

WATERBERG DISTRICT MUNICIPALITY WETLAND REPORT | 2017

LOCAL ACTION FOR BIODIVERSITY (LAB): WETLANDS SOUTH AFRICA



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FOREWORD



It is a great pleasure and honour for me to be part of the ICLEI – Local Action for Biodiversity programme in preservation of the biodiversity, and wetlands in particular of the Waterberg District Municipality. On behalf of the people of Waterberg District Municipality, I would like to thank ICLEI for choosing the district to be part of this programme. Tourism and Heritage opens the door to new opportunities, and it is good to focus on promoting and protecting our amazing wetlands to domestic and international tourists. Our district seeks to promote and preserve South Africa's wetlands in Waterberg as it is an important part of the South African heritage.

Wetlands are complex dynamic ecosystems that are extremely important to society and provide significant economic, social and cultural benefits. Wetlands support our agricultural activities by providing a source of water for irrigation and livestock and for domestic consumption. Many inland wetlands are popular locations for tourism and recreational activities such as swimming, boating, fishing, camping and bird watching, thus offering income opportunities for local communities.

Wetlands act as natural sponges that store water in times of heavy rainfall and release it during dry periods. By regulating water flows during floods, wetlands reduce flood damage and help prevent soil erosion. Wetlands also purify water by acting as natural filters and trapping pollutants, which include heavy metals and disease-causing bacteria and viruses. Waterberg's wetlands are classified as the cleanest and most biologically diverse ecosystems in the district. They occur in all river catchments of the Waterberg, namely the Mokolo River Catchment, the Crocodile River Catchment and the Nyl River

Catchment. The Nylsvlei is the largest inland floodplain wetland system in South Africa. Nylsvlei is within the world renowned UNESCO Waterberg Biosphere Reserve. The Nylsvlei is our pride in Eco-Tourism, a leisure destination of choice in Limpopo. Nylsvlei Nature Reserve is a 40 square kilometre protected area, lying on the floodplain of the Nyl River and the uppermost section of the Mogalakwena River. The area has been declared a RAMSAR Wetland site because of its international biodiversity conservation importance that is endemic to the area.

Despite the valuable services provided by wetlands, it has been found that they are the most threatened ecosystems through poor land management and development. There is great need to develop a Regional Rehabilitation and Redevelopment Plan for the Waterberg wetlands in promotion of Biodiversity Conservation and Eco-Tourism. Partnerships and community involvement will be critical in sustaining the Nylsvlei Nature Reserve as a wetland of international significance. Environmental education is very important for sustainability of the area.

Let us work together to secure our wetlands for our posterity and the future generations.

I THANK YOU.

CLLR S.M. MATABOGE
Executive Mayor
of Waterberg District
Municipality



ICLEI – LOCAL GOVERNMENTS FOR SUSTAINABILITY

@ ICLEI-Africa@iclei.org +27 21 202 0381 www.africa.iclei.org www.twitter.com/ICLEIAfrica



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.

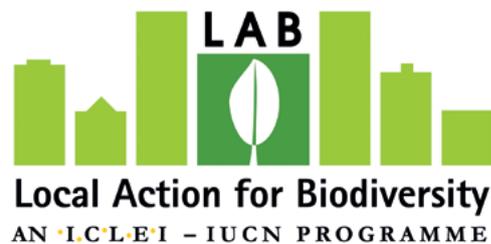
In order to strengthen the role cities and local governments play in the pursuit of greater sustainability through the collaborative design and implementation of integrated urban development and effective biodiversity management, the ICLEI Cities Biodiversity Center (ICLEI CBC) was created in 2009. The 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.

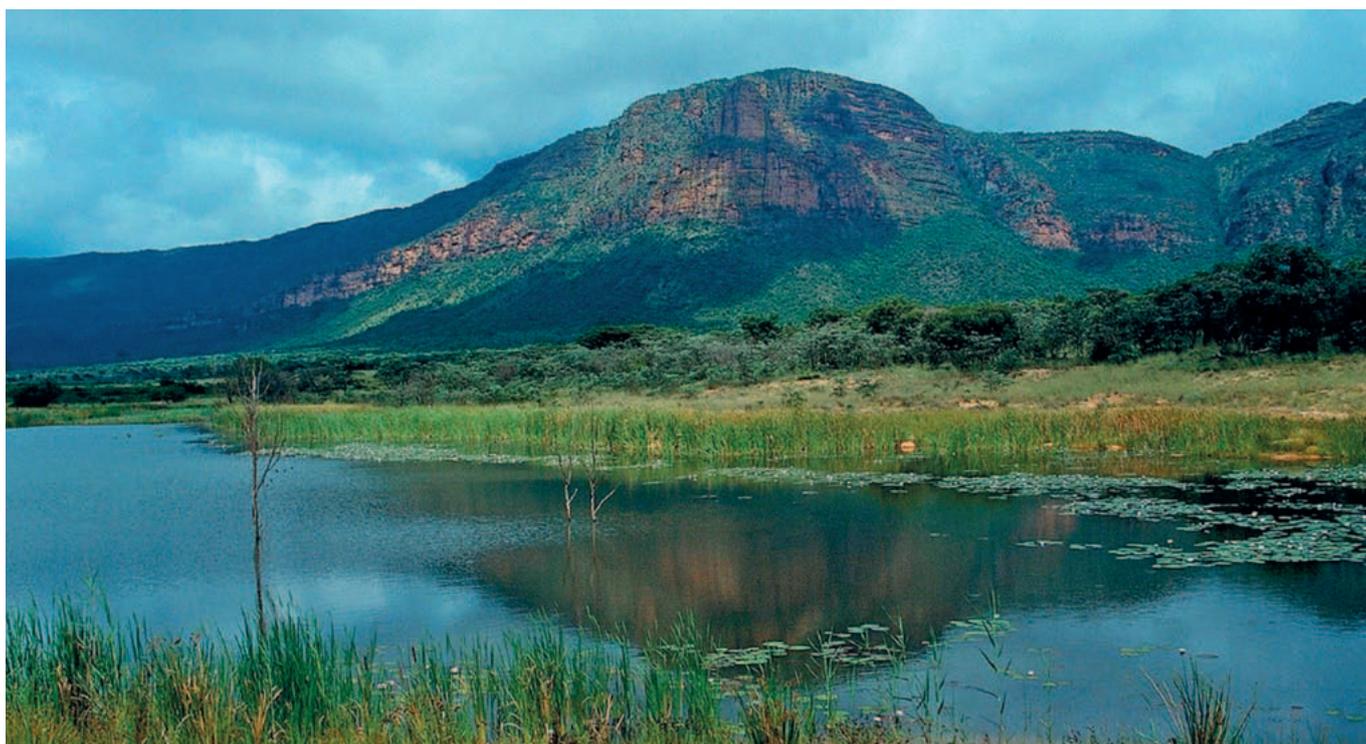
ICLEI's Local Action for Biodiversity (LAB) programme is a unique global biodiversity programme run by The ICLEI Cities Biodiversity Center. The LAB Program is aimed at improving and enhancing ecosystem management at the local level, and is recognized globally as the leading results-driven local government 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

AMD	Acid Mine Drainage	NDP	National Development Plan
AS	Africa Secretariat	NEMA	National Environmental Management Act
BGIS	Biodiversity Geographic Information System	NEMBA	National Environmental Management Biodiversity Act
CBA	Critical Biodiversity Area	NEM:WA	National Environmental Management: Waste Act
CEPA	Communication, education and public awareness	NFEPA	Natural Freshwater Ecosystem Priority Areas
CIP	Climate Information Platform	NSBA	National Spatial Biodiversity Assessment
CR	Critically endangered	NWA	National Water Act
CSAG	Climate Systems Analysis Group	NNR	Nylsvley Nature Reserve
DEA	Department of Environmental Affairs	SA	South Africa
DWS	Department of Water and Sanitation	SANBI	South African National Biodiversity Institute
EIA	Environmental Impact Assessment	SDF	Spatial Development Framework
EMF	Environmental Management Framework	SPLUMA	Spatial Planning and Land Use Management Act
ESA	Ecological Support Areas	UCT	University of Cape Town
FEPA	Freshwater Ecosystem Priority Areas	UNFCCC	United Nations Framework Convention on Climate Change.
GDP	Gross domestic product	USAID	United States Agency for International Development
GIS	Geographic Information System	USEPA	United States Environmental Protection Agency
IAPs	Invasive Alien Plants	WDM	Waterberg District Municipality
IBA	Important Bird Areas	WEBC	Waterberg Environment and Biodiversity Conservation Forum
ICLEI	Local Governments for Sustainability	WfW	Working for Wetlands
IDP	Integrated Development Plan	WNC	Waterberg Nature Conservancy
IAP	Invasive Alien Plants	WWTW	Waste Water Treatment Works
IUCN	International Union for the Conservation of Nature		
LAB	Local Action for Biodiversity		
LCPv2	Limpopo Conservation Plan version 2		
LEDET	Limpopo Department of Economic Development, Environment and Tourism		
LWF	Limpopo Wetland Forum		
MTSF	Medium Term Strategic Framework		

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EXECUTIVE SUMMARY

Waterberg District Municipality (WDM) is a category C municipality and comprises of Bela-Bela, Lephalale, Mogalakwena, Lim 368 and Thabazimbi Local Municipalities. It lies on the western part of the Limpopo Province. Informed by its powers and functions, WDM cannot provide basic services but coordinates and provides support, in line with section 88(2) of the Municipal Structures Act, to its local municipalities. Within its scope of powers and functions, WDM provides disaster management and firefighting services.

The wetlands within the municipality play a pivotal role in disaster risk management as well as reducing the impacts of climate change within the district. The wetlands throughout the district are thus considered to be high-value 'ecological infrastructure' as they provide habitat for flora and fauna, but also provide critical ecosystem services to the municipality, which helps prevent and manage natural disasters. Ecosystem services provided by wetlands 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).

Despite the wetlands within the 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 the spread of invasive alien plants (IAPs), mining activity, and extraction and infilling for development and agriculture, inappropriate development within the close proximity of wetlands, poorly regulated agricultural practices (overgrazing and cultivating) and the poor state of Waste Water Treatment Works (WWTW). Degraded wetlands are unable to function to the same degree as healthy wetlands and as such,

ecosystem service provision is severely hindered or lost. 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 designated wetland management authority within Waterberg District Municipality. Instead, the management of wetlands is a collective but disconnected effort between the various departments of the municipality, the local municipalities within the district, provincial and national departments such as The Limpopo Department of Economic Development, Environment and Tourism (LEDET), Department of Water and Sanitation (DWS), Department of Environmental Affairs (DEA) – Working for Wetlands (WfW), The Waterberg Biosphere Reserve, Waterberg Nature Conservancy (WNS), Friends of Nylsvley and the private sector (mines and private land owners).

In order to streamline and improve the management of wetlands, Waterberg 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 supply of ecosystem services, and promoting resilient communities and sustainable local economies under a changing climate within South African local governments. Through the development of this Wetland Report, ICLEI AS will assist Waterberg 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, all of which contribute to municipal service delivery, water and food security, and quality of life, particularly under a changing climate. Wetlands are high-value 'ecological infrastructure', providing critical ecosystem services such as clean water, clean air, food, medicines, water storage and habitat for biodiversity. They also play a key role in disaster management, and could lessen the negative effects of climate change through flood attenuation, temperature regulation and water and food security.

However, wetlands are South Africa's most threatened ecosystems, with 48% of wetland ecosystems critically

endangered,¹ resulting in an urgent need to increase awareness of wetland importance to incorporate natural wetland resource considerations into municipal governance mechanisms and planning.

The Waterberg District Municipality, situated in the north-eastern province of Limpopo, South Africa, has an estimated total population of 679 336. Majority of the district population are situated in and around Mogalakwena (307 682), Lephalale (115 767), as well as the Thabazimbi (85 234) local municipality areas respectively.² Major economic opportunities in the district include eco-tourism (game farming), mining and agriculture.³ These activities have huge transformative implications for the natural environment in the area.

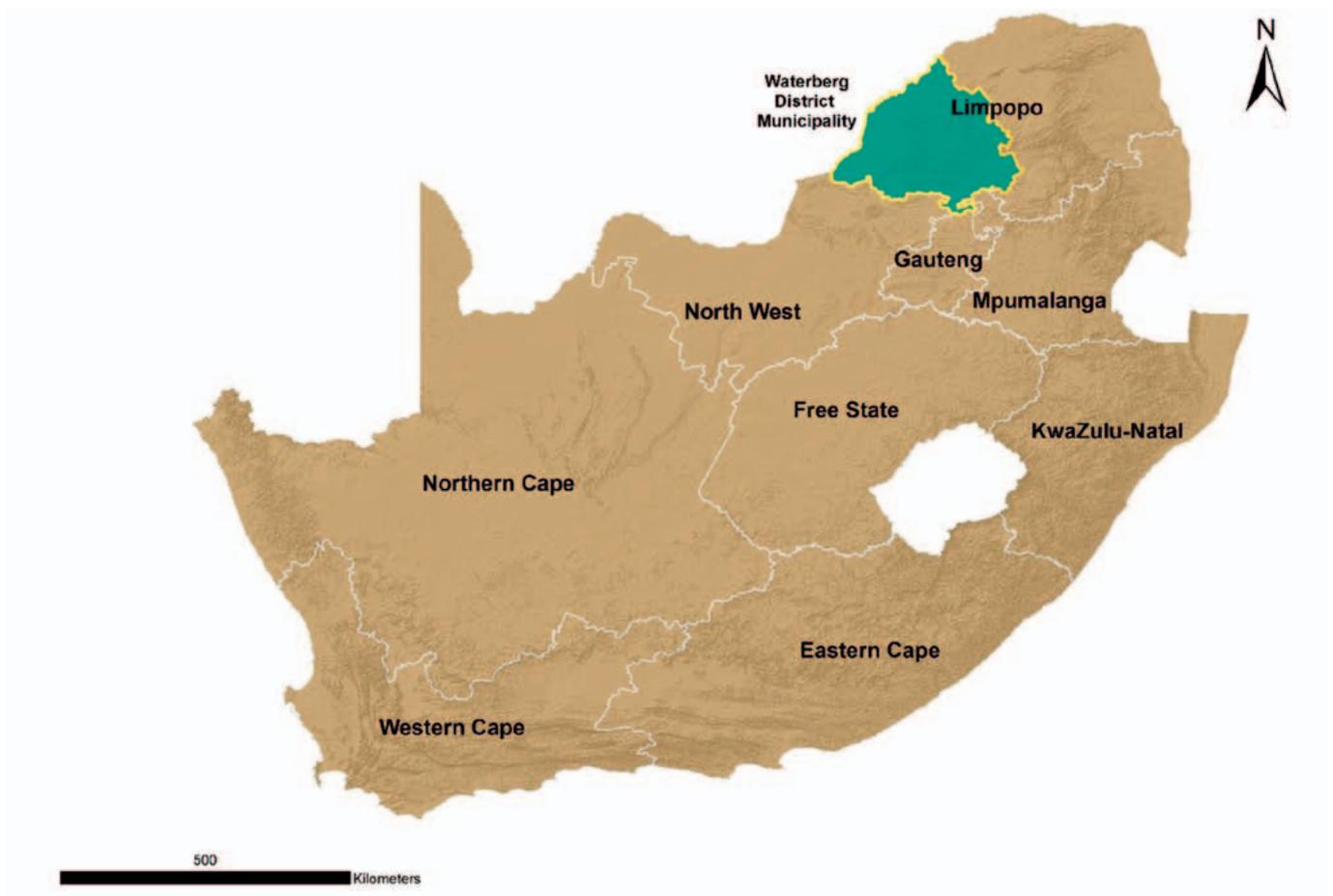


FIGURE 1: Waterberg District Municipality in relation to the rest of South Africa. (Data Source: Municipal Demarcation Board).

INTRODUCTION

Wetlands are exceptionally high value ecosystems that make up a small fraction of the country. Given their strategic importance for ensuring water quality and regulating water supplies, investment in conserving, managing and restoring wetlands are likely to generate disproportionately large returns. These important ecosystems also constitute irreplaceable natural infrastructure for managing water resources, as well as providing a range of other ecosystem services. Society cannot rely solely on complex and expensive engineering solutions to provide drinking water and treat waste water. The ecosystem services provided by wetlands include their ability to improve water quality and contribute to the maintenance of base-flows in rivers and recharge underground water resources. In the context of climate change, with predicted increases in the variability and intensity of rainfall events, wetlands have the potential to play a key role in mitigating extreme episodes such as floods and droughts.

The natural extent of wetlands in South Africa is low, and individual wetlands tend to be small, with approximately 300 000 remaining wetlands covering only 2.4% of the country,⁴ ultimately meaning that the consequences of destruction of these small wetland ecosystems are much greater as opposed to what it would have been if wetlands were larger ecosystems covering large space of land. It also means that managing and conserving the small proportion of the country's surface area covered by wetlands can make a big contribution to improving water quality and to

enhancing resilience to climate change by improving flood and drought regulation.

In South Africa, natural resources from wetlands are often central to the livelihoods of people and natural. These resources include water for agricultural, industrial and domestic use. At the same time these wetlands and the resources that they supply are coming under increasing pressure, e.g. through extensive conversion to settlement and urban development.

The development and compilation of this report was conducted by means of desktop research, face-to-face meetings and interviews with various key stakeholders in the Waterberg region. The objective was to make use of existing sources of information (documents, studies, research, indigenous human knowledge and expertise) and compiling it into one consolidated report for the municipality and others to utilise. This report can function in conjunction with the district-wide Environmental Management Framework (EMF) which also serves as tool for the district, local municipalities and private sector to make better informed decisions regarding issues related to development and utilisation of natural resources.

This report draws together the range of knowledge and understanding of wetlands in Waterberg District Municipality, and provides an overview of the stakeholders and programmes working towards improved wetland management in this region.

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

A wetland is defined in simpler terms as a feature in the landscape which is saturated with water for a long enough periods (either temporarily, seasonally or permanently) that the soils conditions change and the vegetation shifts to respond to these changes.⁵

1.1 TYPES OF WETLANDS

There are many different types of wetlands found throughout the world, all of which have different functional attributes. As a result, over time, several classification systems have been developed. The United States Environmental Protection Agency (USEPA) has developed a classification system for inland wetland systems based on the hydro-geomorphic characteristics of the wetland. The system classifies wetlands according to the way water moves in, through and out of the system and also takes into account the geomorphological position of the wetland (e.g. slope, crest, valley bottom etc.).

The South African National Biodiversity Institute (SANBI) has compiled a detailed hydro-geomorphic classification system based on the USEPA classification system to assist with wetland identification within South Africa. According to the SANBI ‘*Classification System for Wetlands and other Aquatic Ecosystems in South Africa*’, 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.⁷ An illustrative overview from this document of the different types of wetlands is included in **Figure 4**.



FIGURE 2 & 3: Mottled soils indicative of a wetland (top) and specially adapted wetland vegetation (bottom).⁶

1.1 TYPES OF WETLANDS *(continued)*

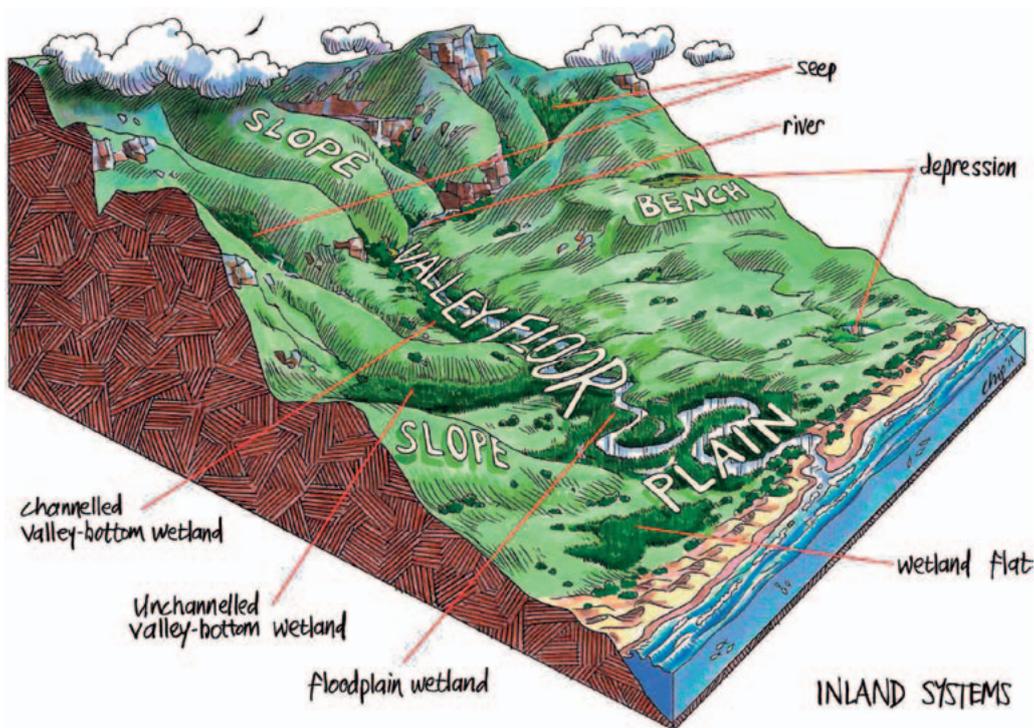


FIGURE 4: Wetland systems within South Africa.⁸

1.2 CLASSIFYING WETLANDS

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 further categorised into either a temporary, seasonal or permanent wetland system depending on the length of time that it remains a feature in the landscape.⁹

A temporary wetland is saturated for a very short period (approximately one – three months) during the rainy season only. Soils are typically characterised by a minimal grey matrix of less than 10 percent of the total soil volume and the occurrence of very few chroma mottles. Vegetation associated with this type of wetland are predominantly grass species, as well as a mixture of other species that occur in non-wetland areas as well as hydrophytic plants that are largely restricted to wetland areas. The hydrological functions associated with temporary wetlands are not considered to be significant due to the limited surface area of the temporary wetland, the limited water

volumes received, absence of the significant aerobic and anaerobic conditions, limited organic matter due to the short periods of anaerobic conditions and the average plant productivity.⁹

A seasonal wetland is saturated for most of the growing season (approximately three to six months). Soils are characterised by a grey soil matrix of more than ten percent of the soil volume, a high occurrence of chroma mottles and significant periods of wetness (minimum of three months). Vegetation associated with this type of wetland are predominantly sedges and grasses that are restricted to wetland areas, usually < 1 m tall. In terms of hydrological functions, the seasonal nature of flooding results in aerobic and anaerobic conditions which are more favourable than permanent zones for performing water purification functions. Seasonally wetlands also usually have a lower organic content than permanent wetlands due to prevalence of aerobic conditions, which promotes

1.2 CLASSIFYING WETLANDS *(continued)*

the decay of organic matter. Efficiency of seasonally wet zones with regards to organic matter is therefore lower than in permanent wet zones, but still contributes significantly to towards water purification with using these processes.

Lastly, a permanent wetland is saturated all year round. Soils are characterised by a prominent grey

(‘gleyed’) matrix, absence of high chroma mottles, saturated throughout the year and a sulphuric odour. This type of wetland is dominated by highly specialised aquatic plants adapted to permanently wet conditions.⁹ Of the three identified temporal wetland types, permanent wetlands are the most efficient at water purification, flood attenuation and stream flow regulation.

1.3 THE VALUE OF WETLANDS

“Ecosystem services are the benefits that people obtain from ecosystems.”

Millennium Ecosystem Assessment (2004)

“Ecological infrastructure refers to the naturally functioning ecosystems that deliver valuable services to people. Ecological infrastructure is the nature-based equivalent of built or hard infrastructure and is just as important for providing services and underpinning socio-economic development. Ecological infrastructure does this by providing long-term solutions to service delivery that can supplement or sometimes even substitute build infrastructure solutions. Ecological infrastructure includes healthy mountain catchments, rivers, wetlands, coastal dunes and corridors of natural habitat, which together form a network of interconnected structural elements within the landscape.”

South African National Biodiversity Institute (SANBI) (2016)

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’,¹⁰ ‘regulating services’, ‘cultural services’ and ‘supporting services’.

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. Cultural services are the nonmaterial benefits that one can obtain from wetlands such as spiritual enrichment, sense of place and aesthetic experience. Lastly supporting services are the services

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

It should be noted that ecosystem services provided by wetlands come at no cost to the municipality 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 the 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 the above definition, 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.

To illustrate the concept of biodiversity, compare two areas of the same size. Both areas have 100 animals living in the area. In the first area, there are 20 birds, 70 insects and 10 mice. The insects pollinate the flowers, the birds disperse seeds and the mice provide soil nutrients in the form of droppings so that more seed-producing plants grow. In the second area, all the animals are mice. Over time, they eat more seeds than are being replaced and the area becomes degraded. So we can see that even though both areas have the same total number of animals, the first has greater biodiversity, and is a healthy, functioning ecosystem.



FIGURE 5 & 6: Images of the Southern Ground-Hornbill (*Bucorvus leadbeateri*) bird species found within Waterberg District Municipality (left)¹¹ and the endemic Waterberg flat lizard (*Platysaurus minor*) (right).¹²

3 | WETLANDS AND BIODIVERSITY IN WATERBERG DISTRICT MUNICIPALITY

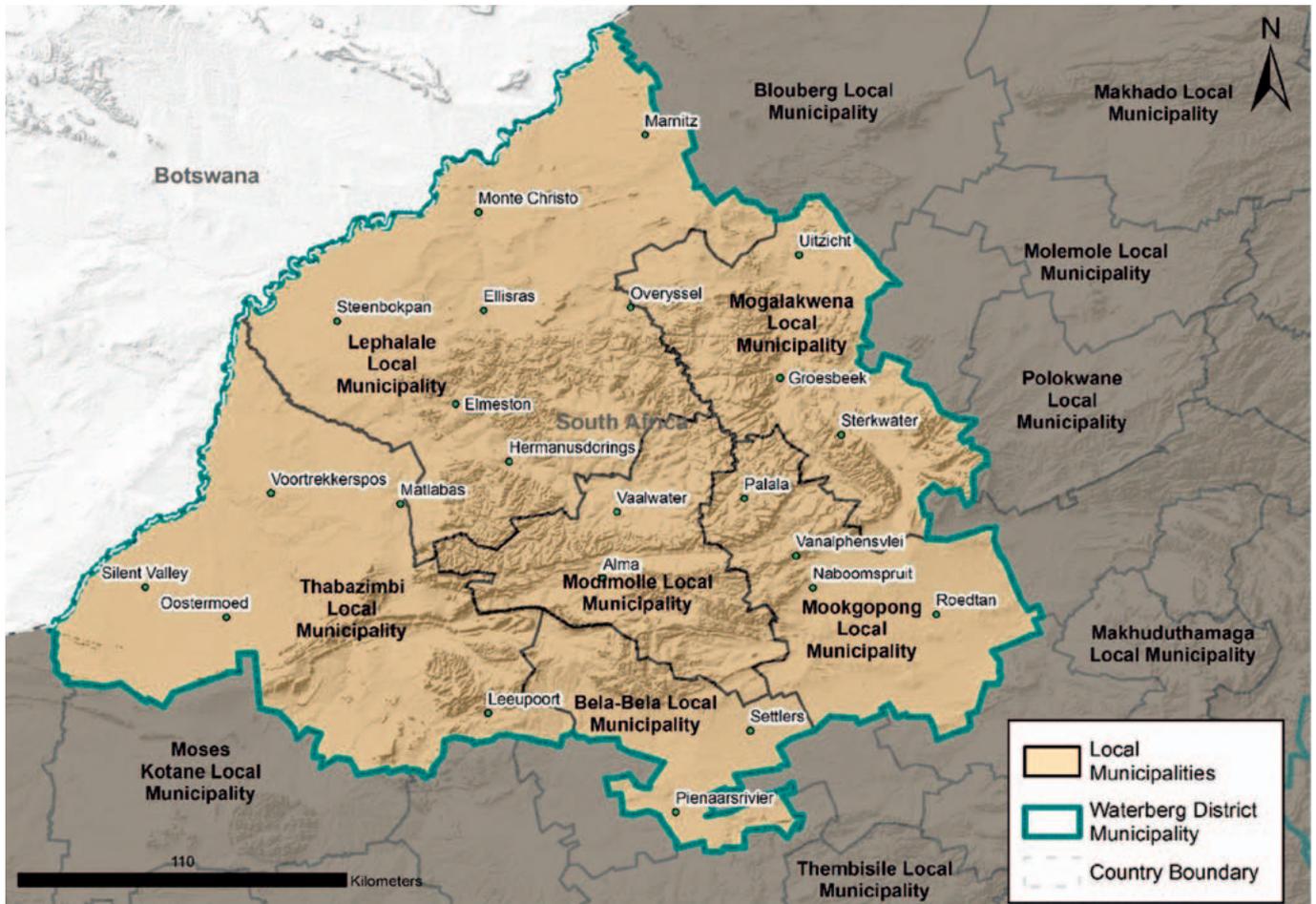


FIGURE 7: Local Municipalities within Waterberg District Municipality.

WDM is a popular tourist destination of choice with beautiful tourist attractions such as the Makapans valley, Marekele National Park, Nylsvley Nature Reserve (RAMSAR site), Warmbaths Resort (Bela Bela) and many private Game Reserves.

Wetland ecosystems present complex patterns of interacting flood dependent components. The components of the ecosystem are derived from two principal sources; the land-based or terrestrial sources and the aquatic sources. Because fluctuating water levels intermittently incorporate terrestrial components into the aquatic systems, the productivity of both systems is governed by the processes which occur under flooded and non-flooded conditions.

As in all ecosystems there are two levels of production; the primary producers (or plants) which trap solar

energy and the secondary producers (animals and decomposer microbes) which in turn are dependent on this energy source. In this way, energy enters the systems via the plants and then after a series of transfers is ultimately lost as heat. Nutrients also enter primarily through the plants but tend to be recycled through the processes of growth and decay.

A large amount of wetlands of different types are found in the Waterberg District Municipality (refer to **Figure 12**). The distribution and extent of wetlands in the area is intimately linked to rainfall, geology, topography and soils. In the more mountainous areas dominated by sandstone and other hard rock geology, wetland conditions are often expressed as sheets or large areas of hillslope seepage areas. It is for this reason that large parts of the Waterberg can be identified as wetland. These wetlands are often

3 WETLANDS AND BIODIVERSITY IN WATERBERG DISTRICT MUNICIPALITY *(continued)*

temporary and dependent on rainfall events. Due to the sandy nature of the soils, wetland expression is often in the form of bleached sandy soils covering large parts of the landscape.

Many of the wetlands in the district are underlain by basic igneous geology. Often valley bottom wetlands with unclear seepage areas and rapid wetland boundaries occur due to the degree of expression of wetness in the soils. In the flat areas to the west where rainfall decreases, the expression of wetlands is more in the form of dry drainage features or pans and structured soil areas as compared to shallower and rockier soils outside of the wetland zones.¹³ In the north and north-eastern areas of the WDM near Lephalale where there is flat to undulating, depression wetlands or endorheic pans are also found.

The majority of the Waterberg falls within the Central Bushveld Bioregion, which falls within the Savanna Biome. There are also small patches of vegetation that fall within the Mesic Highveld Grassland Bioregion, which falls within the Grassland Biome. These bioregions and biomes are zonal vegetation types,

which is vegetation typical of particular climatic zones. A-zonal vegetation, in contrast, occurs under special substrate and/or hydrogeological conditions, which exert an over-riding influence on floristic composition, structure and dynamics over a macroclimate. There are various A-zonal vegetation types occurring in the study area, including a-zonal forest, alluvial vegetation and inland saline vegetation.¹⁴



FIGURE 8: Aerial image of the Nylsvley wetland.¹⁵

3.1 LIMPOPO PROVINCE CONSERVATION PLAN V2

The Limpopo Conservation Plan version 2 (LCPv2) has two primary products – the map of Critical Biodiversity Areas (CBA) and associated land-use guidelines. The primary objective of this project was to produce a revised conservation plan for Limpopo Province that conformed to the Bioregional Planning guidelines published by SANBI in 2009.

Critical Biodiversity Areas within the bioregion are the portfolio of sites that are required to meet the region's biodiversity targets, and need to be maintained in the appropriate condition for their category. A map of CBAs for Limpopo was produced as part of this plan and sites were assigned to CBA categories based on their biodiversity characteristics, spatial configuration and requirement for meeting targets for both biodiversity pattern and ecological processes.



FIGURE 9: View across the Nylsvley wetland.¹⁶

3.1 LIMPOPO PROVINCE CONSERVATION PLAN V2 (continued)

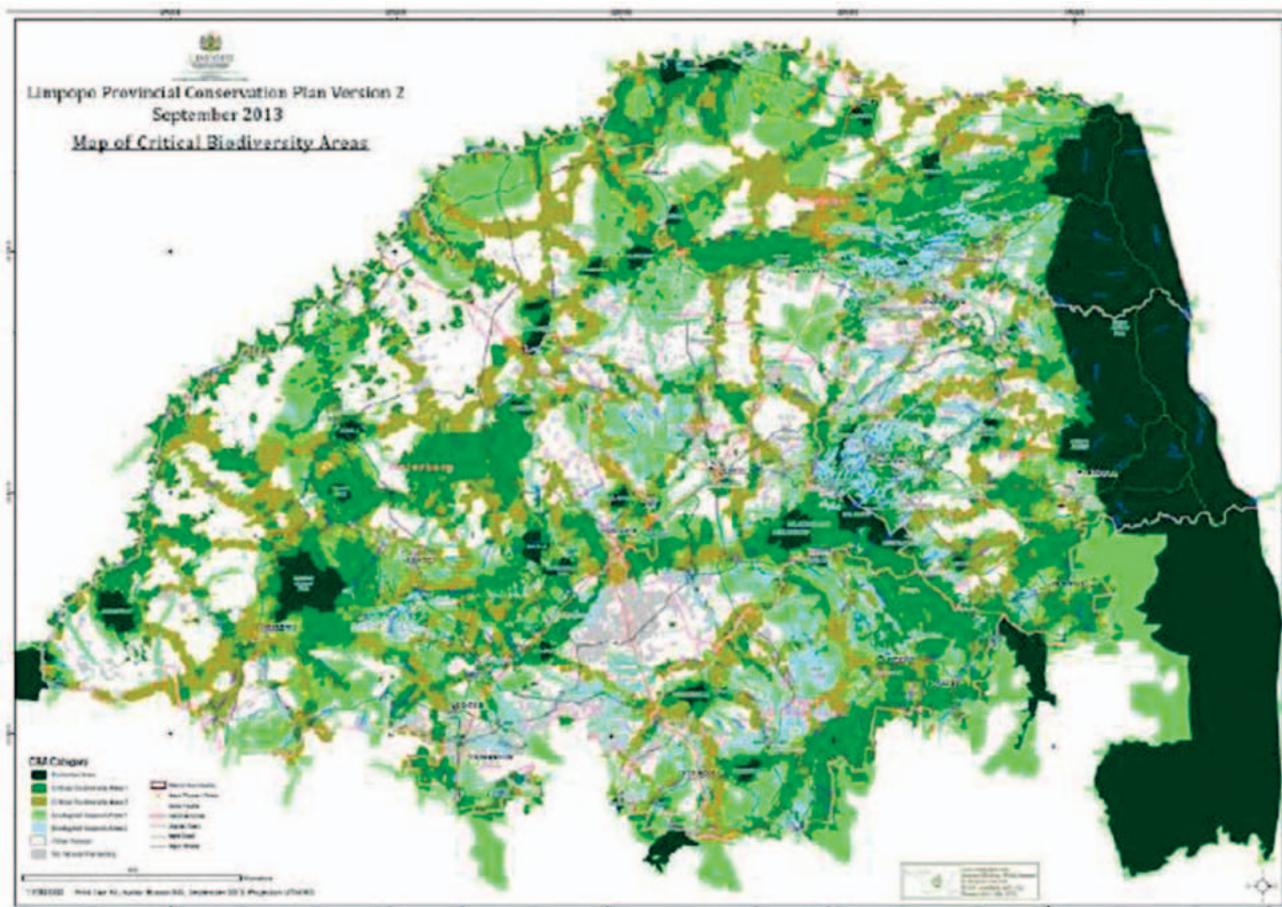


FIGURE 10: Snapshot of the Limpopo Conservation Plan.¹⁷

Based on the Limpopo Conservation Plan, 40% of the province is designated as Critical Biodiversity Area. These CBAs have been split into CBA 1 and CBA 2 on the basis of selection frequency and the underlying characteristics of the biodiversity features which are being protected (i.e. location fixed features such as sites for CR species and flexible ones such as Least Cost Corridors).

The majority of the CBAs in the province are CBA 1 (22%), which can be considered “irreplaceable” in that there is little choice in terms of areas available to meet targets. If CBA 1 areas are not maintained in a natural state then targets cannot be achieved. CBA 2 is considered “optimal” as there is significant design involved in their identification, make up 18% of the province. CBA 2 represent areas where there are spatial options for achieving targets and the selected sites are the ones that best achieve targets within the landscape design objectives of the plan. An additional

23% of the province is designated as Ecological Support Area (ESA). This category has also been split on the basis of land-cover into ESA 1 (16%) and ESA 2 (7%), with ESA 1 being in a largely natural state while ESA 2 areas are no longer intact but potentially retain significant importance from a process perspective (e.g. maintaining landscape connectivity). Other natural areas make up 20% of the province and just over 11% is designated as formal Protected Area. The relatively high portion of remaining natural habitats which have been designated in one of the priority categories is a function of the fully integrated terrestrial and freshwater assessment (i.e. unlike many provinces there is not a second additional map of freshwater priorities), the comprehensive corridor and climate change adaptation features, and the relatively poor overlap of features (i.e. priority areas for one taxa do not spatially correlate well with those of other taxa in most of the savanna areas).

3.1 LIMPOPO PROVINCE CONSERVATION PLAN V2 *(continued)*

Freshwater Ecosystem Priority Areas (FEPA) such as rivers, wetlands and catchments were included in this database. Rivers, wetlands, priority catchments and strategic water source areas form a critical spatial backbone to the LCPv2. This is desirable as hydrological features are a key part of overall landscape function.

The above approach was designed to strongly force FEPAs and other identified priority hydrological features into the identified network of CBAs. Features were designed to overlap, with high targets set for

the key features and lower targets as one moves into buffers and broader catchments. The relatively high targets used for aquatic features are designed to force selection of the broader terrestrial and species priorities into the aquatic priority areas. This is deliberately done to ensure a design which is ecologically sensible and support the key linking process that water related features support in the landscape. Other natural wetlands and a minimum buffer of 1 km around major rivers were included as Ecological Support Areas.

TABLE 1 RECOMMENDED LAND MANAGEMENT GUIDELINES IN CBA'S AND ESA'S

AQUATIC ECOSYSTEMS IN THE CRITICAL BIODIVERSITY AREAS CATEGORIES	AQUATIC ECOSYSTEMS IN THE ECOLOGICAL SUPPORT AREAS CATEGORIES
<ul style="list-style-type: none"> • Maintain water quality and flow regimes should be maintained as close to natural as possible. • Where Environmental Reserves or Environmental Flow Requirements have been determined these should be strictly adhered to. • All effluent (including municipal, mining and industrial waste water) as well as AMD should be treated to required specifications before release. • Stormwater flow should be managed to avoid damage to CBA areas. • Where CBAs include floodplains (e.g. areas within the 1:100 year floodline), riparian areas (e.g. as a minimum, a 32 m buffer around rivers) or buffers around wetlands, particular attention should applied to ensure that these remain in a natural state or are rehabilitated to this state. In addition to avoiding land transformation, other activities such as livestock access may need to be controlled and alien vegetation managed to avoid damage to banks. Do not permit infilling, excavation, drainage, hardened surfaces (including buildings and asphalt), intensive agriculture or any new developments within a river or wetland. • Areas that are degraded or disturbed should be rehabilitated, through programmes such as Working for Water, Working for Wetlands and a systematic alien vegetation eradication programme implemented. Rehabilitation work should be undertaken in a way which does not negatively impact on the survival of threatened species. 	<ul style="list-style-type: none"> • Water quality and flow regimes should be maintained as close to natural as possible. • Where Environmental Reserves or Environmental Flow Requirements have been determined these should be strictly adhered to. • All effluent (including municipal, mining and industrial waste water) as well as AMD should be treated to required specifications before release. • Stormwater flow should be managed to avoid damage to ESA areas. • Where ESAs include floodplains (e.g. areas within the 1:100 year flood line), riparian areas (e.g. as a minimum, the 32 m around rivers) or buffers around wetlands, particular attention should applied to ensure that these remain in a natural state or are rehabilitated to this state, or that there is no additional impact on ecological functioning, and where possible these areas rehabilitated to improve ecological functioning. In addition to avoiding land transformation and intensification of land use, other activities such as livestock access may need to be controlled and alien vegetation managed to avoid damage to banks. Do not permit infilling, excavation, drainage, hardened surfaces (including buildings), intensive agriculture or any new developments within a river or wetland. • Areas that are degraded or disturbed should be rehabilitated, through programmes such as Working for Water, Working for Wetlands and a systematic alien vegetation eradication programme implemented. • Creation of berms, roads, culverts, canalisation, channelisation, alien vegetation, impoundment, abstraction, well points, storm-water or other point source inflows, irrigation return flows, grazing/trampling, agriculture, golf courses, suburban gardens, artificial deepening, and drainage, should be avoided where possible within the 1:20 year flood line.

3.2 MAPPING WETLANDS IN WATERBERG DISTRICT MUNICIPALITY



FIGURE 11: Waterberg District Municipality EMF map indicating wetland ecosystems occurring in the municipal region.

Currently there is no specific ground-truthed wetland map available which covers the Waterberg District Municipality in its entirety.

The Waterberg Environmental Management Framework (EMF) contains a map indicating the location of wetlands and other waterbodies present in the district. While the map is not of the best quality in terms of resolution, it does provide a good district-wide, geographical snapshot of where the waterbodies are located.

Using the mapping tool on the SANBI BGIS (Biodiversity Geographic Information System) website, <http://bgis.sanbi.org/MapViewer>, it is possible to generate a National Freshwater Ecosystem Protection Area (NFEPA) wetland map for a given area with minimal Geographic Information System (GIS) skills.

The map generated 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 map can be used as a first-level assessment of wetland occurrence within the municipality. It should be noted however, that the NFEPA wetland map is based 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 indication of true wetland distribution data across the

3.2 MAPPING WETLANDS IN WATERBERG DISTRICT MUNICIPALITY *(continued)*

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.

The Limpopo Department of Economic Development, Environment and Tourism (LEDET) is currently in the process of locating, mapping and ground-truthing wetland ecosystems throughout the entire Limpopo province. Having to cover a provincial area

of approximately 125,754 km² and being extremely under capacitated, the department is in need of support. Though the process of identifying wetlands is moving at a slow to moderate pace, LEDET has managed to map and ground truth twenty seven (27) wetland ecosystems in the Waterberg area alone. Table 2 represents the research thus far and includes details including localities, impacts, uses and status of the mapped wetlands.

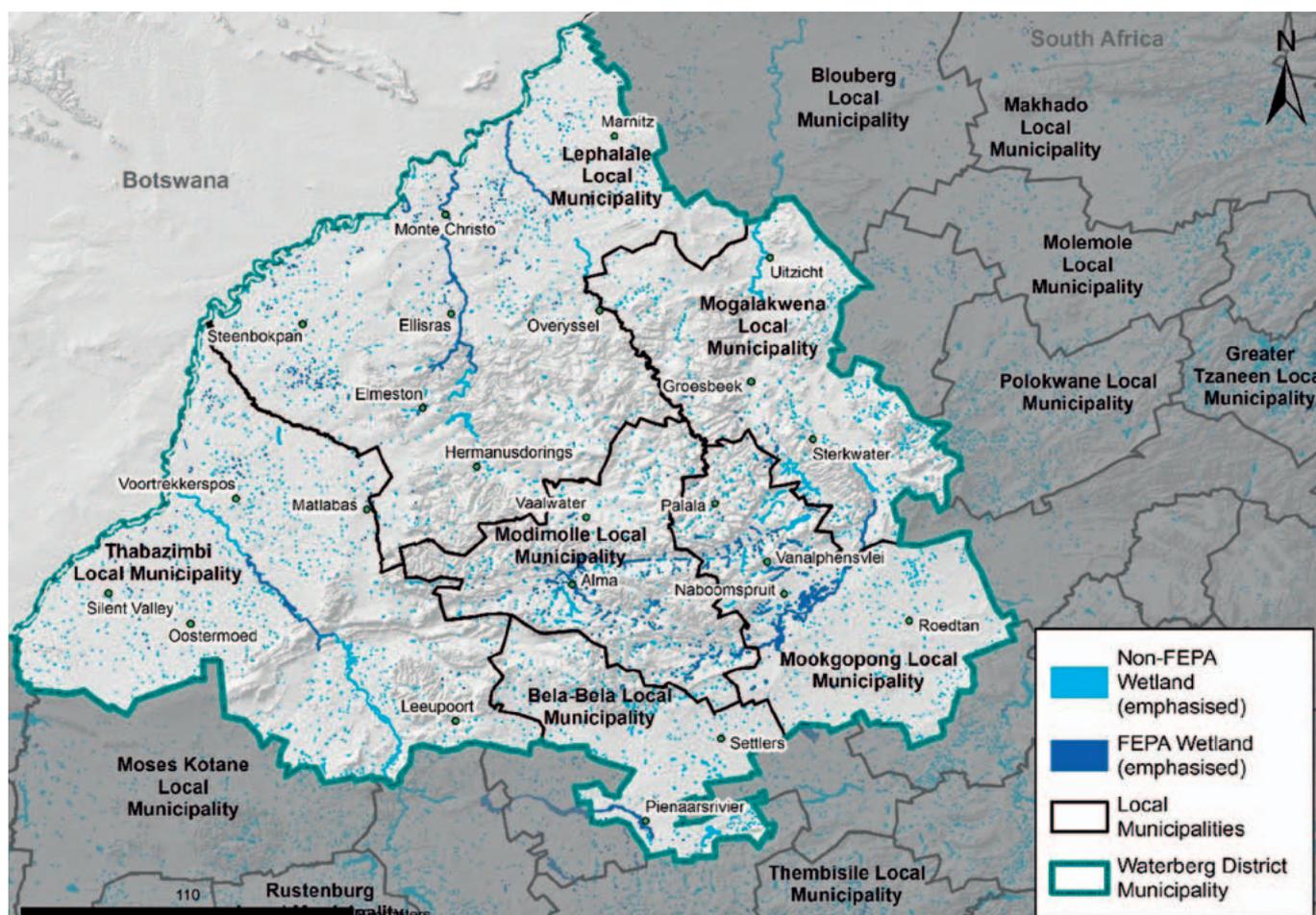


FIGURE 12: Map indicating the spatial distribution of the NFEPA wetlands within Waterberg District Municipality.

The LEDET indicated its commitment towards the continuous mapping and ground-truthing of wetlands throughout the province. The department also

emphasised their need for assistance and capacity in carrying out this tasks.

TABLE 2 MAPPED AND GROUND-THRU THED WETLANDS IN THE WATERBERG DISTRICT MUNICIPALITY

CATCHMENT	LOCALITIES	SIZE (HA)	GPS COORDINATES		TYPE	REGIME	MAIN IMPACT/USE	STATUS
			SOUTH	EAST				
Nyifloodplain	Nyl Bridge	0,5	24°39,614'	28°40,380'	Channelled valley bottom wetland	Permanent	Water Abstraction	Good
Nyifloodplain	Nylsvley Marshes	2	24°38,950'	28°41,488'	Channelled valley bottom wetland	Permanent	Bird Watching Site	Average
Nyifloodplain	Jacana Bird hide	1	24°38,413'	28°41,967'	Channelled valley bottom wetland	Permanent	Bird Watching Site	Good
Nyifloodplain	Crake Bird hide	N/A	N/A	N/A	Channelled valley bottom wetland	Permanent	Bird Watching Site	Good
Nyifloodplain	Dabchick Bird hide	N/A	N/A	N/A	Channelled valley bottom wetland	Permanent	Damming	Average
Nyifloodplain	Vogelfontein	2	24°36,935'	28°41,483'	Channelled valley bottom wetland	Permanent	Road	Good
Nyifloodplain	Mokopane 3	1,5	24°16,580'	28°58,497'	Channelled valley bottom wetland	Permanent	Road	Average
Nyifloodplain	Sekgagapeng	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Thaba Motswere	N/A	N/A	N/A	Channelled valley bottom wetland	Seasonal	Road & Bridge	Average
Mogalakwena	Sondela Doornpunt	3	24°55,130'	28°25,019'	Channelled valley bottom wetland	Seasonal	Grazing	Average
Mogalakwena	Sondela vlei	3	24°52,931'	28°24,225'	Channelled hillslope seepage	Seasonal	Grazing	Average
Mogalakwena	Sondela fontein 1	4	24°53,060'	28°23,253'	Channelled Hillslope seepage	Seasonal	Grazing	Average
Mogalakwena	Sondela Fontein 2	3	24°52,659'	28°22,833'	Channelled Hillslope seepage	Seasonal	Grazing	Poor
Mogalakwena	Thelekhesi	4	23°39,545''	28°34,526'	Channelled Hillslope seepage	Permanent	Residential	Poor
Mogalakwena	Sterkwater	2	23°32,228'	28°37,129'	Channelled valley bottom	N/A	N/A	N/A
Mogalakwena	Belabela	9	24°54,239'	28°17,934'	Pan	Seasonal	Grazing	Average
Limpopo	Steenbokpan	1,2	23°70,661'	27°24,253'	Pan	Seasonal	0	N/A
Limpopo	Brakpan	1	23°68,037'	27°25,089'	Pan	Permanent	Grazing	Average
Lephalale	Lephalale 1	0,5	23°57,904'	27°72,162'	Pan	Seasonal	Grazing	N/A
Lephalale	Lephalale 3	1,5	23°53,64	27°70,787'	Pan	Seasonal	Grazing	Good
Lephalale	Uitpan	0,5	23°35,507'	27°65,298'	Pan	Seasonal	Grazing	Good
Lephalale	Uitpan 2	0,5	23°33,518'	27°68,467'	Pan	Seasonal	Grazing	Good
Lephalale	Seleka 2	3	23°27,186'	27°94,807'	Channelled valley bottom wetland	N/A	Grazing	Poor
Lephalale	Lephalale River Channel	0,5	N/A	N/A	Channelled valley Bottom	Seasonal	Residential	Very poor
Lephalale	Seleka 1	5	23°21,728'	27°89,205'	Not channelled valley bottom	Temporal	Bridge	Good
Lephalale	Stockpoort	2	23°40,361'	27°35,153'	Hillslope Seep	Permanent	Water abstraction	Good
Lephalale	Lephalale Seepage	5	23°61,307'	27°74,379'	Channelled valley bottom wetland	Seasonal	Road	Average ¹⁸

3.3 KEY WETLANDS IN THE WATERBERG DISTRICT MUNICIPALITY

The Waterberg District Municipality is home to the beautiful Waterberg mountain range. The large plateau with its steep escarpments, sandstone hills and 2 000 m above sea level high topography can be characterised by numerous waterbodies. These waterbodies include streams and small rivers, rock-pools, deep and large pools in the stream and river beds, fountains, marshes, and other features associated with the high rainfall on the rocky areas of the mountains. The Lephallala, Mokolo, Matlabas, and

the Mogalakwena rivers are four of the main drainage systems in the Waterberg area and together with their various tributaries and wetlands, make up a major water catchment area for the greater Limpopo basin.¹⁹

Although all wetland ecosystems are important, this section seeks to highlight a few key wetlands in the WDM, primarily focusing on the Waterberg System and the Nyl River Floodplain as Important Bird and Biodiversity Areas (IBA) in the district.

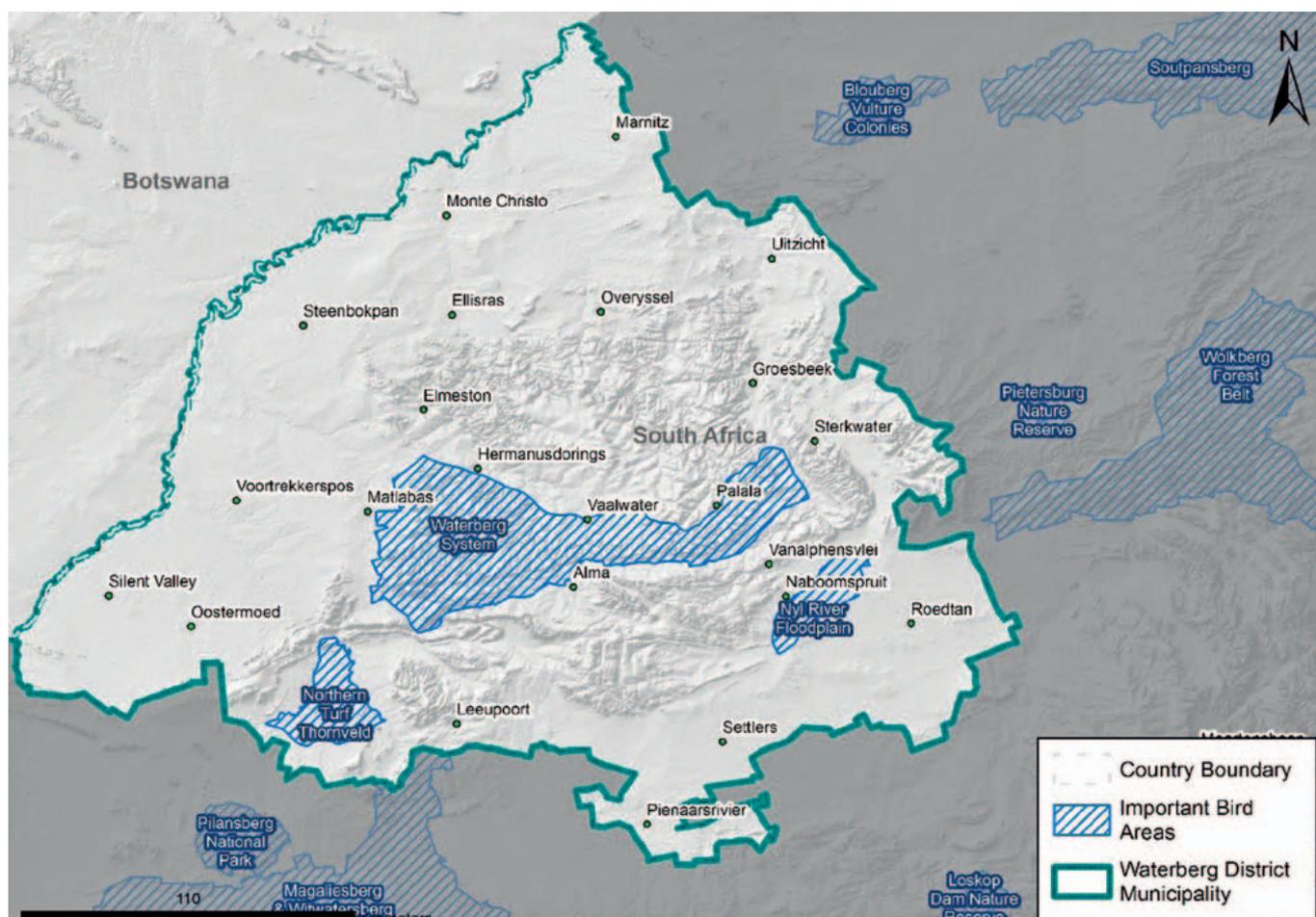


FIGURE 13: A location map of the IBA's found in the Waterberg District Municipality.²⁰

3.3.1 Waterberg System

The Waterberg System sits almost perfectly centred in the heart of the Waterberg region, roughly between the towns of Modimolle, Thabazimbi, Lephallale and Mokopane.

The system forms an important part of the Waterberg Biosphere Reserve, and is home to the entire Waterberg plateau, which is approximately 130 km long. The Kransberg, in the western sector of the Waterberg range, has been incorporated into Marakele National Park.

3.3 KEY WETLANDS IN THE WATERBERG DISTRICT MUNICIPALITY *(continued)*



FIGURE 14 & 15: Plant and animal species found in the system include the (*Protea roupelliae*)²² (left) and the beautiful Half-collared Kingfisher (*Alcedo semitorquata*) (right).²³

The area is rich in marshes, pools, rivers and streams and also characterised by open broad-leaved woodland that is common on the plains below the Waterberg Mountains, and is home to a vast array of plant and animal life which include the globally threatened and IBA triggered species Cape Vulture, the South African endemic Lowveld flat gecko (*Afroedura langi*), and the African elephant (*Loxodonta africana*), which was re-introduced in several high-profile conservation areas. The system forms part of the Waterberg Biosphere Reserve and is home to the protected areas of Marakele National Park, D’Nyala Nature Reserve, Entabeni Nature Reserve, Doordraai Nature Reserve and Hans Strijdom Nature Reserve.²¹

The Waterberg System is believed to form part of the Nyl River Floodplain, which makes the management and protection of the system vitally important. According to the IBA Directory on the Birdlife South Africa website; not many threats impact the system.

Threats to the Waterberg System include:

- Agricultural and mining activities.
- Uncontrolled fires.
- A number of large dams occur in the system, which when not appropriately managed, impact

on the Nyl River Floodplain, as the Waterberg is within the catchment of the Nyl River. These two catchments are therefore interconnected.

3.3.2 Nyl River Floodplain

The Nylsvley Nature Reserve is a RAMSAR site in the Nyl River floodplain, situated within the Waterberg District. The floodplain stretches across and covers a large portion of the region, between the towns of Modimolle and Mookgophong. The site acquired a new national and international status, and as such, is recognized as being of significant value not only for South Africa as a country, but also for humanity as a whole. The system derives its floodwaters from rain that falls in the nearby foothills of the Waterberg range (Waterberg System IBA). About 12 tributaries drain this area and discharge their water into the floodplain at various points along its course. In general, the climate is semi-arid, with three fairly distinct seasons: a hot, wet season from November to April, during which the Nyl River occasionally floods; a cool, dry season from April to August; and a hot, dry season from August to October. The annual average minimum and maximum temperatures are 12°C and 26.4°C respectively, and the mean rainfall is about 600 mm a year.²⁴

3.3 KEY WETLANDS IN THE WATERBERG DISTRICT MUNICIPALITY *(continued)*

The reserve, or Nylsvley wetland as it is more commonly known, is a model of everything a savannah biome encompasses. The area has undergone a tremendous amount of study and in-depth research focussing on different paradigms including its hydrological properties, associated threats, benefits (use) and management. The wetland in its entirety is in fairly good state with majority of the area untouched. Eco-tourism and related opportunities are currently being explored.

The Nyl River Floodplain is also listed as an Important Bird Area (IBA) in the Waterberg region under categories A1, A3 and A4i and iii. Criteria A4i states that the site is known or thought to hold, on a regular basis, >1% of the Afro-tropical population of a congregatory waterbird species; and criteria iii states that the site is known or thought to hold, on a regular basis, >20 000 waterbirds.²⁵

Because of Nylsvley's international recognition, importance and significance in terms of ecology, botany, zoology, hydrology and international importance to waterfowl, it is vitally important for the district and local municipalities to play their part in the conservation and protection of the natural area with a direct bearing on the entire Nylsvley catchment. It is advised that an agreement is established between the reserve and the surrounding municipalities, aimed at reducing and mitigating the impacts municipalities have on this critical catchment.

Key values and attributes of the NNR:

- Nylsvley was declared as a Ramsar site and is one of the largest floodplain wetlands in South Africa.
- The reserve offers some of the best bird watching opportunities in southern Africa and hosts the breeding grounds of a variety of rare bird species.
- The reserve is home to healthy populations of Roan Antelope and Tsessebe.
- Exceptional scenic qualities.
- Reserve Management Documents: Nylsvley Nature Reserve (Strategic Plan)
- The reserve is easily accessible by tourists and offers a self-drive option for normal sedan vehicles.
- Good quality accommodation is available at the reserve.

For more information on the Nylsvley Ramsar site visit the [Birdlife South Africa IBA directory](#) and [Friends of Nylsvley](#) websites.



FIGURE 16: Welcoming notice board at the Nylsvley Nature Reserve (NNR).



FIGURE 17 & 18: Images illustrating the scenic nature of the Nylsvley wetland.

3.4 THE VALUE OF WETLANDS IN WATERBERG DISTRICT MUNICIPALITY

As outlined in Section 1, wetlands provide innumerable goods and services to local communities and municipalities in the form of provisioning, regulatory, cultural and supporting services. Wetlands are not isolated environments; much like large forests are the planet’s “lungs”, wetlands are the world’s “kidneys”. They act like sponges, filtering contaminants out of water and releasing the cleaner water to surrounding

areas when rainfall is low, or soaking excess water up when rainfall is high. They are effective bulk wards against destructive flooding, soaking up large volumes of water, and help keep rivers clean.

The following ecosystem services have been identified as being prominent in the Waterberg District Municipality and are summarised in Table 3 below.

TABLE 3 ECOSYSTEM SERVICES IDENTIFIED IN WATERBERG DISTRICT MUNICIPALITY

ECOSYSTEM SERVICE TYPE	ECOSYSTEM SERVICE	DESCRIPTION/ CASE STUDY
Provisioning	Food	Local communities harvest local plants and fish to support their diets. Wetland fringe zones are used for informal cultivation/small scale farming and plant and harvest various crops.
	Clean drinking water	Local communities, particularly those located in the more rural areas, use clean water supplied by the wetlands for drinking purposes.
	Medicinal plants	Many of the plants growing within and around wetlands have natural medicinal properties. These plants are harvested to maintain/improve their personal health.
	Raw materials	Wetlands provide a significant number of raw materials which directly contribute to local livelihoods and income. Local communities harvest reeds from the wetlands to make baskets and furniture and grasses for thatching.
	Grazing Land	Local communities, living particularly in the more rural areas, use the wetlands as pasture for their livestock.
Regulatory	Water storage and stream flow regulation	Wetlands in the municipality store stormwater runoff and slowly release the water as the water table drops. This contributes to sustained streamflow throughout the year.
	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.
	Erosion control	Wetland plants strengthen the banks of wetlands and thereby contribute to sediment stabilisation and soil retention within the catchment.

continued

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

TABLE 3 ECOSYSTEM SERVICES IDENTIFIED IN WATERBERG DISTRICT MUNICIPALITY

ECOSYSTEM SERVICE TYPE	ECOSYSTEM SERVICE	DESCRIPTION/ CASE STUDY
Regulatory	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.
	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 Nylsvley, are popular tourist destinations.
	Recreation	The wetlands within Waterberg District Municipality are used extensively for recreation purposes. Activities undertaken within these wetlands include birding, frogging, canoeing, bike riding, and hiking, picnicking along the banks of the wetland systems and fishing.
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.
	Supporting habitat	A large variety of bird, fish and invertebrate species are dependent on the wetlands within Waterberg 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.

3.5 WISE USE OF WETLANDS IN THE WATERBERG REGION

At the centre of the RAMSAR philosophy is the “wise use” of wetlands. When Contracting Parties accede to the RAMSAR Convention, they commit to work towards the wise use of all the wetlands and water resources in their territory, through national plans, policies and legislation, management actions and public education. These initiatives should also filter down, be adopted and actioned at the local or municipal level.

The RAMSAR Convention defines wise use of wetlands as the maintenance of their ecological character, achieved through the implementation of ecosystem approaches, within the context of sustainable development.²⁷ Wise use can thus be seen as the conservation and sustainable use of wetlands and all the services they provide, for the benefit of people and nature.

3.5 WISE USE OF WETLANDS IN THE WATERBERG REGION *(continued)*

Contracting Parties commit to work towards the wise use of all the wetlands and water resources in their territory, through national plans, policies and legislation, management actions and public education.

In 1990, Contracting Parties adopted Guidelines for the implementation of the wise use concept. The Guidelines emphasized the importance of:

- Adopting national wetland policies, either separately or as a component of wider initiatives such as national environmental action plans;
- Developing programmes covering wetland inventory, monitoring, research, training, education and public awareness;
- Developing integrated management plans at wetland sites.

3.6 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 deliberate draining of wetlands, development and expansion (both urban and agricultural) and pollution. Damage to wetlands results in increasingly limited functionality and subsequently a decrease in the ability to provide valuable ecosystem services.

Sewage (Municipal infrastructure) – The almost complete failure of sewage works in much of the area and the subsequent pollution of rivers and wetlands is a major concern.

Waste Disposal and/or Dumping – Infilling of wetlands involve the dumping of solid material or waste onto the surface of the wetland. According to Kotze and Breen (2000) infilling generally has a very high and permanent impact on wetland functioning. Water flow patterns in the wetlands are altered and the natural vegetation is lost. This leads to a complete destruction of wetland areas.

Residential and Industrial Development – Due to an increase in population and economic growth, Waterberg is experiencing major infrastructural developments.



FIGURE 19: Dumping of solid waste in a wetland.

3.6 THREATS TO WETLANDS *(continued)*

Invasive Alien Plants (IAPs) – Invasive Alien Plant species (IAPs) displace indigenous vegetation and therefore impact the integrity of the wetland system. They drain wetlands and destroy indigenous vegetation, reducing cover, rendering it poor quality habitat for wetland fauna. The Waterberg is heavily infested with invasive alien plant species. The Waterberg Nature Conservancy website (<http://www.waterbergnatureconservancy.org.za/index.php/from-the-newsletters/invasive-aliens>) goes into some detail on IAPs in the district through information sheets and information on possible solutions of eradication and opportunities (e.g. poverty alleviation) these species present.

Wetlands in particular and open waterbodies in general are of the most threatened habitats in the world. In some catchments in South Africa, studies reveal that over 50% of the wetlands have already been largely transformed or totally destroyed.

Agriculture (cultivation, overgrazing and trampling)

Cultivation: Commercial and Subsistence – Many wetlands have been cultivated, and thus irreversibly transformed due to agriculture practices in the district. Consequently, agricultural activities have significantly altered the size and shape of most wetlands around the area. Additionally, water regimes within most wetlands have been altered from permanent to either seasonal or temporal wetlands.

Livestock – In areas where livestock farming, including ostrich farming, is the dominant form of agriculture. Wetlands have been significantly affected through trampling effects. The trampling effect of livestock leads to suppression and significantly affects the rate of wetland vegetation regeneration. This happens mostly on private land where extensive livestock grazing is predominant.

Irrigation – Irrigation practices can drain wetlands if water is pumped directly from them. This can also change the hydrology of the wetlands and influence the natural ecological processes which depend on seasonal flooding and drying.

Mining (sand, coal, open-pit mining) – The Waterberg is considered the ‘next frontier’ in terms of coal-mining in South Africa, cited by many as the answer to much of the country’s future additional energy requirements. Home to what is believed to be the third-largest coal reserves in South Africa, the area is set to become a new powerhouse for coal-fuelled electricity production in the country – a far cry from the agriculture-dominated area it is today.

Development has been triggered by Eskom’s new Medupi Power Station outside Lephalale. According to Eskom’s website, the power station, which is currently under construction, will be the ‘fourth-largest coal plant in the Southern Hemisphere’, and will be ‘the biggest dry-cooled power station in the world’.

This has prompted various mining companies to start prospecting in the Waterberg region. Further expansion could see more new power stations being constructed and several more new coal mines being added to the region to supply the necessary coal for these large operations. This will undoubtedly lead to dramatic changes in the landscape.

The extensive and rich mineral resources are located in the North-Eastern and Western parts of the District. Currently, mining is the largest and predominant contributor to the Gross Domestic Product (GDP) of the Province at 57.5%, with a recorded annual growth rate of 13.9%. Extensive current and planned mining activities are mainly located in the Lephalale area which has the third biggest coal reserves in country, providing the District with a distinct competitive advantage which could strategically position the area as a continental powerhouse of coal fuelled electricity production. The coal fields at Lephalale also currently fuels a number of Eskom’s power stations.

3.6 THREATS TO WETLANDS *(continued)*

Other mining activities include iron ore mining in the Thabazimbi area, and extensive platinum reserves in the Mokopane and Northham areas, which has been ear-marked for future exploration.

The success of mining development hinges on a number of key factors:

- Effective transport network;
- Water supply;
- Service management;
- Electricity provision; and
- Skilled labour supply.

Besides the mineral extraction process, the emergence of new mining communities' impacts significantly on housing development, retail and service supply demands. Some concerns have been raised about processes and procedures involved in prospecting in local areas as well as reallocation of communities

due to mining rights and activities. Intergovernmental and inter-sectoral planning across private and public sectors to ensure that appropriate planning therefore should precede unlocking potential and conflict mitigation can take place.

Coal mining, or mining in general pose detrimental effects to wetland ecosystems, including:

- Existing hydrological flows change as a result of site disturbances
- Change in the drainage patterns of the landscape
- Reduction in quality, size or function of existing wetlands
- Change in quality of surrounding water
- Habitat loss impacting on small animals (insects, amphibian, mammal) unable to migrate
- Loss of ecosystem services as outlined above
- Loss of species diversity
- Loss of ecosystem resilience



FIGURE 20: Image depicting a small tributary where the water filtration capabilities of wetlands higher up in the catchment is illustrated. The brown water on the left has moved through a wetland that has been compromised by land use change whilst the clear water on the right has moved through a pristine wetland that has not been impacted by human activities.³⁰

3.6 THREATS TO WETLANDS *(continued)*

- **Acid Mine Drainage** – Flow of water from mines that as a consequence contains high levels of salts, sulphate, iron, aluminium, heavy metals and radioactive elements. Currently impacting groundwater and surface water systems in Mpumalanga and Witwatersrand. Threat to human health, potable water supplies.

The consequences of mining in and around wetlands are also experienced downstream where no benefit is derived. An example of this can be in the form of wastewater that is not purified through the wetland ecosystem. Various types of pollutants may wash downstream causing health and other problems. Increased levels of sediment may choke the river channels downstream, reducing the availability and quality of the water for other users. The maintenance of fish communities and various types of plants and animals may be removed from the area due to the destruction of a wetland through development. The degradation of a wetland does not only affect the immediate surroundings, but will inevitably cause problems for neighbouring areas.²⁹

Fire/Burning – Wetland burning has been identified as one of the most significant disturbance factors. This is commonly found in and around wetlands which are in close proximity to townships or informal settlements. Burning of solid wastes (papers, plastics, rubbers, etc.) in open dumping sites, mostly wetland sites, has led to extensive wetland losses and wetland degradation.

Lack of awareness – Due to the lack of understanding and knowledge about wetlands, they are often damaged and polluted by ignorance. There is a great deal of ignorance about the role and importance of wetlands, although in South Africa the new recognition of the importance of water and its costing in legislation is helping to put more focus on the need to protect wetlands both for water supply and purification and ecological and biodiversity purposes. Until quite recently, South African farmers were paid subsidies to reclaim wetlands and convert them into farmland.

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 WATERBERG 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.

4.1.1 Risk identification and mapping

Whilst no formal mapping of the risks to the municipality has been undertaken as yet, the District Disaster Management Plan according to the IDP refers to specifics around disaster management for the district.

Identified disasters for WDM with a direct or indirect bearing on wetlands include:

- Refugees;
- Epidemics;
- Explosions;
- Extreme weather e.g. strong winds, droughts, floods, etc;
- Hazardous material;
- Aircraft crashes;
- Fire, (veldt fire);
- Transport;
- Power; and
- Nuclear waste.



FIGURE 21: Flooding in Bela-Bela causing extensive infrastructure damage.³¹

4.1.2 Role of Wetlands in Disaster Risk Mitigation

As noted in **Section 3.3** 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, and soil erosion, loss of biodiversity and groundwater pollution. Given that some of these have been identified as major risks to Waterberg District Municipality, wetlands can play a key role in disaster risk mitigation within the district. This is summarised in **Table 4** on the next page:

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

TABLE 4 ROLE OF WETLANDS IN DISASTER RISK MITIGATION IN WATERBERG DISTRICT MUNICIPALITY

DISASTER	ROLE OF WETLANDS IS DISASTER RISK MITIGATION ³²
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.



FIGURE 22: Flooding in the Waterberg District Municipality caused widespread damage in 2014.³³

4.2 CLIMATE CHANGE AND WETLANDS IN WATERBERG 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. 9

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 Waterberg District Municipality

Waterberg District Municipality falls within the Limpopo Province of South Africa and has a ‘local steppe’ climate strongly influenced by the geographic location of the district as well as the topography.

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 October and March. As illustrated in **Figure 23**, the coolest months have been June whilst the hottest month has been January. The records indicate that there has been a significant temperature variation between winter and summer months (up to 15°C).³⁴

Rainfall is largely experienced from October to March with the highest amount of rainfall falling in the late summer months (December to February). Waterberg District Municipality also experiences summer thunder storms as well as hail storms, both of which are associated with periods of heavy flooding. Winter rainfall within Waterberg District Municipality is considered to be extremely rare and as such, winter is when the municipality is at its driest.

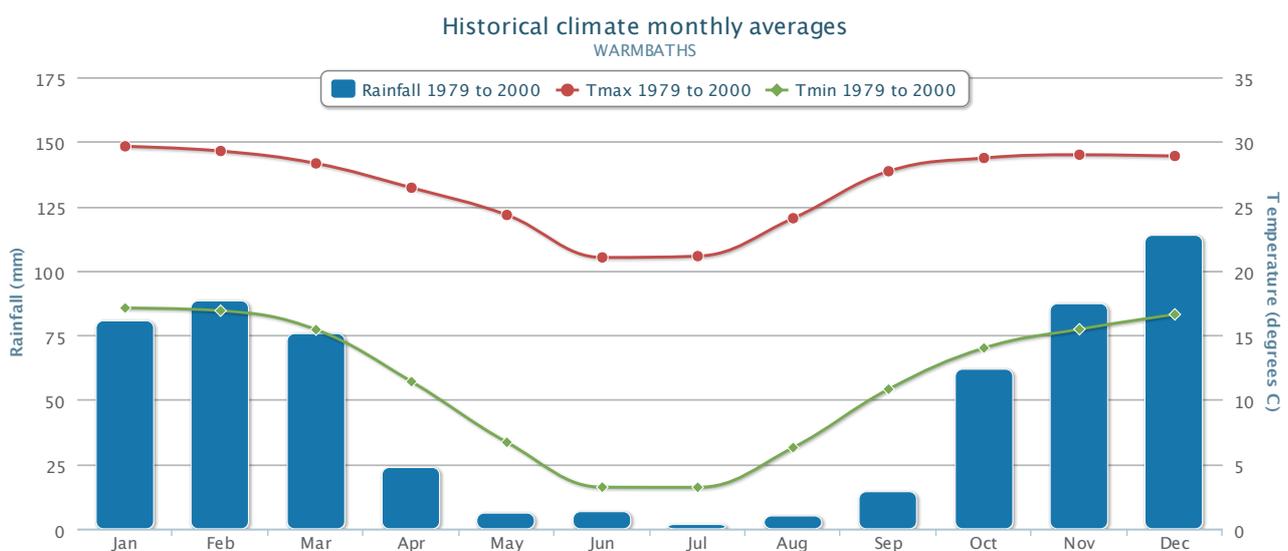


FIGURE 23: Graph depicting the typical climate of Waterberg District Municipality.³⁵

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

4.2.2 Projected Climate Change in Waterberg 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 Waterberg District Municipality will most certainly occur and that there will be a definite overall increase in average monthly temperatures by 1–3°C. The data also indicates that late winter and early summer temperatures are likely to increase slightly more than winter temperatures resulting in a longer, hot summer period overall.

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 overall increase or a decrease in annual rainfall in the municipality. Despite this uncertainty however, the models do indicate that there will most likely be an increase in early summer rainfall resulting in a longer rainy season similar to tropical conditions closer to the Equator, as well as a shift to drier winter conditions.

4.2.3 Impacts of Climate Change in Waterberg District Municipality

As noted in Section 4.2.2, Waterberg 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 overall, as well as an increased duration of

hot spells (> 32°C) particularly in the early 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 Waterberg District Municipality will result in an exacerbation of the existing impacts historically occurring within the municipality. As such, Waterberg 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 addressing 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.³⁶

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. 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 WATERBERG DISTRICT MUNICIPALITY *(continued)*

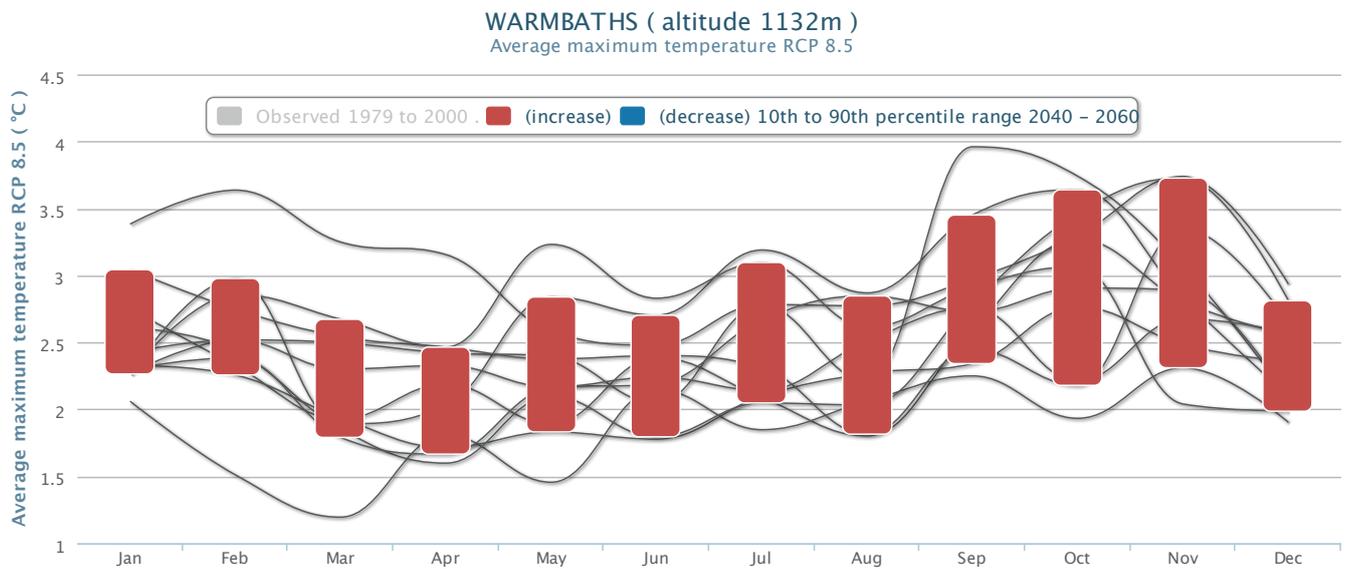


FIGURE 24: Graph depicting the anticipated changes in average maximum temperature patterns for Waterberg District Municipality.³⁷

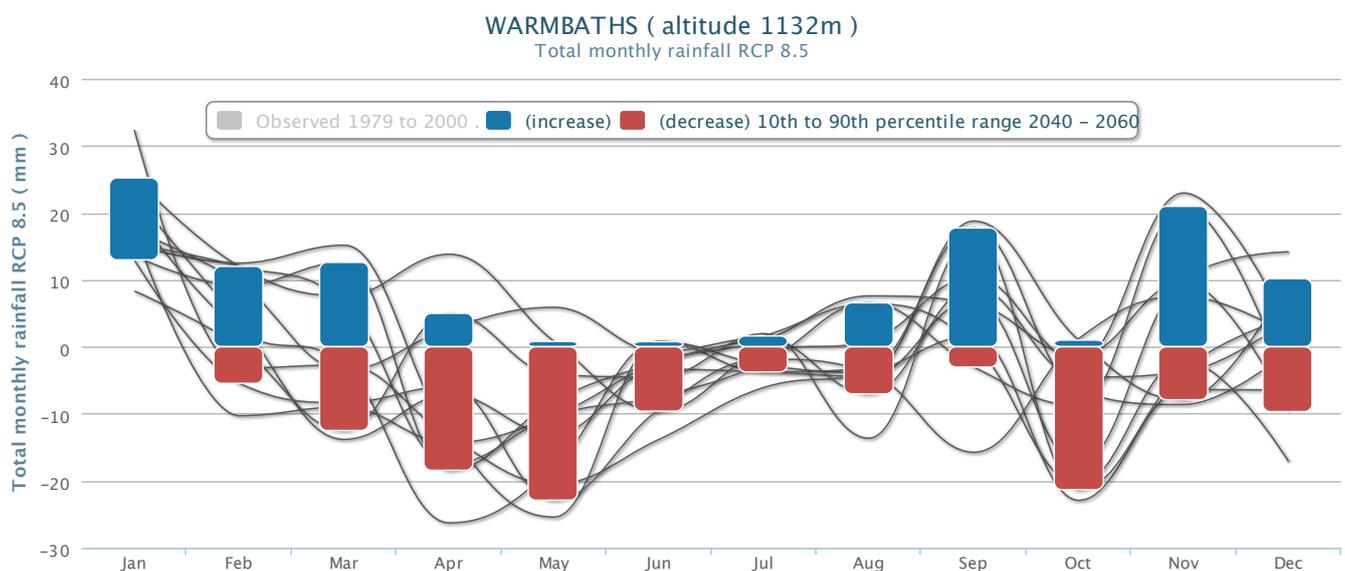


FIGURE 25: Graph depicting the anticipated changes in total monthly rainfall patterns within Waterberg District Municipality.³⁸

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 4.1.2**, 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 protect the district against the more severe impacts of drought.

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

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

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 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.



FIGURE 26: The impact of climate change is being felt by rural farmers.³⁹

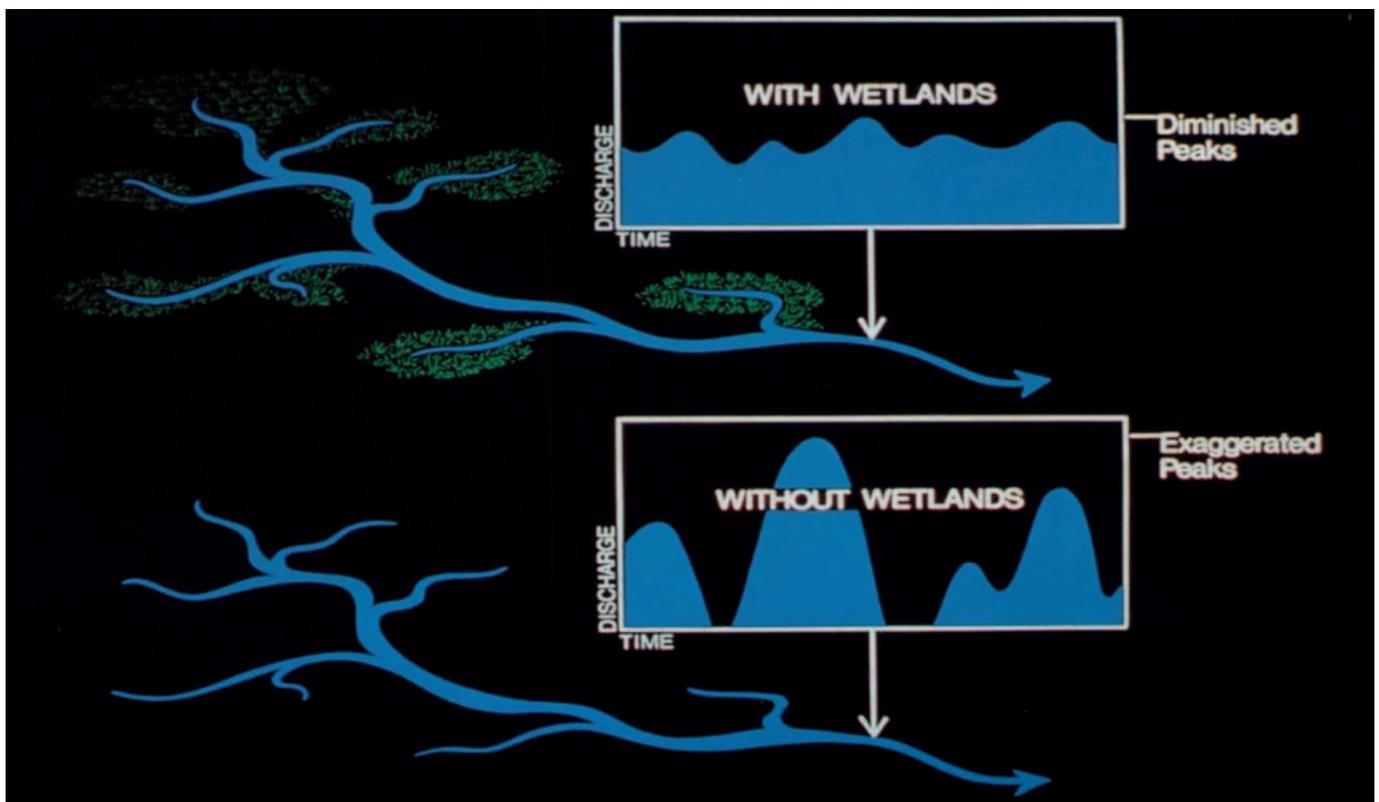


FIGURE 27: Schematic representation on the hydrological buffering capability of wetlands.

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

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

5.1 POLICY FRAMEWORK

The table below (Table 5) provides a comprehensive summary of all South African legislation, policies and strategies pertinent for the management of wetlands within Waterberg 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 5 LEGISLATION GOVERNING WETLAND MANAGEMENT IN WATERBERG 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 Integrated Development Plan (IDP), Spatial Development Framework (SDF) and Disaster Management Plans

continued

5.1 POLICY FRAMEWORK *(continued)*

TABLE 5 LEGISLATION GOVERNING WETLAND MANAGEMENT IN WATERBERG 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.

Taking the above legislation into account, the vision and mission for Waterberg District Municipality as per the current IDP (2017–2022) are currently as follows:

Vision: “To be the best energy hub and ecotourism destination in Southern Africa”

Mission: “To invest in a constituency of talented human capital who are motivated and innovative to build a sustainable economy in the field of energy, minerals and ecotourism for the benefit of all our communities.”

5.2 WETLAND MANAGEMENT WITHIN THE MUNICIPALITY

Currently there is no specific designated wetland management authority within Waterberg District Municipality.⁴⁰ Instead, the management of wetlands is a collective but disconnected effort between the various departments of the municipality, the local municipalities within the district, and other interested and affected parties' including the private sector (consultants etc.), DEA (Working for Wetlands), LEDET, DWS, Waterberg Nature Conservancy (WNC), the Limpopo Wetlands Forum, and the Waterberg Environment and Biodiversity Conservation Forum (WEBC) etc.

At this stage, management of wetlands is extremely fragmented across WDM. The district and local municipalities work from separate IDPs with different mandates as such, environmental management within the individual municipalities is not consistent.

In light of the above, in order to ensure holistic and effective management of wetlands within Waterberg District Municipality, the same vision and standardised goals for the management of wetlands need to be incorporated into the IDPs and SDFs of both the local and district level municipalities. It would also be ideal if Waterberg District Municipality could provide support to the local municipalities where possible in order to assist with the identified capacity constraints. Additionally, enhancing platforms such as the Limpopo Wetlands Forum (LWF) will ensure improved communication between the district and local municipalities as well as the parastatals and private landowners to manage wetlands collectively.



FIGURE 28: The Limpopo Wetland Forum plays an important role in facilitating wetland dialogue and action.



FIGURE 29: The Limpopo Wetland Forum plays an important role in facilitating wetland training to relevant stakeholders.

6 | LOCAL AND REGIONAL PARTNERSHIPS AND PROGRAMMES

The Waterberg District Municipality embarked on a journey towards improved management of its natural environment by partnering with various parties in establishing the WEBC Forum. The envisaged forum members consist of Sector Departments, District and Local Municipalities (IDP, MHS, LED, Spatial Planning, Environmental Management, Technical Service, Waste Management, Parks and Recreation), Biosphere Reserve Structures, Catchments Management Structures, Game Farmers, Agro Farmers, Representatives from Industry and Commerce, Waterberg Business Representatives, Eco-Tourism & LED Structures, Mining Representatives, Disaster Management Structures, Civic Society, Higher Education Structures (Universities and FET's), NGO's, CBO's, and Special interest groups (People with Disability Structures, Elderly People Structures)

The objectives of the WEBC Forum are:

- To **fulfil the environmental mandate** of the Waterberg District Municipality in accord with National Environmental Management Act (NEMA Act 107 of 1998): Last amended by National Environmental Laws Amendment Act 14 of 2004.
- To **promote the environmental mandates** of the RSA National and Provincial Government Sector Departments; by **establishing good**

working relationships and **co-ordination of the efforts** with all stakeholders.

- To **ensure enforcement of Environmental Rights** as enshrined in the bill of rights in the Constitution of South Africa; Act No 108 of 1996, National Environmental Management Act; NEMA Act 107 of 1998, and other relevant legislations. By **developing and supporting a set of principles** which will promote environmental friendly urban/rural spatial planning for long term sustainable economic empowerment, development and protection of the Environment Rights.
- To **be security overseers** over matters concerning **all aspects of Environmental Governance** (Social, Environment and Economic) in the Waterberg District with a view to promote sustainable development principles that allows for a delicate balance between humankind and environment; to remain and permit for all people to share in the sustainable use, practices and protection of the Waterberg District Natural Resources. By **ensuring that all developments** within the Waterberg District follow applicable Environmental Legislations, with specific reference to National Environmental Management Act, No 107 of 1998.



FIGURE 30: Key stakeholders attending the LAB: Wetlands SA Wetland Strategy and Action Plan Workshop in November 2016.

- To **develop strategic environmental related documents, environmental project proposals and source funding** globally, nationally, provincially and locally for implementation of projects; that will holistically embrace solving environmental issues and unlock environmental economic opportunities in the Waterberg District.
- To **implement recommended adaptation and mitigation strategies** that has interventions that are feasible and implementable, suitable and sustainable for the Waterberg District natural and living environment; by partaking in Global Environmental Programmes and Projects that will embrace Social Harmony and Environmental justice.
- To **promote Integrated Environmental Management** by **integrating planning principles** in planning processes of municipal jurisdiction through coordinated involvement of all interested and affected persons or community groups (Public Participation). By ensuring that all relevant stakeholders in Waterberg actively participate in contributing on processes pertaining to planning and implementation of environmental related projects in the Waterberg Region.
- To **inform the Public and/or Local Government Authorities** about developments and practices which may have detrimental effects on the environment and human health; by **supporting and assisting** Local Authorities in **reaching good decisions** regarding Spatial Development and Environmental Issues in the Waterberg District.



- To **identify, support and promote developments** that **conserve Natural Environment, Biodiversity and Heritage** in keeping with intrinsic environmental features and ecological processes of the Waterberg Region; with social, economical and environmental sustainable implementation plans.
- To **enhance development and implementation of ecological infrastructure, ecological protection, and ecological sustainability.**
- To **encourage promotion of natural Environmental Management, Environmental Health, Climate Change Adaptation, Climate Change Mitigation and Green Economy** in local municipalities within the jurisdiction of Waterberg District Municipality.

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 Waterberg District Municipality by various stakeholders to raising awareness and educates the community at large on the value of wetlands.

7.1 COMMUNICATION AND EDUCATION

Both the district and local municipalities conduct holistic environmental management education and awareness initiatives and wetlands are not solely focused on, though there is potential to start engaging

relevant stakeholders around the importance of wetlands and the conservation and protection of the WDM wetland ecosystems in particular.



FIGURE 31: Members of the Limpopo Wetlands Forum receiving wetland related training at Nylsvley.



FIGURE 32 & 33: LAB Wetlands SA project municipal delegates including WDM receiving on the ground wetland and Google Earth training at the 2016 National Wetlands Indaba.

CONCLUSION

The aim of the Waterberg 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 moving forward.

Through an extensive desktop study, as well as multiple bi-lateral meetings with stakeholders working throughout municipality, it was found that the district has a substantial number of important and significant wetlands. 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. They 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 Waterberg District Municipality however, are currently under threat from deliberate draining of wetlands to make way for development and agriculture, inappropriate development within the close proximity to the wetlands, poorly regulated agricultural practices, contamination through chemical, sewage, effluent and stormwater seeps, and water abstraction. This puts the municipality at risk from losing the valuable ecosystem services the wetlands provide.

In terms of wetland management, based on the information available at the time, it was found that currently there is no specific dedicated department within Waterberg District Municipality which directly deals specifically with the management of wetlands within the landscape. Instead, the management of wetlands is a collective but disconnected effort between the various stakeholders. It was also found that different stakeholders are responsible for different sections of land and that the district and local municipalities currently work from separate IDPs with different goals. As a result of all this, management of wetlands is extremely fragmented across Waterberg District Municipality and is not holistic or consistent. This puts wetlands at risk from degradation (whether deliberate or accidental) as well as from total loss.



FIGURE 35: Limpopo Wetland Forum delegates in good spirits after a field trip in 2016.

It was also found that other than the SANBI BGIS NFEPA map, there is currently no formal ground-truthed wetland map for the district, clearly depicting where the wetlands are located within the landscape. This significant gap in mapping makes development planning around wetlands extremely challenging. As such, there is a real need for comprehensive ground-truthed mapping, which not only highlights where wetlands are on the ground but also indicates their status (i.e. pristine condition or degraded), to be undertaken within the municipality to assist town planners and farmers with future planning of developments and farm expansion/ redevelopment.

Overall, in order to strengthen wetland management, prevent further loss of and/damage to 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 WDM developed a wetland management guideline strategy which could then be adopted and utilised by all the local municipalities. Enhancing the forums such as the WEBC and LWF would facilitate better sharing of information, addressing of capacity constraints and allocation of tasks for identified wetland maintenance/rehabilitation actions going forward. It would also be useful to work more closely with key external stakeholders such as SANBI, DEA, LEDET etc. to ensure cohesion between projects across the district.

DEFINITIONS

Biodiversity ⁴¹	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 Change ⁴²	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 Areas ⁴³	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.
Disaster ⁴⁴	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	Disaster Management means the systematic process of using administrative directives, organisations, and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster. This term is an extension of the more general term 'Risk Management' to address the specific issue of disaster risks. Disaster Management aims to avoid, lessen or transfer the adverse effects of hazards through activities and measures for prevention, mitigation and preparedness.
Ecological Support Areas ⁴⁵	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 services	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.

DEFINITIONS

Estuary⁴⁶

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.

Flood

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 Flood

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. 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 Species

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

Ramsar Site⁴⁷

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.

Wetland⁴⁸

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.

ACKNOWLEDGEMENTS

The compilation of the Waterberg District Municipality Wetland Report would not have been possible without the significant contribution and support from the many active stakeholders who currently work within the municipal region.

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The Report cover image is a picture of the Nylsvley Wetland by Albert Froneman.⁴⁹

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