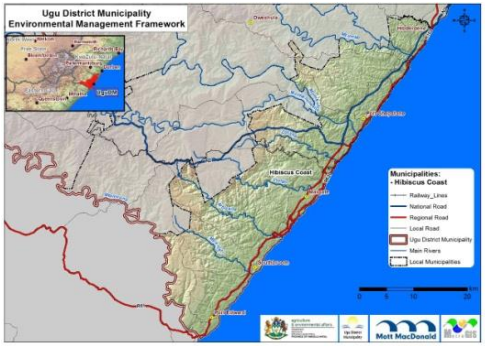
2.3 Overview of District-Wide Environmental Risks, Threats and Trends

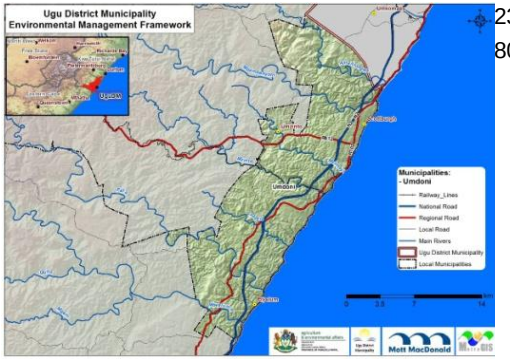
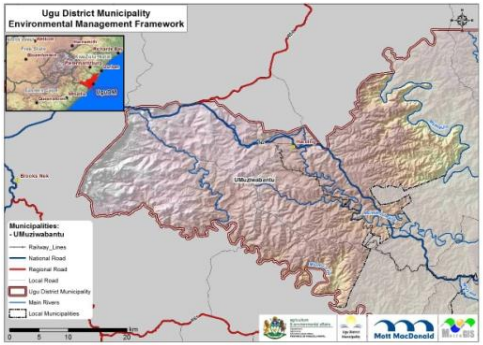
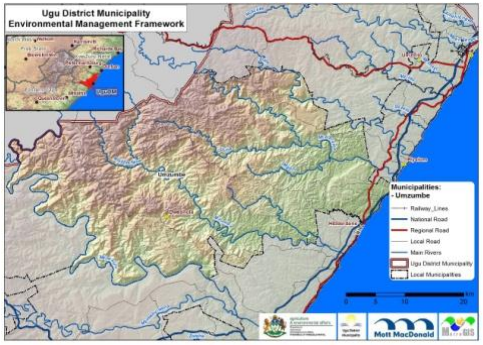
According to the Ugu DM Integrated Development Plan (IDP) of 2011/12, a summary of key environmental issues being experienced in the district are:

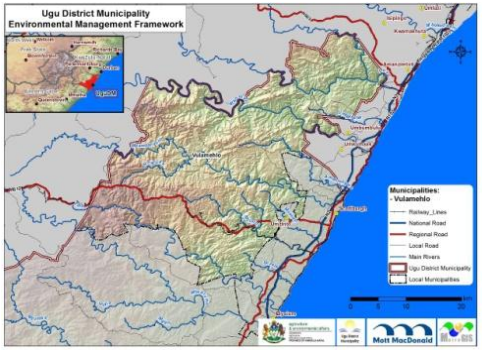
- Soil erosion and wetland degradation;
- Alien invasive plants, which are competing with and replacing indigenous vegetation;
- Active protection of the few intact remaining coastal resources and inland biodiversity is regarded as critical (the Admiralty Reserve, green wedges, wetlands, dune systems and estuaries, fish and other marine and inland species);
- Rehabilitation of damaged and degraded areas is not being adequately undertaken or addressed;
- Water pollution and waste disposal are noted as key threats to water resources and aquatic biodiversity;
- Illegal sand winning and inappropriate developments, particularly along the coastal strip, are of concern to communities;
- Current cultivation practices, grazing densities and illegal muthi harvesting in rural areas are not being undertaken in a sustainable manner;
- Illegal marine resources harvesting occurs all along the coast but mainly near Mfafazana (in particular crayfish), Elysium (in particular mussels) and Port Edward;
- In addition to grazing, incorrect burning regimes are decreasing the quality of grassland/ vegetative cover and is therefore increasing erosion levels;
- Loss of agricultural land due to wide-spread development pressures in the district;
- Protected areas as well as National and Provincial Protected Area Expansion Strategy areas do not adequately encapsulate the biodiversity priority areas identified by EKZNW;
- A clearly defined district wide Municipal Open Space System does not exist;
- Climate change is identified as a threat throughout the district, particularly in urban areas/ areas of dense settlement, floods and coastal erosion;
- Inappropriate planning/development; and
- Poor forestry management practices and unsustainable agricultural practices.

2.4 Overview of Biophysical Features within Local Municipalities

Table 2.1: Overview of biophysical features within each local municipality within the Ugu District Municipality

Local Municipality		Extent	Biomes	Water bodies	Conservation areas
Ezinqoleni		649 km^2 in extent 32.2% transformed	Indian Ocean Coastal Belt Savanna	Mbizana Mtamvuna Mzimkhulu Mzimkhulwana Vunga 167 wetlands covering 341.7 ha	Oribi Gorge Umtamvuna (partially) Mbumbazi (partially) 19.3 km^2 (3%) of LM
Hibiscus Coast		837 km^2 in extent 57% transformed	Indian Ocean Coastal Belt Savanna	Mbizana Mtamvuna Mzimkhulu Mzumbe Vungu 632 wetlands covering 701.9 ha 27 temporarily closed estuaries	- Mbumbazi Mpenjati Skyline Umtamvuna 47.6 km^2 (6%) of LM

Local Municipality		Extent	Biomes	Water bodies	Conservation areas
Umdoni		238 km^2 in extent 80% transformed	Indian Ocean Coastal Belt	aMahlongwa Fafa Mpambanyoni Mtwalume Mzinto 225 wetlands covering 210.6 ha 9 temporarily closed estuaries	TC Robertson Nkomba Aliwal Shoal Marine Protected Area
Umuziwabantu		1,088 km^2 in extent 46.3% transformed	Savanna Grassland	Goxe Mtamvuna Mzimkhulu Mzimkhulwana Weza 140 wetlands covering 693 ha	
Umzumbe		1,259 km^2 in extent 26.9% transformed	Indian Ocean Coastal Belt Savanna	Fafa Mtwalume Mzimkhulu Mzumbe 169 wetlands covering 681.8 ha 4 temporarily closed estuaries	Mehlomnyama 1.63 km^2 (0.13%)of LM

Local Municipality	Extent	Biomes	Water bodies	Conservation areas
Vulamehlo 	973 km^2 in extent 37.5% transformed	Indian Ocean Coastal Belt Savanna	aMahlongwa Fafa Lovu Mkomazi Mpambanyoni Mtwalume Mzinto uMgababa 150 wetlands covering 603.8 ha	Vernon Crookes 47.6 km^2 (2.3%)

2.5 Socio-Economic Background

2.5.1 Social Profile

With a population of 722,484 people in 2011, the district houses 7% of the provincial population (Statistics South Africa, 2012). Since 2001, the Ugu DM has experienced an annual growth rate of 0.26% in comparison to the province's growth rate of 0.69% per annum. Within the Ugu DM, as shown in Table 2.2 below, this growth rate has been uneven, with only Hibiscus Coast, Umdoni and Umuziwabantu LMs showing positive growth rates. The highest growth rate is seen in Umdoni LM with a rate of 2.35 %, whereas at the opposite end of the scale is the Umzumbe LM with a -1.85% growth rate. This trend follows the rural-urban migration, with the general population seeking employment in urban nodes such as Harding within the Umuziwabantu LM and the various urban-coastal nodes in Hibiscus Coast LM and Umdoni LM (Statistics South Africa, 2012). Gender ratios indicate that the population is made up of 46% males and 54% females (Department of Health, KwaZulu-Natal, 2013).

48% of the district's population are under the age of 19. There is a strong perception that young people in Ugu aspire to move into metro areas, given the limited opportunities for both youth development and entertainment within the district. There is concern that land pressures in rural areas are pushing young people off the land, as parcels being allocated are getting smaller and smaller and outsiders move in. This trend could have long-term implications for the district as the young productive population decreases.

As illustrated in Table 2.2 below, the population distribution is uneven, with 35.5% of the population residing within the Hibiscus Coast LM (Statistics SA, 2011). The two coastal LMs, which make up 21.3% of the land mass of the Ugu DM, house 46.4% of the district's population. While the population is predominantly rural (86%), the urban coastal zone has the highest population density. The corresponding density of people per/km^2 thus ranges from an average of 306 to 331 people/km^2 on the coast to an inland average of 80 to 89 people/km^2.

Table 2.2 Population statistics for the Ugu District Municipality based on 2001 and 2011 census data

Local Municipality	2001 (%)	2011 (%)	2011 density (people/km^2)	Population Growth (percentage per annum)	
				1996 – 2011	2001 – 2011
Ezinqoleni	7.8	7.3	81	2.83	-0.42
Hibiscus Coast	30.9	35.5	306	2.61	1.62
Umdoni	8.9	10.9	331	2.81	2.35
Umuziwabantu	13.1	13.4	89	2.35	0.45
Umzumbe	27.5	22.2	128	2.99	-1.85
Vulamehlo	11.8	10.7	80	-3.66	-0.69

Source: Statistics South Africa (2012)

There are 494 public schools and 24 independent schools in the Ugu DM, and out of the estimated 300 000 young people of school going age, only 83% are accounted for in the formal schooling system. Grade R classes accommodate approximately 15,100 learners in public schools, and only 8 registered independent pre-primary schools in the entire Ugu DM. The quality and accessibility of educational facilities and resources remain critical challenges within the district, particularly within the rural areas. Problems include:

- Lack of physical resources such as laboratories and computer centres;
- Poor quality and insufficient quantity of educators;
- High turnover of teachers in rural communities;
- Low levels of motivation of learners and educators;
- Weak maths and science results;
- Inadequate attention to life skills;
- Teenage pregnancies;
- Overcrowding in urban schools owing to pressure to absorb large learner numbers; and
- Limited focus on technical subjects, such as agriculture.

Addressing infrastructure backlogs within public schools is hampered by:

- Inadequate infrastructure planning;
- Poor quality tender documents;
- Capacity constraints within the department of education; and
- Weak implementation.

Within the district, there are a limited number of substantial tertiary training colleges, such as the Esayidi FET College, Boston City Campus and the Coastal College Skills Centre. In addition, there are a few smaller training colleges or centres which provide a limited range of courses. Some training institutions have attempted to operate within the region but have closed. All municipalities in the district have allocated substantial bursary support for Grade 12 registrations in FET colleges. Concerns regarding tertiary education within the district include:

- Insufficient training facilities;
- Accessibility of FET colleges;
- Poor quality training; and
- A mismatch between skills provided and the jobs market and therefore a need to develop stronger linkages between the private sector and FET institutions to ensure course relevance and student job or work experience placements.

HIV/AIDS and TB are major contributors to poor health within Ugu (Table 2.3). In 2011, 114 987 people were identified as HIV positive. The municipality with the largest population, the Hibiscus Coast Municipality, has the highest number of HIV positive people, and the Ezinqoleni Municipality has the lowest number of HIV-infected people. The increase in HIV incidence is a major cause for concern, resulting in:

- Pressure on existing health facilities and resources;
- An increase in child-headed households;
- Higher dependency levels;
- Increasing levels of vulnerability to external shocks;
- Lower productivity levels;

- Deepening poverty; and
- A reduction in the potential labour force within the region.

Table 2.3 Mortality and causes of death in the Ugu DM

Ugu	No.	%
Tuberculosis	1924	15.6
Influenza and pneumonia	829	6.7
HIV disease	815	6.6
Intestinal infectious diseases	796	6.5
Cerebrovascular diseases	754	6.1
Diabetes mellitus	589	4.8
Other forms of heart disease	452	3.7
Other viral diseases	430	3.5
Hypertensive diseases	390	3.2
Chronic lower respiratory diseases	339	2.8
Other natural causes	3991	32.4
Non-natural causes	992	8.1
All causes	12301	100

Source: Mortality and causes of death in South Africa, 2010: Findings from death notification. Statistics South Africa (2013)

Health Facilities Profile in the Ugu DM (Department of Health, KwaZulu-Natal (2013):

- 3 District hospitals;
- 1 Regional hospitals;
- 36 Provincial fixed clinics;
- 1 Provincial Gateway clinics;
- 10 Local Government fixed clinics;
- 14 Mobile clinics;
- 2 Private hospitals;
- 1 NGO hospice;
- 1 Stepdown (NGO);
- 1 Provincial TB stepdown;
- Average Population/clinic is 11541; and
- 16 new clinics built and 3 clinics upgraded since 1994.

Levels of poverty within the Ugu DM remain unacceptably high; with three of the local municipalities within the Ugu DM ranked in the top ten of the province's most deprived areas in 2011. The remaining three local municipalities, Umzumbe, Umdoni, and Hibiscus Coast were ranked at number 37, 43 and 46 out of a total of 50 local municipalities respectively, demonstrating the strong urban/rural divide within the region.

2.5.2 Transport Corridors

The N2 highway is the primary north-south road linkage through the Ugu DM. It links Port Shepstone in the south with Durban in the north. The N2 highway also forms an east-west linkage, linking Port Shepstone in the east to Kokstad in the west. The section of the N2, which runs in the north-south direction up to Port Shepstone, is of freeway standard comprising of four (4) lanes with two (2) lanes in each direction for most parts. However, the highway is largely two (2) single-lanes for the east-west linkage. Environmental authorisation has been granted for the construction of a new highway linking Durban with Port Elizabeth in the Eastern Cape Province. This highway will run along the coast, entering the KZN Province at the existing R61 bridge crossing the Mtamvuna River. It will run along the existing R61.

The R61 is currently the only toll road within the Ugu DM. It starts at the end of the N2 highway in Port Shepstone and runs into the Eastern Cape Province via Port Edward. The R102 is commonly referred to as the Beach Road. It runs parallel to the N2 mainly along the coast, although it does run inland of the N2 through Umzumbe LM going back to the coast at Hibberdene and joining the R61 just south of Ramsgate. The R612 provincial road is an east-west linkage, linking Park Rynie with Highflats in the Sisonke DM.

The main rail corridor in the district is the standard gauge South Coast line that runs from Port Shepstone to eThekwini. The standard gauge line is supplemented by a narrow gauge line from Port Shepstone to Harding, and is primarily used to transport timber and sugar cane. Due to the increase in road-transport, more goods are being transported by road, resulting in a reduced volume of freight on this line. In addition to the road and rail infrastructure, Margate Airport is also located in the Ugu DM, servicing smaller aircraft.

2.5.3 Settlement

As briefly described above, the Ugu DM has settlement areas ranging from high density urban areas located on the coast, to dispersed rural settlements inland (Table 2.4). For more robust assessment and planning purposes it is necessary for settlements be classified. Basic reasons for classifying settlement include the following:

- **To develop infrastructure standards:** It is generally accepted that levels of infrastructure provided in different settlement types will differ. It is necessary that a consistent set of infrastructure standards should be applied across the district;
- **To inform / support policy and strategy development**: The historical split between rural and urban provides no support for policy / strategy development. A further level of disaggregation of settlement types is required; and
- **To prepare population projections**: It is suggested that settlements with the same characteristics will reflect similar growth patterns.

Table 2.4 Percentage of households by settlement type and location

Municipal Settlement Classification	Percentage of HH Category							
	Hibiscus Coast	Umzumbe	Umuziwabantu	Umdoni	Vulamehlo	Ezinqoleni	UGU	Total HH
Formal Urban	50.05%	0.08%	10.22%	43.18%	0.52%	0.00%	24.27%	35,452
Informal Residential Upgrade	0.49%	0.00%	0.82%	1.69%	0.00%	0.00%	0.49%	716
Linked Rural Upgrade	29.45%	28.49%	8.88%	40.45%	17.97%	29.51%	26.38%	38,537
Good Access Rural Upgrade	13.32%	25.67%	29.52%	10.78%	28.23%	46.95%	21.70%	31,697
Limited Access Rural Upgrade	1.90%	17.83%	34.96%	0.75%	14.44%	7.96%	11.67%	17,047
Scattered	4.78%	27.93%	15.60%	3.15%	38.84%	15.57%	15.49%	22,631

Source: Ugu Infrastructure Audit (2011)

The 2011 Ugu DM SDF describes three types of residential areas and suggests basic interventions to be considered in the different areas. The three types of residential areas outlined are listed and described as follows in the SDF:

Formal Residential: the formal residential areas primarily include the existing urban areas and some of the non-urban areas that have levels of cadastral certainty. These areas are subject to relatively little planning intervention, which will comprise essentially of maintenance of infrastructure and services;

Informal Residential Dense: most of the dense "informal" residential areas, within and outside of Traditional Areas (Ingonyama Trust Board) boundaries, are adjacent or close to existing formal urban areas or proposed priority nodes. These will be focus areas for short and medium term investment and will be subject to various levels of improvement, as appropriate to their context, and will include cadastral formalization, *in situ* upgrading to an appropriate level of urban infrastructure and densification; and

Rural Clusters: these clusters represent all settlement not included in the above two categories, and most of these have relatively low density, scattered settlements. These are not subject to any planning intervention and are likely to remain as they are for the short-to-medium term.

2.5.4 Major Economic Trends and Patterns

The Ugu DM has an established manufacturing base, with 235 industries supporting a consistently higher growth rate than the rest of KwaZulu-Natal. Port Shepstone is the major employment centre within the district, being dominant in respect of government and commercial work opportunities. Transport, commerce and manufacturing are important economic sectors for job opportunities. The contribution of the various sectors to the Gross Geographic Product (GGP) is shown in Table 2.5 below.

Table 2.5 Contribution of various sectors to Gross Geographic Product (2000)

Magisterial district name	Agric.	Mining	Manuf.	Electr.	Const.	Trade	Trans.	Finance	Com. service	Total GGP (2000)	Total GGP (1990)
ALFRED	30	0	32	11	2	47	13	2	118	256	245
P.SHEPSTONE	68	65	296	31	105	317	190	304	467	1843	1759
UMBUMBULU	1	3	36	1	6	58	13	14	247	380	368

Source: UDM (2011/12)

In terms of commercial agricultural production, the Ugu district produces approximately 195 000 tons of pine a year in addition to the 1 755 million tons of gum and wattle by local pulp mills. There are approximately 200 small sawmills operating - producing approximately 6 000 tons of board per annum. In the sugar cane industry, some key challenges exist for emerging sugar cane farmers, such as: difficulties in harvesting due to poor road conditions, uncontrolled veld fires and a lack of technical, management and/or financial support. In addition, one fifth of all the bananas consumed in South Africa are produced in the Ugu DM, while tea has been grown within the district for more than a decade. There are also small coffee plantations in the south (UDM, 2011/12).

As previously stated, the district's primary tourist attraction is the sea, and this is complemented by sporting activity destinations for golfing, scuba diving, whale watching and events such as the sardine run. Most tourism facilities are found along the coastal corridor. More than 50% of hospitality industries are found between Shelly Beach and Port Edward. Rural areas hold a wealth of tourism potential too, but remain largely undeveloped as an adventure, eco and cultural tourism destination. This represents possible future opportunities for the district (UDM, 2011/12).

2.6 Socio-economic Drivers at the Local Municipal Level

Table 2.6 Summary of Socio-economic status quo of Ugu Local Municipalities

Municipality	Socio-Economic Drivers	Area	Key LED Activities and Investment Projects
Umuziwabantu LM	Umuziwabantu has its administrative seat in Harding. The main source of income for the area is derived from the municipality's extensive wattle, gum, pine and poplar plantations, and associated industries, including saw mills and furniture-making factories.	Area: 1,089 km^2	Ingeli trails, Honey production, Bean production, training programmes for both cooperatives and SMMEs and formalising their registration, formation of Umuziwabantu chapter business chamber of commerce. In the strategy, it appears that Umuziwabantu area has high potential for production of maize, wheat and sugar cane, other crops and plantations. People in the community are encouraged to form groups of cooperatives in order to access these opportunities. The municipal council has decided not to renew contracts of expiring lease of lands occupied by former advantaged counterparts, in pursuit of encouraging previously disadvantaged people to use the land in future. The municipality plans to make land space available for both residential and commercial development.

Municipality	Socio-Economic Drivers	Area	Key LED Activities and Investment Projects
Ezinqoleni LM	The major land uses in the area being tribal settlements, smallholdings and commercial farming. The Ezinqoleni Municipality accounts for approximately 14% of the Ugu DM area, with its administrative seat in iZingolweni. Approximately 35% of the municipality's total area can be classified as residential or smallholding areas while the remaining 65% of the land is dedicated to agriculture / conservation and other non-residential land uses. There is reportedly an acute shortage of basic services and facilities, housing, and employment.	Area: 648 km^2	Mall – development, Establishment of a Building a mall, Establishment of a Town, Agri-village Development, Focus on rural infrastructure, Human capacity Development, Ncumusa Causeway Bridge Repair, Upgrade community Halls, Livestock kraals and tractors to plough land, Rehabilitation of Qili, Qandangwe and Mgudlwa roads
Hibiscus Coast LM	Hibiscus Coast Local Municipality has its administrative seat in Port Shepstone and covers an area of approximately 90 km of coastline, comprising of 21 beaches and extends 30 km inland, covering a vast, rural area under the leadership of six tribal authorities. It is the most concentrated economic hub within the Ugu DM in the KwaZulu-Natal Province. The main features of the economy are tourism and agriculture with some manufacturing centred around Port Shepstone. Beaches of world-class quality are to be found along the entire seaboard, four of which have been recognised as Blue Flag beaches. The coastline is dotted with numerous small towns, many of which serve as seasonal recreational hubs, such as Port Shepstone, Umtamvuna/Port Edward, Margate, Hibberdene and Impenjati/ Southbroom.	Area: 839 km^2	Margate Airport, chicken abattoir at Kwa Xolo, Siyazenzela Project (Kwa Masinenge, Mkholombe and Louisiana), One Home One Garden in Tin town, rock caves at Kwa Xolo, Gamalakhe Traders Village, banana grower in Mpenjathi, Business Licence, Poverty Alleviation, Port Shepstone Prison, Investment Proposal Program, Multi-Purpose Community Centers (Bhomela, Kwa Xolo and Kwa Nzimakwe), rafters program in Bhobhoyi, Business Retention Program, Solar Youth Development Project, and Sewing Project at Kwa Xolo.
Umzumbe LM	Umzumbe Municipality is the largest municipality within the Ugu DM in terms of the geographic area coverage. The municipal boundary runs along the coast for a short strip between Mthwalume and Hibberdene and then balloons out into rural areas for approximately 60km. It covers a vast, largely rural area with approximately 1% being built up/semi-urban. The municipality incorporates 15 traditional authority areas compromising ten municipal	Area: 1,259 km^2	To ensure provision community facilities such as taxi rank, skills development centres, MPCC'S, crèches, schools, sports facilities and community halls. Relocation of certain pension pay points to community facilities. Utilize environmental resources and agricultural potential by encouraging large community gardens in appropriate areas. Feasibility study for Mfazazana Ocean harvesting project; Feasibility Study and Development of one Commercial Centre / Multi-purpose centre per cluster. Poultry Farming, Piggery, Stock farming. Umzumbe

Municipality	Socio-Economic Drivers	Area	Key LED Activities and Investment Projects
	wards. It has no established towns. The population congregates towards the coast, where fast transport routes allow access to the economic opportunities. The coastal town of Hibberdene serves as a seasonal recreational hub in the Umzumbe LM		beans project development. Feasibility study for small scale commercial forestry, farming of sweet potatoes, madumbi, peanuts & related strategies. Beans project development
Vulamehlo LM	Vulamehlo's main economic driver is agriculture.	Area: 960 km^2	To ensure the development of the agricultural sector; facilitate access to land; promote tourism development; stimulate the second economy; and ensure the creation of economic growth or job opportunities.
Umdoni LM	Umdoni LM is located under the Ugu DM in the KwaZulu-Natal Province. The coastline stretches approximately 40 km, and is approximately 50 km from the city of Durban and 65 km from Port Shepstone. Its main towns are Scottburgh and Umzinto. Umdoni Municipality is made up of nine wards, most of which are rural areas. It covers the areas of Amahlongwa, Amandawe, Umzinto, Ghandinagar, Shayamoya, Alexandra, Park Rynie, Scottburgh, Hazelwood, Asoka Heights, Malibu Heights, Pennington, Sezela, Ifafa, Mtwalume, Malangeni and Esperanza. The municipality can be divided into three major land uses, being Commercial Agriculture, Traditional Authority areas and Coastal Urban nodes. Its main economic driver is commercial agriculture.	Area: 252 km^2	Caravan Parks and camp site, Extension of Park Rynie Industrial Park, Dress a school child campaign. Customer Care vehicles, Develop Access Roads, Job creation, Tourism development, Solar heating for housing projects, Construction of 1000 rural in-situ upgrades, Ifafa Glebe Housing project, Malangeni Rural Housing Phase 2, Amahlongwa Rural Housing Phase 2, which is Ward 1 for 1000 units, which is Ward 7, 8 and 9 for 1000 units, Amandawe/ Kwacele Housing Project Phase 1 for 1000 units. Refurbishment and transfer of flats in Riverside. Providing infrastructure for informal traders. Agricultural support to communal gardens; Tourism attraction initiatives. Scottburgh beach front upgrades; Umdoni Golf Courses.

In terms of LED activities, it is again apparent that most economic development opportunities lie in the two coastal municipalities (Hibiscus Coast and Umdoni), while the other four municipalities in rural areas (Umuziwabantu, Ezinqoleni, Umzumbe and Vulamehlo), apart from commercial farming, are lacking in similar (developmental) drivers that the coast is experiencing.

2.7 Climate Change

17th Conference of Parties (COP 17) on Climate Change – COP 17 and Beyond

Local governments, as recognised in the Local Agenda 21 of the Rio Summit (1992) as "the government closest to the people", recognised the need to develop and implement an adaptation charter that would guide them in making sustainable development materialise. As a result, local government have outlined the undertakings summarised below (IDP 2013-2016):

- Local government development strategies and spatial development frameworks to be mainstreamed within the climate change adaptation charter. These include spatial development framework and a myriad of development strategies;
- Climate change risks through conducting impact and vulnerability assessments should be well understood;
- Preparation and implementation of integrated, inclusive and long-term local adaptation strategies designed to reduce vulnerability and such will secure infrastructure and capital investment through the application of environmentally friendly and climate smart methods;
- Ensuring that adaptation strategies are aligned with mitigation strategies in order to promote cost-effective and sustainable solutions, and limit increases in the production and release of greenhouse gases into the atmosphere;
- Promotion of the use of adaptation that recognises the needs of vulnerable communities and ensuring of sustainable local economic development;
- Prioritization of the role of functioning ecosystems as core municipal green infrastructure, known as Ecosystem-based Adaptation (EBA);
- Accessibility of direct funding opportunities. This calls for the support of creation of a local adaptation thematic window in the Green Climate Fund, and in so doing we will seek the support of national governments and multilateral funding institutions;
- The development of an acceptable, robust, transparent, measureable, reportable and verifiable (MRV) register;
- Promotion of multi-level and integrated governance and advocate partnerships with sub-national and national governments on local climate action; and
- Promotion of partnerships at all levels and city-to-city cooperation and knowledge exchange.

Numerous issues were identified in the Ugu DM in terms of environmental management and the development of appropriate responses to climate change. Strategic Environmental Assessments (SEAs) undertaken in the Umdoni and uMuziwabantu local municipalities have raised concerns such as (Ugu, 2012):

- Over-exploitation of resources;
- Loss of wetlands, coastal forests, bushlands and grasslands, and associated biodiversity;
- Loss of ecosystem services – flooding, erosion and infrastructure damage;
- Alien plant encroachment;
- Poor state of rivers and estuaries;
- Soil erosion, loss of soil fertility in sugar lands, over-grazing and uncontrolled land use in traditional areas;
- Illegal sand mining and quarrying;
- Loss of ecological linkages – fragmentation;
- Uncontrolled urban and rural sprawl;
- Siltation and irrigation compromising water supply; and
- Little evidence of climate change adaptation.

Climate change poses additional environmental stressors on the region with the increased incidence of flooding, drought as well as other natural disasters. These disasters disproportionately affect poor communities within the district and increase their vulnerability. Local coping strategies need to be

understood and supported, together with local and district-level strategies for responding to climate change. Municipal Environmental Management Plans (EMPs) must address both mitigation and rehabilitation needs. The financial impact of such disasters must also be taken into account as increased budgets are demanded for rehabilitation, reducing the budget available for maintenance and new investments.

3 Legal and Institutional Overview

All law is governed and enforced by an institutional body. Nationally, provincially and locally there are a multitude of institutions that are responsible for designated mandates. Understanding these mandates leads to sound governance both nationally and at a grass roots level. It is for this reason that an understanding of environmental mandates is garnered across the relevant/responsible disciplines, to ensure better management of the environment within the Ugu DM and across its six local municipalities.

3.1 The Institutional Environment

The institutional environment includes the systems through which the environment is managed and may include any of the following:

- The formal and informal laws, by-laws and rules that permit, prescribe and prohibit certain actions and resolve conflicts and disputes (for example laws and regulations, as well as societal norms and values);
- The processes within which development is structured (for example procedures that set parameters for defining problems as well as for developing and implementing decisions);
- Institutional capacity to operationalise development (for example organisations, their structures and their systems); and
- Institutional arrangements that structure the way people interact and take part in development (for example consultative fora).

The purpose of the Institutional Status Quo Assessment is to identify the existing institutions that govern environmental management and decision making in Ugu DM in order to inform the development of the SEMP as part of Phase 6 of the EMF.

3.2 Enabling Law

The legislative origin for EMFs comes from Sections 24(2) and 24(3) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). These sections allow the Minister of Water and Environmental Affairs or relevant Member of the Executive Council (MEC) to compile environmental information and maps of particular geographical areas, which must be taken into account in decision making (i.e. environmental authorisations) by the competent authorities.

In accordance with Section 24(5) of NEMA, the EMF Regulations were gazetted on 18 June 2010 in Government Notice No. R547. Regulation 3(1) of the EMF Regulations allows the Minister or MEC with the concurrence of the Minister to initiate an EMF for an area. According to regulation 3(2), the EMF process must include a public participation process. This is in line with NEMA principle 2(4)(f), which requires participation of all interested and affected parties in environmental governance. Interested and affected parties include all relevant stakeholders such as governmental agencies. This is in line with NEMA principle 2(4)(l) that requires intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment. For this reason, the public participation process involved in the preparation of an EMF must be expansive and ensure it encourages and promotes the involvement of the public, nongovernmental organizations and governmental authorities.

This ensures that the final adoption of the EMF, in accordance with regulation 5 of the EMF Regulations, is done in a transparent manner as required by NEMA principle 2(4)(k). This decision must take into consideration the representations, objections and comments received. This is because the EMF will become a legally binding document in terms of Section 24 of NEMA that must be taken into consideration by decision makers and reviewed and updated as and when required.

3.3 Key Governmental and Departmental Mandates in the Environmental Sector

The Republic of South Africa (RSA) is a constitutional democracy. It has a three-sphere system of government, including national, provincial and local government. Although the legislative authority for the RSA is the Parliament of South Africa, each sphere of government has its own legislative and executive authority and responsibility. To enable the fulfilment of this authority and responsibility, a number of Departments have been established within the national and provincial spheres of government.

A total of 45 National Departments exist within the RSA. The Constitution of the RSA (Act No. 108 of 1996) sets out the framework within which all these Departments must operate, and Departments must comply with the full requirements of the Constitution. However, within the Constitution there are sections where specific Departments would take the lead role.

For example, Section 24 of the Constitution reads that, with respect to the environment –

"*Everyone has the right*

(a) to an environment that is not harmful to their health or well-being; and

(b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that

(i) prevent pollution and ecological degradation;
(ii) promote conservation; and
(iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."

All spheres of government and Departments are responsible for ensuring this Constitutional right is achieved. This responsibility can be achieved through regulating the activities of others or taking the environment into appropriate consideration in the carrying out of their own actions. Some departments, however, will have very little interaction with this section of the Constitution (e.g. the Departments of Basic Education, Home Affairs or Labour). Certain national departments, through the implementation of their own mandates, would carry out activities impacting on the environment (e.g. the Departments of Health, Transport and Energy), while other national departments carry out planning and approval functions that have a direct impact on the environment (e.g. Departments of Cooperative Governance, Mineral Resources and Water Affairs). However, the National Department of Environmental Affairs is the primary national department responsible for this mandate.

Below national and provincial Departments, whose planning and approval functions have a direct impact on the environment, are discussed in further detail. These functions are specifically looked at in terms of how they relate to the development of an EMF.

3.3.1 National Department of Environmental Affairs

The National Department of Environmental Affairs (DEA) falls within the Ministry of Water and Environmental Affairs. DEA's mandate stems from Section 24 of the Constitution of the RSA (Act No. 108 of 1996). The DEA is responsible for ensuring implementation of the framework environmental legislation (NEMA). In addition to NEMA, the DEA is responsible for the following legislation as well as resultant regulations and guidelines:

- Environment Conservation Act, 1989 (Act No. 83 of 1989);
- National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004);
- National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004);
- National Environmental Management: Integrated Coastal Management Act, 2008 (Act No. 24 of 2008);
- National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003);
- National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008);
- Marine Living Resources Act, 1998 (Act No. 18 of 1998); and
- World Heritage Convention Act, 1999 (Act No. 49 of 1999).

The DEA is thus the overarching custodian for environmental management in South Africa. Services in addition to protecting the environment include developing the State of the Environment Report, promoting the incorporation of environmental objectives into strategic planning instruments, promoting environmental awareness and partaking in international relations regarding the environment. These services are achieved with the assistance of provincial authorities, including nature conservation authorities, and statutory bodies such as the South African Weather Service (SAWS), EKZNW, the South African National Biodiversity Institute (SANBI) and the South African National Parks (SANParks).

The EMF is one of the integrated environmental management tools made available through NEMA for the DEA to achieve its mandate of protecting the environment as per the requirements of Section 24 of the Constitution. In terms of Sections 24(2) and 24(3), the Minister for Environmental Affairs is the lead custodian of EMFs in South Africa. The involvement of DEA in the development of an EMF is thus pivotal to ensure legal recognition of the EMF in terms of NEMA.

3.3.2 National Department of Water Affairs

The National Department of Water Affairs (DWA) falls under the Ministry Water and Environmental Affairs. It is the custodian of South Africa's water resources and is primarily responsible for the formulation and implementation of policy governing this sector. Its responsibility is carried out in accordance with the National Water Act, 1998 (Act No. 36 of 1998). In this regard, DWA not only protects water resources but also manages the provision of water to the public. Its services extend to monitoring water quality, managing water extraction and usage, controlling discharge of pollutants into water sources, construction

of dams for provision of water and providing assistance to Water Services Authority (WSA) within Provinces. Ugu DM is the Water Services Authority (WSA). In terms of the Water Services Act, a WSA may appoint a Water Service Provider (WSP) to assist it with the provision of water and sanitation services. Ugu DM has appointed Umgeni Water as its bulk Water Service Provider for a portion of its area.

Although DWA can override water authorities and is responsible for the construction of regional dams, DWA mainly performs a regulatory function. This regulatory function includes compliance monitoring and ensuring water polluters are aware of their actions and take the necessary steps to rectify the actions. Common pollution sources include landfills, sewerage systems (municipal and private) and agriculture. Optimal management of these sources is thus required to protect South Africa's water resources. The EMF can be utilised as a tool to assist with this, and it is thus critical that DWA be involved in the development of the EMF.

3.3.3 National Department of Agriculture, Forestry and Fisheries

The National Department of Agriculture, Forestry and Fisheries (DAFF) derives its core mandate from the provisions made in Schedule 4 of the Constitution and is assisted by provincial departments, as allowed for in Schedule 5 of the Constitution, read in concurrence with Section 104 of the Constitution.

DAFF consists of three separate branches, each with their own key focus area. There are approximately 32 National acts, which DAFF is responsible for overseeing and implementing. DAFF is also responsible for any guidelines or regulations developed in accordance with these acts. The list of legislation includes, but is not limited to:

- Animals Protection Act, 1962 (Act No. 71 of 1962);
- Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA);
- Fencing Act, 1963 (Act No. 31 of 1963);
- Marine Living Resources Act, 1998 (Act No. 18 of 1998);
- National Forest Act, 1998 (Act No. 84 of 1998) (NFA);
- National Veld and Forest Fire Act, 1998 (Act No. 101 of 1998);
- Sea Fishery Act, 1998 (Act No. 12 of 1998); and
- Subdivision of Agricultural Land Act, 1970 (Act No. 70 of 1970) (SALA).

Much of the functions carried out by the Agricultural branch are routed within Section 24 of the Constitution. This includes the protection of wetlands and management of alien plant species in accordance with CARA. However, as entrenched in both CARA and SALA, the primary mandate of the Agricultural branch is to ensure continued agricultural production through regulatory functions such as issuing permits for cultivation or controlling the subdivision of agricultural land and management functions such as implementing agricultural projects. The implementation of agricultural projects, however, is primarily done by the respective provincial departments. That said, with the protection of agricultural resources being key in ensuring continued agricultural production, the involvement of the Agricultural branch in the development of an EMF is key within an area such as the Ugu DM, where agriculture is one of the main economical drivers of the district.

With respect to the Forestry branch, the main purpose of this branch is to ensure the sustainable management of the country's forest resources. Forest resources refer to indigenous/natural forests, woodlands, savannas and plantations. Forestry is considered to be one of the key sectors with potential to contribute to poverty alleviation and economic growth and development. For this reason, Forestry form part of the National Industrial Policy Framework and the Accelerated and Shared Growth Initiative. In addition to the economic role forests within South Africa play, there are a number of social benefits forests provide, including being a source of wood, oxygen, food and muthi. Indigenous/natural forests, however, only cover 0.5% of the land area in South Africa. It is thus classified as a vegetation type requiring protection, and the NFA does not allow the destruction or even disturbance of a forest without first obtaining a permit. And such a permit will only be issued if found to be absolutely necessary. Unfortunately, within rural areas, there are often conflicts between communities and the protection of forests. For this reason, the involvement of the Forestry branch in the development of the EMF is critical to ensure that natural forests are accurately mapped and appropriate management measures incorporated into the EMF. This will assist in reducing human-forest conflict in future, as the LMs and Traditional Authorities would be able to plan around such features or know where disturbance of such features will be allowed. The involvement of the Forestry branch in the development of the EMF will also ensure that the planting of plantations and woodlots are taken into adequate consideration, thus assisting in achieving the socio-economic goals of the Forestry branch.

The aim of the Fishery branch is to contribute to maintaining and restoring the productive capacity and biodiversity of the marine environment. The mandate of the Fishery branch is thus in line with Section 24 of the Constitution. Although the branch predominately focuses on marine resources, much of which possibly falls outside the area of the EMF, the Ugu DM has a coastline of approximately 112 km as well as two marine protected areas (i.e. Aliwal Shoal and Trafalgar) off its coast. The Fishery branch plays mainly a regulatory role, and their involvement would assist in ensuring a holistic approach in the development of the EMF. It is important to note that although these marine protected areas do not fall directly in the EMF area, the activities undertaken on land can affect such marine protected areas. Also, the Fishery branch has a section responsible for aquaculture, which would be beneficial to address in the EMF.

3.3.4 National Department of Mineral Resources

The National Department of Mineral Resource (DMR) is tasked with ensuring the sustainable use of mineral resources within the RSA. Their framework legislation is the Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA) and the Mine Health and Safety Act, 1996 (Act No. 29 of 1996). DMR is assisted in carrying out functions set in this framework legislation by state owned entities such as the Council for Geoscience, the council for Mineral Technology, the Mining Qualifications Authority, South Africa Diamond and Precious Metals Regulator and the State Diamond Trader.

Within DMR, it is the Mineral Regulation branch that is responsible for ensuring environmental management is taken into adequate consideration. This is done when issuing rights and permits for prospecting or mining through the processing of applications, approving environmental management programmes and monitoring performance. Part of the functions of this branch includes promoting mineral development by coordinating and liaising with relevant governmental structures. Although the primary

function of the DMR is to promote usage of mineral resources, Sections 48 and 49 of the MRPDA allow the Minister of Mineral Resources to prohibit prospecting and mining of mineral resources within areas where the protection of that area is key to ensuring protection of the natural environment and sustainable development. Taking this into consideration, involvement by the DMR in the EMF process is essential to identify existing mining within the Ugu DM as well as areas of mining potential that should be demarcated as such within the EMF. Similarly, the involvement of DMR in the EMF process could assist to identify areas not suitable for mining due to conservation and sustainable development requirements, thus preventing conflict between mining and the natural environment at an early stage rather than having to address it during an application stage.

It must also be stressed that DMR is responsible for implementation of NEMA within mining operations. Thus, the EMF would have a direct impact on the operations of DMR, highlighting the importance of DMR's involvement in the EMF process.

3.3.5 National Department of Arts and Culture

The National Department of Arts and Culture is responsible for the overall protection of arts and culture, including archaeological and heritage resources within the RSA. Their function, however, with respect to the protection and management of archaeological and heritage resources, has been delegated to the South African Heritage Resources Agency (SAHRA).

SAHRA is a statutory organisation established under the National Heritage Resources Act, 1999 (Act No. 25 of 1999) as the national administrative body responsible for the protection of South Africa's cultural heritage. SAHRA coordinates the identification and management of national heritage resources. Within KwaZulu-Natal, SAHRA thus relies heavily on assistance from the provincial heritage authority, Amafa aKwaZulu- Natali, established in terms of the KwaZulu-Natal Heritage Act, 2008 (Act No. 4 of 2008). Within the Ugu DM there are a number of items and areas of heritage value, and disturbance or demolition of these items and areas is not allowed without first obtaining permission from Amafa aKwaZulu-Natali. Their involvement in the development of an EMF would therefore greatly assist in ensuring these items and areas are included in the EMF and appropriate management measures put in place.

3.3.6 National Department of Cooperative Governance and Traditional Affairs

The National Department of Cooperative Governance and Traditional Affairs (CoGTA) mandate is outlined in Chapters 3 and 7 of the Constitution. Its functions are to develop national policies and legislation with regards to provinces and local government and to support provinces and local government in fulfilling their constitutional and legal obligations. Legislation applicable to CoGTA's mandate is:

- Disaster Management Act, 2002 (Act No. 57 of 2002);
- Ingonyama Trust Act, 1994 (Act No. 3 of 1994), amended by National Act 9 of 1997; Intergovernmental Relations Framework Act, 2005 (Act No. 13 of 2005);
- Municipal Demarcation Act, 1998 (Act No. 27 of 1998);
- Municipal Structures Act, 1998 (Act No. 117 of 1998);

- Municipal Systems Act, 2000 (Act No. 32 of 2000); and
- Traditional Leadership and Governance Framework Act, 2003 (Act No. 41 of 2003).

Provincial departments assist CoGTA with the carrying out of its function. The KwaZulu-Natal CoGTA, in addition to the above-mentioned legislation, is also responsible for the KwaZulu-Natal Planning and Development Act, 2008 (Act No. 6 of 2008). CoGTA, within the KwaZulu-Natal Province, is thus highly involved with development planning. It assists with and reviews IDPs and SDFs produced by municipalities and it oversees and assists municipalities with the preparation of strategic environmental assessments. CoGTA seeks to arrive at decisions on issues such as municipal budget, land management, promotion of local economic development and institutional transformation in a consultative, systematic and strategic manner. This aligns with the objectives of the EMF, especially as the EMF should form part of the IDP for the respective municipalities. For this reason, CoGTA plays a fundamental role in the EMF to ensure alignment of the different planning tools for the Ugu DM.

3.3.7 KwaZulu-Natal Provincial Government

KwaZulu-Natal's provincial government is spearheaded by the office of the Premier. The Premier of KwaZulu-Natal has established eight (8) provincial departments to assist the national departments in the achievement of mutual mandates, as per Schedule 4 of the Constitution. These eight provincial departments are the Department of:

- Agriculture and Environmental Affairs, including Ezemvelo KZN Wildlife as the conservation authority;
- Arts and Culture;
- Community Safety and Liaison;
- Cooperative Governance and Traditional Affairs;
- Economic Development and Tourism;
- Education;
- Health; and
- Human Settlements.

With respect to the Departments of Agriculture and Environmental Affairs, Arts and Culture and Cooperative Governance, they assist the respective national departments with the fulfilment of their mandates as discussed above.

3.3.8 Local Government

The Municipal Structures Act, 1998 (Act No. 117 of 1998) makes provision for the division of powers and functions between district and local municipalities. These powers and functions are according to the capacity of the municipalities to deliver services. Within Ugu, the Ugu DM is responsible for the provision of Water and Sanitation, whereas the local municipalities are primarily responsible for planning. However, the local municipalities rely on Ugu DM to provide advice and support.

All municipalities must draft IDPs in terms of the Municipal Systems Act, 2000 (Act No. 32 of 2000). The purpose of an IDP is defined as being: "A participatory approach to integrate economic, sectoral, spatial, social, institutional, environmental and fiscal strategies in order to support the optimal allocation of scarce resources between sectors and geographical areas and across the population in a manner that provides sustainable growth, equity and the empowerment of the poor and the marginalised." An IDP is therefore a plan that guides the activities and decisions of a Municipality for the next 5 years in terms of Chapter 5 of the Municipal Systems Act, 2000 (Act No. 32 of 2000). It is subject to a review process that shall be followed annually to ensure the improvement of service delivery and the effectiveness of the administration of the Municipality.

3.3.8.1 Local Level Environmental Mandates

While environmental management is often not expressed as an explicit requirement or mandate of Local Government, it is becoming increasingly important to have dedicated environmental staff within local government structures, as these individuals form the 'eyes and ears' on the ground. National DEA and Provincial KZN DAEA officials cannot be everywhere at once, and thus the need is highly apparent. The status of local environmental officials is not only gaining momentum but also importance, primarily due to new laws and regulations being passed. Under the constitution, national and provincial legislative authorities are specifically given the power to pass legislation regarding environmental issues, whereas local government is given the authority to manage environmental issues. However, in the recent case of Le Sueur and Another v Ethekwini Municipality and Others, the court noted those national and provincial legislatures do not possess sole authority, and that environmental matters may be legislated by municipalities.

Recent environmental legislation puts the onus on local government to take charge of environmental matters within their own boundaries. IDPs developed in accordance with the Municipal Systems Act, 2000 (Act No. 32 of 2000) are required to include a chapter on environmental management and to make use of Strategic Environmental Assessments in the development of SDFs. Furthermore, the EMF is a planning tool that will be used within the various strategic planning documents of the Municipality, including the SDF. In addition to this, local government are given mandates for coastal management under the National Environmental Management: Integrated Coastal Management Act, 2008 (Act No. 24 of 2008) and waste management under the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008). The Ugu DM is also responsible for the issuing of Air Emissions Licenses in accordance with the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004).

The NEMA regulations delegate powers to municipalities in terms of approved planning tools for their area of jurisdiction (SDFs, EMFs, MOSS plans, etc.). The National Environmental Management Act, 1998 (Act No. 107 of 1998) [NEMA] defines "Sustainable Development" as "the integration of social, economic and environmental factors into planning, implementation and decision-making (PID) so as to ensure that development serves present and future generations". This requires local government to consider equally the Social, Economic and Environmental Sectors, at a strategic level, for future planning and to engage with all spheres of Government where PID takes place. The Local Government Municipal Systems Act, 2000 (Act No. 32 of 2000) specifically directs local government to carry out its duties in accordance with all relevant legislation by stating in Section (7); "The rights and duties of municipal councils and of the

members ... and the duties of the administrations of municipalities, as set out in sections 4, 5 and 6, are subject to the Constitution, the other provisions of this Act and other applicable legislation". The adoption of new municipal by-laws can also arise out of such planning documents and out of a need for more refined, locally applicable laws. Furthermore, as major landowners, municipalities have an obligation to undertake Duty of Care – and this requires the advice of environmental professionals on a daily basis as municipalities go about service delivery and maintenance of their servitudes, property and critical open spaces. These two examples simply highlight some of the requirements, whether expressed or inferred, of municipalities to fulfil their environmental obligations.

In addition, there are some significant principles contained in NEMA and the National Climate Change Response White Paper (NCCRWP) of 2011, which stipulate that local planning must take into account global/international issues, and that this must be brought into planning as early as possible and that natural resources must be protected for the benefit of present and future generations. The monitoring of greenhouse gas emissions would be an example of this, having seemingly little immediate local impact, but possibly substantial impacts when combined with all global contributions (DEA, 2010).

Taking into consideration the role that local government plays with regards to strategic planning and the control of development, the Ugu DM will benefit greatly from the development of an EMF.

3.4 Key Governmental and Departmental Role-Players within the Ugu DM

As outlined above, a suite of different government departments and parastatals are mandated to ensure sound governance and environmental management in South Africa – nationally, provincially and locally. Table 3.1 below sets out some of the key role-players, particularly within the socio-cultural and environmental realm, but is by no means exhaustive or complete. The up-coming phases of the EMF elaborate and draw further on these responsibilities – particularly in the SEMP phase.

Table 3.1: Key governmental and parastatal role-players for various sectors pertaining to the environment

RESPONSIBILITY/ SECTOR	NATIONAL GOVERNMENT	PROVINCIAL GOVERNMENT	LOCAL GOVERNMENT
Water Resources (availability/supply and quality)	National DWA SANBI	Provincial DWA Umgeni Water EKZNW	Infrastructure Units Ugu DM Environment
Coastal Management	DEA O&C	DAEA EKZNW	ORI Ugu DM Environment Ugu DM Beach Management
Agriculture	DAFF	KZN DAEA	Town Planning Units
Biodiversity (including ecosystem services)	DEA SANBI	KZN DAEA EKZNW	Environmental Units of Ugu and each LM (Umuziwabantu LM, Ezinqoleni LM, Hibiscus Coast LM, Umzumbe LM,

RESPONSIBILITY/ SECTOR	NATIONAL GOVERNMENT	PROVINCIAL GOVERNMENT	LOCAL GOVERNMENT
			Umdoni LM, Vulamehlo LM)
Geology	DEA (excavations and borrow pits in terms of watercourses and coast) DWA (aquifers) DAFF	KZN DAEA	Ugu DM
Air Quality	DEA	DAEA	Ugu DM Environmental Health Unit
Infrastructure & Service Provision	National DoT SANRAL Transnet Spoornet PRASA ESKOM Eskom Telkom Cellphone Companies (MTN, Cell C, Vodacom, Virgin, Heita) ACSA	KZN DoT DWA Umgeni Water	SALGA Ugu DM's Ugu DM and all LMs (Umuziwabantu LM, Ezinqoleni LM, Hibiscus Coast LM, Umzumbe LM, Umdoni LM, Vulamehlo LM) Local Aviation Authorities
Planning	The Presidency DCOG DHS National Treasury	CoGTA DHS	Ugu DM and all planning Departments of LMs (Umuziwabantu LM, Ezinqoleni LM, Hibiscus Coast LM, Umzumbe LM, Umdoni LM, Vulamehlo LM)
Cultural Heritage	National Heritage Council SAHRA	Amafa	Local Museums
Implementation of EMF	DEA	KZN DAEA	Ugu DM and all LMs (Umuziwabantu LM, Ezinqoleni LM, Hibiscus Coast LM, Umzumbe LM, Umdoni LM, Vulamehlo LM)

4 Overview of Planning Tools and Relevant Sector Plans

Before downscaling to the Ugu DM study area, the national, provincial and local planning context needs to be set out. The key findings of these plans are outlined, particularly due to their influence on the integrated environmental management sector.

4.1 Key National Plans

4.1.1 National Development Plan

President Zuma appointed the National Planning Commission (NPC) in May 2010 to draft a vision and National Development Plan (NDP) for consideration by Cabinet and the country. The NPC is an advisory body consisting of 26 experts drawn largely from outside government.

As a long-term strategic plan, it serves four broad objectives:
1. Providing overarching goals for what we want to achieve by 2030;
2. Building consensus on the key obstacles to achieving these goals and what needs to be done to overcome those obstacles;
3. Providing a shared long-term strategic framework within which more detailed planning can take place in order to advance the long-term goals set out in the NDP; and
4. Creating a basis for making choices about how best to use limited resources.

The NDP aims to ensure that all South Africans attain a decent standard of living through the elimination of poverty and reduction of inequality. It therefore defines a desired destination and identifies the role that different sectors of society need to play in reaching that goal.

The intention of the NDP is to make the most of South African citizens - their goodwill, skills and resources. It aims to step away from Business as usual and to spark a cycle of development that will expand opportunities, build capabilities and raise living standards.

National government aims to create five million jobs by 2020 (which is approximately three million more than the anticipated growth rate, which has been extrapolated from the years 2002 to 2009). Related to this is the New Growth Path, which is targeting opportunities for 300 000 households in agricultural smallholder schemes and 145 000 jobs in agro-processing by 2020, while there is potential to upgrade conditions for 660 000 farm workers. In terms of the green economy, there is the national goal to create 300 000 additional direct ‘green jobs’ by 2020.

The primary job-creation drivers that National Government has identified in the NDP are:
- Substantial public investment in infrastructure both to create employment directly, in construction, operation and maintenance as well as the production of inputs, and indirectly by improving efficiency across the economy;
- Targeting more labour-absorbing activities across the main economic sectors – the agricultural and mining value chains, manufacturing and services;
- Taking advantage of new opportunities in the knowledge and green economies;
- Leveraging social capital in the social economy and the public services; and

- Fostering rural development and regional integration.

As such, the National Government has undertaken to prioritise efforts to support employment creation in the following key sectors:

- Infrastructure;
- Agricultural value chain;
- Mining value chain;
- The green economy;
- Manufacturing sectors, which are included in the Industrial Policy Action Plan (IPAP2);
- Tourism; and
- Certain high-level services.

The NDP diagnostic report sets out the following key challenges for Ugu DM:

- Too few people work;
- The standard of education for most black learners is of poor quality;
- Infrastructure is poorly located, under-maintained and insufficient to foster higher growth;
- Spatial patterns exclude the poor from fruits of development;
- The economy is overly and unsustainably resource intensive;
- A wider spread disease burden is compounded by a failing public health system;
- Public services are unevenly distributed and often of poor quality;
- Corruption is widespread; and
- South Africa remains a divided society.

Institutional and Governance Structures include (inter alia):

- Ugu Coastal Management Committee (in terms of the ICMA);
- HCM Environmental Subcommittee;
- Coastwatch and WESSA are NGOs involved in these committees;
- Sezela Environmental Liaison Committee (which involves the sugar farmers);
- KZN Wildlife and Environment Working Group (run by the NPA and attended by EKZNW);
- Several conservancies exist in Ugu; and
- There are a number of alien plant working groups, run both by the DAEA and Ugu.

4.1.2 The Twelve National Outcomes

For the 2010-2014 period, National Cabinet approved 12 National Outcomes aimed at addressing the main strategies of government. Although these outcomes were developed to be the strategic focus of government institutions, it must be acknowledged that these outcomes have definite implications for the strategic plans and visions of municipalities.

Of the twelve Outcomes, Outcome 10 is key in the context of this report and includes the identification of the following strategic priorities:

- Protection and enhancement of environmental assets and natural resources;
- Development of a strategy, which is in line with the COP 17 resolutions; and

- Tackling environmental issues such as climate change, global warming and environmental degradation.

Having the environmental agenda listed as one of the twelve key national outcomes is a significant step forward for the environmental sector. At the local level, these objectives need to be supported and reflected in IDPs and sector plans, in order for these national plans to be realised.

4.1.3 National Strategy on Sustainable Development 1

Five strategic priorities and an associated Action Plan have been developed within the context of sustainable development. Cognisance is taken of emerging global issues and challenges, such as the financial crisis, the global climate change and transitioning to a green economy. 20 headline indicators have been identified to monitor progress towards the implementation of NSSD 1, compiled from key strategic national documents, including the Development Indicators published by the Presidency, the Environmental Sustainability Indicator Technical Report, the Millennium Development Goals and the 12 key outcomes that give structure to government's priorities for the Medium Term Strategic Framework. Strategic priorities and headline indicators are as follows:

Enhancing systems for integrated planning and implementation:

- Establish an effective National Committee on Sustainable Development [established by March 2012];
- Number of government entities and private sector companies that report against sustainability indicators;
- King III sustainability reporting, Carbon Disclosure Project and Water Disclosure Project; and
- Number of community-based capacity building projects [begin measuring].

Sustaining our ecosystems and using natural resources efficiently:

- Curtail water losses at water distribution systems to an average percentage reduction (saving) [from 30 to 15% by 2014];
- Reduction (saving) of demand as determined in the reconciliation strategies for seven large water supply systems by 15% [assessment of water requirements and water monitoring systems implemented by 2014];
- Increase the number of Blue Flag beaches [to above 29 beaches];
- Rehabilitation of land affected by degradation [3.2 million ha by 2014];
- Percentage of coastline with partial protection [from 12 to 14% by 2014]; and
- Percentage of land mass protected (formal and informal) [from 6.1 to 9% by 2014].

Towards a green economy:

- Progress on the implementation of the nine green economy programmes [impact on social (jobs), economic (industry development) and environmental (ecosystem) benefits by 2014];
- Increase percentage (or amount) of financial resources ring-fenced/streamlined and spent for green economy programmes [2010/11 amount – Industrial Development Corporation: R11.7 billion, Development Bank of South Africa: R25 billion, Private: >R100 billion, National Treasury: R800 million];

- Number of patents, prototypes, and technology demonstrators added to the intellectual property (IP) portfolio annually from funded or co-funded research programmes (five additions to the IP portfolio – patents, patent applications, licenses and trademarks – by March 2014); and
- Share of GDP of the Environmental Goods and Services (EGS) Sector [3% of GDP by 2014].

Building sustainable communities:

- Percentage of households with access to water (92 to 100%), sanitation (69 to 100%), refuse removal (64 to 75%) and electricity (81 to 92%) [by 2014];
- Upgrading of 400 000 households in well-located informal settlements with access to basic services and secure tenure (approximately 2 700 informal settlements are in good locations, i.e. located close to metropolitan areas and basic services, have high densities and, in 2008, housed approximately 1.2 million households);
- Increase in the South African Human Development Index (HDI) [2010 HDI: 0.597]; and
- Gini coefficient (reduce income inequality) [2008: 0.66].

Responding effectively to climate change:

- Greenhouse gas emissions (metric ton CO_2 equivalent) [34% reduction below a business-as-usual baseline by 2020 and 42% by 2025];
- Percentage of power generation that is renewable [10 000 GWh by 2014]; and
- Climate change adaptation plans developed [12 sectors by 2012 (Biodiversity, Forestry, Water, Coastal Management, Agriculture, Health, Tourism, Land and Rural Development, Local Government, Fisheries, Human Settlements, Business/Insurance)].

4.2 Key Provincial Plans

4.2.1 KZN Provincial Growth and Development Strategy

The latest KZN Provincial Growth and Development Plan (PGDP) was commissioned by the KZN Provincial Planning Commission and completed in 2012. It is a strategic guideline document which aims at enabling the province to measure its progress in achieving the accepted growth and development goals.

The PGDP has achieved the following:

- Setting a long term (20 year +) vision and direction for development in the province;
- Serving as the overarching strategic framework for development in the Province applying the 80/20 principle;
- Providing Spatial context and prioritization;
- Guiding the activities and resource allocation of provincial government & other spheres of government, business sectors, organised labour and other role players from civil society that can contribute to development in the province;
- Establishing clear institutional arrangement to secure buy-in and ownership, through a structured consultation process with all development partners; and
- Setting clear targets and indicators.

The PGDP builds on the Provincial Spatial Economic Development Strategy (PSEDS) prepared in 2007. The report consists of the following:

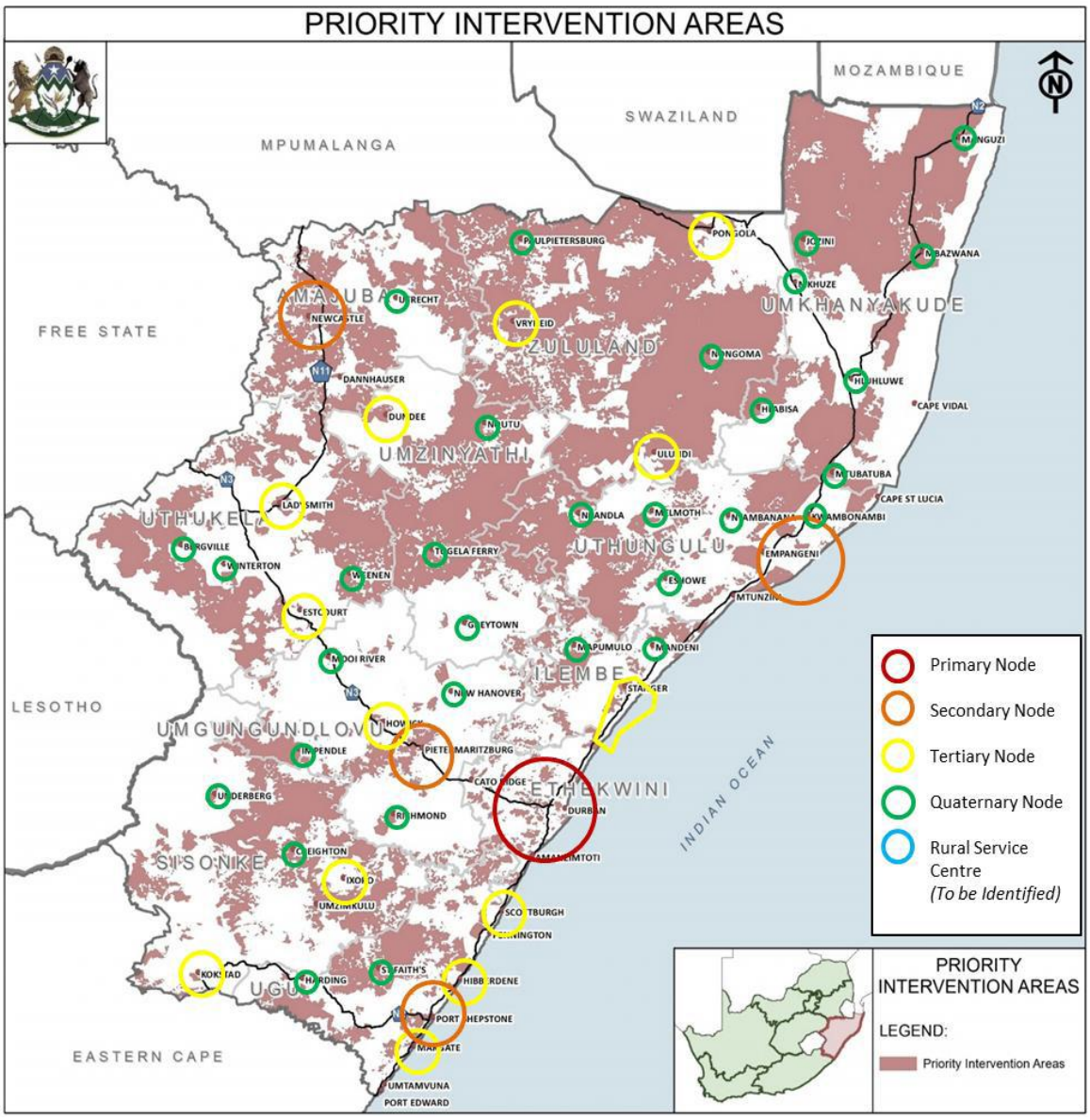
- Situational Overview and Strategic Analysis;
- Long term vision for the Province;
- Sustainable Growth and Development Strategy:
  - Social Issues;
  - Economic Issues;
  - Environmental Issues;
  - Infrastructure Issues;
  - Governance Issues;
  - Spatial Issues; and
  - Spatial Development Strategy.
- Provincial Growth and Development Plan with Interventions, Indicators and Catalytic Projects;
- Institutional Framework; and
- Monitoring, Evaluation & Reporting Framework.

In terms of the Spatial Strategy, the two main maps relevant to Ugu DM are the Priority Intervention Areas (Figure 4.1) and the Spatial Development Framework Map (Figure 4.2).

4.2.1.1 Strategic Integrated Projects

The Ugu DM falls within one of the 17 Strategic Integrated Projects (SIPs) identified by National Government. The SIPs were developed and approved to support economic development and address service delivery in the poorest provinces. SIP 3: South Eastern node & corridor development, which is most relevant to the Ugu DM, aims to “Promote rural development through a new dam at Umzimvubu with irrigation systems and the N2- Wildcoast Highway, which improves access into KZN and national supply chains; strengthen economic development in PE through a manganese rail capacity from N Cape, a manganese sinter (NC) and smelter (EC); possible Mthombo refinery (Coega) and trans-shipment hub at Ngqura and port and rail upgrades to improve industrial capacity and performance of the automotive sector” (PICC, 2012). It is therefore essential that the potential developmental focus along the N2-south corridor be acknowledged and every effort be made to ensure that such projects proceed in line with sustainability principles such that neither the integrity of sensitive environments nor strategic government projects are compromised.

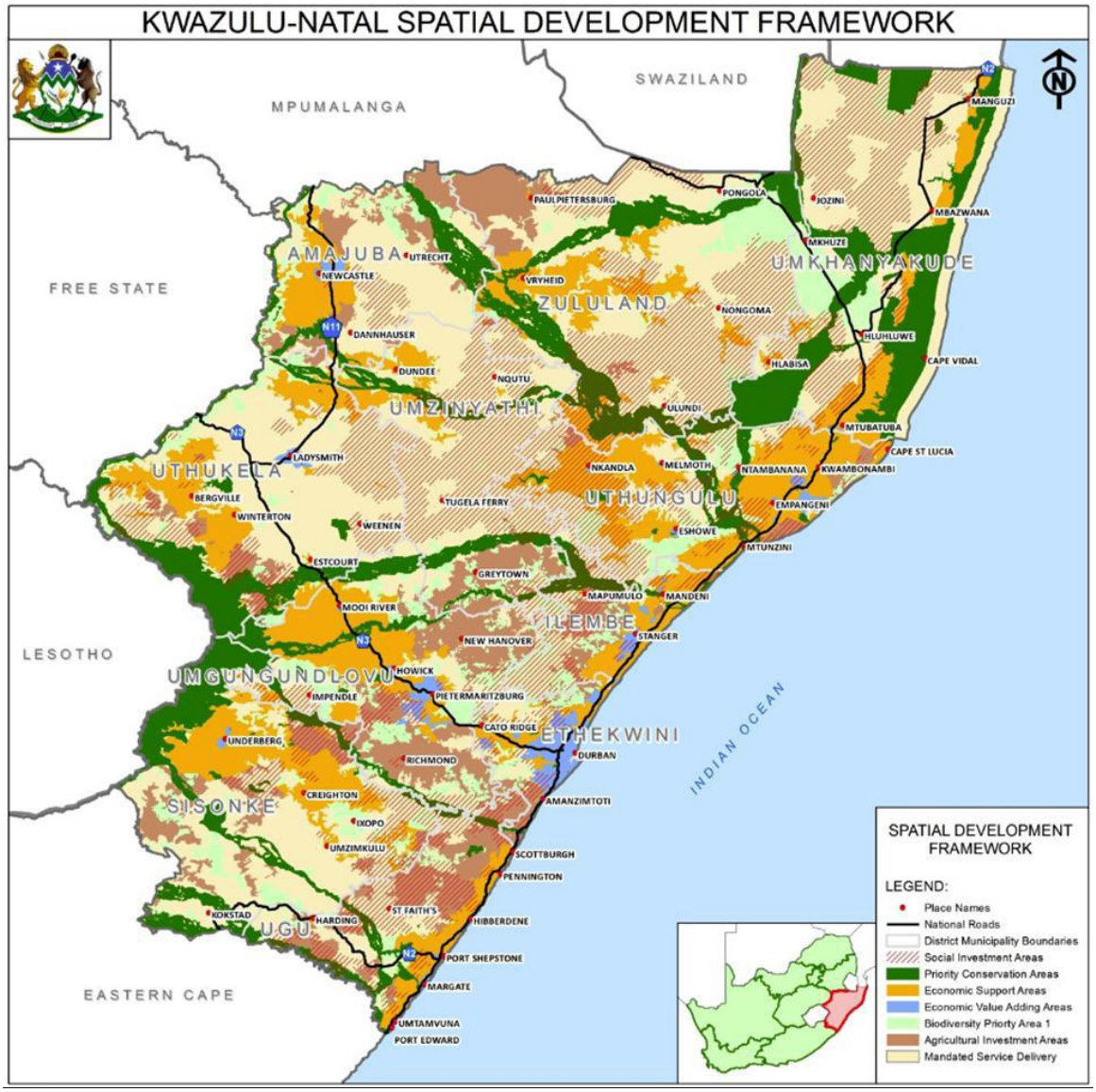
Figure 4.1: PGDP Priority Intervention Areas, KwaZulu-Natal



Source: PGDS, 2012

From the above map, it is evident that the PGDP reinforces Port Shepstone as a secondary node, as well as three other tertiary nodes in Scottburgh, Hibberdene and Margate. The map also highlights those areas that should be prioritized for intervention. In the Ugu DM, there are some areas along the coast, with the most part being in rural areas which have been identified as the areas of greatest need. This then points to where development interventions will be focused in the District and where planning needs to be undertaken to ensure that development occurs in a sustainable manner.

Figure 4.2: Spatial Development Framework Map, KwaZulu-Natal



Source: PGDS (2012)

The Spatial Development Framework map provides greater detail on what types of interventions should be focused in the different areas of the Ugu DM and should be used to guide the development of the District Spatial Plan and should be further refined in the District planning process.

4.2.2 KZN Provincial Spatial Economic Development Strategy (PSEDS)

The KZN PSEDS as adopted in 2007, is premised on the recognition that all government development programmes necessarily have to take place within a spatial context and therefore directs its fixed infrastructure investments to areas of greatest economic development potential as well as areas of greatest need based on poverty densities. The PSEDS reviewed the competitive and comparative advantages of the province's economy to identify the sectors which have the greatest potential to drive growth and impact on poverty and unemployment. This exercise confirmed that the following broad sectors form the base for the economy of the province:

- Agriculture and agri-industry (including land utilisation mapping and giving particular attention to Land Reform);
- Industry, including heavy and light industry and manufacturing;
- Tourism, including domestic and foreign tourism; and
- Services sector - including financial, social, transport, retail and government.

The PSEDS sets out to:

- Focus where government directs its investment and development initiatives to ensure sustainable and maximum impact;
- Capitalise on complementarities and facilitate consistent and focused decision making; and
- Act as a tool to help government move beyond mere focusing on integration and co-ordination procedures to establishing processes and mechanisms to bring out strategic co-ordination, interaction and alignment.

In terms of the PSEDS, there are various sectors of the provincial economy that will need to drive the growth of the province and address unemployment and poverty and an important principle for growth is exploiting sub-regional diversity in terms of comparative advantages. The PSEDS Spatial plan identifies a set of Nodes and Activity Corridors where investment needs to be focused to achieve the vision of the Province. These are to serve the following functions:

- To facilitate the increased growth of existing centres and corridors of economic development in the Province; and
- To ensure that the potential for economic development within areas of high poverty is realized.

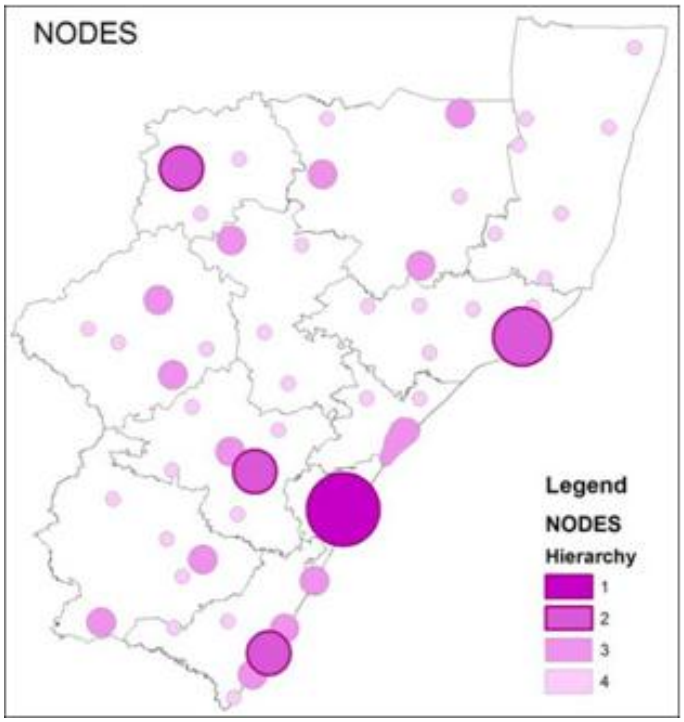
The primary and secondary nodes are summarised in Table 4.1 and illustrated in Figure 4.3.

Table 4.1: PSEDS identified nodes

No.	Node	Classification
PN1	eThekwini	Primary Node
SN1	Richards Bay	Secondary Node
SN2	Msunduzi	Secondary Node
SN3	Newcastle	Secondary Node
SN4	Port Shepstone	Secondary Node

Source: PSEDS (2007)

Figure 4.3: PSEDS Spatial representation of Nodes



Source: PSEDS (2007)

1. Primary Node (PN): An urban centre with very high existing economic growth and the potential for expansion thereof. Provides service to the national and provincial economy.

2. Secondary Node (SN): An urban centre with good existing economic development and the potential for growth. Services the regional economy.

3. Tertiary Node (TN): A centre which should provide service to the sub-regional economy.

4. Quaternary Node (QN): A centre which should provide service to the localised economy.

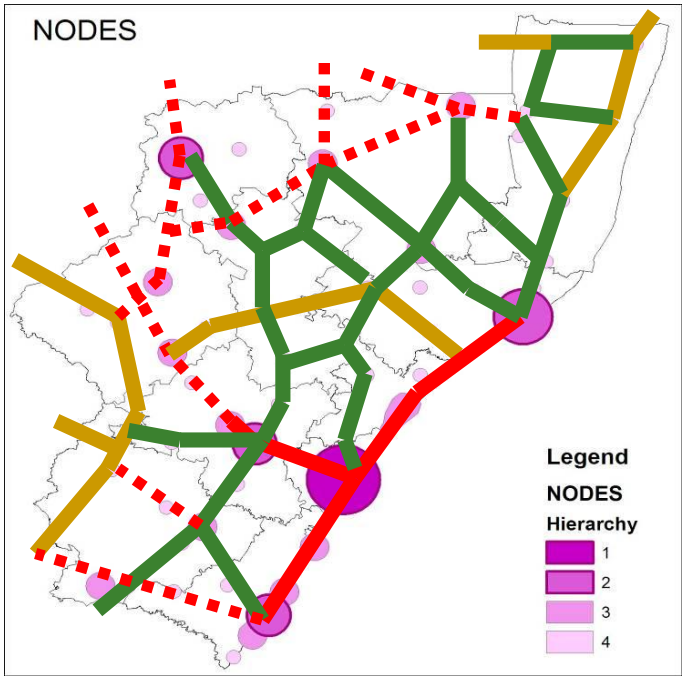
The provincial priority corridors identified are listed in the Table 4.2 below and depicted in Figure 4.4 below.

Table 4.2 KZN corridors and classification types

No.	Corridor	Classification
PC1	eThekwini – Umhlatuze	Primary Corridor
PC2	eThekwini – Msunduzi – uMngeni	Primary Corridor
PC3	eThekwini – Ugu	Primary Corridor
SC1	Umhlatuze – Ulundi – Vryheid	Secondary Corridor
SC2	Kokstad – Umzimkulu – Msunduzi	Secondary Corridor
SC3	Msunduzi – Nkandla – Ulundi	Secondary Corridor
SC4	Ulundi – Nongoma – Pongola	Secondary Corridor
SC5	Lebombo SDI – Maputo	Secondary Corridor
SC6	Port Shepstone – St Faiths – Ixopo	Secondary Corridor
SC7	Maphumulo – Ndwedwe – Dube	Secondary Corridor
SC8	Ukhahlamba corridor	Secondary Corridor
SC9	Weenen – Nkandla – Eshowe	Secondary Corridor
SC10	Manguzi – Swaziland	Secondary Corridor
SC11	Makhatini flats corridor	Secondary Corridor
SC12	Greytown – Msinga – Madadeni	Secondary Corridor
SC13	Nkandla – Nqutu – Vryheid	Secondary Corridor
SC14	Mtubathuba – Nongoma	Secondary Corridor

Source: PSEDS (2007)

Figure 4.4: Schematic depiction of key nodes and corridors in KZN



Source: PSEDS (2007)

Primary Corridor (PC): A corridor with very high economic growth potential within all three sectors which serves areas of high poverty densities.

Secondary Corridor (SC): A corridor serving areas of high poverty levels with good economic development potential within one or two sectors.

In terms of the PSEDS, 1 Primary Corridor (PC3) and 1 Secondary Corridor (SC6) are of relevance to the Ugu DM. It is thus imperative there is adequate investment in these corridors that should entail a network of services ranging from electricity, water, housing, health, education, and transport to community safety. The PSEDS needs to be interpreted and applied at a District level, including an emphasis upon exploiting local comparative advantages. The KZN PSEDS isolates the following sectors for Ugu district:

Agriculture and Land Reform:

- Development of sugar cane and banana production potential on Trust land;
- Alignment of land reform initiative with opportunities presented by Fresh Produce Market;
- Expand agri-processing capabilities and capacities to allow for new entrants to commercial agriculture; and
- Development of further agri-processing capabilities in Port Shepstone – bio fuels, bananas.

Tourism:

- Beach tourism: develop mid-range package tourism destinations, upscale beach resorts;
- Improve security at all major beaches;
- Golf tourism: upgrading and maintaining status of existing courses and related infrastructure;
- Expand on adventure and eco-tourism opportunities: Oribi Gorge and Aliwal Shoal;
- New N2 Wild Coast route: assess impact of this and develop strategy to access opportunities; and
- Develop opportunities related to Margate Airport.

Industry:

- Port Shepstone Industrial townships: provision of world class infrastructure; and
- Provide adequate affordable housing and related services.

Services:

- Formalise and plan St Faiths and Harding to position for investment; and
- Provide adequate affordable housing and related services in towns.

4.3 Key Local Plans

4.3.1 Ugu Growth and Development Strategy

The Ugu Growth and Development Strategy (GDS) commits all stakeholders, including public, private and civil society, to achieving the vision that “by 2030 the Ugu district will be a leading tourism destination and agricultural and manufacturing hub where jobs are created and everyone benefits equally from socio-economic opportunities and services.” (Ugu GDS, 2012). This aim is based on an understanding of inter-relationships amongst communities and the challenges faced by the districts economy. It is based on a commitment to working collaboratively to achieve the most beneficial outcomes for all.

The potential for economic development in the Ugu DM, if realized, could have a substantial positive impact on the lives of everyone that lives, works or visits the area. The district has notable comparative advantages that could be further leveraged, such as: the areas bordering the Ugu DM (eThekwini and the Eastern Cape); the tropical climate, conducive to agriculture and tourism; the Ingonyama Trust and communal land; several nature and forest reserves and conservancies; a magnificent coastline, including Aliwal Shoal and several Blue-Flag status beaches; existing public transport infrastructure; major national and provincial road linkages; and a diverse regional economy including tourism, agricultural, manufacturing, retail, mining and other sectors.

Despite these advantages, a situational analysis undertaken of the district in 2011/12 has found that the district is underperforming, and experiencing a growth in unemployment and poverty. Spatially, the district is divided: there is an urbanised coastal zone with a fairly resilient and diversified formal economy; and a largely poor rural interior under the Ingonyama Trust, with some commercial farms and many struggling subsistence farmers. Some natural assets and resources are being degraded, as there is evidence of uneven environmental management, and due to restrictive legislation which has affected potential agricultural investment, job losses in the agricultural sector have increased in the last decade. The tourism

sector in the Ugu DM, considered by many to be the lead sector within the region, has also struggled to grow. Due to the global economic recession and stricter national credit control measures, it is feared that gains in poverty reduction in the Ugu district prior to 2007 may have been reversed. Without targeted and significant intervention and investment within the economy the Ugu DM will continue on its path of deepening poverty, increasing unemployment, spatial fragmentation and increasing division between those with and without access to the formal economy.

The 2030 Vision for the district is that "by 2030, the Ugu District will be a leading tourism destination and agricultural and manufacturing hub where jobs are created and everyone benefits equally from socio-economic opportunities and services".

The emerging vision elements for the district are to:
- Promote more even, sustainable and integrated development throughout the district;
- Increase levels of participation, investment and value-add within the district economy;
- Substantial job creation within the district; and
- Poverty reduction.

Six key drivers have been identified for the district to achieve the above elements:
- Sectoral Development and Support;
- Education and Skills development;
- Safety and Empowerment of Communities;
- Strategic Infrastructure Investment;
- Institutional Development; and
- Environmental Sustainability.

The Ugu DM has a clear spatial strategy linked to the GDS, outlined in the SDF that drives the economic and spatial changes of the district. The district has identified existing urban and rural nodes that require maintenance, consolidation and/or expansion to ensure that development objectives of the district are met.

4.3.2 Ugu Infrastructure Audit

The findings of the recent Ugu Infrastructure Audit are highly useful in the context of planning.

The objectives of the infrastructure audit were:
- To develop benchmarks for infrastructure capacity based on industry guidelines;
- To assess current capacity (demand vs. supply over the past five years) and projected capacity requirements (over the next 10 years) for communications, electricity, waste, roads, public transport, bulk water and sanitation and social facilities;
- To spatially represent infrastructure and their linkages;
- To identify opportunities and constraints to development;
- To provide a focused assessment of infrastructure capacity of key economic assets (CBDs, industrial areas, development corridors);

- To cost the infrastructure gap based upon the capacity projections and anticipated revenue and spend of the functions of the district. The financial input would need to take into account of spending within all spheres of government, parastatals and the private sector. It would need to take into account replacement, refurbishment and O&M requirements;
- To prioritise infrastructure needs with stakeholders both spatially and sectorally; and
- To develop alternative service delivery models (including those that are more environmentally sustainable) and costing.

The findings of this very comprehensive study are summarised for each infrastructural sector below.

4.3.2.1 Water Infrastructure Services

The Ugu DM has five main catchment areas supplying the different regions throughout the municipality. Water resource management must be a key priority within the Ugu DM into the future with water augmentation options requiring exploration, for example, water conservation demand management, rainwater harvesting, re-use of wastewater and desalination. Water demand (and hence waste water flows) in the peak December/January period is typically 33% higher than the annual average values, due to the influx of visitors to tourism destinations.

Table 4.3 illustrates access to different water service levels across the district. Overall, 71% of the district is supplied with potable water.

Table 4.3 Household Access to Water Supply per Local Municipality (Lowest to Highest)

Local Municipality	No Access	Borehole	Reticulation	Total HHs	% Supplied
Umzumbe	14,117	517	16,454	31,088	55%
Vulamehlo	5,768	456	8,249	14,473	60%
uMuziwabantu	5,143	410	14,755	20,30	75%
Ezinqoleni	2,124	745	5,761	8,630	75%
Hibiscus Coast	11,645	6	39,001	50,652	77%
Umdoni	1,864	7	15,154	17,025	89%
UGU DISTRICT	40,661	2,141	99,374	142,176	71%

Source: Ugu Infrastructure Audit (2011)

Table 4.4 illustrates the distribution of households by access to piped (tap) water per municipality in 1996, 2001 and 2011.

Table 4.4 Distribution of households by access to piped (tap) water and municipality - 1996, 2001 and 2011

	Piped (tap) water inside dwelling/yard			Piped (tap) water on a communal stand			No access to piped (tap) water		
Municipality	**1996**	**2001**	**2011**	**1996**	**2001**	**2011**	**1996**	**2001**	**2011**
Umzumbe	688	1 678	2 705	2 248	2 760	7 912	24 793	11 355	5 518
uMuziwabantu	1 712	7 390	12 075	624	5 671	10 315	11 807	2 238	479
Ezinqoleni	709	1 930	4 763	708	6 633	14 287	7 063	29 716	16 121
Hibiscus Coast	22 204	2 658	3 984	5 824	6 289	14 312	13 717	10 142	3 323
Vulamehlo	1 114	920	1 640	895	3 194	8 169	14 340	6 633	1 663
Umdoni	7 430	21 773	36 525	1 119	12 097	32 928	3 719	17 534	2 723

Source: Census 2011 Municipal report KwaZulu-Natal (2011)

A key challenge for the district will be eradicating household water backlogs while at the same time ensuring that sufficient water is made available for expansion of economic activities. The ability of the district to change its current spatial development patterns will depend to a large extent on addressing water access, rights and management within rural communities. The impact of climate change on the district's water resources must be addressed, particularly on vulnerable communities within the district. For example, the provision of water services and access to the least accessible and scattered communities within Ugu is a priority concern and innovative solutions such as water harvesting units are being explored. Sufficient water for both household and agricultural use is necessary in order to facilitate sustainable livelihoods. A future demand assessment undertaken during the Infrastructure Audit clearly shows that future water demand is greater than the current infrastructure capacity of the district. Current infrastructure capacity is approximately 110,8 Ml/d (million litres per day), whereas 133.8 Ml/d will be required to eradicate household backlogs, and a total of 225,5 Ml/d will be required for eradication of backlogs as well as support growth and development within the region. This indicates that the municipality will need to at least double its current infrastructural capacity. The cost of backlog eradication alone is estimated at R3.4 billion. Massive infrastructure investment will need to be leveraged into the district in the next 10 years.

4.3.2.2 Sanitation

In terms of sanitation backlogs within the Ugu DM, the urban estimate is approximately 2%, while the rural sanitation backlog sits at approximately 30%. It is noted that the sanitation infrastructure recorded and the existing sewered areas are mainly concentrated in the coastal strip of the District. Urban sanitation comprises of a combination of waterborne sewerage linked to waste water treatment works as well as a system of septic tanks and conservancy tanks in less densely populated areas. Access to sanitation across the district is differentiated as follows:

- In Umdoni, Hibiscus Coast and Ezinqoleni approximately 80% of the settlement can be described as either linked or having good access;
- In Vulamehlo, Umzumbe and Umuziwabantu only around 50% of households are linked or have good access; and

- The Vulamehlo and Umzumbe local municipalities have the largest percentage of the scattered population within the district.

In 2005 it was estimated that approximately R2,3 billion is required for the urban backlogs alone, suggesting that a substantial amount of funding will be required to not only address both the rural and urban backlogs, but to plan for future growth and development, specifically to support expansion of economic activities.

4.3.2.3 Public Transport

Access to public transport, and public transport itself, is a major development challenge within the Ugu DM and a major potential factor in increasing access of communities to economic opportunities. 87% of the public transport users within the district are dependent on mini bus transport, compared to 9% dependent on bus transport. Table 4.5 illustrates current commuter demand from the main public transport terminals within the Ugu DM. In these instances where bus services are available, they transport more commuters than the mini bus taxi service.

Table 4.5 Public Transport Demand within the Ugu region

Terminal point	Annual No. of passengers	Mode	Daily vehicle trips
Gamalakhe	3,282,353	Bus	182
	2,230,800	MBT	572
Nyandezulu	2,837,647	Bus	158
	1,662,300	MBT	427
D338/N20	2,601,900	Bus	144
	1,879,800	MBT	482
Mtwalume	2,229,390	Bus	100
	1,610,700	MBT	413
Murchison	2,107,059	Bus	117
	1,267,500	MBT	325
Assisi	1,683,529	Bus	94
	741,000	MBT	190
Mzumbe	1,281,177	Bus	71
	588,900	MBT	151
Palm Beach	1,115,100	Bus	55
	807,300	MBT	207
Melville	900,450	Bus	42
	651,300	MBT	167
D952/R102	198,720	Bus	9
	144,300	MBT	37
D1097/N20	84,600	Bus	5
	66,560	MBT	16

Source: Urban-Econ (2012)

Access to rail transport is limited within the region. The metropolitan rail system serving eThekwini only reaches the northern extremity of the Ugu DM with three stations in the Umdoni LM, namely Kelso, Park Rynie and Scottburgh. Although the south coast railway line is electrified and in use by Transnet Freight Rail as south as Port Shepstone, no commuter services are offered beyond these three stations. The district is looking to benefit from the rail station upgrading plans of the Passenger Rail Agency of South Africa (PRASA) as the Port Shepstone Train Station is one of the targeted multi-modal upgrades[27]. This is in line with longer-term plans to extend the passenger rail service southwards.

Municipal Integrated Public Transport Plans are required to support the SDF of the district and ensure alignment with the plans for nodal investments.

4.3.2.4 Freight Rail Infrastructure

In addition to passenger rail, the need for additional freight rail capacity within the district has been highlighted during the consultation processes. The main rail corridor in the district is the standard gauge South Coast line that runs from Port Shepstone to eThekwini. The standard gauge line is supplemented by a narrow gauge line from Port Shepstone to Harding. This is primarily used to transport timber and sugar cane. Overall, the volume of freight on this line has reduced and more goods are being transported by road along the N2. The reason given for this switch is that many branch lines are no longer in operation. The main commodity currently on the rail network is 500,000 tons of lime clinker from Simuma to Mount Vernon. An opportunity for the district is that Transnet has recently released a plan to invest R300 billion in infrastructure within the country, of which R151 billion has been earmarked for freight rail. Further investigation into demand should be undertaken to inform an approach to Transnet.

The narrow gauge line was also used for tourism, providing excursions to Paddock. Unfortunately the line has been abandoned due to the demise of the Alfred County Railway and the final destruction of the Izotsha River Bridge in 2007.

4.3.2.5 Road Infrastructure

The road hierarchy in the district starts with national roads, then provincial roads down to local municipal roads. The N2 runs parallel to the coast with plans to extend this coastal route into the Eastern Cape. The provincial road network provides a high proportion of the road network in Ugu DM and covers a vast range of types of roads from main regional links (class 2) through to local roads (class 7). In terms of road usage, up to date traffic volume data is only available for the N2 and R103. The largest traffic volumes pass along the N2 towards Port Shepstone, and further towards Kokstad, as well as along the R61 from Port Shepstone towards Port Edward. Large volumes of traffic also pass along the R612 from Park Rynie to Ixopo, and the road from Umtentweni to St Faiths.

Access to road infrastructure varies across the district, especially between rural and urban areas. In Table 4.6 below access to transport is measured in terms of the percentage of households that have access to Level 1 to Level 3 roads (i.e. national, main and district roads).

Table 4.6 Access to road infrastructure within the Ugu District Municipality

Local Municipality	HH within 1 km of a Road	Total HH	Percentage
Vulamehlo	11,771	15,661	75
Umzumbe	24,274	31,801	76
Ezinqoleni	6,996	9,041	77
Umuziwabantu	17,956	20,840	86
Umdoni	16,452	17,257	95
Hibiscus Coast	49,993	51,480	97
Ugu District	127,442	146,080	87

Source: Infrastructure Audit (2011)

In terms of spatial integration within the district, the SDF has identified priority road corridors for development. These include the upgrading of the P77 and P58 in order to increase accessibility for rural communities. Consultations with the agricultural sector have also identified key roads and causeways that need to be targeted for upgrade to open up areas for commercial activity. The key strategy for the district will be to ensure that its specific road infrastructure needs are included in the Department of Transport's and relevant local municipalities project priority lists. The poor condition of provincial and local roads within the Ugu DM has been raised during the consultation processes. A lack of road maintenance and asset deterioration will result in much greater financial burdens on provincial government and municipalities in the medium to long-term. A road in poor condition also impacts negatively on journey speed and road safety decreasing the accessibility or desirability of the region for business.

The findings of the Infrastructure Audit undertaken by the municipality were that:

- National roads are of a very high standard with good continual maintenance. Funding is generally adequate supported by funds generated by toll fees;
- Funding for maintenance and new provincial roads is limited, and generally dealt with at two levels. First, there are major/strategic projects, and secondly there are locally-based projects operated by the regional cost centre based in Port Shepstone and communicated through local "Transport Forums"; and
- Local roads within the more urban centres are constructed and maintained by local municipalities. Rural municipalities are heavily reliant on the provincial Department of transport for budget.

The impact of the N2 re-alignment on the Ugu DM as a whole must be considered both for the opportunities and constraints that it presents. Although the realignment will reduce the volume of traffic passing the Ezinqoleni and Umuziwabantu LMs, it is expected that this will not have a significant negative impact on these areas as substantial traffic will still require the use of this road to access Kokstad and other inland regions. Positive spin-offs will be increased access by the Ugu district into Eastern Cape coastal markets (and vice-versa) and the strategic linking of the Ugu District to the national and provincial road networks, placing Ugu along with the N3 as one of the key investment corridors within the province. This allows the district to be connected to investments in the current Port of Durban, the King Shaka International Airport, the Richards Bay Port, the future DIA port expansion, as well as to the N3 corridor.

4.3.2.6 Aviation Infrastructure and air transport

The major airport in the district is the Margate airport, which used to operate an SAA Airlink route. This route has since closed. With the closure of Durban International and the probable closure of Virginia there is a real search for a convenient facility that can meet Category 4 requirements. Margate is the only option at this point in the greater Durban area, so there is some serious consideration to be given to re-opening the Margate – Johannesburg route. This could dovetail with a Pietermaritzburg – Ulundi – Durban route as it would give the operator enough hours on the equipment to make it worthwhile.

Currently, none of the major operators would consider operating due to the fact that:

1. They do not operate with the right equipment;
2. The passenger numbers do not match their business models;
3. They do not have accurate data on travel into and out of the area; and
4. The facility would need a major expansion to meet SA Civil Aviation Authority guidelines for their type of service.

The airport is, however, due for a R300 million upgrade, which will meet many of these shortcomings. The airport is currently operating flights between Lanseria, Umtata and East London with Studio 88 aviation.

Given the fairly recent relocation of the Durban International Airport to the site of the King Shaka International Airport and Dube Tradeport along the KZN north coast, the south coast is largely un-serviced in terms of both passenger and cargo air transportation. As a result, the south coast is much less accessible to tourists than previously with the international airport now favouring the north coast of KZN. The cost of doing business within Ugu has increased due to longer travel times and greater traffic congestion. The potential exists to increase the capacity of the existing Margate Airport to handle low-cost airlines to make it more attractive within the market. Additionally, the airport could accommodate small cargo planes to ensure that the agricultural sector is able to remain competitive and transport perishable goods.

With the closure of Durban International and the probable closure of Virginia Airport, there is a search for a convenient facility that can meet Category 4 requirements. Margate is the only option at this point in the greater Durban area, so there is some serious consideration to be given to re-opening the Margate-Johannesburg route. This could dovetail with a Pietermaritzburg-Ulundi-Durban route as it would give the operator enough hours on the equipment to make it worthwhile.

The Margate Airport is currently one of the subjects within a Provincial Treasury investigation into Regional Airfields within KZN. The Regional Airport Strategy aims to provide Cabinet with a set of options that will guide decisions around what support is required to be given to each municipal airport within KZN. The Margate Airport has already been assessed in terms of current use (real and potential), demand for the facility, and infrastructural upgrades needed and proposed as indicated in the Airports Master Plan. It is important that the District maintain a good relationship with the Provincial Treasury to ensure that the potential of the Margate Airport is translated to Provincial Government and to ensure that the Airport does form part of the holistic airport master plan for the Province.

4.3.2.7 Electricity

Eskom is the sole supplier of electricity in the Ugu district with the exception of the urban areas of Port Shepstone and Harding. Major capacity problems that affected the district were addressed some ten years ago through the construction of major infrastructure, mostly in the Harding area. Following from this, capacity problems are of a more localized nature as a result of the "Electrification for All" programme and major developments in specific localities. Future developments and electrification backlog programmes will require localized infrastructure upgrades such as the proposed new Kenterton Substation. Generally, commercial developments will not have infrastructure built for them until such time as the relevant developer makes a financial commitment. The proposed extension to the Margate Airport will be a case in point where purpose-built infrastructure will almost certainly be required.

In terms of electricity, the district is well supplied compared to other services with only a 26% backlog, most of this is in the Umdoni and Vulamehlo LMs (Table 4.7). The area with the largest concentration of backlogs is between St Faiths and Dududu, and to the west of Dududu. This is a factor of the terrain and the scattered low density nature of the settlements. There are also opportunities within this sector for exploration of alternative delivery methods or supply-side interventions. Examples of these are: photo-voltaic (solar power); wind generation; bio-mass electricity generation and wave generation. Certain firms within the district are already exploring such alternatives and these initiatives should be encouraged. Demand side alternatives focused on reducing electricity consumption include: photo-voltaic energy, wind generation, solar assisted water heating, power factor correction systems for large power users, and green building design and management systems.

Table 4.7 Households with access to electricity supply in the Ugu district (lowest to highest)

Municipality	Electrified Households	Total Households	% of HHs
Vulamehlo	9,317	15,661	59%
Umzumbe	21,407	31,801	67%
Ezinqoleni	7,867	9,041	87%
uMuziwabantu	18,001	20,840	86%
Umdoni	16,826	17,257	98%
Hibiscus Coast	49,481	51,480	96%
Ugu District	**122,899**	**146,080**	**84%**

Source: Infrastructure Audit (2011)

4.3.2.8 Telecommunications

Telecommunications data is not easily accessible for the district. Whilst no detailed indication of fixed line or broadband services was available, it has been noted that broadband services are limited and only available in major centres. In response to this need, the Ugu DM has initiated a broadband project for the region.

Global System for Mobile Communication (GSM) coverage across the district is good with 99% of households having theoretical access, although the terrain may result in difficulties in some of the low-lying areas. As a result, there is very high penetration of cell phones in the district. However, the majority of households have access to GSM / Voice services only. Only 36.6% of the District, mainly in the coastal areas, has access to data services in the form of the 3G network. In the Hibiscus Coast and Umdoni LMs 3G access is relatively high at 61% and 51% respectively. The district is well covered with respect to both radio and television services, although again lower lying areas may have difficulty in accessing these services.

Development of Primary and Secondary Points of Presence (POPs as well as Municipal Access Networks is currently a priority of the Department of Economic Development and Tourism's Information and Communications Technology Directorate and the district must ensure that these are rolled out within the district and local municipalities to increase access to communities.

4.3.2.9 Solid Waste and Cemeteries

Municipal solid waste management involves the collection, transportation and safe disposal of refuse from residential areas to landfill. Solid waste is the most undersupplied service in the district. Whilst services are being offered, they are usually limited to the formal, urban areas of Umuziwabantu, Hibiscus Coast and the Umdoni LMs. Solid waste services in Ezinqoleni, Umzumbe and Vulamehlo are virtually non-existent. Waste minimization in the district is poorly organized and there is no integrated system for private recyclers to link into. A viable waste recycling system for the district is a necessity. Solid waste services are the most undersupplied service in the District with only approximately 23% of the household in the District located in areas where more than 60% of households have access to this service.

Table 4.8 reflects households with access to solid waste removal services in the District on a settlement level. It is noted that the majority of settlements fall within the category of less than 20% of households having access to solid waste removal services.

Table 4.8 Households in Municipalities with access to solid waste services (lowest to highest)

Local Municipality	None	< 20% of HH	20% - 60% of HH	> 60% of HH	Grand Total
Ezinqoleni	0%	100%	0%	0%	8,630
Umzumbe	5%	95%	0%	0%	31,088
Vulamehlo	10%	90%	0%	0%	14,473
UMuziwabantu	0%	86%	0%	14%	20,308
Hibiscus Coast	6%	35%	14%	45%	50,652
Umdoni	0%	43%	14%	43%	17,025
Ugu District	**4%**	**66%**	**7%**	**23%**	**142,176**

Source: Ugu DM Sector Wide Infrastructure Audit Phase 3: Data Assessment Report (2011)

In terms of cemeteries, three out of the six local municipalities have formal sites, namely Hibiscus Coast, Umdoni and Umuziwabantu. The remaining three, Ezinqoleni, Vulamehlo and Umzumbe, have a majority rural population that practices on-site burial of deceased family members. A detailed study, with a strong social and cultural focus, is required to investigate burials and the provision of cemeteries within the district.

4.3.3 Integrated Waste Management Planning

Section 11(4) of the National Environmental Management Waste Act, 2008 (Act No. 59 of 2008) (NEMWA) requires each municipality to submit an Integrated Waste Management Plan (IWMP) to the responsible MEC for approval. This IWMP must be included in the IDP as contemplated in chapter 5 of the Municipal Systems Act, 2000 (Act No. 32 of 2000). In accordance with section 11(7) of NEMWA the IWMP must undergo a consultative process as per section 29 of the MSA as well as sections 72 and 73 of NEMWA.

The following issues (Table 4.9) regarding waste management in the Ugu DM has been identified in the IDP (2012/2013 to 2016/2017).

Table 4.9 Challenges and interventions regarding Waste management in the Ugu DM

Issue	Challenges	Current interventions	Recommended interventions
Waste collection services, waste minimisation	Limited waste management in local municipalities Absolutely no waste management service in rural areas	- District integrated waste management plan - Support local municipalities - Recycling programmes - Waste management Education and awareness - Waste recycling schools projects	- Extension of refuse removal to unserviced areas in all municipalities and even in rural areas. - Implementation of Basic Refuse Removal to all local municipalities - Development of green jobs-recycling, alternative energies - Focus on waste minimization initiatives, starting with education and infrastructure

Source: Ugu DM IDP (2012/2013 to 2016/2017).

Although IWMPs are largely still in preparation, all LMs and the Ugu DM have waste management requirements written into their IDPs. For example, the Provincial and District IWMPs are still in the process of being developed and this is a gap that has been identified ion this phase of reporting in the EMF. Nevertheless, three of the six local municipalities have IWMPs and these are described below.

4.3.4 Umdoni Integrated Waste Management Plan

The waste service delivery of the Umdoni LM is coordinated from the Scottburgh depot. Waste is not separated at household level and the municipality deals with domestic waste, garden waste and building rubble as one type of waste. However, the IWMP reveals that the majority of waste dumped at the Humberdale Landfill Site is organics and garden waste at 45%. Recyclables (paper, plastic, metal and

glass) makes up 28% of the waste stream while builders rubble constitutes 8%. The remaining 19% is classified as 'other'.

94% of households in the Umdoni LM receive refuse removal services. No industrial waste is collected; however, general waste from the Park Rynie industrial park is collected by the Municipality. Occasionally ash from Illovu Sugar is deposited at the Humberdale landfill.

The Humberdale Landfill was granted a permit in accordance with section 20(1) of the Environment Conservation Act, 1989 (Act No. 73 of 1989) in 2001. The size of the site is ~ 3 ha, and it is estimated that the site has a life span up until 2018 at an average volume of 86 tons per day.

The Umdoni LM has a comprehensive set of by-laws developed in 2006. These by-laws include aspects on illegal dumping, offences and penalties. The IWMP recommends the updating of these by-laws to include aspects of waste minimization.

The Umdoni IWMP takes into consideration refuse removal, street and ablution cleaning, landfill sites, transfer stations and bulk containers. In addition to existing structures, the IWMP considers the implications of planned future developments.

The IWMP identifies the need for:

- Waste minimization initiatives should be supported and extended;
- New areas must be serviced and budgets allocated accordingly;
- Illegal dumping must be addressed;
- Additional personnel is required for waste collection and for the proper management of the disposal facilities;
- The feasibility of composting garden refuse needs to be investigated;
- Effort must be made to ensure continued proper management of the Humberdale landfill site;
- Vehicles need replacement;
- Waste records for informed future decision-making purposes must continue to be kept in accordance with the Government's Waste Information System requirements; and
- Tariffs and the present revenue management/credit control systems and effort for incentives to generators of waste to minimize waste must be reviewed.

4.3.5 Umzumbe Integrated Waste Management Plan

The Umzumbe LM has an IWMP, which identifies all areas that generate waste within the Umzumbe LM. Residential areas within wards 10, 16, 17, 18 and 19 are the main generators of solid waste, while clinics and community facilities are the secondary generator of waste within the LM.

The IWMP identifies a number of strategies for improved waste management in the LM. This includes:

- Establishing waste management sites within the LM;
- Making use of existing waste management sites within the Umdoni and Hibiscus Coast LMs; and
- Budgeting for waste management equipment (e.g. vehicles for waste collection and transport).

4.3.6 Hibiscus Coast Integrated Waste Management Plan

Oatlands Landfill Site is the main landfill site for the lower south coast. In addition, according to the 2010/2011 Hibiscus Coast IDP, there are two unregistered landfill sites in Umtentweni and Hibberdene. There is also a garden refuse transfer station in Hibberdene.

Hibiscus Coast LM has an IWMP, which is in place and is currently being implemented. The IWMP focuses on refuse removal of household, business and industrial waste as well as the development and management of garden refuse stations.

The IWMP identifies the need for:

- A recycling initiative at the Oatlands Landfill Site;
- New sites, extensions and rehabilitation;
- Extending the waste management service to rural communities in a cost effective and coordinated manner;
- Investigation of alternative waste disposal methods;
- Promotion of waste minimization and environmentally friendly waste management practices; and
- Minimizing illegal dumping.

The implementation of the IWMP is a challenge due to inadequate allocation of budget.

4.3.7 Ugu Coastal Development Plan

4.3.7.1 Coastal Management Plan Objectives

The Ugu District Coastal Management Plan (CMP) aims to assist in prioritising areas of conservation value and in identifying areas for investment, development and protection and to provide “guidelines for assessing development applications from an environmental perspective” (Ugu CMP, 2000).

4.3.7.2 Strategy

Three basic levels of analysis were used in the development of the CMP. They are called “Primary, Secondary and Tertiary characteristics”. This analytical tool was used to manage the key issues, objectives, strategies and action plans to realise the vision statements. The aim was to provide a practical ecological basis for planning and development with a focus on tourism. The overall goal is a concrete, empirically driven environmental management plan.

4.3.7.3 Key Findings

Biophysical:

- The common feature along the coast is a cumulative drive towards as many similarly conceived projects as possible without the holistic integration required for sustainability;
- The coastal zone is placed under extreme pressure with numerous conflicts stemming from a general lack of environmental consideration at project initiation stages;
- Environmental issues seem to be taken up in a reactionary mode after councils ratify projects and storm water/environmental management issues arise;
- There are development pressures along the coast, which is likely to have significant environmental impacts; and
- There are a number of proposed future developments, which could have significant impact on the environment, should they be approved.

Socio Economic Considerations:

- There are opportunities of diversification of crops, such as the Incema reed;
- Depletion of coastal mussels along Elysium Beach;
- Industry/manufacturing and agricultural sector contribute significantly to river pollution;
- The highest concentration of people in the region is spatially located along the coast exerting enormous pressure on the coastal zones;
- Tourism serves as a major economic boost to the region; and
- The degradation of natural attractions has impacted negatively on the tourism industry in the region.

Results:

- Eleven strategies with associated Action Plans are recommended. Implementation in the Integrated Development Plan for the Ugu Region (Ugu Regional Development Plan) is based on assessing Action Plans and arranging them in a logical sequence for implementation; and
- These are categorised as Medium-term for implementation in 3-5 years. The remaining Action Plans are designated for long term. At the time of periodic updates and review of the CMP, action plans may be moved from one category to another, as changed circumstances dictate.

Key Action Plans:

- Sustainable livelihood development for Mfazanana;
- The formalisation of the Mfazanana settlement;
- Initiate significance assessment and conservation programme for inland tourism trails;
- Initiate a pilot significance assessment and conservation programme applicable to the archaeological assets within the dune system;
- Initiate a Coastal Catchment Management Programme with a Local Agenda 21 affiliation;
- Commission a Regional Strategic Environmental Assessment; and
- Develop an appropriate Coastal Development Programme.

4.3.8 Umdoni SEA

The Umdoni LM developed a Strategic Environmental Assessment (SEA) whereby the focus is to support the planning and decision making process and to ensure development and land transformation activities are undertaken in a sustainable manner. The Umdoni LM's SEA will assist the Provincial DAEA, Ugu and Umdoni in accelerating the decision making process (as development applications come to the fore).

4.3.9 Umuziwabantu SEA

The Umuziwabantu LM SEA aims to augment the current management and conservation of sensitive environmental assets within the municipality, to sustain the continual benefits of ecosystem goods and services administered by vulnerable ecological resources in local communities, and to promote the ethos of sustainable development in the IDP in pursuance of the principles of Local Agenda 21.

The overall aims of this SEA process were to ensure that:

- The SEA becomes the foundation to integrated sustainable planning;
- It informs the IDP and its Spatial Development Framework (SDF);
- It delivers a Strategic Environmental Management Plan (SEMP);
- It is able to guide day to day development applications; and
- It produces at least five implementable business plans focused on sustainable outcomes.

At the time of compilation of this report, the Umuziwabantu LM SEA was still in the process of being developed.

4.3.10 Umzumbe SEA

The purpose of the Umzumbe SEA was to integrate the objective of Integrated Environmental Management into the process of developing the Umzumbe SDF and into the hierarchy of decisions which may follow the SDF in order to ensure that all future actions and activities in the municipal arena promote sustainability. The Umzumbe SEA is in the process of being developed.

Note: The spatial components of the abovementioned SEAs have formed a role in informing the environmental sector plans such as the recent Biodiversity Sector Plan. In turn, these plans will also be interrogated further to inform the determination of Environmental Management Zones as the Ugu EMF progresses into the next mapping and reporting phase.

5 Coastal Management

5.1 Introduction

The word “Ugu” means “Coast” in isiZulu, providing an apt description of the location of the Ugu DM. The coast can be described as the meeting place of the land and the sea and is an area that is extremely dynamic and complex. The interaction between natural coastal processes and anthropogenic activities is not always well understood. The South African coastline extends from the Border of Namibia to Mozambique, a distance of approximately 3000 kilometres, of which the Ugu DM coastline stretches for approximately 112 kilometres, from the Mtamvuna River in the south to Scottburgh in the north. The climatic conditions between the coastal and inland regions varies greatly, with conditions and temperatures associated with the coastal areas being moderated by the warm Indian Ocean. The mean annual precipitation along the coastal region ranges from 776 mm/annum at Port Shepstone, to 899 mm/annum at Port Edward. Average daily temperatures range from 9°C to 22°C during winter (July) and from 21°C to 27°C in summer (February) for the coastal areas (Macfarlane and Richardson, 2013).

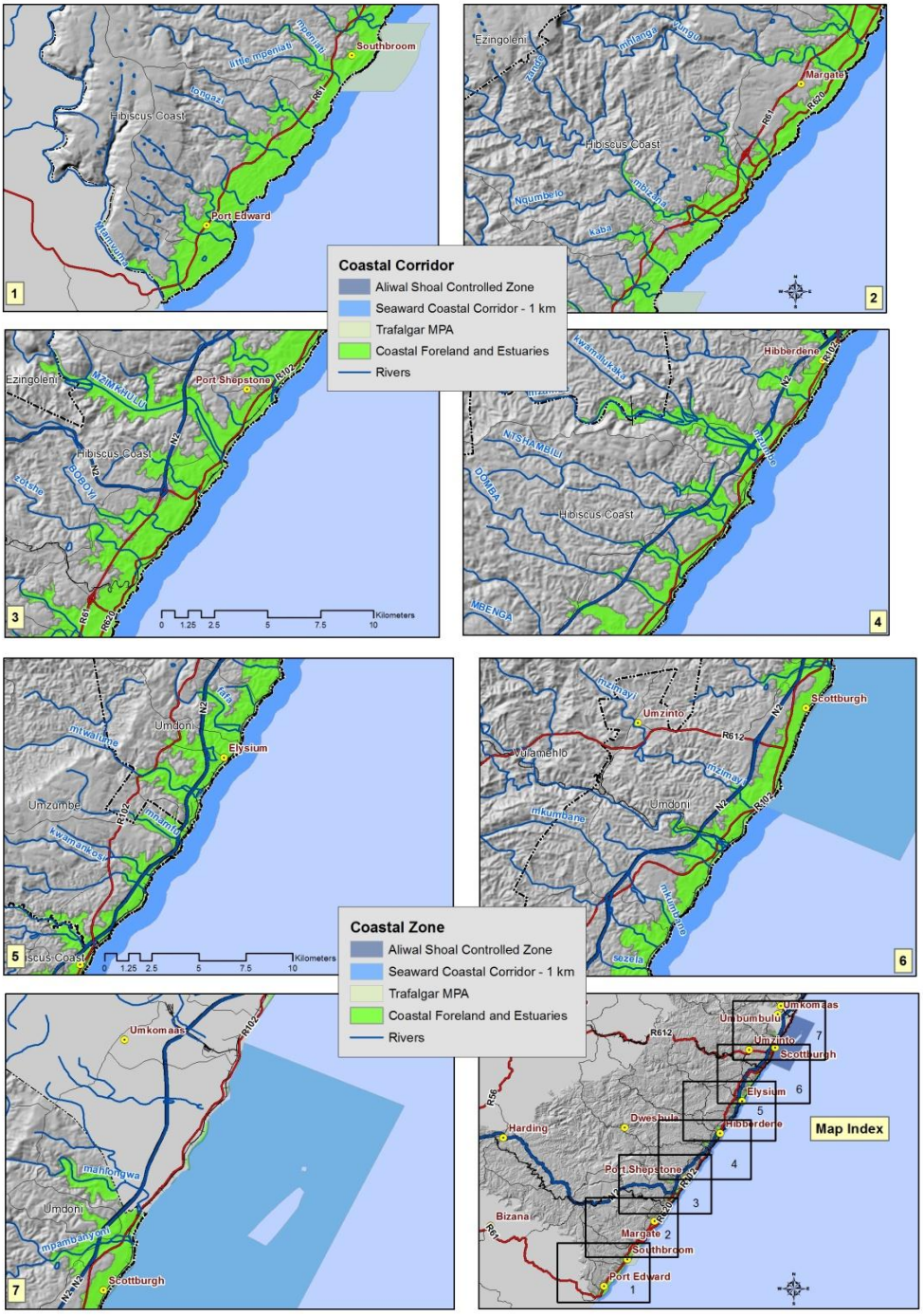
There is no one definition for the coastal zone, as it is defined by individual local, municipal, provincial and national governments, different pieces of legislation, and international treaties according to their own set of requirements. Generally, the coast can be described as the area of land that is directly influenced by, or influences, the sea. The coast (Figure 5.1) can therefore be defined as an area with a landward and a seaward boundary (www.eiatoolkit.ewt.org.za) that includes:

- Coastal waters, which extend from the low water mark into the sea, up to the point where these waters are no longer influenced by land and land-associated activities;
- The coastline or sea shore, which is the area between the low and high water marks; and
- Coastlands, which are inland areas above the high water mark that influence or are influenced in some way by their proximity to coastal waters (these areas may stretch many kilometres inland).

The Ugu coastal zone has therefore delineated using the following parameters:

- Areas adjacency to the sea;
- Altitude below 60m a.m.s.l;
- Scenic Quality;
- Estuaries; and
- Tourism based land use.

Figure 5.1: Ugu Coastal Zone



Source: MetroGIS, 2013

The coastal area of South Africa is covered by a diverse range of ecosystems, and developments impact on them in different ways (www.eiatoolkit.ewt.org.za). Coastal ecosystems may include (some of which are shown in Figure 5.1 above):

- Water catchment areas;
- Rocky shores;
- Sandy beaches;
- Coastal forests;
- Mangrove habitats;
- Coastal dunes;
- Wetlands;
- Estuaries and lagoons;
- Mud flats;
- Kelp forests; and
- Coral reefs.

5.1.1 Importance of Coastal Areas

Coastal ecosystems provide a range of direct and indirect benefits (ewt.org.za), which are of vital importance to the sound functioning of the environment and hence human wellbeing.

Direct benefits include:

- Subsistence food production and commercial food production (fishing and agriculture);
- Raw materials (mining);
- Transportation;
- Recreation;
- Tourism; and
- Aesthetic value (seafront property turnover).

Ecosystem services (indirect benefits) include:

- Erosion control;
- Soil formation;
- Water regulation and supply;
- Nutrient cycling;
- Biological control;
- Habitats;
- Pollination;
- Climate regulation;
- Genetic resource;
- Gas regulation; and
- Existence value.

5.1.2 Coastal Access Land

In order to ensure that the public can gain access to coastal public property via public access servitudes, coastal access land needs to be available. All municipalities with coastal public property must declare these servitudes within four years of the establishment of the Integrated Coastal Management (ICM) Act. They are also required to report, to the MEC, their progress towards declaring coastal access land within two years of the ICM Act coming into effect. Municipalities are required to establish coastal access land using by-laws, which includes (Celliers *et al*., 2009):

- Signposting entrances to coastal access land;
- Control of use of activities on that land;
- Protection and enforcement of the rights of the public to use such access;
- Maintenance of the land to ensure continued public access;
- Promotion of access via the provision of appropriate amenities such as parking, toilets, boardwalks, etc.;
- Removal of inappropriate access that is causing adverse environmental effects that cannot be prevented or mitigated;
- Ensuring that coastal access land does not cause adverse environmental effects;
- Describing coastal access land in municipal coastal management programmes and in any spatial development framework;
- Reporting progress, to the MEC, on the measures to implement this section within two years of the ICM Act coming into force; and
- Performing any other actions that may be prescribed.

When adjusting or determining coastal access land, the municipality must take into account (Celliers *et al*., 2009):

- The kind of access required (pedestrians, vehicles, vessels, other access, etc.);
- Potential adverse effects of public access (including adverse effects from infrastructure, vehicles, increased numbers of people);
- The need for parking, recreational and ablution facilities;
- Existing rights of way, public servitudes or customary means of gaining access to the seashore and coastal waters;
- The need to maintain coastal protected areas; and
- The importance of not unreasonably restricting land owners' rights.

5.1.3 Coastal Set-back Lines

The ICM Act makes provision for instituting a coastal set-back line. This prescribed boundary line is one of the many new and important tools that the Act has provided coastal managers and decision makers with. Coastal set-back lines may be established for various reasons, and there may be more than one set-back line established in any given area. For example, there may be one set-back line for anticipated erosion and another to control aesthetics and the height of buildings to protect a specific scenic landscape. Set-back lines will assist in controlling development along an ecologically sensitive or vulnerable area, or any area that poses a hazard or risk to humans. The coastal set-back line may even be situated wholly or

partially outside the coastal zone. In effect, coastal set-back lines prohibit or restrict the construction, extension or repair of structures that are either wholly or partly seaward of the line. The intention of the coastal set-back line is to protect or preserve the following aspects of the coastal zone (Celliers *et al*., 2009):

- Coastal public property such as beach amenities and other infrastructure such as parking;
- Coastal private property such as private residences and business properties;
- Public safety in the face of extreme climate and other natural events;
- The coastal protection zone as described in Section 16 & 17 (of the ICM Act); and
- The aesthetics or "sense-of-place" of the coastal zone.

The establishment of coastal set-back lines is a provincial responsibility, however the MEC may only declare such a setback line after consultation with municipalities and interested and affected parties. In other words, interested and affected parties may influence the location of this line based on local conditions and knowledge. The MEC must communicate the proposed coastal set-back line by publishing regulations in the Provincial Gazette. Once the regulations have been published, the local municipality of that area must delineate the coastal set-back line on the map or maps that form part of the municipal zoning scheme. This is done so that the public may determine the position of the setback line in relation to existing cadastral boundaries (Celliers *et al*., 2009).

5.2 National Environmental Management: Integrated Coastal Management Act, 2008 (Act No. 24 of 2008)

The purpose of this Act is to establish an integrated coastal and estuarine management system 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; and
- The municipality may make by-laws to assist in the administration of its coastal management programme

(Macfarlane and Richardson, 2013).

Table 5.1 National Environmental Management Act Principles, as adapted for the coastal zone of South Africa (taken from DEAT, 2000).

PRINCIPLE	DESCRIPTION
National Assets	The coast must be retained as a national asset, with public rights to access and benefit from the opportunities provided by coastal resources.
Economic Development	Coastal economic development opportunities must be optimised to meet society's needs and to promote the wellbeing of coastal communities.
Social Equity	Coastal management efforts must ensure that all people, including future generations, enjoy the rights of human dignity, equality and freedom.
Ecological Integrity	The diversity, health and productivity of coastal ecosystems must be maintained and, where appropriate, rehabilitated.
Holism	The coast must be treated as a distinctive and indivisible system, recognising the interrelationships between coastal users and ecosystems, and between the land, sea and air.
Risk Aversion & Precaution	Coastal management efforts must adopt a risk averse and precautionary approach under conditions of uncertainty.
Accountability & Responsibility	Coastal management is a shared responsibility. All people must be held responsible for the consequences of their actions, including financial responsibility for negative impacts.
Duty of Care	All people and organisations must act with due care to avoid negative impacts on the coastal environment and coastal resources.
Integration & Participation	A dedicated, co-ordinated and integrated coastal management approach must be developed and conducted in a participatory, inclusive and transparent manner.
Co-operative Governance	Partnerships between government, the private sector and civil society must be built in order to ensure co-responsibility for coastal management and to empower stakeholders to participate effectively.

Source: Celliers *et al.* (2009)

5.3 Strategic Plan for the Environmental Sector 2009 – 2014, Marine and Coastal Management

The Environmental sector is responsible for managing the development, sustainable use and organized exploitation of marine and coastal resources, as well as protecting the integrity and quality of marine and

coastal ecosystems. The marine and coastal resources of South Africa are very diverse, providing important social and economic benefits to the population, particularly those living in coastal areas. South Africa's coastline is a natural asset: it serves as a major shipping route, contains a vast diversity of marine and coastal species, provides food and employment to many people and attracts vast numbers of tourists annually.

Increasing anthropogenic and environmental pressures on marine and coastal ecosystems are changing the functioning and structure of many of their components, often leading to over-exploitation, degradation and loss of resource. The primary role of the environmental sector is to protect marine and coastal ecosystems and biodiversity, and to ensure that opportunities are available for sustainable use of these resources in a reasonable manner.

The on-going challenge with regards to marine resources for the sector is to ensure sustainable consumptive use of marine biodiversity resources. This needs to be carried out in a manner which ensures fair access to resources in order to redress the inaccessibility to resources experienced by previously disadvantaged communities. Transformation of the fishing industry has made positive progress, however continues to be a matter of importance for the sector. In 2005, the Department of Environmental Affairs (DEA) Marine and Coastal Management (MCM) embarked on a process of allocating long-term commercial fishing rights in fisheries sectors, ranging from the more accessible to the most capital intensive fisheries.

A General Fishing Policy and 20 specific policies were established in 2005/2006 to guide this process, and almost all the long-term rights in the respective fishing sectors were allocated by the end of March 2006. Careful monitoring of fish stocks to identify over-exploitation or negative impacts on the integrity of marine ecosystems is now required. Research is a key function of the sector – in particular research to determine the state of fish stocks and modelling of Total Allowable Catch and Total Allowable Effort for the important commercial fish species. This is an essential input into the long term rights allocation process.

South Africa is also working towards an ecosystem approach to fisheries management. This goal was recognized at the WSSD in 2002, and progress towards its realisation is being made, particularly in work done through collaboration with neighbouring coastal countries through the Benguela Current Large Marine Ecosystem (BCLME) programme. This programme allows fish stocks in these areas to be managed jointly and holistically on a regional basis.

DEA MCM is also responsible for preventing and eliminating illegal marine activity, and South Africa now has a fleet of Environmental Protection Vessels (EPVs), which operate in both South African and Southern African Development Community (SADC) waters. It should, however, be noted that DEA MCM experiences critical capacity and resourcing challenges in these areas. There is an urgent need for added technical and enforcement skills in the sector, and a financial resource to fund operation of the EPVs.

The primary challenge for the sector in the next five years is to increase the effectiveness with which designated Marine Protected areas are managed in South Africa. There are also specific areas where expansion of the network would increase the representativeness of the system (e.g. to include off-shore marine ecosystems). Further expansion of the marine protected areas network is required to guide the

selection and designation of any further areas. In the face of climate change and the impacts this may have on ocean currents, marine species and ecosystems, a priority for the sector is to increase its understanding of the potential impacts of climate change on the marine environment, as well as the vulnerability of these ecosystems to such changes. Additional research is required to provide the platform of understanding upon which any adaptation strategies could be based in the future.

In terms of coastal management, challenges facing the environmental sector are primarily related to minimizing pressure on the coastal zone resulting from anthropogenic activities. In particular:

- The control of development in the coastal zone (which is transforming natural habitats, disrupting coastal ecosystems and reducing their resilience). Commercial developments, including mining, are the greatest cause for concern;
- Ensuring sustainable consumptive use coastal biodiversity resources;
- Encouraging the development of responsible marine aquaculture activities (this is a rapidly increasing activity in the coastal zone which is to be encouraged given its role in providing a source of fish to supplement natural fish stocks – however, strict control is required to ensure that this industry (which does provide some inherent risks to the environment) is managed in a sustainable way. Control is to be achieved primarily through the EIA process, the development of guidelines for the industry and amendments to the Marine Living Resources Act, 1998 (Act No. 18 of 1998); and
- Protection of estuarine ecosystems from pollution and waste water resulting primarily from land-based activities.

As for marine resources, there is a need for further research on the potential impacts of climate change and the vulnerability of coastal ecosystems to changes in climate. There is also a need for further compliance and enforcement activity regarding consumptive use of coastal resources and environmental authorisations for developments.

In all of these areas, the challenge for the sector is to ensure effective cooperative governance. There is an urgent need to improve the performance of all institutions involved in this regard. The implementation of coastal management plans by both provincial and local municipalities are an important tool in this regard, and all coastal provinces and municipalities have one in place.

For both marine and coastal management, there is a need for the sector to continue to work on the development of an effective legislative and regulatory framework for marine and coastal zone management and to ensure that this is effectively implemented. This involves promulgation of the Integrated Coastal Management Bill, amendment to the Marine Living Resources Act, 1998 (Act No. 18 of 1998).

The development of a National Biodiversity Framework, which contains many actions and targets that are relevant to both marine and coastal management, should be noted. Thus the sector will work with SANBI, provincial environmental departments and the Biodiversity and Conservation Branch of DEA to implement the relevant actions within the National Biodiversity Framework (Strategic Plan for the Environmental Sector 2009 – 2014, DEA).

The Strategic Plan for the Environmental Sector (2009 – 2014) aims to:

Marine

- Continue to work towards the equitable and sustainable use of marine natural resources and implementation of an ecosystem approach to the management of marine resources;
- Reduce levels of illegal fishing;
- Improve the effectiveness of existing marine protected areas and develop a strategy to guide any future expansion of the network;
- Increase its knowledge of the vulnerability of marine ecosystems to climate change; and
- Improve the financial management of the Marine Living Resource Fund (MLRF).

Coastal

- Improve protection of marine and coastal areas from unsustainable development;
- Contribute to the enhancement of livelihoods of coastal communities;
- Ensure the marine aquaculture industry is developed and managed in a manner which is sustainable and prevents negative impacts on marine and coastal biodiversity; and
- Work with provincial government, local authorities, the Department of Water Affairs and Forestry (DWAF), Department of Agriculture and other relevant sectors to decrease impacts from land-based activities on estuarine ecosystems.

The Strategic Plan for the Environmental Sector (2009 – 2014) aims to achieve this by:

Marine

- Distributing long term commercial fishing rights and other concessions equitably and sustainably;
- Taking steps to allow recovery of overexploited resources – such as certain linefish and abalone;
- Establishing additional commercial fishing opportunities where appropriate and where fish stocks can support this;
- Encouraging non-consumptive use of marine resources, where feasible;
- Increasing compliance and enforcement activity and effectiveness through increasing numbers, skills and resources available for Fisheries Control Officers (FCO). FCOs will be a component of the national Environmental Management Inspectorate. The MCM branch will work with the Environmental Management Inspectors unit in the Environmental Quality and Protection Branch to develop and deliver the training and development required by the specialist FCOs;
- Increasing research efforts to focus on increasing understanding of the vulnerability of marine and coastal ecosystems to climate change;
- Implementing the relevant components of the National Biodiversity Framework (i.e. those that relate to the conservation and management of marine biodiversity). This framework contains a strategy for the consolidation and expansion of the marine protected areas network and the production of management plans for these areas; and
- Developing and implementing sound and robust financial management systems for the MLRF.

Coastal

- Developing and implementing integrated coastal planning and management systems;
- Increasing control of unsustainable coastal developments;
- Implementing sustainable livelihoods programmes in coastal areas;
- Developing and implementing opportunities for sustainable non-consumptive activities within coastal and marine areas;
- Developing guidelines and a regulatory framework for marine aquaculture – and working with provinces to ensure sound application of the EIA process to aquaculture development applications; and
- Implementing all relevant sections of the National Biodiversity Framework – as they pertain to the conservation and sustainable use of marine biodiversity (including ecosystems).

The three spheres of government are responsible for the marine and coastal environment, and therefore cooperation and coordination of effort is vital. The lead agent for marine and coastal management is the DEA Branch - MCM, responsible for protection and management of the marine environment. It is also the lead agent for coastal management. Hence, for marine issues it is both the lead agent and is responsible for implementation (in terms of fisheries this includes regulation, permitting, monitoring and enforcement). For coastal issues, responsibilities for implementation are distributed between the three spheres. The Marine and Coastal Management Branch is responsible for implementation of the applicable sections of the National Biodiversity Framework, which relate to marine and coastal environments and will work with relevant partners to ensure implementation. Provinces have responsibilities for elements of coastal management and carry out integrated coastal management and planning (includes prevention and removal of illegal development in coastal areas). Coastal municipalities are responsible for many of the management activities for coastal management in the area above the high water mark (e.g. planning, engineering, beach management and tourism), and they have a responsibility to develop coastal management plans. Coordination, cooperation and partnership are vital activities, both within the sector (between the three spheres of government in coastal areas) and between governmental and non-governmental coastal role players. The priority cooperative governance challenge for this area of the sector is to improve coordination and integration of coastal and marine resource management.

5.4 Coastal Pollution

Both the coastal ecosystem and human health are negatively affected by point-source (contaminants discharged from a specific fixed location, e.g. a pipe or outfall structure) and non-point-source (pollution originating from a number of dispersed sources, e.g. water entering a river from a catchment with mine dumps) pollution. The ICM Act addresses a number of issues relating to coastal pollution including the discharge of effluent into coastal waters (specifically municipal and industrial effluent), prohibiting the importing and exporting of waste or material to be dumped at sea, the prohibition of incineration at sea, and controlling dumping at sea. The ICM Act also prescribes the measures to be taken in cases where emergency dumping has to take place. The Act has two mechanisms that control the permissible discharge of effluent into coastal or estuarine waters. The first is what is known as a general authorisation, and the second is a coastal waters discharge permit. Both the general authorisation and coastal waters

discharge permit for the discharge of effluent into estuarine waters require the Minister of Environmental Affairs and Tourism to consult with and issue the authorisation or permit in concurrence with the Minister responsible for Water Affairs.

5.5 Blue Flag

The Blue Flag Programme works towards sustainable development at beaches and marinas through strict criteria relating to water quality, environmental education and information, environmental management, safety and other services, and Blue Flag Status is granted annually to beaches and marinas that satisfy a number of these essential criteria. If some of the vital criteria are not satisfied during the season or the conditions change, the Blue Flag status will be withdrawn.

The main objectives of the Blue Flag programme are to improve the understanding of coastal environments and to promote the incorporation of environmental issues in the decision-making processes of local authorities and their partners. Environmental education (including topics such as environmental practices, management systems, safety and nature interpretation) offers a core value and characteristic of the programme and is targeted toward decision makers, tourists, managers, employees and local communities.

Stakeholders are united by the Blue Flag Programme in the sustainable management and development of marinas and beaches, particularly from the tourism and environmental sector, and at local and national levels. This is done by:

- Promoting standards of water quality, environmental education, environmental management, safety and services;
- Educating beach and marina visitors about good practices in the coastal environments;
- Educating those working directly with the management of beaches and marinas;
- Educating the community in protecting the coastal environment; and
- Encouraging voluntary involvement in environmental action.

(http://www.kzndae.gov.za/en-us/environmentalservices/coastalmanagementandbiodiversity/blueflag.aspx)

Blue Flag Beaches in the Ugu DM are (www.blueflag.co.za):

- Trafalgar Beach;
- Marina Beach;
- Ramsgate Beach;
- Lucien;
- Southport;
- Umzumbe; and
- Hibberdene.

5.6 Coastal Vulnerability Index

The Coastal Vulnerability Index (CVI) was launched in February 2011. The initiative was undertaken by the Department of Agriculture, Environmental Affairs and Rural Development, assisted by the Oceanographic Research Institute, and formed part of the Comprehensive Business Plan, which deals with issues such as coastal erosion in a holistic manner. Noteworthy are the unprecedented levels of erosion, which have occurred on the KwaZulu-Natal coastline over the last few years as a result of major storm events and high tide events (www.info.gov.za).

Areas that are particularly sensitive to environmental hazards can be identified through an index of coastal vulnerability. Vulnerabilities of physical, social, economic and ecological environments are all contributing factors in the process of identifying the overall coastal vulnerability, and are assessed and integrated in order to determine the overall coastal vulnerability for sections of the KwaZulu-Natal coastline. The outcome of this will inform the delineation of KZN's coastal set back line (as required by the Integrated Coastal Management Act, 2008 (Act No. 24 of 2008)) and the development of a coastal risk management strategy. The CVI provides a direct picture of a site`s vulnerability to coastal hazards, allowing Authorities to be proactive and undertake a risk averse and precautionary approach to coastal development and ultimately sustainable development (www.info.gov.za).

5.6.1 Coastal Vulnerability Assessment for the Ugu District Municipality

The southern boundary of Ugu DM from Port Edward to Scottburgh is the Indian Ocean. This is a very important resource for the Ugu DM, as the majority of the population is concentrated along the coastline, where most of the economic activities occur. The disproportionate settlement at the coast has led to increased pressure on the coastal zone, mainly through resource exploitation and coastal development. This leads to the loss of natural coastal functioning, leaving the coast vulnerable to the impacts of sea-level rise, coastal erosion, extreme weather, oceanic events and other coastal hazards (O'Connor *et al*., 2009).

The CVI assesses the relative physical coastal vulnerability based on a set of physical coastal parameters that serve as indicators of risk. The coast is categorised into three risk classes, namely: RISK (Yellow), MODERATE RISK (Green) and HIGH RISK (Red). The risk classes are defined as follows:

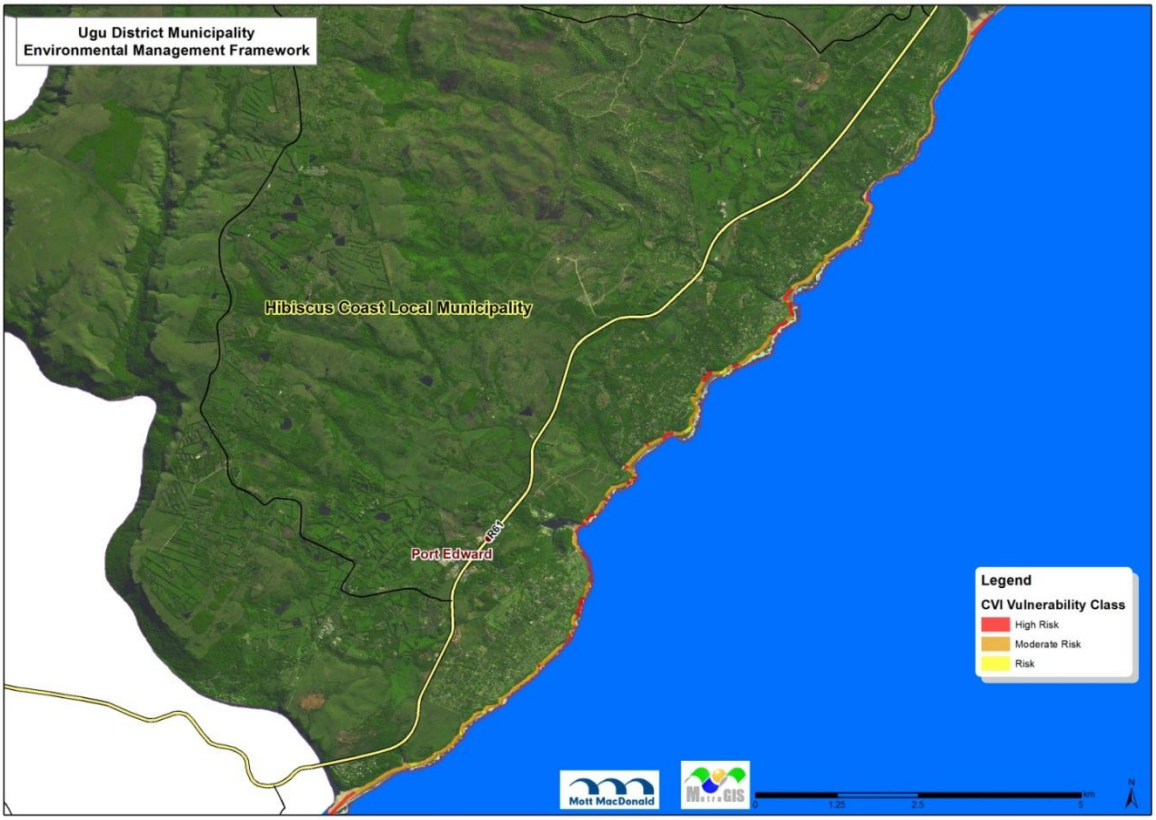
RISK (Yellow): Sites that score RISK are considered to be at lower risk than other areas to be impacted by damage due to favourable physical parameters such as vegetation, beach width, dune width, outcrop and distance to the 20 m isobaths respectively. Any new developments must be set-back appropriately so as to maintain the natural functioning of the coast.

MODERATE RISK (Green): Sites that score MODERATE RISK are at higher risk that areas of RISK, and there is a greater likelihood of these sites being damaged as a result of coastal erosion or extreme weather events. It is recommended that the option of retreat and defence be explored as existing infrastructure may be damaged. New developments must be set back sufficiently to ensure that they are not damaged.

HIGH RISK (Red): Sites that score HIGH RISK are considered to be the most susceptible to the effects of erosion and are most likely to be impacted should sea-levels rise or extreme events occur. It is recommended that the option of retreat and defence be explored, as existing infrastructure may be damaged. New developments in areas adjacent to sites with this risk category must be set back sufficiently to ensure that they are not damaged.

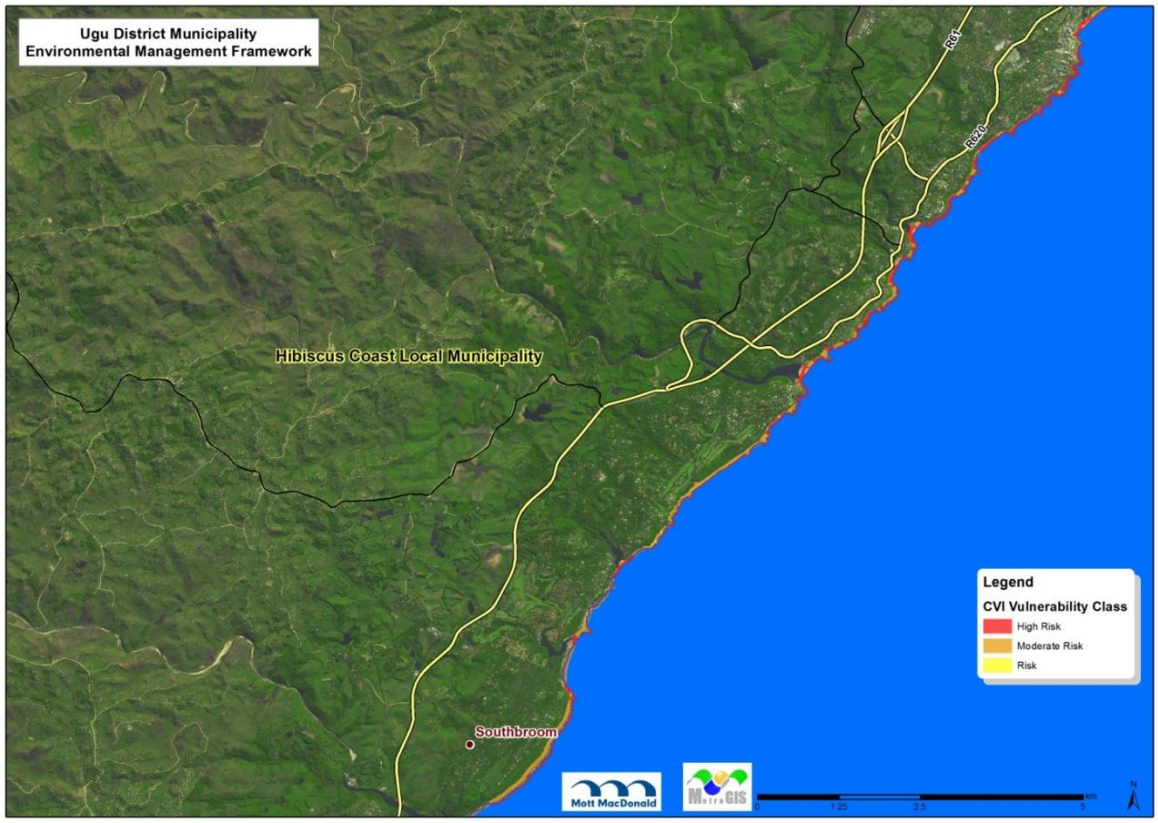
The Coastal Vulnerability Assessment for the Ugu DM is provided below (Figure 5.2 – 5.9).

Figure 5.2 Coastal Vulnerability Index, Port Edward to Southbroom



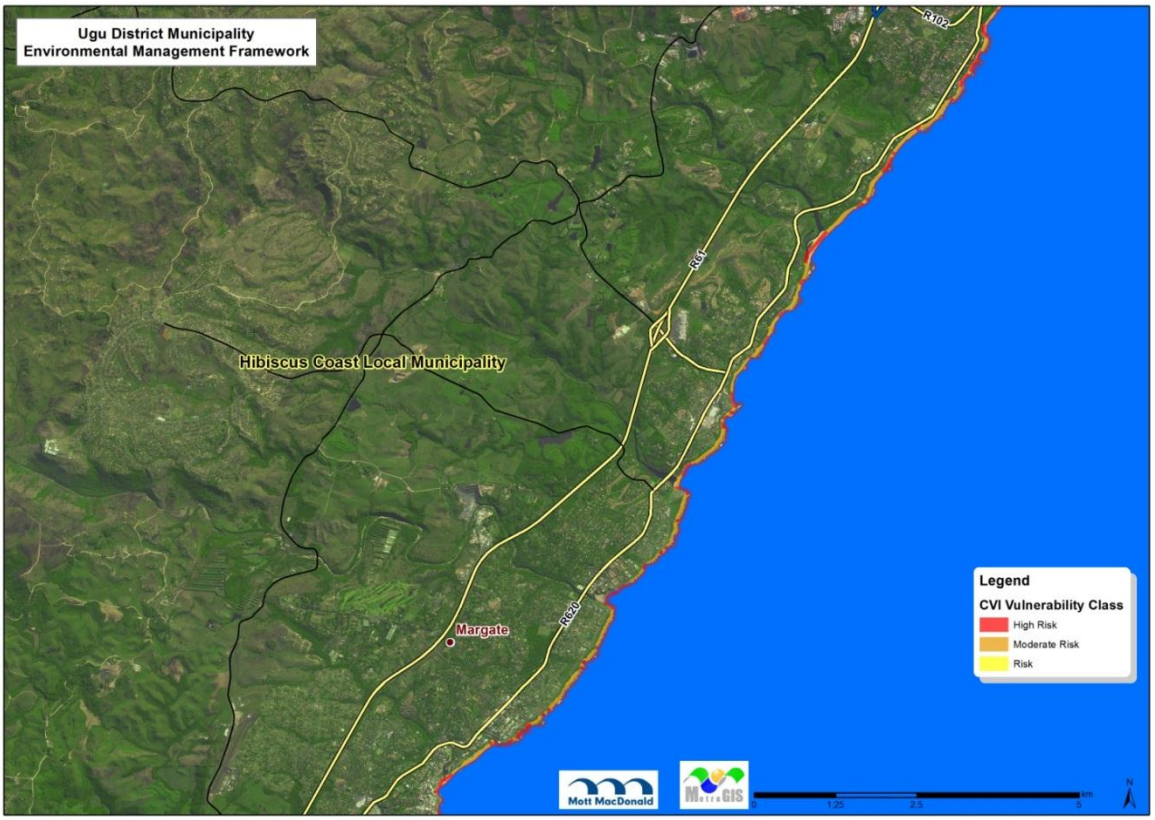
Source: MetroGIS (2013)

Figure 5.3 Coastal Vulnerability Index, Southbroom and North



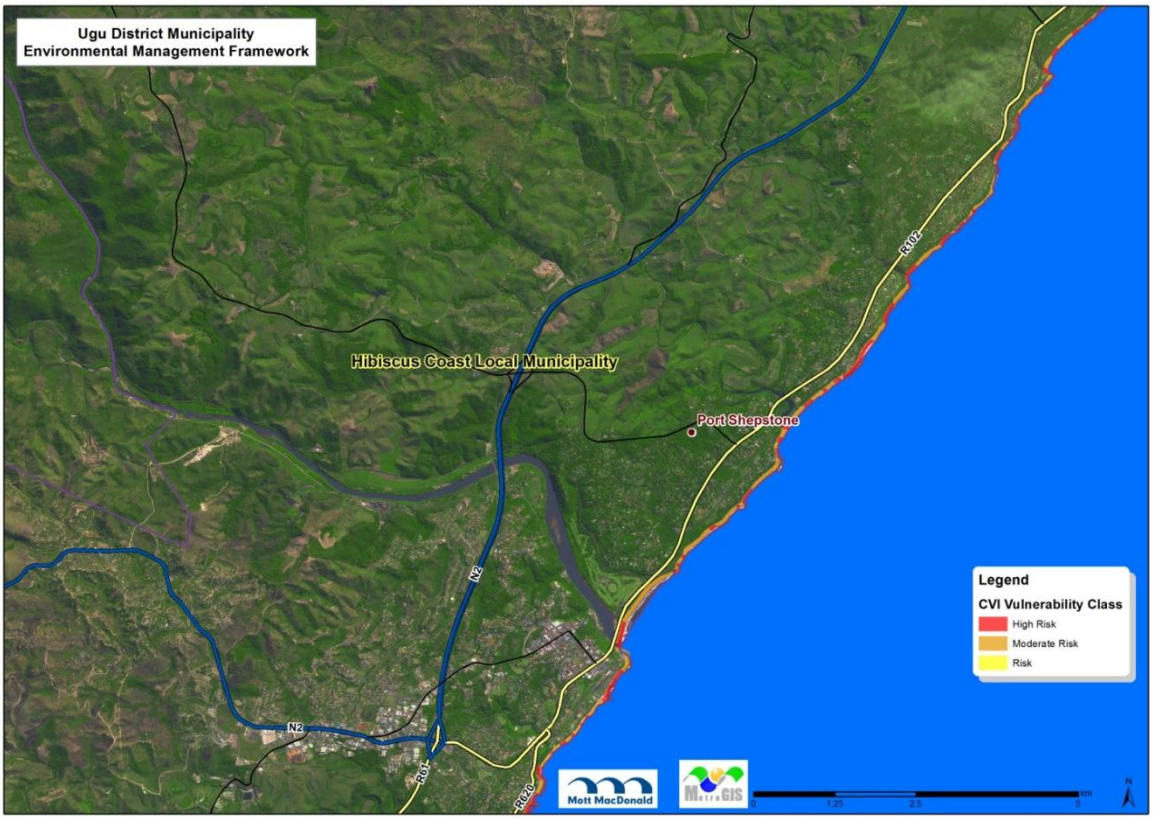
Source: MetroGIS (2013)

Figure 5.4 Coastal Vulnerability Index, South and North of Margate



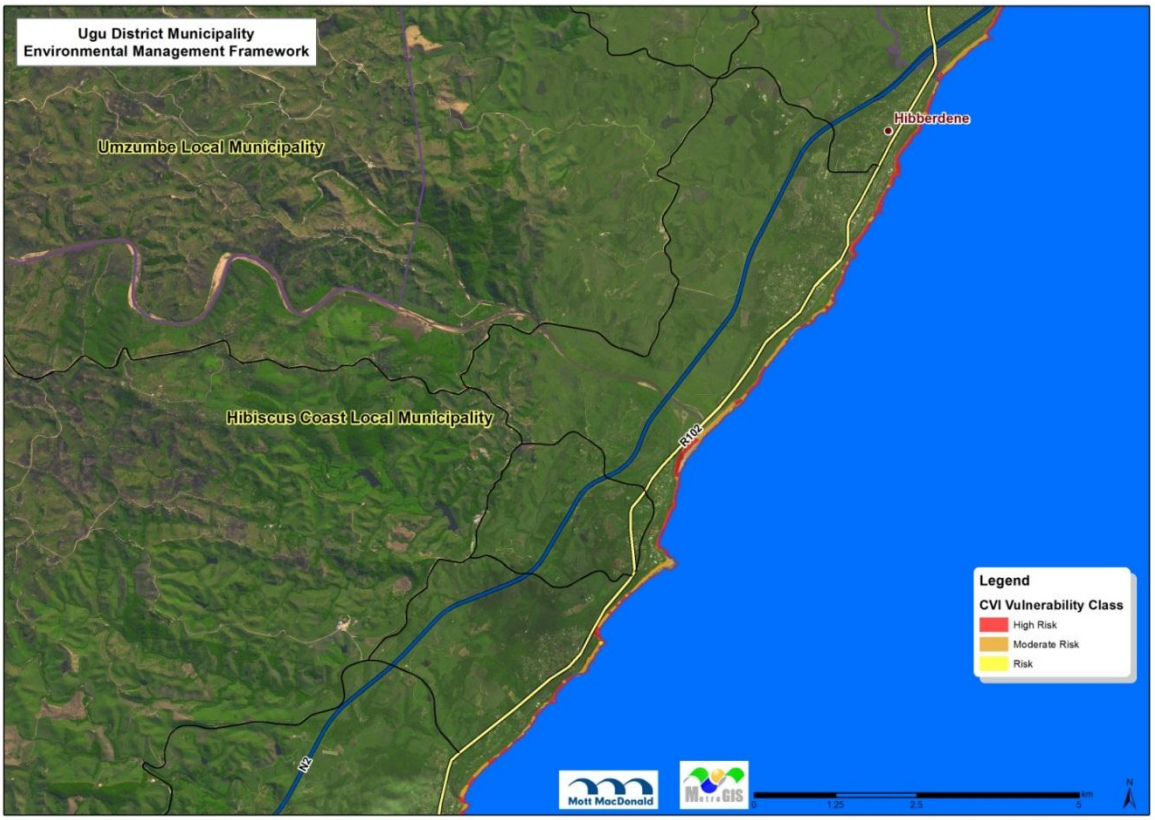
Source: MetroGIS (2013)

Figure 5.5 Coastal Vulnerability Index, South and North of Port Shepstone



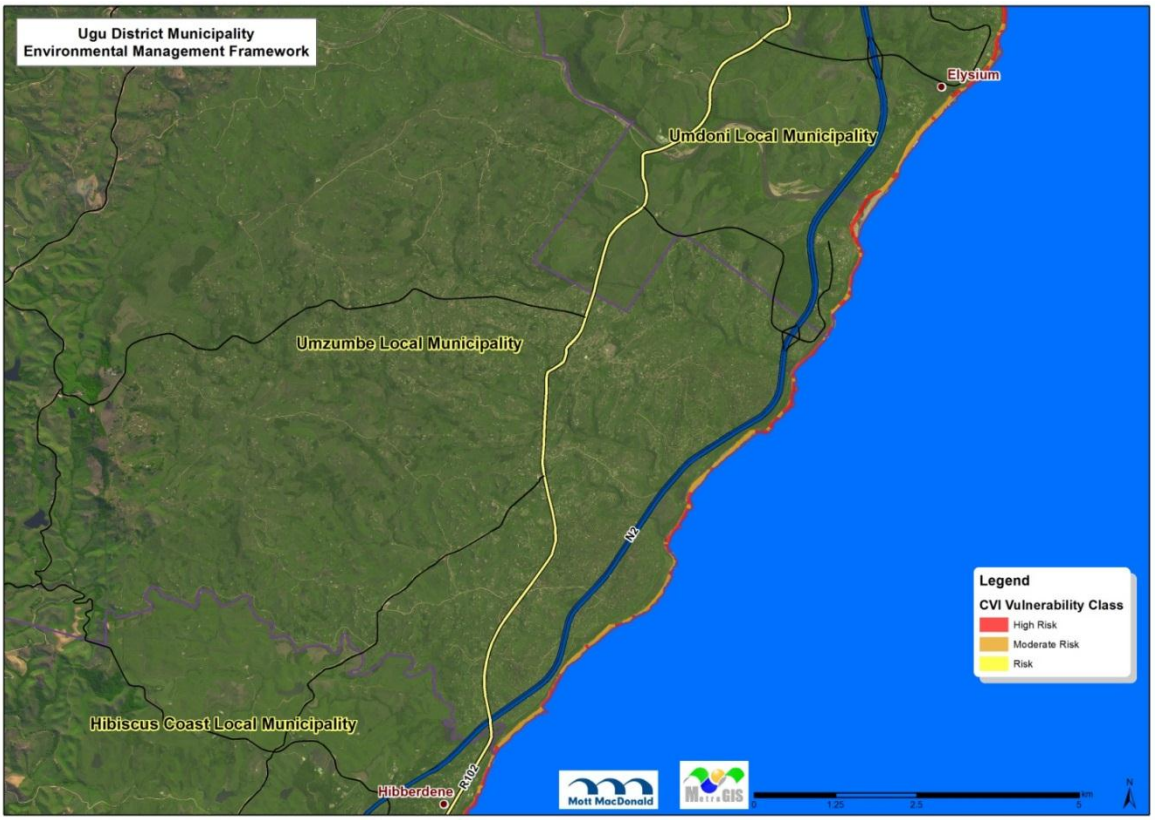
Source: MetroGIS (2013)

Figure 5.6 Coastal Vulnerability Index, North of Port Shepstone to Hibberdene



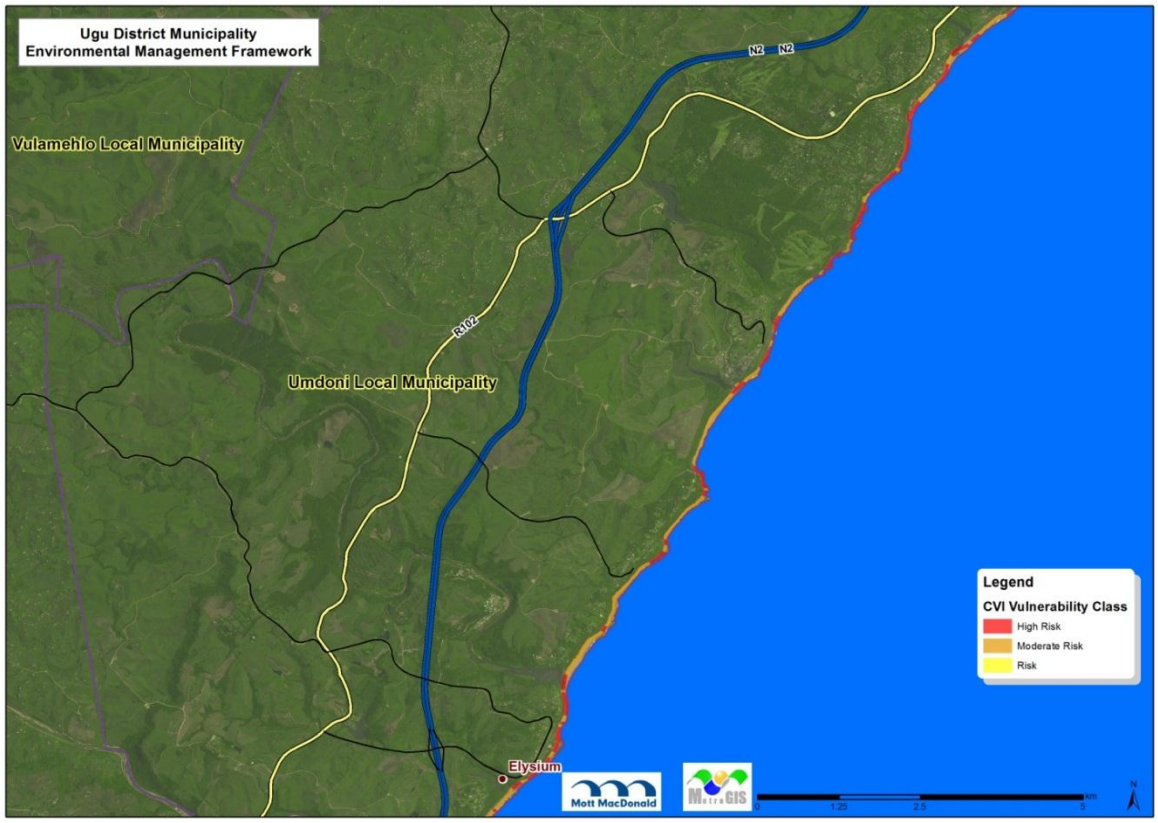
Source: MetroGIS (2013)

Figure 5.7 Coastal Vulnerability Index, Hibberdene to Elysium



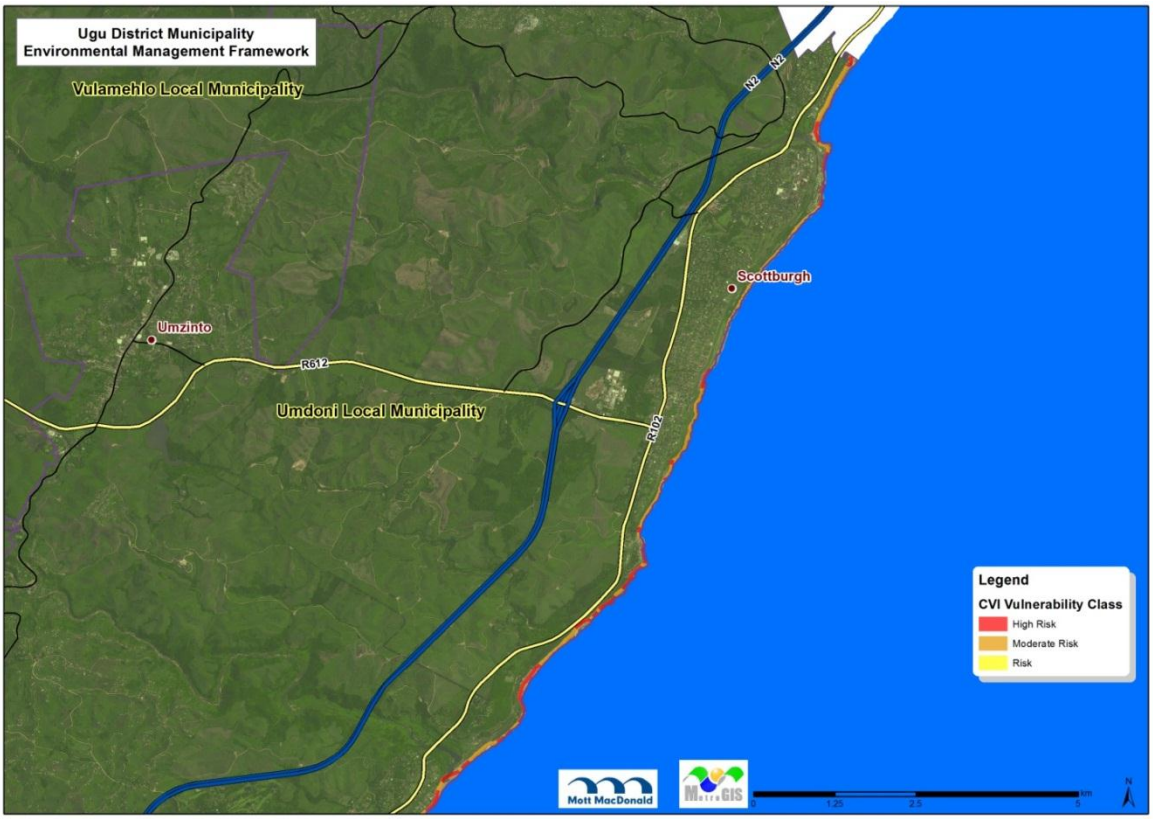
Source: MetroGIS (2013)

Figure 5.8 Coastal Vulnerability Index, North of Elysium



Source: MetroGIS (2013)

Figure 5.9 Coastal Vulnerability Index, South and North of Scottburgh



Source: MetroGIS (2013)

5.7 Coastal Agriculture

The most important sugar growing area on the South Coast is located along the coastal strip where climate, soils and distance to mills are key determinants. It is noted that the output in the sugar industry has been in a decline for a number of years as a result of a number of factors, including: climate change, declining world markets, land reform, pressures from property developers, declining soil fertility and rising costs of production (fuels, labour, transport, etc.). The conditions in the coastal region of the Ugu DM are also suited to a number of fruits, including bananas, citrus, litchis, papaya, mango, macadamia nuts, avocado and coffee (DAEA, 2006).

5.8 Coastal Geology

The coastal geology of the Ugu DM includes 4 main groups (Table 5.2): the Natal Metamorphic Province, the Ecca group, the Drakensberg group and unconsolidated sediments.

Table 5.2 Coastal geology of the Ugu DM (Macfarlane and Richardson, 2013)

Group	Description and Location
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.
Ecca Group (250 Ma)	Minor outcrops of Middle Ecca 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)	Dolerite 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.

Source: Macfarlane and Richardson, 2013

5.9 Coastal Biodiversity

5.9.1 Estuaries and wetlands

Estuaries in South Africa must be managed in a co-ordinated and effective manner, in accordance with a National Estuarine Management Protocol. This protocol must be developed by the Minister of Environmental Affairs and Tourism; in conjunction with the Minister responsible for water affairs, within four years of the commencement of the ICM Act. A summary of the requirements (Celliers *et al*., 2009) of the National Estuarine Management Protocol and the estuarine management plans is provided below.

The purpose of the national estuarine management protocol is:

- To determine a strategic vision and objectives for achieving effective integrated management of estuaries;
- To set standards and guidelines for estuary management;
- To define how management responsibilities must be carried out by organs of state and others;
- To establish minimum requirements and identify people responsible for the preparation of estuarine management plans and the process to be followed;
- To specify a review process for estuarine management plans to ensure compliance to the ICM Act; and
- To publish the protocol for public comment.

The requirements of estuarine management plans are:

- Consistency with the National Estuarine Management Protocol;
- Consistency with the National Coastal Management Programme;

- Consistency with applicable provincial Coastal Management Programme(s);
- Consistency with the applicable municipal Coastal Management Programme; and
- Publication of the plan for public comment.

There are 40 estuaries located along the coastal stretch of the Ugu DM, between Scottburgh and Port Edward, ranging in size from 0.01 ha to 72 ha (Figure 5.10). Most estuaries are classed as 'Temporarily closed', with the exception of the Mzimkhulu estuary, which is classed as 'Permanently open' (Table 5.2). The Mzimkhulu estuary does, however, close from time to time due to anthropogenic disturbances, and is artificially maintained as an open estuary. Noteworthy are the Kaba, Ku-Boboyi and Zolwane estuaries, which have been flagged as 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 5.3). Only seven of the estuaries are considered to be in Good condition, whilst the Mtamvuna is currently in Excellent condition.

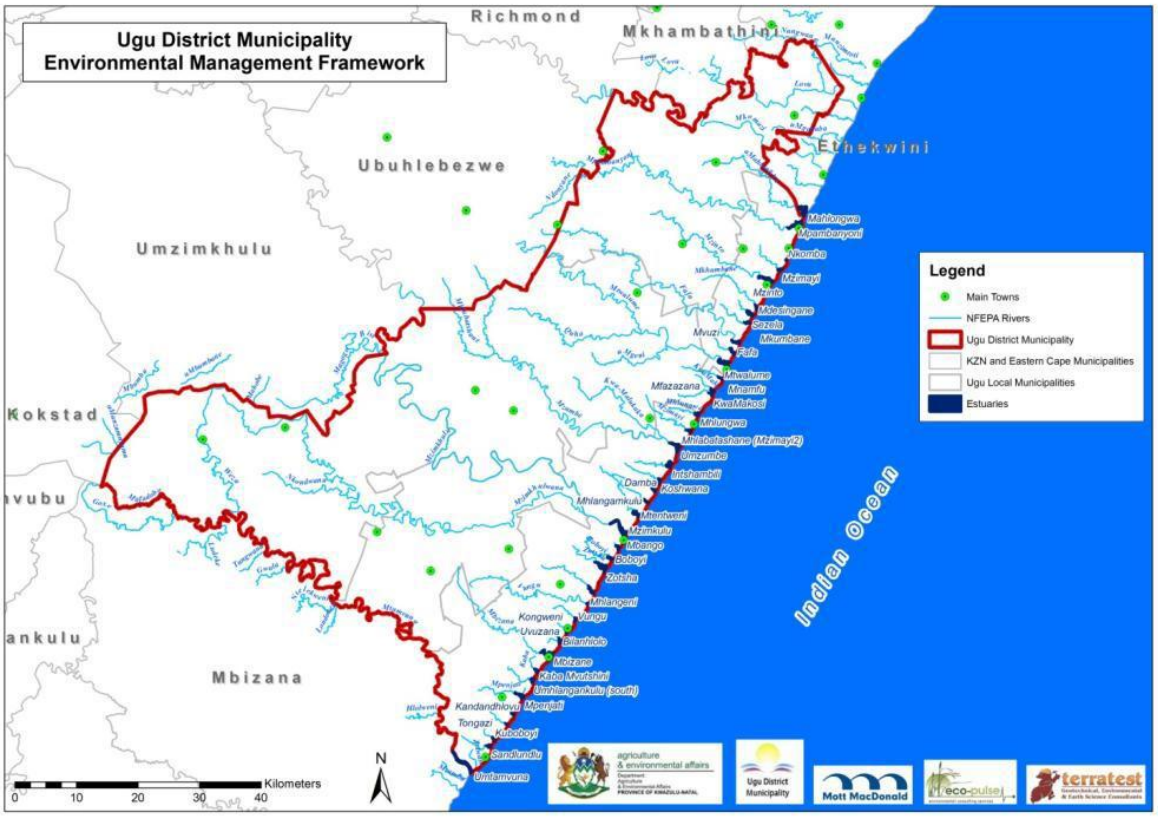
Due to the coastal region receiving higher rainfall than the inland region, higher densities of freshwater wetlands occur along the coast. As a result of intensive urban/housing developments along the coastal zone, formal agricultural practices (sugarcane and forestry) as well as informal housing and associated subsistence cultivation, wetlands in the Ugu DM coastal zone are generally heavily degraded.

Table 5.3 Status of estuaries in the Ugu District Municipality

Estuary Name	Type	Condition (Turpie & Van Niekerk, 2012).	EKZN Priority Estuary
Bilanhlolo	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	-

Estuary Name	Type	Condition (Turpie & Van Niekerk, 2012).	EKZN Priority Estuary
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

Figure 5.10 Map showing the location of estuaries along the Ugu Coastline



Source: GIS Coverage: EKZNW (2012c)

5.9.2 Coastal Management Responses Required

With the most highly threatened ecosystems being located along the Ugu coastal strip, by far the most intensively developed area within the Ugu DM, this has significant implications for future development and planned expansion of land use activities within the coastal zone.

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:

- Development and implementation of a municipal coastal management programme and monitoring forum for managing the coastal zone within the municipality;
- Development and implementation of estuary management plans; and
- Management of sand mining operations within sustainable limits to avoid unacceptable reductions in sediment inputs to rivers, estuaries and the marine environment.

5.10 Coastal Heritage

The majority of archaeological sites are located within 2-3 km of the coastline, as the landscape attracted hunter-gatherers and farmers in the past. Archaeological sites have mostly been revealed at the coast due to the concentration of developments in near-coastal areas and due to decades of agricultural activity (particularly sugarcane) churning the upper 30 cm of soil. Such activities (although responsible for revealing sites) are often responsible for destroying valuable archaeological evidence, destroying the visible spatial layout of sites. Hence, archaeological sites in such cultivated areas have a low heritage value. Stone and Iron Age shell middens along the coast, however, have high heritage significance at all levels for their scientific value. Such sites almost always occur in close proximity to rocky outcrops that were historically an important source of shellfish. Thus, the entire Ugu coastline, within 3 km of the shore, should be mapped as a zone of high archaeological sensitivity, and all developments within this area should be subject to a Heritage Impact Assessment. Shipwrecks are known to occur along most of the KwaZulu-Natal coastline. Many occur along the southern KwaZulu-Natal coast and some comprise popular tourism destinations as scuba diving sites, such as those on Aliwal Shoal just north of Ugu District. The Port Shepstone Maritime Museum has records of other wrecks along the coastline.

5.11 Conclusion

As the Ugu DM coastline stretches for approximately 112 kilometres along the eastern border of the municipality, it is essential to incorporate the protection of the coastal zone into the EMF. This chapter has reviewed some of the municipal responsibilities towards coastal management and the legislation surrounding the protection of the coastal environment. It has also provided an overview of the status of the coastal zone of the Ugu DM.

6 Specialist Studies

6.1 Overview

As mentioned in Section 1, the status quo phase provides a baseline of conditions within Ugu DM, at the time of the study. A suite of specialist studies was therefore commissioned in order to better understand the study area, its natural assets, the relevant drivers and key issues. They are outlined in Figure 6.1 below.

Figure 6.1: Specialist Studies undertaken to inform the Ugu EMF Status Quo Assessment

Note: Services (i.e. infrastructure) reporting has been incorporated into the main body of this report as part of the literature review. This is because of the cross-cutting nature of the various infrastructural sectors.

6.2 Biodiversity Specialist Study

The information below constitutes a summary of the key points arising from the biodiversity specialist study. The full report can be found in Appendix A.

6.2.1 Objectives

The objective of this report was 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;
- To compile biodiversity maps, which adequately represent the importance of untransformed land for biodiversity conservation; and
- To provide additional input on biodiversity issues and management to support the development of the EMF.

Further tasks, some of which have been reported on in this draft report, include spatially representing ecological sensitivities across the area and identifying focal areas and recommendations to prevent further unacceptable biodiversity loss in the future.

6.2.2 Methodology

A brief overview of the methodology applied in preparing this report is outlined below:

- **Legal Review:** 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 has also been emphasised.
- **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.
- **Assessment of present state**: This task was approached by identifying and reporting on appropriate indicators that provide a perspective on the present state of biodiversity in the Ugu district. This was informed by available spatial information and knowledge of the area.
- **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.*, 2013). The Critical Biodiversity Area (CBA) map outputs from the BSP are presented here as they give an indication of the importance of areas for biodiversity protection and maintenance.
- **Prioritization of focal areas for conservation action:** A map indicating the importance of areas for conservation action was developed for terrestrial ecosystems by undertaking a GIS-based analysis that

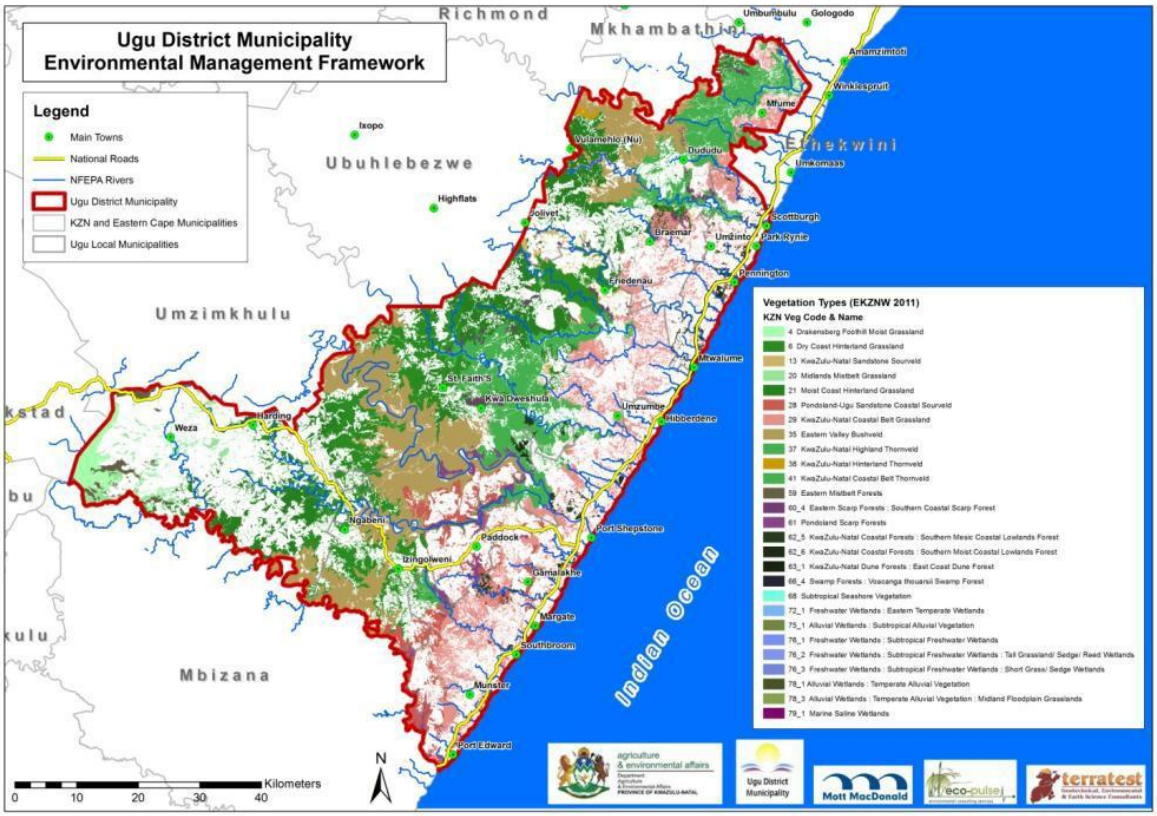
integrated spatial information of biodiversity importance and threats to biodiversity. This was then used to highlight a number of key focal areas for conservation action.

- **Identification of key environmental issues:** The Drivers-Pressures-State-Impact-Response Framework (DPSIR) was used to identify key issues affecting the state of biodiversity in the Ugu district and to identify priority responses for addressing concerns identified.
- **Identification of indicators for monitoring:** This step entailed the identification of potential indicators for monitoring the changes in the status quo of biodiversity.

6.2.3 Results

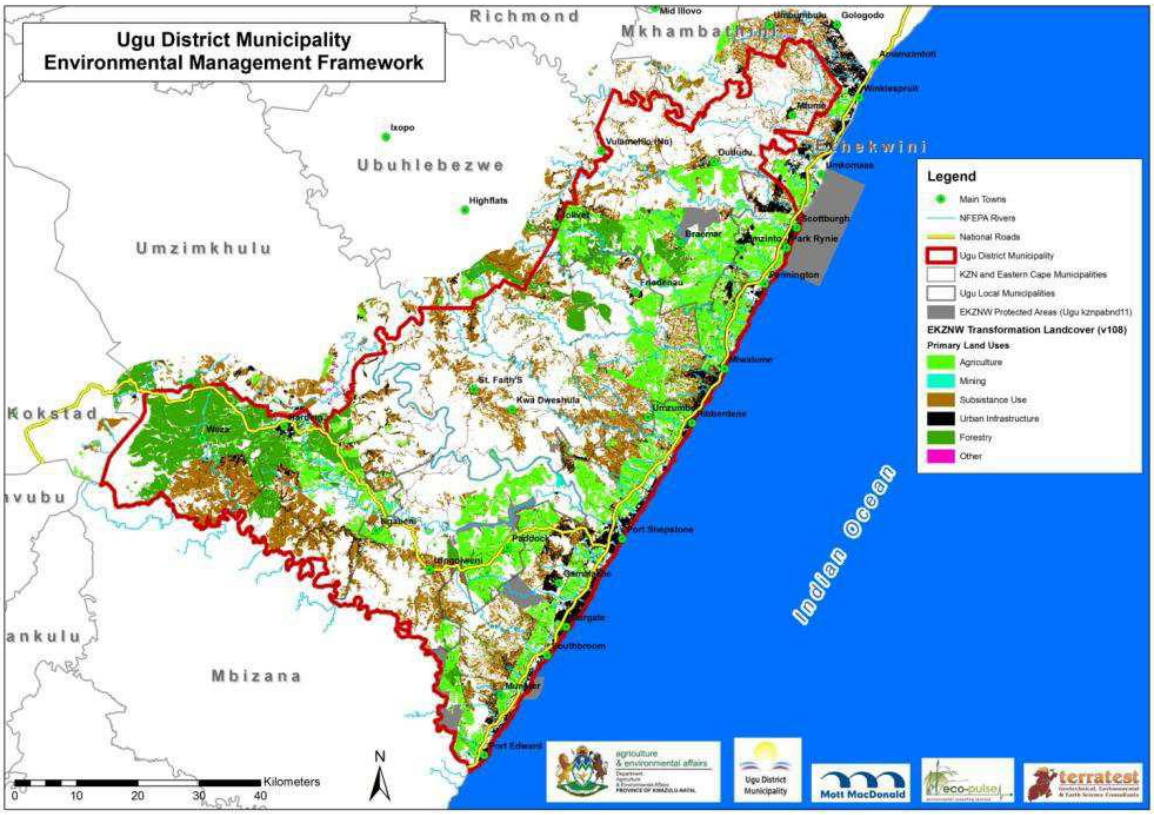
The status quo assessment shows that historic levels of transformation (Figure 6.2) and land use (Figure 6.3) have resulted in dramatic impacts to the environment, particularly along the coastal zone and higher rainfall areas. As a consequence, levels of transformation are such that a large number of ecosystems are now endangered or critically endangered and stand out 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 decline, with species such as the Blue Swallow (*Hirundo atrocaerulea*) now on the verge of extinction.

Figure 6.2: Map showing vegetation types after transformation



Source: GIS Coverage: EKZNW, 2012a

Figure 6.3: Map indicating the extent of primary land-uses across the Ugu District Municipality.



Source: GIS Coverage: EKZNW, 2008a

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 management effectiveness is below par. While opportunities for protection and improved management still remain, drivers such as social and economic development, agricultural expansion, alien invasive plants and deteriorating water quality will continue to erode the remaining environmental assets.

A summary of the headline indicators and results of investigations for the Ugu district is provided below:

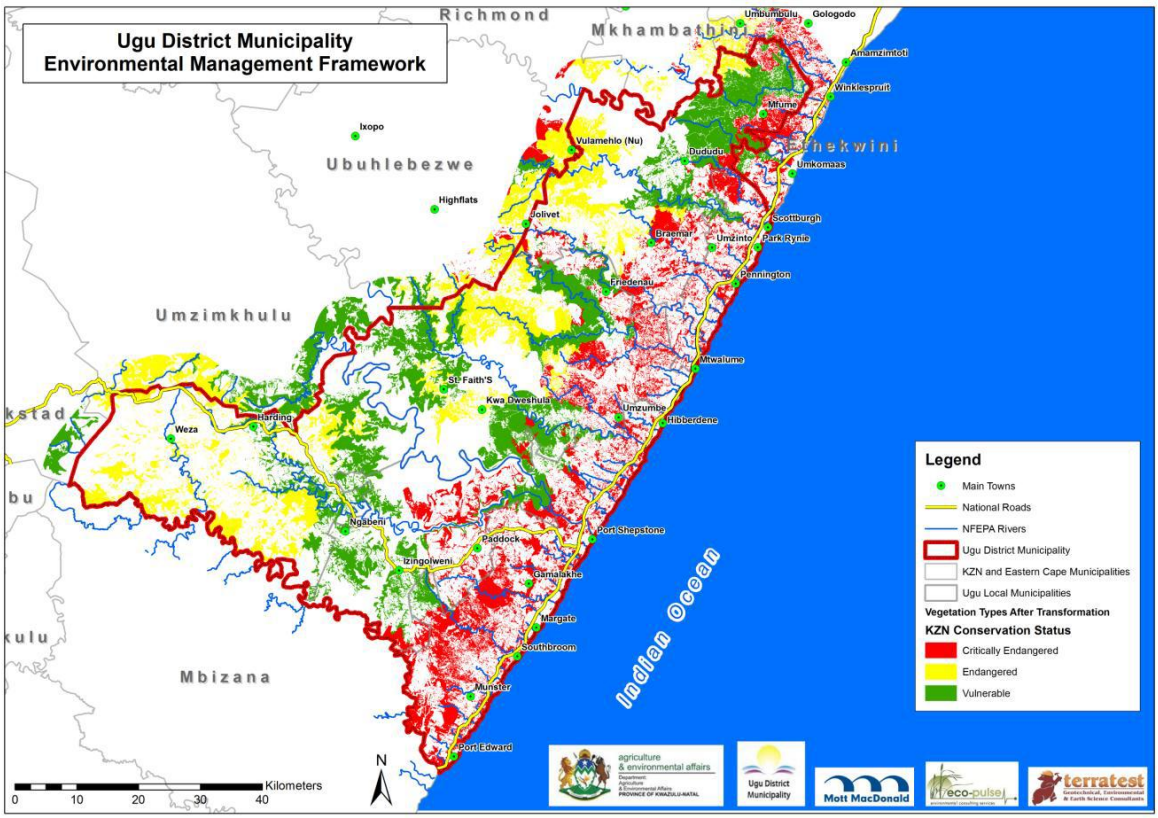
6.2.3.1 Maputaland-Pondoland Albany biodiversity 'hotspot':

The importance of the area is emphasised by noting the location of the municipality within this 'hotspot', which, despite significant (>70%) transformation, is still recognised for its unusually high levels of endemism. As a result of various anthropogenic impacts, only one quarter of this hotspot's vegetation remains untransformed, emphasizing the importance of conservation of untransformed natural habitat in the Ugu district in particular.

6.2.3.2 Status of vegetation types

High levels of transformation in the study area, particularly along the coast and the higher lying inland area, have contributed to six vegetation types (KwaZulu-Natal Coastal Belt Grassland, KwaZulu-Natal Coastal Forests: Southern Mesic Coastal Lowlands Forest, KwaZulu-Natal Coastal Forests: Southern Moist Coastal Lowlands Forest, KwaZulu-Natal Dune Forests: East Coast Dune Forest, KwaZulu-Natal Sandstone Sourveld; Pondoland-Ugu Sandstone Coastal Sourveld) being classified as critically endangered and a further three vegetation types (Eastern Mistbelt Forests, Midlands Mistbelt Grassland, Moist Coast Hinterland Grassland) being classified as endangered (Figure 6.4). 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.

Figure 6.4: Map showing the threat status and extent of vegetation types after transformation in the Ugu District Municipality

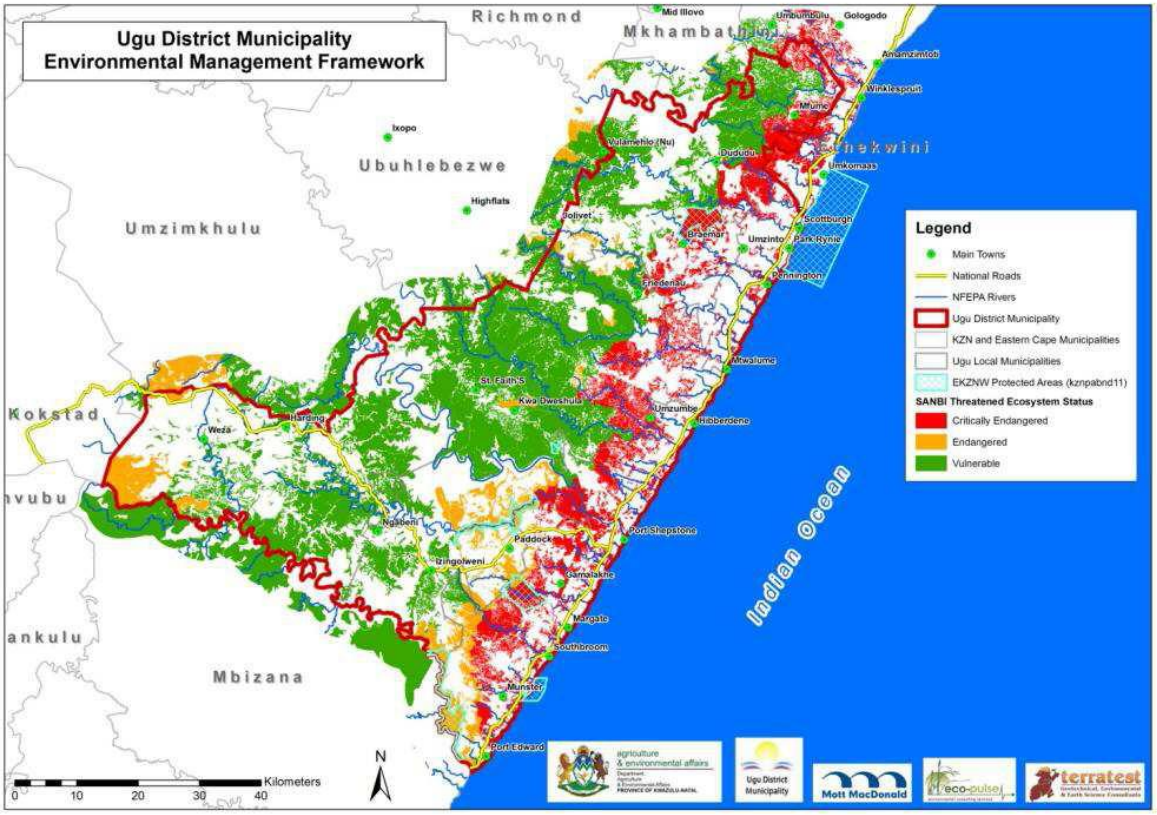


Source: GIS Coverage: EKZNW, 2012a

A list of threatened ecosystems (currently under threat of being transformed by other land uses) has been identified 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). The most threatened

ecosystems (Figure 6.5) in the Ugu DM are located along the intensely-developed coastal strip, resulting in significant implications for development in the coastal zone.

Figure 6.5: Map showing the status of un-transformed threatened ecosystems in the Ugu District Municipality.

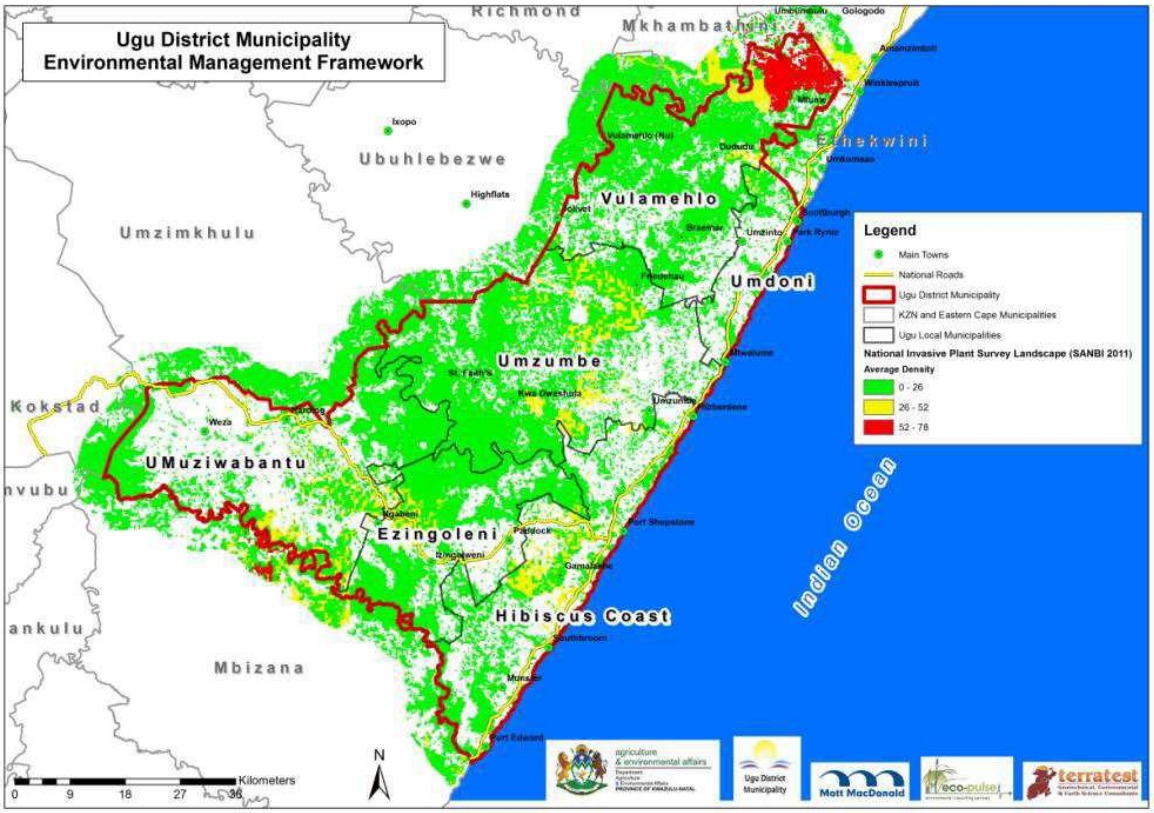


Source: GIS Coverage: SANBI, 2011

6.2.3.3 Alien invasive plants

Data for alien invasive plant species is not available at a fine resolution, however the National Invasive Alien Plant (IAP) Survey project, completed by the Working for Water Programme, provides a broad indication of the extent of alien invasive vegetation in the Ugu DM. Alien invasive vegetation not only poses a risk to biodiversity, but also to socio-economic aspects such as water security, rangeland productivity, fire risk and crops. The total average density (%) of alien vegetation invasion across the Ugu DM (Figure 6.6) indicates that infestation is of greatest concern in the eastern parts of the district, where infestation exceeding 50% is reported.

Figure 6.6: 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, 2010 in the Ugu District Municipality.



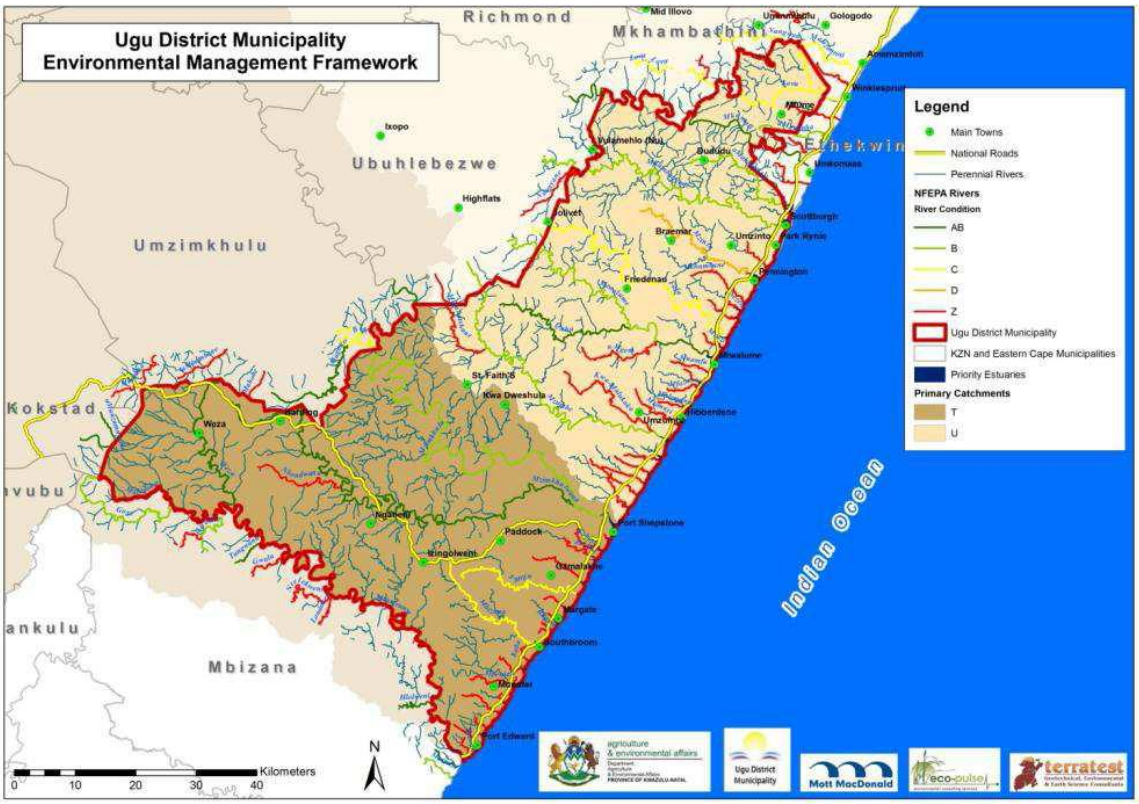
Source: GIS Coverage: Kotze *et. al.*, 2010

6.2.3.4 River ecosystems

Most rivers (Figure 6.7) including the two major perennial rivers (Mtamvuna and Mzimkhulu) are reported as being in good condition (A/B class). The Mtamvuna and Mzimkhulu rivers are free-flowing, which is noteworthy considering levels of impoundment of most rivers in South Africa. 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. Generally, rivers in the Ugu DM are in reasonable condition.

Figure 6.7: Map showing major perennial rivers, NFEPA rivers (CSIR, 2010) and primary catchments in the Ugu District Municipality.

Note that rivers classified as being in a "Z" category are "not intact" according to surrounding land.

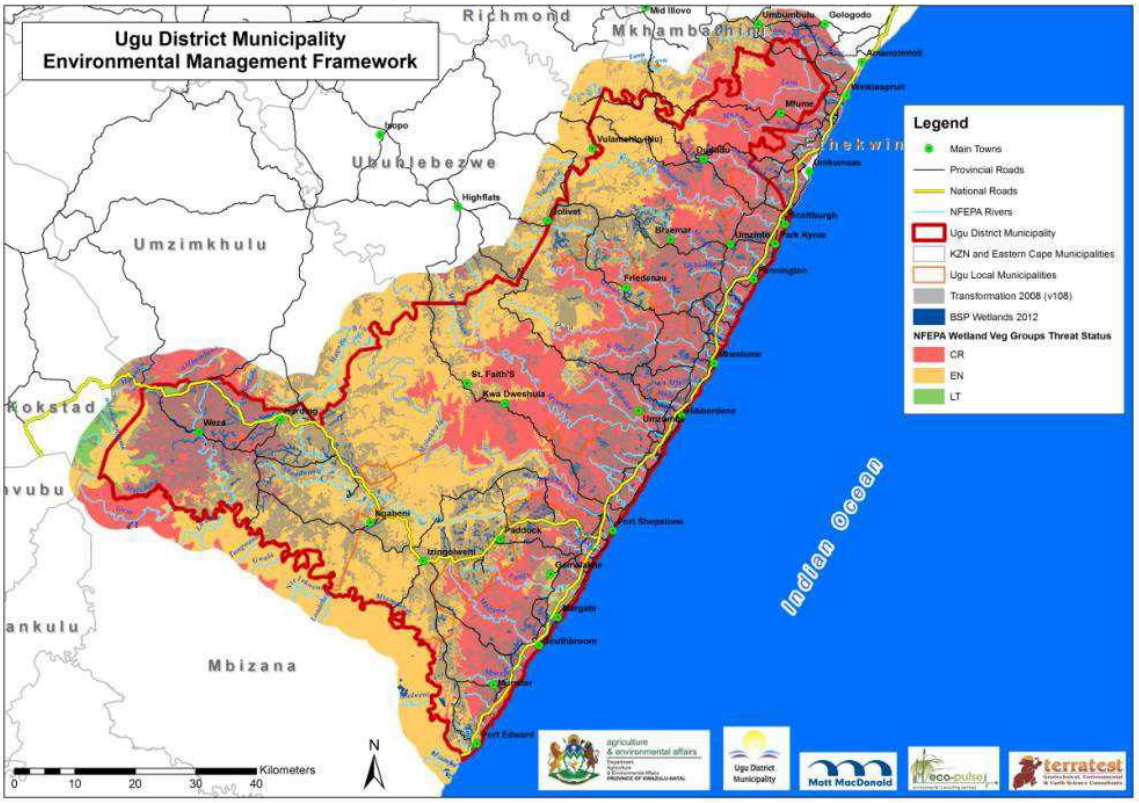


Source: GIS Coverage: CSIR (2010c)

6.2.3.5 Wetland ecosystems

The majority of wetlands in the Ugu DM occur within higher rainfall areas, resulting in high densities of wetlands along the coastal region and fewer located inland. As a result of intensive urban development along the coast and agricultural practices (commercial and informal), 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 (Figure 6.8). The national assessment paints a worse picture with many wetland vegetation groups classified as critically endangered in the study area.

Figure 6.8: Map showing the threat status of wetland vegetation groups and associated location of wetland systems.



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

6.2.3.6 Estuaries

There are 40 estuaries located within the ± 112 km coastal stretch of the Ugu DM (Figure 6.9), ranging in size from 0.01 ha to 72 ha. With the exception of the Mzimkulu estuary, all are classified as 'Temporarily closed'. The Mzimkulu estuary (classified as 'Permanently open' does occasionally close due to recent anthropogenic impacts, but is artificially maintained as an open estuary. The Kaba, Ku-Boboyi and Zolwane estuaries have been flagged as Fresh Water Priority Areas by the South African National Biodiversity Assessment. Estuaries within the Ugu DM are heavily impacted on 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. The Mtamvuna is currently the only estuary within the Ugu DM regarded as being in an Excellent condition.

6.2.3.7 Species status

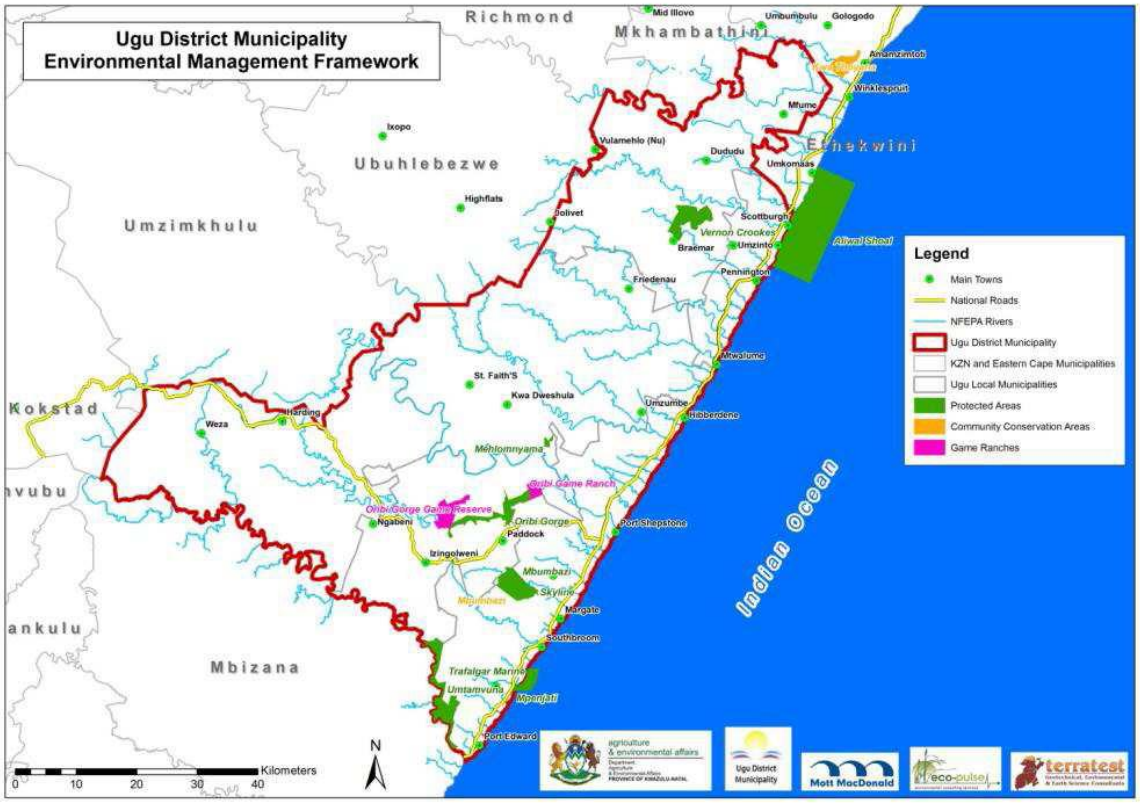
The total number of species of conservation concern in the Ugu District is 180, and includes plants, mammals, birds, amphibians, reptiles, invertebrates and fish. This includes at least 6 species regarded as critically endangered with a further 22 species that are endangered. Species listed as critically

endangered are *Turraea streyi* (Dainty leaved Honey-suckle Bush); *Chrysospalax villosus dobsoni* (Rough-haired golden mole); *Hirundo atrocaerulea* (Blue Swallow); *Bugeranus carunculatus (*Wattled Crane); *Anhydrophryne ngongoniensis* (Mistbelt Moss Frog) and *Gulella salpinx* (Trumpet-mouthed hunter snail). The total number of specied of conservation concern may be higher, due to large areas of the municipality not yet being sampled by specialists.

6.2.3.8 Protected areas

Within the Ugu DM, a total of seven terrestrial formally Protected and two marine Protected Areas (Aliwal Shoal & Trafalgar) have been established. Less than 2% (± 8880 ha) of the study area falls within formally protected areas (Figure 6.9), which is significantly lower than international and national benchmarks, and inadequate to ensure protection of a diversity of species.

Figure 6.9 Map showing the location of formally Protected Areas and other conservation areas in the Ugu District



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

The sensitivity of areas for biodiversity conservation is also presented in the form of a CBA map based on the outputs of the recent 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.

The prioritization exercise helped to produce a map aimed at guiding future conservation efforts in the Municipality. It served to highlight a number of areas requiring urgent conservation action and provides a useful basis to inform future conservation efforts in the Ugu district.

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 also provide a range of goods and services to people living in and around the study area.

6.2.3.9 Management of protected areas

A recent assessment, based on the Management Effectiveness Tracking Tool (METT) suggests that existing protected areas all fall below the recommended minimum standard. The average management effectiveness score was 60%, significantly short of the recommended minimum standard of 77%, set by the METT. Some areas are also subject to significant pressures which also threaten to compromise protected area objectives and failing to ensure the protection of biodiversity assets. Special attention also needs to be given to the level of pressure facing protected areas, which is rated as Very High in the Umtamvuna Nature Reserve.

6.2.4 Recommendations

Based on an understanding of the status quo, the drivers, the pressures and the effect on the environment, the following preliminary responses have been proposed in order to better manage biodiversity within the Ugu district:

6.2.4.1 Integrating biodiversity into municipal and development planning

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:

- 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; and
- Development of local Bye-laws to promote appropriate environmental screening and planning of new developments in sensitive areas.

6.2.4.2 Protection and management of critical biodiversity areas

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 regard:

- 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 Critical Ecosystem 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 Ingonyama Trust Board, and other supportive government departments to find ways to integrate biodiversity conservation into decision making (e.g. land allocation) within rural areas;
- 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 leverage conservation of priority areas, particularly along the coastal zone;
- Development of an Open Space System for the municipalities, 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; and
- Improved Law enforcement, particularly in the case of illegal activities.

6.2.4.3 Rehabilitation of degraded areas

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:

- Prepare and implement an invasive plant species monitoring, control and eradication plan on Municipal land;
- Support and promote broader 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; and
- Capacity building and empowerment, particularly in rural areas where overgrazing is a concern.

6.2.4.4 Protection of water resources

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:

- Rehabilitation of wetlands should be actively encouraged 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; and
- Increased municipal engagement with Catchment Management fora.

6.2.4.5 Coastline management

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:

- Develop and implement a municipal coastal management programme and monitoring forum for managing the coastal zone within the municipality; and
- Development and implementation of estuary management plans is required.

6.3 Agricultural Specialist Study

The information below constitutes a summary of the key points arising from the agricultural specialist study. The full report can be found in Appendix B.

6.3.1 Objectives

The main aim of this project was to prepare an agricultural assessment of the Ugu district, which would be used to inform the preparation of the EMF. The objectives included:

- Preparing a status quo of agriculture in the Ugu district based on a literature review;
- Confirming optimum agricultural zones in commercial and rural areas of the district; and
- Identifying focus areas of agricultural resources in the district and to provide recommendations on the sustainable management of these resources.

6.3.2 Methodology

The method used in this assessment was based on the extraction of data sets (soils, slope, climate, land potential, crops, aspect) relating to the different aspects of agriculture in Ugu district.

These data sets were intersected such that the following could be achieved in spatial form:

- Location of land with potential for arable (cultivation);
- Location of land suited to plantation crops including sugar and tropical fruit;
- Location of land suitable for timber production; and
- Location of land suited to livestock production.

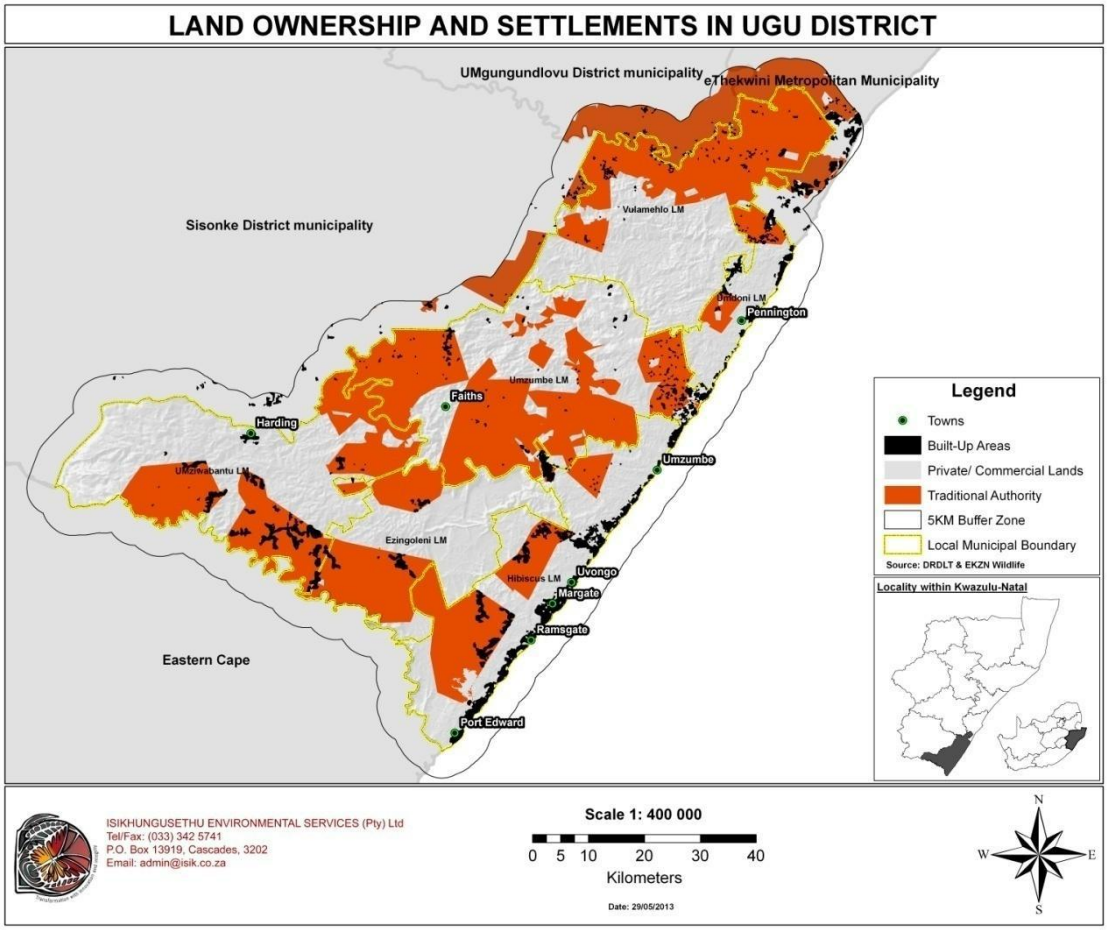
The resultant outputs included maps for each type of agricultural land use and associated text which outlines the types of agricultural activity that could be undertaken, associated production conditions and yields.

The land potential modelling is based on work undertaken at Cedara and adapted by the specialist team to suit local conditions in the Ugu district.

6.3.3 Results

Based on a review of available literature on agriculture in the Ugu district, there is a well-developed commercial agricultural sector and a poorly developed small holder sector in the rural areas of the district. Landownership (Figure 6.10) in the Ugu DM indicates rural areas located in the south, centrally and to the north, and coastal strip. High-lying areas and areas to the west of the Ugu DM are under private ownership, predominantly used for commercial farming purposes. Settlement is most dense along the coastal region, and in the rural areas (particularly along transportation routes). The indications are that the majority of land that can be used for different forms of agricultural production in the district has already been identified and utilised. The only exception to this may be in the drier areas where there may be good soils and associated production conditions, but these can only be realised with water (if available) for irrigation purposes. The review has indicated that the key agricultural activities taking place in the district at the present time include: sugar cane production and milling; timber production and processing for pulp and sawn timber; bananas for local and international markets; macadamia nuts for local and international markets; limited coffee production for local consumption and livestock for commercial and subsistence (beef, dairy, poultry, piggeries and goats).

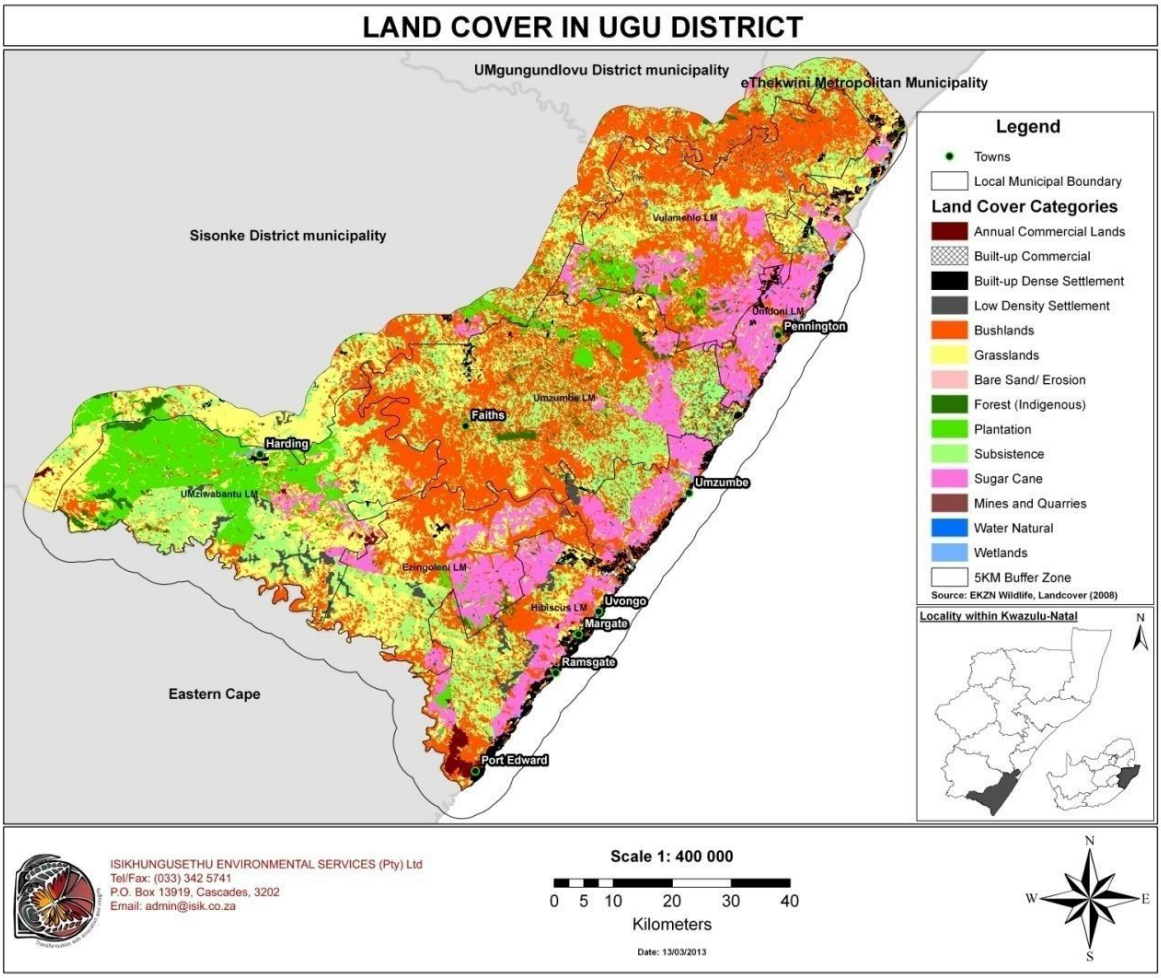
Figure 6.10 Land ownership



Source: EKZN Wildlife & DRDLR-SPI (2012)

Two plantation crops predominantly occur in the Ugu District. Sugar cane production occurs primarily along the coastal strip where conditions are optimal for sugar cane production. Although sugar cane is mostly grown on commercial scale, small scale farmers are assisted through initiatives by the Canegrowers and Productivity South Africa, which aims to improve productivity of growers operating at a smaller scale. Timber production in the Ugu district occurs predominantly in the western highlands around Harding, Umuziwabantu and Vulamehlo. Major timber growers include SAPPI, MONDI, NCT and Singisi Forest products, and a large portion of the land under commercial timber plantations are owned by the Department of Water Affairs and/or South African Forest Company and leased to the commercial growers. There are a number of sawmills located in the timber growing areas, and timber is transported via road to various mill sites. Similarly to sugar cane growers, the outgrower programmes such as Project GROW (SAPPI) and the Khulanathi programme (MONDI) assist communities in rural areas in northern KwaZulu-Natal to extend their timber holdings. Refer to Figure 6.11 for a map of the land cover in the Ugu District.

Figure 6.11: Land cover (2008)



Source: EKZN Wildlife (2008)

Production of various sub-tropical fruit occurs in suitable areas in the Ugu district. Banana plantations between Port Shepstone and Port Edward accounts for the bulk of banana production in KwaZulu-Natal, although potential exists for expansion along the coastal strip. Valencia orange and avocado production occurs on a limited commercial basis on the South Coast, however the extent of production has not been identified through the data available. Based on aerial interpretation, macadamia nuts are produced in the greater Port Edward area, along the coastal region. According to the Agricultural Sector Plan (INR 2007) there are approximately 300 macadamia nit growers located in the Ugu District, with further potential for expansion. Coffee production occurs on a small scale on 3 farms in the vicinity if Port Edward. Attempts are also being made to include outgrowers in rural areas in the Ugu DM.

As indicated by the Agricultural Sector Plan (INR 2007), vegetable production does occur in the Ugu DM, however the scale of production could not be determined. Small scale vegetable production occurs in

rural areas of the Ugu DM, most likely for the informal market, while there is very little commercial production (<1%). Indigenous medicinal plant harvesting in KwaZulu-Natal is valued at approximately R 60 million annually, occurring predominantly in the Umzimkhulu forests and surrounding areas in Umuziwabantu and Vulamehlo. Although commercial production of medicinal plants does occur, it is insufficient to meet the demand and therefore plants are sourced from wild stocks. Consequently, local extinction of commonly used plants occurs in some areas.

Based on research conducted by the Department of Agriculture (2006) and an investigation into the agricultural potential of Ugu (by Isikhungusethu in developing the report for the EMF), it appears that there is potential for the diversification of sub-tropical fruit production in the Ugu district, which could include commercial production of citrus, mangoes, litchis and medicinal plants. The commercial viability of extending these fruit crops into rural areas on an outgrower basis would need to be investigated further as part of an update of the agricultural plan for Ugu.

6.3.4 Recommendations

The following recommendations are noted to avoid further unnecessary loss of agricultural land in the Ugu district:

- The EMF of the District should provide an indication of the areas that could be used for agricultural production in future without further destruction or loss to remaining eco-systems goods and services deriving from the biodiversity of the District;
- In those areas where agriculture has compromised biodiversity (e.g. agricultural production on steep slopes, in river valleys without a buffer, wetlands, etc.), serious consideration should be given to rehabilitation of those ecosystems since they ultimately play a crucial role in sustaining agriculture;
- Those areas which are under 12% slope and at the same time suitable for arable forms of production, should be retained (in terms of the relevant agricultural and environmental legislation for arable production by large, medium and small scale producers irrespective of landownership of the areas in which such land is located;
- Those areas which are suited to sub-tropical fruit production on slopes which are up to 25% should also be identified in spatial plans for protection from other forms of development because the availability of land along the coast and associated river valleys is very limited for this type of production and could, as noted above, be expanded to include a number of additional crops. As in the case of arable, management and protection of these lands against degradation is necessary and should include farms on commercial, traditional and state land areas;
- The remaining areas of natural grasslands in the Ugu district need to be assessed from both a biodiversity and an agricultural perspective to establish condition and carrying capacity. Where grasslands are in a favourable condition and it does not compromise eco-services production, livestock and/or game production could be considered on a commercial and/or subsistence basis, but subject to strict management conditions;
- The area is best suited to game production (limited number of species only) in the Ugu district are limited to remaining grasslands, river valleys (valley bushveld) and remaining areas of indigenous forest. These areas need to be identified for conservation protection for eco-services production purposes in conservation proclamations and spatial plans;

- Sugar and timber, can be produced on slopes of anything from 0-40%. Unlike timber, the majority of the land that can be under sugar was established many years ago and hence many of the areas that were too steep for cultivation can only now be reclaimed and rehabilitated. This should be done in conjunction with the biodiversity sector plan findings and written into the EMF as a key objective – to recover steep land that has been lost to sugar and timber cultivation. It may be possible to compensate for loss of steep lands by investigating additional lands suited for sugar in rural areas;
- Land identified for commercial timber production is and should in future be defined by the DWA permitting system, which is designed to protect the water production potential of catchments. Thus, in this report no provision has been made to define areas that should be set aside for timber production. Furthermore, different species of timber can be produced on slopes ranging from 0-40%, and hence all lands identified for other forms of agriculture could potentially be used for timber. In the interests of biodiversity and water production, timber production should not be permitted on slopes in excess of 30%, particularly in the sensitive upper catchments located in the Ugu district on state, traditional and commercially owned land. Lands lost to timber in the 30-40% slope range should be considered for rehabilitation to indigenous land cover; and
- There is major opportunity in all the drainage lines of the district for the initiation and on-going management of alien vegetation clearing and rehabilitation of these areas under indigenous vegetation cover to optimise eco-services production and in the process establish sustainable green job opportunities for local people.

6.4 Water Resources Specialist Study

The information below constitutes a summary of the key points arising from the water resources specialist study. The full report can be found in Appendix C.

6.4.1 Objectives

The study objectives were as follows:

- To undertake a desktop *Status quo* hydrological assessment of the Ugu DM.

6.4.2 Methodology

The methodology consisted of the following:

- Identification of Quaternary Catchments located within the study area;
- Identification of contributing catchments that don't fall within the study area;
- Sourcing of Mean Annual Runoff (MAR) for each catchment from the WR2005 Study (WRC, 2009);
- Sourcing all registered abstractions for each Quaternary Catchment from the Department of Water Affairs WARMS database;
- Identification of dams within each catchment;
- Sourcing stream flow reduction activities for each catchment;

- Sourcing the applicable Environmental Water Requirement class for each Quaternary Catchment, from the WR2005 study (WRC, 2009). Each Environmental Water Requirement (EWR) class is assigned a per cent of MAR:
  - Class A – 30 % of MAR;
  - Class B – 25 % of MAR;
  - Class C – 20 % of MAR; and
  - Class D – 15 % of MAR.
- Performing a water balance for each river system, resulting in a volume of available water after accounts for the EWR and all registered water users.

6.4.3 Results

6.4.3.1 Catchments

The Ugu DM contains four main river systems (Lovu, Umkomaas, Mzimkhulu and Mtamvuna) as well as a number of smaller rivers. The Quaternary catchments of the Lovu River Catchment are undeveloped and alien invasive vegetation cover is lower than in the Quaternary catchments falling outside the Ugu DM. The catchments are in a good ecological state and are not greatly influenced by anthropogenic impacts. The significant wetlands in the catchment are also considered to be in good ecological state. Only short sections of the Umkomaas River Catchment and the Mzimkhulu River Catchment fall within the Ugu DM. The Quaternary catchments of the Umkomaas River Catchment are not well developed, affected by relatively low anthropogenic impacts and are in a good ecological state, however alien invasive vegetation cover is high. The extensive wetland areas in the catchment are also considered to be in good ecological state. The Mzimkhulu River Catchment is relatively well developed, with a high proportion of alien invasive vegetation. There are very low anthropogenic impacts, and the catchments and wetlands are in a good ecological state. Most of the Mtamvuna River Catchment falls within the Ugu DM. The inland portion of the catchment is relatively well developed, although the Quaternary catchments closer to the coastal region are less developed. The Quaternary catchments have a high level of alien invasive vegetation, although relatively little anthropogenic impacts. The catchment and the wetlands are considered to be in good ecological state. The smaller catchments within the Ugu DM vary in level of development and proportion of alien invasive vegetation cover, although there are low anthropogenic impacts (except for the Mzinto River Catchment where there is a higher level of impact). All are in a good ecological state.

6.4.3.2 Water resource availability

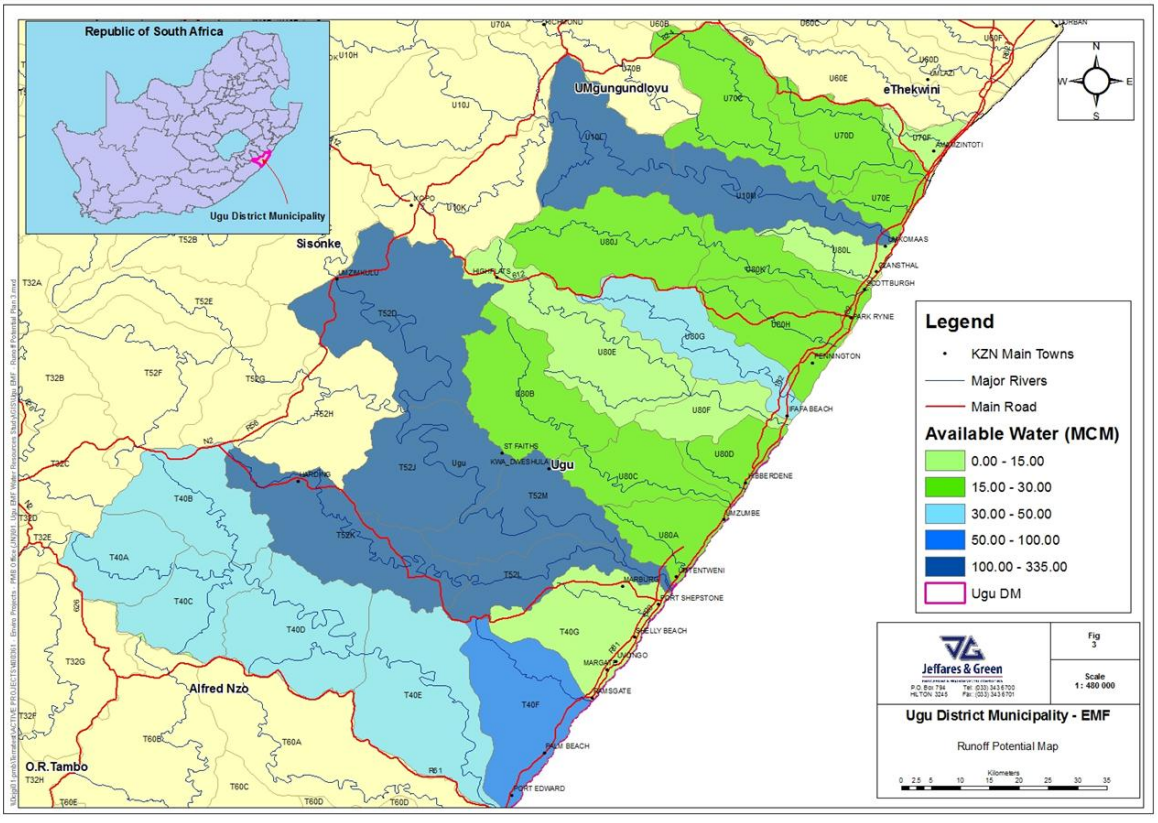
Each river system was described and each aspect of the water balance listed, and this information was used in the water balance calculations (Table 6.1). The graphical representation of the available water within the UDM is presented in Figure 6.12. As the available water is a cumulative value at the end point of the river, to ease in its graphical representation, the cumulative volume has been divided by the number of Quaternary Catchments in the river system, within the UDM, to give each Quaternary Catchment an available annual water volume.

Table 6.1: Water balance of major river catchments in the Ugu DM

Quaternary Catchment	MAR Contribution from Upstream Quaternary (MCM)	MAR (MCM)	Abstractions (MCM)	Available MAR for Downstream Users (MCM)
LOVU RIVER				
U 70 C	14.15	34.94	12.92	36.18
U 70 D	36.18	28.46	32.45	32.18
UMKOMAZI RIVER				
U10 L	653.87	28.08	5.02	676.93
U 10 M	676.93	37.91	45.13	669.71
UMZIMKULU RIVER				
T52K	0.00	48.00	21.47	26.52
T52L	26.52	27.41	10.06	43.86
T52D	723.51	52.74	23.27	752.97
T52J	752.97	44.52	7.67	789.82
T52M	789.82	48.92	57.04	781.69
MTAMVUMA RIVER				
T40A	0.00	57.13	15.04	42.08
T40B	0.00	73.63	23.92	49.70
T40C	49.70	43.06	10.91	81.84
T40D	123.92	41.94	10.57	155.29
T40E	155.29	59.45	18.69	196.04
MBIZANA RIVER				
T 40 F	0.00	87.46	23.82	63.64
UMTENTWENI RIVER				
U 80 A	0.00	29.44	7.36	22.08
MHLABATSHANE RIVER				
U 80 B	0.00	28.25	8.63	19.62
U 80 C	19.62	30.28	8.31	41.59
MTWALUME RIVER				
U80 E	0.00	39.05	23.93	15.12
U 80 F	15.12	18.73	11.24	22.62
MZIMAYI RIVER				
U 80 D	0.00	23.08	6.90	16.18
FAFA RIVER				
U 80 G	0.00	49.94	16.44	33.50
MZINTO RIVER				
U 80 H	0.00	42.11	23.84	18.27
MPAMBANYONI RIVER				
U 80 J	0.00	36.17	11.26	24.91
U 80 K	24.91	26.54	5.80	45.66

Quaternary Catchment	MAR Contribution from Upstream Quaternary (MCM)	MAR (MCM)	Abstractions (MCM)	Available MAR for Downstream Users (MCM)
AMAHLONGA RIVER				
U80L	0.00	16.79	2.80	13.99
MGABABA RIVER				
U 70 E	0.00	26.41	6.75	19.66

Figure 6.12: Potential Available Water for Each Quaternary Catchment in the Ugu DM

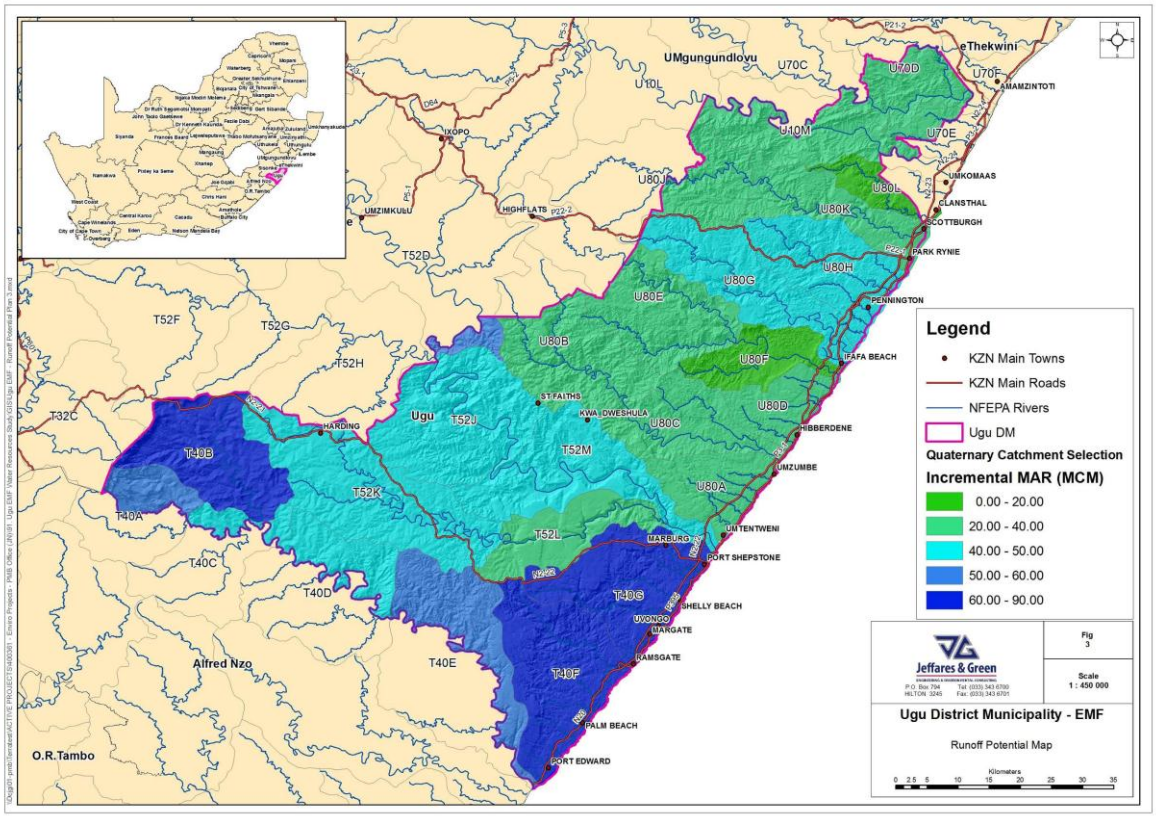


Source: Jeffares & Green, Ugu District Municipality Environmental Management Framework Desktop Hydrology Study Report

6.4.3.3 Runoff potential

There is a trend of increasing runoff potential (Figure 6.13) towards the southern region of the Ugu DM, however it is difficult to assess the available water resources at a desktop level.

Figure 6.13: Incremental Catchment Runoff Potential for the Catchment Areas within the Ugu DM



Source: Jeffares & Green, Ugu District Municipality Environmental Management Framework Desktop Hydrology Study Report

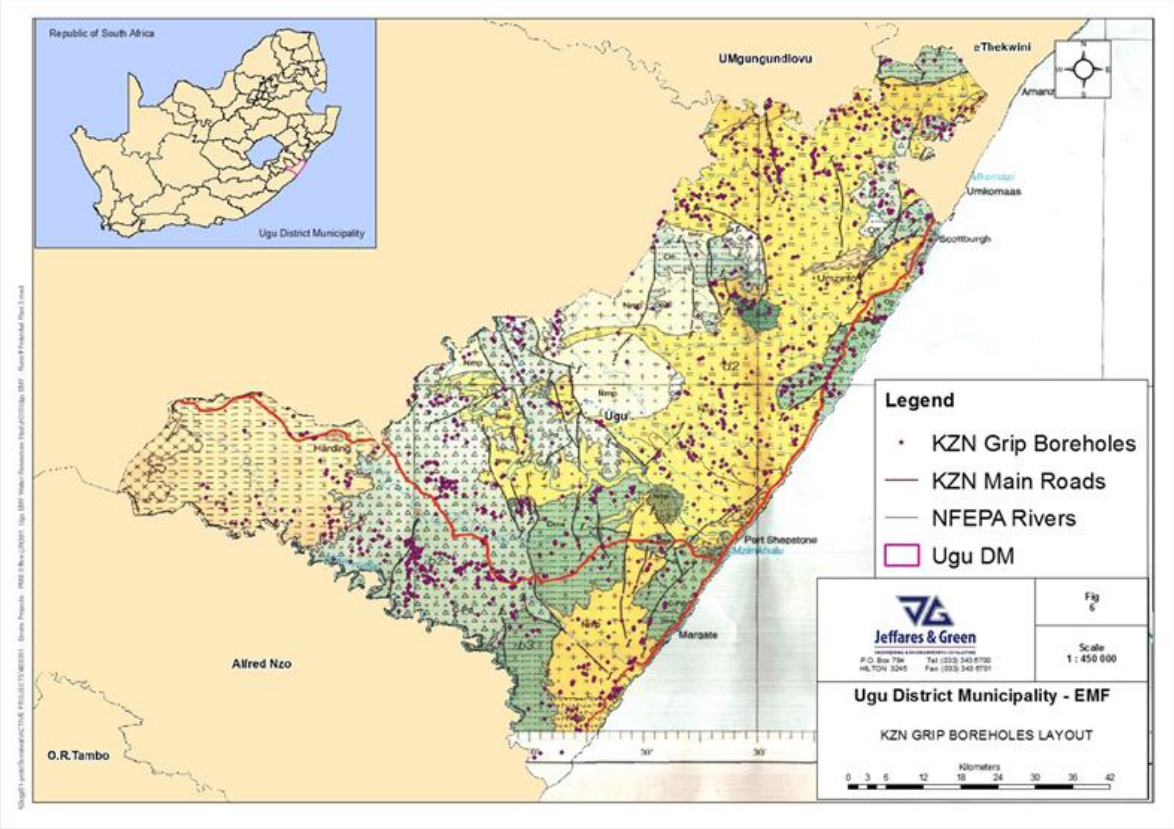
6.4.3.4 Groundwater

The geohydrological map (Figure 6.14) indicates that the materials underlying the Ugu DM is highly variable. Rock types include diamictite (tillite), arenaceous rocks (sandstone, feldspathic sandstone, arkose and sandstone becoming quartzitic in places) and meta-arenaceous rocks (quartzite, gneiss, migmatite and granulite). There are also smaller areas of acid/intermediate/alkaline intrusive rocks (various granitoids) and undifferentiated coastal deposits (unconsolidated to semi-consolidated sediments including sand, calcarenite, conglomerate, clay and silcrete). Predominantly argillaceous rocks (shale, carbonaceous shale, mudstone and siltstone) and dolerite are present between Harding and Kokstad.

The geohydrological units underlying the Ugu DM are classified as secondary aquifers (with the possible exception of the unconsolidated sediments, where they occur), with groundwater occurrence characterised either by aquifers with fractured flow or by aquifers with inter-granular and fractured flow. Median borehole yields are anticipated to be between 0.1 to 0.5 l/s, although higher yields of between 0.5 to 2.0 l/s may be achieved in some areas. There are a limited number of areas within the Ugu DM (e.g. north of Umkomazi) where low yields of 0.0 to 0.1 l/s may occur.

Due to the variability of the geology, groundwater levels and aquifer parameters, such as hydraulic conductivity and transmissivity, will differ across the Ugu DM and will be locally dependent on aquifer type, geological structure and topography. Reference to the Department of Water Affairs (DWA) Groundwater Resource Information Project digital borehole database indicates that groundwater water use is widespread across the Ugu DM, particularly along the coastal, south western and north eastern boundaries (Figure 6.14). Borehole coverage and information is more limited in the central areas and towards the north western boundary such as the inland regions between the R612 and N2 and between Harding and Kokstad. Groundwater levels are moderately deep and generally in the range 10 to 50 metres below ground level (mbgl), although can be deeper at some locations.

Figure 6.14: Geological Map of the UDM, indicating underlying geohydrological conditions



Source: Jeffares & Green, Ugu District Municipality Environmental Management Framework Desktop Hydrology Study Report

Groundwater quality is generally good with electrical conductivity between 0-70 mS/m. There are some areas where electrical conductivity is higher (70-300 mS/m), such as south of the Umkomazi River and also near Port Shepstone. However, groundwater quality will be heavily influenced by the depositional environment, proximity to the coast and industrial activities. Due to the variation in elevation across the Ugu DM, mean annual precipitation, and therefore potential groundwater recharge, is variable. Precipitation is anticipated to be between 600-800 mm/annum in inland areas, whereas in coastal areas it can be greater than 1,000 mm/annum.

6.4.3.5 Blue and Green Drop status

The Blue Drop process measures and compares the results and performance of Water Service Authorities and their Providers in their drinking water quality management, and subsequently reward, or penalises, the municipality upon evidence of their excellence, or failures, according to the minimum standards, or requirements, that have been defined. The Water Resources Report used the 2012 Blue Drop report as it is the latest published report.

The results of the 2011 and 2012 Blue Drop Report for the UDM are presented in Table 6.2. Three water supply systems were awarded the Blue Drop status (above 95%), with two of these managed in partnership with Umgeni Water as the bulk provider. It should be noted that the borehole systems in the UDM are not included in the Blue Drop assessments, suggesting that there is very limited management of these at this stage. The measures are of the overall management, and not actual drinking water quality. In terms of drinking water quality, 10 of the 17 schemes have had failures, with 6 having less than 50% compliance. The Blue Drop scores have decreased from 2011 to 2012 for the majority of the schemes, which is concerning. Some of the main findings in 2012 were (Jeffares & Green, 2013):

- Insufficient compliance monitoring is done (except the two Umgeni Water schemes) with only three chemical determinants been tested;
- Risk assessments for the schemes are generic and shows that specific risks have not been identified per scheme as a full SANS 241 set of analyses has not been done;
- The microbiological quality of the water in the Weza, Phungashe, KwaLembe and, in particular, the KwaFodo, KwaNyuswa 1, KwaHlongwa and Assissi supply systems is poor and presents a potential for infection; and
- No progress on the items planned to improve monitoring actually implemented between 2011 and 2012.

Table 6.2: Blue Drop Results for the Ugu District Municipality

Performance area	Blue Drop Score 2011 (%)	Blue Drop Score 2012	2012 Drinking water compliance (30% of Blue Drop score)
Hibberdene to Ramsgate	91.24	92.4	100%
Southbroom to Port Edward	96.11	95	100%
Ghost town to Mazakhele	95.32	91.31	100%
Kwajali to Mlozane	92.66	73.08	45%
Kwafodo to Esitholweni	82.3	70.71	45%
KwaMbotho to KwaBhidla	82.3	88.4	100%
KwaNyusa to Ekuzameni	92.05	72.18	45%
KwaNyusa to St Martin	92.05	87.15	100%
KwaHlongwa	92.05	77.42	45%
Phungashe and Ndwebu	92.05	81.41	62%
Mehlomnyama and Oshabeni	75.19	77.8	45%
Vulamehlo and Jolvet	93.43	86.98	86%
Kwalembe to Dududu	93.43	80.74	62%

Performance area	Blue Drop Score 2011 (%)	Blue Drop Score 2012	2012 Drinking water compliance (30% of Blue Drop score)
Kwandelu to Morrisons	90.83	85.46	86%
Mathulini*	95.16	95.22	100%
Mzinto*	96.61	96.27	100%
Hlokozi	Not assessed	77.2	45%
KwaQwabe borehole scheme	Not assessed	Not assessed	?
Franklands borehole scheme	Not assessed	Not assessed	?

*Management shared with Umgeni Water Board as bulk water services provider

The 2011 Green Drop Report, Table 6.3, states that the UDM had performed satisfactory with consistent improvement from the 2009 report, therefore indicating that the wastewater services are being managed sufficiently, according to the expectations of the regulation programme. All systems except Uvongo had improved since the 2009 report. The progress assessment in 2012 shows the wastewater quality results, and it is clear that significant improvement is still required, as the effluent at all the works is not of required quality.

Table 6.3: Green Drop Results for the Ugu District Municipality

Performance area	Green Drop Score 2009 (%)	Green Drop Score 2011 (%)	Effluent quality compliance (30% of Green Drop score
Scottburgh	70	77.6	69.5%
Umzinto	47	68.7	73.5%
Pennington	47	77.4	58.8%
Eden Wilds	40	64.9	63.9%
Gamalakhe	40	77.8	69.4%
Margate	68	71.7	54.7%
Melville	47	62.2	61.1%
Mbango	43	66.7	63.2%
Munster	38	79.3	72.8%
Palm Beach		72.6	67.8%
Ramsgate	47	67.9	66.7%
Red Dessert	40	83.8	68.3%
Shelley Beach	50	69.4	42.3%
Shonghei-Bhobaji	54	60.9	Not operational
Southbroom	47	76.7	73.5%
Uvongo	70	61.9	86.4%
Harding	40	60.7	64.7%
Kwabonwa	40	81.1	47.1%

From the results of the Blue Drop and Green Drop reports the water quality of UDM water resources seems satisfactory. The drinking water quality being of upmost importance for the communities of the UDM

is being managed very well. The waste water management is letting the system down. Once the sanitation needs outlined in the Infrastructure Audit have been met, the effluent problem may decrease and improve the Green Drop status.

6.4.3.6 Potential impacts of climate change on water resources in the Ugu DM

As the Ugu DM lies on the eastern seaboard of South Africa, the predictions presented by Lumsden and Schulze's (2009) indicate that there may be a slight wetting (a ratio of 1.05 – 1.20 when compared to present day values) of the area, i.e. there may be more rainfall, on average. An increase in rainfall may have a small, positive impact in the surface and groundwater (through recharge) resources. However, it is unclear how the predicted increase in rainfall will balance with the trend of rising temperatures, which may have a greater influence on the hydrological system than rainfall. Hence, for a full understanding of the potential impacts of climate change on the Ugu DM water resources (which can impact water supply, agriculture, especially dry-land practices, food supply and other critical aspects related to water resources), it is recommended that a detailed climate change study is undertaken for the surface and groundwater resources in the area, including the development of a tool to help manage the risks associated with climate change and help plan and develop affective mitigation and adaptation measures for the Ugu DM.

6.4.4 Recommendations

It is clear that there is potential to develop the water resources across the Ugu DM, however the scope for which development can take place is dependent on the location of the proposed site and the level of development, or demand, required. In all cases, the scope for development and planning of water resources within the Ugu DM should be undertaken on a case-by-case basis, ensuring detailed specialist studies for each proposed development are completed in order to ensure their sustainable and equitable use.

From the results of the Blue Drop and Green Drop reports, it is clear that there is room for improvement of both the drinking and wastewater quality in the Ugu DM. Urgent measures need to be put in place to protect consumers and the water resources. Once the sanitation needs outlined in the Infrastructure Audit have been met, the effluent problem may decrease and improve the Green Drop status.

The impact on available water resources can only be determined through detailed climate change impact assessment studies of the area. It is, thus, recommended that a detailed climate change risk assessment be undertaken for the Ugu DM in order to quantify the areas that are most susceptible to climate change. This would allow for the development and prioritisation of key studies that can assist in the development of mitigation and adaptation strategies within the Ugu DM.

6.5 Geology Specialist Study

The information below constitutes a summary of the key points arising from the geology specialist study. The full report can be found in Appendix D.

6.5.1 Objectives

The study objectives were as follows:

- The focus of the geological report is to determine the general characteristics and properties of the various rocks and soils that form within the Ugu district); and
- To outline potential sensitive areas and highlight sensitive zones in terms of construction activities.

6.5.2 Methodology

As a desktop analysis, the following specialist information was obtained from:

- Geology Data from ENPAT, KZN;
- Soil Depth Data Source: The Department of Agriculture Engineering Geology of Southern Africa, Volume's 1, 2, 3 and 4;
- KwaZulu-Natal Coastal Vulnerability Assessment: Department of Agriculture, Environmental Affairs & Rural Development; and
- Landslide classification, characterization and susceptibility modelling in KwaZulu-Natal.

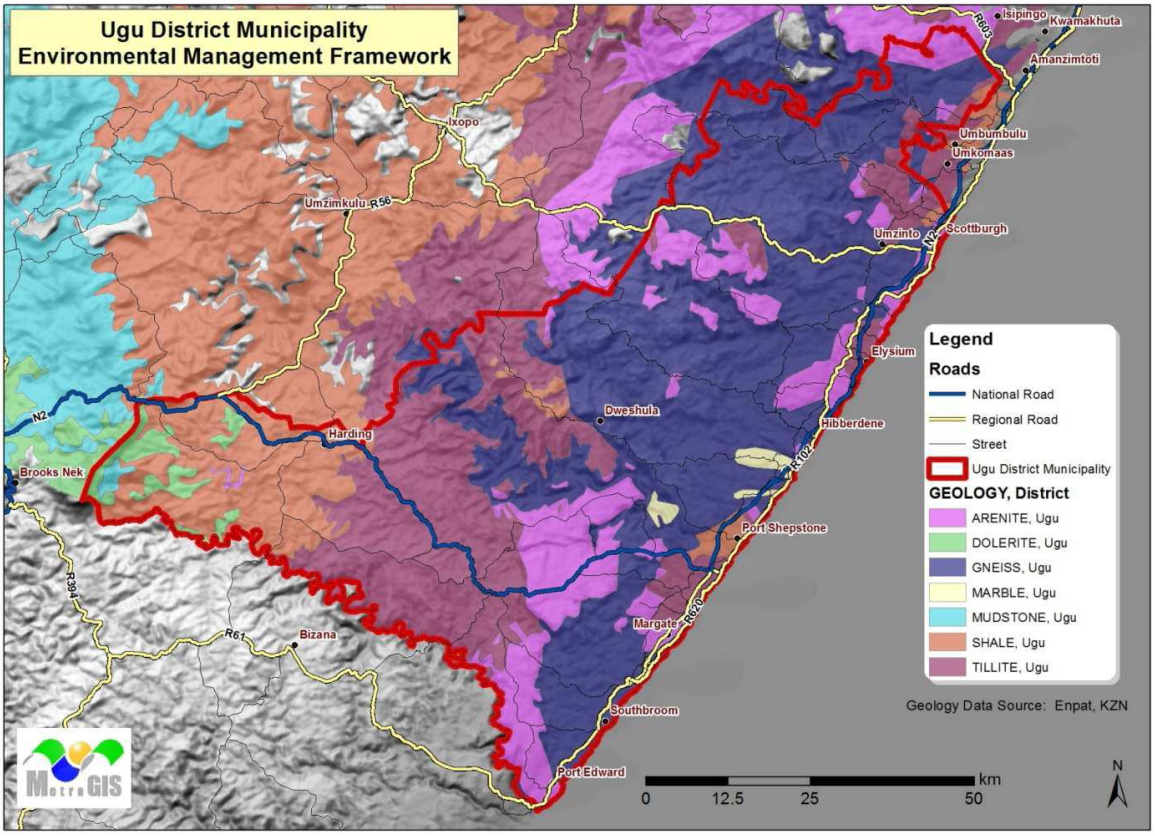
6.5.3 Results

6.5.3.1 Geology Types in the Ugu District

The Ugu district geology comprises of eight solid geology types (Figure 5.15), namely:

- *Tillite:* which is found extensively thought the Ugu district and is an excellent founding material;
- *Mudstone:* is encountered in a small area along Kokstad, the troublesome property of the rock is breaking down after exposure to the atmosphere in cuttings or during tunnelling. There is a risk of deferential settlement of soils, which may lead to structural failure. This phenomenon is common on heaving/shrinking soils;
- *Shale:* is found on the north-western boundary of the Ugu district near Kokstad and Harding and around Port Shepstone. Very similar to Mudstone, has breaking down tendencies, not suitable for construction;
- *Dolerite:* may be found in small areas next to Kokstad, it is an excellent founding material especially for major structure, such as Dams. There is a risk of deferential settlement of soils which may lead to structural failure. This phenomenon is common on heaving/shrinking soils;
- *Gneiss:* is found extensively in the Ugu district and is an excellent found material;
- *Arenite:* is found scattered within the Ugu district. It is a sedimentary rock with similar characteristics of sandstone.
- *Marble*: is encountered in small areas around Port Shepstone. Unweathered marble is an excellent founding material; and
- *Berea Formation:* occurs as a narrow belt along the entire coast belt of KwaZulu-Natal. This material is highly erosive.

Figure 6.15: Solid Geology of the Ugu DM



Source: ENPAT KZN

6.5.3.2 Geological Risk Areas within the Ugu district

An analysis of the risks associated with the different types of soils above different rock formations was conducted and a summary is as follows:

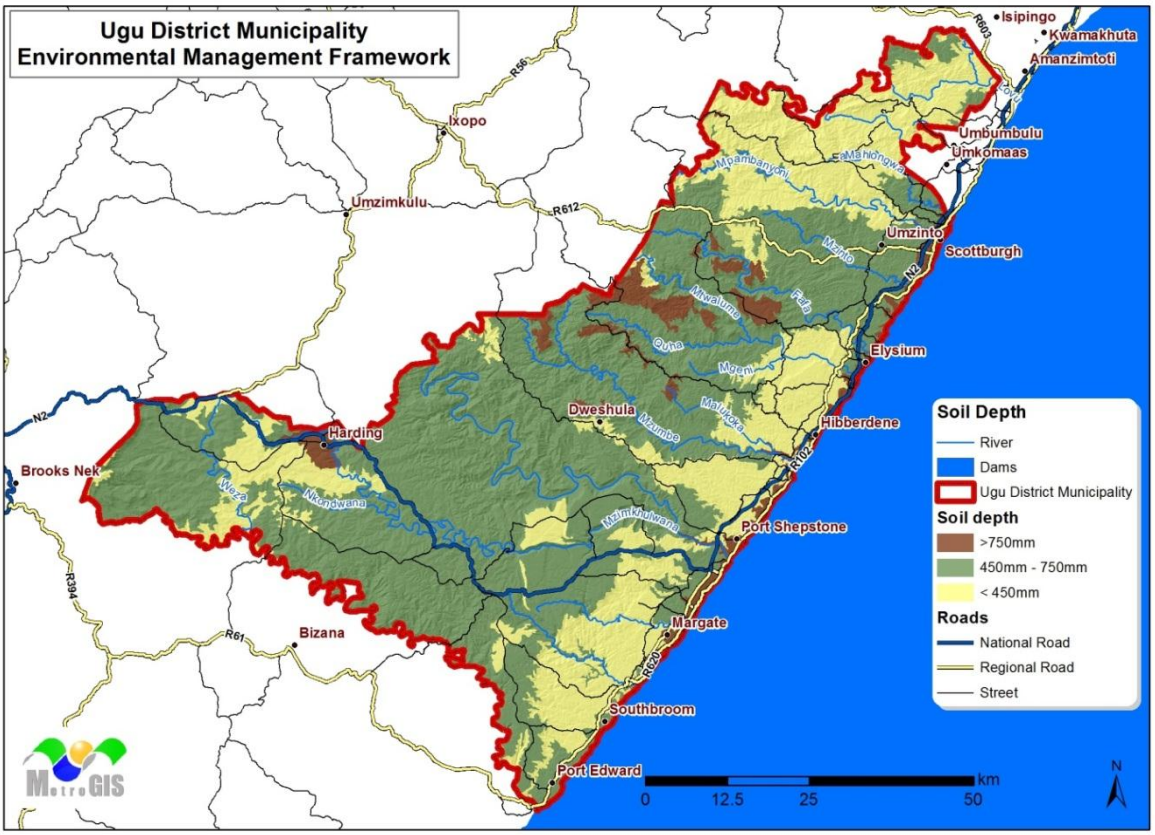
- Collapsible soils - Associated risk is possible extreme settlement of structure and structural failure. These occur on collapsible soils, where there is a change in moisture content;
- Heaving/Shrinking Soils -There is a risk of deferential settlement of soils which may lead to structural failure. This phenomenon is common on Heaving/Shrinking soils;
- Unstable Slopes - slope failure in construction such as road cuttings or excavations can occur in thinly laminated rocks especially if the rock is weathered and fractures are dipping towards the excavations face;
- Historic Mining Risks - there are numerous mining activities, presently active and closed mines within Ugu DM. Any new construction activities close to existing or abandoned mines should investigate the underground stability in and around the structure;

- Seismic Risk – there is a major fault that runs parallel to the coastline, although the potential for a major earthquake occurring is low. Major structures such as dams should however not be built over the fault line;
- Aggressive Coastline – The Ugu DM has a particularly aggressive coastline, and caution should be taken when future installations are made on the coastline; and
- Landslide Susceptibility - factors that increase the risk of landslides occurring are slopes, angle, seismicity, lithostratigraphy and rock type, rainfall, dolerite intrusion contact zone zones, terrain, morphology, lineaments and aspect. The areas most susceptible to landslide are close to Kokstad.

6.5.3.3 Soil depth

The solid geology of the Ugu DM is covered by varying thickness of residual and transported soils. Soil cover greater than 750 mm may be encountered in the area around Harding, along the coast from Margate to Scottburgh, and the northern boundary of the Ugu DM (Figure 6.16). The vast majority of the Ugu DM has soil cover depth (450 – 750 mm) above the solid geology. Soil cover less than 450 mm may be encountered along the coast behind the deep soil areas and above Umzinto extending towards the Ugu DM boundary.

Figure 6.16: Soil Depth of the Ugu DM



Source: The Department of Agriculture

6.5.3.4 Geo-tourism

The Ugu DM has very unique geological features which are ideal locations for geo-tourism. These include:

- The Uvongo waterfall, along the coast;
- Oribi Gorge;
- Wilson's Cutting
- Renken fault line; and
- Hells Gate

6.5.4 Recommendations

The description of the geology above is a general summary of the properties of various rocks and what soils are formed when they weather, but each site is unique, therefore for each new development a detailed geotechnical investigation must still be undertaken. It should also be noted that superficial deposits of rift or residual soils are unknown and will required detailed geotechnical investigation for any development.

Most of the Ugu DM is underlain by good competent rock types but there are small areas where problematic rocks such as Shale and Mudstone are present. The Ugu DMs Southern Boundary is the Indian Ocean, a very sensitive coastal zone. Any development along this zone needs carefully consideration to protect and conserve this area. Geological risks do exist within the Ugu DM and every attempt must be made to identify areas of risk before development occurs so that these areas are avoided where possible. If avoidance is not possible, risks need to be eliminated or reduced.

6.6 Resource Economics Specialist Study

The information below constitutes a summary of the key points arising from the resource economics specialist study. The full report can be found in Appendix E.

6.6.1 Objectives

The objectives of this specialist study were to generate an understanding of and insights into:

- The key generators of ecosystem services within the Ugu Municipal Area based on land cover types;
- The key ecosystem services supplied by these land cover types; and
- The capability of these land cover types to supply ecosystem services based on their current condition, size and level of connectivity.

6.6.2 Methodology

The ECO-FUTURES social learning process was employed to conduct an ecosystem services supply and demand assessment of the Ugu DM as part of the EMF. The model inputs include local wisdom, specialist knowledge and basic available data (such as habitat areas and population numbers). These inputs are

used to develop a series of relative scores, which are then used to drive the model. The model was populated through one-on-one meetings with a number of selected specialists.

6.6.3 Results

In terms of Land Assets:

- The natural and agricultural assets or land cover types of the Ugu district, including those within the built environment, produce a wide variety of ecosystem services;
- The range of services and service supply levels vary depending on the land cover type, its condition, size, and level of connectivity;
- The assets in rural areas are in relatively good condition in comparison to those in the coastal areas due to lower levels of transformation; and
- Similarly, assets in close proximity to settlement areas are generally in poorer condition than those further away.

In terms of the supply of Ecosystem Services:

- A wide range of ecosystem services are supplied by the land cover types within the Ugu district;
- Carbon storage / sequestration, crops, fruits & vegetables, flood attenuation, land-based recreation, temperature moderation, fibre & poles, waste assimilation, and soil stability / retention are services delivered at high levels; and
- Services delivered at low levels, which are likely to constrain land use activities, are waste dilution, water-based recreation, water supply, storm water damage control and stone services.

6.6.4 Recommendations

The study recommended the following management interventions:

- More participation is required from the specialists, as well as local stakeholders in the next phase;
- The transformation of natural and agricultural assets or land cover types may reduce the range of ecosystem services supplied, while changes in condition, size and connectivity may reduce service supply levels; and
- Services with low supply levels will need to be carefully managed as these generate high risk to society. The large volume services offer some buffering to possible changes brought about by future development. The relative importance of these services will only be understood in the following phase once the beneficiaries of these services have been identified and their dependence on the supply of these services scored.

6.7 Air Quality Specialist Study

The information below constitutes a summary of the key points arising from the air quality specialist study. The full report can be found in Appendix F.

6.7.1 Objectives

The objectives of the Air Quality Assessment were to:

- Baseline the status quo of air quality for the Ugu district;
- Define the institutional and regulatory framework;
- Flag areas of concern; and
- Identify areas/interventions for future management.

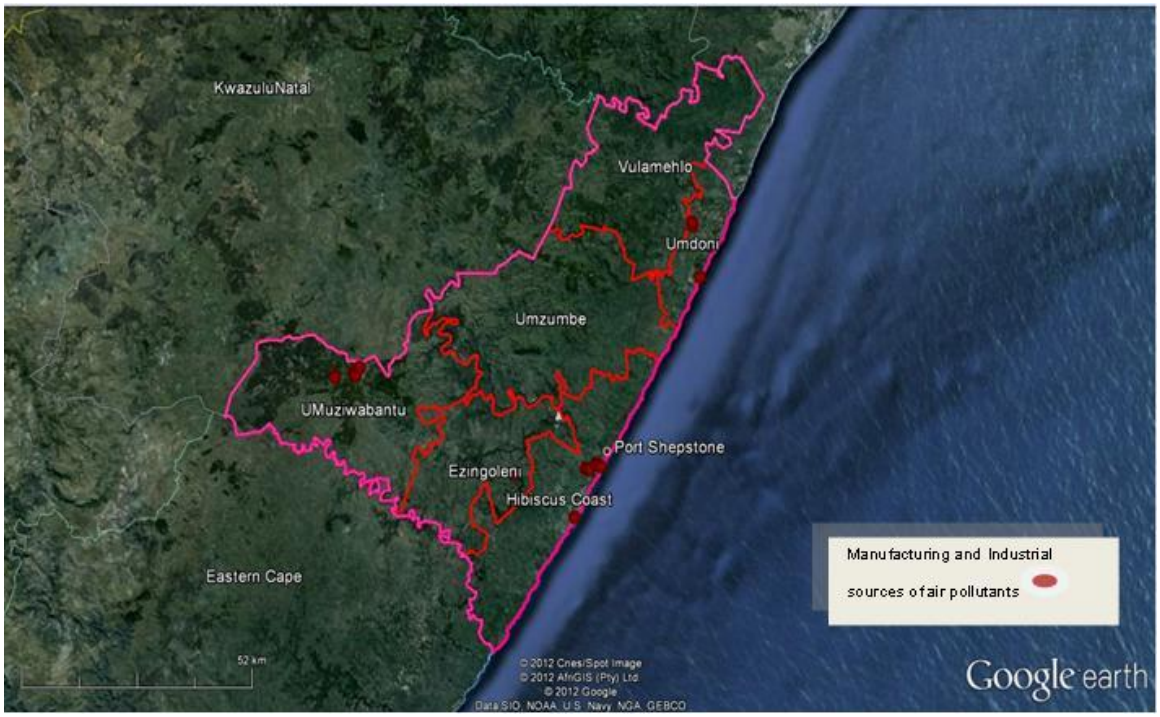
6.7.2 Methodology

The report was compiled based on a desktop review of available literature and relevant legislation with respect to the ambient air quality in the Ugu district. The Air Quality Management Plan (uMoya-NILU, 2012) has therefore formed a key role in informing the baseline assessment of the Ugu district's air quality. The baseline situation with respect to air quality and the institutional/ regulatory frameworks was determined, and recommendations were made with respect to the way forward. No air quality monitoring or testing was carried out; the outcomes and recommendations of this report are based on currently available information which should be reviewed and updated periodically.

6.7.3 Results

Given the limited data available, it was difficult to quantify or map the air quality of the Ugu district. There is a broad mix of land uses in the study area, which results in varied air quality across the area, i.e. emissions vary for rural vs. developed/ urban areas as a result of the type of emissions sources. The main sources of atmospheric emissions in the Ugu DM originate from industrial and manufacturing sources (Figure 6.17), biomass burning, and vehicular and residential emissions. Agricultural, and to an extent some rural, areas are responsible for emissions related to biomass burning, while the more urbanised areas have higher industrial and transport related emissions.

Figure 6.17: Location of industrial and manufacturing sources of emissions in Ugu DM



Source: Ugu DM AQMP, uMoya-NILU, 2013

Ambient air quality monitoring is carried out in the Ugu DM by various organisations, measuring a range of pollutants in a few locations. A summary of the ambient monitoring campaigns in the Ugu DM is provided blow (Table 6.4). Based on existing ambient monitoring data, meteorological information and an understanding of the emission sources, the air quality in the Ugu DM can be described as generally good, with the exception of areas around localised sources. These localised sources include areas of industrial activity, along the N2 at times of high traffic volumes, residential areas (where wood is used for cooking and heating) and areas temporarily affected by sugar cane burning.

Table 6.4: Summary of ambient monitoring campaigns in the Ugu DM

Organisation	Location	Parameters	Date
Ugu DM	Park Rynie Marburg Sezela Sugar Mill	SO2 NO2 H2S BTEX	2008
DAEA	Port Shepstone	SO2 NOx O3 PM10	2007
NPC Cimpor	Vicinity of the cement mill	NO2	???

Organisation	Location	Parameters	Date
		PM10	
		SO2	
Idwala Cements	Vicinity of the mine	PM10	2010

Source: uMoya-NILU, 2008

Climate change is a natural phenomenon, which is being accelerated by human activities, and the magnitude and timing of the change and the increasing frequency and intensity of extreme events in concerning. One of the main concerns is global warming, exacerbated by GHGs. There are a number of sectors which contribute to Greenhouse Gas (GHG) emissions and therefore have an impact on climate change. These include the:

- Energy sector;
- Industrial and transport sectors;
- Residential sector;
- Agricultural sector; and
- Waste sector.

Within the Ugu DM, the agricultural sector is one of the main contributors to NOx, VOC, CO while the industrial sector is the largest contribution of SO_2. The remaining sectors are also contributors to GHGs but they do present opportunities to reduce emissions. It has been established that there are limited sources of information pertaining to emissions (either qualitative or quantitative information) , as such, there is a need to establish more monitoring stations within the predominantly agricultural areas as well as obtain information on emitters in the industrial areas. The type, level and areas of GHG emissions can then be more clearly defined and mapped.

6.7.4 Recommendations

There are a number of gaps in the information currently available that need to be addressed. The following specific gaps were identified in terms of information (both temporary and long-term) and institutional gaps:

6.7.4.1 Information Gaps

1. **Ambient air quality monitoring:** Apart from a few individual companies, there is currently only one real time monitoring station at Marburg, and one baseline air quality monitoring campaign. Therefore air quality is known in only a few locations within the Ugu DM and it is difficult to monitor changes over time. In addition, information for areas further inland from the developed coastal corridor where biomass and domestic burning are sources of emissions is sparse. The specific shortcomings in ambient monitoring in the Ugu DM are:
   - A limited record of ambient monitoring at limited locations;
   - The lack of a long term data record to assess trends; and
   - Limited understanding of the risk associated with exposure to air pollutants.
2. **Emissions inventory:** there is little or no information available of important source sectors such as biomass burning, residential fuel burning and motor vehicles. This limits the understanding of the nature

and scale of these emission sectors, their impact in terms of GHGs and therefore climate change as well as the management interventions/ solutions required. The current shortcomings regarding the emission inventory are:

- Important source categories are excluded from the current information on emission sources;
- There is limited understanding of the significance of the contribution of emissions from the different sectors to ambient air quality; and
- Important information is unavailable for some emission estimates, including industry sources and sugar cane. The national emissions inventory exercise currently being undertaken by the DEA will provide a broader perspective on emissions sources in the Ugu DM.

6.7.4.2 Institutional Gaps

There is a need to improve the following aspects:

1. **Air quality management capacity:** while the Ugu DM has a designated Air Quality Officer and a compliment of five personnel responsible for executing the air quality function, the staff lack the necessary skills and experience to fully perform the function.

2. **Licensing function:** while the Ugu DM is the designated Atmospheric Licensing Authority, it has only issued one licence so far. There is thus a need to improve the licensing procedure as well as to encourage a change in mindset of the proponents, i.e. proponents need to be proactive in their submission of data (accuracy and completeness).

3. **Collaboration between all stakeholders:** Awareness of air quality is limited across stakeholder groups, there is limited buy-in across all stakeholder groups, which hinders implementation and the lack of civil society structures for air quality hinders involvement.

Based on the above air quality related findings for the study area, the following key recommendations are provided:

- Given the limited data available for the municipal area, the need to undertake air quality assessments for individual developments remains for those proposed developments which will result in either temporary or long term emissions;
- High emission developments should not take place near ecologically and/ or socially sensitive receptors (as identified in the relevant specialist reports);
- Alternative fuel sources need to be investigated to reduce the health impacts currently suffered as a result of indoor air pollution (see example in AQMP of possible biofuel gel to replace paraffin and wood);
- Capacities need to be strengthened in the municipal staffing structure, in terms of air quality management, including monitoring and enforcement; and
- Emissions inventory to be established to further inform where there are areas of high emissions and therefore areas for intervention.

6.8 Heritage Specialist Study

The information below constitutes a summary of the key points arising from the heritage specialist study. The full report can be found in Appendix G.

6.8.1 Objectives

The objective of this heritage resources report is to identify and highlight the potentially sensitive nature of heritage resources within the District and to inform opportunities for and constraints to future development.

6.8.2 Methodology

Heritage resource descriptions in this report are limited to publically accessible information. Location information is not provided for most sites and this study did not allow for primary fieldwork to verify data. Literature and database records for various types of heritage resources, as well as the municipal IDP were reviewed.

6.8.3 Results

A significant number of unidentified and poorly documented historical and cultural resources occur, as well as resources that have been recorded but for which geographic coordinates are unavailable at present. These consist of memorials, monuments, places of worship (churches, mosques and temples), cemeteries, open spaces, areas of political significance, and areas of past economic significance. Unfortunately, few comprehensive and accurate records exist for heritage resources in the area, severely constraining mapping opportunities and therefore spatial planning. A summary of heritage resources and archaeological sites available is provided below (Table 6.5).

Table 6.5 Heritage resources within the Ugu District

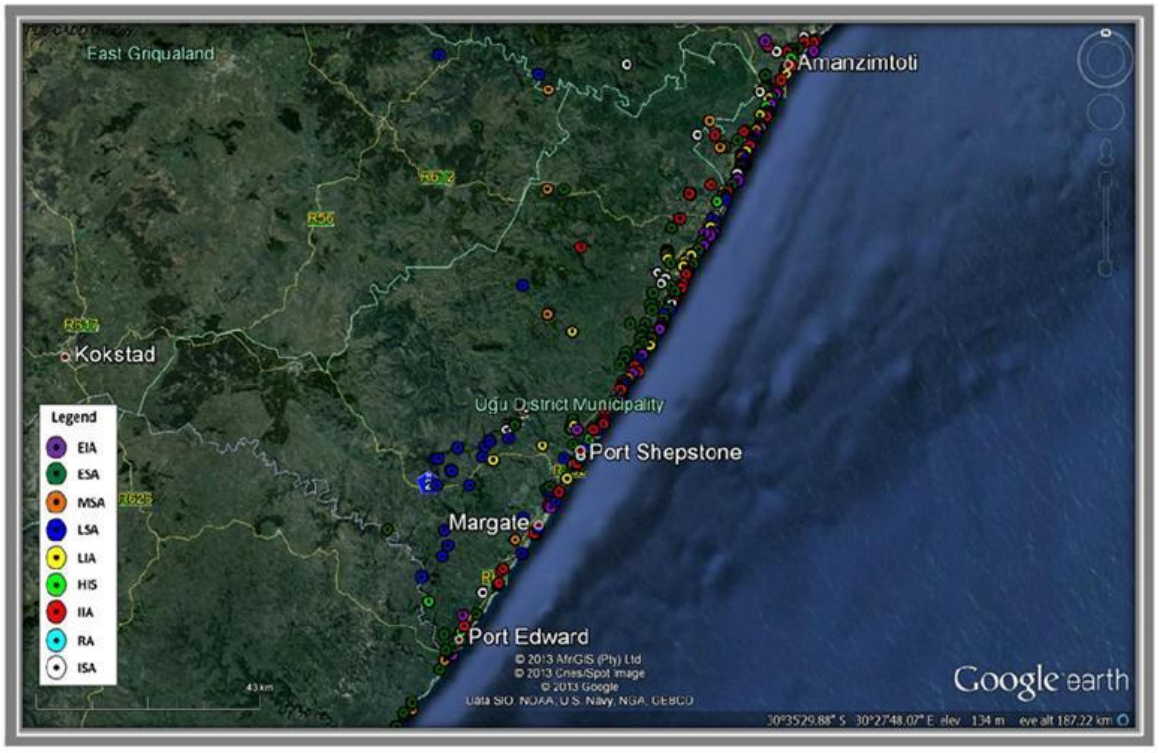
	HERITAGE RESOURCE	LOCATION
BUILDINGS AND PLACES	Port Shepstone Jail	Unknown
	Norwegian Settlers Church	Unknown
	Port Shepstone Railway history	Unknown
	Botha House	30° 23' 38" S
		30° 41' 26" E
	Lynton Hall, Pennington	30° 22' 59" S
		30° 40' 20" E
	Batstone's Drift, Port Shepstone	Unknown
	Bazleys Harbour Works Port Shepstone	Unknown
	Alfred County Annexation site Ezinqoleni	Unknown
	Frank Fynn's Grave Port Shepstone	Unknown
	Green Point Lighthouse Clansthal	30° 14' 57" S
		30° 46' 37" E
	Ndongeni ka Xoki's Grave Port Shepstone	Unknown
	Port Shepstone Maritime Museum	Athlone Drive Port Shepstone
	Shaka's Bush, Port Shepstone	Near Bates's service station
	Sister Dominique Mkhize Assisi Hospital and Convent	Unknown
	St Helen's Rock	On the Umzimkhulu river approximately 10 km from the river mouth

	HERITAGE RESOURCE	LOCATION
PROVINCIAL AND HERITAGE LANDMARKS	Paddock Station, Paddock	30° 45' 54.86" S
		30° 14' 40.16" E
	Old Police Fort, Port Shepstone	30° 44' 01.67" S
		30° 26' 56.54" E
	Port Shepstone Lighthouse	30° 44' 30.92" S
		30° 27' 31.84" E
	Izotsha River Railway Bridge	30° 47' 03.13" S
		30° 25' 27.29" E
	Kneisel's Castle, 24 Reynoulds Street, Port Shepstone	30° 44' 27.07" S
		30° 27' 06.40" E
	Royston Hall, 10 Royston lane Umtentweni	30° 42' 45.68" S
		30° 26' 49.79" E
PROTECTED AREAS	Vernon Crookes Nature Reserve	30° 16' 29" S
		30° 35' 39" E
	Oribi Gorge Nature Reserve	30° 41' 48" S
		30° 17' 32" E
	UMtamvuna Nature Reserve	31° 00' 23" S
		30° 09' 11" E
	Mpenjati Public Resort Nature Reserve and Trafalgar Marine Protected Area	30° 58' 19" S
		30° 16' 54" E
	Uvongo River Nature Reserve	30° 50' 03" S
		30° 23' 20" E
	Skyline Reserve	30° 49' 10" S
		30° 23' 10" E

6.8.3.1 Archaeological Sites

The majority of archaeological sites are located within 2-3 km of the coastline (Figure 6.18), as the landscape attracted hunter-gatherers and farmers in the past. Archaeological sites have mostly been revealed at the coast due to the concentration of developments in near-coastal areas, and due to decades of agricultural activity churning the upper 30 cm of soil. Such activities, although responsible or revealing sites, are often responsible for destroying valuable archaeological evidence.

Figure 6.18: Location of known archaeological sites in the Ugu District



Source: Ethembeni Cultural Heritage Ugu District Municipality Environmental Management Framework Heritage Resources Management Report

6.8.3.2 Places Associated with Oral Traditions or Living Heritage

Cultural tradition; oral history; performance; ritual; popular memory; skills and techniques; indigenous knowledge systems; and the holistic approach to nature, society and social relationships are all considered to be part of Living Heritage. Given the nature of the historical environment and modern land uses it is highly likely that numerous places associated with oral traditions or living heritage are present within Ugu District.

6.8.3.3 Traditional Burial Places

Given the extensive areas of Ingonyama Trust land in the Ugu DM, it is likely that numerous traditional burial places are located outside formal cemeteries. Such burial places are usually located within homestead precincts and are known to and managed by the next-of-kin, however, people may abandon

homesteads or become alienated from traditional burial places through social processes such as forced removals. Accordingly, all Ingonyama Trust land in the District should be mapped as a zone of high sensitivity for traditional burial places, and all developments within this area should be subject to a Heritage Impact Assessment.

6.8.3.4 Palaeontological Sites

Mzamba and Trafalgar Cretaceous fossils

These marine fossil beds are exposed in a 10-m-high cliff that forms a prominent headland about 2.5 km south of the uMtamvuna River. The deposits consist of greyish-brown sandstone and limestone rich in fossil material dating back approximately 80 million, the first evidence of fossils in the Upper Cretaceous. The lower layers contain numerous tree trunks that have been silicified, many of these were penetrated by marine worms before silicification was completed. There is also an abundance of marine shells.

Trafalgar Marine Protected Area

The reserve contains fossilised Cretaceous trees which are embedded in the rocks, which can best be seen at low tide in the intertidal rocks near the Trafalgar access.

6.8.3.5 Military History

Features, structures and artefacts (older than 75 years) associated with military history in the Ugu DM are:

- Bilamhlolo River mouth, Ramsgate;
- Isandlundlu / Tragedy Hill, Port Edward;
- Marburg, Port Shepstone (present Marburg commonage); and
- Execution rock, Dududu.

6.8.4 Recommendations

6.8.4.1 Establishment of Metro and/or District Heritage Forums:

In order to adequately address the conservation of heritage resources within the Ugu district, it is strongly recommended that Amafa and the municipality create a functioning District Heritage Forum, as required in terms of Section 29 of the KwaZulu-Natal Heritage Act, 2008 (Act No. 4 of 2008).

Such a forum would:

- Identify and grade heritage resources;
- Co-ordinate heritage development issues;
- Co-ordinate and facilitate the promotion of both physical and living or intangible heritage;
- Promote value and ownership of local heritage resources;
- Ensure collaboration with local stakeholders in all local heritage initiatives; and
- Promote heritage-related local economic and social development.

6.8.4.2 Heritage resource identification and grading:

An extensive public participation program should be undertaken to identify sites of cultural and historical significance, particularly places of significance of historically disadvantaged groups; living heritage; and cultural landscapes. This program should be widely advertised, including radio broadcasting, and promoted

in all local schools. Funding for the programme could be sought from local businesses and industry, and matched by municipal funding.

6.8.4.3 Development of management plans:

Amafa and the District Heritage Forum should compile integrated site management plans for all Provincial and Heritage Landmarks, places of conflict and other significant heritage resources.

6.8.4.4 Database development:

A national database for all heritage resources, South African Heritage Resources Information System (SAHRIS), has been developed by the South African Heritage Resources Agency and is continually updated based on any new reports received or additional resources identified. Existing resources such as oral histories and Heritage Impact Assessments (HIAs) submitted as part of the Environmental Impact Assessment process should be uploaded to the SAHRIS database.

6.8.4.5 Heritage Impact Assessments:

HIAs, including Archaeological Impact Assessments, should be carried out in all areas identified for development. Heritage resources and development impacts should be assessed according to the criteria included in the appendices to this report.

6.8.4.6 Urban conservation:

Buildings and structures should be assessed in terms of their various values (not just historical or architectural), including their contribution to streetscapes and townscapes. All buildings with heritage significance are protected by heritage legislation, not only those older than sixty years. However, such significance must be demonstrated to be in the public interest. Amafa and the District Heritage Forum should compile a management plan for any heritage zones identified in future. Plans should:

- Identify all buildings, structures and places, including monuments and memorials, located in the various zones;
- Grade each heritage resource in terms of the grading criteria (shown in Appendix C of the Heritage Specialist Report, Appendix G), or similar criteria approved by Amafa;
- Provide general management requirements for heritage resource categories and specific management requirements for individual sites, compiled in liaison with site owners;
- Provide for the notification of site owners concerning the legal protection of sites; and
- Establish limits of acceptable change to heritage zones, including the establishment of buffers with preferred and non-preferred land uses.

Heritage resources' management priorities identified in this component of the EMF should be funded and implemented from the 2015 financial year. These priorities should be subject to annual review with progress reports submitted to the Minister by Amafa and the District Municipality.

Note: This draft report has been submitted to Amafa for review and comment prior to its finalisation.

6.9 Town Planning Specialist Study

The information below constitutes a summary of the key points arising from the town planning/services specialist study. The full report can be found in Appendix H.

6.9.1 Objectives

A number of features need to be considered within the Status Quo analysis, and this report focuses on the town planning sector. The main outcomes in the terms of reference for the town planning report included:

- Undertaking a literature review and gathering of any other relevant data;
- Describing the National and Provincial Planning context;
- Describing the Ugu district context;
- Identifying the key planning and development strategies for the Ugu district; and
- Providing recommendations on areas of focus for the EMF.

6.9.2 Methodology

This report is based on a desktop study and literature review of relevant available literature. The various planning related reports at a National, Provincial, District and Local level were studied and the main findings summarised in this report. Based on this information, the spatial and strategic context of the Ugu district and priority areas for intervention were then identified. The report concludes by providing recommendations on which areas the EMF should focus on in terms of development within the district.

6.9.3 Results

The four main strategic spatial interventions identified for the District are as follows:

6.9.3.1 Linkages and Improved Accessibility

North-south linkages within rural areas are weak and currently limit the potential for additional routes other than the N2 along the coastline. Developing these north-south linkages (from Harding to St Faiths; Oribi Flats through Umzinto to Odidini, and from Umgayi through Kenterton past Dududu) will dramatically improve accessibility within the district, creating a more structured grid-like transportation system throughout the district. This will significantly improve trade between rural nodes and allow greater access for commercial and small-scale farmers to markets both within and outside the District.

6.9.3.2 Key Activity Zones

Three key activity zones are expected to develop further. These are situated between Scottburgh and Hibberdene, Hibberdene and Port Shepstone, and Port Shepstone and Port Edward. This coastal belt currently hosts the majority of formal residential property, tourism activity, retail and manufacturing activities. There will be further development pressure in this zone and, therefore, it needs to be ensured that development is undertaken sustainably.

6.9.3.3 Traditional Settlements and Rural Development

Traditional settlements have poor accessibility and contain very few and/or badly maintained linkages to the existing road network.

The major traditional settlements are surrounded by commercial agriculture, and opportunities exist to not only create linkages between communities and commercial farmers, but also to develop capacity within rural communities to undertake small-scale farming. This will require supporting infrastructure (rural roads, fencing, and facilities to encourage agri-processing), mechanisation, skills development and mentorship, and research into opportunities that exist to ensure that communities can develop agricultural capacity, add value to products, and be linked to commercial markets.

6.9.3.4 Commercial Agriculture

Large scale-commercial agriculture will remain a primary focus of the Ugu district. Current activities, such as sugar and timber production are large employers and present many opportunities for upstream and downstream activities. These industries will continue to play a large part within the District and must be supported.

The District must encourage the development of intensive agriculture and value-adding activities through engagement and close coordination between industry and local, provincial and national government. This will also include development of small-scale commercial farmers, investment into new production techniques and infrastructure, skills development and training and substantial research (and research partnerships) into new opportunities and farming techniques.

The Ugu Growth and Development Strategy, 2012

The Ugu Growth and Development Strategy (GDS) (2012) states that the agricultural sector offers the greatest potential for spatial integration. Whilst there is currently a stark spatial divide between commercial and subsistence farmers, opportunities for expansion in this sector lie in the undeveloped fertile communal lands.

For this to materialize, the following needs to happen:

- Community engagement for buy-in and identification of sustainable livelihoods identified,
- The Ugu EMF to provide the tool to ensure that the natural resource base of the District is well-managed;
- Development of supporting infrastructure, viz. roads and dams and forging of market linkages. This could then potentially transform and turn around the spatial economic landscape of the Ugu District; and
- The tourism sector also has potential to integrate the region through the linking of coastal and hinterland tourism products. The proposed Big Five Game Reserve, resulting from an amalgamation of a number of smaller reserves, is a possible catalytic project in this regard (Ugu GDS [2012]).

6.9.4 Recommendations

The Ugu EMF should focus on providing guidance on the specific types of development that should be encouraged or discouraged as follows:

- Development in the identified nodes and along major routes and corridors as highlighted in the Ugu GDS (2012). Linkages and accessibility has been identified as a major development issue in the District';
- East-west connections are limited in the Ugu District. The District is therefore pursuing the development of new opportunities in the western parts of the district to ensure a higher level of linkage and accessibility in these areas as this will improve socio-economic conditions in this region of the District;
- All strategic plans in the District have identified the importance and need to protect Ugu's natural assets. The EMF will be instrumental in identifying areas that have to be protected for biodiversity and conservation purposes; and
- The EMF needs to provide the basis for future use and land use zones. The EMF should also ensure that high potential agricultural land that can have a major benefit for local communities and commercial farming is protected.

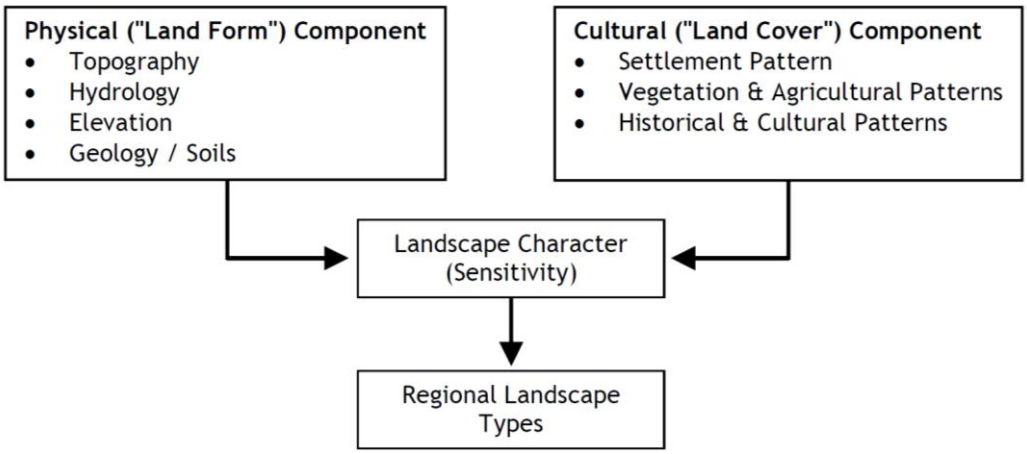
6.10 Landscape Character Assessment Specialist Study

6.10.1 Introduction

"Landscape is the physical reality of the environment around us, the tangible elements that give shape and diversity to our surroundings. But landscape is also the environment perceived, predominantly visually but additionally through our senses of smell, touch and hearing. Our appreciation of landscape is affected too by our cultural backgrounds and by personal and professional interests." (Northumberland National Park Authority; cited in CNdV Africa, 2006).

Landscape Character can be defined as a distinct and recognisable pattern of elements that occur consistently in a certain type of landscape (Swanwick, 2002), or as physical character and cultural evolution (CNdV Africa, 2006). Specific combinations (Figure 6.19) of geology, landform, and natural attributes such as soils, vegetation, land use, field patterns and human settlement create character. The interaction of all these factors makes each part of the landscape distinct and contributes to a sense of place. Each landscape requires a systematic investigation of the various factors that have created and influenced the landscape, as this will assist in exploring and understanding the landscape character (Swanwick, 2002).

Figure 6.19: General components of landscape character



Source: CNdV Africa, 2006

6.10.2 Objectives

The objective of the LCA is to identify sensitive areas and distinguishing features within the Ugu DM that give Ugu its visually distinctive appeal, based on a qualitative approach. The overall goal of the assessment is the protection of valuable and sensitive landscapes as well as the mitigation of potential impacts on visual quality.

6.10.3 Methodology

The methodology for the assessment of the landscape/land use character for the Ugu District Municipality includes an investigation into the general topography of the region, the terrain morphology, the broad land cover and land use patterns, and a visual assessment aimed at determining the visual exposure within the district. These individual data categories are evaluated, rated and merged in order to determine the landscape value or scenic quality index. The result of this index is further analysed in order to identify zones with similar characteristics (in respect of the aforementioned categories), to delineate zones and to provide management guidelines (where applicable) for each zone.

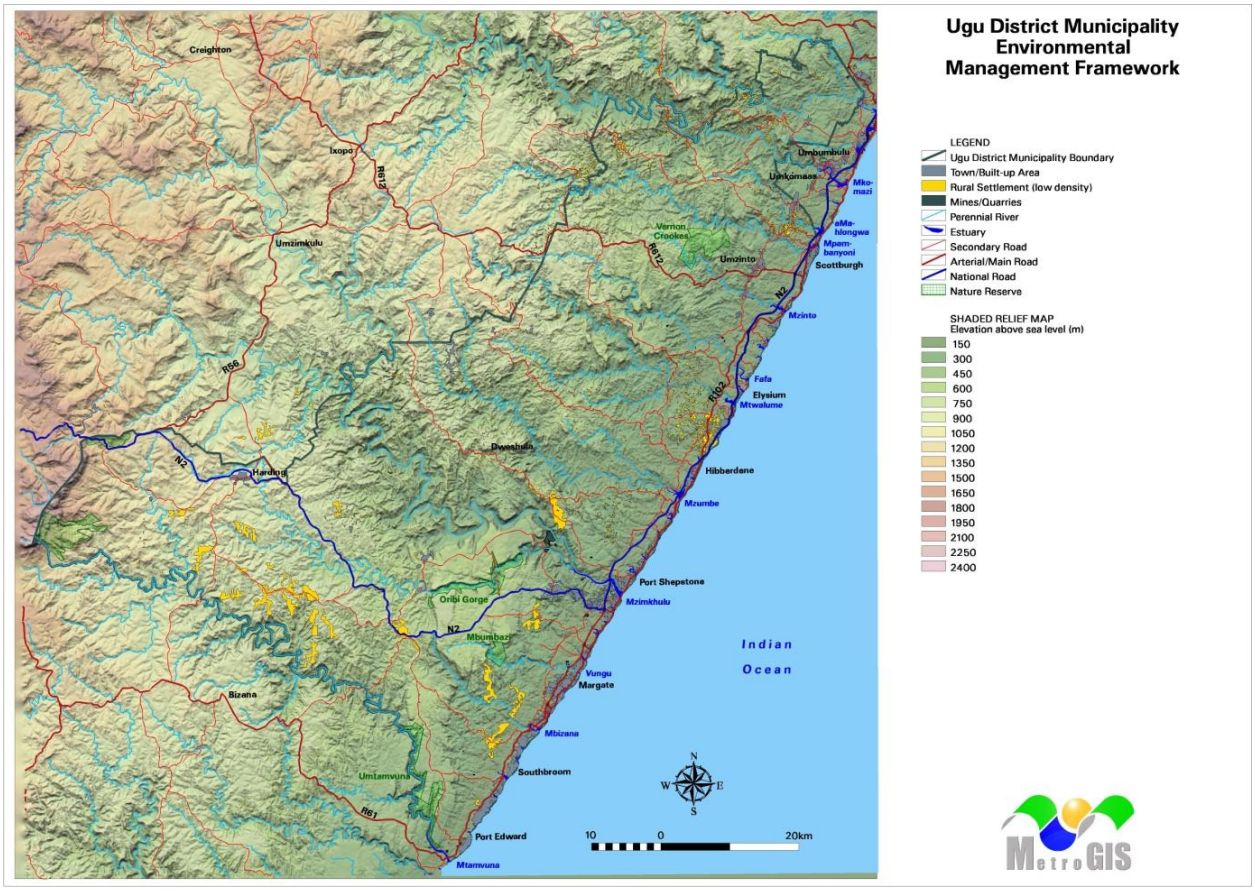
6.10.4 Results

Individual data categories that were evaluated, rated and merged are:

- Topography/Shaded Relief Map (Figure 6.20);
- Terrain Morphology (Figure 6.21):
  - High Mountains;
  - Mountains and Tall Hills;
  - Strongly Undulating Plains and Hills;
  - Undulating Plains and Plains;

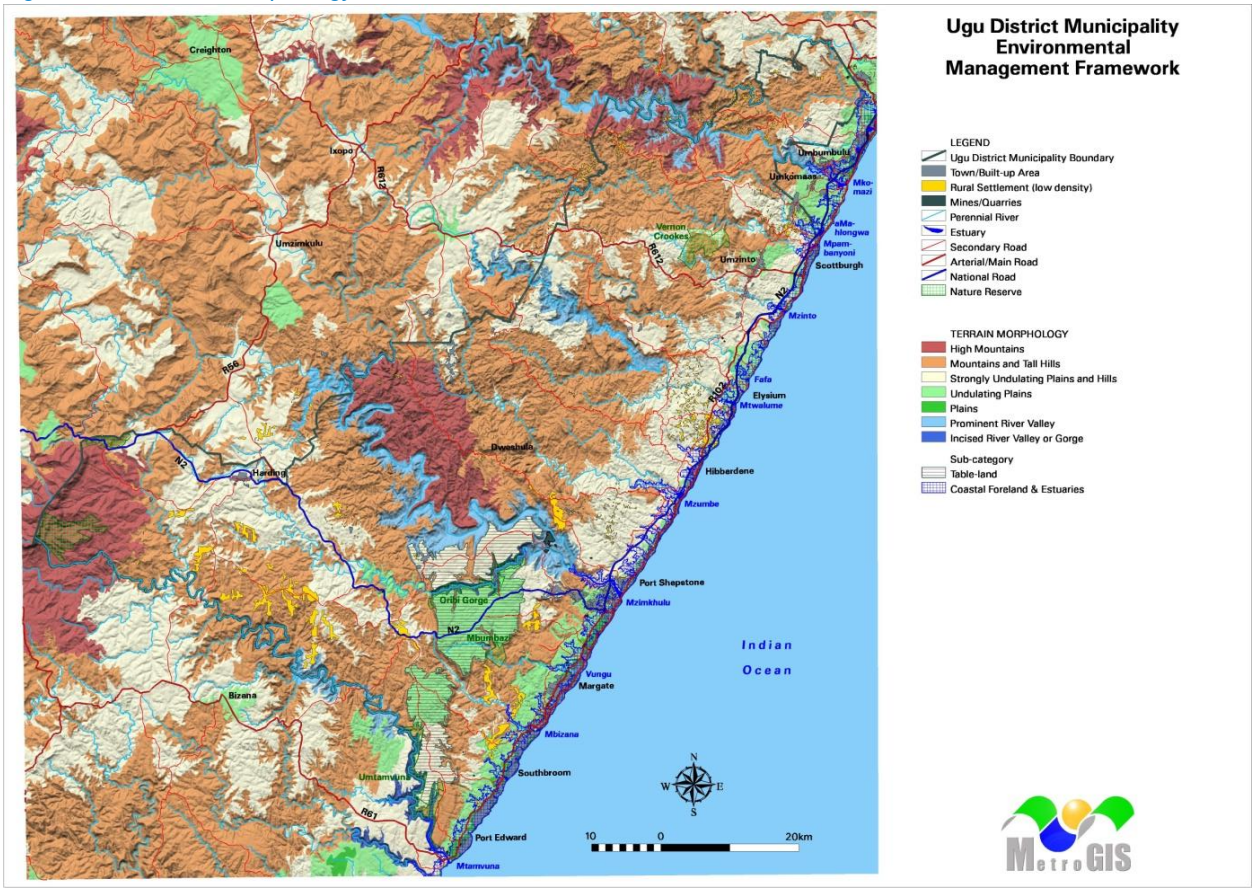
  - Prominent River Valley;
  - Incised River Valley and Gorge; and
  - Coastal Foreland and Estuaries.
- Land Cover/Broad Land Use Patterns (Figure 6.22):
  - Transformed Land Cover Types;
  - Altered Land Cover Types; and
  - Natural Land Cover Types;
- Visual Assessment (Figure 6.23).

Figure 6.20: Shaded Relief Map



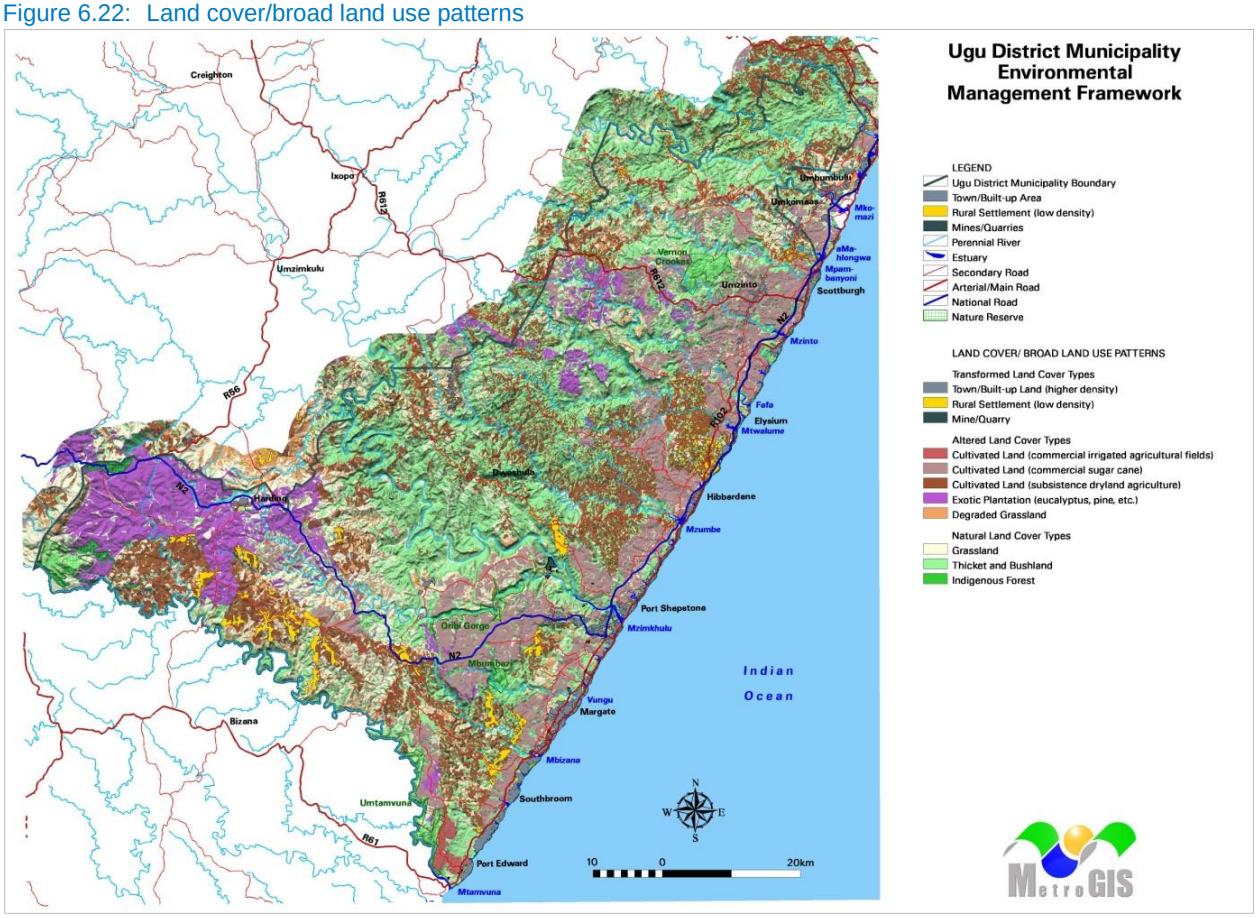
Source: MetroGIS, 2013

Figure 6.21: Terrain Morphology



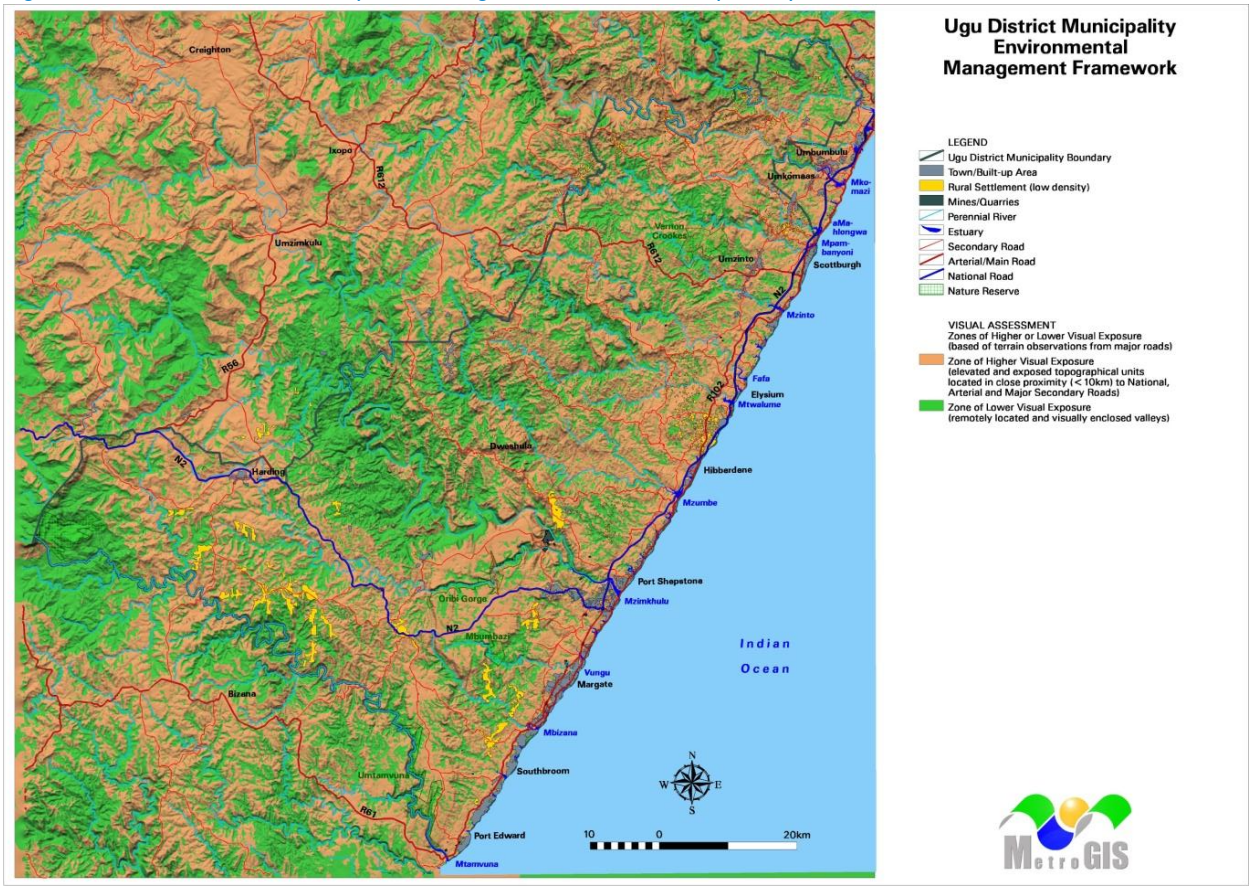
Source: MetroGIS, 2013

Figure 6.22: Land cover/broad land use patterns



Source: MetroGIS, 2013

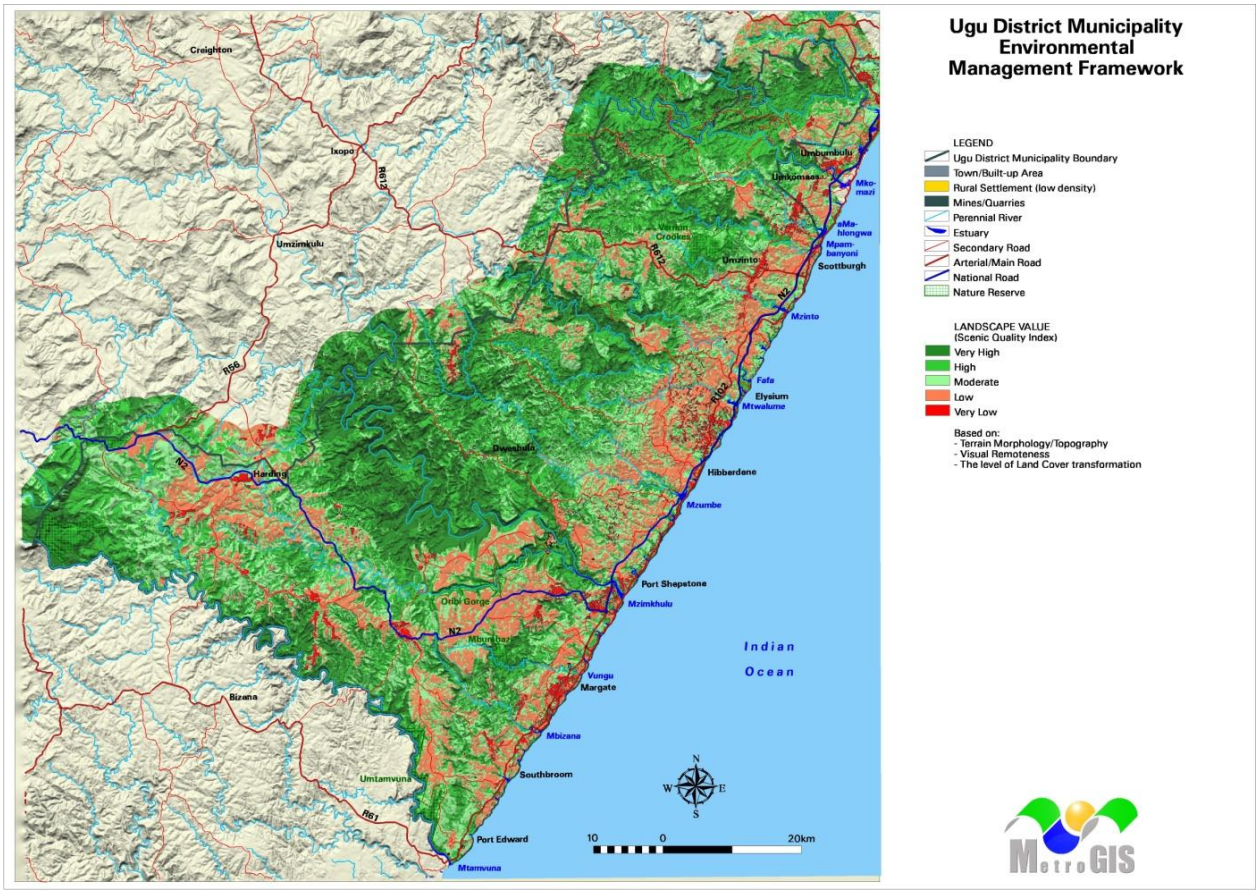
Figure 6.23: Visual assessment (zones of higher or lower visual exposure)



Source: MetroGIS, 2013

Each of the data categories were evaluated per data feature in terms of scenic value, visual quality, level of disturbance and visual remoteness. Terrain morphological units such as high mountains, mountains, gorges, prominent river valleys, etc. were rated higher than plains due to their inherent scenic value and exposed topographical nature. Pristine or natural vegetation types or land cover types, and existing conservation or protected areas, were similarly rated higher than disturbed, altered or transformed land cover types. Visually remote of enclosed regions within the district, where the visual character or sense-of-place is still intact, scored a higher rating than areas exposed to human activities. The resultant scenic quality index or landscape value map is displayed in Figure 6.24. The index reflects the combined calculated value for each of the data categories. Heavily disturbed or built-up land (e.g. quarries or towns) lack the scenic quality or landscape value that is inherent to, for example, protected or natural land set against a mountainous backdrop, within a highly enclosed or protected visual catchment.

Figure 6.24 Landscape value (scenic quality index)



Source: MetroGIS, 2013

The landscape/land use character map is a summation of the all the facets that make up the character, appearance and feeling of a certain area. Zones were delineated in order to provide a regional overview of the varying landscape character precincts within the district. It is not intended as a definitive partitioning of the district into land use compartments, but rather a guide for possible future planning and land use management. Four distinct landscape character zones (Figure 6.25), displaying similar characteristics for each of the input data categories were identified.

Zone 1: Predominantly natural areas

Characteristics of Zone 1 include:

- Scenic topographical features;
- Lower levels of land cover transformation;
- Enclosed viewshed catchments and visual remoteness; and
- Includes existing conservation/protected areas.

Zone 2: Altered Landscapes within a Natural Setting

Characteristics of Zone 2 include:
- Moderate scenic value in terms of topography;
- Some land cover transformation/alteration due to subsistence agriculture, forestry and human settlement; and
- Relatively visually remote.

Zone 3: Transformed Landscapes within a Rural Setting

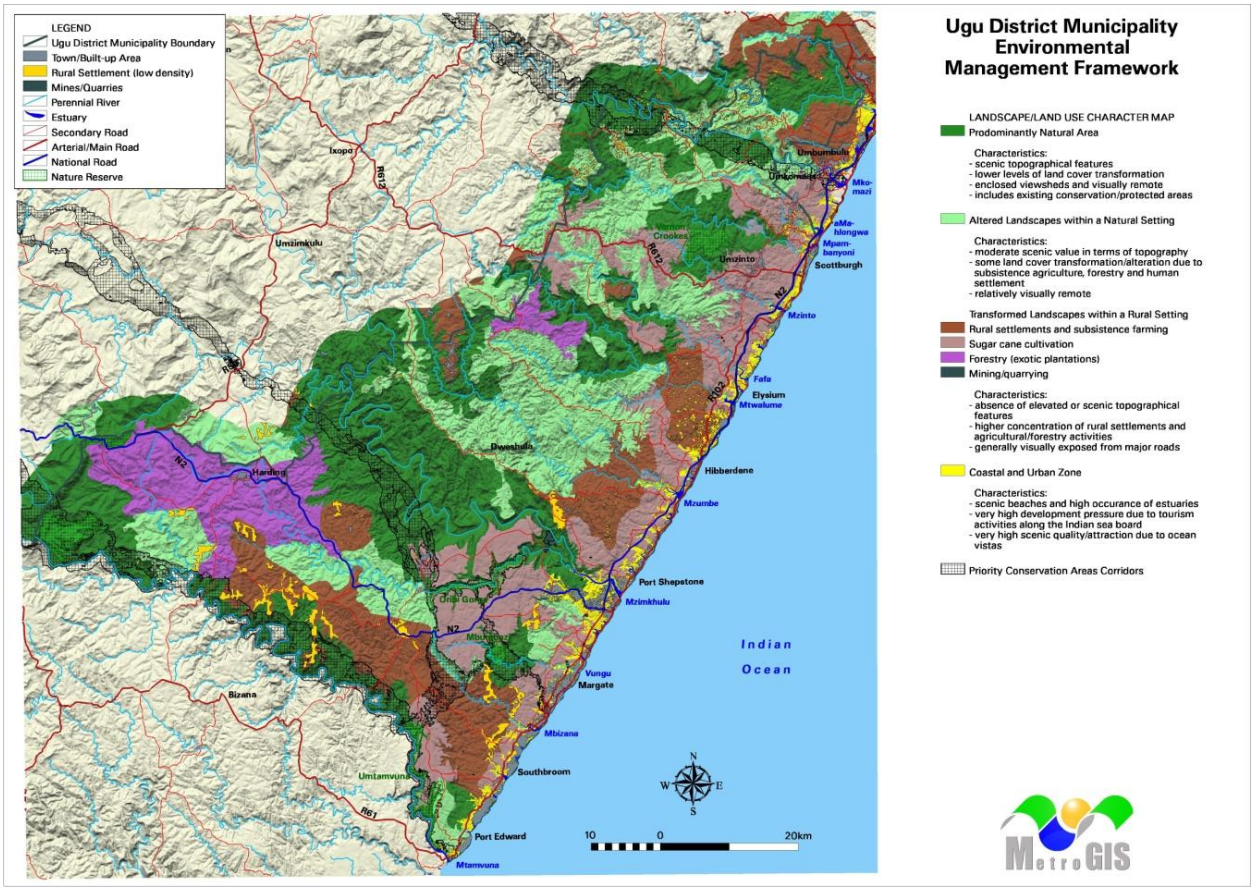
General characteristics (This zone has a number of sub categories) of Zone 3 include:
- Absence of elevated or scenic topographical features;
- Higher concentration of rural settlements and agricultural/forestry activities with limited natural vegetation remaining; and
- Generally visually exposed from major roads.

Zone 4: Coastal and Urban Zone

Characteristics of Zone 4 include:
- Scenic beaches and the high occurrence of estuaries/lagoons;
- Very high development pressure due to tourism activities along the Indian sea board; and
- Very high scenic quality/attraction due to ocean vistas.

Zone 4 potentially requires the highest level of management amongst all the zones in order to protect its visual resources and landscape character.

Figure 6.25 Landscape/land use character map.



Source: MetroGIS, 2013

6.10.5 Recommendations

Zone 1: Predominantly natural areas

Activities preferred within this zone are conservation, low impact eco-tourism, the expansion of existing protected areas, etc.

Zone 2: Altered Landscapes within a Natural Setting

Preferred activities to be considered within this zone is nature-based tourism, cultural tourism and to act as environmental support areas for conservation areas or precincts from the previous zone (Zone 1), where connected.

Zone 3: Transformed Landscapes within a Rural Setting

Simuma limestone quarry is generally in conflict with its surroundings in terms of the proposed land use activities suggested for Zone 1. It is recommended that this quarry be rehabilitated once decommissioned and restored to its original natural state, if possible.

Zone 4: Coastal and Urban Zone

Recommended activities proposed within this zone include predominantly tourism and tourism related developments, as well as lower density residential land uses that are sensitive to the environment. Specific attention should be given to the protection of beaches, dunes and estuaries, with an additional focus on the management of natural open spaces within this zone. Development should not infringe on these scenic features and should preferably be located within already disturbed areas, or favour in-fill developments. Future industrial or large scale commercial developments within this zone should ideally be discouraged or located to more suitable areas with a compatible land use character.

7 Conclusion and Way Forward

The Ugu EMF Status Quo report base-lines all features in the district in a systematic way, profiling the biophysical and socio-economic environment, the planning and legislative context as well as key associated departmental/governmental mandates. Information gaps were identified, and a number of specialist studies were commissioned to ensure that the EMF contains the most recent and complete sets of data, where possible.

This study forms the basis of the EMF and informs the next phases, namely the Desired State, Environmental Management Zones and Strategic Environmental Management Plan phases. The analysis and evaluation of the baseline information, issues raised throughout the stakeholder consultation process provides the basis for establishing environmental opportunities and constraints, thereby assisting with the identification of key intervention/priority areas. These are further explored and dealt with in the following phases of the EMF.

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Appendices

Appendix A. Biodiversity Specialist Report

Appendix B. Agricultural Specialist Report

Appendix C. Water Resources Specialist Report

Appendix D. Geology Specialist Report

Appendix E. Resource Economics Specialist Report

Appendix F. Air Quality Specialist Report

Appendix G. Heritage Specialist Report

Appendix H. Town Planning Specialist Report

Appendix I. Landscape Character Assessment Specialist Report

Appendix J. Summary of Maps Produced

The various specialist reports resulted in a series of maps being produced per study. A summary of these maps is provided below (Table 10.1). These will be furnished to the Ugu DM and its LMs in a systematic and organised system upon completion of the EMF in both graphical (for visual means) and spatial formats (GIS) (for a means of further interrogation).

Table 8.1: Maps produced per specialist report

Specialist Study	Map Produced
Biodiversity	Regional map of the Ugu District Municipality showing local municipalities within the UDM and the surrounding Districts
	Outline of the approach followed in developing a priorities map for the study area.
	Mean Annual Precipitation (MAP) for the Ugu District
	Digital elevation model of the Ugu District
	Geological Map of the Ugu District
	Map indicating the extent of primary land-uses across the Ugu District
	Map showing vegetation types after transformation
	Map showing the threat status and extent of vegetation types after transformation
	Map showing the status of un-transformed threatened ecosystems in the Ugu District
	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 2010
	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
	Map showing the threat status of wetland vegetation groups and associated location of wetland systems
	Map showing the location of estuaries along the Ugu Coastline
	Map showing the location of formally Protected Areas and other conservation areas in the Ugu District
	Map showing priority areas identified for protected area expansion
	Draft Critical Biodiversity Areas Map of the Ugu District Municipality showing CBAs, ESAs and EI
	Composite CBA Map showing terrestrial, aquatic, estuarine and marine Critical Biodiversity Areas (CBAs) for the Ugu District Municipality
	Composite ESA Map showing terrestrial, aquatic, estuarine and marine Ecological Support Areas (ESAs) for the Ugu District Municipality
	Composite EI Map showing terrestrial, aquatic, estuarine and marine Ecological Infrastructure (EI) for the Ugu District Municipality
	Map indicating relative levels of threat to biodiversity in the study area
	Map indicating the prioritization of terrestrial CBA areas for conservation efforts and specific focal areas identified
	Breakdown of transformation classes in the Ugu District
	Map showing the location of priority areas identified through local stakeholder consultation
Agriculture	Landownership
	Land cover
	Land use in Traditional Areas
	Agricultural Potential in Traditional Areas

Specialist Study	Map Produced
	Agricultural Potential in Ugu
	Areas with Arable Potential
	Bioresource Units
	Bioresource Groups
	Broad cropping areas
	Areas currently under orchards
	Sub-tropical fruit potential
	Potential eucalyptus growing areas
	Potential pine growing areas
	Potential sugar growing areas (<12% slope)
	Potential sugar growing areas (<49% slope)
	Potential livestock and game production areas
Resource economics	Status-Quo
	Range of services and service supply levels of each land cover type based on current condition and connectivity
	Total service supply levels for each land cover type based on current condition and connectivity
Water resources	Locality Plan for the Ugu District Municipality Environmental Management Framework
	Major Hydrological Features for the Ugu District Municipality Environmental Management Framework
	Incremental Catchment Runoff Potential for the Catchment Areas within the Ugu District Municipality
	Potential Available Water for Each Quaternary Catchment in the Ugu District Municipality
	Projected Areas for Electricity Installation in the Ugu District Municipality in the Next 3 years
	Geological Map of the Ugu District Municipality, Indicating Underlying Geohydrological Conditions
	Map of projected ratios to historical MAP
Air Quality	Location of industrial and manufacturing sources of emissions in Ugu DM
Geology	Mineral Map of the KwaZulu-Natal Province
	CVI Port Edward to Southbroom
	CVI Southbroom and North
	CVI South and North of Margate
	CVI South and North of Port Shepstone
	CVI North of Port Shepstone to Hibberdene
	CVI Hibberdene to Elysium
	CVI North of Elysium
	CVI South and North of Scottburgh
	Solid Geology of the Ugu District Municipality
	Soil Depth of the Ugu District Municipality
Town Planning	Physical Map of Ugu District
	Political Map of Ugu District, including its six Local Municipalities

Specialist Study	Map Produced
	Land Use map of Ugu DM
	Locality map of Ezinqoleni
	Locality map of Hibiscus Coast
	Locality Map of Umdoni
	Locality Map of Umuziwabantu
	Locality map of Umzumbe
	Locality map of Vulamehlo
	PGDP Priority Intervention Areas
	PGDP Classification of Priority intervention Areas in Ugu District
	Spatial Framework Map
	Land-Use within the Ugu Region
	Map of the Classification of Settlement within Ugu
	Spatial Location of Economic Activities within the Ugu Region
	The Ugu District SDF
	Nodes within the Ugu District
	Protected areas within Ugu
	Transportation within Ugu
	Land-uses within Ugu
	Ugu GDS, Consolidated Spatial Map
	Ugu GDS Spatial Vision, 2012
Heritage	Locations of formally protected Heritage resources in Ugu District
	Locations of formally protected Heritage resources in Port Shepstone
	Locations of prominent places in Ugu District
	Protected areas in Ugu District
	Locations of known archaeological sites in Ugu District
	Location of Tragedy Rock, Port Edward
Landscape	Shaded Relief Map
Character	Terrain Morphology
Assessment	Land cover/broad land use patterns.
	Visual assessment (zones of higher or lower visual exposure)
	Landscape value (scenic quality index)
	Landscape/land use character map

Acronyms

ACSA	Airports Company South Africa
AQMP	Air Quality Management Plan
BCLME	Benguela Current Large Marine Ecosystem
BID	Background Information Document
BSP	Biodiversity Sector Plan
CARA	Conservation of Agricultural Resources Act
CBA	Critical Biodiversity Area
CBD	Central Business District
CBO	Community Based Organizations
CMP	Coastal Management Plan
CVI	Coastal Vulnerability Index
CoGTA	Cooperative Governance Traditional Affairs
DAEA	Department of Agriculture and Environmental Affairs
DAFF	Department of Agriculture, Forestry and Fisheries
DCOG	Department of Cooperative Governance
DEA	Department of Environmental Affairs
DEAT	Department of Environmental Affairs and Tourism
DHS	Department of Human Settlement
DM	District Municipality
DMR	Department of Mineral Resource
DoT	Department of Transport
DPSIR	Drivers-Pressures-State-Impact-Response Framework
DWA	Department of Water Affairs
EBA	Ecosystem-based Adaptation
EC	Electric Conductivity
EI	Ecological Infrastructure
EIA	Environmental Impact Assessment
EKZNW	Ezemvelo KwaZulu-Natal Wildlife
EMF	Environmental Management Framework
EMZ	Environmental Management Zones
EPV	Environmental Protection Vessels
ESA	Ecological Support Areas
EWT	Endangered Wildlife Trust
FCO	Fisheries Control Officers
GDS	Growth and Development Strategy
GHGs	Greenhouse Gasses
GIS	Geographic Information System
GSM	Global System for Mobile Communication
HDI	Human Development Index
HIA	Heritage Impact Assessments
HOD	Head of Department
IAP	Invasive Alien Plant

ICM	Integrated Coastal Management
IDP	Integrated Development Plan
IPAP	Industrial Policy Action Plan
IWMP	Integrated Waste Management Plan
KZN	KwaZulu-Natal
LM	Local Municipality
LUMS	Land Use Management System
MAR	Mean Annual Runoff
MCM	Marine and Coastal Management
MEC	Member of Executive Council
METT	Management Effectiveness Tracking Tool
MLRF	Marine Living Resource Fund
MOSS	Metropolitan Open Spaces System
MPRDA	Minerals and Petroleum Resources Development Act
NCCRWP	National Climate Change Response White Paper
NDP	National Development Plan
NEMA	National Environmental Management Plan
NEMWA	National Environmental Management Waste Act
NFA	National Forestry Act
NFEPA	National Freshwater Ecosystem Priority Areas
NGO	Non-governmental Organizations
NPAE	National Protected Areas Expansion
NPC	National Planning Commission
NPO	Nonprofit Organizations
ORI	Oceanographic Research Institute
PC	Primary Corridor
PGDP	Provincial Growth and Development Plan
PMT	Project Management Team
PN	Primary Node
POP's	Points of Presence
PRASA	Passenger Rail Agency of South Africa
PSC	Project Steering Committee
PSEDS	Provincial Spatial Economic Development Strategy
RSA	Republic of South Africa
SADC	Southern African Development Community
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SALA	Subdivision of Agricultural Land Act
SALGA	South African Local Government Association
SANBI	South African National Biodiversity Institute
SANParks	South African National Parks
SANRAL	South African National Roads Agency Limited

SAWS	South African Weather Service
SC	Secondary Corridor
SDF	Spatial Development Framework
SEA	Strategic Environmental Assessment
SEMP	Strategic Environmental Management Plan
SN	Secondary Node
SQ	Status Quo
EWR	Environmental Water Requirement
WESSA	Wildlife and Environment Society of South Africa
WMA	Water Management Areas
WSA	Water Services Authority
WSP	Water Service Provider