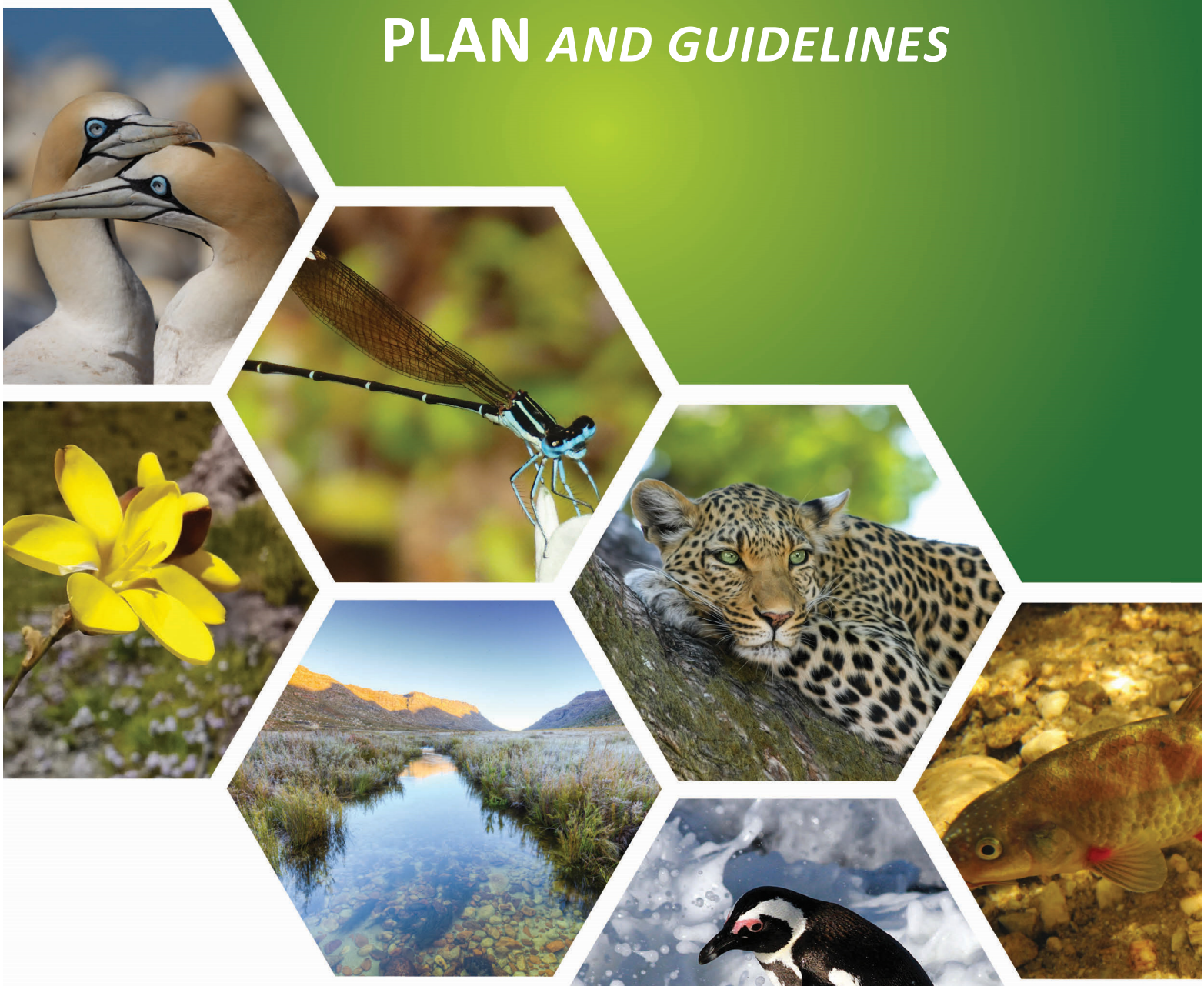
2023 WESTERN CAPE BIODIVERSITY SPATIAL PLAN *AND GUIDELINES*



Western Cape Government

FOR YOU

CapeNature

2023 WESTERN CAPE BIODIVERSITY SPATIAL PLAN AND GUIDELINES

Western Cape Biodiversity Spatial Plan Handbook
ISBN: 0000-0-000-00000-0

Suggested Citation
CapeNature. 2024. ***2023 Western Cape Biodiversity Spatial Plan and Guidelines***. Unpublished Report.

* direct queries to cba@capenature.co.za

Western Cape Government
FOR YOU

CapeNature

Table of Contents

01 Introduction

1.1 Western Cape Biodiversity Spatial Plan Overview

The 2023 Western Cape Biodiversity Spatial Plan (WC BSP) is a provincial plan that is developed to inform the Provincial Protected Area Expansion Strategy, the Provincial Biodiversity Strategy and Action Plan (PBSAP) and policy and guideline development in terms of environmental legislation. The WC BSP contributes to decision-support systems informing environmental legislation development and strategic environmental assessments, and to inform biodiversity offsets. The primary focus of the WC BSP however is to guide land-use planning and decision making.

To help inform spatial planning, the WC BSP provides guidelines that set out desired management objectives for land and resource use in each category of biodiversity priority area. The WC BSP uses the terms Critical Biodiversity Area (CBA) and Ecological Support Area (ESA) which refer to specific categories of biodiversity priority areas. In addition to the guidelines, spatial informants (GIS coverages along with a series of traditional map products) reflecting these different categories are also provided in which CBAs and ESAs are clearly defined and represented spatially. Chapter 4 of this document details land-use guidelines and other tools that can be used to ensure that the ecological infrastructure in the Western Cape is maintained, ecosystem fragmentation and loss are avoided, and the resilience of ecosystems and human communities to the impacts of climate change is strengthened.

The WC BSP is used to spatially prioritise biodiversity priority areas for conservation action such as protected area expansion, maintenance of ecological infrastructure and to inform land-use planning and decision-making. CapeNature and the Department of Environmental Affairs and Development Planning (DEA&DP) work cooperatively to make decisions that affect biodiversity in a coordinated, positive, and holistic manner; recognising the unique biodiversity in the Western Cape, the Republic of South Africa's international obligations, the province's dependence on ecosystem services, the need for access and benefit sharing and the need to ensure long-term ecological resilience.

e-links
PBSAP WC BA

1.2 Theory of Change

The 2023 Western Cape Biodiversity Spatial Plan is guided by a theory of change to understand how outputs will lead to its goals and vision.

Vision	Priority biodiversity and ecosystems in the Western Cape are protected and conserved, to strengthen the resilience of ecosystems and the associated delivery of ecosystem services to communities, and to mitigate against the impacts of climate change.			
Mission	To provide and implement a biodiversity spatial plan that can be integrated across sectors to respond to biodiversity loss and support resilience of ecological infrastructure and sustainable development for all.			
Problem Statement	• Unprecedented biodiversity loss. • 109 of 349 ecosystem types in the Western Cape are Critically Endangered. • 16% of extant taxa in the Western Cape are threatened. • Climate change exacerbates disaster impacts on human communities. • Unsustainable development and unsound land-use practices driving habitat loss. • Degradation of ecological infrastructure. • Inconsistent application of WC BSP guidelines in land-use decision making and planning.			
Goals	Biodiversity targets set.	Biodiversity priority areas identified.	Land-use guidelines for management objectives for each category of Biodiversity Priority Area developed.	
Enablers	Accessible platforms for spatial data and land-use guidelines.	Appropriate and enforceable biodiversity legislation.	Integrated multi-sectoral planning.	Collaborative provincial and municipal platforms support mainstreaming and capacity building.
Objectives	Biodiversity priority areas (Critical Biodiversity Areas and Ecological Support Areas) protected via informed land-use decision making.	Land-Use and planning Guidelines for Desired Management Objectives for each category of Biodiversity Priority Area are used to maintain ecological intactness and ecosystem stability and persistence.	Biodiversity priorities mainstreamed into decision making.	Resilience of ecosystems and human communities to impacts of climate change strengthened.
Outputs	Environmental authorisations are informed by WC BSP.	Municipal spatial development frameworks reflect categories which incorporate the WC BSP Biodiversity priority areas.	Mainstreaming products and capacity building actions.	
Outcomes	Land-use and planning informed by best available science.	Improved compliance with Biodiversity legislation.	Ecological infrastructure maintained.	Biodiversity targets met.

1.3 Purpose and desired outcome of the WC BSP

1.3.1 Purpose of the Biodiversity Spatial Plan

The Western Cape Biodiversity Act 6 of 2021 (WCBA) recognises the unique biodiversity in the Western Cape, the Republic's international obligations, the province's dependence on ecosystem services, the need for access and benefit sharing, and the need to ensure long-term ecological resilience.

Section 35 of the WCBA defines that the purpose of a Biodiversity Spatial Plan is to:

- Set biodiversity targets.
- Spatially identify one or more categories of biodiversity priority areas that will ensure the continued existence and functioning of biodiversity and ecosystems, including the delivery of ecosystem services.
- Provide guidelines that set out the desired management objectives for land and resource use in each category of biodiversity priority areas.
- Provide spatial planning and land-use decision-making guidelines to ensure environmentally sustainable development and resource use, as well as ecological and spatial resilience in the province.
- Ensure that the ecological infrastructure in the province is maintained, ecosystem fragmentation and loss are avoided, and the resilience of ecosystems and human communities to the impacts of climate change is strengthened.

CapeNature is mandated to conserve the unique natural heritage resources of the Western Cape for the benefit of all. The responsibility for conserving the Western Cape's biodiversity, however, also lies with many other state agencies within national, provincial, and local spheres of government, supported by organisations in the private sector and civil society.

The Western Cape State of Conservation Reports (2020, 2021 and 2022) provide biodiversity and ecosystem status updates, a headline indicator of which is that 109 of 349 ecosystem types are Critically Endangered and 16% of extant taxa in the Western Cape are threatened. The biodiversity and ecological infrastructure of the Western Cape is valuable, but vulnerable, and is a source of natural solutions to the challenges posed by poverty, inequality and unemployment, and the effects of climate change. For this potential to be realised, land-use planners and managers in a wide range of sectors need good scientific information that is effectively interpreted and made available to end users; well-capacitated institutions that are responsible for effective management and governance of biodiversity assets; and well-informed policies, can be accessed and used to inform land-use and development planning, environmental assessments and authorisations, natural resource management and other multi-sectoral planning processes. A biodiversity spatial plan achieves this by providing a map of terrestrial and freshwater areas that are biodiversity priority areas important for conserving biodiversity pattern and ecological processes. These areas are called Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs). The map is provided together with contextual information on biodiversity, and land-use guidelines (see Table 4.1 in Chapter 4 for more details) that can be incorporated into the policies and decisions of a wide range of sectors. The WC BSP is accessible on three web-based platforms: CapeFarmMapper, SANBI BGIS and CapeNature.

e-links
CapeFarmMapper SANBI BGIS CapeNature

1.4 Objectives and Uses of the Western Cape Biodiversity Spatial Plan

The WC BSP 2023 was developed using the principles and methods of systematic biodiversity planning and is based on the best available science and data. It is an up-to-date plan that identifies a province-wide network of biodiversity priority areas defined as Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) designed to meet the objectives as defined in Chapter 5 Section 34-35 of the WCBA (see 1.3 above).

The WC BSP 2023 meets national and provincial biodiversity targets on the least amount of land possible; optimises for the least conflict with other forms of land-use; favours areas that are important for freshwater ecosystems and water security; and promotes adaptation to the effects of climate change and connectivity across the landscape.

1.4.1 Intended Users of the WC BSP

The WC BSP should be used by all sectors involved in land-use planning and decision-making in the Western Cape to ensure the persistence of biodiversity assets and ecological infrastructure and the delivery of vital ecosystem services. This includes users (e.g., organs of state) who are required to use the plan to meet legislative or policy requirements, and those users who will find it a useful informant to their planning processes.
The main users of the WC BSP include:

- National and provincial government departments, in particular officials, town planners and scientists
- Department of Environmental Affairs and Development Planning (DEA&DP)
- Department of Forestry, Fisheries, and the Environment (DFFE)
- Department of Water Affairs and Sanitation (DWS)
- Department of Agriculture, Land Reform and Rural Development (DALRRD)
- Conservation agencies such as South African National Parks (SANParks) and CapeNature
- Department of Tourism (DoT)
- Department of Mineral Resources and Energy (DMRE)
- Petroleum Agency of South Africa (PASA)
- Spatial planners and other officials in local and district municipalities
- Environmental professionals including planning and environmental assessment practitioners and specialists, biodiversity and conservation scientists in research institutions, the private sector and civil society organisations.
- Natural resource management programmes, such as Working for Water, Working on Fire, and Working for Wetlands
- Landowners contemplating changes in land-use.

1.4.2 Intended Uses of the Biodiversity Spatial Plan

The WC BSP Map (Figure 3.1) and associated guidelines can be used for four main types of application in land and resource use decision makings (also refer to Chapter 4):

- Development applications: such as EIA authorisations in terms of NEMA; agricultural land-use decisions (e.g., cultivation licenses) in terms of the Conservation of Agricultural Resources Act 43 of 1983 (CARA); authorisations for prospecting and mining in terms of both the Mineral and Petroleum Resources Development Act 28 of 2002 (MPRDA) and National Environmental Management Act 107 of 1998 (NEMA), and land-use planning decisions in terms of both the Spatial Planning and Land-use Management Act 16 of 2013 (SPLUMA) and Land-use Planning Act 3 of 2014 (LUPA).
- Proactive forward-planning: such as the incorporation of CBAs, ESAs, and the land-use guidelines into IDPs, SDFs, SEAs, EMFs, Land-use Management Schemes, Zoning Schemes, and other forward-planning in terms of SPLUMA.
- Proactive conservation: such as identifying land of high biodiversity value for the expansion and consolidation of protected areas, either through biodiversity stewardship agreements, land acquisition or other tools that may be developed.
- Restoration: such as identifying biodiversity priority areas requiring restoration or other action to improve the condition of the environment and restore biodiversity pattern and ecological processes.

The WC BSP is based on the latest available scientific information to represent the biodiversity sector's input to planning and decision-making. This guideline intends to inform the spatial planning processes across multiple sectors.

The WC BSP is intended as the primary spatial biodiversity informant for the Western Cape.

02 Biodiversity of the Western

2.1 The State of Biodiversity in the Western Cape

The Western Cape is situated in the southwestern most part of South Africa, flanked by the Indian Ocean to the south and the Atlantic Ocean to the west and southwest, the two oceans meeting at Cape Agulhas, the southernmost point of Africa. The Western Cape occupies an area of 129 462 km^2. Cape Town is the capital of the province and the legislative capital of South Africa.

The Western Cape is predominantly a winter rainfall area, with warm to hot dry summers and cool rainy winters, with a similar climate to other Mediterranean ecosystems type located in the Mediterranean basin, parts of Chile, California, and parts of Southwestern and Southeastern Australia. The rainfall is more evenly distributed throughout the year further eastward with non-seasonal rainfall in the Southern Cape. Rainfall decreases further inland, with the Cape Fold Mountains creating a rain shadow. The Nama Karoo region in the northeastern parts of the province has predominantly late summer rainfall which falls in erratic thunderstorms.

The Cape Fold Mountains are the most prominent topographic feature of the Western Cape and form a north south axis (including the Cederberg, Groot Winterhoek, and Witzenberg mountain ranges) and an east west axis (including the Langeberg, Riviersonderend, Outeniqua and Swartberg mountain ranges) and converge in the southwest (Boland Mountains). Further inland, the escarpment which separates the inland plateau from the lower lying coastal areas is located along the boundary with the Northern Cape Province.

The primary rivers of the Western Cape are the Berg, Breede, Olifants and Gouritz Rivers, and each provide a vital function in terms of the water needs for the various economic sectors in a predominantly arid province. The mountains mentioned above form vital catchments for the rivers, as these regions experience elevated rainfall. The combination of the high variability of topography, which in turn results in high levels of climatic variation over short distances, variation in altitude/geology/soils and a long history of geological stability and few mass extinction events (e.g., ice ages) has resulted in high levels of speciation within the Western Cape, particularly within the Cape Floristic Region and Succulent Karoo Biome. As a result of this, the Cape Floristic Region, and Succulent Karoo Biome, which occupy most of the province, are global biodiversity hotspots, recognised as having exceptional levels of diversity and endemism.

2.2 Status of Western Cape terrestrial ecosystems

Ecosystems are dynamic complexes of plant, animal and micro-organism communities and their non-living environment, interacting as a functional unit. They can be defined at different scales, from a single vegetation type or community of plants to a cluster of vegetation types, a wetland or group of wetlands, through to an entire range of mountains. Groups of ecosystems with common bioclimatic characteristics at a landscape scale are called Biomes.

2.2.1 Biomes

The Western Cape is comprised of five different Biomes. The Fynbos Biome is the largest Biome occurring in the Western Cape extending along the coastal plain to the Cape Fold Mountains. The CFR includes all vegetation types of the Fynbos Biome and is mostly located within the winter rainfall region. The Fynbos Biome comprises three vegetation types based on climatic and edaphic features, namely Fynbos, Renosterveld and Strandveld. The Succulent Karoo Biome is in the more arid parts of the winter rainfall region occupying the northern sections of the West Coast region and the Little Karoo in the rain shadow basin between the Swartberg and Outeniqua/Langeberg Mountains. The Nama Karoo Biome occupies the arid north-eastern parts of the province which receive predominantly summer rainfall. The Albany Thicket Biome is more characteristic of the Eastern Cape but extends into the Western Cape in areas where the Succulent and Nama Karoo become more mesic. The Afro-temperate Forest Biome occurs as naturally fragmented patches in the higher rainfall areas which are sheltered from frequent fire, more typically in the mountains, with the largest extents occurring in the Garden Route and Tsitsikamma, often extending onto the coast (Rutherford *et al.,* 2006).

TABLE 2.1: *Percentages of Biomes based on the National Vegetation Map of South Africa (Dayaram et al., 2019) compared against the protection levels reflected in the 2017 and 2022 Biodiversity Spatial Plans.*

Biome	Total ha in South Africa	% of Biome in Western Cape	% of Biome in Protected Areas in Western Cape	
Biome	**2022**	**2022**	**2022**	**2017**
Albany Thicket	3 530 662	10.0	1.1	1.0
Azonal Vegetation	2 646 789	17.6	1.5	1.5
Desert	626 246	0.0	0.0	0.0
Forest	498 146	12.9	7.7	7.3
Fynbos	8 165 127	79.4	19.2	18.5
Grassland	36 340 775	0.0	0.0	0.0
Indian Ocean Coastal Belt	1 169 203	0.0	0.0	0.0
Nama-Karoo	24 936 068	11.0	0.7	0.4
Savanna	40 707 744	0.0	0.0	0.0
Succulent Karoo	7 820 816	35.6	3.2	2.7

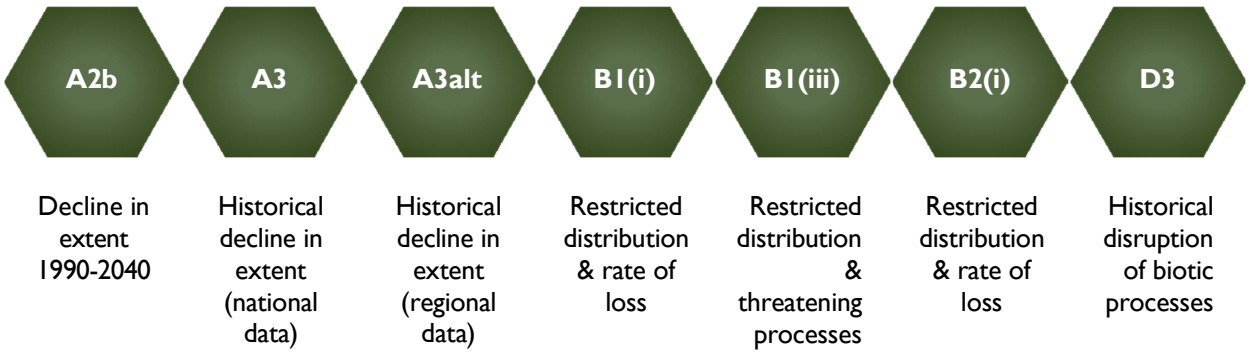
2.2.2 Vegetation Types and Threatened Ecosystems

The vegetation of South Africa can be broadly classified on climate and growth form into nine biomes, five of which occur in the WC (Fynbos, Nama-Karoo, Succulent Karoo, Albany Thicket and Forest). The biomes of South Africa can be further divided in 458 vegetation types, 171 of which occur in the Western Cape (Dayaram *et al.*, 2019; SANBI, 2019). These units provide a good representation of terrestrial biodiversity because most mammals, birds, insects, and other organisms are associated with vegetation types (Jonas *et al.*, 2012). For this reason, they are used as surrogates for ecosystems in the development of systematic biodiversity plans such as the WCBSP.

Ecosystem threat status is indicative of the degree to which ecosystems are still intact or alternatively losing vital aspects of their structure, function, and composition, on which their ability to provide ecosystem services ultimately depends. Ecosystems are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or Least Concern (LC), based on the proportion of the ecosystem that remains in good ecological condition relative to a series of thresholds, as well as several other criteria.

The implementation of the Internationally recognised IUCN Red List of Ecosystems (RLE) process for the 2018 National Biodiversity Assessment (NBA) used a systematic approach based on seven IUCN assessment criteria and sub-criteria. It showed a marked departure from the South African defined criteria originally used to define the List of Threatened Terrestrial Ecosystems gazetted in 2011 (see 'Ecosystem Status' link below for a comprehensive description of this process and its associated implications). The revised list was published in the Government Gazette (Gazette Number 47526, Notice Number 2747) and came into effect on 18 November 2022. The latest assessment identified 64 threatened ecosystems in the Western Cape, listed in Table 2.2.

The IUCN criteria



e-links

2022 Ecosystem Status

TABLE 2.2: *Threatened Ecosystems of the Western Cape, 2022.*

Critically Endangered	Target %	Biome	Criteria
Agulhas Limestone Fynbos	32	Fynbos	B1(iii)
Atlantis Sand Fynbos	32	Fynbos	B1(iii)
Breede Sand Fynbos	30	Azonal Vegetation	B1(iii)
Cape Flats Sand Fynbos	30	Fynbos	B1(i), B1(iii)
Cape Winelands Shale Fynbos	30	Fynbos	B1(i), B1(iii)
Central Rûens Shale Renosterveld	27	Fynbos	A3, A3alt
Ceres Shale Renosterveld	27	Fynbos	B1(i)
Citrusdal Shale Renosterveld	28	Fynbos	B1(i)
Elgin Shale Fynbos	30	Fynbos	B1(i), B1(iii)
Garden Route Granite Fynbos	23	Fynbos	B1(i)
Gouritz Valley Thicket	19	Albany Thicket	B1(i)
Greyton Shale Fynbos	30	Fynbos	B1(iii)
Groot Brak Dune Strandveld	36	Fynbos	B1(i)
Hangklip Sand Fynbos	30	Fynbos	B1(i), B1(iii)
Klawer Sandy Shrubland	29	Succulent Karoo	B1(i)
Knysna Sand Fynbos	23	Fynbos	B1(i)
Kogelberg Sandstone Fynbos	30	Fynbos	B1(iii)
Kouebokkeveld Alluvium Fynbos	29	Fynbos	B1(i)
Kouebokkeveld Shale Fynbos	29	Fynbos	B1(i)
Lambert's Bay Strandveld	24	Fynbos	B1(i)
Lourensford Alluvium Fynbos	30	Fynbos	A2b, A3alt, B1(i), B1(iii)
Mossel Bay Shale Renosterveld	27	Fynbos	B1(i)
Namaqualand Seashore Vegetation	26	Azonal Vegetation	B2(i)
Nardouw Sandstone Fynbos	29	Fynbos	B1(i)
Peninsula Granite Fynbos	30	Fynbos	B1(i), B1(iii)
Peninsula Sandstone Fynbos	30	Fynbos	B1(iii)
Peninsula Shale Renosterveld	26	Fynbos	B1(i), B2(i), B1(iii), B2(iii)
Piketberg Quartz Succulent Shrubland	26	Succulent Karoo	B1(i), B2(i)
Potberg Ferricrete Fynbos	30	Fynbos	B1(iii)
Saldanha Granite Strandveld	24	Fynbos	B1(i), B1(iii)
Saldanha Limestone Strandveld	24	Fynbos	B1(iii)
South Sonderend Sandstone Fynbos	30	Fynbos	B1(iii)
Swartland Shale Renosterveld	26	Fynbos	A3, A3alt
Swartland Silcrete Renosterveld	26	Fynbos	A3alt, B2(i), B2(iii)
Western Rûens Shale Renosterveld	27	Fynbos	B1(i), B1(iii)
Count:		**35**	

TABLE 2.2 *Threatened Ecosystems of the Western Cape, 2022 continued.*

Endangered	Target %	Biome	Criteria
Albertinia Sand Fynbos	32	Fynbos	B1(iii)
Atlantis Sand Fynbos	30	Fynbos	B1(iii)
Boland Granite Fynbos	30	Fynbos	B1(i), B1(iii)
Breede Alluvium Fynbos	30	Fynbos	B1(i), B2(i), B1(iii), B2(iii)
Breede Alluvium Renosterveld	27	Fynbos	B1(i)
Breede Shale Fynbos	30	Fynbos	B1(i), B1(iii)
Breede Shale Renosterveld	27	Fynbos	B1(iii)
Cape Flats Dune Strandveld	24	Fynbos	B1(i), B2(i), B1(iii), B2(iii)
Cape Lowland Alluvial Vegetation	31	Azonal Vegetation	B1(i)
Eastern Coastal Shale Band Vegetation	27	Fynbos	B1(i), B2(i)
Eastern Little Karoo	16	Succulent Karoo	D1
Eastern Rûens Shale Renosterveld	27	Fynbos	A2b,A3,A3alt, B1(i), B1(iii), D3
Elim Ferricrete Fynbos	30	Fynbos	B1(i), B1(iii)
Garden Route Shale Fynbos	23	Fynbos	B1(i)
Hartenbos Dune Thicket	19	Albany Thicket	B1(iii)
Langebaan Dune Strandveld	24	Fynbos	B1(iii)
Langkloof Shale Renosterveld	29	Fynbos	A3alt, B1(i)
Leipoldtville Sand Fynbos	29	Fynbos	B1(i)
Muscadel Riviere	16	Azonal Vegetation	A3alt, B1(i)
Overberg Dune Strandveld	36	Fynbos	B1(iii)
Overberg Sandstone Fynbos	30	Fynbos	B1(iii)
Rûens Silcrete Renosterveld	27	Fynbos	A2b, A3, A3alt, B1(i), B2(i), B1(iii), B2(iii), D3
Saldanha Flats Strandveld	24	Fynbos	B1(i)
Swartland Alluvium Fynbos	30	Fynbos	A3,A3alt, B1(i), B2(i), B1(iii)
Swartland Granite Renosterveld	26	Fynbos	A2b,A3,A3alt, B1(i), B1(iii)
Swellendam Silcrete Fynbos	30	Fynbos	B1(i)
Western Coastal Shale Band Vegation	30	Fynbos	B1(iii)
Count:		**27**	
Vulnerable		**Biome**	**Criteria**
Peninsula Shale Fynbos	30	Fynbos	A3
Swartland Alluvium Renosterveld	26	Fynbos	A3alt
Count:		**2**	

2.3 Freshwater Ecosystems

The freshwater ecosystems of the Western Cape consist of groundwater sources, surface watercourses and wetlands. These form an important basis for the ecological infrastructure of the province, as water resources are key to the socio-economic development of the Western Cape, particularly since it is a relatively water-scarce area, and water supply is a limitation to economic growth.

2.3.1 Wetlands and Watercourses

The Western Cape includes more than 300 000 ha of mapped wetlands and seven major catchments within two water management areas. These major catchments also contain six of the country's Strategic Water Source Areas (Le Maître *et al.,* 2018). Wetlands comprise only 1% of the land cover of the province. According to the results of the most recent National Biodiversity Assessment (SANBI, 2019) only 13% of wetlands in the Western Cape are still intact, with a further 34% being moderately modified and the remaining 53% are critically modified, resulting in 62 of the 74 wetland types being classified as Threatened.

The wetland types found in the Western Cape are known to be extremely diverse with their properties being driven by varying hydrological patterns, soil structure and seasonality of precipitation (Gouws *et al.,* 2012). These wetlands perform a variety of important ecosystem services, including flood attenuation, water purification, drought management and biodiversity habitat. The latter point is linked to the high diversity and high degree of endemism found within the fauna, flora and ecosystems associated with the Fynbos Biome in general.

The diverse range of wetland types, classified according to their hydrogeomorphic units include areas in the upper mountain catchments (hillslope and valley head seeps), to valley bottoms (both channelled and unchanneled) and pans (depressions and benches), and the floodplain wetlands leading down into estuaries at the coast.

e-links
Ramsar Wetlands Wetland Classification in South Africa WetMap Project

2.3.2 Rivers

Due to the semi-arid nature of the country and increased water demand linked to population growth and increased development, the water resources in the Western Cape are under threat. These resources include rivers, many of which originate in mountain catchments, often associated with seeps and other wetland types, contributed to by smaller tributaries and flowing down through the foothills to the lowlands and plains and ultimately into the sea via an estuary (Le Maître *et al.,* 2018). Some river catchments are highly productive in terms of water provision and provide a high water-yield. A total of seven Strategic Water Source Areas were identified and mapped for the Western Cape: Grootwinterhoek, Table Mountain, the Boland Mountains, the Langeberg Mountains, the Swartberg Mountains, the Kougaberg Mountains and the Outeniqua Mountains (Nel *et al.,* 2011a; Nel*,* 2013; Le Maître *et al.,* 2018).

The rivers of the Western Cape Province are within 10 different ecoregions, namely the Drought Corridor, Southern Folded Mountains, Southeastern Coastal Belt, Great Karoo, Southern Coastal Belt, Western Folded Mountains, Southwestern Coastal Belt, Western Coastal Belt, Nama Karoo, and Namaqua Highlands (Nel *et al.,* 2011a). Due to this regional variation the rivers of the Western Cape Province form important habitats for various indigenous fish and other aquatic fauna endemic to the region.

There are several impacts and pressures that threaten the viability and health of river ecosystems, mostly related to land-use practices, the presence of invasive alien fauna and flora as well as water quality and over abstraction of water.

Lowland and floodplain rivers are the least protected and most impacted freshwater ecosystems. Tributaries that are free of alien invasive fish species are the main refuges for the numerous endemic indigenous fish species of the Western Cape. Only 20% of the rivers mapped in the National Freshwater Ecosystem Priority Areas (NFEPA) project for the Western Cape were identified as FEPAs (Nel *et al.,* 2011a), and of these, only 29% were identified to be indigenous important fish areas.

e-links
National Freshwater Ecosystem Priority Areas (NFEPA)

2.3.3 Groundwater

Groundwater plays an important role in terms of interaction with surface water and associated ecosystems and hence is an important consideration in terms of land-use and water resource management, as outlined below.

Significant areas of groundwater-surface water discharge:
In areas indicated to have a high probability of groundwater-surface water interaction (ground water Strategic Water Source Areas), groundwater plays an important role in the ecological functioning of surface waters, maintaining river pools that serve as crucial refugia in the summer low flow months, sustaining river base flows, and maintaining wetlands and riparian vegetation. It is thus important to conserve and manage the groundwater resource in these areas. Management activities should include the control or prevention of groundwater abstraction, maintenance of natural vegetation cover, and clearing alien invasive plants.

Significant areas of groundwater recharge:
Groundwater recharge is dependent mainly on rainfall and geological permeability, and different areas vary in the ability to recharge groundwater. Detrimental activities in areas that have significant recharge can have a key impact on the functioning of groundwater dependent ecosystems, which can be in the immediate vicinity, or far removed from the recharge area. Identifying areas of significant groundwater recharge allows for pro-active management of activities that may lower the groundwater quantity or quality in their vicinity. Such management activities would include the control or prevention of ground-water abstraction, maintenance of natural vegetation cover, and control and removal of alien invasive plants.

2.4 Coastal and Marine Environment

The Western Cape coastline extends just over 1000 km. The coastline and marine biodiversity are impacted by coastal development, increased fishing, reduced freshwater flows into the marine environment, pollution, alien invasive species and various climate change induced influences such as sea level rise and changing local weather patterns (SANBI, 2019). The NBA 2018 indicates that fishing is the greatest threat to marine biodiversity, and coastal development places the greatest pressure on coastal biodiversity. The NBA highlighted that South Africa's marine resources are highly diverse and over-exploited, with more than 770 marine species harvested. The promulgation of marine reserves or Marine Protected Areas (MPAs) should be aimed at protecting and replenishing vulnerable marine biodiversity and coastal habitat. The declaration of 20 new MPAs in 2019 resulted in a five percent increase in national coverage of marine protection from <0.5% prior to the declaration. This new MPA network is helping to protect marine ecosystems, rebuild fish stocks, support climate resilience, and sustain South Africa's emerging ocean economy.

Of the 20 islands that are located off the coast of the Western Cape, 13 are managed by CapeNature, seven of which in turn are Ramsar sites: Dyer, Dassen, Geyser, Jutten, Malgas, Marcus and Schaapen Islands.

2.4.1 Marine Protected Areas

There are currently 13 Marine Protected Areas along the Western Cape coast. As of 2023, of these, six are managed by CapeNature (42 785 ha), six are managed by SANParks (117 037 ha) and one is managed by the City of Cape Town (Helderberg 236.9 ha).

e-links
Marine Protected Areas of South Africa

2.4.2 Estuaries

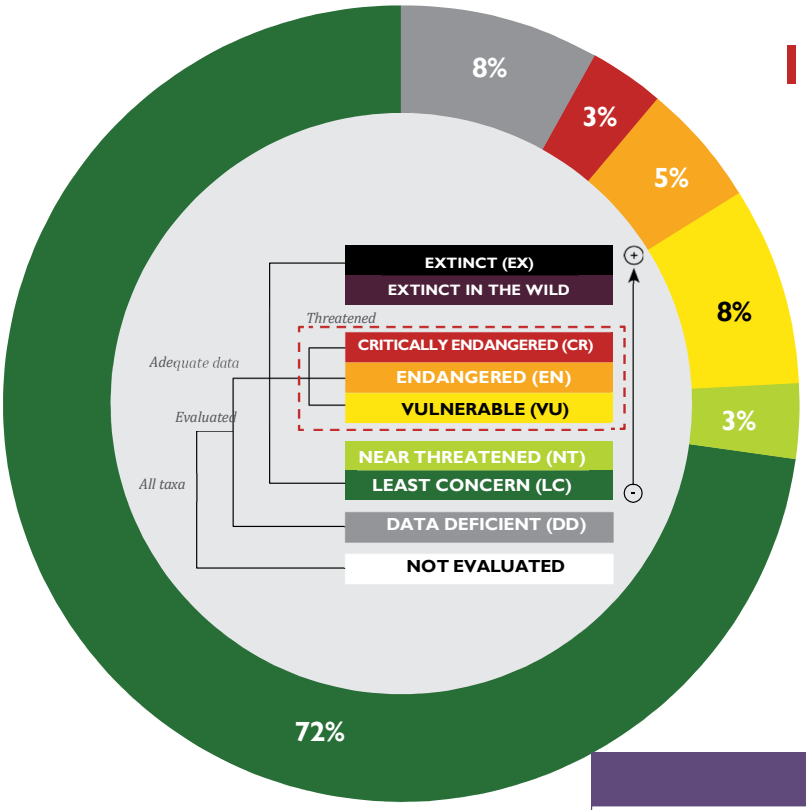
Estuaries are classified as a partially enclosed coastal body of water which is either permanently or periodically open to the sea and within which there is a measurable variation of salinity due to the mixture of sea water with fresh water derived from land drainage (Day, 1980). There are nearly 300 functional estuaries in South Africa which fall into three regions: cool temperate, warm temperate and subtropical (Whitfield, 1998). The Western Cape has 54 estuarine systems with the most westerly being the Olifants estuary on the west coast and the most easterly being the Bloukrans estuary which forms part of the Western and Eastern Cape provincial boundary.

Estuarine systems are not isolated systems as they form the interface between marine and freshwater systems. They form part of regional, national, and global ecosystems either directly via waterflows or indirectly through the movement of fauna. In addition to the biota that estuaries support, they provide a range of goods and services to people. Estuaries are well known for their biodiversity, productive fish, and invertebrate fisheries and for their ecosystem functions which include providing nursery areas for marine fish, conduits for species which move between oceans and rivers, and feeding and staging sites for significant populations of migratory birds (Turpie *et al.,* 2002).

The NBA 2018 (SANBI, 2019) determined that 86% of estuary types are threatened, and that 14% of South Africa's estuarine ecosystem types are not protected. The most significant threats to estuarine biodiversity are flow reduction, habitat modification, fishing, and pollution, all of which are cumulative pressures on estuarine systems (Van Niekerk *et al.,* 2019).

2.5 Status of Western Cape Indigenous Species

The indigenous fauna and flora of the Western Cape, which contains high levels of endemism, is under threat from a range of pressures including habitat loss, changes in local environmental conditions resulting from climate change, non-sustainable land-use practices, biodiversity crime, invasive species, and pollution. The result is that 16 % of extant taxa in the Western Cape are threatened as summarised in the graphics below from the Western Cape State of Conservation Report 2022.



16% of extant taxa in the Western Cape are threatened.

- Data Deficient
- Critically Endangered
- Endangered
- Vulnerable
- Near Threatened
- Least Concern

e-links

IUCN Red List of Threatened Species
Red List of South African Species – Flora
Red List of South African Species – Fauna
CapeNature State of Biodiversity Report

- **24** of 44 Freshwater fish taxa are threatened
- **73** of 758 Marine fish taxa are threatened
- **7** of 27 Marine mammal taxa are threatened
- **7** of 78 Dragonfly & Damselfly taxa are threatened
- **1 939** of 10 778 Plants taxa are threatened
- **28** of 337 Bird taxa are threatened
- **8** of 60 Amphibian taxa are threatened
- **7** of 149 Reptile taxa are threatened
- **16** of 126 Terrestrial mammal taxa are threatened
- **27** of 955 Spider taxa are threatened
- **32** of 300 Butterfly taxa are threatened

2.5.1 Noteworthy species for human use

South Africa has over 2 062 different plant species that are used as a source of traditional medicine, and about 656 of these are actively traded in medicinal markets of KwaZulu-Natal, Gauteng, Limpopo, Eastern Cape, and the Western Cape (Williams, 2013). In total 134 of the 656 species harvested are sourced from rapidly declining populations. Of these species, there are 56 Threatened species, seven of which are Critically Endangered and 78 are classified as Near Threatened, data deficient, rare, or critically rare or as Least Concern. The harvesting activity can result in significant impacts on wild populations, particularly in areas with dense rural populations, which more typically rely on traditional medicine. As such the impact of harvesting of plants of medicinal value is less significant in the Western Cape than other parts of South Africa, however this is still an impact that must be taken cognisance of.

e-links
2019 CapeNature Consumptive Use Policy

2.6 Patterns of Land-use and other Drivers of Habitat Change

2.6.1 Land-use pressures and habitat change

The main threats to biodiversity in the Western Cape are habitat loss due to land-use change, alien infestation, overgrazing, too-frequent fires, over consumption and changes in local environmental conditions the result of climate change.

The agricultural economy of the Western Cape is concentrated within the areas which are suitable for cultivation, which is predominantly on the nutrient-rich soils on the lowlands, derived from shale and granite geologies, which make it highly suitable for cultivation of grain crops (wheat) and vineyards. In addition to supporting the largest agricultural economy of all South Africa's provinces, cultivation in the Western Cape has the longest history of the South African provinces. As such, the areas which are suitable for cultivation have been subjected to very high levels of modification with few remnants of natural vegetation within these areas.

The expansion of irrigation schemes and new technologies have allowed expansion of cultivation into new agricultural areas. Many areas not suitable for cultivation are utilised for livestock farming, examples being the extensive grazing land-uses found in the Succulent and Nama Karoo. Land management is important in these areas for maintaining biodiversity and productivity, as overgrazing is a common practice and can result in high levels of degradation, and arid ecosystems take a long time to recover from disturbance. Ostrich farming in the Little Karoo is typically more intensive with high levels of disturbance and modification.

Urban development is another driver of habitat modification. Cape Town, as the second largest city in South Africa and one of the country's major economic hubs, is the focus of the rapid modification through urbanisation. The City of Cape Town Metropolitan Municipality additionally contains very high levels of biodiversity even by the high standards of biodiversity within the province. There are likely to be very few major cities in the world that can compare with Cape Town in terms of the levels of biodiversity within the municipal boundaries. Many of the species and habitats are restricted to the municipal boundaries and cannot be conserved elsewhere.

2.6.2 Climate change as a driver of habitat change

Climate change encompasses changes in regional climate characteristics, including temperature, humidity, rainfall, wind, and severe weather events which impact on economic and social dimensions and advocate for the inclusion of climate change adaptation into long-term planning.

It is anticipated that the average temperatures in the Western Cape will warm by roughly 1.8°C by the middle of the 21st century (±2050) (Jack *et al*., 2022). The region is anticipated to become drier, intensifying stress on biodiversity. One predicted result is the shrinkage of the Fynbos Biome, with the correlated expansion of the arid biomes. These impacts are also expected to impact the natural distribution ranges of species, however the mobility of the species distributions, dependent on the presence of intact corridors, can be facilitated by appropriate planning. Species located in isolated fragments are likely to become extinct because of their inability to adapt to climate change impacts (Midgley *et al.,* 2002; Jury, 2019).

Habitat fragmentation, the most severe threat to biodiversity, increases the vulnerability of ecosystems to climate change induced changes in environmental conditions. The maintenance and enhancing of habitat connectivity to support and promote the development of adaptation climate change, through adapted distribution, is essential for the long-term survival and diversity of species. In fragmented landscapes, the survival of plant populations depends on sufficient rates of migration between fragments to counteract local extinctions and maintain species diversity. Improving connectivity across the landscape reduces the effects of fragmentation by making more habitat available by means of a network of corridors. The effectiveness of landscape connectivity is enhanced by linking areas of high conservation value. A 2009 study, commissioned by the Table Mountain Fund, identified 28 climate change adaptation corridors towards ensuring spatial connectivity between conservation landscapes with the view to adapt to the challenging effects of climate change (Pence, 2009).

Identifying and securing habitat linkages, particularly bottlenecks or 'ecological pinch-points' in corridor networks, adds significantly to the overall functionality of such a network. Therefore, the WC BSP analysis included detailed planning for securing a network of corridors across the province.

Decision-makers and planners can reduce the effects of climate change by integrating the WC BSP Map and guidelines into land-use planning and decision-making, and by adhering to wise management guidelines, such as:

- identifying key climate adaptation corridors required for long term persistence of biodiversity pattern and process and implementing measures to protect the remaining corridor network (refer to the climate change adaptation corridors – Pence, 2009), particularly critical linkages, with biodiversity-compatible land-uses.
- maintaining intact riparian (riverbank) and watercourse vegetation.
- protecting water resources, especially water source areas, watercourses, and groundwater recharge areas.
- managing invasive alien species.
- implementing appropriate fire management and restoring and maintaining biodiversity for carbon storage.

In addition to safeguarding the environment, these measures can assist with disaster management, by reducing the vulnerability of human communities and built infrastructure to the impacts of natural disasters such as floods and droughts.

2.7 Protected Areas and Conservation Areas

Protected areas in South Africa are defined as areas of the land or sea t that are formally protected by law in terms of the National Environmental Management: Protected Areas Act, Act 57 of 2003 (NEM: PAA) and managed primarily for the purpose of biodiversity conservation. The NEM: PAA provides for any land, including private, communal, or municipal land, to be declared a formal protected area, and allows for co-management of such a protected area by the landowner/s or any suitable person or organisation.

Conservation areas are those areas of land not formally protected by law, but informally protected by the current owners and users, and managed at least partly for biodiversity conservation. Conservation areas are therefore not considered formally protected areas as they are not gazetted in terms of the NEM: PAA and do not allow for long-term security of tenure. They could include areas covered by Biodiversity Management Agreements in terms of the National Environmental Management: Biodiversity Act, Act 10 of 2004 (NEM: BA); Biodiversity Agreements signed in terms of contract law between a landowner and a conservation agency; as well as Voluntary Conservation Partnership Agreements and Conservancies, which are agreements for co-operation among neighbouring landowners and require no legal long-term commitment from the landowners.

A complete protected area network must not only represent the full range of plant and animal species in large enough habitats to support them but must also include landscape-scale natural systems and processes, aquatic and marine habitats and be ecologically functional and resistant to the impacts of climate change. This must also be achieved in a reasonable amount of space without impacting negatively on livelihoods or economic production. As the provincial conservation authority, CapeNature is the lead agency responsible for conserving the Western Cape's biodiversity and resources for future generations.

In the Western Cape, about 80% of land comprising important biodiversity, does not fall within formally protected areas, but is privately or communally owned. The Biodiversity Stewardship Programme offers conservation options to set up partnerships for managing and protecting natural assets. Two of the options (Nature Reserve and Protected Environment) include declaration in terms of the NEM: PAA. The other options comprise contractual agreements between the landowner/s and a conservation authority such as CapeNature or SANParks. Accounting for all the above-mentioned types, the current protected area network amounts to 16.5% of the Western Cape. For a more detailed breakdown of the components of the Conservation Estate in the Western Cape, the reader is referred to the 2023 State of Biodiversity Report.

The primary focus of the Western Cape Protected Area Expansion Strategy (WC PAES) is:

- To expand the Western Cape protected area network to encompass a more representative and resilient suite of areas that support biodiversity and ecological infrastructure, especially those threatened species and ecosystems that remain yet unprotected.
- To regularise existing protected areas, so that environmental security is ensured for everyone in South Africa and the costs and benefits of protection accrue to the appropriate entity.

The WC PAES provides an explanation of the mechanisms used for consolidation and expansion of the Protected Area Network.

e-links

2025 Western Cape Protected Area Expansion Strategy
Western Cape State of Biodiversity Report 2023

03 Spatial Assessment and Map

3.1 2023 Revision and updates to the Biodiversity Spatial Plan Maps

The 2023 WC BSP adopts the principles and methods of the 2017 WC BSP. Although all data previously utilised within the 2017 WC BSP was utilised to ensure consistency, several datasets and data coverages have been updated to reflect those utilised in the NBA 2018 and other national spatial products. The informants used in this revised were as follows:

3.1.1 Land cover map

The Western Cape 2014 Land Cover Map has been updated to account for changes in the road, rail, agriculture, settlement, mining, and dam features, and to correct for certain data classes originally omitted. This involved sourcing and embedding vector information of comparable 2018 and 2020 time periods for the agricultural, dams, roads, and settlement classes. The National Computer Automated Land-Cover (CALC) datasets for 2018 and 2020 were also used to update the land cover map in terms of land cover/use change.

To ensure consistency between the different temporal land cover products, the following principles were applied:

- The maximum dam extents across different time periods were used. This had a significant impact, as the dam surface areas over the 2018 and 2020 National Land Cover periods reflected the low dam levels associated with the drought at the time, providing an inaccurate dam footprint.
- The mapped coastline was aligned to be consistent with the dune baseline as reflected in the 2018 NBA 2018. This ensured a comparable land surface area over time and enables product compatibility.

Building in these various land cover and land-use changes over time allows for the development of a land cover map that reflects natural and near natural land cover categories (e.g., grasslands, bushlands, etc.) and modified land cover categories in which natural vegetation is no longer present or is very degraded (e.g., settlements, roads, cultivated lands, etc. An updated modification coverage was extracted from the updated 2020 WC Land Cover map which was used to determine habitat loss. This coverage was augmented using finer scaled information extracted from the City of Cape Town's 2021 BioNet coverage.

3.1.2 Updated Vegetation Map

The vegetation map has been revised significantly from the version that was utilised in the 2017 WC BSP. This revision used the National Vegetation Map released in June 2021 by the National Department of Forestry Fisheries and the Environment (DFFE) and the South African National Biodiversity Institute (SANBI) that forms the spatial reference for the Red Listed Ecosystems described in the 2022 Red List of Ecosystems (Gazette Notice No 47526).

3.1.3 Climate Change Corridors

Climate change corridors have been refined to reflect more accurately the natural to near-natural extent as delineated in the fine-scaled mapping process utilised to generate the Critical Biodiversity coverage in the Western Cape Biodiversity Framework 2010 (Kirkwood *et al.,* 2010). Added to this refined mapping extent was the protected areas coverage as at 2008 (which best reflects the protected area footprint at the time when the broad scale climate change corridors were originally envisioned (Pence, 2009). This has resulted in the generation of a baseline reference Climate Change Corridor Network for the province of the Western Cape for 2010 against which levels of protection and loss can be measured over time.

3.1.4 Strategic Water Source Areas

The new Strategic Water Source Area (SWSA) coverage is a comprehensive fine-scale delineation of all SWSAs for surface water in the country (Lötter & Le Maître, 2021) and was used to inform this revision. The SWSA's for surface water that were delineated in 2018 are now delineated at a finer scale, which allows them to be mainstreamed into land-use planning and regulation at a local level.

3.1.5 Mapped Coastline Realignment

The mapped coastline was aligned to be consistent with the 2018 National Biodiversity Assessment (NBA) Marine dune base line. The coastal habitats were updated using the new boundary (Harris *et al.,* 2019).

3.1.6 Threatened Species

Threatened species data utilised within the revised 2023 WC BSP was informed by the International Union for Conservation of Nature (IUCN) updated Red List of Threatened Species for 2021 (IUCN 2022). All species previously incorporated were again included in this revision, but the individual datasets were updated using data sourced from CapeNature and SANBI, as well as vetted and checked records from iNaturalist. Species included threatened Fish, Birds, butterflies, Reptiles, Odonates and Mammals. The ranges identified in the Biodiversity Management Plans for the following species were also included: the Cape Mountain Zebra, Bontebok, the Geometric tortoise, the Clan Willian Sandfish, the Barrydale Redfin, and the African Penguin.

3.1.7 Protected Area Estate

The Protected Area Estate for the Western Cape Province was updated to reflect the extent as of February 2022.

3.1.8 Planning Unit Extent

The planning units were revised to reflect change in the Protected Areas Estate that has occurred over the last five years. The coastal interface was also re-aligned to reflect that used in the NBA 2018.

3.1.9 Buffers

- **Riverine buffers.** The buffers for riverine areas were mapped from the edge of the riverine area, while buffers for wetlands begin from the edge of the temporal zone.
- **Coastline buffers.** Coastline buffers were developed using a generic one-kilometre buffer from the coastline in alignment with the principles outlined in the Integrated Coastal Management Act 36 of 2014.

- **CBA and ESA buffers**. Buffers for Critical Biodiversity Areas (CBA) and Ecological Support Areas (ESA) were applied to the mapped features identified as either CBAs or ESAs. These were developed to better reflect the areas of influence associated with each of these respective categories, aiding to protect the 'core' areas of concern from edge effects, as well as to provide ecological support.
- **Ecological Support Areas: Species Specific Overlay.** This refers to areas required for the persistence of specific species. Although these areas are typically modified, a change in current land-use to anything other than rehabilitated land, would typically result in a loss of that feature from the area identified. This category was added in Table 3.1 of this BSP Guideline.

e-links
SANBI Technical Guidelines for CBA Maps

3.2 Biodiversity Spatial Plan

The WC BSP includes a map of biodiversity importance for the entire province, covering both the terrestrial and freshwater realms, as well as major coastal and estuarine habitats (Figure 3.1). It includes a summary of the WC BSP Map categories, the types of data and approach used, and highlights hallmark characteristics of the spatial products and technical advances in the development thereof (See Sections 3.3 and 3.4).

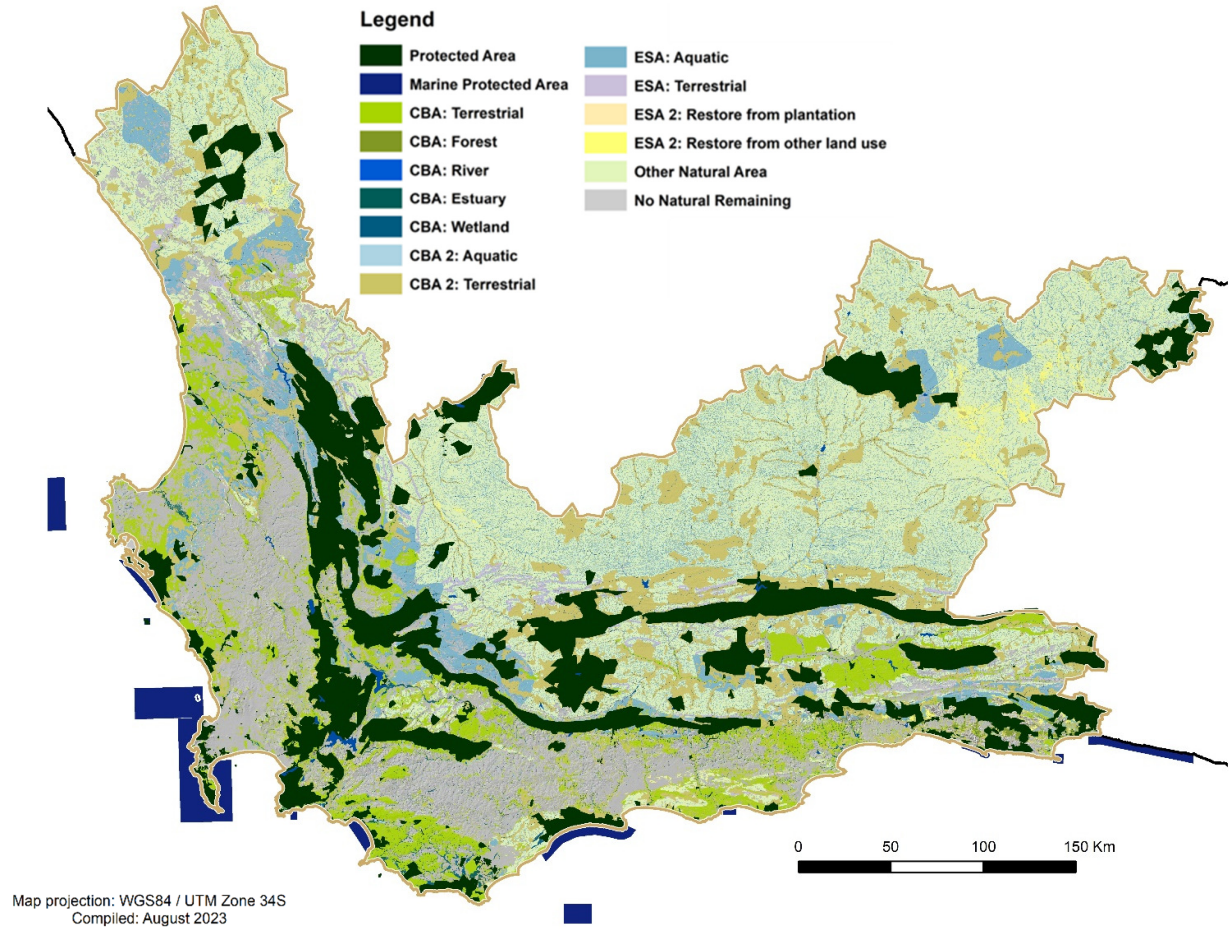


FIGURE 3.1: *The 2023 Western Cape Biodiversity Spatial Plan Map of Biodiversity Priority Areas*

3.2.1 Definitions of the Biodiversity Spatial Plan Map Categories

The WC BSP Map shows five broad biodiversity priority categories, as per SANBI's Technical Guidelines for CBA maps (SANBI, 2017; see also Table 3.1). These areas offer the most flexibility for land-use, but these should be managed in a biodiversity-sensitive manner, aiming to maximise ecological functionality. Authorisation is still required for high-impact land-uses. In the WC BSP Map, five sub-categories of CBA and 11 sub-categories of ESA are recognised, reflecting the dominant feature for the area of interest (e.g., wetland, river, forest, estuary)**.** These are summarised in Table 3.2.

Protected Areas (PAs): Areas that are formally protected by law and recognised in terms of the Protected Areas Act, 57 of 2003. This includes gazetted Contract Nature Reserves and Protected Environments.

Critical Biodiversity Areas (CBAs): Areas that are required to meet biodiversity targets for species, eco-systems or ecological processes and infrastructure. These include:

- All areas required to meet biodiversity pattern (e.g., species, ecosystems) targets.
- Critically Endangered (CR) ecosystems (terrestrial, wetland and river types).
- All areas required to meet ecological infrastructure targets, aimed at ensuring the continued existence and functioning of ecosystems and delivery of essential ecosystem services.
- Critical corridors to maintain landscape connectivity.

CBAs are areas of high biodiversity and ecological value and need to be kept in a natural or near-natural state, with no further loss of habitat or species. Degraded areas should be rehabilitated to natural or near-natural condition. Only low-impact, biodiversity-sensitive land-uses are appropriate.

In the maps, a distinction is made between CBAs that are likely to be in a natural condition (CBA 1) and those that are potentially degraded or represent secondary vegetation (CBA 2). This distinction is based on the best available land cover data.

Ecological Support Areas (ESAs): Areas that are not essential for meeting biodiversity targets, but that play an important role in supporting the functioning of PAs or CBAs and are often vital for delivering ecosystem services. They support landscape connectivity, encompass the ecological infrastructure from which ecosystem goods and services flow, and strengthen resilience to the effects of climate change. They include features such as regional climate adaptation corridors, water source and recharge areas, riparian habitat surrounding rivers or wetlands, and threatened vegetation.

ESAs need to be maintained in at least a functional and preferably natural state, to support the purpose for which they were identified, but some limited habitat loss may be acceptable. A greater range of land-uses over wider areas is appropriate, subject to an authorisation process that ensures the underlying biodiversity objectives and ecological functioning are not compromised. Cumulative impacts must be considered.

In the maps, a distinction is made between ESAs that are likely to be functional i.e., in a natural, near natural or moderately degraded condition (ESA 1), and Ecological Support Areas that are severely degraded or have no natural cover remaining and therefore require restoration (ESA 2).

Other Natural Areas (ONAs): Areas not identified as a priority in the current biodiversity spatial plan but retain most of their natural character and perform a range of biodiversity and ecological infrastructure functions. Where possible, ONAs should be managed or utilised in a manner that minimises habitat and species loss and ensures ecosystem functionality through strategic landscape planning. ONAs offer considerable flexibility in terms of management objectives and permissible land-uses. Authorisation is still required for high impact land-uses.

No Natural Remaining (NNR): Areas severely to completely modified by human activity to the extent that they are no longer natural, and do not contribute to biodiversity targets. These areas may still provide limited biodiversity and ecological infrastructure functions, even if they are never prioritised for conservation action.

3.2.2 Biodiversity Spatial Plan Map

The provincial WC BSP Map (Figure 3.1) was developed using systematic biodiversity planning methodology, following the approaches of Margules and Pressey (2000) and Ardron *et al.* (2010). The data was analysed using specialised software called Marxan (Game & Grantham, 2008) accessed via an open-source GIS platform, QGIS, and the plugin (interface software) CLUZ (Smith, 2016).

Marxan calculates the most efficient selection of planning units required to meet all biodiversity, ecological sustainability, and climate resilience targets, while favouring persistence and avoiding areas of competing land uses. Marxan is based on an algorithm that runs through millions of options to identify the best selection (configuration) of planning units to meet targets. This 'best-design' solution, as well as the summed selection score for each planning unit (i.e., the importance of any single site for meeting biodiversity targets) and an 'irreplaceable feature' ruleset, are used to create the final WC BSP Map.

For the City of Cape Town (CoCT) municipal area, the CoCT 2021 Biodiversity Network (BioNet) replaced the provincial Marxan solution in all final products. This is because the CoCT's BioNet analysis was run using a similar systematic planning approach but with a finer-scale suite of biodiversity features and data, and a ruleset specifically designed for the CoCT's unique needs. The BioNet has also been adopted as policy by the City Council. Thus, the BioNet is a more appropriate planning tool for the metro and should be directly referred to for any spatial planning within the CoCT's boundaries. For the purposes of presenting a complete and consistent provincial product, the CoCT's BioNet categories and 2021 spatial products were cross walked (reconciled) with the WC BSP categories and products and included therein.

e-links
City of Cape Town's 2021 BioNet

3.2.3 Biodiversity Priority Areas

The various Biodiversity Priority Areas, their meanings and desired management objectives are summarised in Table 3.1.

TABLE 3.1 *Summary of map categories and their meanings.*

Map Category	Definition	Desired Management Objective	Sub-Category
Protected Area	Areas proclaimed as protected areas in terms of national or provincial legislation.	Must be kept in a natural state, with a management plan focused on maintaining or improving the state of biodiversity. A benchmark for biodiversity.	
Critical Biodiversity Area 1	Areas in a natural condition that are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure.	Maintain in a natural or near-natural state, with no further loss of habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land-uses are appropriate.	**CBA: River** **CBA: Estuary** **CBA: Wetland** **CBA: Forest** **CBA: Terrestrial**
Critical Biodiversity Area 2	Areas in a degraded or secondary condition that are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure.	Maintain in a functional, natural, or near-natural state, with no further loss of natural habitat. These areas should be rehabilitated.	**CBA: Degraded**
Ecological Support Area 1	Areas that are not essential for meeting biodiversity targets but play an important role in supporting the functioning of PAs or CBAs and are often vital for delivering ecosystem services.	Maintain in a functional, near-natural state. Some habitat loss is acceptable, provided the underlying biodiversity objectives and ecological functioning are not compromised. Maintaining and improving protection of areas identified as ESA Water Source and Water Recharge important to secure water resources, particularly in Strategic Water Source Areas (SWSAs).	**ESA: Foredune** **ESA: Forest** **ESA: Climate Adaptation Corridor** **ESA: Coastal Resource Protection** **ESA: Endangered Ecosystem** **ESA: River** **ESA: Estuary** **ESA: Wetland** **ESA: Watercourse Protection** **ESA: Water Source Protection** **ESA: Water Recharge Protection**
Ecological Support Area 2	Areas that are not essential for meeting biodiversity targets but have an important role in supporting the functioning of PAs or CBAs and are often vital for delivering ecosystem services.	Restore and/or manage to minimise impact on ecological infrastructure functioning; especially soil and water-related service.	**ESA: Restore from Non-Natural**
Ecological Support Area: Species Specific Overlay	Terrestrial NNR modified areas that provide a critical support function to a threatened or protected species, for example agricultural land or dams associated with nesting/ roosting sites.	Maintain current land-use or rehabilitate to functional natural area.	**ESA: Species Specific**

Map Category	Definition	Desired Management Objective	Sub-Category
Other Natural Areas: Natural to Near-Natural	Areas that have not been identified as a priority in the current systematic biodiversity plan but retain most of their natural character and perform a range of biodiversity and ecological infrastructure functions. Although not prioritised for biodiversity, they are still an important part of the natural ecosystem.	Minimise habitat and species loss and ensure ecosystem functionality through strategic landscape planning. Offers flexibility in permissible land-uses, but authorisation required for high-impact land-uses.	**ONA: Natural to Near-Natural**
			ONA: Degraded
No Natural Remaining	Areas that have been modified by human activity to the extent that they are no longer natural, and do not contribute to biodiversity targets. These areas may still provide limited biodiversity and ecological infrastructure functions, even if not currently prioritised for conservation action.	Manage in a biodiversity-sensitive manner, aiming to maximise ecological functionality. Offers the most flexibility regarding potential land-uses, but authorization/s may still be required for high- impact land-uses.	**No Natural Remaining**

3.3 Approach, datasets, and parameters used.

Systematic biodiversity planning has become the standard approach to biodiversity planning in South Africa. It is based on sound science, and has internationally recognised principles, methods, and techniques. It is essential that conservation efforts be strategic, efficient, and mainstreamed. Biodiversity Priority Areas for both production and protection must be identified and ultimately reflected in our daily decisions surrounding land and resource use. Systematic biodiversity planning helps direct and focus conservation action by setting clear goals and identifying the most effective places for protection.

The following excerpt from the Guideline for Bioregional Plans (Government Gazette No. 32006, 2009) highlights key characteristics of the approach:

The principle of representation. The plan identifies areas needed to conserve a representative sample of all biodiversity pattern (species, communities, ecosystems).

The principle of persistence. The plan identifies areas needed to maintain ecological and evolutionary processes that allow biodiversity to persist in the long term.

Biodiversity targets. Quantitative targets are set for biodiversity features, indicating how much of each feature is required to conserve a representative sample of biodiversity pattern and key ecological processes.

Efficiency and conflict avoidance. 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.

3.3.1 Outline of steps taken in the production of the Biodiversity Spatial Plan

Adhering to the principles described above, a systematic biodiversity planning approach involves the following broad steps (Cadman, 2016):

- **Map** a wide range of information about biodiversity features and patterns of land and resource use, to understand what is located where.
- **Set biodiversity targets** that show how much of each feature is needed to conserve it.

- **Analyse the data** using systematic biodiversity planning software. This identifies what needs to be prioritised and where, highlighting the most efficient options for meeting all biodiversity targets, as well as other possible (but less efficient) alternatives.
- I**nterpret the results** of the biodiversity assessment and generate a Biodiversity Priority Areas Map (WC BSP Map) and land-use guidelines.

The subsections that follow provide more information about the specific approach taken in the development of the WC BSP. Technical detail and scientific references are available in the 2023 WC BSP Technical Report.

The generation of the WC BSP Spatial Informants entailed the following four main steps:

1. **Map (source or generate all spatial data)**
    a. Developed a planning unit coverage which divided the entire study area (province) into appropriate units of analysis.
    b. Compiled GIS datasets which allowed the following to be determined for each planning unit:
        i. Protection status (Protected Areas coverage).
        ii. Habitat condition (Land Cover and Ecosystem Remnant coverages).
        iii. Contribution/s to biodiversity targets (see Feature Coverages below).
        iv. Selection 'cost' (to influence spatial design, including efficiency and conflict).
    c. Sourced or created maps of biodiversity pattern features (see also Section 3.3.2 and Table 3.2 below):
        i. Ecosystems (terrestrial vegetation types, coastal habitats, indigenous forest types, river types, wetland types and estuaries).
        ii. Species (threatened plants, amphibians, fish, birds, butterflies, reptiles, odonates and mammals, and species for which a Biodiversity Management Plan for Species (BMP-S) exists or is in progress such as Cape Mountain Zebra, Bontebok, Geometric Tortoise, Clanwilliam Sandfish, Barrydale Redfin, and African Penguin.
    d. Sourced or created maps of ecological persistence features (see also Section 3.3.2 and Table 3.2 below: spatial surrogates for a variety of ecological processes, ecological infrastructure, and climate resilience attributes).
2. **Set biodiversity targets.**
    a. Aligned targets to national biodiversity targets for pattern and process, based on best available science (see Section 3.3.3 and Table 3.2).
    b. Adjusted targets where necessary to address deficits in biodiversity 'stocks' or features.
3. **Analyse the data.**
    a. Created and formatted input files (e.g., a matrix of contributions per planning unit, summary of targets used, and targets already met by current protected areas).
    b. Calibrated Marxan parameters (Boundary Length Modifier, Feature Penalty Factor, Planning Unit Cost, Number of Runs and Iterations).
    c. Ran Marxan (300 000 000 iterations x 100 runs) to generate Selection Frequency Score and Best Solution results.
    d. Screened results with specific focus given to urban edges, special habitats, and corridors.
4. **Interpret results.**
    a. Translated Marxan outputs to maps of Critical Biodiversity Areas, Ecological Support Areas, Other Natural Areas, and areas of No Natural Remaining by:
        i. Replacing planning units with remnant data.
        ii. Augmenting remnants with relevant feature attributes.
        iii. Applying a feature-based rule set to combine the 'best-design' solution with other features that must be categorically included (e.g., all CR vegetation remnants).

The subsections below provide a summary of how the WC BSP spatial assessment adhered to the key characteristics of representation and persistence (Section 3.3.2), quantitative target setting (Section 3.3.3), and efficiency and conflict avoidance (Section 3.3.4).

3.3.2 Representation and persistence

For biodiversity to be appropriately addressed in land-use planning and environmental assessment, both biodiversity pattern (representation) and ecological processes (persistence) must be adequately considered (Cadman, 2016). Both the distribution and variety of native life forms and the ecological and evolutionary processes that maintain them, must be considered. This is done by mapping a set of features selected as surrogates for the full array of biodiversity pattern and ecological processes occurring in a region.

For the Western Cape, a total of 1 513 features were included in the analysis, including 'coarse-filter' biodiversity pattern features such as vegetation units and wetland types, 'fine-filter' features such as species occurrences, and ecological persistence features such as water source areas and climate adaptation corridors. These are listed and described more fully in Table 3.2. All data were carefully vetted to ensure reasonable accuracy and applicability to assessment objectives.

3.3.3 Quantitative targets

Ecosystem services, ecological and evolutionary processes, and native species are lost when landscapes are modified beyond certain thresholds. Using best available science and data, key thresholds for assessing ecosystems and setting spatial targets have been established in South Africa's biodiversity sector community of practice. These thresholds indicate the points at which it is estimated the limits of acceptable change will be reached – that is, the point at which, unless corrective management is put in place, an ecosystem could undergo irreversible change and become something quite different (Cadman, 2016).

Thus, targets were set for each feature, indicating how much of each is required to either conserve a representative sample of biodiversity pattern, or to maintain key ecological processes and infrastructure. Generally, representation targets are around 20% of the original extent of an ecosystem (though for terrestrial ecosystems they range from 16 to 36% as per SANBI (2021).

Persistence targets aim for 60% of a system remaining intact (i.e., in a natural or near-natural state). For species, targets are generally set at 11 localities or sufficient area to support a population of 10 000 individuals, which correlates with IUCN thresholds for listing species as threatened (as per Pfab *et al.,* 2011).

TABLE 3.2 *Summary of the features and targets included in the WC BSP's spatial assessment, the source datasets used, and the target-setting approach taken.*

Features	Description of data and target setting approach
Biodiversity Pattern *Representing the diversity of local species, habitats, ecosystems, and ecological processes*	
Vegetation Units	Based on the 2021 National Vegetation Map (South African National Biodiversity Institute (2021)). National ecosystem targets used. Values range from 16 to 36% of original extent. Threat status affects selection of areas as CBAs especially regarding irreplaceability. Ecosystems which have remaining extent below the national target are likely to have their entire remaining extent selected.
Vegetation Variants	Based on the combined extent of the Vlok fine-scale vegetation maps (2013/14). A target of 10% used for representation at the variant level.
Coastal Habitat Types (landward)	Combination of the DFFE Indigenous Forest Inventory Map and the Western Cape 2013/14 Land cover product (natural forest classes). National ecosystem target used (34% of original extent).

Features	Description of data and target setting approach
Biodiversity Pattern *Representing the diversity of local species, habitats, ecosystems, and ecological processes*	
Indigenous Forest Types	Combination of the DFFE Indigenous Forest Inventory Map and the Western Cape 2013/14 Land cover product (natural forest classes). National ecosystem target used (34% of original extent).
Wetland Types	Combination of the NFEPA Map and the Western Cape 2013/14 Land cover product (natural wetland classes). Biodiversity target of 20% of original extent used. Type, threat status and proximity to terrestrial CBAs also influenced selection.
River Types	Based on NFEPA River products, translated onto 1:50 000 river network data. Biodiversity Pattern target of 20% of original extent used. Type, threat status and proximity to terrestrial CBAs also influenced selection.
Estuaries	From National Estuaries coverage (Van Niekerk & Turpie, 2018). Target of 100% of remaining intact functional area used for estuaries.
Threatened Plants	From SANBI's Threatened Species Programme plant locality data, the latest extract from the CapeNature State of Biodiversity Database. Point data: 100% target used for threatened taxa with limited localities (<11) and target of 11 localities used for other threatened taxa.
Threatened Amphibians and Amphibian Wetland Guild	All threatened taxa extracted from CapeNature's biodiversity occurrence database, plus set of wetland guild species (regardless of threat status); both with a target of 11 localities.
Threatened Fish	Represented by the following NFEPA project features: Important Fish Areas, Fish Support Areas, and priority sub-catchments, plus FEPA rivers. In addition, all threatened taxa were extracted from CapeNature's biodiversity occurrence database and localities in smaller tributaries were included with a target of 11 sites per species.
Threatened Birds	All threatened taxa extracted from CapeNature's biodiversity occurrence database, plus data indicating Verreaux's Eagle nesting sites; target of 11 locations per species used. Important Biodiversity and Bird Areas (IBBAs) included as overlays (Listing Notice 3).
Threatened Butterflies	From CapeNature's biodiversity occurrence database, plus SANBI's butterfly dataset; target of 11 locations per species used.
Threatened Reptiles	From CapeNature's biodiversity occurrence database, plus SANBI's reptile dataset; target of 11 locations per species used.
Threatened Odonates (Dragonflies and Damselflies)	From CapeNature's biodiversity occurrence database, plus SANBI's Odonata dataset; target of 11 locations per species used.
Cape Mountain Zebra *(Equus zebra zebra)*	Informed by the Cape Mountain Zebra BMP-S distribution maps, viability assessment and habitat requirements. CapeNature's biodiversity occurrences also included. Target of 10 000 individuals across entire range used, at 100 ha per individual; adjusted proportionally for the Western Cape. Extended distribution areas also selected to identify sites for reestablishment of populations of Cape Mountain Zebra.
Bontebok *(Damaliscus pygargus pygargus)*	Informed by the Bontebok BMP-S, including natural and extended distribution range maps. Target of 10 000 individuals used, at an ecological carrying capacity of 22 ha per individual. Extended distribution areas also selected to identify sites for re-establishment of Bontebok populations.
Geometric Tortoise *(Psammobates geometricus)*	Informed by the Geometric Tortoise draft BMP-S including field survey data and habitat prioritisation. Target of 90% of priority habitat.
Clanwillian Sandfish *(Labeo seeberi)*	NFEPA fish data informed sub-catchment selection, wherein rivers were buffered by 100m. 100% of remaining intact area targeted.
Barrydale Redfin *(Pseudobarbus burchelli)*	NFEPA fish data informed sub-catchment selection, wherein rivers were buffered by 100m. 100% of remaining intact area targeted.
African Penguin *(Spheniscus demersus)*	All current colonies and potential new nesting sites targeted, these all occur within existing protected areas or state lands.

Features	Description of data and target setting approach
Ecological Infrastructure *Providing ecosystem services and supporting ecosystem function*	
Climate Adaptation Corridors	Based on TMF Climate Adaptation Corridors (Pence, 2009), edited to reflect the remaining natural to near-natural vegetation extent as at 2010, then with modified areas identified using the revised 2014 Western Cape land cover product updated using the 2020 National CALC Land Cover. Target of 60% intact (natural or degraded condition).
Ecosystem-Based Adaptation Areas	From NBA 2011.Targets not employed, but rather used as a cost surface to direct selection towards areas identified as important for climate change resilience.
Coastal Corridor	Mapped as a 1km coastal buffer zone along all rural (non-urban) sections of coast. Target of 60% intact for each section of coastline associated with each District Municipality (natural or degraded condition). Coastal Corridors are important for maintaining ecological connectivity allowing species to shift and adapt when impacted by climate change.
Foredunes	From Integrated Coastal Habitat Map, 2022 version (Harris pers. comm., 2022). Target of 60% intact natural or degraded condition. Protecting foredunes is important for mitigating impacts which may occur because of climate change such as sea-level rise.
Upland-lowland interface	Mapped as a 500m buffer at the interface between upland and lowland vegetation types. Target of 20% of remaining natural veld. These are important for maintaining ecological connectivity and mitigating against the impacts of climate change by allowing species to move between warmer low-lying areas and higher, cooler areas.
Flagship Free-Flowing Rivers	From NFEPA project. All flagship rivers in the province buffered by 100m. 100% of remaining intact area targeted.
High Yield Rivers	From NFEPA project. 60% of original, entire extent targeted per primary catchment. These rivers are important to secure water security.
Strategic Water Source Areas	From the fine-scaled Strategic Water Source Areas surface water coverage of 2021. 60% of original, entire extent targeted per primary catchment. These areas are important to secure water.
Highest Groundwater Recharge Areas	From NFEPA project. 60% of original, entire extent targeted per local municipality. These areas are important for water security and should be protected with no activities resulting in loss of permeability or pollution being permitted.
Riparian Functional Areas (Watercourses)	Combination of the Western Cape's 2013/14 land cover riparian class and the Surveyor General's 1:50 000 river data (buffered by 32m). Target adjusted to 60% of remaining intact areas per freshwater ecoregion. Areas are essential for maintaining provision of good quality water and diversity of aquatic species.

3.3.4 Efficiency and conflict avoidance

One of the underlying principles of systematic biodiversity planning is that of spatial conflict avoidance. This means that in the identification of CBAs one avoids, wherever possible and without compromising the meeting of targets, areas that may be more at risk of being modified from a natural state, or that may be identified as a priority for other land-uses (such as urban development). This principle reduces the likelihood of conflicting land-use objectives and increases the likelihood that the identified CBAs will remain intact and contribute to targets in the long term.

Spatial efficiency is a function of the number of iterations run (the more iterations, the higher the likelihood of achieving a near-optimal solution), the cost surface used, and the boundary length modifier utilised.

Three datasets were integrated to generate a 'cost surface'. This is a measure Marxan uses to identify where best to avoid conflict and obtain the most additional value when it selects a set of planning units for achieving all biodiversity targets. It is a measure of where best to meet the national and provincial biodiversity targets whilst avoiding conflict between competing land-uses and maximising benefits such as climate change adaptation/climate resilience. The datasets used to calculate efficiency included: a penalty coverage representing urban edges, a discount coverage representing the Biodiversity Priority Areas identified in the 2017 WC BSP, and a discount coverage representing features important for climate change adaptation (Figure 3.2).

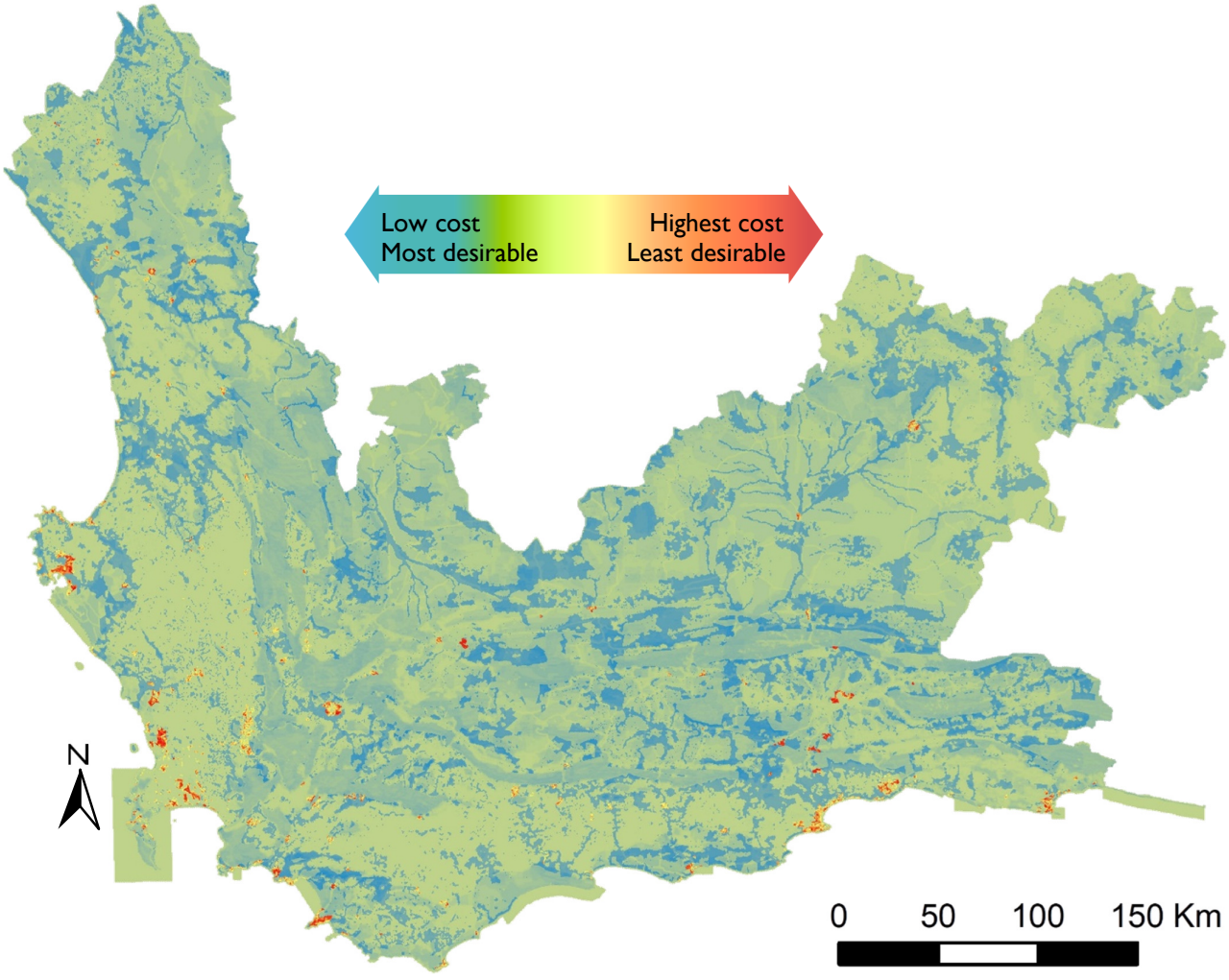


FIGURE 3.2: *The 2023 Western Cape Biodiversity Spatial plan cost surface.*

3.4 Advances made in the 2023 Biodiversity Spatial Plan

The 2023 WC BSP provides a single, province-wide spatial assessment of biodiversity features and ecological infrastructure, identifying the best configuration of biodiversity priority areas required to meet targets, and uses the most up-to-date information available. This product builds upon the data and methodologies employed during the development of the 2017 WC BSP with the aim of providing an update to this product as opposed to replacing it. As such, the primary change are refinements to datasets used in the 2017 WC BSP, as well as new information that has become available. This product thus represents a refinement and update of the 2017 WC BSP, ensuring consistency with the previous product whilst also providing a more refined output.

3.4.1 Revised land cover

Land cover data form the basis of all systematic biodiversity plans by showing where vegetation types and other biodiversity features (e.g., wetlands, threatened species habitat), as well as elements of ecological infrastructure (e.g., climate corridors, foredunes, water source areas) are considered to be in a natural (or near-natural) state versus having been modified to a point beyond which biodiversity function, structure and composition are considered intact. Lands without intact natural vegetation do not contribute to representation targets, though they may contribute to ecological process and functioning.

The latest National Land cover product currently available is the South African National Land Cover 2020 product developed by DFFE (SANLC-2020). This product, along with geographic masks depicting roads, railways, electrified structures, dams, and additional agricultural fields that were mapped circa 2020, was used to revise the Western Cape 2013/14 land cover product utilised in the 2017 WC BSP.

e-links
South African National Land Cover - DFFE

This revised version cannot be considered as a truly reflective land cover map for 2020 however, because the natural classes reflected have not been revised from those reflected in the 2013/14 Western Cape Land cover product. Only land cover categories that were categorised as being either natural to near natural were updated to reflect a change to a non-natural category where the changes were identified; any changes identified within and between the natural classes were ignored (Figure 3.3).

The primary purpose of these amendments was to determine a) the remaining extent of the natural to near natural regions within the province, and b) to conduct preliminary analyses indicating the rate of habitat loss. The revised 2020 Western Cape Land cover product consists of 113 classes which were used as surrogates for three broad categories of ecological condition: (i) natural to near-natural, (ii) degraded and severely modified, to (iii) completely devoid of natural habitat.

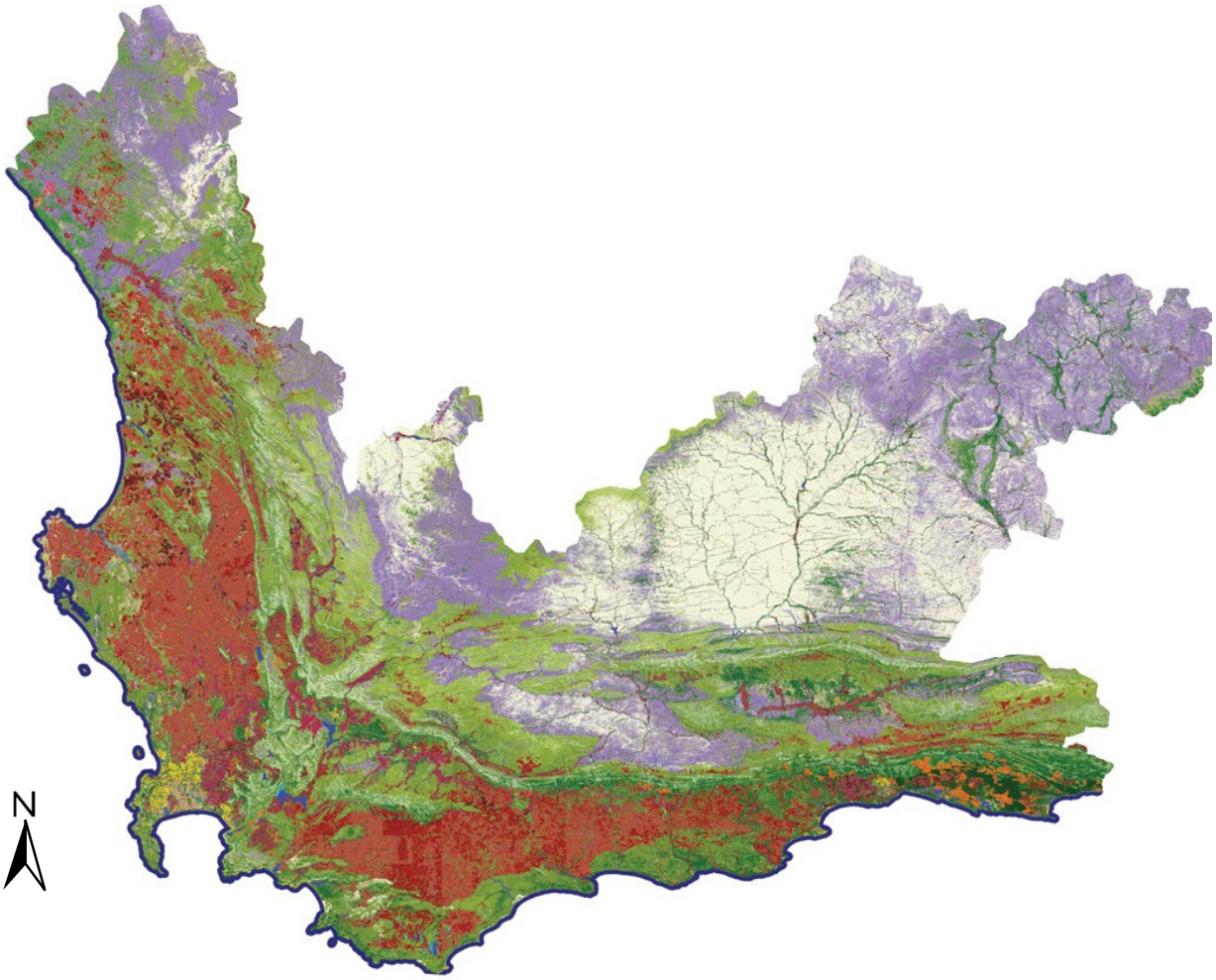


FIGURE 3.3: *2020 Updated Western Cape Land Cover (CapeNature, 2023). Suggested Citation: CapeNature (2023) 2020 Updated Western Cape Land Cover. Biodiversity Capabilities, CapeNature.*

3.4.2 Ecological infrastructure and climate change resilience

Ecological infrastructure refers to naturally functioning ecosystems that deliver valuable services to people, such as water and climate regulation, soil formation and disaster risk reduction. It is the nature-based equivalent of built or hard infrastructure and can be just as important for providing services and underpinning socio-economic development. Ecological infrastructure does this by providing cost effective, long-term solutions to service delivery that can supplement, and sometimes even substitute, built infrastructure solutions. Ecological infrastructure includes healthy mountain catchments, rivers, wetlands, coastal dunes, and nodes and corridors of natural habitat, which together form a network of interconnected structural elements in the landscape.

A spatial representation of how species and ecosystems are supported to adapt to the effects of climate change was generated by integrating the following revised coverages:

- areas of climate change resilience
- areas of large intact ecosystems
- ecological corridors that facilitate the movement of species in response to a changing environment

The BioNet 2021 coverage developed by the City of Cape Town represents one such finer scaled spatial planning product. As this product was developed using systematic conservation planning principles albeit it at a much finer resolution to the WC BSP, this product has been incorporated in its entirety in the WC BSP design thus ensuring consistency between the two products whilst also increasing the accuracy of the provincial product.

TABLE 3.3 *Comparison of Biodiversity Priority Area categories for BioNet and the Western Cape Biodiversity Spatial Plan*

BioNet category	WCBSP category
Protected Area	Protected areas
Conservation Area	Protected areas
CBA 1a	CBA 1: Terrestrial
CBA 1b	CBA 1: Terrestrial
CBA 1c	CBA 1: Terrestrial
CBA 2a	CBA 2: Terrestrial
CESA	ESA 1: Terrestrial
OESA	ESA 1: Terrestrial
ONA	Other Natural Areas
NNR	No Natural Remaining

3.4.3 Spatial flexibility leading to reduced conflicts with urban land planning.

The algorithm within Marxan allows for a huge number of possible solutions (i.e., configurations of planning units) to be appraised. This flexibility gives planners the ability to find solutions which not only satisfy conservation objectives but help reduce potential conflicts between interests. Thus, in support of the Western Cape Provincial Spatial Development Framework's promotion of urban settlement intensity, integration, and consolidation to assist in rectifying inefficient land-use patterns, a 'cost' parameter was employed to preferentially select planning units outside of urban areas for meeting provincial conservation targets, where possible. This, however, is not to imply that urban areas are without important biodiversity, but rather to have identified a minimum set in the WC BSP, thereby affording municipalities the opportunity to identify urban biodiversity networks using additional and/or finer-scale data and via a more detailed process. The CBAs and ESAs identified in the WC BSP Map should be viewed as a minimum set and form the starting point for more focused urban planning, ultimately aimed at strengthening the resilience of both our natural and built environments.

3.4.4 Identification of depleted ecosystem stocks

South Africa published its first formal System of National Accounts in 1953 to measure how much is produced, consumed, and invested in the economy. In recognition of the fact that natural resources drive economies and other human activities around the globe, a System of Environmental Economic Accounting was internationally published in 1993. In South Africa, environmental economic accounts currently exist for energy, minerals, and fisheries. There has also recently been a collaborative effort lead by SANBI and Statistics South Africa to pilot a

study on ecosystem accounts. Ecosystem accounting is a subset of environmental accounting that measures the state and condition of a country's ecosystems. Thus, ecosystem accounting distinguishes between ecosystem assets and ecosystem services. Our stock of ecosystem assets can be measured and monitored over time, thereby providing useful information about the flow of ecosystem services to people and the economy.

A national programme of work on ecosystem accounts is still being developed. By using the targets established for the WC BSP specific ecosystem stocks it is possible to identify ecosystems that have been depleted to such a degree that their ability to deliver the services people rely on has been significantly compromised. In the Western Cape, the following ecosystem stocks have been depleted:

- 20 of 160 National Vegetation Types
- 38 of 331 Wetland Types
- 5 of 54 Estuarine Functional Areas
- 3 of 28 Climate Adaptation Corridors
- 1 of 18 Groundwater Recharge Areas
- 7 of 40 Water Source Areas

3.4.5 More recent and better-quality data

Many spatial data datasets were used in the analysis and WC BSP Map represents the latest and most scientific approach to understanding biodiversity priorities in the Western Cape. Users of the WC BSP Map should be aware that only biodiversity information available at the time of conducting the spatial assessment was fed into the WC BSP Map.

Most notable among the updated coverages used, are the following:

- An updated South African National Vegetation Map (version 2021, released by SANBI in 2022).
- A refined Strategic Water Source Areas coverage (2021).
- Updated 2014 Western Cape Land Cover product reflecting South African National Land Cover 2020.
- A refined fine-scaled Climate Change Corridor Network.
- An updated Protected Areas coverage as curated by CapeNature as of December 2022.
- The most recent (2022) species occurrence data available provincially and/or nationally.

3.4.6 Contribution of the Biodiversity Priority Areas in the Western Cape

Table 3.4 provides a percentage contribution of the different Biodiversity Spatial Plan categories in the Western Cape.

TABLE 3.4 *Percentage contribution of the Biodiversity Priority Areas (as at 2020)*

WCBSP category	% of Western Cape
Protected areas	16.4%
Critical Biodiversity Area	23.6%
Ecological Support Area	13.4%
Other Natural Areas	29.0%
No Natural Remaining	17.5%

04 Guidelines for Land-Use Planning and Decision-making

4.1 Desired Management Objectives of the Biodiversity Spatial Plan Map Categories

The Desired Management Objective determines the ecological state or condition in which a parcel of land or freshwater feature should be maintained and provides the broad direction for appropriate land or
resource use activities and management practices. Only those land or resource use activities that are compatible with maintaining the Desired Management Objective should be encouraged. Different
categories on the WC BSP Map have specific management objectives, according to their biodiversity priority.

4.2 Land-use Guidelines

The focus of these land-use guidelines is to identify land-uses compatible with maintaining and achieving biodiversity targets. They should, therefore, be used in conjunction with any other sector-specific guidelines that may be available for the province.

Land-use guidelines are presented below for terrestrial and freshwater ecosystems. These guidelines are intended primarily to guide planning and decision-making in terrestrial and freshwater CBAs and ESAs on land outside protected areas. Brief guidelines are also provided for protected areas. In the sections that follow, general recommendations are given for each category on the WC BSP Map, relating to Desired Management Objectives and appropriate land-uses. Guidelines for locating land-uses within CBAs are provided in Table 4.1.

TABLE 4.1 *Land-use guidelines for protected areas and Critical Biodiversity Areas. Spatial layers can be viewed in CapeFarmMapper and on SANBI BGIS.*

Map category	Desired management objective	General guidelines	Specific guidelines
Protected Areas	Must be kept in a natural state, with a management plan focused on maintaining or improving the state of biodiversity. A benchmark for biodiversity.	• All operational aspects of managing these areas must be subject to their main purpose, which is to protect and maintain biodiversity and ecological integrity and should be governed by a formally approved management plan including land-use activities that support the primary function of these areas as sites for biodiversity conservation. • The management plan must identify allowable activities, which should be consistent at least with the CBA 1 category; the location of these allowable activities should be captured in a zonation plan in the management plan. • Activities relating to the construction of roads, administrative or tourism infrastructure and services (such as water reticulation systems, power lines, etc.) that are required to support the primary function of the protected area and its allowable activities, are subject to NEMA authorisation and the protected area management plan. • In the case of Protected Environments, a variety of agricultural land-uses may be allowed, such as livestock grazing, plantation forestry and limited cultivation. The location of these land-use activities must be informed by the WC BSP Map and should be specified in the zonation plan in the management plan for the Protected Environment. All areas of natural habitat that are zoned for conservation use, should be subject to implementation of the land-use guidelines for protected areas, CBAs, and ESAs. • Mountain Catchment Areas are also included in this category, however unlike the other types of protected area, there is no requirement for a management plan which would guide allowable land-uses and activities. Therefore, the land-use guideline should be aligned with that of Protected Areas, with the primary intention to ensure the steady supply of good quality water to downstream areas.	
Map category	**Desired management objective**	**General guidelines**	**Specific guidelines**
Critical Biodiversity Area 1: Terrestrial & Forest	Maintain in a natural or near-natural state, with no further loss of habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land-uses are appropriate.	• Biodiversity loss and land-use change in verified CBAs should not be permitted. Unauthorised land-use change or degradation by neglect or ignorance must be monitored as a matter of priority. • Ideally, conservation management activities should be the primary land-use in all irreplaceable areas, or they should at least be managed in ways that have no negative impact on species, ecosystems, or ecosystem services. • Conservation efforts should focus on conserving Species of Conservation Concern and populations of keystone species and species responsible for pollination and seed dispersal.	• Ideally, developments should be avoided in these areas. If they cannot be avoided, it must be shown that the mitigation hierarchy has been applied. If the impact cannot be avoided or reduced to a residual low significance, a biodiversity offset may be considered as a last resort. • The features behind a site being identified as a CBA must be fully investigated. Some areas may appear degraded but still be important for water or ecological connectivity for example. • Relevant specialist studies must form part of a Basic Assessment or the Scoping and EIA process for all land-use applications in these areas, using the services of an experienced and locally knowledgeable biodiversity expert who is registered with the South African Council for Natural Scientific Professions (SACNASP). • Applications for land-use of any kind should be referred to the Land-use and Conservation Planning team at CapeNature for comment. • Degraded areas included in the land parcel, but not the land-use proposal, should be restored to natural ecosystem functioning where possible. • Alien clearing should be given high priority.

Map category	Desired management objective	General guidelines	Specific guidelines
Critical Biodiversity Area 1: Aquatic	Maintain in a natural or near-natural state, with no further loss of natural habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity sensitive land-uses are appropriate.	• Freshwater CBAs should be maintained in good ecological condition, and those that are degraded should be rehabilitated to a good condition. • Land-use practices or activities that will lead to deterioration in the current condition of a freshwater CBA, or that will compromise rehabilitation, are not acceptable. • Any proposed land-use change must be subject to an EIA as it is likely to impact on the ecological drivers of the river or wetland ecosystem and potentially alter its functioning or lead to loss of species. • The hydrological regime and water quality of a river, wetland or estuary must be adequate to maintain the ecosystem in a desired or attainable condition. • Maintain the riparian vegetation and a buffer from other land-uses along watercourses and implement rehabilitation measures where there is erosion or other degradation present.	• There is no flexibility in land-use options in this category. • Any activities that may impact on CBA rivers, wetlands, or estuaries, even upstream or in sub-catchments, need to be avoided, or impacts mitigated if they cannot be avoided. • If the current ecological condition is good (either natural and unmodified, or largely natural with only small change in habitats and biota), then this condition needs to be maintained. • If the current ecological condition is fair to poor (i.e., moderately to severely degraded with significant loss of natural habitat, biota and ecosystem functions), then this needs to be improved through rehabilitation measures. Any further loss of area or ecological condition must be avoided. • Allow for future rehabilitation or restoration. • Specialist studies by a freshwater ecologist should be conducted if there is a watercourse that is likely to be affected.
Critical Biodiversity Area (Degraded)	Maintain in a functional, natural, or near-natural state, with no further loss of natural habitat. These areas should be rehabilitated.	• Acceptable land-uses are those that are least harmful to biodiversity, such as conservation management, or extensive livestock or game farming. Large-scale cultivation, mining and urban or industrial development are not appropriate.	• If small-scale land-use change is unavoidable, it must be located and designed to be as low impact and biodiversity sensitive as possible. • A specialist study must be part of the scoping and EIA process for all land-use applications in these areas, using the services of an experienced and locally knowledgeable biodiversity expert registered with SACNASP. • Should be targeted as high priority areas for rehabilitation and restoration.

ESAs are not essential for meeting biodiversity targets but play an important role in supporting the ecological functioning of CBAs and deliver important ecosystem services. ESAs facilitate landscape connectivity, promote resilience to the effects of climate change, and buffer elements of the landscape including protected areas and sites that are important for the survival of individual species.

TABLE 4.2 *Land-use guidelines for Ecological Support Areas, Other Natural Areas and No Natural Remaining.*

Map category	General guidelines	Specific Guidelines
ESA: Foredune	Maintain in a functional, near-natural state.	• No construction (or other unnatural disturbance) should be allowed in sand movement corridors, on foredunes or in mobile dune fields. All infrastructure should be placed inland of the secondary dunes, within the coastal management lines determined by DEA&DP or the Municipality or as contained in any current Coastal Management Plans. • Locate infrastructure and buildings to avoid damage from coastal processes and, where possible, to avoid the need for physical defences against potential damage resulting from natural coastal processes. • Municipal planning decisions should include phased retreat of infrastructure along the coast, where possible. • Access to the beach should be regulated by establishing designated access points and zonation of certain activities e.g., 4x4 driving. • Avoid stabilisation (e.g., planting) of naturally mobile dune systems as far as possible, unless there is a threat to property in which case it should be in accordance with a NEMA authorisation.
ESA: Forest	Maintain in a functional, near-natural state.	• Unplanned fires must be prevented. • Prioritise alien clearing. • Regulate harvesting of forest resources. • Avoid modification for development.
ESA: Climate Change Adaptation Corridor	Maintain ecological functionality in support of biodiversity connectivity by retaining the existing natural vegetation cover in a healthy ecological state and restore critical linkages where necessary.	• Restoration of corridors is important to maintain continuity of functional habitat. • The impact of land-use proposals on the functionality of ecological corridors must be assessed by a relevant biodiversity specialist for development applications. • Impenetrable fences that restrict animal movement should be discouraged.

ESA: Coastal Resource Protection	Maintain in a functional, near-natural state.	• Coastal Management Lines must be determined and adhered to. From an ecological perspective, the delineation of coastal management lines needs to consider, as a minimum:
		  • the need to protect infrastructure from coastal processes by allowing for absorption of the impacts of severe storm sequences, shoreline movement, global sea level rise and increased storm surges, the fluctuation of natural coastal processes, and any combination of these factors.
		  • the ecological requirements for maintaining biodiversity pattern and ecosystem processes, in combination with factors such as landscape, seascape, visual amenity, indigenous and cultural heritage, public access, recreation, and safety to lives and property.
		  • the need to treat the coast as an indivisible system.

TABLE 4.2 *Land-use guidelines for Ecological Support Areas, Other Natural Areas and No Natural Remaining continued.*

Map category	General guidelines	Specific Guidelines
ESA: Endangered Ecosystem	Maintain in a functional, near-natural state.	• Ideally these areas should be avoided for any activity resulting in habitat loss. If they cannot be avoided, it must be shown that the mitigation hierarchy has been applied. A biodiversity offset may be applicable in certain cases.

ESA: River	Maintain in a functional, near-natural state.	• The hydrological regime and water quality of a river, wetland or open waterbody must be adequate to maintain the ecosystem in a desired or attainable condition.
		• All aquatic ecosystems must be appropriately buffered. Buffers must be provided for, such that they:
		  • are adequate for the protection of the ecosystem from the pressures identified above.
		  • maintain the ecosystem in a desired or attainable ecological condition.
		  • allow for future rehabilitation or restoration.
		• Human activities that will impact directly (e.g., encroachment) or indirectly (e.g., diffuse pollution) on a river, wetland, or open waterbody, and/or its buffer, must be assessed by a suitably qualified and experienced specialist, and the ecosystems ground-truthed as part of any land-use change application, environmental assessment, or licencing process.

ESA: Estuary	Maintain in a functional, near-natural state.	• Maintain freshwater flow regimes that are as close to natural as possible; it is of the utmost importance to maintain low (dry season) flows, seasonality, and flood frequency. • Maintain the minimum freshwater flows (i.e., the Ecological Reserve) required for maintenance of estuary health and protection of estuarine biodiversity. • Maintain and monitor water quality, particularly the quality of freshwater inputs. • Maintain mouth dynamics (opening and closure) that are as close to natural as possible. Any form of artificial mouth management should form part of the holistic estuary management plan. • Ensure that harvesting or utilisation of living estuarine resources (flora and fauna) is kept within sustainable limits.
ESA: Wetland	Maintain in a functional, near-natural state.	• All wetlands are protected in terms of the National Water Act (Act 36 of 1998). • Delineate all wetlands within 500m of a land-use activity as per DWAF (2008) and apply for a Water Use Licence. • Conduct a buffer determination assessment around all wetlands, regardless of ecological condition or ecosystem threat status. Refer to the NFEPA Implementation Manual (Diver *et al.,* 2011) for specific guidelines.

TABLE 4.2 *Land-use guidelines for Ecological Support Areas, Other Natural Areas and No Natural Remaining continued.*

Map category	General guidelines	Specific Guidelines

ESA: Watercourse Protection	Maintain in a functional, near-natural state.	• All aquatic ecosystems must be appropriately buffered. Buffers must be provided for, such that they:
		  • are adequate for the protection of the ecosystem from the pressures identified above.
		  • maintain the ecosystem in a desired or attainable ecological condition.
		  • Activities which result in hardening should be limited and use of chemicals such as pesticides and herbicides should be avoided; and
		  • allow for future rehabilitation or restoration.

ESA: Water Source Protection	Maintain in a functional, near-natural state.	• Any land-use activity in Mountain Catchment Areas should allow for the continued provision and natural slow release of water flowing into river catchments. Hard surfaces should not be permitted and should be restricted to essential infrastructure to support catchment areas. • Mining places the delivery of good quality water in adequate quantities at risk, mining should not be permitted in water source areas especially Strategic Water Source Areas (SWSAs). • These areas should be targeted for rehabilitation and restoration activities that support the release of water, in particular clearing of invasive alien trees and remediation of erosion. The clearing of invasive alien plants from drainage lines and wetlands within these areas must be a provincial priority. • Substantial buffers should be established around streams and wetlands in catchments within these areas. • Cultivation should not be permitted in these areas.
ESA: Water Recharge Protection	Maintain in a functional, near-natural state.	• These areas need to be managed to ensure no further deterioration of the sub-catchment in which they are located. • Flow rates in streams should be maintained by managing land-use practices, especially agriculture to ensure that most of the catchment remains in a natural state. • Hardened surfaces within water recharge protection areas must be minimised. Stormwater management plans must be in place to manage run-off from any developments to ensure that groundwater resources are not compromised. • Activities which result in the pollution or contamination of groundwater must be prevented. • Extraction of groundwater resources must be closely monitored and controlled by the competent authority.
Ecological Support Area 2	Restore and/or manage to minimise impact on ecological infrastructure functioning; especially soil and water-related services.	• These are areas which may already have some form of development (cultivation, mining or even buildings and infrastructure) but which should be providing ecosystem services. Where possible the current land-uses should be withdrawn, and rehabilitation undertaken. • Best practice should apply in areas where land-uses other than conservation is present e.g., agriculture. • These areas should be targeted for habitat rehabilitation and restoration activities e.g., alien clearing.

TABLE 4.2 *Land-use guidelines for Ecological Support Areas, Other Natural Areas and No Natural Remaining continued.*

Map category	General guidelines	Specific Guidelines
Ecological Support Area: Species Specific Overlay	Maintain current land-use or rehabilitate to a natural condition	• These areas could be in a natural or degraded condition but play an important role in providing habitat for certain species. • Activities that result in loss of habitat should not be permitted, only in some instances it may be permissible to replace habitat through rehabilitation or offsets, but this will depend on the species impacted.
Other Natural Areas	Minimise habitat and species loss and ensure ecosystem functionality through strategic landscape planning. Offers flexibility in permissible land-uses, but some authorisation may still be required for high-impact land-uses.	• These areas have the greatest flexibility in terms of management objectives and acceptable land-uses. • Where possible, avoid modifying any remaining natural habitat by locating land-uses, including cultivation and plantations, in already-modified areas. • Note: These areas may still contain species of conservation concern but either have not yet been surveyed, or the data was not available for incorporation into the WC BSP. The presence or absence of species of conservation concern should always be established through site visits before proceeding with a land-use change. Recommendations of an appropriately qualified specialist must be followed in this regard.
No Natural Remaining	Manage land-use in a biodiversity-friendly manner, aiming to maximise ecological functionality. In old lands, stabilise ecosystems and manage them to restore ecological functionality, particularly soil carbon and water-related functionality, using indigenous plant cover.	• Areas with no natural habitat remaining are preferred sites for higher-impact land-uses, and new projects should be in these areas before modifying any remaining natural habitat. • Restoration and re-vegetation should be prioritised where heavily modified areas occur close to land of high biodiversity value or are located such that they could potentially serve useful ecological connectivity functions (such as in ecological corridors). • For individual parcels of land identified as having specific actual or potential biodiversity values, develop incentives to restore lost biodiversity and connectivity. • When locating land-uses in these modified areas, consider the off-site impacts they may have on neighbouring areas of natural habitat, especially if these are of high biodiversity value. For example, controlling use of pesticides in modified areas because of pesticide drift.

4.3 Using the Biodiversity Spatial Plan in developing Integrated Development Plans and Spatial Development Frameworks

The Environmental Sector Plan of the IDP comprises projects or programmes that aim to achieve environmental sustainability. These can be mechanisms or tools for ensuring the protection of CBAs and ESAs. The WC BSP Map should form the spatial focus for biodiversity protection projects of all Environmental Sector Plans in the Western Cape, to be identified in Integrated Development Plans (IDPs). Projects related to the safeguarding or restoring of biodiversity should be in CBAs and ESAs. In this way, the WC BSP Map enables the identification of IDP projects and supports local economic development and poverty alleviation, while promoting sustainable economic growth.

The Western Cape Province and municipalities are obliged in terms of SPLUMA and LUPA to develop maps and associated reports, termed Spatial Development Frameworks (SDFs), which indicate desired patterns of land-use and provide strategic guidance for the location and type of development. According to the Western Cape Provincial Spatial Development Framework, local SDFs should divide the entire landscape into spatial planning categories "to reflect a vision of how the area should develop spatially, so as to ensure sustainability". The SDF also provides policies, management objectives and guidance for appropriate land-use within each Spatial Planning Category. Table 4.3 shows the WC BSP Map categories and the recommended corresponding spatial planning category.

e-links
Western Cape Provincial Spatial Development Framework (WC PSDF)

TABLE 4.3 *Categories on the Biodiversity Spatial Plan Map and their recommended corresponding Spatial Planning Category.*

WC BSP Category Spatial Planning Category	Protected Areas	CBA 1	CBA 2	ESA 1	ESA 2	ONA	NNR
Core 1							
Core 2							
Buffer 1							
Buffer 2							
Intensive Agriculture							
Settlement							
Industry & Existing Mining							

From a biodiversity perspective, Spatial Planning Categories indicate areas where limitations on land-use need to be applied to protect biodiversity. The two spatial planning categories most relevant to biodiversity conservation and the WC BSP Map are those referred to as "Core" and "Buffer".

The "Core" includes areas that are currently protected as well as areas that need protection because they are important areas for biodiversity, i.e., CBAs. Within the province, we can achieve consistency in mainstreaming biodiversity into municipal spatial products, by aligning the WC BSP Map categories with the Spatial Planning Categories as recommended in Table 4.3.

4.4 Land-use guidelines within land-use zones used in spatial planning.

The land-use planning framework legislation in the form of SPLUMA and LUPA require of municipalities to have single zoning schemes for their entire area of jurisdiction. The content of the zoning scheme in respect of zonings and land-uses is a municipal competency. As a result, the zoning schemes for the different municipal areas may differ in respect of zonings and permissible land-uses. LUPA provides for minimum norms and standards for effective municipal development management and therefore the Western Cape Government drafted a provincial standard zoning scheme to guide municipalities in the drafting of their own municipal by-law on the zoning scheme.

A zoning scheme consists of zoning scheme regulations, a map, and a register. This scheme describes zones in which various land-uses are either allowed or prohibited on certain portions of land, regulated through a permitting system. To simplify the integration of the biodiversity classes, land-uses were clustered into seven categories which should cover all potential zoning schemes adopted by each municipality. As far as possible, the WC BSP Map categories have been integrated with the existing zoning definitions used in other planning schemes as indicated in Table 4.4(a) and (b) and Table 4.5, which should be used in conjunction with each other. This aims to support representation of biodiversity priorities in existing spatial planning systems.

TABLE 4.4 *Biodiversity Priority Areas Categories with Desired Management Objectives.*

LAND-USE CATEGORIES	
LAND-USE SUB-CATEGORIES (REFER TO TABLE 4.5 FOR DESCRIPTIONS)	
MAP CATEGORY	**DESIRED MANAGEMENT OBJECTIVE**
Protected Area	Must be kept in a natural state, with a management plan focused on maintaining or improving the state of biodiversity.
Critical Biodiversity Area 1	Keep natural, with no further loss of habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land-uses are appropriate.
Critical Biodiversity Area 2	Keep natural, with no further loss of habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land-uses are appropriate.
Ecological Support Area 1: Terrestrial	Maintain in a functional, near-natural state. Some habitat loss is acceptable, provided the underlying biodiversity objectives and ecological functioning are not compromised.
Ecological Support Area 1: Aquatic	Maintain in a functional, near-natural state. Some habitat loss is acceptable, provided the underlying biodiversity objectives and ecological functioning are not compromised.
Ecological Support Area 2	Restore and/or manage to minimise impact on ecological infrastructure functioning; especially soil and water-related services.
Ecological Support Area: Species Specific Overlay	Maintain current land-use or rehabilitate to a natural state.
ONA: Natural to Near-Natural	Minimise habitat and species loss and ensure ecosystem functionality through strategic landscape planning. Offers flexibility in permissible land-uses, but some authorisation may still be required for high-impact land-uses.
ONA: Degraded	Minimise habitat and species loss and ensure ecosystem functionality through strategic landscape planning. Offers flexibility in permissible land-uses, but some authorisation may still be required for high-impact land-uses.
NNR: No Natural Remaining	These areas are suitable for development but may still provide limited biodiversity and ecological infrastructure functions and should be managed in a way that minimises impacts on biodiversity and ecological infrastructure.

Conservation		Agriculture		Tourism and Recreational Facilities		Rural Accommodation		Urban		Business & Industrial						Infrastructure Installations		
Proclaimed Protected Areas	Conservation Areas	Intensive Agriculture	Extensive Agriculture	Low Impact Facilities	High Impact Facilities	Agri-worker Accommodation	Smallholdings	Community Facilities & Institutions	New Settlements	Rural Business	Non-place-bound Industry (low-moderate impact)	Non-place-bound Industry (high impact)	Renewable Energy	Extractive Industry (incl. Prospecting)	Linear - roads and rail	Linear - pipelines & canals	Linear - powerlines	Other Utilities
Y = Yes: Permissible land-uses that are unlikely to compromise the biodiversity objective						**R = Restricted:** Land-uses that may com- promise the biodiversity objective and are only permissible under certain conditions (refer to Table 4.7 for conditions)						**N = No:** Land-uses that will compromise the biodiversity objective and are not permissible						
Land-use within proclaimed protected areas are subject to a management plan drawn up for that specific protected area.																		
Y	Y	N	R	N	N	N	N	N	N	N	N	N	N	N	N	N	R	N
Y	Y	N	R	R	N	N	N	N	N	N	N	N	N	N	R	R	R	N
Y	Y	N	R	R	N	N	N	N	N	R	R	N	R	N	R	R	R	R
Y	Y	N	R	R	N	N	N	N	N	N	N	N	N	N	R	R	R	N
Y	Y	N	R	R	N	N	R	N	N	N	N	N	R	N	R	R	R	R
R	Y	R	R	R	N	R	R	R	R	N	R	R	N	R	N	R	R	R
Y	Y	R	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
R	R	R	Y	Y	R	R	Y	R	R	R	R	R	R	R	Y	Y	Y	Y
R	R	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

TABLE 4.5 *Land-use Activity Descriptions and Biodiversity-related Conditions/Controls.*

1. Conservation	Subject to stringent controls, the following biodiversity-compatible land-use activities (i.e., those of very low impact) may be accommodated in conservation areas: **1a) Conservation management activities** such as the clearing of invasive alien species, research, and environmental education. **1b) Low intensity ecotourism activities** such as recreation and tourism (e.g., hiking trails, bird and game watching, and small-scale, eco-friendly visitor overnight accommodation) with limited access points**.** **1c) Sustainable consumptive activities** according to the relevant policy: Small-scale harvesting of natural resources **Assumes the following conditions/controls:** • These land-uses are limited to very low modification levels for infrastructure development. If existing infrastructure already exists, this should be used. Alternatively modified areas should be utilised. • Environmental Management Programmes and/or Standard Operating Procedures/Guidelines are put in place for any development or activity. • The entire property or a part thereof (depending on the land-use activity above) is under some form of conservation agreement or mechanism.
2. Agriculture	This category includes all forms of agriculture as described below. **2.a) Intensive agriculture, including:** • All areas of High Potential and Unique Agricultural Land, together with areas of lower agricultural potential where agricultural practices may themselves contribute to the character of the environment, the agricultural working landscape, or the local economy. • **Forestry or Timber Plantations (timber production)** **Includes:** all timber plantations. **Assumes the following practices:** monoculture of alien timber species with heavy impact on hydrology and soil erosion and introduction and spread of a variety of aggressive alien invasive plants. • **Irrigated Crop Cultivation** **Includes:** all irrigated crops (vegetables) and irrigated tree crops (orchards and vineyards) **Assumes the following practices:** intensive production activity with high nutrient and agro-chemical inputs and often two crops per year (but even just ploughing, with no chemicals etc., results in irreversible loss of natural habitat). • **Dryland Crop Cultivation** **Includes:** all tillage cultivation of non-irrigated crops, mostly single-season annuals, but including perennial and orchard-type tree crops if cultivated with an indigenous grass layer. **Assumes the following practices:** crop production methods that conserve water and protect against soil erosion, limited and responsible use of fertilisers, pesticides and other agrochemicals and genetically modified organisms. Therefore, potentially lower impact than other kinds of cultivation on water resources but will also result in irreversible loss of biodiversity. • **Space extensive agricultural enterprises (e.g., intensive feed-lots, poultry battery houses)** **Includes:** all intensive animal production systems, that are dependent primarily on imported foodstuffs and confinement; includes dairy farming and all areas in production support for dairy, including pastures, fodder, and grain crops, much of which is usually irrigated. **Assumes the following practices:** To be near regional routes (including rail) to facilitate product and requisite movement and supply. **2.b) Extensive agriculture, including extensive livestock or game farming.** **Includes:** livestock or game production and related tourism activities on extensive land portions of natural land cover. **Assumes the following practices:** Private game reserves to be officially protected through various mechanisms (e.g., NEM: PAA or other conservation agreements), with strict limits on the level of development considered acceptable for lodge and other accommodation infrastructure; application of minimum size criteria for economic sustainability as are applied to rangeland livestock farming; strictly limited development for revenue generating purposes such as intensified tourism or sectional ownership. Stringent management conditions apply, such as – • Faunal specialist to undertake carrying capacity study for game reserves/production. • Ensure riparian and wetland buffer areas are protected. • Strict adherence to stocking rates for extensive agriculture. • For game reserves, indigenous species only to be stocked. • Environmental Management Plan, including fire management measures, if necessary. Infrastructure to be limited and preferably within disturbed/modified areas or in existing buildings.

TABLE 4.5 *Land-use Activity Descriptions and Biodiversity-related Conditions/Controls Continued.*

3. Tourism and Recreational Facilities	Includes a broad range of rural tourist and recreational facilities in support of sustainable rural tourism and rural businesses and comprises of the following: **3.a) Low Impact Facilities** **Includes:** Small-scale tourist facilities (e.g., lecture rooms, restrooms, restaurants, gift shops), farm rental units, camp sites, outdoor recreation **Assumes the following conditions/controls:** • Rural tourist and recreational activities and facilities to be linked to a unique natural setting or feature. • Location of infrastructure either within disturbed/modified areas and existing buildings, where possible. **3.b) High Impact Facilities:** **Includes:** Golf courses, golf estates, polo fields, polo estates, hotels and resorts and other establishments allowing sleepover of more than 15 people. **Assumes the following conditions/controls:** • All forms of holiday accommodation are encouraged within existing structures or on existing disturbed or modified areas and within proximity to existing infrastructure (e.g., roads and electricity). The form and scale of facilities should be aligned with the character, quality, and environmental sensitivity of the rural landscape. Certain norms (e.g., number of guesthouses or B&B per farm) must be applied, as per the Western Cape Rural Land-use Planning and Management Guidelines. • No large-scale recreational developments including a residential component to be located in close proximity to, and outside of, the urban edge as this may lead to their longer-term inclusion inside the urban edge. • Development outside of ecologically sensitive areas and high-risk areas e.g., riverbeds and their riparian zones, wetlands and their natural buffers, flood-lines and outside of CBAs and priority landscape or ecological corridors.
4. Rural Accommodation	**4.a) Agri-worker accommodation** **Includes:** Residences for farm workers and retirees "on-farm" i.e., where housing is available to farm workers who currently live on the farm and will be living there in future, either due to personal preference or because circumstances require it (e.g., working hours etc.). Does not refer to the use of farmworker accommodation for the use of tourism or second homes. **Assumes the following conditions/controls:** • Fragmentation of agricultural landscape and land for agricultural purposes is not being threatened by the "urbanization" of rural areas. • 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. • **4.b) Smallholdings** **Includes:** Smaller agricultural properties which may be used for agriculture but may also be occupied as places of residence by people who seek a rural lifestyle, and usually includes agriculture, dwelling house, home occupation. **Assumes the following conditions/controls:** • New smallholding developments for rural lifestyles to be restricted to inside the medium to long term urban edge. • Bona-fide small-scale agricultural properties (e.g., agricultural allotments) should be located outside the urban edge within areas of intensive agriculture. • A 'lifestyle' smallholding unit size of between 4 000 m^2 and five ha is recommended inside the urban edge, with consideration to subsequent subdivision as part of the urban growth frontier. The rural landscape character of the area should be considered in determining the appropriate unit size. A minimum agricultural holding size of 8000 m^2 is recommended for small-scale agricultural properties within the Agriculture Spatial Planning Category. Compilation of a Management Plan for new and existing smallholding areas.

TABLE 4.5 *Land-use Activity Descriptions and Biodiversity-related Conditions/Controls Continued.*

5. Urban	**5.a) Existing settlements and urban expansion** **Includes:** Metropolitan areas, cities, larger towns, small towns, villages, and hamlets. **Assumes the following conditions/controls:** • The delineation process is guided by the provincial urban edge guideline document and is informed by the WC BSP to delineate a boundary of the urban edge and urban sprawl is prevented. • The promotion of compact urban settlements, whilst maintaining an open space system (where possible) that is informed by a fine-scale biodiversity plan or map. **5.b) Community Facilities and Institutions** **Includes:** Hospitals, clinics, schools, churches, police stations, fire stations, community halls or other gathering places. **Assumes the following conditions/controls:** • Facilities located within existing towns and rural settlements; in proximity to a settlement or located on a regional route, outside of environmentally sensitive areas e.g., flood-lines, river and wetland buffers and Special Habitats. • Location of facilities to target disturbed areas and areas of low agricultural potential to avoid fragmentation. **5.c) New settlements** that will service isolated farming areas, rural mines, and rural significant infrastructural developments (e.g., power plants) **Assumes the following conditions/controls:** New settlements located in the rural area when necessitated by unique circumstances (e.g., servicing of isolated large infrastructural projects outside the servicing sphere of existing settlements) or to proclaim the urban component of existing rural church, forestry, or conservation settlements (i.e., modification of rural areas).
6. Business and Industrial	**6.a) Rural business** **Includes:** Farm stalls and farm shops, restaurants/taverns and venue facilities (e.g. conference/ wedding); agricultural co-operative, filling station/petro-port, tourist retail outlet, plant nursery, tourism office, boarding kennels. **Assumes the following conditions/controls:** • Farm stall restricted to selling products produced and processed on the farm. • Restaurant, tavern and venue facility located within the farmstead precinct. • Non-place-bound business located in and peripheral to rural settlements, outside of environmentally sensitive areas i.e. CBA and ESA. • Location of infrastructure either within disturbed/modified areas and existing buildings. **6.b) Non-place-bound industry** **Includes:** Examples include (but are not limited to) manufacturing of agricultural requisites (such as pallet making, bottle labelling), processing of regionally sourced products (such as fruit cannery, abattoir and meat processing plant), transport contractors, dairy depots, builders' yards and processing rural sources material (e.g. pottery manufacturing from kaolin). Examples of high impact industries include fish processing, paper manufacturing, mineral processing, oil refineries and power plants. **Assumes the following conditions:** • All non-place-bound industry (i.e. rural industry and service trades) to be located in and peripheral to existing settlements outside of environmentally sensitive areas e.g. CBAs and ESAs. • Appropriate buffers are allowed for between industrial developments and environmentally sensitive areas (especially for high impact industries). **6.c) Extractive Industry which is place-bound** **Includes:** Quarrying and mining and secondary beneficiation. Also takes into consideration visual, physical and chemical aspects of these activities, mine waste and refuse dumps, urban waste sites and landfill sites. **Assumes the following conditions:** Extractive industry to be located at the mineral source within the rural area and informed by environmental considerations (should be located outside of environmentally sensitive areas) and post-mining rehabilitation. Detailed Environmental Management Programme which considers not only on-site impacts but impacts on surrounding area and cumulative impacts. **6.d) Renewable Energy Facilities** **Includes:** Wind and solar energy facilities (farms), large-scale hydroelectricity production. **Assumes the following conditions:** • Facilities located within rural areas are located close to existing urban settlements and can be connected relatively easily to the existing power-grid. • Facilities to be placed outside of Protected Areas and CBAs and should be placed in previously modified areas. Every attempt should be made to avoid ESAs as well but if shown to be essential, the facility must maintain the features and ecological processes as identified in the BSP reasons for the site and vegetation clearing should be kept to a minimum.

TABLE 4.5 *Land-use Activity Descriptions and Biodiversity-related Conditions/Controls Continued.*

7. Infrastructure Installations	This category includes transport and service infrastructure servicing both urban and rural areas. **7.a) Linear infrastructure** **Includes:** Roads, railways, pipelines, canals, bulk water transfer schemes. **7.b) Other utilities** **Includes:** Wastewater treatment works, water purification plants, reservoirs, dams, communication base stations, power stations, renewable energy facilities. **Assumes the following conditions for both categories:** • Installations to be located on modified, disturbed or low-value agricultural land, where possible. • Infrastructure installations requiring a location outside the urban edge is restricted to extensive agricultural areas peripheral to settlements in close proximity to regional routes to facilitate access and restrict fragmentation of the agricultural landscape and natural areas. • Avoidance of sensitive areas such as flood lines, river and wetland buffers and special habitats. • All water abstraction and transfer developments should be subject to the Ecological Reserve in terms of the National Water Act.

4.5 Using the Biodiversity Spatial Plan in Environmental Assessments

Environmental assessments are used to determine the broad 'environmental fit', and ecological sustainability of proposed land-use changes. They also establish the biodiversity context within which a change in land-use is being contemplated, and against which likely impacts (both site-based and cumulative) must be assessed. The WC BSP Map and associated land-use guidelines provide a scientific basis for assessing the potential impacts of proposed land-uses and play an important role in providing a biodiversity sensitive perspective in this process.

Pre-application biodiversity screening refers to "the process of conducting a desktop assessment to determine if a land-use change application, immaterial of its intent, could have an impact on identified Biodiversity Priority Areas." This upfront reference to systematic biodiversity plans indicates whether habitat modification in a particular place will contribute to cumulative impacts by reducing the chances of meeting biodiversity targets for specific ecosystems or species, or by contributing to habitat fragmentation and degradation of ecological processes.

Pre-application biodiversity screening can:

- Show the decision-making authority that potential conflict between biodiversity priorities and other land-uses has been identified and resolved by well-informed project planning.
- Allow the proponent to take an informed decision about the biodiversity (and administrative and, by implication, financial) risks of proceeding with a particular project.
- Identify the scope, type and intensity of environmental assessment that is likely to be required if an application were to proceed.
- Ensure that a project is consistent with the 'Duty of Care' principle as defined in the National Environmental Management Act No. 107 of 1988 (i.e., that the project proponent has taken reasonable measures to prevent significant degradation of the environment).
- Emphasise the fundamental role of alternatives in selecting the best practicable environmental option.
- Ensure that environmental management protects sensitive, vulnerable, highly dynamic, or stressed ecosystems.
- Allow the proponent to design a development proposal taking into consideration the environmental constraints.

In most situations, a full investigation into the biodiversity importance of a site is only triggered when a 'listed activity' in terms of NEMA is proposed, and circumstances therefore warrant specialist investigation. The WC BSP Map can serve as an early warning signal that a biodiversity assessment needs to be undertaken prior to any decision about a proposed change in land-use.

There are several examples of pro forma terms of reference or guidelines for dealing with biodiversity in environmental assessment and planning. These are listed in the document for which the link is provided below:

e-links

Land-Use Planning & Development Applications

Planning to avoid, minimise and remedy impacts on biodiversity involves three key actions, after conducting a site visit with biodiversity specialists (if required) during the appropriate season/s:

a) Compare ground-truthed land cover with that depicted on the WC BSP Map

Apparent mismatches between mapped land cover and observed biodiversity features need to be recorded in a site assessment report and further planning should proceed according to the ground-truthed biodiversity attributes of the site. In cases where degraded or even cultivated land has been included in CBAs or ESAs, the reasons behind the classification should be carefully interrogated and any changes in land-use should be consistent with the desired management objective of the area.

Mismatches in land cover on the ground and in the WC BSP, Map do not mean that an area is or is not a CBA or ESA. This can only be determined by running the systematic conservation planning process. However, it is very important for these discrepancies to be recorded and reported to CapeNature for input to plans.

b) Compare mapped CBA or ESA features with those ground truthed.

It is important to verify the WC BSP Map by comparing it with observed biodiversity and/or environmental conditions. In particular, the location and ecosystem status of CBA wetlands and the functionality of landscape- level corridors may require field verification. Any variance between biophysical features, and what is depicted on the map, needs to be recorded and reported to CapeNature.

c) Identify compromises and solutions that minimise impacts on biodiversity and conflicts in land-use.

Identify the best environmental options for avoiding loss of biodiversity and disturbance to ecosystems, especially in CBAs, by applying the mitigation hierarchy and the land-use guidelines recommended in Section 4.2. In particular:

- Maximise connectivity in CBAs and ESAs, the retention of intact natural habitat and avoid fragmentation: Design project layouts and select locations that minimise loss and fragmentation of remaining natural habitat, and maintain spatial components of ecological processes, especially in ecological corridors, buffers around rivers and wetlands, CBAs, and ESAs. Activities that are proposed for CBAs must be consistent with the desired management objectives for these features and should not result in fragmentation.
- Minimise unavoidable impacts: Reduce the impact of the project footprint on biodiversity pattern and ecological processes.
- Take opportunities to conserve biodiversity: Set aside part of the land at the proposed land-use site, or another site of equivalent or greater biodiversity significance, to be managed for conservation purposes.
- Remedy habitat degradation and fragmentation through rehabilitation: Aim to reinstate pre-disturbance ecosystem composition, structure, and functioning, especially in threatened ecosystems, CBAs and ESAs. Site-specific conservation measures may include contributing areas of natural habitat for the consolidation of corridor networks.
- Promote long-term persistence of taxa of conservation concern: Guidelines for promoting long-term persistence of taxa of conservation concern found at proposed development sites are provided in Appendix 1. The recommendations differ depending on the threat status of the taxa.

When pre-application project planning has exhausted the preceding steps, and significant impacts on biodiversity cannot be avoided, minimised, or remedied, the EIA practitioner should advise the proponent that:

In Critical Biodiversity Areas and Ecological Support Areas:

- Any irreversible loss of habitat would be highly undesirable.
- These biodiversity features must be treated as red flags or even disqualifiers (Fatal Flaws).
- It is necessary to proceed with extreme caution, and with likely delays and higher costs.
- A SACNASP registered biodiversity specialist, with detailed terms of reference should be appointed early in the process so they have opportunity to assist with design or layout of the development and to conduct their surveys in the appropriate season.
- Use of any non-CBA or -ESA alternative sites would be highly desirable.
- Restoration and maintenance of ecological processes will be necessary.

- Regardless of the WC BSP map category, recommendations for project design and implementation should set out explicitly how the WC BSP Map – and, generally, biodiversity pattern (species of conservation concern) and ecological processes – have been considered. For example, through:
    - Determining the least damaging configurations/layouts of the proposed development and its accompanying infrastructure.
    - Reducing the overall number of units to relieve pressure on natural habitat and ecological processes.
    - Concentrating disturbance footprint in degraded or heavily modified areas that have little viability for natural regeneration or restoration of indigenous vegetation.
    - Taking advantage of opportunities to integrate in situ biodiversity conservation and management with the overall design and operation of the proposed land-use development.

4.6 Using the Biodiversity Spatial Plan in Biodiversity Offsets

Biodiversity offsets are conservation activities intended to compensate for the residual, unavoidable harm to biodiversity caused by development projects. The process should preferably involve setting aside land for conservation in the same or similar habitat elsewhere, at the cost of the developer.

Biodiversity offset receiving areas are areas in the landscape that are selected and conserved to compensate for the unavoidable, residual negative impacts on biodiversity of the proposed development. They should be of greater or equal importance to the habitat and/or species which are being impacted on or being lost.

Critical Biodiversity Areas are considered ideal biodiversity offset receiving areas. CapeNature and/or SANParks officials should be consulted when determining if a biodiversity offset will be required and if the proposed offset receiving area is suitable. Biodiversity offsets will most often need to be considered when a development impacts on a CBA, particularly if the habitat is Endangered. Ideally no further loss of Critically Endangered habitat should occur, but biodiversity offsets may be considered in exceptional circumstances.

e-links
National Biodiversity Offset Guideline

05

Acknowledgements
Definitions
References
Annexures

5.1 Acknowledgements

The revision and update of the Biodiversity Spatial Plan is a collaboration.

Feedback from Western Cape Local and District Municipalities and SALGA, received during the mainstreaming of the 2017 WC Biodiversity Spatial Plan, is gratefully acknowledged, and informed the revision and edits to the 2023 WC BSP.

CapeNature expresses thanks to its partners and collaborators for contributing to the development of the 2023 Western Cape Biodiversity Spatial Plan.

CapeNature also acknowledges the important roles of the editors and reviewers.

5.2 References

Ardron JA, Possingham HP & Klein CJ. 2010. Marxan Good Practices Handbook, Version 2. Pacific Marine Analysis and Research Association. Victoria, BC, Canada. 165 pages.

Cadman M. (ed). 2016. Ecosystem Guidelines for Environmental Assessment in the Western Cape, Edition 2. Cape Town: Fynbos Forum.

Dayaram A, Harris LR, Grobler BA, Van der Merwe S, Powrie L, Rebelo AG. 2019.Vegetation Map of South Africa, Lesotho, and Swaziland 2018:A description of changes since 2006. Bothalia 49(1), a2452., 11.

Day JH. 1980. What is an estuary? South African Journal of Science 76: 198.

Department of Environmental Affairs. 2008. National protected area expansion strategy for South Africa 2008. Government of South Africa, Pretoria. ISBN 978-1-919976-55-6.

Department of Environmental Affairs and Tourism. 2009. Guideline regarding the Determination of Bioregions and the Preparation of and Publication of Bioregional Plans. Government Gazette No. 32006. Published in terms of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004). Government Printer, Cape Town.

Department of Environmental Affairs (DEA), Department of Mineral Resources, Chamber of Mines, South African Mining and Biodiversity Forum, and South African National Biodiversity Institute. 2013. Mining and Biodiversity Guideline: Mainstreaming biodiversity into the mining sector. Pretoria.

Department of Environmental Affairs and Development Planning (DEA&DP). 2007. Provincial Guideline on Biodiversity Offsets. Provincial Government of the Western Cape, Cape Town.

Department of Environmental Affairs and Development Planning (DEA&DP). 2011. Information Document on Biodiversity Offsets. EIA Guideline and Information Document Series. Provincial Government of the Western Cape, Cape Town.

Department of Water Affairs and Forestry (DWAF). 2008. Updated Manual for the Identification and Delineation of Wetlands and Riparian Areas, prepared by M. Rountree, A. L. Batchelor, J. MacKenzie and D. Hoare. Draft Report. Stream Flow Reduction Activities, Department of Water Affairs and Forestry, Pretoria, South Africa.

Driver M, Raimondo D, Maze K, Pfab MF & Helme NA. 2009. Applications of the Red List for conservation practitioners. In: Raimondo D, Von Staden L, Foden W, Victor JE, Helme NA, Turner RC, Kamundi DA and Manyama PA (eds). Red List of South African Plants. Strelitzia 25: 41–52. South African National Biodiversity Institute, Pretoria.

Driver A, Nel JL, Snaddon K, Murray K, Roux DJ, Hill L, Swartz ER, Manual J & Funke N. 2011. Implementation Manual for Freshwater Ecosystem Priority Areas. WRC Report No. 1801/1/11. Water Research Commission.

Driver A, Sink KJ, Nel JL, Holness SH, Van Niekerk L, Daniels F, Jonas Z, Majiedt PA, Harris L & Maze K. 2012. National Biodiversity Assessment 2011: An assessment of South Africa's biodiversity and ecosystems. Synthesis report. South African National Biodiversity Institute & Department of Environmental Affairs, Pretoria.

Game ET & Grantham HS. 2008. Marxan user manual: for Marxan version 1.8. 10. St. Lucia, Queensland, Australia and Vancouver, British Columbia, Canada: University of Queensland and Pacific Marine Analysis and Research Association: 1–127.

GeoTerraImage (GTI). 2015. A Natural and Semi-Natural Land-Cover of the Western Cape Province (2013–2014): Data User Report and Metadata. March 2015, version 05b; Western Cape Government License. Pretoria.

Land-Cover of the Western Cape Province (2013–2014): Data User Report and Metadata. March 2015, version 05b; Western Cape Government License. Pretoria.

Gouws EJ, Malan D, Job N, Nieuwoudt H, Nel J, Dallas H & Bellingan T. 2012. Freshwater Ecosystems. Chapter 2. In: Turner AA (ed.) Western Cape Province State of Biodiversity 2012. CapeNature Scientific Services, Stellenbosch. ISBN: 978-0-621-41407-3.

Harris LR, Sink, K.J., Skowno, A.L. & Van Niekerk, L. (eds). 2019. *South African National Biodiversity Assessment 2018: Technical Report. Volume 5: Coast*. South African National Biodiversity Institute, Pretoria. http://hdl.handle.net/20.500.12143/6374

Holmes PM & Pugnalin A. 2016.The Biodiversity Network for the Cape Town Municipal Area: C-Plan and Marxan Analysis: 2016 Methods and Results. City of Cape Town, Environmental Resource Management Department.

IAIA. 2005. Biodiversity in Impact Assessment. IAIA Special Publication Series 3, Fargo, North Dakota.

Jack C, Van Aardenne L, Wolski P, Pinto I, Quagraine K & Kloppers P. 2022. SmartAgri: Updated Climate Change Trends and Projections for the Western Cape. Cape Town: University of Cape Town. Available at https://www.elsenburg.com/wp-content/uploads/2022/08/SmartAgri-Climate-Change.pdf

Jonas Z, Daniels F, Driver A, Malatji KN, Dlamini M, Malebu T, April V & Holness S. 2012. National Biodiversity Assessment 2011: Technical Report. Volume 1: Terrestrial Component. Pretoria: South African National Biodiversity Institute.

Jury MR. 2019. South Africa's future climate: trends and projections. The Geography of South Africa: Contemporary Changes and New Directions, pp.305-312.

Kirkwood D, Pence GQ & von Hase A. 2010 Western Cape Biodiversity Framework: Critical Biodiversity Areas and Ecological Support Areas of the Western Cape. A C.A.P.E. Land-use planning project. CapeNature Unpublished Project Report.

Le Maître DC, Seyler H, Holland M, Smith-Adao L, Nel JL, Maherry A & Witthüser K. 2018. Identification, delineation, and importance of the strategic water source areas of South Africa, Lesotho and Swaziland for surface water and groundwater. Report No.TT 743/1/18.Water Research Commission, Pretoria.

Lötter M & Le Maître D. (2021). Fine-scale delineation of Strategic Water Source Areas for surface water in South Africa using Empirical Bayesian Kriging Regression Prediction: Technical report. Pretoria: South African National Biodiversity Institute (SANBI).

Maree KS & Vromans DC. 2010b.The Biodiversity Sector Plan for the Saldanha Bay, Bergrivier, Cederberg and Matzikama Municipalities: Support and land-use planning and decision-making in Critical Biodiversity Areas and Ecological Support Areas. Produced by CapeNature as part of the C.A.P.E. Fine-scale Biodiversity Planning Project, Kirstenbosch.

Margules CR & Pressey RL. 2000. Systematic conservation planning. Nature 405.6783: 243–253.

Midgley GF, Hannah L, Millar D, Thuiller W & Booth A. 2002. Developing regional and species-level assessments of climate change impacts on biodiversity in the Cape Floristic Region. Biological Conservation 112: 87–97.

Rutherford MC, Mucina L & Powrie LW. 2006. Biomes and bioregions of southern Africa. The vegetation of South Africa, Lesotho, and Swaziland, 19, pp.30-51.

Nel JL, Murray KM, Maherry AM, Petersen CP, Roux DJ, Driver A, Hill L, Van Deventer H, Funke N, Swartz ER, Smith-Adao LB, Mbona N, Downsborough L & Nienaber S. 2011a.Technical Report: National Freshwater Ecosystem Priority Areas project. WRC Report No. 1801/2/11, WRC, Pretoria.

Nel JL & Driver A. 2012. National Biodiversity Assessment 2011: Technical Report. Volume 2: Freshwater Component. CSIR Report Number CSIR/NRE/ECO/IR/2012/0022/A. Council for Scientific and Industrial Research, Stellenbosch.

Nel J, Colvin C, Le Maître D, Smith J & Haines I. 2013. South Africa's strategic water source areas. CSIR: Stellenbosch, South Africa.

Pence GQK. 2009. Climate Adaptation Scenarios for the Cape Floristic Region: Technical Report. CapeNature Unpublished Report, Table Mountain Fund, World Wildlife Fund-South Africa, Cape Town.

Pence GQK. 2017. The Western Cape Biodiversity Spatial Plan: Technical Report. CapeNature Unpublished Report. Western Cape Nature Conservation Board (CapeNature), Cape Town.

Pence GQK. 2014. Western Cape Biodiversity Framework 2014 Status Update: Critical Biodiversity Areas of the Western Cape. CapeNature Unpublished CapeNature project report. Cape Town, South Africa.

Pfab MF, Victor JE & Armstrong AJ. 2011.Application of the IUCN Red Listing system to setting species targets for conservation planning purposes. Biodiversity and Conservation 20(5): 1001–1012.

Sink KJ, Holness S, Harris L, Majiedt PA, Atkinson L, Robinson T, Kirkman S, Hutchings L, Leslie R, Lamberth S, Kerwath S, Von der Heydon S, Lombard AT, Attwood CG, Branch G, Fairweather T, Taljaard S, Weerts S, Cowley P, Awad A, Halpern B, Grantham H & Wolf T. 2012. National Biodiversity Assessment 2011: Technical Report. Volume 4: Marine and Coastal Component. Pretoria: South African National Biodiversity Institute.

Skowno AL, Holness SD & Desmet P. 2009. Biodiversity Assessment of the Central Karoo District Municipality. Unpublished Report, Department of Environmental Affairs and Development Planning, Cape Town.

Skowno AL, Raimondo DC, Poole CJ, Fizzotti B & Slingsby JA. 2019. South African National Biodiversity Assessment 2018 Technical Report Volume 1: Terrestrial Realm. South African National Biodiversity Institute. Pretoria. Smith, R. J. 2004. Conservation land-use zoning (CLUZ) software. Durrell Institute of Conservation and Ecology, Canterbury, UK.

South African National Biodiversity Institute (SANBI). 2012.Vegetation Map of South Africa, Lesotho, and Swaziland (vector geospatial dataset).Available from the Biodiversity GIS website, downloaded on 14 December 2016.

South African National Biodiversity Institute (SANBI). 2015. Red List of South African Plants version 2015.1.

South African National Biodiversity Institute (SANBI). 2019. National Biodiversity Assessment 2018: The status of South Africa's ecosystems and biodiversity. Synthesis Report. South African National Biodiversity Institute, an entity of the Department of Environment, Forestry and Fisheries, Pretoria.

South African National Biodiversity Institute & Department of Forestry, Fisheries, and the Environment (2021) Red List of Terrestrial Ecosystems of South Africa June 2021 – version for public comments. South African National Biodiversity Institute. Pretoria, South Africa.

South African National Biodiversity Institute (SANBI). 2021. South Africa's Terrestrial Red List of Ecosystems (RLE): Technical report on the revision of the "List of terrestrial ecosystems that are threatened and in need of protection". Report 7639. South African National Biodiversity Institute, Pretoria, South Africa.

South African National Biodiversity Institute (SANBI). 2021. Draft Red List Assessments for South African Terrestrial Ecosystems (June 2021). Report 7664. South African National Biodiversity Institute, Pretoria, South Africa.

Turpie JK, Adams JB, Joubert A, Harrison TD, Colloty BM, Maree RC, Whitfield AK, Wooldridge TH, Lamberth SJ, Taljaard S & van Niekerk L. 2002. Assessment of the conservation priority status of South African estuaries for use in management and water allocation. WaterSA 28: 191–206.

Van Niekerk L & Turpie JK (eds.) 2012. South African National Biodiversity Assessment 2011: Technical Report. Volume 3: Estuary Component. CSIR Report Number CSIR/NRE/ECO/ ER/2011/0045/B. Council for Scientific and Industrial Research, Stellenbosch.

Van Niekerk L, Adams JB, Lamberth SJ, MacKay CF, Taljaard S, Turpie JK, Weerts SP & Raimondo DC. 2019 (eds). *South African National Biodiversity Assessment 2018: Technical Report. Volume 3: Estuarine Realm*. CSIR report number CSIR/SPLA/EM/EXP/2019/0062/A. South African National Biodiversity Institute, Pretoria. Report Number: SANBI/NAT/NBA2018/2019/Vol3/A. http://hdl.handle.net/20.500.12143/6373

Van Wilgen BW, Carruthers J, Cowling RM, Esler KJ, Forsyth AT, Gaertner M, Hoffman MT, Kruger FJ, Midgley GF, Palmer G, Pence GQK, Raimondo DC, Richardson DM, Van Wilgen NJ & Wilson JRU. 2016. Ecological research and conservation management in the Cape Floristic Region between 1945 and 2015: History, current understanding, and future challenges. Transactions of the Royal Society of South Africa 71(3): 207–303.

Vlok JHJ & De Villiers ME. 2007. Vegetation map for the Riversdale domain. Unpublished 1:50 000 maps and report supported by CAPE FSP task team and CapeNature.

Vlok JHJ, Cowling RM & Wolf T. 2005. A vegetation map for the Little Karoo. Unpublished maps and report for a SKEP project supported by CEPF grant no 1064410304.

Vlok JHJ, Euston-Brown DIW & Wolf T. 2008. A vegetation map for the Garden Route Initiative. Unpublished 1:50 000 maps and report supported by C.A.P.E. FSP task team.

Western Cape Government. 2014a.Western Cape Provincial Spatial Development Framework.

Western Cape Government. 2014b.Western Cape Biodiversity Framework.

Western Cape Government. 2015. Western Cape Protected Area Expansion Strategy: 2015–2020. Compiled by Maree KS, Pence GQK & Purnell K. 2015. Unpublished report. Produced by CapeNature. Cape Town, South Africa.

Western Cape Department of Environmental Affairs and Development Planning. 2018. State of Environment Outlook Report for the Western Cape Province 2014 - 2017: Final Biodiversity and Ecosystem Health Chapter. Cape Town.

Williams VL, Victor JE & Crouch NR. 2013. Red Listed medicinal plants of South Africa: Status, trends, and assessment challenges. South African Journal of Botany, Elsevier, 23-35.

5.3 In-text URL Links

Page	Link Tab Title	URL
4	Provincial Biodiversity Strategy & Action Plan	https://www.westerncape.gov.za/eadp/sites/eadp.westerncape.gov.za/files/atoms/files/PBSAP_final%2031%20March%202016.pdf
4	Western Cape Biodiversity Act	https://www.capenature.co.za/uploads/files/act-no-6-of-2021-western-cape-biodiversity-act-2021.pdf
6	CapeFarmMapper	https://gis.elsenburg.com/apps/cfm/
6	SANBI Biodiversity GIS	https://bgis.sanbi.org/
6	CapeNature	www.capenature.co.za
11	2018 National Biodiversity Assessment	https://www.sanbi.org/biodiversity/building-knowledge/biodiversity-monitoring-assessment/national-biodiversity-assessment/
11	2022 Ecosystem Status	http://ecosystemstatus.sanbi.org.za
14	Ramsar Wetlands	https://www.ramsar.org/country-profile/south-africa
14	WetMap Project	https://www.sanbi.org/biodiversity/building-knowledge/biodiversity-monitoring-assessment/freshwater-programme-
14	Wetland Classification in South Africa	https://www.sanbi.org/sites/default/files/documents/documents/sanbi-biodiversity-series-wetlands-classification-no-22.pdf
14	National Freshwater Ecosystem Priority Areas (NFEPA)	https://www.sanbi.org/wp-content/uploads/2018/04/nfepa-project-update-may-11_0.pdf
15	Marine Protected Areas of South Africa	https://www.marineprotectedareas.org.za/explore
16	IUCN Red List of Species	https://www.iucnredlist.org/resources/categories-and-criteria
16	Red List of South African Species Flora	http://redlist.sanbi.org/
16	Red List of South African Species Fauna	http://speciesstatus.sanbi.org/
17	Western Cape State of Biodiversity Report	https://www.capenature.co.za/library-educational-information-research
18	2019 CapeNature Consumptive Use Policy	https://www.capenature.co.za/uploads/files/CapeNature-Consumptive-Use-Policy-2019_2023-06-23-104128_libp.pdf
20	2025 Western Cape Protected Area Expansion Strategy	capenature.co.za/uploads/files/Draft-Western-Cape-Protected-Area-Expansion-Strategy-2021-2025-April-2022.pdf
20	Western Cape State of Biodiversity Report 2023	https://www.capenature.co.za/uploads/files/CapeNature-SOBR-Report-2023-Web.pdf
23	SANBI Technical Guidelines for CBA Maps	https://www.sanbi.org/wp-content/uploads/2024/06/2017_Technical-Guidelines-for-CBA-Maps.pdf
24	City of Cape Town's BioNet	https://resource.capetown.gov.za/documentcentre/Documents/Bylaws%20and%20policies/Bioregional_Plan_CCT_FINAL_2015-08-19_policy_number_44854.pdf
32	National Land Cover - DFFE	https://egis.environment.gov.za/sa_national_land_cover_datasets
42	Provincial Spatial Development Framework	https://www.westerncape.gov.za/eadp/sites/eadp.westerncape.gov.za/files/atoms/files/PSDF%20Chapter%204%20Amendment%20-%20Feb%202021.pdf
49	Land-use Planning & Development Applications	https://www.capenature.co.za/land-use-planning-and-development-applications
51	National Biodiversity Offset Guideline	https://www.gov.za/documents/notices/national-environmental-management-national-biodiversity-offset-guideline-23-jun

5.4 Annexure 1: Definitions as aligned with the Western Cape Biodiversity Act 6 of 2021

Alien species:
(a) a species that is not an indigenous species.
(b) an indigenous species translocated or intended to be translocated to a place outside its natural distribution range in nature through human intervention, but not an indigenous species that has extended its natural distribution range by natural means of migration or dispersal without human intervention.
(c) a species listed by the Provincial Minister in terms of section 49(2)(h).

Biodiversity Act in this document refers to the Western Cape Biodiversity Act 10 of 2021 (Provincial Gazette 8529, 14 December 2021)

Biodiversity economy: the businesses and economic activities that either directly depend on biodiversity for their business or that contribute to conservation of biodiversity through their activities.

Biodiversity offset: measurable conservation actions designed to counterbalance the residual adverse effects of any activity, or of the implementation of any plan, on biodiversity or ecological infrastructure after every effort has been made sequentially to avoid and minimise such effects, and to rehabilitate or restore damage, and includes the outcome of such measures.

Biodiversity Pattern: the way in which the components of biodiversity are spatially arranged. In this document, it 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 or 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 priority area: an area in the landscape or seascape that is important for conserving a representative sample of ecosystems and species, maintaining ecological processes and ecological infrastructure or the provision of ecosystem services.

Biodiversity Spatial Plan: a plan contemplated in section 34 of Chapter 5 in the Western Cape Biodiversity Act 10 of 2021.

Biodiversity target: the quantitative amount of any biodiversity feature, including biodiversity patterns or ecological processes, that should be prioritised for conservation to ensure the long-term survival and persistence of the biodiversity feature.

Biodiversity Threshold (also referred to as a target): a threshold (target) is that point at which the existence of an ecosystem or biodiversity feature becomes threatened. It can be represented by a number (e.g., 52 individuals of a species) or size (e.g., 102 hectares of an ecosystem type) and represents the absolute minimum of that ecosystem or species which is required to be safeguarded to ensure the continued persistence of the ecosystem or species. 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. These thresholds are determined through robust scientific calculations.

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 NEM:BA): a bioregional plan is based on a systematic biodiversity plan (ideally at a scale of 1:50 000 or finer) and includes a Critical Biodiversity Areas Map and land- and resource- use guidelines. The purpose of a bioregional plan is to inform land-use planning, environmental assessment and authorisations, and natural resource management by a range of sectors whose policies and decisions impact on biodiversity. Refer to "Guideline regarding the determination of bioregions and the preparation of and publication of bioregional plans". Government Gazette No 32006, 16 March 2009.

Bioregional planning: 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.

Bioprospecting: any research on, or development or application of, indigenous biological resources for commercial exploitation.

Cape Floristic Region (CFR): The Cape Floristic Region is a region of 90 000 km2 that extends from Nieuwoudtville southwards to Cape Town and then eastwards to Grahamstown. Most of this vast region is covered in fynbos, while the remaining areas are covered in renosterveld, forest, succulent karoo or thicket. The region holds close to 9 000 plant species, most of which grow in fynbos vegetation. The region coincides with the area known as the Cape Floral Kingdom that originates from an old system of classification which divided the world into six major plant kingdoms, based on their number of endemic plant families, genera, and species, and which recognised the Cape as the smallest in area, yet one of the richest in species. The Kingdom concept is considered outdated by modern botanists, but it still holds charm amongst plant enthusiasts.

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

Conservation: in relation to biodiversity and nature, means the protection, care, management, rehabilitation and maintenance of ecosystems, habitats and indigenous species and populations, including the genetic variability within ecosystems and species, to safeguard the natural conditions for their long-term persistence and the ecosystem services that they may provide, and "conserve" has a corresponding meaning.

Conservation Areas (In the context of this document): Land under some form of conservation agreement other than those via the National Environmental Management: Protected Areas Act (NEM: PAA). They are not considered formally protected areas, as they are not gazetted in terms of the NEM: PAA 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 NEM: BA, and conservancies.

Conservation corridors: refers to areas of various size, shape and composition that connect fragmented patches of habitat.

Critically endangered species: an indigenous species that is listed by the IUCN as a critically endangered species, and includes a species listed by the Provincial Minister in terms of section 49(2)(b).

Development: any process initiated by a person to change the use, physical nature, appearance, form, or function of a place, and includes—
(a) the construction, erection, alteration, demolition, or removal of a structure or building.
(b) any change to the existing or natural topography of the land.
(c) the carrying out of any works on, over or under a site.
(d) the destruction or removal of indigenous vegetation.
(e) a process to rezone, subdivide or consolidate land.

Ecological infrastructure: the naturally functioning ecosystems, including mountain catchments, water resources, coastal dunes, wetlands and nodes and corridors of natural habitat that together form networks of interconnected structural elements in the landscape that generate or deliver valuable ecosystem services to people.

Ecological Process: natural actions 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.

Ecosystem: a dynamic complex of animal, plant and microorganism communities and their non-living environment interacting as a functional unit, which may be terrestrial, coastal, inland aquatic, estuarine or marine, or a combination thereof.

Ecosystem Services: the benefits humans derive from ecosystems, which benefits include—
(a) provisioning services, such as the production of food and provisioning of water.
(b) regulating services, such as the control of climate, air quality or disease and disaster risk reduction.
(c) supporting services, such as nutrient cycling, soil formation and crop pollination.
(d) cultural services, such as spiritual and recreational benefits.

Endangered species: an indigenous species that is listed by the IUCN as an endangered species, and includes a species listed by the Provincial Minister in terms of section 49(2)(c).

Endemic (vs. Indigenous): a plant or animal species, or a vegetation type, which is naturally restricted to a particular defined region. Endemism implies a level of restricted occurrence, i.e., found nowhere else but in that region. The term "endemic" should however not be confused with the term "indigenous". Indigenous implies that the plant or animal species, or a vegetation type is originally/naturally from that area. For example, if a plant occurs naturally only within South Africa, it implies that the plant is endemic to South Africa (restricted to here) as well as indigenous (naturally occurring here) to South Africa. If however a plant is naturally distributed across the entire African continent, the plant will be indigenous to South Africa but not be endemic to South Africa.

Environment: the surroundings within which humans exist and that are made up of—
(a) the land, water, and atmosphere of the earth.
(b) microorganisms and plant and animal life.
(c) any part or combination of the surroundings contemplated in paragraphs (a) and (b) and the interrelationships among and between them.
(d) the physical, chemical, aesthetic, and cultural properties and conditions of the surroundings contemplated in paragraphs (a), (b) and (c) that influence human health and well-being.

Estuary: a body of surface water—
(a) that is permanently or periodically open to the sea.
(b) in which a rise and fall of the water level because of the tides is measurable at spring tides when the body of surface water is open to the sea.
(c) in respect of which the salinity is higher than fresh water because of the influence of the sea, and where there is a salinity gradient between the tidal reach and the mouth of the body of surface water, and "estuarine" has a corresponding meaning.

Extra-limital species: a species contemplated in paragraph (b) of the definition of "alien species", and includes a species listed by the Provincial Minister in terms of section 49(2)(g).

Habitat: a place where a species or ecological community naturally occurs.

Indigenous
(a) in relation to a species, means a species that occurs, or has historically occurred, naturally in a free state within the borders of the Republic, but excludes a species that has been introduced into the Republic as a result of human activity.
(b) in relation to a specimen, means an indigenous plant or wild animal of a species contemplated in paragraph (a).

Indigenous biological resources: any resource consisting of—
(a) any specimen of an indigenous species.
(b) any genetic material of such specimen.

Invasive alien species: any species whose establishment and spread outside of its natural distribution range—
(a) threaten ecosystems, habitats, ecological infrastructure, or other species or have the potential to threaten eco- systems, habitats, ecological infrastructure, or other species.
(b) may result in economic or environmental harm or harm to human health.

IUCN: the International Union for the Conservation of Nature, established in Fontainebleau, France, 1948.
Landowner: the registered owner of land, except that if—
(a) the land is not occupied by the registered owner, it means the person—
(i) who lawfully occupies the land.
(ii) who exercises general control over the land.
(iii) who has any registered real right in the land, subject to any other law.
(iv) who has been authorised in writing by the registered owner to fulfil his or her rights or duties in relation to the land.
(b) the land is owned by an association of persons, whether corporate or unincorporated, it means the person designated by the association in writing as the owner.
(c) the land is under the control or management of a municipality, it means the municipal manager.
(d) the registered owner or the person who is defined as the owner in paragraph (a) or (b)—
(i) is deceased.
(ii) is insolvent.

Land cover: the class of 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 modification of natural ecosystems and can range from natural through to irreversibly modified. 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).

Long term: a period of 50 years or longer.

Mainstreaming biodiversity: ensuring that biodiversity, and the services it provides, are appropriately and adequately factored into policies and practices that rely and have an impact on biodiversity.

Mitigation measure: a measure or sequence of measures aimed at avoiding, minimising, rehabilitating, restoring, or remedying, including by means of biodiversity offsets, an adverse effect.

Mountain Catchment Area: an area contemplated in section 40 of the Mountain Catchment Areas Act (Act 63 of 1970).

Protected species: a species listed by the Provincial Minister in terms of section 49(2)(e).

Province: the Province of the Western Cape and "provincial" has a corresponding meaning.

Provincial Protected Area: a provincial protected area as defined in the National Environmental Management: Protected Areas Act, which may include a nature reserve in the province declared in terms of section 23(1) of the Protected Areas Act or a nature reserve in the province regarded as having been declared in terms of section 23(5) of that Act.

Ramsar Convention and List: Known as the 'Convention on Wetlands of International Importance', where certain wetlands have been listed and have acquired a new status at the national level and are recognised by the international community as being of significant value not only for the country, but for humanity as a whole (See www.ramsar.org)

Red Data species: All known plant or animal species that have been assessed and classified according to their potential for extinction in the near future by application of the IUCN Threat Assessment Criteria. This classification has the following categories: Extinct, Extinct in the Wild, Critically Endangered, Endangered, Vulnerable, Near Threatened and Least Concern. The terms Red Data species or Red data listed species or threatened species are however colloquially used to refer to species which are Extinct, Extinct in the Wild, Critically Endangered, Endangered or Vulnerable. These species are protected by law in terms of provincial ordinances, the NEMA, and the NEM:BA.

Red Listed Ecosystems: IUCN's Red List of Ecosystems is a global standard that assesses the conservation status of ecosystems on a local, national, regional, and global scale. The Red List of Ecosystems (RLE) evaluates the level of risk that an ecosystem is facing; whether ecosystems have reached the final stage of degradation (a state of Collapse), whether they are threatened at Critically Endangered, Endangered or Vulnerable levels, or if they are not currently at risk of collapse (Least Concern).These evaluations are based on a set of rules, or criteria, for performing

evidence-based, scientific assessments of the risk of ecosystem collapse, as measured by reductions in geographical distribution or degradation of the key processes and components of ecosystems.
Species: a kind of animal, plant or other organism that does not normally interbreed with individuals of another kind, and includes any subspecies, cultivar, variety, geographic race, strain, hybrid, or geographically separate population.

Species of Special Concern: in this handbook refer to threatened species, endemic, scarce, and nationally protect- ed species. Species of Special Concern are also referred to as Species of Conservation Concern.

Sustainable: the use of or impact on biodiversity, ecosystems, or ecosystem services in a way and at a rate that—
(a) will not lead to its long-term decline and which can be sustained indefinitely without causing adverse effects thereon.
(b) will not compromise or disrupt its ecological integrity.
(c) ensures its continued persistence to meet the needs and aspirations of present and future generations of people.

Sustainable development: Development that meets the needs of both present and future development, 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 planning: a planning method that identifies biodiversity priority areas, considering biodiversity patterns and the ecological and evolutionary processes that sustain them, based on quantitative biodiversity targets and thresholds for aquatic, terrestrial, coastal, and marine biodiversity features to conserve a representative sample of biodiversity patterns and ecological processes.

Vegetation Unit: vegetation units are defined as 'a complex of plant communities ecologically and historically occupying habitat complexes at the landscape scale'. Vegetation units share general ecological properties such as position on major ecological gradients and nutrient levels and appear similar in vegetation structure and composition.

Vulnerable species: an indigenous species that is listed by the IUCN as a vulnerable species, and includes a species listed by the Provincial Minister in terms of section 49(2)(d).

Watercourse**:**
(a) a river or spring.
(b) a natural channel in which water flows regularly or intermittently.
(c) a wetland, lake, or dam into which, or from which, water flows.
(d) any collection of water declared in terms of the National Water Act, 1998, to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks.

Water resource: includes a watercourse, surface water, an estuary, and an aquifer.

Well-being: means the ecological, behavioural, physical, and physiological state of health of a wild animal.

Wild animal: an animal, excluding a domesticated species and a microorganism, whether the animal is alive or dead, tame, bred or kept in captivity, and includes the eggs, spawn, gametes, genetic material, or any part of such an animal.

5.5 Annexure 2: Guidelines on EIA recommendations for taxa of conservation concern found on proposed development sites

Status	Criterion	Guideline for Recommendation
Data Deficient	**T**	There is uncertainty regarding the taxonomic status of this taxon, but it is likely to be threatened. Contact the taxonomist working on this group to resolve its taxonomic status; status will then be reassessed by the Threatened Species Programme.
Near Threatened	**O**	Currently known from fewer than 10 locations, therefore preferably recommend no loss of habitat. Should loss of this taxon's habitat be considered, then an offset that includes conserving another viable subpopulation (in terms of the NEM: PAA) should be implemented, provided that the subpopulation to be destroyed does not occur (i) within a threatened ecosystem or (ii) within an area required for biodiversity conservation in terms of a relevant spatial biodiversity plan or (iii) on a site associated with additional ecological sensitivities.
Near Threatened	**B, C**	The taxon is approaching thresholds for listing as threatened but there are still subpopulations in existence and therefore there is need to minimise loss of habitat. Conservation of subpopulations is essential if they occur (i) within a threatened ecosystem or (ii) within an area required for biodiversity conservation in terms of a relevant spatial biodiversity plan or (iii) on a site associated with additional ecological sensitivities.
Near Threatened	**Listed under A only**	If this taxon has a restricted range, EOO < 2 000 km^2, then recommend no further loss of habitat. If range size is larger, the taxon is possibly long lived but widespread, and limited habitat loss may be considered. Conservation of subpopulations is essential if they occur (i) within a threatened ecosystem or (ii) within an area required for biodiversity conservation in terms of a relevant biodiversity conservation plan or (iii) on a site associated with additional ecological sensitivities.
Critically Rare		This is a highly range-restricted taxon, known from one site only, and therefore no loss of habitat should be permitted as it may lead to extinction of the taxon. The National Threatened Species Programme is not aware of any current threats to this taxon.
Rare		This taxon is likely to have a restricted range, or be highly habitat specific, or have small numbers of individuals, all of which makes it vulnerable to extinction should it lose habitat. Recommend no loss of habitat. The National Threatened Species Programme is not aware of any current threats to this taxon.
Declining		This taxon is declining but the population has not yet reached a threshold of concern; limited loss of habitat may be permitted. Should the taxon be a known medicinal species and if individuals will not be conserved in situ, plants should be rescued and used as mother stock for medicinal plant cultivation programmes.
Critically Endangered	**PE (possibly extinct)**	No further loss of natural habitat should be permitted as the taxon is on the verge of extinction.
Critically Endangered	**A, B, C, D**	No further loss of natural habitat should be permitted as the taxon is on the verge of extinction.
Endangered	**B, C, D**	No further loss of habitat should be permitted as the taxon is likely to go extinct in the near future if current pressures continue. All remaining subpopulations must be conserved if this taxon is to survive in the long term.
Endangered	**Listed under A only**	If this taxon has a restricted range, EOO < 2 000 km2, recommend no further loss of habitat. If range size is larger, the taxon is possibly long-lived but widespread, and limited habitat loss may be considered under certain circumstances, such as the implementation of an offset whereby another viable, known subpopulation is formally conserved in terms of the NEM: PAA, and provided that the subpopulation to be destroyed does not occur (i) within a threatened ecosystem or (ii) within an area required for biodiversity conservation in terms of a relevant spatial biodiversity plan or (iii) on a site associated with additional ecological sensitivities.

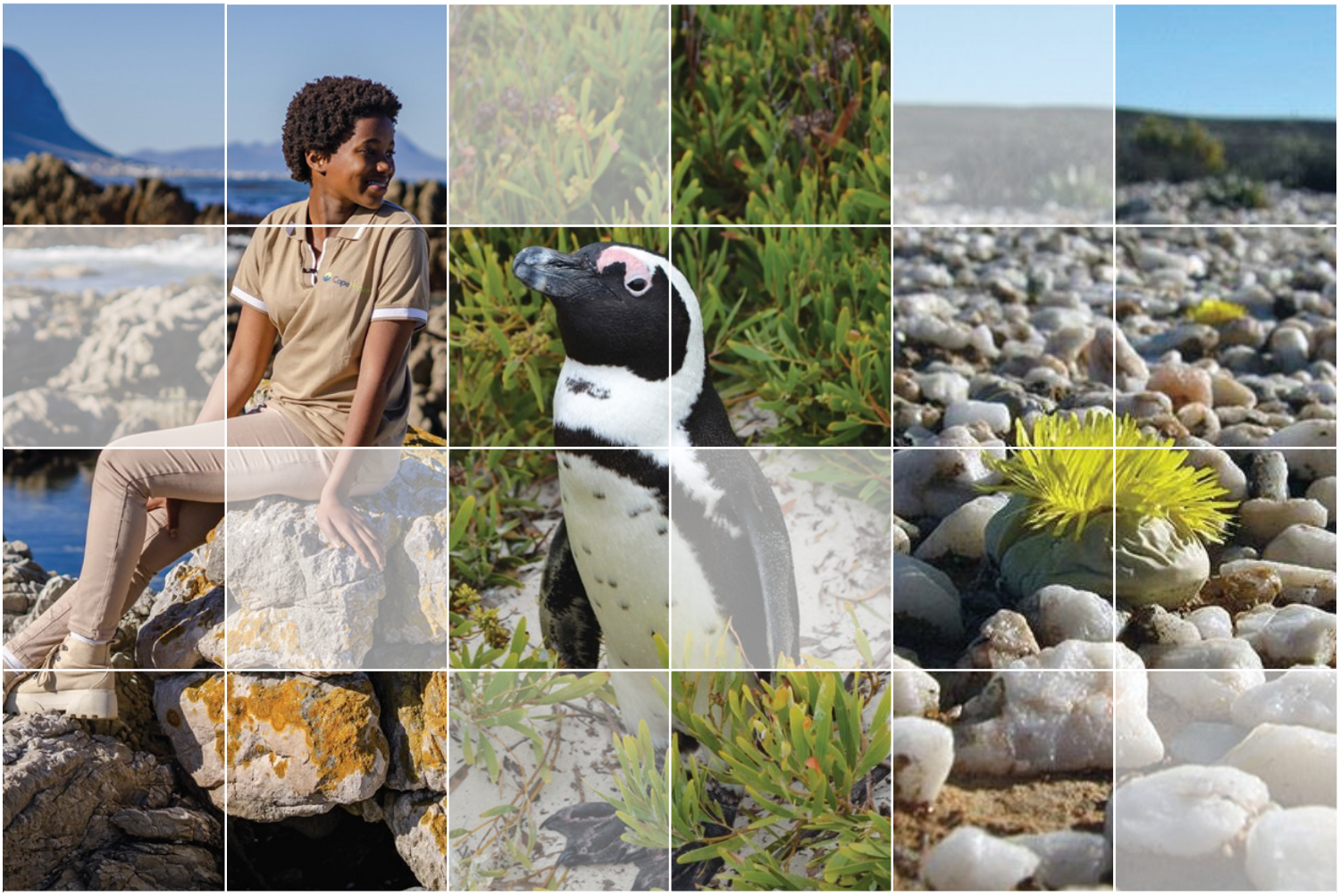
Status	Criterion	Guideline for Recommendation
Vulnerable	**D**	This taxon either constitutes less than 1 000 individuals or is known from a very restricted range. No further loss of habitat should be permitted as the taxon's status will immediately become either Critically Endangered or Endangered, should habitat be lost.
Vulnerable	**B, C**	The taxon is approaching extinction but there are still several subpopulations in existence. Recommend no further loss of habitat as this will increase the extinction risk of the taxon.
Vulnerable	**PE (possibly extinct)**	If this taxon has a restricted range, EOO < 2 000 km2, recommend no further loss of habitat. If range size is larger, the taxon is possibly long lived but widespread, and limited habitat loss may be considered under certain circumstances, such as the implementation of an offset whereby another viable, known subpopulation is formally conserved in terms of the NEM: PAA, and provided that the subpopulation to be destroyed does not occur (i) within a threatened ecosystem or (ii) within an area required for biodiversity conservation in terms of a relevant spatial biodiversity plan or (iii) on a site associated with additional ecological sensitivities.
Data Deficient	**D**	This taxon is very poorly known, with insufficient information on its habitat, population status or distribution to assess it. However, it is highly likely to qualify as threatened. If a Data Deficient taxon will be affected by a proposed activity, the subpopulation should be well surveyed, and the data sent to the Threatened Species Programme. Assessments will be repeated and the new status of the taxon, with a recommendation, will be provided within a short timeframe.

PHYSICAL ADDRESS
CapeNature
PGWC Shared Services Centre
Cnr Bosduif and Volstruis Streets
Bridgetown
Cape Town

POSTAL ADDRESS
CapeNature
Private Bag X29
Gatesville
7766

EMAIL
cba@capenature.co.za

WEBSITE
www.capenature.co.za



CapeNature

Western Cape Government

FOR YOU

/capenature1

@capenature

@capenature1