

Planning and Caring for Biodiversity in Land Use

A Beginners Guide

The importance of biodiversity and conservation-based planning in the determination of land use activities

Using the example of Maruleng Local Municipality, Lowveld (Limpopo Province)

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This is a basic beginner's guide to support land use planning and decision-making in Critical Biodiversity Areas and Ecological Support Areas for sustainable development.

Biodiversity is important for everyone everywhere.

Biodiversity planning is not only for parks!

We need to plan for and care for biodiversity everywhere.

You have an important role to play!

Find out how here...

This guide was compiled by Derick du Toit, William Mponwana and Stephen Holness in collaboration with Maruleng Local Municipality: Spatial Planning and Economic Development Unit. The guide was prepared as part of the RESILIM-O project (Resilience in the Limpopo River Basin - Olifants Catchment Program). The project is funded by the United States Agency for International Development (USAID).

For further information

The Geographical Information System (GIS) maps used to prepare the Maruleng Critical Biodiversity Areas Map, plus electronic versions of this document and JPEG maps, are available on DVD. Copies of the DVD can be obtained from

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Maruleng CBA Map

The Maruleng Critical Biodiversity Areas Map was developed as part of the Mopani District Bioregional Plan (LEDET, 2016a). NuLeaf Planning and Environmental (Pty) Ltd developed the map in 2015/2016 for the Limpopo Department of Economic Development, Environment and Tourism (LEDET), in collaboration with the LEDET, the South African National Biodiversity Institute (SANBI), South African National Parks (SANParks) and various stakeholders within the Mopani District (including the Maruleng Municipality). The protected area layer was updated by AWARD (Dr S. Holness) and integrated into the CBA Map.

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Abbreviations and acronyms

BSP	Biodiversity Sector Plan
CBA	Critical Biodiversity Area
DAFF	Department of Agriculture, Forestry and Fisheries
DEA	Department of Environmental Affairs (National)
DWS	Department of Water and Sanitation
EIA	Environmental Impact Assessment
EIP	Environmental Implementation Plan
EMF	Environmental Management Framework
EMP	Environmental Management Plan
ESA	Ecological Support Area
ha	hectares
LEDET	Limpopo Department of Economic Development, Environment and Tourism
IDP	Integrated Development Plan
NEMA	National Environmental Management Act (107 of 1998)
NEMBA	National Environmental Management: Biodiversity Act (10 of 2004)
NEMPAA	National Environmental Management: Protected Areas Act (57 of 2003)
NFEPA	National Freshwater Ecosystem Priority Areas (or FEPA)
NGO	Non-Governmental Organisation
NNR	No Natural Remaining
NSBA	National Spatial Biodiversity Assessment (2011)
ONA	Other Natural Areas
PA	Protected area
SANBI	South African National Biodiversity Institute
SDF	Spatial Development Framework
SPLUMA	Spatial Planning and Land Use Management Act (16 of 2013)



Overview and purpose

The Lowveld is well known for its conservation and biodiversity activities. Maruleng Local Municipality, for example, is known as ‘The Wildlife Haven’ and has a multitude of tourist activities, lodges and wildlife estates that are all grounded in conservation-based activities. Critical for these activities to continue is to secure habitats that offer opportunities to further develop this part of the economy. This beginner’s guide to biodiversity uses the example of Maruleng Local Municipality to share basic biodiversity concepts (part 1), biodiversity tools (part 2) and recommended biodiversity-compatible land use guidelines (part 3).

Who is this guide for?

... anyone who is working with land and needing to get a handle on basic biodiversity concepts, including:

- Estate agents
- Farmers
- Managers of nature reserves
- Local municipality employees
- Land owners
- Land developers

More detailed handbooks have been developed for spatial planners and conservation specialists in Ba-Phalaborwa and Maruleng Local Municipalities. This guide simplifies and highlights some general principles and tools for working with biodiversity, drawing on examples from Maruleng which can be adapted to other areas (see brown boxes and text for extracts from the Maruleng Biodiversity Handbook).

Maruleng Local Municipality is used as an example of planning for and working with biodiversity – see the text and boxes in brown throughout this guide.

Biodiversity



What is biodiversity?

Biodiversity is the scientific term which refers to the 'natural environment' or 'nature'. It encompasses the diversity of all living biota - plants, animals, insects, micro-organisms etc., and also the interactions that sustain and enable them to persist into the future.

Biodiversity is comprised of the following:

Biodiversity pattern	<p>The way in which the components of biodiversity are spatially arranged. Biodiversity pattern can be expressed as:</p> <ul style="list-style-type: none">■ Different vegetation types (such as Savanna or Grassland), or■ Natural habitats (the natural home of a living organism such as a wetland), or■ Specific features (populations of rare plants which grow in a specific area and nowhere else).
Ecological processes	<p>The actions and interactions which enable natural systems to function as healthy, working systems. For example:</p> <ul style="list-style-type: none">■ Insect and bird pollination, movement of animals along river and mountain corridors, nutrient recycling.
Evolutionary processes	<p>The series of actions which enable new species to evolve in response to changing conditions over extended time periods. This is particularly important in the face of climate change.</p>
Ecological drivers	<p>The variety of factors, such as rainfall, temperature, fire, grazing and browsing (herbivory) etc., which maintain the functioning and health of natural systems.</p>
Ecosystem	<p>A natural system which is comprised of all the living organisms (plants, animals etc.) and the non-living aspects of the environment (water, air, soil etc.), in a particular area, which both function together as a unit.</p> <p>A mountain ecosystem, for example, is very different to a lowland ecosystem because they are comprised of different plants, animals and climates. Ecosystems can operate at any scale from very small (e.g. a small wetland) to an extensive landscape (an entire mountain catchment area).</p>
Ecosystem services	<p>Ecosystems deliver a number of ecosystem services. For example, healthy ecosystems provide us with water to drink, foodstuffs, wood fuel, medicines, clean air and a buffer against flooding. Ecosystems that deliver ecosystem services are also referred to as ecological infrastructure.</p>



Why is biodiversity important?

Sustainable development can only be achieved through the protection and management of our natural resources. To ensure sustainable development, **biodiversity** (**‘the natural environment’**) must, by law, be taken into account when developing spatial planning tools (e.g. spatial development frameworks, land use schemes) or when authorising land development applications (e.g. rezoning applications, environmental impact assessments).

To enable this, scientists research an area’s biodiversity to determine the location of priority areas for protection and for appropriate land use activities. Based on the available biodiversity data, such as threatened species, vegetation, rivers and wetlands, the natural landscape has been classified according to its biodiversity importance, namely Critical Biodiversity Areas, Ecological Support Areas, Other Natural Areas and No Natural Remaining. This information is synthesised into a map of Critical Biodiversity Areas and Ecological Support Areas.

For the Maruleng Municipality, this is referred to as the **Maruleng Critical Biodiversity Areas Map**.

All organs of state are obliged to consider biodiversity in their decision-making and to make use of the most up to date information (National Environmental Management Act 107 of 1998). Furthermore, all spheres of government and all organs of state must co-operate with, consult and support one another. In this regard, the CBA Map should be the common reference of biodiversity priority areas for supporting municipalities and other sectors in multi-sectoral planning procedures.

Ecosystem services, ecological infrastructure, the economy and poverty alleviation

All social and economic sectors are dependent on biodiversity because it delivers **ecosystem services**, which are fundamental to our survival. Ecosystem services can be divided into four groups, which in turn provide vital services, as shown in Table 1.

Biodiversity loss and associated loss of economic growth

The loss of biodiversity through disturbance or development has impacts on ecosystem functioning and reduces the delivery of ecosystem services and as a result, economic growth. For example, the water holding capacity of a catchment area is reduced by the removal of vegetation, which reduces water supplies downstream. This also leads to erosion and heavy silt loads which then necessitate increased municipal spending (e.g. dredging etc.). Water becomes more costly to supply, reducing finances for other service delivery. Furthermore, after the removal of plant cover, heavy rainfall results in flooding, and homes and roads are washed away, with the rural poor often being the most severely affected. The loss of natural bush can impact on nearby agricultural crops as a reduction in insect pollinators leads to smaller harvests, with fewer jobs leading to greater poverty.

Table 1 *Ecosystem services*

Provisioning services	<ul style="list-style-type: none"> ■ A regular supply of clean water and oxygen (clean air) ■ Food and fibre (clothing) ■ Medicines and genetic resources
Regulating services	<ul style="list-style-type: none"> ■ Flood attenuation ■ Erosion control (due to plants protecting soils along river banks) ■ Pest control and pollination (vital for the fruit industry) ■ Carbon storage (to counteract climate change)
Supporting services	<ul style="list-style-type: none"> ■ Primary production ■ Nutrient cycling (important for plant growth and survival) ■ Livestock grazing (vital to farmers)
Cultural services	<ul style="list-style-type: none"> ■ Spiritual and cultural areas ■ Recreational areas (nature-based tourism)

Biodiversity and poverty alleviation

Biodiversity has the potential to provide for nature-based community initiatives that support poverty alleviation thereby creating jobs in industries such as eco-tourism, wild cut-flowers, professional nature guiding, and bee farming. Some of these initiatives are good examples of collaborative programmes involving a range of national agencies and municipalities at the local level e.g. SANParks 'People and Conservation'.

Other programmes, such as the Working for Water programme and Working for Wetlands, which are involved in clearing alien invasive plants and the restoration of wetlands and rivers, contribute to job creation while safeguarding biodiversity and associated ecosystem services (e.g. water supply, flood attenuation, soil erosion protection, prevention of sedimentation).



Managing biodiversity to sustain and improve the availability of ecosystem services

■ Application of a Critical Biodiversity Areas (CBA) map and guidelines ensures that we maintain nature's valuable ecosystems services for sustainable economic and social development.

■ Land management activities that improve biodiversity include, for example:

■ Alien plant clearing programmes. These initiatives not only provide employment and training opportunities, but increase river flow and therefore water supplies to communities.

■ Protecting and restoring wetlands and rivers by retaining the natural indigenous vegetation that borders and supports these systems.

■ Protecting and improving the water quality of rivers and associated wetlands.

Critical Biodiversity Areas (CBA), Ecological Support Areas (ESA) and Biodiversity Targets

Table 2 below presents the standard definitions of Critical Biodiversity Areas, Ecological Support Areas and biodiversity targets. Refer to this table for the criteria used to delineate the categories on a CBA Map.

Table 2 *Description of Critical Biodiversity Areas, Ecological Support Areas and Biodiversity Targets*

CBA MAP CATEGORY/ TERM	DEFINITION
<p>Critical Biodiversity Areas (CBA)</p>	<p>CBA are terrestrial (land) and aquatic (water) areas which must be safeguarded in their natural or near-natural state as they are critical for conserving biodiversity and maintaining ecosystem functioning.</p> <p>These include natural/near-natural areas that are required:</p> <p>.....</p> <p>(a) to meet national biodiversity thresholds;</p> <p>.....</p> <p>(b) to ensure the continued existence and functioning of species and ecosystems, including the delivery of ecosystem services; and/or</p> <p>.....</p> <p>(c) as important locations for biodiversity features or threatened species.</p>
<p>Ecological Support Areas (ESA)</p>	<p>ESA are supporting zones that prevent the degradation of Critical Biodiversity Areas and formal Protected Areas.</p> <p>Although many ESA consist of natural bush/veld, there are areas of land - partially or wholly modified or degraded - that have been classified as ESA even though they are no longer in a natural state. Although these areas are heavily degraded or modified, they still play an important role in supporting ecological processes. This is particularly the case with riparian areas, some key catchment areas and key pieces of corridors.</p>
<p>Biodiversity Targets</p>	<p>Target areas (hectares) of biodiversity which must be safeguarded for the component plants and animals to exist and for ecosystems to continue functioning (e.g. pollination, migration of animals) i.e. the target areas comprise the Protected Area and CBA network.</p> <p>Targets for various types of habitats (e.g. vegetation types, estuaries, rivers etc.) are set nationally within the National Spatial Biodiversity Assessment (NSBA) planning process i.e. National Biodiversity Thresholds.</p>

Land must be managed appropriately according to the CBA map categories. Table 3 overleaf lists the land management objectives according to the categories on the CBA map.

Table 3 Land management objectives for the CBA Map categories

CBA MAP CATEGORY	LAND MANAGEMENT OBJECTIVE
<p>Protected Areas & Critical Biodiversity Area 1 (CBA1)</p>	<p>Maintain as natural conservation or production landscapes that maximise the retention of biodiversity pattern and ecological process:</p> <ul style="list-style-type: none"> ■ Ecosystems and species are fully intact and undisturbed. ■ These are areas with high irreplaceability or low flexibility in terms of meeting biodiversity pattern targets. If the biodiversity features targeted in these areas are lost then targets will not be met. ■ These are landscapes that are at or have passed their limits of acceptable change.
<p>Critical Biodiversity Area 2 (CBA2)</p>	<p>Maintain as near-natural production landscapes that maximise the retention of biodiversity pattern and ecological process:</p> <ul style="list-style-type: none"> ■ Ecosystems and species are largely intact and undisturbed. ■ Areas with intermediate irreplaceability or some flexibility in terms of area required for meeting biodiversity targets. There are options for loss of some components of biodiversity in these landscapes without compromising our ability to achieve targets. ■ These are landscapes that are approaching but have not passed their limits of acceptable change.
<p>Ecological Support Area 1 (ESA1)</p>	<p>Maintain as ecologically functional landscapes that retain basic natural attributes (generally natural or near-natural areas):</p> <ul style="list-style-type: none"> ■ Ecosystem is still in a natural or near-natural state, and has not been previously developed. ■ Ecosystems moderately to significantly disturbed but still able to maintain basic functionality. ■ Individual species or other biodiversity indicators may be severely disturbed or reduced. ■ These are areas with low irreplaceability with respect to biodiversity pattern targets only.
<p>Ecological Support Area 2 (ESA2)</p>	<p>Maintain as ecologically partly-functional landscapes that retain some natural attributes (generally cultivated areas):</p> <ul style="list-style-type: none"> ■ Ecosystem is NOT in a natural or near-natural state, which has been previously developed (e.g. ploughed). ■ Ecosystem is significantly disturbed but still able to maintain some ecological functionality. ■ Individual species or other biodiversity indicators are severely disturbed or reduced. ■ These are areas with low irreplaceability with respect to biodiversity pattern targets only.
<p>Other Natural Areas & No Natural Remaining</p>	<p>Production landscapes:</p> <ul style="list-style-type: none"> ■ Manage land to optimise sustainable utilisation of natural areas.



Tools to help us care for biodiversity

Having established some designated areas and targets for biodiversity (as described in the previous section), it is helpful to know there are number of tools out there to help us protect this biodiversity.

■ A bioregional plan is published by the Minister or MEC in terms of the Biodiversity Act.

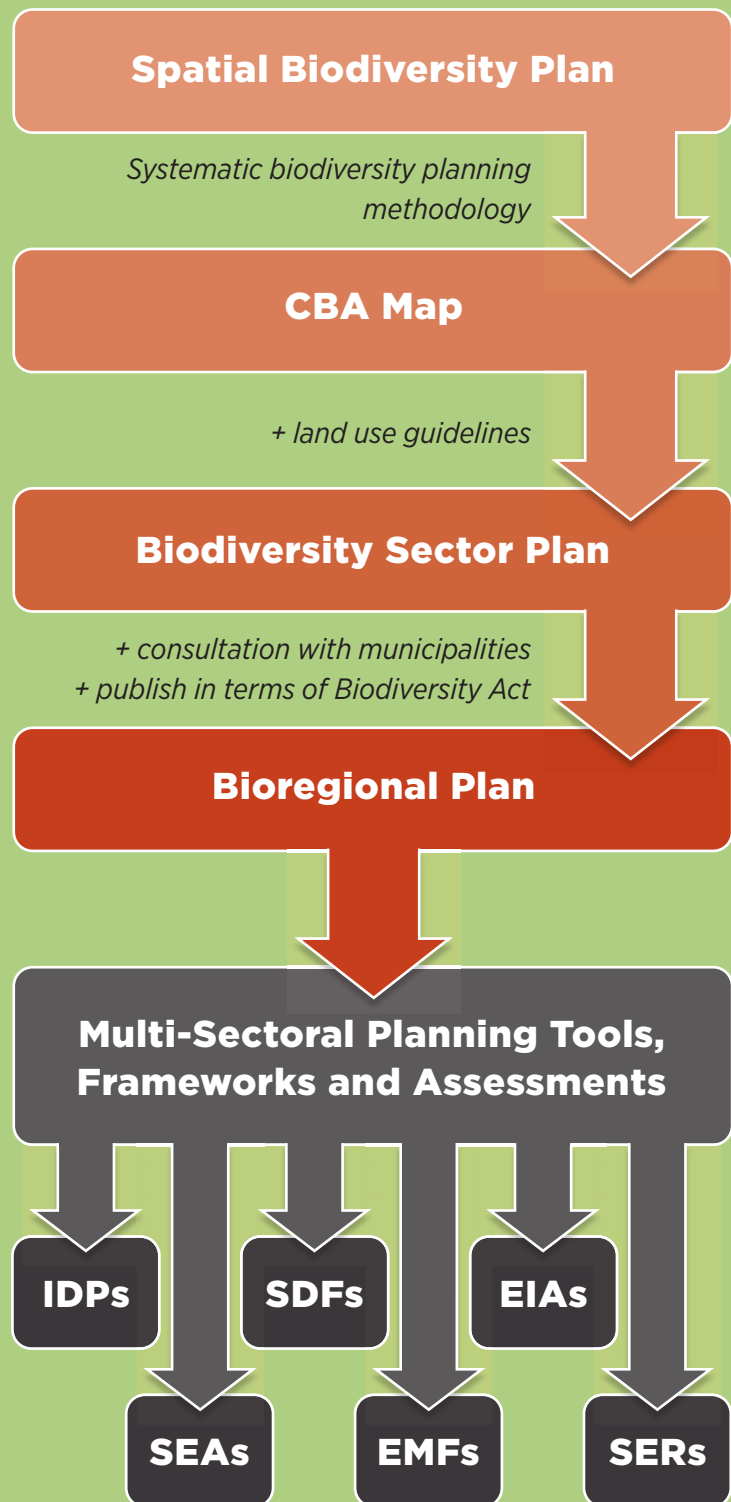
■ The bioregional plan includes:

■ A 'Map of Critical Biodiversity Areas and Ecological Support Areas' (or CBA Map);

■ Accompanying land-use guidelines for avoiding loss or degradation.

■ A bioregional plan is a spatial plan for ecological sustainability, which promotes **living landscapes** that retain and maintain representative examples of all our species and ecosystems, as well as important ecological processes, services and infrastructure.

■ A bioregional plan is the biodiversity sector's input to multi-sectoral planning and assessment processes. By itself it is not a multi-sectoral planning or assessment tool.



Critical Biodiversity Areas (CBA) maps

A CBA Map is a systematic biodiversity plan produced at a scale of 1:50 000. CBA Maps divide the landscape into five main categories with varying degrees of ecological importance: **Protected Areas**, **Critical Biodiversity Areas**, **Ecological Support Areas**, **Other Natural Areas** and **No Natural Remaining**. Each category has a different desired state, which in turn determines which land uses are compatible with that category.

Systematic biodiversity (conservation) planning identifies those areas which are most in need of conservation and protection in order to meet **national biodiversity targets** (also referred to as biodiversity thresholds). These areas represent the Critical Biodiversity Areas on the map. Note that the Protected Areas also include the target areas and are essentially CBA (Protected Areas).

Protected Areas, Critical Biodiversity Areas and Ecological Support Areas are referred to as the **biodiversity priority areas**. Central to the CBA Map is a series of land use guidelines (see section that follows). The broad objective of the CBA Map is to ensure appropriate land use planning for sustainable development, to reduce cumulative impacts on biodiversity and to promote integrated management of natural resources.

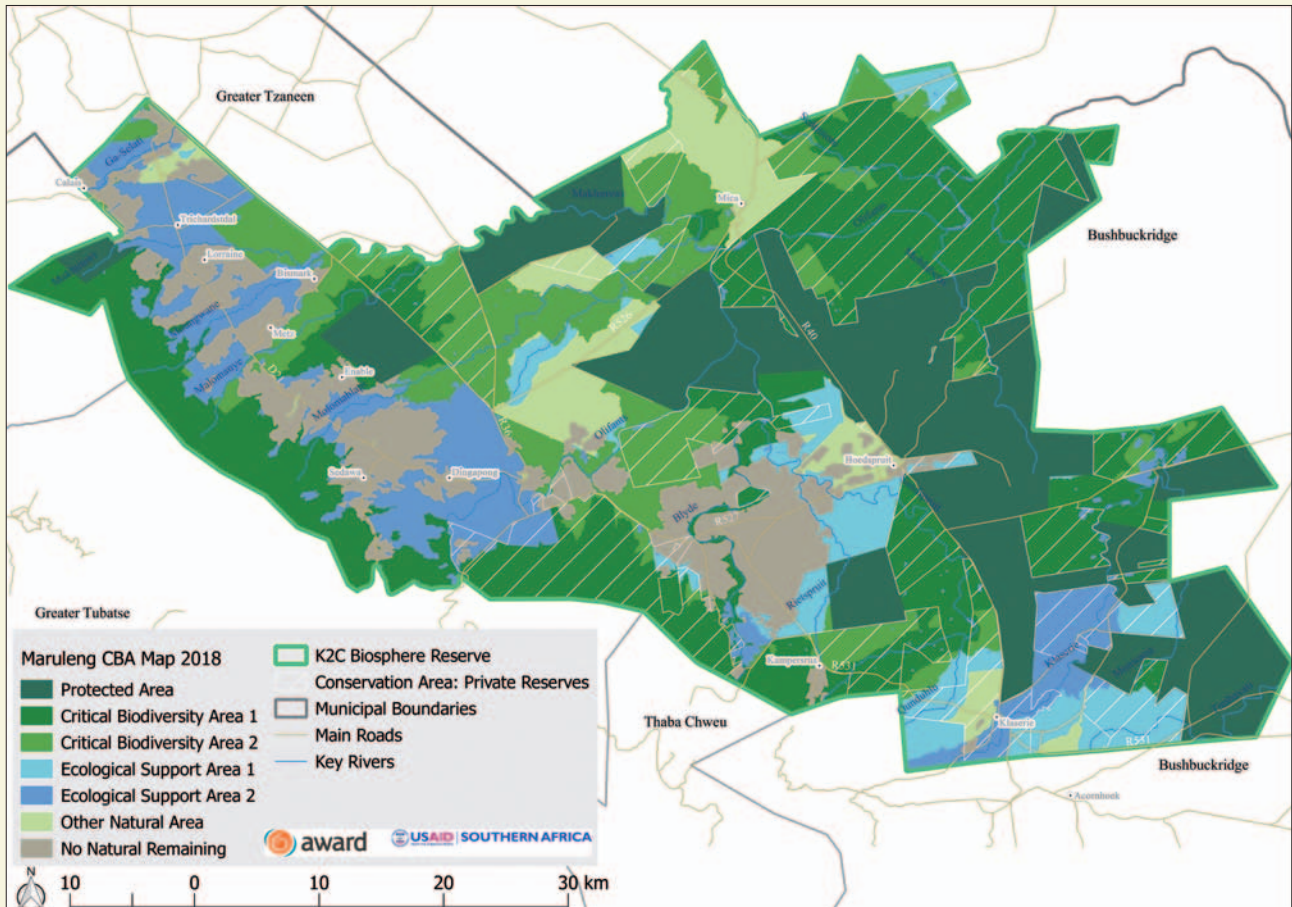
CBA Maps are the biodiversity sector's input into decisions on appropriate land uses. There are two main ways that CBA Maps should be used:

1. To inform spatial planning that shows the desired future uses of the land (such as Spatial Development Frameworks).
2. In decision-making in response to development applications (such as environmental authorisations).



The Maruleng Municipality CBA Map

The map below is copied from the Maruleng Biodiversity Handbook and presents the map of Critical Biodiversity Areas and Ecological Support Areas for the Maruleng Municipality, as part of the Mopani District Bioregional Plan. Refer to Section 5 of the Handbook for guidance on integrating the CBA Map in land use planning and decision-making.



The Maruleng CBA Map is based on the provincial map generated in the provincial Limpopo Conservation Plan version 2, which was developed by LEDET. It was further refined to align with other relevant spatial plans for the District, such as the Olifants and Letaba Catchment Environmental Management Framework (EMF), the Kruger to Canyon Biosphere Reserve, municipal Spatial Development Frameworks (SDFs) and available land cover.

The spatial accuracy of the CBA Map is limited by the accuracy of the biodiversity information, the date of aerial imagery used to digitise land cover and the existing land cover data used to develop the map. Some of the information used to delineate the CBA and ESA is therefore based on broad-scale maps of biodiversity pattern (e.g. vegetation and wetland maps) and ecological processes (landscape corridors).

The provincial systematic biodiversity plan, on which the CBA Map is based, was designed to be used at a scale of 1:50 000. Due to corrections in land cover during the development of the CBA Map for the Mopani District Bioregional Plan, the Maruleng CBA Map's land cover data was improved.

District Bioregional Plans

District Bioregional Plans are broad and can be used by a range of users, including:

- District and local municipalities
- Any organ of state that must prepare an Environmental Implementation Plan (EIP) or Environmental Management Plan (EMP) in terms of Chapter 3 of NEMA Working for Water, Working for Wetlands, LandCare
- Environmental decision-makers who are required by section 2(1)(c) of NEMA to apply the NEMA section 2 principles in their decision-making (such as DAFF, DEA, DWS)
- Environmental and planning consultants
- Conservation NGOs
- Private and communal landowners
- Private developers and businesses.

The table below shows mandatory and recommended uses for the published Mopani District Bioregional Plan.

Table 4 *Intended users of the published Mopani District Bioregional Plan (from the Waterberg District Bioregional Plan, 2016). The Maruleng Biodiversity Sector Plan can be consulted for municipal specific data.*

USERS	MANDATORY USES	RECOMMENDED USES
Any organ of state that must prepare an Environmental Implementation Plan (EIP) or Environmental Management Plan (EMP) in terms of Chapter 3 of NEMA	Must consider the Bioregional Plan in developing the EIP or EMP	Should integrate PAs, CBAs, ESAs, ONAs and other relevant guidelines and recommendations from the Bioregional Plan into the EIP and EMP
Environmental decision-makers who are required by section 2(1)(c) of NEMA to apply the NEMA section 2 principles in their decision-making (with mandatory and recommended uses)		
National Department of Environmental Affairs	Must consider the Bioregional Plan before issuing environmental authorisations on applications dealt with at a national level	Should take the Bioregional Plan into account in their planning processes and in their programmes
Limpopo Department of Economic Development, Environment and Tourism (LEDET)	Must consider the Bioregional Plan before issuing environmental authorisations. Should take the Bioregional Plan and identified CBAs and ESAs into account in their comments on applications	Should take the Bioregional Plan into account in their authorisations as part of the EIA and BA processes

USERS	MANDATORY USES	RECOMMENDED USES
Municipalities (with mandatory and recommended uses)		
Mopani DM (and the local municipalities)	Must align its Integrated development Plan (IDP) and Spatial Development Framework (SDF) with the published Bioregional Plan and must demonstrate how the Bioregional Plan may be implemented. Must also take the Bioregional Plan into account in issuing planning authorisations. An approved bioregional plan cannot be in conflict with an approved SDF and vice versa.	Should integrate PAs, CBAs, ESAs, ONAs and other relevant guidelines and recommendations from the Bioregional Plan into Environmental Management Frameworks (EMFs) and land use schemes
Environmental decision-makers who are required by section 2(1)(c) of NEMA to apply the NEMA section 2 principles in their decision-making (with recommended uses only)		
USERS	RECOMMENDED USES	
National and Provincial Department of Agriculture, Forestry and Fisheries (DAFF)	Should take the Bioregional Plan into account in their planning processes and in their programmes. The Department of Agriculture should take the Bioregional Plan into account in planning Land Care activities, farm planning, ploughing and subdivision applications, land reform and Area Wide Planning, and in the development of policy, legislation or guidelines for land use planning and management	
Department of Water and Sanitation	Should take the Bioregional Plan into account in their authorisations as part of the EIA process. Should take the Bioregional Plan into account in their planning processes and in their programmes e.g. Water Development Plans	
Department of Mineral Resources	Should take the Bioregional Plan into account in their authorisations for prospecting and mining, and mining development plans, especially Strategic Infrastructure Projects related to the Northern Mineral Belt (e.g. mining licence areas)	
Department of Co-operative Governance, Human Settlements and Traditional Affairs (COGHSTA Limpopo)	Should take the Bioregional Plan into account when planning human settlements; when reviewing municipal IDPs and when developing provincial SDFs	
Department of Roads and Transport	Should take the Bioregional Plan into account when planning roads and other transport infrastructure	
Department of Health and Social Development	Should take the Bioregional Plan into account when developing social development plans	
DRDLR Department of Rural Development and Land Reform	Should take the Bioregional Plan into account when developing rural development plans	
Office of the Premier (OTP)	Assisting with the mainstreaming of the Bioregional Plan within provincial government; and 'clearing-house' for the spatial data	

USER	RECOMMENDED USES
Other intended users of the Bioregional Plan	
Working for Water, Working for Wetlands, LandCare	Should take the Bioregional Plan into account in planning and scheduling their activities
Environmental and planning consultants	Should take the Bioregional Plan into account when undertaking Strategic Environmental Assessments and Environmental Impact Assessments or when developing IDPs, SDFs or EMFs for a municipality
Conservation NGOs	Should use the Bioregional Plan to guide comments on land use change applications, and to direct conservation initiatives
Private and communal landowners	Should use the Bioregional Plan if they want more information about the biodiversity importance of their land
Private developers and businesses	Should facilitate their process of obtaining development rights by utilising the Bioregional Plan to identify appropriate areas for different types of land use in order to avoid unnecessary delays and costs associated with submitting inappropriate development proposals, which are unlikely to be approved

Biodiversity Sector Plans

While the bioregional plans are broad, Biodiversity Sector Plans can be consulted for municipal specific data. See the table below for a summary of the intended uses of the Maruleng Biodiversity Sector Plan (the municipal version of the Mopani District Bioregional Plan).

Table 5 *Intended uses of the Maruleng Biodiversity Sector Plan*

1. Proactive forward planning	Serves as an input into planning tools, such as IDPs, SDFs, EMFs, Municipal Open Space Systems and land use schemes
2. Reactive land use decision-making	Provides guidance for evaluating Environmental Impact Assessments, Basic Assessments, agricultural land use permits, water use authorisations and development control decisions through land use legislation (e.g. rezoning and subdivision approvals)
3. Proactive conservation	Provides input into decisions on the expansion of protected areas through land acquisition by the state and biodiversity stewardship agreements with private or communal landowners

Biodiversity management



General Management Recommendations

Managing loss of natural habitat in CBAs

- Further loss of natural habitat should be avoided in CBA1, whereas loss should be minimised in CBA2 i.e. land in these two categories should be maintained as natural vegetation cover as far as possible.
- CBA1s and CBA2s not formally protected should be rezoned where possible to conservation or an appropriate zoning, and where possible declared in terms of the Protected Areas Act.
- CBA1 and CBA2 can act as possible biodiversity offset receiving areas.
- The provincial biodiversity stewardship programme may wish to prioritise privately owned erven in CBA1s and CBA2s to be incorporated into the protected area network through biodiversity stewardship agreements. The provincial protected area expansion strategy to use the CBA Map in prioritising these erven.
- Degraded or disturbed CBA1s and CBA2s should be prioritized for rehabilitation through programmes such as Working for Water and Working for Wetlands. An invasive alien vegetation eradication programme should be implemented. If threatened species are identified as being present, rehabilitation programmes should explicitly consider these species in the development of restoration programmes. Rehabilitation activities should be undertaken in such a way that does not negatively impact on the survival of threatened species.





Managing loss of ecological functionality in ESAs

- In ESA1s, maintain in a functional state, avoid intensification of land uses, and rehabilitate to a natural or near-natural state, where possible.
- In ESA2s, additional impacts on ecological processes should be avoided.
- Maintain connectivity between CBAs, continue ecosystem functioning within the CBA corridors and prevent the degradation of adjacent CBAs.

General management guidelines in CBAs and ESA1s

- An Environmental Management Plan should be compiled where required in CBA1, CBA2 and ESA1. The Environmental Management Plan should include invasive alien species control, fire management, prevention of overgrazing etc. Fire management is especially important and should be appropriately managed for the particular vegetation type(s) on site.
- Control of illegal activities, such as hunting and dumping, which impact on biodiversity, should be prioritised in CBA1s, then CBA2s then ESA1s.
- Prioritise CBA1s for LandCare projects, Working for Water, beneficial green economy projects (e.g. alien clearing, rehabilitation) and NGOs to direct their conservation projects, programmes and activities, thereafter CBA2s and then ESA1s. In some cases, ESA2s might be suitable sites for such projects.
- The introduction and breeding of alien species should not be permitted in CBAs and ESAs.
- The restriction of animal movement (especially of threatened species) due to impenetrable fences should be discouraged, where possible.

General management guidelines in aquatic CBAs and ESAs

- Maintain water quality and flow regimes as close to natural as possible.
- Where Ecological Reserves or Environmental Flow Requirements have been determined, these should be strictly adhered to. Where these have not been determined, determination should be prioritised for all CBA and ESA rivers and wetlands.
- All effluent (including municipal, mining and industrial waste water) as well as acid mine drainage should be treated to the required specifications before release.
- Storm water flow should be managed to avoid degradation of CBAs and ESAs.
- Where CBAs and ESAs include floodplains (e.g. areas within the 1:100 year flood line), riparian areas (e.g. as a minimum, a 32m buffer around rivers) or buffers around wetlands, management activities should ensure that these remain in a natural state or are rehabilitated to a natural state. Do not permit infilling, excavation, drainage, hardened surfaces (including buildings and asphalt), intensive agriculture or any new infrastructure developments within a river, riparian area, wetland or buffer area. In addition to avoiding irreversible modification of natural vegetation cover, other activities such as livestock access may need to be controlled and alien vegetation managed to avoid damage to banks, riparian areas, wetlands and buffer areas.
- Where necessary, the site development plan should indicate the 1:100 year flood line, as determined by

a professional engineer. If the development is not subject to flood lines this should be confirmed by a professional engineer.

- Areas that are degraded or disturbed should be rehabilitated through programmes, such as Working for Water and Working for Wetlands; and an invasive alien vegetation eradication programme implemented.

- Linear infrastructure that crosses CBAs is not desirable, whereas for ESA1s and 2s, linear infrastructure features designed to cross rivers and riparian areas are permitted subject to appropriate impact minimisation, avoidance, mitigation and offset.

- Creation of berms, roads, culverts, canalisation, channelisation, invasive 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 within CBAs, whereas for ESAs these impacts should be avoided, where possible, within the 1:100 year flood line.



Rezoning, land use change and infrastructure

Where rezoning, land use change and infrastructure is proposed, the following guidelines are recommended:

■ A biodiversity or ecological specialist to conduct an ecological assessment.

■ Land use changes that may impact on the population viability of listed threatened species should be assessed by a specialist.

■ Rezoning in CBAs and ESAs:

■ **In CBA1s and CBA2s:** Rezoning of properties to afford additional land use rights that will result in increased biodiversity loss should not be granted (i.e. permission to increase the permitted number of units per erf or per hectare should not be granted).

■ **In ESA1s:** Rezoning of properties to afford additional land use rights that will result in increased impacts on ecological processes should not be granted, unless significant net conservation gains can be achieved, ecosystem functioning and connectivity of ESAs will not be compromised, and biodiversity impacts with regard to species and habitats are of an acceptable significance and mitigated where possible.

■ **In highly modified ESA2s** that are still important for supporting ecological processes: Current land uses should either be maintained or less intensive land uses permitted (e.g. game farming, game reserves, eco-tourism facilities, low density rural residential), intensification of land use should be avoided (e.g. a transition from extensive agriculture to urban or mining). If cultivation is no longer viable then these areas should be targeted for ecological restoration.

■ Infrastructure in CBAs and ESAs:

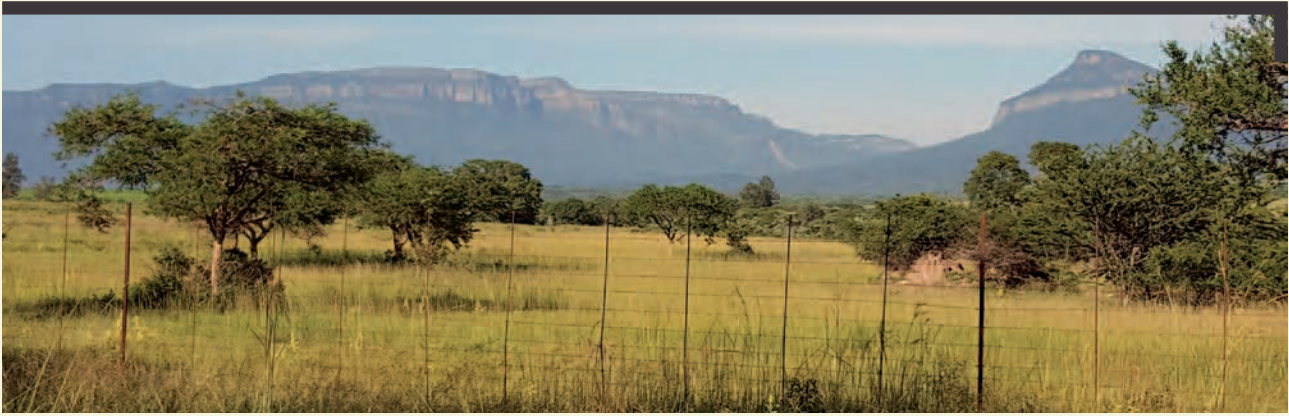
■ **In CBA1s:** The installation of infrastructure in CBA1s is not desirable and should only be considered if all alternative alignment and design options have been assessed and found to be non-viable. Under such conditions, at least a Basic Assessment (BA) should be undertaken, and if approved, a comprehensive Environmental Management Plan (EMP) must be developed and best-practice restoration efforts strictly implemented.

■ **In CBA2s:** Should additional infrastructure be required in CBA2, the requirements of threatened species should be taken into account. At least a Basic Assessment (BA) should be undertaken for any development which results in the intensification of land use, and if intensification of land use is approved, an Environmental Management Plan (EMP) must be developed to minimise impacts on threatened species.

■ Infrastructure developments should be limited to existing degraded / modified footprints, if and where present.

■ **In ESA2:** Infrastructure should be designed to avoid additional impacts on ecological processes (e.g. ensuring that hydrological functioning of runoff flow rate, quantity and quality are not impacted; or, landscape connectivity is not reduced through, for example, fencing).

For more details and guidelines, refer to Section 5.1 in the Maruleng Handbook (Guide to integrating the critical biodiversity areas map into environmental impact assessments and land use change applications).



- Units should be carefully dispersed or clumped to achieve least impact, particularly with regard to threatened species, habitat loss and fragmentation.

■ A site development plan should be compiled and approved by the municipality and provincial authority such as LEDET in Limpopo.

■ A services report should be compiled by a professional engineer and a services agreement drawn up with the local municipality. Long term maintenance of infrastructure should be indicated, for example road, sewage and water supply infrastructure.

Consult the Mopani District Bioregional Plan guidelines (Part 4, tables 3-7) for additional support.

These guidelines should be used in conjunction with available ecosystem guidelines and/or other guidelines when undergoing land development applications (e.g. EIAs, water use licenses, mining or agricultural applications etc.), where applicable:

■ NFEPA Implementation Manual for Freshwater Ecosystem Priority Areas (Driver et al., 2011)

■ Wetland offsets: A Best-Practice Guideline for South Africa (Macfarlane et al., 2014)

■ Buffer zone guidelines for rivers, wetlands and estuaries (Macfarlane and Bredin, 2017)

■ Guidelines for Development within Kruger to Canyons Biosphere Region. Download from <http://www.kruger2canyons.org/01-17%20-%20K2C%20Development%20Guidelines.pdf>

■ Grassland Ecosystem Guidelines (SANBI, 2013)

■ Grazing and Burning Guidelines (SANBI, 2014)

■ Guidelines for Game Farming (developed by the Department of Local Government and Human Settlements)

■ Mining and Biodiversity Guideline (SANBI, 2013)

■ The Western Cape Provincial Guideline on Biodiversity Offsets can also be consulted for additional support (DE&ADP, 2007)

Land use guidelines

Recommended biodiversity-compatible land use guidelines

This section outlines the recommended land uses per land use zone as per the Biodiversity Sector Plan (BSP).



It is important to note:

- The land use zones are based on those recommended under the Spatial Planning Land Use Management Act, 16 of 2013 ('schedule 2 land use purposes')
- These land use guidelines serve as the primary biodiversity informant to land use planning and decision-making, and cannot grant or take away existing land use rights.
- The land use guidelines are offered for the biodiversity priority categories (PA, CBA, ESA) and the remaining categories (ONA, NNR). Always prioritise for sustainable development, within general rural land-use principles, when considering land and water use applications in remaining categories i.e. other natural areas.

Table 6 Recommended biodiversity-compatible land use guidelines matrix (adapted from the MPTA, 2014; DEA&DP, 2004)

No	LAND USE ZONE	ASSOCIATED LAND USE ACTIVITIES	PA	CBA1	CBA2	ESA1	ESA2	ONA	NNR
1	Environmental Conservation (& similar zones in EMFs etc.)	Conservation management, low-intensity eco-tourism activities and sustainable consumptive activities. This includes both gazetted Protected Areas (NEMPA) and non-gazetted conservation areas	Y	Y	Y	Y	Y	Y	Y
2	Tourism and Accommodation	Low Impact Eco-Tourism (e.g. lodge or other ecotourism infrastructure on game reserve)	Y	Y	Y	Y	Y	Y	Y
		Medium Impact Tourism / Recreational and Accommodation	N	R	R	R	R	Y	Y
		High Impact Tourism / Recreational and Accommodation (e.g. golf and polo estates)	N	N	N	N	R	Y	Y
3	Rural Residential	Low density rural housing or eco-estates	N	R	R	R	R	Y	Y
		Moderate density rural housing or eco-estates	N	N	R	R	R	Y	Y
		Traditional Communal Areas and Rural Communal Settlement (new)	N	N	N	R	R	Y	Y
4	Agriculture	Extensive Game Farming	Y	Y	Y	Y	Y	Y	Y
		Extensive Livestock Production	N	Y	Y	Y	Y	Y	Y
		Extensive Game Breeding (≥100 ha camps)	N	R	R	Y	Y	Y	Y

No	LAND USE ZONE	ASSOCIATED LAND USE ACTIVITIES	PA	CBA1	CBA2	ESA1	ESA2	ONA	NNR
4	Agriculture (cont.)	Low Impact Extensive Game Breeding (permeable fencing and camps >100 ha)	N	Y	Y	Y	Y	Y	Y
		Intensive Game Breeding (<100 ha camps, high stocking densities, impermeable fencing)	N	N	N	R	R	Y	Y
		Arable Land - Dryland and Irrigated Crop Cultivation	N	N	N	N	R	Y	Y
		Plantation Forestry: Timber Production	N	N	N	N	R	Y	Y
		Agricultural Infrastructure - Intensive Animal Farming (e.g. feedlot, dairy, piggery, chicken battery)	N	N	N	N	R	Y	Y
5	Open-Space	Public or Private Open-Space (Modified), includes recreational areas, parks etc. i.e. loss of indigenous vegetation	N	N	N	N	Y	Y	Y
		Public or Private Open-Space (Natural) – includes natural open space (indigenous vegetation retained or rehabilitated in ESA2)	Y	Y	Y	Y	Y	Y	Y
6	Residential	Low, low-medium, medium-high, and high density urban residential development	N	N	N	N	N	Y	Y
7	Urban Influence	An amalgamation of land use zones, including Institutional, Urban Influence, General Mixed Use, Low Impact Mixed Use, Suburban Mixed Use and General Business	N	N	N	N	N	Y	Y
8	Low or High Impact and General Industry	Low Impact, General Industry and High Impact Industry (Urban & Business Development)	N	N	N	N	N	Y	Y
9	Transport Services	Transportation service land uses e.g. airports, railway stations, petro-ports and truck stops, bus and taxi ranks and other transport depots	N	N	N	R	R	Y	Y
10	Roads and Railways	Existing and planned linear infrastructure such as hardened roads and railways, including activities and buildings associated with road construction and maintenance, e.g. toll booths, construction camps and road depot sites (Linear Engineering Structures)	N	N	R	R	R	Y	Y
11	Utilities	Linear engineering structures, such as pipelines, canals and power lines (Linear Engineering Structures)	N	R	R	R	R	Y	Y
		Small-scale Infrastructural installations, including wastewater treatment works and energy sub-stations	N	N	R	R	R	Y	Y
		Large-scale Infrastructure installations, including bulk water transfer schemes, impoundments (Water Projects & Transfers), and energy-generation facilities	N	N	N	N	R	Y	Y
		Renewable Energy (Photovoltaic farms and solar arrays)	N	N	N	R	R	Y	Y
		Renewable Energy (wind farms)	N	N	R	R	R	Y	Y



No	LAND USE ZONE	ASSOCIATED LAND USE ACTIVITIES	PA	CBA1	CBA2	ESA1	ESA2	ONA	NNR	
12	Quarrying and Mining	Prospecting and Underground Mining	N	N	N	R	R	Y	Y	
		Quarrying and Opencast Mining (includes surface mining, dumping & dredging)	N	N	N	N	N	Y	Y	
		Hydraulic Fracturing	N	N	R	R	R	Y	Y	
SPECIAL MANAGEMENT OVERLAY ZONE										
13	CBA Map Overlay Zone / Bioregional Planning Overlay Zone / Environmental Management Overlay Zone	These are areas that are designated as priority areas for protection, namely CBAs and ESAs. Therefore the land use activities for CBA and ESA above will apply.	Land use activities for CBA and ESA above will apply							

Key:

- Y YES, permitted and actively encouraged activity
- N NO, not permitted, actively discouraged activity
- R RESTRICTED to compulsory, site-specific conditions and controls when unavoidable, not usually permitted

Descriptions of land use zone categories and activities*

These land use zones have been aligned as far as is possible with land use zones generally used in municipal land use schemes, and the 'schedule 2 land use purposes' of the **Spatial Planning and Land Use Management Act (16 of 2013)** (SPLUMA).

* Source: Maruleng Biodiversity handbook (AWARD, 2017); adapted from the Mpumalanga Biodiversity Sector Plan handbook (MPTA, 2014).

LAND
USE
ZONE

1

Environmental Conservation

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

The Environmental Conservation zone (as well as similar zones in EMFs etc.) provides for conservation purposes which includes a range of land use activities where biodiversity conservation is the primary land use objective.

The Environmental Conservation zone includes:

- Conservation management activities in formal protected areas and informal Conservation Areas managed for biodiversity (wildlife production and recreational/educational tourism);
- Low-intensity eco-tourism activities (such as hiking trails); and
- Sustainable consumptive activities (e.g. sustainable harvesting of natural resources such as medicinal plants), conducted in natural habitats on public or private land.

These land use activities provide the following:

- Protection of the natural environment and natural processes for their historic, scientific, landscape, biodiversity, habitat, or cultural values.
- Provision facilities which assist in public education and the integration of the built and natural environments, with minimal degradation of the natural environment or natural processes.
- Creation of a holistic framework where culturally significant and historical sites are accorded equal status and value along with new developments.
- The sustainable provision of ecosystem services to the community.

Subject to appropriate controls, planning and management, these land use activities can be accommodated in CBAs and ESAs. It is the preferred land use in CBAs and ESAs. Where there is a requirement to use natural resources, this should be demonstrably sustainable. This would include the concept of catchment management and protection for water security.



LAND
USE
ZONE

2

Tourism and Accommodation

The Tourism and Accommodation zone provides opportunities for the development of a broad range of tourist and recreational facilities, inclusive of tourism, recreation and accommodation facilities.

Tourism and Accommodation includes three sub-categories:

a. Low impact eco-tourism facilities include activities such as outdoor recreation (e.g. hiking trails, 4x4 tracks), camping sites, gift shops, restrooms and non-place-bound tourist and recreation facilities such as paint-ball parks (in natural settings). In addition, lodges and other similar facilities on a game reserve with large expanses of natural cover are considered low impact so long as the facilities will not cover more than 0.1% of the original natural area (i.e. a maximum of 1 hectare of impact per 1000 hectares of natural cover).

b. Medium-impact facilities include tourism and accommodation that has a moderate impact on the natural environment, but does not include typical smaller eco-tourism type facilities (e.g. a lodge) with large expanses of natural cover where the facilities will not cover more than 0.1% of the original natural area (i.e. a maximum of 1 hectare of impact per 1000 hectares of natural cover – as indicated above).

c. High-impact facilities include developments such as large resorts, golf courses and golf estates, polo estates.

Low Impact tourism and accommodation facilities that are in support of sustainable rural tourism, rural businesses and communities and that provide for the rural recreational and leisure needs of urban dwellers, could be allowed in protected areas, CBAs and ESAs subject to the appropriate biodiversity related controls being in place. In all cases, permission would be required to ensure that these land uses do not compromise the specific biodiversity objectives of the area that the location of infrastructure is within already-modified areas (if possible) that large-scale tourist facilities are kept to the urban fringe and that infrastructure development is kept out of ecologically sensitive areas and priority ecological corridors.

This land use zone corresponds to the SPLUMA scheduled land use purpose ‘residential purpose’ and represents rural residential housing.

The Rural Residential zone makes provision for residential and recreational non-urban infrastructure associated with rural landscapes, including the villages and gardens of traditional areas (but excluding subsistence agriculture).

Rural Residential includes four sub-categories:

a. Low-Density Rural Housing or Eco-Estate, the establishment of lifestyle estates or investment-type recreational ownership of facilities such as share-block schemes, multi-ownership reserves and **eco-estates** but excludes golf and polo estates. Infrastructure development within CBA1, CBA2, ESA1 and ESA2 may be suitable if the property size exceeds 250 ha and if over 90% of the land is not modified in any way (through the establishment of infrastructure or gardens) / retained as natural habitat.

b. Moderate Density Rural Housing or Eco-Estates: As above but moderate densities. Infrastructure development within CBA2, ESA1 and ESA2 may be suitable if the property size exceeds 250 ha and if over 80% of the land is not modified in any way (through the establishment of infrastructure or gardens) / retained as natural habitat.

c. Traditional Communal Areas (New), which includes gardens and villages, but excluding subsistence agriculture. This land use should not *currently* be sited in CBA, but may *currently* be sited in ESA2. The land use guidelines thus serve to inform proposed / new traditional communal areas.

d. Rural (Communal) Settlement (New), which encompasses new residences for farm workers and retirees i.e. where housing is available to farm workers who currently live on the farm and will be residing there in future, either due to personal preference (e.g. their tenure rights, rural surroundings, place for retirement, etc.) or because circumstances require it (e.g. working hours, etc.).

The purpose of this land use zone is:

- To create the opportunity for people to enjoy a semi-rural lifestyle and yet have ready access to the full range of physical and social services which are available in the adjacent urban areas.

- To allow only a limited number of ancillary uses so as to protect the primary **low-density residential or agricultural land use**.

- To ensure that urban agricultural activities are undertaken in a sustainable manner and in accordance with the relevant environmental principles.

Low to Moderate Density Rural Housing or Eco-Estates and the development of some lifestyle estates can be compatible in CBAs and ESAs if land portions are large, if the development footprint is small,

and if impacts are carefully assessed and managed. As per the specifications above, (a) Low Density Rural Housing or Eco-Estates within CBA1, CBA2, ESA1 and ESA2 may be suitable if the property is > 250 ha and if over 90% of the land is retained as natural habitat; (b) Moderate Density Rural Housing or Eco-Estates within CBA2, ESA1 and ESA2 may be suitable if the property is > 250 ha and if over 80% of the land is retained as natural habitat. In some cases, these kinds of land uses can therefore increase the amount of land available for conservation. Applications should be handled on a case-by-case basis and the EIA and National Water Act regulations applied.

The following conditions should be considered:

- Intensive recreational developments such as golf and polo estates, which result in significant habitat loss and which represent urban development outside the urban edge, are not compatible with CBAs.
- Any infrastructural developments in CBA1s should be avoided unless the land use qualifies as a low density eco-estate (see densities above).
- Rural residential development within CBAs and ESAs can be considered if the houses and infrastructure are clustered, and meet other criteria and densities that are consistent with the land management objectives.
- Residential developments within ESAs must consider the functionality of the ESA which may be related to connectivity and their role as ecological corridors. In these cases residential houses and infrastructure should not disrupt or fragment the corridor, or establish impermeable fences or boundaries to disrupt faunal movement.
- Rural (Communal) Settlement should not involve the cadastral fragmentation of agricultural landscapes and, where possible, clustering of units in distinct housing precincts located in visually unobtrusive locations and existing footprints, but enjoying convenient access to the rural access network should be encouraged.





LAND
USE
ZONE

4

Agriculture

This land use zone corresponds to the SPLUMA scheduled land use purpose ‘**agricultural purpose**’, and is sub-divided into the land use activities below.

The Agriculture zone accommodates a range of land uses including:

.....
a. Extensive Game Farming and Livestock Production (where ‘extensive’ means at low stocking rates over large areas).
.....

b. Game Breeding (Extensive, Low Impact Extensive and Intensive Game Breeding).
.....

c. Arable Land, including cultivation of irrigated and dryland crops, orchards and multi-cropping systems.
.....

d. Plantation Forestry, including all kinds of commercial timber plantations, woodlots, and converted infestations of invasive alien woody species.
.....

e. Agricultural Infrastructure, including agri-industrial facilities, agri-villages, buildings, houses, sheds, and intensive animal production facilities.

Many zonation schemes distinguish between a number of agriculture zones (e.g. Agriculture 1, Agriculture 2) based on agricultural land use activities and consent uses. The various land uses above are characteristic of agricultural practices in the province and could be used to develop distinct agricultural zones that could be aligned with the CBA Map categories.

Although many land uses are freely permitted within the agricultural zone, all of them, other than extensive livestock and game production, have significant impacts on biodiversity, and are largely incompatible with biodiversity conservation objectives. They may even accelerate degradation by causing habitat loss, soil erosion and hydrological changes. Their impacts vary from moderate to severe depletion of natural biota and disturbance of ecosystem functioning. However, they can still contribute to the overall functionality of a landscape and allow for the movement and foraging of animals.

Extensive Game Farming and Livestock Production

Extensive Livestock and Game Farming (Ranching) is the management of large areas of natural (unimproved) rangelands with the commercial objective of producing livestock or game animals for hunting or to sell as live animals or processed animal products. This specifically excludes feedlots and intensive game breeding farms. This land use is considered to be compatible with biodiversity objectives of some protected areas (such as Protected Environments), CBAs and ESAs, under certain conditions, including:

- A biodiversity and veld condition assessment should underpin the calculation of carrying capacity.
- Game and livestock stocking rates should never exceed the recommended carrying capacity.
- If the irreplaceability of the site is due to the presence of a grassland vegetation feature, then exclusive sheep farming should be avoided and stocking rates of concentrate grazers, such as blesbok, should be conservative (this may mitigate against commercial-scale production).
- Appropriate grazing and burning regimes must be employed to ensure that rangeland condition does not deteriorate, specifically in terms of implementing a rotational burning and grazing system that allows for adequate rest of the vegetation.
- A coherent management plan that governs grazing, burning and invasive alien plant control (and other aspects of farm management) must be in place.
- Sensitive habitats and species-rich areas, such as intact grasslands, wetlands, rivers and forests, should ideally be delineated accurately and zoned separately (this could include the Environmental Conservation Zone or CBA Map Overlay Zone).
- Ecologically and economically sustainable management is applied to farm portions above a certain minimum size, based on ecological and economic viability.

Game Breeding

Extensive Game Breeding is a key land use activity in the region. Extensive game breeding takes place on camps ≥ 100 ha in size. Stocking rates are within the recommended ecological carrying capacities and there is limited use of supplementary feed.

Low Impact Extensive Game Breeding would include fencing that is permeable to smaller fauna and larger paddocks of at least 100ha. Stocking rates are within the recommended ecological carrying capacities, and there is limited use of supplementary feed.

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

intensive animal production resulting in severe biodiversity (loss of species) and ecological impacts (overgrazing, landscape fragmentation) that are difficult to mitigate.

■ Game breeding can only be permitted in CBA if camps are ≥ 100 ha and within the ecological carrying capacity of the vegetation type / veld and there is limited use of supplementary feed.

■ Game breeding that is more intensive – with camps that are less than 100 ha in size as indicated above - should not be permitted in CBA.

■ Fencing systems must allow for natural species movement for smaller species.

■ Conversion to a game breeding facility requires (1) registration with LEDET; and, (2) an environmental assessment.

Arable Land

The Arable Land category is subdivided into two sub-categories, which includes all forms of:

■ Irrigated crops

■ Dry crops

These crops include, for example, orchards, pastures and improved grasslands; and are an intensive form of cultivation.

Any activity that turns the soil or replaces the natural vegetation with a crop generally results in loss of ecosystem composition and structure and is not considered compatible with the biodiversity objectives of protected areas (with some exceptions in Protected Environments), CBAs, and some ESAs.





Plantation Forestry

Plantation Forestry involves timber production and includes:

- All land planted to trees (primarily pine, gum and wattle species) for commercial timber or pulp production, irrespective of the size of the area. It excludes the natural, open areas that remain unplanted within a plantation.

Although very similar to arable land in terms of biodiversity impact, plantations have been separated out due to the unique nature of their land management context.

All planted areas are considered to be incompatible with biodiversity objectives of protected areas (although some Protected Environments might include afforested areas), CBAs and most ESAs. It should be noted however, that the unplanted areas within plantations often harbour important biodiversity and can make an important contribution to meeting biodiversity conservation goals and for providing connectivity between natural areas across landscapes. This means that with sound planning, the biodiversity-compatibility of plantation forestry can be improved, but afforested land must be covered by the necessary plantation permits and the management of the plantation and associated lands must adhere to industry best-practice guidelines. Forestry Stewardship Council (FSC) certification is encouraged. Monoculture of alien timber species is discouraged, as this impacts heavily on hydrology and soil erosion, and holds high potential for the introduction and spread of a variety of aggressive invasive alien plants.

Agricultural Infrastructure

Agricultural Infrastructure includes:

- All the land use categories associated with infrastructure in the agricultural sector, including facilities associated with agri-industry (the processing of agricultural products close to the land where these are produced) and intensive animal production (the production of confined animals that are dependent primarily on imported food, including dairy cattle in feedlots, piggeries, and fish farms in rivers).

These land uses have impacts that are felt beyond the direct footprint of the land use activity itself, impacting on ecosystem functionality. All such infrastructure is considered incompatible with the land management objectives of protected areas (including Protected Environments) and CBAs. It can be considered an ESA with restrictions.

This land use zone corresponds to the SPLUMA scheduled land use purposes ‘**public purpose**’ or ‘**recreational purposes**’.

Open-Space includes:

- Public or Private Open-Space (Modified), which includes recreational areas, parks etc. where there is a loss of indigenous vegetation or natural cover. This is not compatible with PA, CBA and ESA 1.
- Public or Private Open-Space (Natural), which includes natural open spaces where the indigenous vegetation or natural cover is retained. This is compatible with PA, CBA1, CBA2 and ESA 1. If ESA 2 are rehabilitated / revegetated, this land use would be applicable to ESA 2.

Open-Space provides for:

- Appropriately situated sites that are easily accessible for recreational purposes and activities for local and designated communities (including the physically challenged, the elderly, women, and children), and are located and maintained to attract visitors and tourists.
- Parks, botanical gardens and other open spaces as well as corridor linkages between open areas for passive recreational purposes.

Although there may be some infrastructural development associated with this land use zone, it could potentially be compatible with some of the management objectives of CBAs and ESAs **if it secures significant areas of natural habitat**. However, this would need to be decided on a case-by-case assessment of the nature of the land use and the context of the area. In CBAs or ESAs, Open Space that maintains and enhances the natural habitat should be permitted.



This land use zone corresponds to the SPLUMA scheduled land use purpose ‘**residential purpose**’, and represents urban residential housing.

The Residential zone includes:

- Residential housing in the urban context where the use of land is primarily for human habitation, and comprises a dwelling house, group housing and flats. It provides for safe and sustainable residential environments for all communities. It limits the allowable ancillary uses to those that can be accommodated within the residential fabric with minimal impact or disruption.

Many zonation schemes distinguish between a number of categories of residential (e.g. Residential Zone 1, Residential Zone 2) based on density (e.g. low, low-medium, medium-high, and high). However, these have been grouped into a single category here as the impacts on biodiversity objectives, and the recommended land use guidelines, are very similar.

Residential land uses are generally not compatible with the land management objectives of protected areas, CBAs or ESAs. **ESA2 are usually floodplains, which should not be intensified or built up.** Subject to the necessary authorisations, residential housing can be considered in ONAs or areas with No Natural Habitat Remaining.

Urban expansion should be managed through the delineation of an urban edge, and all residential developments (and their associated infrastructure) should be located within the urban edge.

This land use zone corresponds to a mix of the SPLUMA scheduled land use purposes, namely: ‘**commercial purposes**’, ‘**educational purposes**’, ‘**institutional purpose**’, ‘**business purposes**’ and ‘**residential purposes**’.

Urban Influence includes:

- An amalgamation of a number of land use zones (including Institutional, Urban Influence, General Mixed Use, Low Impact Mixed Use, Suburban Mixed Use and General Business) that have similar impacts on biodiversity.

In all cases, the land uses allowed in these zones are **not** compatible with protected areas, CBAs or ESAs.



LAND
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ZONE

8

Low or High Impact and General Industry

This zone encompasses industrial land use activities and corresponds to the SPLUMA scheduled land use purpose ‘**industrial purposes**’.

8a. Low Impact Industry, General Industry and Industry:

These land uses are not biodiversity compatible and should not be located in protected areas, CBAs and ESA1s. They can be located in ESA2s with the necessary restrictions, and are preferable in areas with No Natural Habitat Remaining, subject to the appropriate authorisations.

8b. The High Impact Industry zone accommodates:

■ Intensive, high-impact industries, which have high local impacts (e.g. high levels of air, water and noise pollution and heavy traffic) as well as significant dispersed and cumulative impacts.

These types of industrial developments have significant and wide-ranging impacts that may have effects hundreds of kilometres from their source, especially along river systems. High-impact industrial development is not compatible with biodiversity and should not be located in protected areas, CBAs and ESA1s. They can be located in ESA2s but only with the necessary restrictions.

This land use zone corresponds to the SPLUMA scheduled land use purpose **'transport purposes'**, which corresponds to the land use activities below.

This zone accommodates transportation service functions and land uses such as:

- Airports, railway stations, petro-ports and truck stops, bus and taxi ranks and other transport depots.

These services should be located so that they provide the catalyst for local economic development whilst ensuring that they are developed in accordance with EIA requirements and ongoing environmental monitoring procedures. All the land uses allowed in this zone are not compatible with protected areas, and can only be considered, under permit, with restrictions, in CBAs and ESAs where it is certain they will not impact on neighbouring biodiversity priority areas. Preferable sites are areas with No Natural Habitat Remaining.

This land use zone corresponds to the SPLUMA scheduled land use purpose **'transport purposes'**, which includes roads, railways and associated construction and maintenance activities.

Roads and Railways include:

- All existing and future planned linear infrastructure, such as hardened roads and railways.
- All activities and buildings associated with road construction and maintenance, e.g. toll booths, construction camps and road depot sites. It *does not* include power and telephone lines (which are accommodated under the next category, referred to as Utilities).

The land uses allowed in this zone can be biodiversity-sensitive and compatible with the land management objectives of CBAs, and ESAs under certain conditions, but should be discouraged where the management objective is the maintenance of ecological connectivity across the landscape, or where the installation of the infrastructure would disrupt this connectivity. In all other cases, transportation infrastructure could be allowed in CBAs and ESAs under certain conditions, and subject to the necessary environmental authorisations and other relevant approvals.

The design of the transportation network should:

- Avoid impacts (direct or indirect) on CBAs and ESAs, especially connectivity of the landscape and local corridors. Transport infrastructure should not be located in sensitive areas such as river and wetland buffers, and should avoid flood-lines.

This land use zone corresponds to the SPLUMA scheduled land use purpose **'government purposes'** where it relates to activities or the use of land by national government, provincial government and a municipality to give effect to its governance role. Here it extends to include parastatal companies, such as Eskom, the South African National Roads Agency (SANRAL), including other agencies, such as water service boards.

The Utilities zone allocates land for the provision of a diverse range of services such as:

- Water and sewerage works, linear structures (such as pipelines, canals and power lines) and other similar utilities. The Utilities zone should be located at a distance from residential or other land uses where they may detract from levels of amenity or safety. They should also be located such that disruption to natural areas and water courses through the laying of service pipelines or cables is minimised by adhering to sound environmental management principles.

Linear Structures: Pipelines, Canals, Catchment Transfers and Power Lines

- The structures included here are similar to transport services and roads and railways, but also include those linear engineering structures not included under Transport, Roads and Railways, such as pipelines, conveyor belts, power lines, canals, and so on. These can have measurable impacts on particular species, for example the impacts of power lines on birds.

The land uses allowed in this zone can be biodiversity-sensitive and compatible with the land management objectives of CBAs and ESAs. Linear infrastructure could be allowed in CBAs and ESAs under certain conditions, and subject to the necessary environmental authorisations and other relevant approvals. Linear infrastructure should not be located in sensitive areas such as river and wetland buffers, and should avoid flood-lines.





Small-scale Infrastructural installations, including wastewater treatment works and energy sub-stations

- This category includes a wide range of infrastructural installations serving rural and urban areas, including wastewater treatment works and energy-generation facilities (power stations).

Sewerage works may have significant impacts on water quality and flow in rivers and wetlands. This land use category also falls outside of the municipal land use zonation system but is important when considering impacts on freshwater CBAs and ESAs. The land uses could be allowed in CBA2s and ESAs under certain conditions, and subject to the necessary environmental authorisations and other relevant approvals. Footprints should not be located in river and wetland buffers, and should avoid flood-lines.

Large-scale Infrastructure installations, including bulk water transfer schemes, impoundments (Water Projects & Transfers), and energy-generation facilities

- This category should not be permitted in PAs, CBAs and ESAs.

Renewable Energy (PV farms and solar arrays)

- This category includes extensive areas of PV farms resulting in intensive or high impacts; and thus should not be permitted in PAs, CBAs and ESA1s, and should be 'restricted' in ESA2s.

Renewable Energy (wind farms)

- This category includes extensive areas of wind farms but due to the nature of the infrastructure (wind turbines with access roads) the resulting impacts are not as intensive; and can thus be restricted in CBA2s, ESA1s and ESA2s; but should not be permitted in PAs and CBA1s.

Other Utilities

- This category provides for any other land uses not specified in any of the other categories, and may include a wide variety of infrastructure, such as radio masts, electrical sub-stations and other such utilities.

Generally, land uses in the utilities category are not compatible with the land management objectives of freshwater CBAs or ESAs, but could be allowed, under certain conditions in protected areas, and terrestrial CBAs and ESAs.

This land use zone corresponds to the SPLUMA scheduled land use purpose ‘mining purposes’.

The Quarrying and Mining zone includes all forms of mineral extraction and is sub-divided into the following sub-categories:

- Prospecting and underground mining
- Quarrying and opencast mining (includes strip mining, surface mining, dumping and dredging)
- Hydraulic fracturing

It also encompasses the surrounding footprint of associated activities including the establishment of residential areas, waste dumps, settlement ponds and disposal sites, urban waste sites and landfill sites.

Prospecting versus mining applications

Prospecting, particularly bulk sampling and the fracturing of water tables, can have negative impacts on the environment. Prospecting also includes associated disturbances such as the construction of roads. Although prospecting does not automatically lead to the issuing of mining rights, it does grant the prospecting license holder the exclusive right of applying to mine the mineral resource.

- Prospecting can be ‘restricted’ in CBA2s, ESA1s and ESAs; but should not be permitted in PAs and CBA1s.



Underground mining versus open-cast/surface mining

The Quarrying and Mining zone can also be split into surface and underground mining activities. Although impacts from underground mining may be less than open-cast mining, impacts need to be considered in terms of both terrestrial and freshwater ecosystems. Ideally, no underground mining infrastructure should be located in or adjacent to terrestrial or freshwater CBAs and ESAs and no open-cast mining should occur in these biodiversity priority areas.

- Quarrying and opencast mining should not be permitted in PAs, CBAs and ESAs.

Hydraulic Fracturing

- Hydraulic fracturing should not be permitted in PAs and CBA1s, but can be 'restricted' in CBA2s, ESAs.

The following conditions should be observed:

- The NFEPA Implementation Manual (Driver et al., 2011) recommends that mining should not take place within 1 000 m of the outer edge of a generic 100 m wetland buffer (i.e. 1,1 km if the buffer is 100 m).
- Buffer widths should be determined based on the guidelines in the NFEPA Implementation Manual, or according to the Department of Water and Sanitation buffer tool, when it is available.
- Ideally, effluent should be reflective of Resource Quality Objectives, as determined by a Reserve Determination, or should be determined on the basis of species sensitivities.





LAND
USE
ZONE

13

CBA Map Planning Overlay Zone / Bioregional Planning Overlay Zone / Environmental Management Overlay Zone

This land use zone corresponds to the SPLUMA scheduled land use purpose ‘**any other purpose that may be prescribed**’, which in this instance is CBA Map Overlay Zone / Bioregional Planning Overlay Zone / Environmental Management Overlay Zone i.e. where an appropriate zone is developed for the land use scheme.

The objective of the CBA Map Planning Overlay Zone / Bioregional Planning Overlay Zone is to provide a mechanism to protect biodiversity and promote sustainable development. This zone enables the Council to determine development management provisions that respond to specific biodiversity issues and characteristics of CBAs and ESAs. Contractual obligations can be placed on landowners where additional land use rights have been granted (DEA&DP, 2004).

The zone includes:

- The overlay zone can be utilised to protect land that is classified as CBAs and ESAs (and potentially ONAs where this is deemed necessary), that fall partially within any other land use zone above. For example, on land zoned as agriculture, but which still supports natural or near-natural areas on a portion of the land parcel. It could also include agricultural zoned land that is classified as ESA, for example along a river; where the land use should not be further intensified.

The land use activities permitted in this zone should therefore correspond to the recommended land uses for the respective categories, particularly CBAs and ESAs.

STEP BY STEP guide to using the CBA map and BSP data

STEP 1

Assess the Biodiversity Sector Plan/CBA Map information

Consult the following GIS data to determine the CBA Map category, biodiversity features and land cover on the property:

- Consult the CBA Map GIS shapefile to determine the category of the property (CBA, ESA, ONA and/or No Natural Remaining).
- Consult the associated GIS shapefiles to determine the presence of specific biodiversity features on the property e.g. wetland, river, vegetation type.
- Consult the 'Land Cover' GIS shapefile to determine the land cover category of the property (natural, degraded, irreversibly modified etc.).

The user friendly cell phone app and A3 map book can also be used to interrogate the CBA Map in relation to the property in question.

STEP 2

Assess other available information

Consult other available information to assist with interpreting the biodiversity of the property and surrounding area. This is especially important since the CBA may not show enough detail. Consider, for example:

- The Land use Decision Support (LUDS) Tool on the SANBI BGIS website at <http://bgis.sanbi.org> to determine property specific details, and aerial imagery via Google Earth, if necessary.
- The SANBI website for additional biodiversity information resources at <http://www.sanbi.org/information>.
- Up-to-date orthophotos, aerial or satellite imagery and Google Earth imagery to assess the presence of natural vegetation on site and/or the level of modification or degradation.
- The national and provincial Protected Area Expansion Strategies to identify focus areas for expansion of the protected area network (downloadable from the SANBI BGIS website).
- The Provincial Spatial Development Framework (SDF) for land use policy recommendations.
- Other strategic guidelines e.g. Grazing and Burning Guidelines (SANBI, 2014); NFEPA Implementation Manual for Freshwater Ecosystem Priority Areas (Driver et al., 2011), Guidelines for Development within Kruger to Canyons Biosphere Region (unpublished report), Mining and Biodiversity Guideline (SANBI, 2013); Buffer zone guidelines for rivers, wetlands and estuaries (Macfarlane and Bredin, 2016 & 2017) etc.



STEP 3

Site verification

A **biodiversity specialist** or **ecologist** should conduct a site visit to verify that the CBA map is accurate. The role of the specialist is to confirm or modify the CBA classification of the site based on observed conditions. Refer to **Section 5.1.3 of the Biodiversity Sector Plan handbook** for the minimum requirements to be determined by the specialist.



STEP 4

Consult the Guidelines for Land Use Planning and Decision-Making (Section 4 of the BSP)

Once the CBA map category of the property has been verified (Step 3), consult the land management objective (Table 13), recommended biodiversity-compatible land uses (Table 14) and land management guidelines (Table 15) in **Section 4 of the BSP Handbook**. A comparison of the BSP land use guidelines with the Mopani District Bioregional Plan is provided in Table 16.



STEP 5

Follow the terms of reference for environmental assessments (recommended by the Botanical Society of South Africa - Conservation Unit)

The terms of reference should then be followed as part of the environmental assessment process (basic assessment or full EIA). Refer to **Section 5.1.5 of the Biodiversity Sector Plan handbook** or download the terms of reference on <http://biodiversityadvisor.sanbi.org/planning-and-assessment/environmental-assessments/contextualisation/what-is-screening/tor-for-screening/>



All mapped information should be provided in shapefile (GIS) format, with the proposed development area (go area) and the area that will not be developed (no go area) presented in hectares (extent of go and no go area per cadastral unit). This data should be integrated into a GIS land use management database to monitor changes in the CBA map and the loss of biodiversity in the municipal area.

Refer to **Section 5.1.6 of the BSP Handbook** for 'Frequently asked questions when using the CBA Map' to understand the map better.

Glossary



Aquatic features or ecosystems – refer to rivers, wetlands and estuaries or natural water features.

Aquifer – Underground water-bearing areas.

‘Best design’ – refers to an identified network of natural sites that meet pattern and process thresholds in all vegetation types in a spatially efficient and ecologically robust way, and aim to avoid conflict with other activities (e.g. economic activity) where it is possible to achieve biodiversity thresholds elsewhere. The ‘best design’ sites include the largest, most intact, least disturbed, connected and/or adjacent areas required in terms of meeting pattern and process thresholds.

Biodiversity – The wide variety of plant and animal species in their natural environment. It not only refers to species (plants, animals and micro-organisms), but also to ecosystems, landscapes, and the ecological and evolutionary processes that allow biodiversity to persist over time. It includes the diversity within species, between species, and of ecosystems.

Biodiversity offsets – Conservation activities intended to compensate for the residual, unavoidable harm to biodiversity caused by development projects. It usually involves setting aside land in a similar ecosystem elsewhere, at the cost of the developer. See biodiversity receiving areas below.

Biodiversity offset receiving areas – These are areas in the landscape that are selected to compensate for the unavoidable and negative impacts of a proposed development. They are usually of equal or greater biodiversity importance to the area of land impacted on or lost.

Biodiversity pattern – The term for the way in which the components of biodiversity are spatially arranged, and in this document, refers to specific vegetation types or habitat types, e.g. forest or fynbos, a population of rare and endemic species, or other biodiversity features, e.g. a river, wetland (vlei). The habitat type or feature is home to specific animals, plants, birds, insects and other organisms, for example Blue Duiker in forests.

Biodiversity plan(ning) – A map of information about biodiversity features (species, ecosystems, ecological processes), existing Protected Areas; current patterns of land use; and potential and conflicting patterns of land use. These mapped features can be linked for further analysis using Geographic Information Systems (GIS) to identify areas of highest biodiversity importance and to determine priority areas for action.

Biodiversity priority areas – In this guide, the term refers to formal Protected Areas, Critical Biodiversity Areas and Ecological Support Areas.

Biodiversity Sector Plan – A tool that feeds into a range of multi-sectoral planning and assessment processes to inform land use planning and decision-making. As a minimum, it should include a Critical Biodiversity Areas Map, a Biodiversity Sector Plan handbook with land use management guidelines and a municipal biodiversity profile; and all relevant GIS shapefiles. It is often a precursor to a gazetted bio-regional plan, but in our example, it has been developed to accompany and further explain the Mopani District Bioregional Plan, as it relates to the Maruleng Local Municipality. It provides biodiversity data specific to the Maruleng Municipality landscape, along with explanatory information, to assist in the uptake of the Mopani District Bioregional Plan at the local level. See ‘Bioregional Plan’ below.

Biodiversity Target (or threshold) – A target area (hectares) which must be safeguarded in order for the component plants and animals to exist and for ecosystems to continue functioning (e.g. pollination, migration of animals). If the threshold for a feature is exceeded (i.e. the extent of the feature is reduced through

human activities), the threat arises that ecosystems will deteriorate/collapse, which will severely impact on the delivery of ecosystem services. The thresholds drive the 'amount' of an ecosystem type (e.g. vegetation type) is selected on the CBA Map. It answers the query: 'How much do we need to achieve a living landscape' (e.g. number of hectares). Biodiversity Thresholds are the cornerstone of the systematic biodiversity planning approach and are based on species diversity and richness within each vegetation type. Legislative control also influences target setting, for example Forests are protected by legislation therefore a target of 100 % is set i.e. all the remaining forests require protection.

Bioregion – A land and water territory, the limits of which are not politically bound, but which are defined by the geographical boundaries of human communities and ecological systems. Also a geographical space that contains one whole, or several nested, ecosystems characterised by landforms, vegetative cover, human culture and history as identified by local communities, governments and scientists.

Bioregional Plan (published in terms of the NEMBA) – A bioregional plan is based on a systematic fine-scale biodiversity plan (ideally at a scale of 1:10 000; or \leq 1:50 000). It includes a Critical Biodiversity Areas map and land and water use guidelines. The compilation and monitoring of bioregional plans is usually the responsibility of the conservation authority or provincial environmental department or of a municipality, if the capacity exists. Municipalities must be consulted in the publishing process. After its publication, the bioregional plan must be taken into account in all future planning by a municipality. A bioregional plan should be compiled for a municipality or cluster of municipalities. Refer to the 'Guideline regarding the Determination of Bioregions and the Preparation and Publication of Bioregional Plans'.

Bioregional planning – refers to land use planning and management that promotes sustainable development by recognising the relationship between, and giving practical effect to, environmental integrity, human-well-being and economic efficiency within a defined geographical space, the boundaries of which are determined in accordance with environmental and social criteria. It is an internationally recognised planning concept aimed at achieving sustainable development.

Biodiversity priority areas – In this guide, the term refers to formal Protected Areas, Critical Biodiversity Areas and Ecological Support Areas.

Cadastral unit – A single property or erf.

Carbon storage (or carbon sequestration) – The storage of carbon dioxide or other forms of carbon through biological, chemical or physical processes. This reduces the impact of carbon, a greenhouse gas, on climate change. In this guide carbon storage refers to the storage of carbon in plants (via biological processes).

Catchment – A catchment is the area (a geographical region) where water from rain (or snow) becomes concentrated and drains downhill into a river or lake. The term includes all land surface, streams, rivers, and lakes between the source and where the water enters the ocean.

Connectivity – "Functional" connectivity refers to the ability of connective corridors to sustain ecosystem processes common to linked patches (it is the opposite of fragmentation).

Conservancy – Agreements for co-operation among neighbouring landowners for conservation purposes, and which require no legal long-term commitment from landowners.

Conservation – The safeguarding of biodiversity and its processes (often referred to as biodiversity conservation).

Conservation areas – (in the context of this document) Land under some form of conservation agreement other than those via the NEMPAA. They are not considered formally protected areas, as they are not gazetted in terms of the NEMPAA and do not allow for long term security of tenure. For example Private Nature Reserves declared in terms of provincial ordinances, Biodiversity Agreements in terms of the Biodiversity Act, and conservancies.

Corridor/s – see ecological process areas

Critical Biodiversity Areas (CBA) – Terrestrial (land) and aquatic (water) features (e.g. vleis, rivers and estuaries) in the landscape that are critical for conserving biodiversity and maintaining ecosystem functioning in the long term (which is particularly important in the face of climate change). They are identified through a systematic biodiversity planning approach (see below).

Critical Biodiversity Areas Map – A fine-scale systematic biodiversity plan that delineates on a map Critical Biodiversity Areas and Ecological Support Areas which require safeguarding to ensure the continued existence of biodiversity, its ecological processes (e.g. animal migration, pollination) and its ecosystem services e.g. water supply. The map also delineates formal Protected Areas, Other Natural Areas and No Natural Remaining.

Delineate [a wetland] – Determine the boundary of a wetland based on soil, vegetation, and/or hydrological indicators.

Degraded landscapes – Areas of indigenous habitat that are infested with alien plants, overgrazed or have been impacted in some other manner. These areas are still able to function ecologically (e.g. animals still make use of these areas); albeit in a deteriorated state. Degraded areas have the potential to be restored or rehabilitated.

Ecological process – Natural operations which occur within ecosystems and maintain them as working systems. Ecosystems work because they are kept “alive” by ecological processes such as pollination, nutrient cycling, natural disturbance (e.g. fire, grazing), migration of species, and soil maintenance. Other examples of processes include plant-herbivore processes, lowland to upland gradients, predator-prey relationships, migration and exchange between inland and coastal systems (often along river corridors), seasonal migration of animals, and hydrological regimes (e.g. rivers, wetlands).

Ecological process areas are important for maintaining ecological processes (see above). These can either be large scale corridors stretching across entire mountain ranges or from the mountain range to the sea (i.e. landscape, ecological or regional corridors), or they can be small scale such as the buffer area around an isolated wetland.

Ecological Reserve – The ecological reserve refers to that portion of streamflow which must remain in rivers to ensure the sustainable healthy functioning of aquatic ecosystems (i.e. the river and its associated wetlands and estuaries).

Ecological Support Area – A supporting zone (ecological) or area required to prevent degradation of Critical Biodiversity Areas and formal Protected Areas, usually located adjacent to or which link CBA and/

or Protected Areas. Some of these areas may already be transformed or degraded, but they still support ecological processes.

Ecosystem – A natural system that represents the interactions between plants, animals, insects, micro-organisms and the non-living environment (e.g. soil, air, water). Ecosystems can operate at different scales – from very small (a pond) to whole landscapes (an entire water catchment area). In the CBA Map, different types of vegetation were recognised as ecosystems.

Ecosystem services – The benefits that people get from nature, such as a regular supply of clean water, flood control, prevention of erosion, pollination (important to the fruit industry, for example), carbon storage (to counteract global warming), stone and sand for building, and clean air vital for our survival i.e. ‘what nature does for us’.

Ecosystem threat status – Describes the condition of an area’s biodiversity relative to past, present and future threats, and is an indicator of the level of safeguarding required for the continued existence of the biodiversity which is found in that particular area. Ecosystem status of terrestrial ecosystems is based on the degree of habitat loss that has occurred in each ecosystem, relative to two thresholds: one for maintaining healthy ecosystem functioning, and one for conserving the majority of species associated with the ecosystem. As natural habitat is lost in an ecosystem, its functioning is increasingly compromised, leading eventually to the collapse of the ecosystem and to loss of species associated with that ecosystem. Four Ecosystem status classifications types exist, namely Critically Endangered, Endangered, Vulnerable and Least Threatened.

Eco-status – The overall ecological status of an aquatic resource in which it should be managed as determined by the Reserve Determination Methodology (developed by the Department of Water Affairs). For example, Eco-status A requires that a river or wetland be managed in its natural state and is not subject to impacts. It indicates the level of protection a river or wetland should receive.

Ecotone – A transitional zone between two or more ecosystems (such as a forest and fynbos) which may display characteristics of both. For example, between forests and fynbos, the ecotone comprises hardy pioneer plants that can recover rapidly after disturbance and can protect the forest from fire and the drying effects of the sun.

Endemic – A plant or animal species, or a vegetation type, which is naturally restricted to a particular defined region (not to be confused with indigenous). For example, a plant may be endemic to a certain region, which means it is restricted to this area and does not grow naturally anywhere else in the country or world.

Environmental Management Framework (EMF) – An EMF allows environmental constraints and opportunities to be examined at a regional level to influence project-specific decisions before they are made. They identify opportunities and constraints to developments, and also allow for the consideration of cumulative effects that may be expected in the study area. They inform land use decision-making processes once development proposals are submitted.

Environmental Management Plan (EMP) – The EMP provides specifications that the landowner shall adhere to, in order to minimise adverse environmental impacts associated with a land use activity e.g. alien plant management on land for conservation. In terms of proposed developments, an EMP can be defined as “an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented; and that the positive benefits of the projects are enhanced”. EMPs are therefore important tools for ensuring that the management actions

arising from Environmental Impact Assessment (EIA) processes are clearly defined and implemented through all phases of the project life-cycle.

Floodplain – A smooth, relatively flat valley floor next to and formed by a river or stream subject to periodic overflows.

Fine-Scale Biodiversity Plans – More accurate maps of biodiversity prepared at a scale of 1:5 000 – 1:50 000 (or finer) and which identify important areas for conservation and sustainable management. See systematic biodiversity plan below.

Fragmentation [of habitat] – The breaking up of a continuous habitat, ecosystem, or land use type into smaller fragments.

Function/functioning/functional – Used here to describe natural systems working or operating in a healthy way (opposite to dysfunctional which means working poorly or in an unhealthy way)

Ground truthing – The verification of mapped information with real features on the site.

Groundwater – Any water found subsurface in the saturated zone below the water table, i.e. the water table marks the upper surface of the groundwater systems.

Habitat – The natural home of a plant or animal species. Generally those features of an area inhabited by animal or plant which are essential to its survival. The habitat of a frog might be a wetland.

Hotspot – Biodiversity hotspots are areas of high species diversity, which are also under serious threat.

Indigenous – Naturally occurring or “native” to a broad area, such as South Africa.

Intact/ecological integrity – Used here to describe natural environment that is not badly damaged, and is still operating healthily.

Integrated management in this guide refers to the management of land use in an integrated fashion. This implies the need to consider the socio-economic and environmental (biodiversity) impact of land use change and development to ensure sustainable development. The principles of accountability, participation, equitability and sustainability are promoted.

Invasive alien species – Invasive alien species means any non-indigenous plant or animal species whose establishment and spread outside of its natural range threatens or has the potential to threaten natural ecosystems, habitats or other species ecosystems; and may result in economic or environmental harm, or harm to human health.

Land cover – The substance which covers the land, e.g. natural vegetation, roads, factory, or bare ground. In the context of this document, land cover gives an indication of the level of transformation of natural ecosystems and can range from natural through to irreversibly transformed. Land cover cannot always be equated to land use, e.g. bare land can either be borrow pits (where the land use is mining) or natural bare soil (where the land use may be conservation). It is one of the crucial components of systematic biodiversity planning (see below).

Landscape corridor – see ecological process area.

Land use – The human alteration of the natural environment into the built environment (e.g. agri-culture, mining, plantation, and settlements) or the human preservation of the natural environment (e.g. conservation).

Mainstreaming biodiversity – Integrating biodiversity considerations and the sustainable use of biological resources into the policies, strategies and day-to-day operations of a range of sectors whose core business is not biodiversity conservation (e.g. into economic sectors and development models and programmes) and in so doing, integrating it into all human behaviour. Mainstreaming biodiversity is essential for overcoming the “conservation versus development” mindset, and for ensuring sustainable development.

Modification/Modified Land – [habitat loss] Area of land cleared of its indigenous vegetation. These modified parts of the landscape no longer contain indigenous habitat. In many areas, this has led to the breakdown of natural ecological processes.

Multi-sectoral planning procedures consider all available sector plans (biodiversity, agricultural, mining, economic, social, etc.) in order to make informed decisions and promote sustainable development. IDPs and SDFs are examples of multi-sectoral planning tools.

National Equivalent ecosystem status – see Ecosystem status above.

Precautionary principle – In the face of uncertainty about the workings of ecosystems and the effects of human activities, we should always err on the side of caution. Incomplete or inadequate data are generally the norm in conservation and resource management activities; however, the lack of data should not be used to justify a delay in taking conservation actions. Actions or refraining from potentially harmful actions should be based on the probable consequences to species, habitats and ecosystems, especially when long-term, or irreversible, consequences are more likely than not. Referred to in the NEMA.

Pristine – Unspoiled, used here to describe the natural environment in its undisturbed state.

Protected Areas – Formally protected areas declared in terms of the National Environmental Management: Protected Areas Act.

Red Data species – Plant or animal species that have been assessed and classified according to their potential for extinction in the near future. These species are listed in the Red Data Book and classified as Extinct, Critically Endangered, Endangered, Vulnerable, Near Threatened or Least Concern. Red Data species are those species classified as Extinct, Critically Endangered, Endangered or Vulnerable. They are protected by law under provincial ordinances, the NEMA, and the Biodiversity Act.

Rehabilitate/rehabilitation (see also Restore/restoration below) – Restoration, especially after mining activities or quarrying, but where the natural environment is not repaired to its original pristine state. Rehabilitation emphasises the reparation of ecosystem processes, productivity and services.

Restore/restoration (ecological restoration) – The process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed. It involves the repair of the natural environment to a state close to its original state. For example, this can be achieved through the removal of alien invasive plants, or the repair of eroded sites and the replanting of indigenous plants. Restoration involves, not only the

reparation of ecosystem processes, productivity and services, but also the re-establishment of species composition and community structure.

Species – Any living organism e.g. plant, animal, insect, bird, etc., of a particular kind and name.

Sustainable development – Development that meets the needs of both present and future generations, equitably. In terms of the NEMA, (sustainable) development is the integration of social, economic and environmental factors into planning, implementation and decision-making so as to ensure that development serves present and future generations.

Systematic biodiversity plan (technically known as a systematic conservation plan) – A map which indicates priority areas for conservation and sustainable management to ensure the continued existence of biodiversity. Systematic biodiversity planning is an approach to conservation that prioritises actions by setting quantitative targets (thresholds) for biodiversity features (e.g. vegetation types). It is premised on conserving a representative sample of biodiversity pattern, including species and habitats (the principle of representation), as well as the ecological and evolutionary processes that maintain biodiversity over time (the principle of persistence). The configuration of priority areas identified in the plan is designed to be spatially efficient (i.e. to meet biodiversity targets as efficiently as possible in terms of the amount of land required) and where possible to avoid conflict with other land uses where these are known to exist (principles of efficiency and conflict avoidance). It recognises that the whole landscape must be planned and managed strategically to ensure sustainable development. (It is the technical term for the CBA Map – see Critical Biodiversity Areas Map above).

Thresholds – see Biodiversity threshold above.

Urban edge – An urban edge is ‘a defined line drawn around an urban node as a growth boundary i.e. the outer limit of urban areas’. It is intended to protect the rural environment from urban sprawl and to encourage efficient settlement patterns. Refer to the DEADP Guideline Document ‘Urban Edge Guidelines in the Western Cape’.

Vegetation – The collective term for plants in an area. Often referred to as “bush” or “veld”.

Water Management Area – South Africa is divided into Water Management Areas (WMAs), according to the National Water Act (36 of 1998). A WMA is an area established as a management unit in the national water resource strategy within which a catchment management agency will conduct the protection, use, development, conservation, management and control of water resources.



award

The Association for Water and Rural Development

AWARD is a non-profit organisation specialising in participatory, research-based project implementation. Their work addresses issues of sustainability, inequity and poverty by building natural-resource management competence and supporting sustainable livelihoods. One of their current projects, supported by USAID, focuses on the Olifants River and the way in which people living in South Africa and Mozambique depend on the Olifants and its contributing waterways. It aims to improve water security and resource management in support of the healthy ecosystems to sustain livelihoods and resilient economic development in the catchment.

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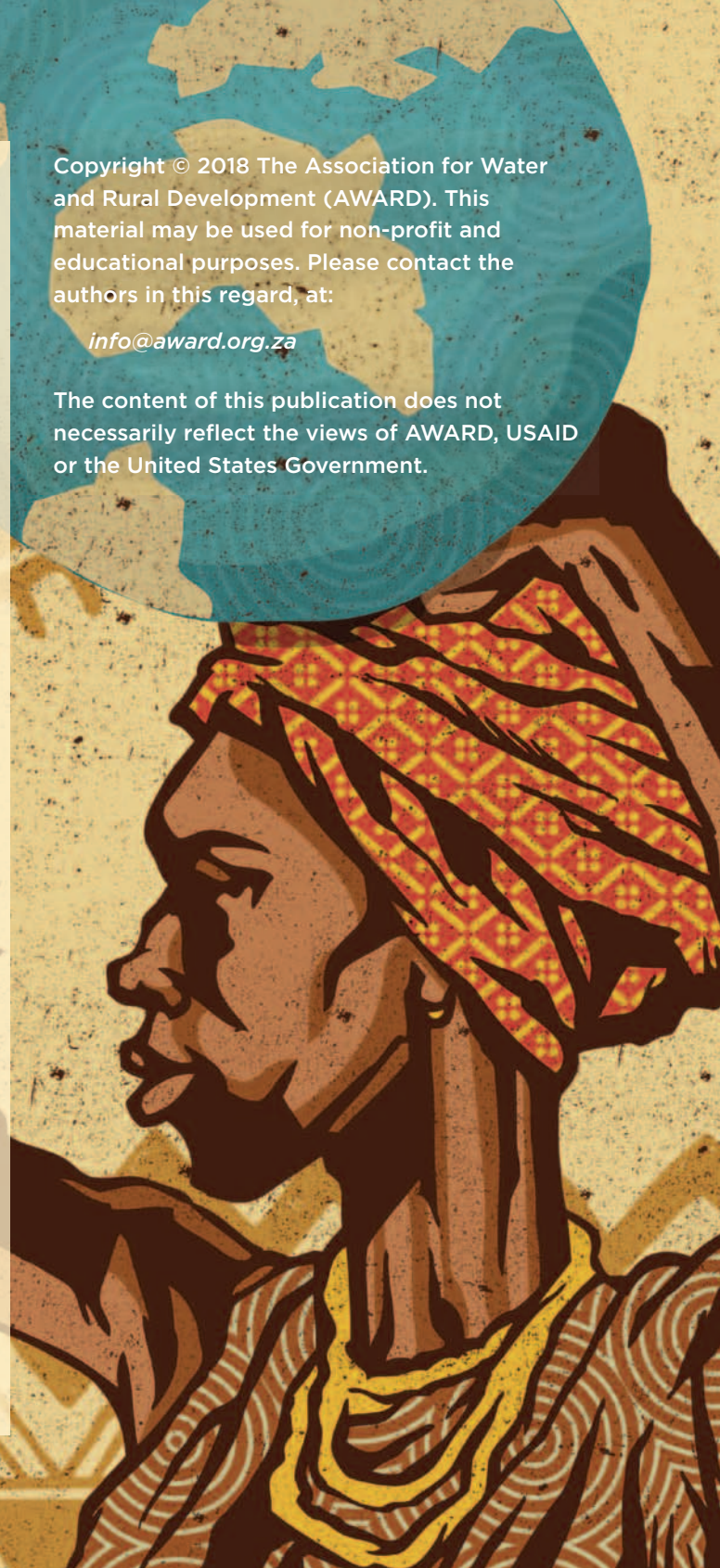
About USAID: RESILIM-O

USAID: RESILIM-O focuses on the Olifants River Basin and the way in which people living in South Africa and Mozambique depend on the Olifants and its contributing waterways. It aims to improve water security and resource management in support of the healthy ecosystems that support livelihoods and resilient economic development in the catchment. The 5-year programme, involving the South African and Mozambican portions of the Olifants catchment, is being implemented by the Association for Water and Rural Development (AWARD) and is funded by USAID Southern Africa.

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