

EHLANZENI DISTRICT MUNICIPALITY WETLAND REPORT | 2017

LOCAL ACTION FOR BIODIVERSITY (LAB): WETLANDS SOUTH AFRICA



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SANBI
Biodiversity for Life
South African National Biodiversity Institute



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Wetlands are one of the most valuable and diverse ecosystems on this planet and are essential for human existence. Wetlands clean the water we drink as well as provide nutritious food in the form of plants and fish. Wetlands also provide organic materials which can be used for medicinal purposes. They help protect us from flooding and storm surges and also have the ability to store water which is then released in times of drought. Wetlands also provide key habitat for a significant array of critically endangered flora and fauna.

Wetlands also play a key role in the mitigation of climate change which is predicted to have a major impact on human livelihoods. They can store large amount so of carbon and thus can help with the regulation of greenhouse gases thereby assisting in the control of accelerating climate change. These ecosystems also have the ability to protect against the effects of climate change by reducing flooding risk, stabilising shorelines and controlling erosion.

Despite the essential role wetlands play in maintaining the delicate balance of life on Earth, they are being lost and degraded at an unprecedented rate, faster than any other ecosystem in the world. Since the 1900s, it is estimated that 64% of the world's wetlands have been destroyed. Within South Africa, 50% of the country's wetlands have been lost and 48% of the remaining wetlands are critically endangered. The astounding loss of the wetland systems worldwide is largely as a result of wetland areas being 'reclaimed' for expanding urban development or agricultural expansion as well as encroachment of invasive alien vegetation. As a result, species which once

populated these areas in vast numbers are seeing a rapid decline and countless animals and plants have been brought to the verge of extinction. Wetlands are also increasingly unable to perform the ecosystem services so vital for human life.

In the 21st century we need wetlands more than ever before. The conservation and the management of wetlands in a holistic, collaborative and effective manner is therefore essential to sustain human livelihoods and local economies, protect our valuable biodiversity and buffer the impacts of climate change.

CLLR. J SIDELL
Executive Mayor
Ehlanzeni District
Municipality



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ICLEI – Local Governments for Sustainability is the leading global network of over 1,500 cities, towns and regions committed to building a sustainable future. By helping the ICLEI Network to become sustainable, low-carbon, ecomobile, resilient, biodiverse, resource-efficient, healthy and happy, with a green economy and smart infrastructure, we impact over 25% of the global urban population.

ICLEI Africa’s work is conducted by a dynamic and passionate team of professionals that seek to work with cities to ensure a more sustainable future, with a specific focus on urban biodiversity matters.

In order to strengthen the role cities and local governments play in the pursuit of greater sustainability through the collaborative design and implementation of integrated urban development and effective biodiversity management, the ICLEI Cities Biodiversity Center (ICLEI CBC) was created in 2009. The ICLEI CBC is located in Cape Town, South Africa, embedded in the Africa Regional Office of ICLEI. We offer cities a broad portfolio of supportive services through our dedicated team of passionate, skilled and dynamic biodiversity and urban development experts.



ICLEI CITIES BIODIVERSITY CENTER

LOCAL ACTION FOR BIODIVERSITY PROGRAMME

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The ICLEI Cities Biodiversity Center aims to create BiodiverCities, which promote urban biodiversity for the many benefits they offer, including human well-being, poverty alleviation, habitat conservation, air and water quality, climate change adaptation and mitigation, food provision, fortified infrastructure resilience, and happiness of citizens.

BiodiverCities are aware that ecosystem services contribute towards many essential municipal services, as well as towards the local economy, sustainability and social well-being of their cities. Biodiversity in cities provides a critical contribution towards achieving the global biodiversity targets. It

buffers further biodiversity loss, improves the urban standard of living, and provides local opportunities for global education and awareness.

ICLEI's Local Action for Biodiversity (LAB) programme is a unique global biodiversity programme run by The ICLEI Cities Biodiversity Center. The LAB Program is aimed at improving and enhancing ecosystem management at the local level, and is recognized globally as the leading results-driven local government biodiversity initiative. Currently, LAB is working on wetland restoration in South Africa under the Local Action for Biodiversity: Wetlands South Africa (LAB Wetlands SA) project.



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LIST OF ACRONYMS AND ABBREVIATIONS

AS	Africa Secretariat	SANBI	South African National Biodiversity Institute
BGIS	Biodiversity Geographic Information System	SANRAL	South Africa National Roads Agency
CARA	Conservation Agricultural Resources Act	SANTAM	South African financial services company
CBA	Critical Biodiversity Area	SDF	Spatial Development Framework
CEPA	Communication, Education and Public Awareness	SPLUMA	Spatial Planning and Land Use Management Act
CIP	Climate Information Portal	SWSA	Strategic Water Source Area
CMA	Catchment Management Area	UCT	University of Cape Town
CSAG	Climate Systems Analysis Group	UNFCCC	United Nations Framework Convention on Climate Change
DEA	Department of Environmental Affairs	WFW	Working for Wetlands
DMF	Disaster Management Framework	WSA	Water Source Area
DMP	Disaster Management Plan		
DRA	Disaster Risk Assessment		
EhDM	Ehlanzeni District Municipality		
EIA	Environmental Impact Assessment		
EMF	Environmental Management Framework		
ESA	Ecological Support Area		
GIS	Geographic Information System		
GEF	Global Environment Facility		
IAP	Invasive Alien Plant		
IBA	Important Bird Area		
ICLEI	ICLEI - Local Governments for Sustainability		
IDP	Integrated Development Plan		
LAB	Local Action for Biodiversity		
LM	Local Municipality		
NDP	National Development Plan		
NEMA	National Environmental Management Act		
NEMBA	National Environmental Management: Biodiversity Act		
NEMWA	National Environmental Management: Water Act		
NFEPA	National Freshwater Ecosystem Priority Areas		
NGO	Non-Governmental Organisation		
NWA	National Water Act		
MTSF	Medium Term Strategic Framework		
SA	South Africa		

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EXECUTIVE SUMMARY

Ehlanzeni District Municipality is located within the Mpumalanga Province of South Africa and covers an area of 27 896 km². Of the nine vegetation biomes found in South Africa, three of these biomes occur within the Ehlanzeni District Municipality (Grasslands, Forests, and Savannah). Numerous wetlands can be found throughout the municipality as a result, including one RAMSAR site of international importance which provides crucial habitat for the unique flora in the region as well as for a variety of critically endangered flora and fauna species and Red Listed Species.

The wetlands throughout Ehlanzeni District Municipality are considered to be high-value 'ecological infrastructure' as they not only provide habitat for flora and fauna, but also provide critical ecosystem services to the municipality. These include flood attenuation, water filtration, erosion control and water storage (regulatory services) as well as food provision, supply of raw materials and clean drinking water (provisioning services). The wetlands within the municipality also play a pivotal role in disaster risk management as well as reducing the impacts of climate change within the district.

Despite the wetlands within Ehlanzeni District Municipality being of high value to the municipality in terms of ecosystem service provision, a large number of the wetlands in the region are under threat or have already been lost. This is largely due to mining, afforestation, historical degradation, deliberate draining of wetlands to make way for development, inappropriate development within the close proximity to the wetlands, contamination through sewage, effluent and stormwater seeps, and the spread of invasive alien plants (IAPs). Degraded wetlands are unable to function to the same degree as healthy wetlands and as such ecosystem service provision is severely hindered or even lost altogether. As such, careful management as well as the investment in the maintenance of healthy wetlands and the rehabilitation and restoration of damaged or degraded wetlands is required. This will ensure the continued provision of these vital ecosystem services to the municipality.

Currently there is no specific designated wetland management authority within Ehlanzeni District Municipality; nor is there any specific policy in place which guides the management of wetland areas within the district. Instead, the management of wetlands is a collective but disconnected effort between Ehlanzeni District Municipality, the five local municipalities within Ehlanzeni District Municipality and entities such as the Mpumalanga Parks Board and Working for Wetlands, each of which have their own key objectives and management requirements. Various forums also inform wetland management. These include the Environmental Management Forum, which is utilised specifically to address environmental related issues and challenges within the district municipality, as well as the Disaster Management Forum and the Waste Forum. The Mpumalanga Wetlands Forum addresses wetlands challenges at a provincial level.

In order to streamline and improve the management of wetlands, Ehlanzeni District Municipality is implementing the Local Action for Biodiversity: Wetlands South Africa (LAB: Wetlands SA) programme with support from ICLEI Africa Secretariat (ICLEI AS). The LAB: Wetlands SA project aims to ensure the protection of priority natural wetland resources, thus enabling the continued supply of ecosystem services, and promoting resilient communities and sustainable local economies under a changing climate within the South African local government context. Through the development of this Wetland Report, ICLEI AS will assist Ehlanzeni District Municipality in identifying the gaps in management and assist with devising new and better wetlands management strategies going forward.

INTRODUCTION

South Africa is endowed with a rich wealth of biodiversity, which offers an immense opportunity to support the country's development path by providing many goods and services which contribute to municipal service delivery, water and food security and quality of life, especially under a changing climate. Wetlands in particular, are high-value 'ecological infrastructure', providing critical ecosystem services such as clean water, clean air, food, medicines, water storage and habitat for biodiversity. Wetlands also play a role in disaster management, and could lessen the negative effects of climate change thorough flood attenuation, temperature regulation and water and food security.

Wetlands are South Africa's most threatened ecosystems, with 48% of wetland ecosystems listed as critically endangered¹, resulting in an urgent need to increase awareness of wetland importance to incorporate natural wetland resource considerations into municipal governance mechanisms and planning.

Ehlanzeni District Municipality (EhDM) is located in the Mpumalanga Province of South Africa (refer to Figure 1). Numerous wetlands, including one RAMSAR site of high ecological value and exceptional beauty, occur within the region and provide crucial habitat for a variety of critically endangered flora and fauna species as well as provide key ecosystem services for local communities living in the area. A large number of the wetlands in the region however are under threat due to mining, afforestation, historical unsustainable development as well as encroachment of invasive alien plants (IAPs).

This report draws together the range of knowledge about wetlands within Ehlanzeni District Municipality, and provides a detailed overview of the stakeholders and programmes working towards improved wetland management in this region.

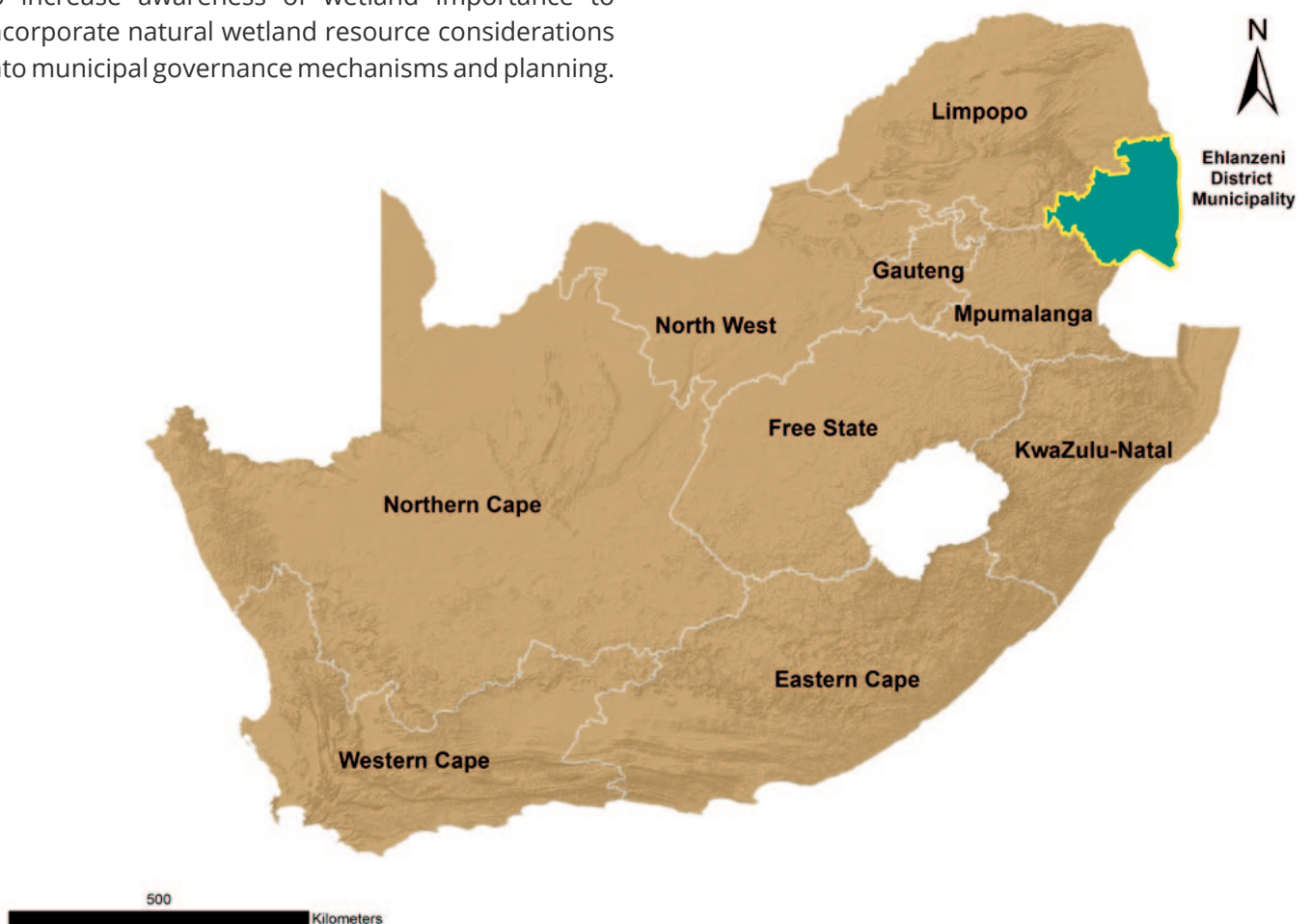


FIGURE 1: Ehlanzeni District Municipality in relation to the rest of South Africa.

1 | WHAT IS A WETLAND?

“Wetlands are land which is transitional between terrestrial and aquatic systems, where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.”

National Water Act No. 36 of 1998

In simpler terms, a wetland is a feature in the landscape which is saturated with water for a long enough period that the soil conditions change (mottling as a result of the anaerobic conditions) and the vegetation shifts to respond to these changes.²

Six different types of wetlands occur across the country. These vary based on the underlying geology and include seeps, depressions, wetland flats, floodplain wetlands, channelled valley-bottom wetlands and unchannelled valley bottom wetlands.⁴ SANBI has compiled a detailed hydro-geomorphic classification system to assist with wetland identification. An illustrative overview from this guide on the different types of wetlands is included in **Figure 4**.

Wetlands also vary on a temporal scale based on the climate and season. As such, once a wetland type has been established, it can then be categorised into either a temporary, seasonal or permanent wetland. A temporary wetland is saturated for a very short period (approximately one month) during the rainy season only. Vegetation types associated with this type of wetland are predominantly grass species, as well as a mixture of species that occur in non-wetland areas and hydrophytic plants that are largely restricted to wetland areas. A seasonal wetland is saturated for most of the growing season. Vegetation types associated with this type of wetland are predominantly sedges and grasses that are restricted to wetland areas, usually < 1m tall. Lastly, a permanent wetland is saturated all year round. This type of wetland is dominated by highly specialised aquatic plants adapted to permanently wet conditions.² For further detail regarding specific wetlands located within Ehlanzeni District Municipality, please refer to **Section 3.2** of this report.



FIGURE 2 & 3: Mottled soils indicative of a wetland (top) and specially adapted wetland vegetation (bottom).³

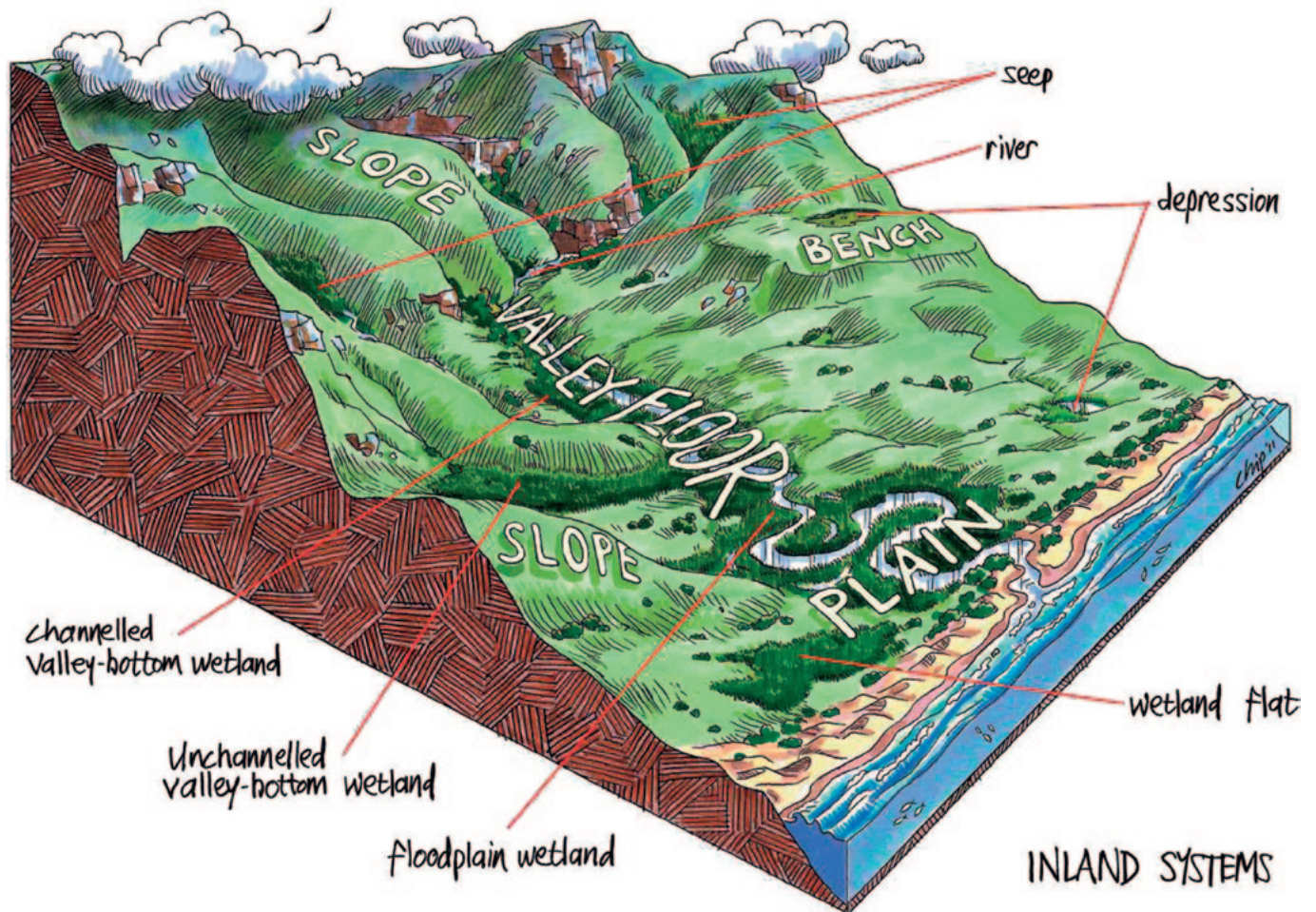


FIGURE 4: Wetland systems within South Africa.⁴

All wetland types can be classified as high value 'ecological infrastructure' due to the large number of ecosystem services that they provide. Wetland ecosystem services can be classified into four separate categories namely 'provisioning services', 'regulating services', 'cultural services' and 'supporting services'.⁵ Provisioning services can be described as the products one can physically obtain from wetlands such as fresh water, food and natural medicines. Regulatory services can be described as the benefits one receives from the wetland such as stream flow regulation, erosion control, water filtration and flood attenuation.⁵ Cultural services are the nonmaterial benefits that one can obtain from wetlands such as spiritual enrichment, sense of place and aesthetic experience.⁵ Lastly, supporting services are the services provided that are necessary for the

production of all other ecosystem services namely, nutrient cycling and water cycling.⁵ Please refer to **Section 3.4** of this report for a detailed description of the identified ecosystem services that wetlands within Ehlanzeni District Municipality provide.

It should be noted that ecosystem services provided by wetlands come at no cost to local authorities and as such, all that needs to be done to ensure continued provision of these services is to protect and maintain local wetlands. However, the inappropriate management of wetlands, can cause a loss of wetland area and subsequent loss of ecosystem services. This results in municipalities having to invest in expensive infrastructure (e.g. water filtration plants or flood barriers) to ensure the same level of service delivery.

2 | WHAT IS BIODIVERSITY?

‘The variability among living organisms from all sources, including, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part and also includes diversity within species, between species, and of ecosystems.’

National Environmental Management: Biodiversity Act No. 10 of 2004

To expand on this, biological diversity or the shorter more commonly used term ‘biodiversity’, is the variety of genes, species and ecosystems on Earth, and the processes that maintain this diversity. It is the living species and natural processes that constitute nature. Rather than simply considering plant and animal populations (i.e. total numbers), biodiversity reflects the variability of plants and animals and crucially, the processes by which they are supported, and the functions that they deliver.

Essentially, as biodiversity includes natural processes, it describes the health and functioning of a given

area. For example, if a wetland becomes polluted and its ecological condition deteriorates, it is no longer able to function correctly and natural processes such as providing food (e.g. fish), materials (e.g. reeds) and water purification no longer take place. The real value in the term biodiversity is that by describing the variety of life forms rather than total numbers, biodiversity can be used at any scale (e.g. for landscapes such as grasslands or a habitat such as a woodland or koppie) to reflect the health of any area – not just wild landscapes, but pockets of biodiversity such as wetlands, too.



FIGURE 5, 6 AND 7: Pyramidal orchid (*Disperis wealii*) (left), Giant Nerine (*Nerine augustifolia*) (middle) and Butterfly Gladiolus (*Gladiolus papilio*) (right), three wetland- dependent species endemic to the Mpumulanga area.⁶

3 | WETLANDS AND BIODIVERSITY IN EHLANZENI DISTRICT MUNICIPALITY

Ehlanzeni District Municipality is located in the Mpumalanga Province of South Africa. It covers an area of 27 896 km² and is bordered by Mozambique to the east, Swaziland to the south-east, Gert Sibande District Municipality in the south-west, Mopani and Sekhukhune District Municipalities to the north and Nkangala District Municipality in the north-west.⁷ Within Ehlanzeni District Municipality are five local municipalities namely Bushbuckridge Local Municipality, Thaba Chweu Local Municipality, Mbombela Local Municipality, Nkomazi Local Municipality and Umjindi Local Municipality (refer to Figure 8).

Of the nine vegetation biomes found in South Africa, three of these biomes occur within the

Ehlanzeni District Municipality (Grasslands, Forests, and Savannah). Numerous wetlands can be found throughout the municipality as a result, including one RAMSAR site of international importance which provides crucial habitat for the unique flora in the region as well as for a variety of critically endangered flora and fauna species and Red Listed Species.

This section will provide existing maps and information on the known key wetlands in the district. It will provide detail on the value of wetlands to the district and highlight the key threats to wetlands. Also included is information the role of Ehlanzeni District Municipality as a Strategic Water Source Area (SWSA).

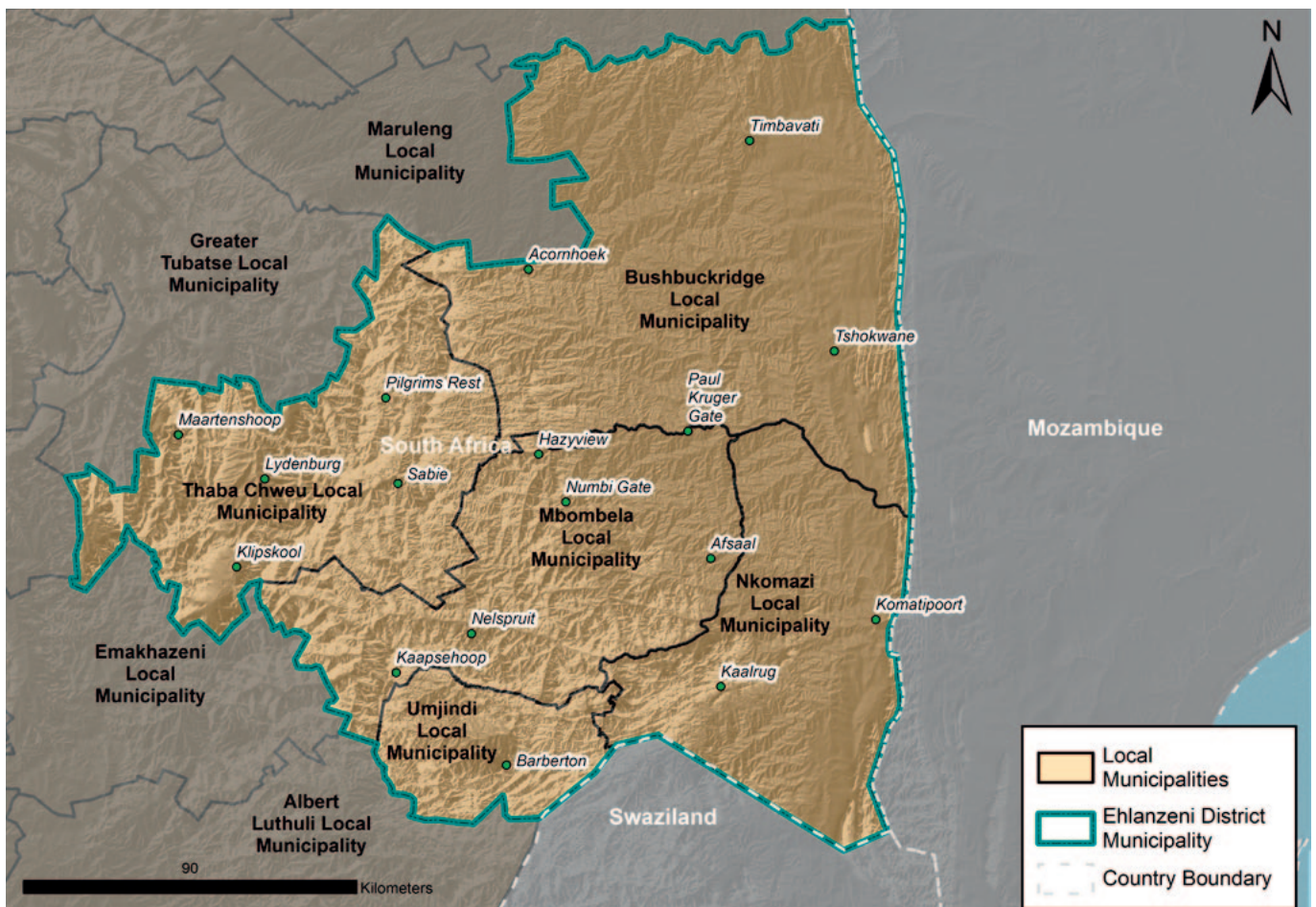


FIGURE 8: Local Municipalities located within Ehlanzeni District Municipality.

3.1 MAPPING WETLANDS IN EHLANZENI DISTRICT MUNICIPALITY

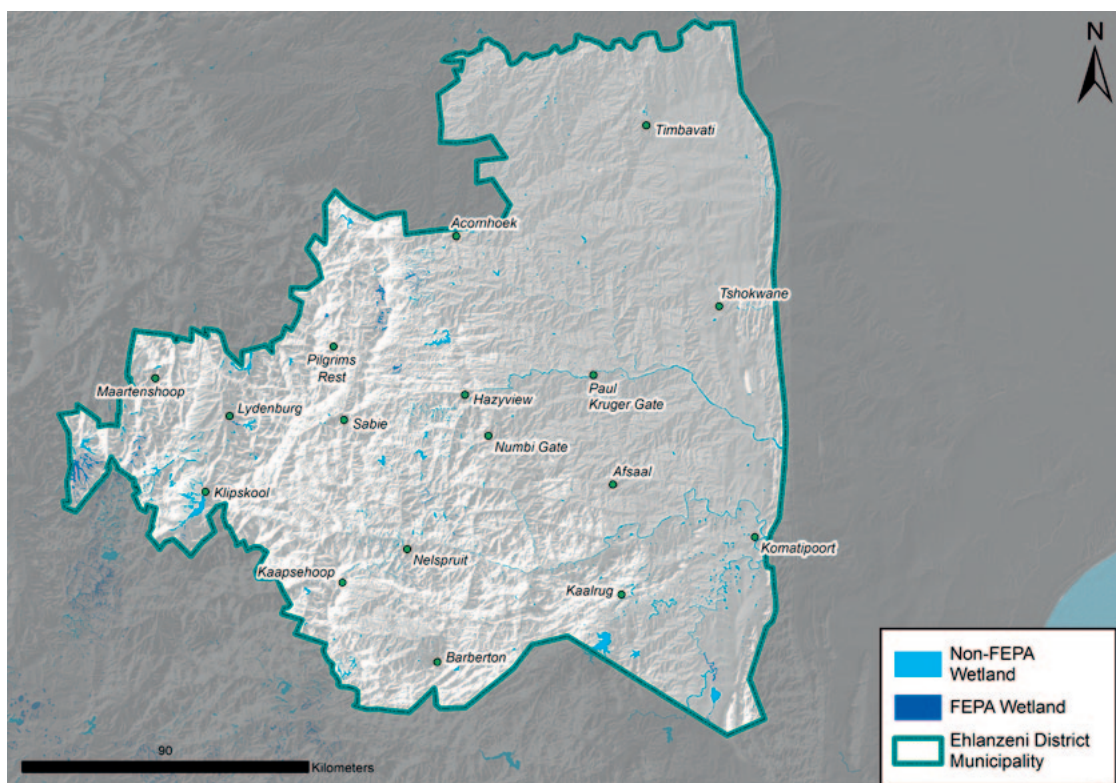


FIGURE 9: Map indicating the spatial distribution of the NFEPA wetlands within Ehlazeni District Municipality.

Currently there is no specific ground-truthed wetland map available which covers the Ehlazeni District Municipality in its entirety. SANBI’s National Freshwater Ecosystem Priority Area (NFEPA) data however provides a broad national-level overview of where wetlands are located within the landscape including individual wetlands and clusters of wetlands which are considered to be of regional or national importance. As such, the SANBI NFEPA data can be used as a first-level or preliminary assessment of wetland occurrence within the municipality (refer to **Figure 9** for Ehlazeni District Municipality, and **Annexure 1** for the local municipalities within Ehlazeni District Municipality).

It should be noted however, that the NFEPA wetland map is based predominantly on remote-sensing imagery (which does not always detect features on the ground) and at this stage is largely not ground-truthed. As such the data should be treated with caution and for initial planning only as some wetlands may not be reflected (e.g. a number of known seeps occurring within the municipality are not reflected

in the NFEPA wetland map whilst a number of farm dams are). Despite these limitations, the NFEPA wetland map is thought to provide the best available indication of true wetland distribution data across the country and although the spatial representation of wetlands cannot be considered as definitive, it does provide an indication of relative wetland occurrence, size and density across the municipality.

Based on the information available at the time of writing this report, it is clear that there are significant gaps in wetland mapping across the district and that there is a real need for comprehensive ground-truthed mapping to be undertaken within the municipality to assist with accurate and holistic planning going forward, both at a local level as well as at a district level. This could be achieved by incorporating a GIS specialist into the existing municipal structure to undertake the required mapping or by employing a wetland specialist to ground-truth wetlands within Ehlazeni District Municipality and developing a wetland map accordingly.

3.2 KEY WETLANDS IN THE EHLANZENI DISTRICT MUNICIPALITY

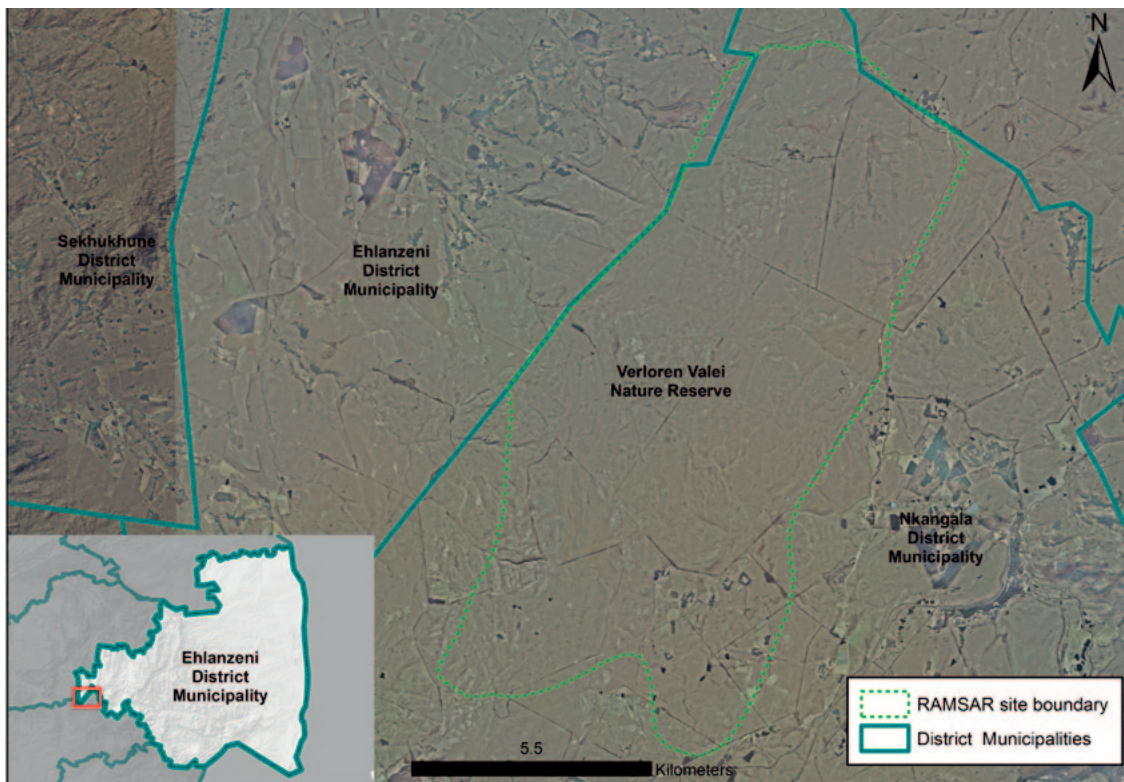


FIGURE 10: Map of the Verloren Valei Wetland located within Ehlanzeni District Municipality.

Numerous wetlands considered to be high-value 'ecological infrastructure' can be found throughout Ehlanzeni District Municipality. These include one RAMSAR site of international importance which provides crucial habitat for the unique flora in the region as well as for a variety of critically endangered flora and fauna species. These wetlands also provide essential ecosystem services to the municipality.

This section, will go into detail on some of the identified key wetlands within the district. The case studies outlined below are not exhaustive, as a significant number of other wetlands of high ecological value occur throughout the district.

3.2.1 Verloren Valei Wetland System (RAMSAR site)

The Verloren Valei Wetland System is a Protected Area comprising of more than 30 individual wetlands ranging between 2 and 250 ha in size.⁸ The area is exceptionally beautiful and was awarded RAMSAR status in 2001. The full Verloren Valei Wetland System is approximately 5 891 ha in size. The majority of the

system is located within the Verloren Valei Nature Reserve which is just outside the west border of Ehlanzeni District Municipality within Nkangala District Municipality. Several significant wetlands forming a part of the larger system however fall within the north- west boundary of Ehlanzeni District Municipality. The town of Lydenberg is located 55 km to the north- east and the town of Dullstroom is 17 km to the south.

The Verloren Valei wetland system lies at the upper catchment of the Crocodile and Olifants Rivers, which are key water sources for both South Africa and Mozambique. The wetland system is considered to be of international importance from a hydrological perspective as it acts as a sponge absorbing heavy rains during the rainy summer season (thereby limiting the impacts of flooding downstream) and ensuring the gradual and continual release of water downstream during the hot and dry winter season (thereby ensuring consistent stream flow downstream).⁸

3.2 KEY WETLANDS IN THE EHLANZENI DISTRICT MUNICIPALITY *(continued)*



FIGURE 11: Verloren Valei Wetland System⁹

Due to its geographic location and unique vegetation composition, the Verloren Valei Protected Area also provides ideal habitat for a significant number of rare, vulnerable or endangered species. 50 species of butterfly are known to occur in the area. These include the rare Swanepoel's Widow (*Dira swanepeoli*

swanepeoli), which is endemic to South Africa, and the Warren's Blue Butterfly (*Orachrysops warreni*) which is extremely rare and presently is only found within the Verloren Valei Nature Reserve.⁸



FIGURE 12 & 13: Swanepoel's Widow Butterfly (left)¹⁰ and Warren's Blue Butterfly (right).¹¹

3.2 KEY WETLANDS IN THE EHLANZENI DISTRICT MUNICIPALITY *(continued)*

Over 160 bird species have been recorded at the Verloren Valei Wetland site. Of these, the most significant is the Wattled Crane (*Bugeranus carunculata*) which is classified as Vulnerable. Current records indicate that South Africa supports a population of just 250 individuals, including 80 active breeding pairs. Verloren Valei currently supports 6 known breeding pairs, the largest grouping of these birds in any one area in the whole country. Verloren Valei also provides critical habitat for the Endangered Blue Crane (*Anthropoides paradiseus*), the Grey Crowned Crane (*Balearica regulorum*) as well as the Rare Rudd's Lark (*Heteromirafra ruddi*).⁸



FIGURE 14 & 15: Wattled Crane (top)¹² and the Blue Crane (bottom).¹³

In addition to providing crucial habitat and breeding ground for numerous butterfly and bird species, Verloren Valei also provides vital habitat for 379 plant different species as well as foraging and breeding grounds for 36 species of reptiles, 9 species of amphibians, 5 species of fish and 10 mammal species (of which seven are Red Data species and three are endemic species).⁸

3.2.2 Chrissiesmeer Pans

The Chrissiesmeer Pan System is a Protected Area consisting of more than 320 individual pans and wetlands as well as Lake Chrissie, the largest natural inland freshwater lake in South Africa (1 150 ha when full).¹⁴ The Chrissiesmeer Pans surround the village of Chrissiesmeer which is located within Mpumalanga Province just outside the southern border of Ehlanzeni District Municipality.

Whilst the Chrissiesmeer Pans are not located specifically within Ehlanzeni District Municipality, they are included within this report as this wetland system is considered to be of both regional and national importance from a hydrological perspective. The head waters of several major rivers are located at the Pans, namely the Vaal, Komati, Olifants, uMpuuzi and Usutu Rivers and thus the Chrissiesmeer Pan system ensures consistent water supply to the majority of Ehlanzeni District Municipality as well as significant portions of Gauteng and Swaziland.¹⁴

In addition to being important from a hydrological perspective, Chrissiesmeer Pans have also been identified as one of the South Africa's 122 Important Birding Areas (IBAs) as they provide critical breeding, foraging and nesting habitat for a significant number of bird species.¹⁵ Over 220 bird species have been recorded at the site, including 83 water bird species, 17 endemic species and 16 globally and regionally threatened species.¹⁵

3.2 KEY WETLANDS IN THE EHLANZENI DISTRICT MUNICIPALITY *(continued)*

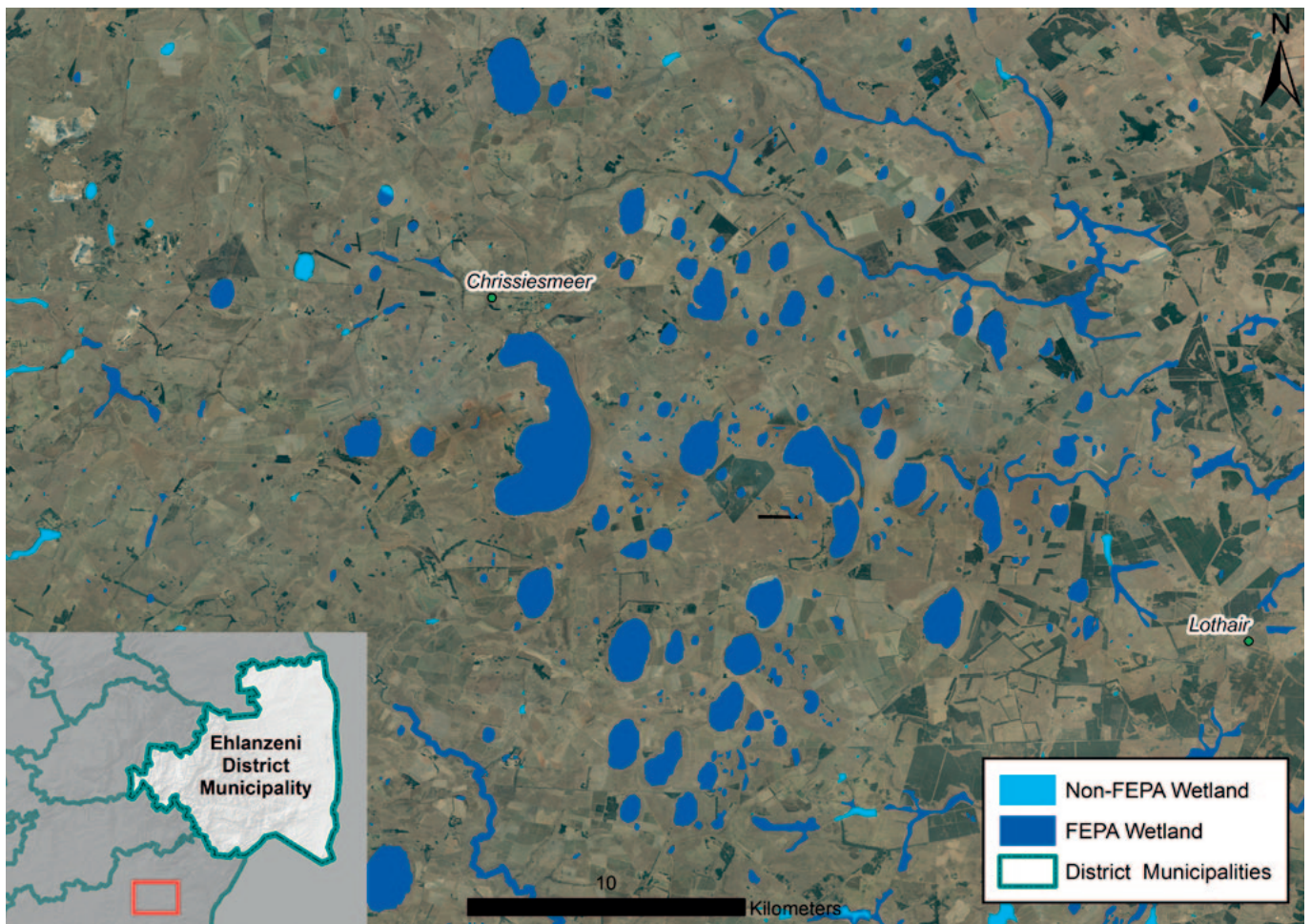


FIGURE 16: Map of the Chrissiesmeer Pans located just outside Ehlanzeni District Municipality.



FIGURE 17: Image depicting a portion of the Chrissiesmeer Pans¹⁴

3.2 KEY WETLANDS IN THE EHLANZENI DISTRICT MUNICIPALITY *(continued)*

Significant globally threatened, wetland dependent bird species that can be found at the Chrissiesmeer Pans include the Grey Crowned Crane (*Balearica regulorum*), the Wattled Crane (*Bugeranus carunculatus*) and the Lesser Flamingo (*Phoeniconaias minor*).¹⁴ Significant regionally threatened, wetland dependent bird species found at the Chrissiesmeer Pans include the African Marsh-Harrier (*Circus ranivorus*), African Grass Owl (*Tyto capensis*) and the Greater Flamingo (*Phoenicopterus roseus*).¹⁴ Other key IBA trigger species dependent on the Chrissiesmeer Pans include the Maccoa Duck (*Oxyura maccoa*), Chestnut-banded Plover (*Charadrius pallidus*), and the Secretary Bird (*Sagittarius serpentarius*) to name a few.¹⁵

Despite the critical importance of Chrissiesmeer Pans from both a hydrological and birding perspective, Chrissiesmeer is highly threatened by human activities, most notably farming and mining.¹⁸ Signs of overutilization of the veld for grazing by livestock are evident on many of the surrounding farms and many pans are subsequently subjected to contamination as well as eutrophication from pesticide and fertiliser use.¹⁴

In addition, established coal mines and associated power stations in close proximity to Chrissiesmeer produce acid rain which alters the pH of the water, interfering with the functioning of the system and negatively impacting the flora and fauna dependent on the system. Further, an increasing number of smaller operations are applying for mining rights to establish open cast mine within Chrissiesmeer which, if granted, would irreversibly destroy the system.¹⁸

3.2.3 White River Wetland

The White River Wetland is located just outside of the town of White River (approximately 20 km north of Nelspruit). Although small, this wetland is considered to be of significance from a botanical perspective as it provides vital habitat to the endemic and critically endangered *Aloe simii* plant (no common name). The plant is a key ecological species and is endemic to the temporary zone (fringes) of the wetland area.¹⁹ According to the Mpumalanga Parks Board there are currently only between 500 and 550 of these plants left making this wetland of critical conservation importance.²⁰



FIGURE 18, 19, 20 & 21: From top to bottom – Grey Crowned Crane¹⁶, the Greater Flamingo¹⁷, the White River Wetland and the critically endangered *Aloe simii* plant.²¹

3.2 KEY WETLANDS IN THE EHLANZENI DISTRICT MUNICIPALITY *(continued)*

The White River Wetland however is threatened by development. The South African National Roads Agency (SANRAL) are proposing to build a new road which, if authorised, will run directly through the wetland and severely compromise the functioning of the wetland and significantly reduce the habitat range of the *Aloe simii* plant.²⁰

3.2.4 Craigieburn Wetland System

Craigie Burn Wetland is located just outside of the rural village of Craigieburn within Ehlanzeni District Municipality. The wetland, although small, is considered important from a hydrological perspective as it feeds clean water into the Sand River which is a critical tributary for the Sabie River, one of the last remaining rivers that runs throughout the year within the Kruger National Park. Historically the wetland system has been subject to extensive erosion both from natural geomorphological process as well as, in more recent times, human activities including subsistence agriculture and informal housing development upstream.

The wetland system has recently been rehabilitated by Working for Wetlands and a groin has been constructed into the portion of the wetland system. This has not only resulted in a halting of the erosion occurring so extensively in the area but also in the holding back of water in the close vicinity of the Craigieburn village. This has allowed the local community to benefit from the important ecosystem services that the wetland system provides, namely provision of clean water for drinking, bathing and household chores and flood attenuation. The rehabilitated wetland also provides an increase in the area of saturated land around the system which can be utilised for subsistence agriculture (particularly the planting of the local Madumbi plant) thereby directly supporting local livelihoods.



FIGURE 22: Local resident of Craigieburn village utilising the fringes of the rehabilitated Craigieburn Wetland for subsistence agriculture (in this case growing Madumbi).

3.3 STRATEGIC WATER SOURCE AREAS AND CATCHMENT MANAGEMENT WITHIN EHLANZENI DISTRICT MUNICIPALITY

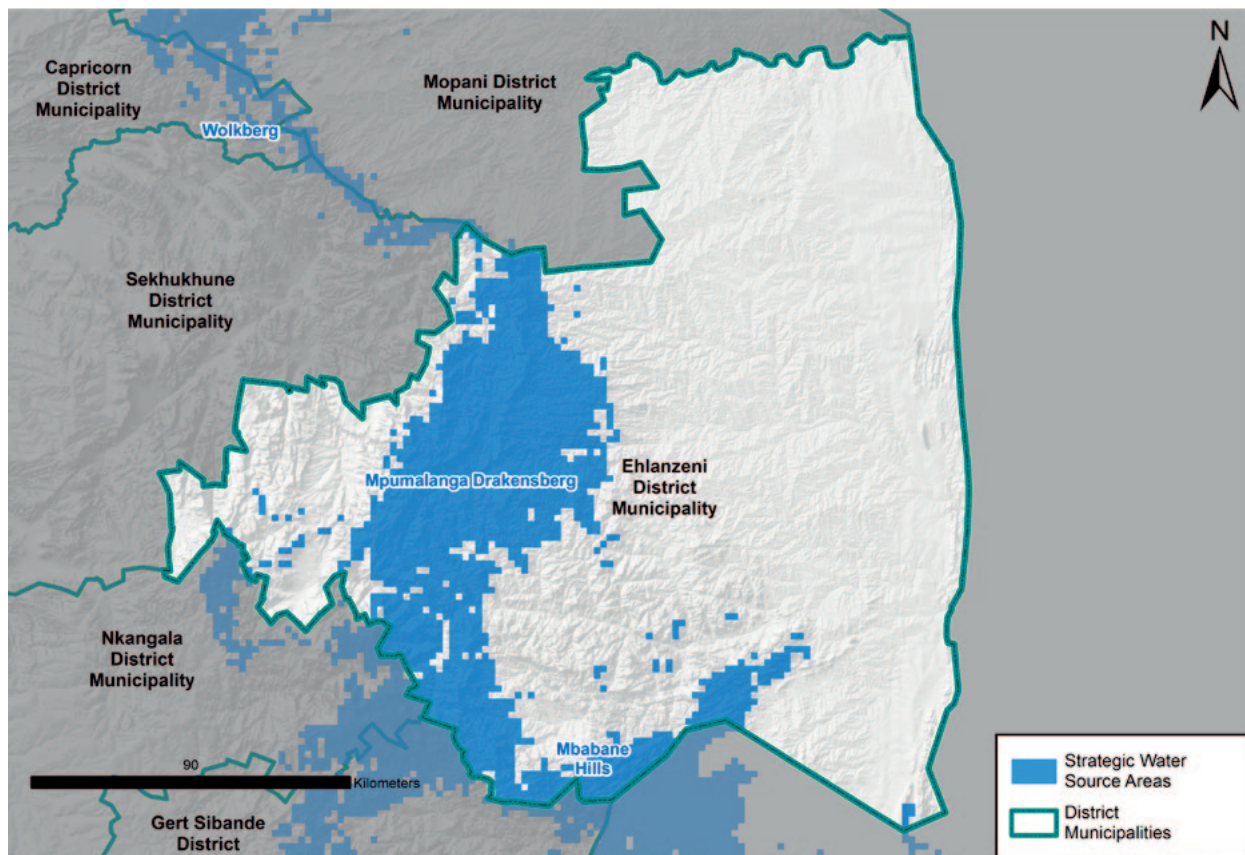


FIGURE 23: SWSAs within the Mpumalanga Province including those which lie within Ehlanzeni District Municipality.

Water Source Areas (WSAs) are sections of the landscape that provide a disproportionate amount of run-off compared to the rest of a given catchment area. South Africa’s WSAs are largely spread across the country, however they are generally found in the highest parts of the landscape, receiving high amounts of rainfall. Downstream users and ecosystems are highly dependent on the healthy functioning of WSAs in order to sustain good quality water supplies for human consumption as well as for agriculture and industry. Disrupting the water supply from the WSAs therefore has the potential to have a hugely negative impact on national water and food security.²²

Twenty one separate WSAs have been identified in South Africa and can be divided into those of local importance (5) and those of strategic national importance (Strategic Water Source Areas or SWSA), (16). Two SWSAs, namely the Mpumalanga Drakensberg and Mbabane Hills are located within

Ehlanzeni District Municipality. These are illustrated in **Figure 23**.²⁹

The Mpumalanga Drakensberg SWSA includes the Eland, Sabie, Crocodile and Olifants Rivers and is the main water source area for certain the parts of Mpumalanga (Nelspruit, eMalahleni and Middleburg), as well as Phalaborwa in Limpopo. Verloren Valei Wetland (RAMSAR site) is also included in part of this system.²² The Mbabane Hills SWSA includes the Usutu, Lusushwana, Inkomati, Pongola and Mpuluzi Rivers and is the main water source for certain parts of Mpumalanga (Nelspruit, Standerton, Emerlo) as well as large portions of Swaziland and Mozambique.

The main threats to the two SWSAs within Ehlanzeni District Municipality include large scale plantations and land degradation. The Mbabane Hills SWSA is also particularly threatened by coal mining.²²

3.4 THE VALUE OF WETLANDS IN EHLANZENI DISTRICT MUNICIPALITY

As outlined in Section 1: “What is a Wetland”, wetlands provide innumerable goods and services to local communities and municipalities in the form of provisioning, regulatory, cultural and supporting services. Following verbal communications with active stakeholders working in Ehlanzeni District Municipality, the following ecosystem services have been identified and are summarised in Table 1 below.



FIGURE 24: The River Pumpkin (*Gunnera perpensa*).

TABLE 1 ECOSYSTEM SERVICES IDENTIFIED IN EHLANZENI DISTRICT MUNICIPALITY

ECOSYSTEM SERVICE TYPE	ECOSYSTEM SERVICE	DESCRIPTION/ CASE STUDY
Provisioning	Food	Local communities living within Ehlanzeni District Municipality harvest local plants and fish to support their diets. Local communities also use the wetland fringe zones for informal cultivation/ small scale farming and plant and harvest various crops such as maize and sugarcane as well as the local Madumbi.
	Clean drinking water	Local communities living within Ehlanzeni District Municipality, particularly those located in the more rural areas, use clean water supplied by the wetlands for drinking purposes. ²³
	Medicinal plants	Many of the plants growing within and around wetlands have natural medicinal properties. Local communities living within Ehlanzeni District Municipality harvest these plants to maintain/ improve their personal health. The River Pumpkin (<i>Gunnera perpensa</i>) is one such plant and is highly valued and extensively used by traditional healers to relieve the symptoms of colds and flu, heal psoriasis and for various traditional gynaecological practices. ²⁴
	Raw materials	Wetlands provide a significant number of raw materials which directly contribute to local livelihoods and income. Local communities living within Ehlanzeni District Municipality harvest reeds from the wetlands to make baskets and furniture and grasses for thatching. ²³
	Grazing Land	Local communities, living particularly in the more rural areas, use the wetlands as pasture for their livestock (goats and cows mainly). ²³
Regulatory	Water storage and stream flow regulation	The local wetlands within Ehlanzeni District Municipality store stormwater runoff and slowly release the water as the water table drops. This contributes to sustained streamflow throughout the year. ²⁵

continued

3.4 THE VALUE OF WETLANDS IN EHLANZENI DISTRICT MUNICIPALITY *(continued)*

TABLE 1 ECOSYSTEM SERVICES IDENTIFIED IN EHLANZENI DISTRICT MUNICIPALITY

ECOSYSTEM SERVICE TYPE	ECOSYSTEM SERVICE	DESCRIPTION/ CASE STUDY
Regulatory	Flood attenuation and control	Wetlands and the associated plants play a crucial role in flood attenuation as they have the ability to absorb flood water and reduce the velocity of the water moving through the system. This contributes to the protection of agricultural land as well as infrastructure downstream. ²⁵
	Erosion control	Wetland plants, strengthen the banks of wetlands and thereby contribute to sediment stabilisation and soil retention within the catchment. ²⁵
	Water filtration and purification	Wetlands and wetland plants contribute substantially to improving water quality by filtering and purifying water as it moves through the system. Wetlands have the ability to modify or trap a wide range of substances commonly considered to be pollutants including suspended sediment, excess nutrients, phosphorus, nitrogen, pesticide residue, industrial effluent, pathogenic bacteria and viruses. ²⁶ As such, high concentrations of the above are prevented from reaching groundwater supplies or surface water downstream thus contributing to clean drinkable water. ²⁶
	Buffer the impacts of climate change	Wetlands have the ability to protect both coastal and inland areas against the effects of climatic change Please refer to Section 4.2 for more detail in this regard.
Cultural	Tourism	Due to their natural beauty and diversity of plant and animal life, the wetlands, particularly Verloren Valei Wetland and Chrissiesmeer Pans, within Ehlanzeni District Municipality are popular tourist destinations.
	Recreation	The wetlands within Ehlanzeni District Municipality are used extensively for recreation purposes. Activities undertaken within these wetlands include, birding, frogging, canoeing, bike riding, hiking, picnicking along the banks of the wetland systems and fishing. ²⁷
Supporting	Nutrient recycling	Wetlands naturally slow down the flow of water, thereby promoting the deposition and retention of nutrients. These are then utilised by the microbial species living in the wetland habitat which are in turn eaten by larger species such as prawns and blood worms. ²⁶
	Supporting habitat	A large variety of bird, fish and invertebrate species are dependent on the wetlands within Ehlanzeni District Municipality for at least part of their lifecycle. Wetlands provide vital breeding and foraging ground for a variety of bird species as well as breeding, courtship and foraging ground for a variety of frog species. ²⁶

3.5 THREATS TO WETLANDS

Despite the huge benefits that wetlands provide in terms of ecosystem services, 50% of wetlands in South Africa have already been lost and 48% of the remaining wetlands are critically endangered and/or degraded.²⁸ This loss is a direct result of historical degradation, pollution and deliberate draining of wetlands to make way for development and expansion (both urban and agricultural). Damage to wetlands results in increasingly limited functionality and subsequently a decrease in the ability to provide valuable ecosystem services.

Following verbal communications with active stakeholders working within Ehlanzeni District Municipality, it has become clear that wetlands face a significant number of threats within the municipality, all of which have the ability to severely compromise function and provision of ecosystem services or destroy the wetland entirely. The key threats to the wetlands located within Ehlanzeni District Municipality have been identified as follows:

3.5.1 Historical Degradation

Historically, due to limited knowledge on the value of wetlands and their ecosystem services, wetland areas were seen as waste lands. As such, wetlands throughout Ehlanzeni District Municipality were deliberately drained and infilled in order to 'reclaim the land' for commercial, agricultural and even urban uses.

3.5.2 Mining

Mining poses the biggest threat to wetlands within Ehlanzeni District Municipality.²⁹ The Mpumalanga Province is well known for its rich deposits of diamonds, coal, and to a lesser extent gold. As such, a number of mines have been firmly established throughout the Province, including within areas of Ehlanzeni District Municipality. The activities associated with mining, particularly excavation and stockpiling of discarded soil, have irreversibly destroyed the wetland areas within close proximity of these mines.

This threat to wetlands is increasing however as a rising number of open cast mining applications are being submitted, particularly for areas near

the Chrissiesmeer Pans and Verloren Valei. If these applications are granted and the mining activities are not properly regulated, it will result in further irreversible wetland loss within Ehlanzeni District Municipality.

3.5.3 Afforestation and Water Abstraction

Another major threat to wetlands is the extensive afforestation that occurs throughout the district.³⁰ Extensive plantations of pine trees stretch across the majority of both Bushbuckridge and Thaba Chweu Local Municipalities within Ehlanzeni District Municipality. Converting the land for such large scale forestry not only results in the degradation or even complete removal of the wetland systems within these areas but also results in the continuous abstraction of significantly more water than the original indigenous vegetation would have done.³⁰ Subsequently, this means that there is significant stream-flow reduction as these man-made plantations and forests hold water that would otherwise have been available for downstream users.

3.5.4 Urban Development and Expansion

Wetlands throughout Ehlanzeni District Municipality are at risk from both formal and informal urban development and expansion. Due to increasing population, particularly in areas such as Nelspruit, development is being taken right up to, and sometimes beyond, the urban edge threatening wetlands near the vicinity of the urban edge. Additionally, due to limited knowledge of where wetlands are on the ground both within and outside of the urban edge, the development process often entails the accidental draining or infilling of wetlands to make room for these developments. One such example is the Mbombela Soccer Stadium which was inadvertently built upon a wetland in 2010.³¹

In addition to the expansion of formal, planned urban development, there is also an increase in informal developments expanding beyond the formally recognised urban edge as well as an expansion of established villages in the more rural areas. Due to

3.5 THREATS TO WETLANDS *(continued)*

lack of formal planning, these informal developments are more often than not located inappropriately in wetland areas due to the close proximity to water. This not only increases the risk and exposure of communities to environmental hazards such as flooding, but the development of informal settlements within wetland areas often brings with it waste disposal into and around the wetland area. Expansion of the village areas also additionally brings an increase in livestock grazing within the wetland areas as well as clearing of the indigenous plants to make way for subsistence farming. This land use change compromises the wetlands' ability to perform valuable ecosystem services such as water filtration resulting in poorer water quality moving downstream.

3.5.5 Pollution and Dumping in Wetlands

As noted above, mining and forestry are having a significant overall effect on wetlands within the municipality and their ability to provide ecosystem services. As a result of expanding urbanization in close vicinity to wetland areas, combined with ageing and failing waste water treatment infrastructure and poor stormwater runoff monitoring and management, the wetlands within Ehlanzeni District Municipality

are also at a very high risk from polluted stormwater runoff as well as from sewerage seeping into wetland areas. Dumping within wetland areas has also become increasingly prevalent in recent years. The effect of this includes increased nutrient loads as well as *E.coli* levels within in the wetland systems which negatively affects both the water quality of the water moving through the system as well as the delicate biodiversity depending on these systems for survival.

3.5.6 Encroachment of Invasive Alien Vegetation

Invasive plant and animal species, introduced by human actions either accidentally or intentionally, are proving a major threat to wetlands, as well as to the general biodiversity within Ehlanzeni District Municipality.²⁹ IAPs have the ability to push out the local indigenous vegetation, alter local water quality, displace indigenous plants (and subsequently the fauna that depends on that vegetation for survival) and ultimately alter the habitat and change ecosystem functioning to suit themselves.²⁹ IAPs are also 'thirsty' as they draw a far greater amount of water than the local indigenous vegetation resulting in a reduced amount of water moving through the system to downstream users.²⁹



FIGURE 25: Example of the water filtration capabilities of wetlands. The brown water flowing in the tributary on the left has moved through a wetland that has been compromised by land use change whilst the clear water flowing in the tributary on the right has moved through a pristine wetland that has not been impacted by human activities.³²

4 | DISASTER MANAGEMENT AND CLIMATE CHANGE

“Disaster means a progressive or sudden, widespread or localised, natural or human-caused occurrence which is a serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources.”

Disaster Management Act No. 57 of 2002

4.1 DISASTER RISK MANAGEMENT IN THE EHLANZENI DISTRICT MUNICIPALITY

The Disaster Management Act (Act No. 57 of 2002) stipulates that every Metropolitan and District Municipality within South Africa must establish and implement a framework for disaster management within the municipality. This is to ensure that each municipality takes responsibility for hazard monitoring and risk mapping (“disaster risk assessment”), takes the necessary remedial steps to prevent and/or mitigate the occurrence or re-occurrence of disasters in their area of jurisdiction and that there is an integrated and uniform approach to disaster management.

Watees Consulting compiled the initial Ehlanzeni Disaster Management Framework (DMF) on behalf of Ehlanzeni District Municipality. The main aim of the DMF was to develop a coherent, transparent and inclusive policy on disaster management for Ehlanzeni District Municipality. Contained within the DMF is a vision and mission for Ehlanzeni District Municipality as well as key performance areas that need to be addressed in order to develop a full Disaster Risk Assessment (DRA) and Disaster Management Plan (DMP) for the municipality. The DMF also provides detail on what is required to be included in a DMP for Ehlanzeni District Municipality in terms of internal institutional structuring, key performance areas, risk mapping and roles and responsibilities.

4.1.1 Risk identification and mapping

As noted above, a DMF has already been compiled for Ehlanzeni District Municipality. Developing a DRA and DMP is the next step for the municipality. The DRA will identify the major risks or threats to the municipality that need to be addressed whilst a DMP will outline the methodologies for reducing/ managing these risks.

A number of discussions were held with key stakeholders (members of the district and local municipalities as well as private NGOs and wetland specialists) working within Ehlanzeni District Municipality to gather information for this Wetland Report specifically. During these discussions, some of the key risks in terms of human livelihood and costs incurred to the municipality were highlighted. These include lightning, storms, heavy rainfall and associated heavy flooding and flash flooding (especially in the lower lying areas), drought and associated wild fires, shifts in the seasonal rainfall patterns and extreme weather events.³³

Whilst no formal mapping of the risks to the municipality has been undertaken as yet, SANTAM is working within Ehlanzeni District Municipality and intends to map flood risk and wetland areas as part of their project. Once this becomes available, this information will assist the municipality in identifying flood prone areas and adjusting development mandates accordingly to reduce flood risk.

4.1 DISASTER RISK MANAGEMENT IN THE EHLANZENI DISTRICT MUNICIPALITY *(continued)*

4.1.2 Role of Wetlands in Disaster Risk Mitigation

As noted in **Section 3.4** wetlands are considered to be high-value “ecological infrastructure” as they provide a substantial number of ecosystem services to the surrounding local area as well as downstream. Wetlands also have the natural ability to buffer and reduce the impacts of a substantial array of disasters including flooding, inconsistent water supply, drought, soil erosion, loss of biodiversity and groundwater pollution. Given that some of these have been identified as major risks to Ehlanzeni District Municipality, wetlands can play a key role in disaster risk mitigation within the district. This is summarised in **Table 2** below:



FIGURE 26: Colburn wetland, a rehabilitated wetland providing ecosystem services in the form of flood attenuation to the municipality.

TABLE 2 ROLE OF WETLANDS IN DISASTER RISK MITIGATION IN EHLANZENI DISTRICT MUNICIPALITY

DISASTER	ROLE OF WETLANDS IS DISASTER RISK MITIGATION ³⁴
Flooding	Wetlands have the ability to reduce the velocity of flowing water and absorb some of the water into the wetland system. As such, rather than the flood water moving through the system in one go, water is retained and released at a slower rate. This means that not only is the intensity of the flood reduced or prevented all together (thereby reducing the potential impact on infrastructure and housing downstream) but there is sustained water flow long after the rainfall event.
Inconsistent Water Flow & Drought	Wetlands have the ability to act like sponges in that throughout the rainy season they absorb water. During the dry season, and even in times of drought, this water is slowly released thereby ensuring that rivers and streams maintain sustainable flows and supply continuous water despite lack of rainfall.
Soil Erosion	Due to the fact that wetlands are covered by specially adapted vegetation, little to no erosion occurs in wetland areas as the wetland plants have the ability to stabilise and bind the soil, reducing the risk of top soil loss downstream.
Loss of Biodiversity	Wetlands can be considered as biodiversity hotspots in themselves as they provide key habitat to a number of plant and animal species. Often these species are considered to be unique and are completely dependent on the system. Maintaining healthy wetlands therefore can contribute to halting loss of biodiversity within the municipality.
Groundwater Pollution	Wetlands have the ability to purify water by trapping pollutants, sediments, excess nutrients (especially nitrogen and phosphorus), heavy metals, disease-causing bacteria and viruses, and synthesized organic pollutants such as pesticides, thereby ensuring that the water leaving the wetland is cleaner than the water that entered it.

4.2 CLIMATE CHANGE AND WETLANDS IN EHLANZENI DISTRICT MUNICIPALITY

‘Climate change’ means a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.

United Nations Framework Convention on Climate Change (UNFCCC)

In simpler terms, climate change can best be described as a long term change in the Earth’s global climate patterns including shifts in historical seasonality, rainfall patterns and average temperature ranges. These shifts are caused by an increase in global temperatures which are caused by increasing greenhouse gases (e.g. carbon dioxide) being emitted into the atmosphere. The rising of greenhouse gases in the atmosphere is caused by large scale human activities including industry, agriculture, transport and land use change. As a result, the long term historical climate is shifting towards unstable and unpredictable future climate conditions.

4.2.1 Historical climate in Ehlanzeni District Municipality

Ehlanzeni District Municipality falls within the Lowveld Region of the Mpumalanga Province and has a subtropical climate strongly influenced by the close proximity to the Indian Ocean.

In terms of temperature, historically there has been a strong seasonality between the winter and summer months. The cooler winter months occur between May and August whilst the warmer summer months occur between December and February. As illustrated in **Figure 27**, the coolest month has been June whilst the hottest month has been February. The records indicate that there has been a very moderate temperature variation between winter and summer months.³⁶

Historically Ehlanzeni District Municipality has been subject to subtropical summer rainfall. As illustrated in **Figure 27**, rainfall is largely experienced from September to March with the highest amount of rainfall falling in the late summer months (December to February). Ehlanzeni District Municipality has also experienced summer thunder storms as well as hail storms, both of which are associated with periods of heavy flooding. Winter rainfall within Ehlanzeni District Municipality is considered to be rare.

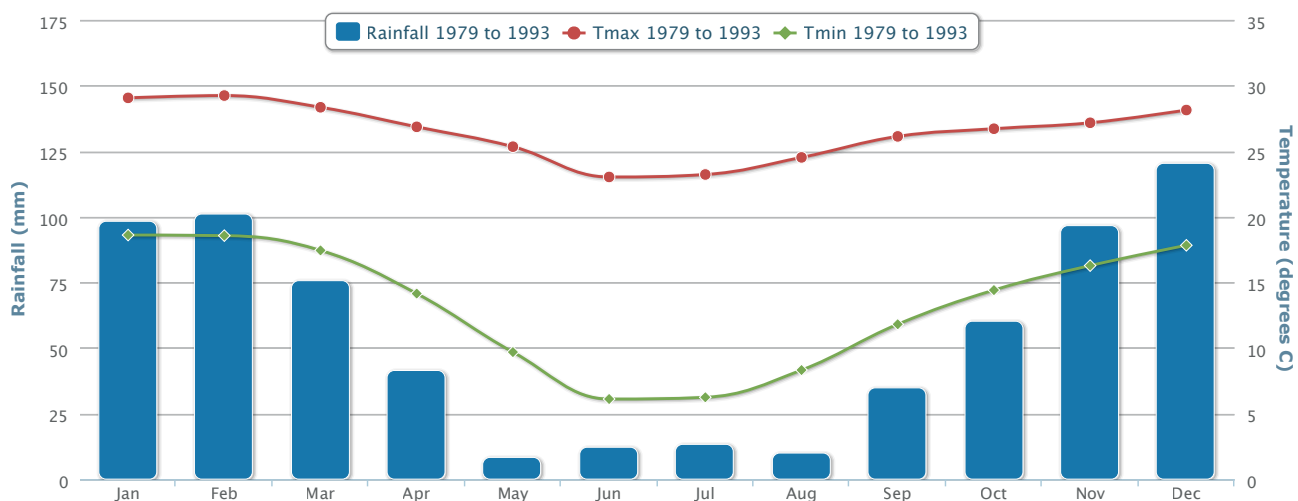


FIGURE 27: Graph depicting the typical climate of Ehlanzeni District Municipality.³⁵

4.2 CLIMATE CHANGE AND WETLANDS IN EHLANZENI DISTRICT MUNICIPALITY *(continued)*

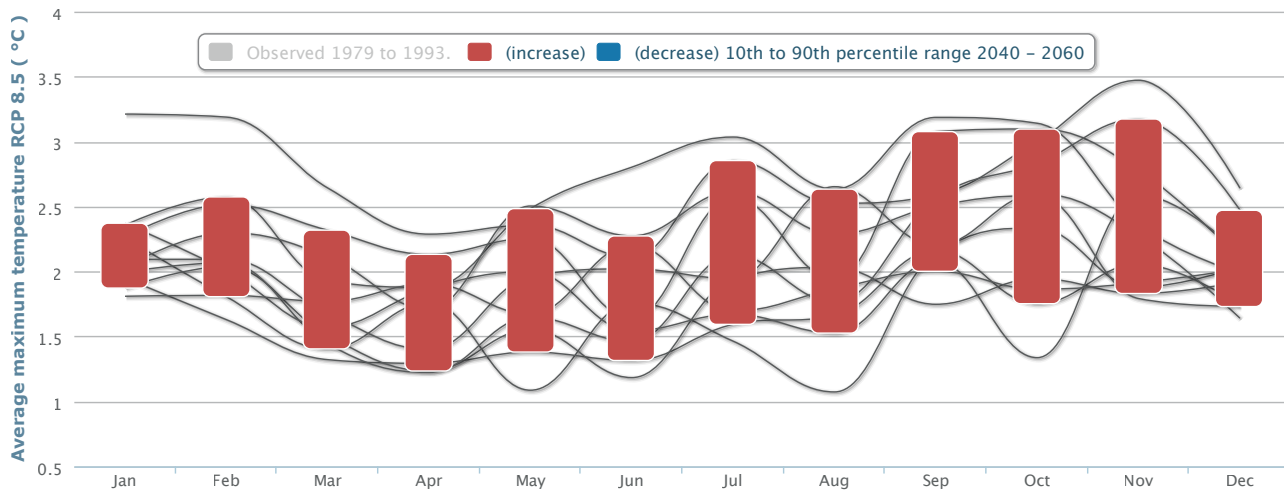


FIGURE 28: Graph depicting the anticipated changes in average maximum temperature patterns for Ehlanzeni District Municipality.³⁵

4.2.2 Projected Climate Change in Ehlanzeni District Municipality

The Climate Systems Analysis Group (CSAG) from the University of Cape Town (UCT) have developed the Climate Information Platform (CIP) which provides real time climate information. The CIP runs a series of climate models which collectively provide a database of historical climate patterns as well as future projections for regions and districts throughout the world.

Temperature:

In terms of temperature, the climate models all agree that warming within Ehlanzeni District Municipality will most certainly occur and that there will be a definite overall increase in average monthly temperatures by 1 – 2.5°C. The data also indicates that winter temperatures are likely to increase slightly more than summer temperatures and that minimum temperature range will increase slightly more than the maximum temperature range.

Rainfall:

In terms of rainfall, the climate models all agree that a shift in the historical rainfall patterns will most certainly occur. The models do not agree on the direction of change however and as such there is uncertainty as to whether there will be an increase or a decrease in annual rainfall in the municipality.

Despite the uncertainty however, the models do indicate that there will be a shift to generally drier conditions overall throughout the municipality.³⁶

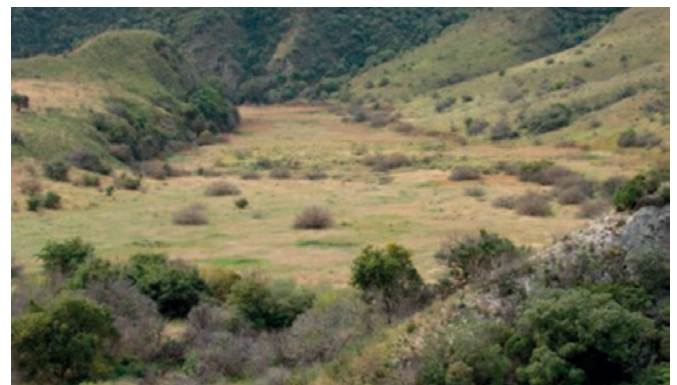


FIGURE 29: Crissiesmeer Pans located just outside Ehlanzeni District Municipality

4.2 CLIMATE CHANGE AND WETLANDS IN EHLANZENI DISTRICT MUNICIPALITY *(continued)*

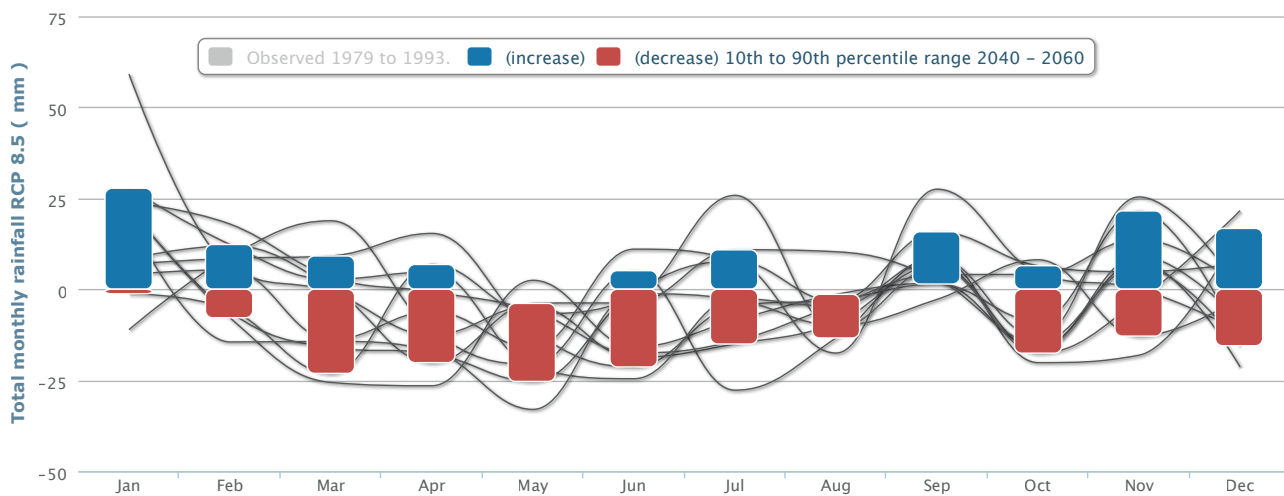


FIGURE 30: Graph depicting the anticipated changes in total monthly rainfall patterns within Ehlanzeni District Municipality.³⁵

4.2.3 Impacts of Climate Change in Ehlanzeni District Municipality

As noted in **Section 4.2.2**, Ehlanzeni District Municipality is likely to experience an increase in average monthly temperatures as well as a shift in the known historical rainfall patterns. A shifting climate means that the historical seasonality and associated rainfall and temperature patterns no longer apply. The predicted increase in temperature will result in, on average, hotter days throughout the year, as well as an increased duration of hot and dry spells particularly in the early – mid summer months. The uncertain changes in rainfall patterns however mean that resulting impacts could go one of two ways. Should there be an increase in annual rainfall, there will also most likely be an increase in the magnitude and frequency of storm events (i.e. more severe storms happening more often) resulting in an increased number of severe flooding incidents and hail storms, particularly in the late summer months. Should there be a decrease in annual rainfall however, there will be an increased number of annual dry days resulting in subsequent increased risk of water scarcity and drought conditions within the district.

In short, climate change in Ehlanzeni District Municipality will result in an exacerbation of the existing impacts historically occurring within the

municipality. As such, Ehlanzeni District Municipality should continue to plan for historical climate related impacts and be mindful that these impacts will most likely become more severe over time.

4.2.4 Role of Wetlands in mitigating and adapting to the impacts of climate change

Wetlands and their associated ecosystem services provide effective tools for both mitigating and adapting to the impacts of climate change. In terms of climate change mitigation, wetlands, particularly peatland systems, are well known for being carbon sequestering systems (aka “carbon sinks”). That means that wetlands or peatlands have the ability to store excess carbon (via photosynthesis) from the atmosphere – one of the primary components of greenhouse gases and a driver of climate change.³⁷

Protecting wetlands can therefore assist in preventing further climate change by reducing the quantity of carbon in the atmosphere. Drainage and degradation of wetlands however can release significant amounts of this stored carbon back into the atmosphere and reduce the ability of wetlands to sequester additional carbon.³⁷ Better management practices thus can help protect these stores of carbon and the ability of wetlands to sequester it.

4.2 CLIMATE CHANGE AND WETLANDS IN EHLANZENI DISTRICT MUNICIPALITY *(continued)*

In terms of adaptation, wetlands have the ability to act as natural buffers to the most severe of climate change impacts. For example, as noted in Section 3.4, wetlands have the ability to soak up heavy rainfall and attenuate flood water protecting the district

against the most extreme of floods. Wetlands can also store water and release it slowly in drier times which protects the district against the more severe impacts of drought.

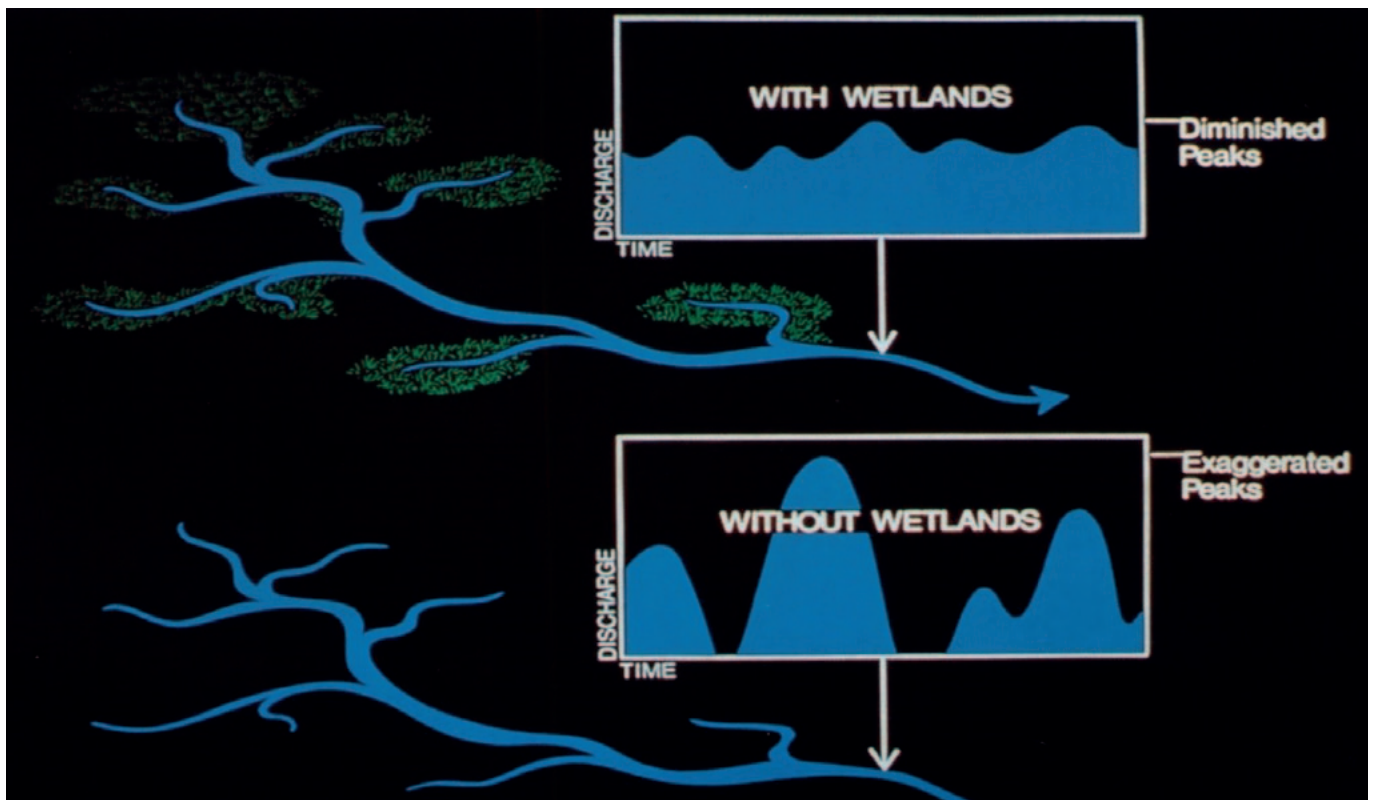


FIGURE 31: Schematic representation on the hydrological buffering capability of wetlands.

Climate change can however have a negative impact on wetlands if they are not in a healthy condition. Wetlands which are in poor condition have a reduced ability to respond and adapt to a shift in climate which means climate impacts (e.g. flooding) are more likely to damage or destroy the wetland. Subsequently the wetland is compromised in its ability to perform vital ecosystem services (including most importantly flood attenuation, water storage and flow regulation) and provide habitat for the specialised species living within and around these wetlands. Healthy wetlands however have a high resilience to climate change impacts, meaning that they are able to maintain their capabilities to supply ecosystem services and continue to provide key habitat to the specialised flora and fauna despite significant shifts in climate.

Given that healthy wetlands are able to maintain their ecosystem services, they are able to play a highly significant role in reducing the impacts of climate change within the municipality. Investment in the maintenance of healthy wetlands and the rehabilitation and restoration of damaged or degraded wetlands therefore will not only ensure wetland resilience to climate change but will ensure increased resilience of the municipality itself to the impacts of climate change.

5 | GOVERNANCE & MANAGEMENT

South Africa has an extensive legislative framework concerning the environment and biodiversity is considered in both development planning as well as national government priorities. This section outlines

key legislation and policies as well as the governance structure within Ehlanzeni District Municipality which leads to the current wetland management strategy within the district.

5.1 POLICY FRAMEWORK

Table 3 provides a comprehensive summary of all South African legislation, policies and strategies pertinent for the management of wetlands within Ehlanzeni District Municipality. It is important to note that some of the legislation such as the National

Environmental Management Act (NEMA) provides specific instructions regarding wetland management whilst other legislation indirectly supports management of wetlands such as the National Environmental Management: Waste Act (NEM:WA).

TABLE 3 LEGISLATION GOVERNING WETLAND MANAGEMENT IN EHLANZENI DISTRICT MUNICIPALITY

LEGISLATION/ POLICY/ STRATEGY	HOW IT RELATES TO WETLANDS
Legislation	
South African Constitution	Overarching principles of care for the environment.
Environmental Conservation Act and associated By-Laws	Controls access to and activities within coastal and wetland areas.
National Water Act	Water use control, including extraction and construction within the vicinity of a watercourse or wetland.
National Environmental Management Act	Environmental impact assessments (EIAs) for the development of a new or disturbed site within the vicinity of a watercourse or wetland.
National Environmental Management: Biodiversity Act	Protection of biodiversity and the formulation of a number of tools (e.g. bioregional plans and threatened ecosystem lists) that feed into land use planning and EIA procedures.
National Environmental Management: Biodiversity Act – Alien and Invasive Species Regulations	All matters related to invasive species management (both fauna and flora).
National Environmental Management: Protected Areas Act	Protection of national parks, protected areas and conservation sites. This includes the protection of wetland site.
National Environmental Management: Waste Act	Regulation of illegal dumping.
Conservation of Agricultural Resources Act	Protect the utilization of the natural agricultural resources to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invasive plants.
Municipal Systems Act	Role of local governments and the requirements for IDPs, SDFs and Disaster Management Plans.

continued

5.1 POLICY FRAMEWORK *(continued)*

TABLE 3 LEGISLATION GOVERNING WETLAND MANAGEMENT IN EHLANZENI DISTRICT MUNICIPALITY

LEGISLATION/ POLICY/ STRATEGY	HOW IT RELATES TO WETLANDS
Municipal Structures Act	Promotion of regional planning and spatial planning categories.
Municipal Health Act	Monitoring of Waste Water Treatment Works (WWTW) discharge.
Policies	
National Development Plan (NDP), and associated Medium Term Strategic Framework (MTSF)	Sets out measures to protect natural resources in South Africa. Through the creation of the MTSF and associated 'Delivery Agreements', required outputs and targets are set.
Municipal Planning	
Provincial Strategic Development Framework (SDF)	Overarching spatial planning guidelines for the province.
Integrated Development Plan (IDP)	Overall strategy document for the municipality.
District SDF	Broad spatial planning guidelines for the district (including a map of land use within the district).
Local Municipal IDPs	Overall strategy document for the local municipalities linking to the district level IDP.
Local Municipal SDFs	Strategic plans to manage municipal land at the local level.
Open Space Framework	Demarcation of Open Space Areas.
Environmental Management Framework	Map and land use guidelines for areas of environmental importance.
Sector Plans	This includes the Disaster Management Plan.
Strategies	
The National Biodiversity Framework	Provides biodiversity targets for South Africa.
National Water Resource Strategy	Speaks to protection and rehabilitation of wetlands.
Other	
Bioregional plans (draft or gazetted)	Maps Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs).
Spatial Planning and Land Use Management Act (SPLUMA)	Provides a framework for spatial planning and land use management in South Africa. It also stipulates that municipal planning is primarily the executive function of the local sphere of government and requires that biodiversity is adequately considered in spatial planning.
Disaster Management Amendment Bill	Outlines how ecosystems should be considered in the updated Disaster Management Act.

5.1 POLICY FRAMEWORK *(continued)*

Taking the above legislation into account, the district priorities for Ehlanzeni District Municipality as per the current five year IDP (2012 – 2016) are currently as follows:

- Basic water & infrastructure development;
- Job creation;
- Rural development;
- Institutional transformation & development;
- Good governance and operation clean audit;

- Municipal Health/ Disaster Management/ Environmental Management; and
- Transversal and HIV/AIDS programmes.

At this stage, biodiversity and wetlands are not specifically included in the district level priorities however biodiversity is included as part of a provincial priority along with tourism and cultural heritage.

5.2 WETLAND MANAGEMENT WITHIN THE MUNICIPALITY

Currently there is no specific designated wetland management authority within Ehlanzeni District Municipality nor any specific policy in place which guides the management of wetland areas within the district.³⁸ Instead, the management of wetlands is a collective, but disconnected effort between Ehlanzeni District Municipality, the five local municipalities within Ehlanzeni District Municipality and entities such as the Mpumulanga Parks Board and Working for Wetlands. Various forums also inform wetland management. These include the Environmental Management Forum, which is utilised specifically to address environmental related issues and challenges within the district municipality, as well as the Disaster Management Forum and the Waste Forum.³⁸ The Mpumulanga Wetlands Forum addresses wetlands challenges at a provincial level.

At this stage, management of wetlands is somewhat fragmented across Ehlanzeni District Municipality. The district and local municipalities work from separate IDPs with different mandates and as such, environmental management within the individual municipalities is not consistent.³⁸ In addition,

different local municipalities have different capacity levels for effective environmental management making a coordinated approach challenging. As a result, there is no holistic management of wetlands due to the differences in agendas within each of the municipalities. There is also currently little to no cooperative action between private stakeholder which overall puts wetlands at risk from mismanagement.

To ensure holistic and effective management of wetlands within Ehlanzeni District Municipality, ideally the same vision and standardised goals for the management of wetlands should be incorporated into the IDPs and SDFs of both the local and district level municipalities. Additionally, more effectively utilising existing platforms such as the Environmental Management Forum and Mpumulanga Wetlands Forum will ensure better communication between both the district and local municipalities as well as the Mpumulanga Parks Board, Working for Wetlands and private stakeholders.

6 | LOCAL AND REGIONAL PARTNERSHIPS AND PROGRAMMES

At this stage, there are no municipal partnerships or programmes running between Ehlanzeni District Municipality and the surrounding district municipalities.³⁸ Ehlanzeni District Municipality has however started to develop a relationship with the University of Johannesburg, Tshwane University of Technology and Nelson Mandela Bay University. These universities are interested in becoming involved in, and assisting with, existing projects currently running within the municipality (including LAB: Wetlands SA) as well as any future biodiversity and wetland related projects that may be developed.

On a much broader scale, SANBI is currently implementing the Global Environment Facility (GEF) 5 project within Ehlanzeni District Municipality as well as three other district municipalities within South Africa (Amathole, uMgungundlovu and Cape Winelands District Municipalities) that have been identified as global biodiversity hotspots and national biodiversity priority areas, with high rates of habitat degradation and conversion, high levels of poverty, and other pressing needs for action.

GEF is a partnership for international cooperation where 183 countries work together with international institutions, civil society organizations and the private sector, to address global environmental issues. This is done to support activities related to biodiversity, climate change, international waters, land degradation, chemicals and waste in the context of development projects and programs. SANBI recognises that capacity at the municipal scale to engage with biodiversity conservation and sustainable development is weak, and that there is little coordination between institutions that regulate land use. The GEF 5 project is designed to address these challenges by (a) strengthening cooperation, coordination and capacity of municipal and other regulatory authorities that regulate land use decisions to incorporate criteria to avoid/ prevent, minimize and/or offset impacts on biodiversity, and improve compliance monitoring and enforcement, and (b) introducing mechanisms in collaboration with private and communal land owners to better protect critical biodiversity areas and manage land,

while demonstrating the potential of biodiversity to create jobs and contribute to economic growth. The project will run until 2019 within Ehlanzeni District Municipality.³³

In addition to SANBI's work within the municipality, SANTAM are also closely working with Ehlanzeni District Municipality to develop a partnership for reducing risk to the impacts of climate change, particularly flood risk, and building resilience. To date SANTAM, in collaboration with Ehlanzeni District Municipality, has conducted disaster awareness training sessions with 100 traditional leaders on preventing, mitigating and reducing disasters. SANTAM has also established priority areas which are at high risk from flooding and has developed a proactive flood management model to assist Ehlanzeni District Municipality in managing its flood risk. SANTAM is now focusing on assisting with the development of upstream catchment land rehabilitation initiatives to reduce flood risk exposure of communities living downstream.⁴⁰

In addition to the collective biodiversity and disaster risk related work that is being undertaken within Ehlanzeni District Municipality, there are numerous projects and activities currently being implemented within and around wetlands by private consultants. These projects range from small scale monitoring reports of wetlands on private land to large scale Environmental Impact Assessments on areas of land scheduled for development where wetland systems are known to exist.

Communication, education and public awareness (CEPA) play an essential role in gaining the cooperation and collaboration of individuals and organizations in the public, political and economic sectors to act to reduce wetland loss and degradation. This section

details the current known activities being undertaken within Ehlanzeni District Municipality by various stakeholders to raising awareness and educate the community at large on the value of wetlands.



FIGURE 32: Anton Listrom undertaking municipal level awareness raising on the value of wetlands for local communities living in rural areas.

7.1. COMMUNICATION AND EDUCATION

At this stage, there are currently no community education or awareness campaigns to increase knowledge of the value of biodiversity or wetlands being undertaken by Ehlanzeni District Municipality itself.³⁸ At the local level however both Bushbuckridge Local Municipality as well as Mbombela Local Municipality have been actively involved with awareness raising work. Both Bushbuckridge and Mbombela Local Municipality have been involved in community awareness raising events each

year, including the celebration of World Wetlands Day on 2nd February 2016.⁴¹ Bushbuckridge have also produced a number of flyers to increase the knowledge of the local community of the value of wetlands.

At this stage, no known community work is being undertaken by Umjindi, Thaba Chweu or Nkomazi Local Municipalities.

7.2. PUBLIC PARTICIPATION AND AWARENESS

Strategic documents such as the IDP, SDF, Coastal Management Programme and EMF are reviewed and updated regularly. Ehlanzeni District Municipality follows formal public participation processes whenever these documents are updated to ensure that the public has ample opportunity to submit comments and engage with the municipality. Ehlanzeni District Municipality is also responsible for commenting on all Environmental Impact Assessment (EIA) applications, the process of which requires two rounds of public participation, before a decision is made by either Provincial Department of Environmental Affairs or the National DEA.

Public participation is also conducted by non-municipal entities working within Ehlanzeni District Municipality. Working for Wetlands undertakes local public participation and awareness raising activities as part of their wetland rehabilitation projects implemented throughout Ehlanzeni District Municipality⁴² and the Mpumalanga Wetlands Forum has presented on the value of wetlands at many of the local schools within Ehlanzeni District Municipality.⁴³



FIGURE 33: Field trip of key political officials to a local wetland on World Wetlands Day 2015.



FIGURE 34: Key stakeholders within Ehlanzeni District Municipality developing the Ehlanzeni Wetland Strategy and Action Plan.



FIGURE 35: Key stakeholders within Ehlanzeni District Municipality attending the LAB: Wetlands SA Wetland Awareness Raising Workshop in November 2016.

CONCLUSION

The aim of the Ehlanzeni District Municipality Wetland Report was to bring together all the available wetland related information for the municipality as well as highlight gaps where wetland management within the municipality could be strengthened going forward.

Through an extensive desktop study, as well as multiple bi-lateral meetings with stakeholders working throughout Ehlanzeni District Municipality, it was found that the district has a huge wealth of wetlands including one RAMSAR site, namely the Verloren Valei Wetland. The wetlands within the municipality not only provide a wide range of ecosystem services including flood attenuation, water storage, water filtration and food provision but also provide key habitat for a number of rare and critically endangered flora and fauna including the Blue Crane (*Anthropoides paradiseus*) (South Africa's National Bird), the Crowned Crane (*Balearica regulorum*) and the Wattled Crane (*Bugeranus carunculatus*). The wetlands within Ehlanzeni District Municipality also play a pivotal role in reducing the impacts of climate change as well as in disaster risk management within the district.

The wetlands within Ehlanzeni District Municipality however, are currently under threat from mining, afforestation, inappropriate development within the close proximity to the wetlands, contamination through sewage, effluent and stormwater seeps, as well as the spread of invasive alien plant species; and

a number of wetlands have already been lost as a result. Further wetland loss puts the municipality at risk from losing the remaining valuable ecosystem services these wetland systems provide.

During the reporting process, it was also found that currently there are a number of challenges associated the management of wetlands within Ehlanzeni District Municipality.

Other than the SANBI BGIS NFEPA data, there is currently no formal ground-truthed wetland spatial data for the district, clearly depicting where the wetlands are located within the landscape or their status. This makes development planning around wetlands extremely challenging. It was also found that there is also no formal wetland information database monitoring the shifting status of wetlands within Ehlanzeni District Municipality. As such, wetlands are at risk from being degraded or even lost entirely due to lack of knowledge on their current location and status. To address this, it would be useful to develop a ground-truthed wetland map which not only highlights where wetlands are on the ground but also indicates their status (i.e. pristine condition, degraded etc.) as this would assist town planners and farmers with future planning of developments and farm expansion/ redevelopment.



At the time of reporting it was also found that wetlands are not included in the current IDP or the SDF, there is no specific policy in place which guides the management of wetland areas within the district and there is no specific designated wetland management authority within Ehlanzeni District Municipality. Instead, the management of wetlands is a collective, but disconnected effort between Ehlanzeni District Municipality, the five local municipalities within Ehlanzeni District Municipality and entities such as the Mpumulanga Parks Board and Working for Wetlands, all of whom manage wetlands as per their own internal mandates.

Due to capacity constraints and the tendency of these separate municipal departments to work “in silos”, there is also currently very little communication or cohesion across the separate departments dealing with issues or concerns pertaining to the wetlands specifically, making the holistic management of wetlands within the district a difficult task and also increasing the risk of wetland degradation. Thus, in order to strengthen holistic wetland management, prevent further loss of wetlands and ensure the continued provision of valuable ecosystem services to the municipality, it is recommended that wetlands are included within the IDP and SDF at both the district and local level and that their management thereafter it addressed specifically by one department within each of the municipalities. Alternatively, a platform

such as the Environmental Management Forum or the Mpumulanga Wetlands Forum could be utilised so wetland related information can be easily shared and maintenance/rehabilitation actions can be allocated, monitored and taken forward accordingly. It would also be useful to work more closely with key external stakeholders such as Mpumulanga Parks Board to ensure cohesion between projects across the district.

Finally, it was found that Ehlanzeni District Municipality currently does not have any environmental or education strategies surrounding wetlands and as such, at this stage, no wetland education is currently being implemented into schools or within the local municipalities. Developing a wetland awareness education tool for the municipality would be useful to ensure ongoing wetland education and awareness raising is implemented throughout the municipality.

Overall, in addition to addressing the above, in order to strengthen wetland management, prevent further loss of wetlands and ensure the continued provision of valuable ecosystem services to the municipality, a holistic and collaborative management approach is recommended. It would be useful if Ehlanzeni District Municipality developed a wetland management guideline strategy which could then be adopted and utilised by all the local municipalities within Ehlanzeni District Municipality.



DEFINITIONS

Biodiversity⁴⁴

The variability among living organisms from all sources, including, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part and also includes diversity within species, between species, and of ecosystems.

Climate Change⁴⁵

Climate change means a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.

Critically Biodiversity Areas⁴⁶

CBAs incorporate: (i) areas that need to be safeguarded in order to meet national biodiversity thresholds (ii) areas required to ensure the continued existence and functioning of species and ecosystems, including the delivery of ecosystem services; and/or (iii) important locations for biodiversity features or rare species.

Disaster⁴⁷

Disaster means a progressive or sudden, widespread or localised, natural or human-caused occurrence which is a serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources.

Ecological Support Areas⁴⁸

ESAs are supporting zones required to prevent the degradation of Critical Biodiversity Areas and Protected Areas. An ESA may be an ecological process area that connects and therefore sustains Critical Biodiversity Areas or a terrestrial feature, e.g. the riparian habitat surrounding and supporting aquatic Critical Biodiversity Areas.

Ecosystem services⁴⁸

This is the benefits people obtain from ecosystems. These include provisioning services such as food and water; regulating services such as flood and disease control; cultural services such as spiritual, recreational, and cultural benefits; and supporting services, such as nutrient cycling, that maintain the conditions for life on Earth.

Estuary⁴⁹

Means a body of surface water –

- (a) that is part of a water course that is permanently or periodically open to the sea;
- (b) in which a rise and fall of the water level as a result of the tides is measurable at spring tides when the water course is open to the sea; or
- (c) in respect of which the salinity is measurably higher as a result of the influence of the sea.

Flood⁵⁰

A flood is defined as the temporary inundation of normally dry land areas resulting from the overflowing of the natural or artificial confines of a river or other body of water, including groundwater.

Flash Flood⁵⁰

Flash floods are caused by heavy or excessive rainfall in a short period of time, generally less than 6 hours. Flash floods are usually characterized by raging torrents after heavy rains that rip through river beds, urban streets, or mountain canyons sweeping everything before them. They can occur within minutes or a few hours of excessive rainfall. They can also occur even if no rain has fallen, for instance after a levee or dam has failed, or after a sudden release of water by a debris or ice jam.⁴¹ The basic cause of most river floods is excessive rainfall which causes significant elevations in river levels. The effect of elevated water levels is the inundation of low lying river floodplain areas.

Invasive Species⁵⁰

Means species that have been introduced into an area, and are able to outcompete and displace indigenous or useful alien species.

Ramsar Site⁵¹

Ramsar Sites are designated because they meet the Criteria for identifying Wetlands of International Importance. The first criterion refers to Sites containing representative, rare or unique wetland types, and the other eight cover Sites of international importance for conserving biological diversity. These criteria emphasize the importance the Convention places on sustaining biodiversity.

Wetland⁵²

Land which is transitional between terrestrial and aquatic systems, where the water table is usually at or near the surface or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.

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Pinkie Hermanus of Mbombela Local Municipality for providing information of the wetlands within Mbombela Local Municipality and information on the issues threatening wetlands located within the municipality.

Ray-Anne Sedres of SANTAM for providing information of the disaster risk profile within Ehlanzeni District Municipality as well as information on the SANTAM project currently being implemented within the municipality.

Zandile of Umjindi Local Municipality for providing information on the wetlands within Umjindi Local Municipality.

RESOURCES

Bird Life South Africa <http://www.birdlife.org.za/conservation/important-bird-areas/iba-directory/item/160-sa019-chrissie-pans>

CSAG Climate Information Portal <http://cip.csag.uct.ac.za/webclient2/app/>

Collins, N.B. 2005. Wetlands: The basics and some more. Free State Department of Tourism, Environmental and Economic Affairs.

Disaster Management Act No. 57 of 2002.

I-Spot SA <http://www.ispotnature.org/communities/southern-africa>

Kotze, D. 2015. Wetlands and water quality enhancement.

National Environmental Management: Biodiversity Act No. 10 of 2004

National Water Act No. 36 of 1998.

Ollis, D., Snaddon, K., Job, N. and Mbona, N. 2013. SANBI Classification System for Wetlands and other Aquatic Ecosystems in South Africa. User Manual: Inland Systems. SANBI Biodiversity Series 22. South African National Biodiversity Institute, Pretoria.

Ramsar Convention on Wetlands <http://www.ramsar.org/about/the-importance-of-wetlands>

Ramsar Sites of International Importance: <http://www.ramsar.org/sites-countries/the-ramsar-sites>

RAMSAR Information Sheet: Verloren Valei <https://rsis.ramsar.org/RISapp/files/RISrep/ZA1110RIS.pdf>

Russi, D. Brink, P. Farmer, A. Badura, T. Coates, D. Förster, J. Kumar, R. Davidson, N. 2013. The Economics of Ecosystems and Biodiversity for Water and Wetlands. IEEP, London and Brussels; Ramsar Secretariat, Gland. <http://www.teebweb.org/publication/the-economics-of-ecosystems-and-biodiversity-teeb-for-water-and-wetlands/>

SANBI BGIS Mapping Tool. 2016. <http://bgis.sanbi.org/MapView>

SANBI. 2011. National Biodiversity Assessment. <http://bgis.sanbi.org/nba/project.asp>

Uys, C. 2016. Chrissie Pans Important Bird Area: A wetland birding hotspot of conservation priority. BirdLife South Africa <http://www.chrissiesmeer.co.za/docs/Chrissie%20Pans%20Important%20Bird%20Area.pdf>

United Nations Framework Convention on Climate Change (UNFCCC).

Vari. 1986. Genus Orachrysops. <http://www.metamorphosis.org.za/articlesPDF/1273/330%20Genus%20Orachrysops%20Vari.pdf>

WWF. 2013. An introduction to South Africa's Water Source Areas: The 8% land area that provides 50% of our surface water. http://awsassets.wwf.org.za/downloads/wwf_sa_watersource_area10_lo.pdf

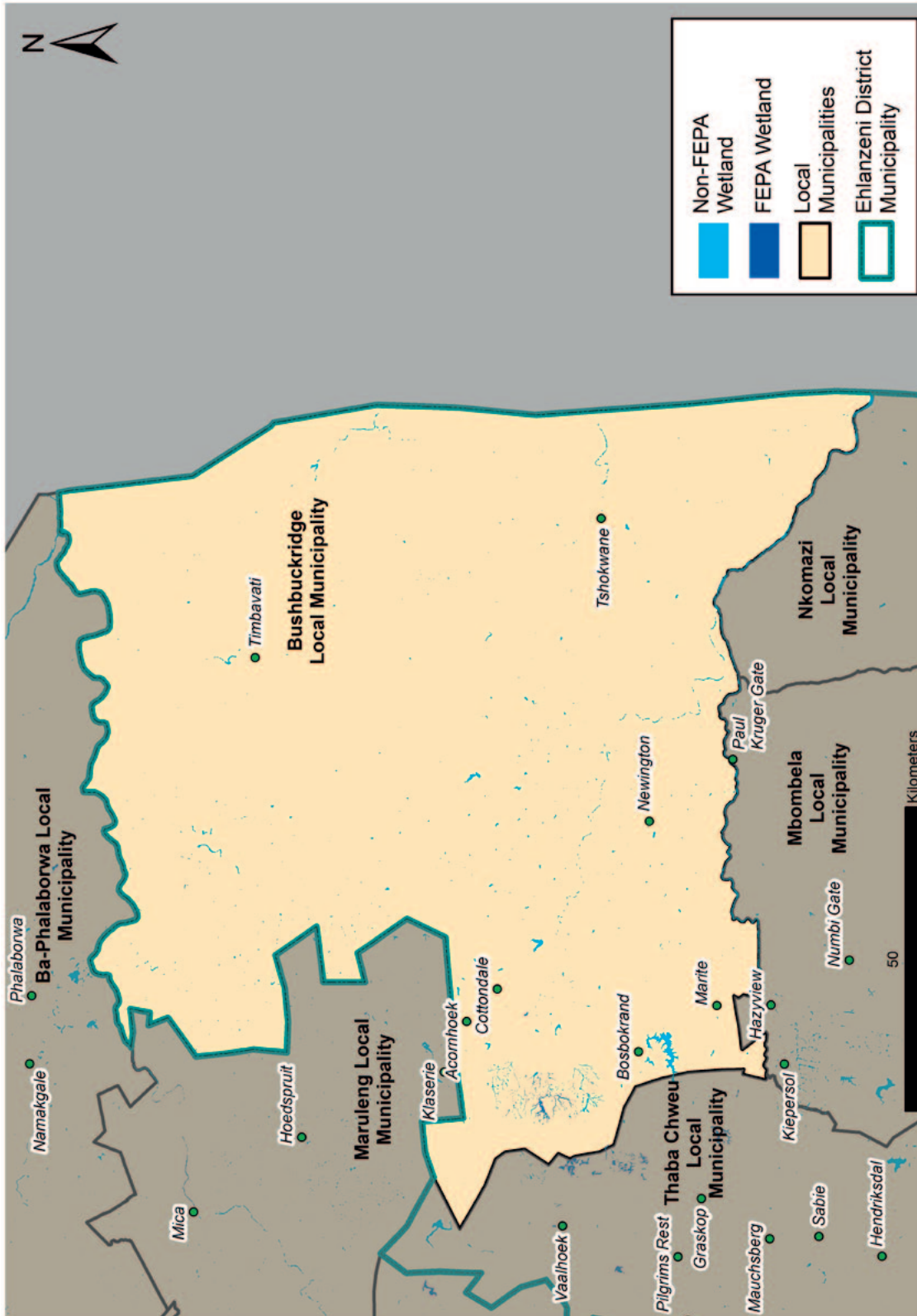
FOOTNOTES

1. SANBI (2011) National Biodiversity Assessment.
2. Per comms with Mbali Kubheka (DEA: Working for Wetlands Programme, KZN) in (February, 2016).
3. Images courtesy of Mbali Kubheka (DEA: Working for Wetlands Programme, KZN).
4. Ollis, D; Snaddon, K; Job, N and Mbona, N (2013) "SANBI Classification System for Wetlands and other Aquatic Ecosystems in South Africa".
5. Russi D., Brink P., Farmer A., Badura T., Coates D., Förster J., Kumar R. and Davidson N. (2013) The Economics of Ecosystems and Biodiversity for Water and Wetlands. IEEP, London and Brussels; Ramsar Secretariat, Gland.
6. Images courtesy of Mervyn Lotter of the Mpumalanga Parks Agency, 2016.
7. <http://www.ehlanzeni.gov.za/>
8. RAMSAR Information Sheet: Verloren Valei (<https://rsis.ramsar.org/RISapp/files/RISrep/ZA1110RIS.pdf>).
9. Image courtesy of Hannes Marias.
10. Image sourced from I-Spot (<https://www.ispotnature.org/species-dictionaries/sanbi/Dira>).
11. Image sourced from Vari. 1986. Genus Orachrysops. (<http://www.metamorphosis.org.za/articlesPDF/1273/330%20Genus%20Orachrysops%20Vari.pdf>).
12. Image sourced from I-Spot: (<https://www.ispotnature.org/node/499654>).
13. Image sourced from i-Spot: (<https://www.ispotnature.org/node/789000?nav=related>).
14. Bird Life South Africa: (<http://www.birdlife.org.za/conservation/important-bird-areas/iba-directory/item/160-sa019-chrissiepens>).
15. Uys, C. 2016. Chrissie Pans Important Bird Area: A wetland birding hotspot of conservation priority. BirdLife South Africa. (<http://www.chrissiesmeer.co.za/docs/Chrissie%20Pans%20Important%20Bird%20Area.pdf>).
16. Image sourced from: (<http://highvelder.co.za/8726/conservation-milestone-benefits-chrissiesmeer/>).
17. Image courtesy of Odette Curtis from the Overberg Lowlands Conservation Trust.
18. Per comms with Anton Linstrom (Private Wetland Ecologist), (April, 2016).
19. Per comms with Anton Linstrom, a private wetland consultant (April, 2016).
20. Per comms with Mervyn Lotter of Mpumalanga Parks Board (April, 2016).
21. Images sourced from Duncan Mackenzie, a private wetland consultant.
22. WWF. 2013. An introduction to South Africa's Water Source Areas: The 8% land area that provides 50% of our surface water.
23. Per comms with Julia Hlebe of Bushbuckridge Local Municipality (April, 2016).
24. Per comms with Anton Linstrom (April, 2016).
25. Per comms with Andre Beetge of Working for Wetlands (April, 2016).
26. Kotze, D. 2015. Wetlands and water quality enhancement.
27. Per comms with Anton Linstrom (April, 2016).
28. Collins, N.B. 2005. Wetlands: The basics and some more. Free State Department of Tourism, Environmental and Economic Affairs.
29. Per comms with Mervyn Lotter of the Mpumalanga Parks Board (April, 2016).
30. Per comms with Anton Linstrom (April, 2016).
31. Per comms with Pinkie Hermanus of Mbombela Local Municipality (April, 2016).
32. Image courtesy of Anton Linstrom.
33. Per comms with Pinkie Hermanus of Mbombela Local Municipality; Julia Hlebe of Bushbuckridge Local Municipality; Zandile of Umjindi Local Municipality; and Anton Linstrom (April, 2016).

34. Collins, N.B. 2005. Wetlands: The basics and some more. Free State Department of Tourism, Environmental and Economic Affairs.
35. Graph sourced from the CSAG Climate Information Portal: (<http://cip.csag.uct.ac.za/webclient2/app/>).
36. Per comms with Lisa Coop of CSAG, University of Cape Town. (February, 2016).
37. Per comms with Anton Linstrom (April, 2016).
38. Per comms with Godfrey Phaswana of Ehlanzeni District Municipality (April, 2016).
39. Per comms with Aziza Parker of SANBI (April, 2016).
40. Per comms with Ray-Anne Sedres of SANTAM (November, 2015).
41. Per comms with Julia Hlebe of Bushbuckridge Local Municipality (April, 2016).
42. Per comms with Andre Beetge of Working for Wetlands (April, 2016).
43. Per comms with Hannes Marais of Mpumalanga Wetlands Forum (April, 2016).
44. Reference: Definition from SANBI (2011) National Biodiversity Assessment.
45. United Nations Framework Convention on Climate Change (UNFCCC).
46. Reference: (<http://bgis.sanbi.org/projectsearch.asp>).
47. Disaster Management Act No. 57 of 2002.
48. Reference: (<http://bgis.sanbi.org/projectsearch.asp>).
49. Reference: Integrated coastal management Act.
50. Ehlanzeni Disaster Risk Assessment, 2013.
51. <http://www.ramsar.org/sites-countries/the-ramsar-sites>
52. National Water Act 36 of 1998.

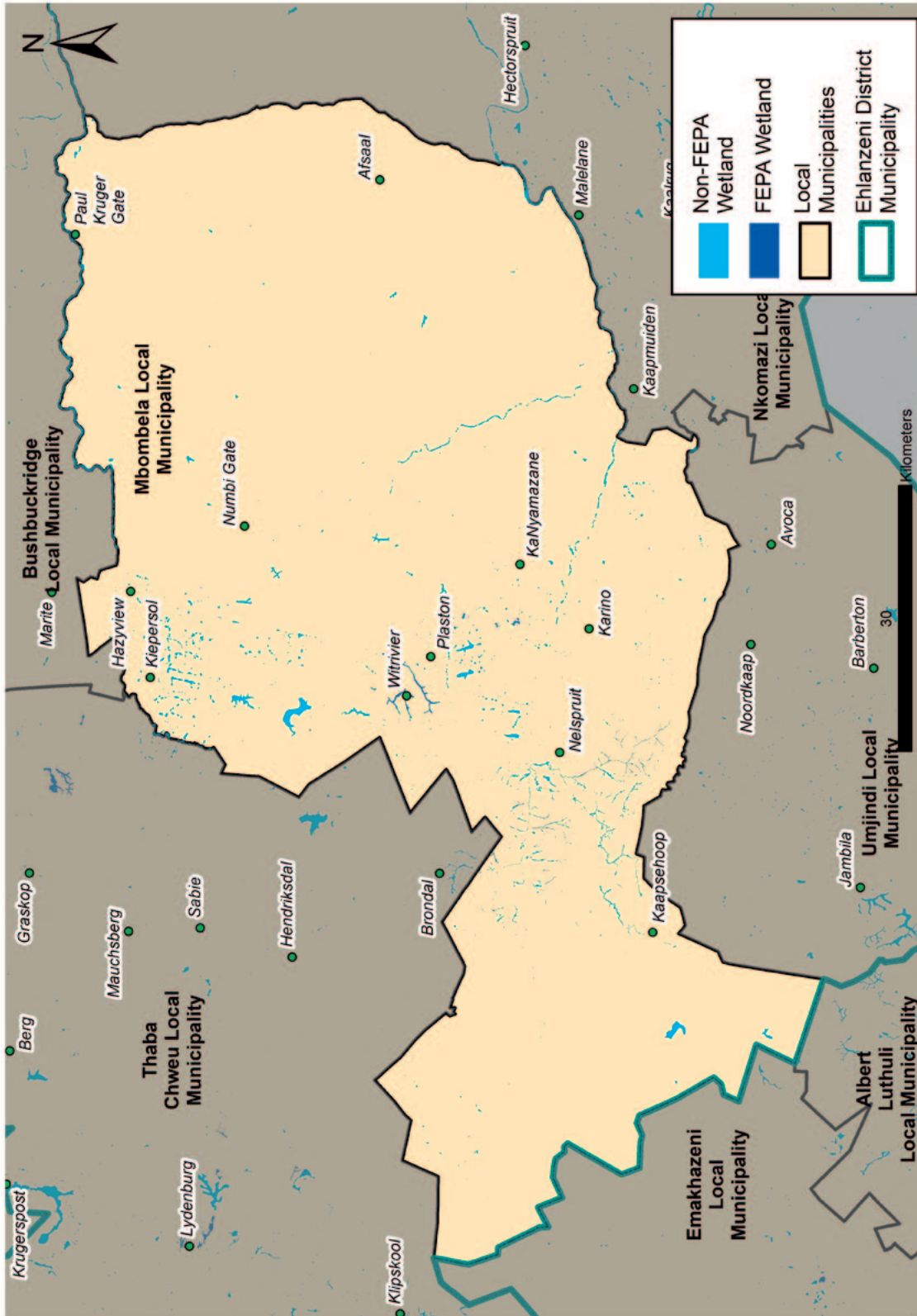
ANNEXURES

ANNEXURE 1 MAPS INDICATING THE SPATIAL DISTRIBUTION OF WETLANDS WITHIN THE LOCAL MUNICIPALITIES WITHIN EHLANZENI DISTRICT MUNICIPALITY



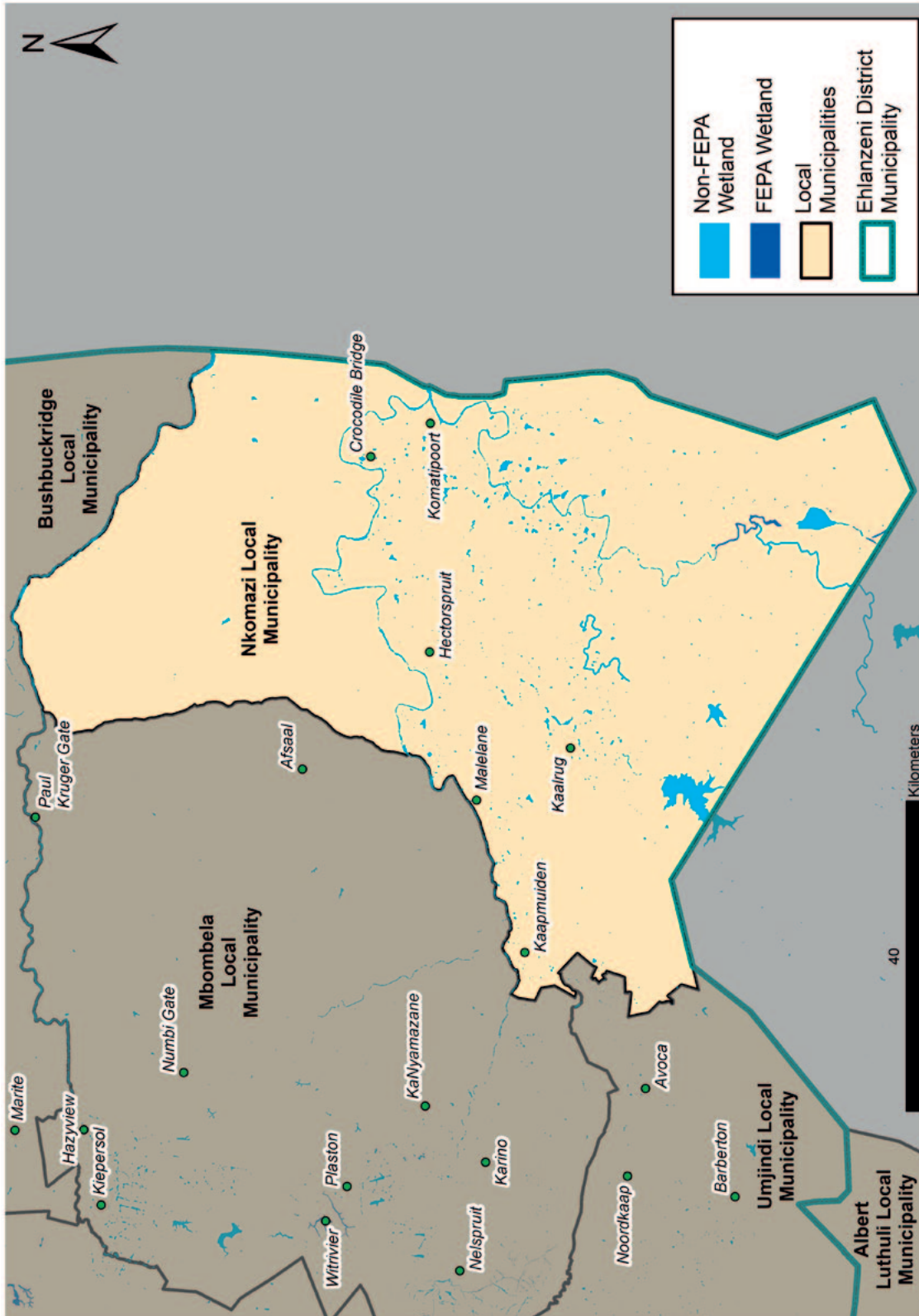
ANNEXURES

ANNEXURE 1 MAPS INDICATING THE SPATIAL DISTRIBUTION OF WETLANDS WITHIN THE LOCAL MUNICIPALITIES WITHIN EHLANZENI DISTRICT MUNICIPALITY *continued*



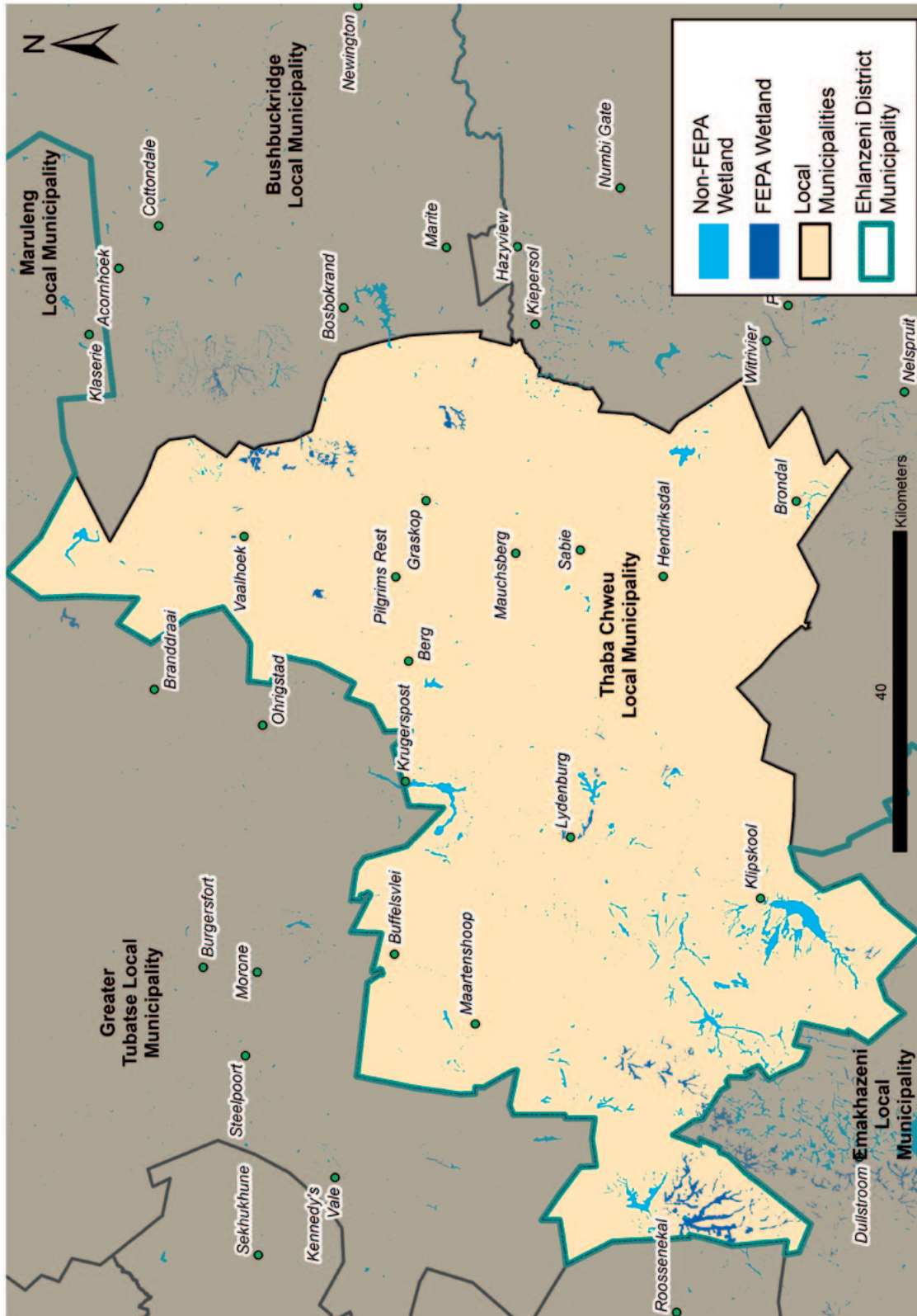
ANNEXURES

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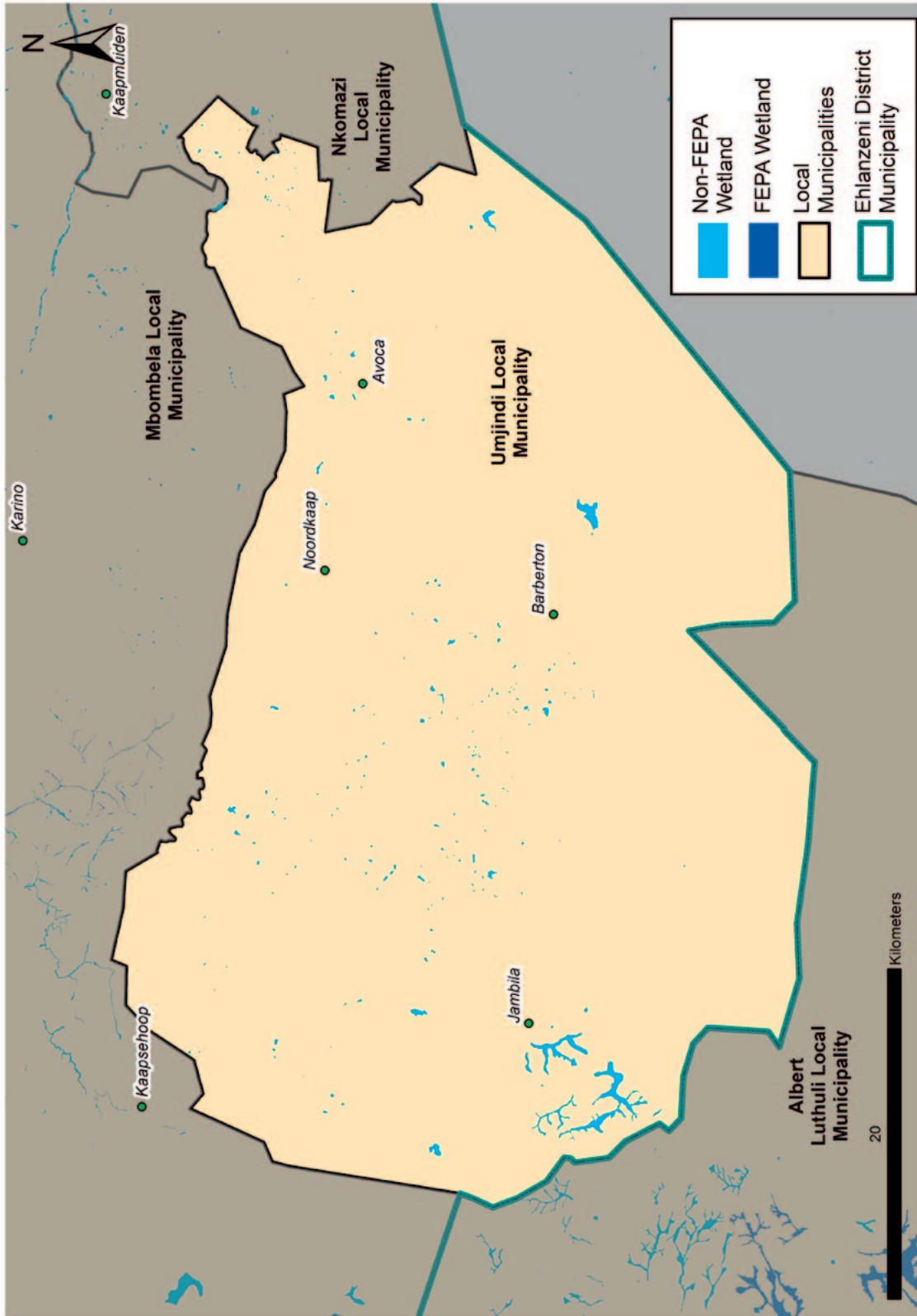
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environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

