



SANDVELD COASTAL COMPLEX PROTECTED AREA MANAGEMENT PLAN 2024 – 2034

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CITATION



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AUTHORISATIONS

In terms of sections 39 and 41 of the National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003), either the National Minister or Member of Executive Council in a particular province, holds jurisdiction to approve a management plan submitted for land designated as a Provincial Nature Reserve, Provincial Island Nature Reserve, Marine Protected Area, and State Forest. The Sandveld Coastal Complex is hereby approved.

TITLE	NAME	SIGNATURE	DATE
PROVINCIAL MINISTER: Department of Environmental Affairs and Development Planning	Mr Anton Bredell		15/02/2024

Recommended:

TITLE	NAME	SIGNATURE	DATE
CHAIRPERSON OF THE BOARD: Western Cape Nature Conservation Board	Prof Denver Hendricks		15/02/2024
CHIEF EXECUTIVE OFFICER: CapeNature	Dr Ashley Naidoo		15/02/2024

Review Date: 10 years from the date of approval by the Member of Executive Council.

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This management plan was prepared by the core reserve management planning team consisting of Mr Marius Wheeler, Mr Callum Beattie, Ms Antoinette Veldtman and Ms Sheila Henning. The planning team was supported with inputs from various internal and external partners. Colleagues from within CapeNature are especially thanked for their contributions.

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GLOSSARY

Derived from: Conservation Measures Partnership (CMP 2020).

Term	Explanation
Adaptive Management	The incorporation of a formal learning process into conservation action to reduce uncertainty in decision-making. Specifically, it is the integration of knowledge, management, and monitoring, to provide a framework to systematically and efficiently test assumptions, promote learning, and supply timely information for management to make decisions and adjust actions based on outcomes of monitoring. The <i>Conservation Standards</i> explicitly bring adaptive management principles into conservation practice.
Conservation Target	An element of biodiversity (natural value) or heritage (cultural value) of the complex, which can be a species, habitat, ecological system, or heritage feature, that management strives to protect, and threats towards which management should strive to minimise. All focal conservation targets at a site should collectively represent the biodiversity and heritage features of concern at the site.
Factor	A generic term for an element of a conceptual model including direct and indirect threats, opportunities, and associated stakeholders. It is often advantageous to use this generic term since many factors-for example tourism-could be both a threat and an opportunity. Also known as root causes or drivers.
Goal	A formal statement detailing a desired impact of a project, such as the desired future status of a target. A good goal meets the criteria of being <i>linked to targets, impact oriented, measurable, time limited, and specific</i> .
Heritage Resources	Means any place or object of cultural significance as per the National Heritage Resources Act, 1999 (Act No. 25 of 1999).
Human Well-being Value	In the context of a conservation project, human well-being values are those components of human well-being affected by the status of conservation targets. All human well-being values at a site should collectively represent the array of human well-being needs and outcomes dependent on the conservation targets.
Indicator	A measurable entity related to a specific information need such as the status of a value / factor, change in a threat, or progress toward an objective, or association between one or more variables. A good indicator meets the criteria of being <i>measurable, precise, consistent, and sensitive</i> .

Key (Ecological) Attribute	An aspect of a focal conservation target's biology or ecology that if present, define a healthy status and if missing or altered, would lead to the outright loss or extreme degradation of that target over time.
Living Heritage	The intangible aspects of inherited culture as defined by the National Heritage Resources Act, 1999 (Act No. 25 of 1999) that may include: (a) Cultural tradition. (b) Oral history. (c) Performance. (d) Ritual. (e) Popular memory. (f) Skills and techniques. (g) Indigenous knowledge systems. (h) The holistic approach to nature, society, and social relationships.
Objective	A formal statement detailing a desired outcome of a project such as reducing a critical threat. A good objective meets the criteria of being <i>results oriented, measurable, time limited, specific, and practical</i> . If the project is well conceptualized and designed, realization of a project's objectives should lead to the fulfilment of the project's goals and ultimately its vision. Compare to vision and goal.
Results Chain	A visual diagram of management's theory of change. A results chain includes core assumptions and the logical sequence linking interventions to one or more values. In scientific terms, it lays out hypothesized relationships or theories of change.
Situation Analysis	The purpose of a situation analysis is to understand the relationships between the biological environment and the social, economic, political, and institutional systems, associated stakeholders and drivers that affect the conservation targets of the complex.
Vision	A description of the desired long-term future or ultimate condition that stakeholders see, and management strives to achieve for the complex.

ACRONYMS

BMP	Biodiversity Management Plan
CAP	Conservation Action Priority
CBA	Critical Biodiversity Area
CDF	Conservation Development Framework
DEA	Department of Environmental Affairs
DFFE	Department of Forestry, Fisheries and the Environment
DFFE: O&C	Department of Forestry, Fisheries and the Environment: Directorate Biodiversity and Coastal Research
DWS	National Department of Water and Sanitation
EMF	Environmental Management Framework
EMP	Estuarine Management Plan
EMZ	Environment Management Zone
EPWP	Expanded Public Works Programme
GCBC	Greater Cederberg Biodiversity Corridor
ICMP	Integrated Coastal Management Plan
IDP	Integrated Development Plan
IUCN	International Union for Conservation of Nature
METT-SA	Management Effectiveness Tracking Tool for South Africa
MoU	Memorandum of Understanding
MPA	Marine Protected Area
NBA	National Biodiversity Assessment
NEMA	National Environmental Management Act
NEM: BA	National Environmental Management: Biodiversity Act

NEM: PAA	National Environmental Management: Protected Areas Act
NFEPA	National Freshwater Ecosystem Priority Areas
NGO	Non-governmental Organisation
NPAES	National Protected Area Expansion Strategy
PAAC	Protected Area Advisory Committee
PAMP	Protected Area Management Plan
SABAP2	South African Bird Atlas Project (second)
SANBI	South African National Biodiversity Institute
SANCCOB	Southern African Foundation for the Conservation of Coastal Birds
SASS 5	South African Scoring System – Version 5
SDF	Spatial Development Framework
WCBSB	Western Cape Biodiversity Spatial Plan
WCDM	West Coast District Municipality
WCPAES	Western Cape Protected Area Expansion Strategy

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EXECUTIVE SUMMARY

In compliance with the National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003), the management authority of a protected area is required to develop management plans for each of its protected areas. The National Minister and Member of Executive Council (MEC) in a particular province have concurrent jurisdiction to approve a management plan for a protected area submitted under section 39(2) of the National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003).

In developing the management plan for the Sandveld Coastal Complex, CapeNature as the management authority strives to establish biodiversity conservation as a foundation for a sustainable economy and for the provision of ecosystem services, and to promote sustainable access and opportunities for all.

An Overview of the Sandveld Coastal Complex

The Sandveld Coastal Complex is situated along the West Coast of South Africa and is 1 486 hectares in size. It is made up of seven parcels of protected areas stretching from Elephant Rock Island Nature Reserve in the north, close to the Olifants River Estuary, to Jacobs Rock Island Nature Reserve just off Jacobs Bay in the south.

The complex is made up of two terrestrial parcels, Elands Bay State Forest and Rocherpan Nature Reserve. Elands Bay State Forest is primarily open coastal dune habitat whereas Rocherpan Nature Reserve is typical coastal strandveld comprising mostly threatened ecosystem types. Associated with Rocherpan is an ephemeral saline wetland as well as a Marine Protected Area. The other parcels in the complex are all offshore islands and rocks ranging in size. These marine parcels are important for threatened seabird species as well as Cape fur seal. Penguin (Bird) Island is significant as it harbours one of only six Cape gannet colonies in the world. Both Penguin (Bird) Island and Rocherpan Nature Reserves are accessible to the public and serve as important sources of tourism revenue for CapeNature. Both reserves also contribute to the local economy through creating employment and drawing tourists to the region.

The complex's zone of influence of approximately 332 457 hectares is designed to facilitate functional connectivity and protected area expansion as well as water security for the Rocherpan wetland and Verlorenvlei Ramsar site. The zone of influence focuses on mitigating coastal and climate change impacts, particularly on seals and seabirds. The Sandveld Coastal Complex is positively supported by strong, partnership driven protected area expansion initiatives within the zone of influence. Examples include the initiatives to proclaim the Olifants River and Verlorenvlei wetlands as protected areas, as well as the declaration of the Moutonshoek and Melck Protected Environments.

Planning, Policy, Implementation and Review

To develop this management plan CapeNature applied the Conservation Standards. This is a Strategic Adaptive Management framework that is robust, yet flexible, multi-disciplinary in approach, and inclusive of internal and external stakeholders, as well as the general public. It enables management teams to develop effective conservation plans, based on the best available traditional, expert, and scientific knowledge. Furthermore, it promotes stakeholder and public engagement throughout the planning and implementation phase of the management plan. Key to this process is identifying the focal conservation targets and human well-being values representative of the protected area, and determining what state they are in and what threats they face. This forms the basis for establishing clear goals, strategies and objectives that are time bound and feasible to implement.

This management plan provides the basis for the management, development, and operation of the Sandveld Coastal Complex over a timeframe of 10 years. The implementation of the management plan is subject to legislation, regulations, policies, and guidelines to ensure and promote sound financial and biodiversity management, effective compliance, safety, good neighbour relations and sustainable access to the complex. The success of implementation will be subject to sufficient resource allocation and strong partnership and stakeholder support.

Fundamental to implementation is pursuing the achievement of conservation outcomes and regular review thereof. Strategic Adaptive Management integrates planning, management, and monitoring, and is used to systematically evaluate results, thus enabling management to “change direction” when required. CapeNature uses an internationally recognised review system, The Management Effectiveness Tracking Tool for South Africa, adopted by the national Department of Forestry, Fisheries and the Environment. The tool is used to assess the management effectiveness of all CapeNature’s protected areas at a strategic level. Additionally, mechanisms for monitoring and evaluation are built into each aspect highlighted in the strategic plan.

Purpose, Vision, and Desired State

CapeNature manages the Sandveld Coastal Complex in accordance with its organisational vision, and in agreement with the vision, goals and strategies derived through the planning process. The vision for the complex is:

“The Sandveld Coastal Complex supports resilient ecosystems that contribute to sustainable livelihoods, tourism, and partnerships, for the future of the West Coast.”

Seven focal conservation targets that incorporate several nested aspects have been identified for the Sandveld Coastal Complex. These are:

1) Marine ecosystems, 2) Marine birds, 3) Cape fur seal, 4) Rocherpan wetland, 5) Elands Bay dune system, 6) Terrestrial vegetation, and 7) Cultural heritage and history of Penguin (Bird) Island.

As the public entity responsible for biodiversity conservation in the Western Cape Province, CapeNature delivers a suite of core services to the public in support of the following outcomes: Resilient ecosystems that provide water and other ecosystem services, the promotion of local economic development, job creation and skills development, growing diversified nature-based revenue streams, access to environmental education and research, environmental awareness advocacy and education, and access to natural and cultural heritage.

Eight focal human well-being values have been identified for the Sandveld Coastal Complex. These are:

1) Freedom, choice, and capacity to act independently within the legislated rules and regulations of the protected area, 2) Tourism and nature-based economic opportunities, 3) Responsible utilisation of natural resources, 4) Security from natural disasters, 5) Primary production and nutrient cycling, 6) Spiritual and physical health and cultural identity, 7) Respect and care for the natural environment, and 8) Knowledge economy contribution.

Ten goals have been formulated to maintain or enhance the focal conservation targets and human well-being values of the Sandveld Coastal Complex. An asterisk indicates the availability of detailed information in section five. The goals are:

1. By 2034, the Sandveld Coastal Complex continues to sustain viable populations of priority seabirds.
2. By 2034, the Sandveld Coastal Complex sustains a healthy seabird species composition and annual recruitment of African black oystercatchers.
3. By 2034, the Sandveld Coastal Complex maintains a managed Cape fur seal population on Penguin (Bird) Island, and natural Cape fur seal populations on Elephant Rock, Paternoster Rocks, and Jacobs Rock.
4. By 2034, Rocherpan wetland is in a near-natural condition* and it sustains a healthy** waterbird species composition and population.

5. By 2034, the Sandveld Coastal Complex comprises 90-100% indigenous terrestrial plant species, with steenbok recruitment at least every second year.
6. By 2034, the Elands Bay State Forest comprises 90-100% indigenous terrestrial plant species, and the percentage of unvegetated mobile dune habitat is maintained or extended.
7. By 2034, the history of the West Coast islands in the Sandveld Coastal Complex is portrayed and easily available for visitors to Penguin (Bird) Island.
8. By 2034, the Sandveld Coastal Complex continues to provide and support job opportunities in partnership with role-players and contributes to economic development and social upliftment in and around the complex.
9. By 2034, the Sandveld Coastal Complex's environmental awareness and interpretation plan promotes ecological targets and human well-being values.
10. By 2034, the Sandveld Coastal Complex continues to contribute to providing access and utilisation of natural resources within the complex.

Threats

Threats and contributing factors that degrade or destroy the Sandveld Coastal Complex's targets and values were identified and unpacked in a conceptual model to illustrate the current conservation situation and to guide the formulation of mitigating strategies. The following six direct threats had high and medium impacts:

1) Overfishing of pelagic prey species, 2) Loss of cultural heritage and history of Penguin (Bird) Island), 3) Oil spills, 4) Avian diseases, 5) Cape fur seal colonization of marine bird breeding habitat, and 6) The common reed invading and altering the Rocherpan wetland habitat.

Climate change was identified as a threat multiplier for the Sandveld Coastal Complex and its impacts on the complex are expected to be medium to high. Indirect threats posed by climate change include a change in distribution of pelagic prey species, less rainfall and higher temperatures, Sea level rise and resulting increase in frequency and severity of storm surges, heat impacting seabird breeding success, and a rise in sea temperatures. To assist the complex with mitigating and managing the identified threats and contributing factors effectively, both inside and outside of its boundaries, the complex will incorporate spatial planning tools which include the sensitivity analysis, zonation, and zone of influence determination.

Strategic Plan

A thorough analysis of the Sandveld Coastal Complex's conservation situation, inclusive of the biological, social, economic, cultural, and institutional systems that affect the protected area's targets and values, formed the basis for developing conservation strategies and action plans. The aim was to identify opportunities and strategic points where intervention is feasible and likely to have the biggest positive impact towards achieving goals. CapeNature will lead the implementation of the management plan, although achieving the complex's vision requires coordinated effort between various key external stakeholders. Ten key strategies have been identified to ensure the effective conservation of the complex. These are:

Strategy 1: In partnership with national, provincial, and local government, non-governmental organisations and academic stakeholders, work towards solutions to address and mitigate threats to seals and seabirds within the Sandveld Coastal Complex.

Strategy 2: Develop and implement standard CapeNature operating guidelines to guide an effective response to predation on priority seabird breeding localities.

Strategy 3: With relevant partners, develop and implement integrated disaster management and contingency plans in the event of oil spills, disease outbreaks and extreme climate events in the Sandveld Coastal Complex.

Strategy 4: Through partnership with relevant stakeholders, address water law compliance, in-stream modification, and best practice along the Papkuils River, upstream of Rocherpan Nature Reserve.

Strategy 5: Develop and display interpretation and awareness resources that have a strong focus on the historical aspects of Penguin (Bird) Island, as well as other historical guano scraping islands in the Sandveld Coastal Complex.

Strategy 6: Enhance the understanding and raise awareness of all ecological values within the Sandveld Coastal Complex and where appropriate, within its zone of influence.

I INTRODUCTION

Towards CapeNature's vision of conserving nature for resilience and sustainability (CapeNature 2020b), the organisation's protected area management, in accordance with the purpose of the protected area, strives to:

- Conserve and represent natural habitats and indigenous biodiversity including threatened species for their scientific and conservation value in the Western Cape Province.
- Conserve representative samples of significant ongoing ecological processes in the evolution and development of ecosystems and communities of plants and animals.
- Provide ecosystem services that benefit people of the Western Cape.
- Manage protected areas effectively and efficiently, including the interrelationships between biophysical, social, and economic environments.
- Ensure that protected area planning and management is integrated and participatory.
- Provide for sustainable use and equitable access.

The management plan is a strategic adaptive management framework for the protected area, guided by the Open Standards for the Practice of Conservation (hereafter referred to as the Conservation Standards) (CMP 2020) adaptive management paradigm. The Conservation Standards is dependent upon and promotes stakeholder engagement and participatory planning in the development of the plan. The framework further stimulates the incorporation of mechanisms to facilitate stakeholder engagement and participation during operationalisation of the plan.

The Sandveld Coastal Complex Protected Area Management Plan (PAMP) serves as a reference for the management and development of the complex in its current and envisaged future state. It directs management at all levels. The management plan addresses:

- The mandate, human capacity and financial resources that are required to meet goals and objectives based on the condition of natural and cultural targets, and core service areas requiring a focused effort.
- The delivery of socio-economic benefits to neighbouring communities.
- Flexibility of service delivery that encourages innovation and involvement by a wide range of government, community, and non-government sectors.
- Performance indicators and accountability measures that provide for regular review and adaptive management.

2 LEGAL STATUS AND BACKGROUND

This section provides a record of the legal status of the Sandveld Coastal Complex, as well as its description, location, and designation by South Africa in terms of international agreements. Furthermore, it provides an overview of the biophysical, biodiversity, heritage, and socio-economic context of the protected area.

2.1 Legal Status

2.1.1 Name and legal designations

The terminology used to describe the components of the Sandveld Coastal Complex follows that used in the protected area declarations done according to the Western Cape Biodiversity Act, 2021 (Act No. 6 of 2021), Nature Conservation Ordinance, 1974 (Ordinance 19 of 1974), National Forest Act, 1998 (Act No. 84 of 1998) and the National Environmental Management: Protected Areas Act (NEM: PAA), 2003 (Act No. 57 of 2003) and as reflected on the Protected Areas Register held by the Department of Forestry, Fisheries and the Environment (DFFE).

The Sandveld Coastal Complex comprises the following:

- Rocherpan Nature Reserve.
- Rocherpan Marine Protected Area.
- Penguin (Bird) Island Nature Reserve.
- Elands Bay State Forest.
- Elephant Rock Island Nature Reserve.
- Jacobs Rock Island Nature Reserve.
- Paternoster Rocks Island Nature Reserve.

A full list of the declarations and status of land parcels appears in Table 2.1 and Table 2.2.

Table 2.1: Land parcels and status that comprise Nature Reserves and Marine Protected Areas in the Sandveld Coastal Complex.

Title Deed	Farm Name	Farm No.	Portion No.	Extent (ha)	Registration Division	SG Code	Landowner	Proclamation Date	Proclamation No.	Govt. Gazette	Status
Rocherpan Nature Reserve											
T15643/1967	St Helenafontein A	29	2	250.09	Piketberg	C05800000000 002900002	RSA-Provincial	10 December 1976	409 of 1976		Provincial Nature Reserve
T15644/1967	Bookram	30	2	153.32	Piketberg	C05800000000 003000002	RSA-Provincial	10 December 1976	409 of 1976		Provincial Nature Reserve
T66517/1991	St Helenafontein	29	3	521.79	Piketberg	C05800000000 002900003	RSA-Provincial	19 June 1992	42 of 1992	4754	Provincial Nature Reserve
Rocherpan Marine Protected Area											
Unregistered State Land	N/A	N/A	N/A	150.86	N/A	N/A	RSA	27 July 1990	R1810	12667	Marine Protected Area
Lambert's Bay Penguin Island Provincial Nature Reserve – hereafter referred to as: Penguin (Bird) Island Nature Reserve											
N/A	N/A	N/A	N/A	4.54	N/A	N/A	RSA	18 March 1988	23 of 1988	4524	Provincial Nature Reserve
Elephant Rock Provincial Nature Reserve – hereafter referred to as: Elephant Rock Island Nature Reserve											
N/A	N/A	N/A	N/A	1.46	N/A	N/A	RSA	18 March 1988	23 of 1988	4524	Provincial Nature Reserve
Paternoster Rocks Provincial Nature Reserve – hereafter referred to as: Paternoster Rocks Island Nature Reserve											
N/A	N/A	N/A	N/A	15.01	N/A	N/A	RSA	18 March 1988	23 of 1988	4524	Provincial Nature Reserve
Jacob's Rock Provincial Nature Reserve – hereafter referred to as: Jacobs Rock Island Nature Reserve											
N/A	N/A	N/A	N/A	0.60	N/A	N/A	RSA	18 March 1988	23 of 1988	4524	Provincial Nature Reserve

Table 2.2: Land parcels and status that comprise Forest Nature Reserves in the Sandveld Coastal Complex.

Title Deed	Farm Name	Farm No.	Portion No.	Extent (ha)	Registration Division	SG Code	Landowner	Proclamation Date	Proclamation No.	Govt. Gazette	Status
Elands Bay State Forest											
T1415/1964	Grauwe Duynen	231	6	238.17	Clanwilliam	C02000000000 023100006	RSA-National	7 December 1979	2753	6764	State Forest Nature Reserve
T28897/1965	Bonteheuvel	1	23	67.30	Piketberg	C05800000000 000100023	RSA-National	7 December 1979	2753	6764	State Forest Nature Reserve
T16004/1973	Bonteheuvel	1	28	83.48	Piketberg	C05800000000 000100028	RSA-National	7 December 1979	2753	6764	State Forest Nature Reserve

2.1.2 Contractual agreements

CapeNature contractual agreements with non-governmental organisations (NGOs) and government departments for the Sandveld Coastal Complex are as follows:

- Memorandum of Agreement with the Department of Forestry, Fisheries and the Environment: Directorate Biodiversity and Coastal Research (DFFE: O&C) for the management of Penguin (Bird) Island as a Cape gannet breeding site.
- Memorandum of Agreement with the Bergrivier Municipality to employ two Marine Rangers to enforce the Berg River Estuary by-laws. This is a three-year agreement (2023-2026). The Berg River Estuary does not form part of the Sandveld Coastal Complex, but it does fall within the complex's zone of influence and the Marine Rangers form part of the complex's staff component.
- Memorandum of Agreement with the Leisure Trust to employ one additional Marine Ranger at the Berg River Estuary. This agreement expires in December 2023 and the aim is to extend it for an additional three years up to 2026.
- Contract with the national Expanded Public Works Programme (EPWP), which is a medium to long-term strategy to reduce unemployment and alleviate poverty through the creation of work opportunities using labour-intensive methods. The current contract period spans from April 2022-2025.

2.1.3 Location, extent, and highest point

Maps 1 and 2 (Appendix 1) show the locations and topography of the components of the Sandveld Coastal Complex.

The Rocherpan Nature Reserve is situated approximately 180 km north of Cape Town along the R27 road. The closest town is Velddrif, approximately 25 km to the south. Rocherpan Nature Reserve is comprised of a 925.21 ha terrestrial nature reserve and an 150.86 ha proclaimed Marine Protected Area (MPA) giving the reserve a total area of 1 076.07 ha. Rocherpan is bound on the west by the Atlantic Ocean. The northern and southern boundaries adjoin private land. The eastern boundary is formed in part by the Sishen-Saldanha Transnet private road and railway line, and the public road between Velddrif and Elands Bay.

Penguin (Bird) Island Nature Reserve is located approximately 280 km northwest of Cape Town and lies about 50 m offshore of the town Lamberts Bay on South Africa's West Coast. It has the latitude 32° 05' 22.13" S and longitude 18° 18' 07.65" E. The reserve is approximately 4.54 ha in size and is approximately 298 m long and 236 m wide. The island is flat and low-lying, with the highest point above sea level being only 10 m.

Elands Bay State Forest is located approximately 180 km north of Cape Town. The reserve covers an area of 389.20 ha. It is located 3 km northeast of the town of Elands Bay and can be accessed via the R27 road.

The remaining sites that make up the complex include Elephant Rock Island Nature Reserve just north of the Olifants River Estuary, Paternoster Rocks Island Nature Reserve just offshore from Groot Paternoster Point, and Jacobs Rock Island Nature Reserve just offshore from Jacobs Bay. The latter reserves are small, low lying marine islands and rocks. Elephant and Jacobs Rocks Island Nature Reserves are distinct islands whereas Paternoster Rocks comprises a cluster of rocks.

2.1.4 Municipal jurisdiction

The district and local municipal boundaries within which the Sandveld Coastal Complex is situated are listed in Table 2.3.

Table 2.3: Municipalities into which the Sandveld Coastal Complex falls.

District Municipality	
West Coast District Municipality	
Local Municipality	Nature Reserve
Cederberg Municipality	Penguin (Bird) Island Nature Reserve, Elands Bay State Forest
Bergrivier Municipality	Rocherpan Nature Reserve
Saldanha Bay Municipality	Paternoster Rocks Island Nature Reserve, Jacobs Rock Island Nature Reserve
Matzikama Municipality	Elephant Rock Island Nature Reserve

2.1.5 International, national, and provincial listings

Marine Protected Area:

On 27 July 1990, the coast and sea 500 m seawards from the high-water mark off Rocherpan Nature Reserve were proclaimed a marine reserve under the Sea Fishery Act, 1988 (Act No. 12 of 1988) in Government Gazette No. 12667, Proclamation No. R1810.

The Sea Fishery Act, 1988 (Act No. 12 of 1988) was repealed by the Marine Living Resources Act, 1998 (Act No. 18 of 1998), which commenced on 1 September 1998. This led to Rocherpan Marine Reserve being declared as a Marine Protected Area (MPA) under subsection 84(4) of the latter act. This subsection states that an area set aside as a marine reserve under the provisions of the former act shall be deemed to have been declared a MPA in terms of the latter act.

Important Bird Area:

Penguin (Bird) Island Nature Reserve was designated as an international Important Bird Area according to Criteria A1 (the site regularly holds significant numbers of globally Threatened species), A4i, A4ii, A4iii (A4 - the site holds congregations of >1% of the global population of one or more species on a regular or predictable basis) (Marnewick *et al.* 2015).

Ramsar Sites:

Although not part of the Sandveld Coastal Complex, the Verlorenvlei and Berg River Estuaries have been designated wetlands of international significance (Ramsar 2019). Verlorenvlei was designated a Ramsar site in 1991 and Berg River Estuary in 2022. Both these sites are key waterbird breeding and roosting sites along the West Coast and fall within the complex's zone of influence.

2.2 Biophysical Description

2.2.1 Climate

The Sandveld Coastal Complex experiences a temperate, Mediterranean-type climate, with hot, dry summers and moderate to cool, wetter winters. The air above the Atlantic Ocean and cold Benguela current has a moderating effect on temperatures especially along the coastal zone. Mean annual temperatures range from 12-23°C. The highest maximum temperature is in February, with an average daytime temperature of 26°C. The mean minimum temperature is in August, with an average nighttime temperature of 8°C. Average monthly temperatures for the Nortier weather station located just outside Lamberts Bay are indicated in Figure 2.1.

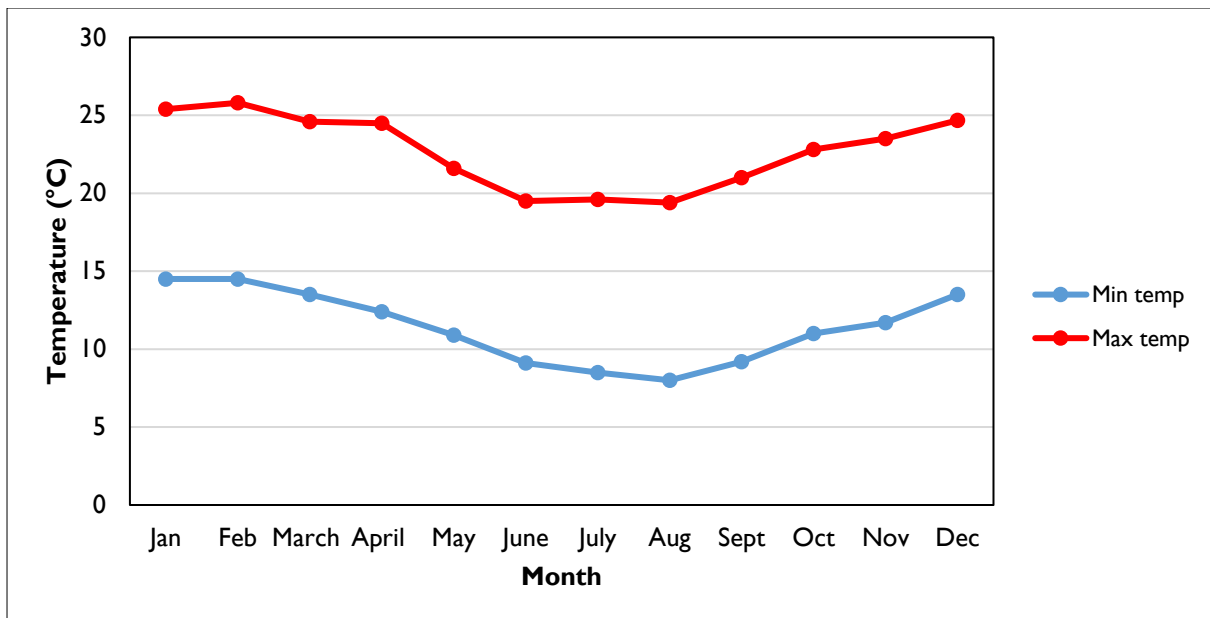


Figure 2.1: Average maximum and minimum temperatures for the Nortier weather station for the period 2010-2020. Data provided by the South African Weather Service (2021).

Average rainfall throughout the complex is mostly low to moderate, and generally occurs as a result of cold fronts moving in from the South Atlantic Ocean. Mean annual rainfall recorded at the Nortier weather station was 178.7 mm per annum for the 10-year period (2010-2020), but there is considerable inter-annual variability in rainfall (Figure 2.2). For example, in 2013 a total of 295.2 mm was recorded whereas during a regional drought in 2015, only 111 mm was recorded.

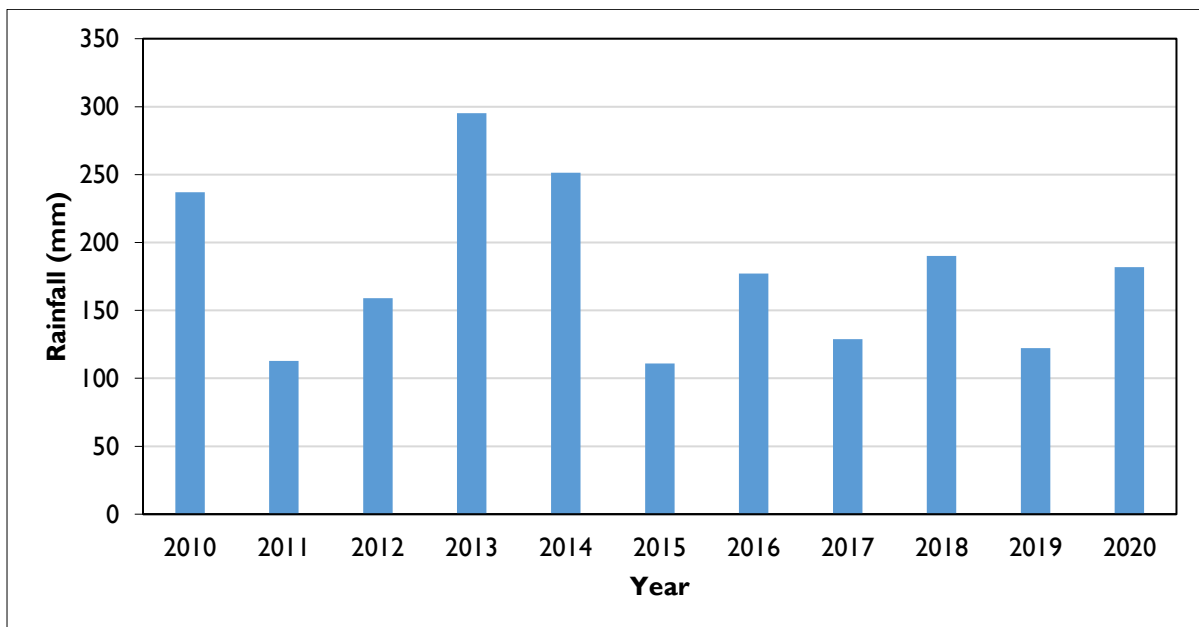


Figure 2.2: Total annual rainfall for the Nortier weather station for the period 2010-2020. Data provided by the South African Weather Service (2021).

The complex falls within the winter rainfall region of South Africa. Most of the rain occurs between May and August, normally peaking in June (Figure 2.3), although there is some inter-annual variation in rainfall timing. June, July, and August are considered the wettest over a consecutive three-month period, with the rainfall averaging at 32.3 mm. Coastal fog mainly occur in the winter months from May to August.

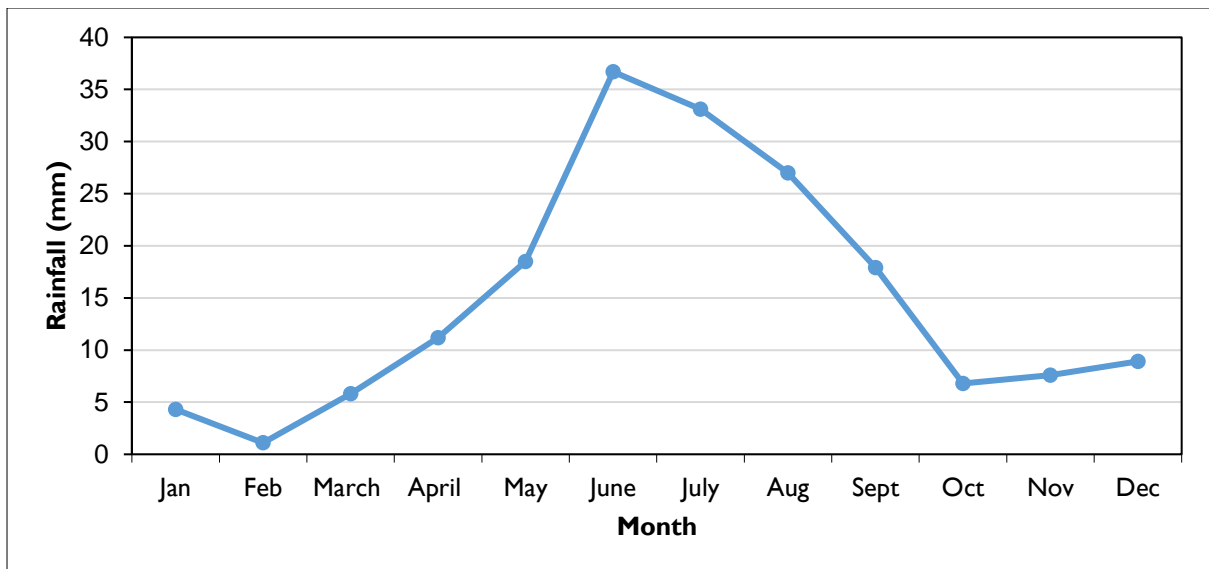


Figure 2.3: Average monthly rainfall for the Nortier weather station for the period 2010-2020. Data provided by the South African Weather Service (2021).

Northerly and north-westerly winds predominate in winter and southerly and south-easterly winds in summer. The incidence of calms is greatest in spring and autumn months (September-November and March-May) (Jürgens *et al.* 2010). On the mainland, dry, desiccating easterly berg winds can occur at any time of the year. Figure 2.4 provides a summary of wind speeds and direction recorded at the Cape Columbine weather station located just outside Paternoster. Southerly winds (speeds and directions) dominate.

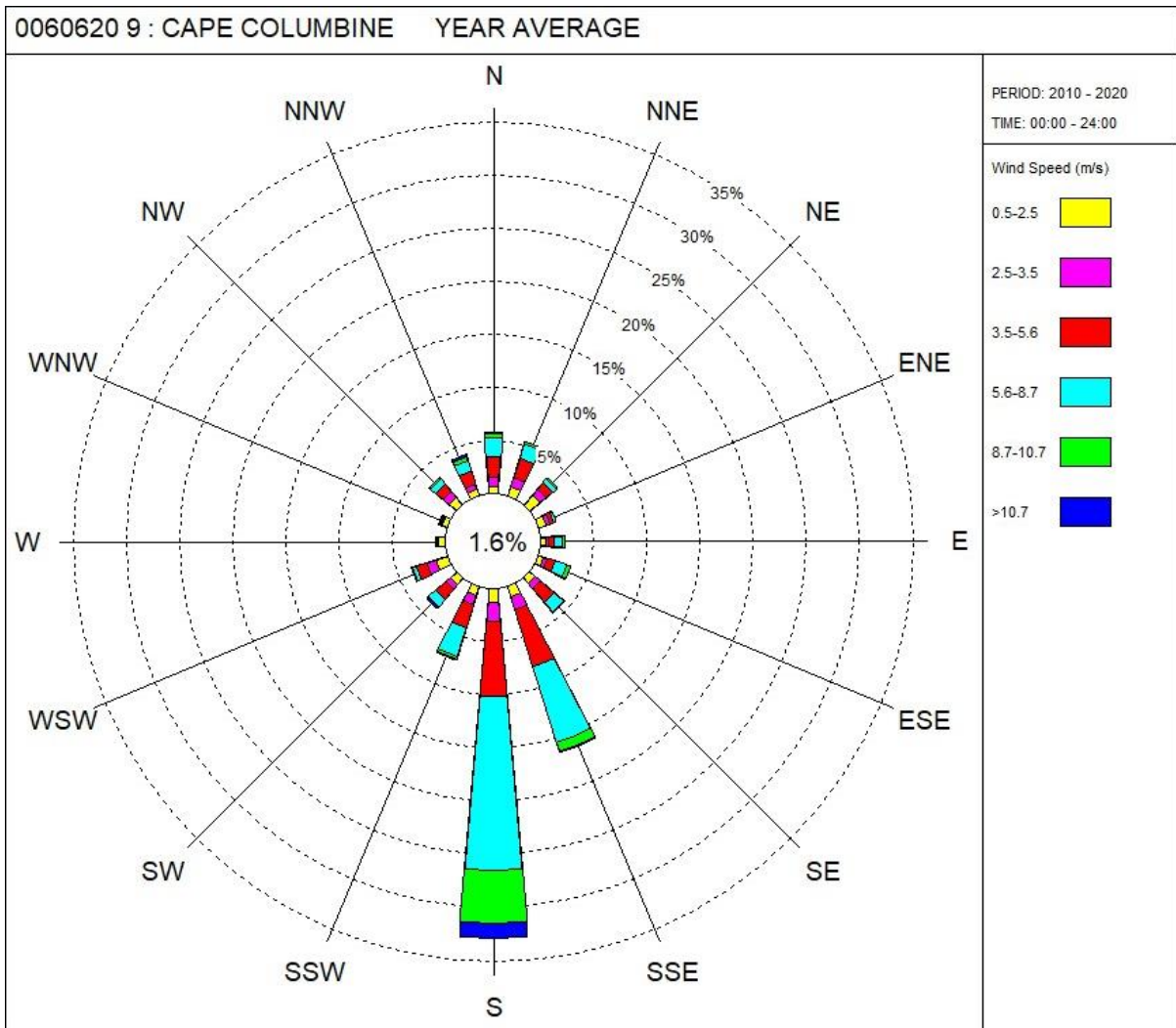


Figure 2.4: Average wind speed and direction for the Cape Columbine weather station for the period 2010-2020. Data provided by the South African Weather Service (2021).

The western part of Penguin (Bird) Island Nature Reserve is frequently inundated by the sea during spring high tides and storm surge events (Figure 2.5), when waves can break over the breakwater wall and inundate a large section of the western part of the island (Figure 2.6). During such events the island is inaccessible to staff and visitors. Extreme storm events can result in the entire island being inundated with a detrimental effect on Cape gannet *Morus capensis* breeding success.

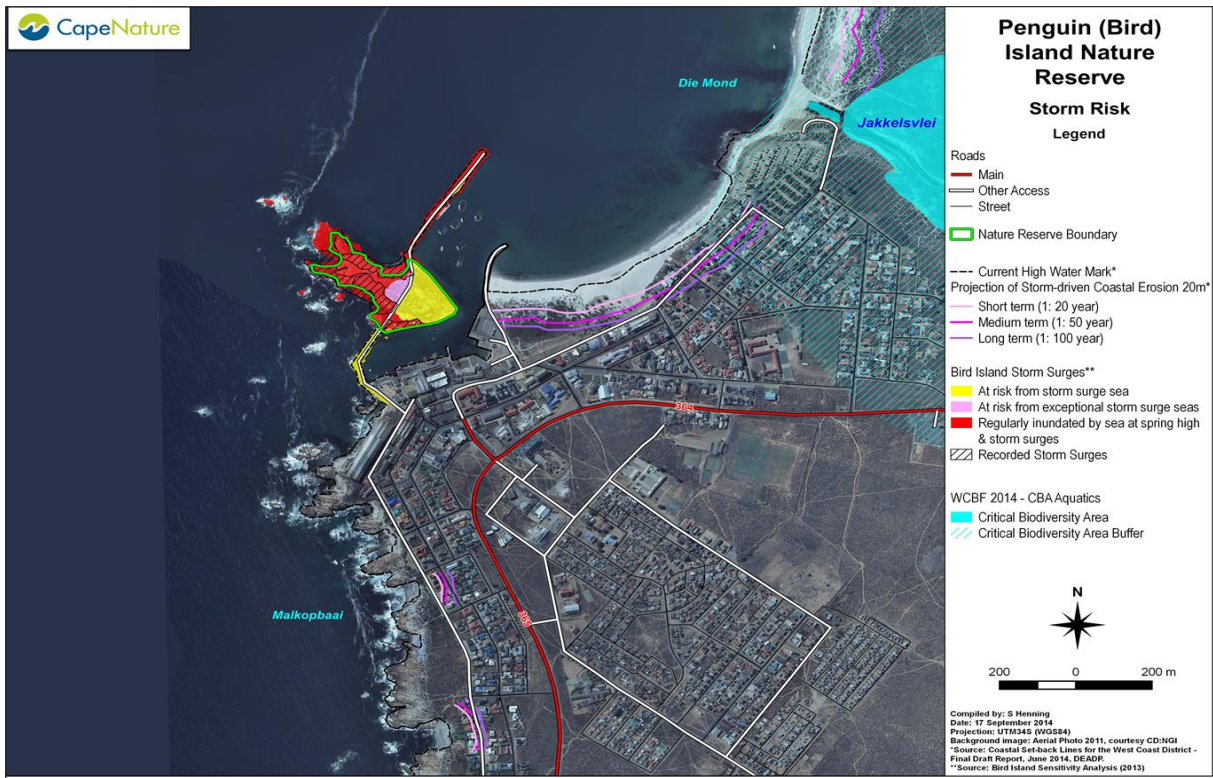


Figure 2.5: Storm risk on Penguin (Bird) Island Nature Reserve.



Figure 2.6: Storm surge breaching the harbour breakwater wall which is the only access point to Penguin (Bird) Island Nature Reserve (Photo: Y. Chesselet).

2.2.2 Topography

Rocherpan Nature Reserve is fairly flat and low-lying as it is situated in the coastal plain. The western coastal dune system is the only part of the reserve providing some elevation. The highest elevation is

20 m above sea level. The Rocherpan MPA elevation is absolute zero. Penguin (Bird) Island Nature Reserve is flat and low-lying, the highest point being only 10 m above sea level.

Much of the Elands Bay State Forest is made up of white mobile sand that was blown in from the coast. The more established dunes on the reserve forms a rolling topography. The highest elevation on the reserve is approximately 120 m above sea level.

Paternoster Rocks Island Nature Reserve comprises a number of small islands and smaller rocks directly off the point at Groot Paternoster. The rocks vary in height and are subject to wave impacts during storm events; only the highest parts remain dry during high tides and even less so during storm surges.

Jacobs Rock and Elephant Rock Island Nature Reserves are small, distinct rocky islands that have elevations of up to 8-10 m above sea level.

Appendix 1, Map 2 illustrates the topography of the Sandveld Coastal Complex.

2.2.3 Geology and soils

The coastal platform, on which Rocherpan Nature Reserve and MPA are located, cuts across hard quartzose as well as softer rocks and is stepped from an elevation of 400 m in the foothills of the mountains down to the coast (Wessels 1997). The smoothly undulating plain is underlain by Malmesbury formation phyllites. Along the West Coast a strip of drift sand of considerable depth (Lambrechts 1979) covers an old coastal plain with elevations less than 50 m. In the Velddrif area, to the south of the complex, the sand cover extends up to 50 km inland. The even, plain surface is however broken by a number of smooth, rounded granite batholiths such as Paarl Mountain, as well as relic anticlinal Table Mountain Group massifs such as Piketberg, Simonsberg and the Cape Peninsula (Wessels 1997).

The majority of the West Coast strandveld is tertiary to recent sediments (conglomerate, limestone, sandstone, marl, gravel, sands), with white to slightly reddish sand (Visser & Schoch 1973). These white to reddish sands are derived from adjoining unconsolidated sands and clay. Near the sea the soil becomes finer and chalky. The dune sand contains marine shells, and the beaches are rich in shells and a certain amount of rounded pebbles.

There is an abundance of aeolian deposited tertiary to residual sands. The dune slacks have been formed on granite-gneiss (Wessels 1997). The deposits consist of mostly conglomerates, sandstone, limestone, marble, gravel, and sand. Small deposits of gypsum are also present. Appendix 1, Map 3 shows the geology of the Sandveld Coastal Complex and illustrates the different kind of substrates distributed within the complex and wider region.

Outcrops and underlying bedrock on Penguin (Bird) Island Nature Reserve belong to the Piekenierskloof Formation, the lowermost lithostratigraphic unit of the Table Mountain Group. It overlies the Neoproterozoic Gariep Supergroup and Malmesbury Group unconformably. The absence of diagnostic biogenic traces and fossils in the Piekenierskloof Formation precludes its accurate dating, but a combination of tectonic and isotopic data from the underlying sequences suggest an Early Ordovician age (ca 480 Ma) (CapeNature 2015b).

Penguin (Bird) Island is predominately comprised of white/cream quartzite, with small patches of conglomerate and shale lenses. The pebbles within the conglomerate include quartzite, granite, and jasper. According to Thamm (1993), sandstone constitutes approximately 70-100% and conglomerate approximately 0-30% of the sequence, with mudrock being less than 5%. The presence of two distinct lithofacies associations in the Piekenierskloof Formation has led to its subdivision into the De Hoek Member (trough and planar cross-bedded sandstone with localised horizontal bedding) and the Rest Member (conglomerate, oligomictic granule- to cobble-sized clasts, matrix-supported and clast-supported, coarse-to very coarse-grained sandstone interbeds). Due to the small limited spatial extent of the exposed outcrop, it is difficult to determine which of the two members is represented on Penguin (Bird) Island specifically.

Intrusive into the Piekenierskloof Formation are at least two intersecting dark red trachyte dykes traversing the north-eastern headland, with an approximate age of 130-140 million years. The larger dyke is north-south trending with a shorter dyke being orientated approximately east-west. There are several outcrops of banded metamorphic rock suggesting that there may be several more dykes buried under surface sediments or underwater. Overlying the Piekenierskloof Formation to the west of the causeway are coarse sand and pebbles. To the east of the causeway, are anthropogenic sediments consisting of dredged sand and shells (CapeNature 2015b).

According to the Council for Geoscience (CGS 1973), the Elands Bay State Forest is underlain by Cambrian aged mudstone and minor sandstone of the Populiersbos Formation (Klipheuwel Group) which outcrops south of Verlorenvlei. The Ordivician aged Piekenierskloof, Graafwater and Peninsula Formations of the Table Mountain Group overlie the Populierbos Formation. Of these three Table Mountain Group formations, the Piekenierskloof, consisting of sandstone (pebbly in places) and conglomerate, is most significant as it is the lowest lying of the three and therefore the most exposed in this area. The reserve is overlain by the Tertiary and Quarternary deposits of the Varswater and Witzand Formations respectively. Loamy and sandy loam soil is also found on the reserve. The Varswater Formation is comprised of quartzose sand, pelletal phosphorite, gravel, sandy silt, grey-black carbonaceous kaolinitic clay and peat although it is likely that at Elands Bay, the organic and clay components are absent. The generally unconsolidated, calcareous dune sand of the Witzand Formation is characteristic of the reserve (Figure 2.7).



Figure 2.7: Unconsolidated, calcareous dune fields of Elands Bay State Forest (Photo: M. Wheeler).

The Witzand Formation forms part of the Sandveld Group aquifer (GEOSS 2010), a largely intergranular aquifer with typical borehole yields of > 5 l/s. This unconfined aquifer has a thickness of between 9 and 30 m and yields good quality water at Elands Bay with electrical conductivity measured at between 54 and 115 mS/m (GEOSS 2010).

The geology of the Sandveld Coastal Complex is illustrated in Appendix I, Map 3.

2.3 Biodiversity Context: Ecosystems

2.3.1 Vegetation

The Sandveld Coastal Complex falls fully within the Core Cape Subregion (Manning & Goldblatt 2012). The Core Cape Subregion (previously termed the Cape Floristic Kingdom) has a flora that differs sharply from the immediate surrounds (Manning & Goldblatt 2012). This Subregion is one of the world's smallest but richest floral kingdoms, encompassing a land area of approximately 90 760 km² (less than 4% of the southern African subcontinent). An estimated 9 383 species of vascular plants (ferns and other spore-bearing vascular plants, gymnosperms, and flowering plants) are known to occur here, of which just over 68% are endemic. The majority of these species are flowering plants. The Core Cape Flora of the Greater Cape Floristic Region is characterised by six endemic or near-endemic families and by the conspicuous presence of Asteraceae and Fabaceae (the two largest families), and the Iridaceae, Aizoaceae, Ericaceae, Proteaceae, and Restionaceae (Manning & Goldblatt 2012). The Core Cape Subregion is notable for its range of ecosystems, from coastal foredunes through strandveld, lowland and mountain fynbos.

The vegetation of the area has been mapped nationally at a 1:1 000 000 scale (Mucina & Rutherford 2006; SANBI 2006). The original 2006 national vegetation map was recently updated with substantive changes to vegetation units in the Namaqualand area and the Subtropical Thicket vegetation units in the Western Cape and Eastern Cape Provinces (SANBI 2006). According to the latest information a total of four different vegetation units occur within the Sandveld Coastal Complex. These are listed in Table 2.4 and illustrated in Appendix I Map 4.

South Africa recognises that different ecosystems have differing species compositions and to effectively conserve biodiversity, the country has set targets for each ecosystem (see Table 2.4). The biodiversity target is the minimum proportion of each ecosystem type that needs to be kept in a natural or near-natural state over the long term to maintain viable representative samples of all ecosystem types and to maintain most of the species associated with those ecosystems. The biodiversity target is calculated based on species richness, using species-area relationships, and varies between 16% and 36% of the original extent of each ecosystem type (Desmet & Cowling 2004).

Threat status is provided for each ecosystem (see Table 2.4). Ecosystem threat statuses are provided in the most recent National Biodiversity Assessment (NBA) compiled by the South African National Biodiversity Institute (SANBI). Following the completion of the NBA in 2018, the red list of terrestrial ecosystems was updated in 2021 based on updated national and provincial land cover data and updated threatened species data (Skowno & Monyeke 2021; RSA 2022).

Table 2.4: Vegetation types conserved by the Sandveld Coastal Complex.

Vegetation Unit	Provincial Protection Target (ha)	Target conserved in the Sandveld Coastal Complex (ha)	Target conserved in the Sandveld Coastal Complex (%)	Ecosystem Status (2021)
Saldanha Flats Strandveld	38 067.06	533.77	1.40	Endangered
Lambert's Bay Strandveld	16 947.65	16.32	0.09	Critically Endangered
Langebaan Dune Strandveld	7 492.64	737.97	9.84	Endangered
Cape Seashore Vegetation	982.90	32.93	3.03	Least Concern

2.3.1.1 Vegetation unit descriptions

The vegetation of the Sandveld Coastal Complex currently consists of four vegetation units (Table 2.4) however this section will also describe a fifth unit (Cape Inland Salt Pans) which was applicable in the previous version of the South African Vegetation Map (Rebello *et al.* 2006). The latter provides

more detail pertaining specifically to the open pan habitat which features prominently within the Rocherpan Nature Reserve. Rocherpan comprises three vegetation units namely, Saldanha Flats Strandveld, Langebaan Dune Strandveld and Cape Seashore Vegetation (SANBI 2006). Elands Bay State Forest comprises two units namely Lambert's Bay Strandveld and Langebaan Dune Strandveld. Of the four vegetation units within the complex, three are Threatened and one is Least Concern (SANBI 2021).

Some of the other components of the Sandveld Coastal Complex, namely Elephant Rock Island, Jacobs Rock Island, and Paternoster Rocks Island Nature Reserves, are all denuded of vegetation.

Little is known about the vegetation on Penguin (Bird) Island Nature Reserve. The high levels of nitrates and phosphates in guano, in conjunction with high salt levels in dredged sediments, have largely stifled plant growth. The declines of sea bird populations, and the leaching of salts out of the soil, have allowed some plant species to become established. Vegetation composition and cover however remains limited.

The current plant list for the Sandveld Coastal Complex contains 307 taxonomic records (CapeNature 2023a). The following is a description of the various vegetation units occurring in the complex.

Saldanha Flats Strandveld (FS 3):

The conservation target for this vegetation unit is 24% (Mucina *et al.* 2007). The unit is listed as Endangered.

Some 11% of the unit is statutorily conserved; however, more than half of the unit has already been transformed for cultivation, roads, and urban development. Alien infestation is a serious concern caused by trees such as rooikrans *Acacia cyclops* and Port Jackson *A. saligna*, and herbs including wild oats *Bromus diandrus* and wild clover *Medicago polymorpha* (Rebelo *et al.* 2006).

Saldanha Flats Strandveld occurs on the sandy coastal flats, both north and south of the Berg River, at elevations of up to 120 m. Most of the Rocherpan Nature Reserve is covered by this unit. Soils are alkaline to neutral sands, south of the Berg River often overlying shallow limestone (frequently visible in ploughed lands as piles of stone), and in rare instances the sands overlay shallow granites. The vegetation is usually a fairly dense shrubland up to 1.4 m high with regular emergents (1.5-3 m). There is an abundance of leafy deciduous shrubs, succulents, and restioids, but very few of the other typical fynbos elements such as Rutaceae, Rhamnaceae, Polygalaceae or Proteaceae, and no Ericaceae are present. Thicket elements are nearly always present, often emergent, and spiny, and usually make up 5-15% of the canopy cover. Annuals are common, and geophytes are not diverse, although a few species may be locally common (Mucina & Rutherford 2006; Helme 2007).

This dense shrubland can have up to 70% total canopy cover with two main strata. The higher 2-3 m stratum is dominated by *Euclea racemosa* subsp. *racemosa* and *Stoeberia utilis* subsp. *utilis* and the lower 1-2 m stratum is dominated by *Eriocephalus africanus* subsp. *africanus*, *Melianthus elongatus*, *Willdenowia incurvata*, and *Ballota africana*. Other important species in this community are *Pteronia onobromoides*, *Pteronia divaricata*, *Calobota angustifolia*, *Calobota spinescens*, *Salvia lanceolata*, *Hermannia scordifolia*, *Hermannia trifurca*, *Eriocephalus racemosus*, *Searsia glauca*, *Searsia laevigata*, *Tetragonia fruticosa*, *Putterlickia pyracantha*, *Cissampelos capensis*, and *Asparagus*. Endemic taxa include the geophytic herbs *Hessea mathewsii* (Critically Endangered) and *Romulea elliptica* (Endangered) (Rebelo *et al.* 2006). Figure 2.8 provides an example of this vegetation unit.



Figure 2.8: Saldanha Flats Strandveld within Rocherpan Nature Reserve (Photo: D Kirkwood).

Lambert's Bay Strandveld (FS 1):

The conservation target for this vegetation unit is 24% (Mucina *et al.* 2007). The unit is listed as Critically Endangered.

This vegetation unit occurs along a coastal strip between Donkin Bay and Elands Bay at elevations of 20-180 meters above sea level. Only about 0.09% of this vegetation unit is statutorily conserved in Elands Bay State Forest, with a further 7% occurring in private conservation areas. About 25% is transformed for cultivation. The invasive alien plants rooikrans *Acacia cyclops* and Port Jackson *A. saligna* are of serious concern.

The landscape features comprise consolidated, old, slightly undulating sand-dune fields that support mixed dense shrublands of evergreen sclerophyllous and fleshy, drought-resistant leaved shrubs. The dense understorey is made up of unpalatable succulent shrubs. In degraded areas, perennial herbs and annuals are dominant. Rare species recorded in the area include *Ferraria densepunctulata* (Vulnerable), *F. foliosa* (Near Threatened), and *Cullumia floccosa* (Critically Endangered). West Coast endemic plants include low shrubs such as *Pteronia onobromoides* and *Lycium strandveldense*, succulent shrubs such as *Euphorbia caput-medusae* and *Pelargonium gibbosum*, and herbs such as *Babiana hirsuta* (Near Threatened) and *Felicia josephinae* (Vulnerable) (Rebelo *et al.* 2006).

Langebaan Dune Strandveld (FS 5):

The conservation target for this vegetation unit is 24% (Mucina *et al.* 2007). The unit is listed as Endangered.

The vegetation unit occurs in three large, disconnected patches: a narrow coastal strip from Elands Bay to Velddrif; from Britannia Bay to Danger Bay near Saldanha Bay; and from the Langebaan Lagoon as a narrow strip along the seaboard as far south as Bokbaai with an elevation up to 100 meters above sea level. The landscape features comprise flat to slightly undulating old coastal dune systems and inland duneveld supporting evergreen sclerophyllous shrubland with prominent annual herbaceous flora forming spectacular displays especially after good rain in late winter (Rebelo *et al.* 2006).

Almost 30% of the vegetation unit is statutorily conserved in the West Coast National Park, Sandveld Coastal Complex (contributes 9.84%), and some other coastal reserves. Some 35% is transformed by cultivation and urban sprawl. Alien rooikrans *Acacia cyclops* and Port Jackson *A. saligna* have infested

large areas along the coastal plain, including Elands Bay State Forest. Rocherpan Nature Reserve is however clear of alien plants.

In Rocherpan Nature Reserve, the Langebaan Dune Strandveld of the secondary dunes is characterised by the following species: *Osteospermum moniliferum*, *Euphorbia burmannii*, *E. caput-medusae*, *E. mauritanica*, *Pterocelastrus tricuspidatus*, *Limonium peregrinum*, *Euclea racemosa*, *Tetragonia fruticosa*, *Stoeberia utilis*, *Searsia glauca*, and *Trachyandra divaricata*.

Three strata are recognised. The tallest of 2.5-4 m is dominated by *Pterocelastrus tricuspidatus* and *Euclea racemosa* followed by *Osteospermum moniliferum* and *Roepera margsana* at heights of 1.5-2 m, while *Tetragonia fruticosa* occupies the stratum below 1 m in height. Within Rocherpan, the Langebaan Dune Strandveld can be divided into two sub-units as compiled from Van Rooyen (1981) and Gray (1997) and described below.

Central dune vegetation:

The cover of this vegetation can be up to 65% and it is dominated by *Pterocelastrus tricuspidatus*, which can be taller than 2 m. *Osteospermum moniliferum*, *Euclea racemosa* and *Stoeberia utilis* are between 1-2 m tall and *Tetragonia fruticosa* less than 1 m. Apart from the dominant species mentioned, *Manochlamys albicans*, *Cotyledon orbiculata*, *Euphorbia caput-medusae*, *Euphorbia burmannii*, *Asparagus asparagoides* and *Galium tomentosum* are also of common importance in the lower stratum.

Eastern dune vegetation:

The eastern most dunes closest to the pan consists of two strata. The tallest at 2.5-3 m is dominated by *Euclea racemosa* and *Rhus glauca* while the <1 m stratum is dominated by *Limonium peregrinum*, *Eriocephalus africanus*, *Euphorbia mauritanica* and *Osteospermum moniliferum*. Other important species here are *Stoeberia utilis*, *Tetragonia fruticosa*, *Roepera margsana*, *Euphorbia burmannii*, *Pelargonium gibbosum*, and three *Asparagus* species.

Cape Seashore Vegetation (AZd 3):

The conservation target for this vegetation unit is 20% (Mucina *et al.* 2007). The unit is listed as Least Concern.

This vegetation unit occurs along the temperate coasts of the Atlantic and Indian Oceans in the Western and Eastern Cape provinces. Landscape features include beaches, coastal dunes, dune slacks and coastal cliffs of open grassy, herbaceous, and also dwarf-shrubby vegetation. Almost half of the vegetation unit is statutorily conserved in national parks and nature reserves, including Rocherpan Nature Reserve. Only about 1.7% has been transformed, mainly by urban development (Mucina & Rutherford 2006).

The plant communities on the semi-mobile, white, fine-sand dunes are occasionally mobile or stabilised along the coast. This reflects the age of the substrate (often related to distance from the sea), natural disturbance regime (dune stability), distance from the high-water mark, and the exposure of dune slopes (leeward versus seaward) (Mucina & Rutherford 2006). The sand is well drained and does not support wetlands (Helme 2007).

The vegetation consists of low shrubs (<0.5 m) and graminoids. There is a relatively high degree of succulence, (e.g., *Senecio littoreus*), and a number of genera whose only succulent species occur in this coastal habitat (e.g., *Hebenstretia*, *Dischisma*). Annuals may be common. Many species are adapted to being covered by mobile sands, and thus able to root at nodes. Few geophyte species occur, but those that exist may be prominent (e.g., *Trachyandra divaricata*) (Helme 2007).

The vegetation descriptions provided below for the different subcommunities within this unit has been compiled from Van Rooyen (1981) and Gray (1997).

Foredune vegetation:

This is a single stratum of specialised pioneer species of about 0.3 m high, with a total cover of up to 40%. Species found on the foredune are *Tetragonia decumbens*, *Didelta carnosa*, *Oncosiphon sabulosum*, *Dasispermum suffruticosum*, *Trachyandra divaricata*, *Felicia hyssopifolia* subsp. *hyssopifolia*, and *Cladoraphis cyperoides*.

Arctotheca populifolia, *Hebenstretia cordata*, and *Thinopyrum distichum* (sea wheat, exotic) is often found at the foot of the dunes and are sometimes exposed to spring tides.

Leeward dune vegetation:

Occupying the leeward side of the primary dunes at Rocherpan, this sub-community comprises two main strata. The vegetation cover is up to 65%. The most abundant species occur at 0.3-0.5 m with *Cladoraphis cyperoides* being dominant. Other species present are *Pharnaceum microphyllum* var. *microphyllum*, *Felicia hyssopifolia* subsp. *hyssopifolia*, *Odeyssea paucinervis* and *Helichrysum dunense* (Vulnerable). The taller stratum of 0.5> m is represented primarily by *Stoeberia utilis* and *Roepera morgsana*. Threatened species include *Dischisma crassum*, *Limonium acuminatum* and *Helichrysum dunense* (all Vulnerable) and *Babiana hirsute* (Near Threatened).

Cape Inland Salt Pans (AZi 9):

This vegetation unit does not officially exist in the latest vegetation map (SANBI 2006) and has been wholly incorporated into Langebaan Dune Strandveld. It is, however, kept in this section as it provides specific details about this plant community which is associated with the pan floor; a prominent feature within Rocherpan Nature Reserve.

The vegetation unit occurs in both the Western and Eastern Cape provinces, at elevations ranging from 1-150 meters above sea level. The landscape features include small depressions dominated by low succulent scrub composed of creeping chenopods and salt-tolerant herbs and grasses. Originally, most of the saline pans were coastal lagoons but became dry after having been cut off from the sea (Mucina & Rutherford 2006).

At Rocherpan Nature Reserve this vegetation unit is essentially seasonal wetland vegetation in a sandy area where the wetland nature of this habitat is due to underlying clay and calcrete, which are less porous than the sands. The pan is extremely saline, and saltmarsh vegetation grows in zones or terraces determined by the seasonality of the inundated parts of the wetland. The deeper the terrace, the less botanically diverse the vegetation becomes (Gray 1997; Van Rooyen 1981).

Two ecotones have been identified within Rocherpan Nature Reserve. Saldanha Flats Strandveld/Salt Pan Ecotone is found on the eastern side of the pan, between the reed peripheral or wetland margin and the Saldanha Flats Strandveld. This ecotone has many of the same species as the Saldanha Flats Strandveld, but the structure is different (lower shrubland with sparser vegetation) and species diversity is lower. *Roepera morgsana*, *Osteospermum moniliferum*, *Ruschia bolusiae* and *Limonium peregrinum* are the most obvious plant species.

Species distribution in the Salt Pan/Margin Wetland Vegetation Ecotone is patchy. This ecotone is dominated by *Sarcocornia pillansii* and *Ficinia nodosa* and is situated around the entire pan next to *Juncus acutus* subsp. *leopoldii*. directly bordering the surface water during the wet season. There are also large patches of common reed *Phragmites australis* with 100% cover of 3 m or taller. Along the southern end of the pan *Senecio halimifolius* forms a stratum of 2 m tall. The 1 m stratum is recognised by *Ficinia nodosa* and the <0.5 m stratum by *Sarcocornia pillansii*. The plant growth of this community is thick with an almost 100% canopy cover throughout.

Juncus acutus subsp. *leopoldii* forms a narrow, single species band up to 1.5 m high, directly along the edges of the pan, often with 100% cover. The plant bases can be water inundated for short periods during the wet season. *Heliotropium curassavicum* and *Nidorella foetida* can also be found in this zone but are less important than *Juncus acutus* subsp. *leopoldii*, and only appear after the water level has receded.

In the shallow seasonal water of the pan, two <0.1 m high mat-forming species, *Sarcocornia natalensis* subsp. *affinis* and *Sporobolus virginicus*, dominate; the former is prolific throughout the community while the latter is more prominent in the northern sections of the pan that dries out sooner. As the pan dries out and *Sarcocornia natalensis* subsp. *affinis* becomes water stressed it turns reddish/pink, forming spectacular displays.

Important plant taxa found within this vegetation unit include *Drosanthemum salicola*, *Orphium frutescens*, *Senecio halimifolius*, *Sarcocornia capensis*, *Lycium cinereum*, and herbs such as *Frankenia repens*, *Limonium equisetinum*, and *Chironia baccifera* (Mucina & Rutherford 2006).

2.3.1.2 Flora species of conservation concern

Table 2.5 provides a summary of the 17 known flora species of conservation concern that are known to occur in the Sandveld Coastal Complex (Raimondo et al. 2009).

Table 2.5: Summary of highly restricted species within the Sandveld Coastal Complex (Raimondo et al., 2009).

Nature Reserve	Species	Family	Threatened Status
Elands Bay State Forest	<i>Cullumia floccosa</i>	Asteraceae	Critically Endangered
	<i>Ferraria densepunctulata</i>	Iridaceae	Vulnerable
	<i>Ferraria foliosa</i>	Iridaceae	Near Threatened
Rocherpan Nature Reserve	<i>Babiana hirsuta</i>	Iridaceae	Near Threatened
	<i>Dischisma crassum</i>	Scrophulariaceae	Vulnerable
	<i>Galenia crystallina</i> var. <i>maritima</i>	Aizoaceae	Vulnerable
	<i>Helichrysum dunense</i>	Asteraceae	Vulnerable
	<i>Limonium acuminatum</i>	Plumbaginaceae	Vulnerable
Wider distribution within the Sandveld Coastal Complex	<i>Argyrolobium velutinum</i>	Fabaceae	Vulnerable
	<i>Babiana tubulosa</i>	Iridaceae	Near Threatened
	<i>Capnophyllum africanum</i>	Apiaceae	Near Threatened
	<i>Drosanthemum marinum</i>	Aizoaceae	Near Threatened
	<i>Felicia josephinae</i>	Asteraceae	Vulnerable
	<i>Helichrysum tricostatum</i>	Asteraceae	Near Threatened
	<i>Hessea mathewsii</i>	Amaryllidaceae	Critically Endangered
	<i>Romulea elliptica</i>	Iridaceae	Endangered
<i>Ruschia indecora</i>	Aizoaceae	Near Threatened	

2.3.1.3 Fire regime

Rocherpan Nature Reserve is mainly comprised of Strandveld vegetation (Saldanha Flats and Langebaan Dune). Despite the high vegetation cover of the Strandveld shrublands, fire frequency is low as the succulent component impedes the spread of fire, except under exceptional conditions (Mucina & Rutherford 2006). Fire management is of a low ecological and operational concern, but firebreaks are maintained along the boundary and around visitor infrastructure to mitigate and manage accidental fires.

Elands Bay State Forest is mainly comprised of Langebaan Dune Strandveld vegetation. Although the area has a dense shrubland cover, fire frequency is low as the succulent nature of Strandveld impedes the spread of fire, except under exceptional conditions (Mucina & Rutherford 2006). Within the reserve the presence of stands of alien plants such as rooikrans *Acacia cyclops* does however increase the fire risk and frequency. Accidental fires have resulted in some sections of veld (primarily outside the reserve) burning but this is not of ecological or operational concern within the reserve. Elands Bay State Forest primarily comprises open dune habitat (associated with the Langebaan Dune Strandveld vegetation unit). This open dune habitat primarily faces the threat of vegetation stabilisation by either alien or indigenous woody or grassy components. Fire and alien wood harvesting inside the reserve are beneficial as it reduces unwanted biomass and assist with mitigating the vegetation stabilisation threats.

Fire is not of ecological concern for any of the offshore islands within the Sandveld Coastal Complex.

2.3.1.4 Invasive and alien plants

The most problematic invasive alien plant present in the Sandveld Coastal Complex is rooikrans *Acacia cyclops*. This species occurs at medium density (25-50%), mainly at Elands Bay State Forest. Historically this species was planted in the reserve, including various other sites within the West Coast, to assist with dune sand stabilisation. The flower galling midge *Dasineura dielsi* is a very effective biological control agent of rooikrans and it is widespread across the whole West Coast, including the reserve. Other species that occur here at rare to very scattered densities (0-5%) include Port Jackson *Acacia saligna*, prickly pear *Opuntia ficus-indica* and a few *Eucalyptus* tree species.

The threat posed to Rocherpan Nature Reserve by invasive alien plants is minimal due to their small numbers and clustered occurrence at the old farmstead, the CapeNature office buildings and tourism chalets. For this reason, Appendix I, Map 5 shows only rare or occasional infestation in the reserve. Invasive alien plant species densities for the Sandveld Coastal Complex are illustrated in Appendix I, Map 5.

Invasive alien plants are of minimal ecological concern for the offshore islands within the Sandveld Coastal Complex.

2.3.2 Freshwater ecosystems

No freshwater ecosystems are associated with the islands and the Rocherpan MPA. This section only relates to the Elands Bay State Forest and Rocherpan Nature Reserve terrestrial sections. The Strandveld Coastal Complex falls within the Olifants-Doring catchment of the Berg-Olifants/Doring amalgamated Water Management Area. The Rocherpan Nature Reserve is located just north of the border between the Olifants/Doring and the Berg River catchment side of the Water Management Area. According to the aquatic ecoregions (level 1) identified for southern Africa, the Elands Bay State Forest falls into the Western Coastal Belt, while Rocherpan Nature Reserve is located within the Southwestern Coastal Belt (Kleynhans *et al.* 2005). Elands Bay State Forest overlays a small section of the Sandveld National Strategic groundwater source area and Rocherpan Nature Reserve is located just outside the extent of the West Coast Aquifer Strategic groundwater source area (Le Maitre *et al.* 2018).

The freshwater ecosystems of the Sandveld Coastal Complex are illustrated in Appendix I, Map 6.

2.3.2.1 Groundwater

In the larger Olifants-Doring catchment, both Tertiary to Recent sediments occur along the major river courses and extensively along the coast (DEA&DP 2011). Subsequently, the dominant geology underlying the Elands Bay State Forest and Rocherpan Nature Reserve consists of Quaternary sediments (alluvial and sedimentary rock) of the Kalahari Deposits formation (DEA&DP 2011).

Underlying sediments at Rocherpan Nature Reserve consists of undifferentiated coastal deposits (unconsolidated to semi-consolidated sediments including sand, gravel, clay, peat, and limestone) (DWAF 2002). The geohydrological setting comprises unconsolidated tertiary dune sand and brackish calcareous sand which in turn is underlain by Malmesbury Group greywacke and shale. The unconsolidated deposits are approximately 15-20 m thick. The groundwater resources occur within the unconsolidated deposits and the quality is variable. The groundwater becomes increasingly saline with increasing depth below ground surface level. It is particularly poor around the Rocherpan vlei (electrical conductivity of 100-300 mS/m) and therefore not suitable for domestic use (DWAF 1998). The groundwater of the unconfined aquifer and surface water quality generally improves during winter with a significant decrease in electrical conductivity, indicating a decrease in the total dissolved solids concentration. However, during summer months, the electrical conductivity of the water more than doubles (Toens & Associates 1994). The water table is shallow at approximately 2.5 m below ground level (Conrad *et al.* 2011) and unconfined, intergranular aquifer yield is low, within a range of 0.1-0.5 l/s (DWAF 2002).

The underlying geology at Elands Bay State Forest varies from argillaceous and arenaceous rock (in equal proportions) to the south, with alluvium sediments (including sand, gravel, and boulders) in the northern parts. The aquifer water yield varies from 0.5-2 L/s in the fracture rocks, up to 2-5 L/s in the intergranular rocks. The water quality here is better and has electrical conductivity ranging between 70-300 mS/m (DWAF 2002).

There are three production boreholes within Elands Bay State Forest in the Graauwe Duynen well field, which abstract water from the unconsolidated Witzand Formation. The well field (production and monitoring boreholes) supplies the town of Elands Bay and is administered by the national Department of Water and Sanitation (DWS) as custodian of water resources. DWS also monitor the well field in collaboration with the local Cederberg Municipality. In the past, the production boreholes from Graauwe Duynen well field alone were not sufficient to meet demand and the water quality was not acceptable (GEOSS 2010). However, in 2007, with the establishment of the Waaihoek Wellfield to the Southeast of the reserve, the water quality and quantity of the combined well fields have improved the water supply to the town of Elands Bay (GEOSS 2010).

Pump rate recommendations for the Graauwe Duynen well-field were proposed following pump testing (GEOSS 2010; see Table 2.6). Sustainable yields for the three boreholes are given as 427 kl/day. Based on recommendations, Graauwe Duynen well field supplies 34% of the town's water supply with Waaihoek well field supplying the remaining 66%. The forecast water production requirement for the town of Elands Bay together with the safe yield recommendations indicates that around 2033, Elands Bay will only be using 38% of the available sustainable groundwater supply.

Table 2.6: Pump details, pumping recommendation, and water quality for the three boreholes in the Graauwe Duynen wellfield.

Borehole	Yield (l/s)	Duration per Day (h)	Yield (kl/day)	Yield (kl/month)	Pump Depth	Electrical Conductivity (mS/m)
R1	1.09	12	47.08	1 412	24.70	79.50
R2	0.61	12	26.35	790	25.50	54.10
R3	8.20	12	354.24	10 627	38.54	115.60

Despite the predicted sustainability of the groundwater supply, any new development will put a major strain on available resources. The monitoring and management of the well field remains crucial since the area experiences very low rainfall and is located close to the sea, making saltwater intrusion a very real risk. As abstraction takes place from shallow intergranular aquifers near the surface, these abstraction points are also at risk of contamination due to pollution from inadequate sanitation facilities in the area (Umvoto 2011). An additional risk identified for this area is mining. The underlying geology of the area is conducive to the occurrence of heavy minerals and other economically viable mining commodities. The continued monitoring of key boreholes in the area is therefore critical to inform any future development planning.

2.3.2.2 Rivers

No rivers occur within Elands Bay State Forest. This reserve is located close to the northern shore of the lower Verlorenvlei River wetland (Figure 2.9) and estuary. The Verlorenvlei River is of ecological importance for several reasons. It is a Knersvlakte Bioregion floodplain wetland which is Critically Endangered, feeding into a cool temperate estuarine lake system, which is an Endangered and poorly protected system (National Wetlands Map 5; van Deventer *et al.* 2019). The Verlorenvlei wetland and river itself is currently unprotected. This system houses the endemic Endangered Verlorenvlei redbfin minnow *Pseudobarbus verloreni* in the upper reaches (Chakona *et al.* 2014). The Verlorenvlei wetland is also a declared Ramsar site and is particularly important for local and migratory bird species (Ramsar 2019). Elands Bay State Forest falls into the National Freshwater Ecosystem Area (NFEPA) fish support area associated with the Verlorenvlei system in the south, and the southernmost part of the NFEPA fish support area sub-catchment that is associated with the lower section of the Langvlei River that lies north of Verlorenvlei (Nel *et al.* 2011a; Nel *et al.* 2011b) (see Appendix I, Map 6).



Figure 2.9: Lower Verlorenvlei (Photo: K. Shaw).

Two small seasonal rivers flow into the Rocherpan Nature Reserve; the Papkuils and Sout rivers. According to the NFEPA project, the Papkuils River is classified as being moderately modified, i.e., Class C (Nel *et al.* 2011a; Nel *et al.* 2011b). It is also not listed as a Freshwater Ecosystem Priority Area. The Rocherpan vlei is almost entirely dependent on the inflow of water from the Papkuils River that has its source on the farm Rietvlei in the catchment area of the Aurora Mountains. The 24-km river flows through 15 farms before reaching the Rocherpan wetland within the Rocherpan Nature Reserve. The Sout River catchment is small and contributes insignificantly to the Rocherpan wetland.

Historically the Rocherpan wetland was small and highly seasonal and only received water via the Sout River. The Papkuils River originally opened out into St Helena Bay but was historically diverted on the neighbouring farm, Bookram. The river was initially fully diverted to allow all water to accumulate behind the coastal foredunes to enhance the historically “small” Rocherpan wetland. However due to the diversion not being fully maintained over the years, the river does periodically break through to follow its original course and currently only forms a partial diversion (Kevin Shaw, former CapeNature Ornithologist, 2023, pers. comm.). The river flow is highly seasonal, only occurring during the winter season and only if rainfall is exceptionally good. Three riparian farms closest to the source of the Papkuils River abstract water directly from the river during the summer months, significantly decreasing run-off downstream. Further abstraction, or water intensive agricultural expansion upstream along the river, would be detrimental to all landowners downstream and would negatively impact the ecological viability of the Rocherpan wetland and associated biodiversity.

2.3.2.3 Wetlands and pans

No wetlands are associated with the Elands Bay State Forest and offshore islands within the Sandveld Coastal Complex. Rocherpan Nature Reserve is dominated by a large, longitudinal wetland (Figure 2.10 and Appendix I, Map 6). The vlei and associated wetland cluster are largely saline, with freshwater entering the system seasonally through the Papkuils and Sout rivers. These wetlands fall into the floodplain wetland hydro-geomorphic zone and the Western Strandveld wetland vegetation types. The Western Strandveld wetlands, in general, are moderately to poorly protected (van Deventer *et al.* 2019) and are mostly classified as Endangered or Critically Endangered ecosystems. As a result, the Rocherpan wetland cluster has been classified as a wetland Freshwater Ecosystem Priority Area (Nel *et al.* 2011a; Nel *et al.* 2011b) and provides important habitat for waterbirds along the West Coast (Gouws *et al.* 2012). One major threat to this wetland is the abstraction, and specifically over abstraction of surface water from the Papkuils River.



Figure 2.10: Rocherpan wetland during inundation (Photo: M. Wheeler).

Cape Inland Salt Pans:

Within Rocherpan Nature Reserve, this is essentially a seasonal wetland vegetation type due to underlying clay and calcrete, which are less porous than the surrounding sands. The pan is extremely saline, and saltmarsh vegetation grows in zones or terraces determined by the seasonality of the inundated parts. The deeper the terrace, the less botanical diverse the vegetation becomes.

Salt Pan-Stream Channel:

This is a relatively small part of the wetland and covers the stream areas where the Papkuils and Sout Rivers enters the pan.

Dry Salt Flats (artificial):

This habitat is composed of highly saline, calcareous fine silt on the western side of the pan. Based on both its occurrence as raised beds above the level of the immediate surroundings, and its soil composition, this mapped habitat subtype seems to be derived from historical anthropogenic scraping or excavation of the pan bottom. The presence of a good diversity of plants, including several geophytes, suggests that if this habitat is indeed artificial, it was created well before the establishment of the reserve in 1967. This may have occurred at the same time, or shortly after, the original diversion of the Papkuils River by Mr Pierre Rocher, who settled in the area in 1839 (Kirkwood 2010).

2.3.3 Marine and coastal systems

The South Africa marine realm has been categorized to reflect four main shelf ecoregions, the Southern Benguela Shelf, Agulhas Shelf, Natal Shelf, and Delagoa Shelf ecoregions, as well as two Deep Ocean ecoregions, the Southeast Atlantic Deep Ocean, and Southwest Indian Deep Ocean (Sink *et al.* 2019). The Sandveld Coastal Complex falls within the Southern Benguela Shelf Ecoregion (Appendix I, Map 7). This cold, temperate shelf ecoregion in the southeast Atlantic extends from Namibia to Cape Point, and offshore it includes the western Agulhas bank in South Africa. This is South Africa's most productive ecoregion and is characterised by the cold equator-ward flowing Benguela Current and large-scale intensive upwelling with nutrient rich waters. This ecoregion supports major commercial fisheries including hake trawl and longline fisheries, a small pelagic fishery, large pelagic longline fishing, and commercial line fishing.

The West Coast is characterised by long, sandy beaches broken by rocky outcrops and prolific kelp forests. The West Coast rock lobster *Jasus lalandii* and abalone *Haliotis midae* are key inshore fisheries.

Low oxygen events, known as red tides, are known to occur during late summer. Subregions within this ecoregion include the Namaqua and Cape subregions. The Namaqua Subregion is a cool temperate region that is considered to extend from Sylvia Hill in Namibia to Donkin Bay, just south of Doringbaai, in South Africa. The Cape Subregion has a narrower, rockier shelf with extensive inshore reef development and an absence of mud on the inner shelf. This cool temperate subregion is characterised by high variability in the oceanographic environment (Sink *et al.* 2019). Large plankton populations feed large offshore stocks of pelagic fish such as pilchard/sardine *Sardinops sagax* and anchovy *Engraulis encrasicolus*, which in turn form the main prey source for many marine predators and seabirds.

The Rocherpan MPA (Figure 2.11) is comprised of Southern Benguela Dissipative Intermediate Sandy Shore (Least Concern) and associated St Helena Bay (Vulnerable) ecosystem types (Appendix I, Map 7). Southern Benguela Dissipative Intermediate Sandy Shore is a fine grained, sloping sandy shore with moderately wide beach and surf zone widths. St Helena Bay is the most prominent bay on the West Coast of southern Africa and was delineated to incorporate a cyclonic (clockwise) eddy that entrains water from the Cape Columbine upwelling plume- into the bay. This drives exceptional plankton productivity and associated marine nursery function within the bay. The bay is also characterised by lower oxygen levels compared to other South African bay types and is regarded as a unique bay ecosystem type within the region (Sink *et al.* 2019). Bays provide natural shelter from storms and swell and serve as refugia for many coastal marine species that seek calm conditions, either permanently or during specific parts of their life cycles.



Figure 2.11: View of foredunes within Rocherpan Nature Reserve with the Rocherpan Marine Protected Area as part of St Helena Bay in the background (Photo: D Kirkwood).

South Africa has at least 30 rocky coastal islands distributed along the mainland's west and south coasts that have suitable area for permanent breeding colonies of Cape fur seal *Arctocephalus pusillus pusillus* or substantial numbers of seabirds. The islands range in size from approximately 500 ha (Robben Island) down to small islets of <0.5 ha. Apart from size and faunal composition, there is also considerable variation in geology, distance from the mainland, and local climatic and oceanographic conditions among islands (Sink *et al.* 2019).

On most of these islands, a common ecological feature is dominance by Cape fur seal *Arctocephalus pusillus pusillus* or one or more species of seabird, with associated trampling and high nutrient concentrations from their waste products (guano, feathers, fur, carcasses, faeces, and urine). Combinations of these factors, wave action and restricted precipitation, have contributed to depauperate plant and invertebrate communities on these islands. Furthermore, impacts of the high nutrient inputs and local depletion of prey species have resulted in intertidal and subtidal communities around the islands that differ from those adjoining nearby mainland areas (Sink *et al.* 2019).

Penguin (Bird) Island Nature Reserve is largely characterised as Cape Exposed Rocky Shore which is classified as Vulnerable and forms part of the Cape Subregion within the Southern Benguela Ecoregion. The island is exposed to moderate wave intensity and sections of the shoreline are classified as Cape Kelp Forest. Elephant Rock Island Nature Reserve falls in the shore zone and is classified as Namaqua Mixed Shore (Vulnerable). Paternoster Rocks and Jacobs Rock islands are located offshore classified as a mix of Cape Rocky Inner Shelf (Vulnerable), Cape Kelp Forest (Vulnerable), and Cape Island (Endangered). (Appendix I, Map 7).

2.4 Biodiversity Context: Taxa

2.4.1 Invertebrates

Invertebrates are a vital component of terrestrial ecosystems and constitute more than 80% of all animal diversity, yet they are grossly under-represented in studies of African diversity. Site biodiversity estimates that do not consider invertebrates not only omit the greatest components of what they are attempting to measure, but also ignore groups that are significant contributors to terrestrial ecosystem processes.

The core of the Cape Floristic Region represents a distinct zoogeographic zone, the Cape Faunal Centre (Stuckenberg 1962), characterised by the phylogenetic antiquity of much of its invertebrate fauna. The component species of this centre represent what is probably the richest known assemblage of post-Gondwanan relict species. It is a pronounced hotspot for faunal endemism within southern Africa, where high levels of endemism are characterised for virtually all taxa examined.

2.4.1.1 Terrestrial invertebrates

In addition to the vital role that invertebrates play in ecosystems (McGeoch 2002; Samways *et al.* 2010; Samways *et al.* 2012), such as primary production, nutrient recycling, predation, herbivory, and competition, the Cape flora is dependent on specialised pollination guilds and insect-driven ecological processes such as myrmecochory (seed dispersal by ants) (Le Maitre & Midgley 1992). In South Africa, myrmecochorous plants are mainly restricted to the Fynbos biome and approximately 20% of the strictly Fynbos plant species are dependent on myrmecochory for their survival (Johnson 1992). A total of 29 families and 78 genera of Fynbos plants have been identified as containing species that are ant-dispersed (see Table I in Bond & Slingsby 1983).

The butterflies of South Africa were assessed according to the International Union for Conservation of Nature (IUCN) criteria as part of the South African Butterfly Conservation Assessment project (Mecenero *et al.* 2013) and the South African Lepidoptera Conservation Assessment (Mecenero *et al.* 2020). There are 38 species of Lepidoptera that are endemic to the Western Cape. One species, *Thestor dicksoni malagas* (Vulnerable), occurs within the Sandveld Coastal Complex and its zone of influence. This species occurs within a few hundred metres of the shoreline in Langebaan Dune Strandveld among sandy and rocky habitat with low-growing scrubby fynbos. This species is under threat from coastal residential and tourism development and increased recreational activities in the area (Mecenero *et al.* 2013; Mecenero *et al.* 2020).

Another ecologically important invertebrate group is the Arachnida (spiders). The South African National Survey of Arachnida was initiated in 1997 (Dippenaar-Schoeman *et al.* 2015) and is an umbrella project that is implemented at a national level in collaboration with researchers and institutions countrywide dedicated to document and unify information on arachnids in South Africa. The project is providing essential information needed to address issues concerning the conservation and sustainable use of the arachnid fauna (Dippenaar-Schoeman *et al.* 2015). Presently 71 spider families, 471 genera and 2 240 species are known from South Africa, representing approximately 4.8% of the world fauna. A total of 954 species representing 62 families have been recorded in the Western Cape Province (Dippenaar-Schoeman *et al.* 2015; Foord *et al.* 2020). Of these, 306 are endemic (32%).

Unfortunately, there is no comprehensive spider species list available for the complex, but given the information generated by the South African National Survey of Arachnida, it is likely that there might

be endemic spider species in the Sandveld Coastal Complex. Main threats to invertebrate populations include habitat destruction and invasive alien plants.

2.4.1.2 Freshwater macro-invertebrates

Benthic macro-invertebrates can be used to monitor both water quality and habitat diversity over the long term, using the South African Scoring System-Version 5 (SASS) methodology following standardized protocols (Dickens & Graham 2002). The SASS method is a rapid bio-assessment method and is used to assess water quality, habitat availability and health of a river system (Dickens & Graham 2002). The method uses the presence/absence of macro-invertebrate families, with a sensitivity/tolerance score out of 15 linked to each taxon. The higher the score, the more sensitive the specific taxon is to pollution. The method also considers invertebrate abundance and habitat (or biotope) availability, as different taxa prefer different parts of a river system. The SASS score is linked to an ecological category developed by Dallas (2007) (Table 2.7).

Table 2.7: Ecological categories for interpreting SASS data. Adapted from Dallas (2007).

Ecological Category	Category Name	Description
A	Natural	Unmodified, natural
B	Good	Largely natural with few modifications
C	Fair	Moderately modified
D	Poor	Largely modified
E	Seriously modified	Seriously modified
F	Critically modified	Critically or extremely modified

The SASS data collected provides only a snapshot of the water quality and biotope/habitat availability. Seasonal, more in-depth invertebrate surveys are needed to get a complete picture of the species and community structures present and to determine the effects of certain impacts (Bellingan *et al.* 2015; Barber-James & Pereira-da-Conceicao 2016). Additionally, the initial baseline survey only allows preliminary analyses of the data, and patterns of seasonal, temporal and impact effect variance will only be detected with long term monitoring of selected sites. Regardless, the SASS data provide valuable information on water quality at the time of sampling. In the case of the Sandveld Coastal Complex, the initial SASS results from the 2022 survey can serve as a precursor to potential detailed studies on specifically the benthic macro-invertebrates.

Another focal taxon group for measuring the quality of freshwater is Odonata (dragonflies and damselflies). There is a wide range of sensitivities among South African Odonata to regional and local events that affect their habitats (Samways & Simaika 2016). A freshwater health index, the Dragonfly Biotic Index, is particularly useful for assessing the level of threat to the local dragonfly fauna as well as its recovery when these threats are lifted (Samways & Simaika 2016). By far the biggest threat to Western Cape dragonflies is invasive alien trees (Samways & Taylor 2004). Removal of these trees has resulted in substantial recovery of dragonfly species, as well as that of other endemic invertebrates, especially in low-elevation mountain rivers (Samways & Sharratt 2010).

Recent work on some of the Western Cape dragonflies and damselflies has indicated that they represent ancient lineages (Samways & Simaika 2016). Species in the genus *Syncordulia* (Corduliidae or Emeralds) for example, diverged some 60 million years ago. These species, along with several others, currently survive in small populations and are more resilient than expected, recovering quickly when invasive alien trees are removed. These trees shade out the sunny habitat that the dragonflies require for their life activities.

Several dragonfly species occur in the complex, none of which are of conservation concern. However, there is no comprehensive invertebrate species list available for the Sandveld Coastal Complex. Such lists are essential as inventories of what occurs in the complex, especially in terms of Red Data and endemic species, and as baseline information for long term monitoring. Some protection might be provided to certain arthropod groups in protected areas given the fact that there are correlations between insect species richness and biomes in the Western Cape (Procheş & Cowling 2006; Procheş & Cowling 2007; Procheş *et al.* 2009). Therefore, the attention and protection that the area receives

in terms of its floral diversity might provide some protection for its insect diversity (Samways *et al.* 2012).

2.4.1.3 Marine invertebrates

The inter-tidal zones, kelp forests, and sandy beaches found within the Sandveld Coastal Complex create suitable habitat for a large variety of marine invertebrates. These include sponges, sea anemones, zoanthids, soft corals, sea fans and sea pens, hard corals, sea fans, flat worms, bristle worms, sea spiders, barnacles, isopods, amphipods, rock lobsters, rock crabs, various mollusc species, sea hares, nudibranchs, octopus, mussels, and whelks.

The many kelp forests create habitat for commercially exploited marine species such as abalone *Haliotis midae* (Endangered), alikreukel *Turbo sarmaticus* and West Coast rock lobster *Jasus lalandii*. The Rocherpan MPA beach has a healthy population of white mussel *Donax serra* which is protected from recreational and commercial harvesting. Most of these invertebrate species are subject to heavy exploitation through legal and unlawful means. There have been no formal baseline surveys of marine invertebrates within the complex and additional data collection and research in this field are needed.

2.4.2 Amphibians

Seven frog species have been recorded in Rocherpan Nature Reserve, namely the Cape river frog *Amietia fuscigula* (Figure 2.12), Namaqua rain frog *Breviceps namaquensis*, Rose's rain frog *Breviceps rosei*, clicking stream frog *Strongylopus grayii*, Cape sand frog *Tomopterna delalandii*, sand toad *Vandijkophrynus angusticeps* (Figure 2.12) and the common platanna *Xenopus laevis laevis*. None of the species are currently red listed by the IUCN. No amphibian species have been recorded on Elands Bay State Forest. However, Elands Bay State Forest is expected to host a small number of frog species representing a subset of the species listed for Rocherpan Nature Reserve. There are no specific amphibian monitoring or management actions currently recommended for this complex.

No amphibian species are expected to occur on any of the marine islands that form part of the Sandveld Coastal Complex.



Figure 2.12: The Cape river frog (Top Photo: P. Lane) and sand toad (Bottom Photo: A. Turner) found at Rocherpan Nature Reserve.

2.4.3 Fish

Of the land parcels that make up the Sandveld Coastal Complex, only Rocherpan Nature Reserve and Elands Bay State Forest are terrestrial. The Rocherpan wetland receives water primarily from the Papkuils River and due to the seasonal nature and high salinity of the wetland, no fish species has been recorded in the vlei. The Rocherpan wetland is not connected to the sea and no marine fish species are present. Records from the mid-1980s exist for Cape galaxias *Galaxias zebratus* in the headwater of the Papkuils River but the present status of this population is unknown. These records are important to verify as Cape galaxias is currently under taxonomic revision. Evidence exists for this taxon to be a species complex comprising up to 14 distinct lineages (Skelton & Swartz 2011; Chakona *et al.* 2013) thus its current red list status is Data Deficient (Swartz *et al.* 2007).

Elands Bay State Forest is located on the boundary of the Verlorenvlei and Langvlei catchments, both of which are listed as Fish Sanctuaries according to the 2010 NFEPA Atlas (Nel *et al.* 2011b). The reserve itself does not contribute to the conservation of freshwater fish as it does not have any suitable waterbodies, but the Verlorenvlei River and its tributaries are of high conservation value. This system

is home to the newly described Verlorenvlei redbfin *Pseudobarbus verloreni* (Chakona et al. 2014) (Figure 2.13), listed as Endangered (Chakona et al. 2017).



Figure 2.13: The newly described Verlorenvlei redbfin (Photo: A. Chakona).

In addition, the catchment is home to unique but currently undescribed lineages of the Cape kurper *Sandelia* sp. ‘*capensis* West Coast’ and Cape galaxias *Galaxias* sp. ‘*zebratus* Verlorenvlei’ (Chakona et al. 2019). The *Galaxias* lineage is listed as Endangered while the *Sandelia* lineage has not yet been assessed for red listing. These lineages, while very range-restricted, are relatively widespread in the Verlorenvlei catchment, but under threat due to anthropogenic aspects such as agricultural expansion and water abstraction. The only non-native freshwater species that is known from the catchment is the extralimital banded tilapia *Tilapia sparrmanii*. Banded tilapia exert pressure on indigenous fish species mainly through competition for space and resources, but can potentially exert some predation pressure on indigenous species through predation on eggs and juveniles.

The Rocherpan MPA does allow for shore angling but excludes any other form of extractive exploitation. Some of the species caught from shore include galjoen *Dichistius capensis*, silver cob *Argyrosomus inodorus* and lesser guitarfish *Rhinobatos annulatus*. The National Marine Line Survey monitoring programme is implemented by CapeNature along the Rocherpan MPA.

Scat samples obtained from the Penguin (Bird) Island Nature Reserve Cape fur seal *Arctocephalus pusillus pusillus* colony were used to establish the prey composition of this species on the island (Hlati 2015). Fish were the most common prey category, occurring in most of the scats (74%), whereas cephalopods and crustaceans occurred in negligible amounts (2.8%). Interestingly, 2.2% of diet samples contained bird feathers, and pilchard/sardine *Sardinops sagax* were notably absent (Hlati 2015). Table 2.8 lists the marine fish species found within Cape fur seal diet samples on the island. Although Cape fur seal can travel up to 220 km within a single foraging trip, the identifiable prey remaining in the scat probably represent prey eaten within 24 hours of the animal coming ashore. Fish species identified in scats therefore represent local rather than distant feeding conditions (Hlati 2015).

Table 2.8: Fish species predated on by Cape fur seal within the Penguin (Bird) Island Nature Reserve colony. Information from Hlati (2015).

Common Name	Scientific Name
Anchovy	<i>Engraulis encrasicolus</i>
Cape hake	<i>Merluccius capensis</i>
Gurnard	<i>Chelidonichthys spp.</i>
Hector’s lantern fish	<i>Lampanyctodes hectoris</i>
Horse mackerel	<i>Trachurus trachurus</i>
Klip Fish	<i>Clinus superciliosus</i>
Mullet	<i>Chelon richardsonii</i>

Common Name	Scientific Name
Pelagic goby	<i>Sufflogobius bibarbatus</i>
Pilchard/Sardine	<i>Sardinops sagax</i>
Round herring	<i>Etrumeus whiteheadi</i>
West Coast sole	<i>Austroglossus microlepis</i>

2.4.4 Reptiles

Fourteen reptile species have been recorded on Rocherpan Nature Reserve although this list is probably incomplete. None of the recorded species are red listed by the IUCN. No reptile species have been recorded on Penguin (Bird) Island Nature Reserve. Three reptile species, which include the coastal legless *Microacoentias litoralis* and striped leaf-toed gecko *Goggia lineata* (Figure 2.14), have been recorded in Elands Bay State Forest. None of these species are red listed or require any specific management action. Several more reptile species are expected to occur in the Elands Bay State Forest.



Figure 2.14: Coastal legless skink (left) and striped leaf-toed gecko (right) found within Elands Bay State Forest (Photos: A. Turner).

2.4.5 Avifauna

The Sandveld Coastal Complex consists of several types of bird habitats. A number of species are threatened due to threats such as overfishing of their prey, predation, disease, and climatic impacts. The marine islands and rocks provide roosting and breeding sites for several marine and coastal bird species. The terrestrial portions of the complex, Rocherpan Nature Reserve and Elands Bay State Forest, contain strandveld vegetation which provides habitat for a suite of species including black harrier *Circus maurus*, Cape bulbul *Pycnonotus capensis*, Southern double-collared sunbird *Cinnyris chalybeus*, and yellow canary *Crithagra flaviventris*. When it contains sufficient water, the large ephemeral pan found within the Rocherpan Nature Reserve attracts a wide variety of waterbirds, while the coastal section provides habitat to a few species of birds that inhabit the narrow stretch of habitat between the sea and the foredunes. The Rocherpan MPA is relatively small, consisting of open sea, and does not support any significant numbers of marine bird species. The list of threatened species recorded within the reserve complex is indicated in Table 2.9.

Table 2.9: List of regional and globally threatened bird species recorded within the Sandveld Coastal Complex.

Species Name	Scientific Name	Regional Threat Status (Taylor et al. 2015)	Global Threat Status (IUCN 2023)
African penguin	<i>Spheniscus demersus</i>	Endangered	Endangered
African marsh-harrier	<i>Circus ranivorus</i>	Endangered	Least Concern
Bank cormorant*	<i>Phalacrocorax neglectus</i>	Endangered	Endangered
Bar-tailed godwit	<i>Limosa lapponica</i>	Least Concern	Near Threatened
Black harrier*	<i>Circus maurus</i>	Endangered	Endangered

Species Name	Scientific Name	Regional Threat Status (Taylor et al. 2015)	Global Threat Status (IUCN 2023)
Blue crane	<i>Anthropoides paradiseus</i>	Near Threatened	Vulnerable
Cape cormorant*	<i>Phalacrocorax capensis</i>	Endangered	Endangered
Cape gannet*	<i>Morus capensis</i>	Vulnerable	Endangered
Caspian tern	<i>Sterna caspia</i>	Vulnerable	Least Concern
Crowned cormorant*	<i>Microcarbo coronatus</i>	Near Threatened	Least Concern
Curlew sandpiper	<i>Calidris ferruginea</i>	Least Concern	Near Threatened
Great white pelican	<i>Pelecanus onocrotalus</i>	Vulnerable	Least Concern
Greater flamingo	<i>Phoenicopterus roseus</i>	Near Threatened	Least Concern
Lesser flamingo	<i>Phoenicopterus minor</i>	Near Threatened	Near Threatened
Maccoa duck	<i>Oxyura maccoa</i>	Near Threatened	Endangered
Secretarybird	<i>Sagittarius serpentarius</i>	Vulnerable	Endangered
Southern black korhaan	<i>Afrotis afra</i>	Vulnerable	Vulnerable

* Denotes those species for which the Sandveld Coastal Complex is important.

Species marked with an asterisk are species for which the reserve complex is important either for roosting or breeding purposes. Aside from the threatened coastal species, the only other threatened species of importance is the black harrier (Figure 2.15), which regularly breeds in the Rocherpan Nature Reserve. The reporting rate for this species within the reserve is 36.5% (SABAP2 2021) which is substantially more than the reporting rate of 5% which Taylor et al. (2015) use as the lower limit to identify areas of high densities for this species.

Waterbird monitoring on the Rocherpan wetland began during mid-1979 and has continued to date. The continuation of this monitoring is important as it contributes to the national data set of waterbird monitoring (Coordinated Waterbird Counts - <https://cwac.birdmap.africa/>). This data provides information relevant to South Africa's obligations to international multi-lateral environmental agreements e.g., the Ramsar Convention and the Convention on Migratory Species.



Figure 2.15: Black harrier, a threatened ground breeding raptor regularly breed within Rocherpan Nature Reserve (Photo: R Simmons).

Penguin (Bird) Island used to have an African penguin *Spheniscus demersus* colony, hence its name, however this colony officially become extinct in 2006 (Crawford et al. 2008). Penguins still occasionally come ashore but numbers are limited, and they do not breed on the island at all. Other important species are all coastal seabirds confined to the island portions of the reserve complex. Elephant and Jacobs Rocks Island nature reserves are both less than one hectare each and support insignificant numbers of threatened marine and coastal birds. Penguin (Bird) Island (4.5 ha) and the larger Paternoster Rocks Islets (≈15 ha), however, support substantial populations of threatened marine and coastal birds. The percentage of the regional and global populations of important coastal seabird species inhabiting these islands is provided in Table 2.10.

Table 2.10: Contributions that Penguin (Bird) Island, Lamberts Bay, and Paternoster Rocks make towards the populations of threatened coastal and marine birds. South African and global population figures from DFFE: O&C (2022).

Nature Reserve	Species	Percentage Population (%)	Global Threat Status (IUCN 2023)
Paternoster Rocks Island Nature Reserve	Bank cormorant <i>Phalacrocorax neglectus</i>	6-29% of South African population 0.7-3.5% of global population	Endangered
	Cape cormorant <i>Phalacrocorax capensis</i>	1-3% of the South African population 0.5-1.5% of global population	Endangered
Penguin (Bird) Island Nature Reserve and Lamberts Bay	Cape gannet <i>Morus capensis</i>	4-13% of South African population 3-9% of global population	Endangered
	Cape cormorant <i>Phalacrocorax capensis</i>	0.1-2% of South African population 0.05-1% of global population	Endangered
	Crowned cormorant <i>Microcarbo coronatus</i>	0.3-16% of South African population 0.3%-9% of global population	Least Concern

The percentages in Table 2.10 reflect the upper and lower values of the site-specific populations over the number years for which data exists (DFFE: O&C 2022). This period for which data exists varies between species, but there is more than 10 years data for each species. The percentages reflected for Penguin (Bird) Island Nature Reserve for both crowned and Cape cormorant include birds nesting in large numbers on the factory roofs and trees within the adjacent town of Lamberts Bay. The conservation significance of Penguin (Bird) Island for these two species is therefore substantially lower than indicated in the table. To place the percentages in context, the Ramsar Convention recognises a site of international importance if it contains more than 1% of the global population of a species. Paternoster Rocks Island Nature Reserve (Figure 2.16) is thus globally important for bank cormorant *Phalacrocorax neglectus* and Cape cormorant *P. capensis*, and Penguin (Bird) Island (Figure 2.17) for Cape gannet *Morus capensis*. Penguin (Bird) Island is one of six global sites where Cape gannet breeds.



Figure 2.16: Cormorants roosting and breeding on a small section of the Paternoster Rocks Nature Reserve (Photo: M. Wheeler).



Figure 2.17: The Cape gannet colony on Penguin (Bird) Island Nature Reserve (Photo: M. Wheeler).

The monitoring and evaluation of all red listed marine and coastal birds within the Sandveld Coastal Complex is of paramount importance to track population trends, thereby enabling evaluation of threat mitigation measures (see section 5.5). This data is used by various partners including DFFE: O&C, BirdLife SA and Wetlands International.

2.4.6 Mammals

Mammal records were obtained from CapeNature’s State of Biodiversity database (CapeNature 2023a) as well as the DFFE: O&C (Seakamela *et al.* 2023). The resulting mammal list for the Sandveld Coastal Complex is not exhaustive. The complex comprises terrestrial land parcels, marine islands and rocks and open marine water. These land parcels have a variety of habitat types that support a range of mammals. Broadly, the mammal fauna can be divided into terrestrial and marine species.

The marine mammal species include two seal species, of which the Southern elephant seal *Mirounga leonina* is currently listed as Near Threatened (De Bruyn *et al.* 2016). This sub-Antarctic species is a vagrant in the area and the complex does not play a meaningful role in terms of providing habitat to

the species. In most cases, Southern elephant seal sightings are of moulters which will return to the sea once this process is complete (normally around four weeks).

The Cape fur seal *Arctocephalus pusillus pusillus* is a common species which hauls out and breed within the complex (Elephant Rock, Jacobs Rock, Paternoster Rocks, and Penguin (Bird) Island Nature Reserves) (Figure 2.18)). Occasionally seals also haul out within the Rocherpan MPA. The Cape fur seal is not listed as threatened but is protected in terms of the Threatened or Protected Marine Species Regulations published under the National Environmental Management: Biodiversity Act (NEM: BA), 2004 (Act No. 10 of 2004).



Figure 2.18: The Cape fur seal colony on Penguin (Bird) Island Nature Reserve (Photo: L. Seabi).

Other marine mammals found in the waters around the complex include two species of dolphins, Heaviside's dolphin *Cephalorhynchus heavisidii* (Near Threatened) and Risso's dolphin *Grampus griseus* as well as two species of whales, Southern right whale *Eubalaena australis* and humpback whale *Megaptera novaeangliae*. Along the West Coast, humpback whales belong to the B2 population which comprises only 350-500 individuals and is considered regionally Vulnerable (Barendse & Carvalho 2016).

The two terrestrial land parcels of the complex, Rocherpan Nature Reserve and Elands Bay State Forest, contain strandveld vegetation providing habitat for a suite of mammal species, all of which are listed as Least Concern (Child *et al.* 2016). Some of these, such as caracals, mongoose, genets, porcupines, and small antelope, can be used as indicators of Strandveld health (Cadman 2016). The group for which most species have been recorded are the small to medium-sized carnivores, all of which are relatively common. These species play an important ecological role, regulating the populations of animals such as rock hyrax *Procavia capensis*, rodents and termites. However, some of these carnivores are the subjects of human-wildlife conflict and are the targets of persecution and unlawful hunting. Records exist for 11 species comprising four mongoose species, two species of genet (*Genetta* spp.), bat-eared fox *Otocyon megalotis*, Cape fox *Vulpes chama*, African wild cat *Felis silvestris*, honey badger *Mellivora capensis* and caracal *Caracal caracal*. Although the African wild cat is listed as Least Concern, this is a watch-list (conservation dependent) species. The risk of hybridization of this species with domestic cat *Felis catus* is pronounced where protected areas are small and close to towns (Herbst *et al.* 2016), as is the case for both Rocherpan Nature Reserve and Elands Bay State Forest.

The group with the second most species is the rodents (nine species), including gerbils (*Gerbilliscus* spp.), vlei rats (*Otomys* spp.), African pygmy mouse *Mus minutoides*, four-striped mouse *Rhodomys pumilio*, porcupine *Hystrix africaeaustralis* and Cape dune mole-rat *Bathyergus suillus*. As with the small carnivores, these are relatively widespread, generalist species. Other small mammals on the reserve

complex include Cape golden mole *Chrysochloris asiatica*, greater red musk shrew *Crocidura flavescens*, Cape serotine bat *Neoromicia capensis*, rock hyrax *Procavia capensis* and Cape hare *Lepus capensis* and scrub hare *Lepus saxatilis*.

It is likely that the diversity of small mammals is far higher than the records reflect. Some small mammals are difficult to observe because of their size and the fact that they are nocturnal and/or fossorial, and detection and identification requires specialized equipment and knowledge. They are, however, important components of ecosystems, performing functions such as turn-over of plant and invertebrate biomass, plant pollination and seed dispersal. Priority species that have been recorded near the complex's reserves include Van Zyl's golden mole *Cryptochloris zyli* (Endangered) recorded at Lamberts Bay, and Grant's golden mole *Eremitalpa granti granti* (Vulnerable) and white-tailed mouse *Mystromys albicaudatus* (Vulnerable), both recorded north of Elands Bay (Child *et al.* 2016). The Endangered Wildlife Trust is concentrating efforts to find these elusive species in the area.

Small ungulates in the complex comprise three indigenous ecotypical game species (i.e., discrete populations below the level of subspecies that can be recognized on genetic, phenotypic, or zoogeographic grounds), namely steenbok *Raphicerus campestris*, Cape grysbok *Raphicerus melanotis* and common duiker *Sylvicapra grimmia grimmia*. The recruitment of steenbok has also been selected as a key ecological attribute for measuring the health of the terrestrial vegetation on Rocherpan Nature Reserve. All three species are currently listed as Least Concern. Records for feral or invasive animals exist within the reserve complex. These animals include feral domestic dogs *Canis familiaris* and cats *Felis catus*, domestic cattle *Bos taurus* and domestic goats *Capra hircus*. Invasive species recorded on Penguin (Bird) Island Nature Reserve include house rat *Rattus rattus* and house mouse *Mus musculus*.

2.5 Heritage Context

Section 5 of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) outlines general principles for heritage resources management while section 9 outlines responsibilities of the state and supported bodies.

2.5.1 Living heritage

The original inhabitants of the region were hunter-gatherers who lived more than half a million years ago during the Earlier Stone Age. People of our own species, *Homo sapiens sapiens*, made Middle Stone Age artefacts in the south-western interior at least 100 000 years ago, and Later Stone Age people, ancestors of the San (Bushmen), occupied many rock shelters in the area during the last 10 000 years (Deacon & Deacon 1999; Parkington & Dlamini 2015).

Approximately 2 000 years ago, the Khoekhoen (pastoralist) descendants arrived in the south from present day Botswana and brought sheep and cattle with them (Stephanie-Anne Barnardt, Heritage Officer, Heritage Western Cape, 2021, pers. comm.). By the 17th century they were established in the area and their population numbers far exceeded those of the remaining San (Maingard 1931). The Khoekhoen produced dairy products, collected food from the veld and hunted game. The Guriqua Khoekhoen are the most likely group to have lived in the south-western interior during the late 17th to early 18th century (Maingard 1931) (Figure 2.19).

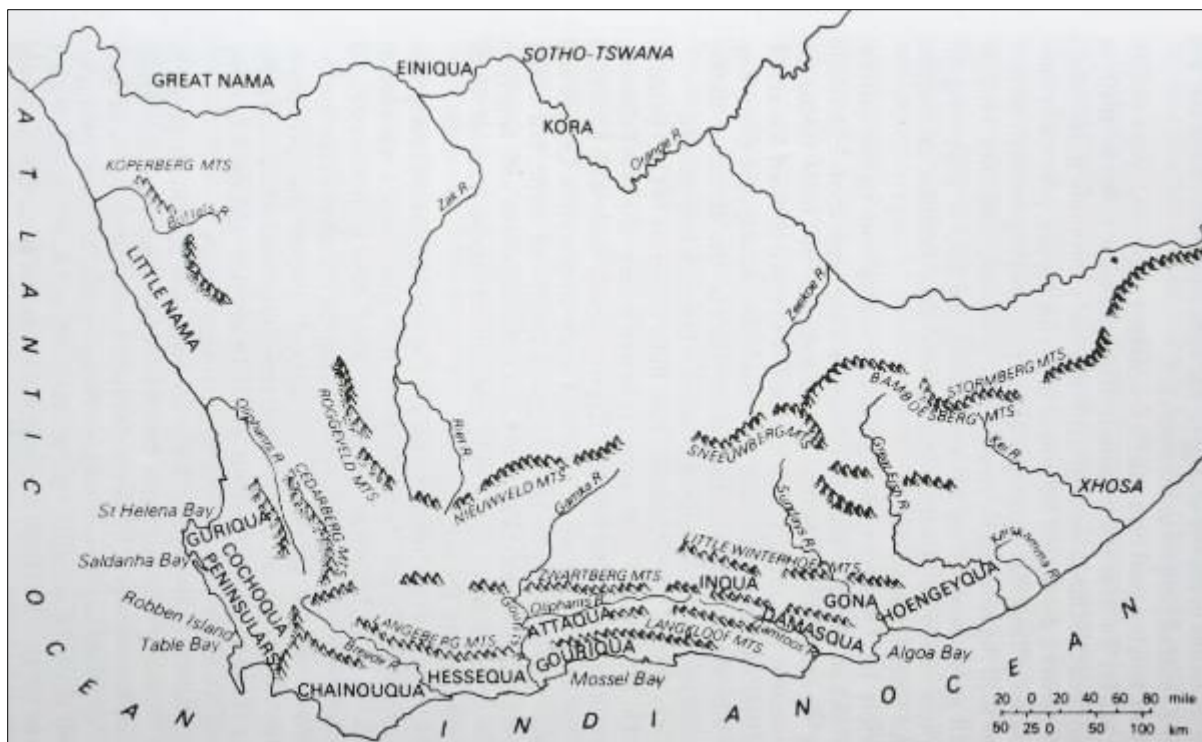


Figure 2.19: Approximate distribution of Khoekhoe groups in the south-western Cape at the time of European contact (Reprint from Maingard 1931).

In 1652, the Dutch East India Company founded a refreshment post near the Cape of Good Hope. Shortly after arriving, European settlers started exploring the interior including the Cape West Coast and Namaqualand (Boonzaier *et. al.* 1996). The Trutro (north-western frontier) was further made known by explorers such as Pieter van Meerhoff, Olof Bergh and Christoffel Henningh who travelled inland in search of copper, after a number of Namaqua travellers visited Commander Simon van der Stel in the Cape with samples of copper during 1681 (Scholtz 1964; SAHO 2011).

The smallpox epidemic of 1713 had a major impact on the Khoekhoen, weakening their position on the land and leading to many entering the service of European colonialists during the mid to late-1700s. The process of colonial domination continued once the British defeated the Dutch in 1806 and the Cape became part of the British Empire. In 1809 it was reported that neither San hunter-gatherers nor Khoekhoe herders were living independently in the Cederberg (Penn 2005).

2.5.2 Heritage resources

Elephant Rock Island Nature Reserve:

The discoverer of this island just north of the Olifants River mouth is unknown. From records in Shaughnessy (1984), it is known that Cape fur seal were harvested from Elephant Rock as early as 1820, and guano from around 1845. From Sclater (1904), it is known that 25 tons of guano were collected from the island in 1902. This guano was primarily derived from Cape cormorant *Phalacrocorax capensis* and shipped to Cape Town for sale to farmers in the western part of the Cape Colony (Sclater 1896). According to Shaughnessy (1984), guano collection ceased by 1934, suggesting a collapse of the seabird population breeding on the island. Seal harvesting continued and by 1948 a steel cable way (Figure 2.20) was constructed to facilitate access to the island. This practice continued until 1976. Between 1905 and 1957, an average of 875 seal pups were removed from the island annually. Today the island primarily supports a Cape fur seal *Arctocephalus pusillus pusillus* colony with very few seabirds still breeding on the island, and only in those areas inaccessible to the seals.



Figure 2.20: Elephant Rock Island Nature Reserve with sections of the old steel cableway stays used to support seal harvesting still visible (Photo: Marius Wheeler).

Penguin (Bird) Island Nature Reserve:

Human occupancy of the island started primarily as part of the guano rush from 1844 onwards. The nature reserve was part of a West Coast guano island chain stretching from the southern Namibian coast. The focus at Penguin (Bird) Island was commercial guano scraping and harvesting of African penguin *Spheniscus demersus* eggs. During an aerial survey in 1956 (Rand 1963) (Figure 2.21), the following species and total nests were recorded: Cape gannet *Morus capensis* (4 920), Cape cormorant *Phalacrocorax capensis* (30 977), bank cormorant *Phalacrocorax neglectus* (69), crowned cormorant *Microcarbo coronatus* (74) and African penguin (200 pairs). Historically, this island never hosted a Cape fur seal *Arctocephalus pusillus pusillus* colony and seals only occasionally hauled out here (Rand 1972). The first breeding Cape fur seal on the island were recorded in 1986 (Kirkman *et al.* 2007).

The reserve is the only island within the Sandveld Coastal Complex, and indeed the whole Western Cape Province, that is easily accessible to the general public. This provides CapeNature with a unique opportunity to showcase both the ecological, historical and heritage values associated with offshore islands along the South African West Coast (see section 4.5).



Figure 2.21: A historical perspective of Penguin (Bird) Island Nature Reserve during an aerial reconnaissance flight conducted by 22 Squadron (Ysterplaat) in 1956. (Reprint from Rand 1963). The artificial breakwater to the mainland is clearly visible.

During the early 1950s the island was connected with the mainland via the construction of a harbour wall (Jarvis & Cram 1971) which contributed to additional human disturbance of seabirds and provided access to land-based predators. Significant human disturbance resulted between 1960 and 1967 and since then, total breeding bird numbers have continued to decline (Jarvis & Cram 1971). Conservation measures were brought in to control human disturbance during 1968.

As the island was historically always used for guano harvesting, it housed a foreman and labourers' quarters with 30 bunk beds for seasonal labourers. A large section of the island was artificially paved to facilitate guano scraping and a small sea-defence wall was built on the south-western side to protect

guano deposits from winter sea swells. (Jarvis & Cram 1971). Much of this historical infrastructure has been altered or destroyed over the years. The old living quarters have been converted to offices. Some of the old guano scraping floor is still visible and conserved on the island. Guano scraping stopped in the 1970s.

Elands Bay State Forest:

Elands Bay State Forest was historically managed by the then Department of Forestry (now Department of Forestry, Fisheries and the Environment). The area was expropriated many years ago because of a concern about dune sand movement into the town of Elands Bay and onto the Sishen-Saldanha railway line running past the town. Various species of Australian *Acacia* species, primarily rooikrans *Acacia cyclops*, were planted on the mobile dunes to stabilise the sand movement. Seed was also collected of local indigenous species and sown onto the dunes and then packed with reeds cut from the Verlorenvlei wetland to provide a microclimate for germination.

Although not directly part of the Sandveld Coastal Complex, the area around Elands Bay State Forest is rich in archaeological sites, indicating the existence of humans in the area for the past 100 000 years. Some of the more prominent archaeological sites include:

- Baboon Point: Elands Bay Cave.
- Diepkloof / Witklip / Grootdrif Complex with its caves and rock art.
- Shell midden sites north and south of Verlorenvlei.
- Steenbokfontein Cave with its rock art.

Baboon Point has been declared a provincial heritage site by Heritage Western Cape, the provincial heritage resources authority. The area includes several well-preserved archaeological and historical sites which depict an established relationship between the original Khoi-San inhabitants and the ocean. Baboon Point is also home to a World War II radar station building.

Rocherpan Nature Reserve:

Although old Khoi shell middens are fairly common along the shore to the north and south of Rocherpan Nature Reserve, no middens or other archaeological sites have been identified on the reserve.

Rocherpan Nature Reserve was named after Mr Pierre Rocher who arrived in the Sandveld area in 1839. The Rocherpan wetland is an anthropogenic system that was created when Mr Pierre Rocher partially closed off the mouth of the Papkuils River between 1840 and 1880. The river was forced to flow in behind the foredunes in order to improve summer grazing and water availability for domestic livestock. A habitat for waterbirds was thus inadvertently created. Duck hunts were organised once a year on New Year's day by invitation only.

Efforts to formally conserve the seasonal wetland, now known as Rocherpan, were initiated in 1965. Portion 2 of the farm St. Helenafontein A No 29 (239.8 ha), previously owned by Jean Rocher and known as "Duinefontein", and Portion 2 of the farm Bookram No. 30 (154.3 ha), previously owned by Barend Frederik Rocher and known as "La Rochelle", were expropriated by the state on 14 July 1967. The properties were registered to the State per Title Deeds 15643 and 15644 of 14/7/67. The reserve, which at that time covered 394 ha, was first known as the Provincial Waterfowl Reserve, "Die Panne". In 1976 the reserve was officially proclaimed and became known as Rocherpan Nature Reserve per Proclamation No. 409 of 10 December 1976.

The remainder of Portion 1 of the farm St. Helenafontein A No. 29, approximately 520 ha, was donated by G.A. Rocher and transferred to the state on 02 June 1992. With this, an additional 40 ha of the wetland was acquired, and the reserve's area increased to 930 ha.

Paternoster Rocks Island Nature Reserve:

This nature reserve is primarily a collection of small rocks located just west of Groot Paternoster Point. The two biggest islets (seal and egg) were subject to historical guano harvesting. Rand (1963) reported that up to 120 tons of guano were taken off in a single season, suggesting that these two islets supported a large seabird population in the past. Cape fur seal *Arctocephalus pusillus pusillus* have been present at this site since the mid-1970s but breeding only commenced during the mid-1980s (Oosthuizen & David 1988). No Cape fur seal harvesting ever took place here.

Jacobs Rock Island Nature Reserve:

Also known as Jacob's Reef, this small boulder strewn island has always been occupied by a Cape fur seal *Arctocephalus pusillus pusillus* colony. Rand (1972) reports that sealing mainly took place between 1905 and 1952. Government sealers took the pelts of young seals and processed them in Saldanha Bay, before selling them. During an aerial survey in 1956 (Rand 1972), the island was occupied by approximately 2 400 Cape fur seal (Figure 2.22).

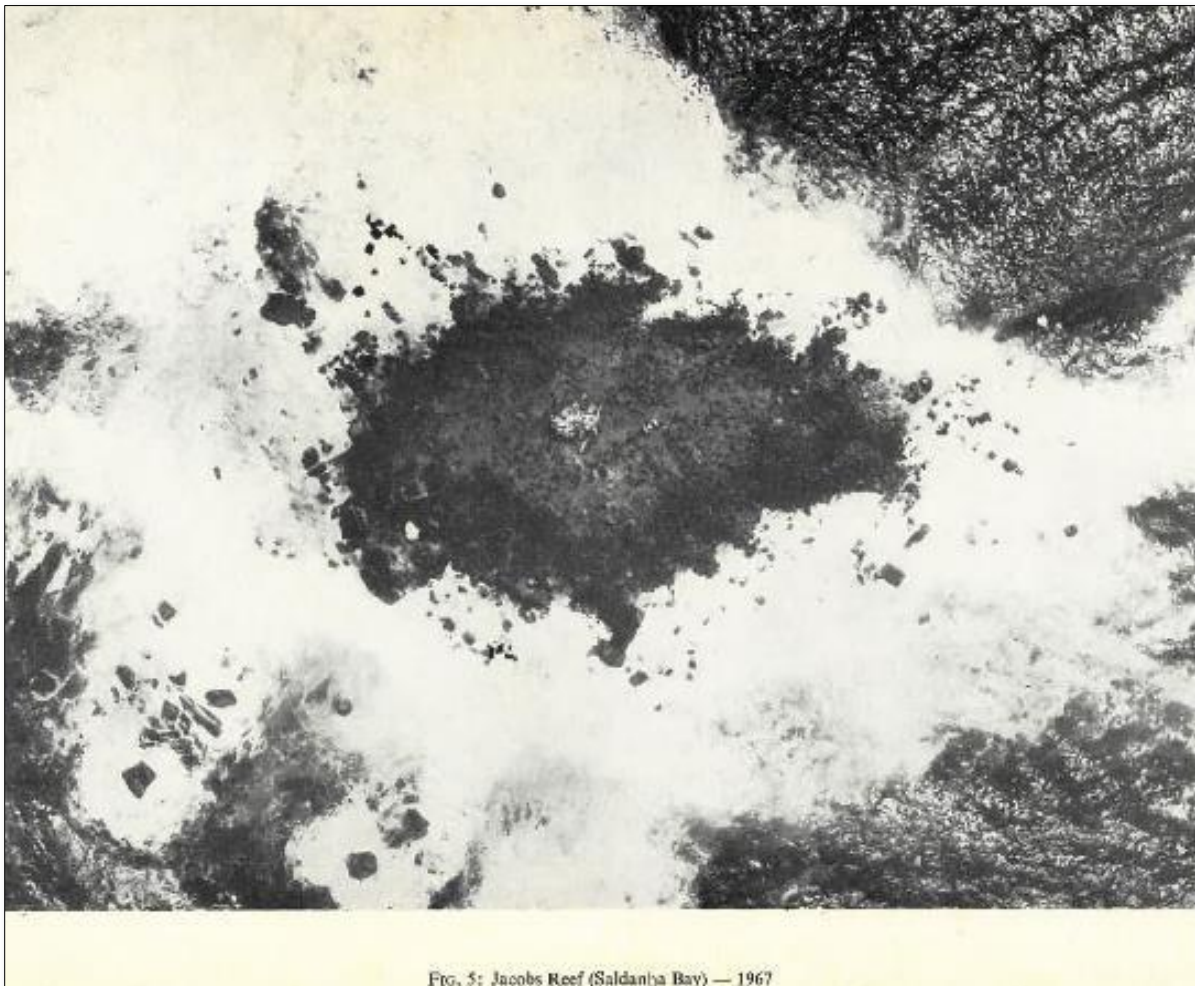


Figure 2.22: Jacobs Rock Island Nature Reserve with approximately 2 400 Cape fur seal captured by aerial image in 1967 (Reprint from Rand 1972).

2.6 Socio-Economic Context

In terms of the Municipal Systems Act, 2000 (Act No. 32 of 2000), municipalities are required to use integrated development planning to plot future development in their mandated management areas. The municipal Integrated Development Plan (IDP) sets the strategic and budget priorities for development and aims to co-ordinate the work of local and other spheres of government. The IDP

should also address how the environment will be managed and protected and is supplemented by a Spatial Development Framework (SDF).

IDPs and SDFs are tools for integrating social, economic, and environmental issues. As biodiversity is a fundamental component of sustainable development, IDPs and SDFs offer an opportunity to ensure that biodiversity priorities are incorporated into municipal planning processes through consultation. In turn, the identification of biodiversity-related projects for the IDP can support local economic development and poverty alleviation. Municipalities within which the Sandveld Coastal Complex occurs are illustrated in Appendix I, Map 1.

The Sandveld Coastal Complex stretches across four local municipalities within the West Coast District Municipality (WCDM): Matzikama, Cederberg, Bergrivier and Saldanha Bay. Table 2.11 shows key socio-economic information for the four municipalities (WCDM 2020). Primary communities in the complex include Lamberts Bay, Elands Bay, Velddrif, Paternoster, St. Helena, Langebaan, Saldanha Bay, Vredenburg, and Redelinghuys. Eco-tourism is seen as a potential avenue for the generation of additional revenue, given the relatively small population of the region, and could be a significant driving force of growth within towns located in the Bergrivier Municipality (Ranger & Du Plessis 2010).

Table 2.11: Key socio-economic information for the Saldanha Bay, Bergrivier, Cederberg and Matzikama local municipalities.

Local Municipality (2020)	Population Estimates (2020)*	Households (2019)*	Population Density (2020)*	Actual Households (2016)**
Saldanha Bay Municipality	121 939	34 874	61 people//km ²	35 550
Bergrivier Municipality	73 531	18 202	17 people//km ²	19 072
Cederberg Municipality	59 832	16 488	7 people//km ²	15 279
Matzikama Municipality	73 066	20 885	6 people//km ²	20 821

*Source: Western Cape Socio-Economic Profiles 2020 (WCG 2020a)

**Source: WCDM 2020

Elands Bay is an isolated settlement that functions as a small holiday town and is frequented by a small number of visitors annually. Some locals still practice subsistence fishing but the main economic base, fishing, is showing a downward trend. Agriculture, and in particular potato farming, contributes to the Sandveld economy. Tourism has the potential to grow the local economy. Lamberts Bay owes its existence to the fishing industry and harbour. The processing factories for fishmeal, lobster packaging and potato chips make substantial contributions to the local economy. The town's tourism sector is mainly driven by the annual spring flower blooms along the West Coast and by visitors to Penguin (Bird) Island Nature Reserve (Cederberg Municipality 2014).

Employment is mainly concentrated in the Saldanha Bay Municipality (28.2%) which provides 50 734 jobs (WCDM 2020). This is mainly driven by the large port and industrial activities associated with the area. The newly created Besaansklip Industrial Area associated with the port of Saldanha is earmarked for development as part of a national Industrial Development Zone that will boost the local economy and provide additional employment. In 2017, the agriculture, forestry and fishing sectors were still the primary source of employment (38.5%), contributing 69 316 jobs within the WCDM, but the sector suffered a net shed of 15 529 employment opportunities between 2008-2017, primarily due to persistent drought conditions (WCDM 2020).

The Bergrivier Municipality was the only municipality within the WCDM that experienced a net decline in employment over the period, with a net loss of 942 jobs. Table 2.12 shows the employment figures for the different municipalities in which the Sandveld Coastal Complex is situated (WCDM 2020; WCG 2020a).

Table 2.12: Employment figures for the Saldanha Bay, Bergrivier, Cederberg and Matzikama local municipalities.

Local Municipality	Contribution to Employment (2017)	Number of Jobs (2017)	Trend (2008-2017)	Unemployment Rate 2019*
Saldanha Bay Municipality	28.20 %	50 734	3 180	12.20 %
Bergrivier Municipality	16.40 %	29 448	- 942	5.60 %
Cederberg Municipality	14.50 %	26 167	1 245	7.90 %
Matzikama Municipality	15.60 %	28 105	480	12.20 %

*Source: WCG 2020a

Considering the relatively small size of their economies, the Matzikama and Bergrivier municipalities also contributed significantly to this sector's employment at 16.3% each. The wholesale and retail trade, catering and accommodation sector was the second largest contributor to employment across municipal areas, followed by the community, social and personal services sector. The Saldanha Bay and Matzikama Municipalities had the highest unemployment rate (12.20%) with an average unemployment rate 4% higher than the West Coast District average. The Bergrivier and Cederberg municipal areas registered the lowest average unemployment rates between 2008 and 2018 (Table 2.12) (WCG 2020a).

Ecotourism can be an important tool for conservation, raising much needed funds through the non-consumptive use of wildlife (Pegas & Castley 2014; Shannon *et al.* 2017; Steven *et al.* 2013) as well as creating public awareness of environmental issues (Emerton *et al.* 2006). In South Africa, Simon's Town, Stony Point and Robben Island provide opportunities for the public to observe African penguin *Spheniscus demersus* in their natural habitat and have become popular tourist destinations (Lewis *et al.* 2012). The economic benefits of these colonies include income generated through entrance fees, provision of jobs and associated tourism benefits to the surrounding areas (Lewis *et al.* 2012). Penguin (Bird) Island occupies a similar niche in that it provides visitors with a unique opportunity to see a Cape gannet *Morus capensis* colony up close. This is one of only six such breeding colonies in the world and the only one readily accessible to the public.

It is important, however, to ensure that potential negative impacts of ecotourism and other human activities at seabird colonies are recognized, monitored, and carefully mitigated. Wildlife disturbance can result from a variety of human activities including ecotourism, research, monitoring and management. Wildlife must cope with natural stressors such as seasonal changes in climate and resource availability. Anthropogenic disturbance, especially unpredictable disturbance, can add to stress levels, triggering detrimental behavioural and physiological responses which, over time, can negatively impact health, breeding success and survival. For colonial seabirds, entire populations rather than isolated individuals can be affected if disturbance is unmitigated (Gaynor *et al.* 2018).

Within the context of Penguin (Bird) Island and Rocherpan Nature Reserves, current socio-economic upliftment efforts by CapeNature are centred on the provision of Full Time Equivalent (FTE) employment opportunities to people from Lamberts Bay and Velddrif. The complex provides work opportunities that expose workers to activities such as ecological monitoring and data processing, compliance work, eco-tourism activities, administrative and reporting functions, cleaning and maintenance services, stakeholder engagement, environmental education, and training and capacity building among the youth and the general public. During their employment with CapeNature, FTEs are also provided with functional training opportunities to upskill them and make them more competitive in the job market.

3 POLICY FRAMEWORK

CapeNature is subject to the framework of the Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996), national legislation including the National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003), Marine Living Resources Act, 1998 (Act No. 18 of 1998), National World Heritage Convention Act, 1999 (Act No. 49 of 1999), all associated regulations and norms and standards for the management of protected areas in South Africa and all other relevant requirements as set out in the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) and the National Environmental Management: Integrated Coastal Management Act, 2008 (Act No. 24 of 2008).

3.1 Purpose of Protected Area Management

The declaration of protected areas is part of a strategy to manage and conserve South Africa's biodiversity. Accordingly, the object of the management plan is to ensure the protection, conservation, and management of the natural and cultural historic heritage in a manner that is consistent with the objectives of the NEM: PAA, and for the purpose for which protected areas were declared.

3.2 Guiding Principles

The following guiding principles underpin the management plan for the Sandveld Coastal Complex:

- Articulate desired results in terms of conservation outcomes, not actions.
- Articulate how management responses will lead to desired results.
- Monitor progress towards achieving desired results.
- Consider monitoring programme design at the onset of planning.
- Consider expected outcomes of management at the outset of planning.
- Invest in management response appropriate to the risk.
- Adapt strategies based on lessons learnt understanding that measuring effectiveness alone may not resolve uncertainty; data and analyses are necessary to guide management towards doing more of what works and less of what does not work.
- Share results to facilitate learning, acknowledging that although success is not a given, learning can be, through honest appraisal of efforts.

The complex is also subject to the principles and provisions of relevant international treaties and conventions, national and provincial legislation, and policy, and any local contractual or co-management agreements.

3.3 Strategic Adaptive Management

Strategic Adaptive Management integrates planning, management and monitoring to provide a framework for:

- Testing assumptions.
- Learning through monitoring and evaluation.
- Adapting strategies or assumptions.

Strategic adaptive management bridges management and decision science by systematically evaluating results and using this information in a community of practice (CMP 2020) enabling management to change course when it becomes evident that it is necessary, rather than waiting until the end of a strategy to determine whether an intervention worked (Conservation Coaches Network 2012).

CapeNature has adopted, and applies, the Conservation Standards for the Practice of Conservation adaptive management framework (CMP 2020) as illustrated in Figure 3.1. The Conservation Standards facilitates strategic adaptive management through a systematic evidence based participatory process

with stakeholders (CMP 2020). The systematic approach makes explicit the links between goals, focal conservation targets, threats, strategies, and actions, enabling management to define and measure success of their actions in the complex over time.

The Conservation Standards framework is comprised of five stages (Figure 3.1):

- Conceptualising the protected area (i.e., defining the purpose of the protected area, establishing scope and vision; selecting focal conservation targets and assessing threats, and analysing the conservation situation (i.e., assessing contributing factors in terms of opportunities and challenges).
- Planning actions and monitoring (i.e., drafting the plan based on theories of change using results chains).
- Implementing actions and monitoring (i.e., drafting work plans, doing the work, and monitoring the work).
- Analysing and using results to adapt (i.e., deciding if what was planned is working).
- Capturing results, sharing, and learning (i.e., learning and sharing what is learned).



Figure 3.1: Strategic Adaptive Management Framework adapted from the Conservation Standards for the Practice of Conservation (CMP 2020).

The framework works on the rationale that effective conservation of carefully selected conservation targets will ensure the conservation of all indigenous biodiversity and cultural historic heritage within the complex that in turn contributes to a functional landscape. At the same time, the rationale follows that healthy focal conservation targets deliver ecosystem services essential for human well-being. An

assessment of the current condition of focal conservation targets serves as a baseline against which to measure condition over the next 10 years and guides the formulation of goals and conservation strategies with associated objectives, indicators, and work plans.

As such, step one of the adaptive management framework illustrated above is foundational to effective management of the complex.

Focal conservation targets are classified as follows:

- Natural targets can be species, habitats, or ecological systems, which collectively represent and encompass the biodiversity of the complex. They can include the physical, natural features from which ecosystem services flow, benefitting humans in a variety of ways.
- Cultural historic targets are described in terms of the tangible features that collectively represent and encompass the cultural historic heritage of the complex. They can also include the physical, cultural and/or historic features from which human well-being values are derived.
- Human well-being values are the intangible or non-material values derived from tangible values, and which collectively represent the array of human well-being needs dependent on natural and cultural features; they can be defined in terms of the benefits delivered to humans by healthy ecosystems, or by intact cultural or historical features.

3.4 Protected Area Management Effectiveness

Management effectiveness evaluation is the assessment of how well a protected area is being managed, primarily the extent to which management is protecting targets and values and achieving objectives (Hockings *et al.* 2015). The following questions underpin management effectiveness evaluation (Leverington & Hockings 2004):

- Is the protected area effectively conserving the targets and values for which it exists?
- Is management of the area effective and how can it be improved?
- Are specific projects, interventions and management activities achieving their objectives, and how can they be improved?

The monitoring and evaluation framework applied (Figure 3.2) measures compliance and management effectiveness of the complex in terms of the NEM: PAA and associated Norms and Standards for Protected Area Management. Management effectiveness is assessed over time using the Management Effectiveness Tracking Tool (METT). METT-SA, adapted for South Africa, is based on the six elements of good management:

- It begins with understanding the **context** of existing targets, values, and threats;
- progresses through **planning**;
- and allocation of resources (**inputs**);
- and as a result of management actions (**processes**);
- eventually produces products and services (**outputs**);
- that result in impacts or **outcomes**.

Management effectiveness is measured at the strategic level as a percentage, drawing upon the results of fine scale monitoring linked to management actions, objectives, goals, and focal conservation targets articulated in this management plan (Figure 3.2). Management effectiveness includes the measurement of administrative processes such as capacity and budgets that, when adequate, are likely to result in positive conservation outcomes.

Mechanisms for monitoring and evaluation are built into each aspect of the Strategic Plan (section 10) through the inclusion of verifiable indicators of progress. The protected area monitoring and evaluation programme, supplementary to the management plan, monitors site level implementation of the plan,

status of targets and effectiveness of strategies. Results contribute to the annually reviewed Western Cape State of Conservation report as well as the in-depth Western Cape State of Biodiversity report, produced at five-year intervals.

Furthermore, management reports annually on the implementation of the plan through CapeNature’s strategic Performance Management System. The Performance Management System ensures that implementation of the management plan is embedded in individual staff performance agreements.

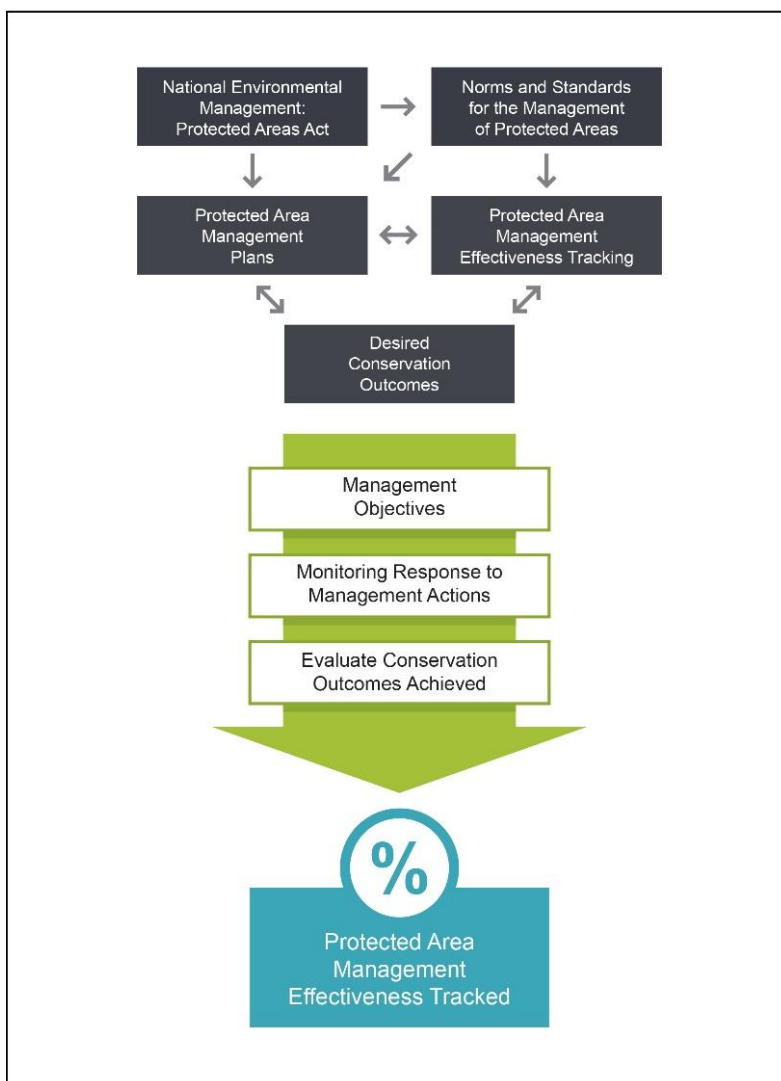


Figure 3.2: Protected Area Monitoring and Evaluation Framework.

3.5 Policy Frameworks

Protected area management is guided by CapeNature policies, procedures, and guidelines for use across all of its components. Policies, procedures, and guidelines applicable to this management plan are referenced here and in section 10.

3.5.1 Internal rules

In terms of section 52 of NEM: PAA, as amended, the management authority of a nature reserve may, in accordance with the prescribed Norms and Standards, make rules for the proper administration of the protected area.

In addition to the Regulations for the Proper Administration of Nature Reserves, as gazetted on 8 February 2012 in Government Gazette 35021, and the Regulations for the Proper Administration of Special Nature Reserves, National Parks and World Heritage Sites, as gazetted on 28 October 2005

in Government Gazette 28181, the Sandveld Coastal Complex is also subject to the Nature Conservation Ordinance, 1974 (No.19 of 1974), Provincial Notice 955 of 1975, the latest Western Cape Biodiversity Act, 2021 (Act No. 6 of 2021) and the regulations published under Government Notice 1111 in terms of the Marine Living Resources Act, 1998 (Act No. 18 of 1998).

The Nature Conservation Ordinance of 1974 will be repealed once the regulations in terms of the Western Cape Biodiversity Act, 2021 (Act No. 6 of 2021), which was signed by the premier on 10 November 2022, have been promulgated. The new act indicates that CapeNature, together with DEA&DP, are responsible for nature conservation and the protection, management and sustainable use of biodiversity and ecosystems in the Western Cape Province.

3.5.2 Financial

CapeNature is a schedule 3C public entity responsible for nature conservation in the Western Cape. CapeNature is the executive arm of the Western Cape Nature Conservation Board, established in terms of the Western Cape Biodiversity Act, 2021 (Act No. 6 of 2021). The objectives of the board as per the act are:

- To promote and ensure nature conservation and deal pro-actively with related matters in the province.
- To render services and provide facilities for research and training that would inform and contribute to nature conservation and related matters in the province.
- To generate income, within the framework of the applicable policy framework.

Funding for the entity comprises three main revenue streams. The majority of funding, which equates to approximately 80%, is received in terms of a provincial allocation received in terms of Vote 9. Secondary funding, which is approximately the further 20%, is received from external donors and own revenue. Own revenue generation consists mainly of tourism income generated through activities and accommodation available on various nature reserves managed by CapeNature.

CapeNature prides itself on its strong internal controls, sound financial management and practicing of good corporate governance. Corporate governance within the entity embodies sound processes and systems and is guided by the Public Finance Management Act, 1999 (Act No. 1 of 1999) and the principles contained in the King 4 Report of Corporate Governance.

3.5.3 Safety and security

Business Continuity Plan:

The CapeNature Business Continuity Plan (CapeNature 2023b) establishes and provides emergency response procedures and protocols which need to be implemented should an event significantly disrupt the operations of the organisations, or an emergency situation is declared by management. The plan identifies critical services, how these will be maintained, how to minimise the impact, increase preparedness and initiate effective responses.

Integrated Compliance Plan:

The integrated compliance plan for the Sandveld Coastal Complex details how compliance and enforcement will be implemented in the complex in order to:

- Prevent biodiversity loss caused by human activities on the complex through the implementation of active and passive compliance and enforcement operations.
- Ensure compliance with legislation through the monitoring of activities in the complex.
- Address and combat unlawful activities through the institution of criminal proceedings.
- Reports unlawful activities to the delegated authority where activities have a negative impact on the complex (e.g., listed activities in terms of the NEM: BA).

The integrated compliance plan is a dynamic reference document which is continually updated and improved, using the data that is gathered in the course of the implementation thereof in order to achieve the management objectives of the complex.

Regional Oil spill Contingency Plan:

The Department of Transport and the South African Maritime Safety Authority established the National Incident Management Organisation which played a role in the review of the National Oil Spill Contingency Plan, under which the National Oiled Wildlife Contingency Plan is drafted. The National Oiled Wildlife Preparedness, Response and Contingency Plan was drafted to ensure that species such as the African penguin *Spheniscus demersus*, which are highly susceptible to oiling, formed part of the overall oil spill response. Some members of the African Penguin Working Groups are standing members under the Incident Management Organisation.

Fire Protection Associations:

CapeNature is obliged in terms of the National Veld and Forest Fire Act, 1998 (Act No. 101 of 1998) to be a member of their local fire protection association. Within the Western Cape, five large fire protection associations have been established that cover the whole province. The Sandveld Coastal Complex is a member of the Greater Cederberg Fire Protection Association. Fire protection associations are the primary partnership tool in veldfire management and response in South Africa.

Fire Management Plan:

The fire management plan is essentially a derivative and part of the complex's management plan. The latter details the objectives of the Sandveld Coastal Complex, and the fire management plan uses this information to detail how fire will be managed to ensure that the ecological objectives of the complex are met. This includes the management of both wild and controlled fires.

Fire Response Plan:

The fire response plan forms part of the fire management plan and serves as an operational document for cooperative wildfire management in the Sandveld Coastal Complex. This plan is compiled annually at regional level according to the CapeNature fire policy to ensure that there is complete co-operation at all levels in case of a fire incident. It includes updated names and telephone numbers of all contact persons and radio frequencies for emergency notifications.

Unlawful Invasion and/or Occupation of Land Plan:

To prevent the unlawful invasion and/or occupation of land within the complex, a co-operative agreement with the local authority needs to be established and reviewed periodically. The aim of the agreement is the optimisation of any combination of resources to expeditiously deal with threats and incidents of unlawful occupation within and adjacent to any CapeNature managed protected area. An Early Detection & Rapid Response Strategy and Protocol was developed for protected areas (CapeNature 2020a).

The objective of such an agreement with local authorities is:

- To regulate and formalise co-operation and the structures, systems, processes, procedures, and responsibilities relating to such co-operation.
- An integrated approach to prevention of unlawful invasion and/or occupation of land.
- Rapid response with regards to the prevention of unlawful invasion and/or occupation of lands and emergency notifications.

3.5.4 Resource use

CapeNature recognises that the primary purpose of protected areas is to protect and conserve biodiversity, ecosystems, ecological process, and serve as benchmarks for conservation. Furthermore,

it is recognised that the unsustainable use of natural resources can lead to the loss of biodiversity, resulting in compromised delivery of ecosystem services and reduced benefits for people. Consumptive utilisation of wild flora can, however, provide socio-economic benefits to people.

CapeNature supports the sustainable consumptive use of wild flora within protected areas under its management for non-commercial purposes. Resource utilisation is governed by CapeNature's policy on consumptive use of wild flora from CapeNature managed protected areas (CapeNature 2019). The policy provides the principles, objectives, policy statement, and framework to facilitate and process applications for consumptive use of wild flora from CapeNature managed protected areas.

The policy on consumptive use of wild flora indicates that consumptive use of wild flora in CapeNature managed protected areas may only take place within areas that have been zoned for that specific purpose, with the necessary permit.

According to NEM: PAA, section 50, the management authority of a protected area may, subject to the management plan, allow or enter into a written agreement with, or authorise a local community inside or adjacent to the protected area or site, to allow members of the community to use in a sustainable manner biological resources in the protected area. Section 50, however also states that an activity allowed in terms of this section may not negatively affect the survival of any species in, or significantly disrupt the integrity of the ecological systems of, the protected area.

CapeNature undertakes to build the capacity of natural resource users and other relevant stakeholders on the sustainable utilisation of natural resources and its environmental regulatory framework in and outside protected areas.

3.5.5 Biodiversity management

Catchment to Coast Strategy:

Guided by the Provincial Biodiversity Strategy and Action Plan (2015-2025) (Western Cape Government 2016) and CapeNature's 5-year Strategic Plan (2020-2025) (CapeNature 2020b), the Catchment to Coast Strategy (2022-2026) (CapeNature 2022a) aims to guide CapeNature's actions towards improving, maintaining, and restoring ecological infrastructure in priority areas, to ensure ecological resilience and ecosystem functioning in order to provide benefits to people. The strategy focuses on key outcomes for terrestrial, freshwater (including rivers, wetlands, and groundwater), estuaries and marine and coastal ecosystems, and is aligned to national and provincial plans. CapeNature's nature conservation mandate is not confined to protected areas alone but applies throughout the province, and the Catchment to Coast Strategy focuses CapeNature resources to address priorities at a provincial scale.

The Catchment to Coast Strategy is aligned to national and provincial priorities and has four strategic goals to guide implementation, namely:

Goal 1: Conserve and restore biodiversity and ecological infrastructure to deliver ecosystem services that improve the quality of life for all people of the Western Cape Province.

Goal 2: Leverage a collaborative investment into conservation and improved ecosystem functioning.

Goal 3: Enhance biodiversity capability through the implementation of strategic adaptive management to increase ecosystem resilience.

Goal 4: Enable reasonable and sustainable access to benefits and opportunities emanating from biodiversity, ecosystems, ecosystem services and ecological infrastructure.

Biodiversity Management Plans

The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) makes provision for the compilation of a Biodiversity Management Plan (BMP). A BMP is an implementation plan under section 43 of the act for conserving, restoring, and enhancing the biodiversity value of a

species or ecosystem. It establishes the objectives and defines the management measures required to achieve the intended results. A BMP can be developed by any person or organ of state who wants to contribute to the management of biodiversity and the achievement of the objectives of the National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004). A BMP can be developed for any indigenous or migratory species, or for any listed or other ecosystem of special concern within South Africa. It must be submitted to the national minister for public comment and approval before it can be implemented. A BMP aims to provide for the long-term survival of a species or an ecosystem in the wild and to provide a platform for monitoring and reporting on the progress of its implementation.

Estuary Management Plans

Estuarine management is the process of planning and implementing actions to protect and restore the ecological, economic, and social values of estuaries. Estuaries are dynamic ecosystems that are influenced by marine, riverine, and terrestrial factors, and they provide many benefits to humans and wildlife. Estuarine management aims to balance the needs of different stakeholders and sectors, such as fisheries, tourism, agriculture, industry, conservation, and recreation. Estuarine management also involves addressing the threats and pressures that estuaries face, such as pollution, habitat loss, overexploitation, invasive species, climate change, and coastal development.

One of the tools for estuarine management is the development and implementation of an Estuarine Management Plan (EMP), which is a specific document that outline the vision, objectives, strategies, and actions for a particular estuary. An EMP is based on scientific assessments of an estuary's status, functions, and values, as well as stakeholder participation and consultation. EMPs are guided by national and international policies and protocols that set standards and principles for estuarine management. In South Africa, the National Environmental Management: Integrated Coastal Management Act, 2008 (Act No. 24 of 2008) requires estuaries to be managed in accordance with the national estuarine management protocol. The protocol provides guidance on how to prepare, implement, review and report on EMPs.

Invasive Species Monitoring, Control and Eradication plans:

An Invasive Species Monitoring, Control and Eradication plan for the Sandveld Coastal Complex is compiled according to the requirements of the Invasive Alien Species regulations (Government Gazette No. 43735, 25 September 2020) published under NEM: BA. The plan aims to guide management actions to reduce infestation densities and rates of invasive fauna and flora species through systematic integrated control methods.

Western Cape Protected Area Expansion Strategy:

This strategy (CapeNature 2021) aims 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 as yet unprotected.

Fencing and Enclosure of Game and Predators in the Western Cape Province Policy:

All protected areas with game species are subject to the management guidelines outlined in the policy (CapeNature 2022c).

The Western Cape Game Translocation and Utilization Policy:

All protected areas with game species are subject to the management guidelines outlined in the policy (CapeNature 2022d).

Management of large game:

Management of all large game species in CapeNature managed protected areas is subject to the following principles:

- All game farms bordering a protected area that have extra-limital or historic alien animals must be enclosed to the standards stipulated in the CapeNature fencing policy. Protected area personnel must do regular fence inspections and escaped animals must be reported and dealt with by the owner immediately.
- If the owner is not in possession of a Certificate of Adequate Enclosure, they must be given reasonable time to remove the escaped animals as soon as possible. Game animals escaping from properties without a valid Certificate of Adequate Enclosure are *res nullius* and must be dealt with accordingly. Management staff must stipulate and regulate the actions to remove the animals (i.e., flying with a helicopter to recapture or to chase back).
- In cases where *res nullius* game animals enter the protected area, management staff must report it immediately and a decision must be taken to either have the animals removed or humanely culled or allow them to remain on the protected area.
- Managers of protected areas who wish to remove surplus game must follow protocol, which includes approval at landscape and directorate level.
- Where alien invasive game (e.g., fallow deer) are observed in protected areas, management staff must take immediate action to remove such animals in a humane manner.

Damage-causing wild animals:

CapeNature aims to ensure coexistence of humans and indigenous wild animals and defines human-wildlife conflict as situations where anthropogenically induced interactions between humans and wildlife lead to situations requiring mitigation of loss, disturbance, or damage. CapeNature requires that human-wildlife conflict is managed; taking into consideration all legal, ethical and welfare implications and that interventions are carried out within an ecologically sound framework, per CapeNature’s position statement on human–wildlife conflict (CapeNature 2015c).

CapeNature advocates a five-step approach to holistic wildlife management of damage causing wildlife, namely (1) understanding the origin of the problem; (2) maintaining an unbiased and respectful attitude towards the animal; (3) correctly identifying the responsible species; (4) implementing suitable mitigation measures; and (5) implementing effective, selective control as per the information contained in “The Landowner’s guide: human-wildlife conflict – sensible solutions to living with wildlife”. (CapeNature 2015a). This handbook supplies basic and cost-effective mitigation methods to landowners who report damage caused by wildlife. Implementing the suggested interventions and understanding the ecological role of each species will allow management staff to deal appropriately with wildlife conflict situations both on and off protected areas.

The national predation management manual prepared by the Predation Management Forum (TPMF 2016) is also available to give management guidance on dealing with predation problems. CapeNature advocates the following broad best practice guidelines:

- All reports of predators found on protected areas and causing stock losses on neighbouring properties must be reported to and investigated by relevant CapeNature staff who will assist the landowner with mitigation management. All actions against predators must be actioned on the property where the losses occurred and not within the protected area. No hunting or pursuing of predators on any protected area is legally allowed.
- Domestic animals (e.g., donkeys, goats, cattle, sheep, and pigs) that roam onto protected areas from neighbouring properties must be addressed by relevant CapeNature staff in conjunction with the local municipal authority through the draft National Animal Pounds Bill and/or any local authority bylaws.
- All feral animals (domestic animals that have become wild and without an owner) found within a protected area must be removed in a humane manner immediately.

- No confiscated, nuisance, damage-causing wildlife or rehabilitated wild animals may be released onto a protected area unconditionally and applicable CapeNature policies and procedures must be adhered to. The IUCN Guidelines for Reintroductions and Other Conservation Translocations (2013) are used as a basis for informing decision-making regarding wildlife releases.

3.5.6 Cultural resource management

CapeNature acknowledges that access to protected areas for traditional, spiritual, cultural, and historical purposes has major benefits for people and accepts that protected areas have intrinsic and extrinsic use value for the people of the region. CapeNature therefore recognises the need to manage, conserve and promote natural assets for the benefit of all. CapeNature contributes towards the promotion of culture and heritage through the development and conservation of heritage resources as well as the facilitation of access.

3.5.7 Neighbour relations

Firebreak/Landowner Agreements:

The National Veld and Forest Fire Act, 1998 (Act No. 101 of 1998) places a duty on landowners to prepare and maintain firebreaks. Chapter 4, section 12 (7) of the act states that owners of adjoining land may agree to position a common firebreak away from a boundary. Firebreaks that have been repositioned off common boundaries must be documented in an official firebreak agreement between CapeNature and the relevant landowner. Firebreak agreements bind all parties over a five-year period (unless otherwise stated) and are renewable upon joint agreement by both parties.

Within the operational structure of CapeNature, firebreak registers are used as a management tool to assist with the prioritisation and maintenance schedule of each firebreak. The register is updated annually and indicates whether a firebreak has been realigned to aid with maintenance or fire suppression operations.

3.5.8 Research and development

The National Biodiversity Research Development and Evidence Strategy (2015-2025) (DEA 2016a) highlights the increasing demand for knowledge and evidence to support policy and decision making for the protection of biodiversity and the realisation of benefits from our natural resources. In response to this, CapeNature developed an Ecological Surveillance, Monitoring and Research Framework (2022-2026) (CapeNature 2022b). This provides the foundation for a partnership driven biodiversity surveillance and monitoring system that allows for provincial level reporting on key aspects of the state of biodiversity to inform policies, support decision making, and guide research. This information aids national and international state of biodiversity reporting.

Structured monitoring programmes need to be put in place and carried out consistently over time to track the state of biodiversity and ecosystem functioning. This allows for critical evaluation of management practices and an adaptive management approach. There is a focus on applied scientific research that is driven by management requirements. The framework emphasises the measurement of outcomes in order to provide evidence of the correlation between management input and biodiversity function.

The guiding principles of the framework are good science, alignment with management requirements, taking an integrated management and ecosystems approach, and employing a full monitoring lifecycle approach to planning, implementation, and review.

Key objectives of the Ecological Surveillance, Monitoring and Research Framework are to:

- Ensure that the province is aligned with South Africa's national and international monitoring and reporting commitments.

- Enable annual State of Conservation and five-yearly State of Biodiversity reporting.
- Ensure that monitoring methods are clearly defined, data produced is of a high quality, and that data analysis is effective and repeatable across the organisation.
- Identify key biodiversity research required to understand ecosystem functioning, better understand the impact of threats, and measure the effectiveness of management interventions.

This framework facilitates surveillance, monitoring and research within the Sandveld Coastal Complex pertaining but not limited to the following:

- Priority species (invasive alien, threatened, endemic, keystone, and indicator species).
- Damage causing animals (seabird mortality and predation).
- Integrated Catchment Management with reference to fynbos and coastal ecosystems.
- Land-use change and associated activities in the complex's zone of influence.
- Ecosystem services and functioning.
- Climate change.
- Conservation management effectiveness.
- Culture, history, and archaeology.
- Social impacts and outcomes.

3.5.9 Access

CapeNature strives to establish a differentiated and leading brand of products in outdoor nature-based tourism across the Western Cape for all to enjoy. This is achieved by providing opportunities to the public and interacting in an environmentally responsible and sustainable manner specifically to:

- Optimise income generation for biodiversity conservation.
- Optimise shared growth and economic benefits, to contribute to national and provincial tourism strategies and transform the tourism operations within CapeNature.
- Strengthen existing and develop new products with special attention to the provision of broader access for all people of the province.

Furthermore, CapeNature strives to increase and improve stakeholder awareness, understanding, and participation in environmental conservation by:

- Developing the capacity of local people to participate in the sustainable management and enjoyment of protected areas.
- Creating awareness around key environmental issues, developing a deeper understanding of environmental principals, and encouraging environmentally conscious values and decision making.

As part of its multi-sectoral approach, CapeNature aims to support the Western Cape Education Department's efforts by presenting curriculum aligned environmental education programmes to schools, and by collaborating with like-minded partners in pursuit of environmentally sustainable development goals. Behaviour change efforts will be optimised by targeting specific audiences with innovative, transformative, quality assured programmes and interventions.

3.5.10 Administrative framework

In terms of CapeNature's administrative operating footprint, the Western Cape Province is divided into two regions: Region East and Region West. Each region is further sub-divided into two landscapes: Landscape West, Landscape Central, Landscape South and Landscape East. Each landscape is further sub-divided into three landscape units (Figure 3.3). The Sandveld Coastal Complex falls within all of the three landscape units comprising Landscape West.

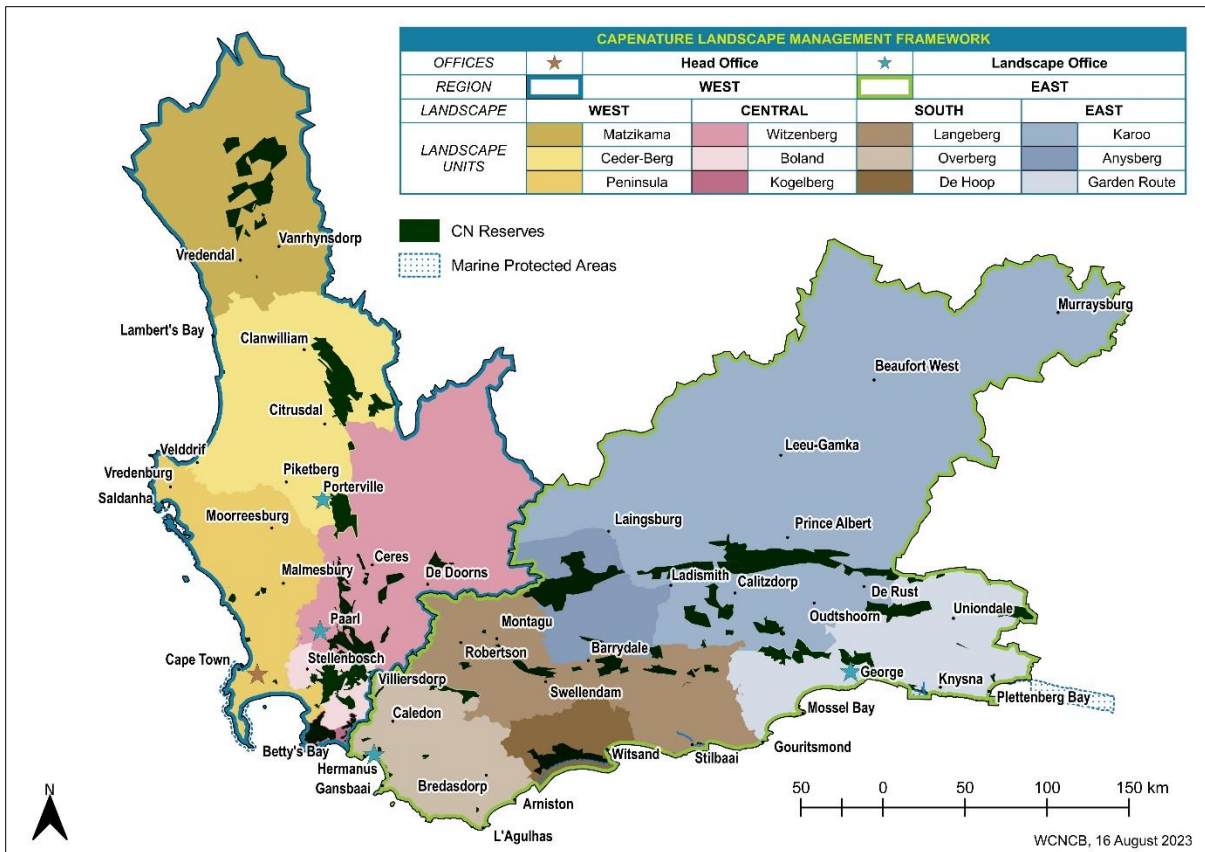


Figure 3.3: CapeNature’s landscape management framework.

CapeNature’s provincial biodiversity functions, both within protected areas and across the province, are supported by a number of staff and systems located at various offices. Head office is located in Cape Town and provides strategic support services. Protected areas within each landscape are further supported by a landscape office: Landscape West (Porterville), Landscape Central (Paarl), Landscape South (Hermanus) and Landscape East (George). There are also various smaller satellite and on-reserve offices.

4 CONSULTATION

This section outlines procedures for public participation during the development of this management plan, including formal processes for public comment on the draft plan, and establishes procedures for public participation during the implementation phase of this plan (Figure 4.1).

Stakeholder engagement takes place throughout the adaptive management cycle and enables public participation essential for sustainability, builds capacity and enhances responsibility. It promotes communication and the derivation of new information and/or expertise.

At the outset of the planning process for the Sandveld Coastal Complex, a stakeholder analysis identified relevant internal and external stakeholders, and defined the scope and purpose of engagement.

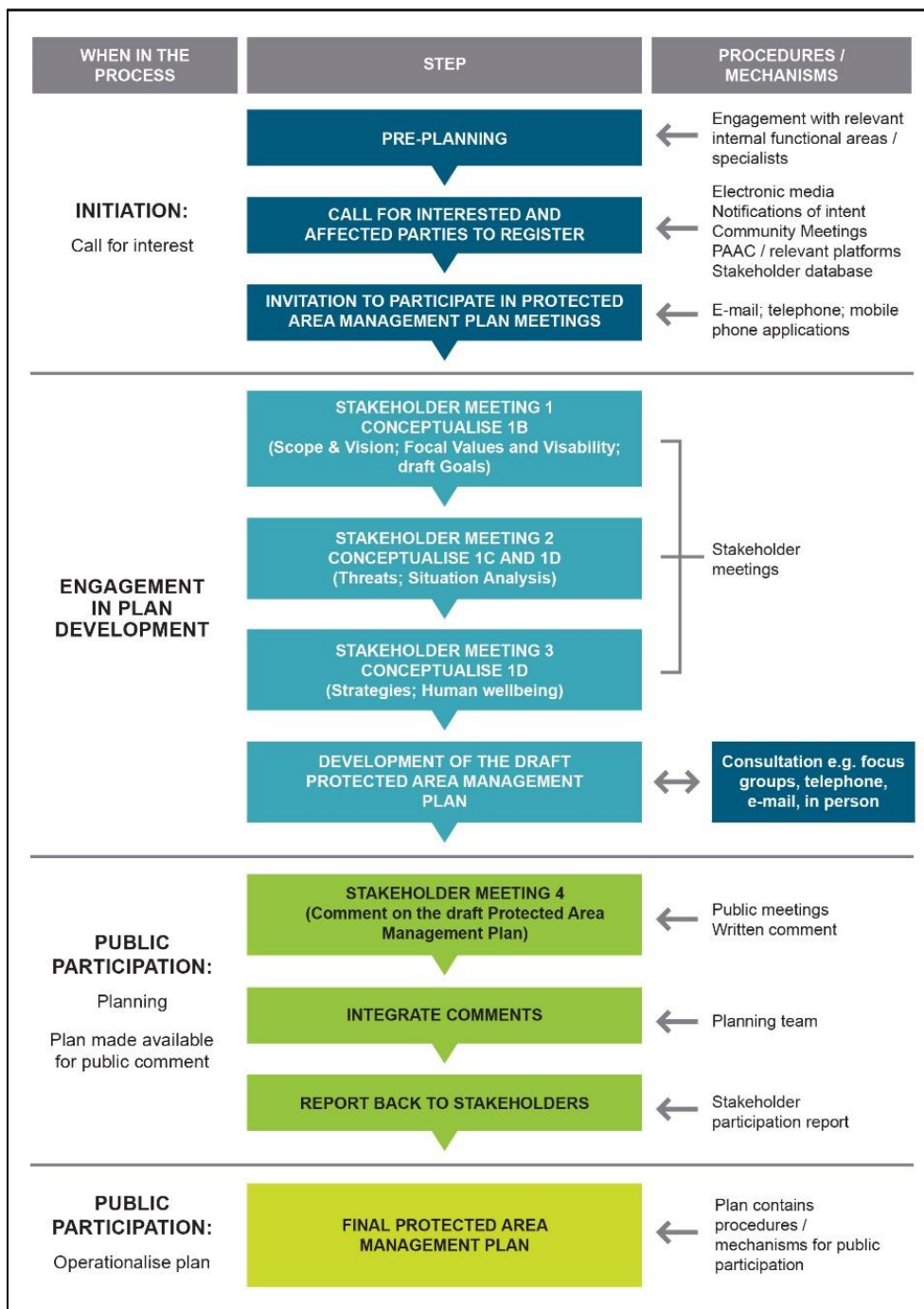


Figure 4.1: Process flow for protected area stakeholder engagement.

4.1 Stakeholder Engagement

4.1.1 Participatory planning

Several approaches to engaging internally and externally with stakeholders were applied, including structured facilitated workshops, meetings, site visits and the provision and circulation of information for input. Stakeholders were engaged using varied approaches during the stages of the planning process, from gathering and sharing information, to consultation, dialogue, working groups, and partnerships. The degree of engagement was guided by the stakeholder analysis and in response to the need (i.e., transparency of process, expert opinion, buy-in and support, etc.).

During 2021-2022, a series of stakeholder workshops were coordinated and facilitated by CapeNature. A range of stakeholders representing individuals or organisations were invited/involved. These stakeholders had an interest in, and/or knowledge/expertise of the landscape/complex, and/or the capability to support the implementation of the Sandveld Coastal Complex management plan. Stakeholders included landowners and land managers (private and communal), and relevant land or resource management authorities. Workshops were aimed at developing a strategic framework for the complex to help coordinate efforts in the landscape towards a common vision. The desired outcomes were to capacitate stakeholders in the understanding of the natural and cultural conservation targets within the complex and its zone of influence, and to identify mechanisms to maintain these targets over time.

The outcomes of the above-mentioned process were precursors to the site-specific management planning process for the Sandveld Coastal Complex and formed the foundation for smaller working groups and planning deliverables. The development process was facilitated by a core planning team comprised of the Landscape Conservation Intelligence Manager, Ceder-Berg Landscape Unit Manager, Landscape Ecologist, Ecological Coordinator, and Stakeholder Engagement Officer.

Due to COVID-19 lockdown restrictions during the initial development stages of the management plan, stakeholder engagements were primarily conducted online.

4.1.1.1 Key stakeholder groups engaged

- Academic specialists.
- BirdLife South Africa.
- CapeNature internal staff and specialists.
- Department of Environmental Affairs and Development Planning.
- Department of Forestry, Fisheries and the Environment.
- Groot Paternoster Private Nature Reserve.
- Saldanha, Bergrivier, Cederberg and Matzikama Municipalities.
- Southern African Foundation for the Conservation of Coastal Birds (SANCCOB).
- Various private landowners and neighbours.
- West Coast District Municipality.

4.1.1.2 Key workshop and engagement

- **Purpose:** Introducing stakeholders to planning for adaptive management; planning scope and vision; Conservation Standards principles.
- **Assessment:** Capacitating stakeholders in adaptive management planning; selecting focal conservation targets; selecting human well-being values; assessing the condition and status of targets and values; identification of key ecological attributes; threats assessment and conservation situation analysis.
- **Planning:** Identifying strategies; developing theories of change; developing objectives and indicators; developing actions.
- **Internal stakeholder engagement:** Scientific and technical review; executive review; board conservation committee review.
- **External review:** External peer review; formal public review.

4.1.1.3 Working groups and other input opportunities

In instances where specific input was required or stakeholders and/or experts were unable to participate during the initial workshops, smaller teams engaged directly, or stakeholders were engaged on a one-on-one basis to:

- Share workshop outputs and progress.
- Test the rationale of situation analyses, for example meetings with stakeholders related to taxon and habitat specific planning.
- Address relevant knowledge gaps and test rationale to address knowledge gaps.
- Facilitate information sessions and registration of interest with community members.

4.1.2 Procedures for public comment

The formal stakeholder participation process for the Sandveld Coastal Complex was initiated on 15 November 2023 and was concluded on 15 December 2023. The process was facilitated by an external service provider, Contour Enviro Group. A process inviting the public and interested and affected parties to register their interest and comment on the draft protected area management plan was initiated via the media and direct contact via email and telephone calls. Notifications of the process was placed in two local newspapers (Weslander and Ons Kontrei), as well as CapeNature's website and Facebook Page.

Notifications and copies of the draft management plan were placed at public libraries in Lamberts Bay, Velddrif and Saldanha Bay, as well as the Penguin (Bird) Island bird hide and Rocherpan reception office where it was accessible to all visitors. Furthermore, the draft plan was also made available electronically on the CapeNature website. Written comment was invited on the draft protected area management plan for a period of 30 days.

Registered interested and affected parties were invited to two public meetings and provided with an opportunity to ask questions or raise any concerns. The first meeting was held on the 4th of December 2023 in Velddrif at the community hall. A second meeting was held on the 5th of December 2023 at the sports community hall in Lamberts Bay. To encourage further and wider participation an online public meeting was also available.

All comments and inputs received during the entire stakeholder participation process were recorded and considered. Based on a comprehensive stakeholder engagement report provided by Contour Enviro Group, containing all inputs received from the public meetings, written comments, and comments and responses received by email and phone, the draft management plan was amended where relevant. Feedback was provided to all registered interested and affected parties.

A comprehensive stakeholder register, maintained by the Sandveld Coastal Complex lists all stakeholders and registered interested and affected parties, as well as comments received, and responses provided. Refer to Appendix 2, Stakeholder Engagement Process Report for the Sandveld Coastal Complex.

4.1.3 Procedures for participatory implementation

4.1.3.1 Protected area advisory committee

Participatory management is facilitated through advisory committee structures such as Protected Area Advisory Committees (PAACs) and Estuary Advisory Forums. These structures allow for regular interaction with stakeholders and are a mechanism to evaluate stakeholder feedback, to promote good neighbour relations and to influence beyond protected area boundaries.

The Sandveld Coastal Complex makes use of the Rocherpan Nature Reserve PAAC and the Penguin (Bird) Island Nature Reserve PAAC. The Rocherpan PAAC was initiated in 2015 and the Penguin (Bird) Island PAAC in 2013. Penguin (Bird) Island PAAC currently has an external chairperson from Lamberts Bay Tourism whilst the Rocherpan Nature Reserve PAAC is chaired by CapeNature. Meetings generally take place quarterly.

These committees represent the interest of registered stakeholders and are open to a wide variety of representatives that can/may include local authorities, provincial and national departments, neighbouring communities and landowners, NGOs, tourism, education, academic, and research

partners. Members attending must be the nominated delegates from their respective constituencies and are expected to provide feedback to their respective groups.

Protected Area Advisory Committees are expected to:

- Provide input into protected area management decisions.
- Play a supporting role in educating the community and various interest groups about the importance of conservation, protection and management of natural resources and the objectives of the complex management plan that are intended to pursue these goals.
- Monitor and evaluate progress on implementation of programmes and actions outlined in the complex management plan.
- Make recommendations on how CapeNature can improve programmes and policies.
- Promote involvement and decision-making around the management of natural and cultural heritage resources within the scope of the complex management plan.
- Promote the integration of conservation activities within the complex with those of surrounding areas.
- Identify opportunities and constraints pertaining to natural resource use.
- Establish, promote, and maintain beneficial partnerships for the complex.

Key members of the Sandveld Coastal Complex PAACs include:

- BirdLife SA.
- Cederberg and Bergrivier Municipality.
- Department of Forestry, Fisheries and the Environment.
- Department of Water and Sanitation.
- Farmers/Neighbours.
- Greater Cederberg Fire Protection Association.
- Lamberts Bay and Noordhoek High School.
- Lamberts Bay and Velddrif Tourism.
- Local business.
- SANCCOB.
- South African Police Services.
- West Coast District Municipality.
- Western Cape Government - Department of Agriculture.
- Western Cape Government - Department of Environmental Affairs and Development Planning.

4.1.3.2 Other mechanisms for stakeholder engagement

Enhancing engagement and participation by relevant stakeholders throughout the Sandveld Coastal Complex and its zone of influence is a key focus area. In addition to the existing PAAC platforms, a number of other mechanisms exist to facilitate and promote partnerships that help to meet the objectives of this management plan. These include but not limited to:

- The Western Cape Stewardship Reference Group, chaired by CapeNature, facilitates engagement between CapeNature and various partners working in the protected area expansion and stewardship space.
- CapeNature, BirdLife SA, SANCCOB and the DFFE: O&C have a strong mutual working relationship through bi-lateral MoUs to enhance particularly marine and coastal bird species conservation.

- The Olifants, Verlorenvlei and Berg River estuary forums have been established to mobilise civil society and empower participation in governance and management. Stakeholder engagement remains critical during the implementation of the estuarine management plans and these forums provide knowledge sharing platforms.
- Coastal Committee Meetings are chaired by the WCDM and are attended by CapeNature. These serve as a strategic platform to report to and engage district and other departments operating within the West Coast.
- The Sandveld Conservation Committee consists of various governmental departments and private landowners. Discussions mainly focus on agricultural, conservation and development related activities in the Sandveld area.
- The Sandveld Coastal Complex is a member of the Greater Cederberg Fire Protection Association.
- Operation Phakisa is a multi-departmental law enforcement collaboration focusing on marine and coastal activities. Regular planning and feedback meetings are held where hotspots are identified for planned compliance interventions.
- The National People and Parks Programme implemented by CapeNature has established a regional structure in the area to enable community engagement. The primary objective is to link communities with relevant government departments that can assist with issues such as access for marine resource utilisation or for spiritual, recreational, educational, traditional, and other purposes.
- Through the Comprehensive Rural Development Programme, CapeNature partners with NGOs, government departments and communities. The Council of Stakeholders is an elected structure of representatives from communities and focus areas include access, job creation opportunities, youth development, and small, medium, and micro-enterprise development.
- West Coast Biosphere meetings provide a platform to promote and foster sustainable human development along the West Coast.

5 PURPOSE AND VISION

This section makes provision for CapeNature to manage the Sandveld Coastal Complex exclusively for the purpose for which it was declared. It presents the vision, purpose, focal conservation targets, human well-being values and key threats foundational to developing the desired state for the complex.

The desired state, articulated as goals in this management plan, defines the outcome of management and directs management within and beyond protected area boundaries. This serves as a foundation for appropriate monitoring, evaluation, and adaptation to improve management effectiveness.

5.1 Management Intent and Desired State

The Sandveld Coastal Complex supports diverse and important marine, coastal, and terrestrial habitats which include coastal strandveld, coastal dunes, seasonal wetlands and a diverse range of marine islands, rocks, beach, and open water habitats. These habitats support a wide range of genetic, species and ecosystem diversity, which provide essential ecosystem services and contribute to human health and wellbeing. The management extent of this complex is extensive, from Elephant Rock Island Nature Reserve in the north down to Jacobs Rock Island Nature Reserve in the south.

The aims for the complex are to strategically, and adaptively, manage biodiversity towards ensuring the expansion, persistence, and recovery of terrestrial biodiversity of international importance, intact natural climate change corridors, freshwater, island, and dune ecosystems, and the unique cultural and historical heritage of the West Coast region, and in particular offshore island history through:

- The prioritised strategic management of threats.
- Maximizing and securing breeding habitat for threatened marine bird species.
- Ensuring that the properties comprising the complex are legally secured and that protected area design is augmented by expansion/consolidation through stewardship or other buffering mechanisms.
- Ensuring cooperative governance across all tiers and sectors of government and associated agencies.
- Facilitating sustainable use of identified natural resources coupled with effective natural resource use control.
- Providing unique tourism opportunities to augment income and access for the public.
- Providing valuable research, awareness, and environmental interpretation space along ecological gradients, with the emphasis on change adaptation and a specific focus on threatened marine species and offshore island history.
- Contributing meaningfully to the socio-economic development of the region and its people.
- Ensuring the conservation and protection of the unique endemic and sensitive biodiversity and ecological processes on, and surrounding, the islands, as well as conservation of the scenic, historical, archaeological, biological, and geological features of these islands.
- Promote and facilitate protected area expansion initiatives.

5.2 Purpose

CapeNature manages the Sandveld Coastal Complex in accordance with its organisational vision, and in accordance with the vision, goals and strategies derived in consultation with stakeholders.

According to section 17 of the NEM: PAA each protected area in South Africa is declared for one or more of the following purposes:

- A.** To protect ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes in a system of protected areas.
- B.** To preserve the ecological integrity of those areas.
- C.** To conserve biodiversity in those areas.
- D.** To protect areas representative of all ecosystems, habitats and species naturally occurring in South Africa.
- E.** To protect South Africa's threatened or rare species.
- F.** To protect an area which is vulnerable or ecologically sensitive.
- G.** To assist in ensuring the sustained supply of environmental goods and services.
- H.** To provide for the sustainable use of natural and biological resources.
- I.** To create or augment destinations for nature-based tourism.
- J.** To manage the interrelationship between natural environmental biodiversity, human settlement, and economic development.
- K.** Generally, to contribute to human, social, cultural, spiritual, and economic development.
- L.** To rehabilitate and restore degraded ecosystems and promote the recovery of endangered and vulnerable species.

All of the above listed purposes apply and are relevant to the Sandveld Coastal Complex.

5.3 Vision

The vision formulated for the Sandveld Coastal Complex is:

The Sandveld Coastal Complex supports resilient ecosystems that contribute to sustainable livelihoods, tourism, and partnerships, for the future of the West Coast.

5.4 Focal Conservation Targets

In consultation with stakeholders, natural and cultural historic focal conservation targets were identified, explicitly defined, and selected for their ability to represent the full suite of biodiversity and cultural historic heritage within the Sandveld Coastal Complex.

Focal conservation targets are summarised in Table 5.1. Features considered to be nested within or catered for by the conservation target are noted. Key ecological attributes are also included. These are features of conservation targets that can be measured to determine target condition. Key human well-being values derived from the tangible natural and cultural conservation targets are also noted. Since human well-being values are those components of well-being affected by the status of tangible natural or cultural targets, their status or “health” is not assessed separately but seen as contingent upon the status of the natural and cultural conservation targets.

Table 5.1: Summary of the Sandveld Coastal Complex focal conservation targets and associated viability status as rated in 2022.

Conservation Target	Description, Nested Values, Key Attributes and Associated Human Well-being Values	Current Status
Marine Ecosystems	<p>Description: Rocherpan MPA.</p> <p>Nested targets of note: Marine habitats with all associated fauna and fauna species found in the MPA.</p> <p>Key attributes: Marine fish species composition; breeding success of priority shorebirds (e.g., African black oystercatcher); shorebird species composition, abundance, and population trend.</p> <p>Associated human well-being value(s): Freedom, choice, and capacity to act independently within the legislated rules and regulations of the protected area; responsible utilisation of natural resources; knowledge economy contribution; primary production and nutrient cycling; respect and care for the natural environment.</p>	Good
Marine Birds	<p>Description: All species of marine birds found in the complex.</p> <p>Nested targets of note: Cape gannet; Cape cormorant; African penguin; white-breasted cormorant; crowned cormorant; bank cormorant; Hartlaub’s gull; kelp gull; various tern species.</p> <p>Key attributes: Breeding success, population sizes and trends of priority seabirds.</p> <p>Associated human well-being value(s): Freedom, choice, and capacity to act independently within the legislated rules and regulations of the protected area; responsible utilisation of natural resources; knowledge economy contribution; tourism and nature-based economic opportunities; primary production and nutrient cycling; respect and care for the natural environment.</p>	Fair
Cape Fur Seal	<p>Description: Cape fur seal colonies on Penguin (Bird), Elephant Rock, Paternoster Rocks, and Jacobs Rock islands.</p> <p>Nested targets of note: Apex predator and keystone species; indicator of marine prey availability.</p> <p>Key Attributes: Cape fur seal population size and trend.</p>	Good

Conservation Target	Description, Nested Values, Key Attributes and Associated Human Well-being Values	Current Status
	Associated human well-being value(s): Responsible utilisation of natural resources; knowledge economy contribution; primary production and nutrient cycling; respect and care for the natural environment.	
Rocherpan Wetland	<p>Description: Rocherpan Nature Reserve is dominated by a linear ephemeral wetland that is largely saline, with freshwater entering the system seasonally through two rivers.</p> <p>Nested targets of note: Waterbirds, mammals, invertebrates, and plants associated with this habitat and its buffer.</p> <p>Key attributes: Waterbird species composition, abundance, and trend; wetland ecosystem health; natural vegetation structure and species composition; water quality and quantity.</p> <p>Associated human well-being value(s): Freedom, choice, and capacity to act independently within the legislated rules and regulations of the protected area; tourism and nature-based economic opportunities; responsible utilisation of natural resources; knowledge economy contribution; security from natural disasters; respect and care for the natural environment.</p>	Good
Elands Bay Dune System	<p>Description: Semi-natural open dune system just north of the town of Elands Bay.</p> <p>Nested targets of note: All associated dune vegetation and fauna occurring in it; Witzand aquifer</p> <p>Key attributes: Vegetation structure and species composition; level of stabilisation of mobile dune systems.</p> <p>Associated human well-being value(s): Responsible utilisation of natural resources; knowledge economy contribution; security from natural disasters; security from natural disasters; primary production and nutrient cycling; respect and care for the natural environment.</p>	Good
Terrestrial Vegetation	<p>Description: Includes all fauna and flora species associated with intact terrestrial vegetation found within Rocherpan Nature Reserve and Elands Bay State Forest.</p> <p>Nested targets of note: Saldanha Flats Strandveld (Endangered); Langebaan Dune Strandveld (Endangered); Lambert's Bay Strandveld (Critically Endangered); Cape Seashore Vegetation (Least Concern); all fauna associated with these habitats possibly including three red listed small mammal species (Van Zyl's and Grant's golden moles and white-tailed mouse).</p> <p>Key attributes: Vegetation structure and species composition; recruitment of indicator species (steenbok and black harrier); fire return interval.</p> <p>Associated human well-being value(s): Freedom, choice, and capacity to act independently within the legislated rules and regulations of the protected area; responsible utilisation of natural resources; knowledge economy contribution; spiritual and physical health and cultural identity; respect and care for the natural environment.</p>	Very Good
Cultural Heritage (Non-tangible History) of Penguin (Bird) Island	<p>Description: The history of guano, seal and egg collection that occurred on Penguin (Bird) Island as well as some of the other marine islands in the complex and within the larger West Coast.</p> <p>Nested targets of note: Cultural historic information made available to the public.</p> <p>Key attributes: Conceptual meaning.</p> <p>Associated human well-being value(s): Spiritual and physical health and cultural identity; respect and care for the natural environment; responsible utilisation of natural resources; knowledge economy contribution; Freedom, choice, and capacity to act independently within the legislated rules and regulations of the protected area; tourism and nature-based economic opportunities.</p>	Very Good

As the public entity responsible for biodiversity conservation in the Western Cape Province, CapeNature delivers a suite of core services to the public, contributing towards the following outcomes:

- Resilient ecosystems that provide water and other ecosystem services.
- The promotion of local economic development.
- Job creation and skills development.
- Diversified and growing nature-based revenue streams.
- Access to environmental education and research.
- Environmental awareness, advocacy, and education.
- Access to natural and cultural heritage.

Human well-being is articulated as an outcome of conservation and is illustrated in Table 5.2. These focus areas are essential to the effective execution of this management plan and the achievement of the identified goals.

Table 5.2: Human well-being values of the Sandveld Coastal Complex.

Human Well-being Values	Description and Associated Benefits	Current Status
<p>Freedom, choice, and capacity to act independently within the legislated rules and regulations of the protected area</p> <p>Tourism and nature-based economic opportunities</p>	<p>Description: Socio-economic development is sustainably facilitated and maintained. Ecosystems are intact and healthy and thus add economic value to ecotourism products that are in line with the zonation of the Sandveld Coastal Complex.</p> <p>Associated benefits: Access to employment opportunities; access to capacity and skills development opportunities; tourism infrastructure; access to environmental awareness and education opportunities; mechanisms to enable tourism enterprises (e.g., small, medium, and micro enterprises); intact ecosystems and abundant wildlife.</p>	<p>Very Good</p>
<p>Responsible utilisation of natural resources</p>	<p>Description: Provide access to and promote consumptive and non-consumptive utilisation of identified natural resources in the Sandveld Coastal Complex, underpinned by structures that promote and enable responsible, sustainable use.</p> <p>Associated benefits: Permitted utilisation of resources; access to guidelines for responsible and sustainable utilisation of resources; access to sites for non-consumptive utilisation (e.g., events, filming, hiking); intact ecosystems and abundant wildlife.</p>	<p>Very Good</p>
<p>Security from natural disasters</p> <p>Primary production and nutrient cycling</p>	<p>Description: A healthy and intact environment provides security from natural disasters such as wildfire, drought, and flooding for the benefit of the dependent human communities. Primary production and nutrient cycling provided by the marine environment benefit fishing communities. The Witzand aquifer provides water to surrounding communities and for agricultural production.</p> <p>Associated benefits: Impact of natural protection from flooding, erosion, siltation; environmentally sound development; mechanisms to enable coordinated disaster management; mechanisms in place to protect groundwater resources.</p>	<p>To be determined</p>
<p>Spiritual and physical health and cultural identity</p> <p>Respect and care for the natural environment</p>	<p>Description: An effective environmental education, awareness and interpretation programme that supports the values of the complex and promotes respect and care for the natural environment.</p> <p>Associated benefits: Access to natural areas and wildlife (e.g., recreation, events, hiking, birding); safety of person and possessions whilst in the complex; quality or condition of sites; means of interpretation (e.g., providing interpretive information and signage).</p>	<p>Good (Estimate)</p>

Human Well-being Values	Description and Associated Benefits	Current Status
Knowledge economy contribution	<p>Description: The complex provides and facilitates monitoring and research to increase the natural knowledge base and human development.</p> <p>Associated benefits: Access to sites to conduct monitoring and research; mechanisms to facilitate monitoring and research; accessible repository of information/data.</p>	To be determined

5.5 Threats

CapeNature aims to mitigate threats to conservation targets, either through direct threat mitigation, or through mitigation or management of factors contributing to or driving threats. Threat assessment influences the direction and effectiveness of management actions.

Rating threats facilitates the allocation of limited resources, simplifies complex scenarios, and provides a systematic decision support method to focus management efforts. Direct threats are those impacting on targets directly and in many instances, such threats are compounded by contributing factors. Direct threats are rated on the following three criteria:

- **Scope:** The proportion of the target that can reasonably be expected to be affected by the threat within ten years given the continuation of current circumstances and trends.
- **Severity:** Within the scope, the level of damage to the target from the threat that can reasonably be expected given the continuation of current circumstances and trends.
- **Irreversibility:** The degree to which the effects of a threat can be reversed, and the target affected by the threat restored, if the threat no longer existed.

In many instances, climate change is not regarded as a direct threat but treated as a “Threat Multiplier”, often compounding direct threats and/or contributing factors that already exist. Mitigating climate change impacts directly is not always possible and as such they are rated in a slightly different way, taking an additional criterion into account:

- **Feasibility:** The degree to which the effects of a climate threat on a target can be mitigated, within a given time period and the feasibility of mitigation or management measures.

Table 5.3 summarises the critical threats identified for the seven focal conservation targets of the Sandveld Coastal Complex.

Table 5.3: A summary of critical threats affecting the seven focal conservation targets of the Sandveld Coastal Complex.

Focal Conservation Targets	Critical Threats	Threat Rating
Marine Birds	<p>Direct threats: Overfishing of pelagic prey species; Predation imbalance on seabirds, chicks, and eggs; Oil spills; Avian diseases (e.g., avian influenza and botulism); Cape fur seal colonization of marine bird breeding habitat particular that of Cape gannet.</p> <p>Climate change threats: Change in distribution of pelagic prey species; Sea level rise and resulting increase in frequency and severity of storm surges; Heat impacting seabird breeding; Rise in sea temperature and possible impacts.</p>	Very High
Rocherpan Wetland	<p>Direct threats: Avian diseases (e.g., avian influenza and botulism); Common reed spreading unabatedly across the Rocherpan wetland and its buffer; Over abstraction of surface water from the Papkuils River; Unlawful access by livestock.</p>	High

Focal Conservation Targets	Critical Threats	Threat Rating
	Climate change threat: Lack of water in the wetland due to lack of rainfall and regional warming.	
Cultural Heritage (Non-tangible History) of Penguin (Bird) Island	Direct threats: Loss of historical information regarding the history of guano, seal and egg harvesting on Elephant Rock, Jacobs Rock, and Penguin (Bird) Island. Climate change threat: Increased storm surges causing damage to guano scraping floor.	High
Marine Ecosystems	Direct threats: Oil spills; Solid waste pollution; Unlawful access. Climate change threat: Rise in sea temperature and possible impacts.	Medium
Cape fur seal	Direct threats: Overfishing of pelagic prey species; Marine mammal diseases (e.g., canine distemper, morbillivirus, avian influenza and domoic acid). Climate change threats: Change in distribution of pelagic prey species; Rise in sea temperature and possible impacts.	Medium
Terrestrial Vegetation	Climate change threats: Less rainfall and higher temperatures.	Medium
Elands Bay Dune System	Direct threats: Encroachment of invasive alien plants; Unlawful access into the dune field by 4x4 vehicles; Unlawful access by livestock.	Low

Table 5.4 summarises the ratings applied for the direct threats as well as the climate change threats associated with the Sandveld Coastal Complex.

Table 5.4: Summary rating of key threats for the Sandveld Coastal Complex.

Direct Threats	Associated Targets	Summary Threat rating
Overfishing of pelagic prey species	Marine birds; Cape fur seal	High
Loss of historical information regarding the history of guano, seal and egg harvesting on Elephant Rock, Jacobs Rock, and Penguin (Bird) Island	Cultural heritage	High
Oil spills	Marine birds; Marine ecosystems	Medium
Avian diseases (e.g., avian influenza and botulism)	Marine birds; Rocherpan wetland	Medium
Cape fur seal colonization of marine bird breeding habitat	Marine birds	Medium
Common reed spreading unabatedly across the Rocherpan wetland and its buffer	Rocherpan wetland	Medium
Predation imbalance on seabirds, chicks, and eggs	Marine birds	Low
Unlawful access Penguin (Bird) Island, dune driving at Elands Bay, livestock grazing at Rocherpan and Elands Bay)	Marine birds; Marine ecosystems; Terrestrial vegetation; Elands Bay dune system	Low
Climate Change Threats	Associated Targets	Summary Threat rating
Change in distribution of pelagic prey species	Marine birds; Cape fur seal	High
Less rainfall / higher temperatures	Rocherpan wetland; Terrestrial vegetation	High

Sea level rise and resulting increase in frequency and severity of storm surges	Marine birds	Medium
Increased storm surges	Cultural heritage	Medium
Heat impacting seabird breeding	Marine birds	Medium
Rise in sea temperature and possible impacts	Marine ecosystems	Medium
Zone of Influence Threats	Associated Targets	Summary Threat rating
Over abstraction of surface water from the Papkuils River	Rocherpan wetland	High
Unlawful land occupation	Elands Bay dune system	Medium
Invasive alien plants	Rocherpan wetland; Elands Bay dune system	Low
Agricultural effluents and water pollution	Rocherpan wetland	Low
Potential prospecting, mining, and seismic exploration	Marine birds; Marine ecosystems; Elands Bay dune system	Low
Dredging of Lamberts Bay Harbour	Marine birds; Marine ecosystems	Low

Overfishing of pelagic prey species (High):

The availability of food to seabirds is affected by shifts in the distributions of prey species and competition with commercial purse-seine fisheries. The latter is the main driver of the decline of seabird populations (e.g., Pichegru *et al.* 2009; Crawford *et al.* 2011; Crawford *et al.* 2018; Sherley *et al.* 2018; Crawford & Makhado 2020). Moreover, a number of marine predators rely on fish as a food source. Investigations into more efficient uses for anchovy *Engraulis encrasicolus* are necessary (AEWA 2020; Shannon & Waller 2021). This would include investigating and supporting using anchovy for human consumption instead of animal feed (van der Lingen 2021) and finding alternative sources of protein for animal feed such as insect protein (Shannon & Waller 2021).

Furthermore, the availability of prey to some flying seabirds such as Cape gannet *Morus capensis*, Cape cormorant *Phalacrocorax capensis* and greater-crested tern *Sterna bergii* is directly assisted by non-flying species such as African penguin *Spheniscus demersus*, which play an important role in herding fish prey from as deep as 33 m to the ocean surface (McInnes & Pistorius 2019). The dramatic decline of the African penguin populations along the West Coast in the last century will act as a contributing factor to decreasing food availability for various aerial seabirds.

Loss of historical information regarding the history of guano, seal and egg harvesting on Elephant Rock, Jacobs Rock, and Penguin (Bird) Island. (High):

The history and records of plundering most of the offshore island resources along the west coast of South Africa and southern Namibia by early colonial settlers are not easily available to the general public. Most of the islands that fall within the Sandveld Coastal Complex have been subject to some sort of harvesting from as early as 1820 (Shaughnessy 1984). Some of this important history is touched on briefly in this management plan (section 2.5), including various old literature sources, reports, and national archives.

Besides Robben Island, which can only be reached by ferry in limited numbers, Penguin (Bird) Island is the only island along the South African West Coast that is easily accessible to the general public. The reserve has a unique opportunity and role to showcase this history, not only of its own colonial exploitation, but also that of many of the other offshore islands along the West Coast. Without such an awareness intervention the story of how the islands were exploited, as well as the impacts that those activities had on biodiversity, will remain largely untold.

Oil Spills (Medium):

Oil pollution can be categorised as accidental discharge or operational discharge. Accidental discharge is mainly the result of major oil tanker disasters. These are significant but infrequent events. Operational discharge from vessels occurs daily due to poor maintenance, human error, and deliberate

illicit acts (Rantsoabe 2014). The impact of this threat can be both immediate (direct) and long-term (in-direct). Specifically, oil can smother marine life, cause chemical toxicity, lead to the loss of key organisms and changes to the marine ecology, habitat loss, and in the end the loss of vital species (Rantsoabe 2014).

Mass mortalities of seabirds are a common aftermath of major oil spills, with tens if not hundreds of thousands of birds affected. Seabird populations are particularly vulnerable due to their distribution, foraging and breeding behaviour (Parsons & Underhill 2005). Oil causes the feathers of seabirds to mat and separate, impairing waterproofing and exposing the animal's sensitive skin to temperature extremes, resulting in hypothermia or hyperthermia. Oiled seabirds will instinctively try to get the oil off their feathers by preening, which results in the animal ingesting the oil, resulting in severe organ damage. Oiled seabirds concentrate on preening and this overrides all other natural behaviours, including evading predators, feeding, and taking care of their young. This results in secondary impacts such as severe weight loss, anaemia, dehydration and abandoning their young (Parsons & Underhill 2005).

The Sandveld Coastal Complex and its zone of influence includes a long section of coastline and parts of the complex are particularly close to oil risk areas. Jacobs Rock and Paternoster Rocks Island Nature Reserves are situated just north of Saldanha Bay Port which is the main port through which bunker oil, gas and fuel are imported into the province. Rocherpan Nature Reserve and MPA are located within the greater St Helena Bay, which is used by large ships as a safe anchor zone before entering the Saldanha Bay Port (Biccard *et al.* 2020).

Avian diseases (e.g., avian influenza and botulism) (Medium):

Disease, such as the highly infectious avian influenza, is a threat to a number of marine and freshwater bird species found throughout the Sandveld Coastal Complex (Khomenko *et al.* 2018). Other diseases of note include avian cholera or pasteurellosis *Pasteurella multocida*, aspergillosis *Aspergillus fumigatus*, avian malaria *Plasmodium sp.*, babesiosis *Babesia peircei*, and botulism *Clostridium botulinum* (DFFE 2022).

Historically, avian cholera on Dyer Island caused a mass mortality of approximately 9 733 adult and 4 794 juvenile Cape cormorant *Phalacrocorax capensis* between 2004 and 2005 (Waller & Underhill 2007). More recently (2021-2022) the avian influenza outbreak along the West Coast resulted in the deaths of about 24 000 Cape cormorant and more than 300 African penguin *Spheniscus demersus* (Abolnik *et al.* 2023).

Diseases are transmitted to marine birds through various vectors, for example, infected migratory passerine birds, waterbirds, mosquitoes, and humans. Some bird species such as kelp gull *Larus dominicanus* and sacred ibis *Threskiornis aethiopicus* also often come in contact with human and agricultural waste (e.g., at landfill sites and abattoirs) which increases the risk for contracting and spreading diseases from one colony or population to the next. All birds, but in particular seabirds, are more susceptible to disease when they are in poor condition with compromised immune function. This can be due to food shortages and high parasite loads as a result of colonial lifestyles.

Cape fur seal colonization of marine bird breeding habitat (Medium):

The historical population of Cape fur seal *Arctocephalus pusillus pusillus* in Southern Africa is estimated at 1.5-2 million animals (Butterworth *et al.* 1995). The population has remained stable, however there have been spatial changes in seal distribution and breeding sites, primarily due to a southern shift of their main prey, pilchard/sardines *Sardinops sagax* and anchovy *Engraulis encrasicolus* (van der Lingen *et al.* 2006; Kirkman *et al.* 2013).

Figure 5.1 depicts the Cape fur seal pup count trends at the four breeding localities within the Sandveld Coastal Complex over a fifty-year period. The Paternoster Rocks and Penguin (Bird) Island colonies were established around the mid-1980s. At Paternoster Rocks, Cape fur seal is primarily found on the two largest islets (Seal and Egg). Numbers of pups born fluctuate over time, but all four colonies have increased since the mid-1990s. It is likely that the Elephant Rock and Jacobs Rock Island colonies have

reached their maximum carrying capacity due to space constraints of the islands, with growth rates of approximately 9% and 15% respectively (Seakamela et al. 2023). This might also be the case for Paternoster Rocks.

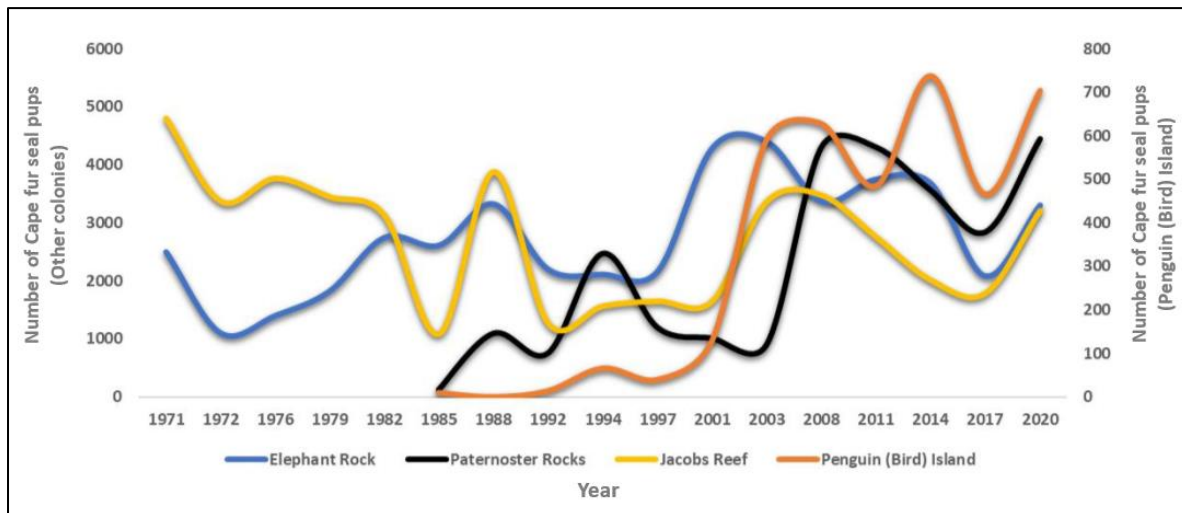


Figure 5.1: Cape fur seal pup production trends at four colonies within the Sandveld Coastal Complex.

Except for Penguin (Bird Island), the reserves within the complex that harbour Cape fur seal colonies support very few breeding seabirds. The Cape fur seal colony on Penguin (Bird) Island is actively managed on a daily basis to prevent the colony from expanding its range on the island. If this were allowed to happen, the seals would displace the important Cape gannet *Morus capensis* colony.

Common reed spreading unabatedly across the Rocherpan wetland and its buffer (Medium):

Mr C.W. Hëyl, former CapeNature Ornithologist, reported common reed *Phragmites australis* occurring within the Rocherpan Nature Reserve for the first time in 1978 (CapeNature 2023a). The species has been known to spread and increase within the Rocherpan wetland since the early 1990s (Kevin Shaw, former CapeNature Ornithologist, 2022, pers. comm.) In 1991, this species was only known from four relatively small and localised localities within the Rocherpan wetland. However, it quickly spread and by 1997 the former Rocherpan management plan (Wessels 1997) required this species to be actively managed in order to prevent it from spreading too fast.

Unfortunately, the extent of common reed was not actively managed between 2001 and 2014, resulting in large sections of the wetland boundary being engulfed and transformed, resulting in a mono-stand of reed, impacting negatively on waterbird diversity within the wetland (Kevin Shaw, former CapeNature Ornithologist, 2022, pers. comm.). In early 2014, the common reed covered an extent of 6.14 ha of the wetland (CapeNature 2014). However, since 2015, active management of the species has been initiated, based on recommendations from a multi-disciplinary stakeholder group (CapeNature 2014). Currently, the spread of the species is contained to three small localities of approximately 0.91 ha. The reason that this strategy was chosen (as opposed to total eradication) was to allow for additional bird breeding habitat within the wetland.

Predation imbalance on seabirds, chicks, and eggs (Low):

Where Cape fur seal *Arctocephalus pusillus pusillus* colonies overlap with threatened marine bird breeding sites, predation of Cape fur seal on seabird fledglings and adults is a concern and can have a detrimental effect on breeding success (Strydom et al. 2022a). On Penguin (Bird) Island, some Cape fur seal target seabirds, especially Cape gannet *Morus capensis* fledglings. The Cape fur seal population on the island is actively managed to prevent the seal population from occupying and displacing the

Cape gannet population. Furthermore, damage causing Cape fur seal are occasionally actively euthanised during the Cape gannet fledgling season when data indicates high levels of predation.

Kelp gull *Larus dominicanus* also poses a predation risk to Cape gannet (Strydom *et al.* 2022b) and various other seabirds (Harris *et al.* 2019). During the Cape gannet egg laying and incubation season on Penguin (Bird) Island, certain kelp gulls have learned, and become very efficient, at targeting Cape gannet eggs (Figure 5.2). Such individual problematic kelp gulls are occasionally actively euthanised during the breeding season when data indicates high levels of predation.



Figure 5.2: Kelp gull become skilled in stealing eggs from the Cape gannet colony (Photo: A. Fortuin).

Predation figures for Penguin (Bird) Island are depicted in Figure 5.3. Predation by Cape fur seal can be attributed to natural prey shortages. A study investigating Cape fur seal predation on Cape gannet fledglings found that in years with an increase in anchovy *Engraulis encrasicolus* and pilchard/sardine *Sardinops sagax* biomass, there was a decrease in seal predation on the gannet fledglings (Strydom *et al.* 2022a). Predation by kelp gull is likely driven by an unnaturally high population found within Lamberts Bay. Due to the availability of large quantities of food waste from the potato factory within the harbour precinct, the kelp gull population is likely much higher than it would naturally be with subsequent higher egg predation impacts.

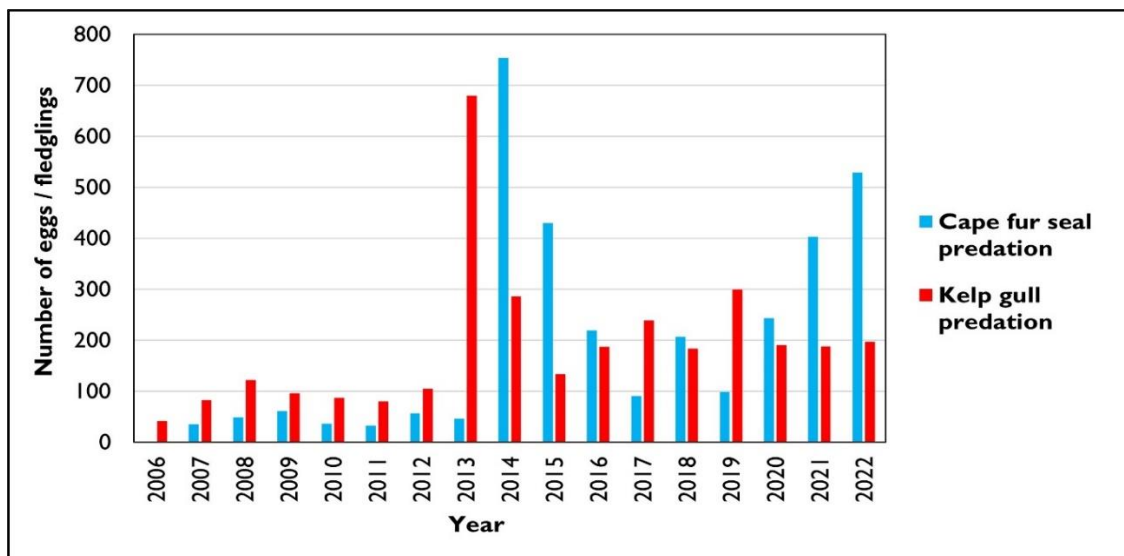


Figure 5.3: Cape fur seal and kelp gull predation figures for Penguin (Bird) Island 2006-2022 (CapeNature 2023a).

During the early 1990's, a relatively large number of feral cats *Felis catus* were living and breeding on Penguin (Bird) Island (Jaco van Deventer, former CapeNature Biodiversity Specialist, 2023, pers. comm.). The cats were able to access the island via the artificial breakwater. During that time, there were quite a large population of Cape cormorant *Phalacrocorax capensis* breeding on the island. The feral cats preyed mainly on the cormorant chicks and had a high impact on their breeding success. Fortunately, feral cats are a less of a problem these days as they are actively removed or euthanized if recorded on the island. Occasionally, water mongooses *Atilax paludinosus* also visit the island and may also opportunistically prey on adult or juvenile seabirds. Similarly, mice and rats may pose a similar problem.

Fortunately, the other offshore islands in the complex harbouring marine birds are not easily accessible for land-based predators. Cape fur seal predation of seabirds likely occurs, but it is expected to be less of a concern.

Change in distribution of pelagic prey species (High):

Climate change is affecting food availability to marine birds and mammals Cochrane *et al.* (2020) predicts that ocean surface temperature increases will result in a poleward shift of the Angola-Benguela front, which will lead to a decline in small pelagic fish species such as pilchard/sardine *Sardinops sagax*.

A shift in distribution of pilchard/sardines and anchovy *Engraulis encrasicolus* from the west to south coast of South Africa has already resulted in spatio-temporal changes in Cape fur seal *Arctocephalus pusillus pusillus* colonies (van der Lingen *et al.*, 2006; Kirkman *et al.*, 2013). Furthermore, Sherley *et al.* (2017) indicated that climate change most likely contributed significantly towards a shift or collapse of African penguin's *Spheniscus demersus* prey species within the northern west coast of South Africa.

Spatial shifting or stock collapse of small pelagic prey fish species will be detrimental to many pelagic feeding bird species found within the Sandveld Coastal Complex and indeed the wider West Coast. Unless this aspect can be addressed, seabird populations dependent on this prey type will continue to decline (Sherley *et al.*, 2018). For example, climate-mediated displacement of pilchard/sardine and anchovy stocks triggered dietary shifts in Cape gannet *Morus capensis* at Penguin (Bird) Island and Bird Island in Algoa Bay (Green *et al.* 2015). In addition, bank cormorant *Phalacrocorax neglectus* experienced a reduction in numbers in the northern parts of the Western Cape Province and increases in the south consistent with distributional shifts in West Coast rock lobster *Jasus lalandii* (Crawford *et al.* 2010).

Less rainfall / higher temperatures (High):

Appendix I, Map 8 shows the predicted terrestrial changes in temperature and rainfall in the Sandveld Coastal Complex. It is predicted that the Western Cape Province will experience higher minimum and maximum temperatures, a higher average annual temperature, and more heat events (WCG 2014). In addition, average rainfall in the province will decline, particularly in the western parts. Projected climate change impacts related to ecological targets and human well-being values of the complex include:

- Changes to wetland and estuary ecosystems due to sea level rise, erosion, and siltation due to high intensity rainfall events, saline intrusion and reduced freshwater flows.
- Changes in the distribution of invasive species and associated increased threats and loss of biodiversity.
- An increase in veldfire intensity and frequency.
- Changes in the geographical distribution of indigenous fauna and flora.
- Increased risk of species extinction.
- Increase in sea and land surface temperatures and higher evaporation.
- Reduced breeding success for seabirds and seals due to heat, storms, sea level rise and reduced food availability.
- Reduced ecosystem resilience and a reduction in ecosystem services and associated human well-being values.
- Changes in coastal and estuary habitats including marine water intrusion and coastal erosion.

Sea level rise and resulting increase in frequency and severity of storm surges (Medium):

Along the West Coast, sea levels have risen by 1.87 mm per annum between 1959 and 2006 (Mather *et al.* 2009). As sea level rise is predicted to accelerate, the impacts of storm surges will worsen due to a combination of increased intensity of sea storms, accompanied by increases in wave heights (Stocker *et al.* 2013). Rising sea levels are likely to result in the loss of intertidal areas, which are important nursery grounds for coastal fish species (Potts *et al.* 2015).

Sea level rise is a threat to coastal ecosystems only where the shoreline is constrained, and it cannot naturally realign. When the seashore is intact and unconstrained, beaches and dunes erode and realign further inland in response to rising sea levels (Bruun 1962; Harris 2008). However, where hard infrastructure is built inappropriately close to the shore (e.g., buildings, promenades, and sea walls), this natural re-alignment cannot take place (Kelly *et al.* 2019).

A rise in sea level will negatively affect the colonies of seabirds and Cape fur seal *Arctocephalus pusillus pusillus* on all islands within the Sandveld Coastal Complex. The available space on these islands will decrease as the mean sea level rises and storm surge impacts increase, resulting in the partial or total displacement of these species at these sites. Some species, such as Cape fur seal and Cape cormorant *Phalacrocorax capensis*, are expected to adapt to such rising sea levels by moving to alternative breeding sites. It may also be a possibility to build artificially raised platforms for some species such as Cape cormorant. However other species such as African penguin *Spheniscus demersus* and Cape gannet *Morus capensis*, which exhibit strong natal and breeding site fidelity, will be less adaptable. Large storm surges in Lamberts Bay occasionally result in the whole Cape gannet breeding area on Penguin (Bird) Island being inundated with seawater, kelp, grit, and mussel shells (Figure 5.4). When such storms strike while the Cape gannet are still actively breeding, it usually results in a mass disruption of the breeding attempt, with many adults having to rebuild their nests and lay a second clutch of eggs. It may also result in many young chicks being abandoned.



Figure 5.4: The Cape gannet breeding area covered with mussel shells and kelp after a strong winter storm swell (Photo: Island Staff).

Heat impacting seabird breeding (Medium):

According to Harris *et al.* (2019), climate change may result in heat stress in several seabird species including bank cormorant *Phalacrocorax neglectus*, Cape gannet *Morus capensis*, and African penguin *Spheniscus demersus*, leading to death or nest abandonment (Ward & Williams 2004; Crawford *et al.* 2018). An increase in the frequency and intensity of storms and in ambient temperatures may also reduce the breeding success of seabirds at low-elevation or unshaded nest sites (Sherley *et al.* 2012).

Recent observations at the African penguin *Spheniscus demersus* colonies at Simon's Town, Stony Point and Robben Island suggest that an increase in the frequency of long periods of high temperatures early on in the breeding season may have resulted in an increase in the rate of nest abandonment (DFFE 2022). It has also been shown that African penguin on Dassen Island bred approximately one month earlier during 2004-2008 compared to 1995-2001, a change attributed to warmer temperatures which led to a reduction in population growth rates (Moloney *et al.* 2013).

Rise in sea temperature and possible impacts (Medium):

Broad trends in observed sea surface temperature between 1961-2008 reveal warming at all latitudes along the entire African coastline (Kelly *et al.* 2019) and sea surface temperature is predicted to continue to warm (Popova *et al.* 2019). In addition, extreme ocean temperature events (marine heat waves and marine cold spells) occur on average at least annually at South African coastal sites (Schlegel *et al.* 2017). Temperature-driven shifts in spatial distribution have been experienced across multiple taxa (Kelly *et al.* 2019). Many impacted species are considered pioneers and may trigger ecological successions (Whitfield *et al.* 2016). Several species including kelp *Ecklonia sp.* (Bolton *et al.* 2012), West Coast rock lobster *Jasus lalandii* (Cockcroft *et al.* 2008), anchovy *Engraulis encrasicolus* (Roy *et al.* 2007) and pilchard/sardine *Sardinops sagax* (Coetzee *et al.* 2008) have shown recent eastward shifts in their distributions. This, in turn, affects seabird distribution, survival and breeding success because seabirds rely on many of these species as their primary food source.

5.5.1 Climate change as a threat multiplier

As the planet experiences increased pressure from population growth, economic development, and a warming climate, species, habitats, ecosystems, and ecological infrastructure is stressed to the point where it radically alters, moves, or collapses. Catastrophic weather events and variable climates can

wreak havoc with human food and water supplies (Huntjens & Nachbar 2015). As a consequence, basic human needs such as water, food, shelter, and health are in danger. New patterns of infectious disease outbreaks, and emerging diseases linked to ecosystem changes, are all associated with global warming and pose health risks not only to humans but also plants and animals (Huntjens & Nachbar 2015). The ramifications of not responding adequately are far greater than any earlier threat to humanity in recent history. Research shows climate change is a “Threat Multiplier” for ecosystems, human disaster, security and ultimately conflict (Huntjens & Nachbar 2015; Blamey *et al.* 2014).

The climate projections for the Western Cape Province not only indicate a general warming trend, but also projected drying in many areas, with increased variability (longer time periods between increasingly intense rainfall events) (WCG 2014; Beck *et al.* 2018; Skowno *et al.* 2019). Drying is of particular concern to a province that is already water stressed. These broad projections raise the risk profile of the Western Cape Province, which is already vulnerable to droughts, floods, and fire. In addition to this, the province has a coastline spanning approximately 900 km, leaving it vulnerable to storm surges and sea level rise (WCG 2014; Skowno *et al.* 2019). The Western Cape is especially vulnerable to climate change, being a winter rainfall area, as opposed to the other provinces in the country that are summer rainfall areas. The vegetation and agricultural conditions are therefore largely unique to this province, resulting in a particular climate vulnerability (WCG 2014).

The Western Cape Climate Change Response Strategy (WCG 2014) highlights the fact that well-managed natural systems reduce climate vulnerability and improve resilience to climate change. This critical climate change adaptation outcome has three biodiversity related focus areas:

- Water security and efficiency.
- Biodiversity and ecosystem goods and services.
- Coastal and estuary management.

5.6 Goals

Clear and measurable outcome-based goals, strategies and objectives are fundamental for the assessment of protected area management effectiveness and to the whole process of management itself. Based on the viability and threats assessment, a desired future condition was established for focal conservation targets and human well-being values, including associated core service areas, by setting measurable, time-bound goals directly linked to the targets and values and their key attributes.

Sandveld Coastal Complex Goals:

To maintain and build healthy and resilient ecological infrastructure that supports the focal conservation targets and human well-being values of the Sandveld Coastal Complex, management needs to achieve the following:

1. By 2034, the Sandveld Coastal Complex continues to sustain viable* populations of priority seabirds.**

* For Cape gannet a population >16 000 birds and at least 6 545 fledglings annually at Penguin (Bird) Island; For bank cormorant at least 200 breeding pairs at Paternoster Rocks and 20 breeding pairs at Jacobs Rock; For Cape cormorant at least 20 breeding pairs at Penguin (Bird) Island and 400 breeding pairs at Paternoster Rocks.

** Cape gannet, bank cormorant and Cape cormorant.

2. By 2034, the Sandveld Coastal Complex sustains a healthy* seabird species composition and annual recruitment of African black oystercatcher.

* 10 species expected to occur: Cape cormorant, white-breasted cormorant, Cape gannet, Hartlaub's gull, kelp gull, African black oystercatcher, white-fronted plover, common tern, greater-crested tern, sandwich tern.

3. By 2034, the Sandveld Coastal Complex maintains a managed* Cape fur seal population on Penguin (Bird) Island, and natural** Cape fur seal populations on Elephant Rock, Paternoster Rocks, and Jacobs Rock.

* Annual pup count of between 400 and 600.

** Annual pup counts: Elephant Rock >3 000; Paternoster Rocks >4 000; Jacobs Rock >1 000.

4. By 2034, Rocherpan wetland is in a near-natural condition* and it sustains a healthy** waterbird species composition and population.

* B = A slight change in ecosystem processes is discernible and a small loss of natural habitats and biota may have taken place.

** 40 species expected to occur during summer when water is present in the wetland: pied avocet, red-knobbed coot, reed cormorant, white-breasted cormorant, yellow-billed duck, greater flamingo, lesser flamingo, Egyptian goose, spur-winged goose, black-necked grebe, great-crested grebe, little grebe, common greenshank, Hartlaub's gull, kelp gull, grey heron, African sacred ibis, glossy ibis, blacksmith lapwing, common moorhen, African black oystercatcher, great white pelican, Kittlitz's plover, three-banded plover, white-fronted plover, southern pochard, curlew sandpiper, marsh sandpiper, South African shelduck, Cape shoveler, African spoonbill, black-winged stilt, little stint, Cape teal, red-billed teal, Caspian tern, common tern, greater-crested tern, sandwich tern, white-winged tern.

5. By 2034, the Sandveld Coastal Complex comprises 90-100% indigenous terrestrial plant species, with steenbok recruitment at least every second year.
6. By 2034, the Elands Bay State Forest comprises 90-100% indigenous terrestrial plant species, and the percentage of unvegetated mobile dune habitat is maintained or extended.
7. By 2034, the history of the West Coast islands in the Sandveld Coastal Complex is portrayed and easily available for visitors to Penguin (Bird) Island.

Achieving human well-being values, derived from healthy, responsibly managed ecological infrastructure and heritage, requires that:

8. By 2034, the Sandveld Coastal Complex continues to provide and support job opportunities in partnership with role-players and contributes to economic development and social upliftment in and around the complex.
9. By 2034, the Sandveld Coastal Complex's environmental awareness and interpretation plan promotes ecological targets and human well-being values.
10. By 2034, the Sandveld Coastal Complex continues to contribute to providing access and utilisation of natural resources within the complex.

5.7 Sensitivity Analysis

Sensitivity analysis based on the protected area's biodiversity, heritage and physical environment is a key informant for spatial planning and decision-making in protected areas. Sensitivity analysis aims to:

- Highlight areas containing sensitive biodiversity and heritage features.
- Inform all infrastructure development e.g., location of management and tourism buildings and precincts, roads, trails, and firebreaks.
- Facilitate holistic reserve planning and zonation.
- Support conservation management decisions and prioritisation of management actions.

At the regional scale, sensitivity mapping also allows for direct comparison of sites both within and between protected areas to support organisational planning across CapeNature's protected areas network. The process elevates:

- Sites with the highest regional conservation value.
- Areas where human access or disturbance will have a negative impact on biodiversity or heritage, and where specific environmental protection is required.
- Areas where physical disturbance or infrastructure development will cause greater environmental impacts, and/or increasing construction and maintenance costs.
- Areas where there is a significant environmental risk to infrastructure.
- Areas that are visually sensitive and need to be protected to preserve the aesthetic quality of the visitor's experience.

Sensitivity analysis provides decision support to ensure that the location, nature and required mitigation for access, utilisation and infrastructure development in the protected area are guided by the best possible landscape-level biodiversity and heritage informants. The process is transparent, relying on defensible expert-derived information and scientific data. Sensitivity maps do not replace site-level investigation, although they do allow for rapid assessment of known environmental risks, guiding planning to minimise negative impacts.

Sensitivity analysis uses a hierarchical approach. The method uses the premise that if a portion of the landscape is demarcated as highly sensitive in one of the categories considered in analysis, then, regardless of the sensitivity in other categories, that portion is elevated as highly sensitive in the overall scoring. The approach thus allocates the highest allocated sensitivity in any of the input categories as the ultimate sensitivity class for that particular portion. As new and improved data become available, these can be included.

Biodiversity, heritage, and physical features are rated on a standard scale of one to five, where one represents 'no' or 'minimal sensitivity' and five indicates 'maximum sensitivity' (Figure 5.5). Additional features such as visual sensitivity, fire risk and transport costs can be included. Higher scores represent areas that should be avoided for conventional access and infrastructure development, or where a specific strategy is applicable relative to sensitivity. A score of five typically represents areas where mitigation for conventional access or infrastructure development would be extensive, costly, or impractical enough to be avoided at all costs or contain features so sensitive that they represent a 'no go' area.

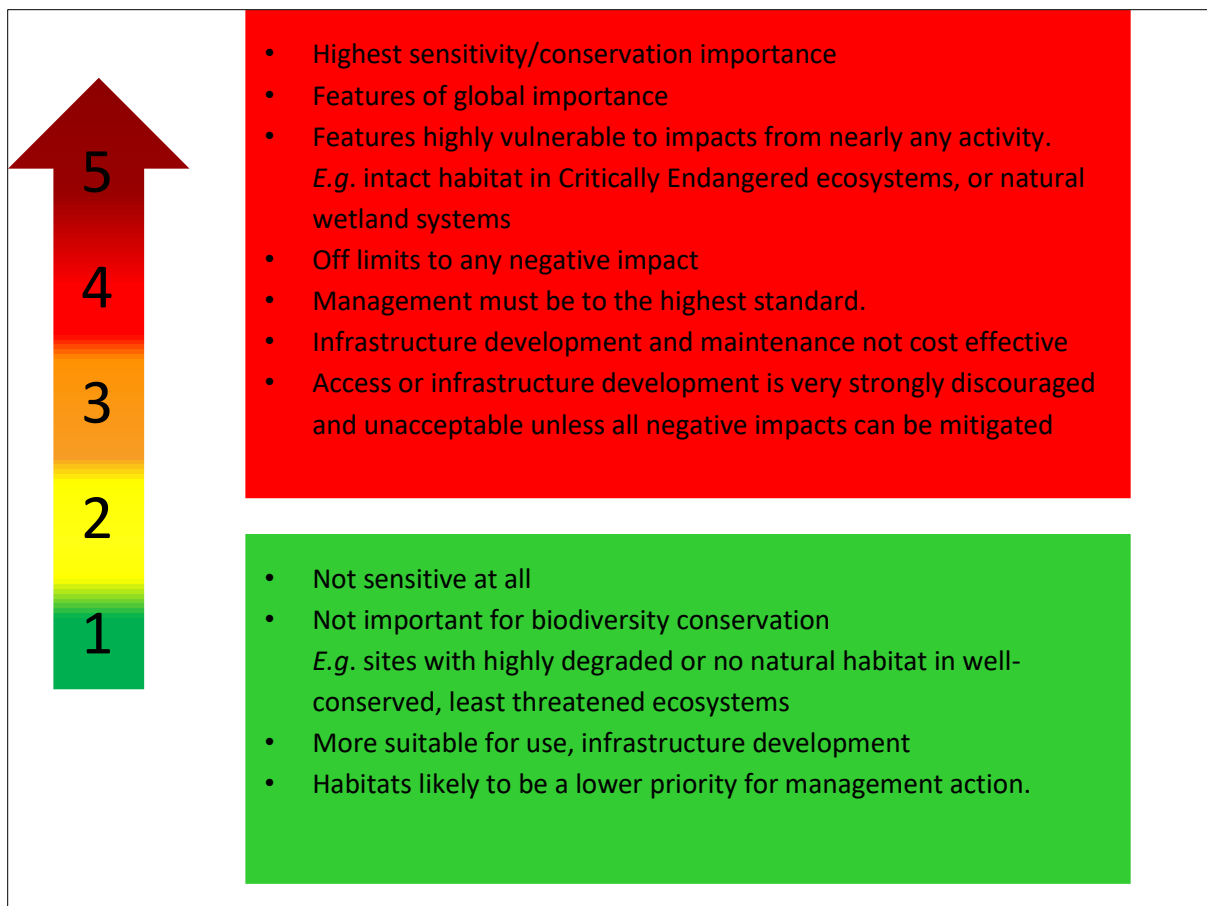


Figure 5.5: CapeNature method for sensitivity scoring and synthesis.

Physical, biodiversity and heritage features included in the sensitivity analysis for the Sandveld Coastal Complex are summarised Table 5.5 and Appendix 1, Map 9.

Table 5.5: Physical, biodiversity and heritage features included in the sensitivity analysis for the Sandveld Coastal Complex.

Category		Dataset	Criteria	Sensitivity Score	
Physical	Slope (degrees)	Slope calculated from 5 m resolution digital elevation model generated from 5 m contours. Only relevant for Penguin (Bird) Island, Elands Bay State Forest, and Rocherpan Nature Reserve.	> 30° Effectively off-limits for infrastructure development due to extreme risk of erosion and geological instability, or extreme engineering mitigation and associated construction costs required.	Highest sensitivity	5
			20°-30° Strongly avoid for infrastructure development-cut and fill or other difficult and expensive construction methods required. Appropriate engineering mitigation essential to prevent erosion and slope instability. Highest initial and on-going cost due to slope stabilization and erosion management requirements.	High sensitivity	4
			10°-20° Avoid for road, trail, and firebreak construction if possible. Severe erosion will develop on exposed and unprotected substrates. Pave roads and tracks and ensure adequate drainage and erosion management is implemented. May provide good views.	Moderate sensitivity	3
			5°-10° Low topographic sensitivity, likely still suitable for built infrastructure. Use of gentle	Low sensitivity	2

Category	Dataset	Criteria	Sensitivity Score		
		slopes may provide improved views or allow access to higher areas.			
		0°-5° Preferred areas for any built infrastructure, lowest risk of erosion or instability, lowest construction, and on-going maintenance costs.	Lowest sensitivity	1	
Biodiversity	Rivers	I: 50 000 National Geo-Spatial Information Rivers; National Biodiversity Assessment NBA wetlands and seeps (Van Deventer <i>et al.</i> 2018).	Within 100 m of non-perennial river. Rivers only feature in Rocherpan Nature Reserve. According to NFEPA, the Papkuils River is moderately modified. According to the NBA, the Papkuils River is listed as Critically Endangered. The Papkuils and Sout Rivers are non-perennial and included in this category.	High sensitivity	4
	Wetlands and seeps	NBA wetlands and seeps (Van Deventer <i>et al.</i> 2018).	Wetlands and seeps, extracted from the NBA, inland aquatic (freshwater) realm. This layer included only natural wetlands. Wetlands only occur in Rocherpan Nature Reserve.	Highest sensitivity	5
			Within 200 m of wetlands and seeps.	High sensitivity	4
	Ecosystem threat status	Red-listed ecosystems per NBA; The integrated coastal layer incorporates terrestrial, coastal, and marine ecosystems (Harris <i>et al.</i> 2019).	Critically Endangered: None.	Highest sensitivity	5
			Endangered: Cape Island, Saldanha Flats Strandveld.	High sensitivity	4
			Vulnerable: Cape Exposed Rocky Shore, Cape Kelp Forest, Cape Mix Shore, Cape Rocky Inner Shelf, and Namaqua Mixed Shore.	Moderate sensitivity	3
			Near Threatened: None.	Low sensitivity	2
			Least Concern: Cape Seashore Vegetation, Lambert's Bay Strandveld, Langebaan Dune Strandveld, and Southern Benguela Dissipative Intermediate Sandy Shore.	Lowest sensitivity	1
	Protection levels per ecosystem type	Protection levels per the NBA; The integrated coastal layer incorporates terrestrial, coastal, and marine ecosystems (Harris <i>et al.</i> 2019).	Not Protected: St Helena Bay.	High sensitivity	4
			Poorly Protected: Lamberts Bay Strandveld, and Saldanha Flats Strandveld.	Moderate sensitivity	3
			Moderately Protected: Cape Mixed Shore, Namaqua Mixed Shore, Cape Exposed Rocky Shore, Cape Rocky Inner Shelf, Cape Island, and Cape Kelp Forest.	Low sensitivity	2
			Well Protected: Langebaan Dune Strandveld, Southern Benguela Dissipative Intermediate Sandy Shore, and Cape Seashore Vegetation.	Lowest sensitivity	1
	Vegetation status / Ecosystems threat status	Ecosystem threat status based on Cape's 2016 assessments (Mucina & Rutherford 2006). Only	Critically Endangered: None.	Highest sensitivity	5
			Endangered: Saldanha Flats Strandveld.	High sensitivity	4
			Vulnerable: Lambert's Bay Strandveld.	Moderate sensitivity	3
			Near Threatened: None.	Low sensitivity	2

Category		Dataset	Criteria	Sensitivity Score	
		relevant for Elands Bay State Forest and Rocherpan Nature Reserve.	Least Concern: Cape Inland Salt pans, Cape Seashore Vegetation, and Langebaan Dune Strandveld.	Lowest sensitivity	1
	Rare and endangered plant species	Extracted from CapeNature State of Biodiversity database; All threatened species (Raimondo <i>et al.</i> 2009).	All plant species rated as Critically Endangered, Critically Rare, Declining, Endangered, Near Threatened, Rare or Vulnerable. Point localities buffered by 5 m.	Highest sensitivity	5
	Special habitat	Special habitat for threatened seabird and Cape fur seal.	Sites used by threatened and/or colonial marine species for breeding, roosting, or hauling out. Paternoster Rocks and Jacobs Rock (entire islands) - seabird breeding and roosting sites as well as a Cape fur seal breeding site. Rocherpan Nature Reserve - coastal strip is a seabird roosting site. Penguin (Bird) Island – is a seabird roosting and breeding site. Sites used by Cape fur seal for breeding. Elephant Rock (entire island). Penguin (Bird) Island (partly).	Highest sensitivity	5
Heritage	Archaeological and cultural sites	Cultural and heritage sites as recorded in the protected area infrastructure register and heritage inventory.	Heritage sites as recorded by CapeNature, buffered by 5 m.	High sensitivity	4

Sensitivity for the Sandveld Coastal Complex is illustrated in Table 5.6 and Appendix I, Map 9. Approximately 19% of the area of the complex is classified as highest sensitivity, and approximately 47% as high sensitivity (Table 5.6).

Table 5.6: Summary of sensitivity scores for the Sandveld Coastal Complex.

Score	Total Sensitivity Score		Main Features (% of total area)								
	Area (ha) = 1 485.89	% of total	Slope Sensitivity	River Buffers	NSBA 2018 Wetlands	Red-Listed Ecosystems	Protection Levels	Ecosystem Threat Status per Vegetation Type	Species of Special Concern	Special Habitat	Heritage Sites
1	309.83	20.85	85.07	-	-	57.12	56.02	52.01	-	-	-
2	119.91	8.07	10.39	-	-	-	1.45	-	-	-	-

Score	Total Sensitivity Score		Main Features (% of total area)								
	Area (ha) = 1 485.89	% of total	Slope Sensitivity	River Buffers	NSBA 2018 Wetlands	Red-Listed Ecosystems	Protection Levels	Ecosystem Threat Status per Vegetation Type	Species of Special Concern	Special Habitat	Heritage Sites
3	64.17	4.32	4.30	-	-	6.67	37.00	1.10	-	-	-
4	705.25	47.46	0.21	8.16	15.65	36.21	5.53	35.50	-	0.10	0.01
5	286.74	19.30	0.02	-	15.86	-	-	-	0.08	3.34	-

Based on area (ha), slope was not found to be a key driver of sensitivity within the complex as a whole. The overall sensitivity based on the protection levels and ecosystem threat status per vegetation type was scored as having the lowest sensitivity (52-56%), although just over one third (35%) of the complex had high sensitivity due to ecosystem threat status per vegetation type. Special habitat and species of special concern only contributed a small amount to sensitivity within the complex, albeit at the highest possible sensitivity.

When the protected area components of the complex were considered individually, however, different sensitivities emerged. Approximately 26% of Penguin (Bird) Island had very high sensitivity due to breeding and roosting habitat for various seabirds and Cape fur seal. The island is a low-lying offshore island that provides vital breeding habitat and refuge for a number of seabird species, including highly threatened species of global importance. Historical guano-collecting infrastructure on the island also represents important heritage features. The flat terrain of the island also means that a large area is vulnerable to physical damage during storm surges. Due to the presence of these highly sensitive features concentrated within a relatively small area, Penguin (Bird) Island was characterised as a highly sensitive reserve overall. Any new infrastructure development must be approached with extreme caution, and planning must take relevant sensitivity features into account.

The lowest sensitivity was along the walkway providing access through the island as well as the existing infrastructure footprint of the museum, the Southern right whale display, and the visitor centre. The moderately sensitive area includes the area west of the visitor centre where Cape cormorant *Phalacrocorax capensis* historically bred. Although not actively used currently, the adjacent buildings and walkways do generate additional disturbance to potential seabirds that want to breed or roost in this area. The current bird hide location was within a moderately sensitivity area, next to the highly sensitive Cape gannet *Morus capensis* colony. Depending on the frequency of storm surge events related to slow sea level rise, the locality of this hide may need to move slightly east to mitigate against flood damage and to allow the Cape gannet colony to expand slightly east to higher ground.

The remaining rocky marine islands (Elephant Rock, Paternoster Rocks, and Jacobs Rock) were classified as highly sensitive due to these islands having special habitats, i.e., roosting and breeding sites for Cape fur seal *Arctocephalus pusillus pusillus* and threatened seabirds such as African penguin *Spheniscus demersus*, bank cormorant *Phalacrocorax neglectus* and Cape cormorant *Phalacrocorax capensis*.

More than 80% of Elands Bay State Forest scored a low sensitivity. This was due to the low sensitivity of the vegetation and the high protection levels of the ecosystem types.

More than 90% of Rocherpan Nature Reserve had high to very high sensitivity due to the presence of wetland habitat and red-listed ecosystems. This small coastal reserve contains significant areas of

Saldanha Flats Strandveld vegetation, which is poorly conserved and listed as Endangered. Large areas of the reserve contain Langebaan Dune Strandveld, also listed as Endangered. The seasonally inundated Cape Inland Salt Pans provide important foraging and breeding habitat for a number of waterbird species when the wetland contains water. Sandy coastal substrates and wetlands are also important risk factors for road and built infrastructure. Any proposed infrastructure or activity must take these sensitivity features into account.

Appendix I, Map 9 illustrates the sensitivity for the Sandveld Coastal Complex in detail.

6 ZONING PLAN

This section outlines the zoning plan for the Sandveld Coastal Complex. The complex forms part of a planning matrix and locating the complex in terms of the municipal integrated development plan is aimed at minimising conflicting development in either the protected area or the neighbouring municipal area.

The primary objective of the zoning plan is to establish a coherent spatial framework within and around the Sandveld Coastal Complex to guide and co-ordinate conservation, tourism and visitor experience, access and utilisation, and stakeholder and neighbour relations.

Zoning is intended to minimise user conflict by separating potentially conflicting activities such as wildlife viewing, recreational activities, and tourism accommodation, whilst ensuring that activities and utilisation continues in appropriate areas and do not conflict with the goals and objectives of the complex.

6.1 The Sandveld Coastal Complex in the Context of Municipal Integrated Development Planning

Municipalities across South Africa develop Spatial Development Frameworks (SDFs) to illustrate current and desired future land uses spatially across the municipal area that link into their Integrated Development Plans (IDPs). IDPs are compiled for five-year periods and are reviewed annually to establish prioritization and allocation of budget expenditure in relation to their development priorities.

The Sandveld Coastal Complex lies within the West Coast District Municipality (WCDM) and spans the Saldanha Bay, Bergrivier, Cederberg and Matzikama local municipalities (Appendix I, Map 1). As such, there is one district SDF and IDP and four local SDFs and IDPs. These have bearing on the Sandveld Coastal Complex in terms of alignment between statutory initiatives at the three tiers of government and management of the complex, identification of risks, and interventions required. The IDPs and SDFs should be taken into consideration in determining the zone of influence of the protected area and establishing potential threats and opportunities in this zone. There is also the opportunity to identify projects and interventions that need to be included in the municipal IDPs and SDFs where appropriate and within the legislated stakeholder engagement processes. Aspects of the 10 municipal development plans applicable to the Sandveld Coastal Complex are summarised at the end of this section in Table 6.1.

6.1.1.1 West Coast District Municipality SDF and IDP

The WCDM SDF incorporates the Western Cape Biodiversity Spatial Plan (WCBSP) (Pence 2017) as a key informant and directly aligns spatial planning categories to the appropriate WCBSP category including clear descriptions. The WCDM SDF discusses the need to have conservation areas and the spatial implications thereof. These spatial implications relate to the need for restricted and carefully considered land use and development, managed and controlled public access, environmental management plans, buffer areas around nature reserves, continued efforts to maintain the natural state of habitats and ecosystems, and linkages between interrelated conservation areas (WCDM 2020). All these spatial implications are of direct relevance to the Sandveld Coastal Complex.

The WCDM SDF also refers to the importance of protecting hydrology and freshwater ecosystems, particularly in light of regular droughts experienced. Water security is highlighted as a key challenge and the implications of climate change for water, biodiversity, infrastructure, agriculture, and health are defined. The SDF acknowledges the need to protect ecological corridors which will allow for movement of species as part of the response to climate change. This is relevant to corridor and protected area expansion initiatives around the complex.

Certain challenges are identified with regard to biodiversity conservation. These include degrading of sensitive ecosystems of high conservation importance, loss of ecological connectivity, conflict between conservation, agriculture and development needs, and loss of ecological infrastructure and ecosystem services. Goal three of the SDF promotes the enhancement and protection of key biodiversity and agricultural assets in the district. This goal aligns directly with one of the WCDM IDP strategic objectives, which is to promote sustainable utilisation of the district's natural resource base to extract economic development opportunities without compromising conservation objectives and biodiversity.

According to the SDF, the WCDM undertakes several environmental management programmes and activities including environmental education and awareness, integrated coastal and estuarine management, inland water management, addressing environmental complaints, alien plant clearing, biodiversity conservation, implementing Coast Care, and acting as a commenting authority for development applications.

Strategies and plans included as part of the WCDM IDP include *inter alia* a regional climate change strategy, an integrated environmental strategy, and support for the Greater Cederberg Biodiversity Corridor (GCBC) initiative. The IDP also indicates the need for developing an invasive species monitoring, control, and eradication plan (WCDM 2020).

6.1.1.2 Saldanha Bay Municipal Planning Tools

The Saldanha Bay Municipal SDF and Conceptual Development Frameworks (CDFs) are relevant to Paternoster Rocks and Jacobs Rock Island Nature Reserves. CDFs present site-specific goals and objectives as part of site specific sub-SDFs, which form part of the Saldanha Bay Municipality's overall SDF.

The Saldanha Bay Municipal SDF uses the WCBSP (Pence 2017) as a key informant in the Greater Saldanha Environmental Management Framework (EMF). The Greater Saldanha EMF considers issues related to land use and development and indicates the environmental management priorities for the municipal area. The strategic environmental management plan developed from this process facilitates the incorporation of sustainability issues into spatial development and land use planning. It identifies seven Environment Management Zones (EMZs) based on a combination of environmental and development attributes: urban conservation, rural conservation, controlled development, restoration, agricultural development, industrial activity, and urban development. The EMZs act as a tool to assist in identifying appropriate locations for development and providing guidelines for sustainable development. The EMZ maps provided in the SDF assist with the identification of factors that should be considered in formulating and assessing development proposals, including: the WCBSP spatial categories, freshwater ecosystems, dune systems, Ramsar sites, and all protected areas (Saldanha Bay Municipality 2019).

The SDF and Greater Saldanha EMF are intended to be integrated, given the shared objective of these two documents. However, when comparing the town proposals, these two documents do not reflect the same proposed land use. Thus, town proposals need to be considered in conjunction with the Greater Saldanha EMF (Saldanha Bay Municipality 2019).

The Saldanha Strategic Biodiversity Offset Strategy approved in 2020 (WCG 2020b) was developed for the Besaansklip Industrial Area within the municipality. The strategy designates a core corridor of Critical Biodiversity Area (CBA) that is a non-developable zone, with adjacent areas within the industrial area designated as offset-required or no-offset required zones. Development proposals within the Besaansklip Industrial Area need to consider these development limitations.

Goals one and five of the SDF relate directly to the Sandveld Coastal Complex. Goal one aims to develop and maintain a strong local economic base, through the promotion of non-consumptive tourism, industrial development, and agriculture. The corresponding objective is to develop a clear and appropriate tourism management strategy based on the natural and heritage resources within the municipality. Goal five aims to promote the conservation and sustainable use of natural resources in the municipality. The objectives aim to limit and control development and activities within environmentally sensitive and/or conservation worthy areas, address and rectify the unsustainable utilisation of natural resources, and promote the sound management of natural areas to ensure their sustainability.

The Jacobs Bay and Paternoster CDFs further relate to the complex by aiming to prohibit or restrict erection, alteration or extension of buildings and structures seaward of the coastal management line, and in the case of Jacobs Bay, to ensure ecological integrity and environmental attractiveness as Jacobs Bay's main economic attraction.

Section six of the fourth generation Saldanha Bay Municipal IDP considers environmental management and land use management. Environmental focus areas that are relevant to the Sandveld Coastal Complex include environmental management, climate change and coastal management. Environmental management focuses on the WCBSP and discusses biodiversity areas and their importance in identifying conservation priorities within the municipal area.

The municipality acknowledges that climate change presents serious threats to the future of the municipal area and its environs due to rising sea levels and the risk to infrastructure in low-lying areas. Furthermore, changing rainfall patterns and extreme weather events will affect the area directly as it is critically dependant on natural resources, particularly marine and agricultural, both of which will face increasing threats from climate change.

The municipal area also has many opportunities for low carbon development, particularly linked to the industrial activities taking place in the region. Much effort has already gone into determining how industrial activities and economic development can support the low carbon economy. The opportunities around small and large renewable energy developments also need to be considered when planning in the region. The municipal SDF and IDP should support decisions in this regard.

Lastly, the Saldanha Bay Municipality has a second generation Integrated Coastal Management Plan (ICMP) which was completed and approved in 2019. The ICMP deals with the current state of the coastal environment and strategies to address these challenges. The ICMP also facilitates improvement of institutional structures and capacity to respond to existing management gaps, and the roles and responsibilities outlined in the National Environmental Management: Integrated Coastal Management Act, 2008 (Act No. 49 of 1999).

6.1.1.3 Bergrivier Municipality SDF and IDP

The Bergrivier Municipal SDF and IDP are relevant to Rocherpan Nature Reserve. The SDF uses the WCBSP (Pence 2017) as a key informant and directly aligns spatial planning categories to the appropriate WCBSP category. The SDF states the need for the municipality to safeguard the region's natural assets, ensure on-going ecological functioning, and promote sustainable land uses. Conservation related initiatives which have been identified as opportunities in the SDF include expansion of the private conservation estate, targeting key representative habitats and promoting landscape connectivity. The municipality also has an approved invasive species monitoring, control, and eradication plan.

Key actions for conservation management are identified in the SDF. These include rehabilitating and maintaining ecological infrastructure, securing Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), managing land uses compatible with CBAs and ESAs, applying development setbacks in coastal, estuarine, and riverine areas, rehabilitating and maintaining ecological infrastructure, and ensuring ecological corridors to facilitate climate change adaptation (Bergrivier Municipality 2019).

The need to improve catchment and riparian management and clear alien plants which are high consumers of water is identified as an opportunity, especially considering the regional strategic value of water resources. The SDF acknowledges that stricter management of natural resources and utilisation is required particularly related to ecological reserves for surface and groundwater resources and not threatening the flow regimes of rivers and wetlands.

The Bergrivier Municipality aims to address climate change pressures and adapt and diversify its response to changing market conditions, extreme climatic conditions, and increased food security concerns. One of the ways in which the municipality aims to support this is by reducing climate vulnerability and improving landscape resilience by developing a green economy. The municipality also supports opportunities for payment for water supply and habitat restoration.

The SDF has several strategic focus areas. Of relevance to the Sandveld Coastal Complex is the “building resilience” focus area which recognises that biodiversity, ecological infrastructure, and ecosystem services underpin the local economy. The SDF pursues mitigation and rehabilitation strategies for stressed and degraded habitats. One of the strategic objectives in the IDP is to conserve and manage the natural environment and mitigate the impacts of climate change. A municipal climate change adaptation plan was developed in partnership with the Western Cape Government.

6.1.1.4 Cederberg Municipality SDF and IDP

Elands Bay State Forest and Penguin (Bird) Island Nature Reserves fall within the Cederberg Municipality. The municipal SDF uses the WCBSP (Pence 2017) as a key informant and directly aligns spatial planning categories to that of the WCBSP. Coastal management is also incorporated into the SDF using coastal management setback lines administered with coastal overlay zones, coastal management and protection zones and coastal management controls.

The Cederberg Municipality SDF recognises that the spatial realm includes the biophysical environment and proposes three strategies to address the strengths, weaknesses, threats, and opportunities identified in the SDF. One of the most important strengths identified is that Elands Bay and Lamberts Bay function as tourism nodes. Penguin (Bird) Island plays a particularly important role in attracting visitors to the region. Threats to biodiversity include the effects of climate change. Three strategies to address threats to biodiversity and enhance strengths are protecting natural resources to ensure their use in perpetuity, changing from a functionalist and modernist planning approach to a human and nature centred approach, and growing opportunities to ensure convenient and equal access.

Five spatial objectives are presented by the Cederberg Municipal SDF. Objective 5 has relevance to the Sandveld Coastal Complex. It relates to protecting ecological and agricultural integrity to promote the GCBC, and in particular the establishment of the West Coast and Sandveld corridors. The spatial strategies related to biodiversity protection include protection of food and water security, applying bioregional classification, growing conservation potential, formalising conservation of CBAs, coastal management, and protecting and preserving sensitive habitats.

Bioregional classification is implemented with the development of the Sandveld EMF which addresses the cumulative impact on ecological degradation and biodiversity loss in the area. In terms of growing conservation potential, ecologically sensitive areas within and immediately around the urban areas are identified and are included in the open space networks of each town. While encouraging, development, waste management, and degradation of natural habitats and CBAs within the municipality remain challenges. It is critical to enhance biodiversity conservation in the Cederberg Municipality, especially in light of detrimental climate change impacts.

The Cederberg municipal IDP (Cederberg Municipality 2023) indicates that the region’s tourism industry is diverse, and primarily based on the following values: biodiversity significance, cultural and historic heritage, natural environment, rock formations, sea activities, accommodation, and the importance of Lamberts Bay and Elands Bay as fishing towns. The municipal IDP aligns its strategic objectives with that of district and provincial government. For example, its strategic objective of enabling resilient, sustainable, quality, and inclusive living environment and human settlements,

corresponds directly to the WCDM’s strategic goal of ensuring environmental integrity for the West Coast. It also aligns to the provincial strategic goal of enabling a resilient, sustainable, quality, and inclusive living environment. The IDP also addresses coastal management. The municipality utilises the ICMP developed by the WCDM, requiring the municipality to address, among others: delineating coastal boundaries that form part of its zoning scheme e.g., setback lines, alien vegetation clearing, and the implementation of estuary management plans and forums.

6.1.1.5 Matzikama Municipality SDF and IDP

The Matzikama Municipality incorporates only one of the Sandveld Coastal Complex’s land parcels, Elephant Rock Island Nature Reserve. The municipal IDP and SDF (Matzikama Municipality 2023) incorporates biodiversity mapping, CBAs, ESAs, and protected areas as mapped in the WCBS (Pence 2017). The Matzikama SDF indicates that coastal management aspects are still being compiled, such as the implementation of a coastal management program and the development of coastal setback lines and coastal management lines to manage existing and new developments located adjacent to the coast.

The IDP indicates that the Olifants River Estuary is in the process of being proclaimed as a nature reserve. The IDP further indicates that the municipality gazetted a coastal management by-law in September 2019 and plans to budget for coastal management out of “state grants” or external funding to be sourced as budget constraints are holding up the implementation of such initiatives. The IDP further recognises CapeNature’s provincial reserves, biosphere reserves, and the biodiversity corridors located within the municipality. The municipality recognises climate change as a threat to biodiversity resilience and maps areas that are critical to protect such as topographic areas providing temperature refuges (e.g., kloofs), areas with altitudinal and climate gradients and river corridors which provide ecological connectivity in arid environments.

The Matzikama municipal area, especially along the coast, has seen a proliferation of prospecting and mining applications recently and this holds severe challenges for biodiversity conservation, agricultural resilience, water security and tourism in the region. The lack of strategic environmental tools such as an EMF or a Strategic Environmental Assessment (SEA) hampers strategic environmental and biodiversity conservation, planning and protected area expansion initiatives.

Table 6.1: Aspects of the five municipal development plans applicable to the Sandveld Coastal Complex.

Municipality	Aspect in IDP/SDF to be Addressed	Proposed Intervention
West Coast District Municipality	<ul style="list-style-type: none"> Protection of ecological corridors. 	<ul style="list-style-type: none"> Integrate with CapeNature operations. Align with Western Cape Protected Area Expansion Strategy.
Saldanha Bay Municipality	<ul style="list-style-type: none"> Protection of ecological corridors. Alien invasive species clearing. Consolidation of the coastal wilderness areas and promote tourism and job creation. 	<ul style="list-style-type: none"> Integrate with CapeNature operations. Align with Western Cape Protected Area Expansion Strategy.
Bergrivier Municipality	<ul style="list-style-type: none"> Protection of ecological corridors. Alien invasive species clearing. Tapping into green economy of municipality. 	<ul style="list-style-type: none"> Integrate with CapeNature operations. Align with Western Cape Protected Area Expansion Strategy.
Cederberg Municipality	<ul style="list-style-type: none"> Protection of ecological corridors. Alien invasive species clearing. 	<ul style="list-style-type: none"> Integrate with CapeNature operations.

Municipality	Aspect in IDP/SDF to be Addressed	Proposed Intervention
	<ul style="list-style-type: none"> Tapping into green economy of municipality. 	<ul style="list-style-type: none"> Align with Western Cape Protected Area Expansion Strategy.
Matzikama Municipality	<ul style="list-style-type: none"> Establishing coastal management lines. Relating spatial planning categories to the Western Cape Biodiversity Spatial Plan. Securing ecological corridors to enhance resilience to climate change. 	<ul style="list-style-type: none"> Integrate with CapeNature operations. Align with Western Cape Protected Area Expansion Strategy.

6.2 Protected Area Zonation

The primary function of the Sandveld Coastal Complex is to conserve biodiversity. However, other functions such as ensuring access and providing benefits to neighbouring communities and local economies, may conflict with this primary function.

The zonation plan is thus a standard framework and set of formal guidelines to balance conservation, access, and utilisation within the complex, and is informed by the analysis.

Zonation:

- Is foundational to planning and development within the complex.
- Provides a framework for development of the complex.
- Recognises the purpose for which the complex is established.
- Ensures ecosystem resilience by limiting human intrusion in the landscape.
- Mitigates user conflict and minimises the impact of utilisation on natural and cultural heritage through access and activity management.
- Accommodates a range of activities ensuring that nature-based recreation and experiences for solitude do not conflict with social and environmental requirements or needs.
- Confines development within the complex to areas deemed appropriate to tolerate transformation without detracting from the protected area's sense of place.

CapeNature's zonation categories, described in Table 6.2, are derived from existing protected area zonation schemes worldwide, to develop a coherent scheme that provides for visitor experiences, access, and conservation management needs.

Table 6.2: Guide to CapeNature zonation categories.

Zonation Category	Explanation
Wilderness / Wilderness (declared)	Areas with pristine landscape, sensitive areas or threatened ecosystems. Very limited access.
Primitive	Areas providing natural landscape, solitude, and limited access. Normally a buffer area to wilderness zones.
Nature Access	Providing easy access to natural landscapes. Includes areas with roads and trails, and access to popular viewing sites and other sites of interest.
Development – Low intensity	Area with existing degraded footprint. Providing primarily self-catering accommodation and camping, environmental education facilities.
Development – High intensity	Area extensively degraded. Providing low and/or higher density accommodation, and possible conveniences such as shops and restaurants.

Zonation Category	Explanation
Development – Management	Location of infrastructure and facilities for reserve administration and operational management.
Development – Production	Commercial or subsistence farming (applicable to privately owned and managed nature reserves).
Development – Private Areas	Private dwellings and surrounds (applicable to privately owned and managed nature reserve).
Species / Habitat / Cultural Protection	Areas for protection of species or habitats of special conservation concern.
Cultural Species / Habitat Visual Natural Resource Access	Special management overlays for areas requiring specific management interventions within the Species / Habitat / Cultural Protection Zone.

The following underlying decision-making rules are applied in determining zones:

1. Strike a balance between environmental protection and development to meet broader economic and social objectives of the protected area.
2. Consider existing development footprints and tourism access routes based on the following principles:
 - All else being equal, an existing transformed site is preferable for developments to a site containing natural vegetation (either fully or partially intact).
 - Increase in maintenance cost if the development is not near existing infrastructure.
 - The socio-economic benefit of existing tourism nodes and access routes.
 - Infrastructure design and services with due consideration for focal conservation targets.
3. Where existing development nodes, tourist sites, and access routes occur in areas with high sensitivity value, associated zonation must aim to confine the development footprint as much as possible and preferably within the existing transformed site.
4. Sites with high biodiversity sensitivity value are zoned for stronger protection and peripheral development is favoured.

A summary of the zonation scheme applicable to the Sandveld Coastal Complex is outlined in Table 6.3 and illustrated in Appendix 1, Map 10.

Table 6.3: Summary of zonation categories applicable to the Sandveld Coastal Complex.

Zonation Category	Explanation
Primitive	<ul style="list-style-type: none"> • Elands Bay State Forest: Entire reserve except for area zoned as management development (servitude). • Rocherpan Nature Reserve: Approximately half of the western part of the reserve.
Nature Access	<ul style="list-style-type: none"> • Rocherpan Nature Reserve: Buffer approximately 250 m in width along the eastern boundary of the wetland and the entire stretch from the western boundary of the wetland to the high-water mark, from just north of the Sout River and jeep track turning west, up to the southern boundary of the main wetland. It includes a buffer of 2.5 m on trails to the bird hides. Areas zoned for low intensity development and management are excluded. • Rocherpan MPA: Entire MPA accessible for permitted fishing.

Zonation Category	Explanation
Development – Low intensity	<ul style="list-style-type: none"> Penguin (Bird) Island Nature Reserve: Zone around infrastructure including the trail to the bird hide and the access route from the harbour to the northern breakwater. Rocherpan Nature Reserve: Includes picnic sites for day visitors and the entire office precinct.
Development – Management	<ul style="list-style-type: none"> Elands Bay State Forest: Pipeline servitude buffered by approximately 2.5 m and areas around pump stations. Rocherpan Nature Reserve: Infrastructure containing atmospheric water generators.
Species / Habitat / Cultural Protection	<ul style="list-style-type: none"> Penguin (Bird) Island Nature Reserve: Most of reserve except for area zoned for low intensity development. Rocherpan Nature Reserve: Entire Rocherpan wetland and Papkuils River. Elephant Rock Island Nature Reserve: Entire reserve. Jacobs Rock Island Nature Reserve: Entire reserve. Paternoster Rocks Island Nature Reserve: Entire reserve.

6.3 Protected Area Zone of Influence

CapeNature seeks to maximise positive influences and/or minimise direct and indirect negative pressures on protected area conservation targets, with the aim of ensuring the persistence of species and biodiversity in general. Activities managed include those that might have direct impacts on targets, and those that have only indirect effects, often at considerable distance from the location where the activity takes place.

The zone of influence is a mechanism that recognises and activates the abovementioned principle. Three key informants (Figure 6.1) are used to delineate the zone include:

- Viability of focal conservation targets.
- Threats assessment.
- Protected area sensitivity and zonation.

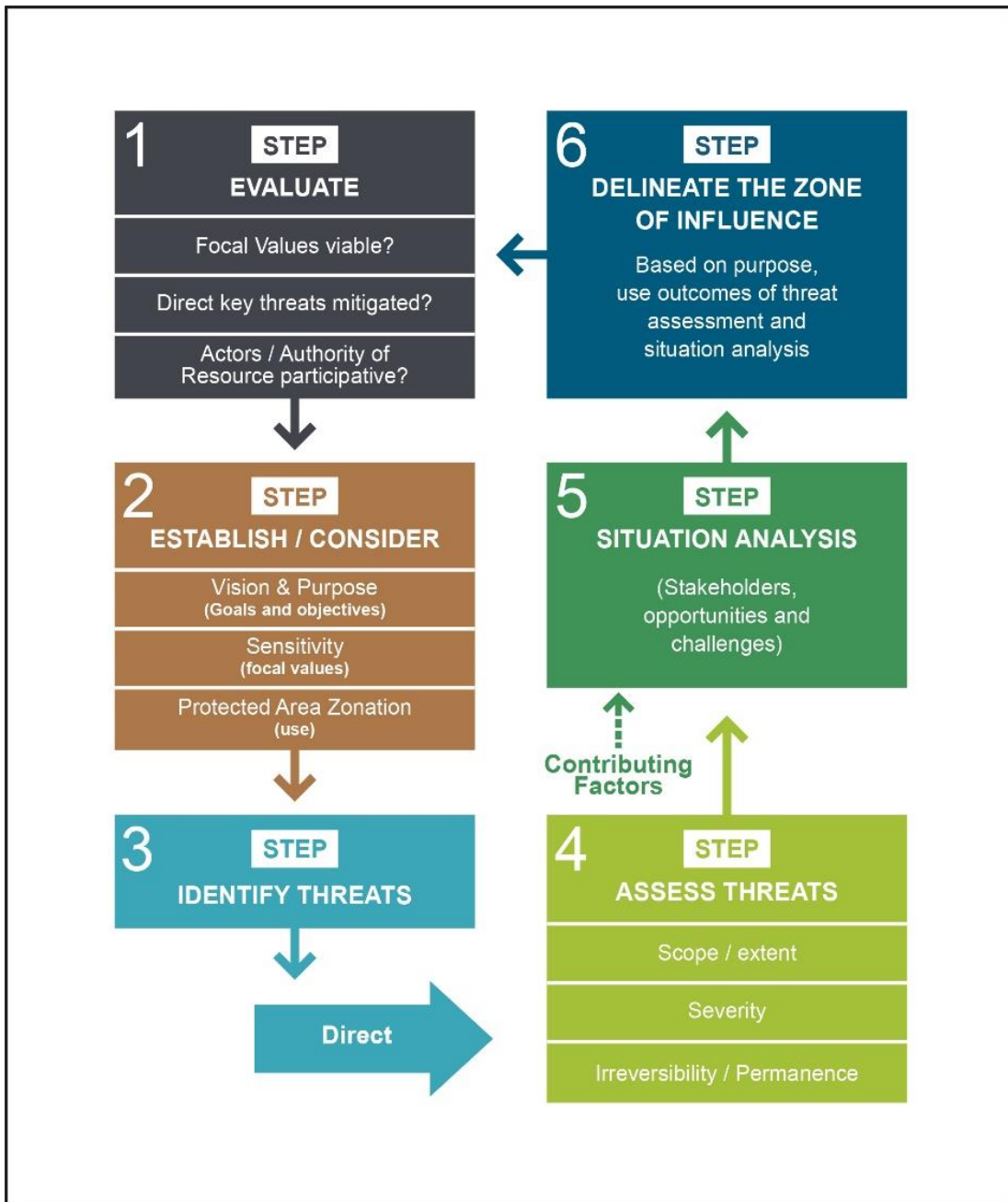


Figure 6.1: Process flow for the delineation of the protected area zone of influence.

The zone of influence is a non-legislated area spatially depicted around the Sandveld Coastal Complex. The zone ultimately aims to facilitate strategic stakeholder engagement by linking key stakeholders to prioritised influences to promote an ecologically functional landscape that supports the goals and objectives of the complex and enhances the benefits derived from the protected area. The process of delineation helps to identify:

1. Actions to directly restore a value or mitigate a threat.
2. Actions designed for people to continue positive behaviours or halt direct threats.
3. Actions to address enabling conditions.

The zone of influence is thus:

- A tool to guide resource allocation and investment outside of the complex.
- A tool to marry stakeholder engagement/authorities of resource to activities.

- A spatial prioritisation of where to support compatible land and water use, and foster positive behaviours.
- A spatial prioritisation of where to collaborate and with whom.
- A mechanism to prioritise support to landowners or managers of priority landscapes.
- An all-encompassing mechanism that includes all or part of a buffer zone as prescribed in terms of legislative frameworks and conventions.

The spatial features used in the zone of influence calculation are rated on a standard scale of one to four: low (1), medium (2), high (3), and very high (4). These ratings are assigned to each input feature within the zone of influence. Higher scores represent areas where many features overlap, elevating the necessity to engage stakeholders and positively influence neighbour relations and/or activities. Table 6.4 lists the features, criteria and ratings applied to delineate the zone of influence around the Sandveld Coastal Complex. Appendix I, Map 11 illustrates the zone of influence for the complex.

Table 6.4: Criteria used for defining the zone of influence around the Sandveld Coastal Complex.

Feature	Criteria	Rating	Zone Area (ha)	Zone Area (%)
Overfishing of pelagic prey species	Overfishing of pelagic prey species, mainly along the various coastlines (coastal reserves and island reserves), and the greater St Helena Bay, affecting food availability at coastal seabird roosting and breeding sites, including Cape fur seal breeding colonies: Elephant Rock, Penguin (Bird), Paternoster Rocks, and Jacobs Rock Island Nature Reserves. (Strydom <i>et al.</i> unpublished data; DFFE: O&C 2022; Carpenter-Kling <i>et al.</i> 2022).	Very high (4)	3 593 890.50	87.17
Unlawful fishing and marine resource harvesting (poaching)	Area identified where unlawful fishing and poaching occur along the beach, mainly along the various coastlines (coastal reserves and Rocherpan MPA). Penguin (Bird) Island: People poach crayfish along northern breakwater and cause disturbance to bird colonies on the island and breakwater. Rocherpan MPA: Unlawful access for fishing from boats.	Very high (4)	562.16	0.01
	Coastline where unlawful harvesting could occur. Even though this doesn't fall near the complex, this area could be where Cape fur seal and seabird's forage.	Medium (2)	7.17	0.00
Over abstraction of surface water from the Papkuils River	Surface water abstraction during Papkuils River flow periods for agricultural use has an impact on water reaching the Rocherpan wetland.	High (3)	263.19	0.09
Excessive nutrient load from agriculture activities	Areas where there is possible water pollution due to agricultural activities near rivers. Spread of common reed in the Rocherpan wetland can be attributed to nutrients	High (3)	812.38	0.02

Feature	Criteria	Rating	Zone Area (ha)	Zone Area (%)
	entering the Papkuils and Sout Rivers from agricultural activities upstream.			
Unlawful land occupation	Unlawful land occupation is possible at Elands Bay State Forest.	Medium (2)	232.76	0.01
Pollution through hazardous material spills on roads adjacent to the complex	Areas identified for possible pollution events due to either an environmental or man-made disaster. Possible hazardous materials spills are one of the risks identified for Rocherpan wetland due to the R27 road crossing the Papkuils River.	Medium (2)	520.88	0.01
Marine pollution (oil spills, plastic pollution, etc.)	Pollution into the marine environment/complex, or from the marine environment into the complex. Sources include passing ships and/or ships on anchor in St Helena Bay and land-based pollution sources. Examples include oil spills, plastic, etc.	Medium (2)	82 721.12	2.01
Climate change	The climate adaptation corridors were delineated as identified in the Table Mountain Fund project. The corridors include important landscape features that provide climate change resilience. The impact is mostly related to terrestrial vegetation. Three of these corridors occur within the area: Vredenburg Peninsula, West Coast to Cederberg Mountains, and Knersvlakte to Coast.	Medium (2)	110 648.65	2.68
Invasive alien plants	Stands of invasive alien plants or plantations within a radius of the complex are a source of re-infestation of invasive alien plants cleared from reserves, including such plants along rivers upstream of the complex.	Low (1)	3 905.26	0.09
New agriculture	Identified areas with high or very high potential for both arable and grazing capacity, adjacent, or within close proximity within the defined buffer areas of the complex. Remnants of the marginal potential arable land adjacent to Rocherpan Nature Reserve and Elands Bay State Forest were included.	Low (1)	8 458.72	0.21
Fire hazards (high fire frequency)	Fire ignition risk along roads leading to, and/or adjacent to, Rocherpan Nature Reserve and Elands Bay State Forest (R27 and Transnet Road).	Low (1)	1 010.35	0.02
Unlawful access along routes and resource use	Unlawful access along transportation and services corridors adjacent to the complex. Unlawful resource use, which includes various unregulated human activities such as grazing by livestock, and 4x4 driving on dunes and beaches. Eland Bay State Forest: Digitised an area along the southern border where unlawful livestock grazing takes place, including unlawful access for Rooikrans wood harvesting.	Low (1)	3 376.72	0.08

Feature	Criteria	Rating	Zone Area (ha)	Zone Area (%)
	Rocherpan Nature Reserve: Unlawful access for livestock grazing from neighbouring Bookram farm and also 4x4 vehicles on the dunes and beaches within the reserve. Included are occasional resource uses within the Rocherpan MPA. Penguin (Bird) Island: Zones along access routes.			
Pollution of groundwater system	Potential groundwater pollution caused by agricultural activities. Mainly along the Papkuils River upstream of Rocherpan wetland. Pollution impact is unknown.	Low (1)	1 758.28	0.04
Mining (minerals, oil, and gas) - areas for exploration and approved	Areas of past mining activities or areas where application for prospecting and/or mining operations were received, irrespective whether it was approved or not. In addition to the ecological impact of such mining activities, it can also lead to noise pollution through blasting, or seismic tests (DFFE 2023; PASA 2023). The identified areas were intersected with the priority pelagic feeding zone identified for seabirds and seals (offshore specific).	Low (1)	3 231 499.82	78.38
Renewable energy projects (wind, solar) - approved	Renewable Energy EIA Application Database. Vector digital data included (DFFE 2023).	Low (1)	20 712.42	0.50
Game farms	The threat of game farming adjacent to protected areas can stem from the introduction and escape of extra-limited game species, as well as fencing limiting the movement of small animals and game.	Low (1)	8 723.07	0.21
Private nature reserves	Private nature reserves that contribute to protected area values through connectivity and extent.	Low (1)	342.33	0.01
Stewardship sites	Stewardship sites that have direct land and/or water management responsibilities and that contribute to protected area values and extent.	Low (1)	2 091.86	0.05
Areas identified in the Western Cape Protected Area Expansion Strategy	Includes priority areas for protected area expansion and/or stewardship as identified in the Western Cape Protected Area Expansion Strategy and Conservation Action Priority Map (CapeNature 2021).	Low (1)	21 717.57	0.53
Special projects	The Western Cape Biodiversity Spatial Plan (Pence 2017) project data were used to delineate a corridor along the coast by extracting CBAs directly along the coastline. CBAs included were those listed as “natural” as extracted from the National Coastal & Marine Spatial Biodiversity Plan (Harris <i>et al.</i> 2022). Important Bird Areas (Marnewick <i>et al.</i> 2015) include the Olifants River, Verlorenvlei, and Berg River Estuaries.	Low (1)	61 792.90	1.50

The zone of influence for the Sandveld Coastal Complex has a total extent of 4 122 678.30 ha (Appendix I, Map I I). Commercial fishing affecting pelagic food availability received a very high rating but only affects the marine component of the complex. The impact zone identified is large, contributing 87.17% to the zone of influence. The foraging areas of marine seabirds and mammals such as Cape gannet *Morus capensis*, Cape cormorant *Phalacrocorax capensis*, and Cape fur seal *Arctocephalus pusillus pusillus* are extensive and highly variably depending on food availability. The role that commercial pelagic fishing (in particular overfishing), plays a large role in food availability for particularly pelagic feeding seabirds and seals (Crawford *et al.* 2018; Sherley *et al.* 2018; Crawford & Makhado 2020; Carpenter-Kling *et al.* 2022).

Onshore and offshore exploration and potential extraction of mineral and gas resources also contribute to a large proportion of the zone of influence (78.38%). This has become a significant threat along the West Coast in the last few years. Prospecting applications are on the rise and cover large areas of the coastal and inland areas between Lamberts Bay and the provincial boundary, extending further up the Northern Cape coastline (Marius Wheeler, CapeNature Landscape Conservation Intelligence Manager, 2023, pers. comm.). The impacts may not always be directly within the marine and protected area network along the coast, but there will be many indirect impacts such as reduced water availability, seismic and noise impacts, offshore pollution, fragmenting landscapes, and reduced ecological connectivity and ecological infrastructure function.

Pollution into the marine environment or onto the complex, either from land or ship sources, has been identified as a medium impact, contributing 2.01% to the zone of influence. Renewable energy projects and agricultural expansion has also been identified as factors having a low impact, contributing 0.50% and 0.21% to the zone of influence respectively.

The bioaccumulation of nutrients and minerals may have a potential high impact on the water quality within the Rocherpan wetland, particularly in the southern portions of the pan (Kevin Shaw, former CapeNature Ornithologist, 2022, pers. comm.). Similarly, the over abstraction of surface water in the Papkuils River system has been highlighted as having a high impact on water availability for the downstream Rocherpan wetland. Collaboration with neighbours and departmental partners will be important to address this aspect (section 10).

Climate change impacts will be felt over the entire zone of influence, similar to the way that it also affects the entire Sandveld Coastal Complex. Climate change in particular is not a direct threat but it is a contributing factor, or threat multiplier, to many of the direct threats facing the complex (section 5.5). It is likely to contribute significantly and exacerbate the negative impacts on the complex's ecological targets in future, affecting the marine and terrestrial components in particular (Blamey *et al.* 2014; Cochrane *et al.* 2020).

The Sandveld Coastal Complex's zone of influence also provides opportunities for climate change adaptation corridor development and protected area expansion. Fortunately, the region has large natural areas that remain intact and ecologically functional that has been identified as priority conservation areas. This provides various stakeholders with conservation opportunities that will be beneficial to the complex (section 8).

7 ACCESS AND FACILITIES

This section describes infrastructure and procedures necessary for management of the Sandveld Coastal Complex, inclusive of operational and tourism access. It provides information on access facilities, operational facilities, control measures as well as commercial and community use.

7.1 Public Access and Management

Access points to protected areas must be easily accessible to relevant user groups yet controlled by protected area staff. Such points include controlled and uncontrolled entrances to the protected area, providing for various activities. Controlled access is through established, manned, or unmanned

entrance gates, usually restricted by fences or other physical barriers of some sort. Some protected areas are not fenced, or have long open and unrestrictive boundaries, making unauthorised access easier. In such cases signage may be the only practical way of managing access.

The Sandveld Coastal Complex is primarily accessed at two points. Firstly, at Rocherpan Nature Reserve there are two main gates, both accessible along the R27 road. Visitors must first report to reception to obtain their access permit before they can gain access to the popular tourist spots within the reserve. Permits to visit the reserve are available at the Rocherpan reception office on a daily basis between 08:00-18:00. Unlawful access along the beach for fishing or for the purpose of off-road driving does occur occasionally as beach access is not controlled and only managed via signage. Reserve staff carries out coastal compliance patrols from time to time.

Public access to Penguin (Bird) Island Nature Reserve is managed via an entrance gate and small mobile reception office located at the start of the harbour breakwater wall. Access is managed by gate guards stationed at the entrance and visitors can obtain their access permits every day between 08:00-18:00.

Access to the Elands Bay State Forest is not controlled but signage is in place to inform the public that they are trespassing onto a nature reserve. The reserve is unfortunately frequented by some inhabitants of the nearby town of Elands Bay who enter the reserve to chop down alien rooikrans *Acacia cyclops* for wood, or to graze livestock. Occasionally, people with 4x4 vehicles may access the dune field illegally.

Access to the remainder of the complex's islands and offshore rocks is extremely difficult and unsafe and they are only approachable by boat. No visitors are allowed on these sites due to the sensitive nature of these seabird and seal breeding localities. No signage is placed at these sites due to the harsh climatic conditions. Public access points to the complex are listed in Table 7.1 and illustrated in Appendix 1, Map 12.

Table 7.1: Managed public access points to the Sandveld Coastal Complex.

Locality	Name	Type of Access	Activity
R27, west (seaward) of the Rocherpan wetland	Rocherpan Gate House	Gated, Unmanned	Leads to bird hides, picnic areas and the beach.
R27, east (inland) of the Rocherpan wetland	Rocherpan Main Gate	Gated, Manned via intercom	Leads to offices, chalets, and hiking trail.
Lamberts Bay Harbour breakwater	Penguin (Bird) Island Reserve Entrance	Gated, Manned	Entrance via causeway onto Penguin (Bird) Island.
R366 east of Elands Bay	Elands Bay State Forest Entrance	Unmanned	Access onto Elands Bay State Forest and dune field.

7.2 Airfields and Flight Corridors

Section 47 of the NEM: PAA stipulates prescriptions for the use of aircraft in a world heritage site. A legal no fly-zone restriction of 2 500 feet (762 m) exists above all special nature reserves, national parks, and world heritage sites. The Sandveld Coastal Complex has no designated aircraft landing sites. In an emergency situation, a helicopter would be able to land at Rocherpan Nature Reserve and Elands Bay State Forest.

7.3 Facilities for Vessels

The Sandveld Coastal Complex has no designated launching sites for vessels. In cases where a vessel is needed to access the marine sections of the complex, such vessels will need to be launched from the closest public launch site.

7.4 Administrative and other Facilities

The Sandveld Coastal Complex is one of five protected area units that are located in Landscape West. The complex spans all three landscape units: Matzikama, Ceder-Berg and Peninsula. The staff component for the complex is primarily based in the Rocherpan and Penguin (Bird) Island Nature

Reserve offices and field staff report through two Conservation Officers: On-reserve, to the Landscape Unit Manager: Ceder-Berg, to the Landscape Manager: Landscape West. The staffing structure for the complex is outlined in Figure 7.1.

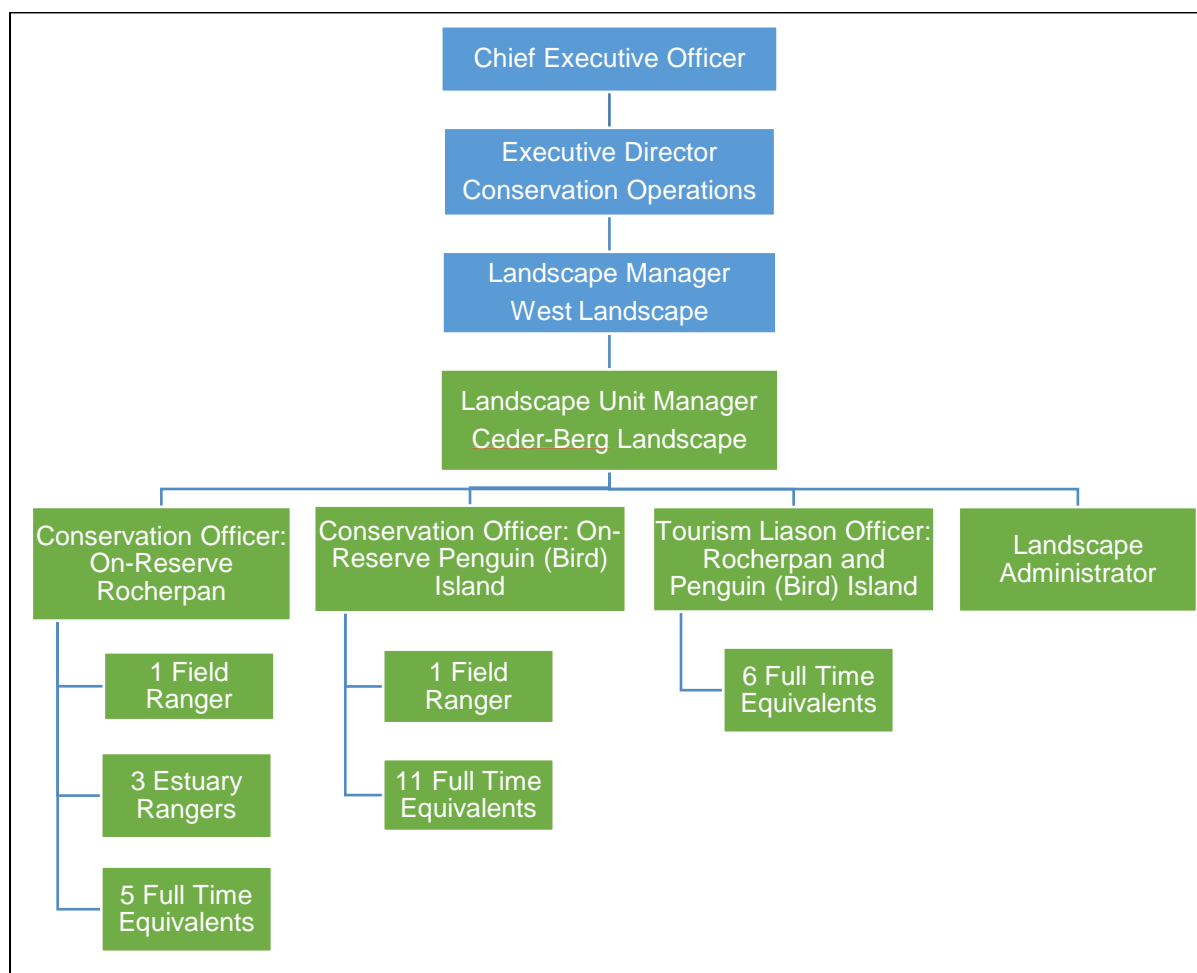


Figure 7.1: Approved organogram for the Sandveld Coastal Complex.

The concept development plan, associated zonation scheme, and strategic framework guide proposed development of new infrastructure over the planning period (section 9). Focus areas include infrastructure evaluation, environmental scoping, and land-use advice to define environmentally responsible development options.

Existing infrastructure within the complex mainly includes jeep tracks, hiking trails, fences, firebreaks, signage, operational and visitor facilities, water reticulation, and electrical systems. Infrastructure will require periodic maintenance and/or upgrades during the time span of this management plan. This infrastructure maintenance list is not exhaustive. Major infrastructure for the complex is illustrated in Appendix I, Maps 13 and 14.

7.4.1 Roads and jeep tracks

Penguin (Bird) Island Nature Reserve:

The breakwater wall provides vehicle and pedestrian access to the island for all visitors, staff, and stakeholders who need to access the island legally. No public vehicle access is generally allowed onto the island as it has been shown to disturb roosting birds and in particular the tern roosting area on the seaward side of the breakwater wall at the southern section of the island. Stakeholders such as Portnet, the South African Police Service and members from DFFE: O&C do access the island for maintenance, compliance or monitoring duties. Visitor parking is provided off reserve in the harbour precinct. Parking on the island is only for official duties.

Rocherpan Nature Reserve:

Jeep tracks within the Rocherpan Nature Reserve are gravel and accessible by most types of vehicles. The jeep track that runs along the western side of the wetland can become difficult to manoeuvre for low sedan vehicles, especially during the wet season. Shorter jeep tracks that branch off the main track lead to two lookout points overlooking the ocean. Sections of the jeep tracks have been paved to facilitate access, especially in sandy areas, and there are also a number of parking areas and laybys along the route. Grading of the jeep tracks is not allowed as it lowers the level of the road, resulting in negative road and hydrological impacts.

Historically, the main gravel road between Velddrif and Elands Bay used to run through the middle of the vlei. Today however, all historic jeep tracks made through the wetland have been permanently closed and allowed to rehabilitate naturally.

Elands Bay State Forest:

Jeep tracks within the Elands Bay State Forest consist mostly of thick loose sand and a 4x4 vehicle is required to access this reserve. The jeep tracks are not maintained and are only used for management purposes by CapeNature staff or the Cederberg Municipality to access their borehole pump infrastructure. Vehicle access to the Elands Bay dune field is not permitted.

7.4.2 Hiking trails

Penguin (Bird) Island Nature Reserve:

Visitors to the island can take a short stroll on a circular route while visiting the island. This walking trail takes visitors past all the important sites on the island and there is extensive interpretive signage along the way.

Rocherpan Nature Reserve:

Rocherpan Nature Reserve has a day hiking trail that starts at the reception office and carries northwards around the eastern side of the wetland and links up with the jeep track on the western side of the wetland. The trail provides the hiker with three possible return routes: either along the trail itself, or via the western jeep track, or via a loop along the beach. The distance from the start of the trail to where the trail meets up with the return routes is approximately 3 km. Boardwalks have been erected in areas where the trail is vulnerable to erosion and/or seasonal flooding (Figure 7.2).



Figure 7.2: A part of the Rocherpan hiking trail with boardwalk. (Photo: R. Kissen).

7.4.3 Buildings and visitor facilities

Infrastructure and associated building maintenance requirements are captured in both the Sandveld Coastal Complex's infrastructure register and the CapeNature User Asset Management Plan. The User Asset Management Plan is updated and submitted to Provincial Treasury and the Western Cape Department of Transport and Public Works on an annual basis. CapeNature also implements and funds scheduled maintenance and emergency repairs to infrastructure via dedicated funding (see section 11).

Penguin (Bird) Island Nature Reserve:

The bird hide on the island is the main attraction point for visitors. It provides visitors with viewing access to the Cape gannet *Morus capensis* and Cape fur seal *Arctocephalus pusillus pusillus* breeding colony. The building incorporates one way glass downstairs and an open viewing deck upstairs (Figure 7.3). Visitors will find a variety of different animal skeletons and interpretive information in the museum, also known as the "Bone Box". The visitor centre contains a small curio shop, auditorium, penguin rehabilitation facilities, staff offices and ablutions. CapeNature is working with various partners to house African penguins *Spheniscus demersus* undergoing rehabilitation at the facility to enhance the visitor experience.



Figure 7.3: The bird hide provides visitors with a unique opportunity to see the Cape gannet up close (Photo: M. Wheeler).

Rocherpan Nature Reserve:

Rocherpan Nature Reserve has an office complex which includes staff facilities, stores, vehicle parking, two staff accommodation units, a visitor reception centre and eight overnight visitor cabins. Phase one of the tourism developments was completed in 2011 and phase two during 2013. Four of the chalets provide universal access. A small mini-golf track, swimming pool and children's play area is located within the office precinct and available for visitor use.

On the western side of the Rocherpan wetland visitors have access to two picnic areas. The northern most picnic site (which overlooks the ocean) is decked and provides seating and tables, ablution facilities and boardwalk access to the beach. The second day picnic area (adjacent to the vlei) provides visitors with seating and tables, ablutions, and barbecue facilities. Three bird hides spread out along the western part of the wetland are available for visitor use.

Elands Bay State Forest:

The reserve used to have a small office precinct, including stores and accommodation. Due to ongoing vandalism and unlawful access by some members of the Elands Bay community, the decision was taken to close and remove all management infrastructure in 2020.

7.4.4 Fences

Penguin (Bird) Island Nature Reserve:

There are no fences on Penguin (Bird) Island Nature Reserve but the entrance to the breakwater wall has a gate that is locked after-hours to prevent unlawful access to the island. The breakwater has a line of bollards and safety rope to ensure visitor safety.

Rocherpan Nature Reserve:

Rocherpan Nature Reserve has a boundary fence that requires periodic maintenance. The southern boundary fence is scheduled for repairs to allow movement of smaller indigenous animals but to prevent access by domestic livestock from the Bookram farm. Management is also considering erecting a section of fence along the western boundary to minimise access by livestock from the beach.

Elands Bay State Forest:

The Elands Bay State Forest is primarily unfenced. Fences that do exist are in a state of disrepair. Vandalism of infrastructure is a challenge.

7.4.5 Firebreaks

Rocherpan Nature Reserve is the only reserve in the Sandveld Coastal Complex with five boundary firebreaks. These are maintained annually according to the reserve firebreak register.

7.4.6 High sites

There are no high sites within the Sandveld Coastal Complex. Staff either use two-way line of sight radios or cellular communication.

7.4.7 Signage

Penguin (Bird) Island Nature Reserve:

Signage on-route to Penguin (Bird) Island Nature Reserve, as well as the interpretive signage on the island itself, is inadequate and outdated. During the current financial cycle (2023/24), these shortcomings will be addressed. A service provider has been appointed to renew all the interpretive signage on the island with high quality relevant material. A request for the replacement of signage on-route to the island has been finalised.

Rocherpan Island Nature Reserve:

Signage on-route to Rocherpan Nature Reserve, as well as on the reserve, itself is inadequate and outdated. Existing signage is being upgraded and additional signage will be identified and prioritised for replacement.

Elands Bay State Forest:

Minimal signage is located within Elands Bay State Forest and relates to the reserve's status, access management and legal liability.

7.4.8 Utilities

7.4.8.1 Water supply

Potable water for visitors and staff on Penguin (Bird) Island is obtained from the local municipality and is piped to and metered on the island. The penguin rehabilitation facility uses sea water which is pumped from the harbour and filtered before use.

At Rocherpan Nature Reserve, potable water for staff and visitors is supplied by harvesting rainwater from roof infrastructure located in the office precinct (Figure 7.4). Collected water is distributed to different buildings via a pressure pump water reticulation system. Atmospheric water generators are also installed on the reserve and extract moisture from the air to supplement rainwater. In case of emergency, water is transported by vehicle from the closest town, Dwarskersbos.



Figure 7.4: The Rocherpan rainwater system located in the office precinct provides water for staff and visitors (Photo L. Seabi).

7.4.8.2 Electricity supply

At Penguin (Bird) Island, power is supplied via an Eskom mains line. At Rocherpan Nature Reserve, solar electricity is generated and the Eskom supply is used as a backup.

7.4.8.3 Waste management

At Penguin (Bird) Island all refuse generated on the island is collected and taken to the municipal landfill site in Lamberts Bay. The implementation of a waste recycling project on the island is dependent on the availability of this service at Lamberts Bay town. The ablution facilities at the visitor centre still use a soak-away drain system.

All waste generated at Rocherpan Nature Reserve is collected and removed off the reserve and disposed of at the municipal refuse facility in the town of Velddrif. No recycling project is currently in use on the reserve; however the local municipality does implement a recycling project. All accommodation, day picnic sites and staff facilities make use of self-contained dry-composting toilets (eco-loos) to prevent the leaching of any nutrients or pathogens into the ground from wastewater.

7.5 Commercial Activities

No external commercial activities exist within the Sandveld Coastal Complex, and no agreements or concessions are in place. All tourism facilities and activities are managed by CapeNature directly.

7.6 Community Use

No community use agreements exist within the Sandveld Coastal Complex.

7.7 Servitudes

Within Elands Bay State Forest, the Cederberg Municipality has access and water pipeline servitudes for accessing their borehole water infrastructure (Table 7.2 and Appendix I, Map 12).

Table 7.2: Servitudes and formal agreements applicable to the Sandveld Coastal Complex.

Date of Agreement	Type of Agreement	Partner	Duration of Agreement (years)	Area Affected	Conditions of Use
None	Water access right as per Title Deed T1415/1964	Cederberg Municipality	N/A	Elands Bay State Forest	Only access on jeep tracks

8 EXPANSION STRATEGY

Within South Africa, the expansion of protected areas is informed by the National Protected Area Expansion Strategy (NPAES) (DEA 2016b). This strategy provides a broad national framework for protected area expansion in South Africa by identifying large areas which should be targeted for formal declaration and by introducing a suite of mechanisms which could aid in achieving this.

In response to the NPAES, CapeNature has produced a Western Cape Protected Area Expansion Strategy (WCPAES) and Implementation Plan 2021-2025 (CapeNature 2021). This strategy addresses the formal declaration of priority natural terrestrial, freshwater, and estuarine habitats in the Western Cape Province as protected areas to secure biodiversity and ecosystem services for future generations. The Conservation Action Priority (CAP) map is a spatial representation of the WCPAES. Priority expansion areas have been identified through a process of systematic conservation planning as part of the WCBSP (Pool-Stanvliet *et al.* 2017) and include sites that contain CBAs (Pence 2017). Protected area expansion within the Sandveld Coastal Complex's zone of influence, including the larger West Coast, will be guided by the WCPAES and associated CAP map.

Stewardship refers to the wise use, management, and protection of that which has been entrusted to someone or that is rightfully theirs. Within the context of biodiversity conservation, stewardship means protecting important ecosystems, effectively managing natural veld, removing invasive alien species, managing fires to promote species diversity, and using water resources sustainably and equitably. There is a selection of stewardship options available that range from informal agreements to full legal protection (Pence 2017) (Figure 8.1).

	TYPE OF AGREEMENT	LEGAL MECHANISM
	Nature Reserve	National Environmental Management: Protected Areas Act (Act 57 of 2003) <ul style="list-style-type: none"> Favourable for sites with highest biodiversity importance Binding on property: declaration of Nature Reserve, and a title deed restriction Binding on landowner: contract with landowner usually for 30–99 years/in perpetuity Contributes to South Africa's protected area estate
	Protected Environment	National Environmental Management: Protected Areas Act (Act 57 of 2003) <ul style="list-style-type: none"> Favourable for declaration over multiple properties Less restrictive land use than Nature Reserve Binding on property: declaration of Protected Environment, and a title deed note Binding on landowner: contract with landowner usually for 30–99 years/in perpetuity Contributes to South Africa's protected area estate
	Biodiversity Management Agreement	National Environmental Management: Biodiversity Act (Act 10 of 2004) <ul style="list-style-type: none"> Shorter term, less restrictive than protected area declaration Binding on landowner: contract with landowner ideally 5–10 years Contributes to South Africa's Conservation Area Estate
	Biodiversity Agreement	Contract law <ul style="list-style-type: none"> Less restrictive than protected area declaration Binding on landowner: contract with landowner ideally 5–10 years Contributes to South Africa's Conservation Area Estate
	Biodiversity Partnership Area	Informal agreement <ul style="list-style-type: none"> Non-binding partnership May include a Memorandum of Understanding

Figure 8.1: Stewardship options available to private landowners.

Due to limited expertise and resources, the current WCPAES and implementation plan does not highlight priority marine areas for expansion, nor does it address appropriate mechanisms to be applied in marine environments. The NPAES, however, does provide guidance when considering areas for MPA expansion. This will be addressed in future iterations of the WCPAES and WCBSP.

The priority conservation habitat map (Appendix I, Map 15) depicts the Sandveld Coastal Complex in relation to protected areas, including contractual stewardship sites, and aquatic and terrestrial CBAs in the area. Table 8.1 provides a summary of existing and potential protected area expansion initiatives within the complex's zone of influence.

Table 8.1: Stewardship sites and other protected area expansion initiatives located within the Sandveld Coastal Complex's zone of influence.

Site Name	Hectares	Protection Status
Aan de Klipheuvel	684	Contract Nature Reserve - Renewal negotiations underway
Berg River Estuary Ramsar Site	1 161	Department of Forestry, Fisheries and the Environment is the management authority
Bo-Kruisfontein	610	Biodiversity Agreement - Renewal negotiations underway
Jakkalsvlei Estuary	TBD	Discussions underway with Cederberg Municipality - CapeNature will be the management authority
Matroozefontein	558	Contract Nature Reserve - Active
Melck Protected Environment	6 890	Protected Environment - Declaration underway – Expansion initiative driven by BirdLife SA
Modderfontein	170	Contract Nature Reserve - Renewal negotiations underway
Moutonshoek Protected Environment	8 092	Protected Environment - Active
Olifants River Estuary Protected Area	421	To be Proclaimed - CapeNature will be the management authority
Redelingshuis	62	Contract Nature Reserve - Active
Rocherpan MPA Extension	TBD	Investigate expanding the existing Rocherpan MPA boundaries to align with that of the Rocherpan Nature Reserve
Rust Roes	891	Biodiversity Agreement - Renewal negotiations underway

Site Name	Hectares	Protection Status
Verlorenvlei Ramsar Site	1 559	To be proclaimed as a protected area - CapeNature will be the management authority
Vleikraal	1 471	Contract Nature Reserve - Active
Vredelust	226	Biodiversity Agreement - Renewal negotiations underway

CapeNature, in partnership with the Western Cape Government and BirdLife SA, is driving the development of a formal conservation area at the Olifants River Estuary. A similar initiative has been initiated for the Verlorenvlei Ramsar site. Currently, these two priority wetlands are not formally protected and in need of legal protection. The Moutonshoek Protected Environment, proclaimed in 2018, secures critical headwaters of the Verlorenvlei wetland and spans an area of 8 092 ha. BirdLife SA was fundamental in securing this critical area. Furthermore, BirdLife SA has been instrumental in establishing the Melck Protected Environment, a 6 890-ha area along the Berg River Estuary which is in the final stages of declaration. The Berg River Estuary is recognised as a wetland of international importance and was declared as a Ramsar site in 2022. It is also listed as an Important Bird Area (Marnewick *et al.* 2015) and the estuary will benefit from additional protected area expansion initiatives as well as formal protection.

A number of stewardship sites are located within the Sandveld in close proximity of Elands Bay State Forest (Table 8.1). These sites all fall within the GCBC planning domain and are audited by CapeNature on an annual basis.

Expansion of the Rocherpan MPA may include consolidating the northern 1.7 km of marine area next to the MPA. This will facilitate the management of the Rocherpan Nature Reserve and MPA as a unit with aligned boundaries. Furthermore, the farm Modderontein just to the north of Rocherpan is a stewardship priority as it would extend the protection of the larger Rocherpan wetland.

Towards the south of the Sandveld Coastal Complex, the Saldanha Strategic Biodiversity Offset Strategy approved in 2020 (WCG 2020b) aims to protect irreplaceable CBA within the Besaansklip Industrial Area, an area earmarked for industrial development as part of Saldanha Bay port and a national Industrial Development Zone. The strategy designates a core vegetation corridor that is non-developable and identifies off-set requiring and receiving areas within the greater Saldanha Bay Municipality. This conservation initiative is a collaboration between CapeNature, the Western Cape Government, Saldanha Bay Municipality, and the Saldanha Bay IDZ Licensing Company.

9 CONCEPT DEVELOPMENT PLAN

The concept development plan sets out the long-term plan for the development of the Sandveld Coastal Complex in keeping with the purpose of the complex and with due consideration for protected area sensitivity and zonation (sections 5.7 and 6.3).

Tourism products and related infrastructure developments in CapeNature are considered investments and are intended to:

- Harness and enhance the income generation potential of protected areas with a view to achieving long term business sustainability.
- Provide safe, informative, and purpose-built access to protected areas.
- Enhance the operational efficiency and management of protected areas.

9.1 Project Selection

Organisationally, potential tourism product developments are selected based on internal consultation and approval where factors such as appropriateness, environmental authorisation, financial feasibility, and the apparent return on investment are considered. Where external approvals for developments are required, these are sought from the relevant authorities prior to the commencement of any development activities (Figure 9.1).

CapeNature may elect to operate tourism products and services internally, or via other mechanisms described in the Public Finance Management Act, 1999 (Act No.1 of 1999), such as concessions or public private partnerships.

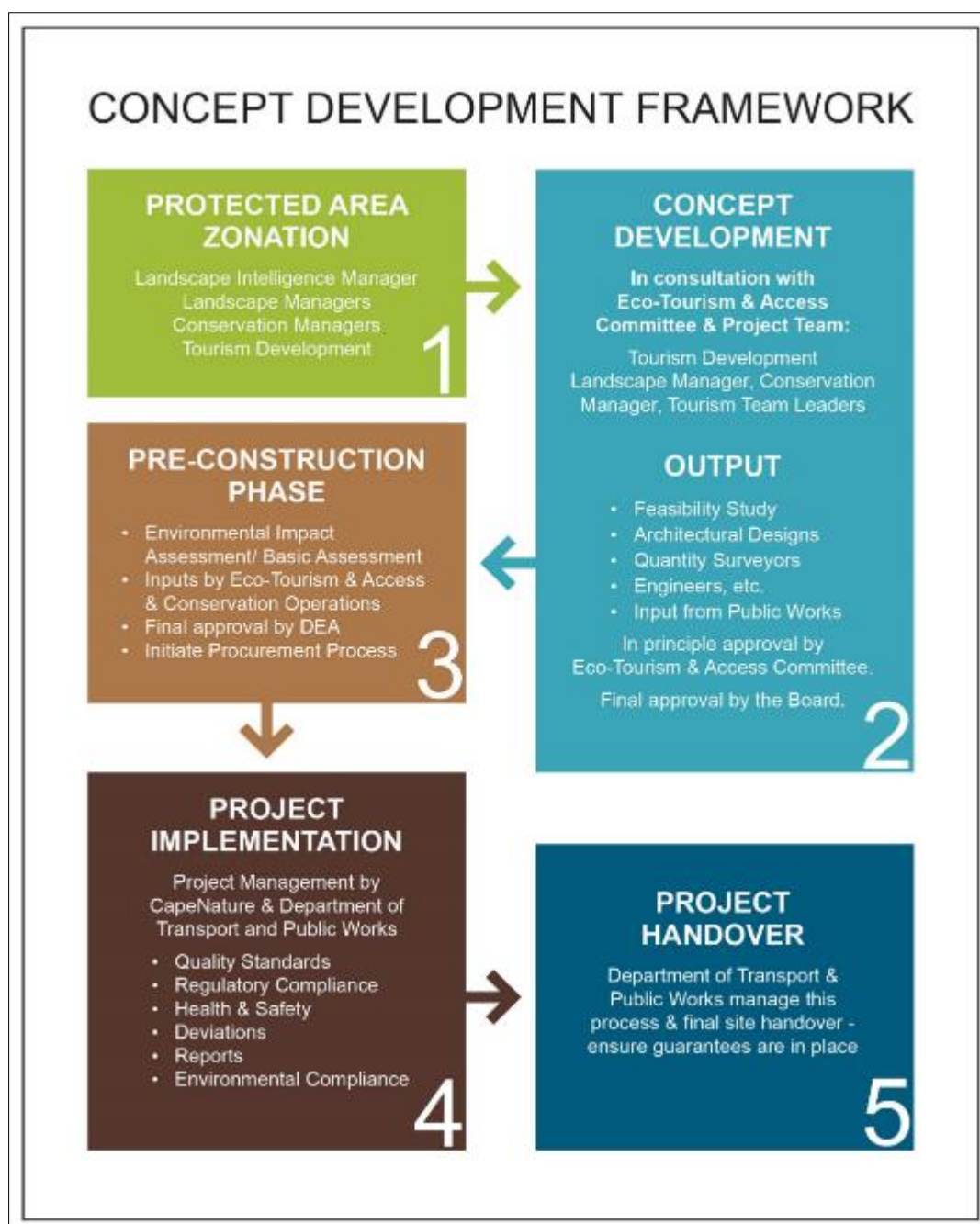


Figure 9.1: CapeNature’s Concept Development Plan Framework.

9.2 Methodology

Tourism products and infrastructure within CapeNature protected areas are designed to be sensitive to their locations and are intended as prime examples of responsible and sustainable commercial developments. Examples include off-grid bulk water and energy services, passive design efficiencies and enhanced resource utilisation and resource-saving features. Tourism developments aim to comply with prevailing zonation schemes and sensitivity analysis unless approval to the contrary has been obtained.

Wherever possible, tourism products, developments and services are intended to provide training and employment opportunities to communities within and surrounding the protected area.

9.3 Infrastructure Management and Development

Much of the Sandveld Coastal Complex is very sensitive in nature (Appendix I, Map 9) and future infrastructure development is thus unlikely. No developments are planned for Elephant Rock, Paternoster Rocks, and Jacobs Rock Island Nature Reserves. Penguin (Bird) Island is a popular tourism site, but further development of infrastructure is unlikely due to the sensitive nature of the island. Existing infrastructure on the island will require ongoing maintenance. The aim is to continue to operate and create visitor efficiencies within the existing infrastructure footprint. There is a possibility that existing or new storm protection infrastructure may be required at strategic points to mitigate against storm surge impacts on existing infrastructure and/or the Cape gannet *Morus capensis* colony.

The Rocherpan Nature Reserve has undergone major tourism upgrades in the past 10 years, and it is likely that the reserve has reached a maximum development footprint. Some additional infrastructure may be added within the existing office complex footprint to facilitate operational management. The addition of a small number of eco-campsites within the existing nature access zone may be considered subject to environmental approval and financial feasibility (see Appendix I, Map 14).

No new infrastructure is to be constructed within Elands Bay State Forests due to the remote nature of the site and because such infrastructure would be subject to vandalism by members of the nearby Elands Bay community.

10 STRATEGIC PLAN

This section presents the strategic plan for the Sandveld Coastal Complex. The strategic plan was derived from an assessment of the conservation situation, inclusive of the biological environment and the social, economic, cultural, and institutional systems that influence focal conservation targets and human well-being values. Strategic intervention points formed the basis for developing strategies, using results chains to test theories of change and establish short to medium term objectives. From these, detailed actions with timeframes were developed to guide implementation, monitoring, and evaluation.

Strategies are aimed at:

- Focal conservation target restoration/stress reduction.
- Behavioural change/threat reduction.
- Establishing/promoting enabling conditions.

A summary of selected strategies and objectives for the Sandveld Coastal Complex is provided in Table 10.1. Table 10.2 details the actions and associated timeframes for each separate strategy.

CapeNature will lead the implementation of the management plan, although achieving the vision requires coordinated effort. Stakeholder groups and organisations identified in the strategic plan are key role players in successful delivery of this management plan.

Table 10.1: Summary of strategies and objectives for the Sandveld Coastal Complex.

Threat Abated	Strategy Type	Strategy	Objectives
<p>Overfishing of pelagic prey species; Cape fur seal colonization of marine bird breeding habitat; Change in distribution of pelagic prey species; Heat impacting seabird breeding; Marine mammal diseases (e.g., canine distemper, morbillivirus, avian influenza and domoic acid); Avian diseases (e.g., avian influenza and botulism); Sea level rise and resulting increase in frequency and severity of storm surges; Potential prospecting, mining, and seismic exploration; Dredging of Lamberts Bay Harbour.</p>	<p>Enabling Conditions / Threat Reduction</p>	<p>Strategy 1: In partnership with national, provincial, and local government, non-governmental organisations and academic stakeholders, work towards solutions to address and mitigate threats to seals and seabirds within the Sandveld Coastal Complex.</p>	<p>Objective 1.1: By 2025 and beyond, functioning governance structures facilitate participatory integrated planning and management with relevant stakeholders to enhance management and protection of seals and seabirds.</p>
			<p>Objective 1.2: By 2026 and beyond, the existing Memorandum of Understandings (MoUs) with DFFE: O&C, BirdLife SA and SANCCOB have been reviewed, maintained, and updated as required.</p>
			<p>Objective 1.3: By 2025 and beyond, facilitate and participate in monitoring and research on seals and seabirds to support strategic adaptive management.</p>
			<p>Objective 1.4: By 2025 and beyond, conservation management of priority seabirds on Penguin (Bird) Island is enhanced by providing additional artificial breeding habitat.</p>
<p>Predation imbalance on seabirds, chicks, and eggs.</p>	<p>Threat Reduction</p>	<p>Strategy 2: Develop and implement standard CapeNature operating guidelines to guide an effective response to predation on priority seabird breeding localities.</p>	<p>Objective 2.1: By 2024 and beyond, predation on priority seabirds on Penguin (Bird) Island is controlled through effective predation monitoring and the implementation of rapid response control actions.</p>
			<p>Objective 2.2: By 2025, address the anthropogenic availability of waste food in the Lamberts Bay harbour through pro-active engagement with industry.</p>
<p>Oil spills; Marine mammal diseases (e.g., canine distemper, morbillivirus, avian influenza and domoic acid); Various climate change and possible zone of influence impacts.</p>	<p>Enabling Conditions / Threat Reduction</p>	<p>Strategy 3: With relevant partners, develop and implement integrated disaster management and contingency plans in the event of oil spills, disease outbreaks and extreme climate events in the Sandveld Coastal Complex.</p>	<p>Objective 3.1: By 2025, disaster management and contingency planning enables mitigation of extreme weather, natural disasters, oil spills and disease outbreaks to ensure early detection and rapid response for the conservation of priority seabirds, Cape fur seal, and heritage features.</p>
<p>Agricultural effluents and water pollution; Over abstraction of surface water from the Papkuils River; Common reed spreading unabatedly across the Rocherpan wetland and its buffer.</p>	<p>Enabling Conditions / Threat Reduction</p>	<p>Strategy 4: Through partnership with relevant stakeholders, address water law compliance, in-stream modification, and best</p>	<p>Objective 4.1: By 2026 and beyond CapeNature, in collaboration with partners, advocates agricultural water use best practice and ensures compliance within the complex's zone of influence.</p>

Threat Abated	Strategy Type	Strategy	Objectives
		practice along the Papkuils River, upstream of Rocherpan Nature Reserve.	Objective 4.2: By 2024 and beyond, the Rocherpan wetland health is monitored to inform strategic adaptive management.
Loss of historical information regarding the history of guano, seal and egg harvesting on Elephant Rock, Jacobs Rock, and Penguin (Bird) Island.	Behavioural Change / Target Awareness	Strategy 5: Develop and display interpretation and awareness resources that have a strong focus on the historical aspects of Penguin (Bird) Island, as well as other historical guano scraping islands in the Sandveld Coastal Complex.	Objective 5.1: By 2025, CapeNature has upgraded the Penguin (Bird) Island interpretation and awareness resources to enhance the visitor experience and to document and portray the history of the island and other West Coast guano scraping islands.
Overfishing of pelagic prey species; Predation imbalance on seabirds, chicks and eggs; Oil spills; Avian diseases (e.g., avian influenza and botulism); unlawful access Penguin (Bird) Island; dune driving at Elands Bay, livestock grazing at Rocherpan and Elands Bay); Cape fur seal colonization of marine bird breeding habitat; Unplanned fires / Arson at Rocherpan and Elands Bay; Common reed spreading unabatedly across the Rocherpan wetland and its buffer; Loss of historical information regarding the history of guano, seal and egg harvesting on Elephant Rock, Jacobs Rock, and Penguin (Bird) Island.; Various climate change related threats.	Behavioural Change / Target Awareness	Strategy 6: Enhance the understanding and raise awareness of all ecological values within the Sandveld Coastal Complex and where appropriate, within its zone of influence.	Objective 6.1: By 2025, CapeNature has revised and implemented the Sandveld Coastal Complex environmental education, awareness, and interpretation programme to raise awareness on all values identified in the management plan.
			Objective 6.2: By 2026, CapeNature has developed and implemented a signage plan to raise awareness of all ecological values within the Sandveld Coastal Complex.
			Objective 6.3: By 2024, the Sandveld Coastal Complex has functioning PAACs in place.

Table 10.2: Strategic Plan for the Sandveld Coastal Complex.

COOPERATIVE GOVERNANCE					
STRATEGY I:	In partnership with national, provincial, and local government, non-governmental organisations and academic stakeholders, work towards solutions to address and mitigate threats to seals and seabirds within the Sandveld Coastal Complex.				
GOALS:	<ol style="list-style-type: none"> By 2034, the Sandveld Coastal Complex continues to sustain viable populations of priority seabirds. By 2034, the Sandveld Coastal Complex sustains a healthy seabird species composition and annual recruitment of African black oystercatchers. By 2034, the Sandveld Coastal Complex maintains a managed Cape fur seal population on Penguin (Bird) Island, and natural Cape fur seal populations on Elephant Rock, Paternoster Rocks, and Jacobs Rock. 				
THREATS:	Overfishing of pelagic prey species; Cape fur seal colonization of marine bird breeding habitat; Change in distribution of pelagic prey species; Heat impacting seabird breeding; Marine mammal diseases (e.g., canine distemper, morbillivirus, avian influenza and domoic acid); Avian diseases (e.g., avian influenza and botulism); Potential prospecting, mining, and seismic exploration.				
Objectives	Actions	Responsibility	Timeframe	Measurable Indicators / Outputs	References / Existing Procedures
Objective 1.1: By 2025 and beyond, functioning governance structures facilitate participatory integrated planning and management with relevant stakeholders to enhance management and protection of seals and seabirds.	<ul style="list-style-type: none"> Identify relevant engagement forum(s) to formally engage DFFE: O&C, SANCCOB, BirdLife SA and other relevant stakeholders to discuss challenges and implement solutions with regards to Cape fur seal and seabird conservation challenges. Attend and engage partners on a regular basis. Prevent further colonisation of priority bird breeding habitat within the complex. 	Lead: Conservation Manager (on reserve) Enablers: Landscape Manager; Landscape Unit Manager; Marine and Coasts Specialist; Landscape Conservation Intelligence Manager	Year 2 and onwards	Minutes of meetings; Number of engagements.	DFFE: O&C MoUs; BirdLife SA MoU; SANCCOB MoU.
Objective 1.2: By 2026 and beyond, the existing Memorandum of Understandings (MoUs) with DFFE: O&C, BirdLife SA and SANCCOB have been reviewed, maintained, and updated as required.	<ul style="list-style-type: none"> Renew and/or maintain DFFE: O&C MoUs when required. Renew BirdLife SA MoU in 2026. Renew SANCCOB MoU in 2027. Develop and maintain new MoUs with relevant partners where needed. 	Lead: Landscape Manager; Marine and Coasts Specialist Enablers: Landscape Unit Manager; Conservation Manager (on reserve); Landscape Conservation Intelligence Manager	Year 3 and onwards	Updated MoUs.	DFFE: O&C MoUs; BirdLife SA MoU; SANCCOB MoU; International Multi-species Action Plan for the Conservation of Benguela Current Upwelling System Coastal Seabirds.
Objective 1.3: By 2025 and beyond, facilitate and participate in monitoring and research on seals and	<ul style="list-style-type: none"> Annually implement Cape fur seal and seabird monitoring as identified in the Sandveld Coastal Complex eco-matrix. 	Lead: Conservation Manager (on reserve) Enablers: Landscape Manager; Landscape	Year 2 and onwards	Data collected and analysed and used to inform management recommendations;	Monitoring protocol; Ecological matrix; Monitoring and Surveillance Prioritization Framework;

Objectives	Actions	Responsibility	Timeframe	Measurable Indicators / Outputs	References / Existing Procedures
seabirds to support strategic adaptive management.	<ul style="list-style-type: none"> • Liaise with DFFE: O&C on an annual basis to obtain aerial Cape fur seal pup counts for the complex. • Liaise with DFFE: O&C on an annual basis to obtain seabird census data for aerial or boat counts conducted in the complex. • Complex staff to accompany DFFE: O&C on boat counts to the offshore rocks annually. • Conduct and support research which results in information that feeds into strategic adaptive management for priority seabirds within the complex. • Create an enabling environment to accommodate students, researchers, and volunteers to contribute to research within the complex. • Review monitoring data as part of scheduled PAMP revisions and implement strategic adaptive management recommendations. 	Conservation Intelligence Manager; Landscape Ecologist; Landscape Unit Manager; Marine and Coasts Specialist		Research permits issued; Research information informs conservation management.	CapeNature Permitting system.
Objective I.4: By 2025 and beyond, conservation management of priority seabirds on Penguin (Bird) Island is enhanced by providing additional artificial breeding habitat.	<ul style="list-style-type: none"> • Increase breeding habitat available to cormorant species breeding on Penguin (Bird) Island through building and installing additional artificial nest structures. • Investigate new artificial nest structure designs and test these on Penguin (Bird) Island. • Garner volunteer support to assist Penguin (Bird) Island staff with the construction of artificial nest structures. 	Lead: Conservation Manager (on reserve) Enablers: Landscape Conservation Intelligence Manager; Landscape Ecologist; Landscape Manager; Marine and Coasts Specialist	Year 2 and onwards	Artificial nest structures deployed; Assessment of artificial nest structures.	African Penguin-BMP; MoUs; International Multi-species Action Plan for the Conservation of Benguela Current Upwelling System Coastal Seabirds.

INTEGRATED PREDATION MANAGEMENT					
STRATEGY 2:	Develop and implement standard CapeNature operating guidelines to guide an effective response to predation on priority seabird breeding localities.				
GOALS:	<ol style="list-style-type: none"> By 2034, the Sandveld Coastal Complex continues to sustain viable populations of priority seabirds. By 2034, the Sandveld Coastal Complex maintains a managed Cape fur seal population on Penguin (Bird) Island, and natural Cape fur seal populations on Elephant Rock, Paternoster Rocks, and Jacobs Rock. 				
THREATS:	Predation imbalance on seabirds, chicks, and eggs.				
Objectives	Actions	Responsibility	Timeframe	Measurable Indicators / Outputs	References / Existing Procedures
Objective 2.1: By 2024 and beyond, predation on priority seabirds on Penguin (Bird) Island is controlled through effective predation monitoring and the implementation of rapid response control actions.	<ul style="list-style-type: none"> Annually implement monitoring of predation on Cape gannet as identified in the Penguin (Bird) Island eco-matrix. Review predation data and develop predation threshold guidelines to scientifically justify control activities. Review monitoring data as part of scheduled PAMP revisions and implement strategic adaptive management recommendations. Renew CapeNature's Threatened or Protected Species permit as required. Implement ethical control of kelp gull and Cape fur seal in line with predation thresholds and CapeNature's Threatened or Protected Species permit, when required. 	Lead: Conservation Manager (on reserve) Enablers: Landscape Conservation Intelligence Manager; Landscape Ecologist; Landscape Manager; Marine and Coasts Specialist	Year 1 and onwards	CapeNature Mortality and Predation Database.	Eco-matrix; African Penguin-BMP; International Multi-species Action Plan for the Conservation of Benguela Current Upwelling System Coastal Seabirds; Permits.
Objective 2.2: By 2025, address the anthropogenic availability of waste food in the Lamberts Bay harbour through pro-active engagement with industry.	<ul style="list-style-type: none"> Engage Lamberts Bay foods factory to find a permanent solution to mitigate the availability of factory waste to gulls in Lamberts Bay; and thereby contributing to an artificially high gull population. 	Lead: Conservation Manager (on reserve) Enablers: Marine and Coasts Specialist	Year 2	CapeNature Mortality and Predation Database.	CapeNature Protected Area Advisory Committee

INTEGRATED DISASTER PREPAREDNESS AND MANAGEMENT					
STRATEGY 3:	With relevant partners, develop and implement integrated disaster management and contingency plans in the event of oil spills, disease outbreaks and extreme climate events in the Sandveld Coastal Complex.				
GOALS:	<ol style="list-style-type: none"> By 2034, the Sandveld Coastal Complex continues to sustain viable populations of priority seabirds. By 2034, the Sandveld Coastal Complex sustains a healthy seabird species composition and annual recruitment of African black oystercatchers. By 2034, the Sandveld Coastal Complex maintains a managed Cape fur seal population on Penguin (Bird) Island, and natural Cape fur seal populations on Elephant Rock, Paternoster Rocks, and Jacobs Rock. 				
THREATS:	Oil spills; Marine mammal diseases (e.g., canine distemper, morbillivirus, avian influenza and domoic acid); Avian diseases (e.g., avian influenza and botulism); Various climate change and possible zone of influence impacts.				
Objectives	Actions	Responsibility	Timeframe	Measurable Indicators / Outputs	References / Existing Procedures
Objective 3.1: By 2025, disaster management and contingency planning enables mitigation of extreme weather, natural disasters, oil spills and disease outbreaks to ensure early detection and rapid response for the conservation of priority seabirds, Cape fur seal, and heritage features.	<ul style="list-style-type: none"> Maintain monitoring for sick and distressed seabirds within the complex on a regular basis. Maintain a strong working relationship with Cederberg and Bergrivier municipalities as well as WCDM to assist the complex in disaster response. Maintain a strong working relationship with SANCCOB and the State Veterinarian to support disaster and disease response. Liaise with SANCCOB to collect sick and injured seabirds for rehabilitation. Support avian disease research priorities. Develop an oiled wildlife preparedness response contingency plan for the complex that is in line with the national plans. Address associated training and equipment needs associated with the oiled wildlife preparedness response contingency plan. In case of a natural or artificial disaster, lead and engage partners to enable a quick and effective response. Consider the upgrade/re-construction of a small storm-protection wall to mitigate storm surge events into the Cape gannet colony. 	Lead: Conservation Manager (on reserve) Enablers: Landscape Conservation Intelligence Manager; Landscape Ecologist; Landscape Manager; Marine and Coasts Specialist	Year 2 and onwards	Data collected; Number of training events and/or interactions; Approved oil response plan; Valid MoUs	National Oil Spill Contingency Plan; National Oiled Wildlife Preparedness, Response and Contingency Plan;

COOPERATIVE RIVER, WETLAND AND GROUNDWATER MANAGEMENT					
STRATEGY 4:	Through partnership with relevant stakeholders, address water law compliance, in-stream modification, and best practice along the Papkuils River, upstream of Rocherpan Nature Reserve.				
GOALS:	<ol style="list-style-type: none"> By 2034, Rocherpan wetland is in a near-natural condition and it sustains a healthy waterbird species composition and population. By 2034, the Sandveld Coastal Complex comprises 90-100% indigenous terrestrial plant species, with steenbok recruitment at least every second year. 				
THREATS:	Agricultural effluents and water pollution; Over abstraction of surface water from the Papkuils River; Common reed spreading unabatedly across the Rocherpan wetland and its buffer.				
Objectives	Actions	Responsibility	Timeframe	Measurable Indicators / Outputs	References / Existing Procedures
Objective 4.1: By 2026 and beyond CapeNature, in collaboration with partners, advocates agricultural water use best practice and ensures compliance within the complex's zone of influence.	<ul style="list-style-type: none"> Review and implement recommendations from the Berg-Olifants Reserve Determination Study conducted by BlueScience. Become a participating member at the Berg-Olifants Catchment Management Agency meetings (or similar forum) and request assistance to address actions listed in this PAMP. In partnership, drive, and lobby for recommendations from the Berg-Olifants Reserve Determination Study to be implemented. As responsible management authority, drive and participate in the Olifants and Verlorenvlei Estuary forums. As responsible management authority, evaluate conservation options and implement estuary management plan for Jakkalsvlei Estuary. Assist the Department of Forestry, Fisheries and the Environment as well as the Bergrivier Municipality with implementing the Berg River Estuary management plan. 	Lead: Conservation Manager (off reserve); Stakeholder Engagement Officer Enablers: Landscape Manager; Landscape Unit Manager; Landscape Conservation Intelligence Manager	Year 3 and onwards	Berg-Olifants Catchment Management Agency and Olifants and Verlorenvlei Estuary Forums meeting minutes; Berg River Estuary staff appointed	Berg-Olifants Reserve Determination Study conducted by BlueScience; Berg River and Jakkalsvlei Estuary Management Plans.
Objective 4.2: By 2024 and beyond, the Rocherpan wetland health is monitored	<ul style="list-style-type: none"> Formulate monitoring projects in line with existing relevant monitoring protocols and include on Rocherpan eco-matrix. 	Lead: Landscape Ecologist; Freshwater Ecologist Enablers:	Year 1 and onwards	Site specific monitoring project; Data from the monitoring projects; Trained personnel; No	Eco-matrix; Ecological Monitoring Protocols; SASS; Invasive Alien

Objectives	Actions	Responsibility	Timeframe	Measurable Indicators / Outputs	References / Existing Procedures
to inform strategic adaptive management.	<ul style="list-style-type: none"> • Facilitate and conduct training of personnel to carry out monitoring activities. • Implement monitoring as per Rocherpan eco-matrix. • Review monitoring data as part of scheduled PAMP revisions and implement strategic adaptive management recommendations. • Address unlawful grazing of livestock within the Rocherpan wetland through appropriate compliance action. • Control common reed and invasive alien plants according to the Rocherpan reed management plan and Invasive Alien Species Plan. 	Conservation Manager (on reserve)		more cattle coming into the reserve	Species Plan; Rocherpan reed management plan

HISTORICAL INTERPRETATION AND AWARENESS					
STRATEGY 5:	Develop and display interpretation and awareness resources that have a strong focus on the historical aspects of Penguin (Bird) Island, as well as other historical guano scraping islands in the Sandveld Coastal Complex.				
GOALS:	1. By 2034, the history of the West Coast Islands in the Sandveld Coastal Complex is portrayed and easily available for visitors to Penguin (Bird) Island.				
THREATS:	Loss of historical information regarding the history of guano, seal and egg harvesting on Elephant Rock, Jacobs Rock, and Penguin (Bird) Island.				
Objectives	Actions	Responsibility	Timeframe	Measurable Indicators / Outputs	References / Existing Procedures
Objective 5.1: By 2025, CapeNature has upgraded the Penguin (Bird) Island interpretation and awareness resources to enhance the visitor experience and to document and portray the history of the island and other West Coast guano scraping islands.	<ul style="list-style-type: none"> Appoint a service provider to upgrade the Penguin (Bird) Island signage and awareness resources with a special focus on the history of guano scraping on islands along the West Coast of South Africa. Ensure all newly appointed Penguin (Bird) Island staff receives site specific heritage induction within their first quarter of appointment. 	Lead: Stakeholder Engagement Officer Enablers: Conservation Manager (on reserve); Landscape Unit Manager.	Year 2	Awareness raising material (leaflets/pamphlets/booklets etc.) available and in use for Heritage resources; New signage	CapeNature Communications Policy; The Development of Educational Resources (Corporate Strategic Plan); Historical literature.

ENVIRONMENTAL EDUCATION AND EXTENSION					
STRATEGY 6:	Enhance the understanding and raise awareness of all ecological values within the Sandveld Coastal Complex and where appropriate, within its zone of influence.				
GOALS:	<ol style="list-style-type: none"> 1. By 2034, the Sandveld Coastal Complex continues to sustain viable populations of priority seabirds. 2. By 2034, the Sandveld Coastal Complex sustains a healthy seabird species composition and annual recruitment of African black oystercatchers. 3. By 2034, the Sandveld Coastal Complex maintains a managed Cape fur seal population on Penguin (Bird) Island, and natural Cape fur seal populations on Elephant Rock, Paternoster Rocks, and Jacobs Rock. 4. By 2034, Rocherpan wetland is in a near-natural condition and it sustains a healthy waterbird species composition and population. 5. By 2034, the Sandveld Coastal Complex comprises 90-100% indigenous terrestrial plant species, with steenbok recruitment at least every second year. 6. By 2034, the Elands Bay State Forest comprises 90-100% indigenous terrestrial plant species, and the percentage of unvegetated mobile dune habitat is maintained or extended. 7. By 2034, the history of the West Coast Islands in the Sandveld Coastal Complex is portrayed and easily available for visitors to Penguin (Bird) Island. 				
THREATS:	Overfishing of pelagic prey species; Predation imbalance on seabirds, chicks and eggs; Oil spills; Avian diseases (e.g., avian influenza and botulism); Unlawful access Penguin (Bird) Island; dune driving at Elands Bay; livestock grazing at Rocherpan and Elands Bay; Cape fur seal colonization of marine bird breeding habitat; Unplanned fires / Arson at Rocherpan and Elands Bay; Common reed spreading unabatedly across the Rocherpan wetland and its buffer; Loss of historical information regarding the history of guano, seal and egg harvesting on Elephant Rock, Jacobs Rock, and Penguin (Bird) Island.; Various climate change related threats.				
Objectives	Actions	Responsibility	Timeframe	Measurable Indicators / Outputs	References / Existing Procedures
Objective 6.1: By 2025, CapeNature has revised and implemented the Sandveld Coastal Complex environmental education, awareness, and interpretation programme to raise awareness on all values identified in the management plan.	<ul style="list-style-type: none"> • Revise the Sandveld Coastal Complex environmental education, awareness, and interpretation programme to include all identified values. • Implement the complex environmental education, awareness, and interpretation programme. • Review the environmental education, awareness, and interpretation programme every five years. 	Lead: Stakeholder Engagement Officer Enablers: Conservation Manager (on reserve)	Year 2 and onwards	Approved Sandveld Coastal Complex Environmental Education and Awareness Programme for a 5-year period; Awareness raising material (leaflets/pamphlets/booklets etc.) available and in use.	Environmental Education and Awareness Programme Template and annual work plans; Integrated Work Plan; CapeNature; Communications Policy; The Development of Educational Resources (Corporate Strategic Plan).
Objective 6.2: By 2026, CapeNature has developed and implemented a signage	<ul style="list-style-type: none"> • Appoint a service provider to revamp the Penguin (Bird) Island signage and awareness resources with 	Lead: Stakeholder Engagement Officer	Year 3	Updated signage register; Signage erected	Corporate Identity Manual; Communications Policy.

Objectives	Actions	Responsibility	Timeframe	Measurable Indicators / Outputs	References / Existing Procedures
plan to raise awareness of all ecological values within the Sandveld Coastal Complex.	<p>a special focus on the values identified for the island.</p> <ul style="list-style-type: none"> • Evaluate signage for Rocherpan Nature Reserve and ensure it highlights the values applicable to the reserve. • Evaluate signage for Elands Bay State Forest and ensure it highlights the values applicable to the reserve. • Engage internal and external stakeholders to have the signage developed, printed, and erected. 	Enablers: Conservation Manager (on reserve)			
Objective 6.3: By 2024, the Sandveld Coastal Complex has functioning PAACs in place.	<ul style="list-style-type: none"> • Maintain the Penguin (Bird) Island and Rocherpan PAAC platforms and invite the chairperson of each to the GCBC forum. • Engage the Cederberg Municipality either through a dedicated forum or as part of the GCBC forum to address conservation and social challenges at Elands Bay State Forest. 	Lead: Stakeholder Engagement Officer Enablers: Conservation Manager (on reserve)	Year 1	Number of functional interactions – digital or in person; Minutes of Protected Area Advisory Committee meetings.	CapeNature Protected Area Advisory Committee Term of Reference.

II COSTING

This section provides an overview of costing and fund allocation for conservation strategies identified for the Sandveld Coastal Complex. It outlines existing financial resources (current budget), funding shortfalls, sources of alternate funding and future financial projections.

II.1 Finance and Asset Management

In line with the legal requirement, the strategies identified to achieve the desired conservation state within the Sandveld Coastal Complex have been costed below.

The complex will adhere to the following financial guiding principles:

- Responsibly manage the allocation of budget, revenue raising activities and expenditure.
- Ensure solid financial management supporting the achievement of the objectives of this management plan.
- Compliance with the Public Finance Management Act, 1999 (Act No. 1 of 1999) as well as CapeNature's financial policies and procedures.

A budget for the complex was derived based upon the activities in this management plan. When estimating financial costs, the following items were considered:

- Those costs and associated resources which could be allocated to specific activities, and which were both of a recurring and once-off nature.
- Unallocated fixed costs (e.g., water, electricity, phones, bank fees).
- Costs associated with maintenance of infrastructure.
- Provision for replacement of minor and major assets, (e.g., furniture, electronic equipment, vehicles, fences).

Items above a specified financial value of (R2 000) are recorded in the fixed asset register associated with the complex. All assets are associated with staff appointed within the complex and should any such staff move position, new custodians are appointed. All assets are verified on a regular basis for audit purposes. Minor assets below the specified value are recorded on the complex's minor asset register. Broken or obsolete assets are disposed of as per CapeNature's asset disposal protocol.

II.1.1 Income

CapeNature's budget is funded by the Medium-Term Expenditure Framework allocation, other government grants and from own revenue generating commercial activities. Any surplus revenue generated is used to fund shortfalls in management costs across the organisation.

CapeNature has overhead costs relating to support services such as human resources, communication, marketing and learning, finance, biodiversity capabilities, conservation operations, eco-tourism and access, legal services, etc. which is not allocated to landscape or individual protected area budgets but covered at a corporate level. Some protected area's cover operational expenses through grant funding such as the Expanded Public Works Programme.

This management plan is a 10-year plan, and thus straddles multiple Medium-Term Expenditure Framework periods that impact on actual budget allocation and projection. Due to the ongoing challenging fiscal position South Africa faces, the organisation is under continued financial strain, impacting on the implementation of this management plan.

Total income projected for 2023/24 is budgeted at R 6 826 211. An annual summary is presented in Table II.1.

Table 11.1: Annual summary of the total projected income for the Sandveld Coastal Complex, part of the Ceder-Berg Landscape Unit.

Income Allocation Source (2023-2024)	Amount (R)
Medium Term Expenditure Framework Allocation*	R2 565 907
Landscape Tourism Allocation*	R2 966 026
External Funding (EPWP: Rocherpan and Penguin (Bird) Island Specific Allocation)	R1 106 278
External Funding (DFFE: O&C: Penguin (Bird) Island Specific Allocation)	R188 000
Total Income	R6 826 211

* This allocation is for the whole Ceder-Berg Landscape Unit.

11.1.2 Expenditure

11.1.2.1 Recurring costs

Annual direct costs may include staff, transport and travel, stores and equipment, and other fixed costs. This expenditure is split according to strategies as illustrated in Figure 11.1.

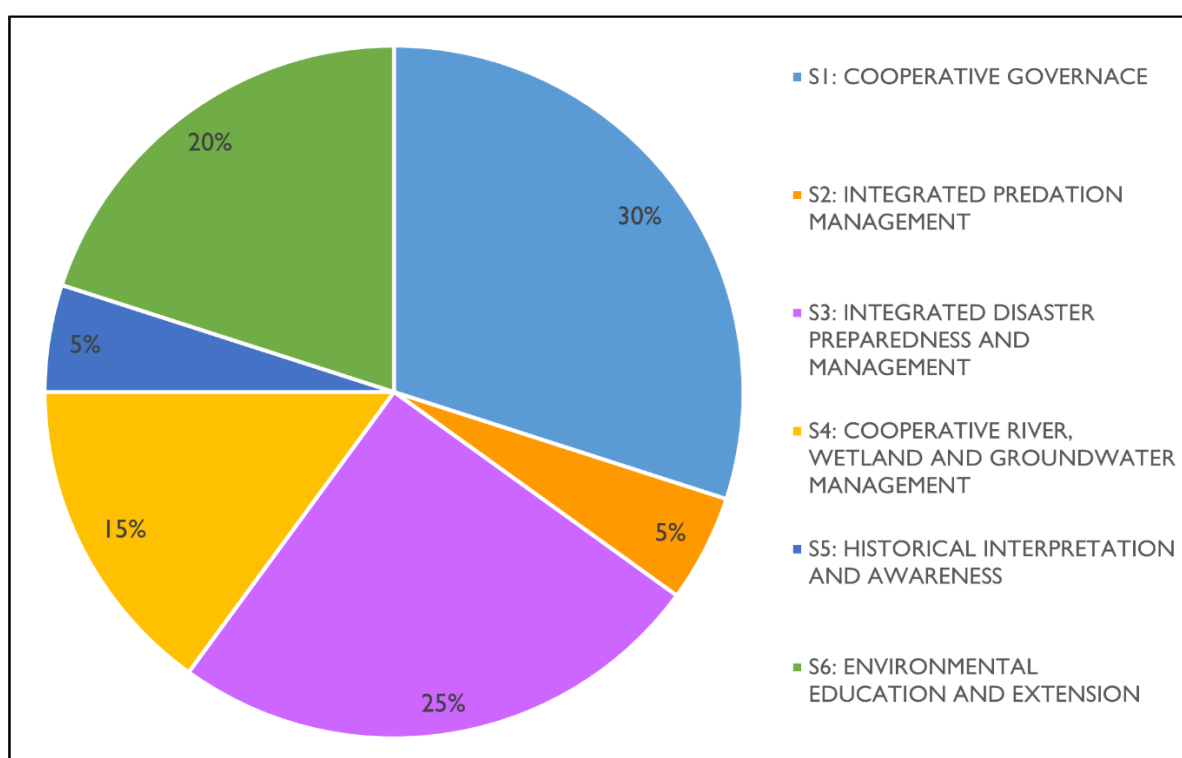


Figure 11.1: The estimated proportion of annual operational costs for the Sandveld Coastal Complex for 2023/24 aligned with the six strategies identified.

11.1.2.2 Once off costs

In addition to recurring costs there might be once-off replacement costs for assets such as tractors, firefighting equipment, field equipment and fencing; that are aligned with the life span of the relevant assets being replaced.

11.1.2.3 Maintenance

An annual earmarked allocation is provided for the development of new tourism and operational infrastructure as well as the upgrade and maintenance for such. Tourism projects are prioritised across all CapeNature facilities and maintenance is scheduled accordingly.

11.1.2.4 Financial implications

The unsuccessful securing of external funding, replacement and maintenance of critical capital equipment, assets, and infrastructure and further reductions in organisational budget allocation could lead to potential financial shortfalls and will have a negative impact on strategic implementation throughout the complex. The implications of this are that the strategic plan may not be fully achieved. Available funding will have to be prioritised accordingly. A zero-based budget assessment is needed to determine the true financial needs of the complex.

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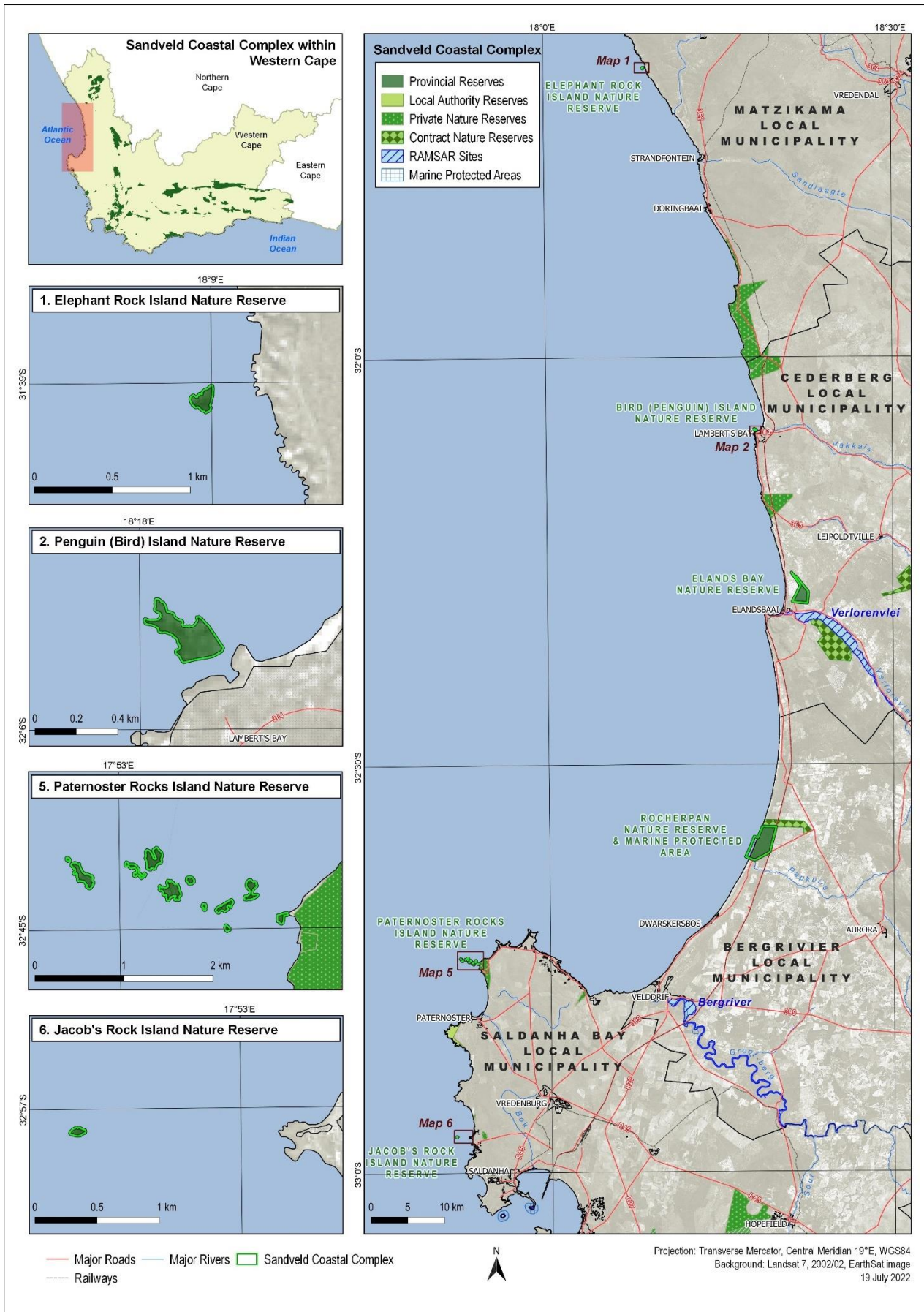
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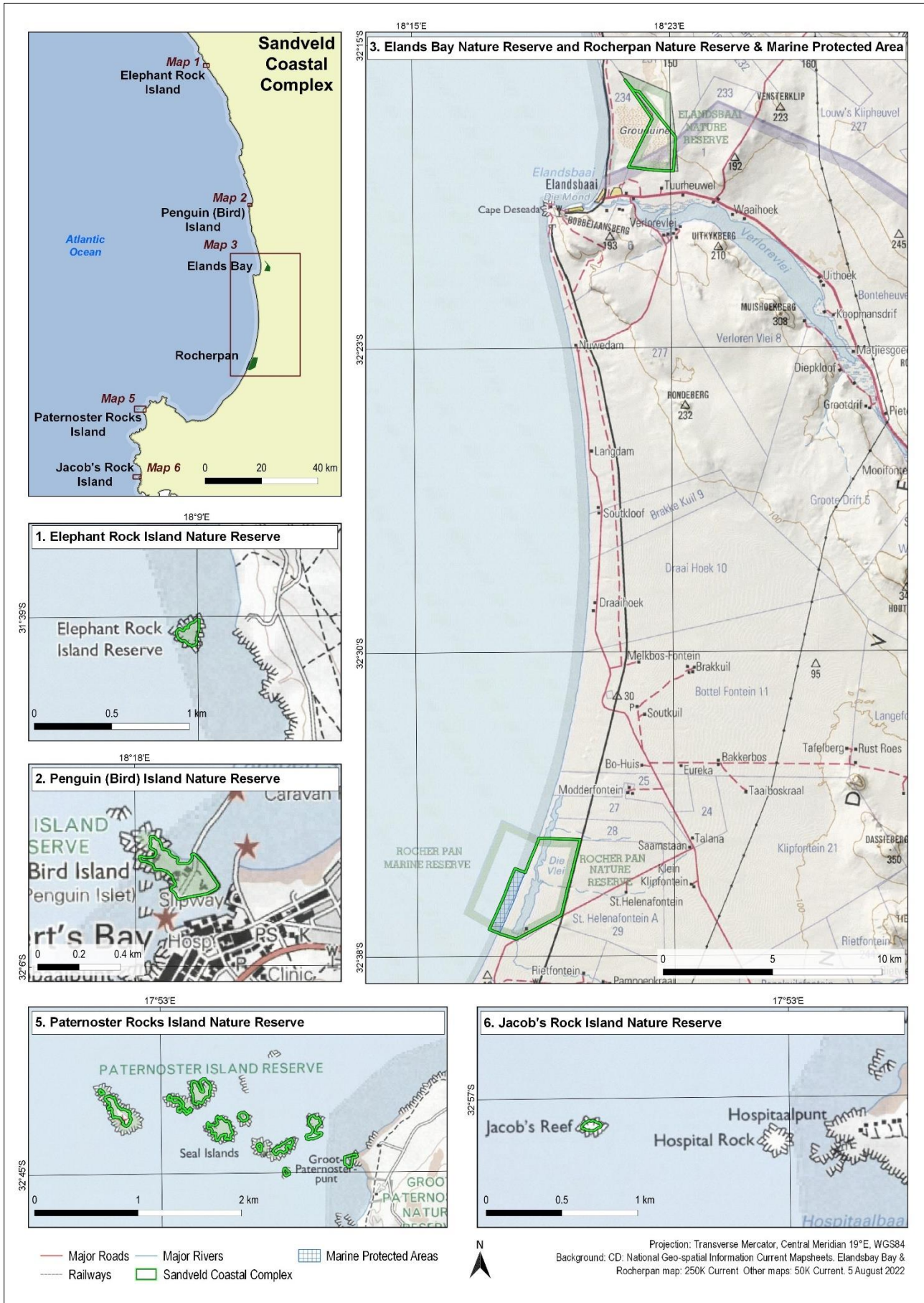
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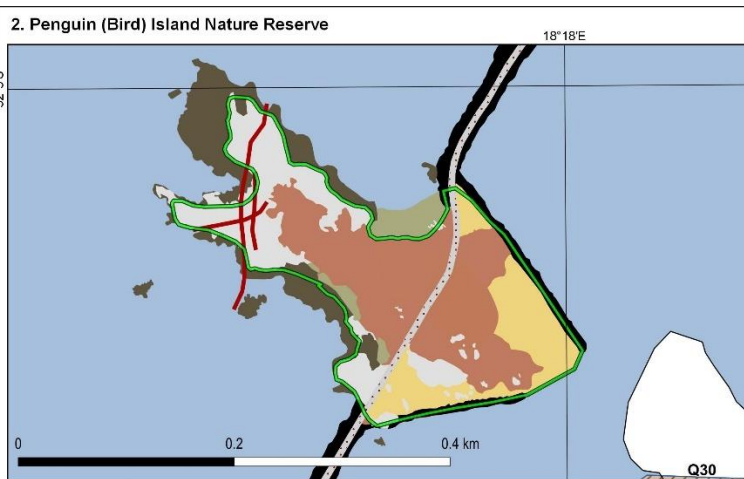
APPENDIX I Maps of the Sandveld Coastal Complex.



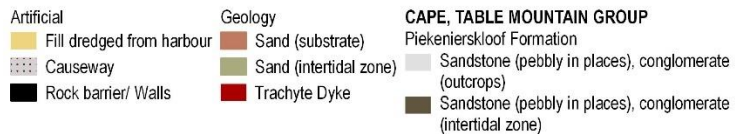
Map I: Location and extent of the Sandveld Coastal Complex.



Map 2: Topography of the Sandveld Coastal Complex.



Penguin (Bird) Island Geology**



**Source: Bird Island Sensitivity Analysis (2013)

SA Geology Map (1: 250 000)

Dominant Lithology (-ies)*

QUATERNARY

- Q-a - Alluvium
- Q46 - Loam and sandy loam
- Q54 - Calcareous and gypsiferous soil
- Q30 - Light-grey to red sandy soil

SANDVELD GROUP

- Witzand Formation
- Qwi - Generally unconsolidated, calcareous dune sand
- Velddrif Formation
- Qv - Shelly limestone and sandstone
- Varswater Formation
- Tv - Quartzose sand, pelletal phosphorite, gravel, sandy silt, grey-black carbonaceous kaolinic clay, peat

CAPE, TABLE MOUNTAIN GROUP

- Piekenierskloof Formation
- Opi - Sandstone (pebbly in places), conglomerate

GARIEP, GIFBERG GROUP

- Aties Formation
- Nat - Limestone, dolomite, marble

CAPE GRANITE SUITE

- Robertson Pluton
- N#r - Granite
- Saldanha Batholith
- N#sa - Granite, quartz-monzonite, quartz-porphry

□ No geology data available

Structural Points

- ▲ Strike and dip of foliation
- Direction and plunge of lineation

Mineral Deposits

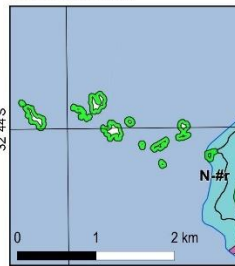
- Gy Gypsum
- P Phosphate

*Source: 1:250 000: Geological Map of 3218 Clanwilliam (1973) & Metallogenic Map of 3118 Calvinia (2003), courtesy Council of Geoscience

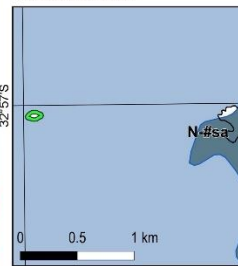
1. Elephant Rock Island Nature Reserve



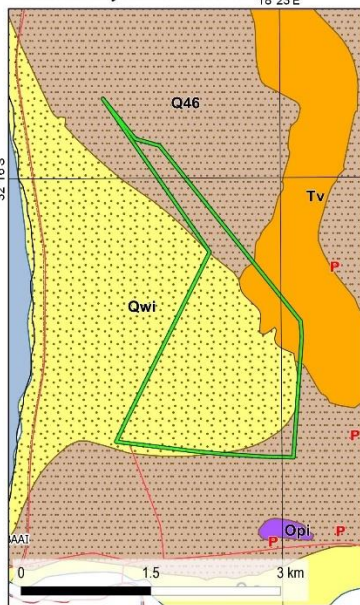
5. Paternoster Rocks Island Nature Reserve



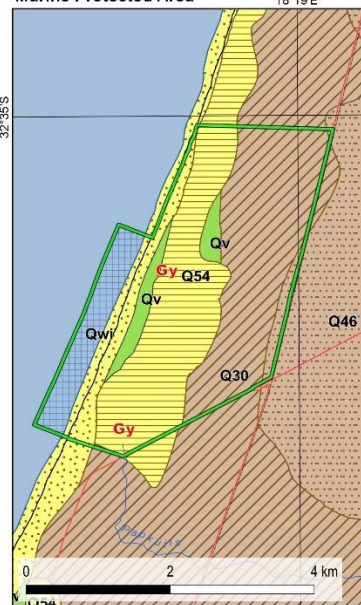
6. Jacob's Rock Island Nature Reserve



3. Elands Bay Nature Reserve



4. Rocherpan Nature Reserve and Marine Protected Area

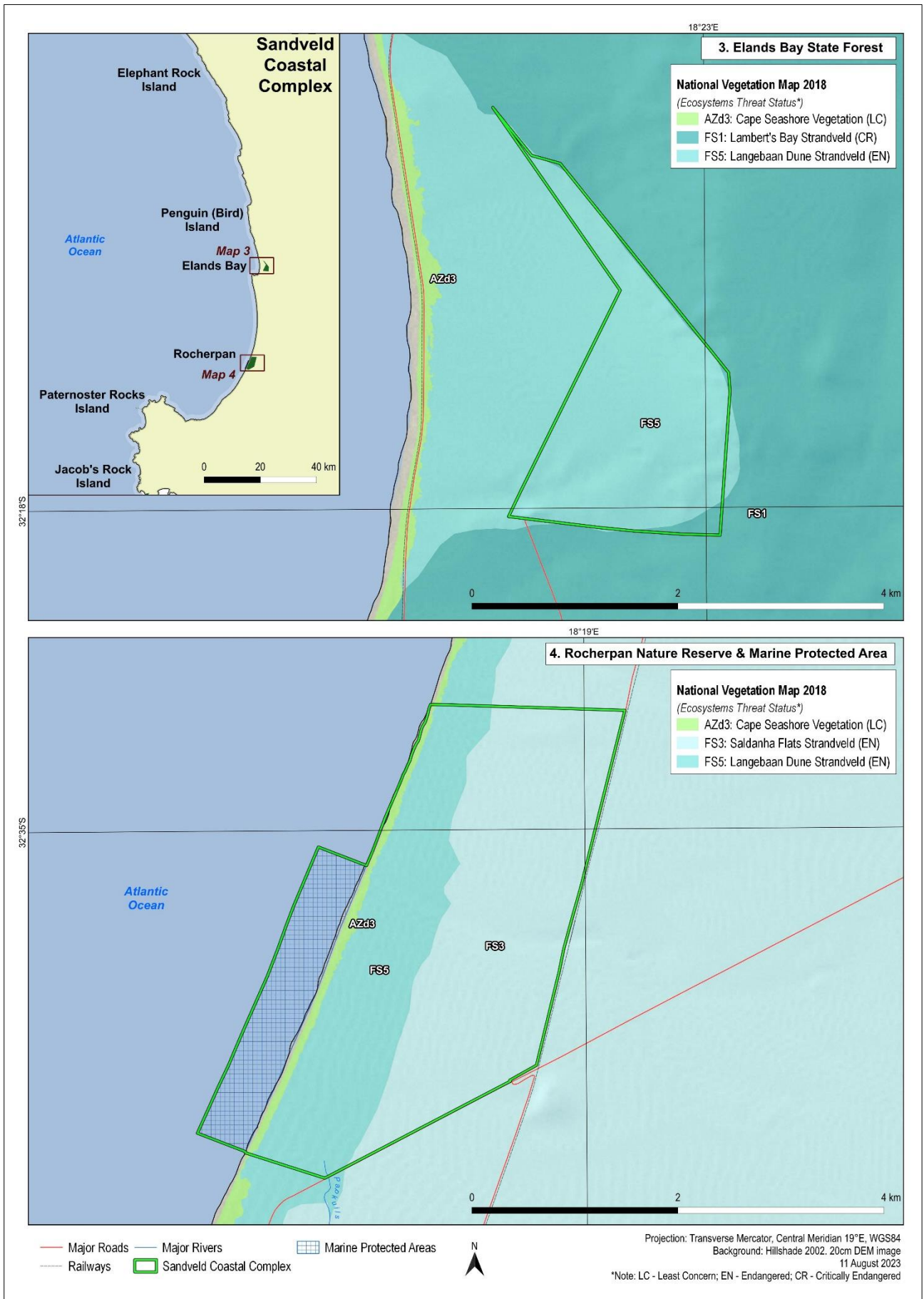


- Major Roads
- Major Rivers
- ▭ Marine Protected Areas
- Railways
- ▭ Sandveld Coastal Complex

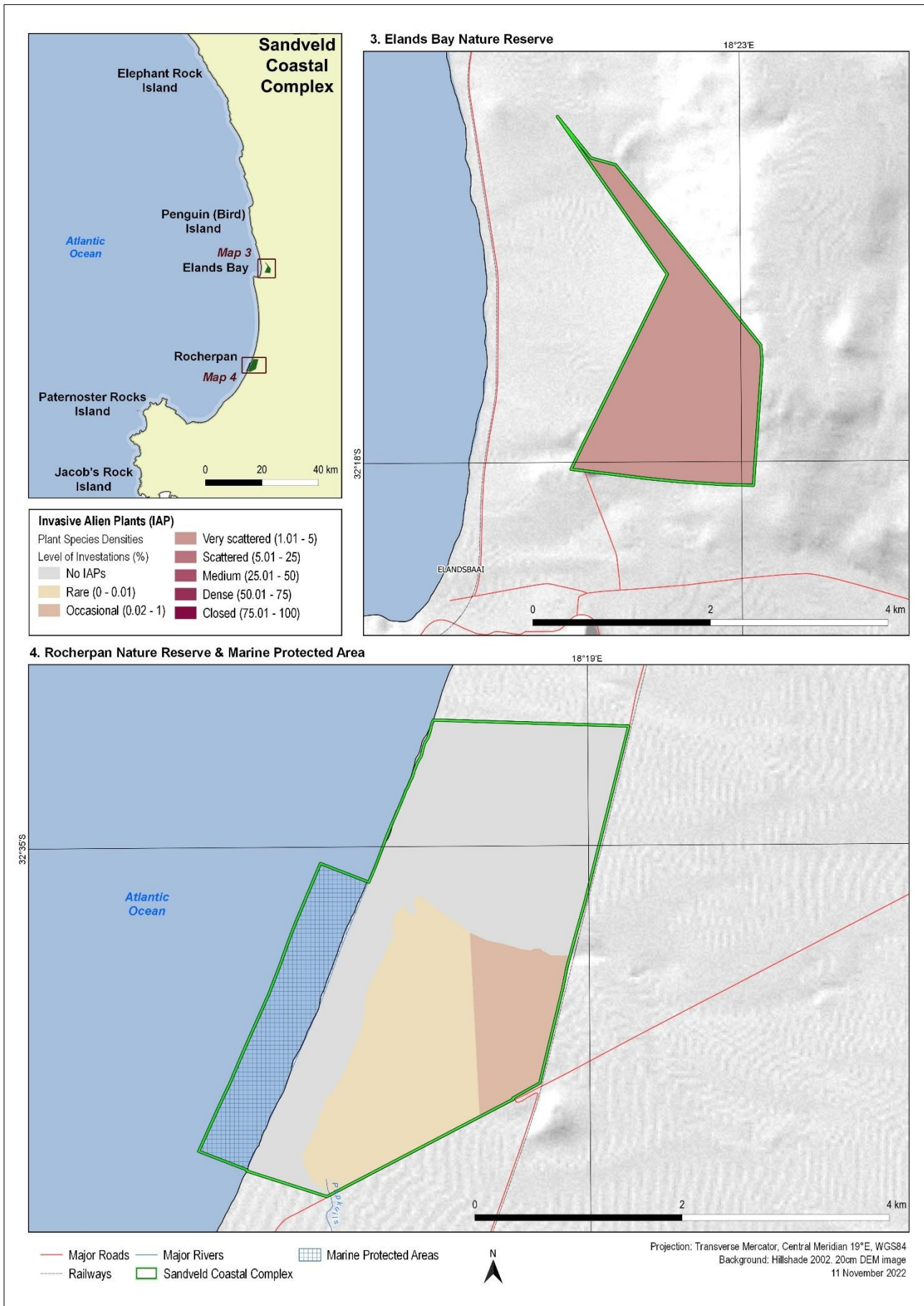


Projection: Transverse Mercator, Central Meridian 19°E, WGS84
Background: Hillshade 2002, 20cm DEM image
9 November 2022

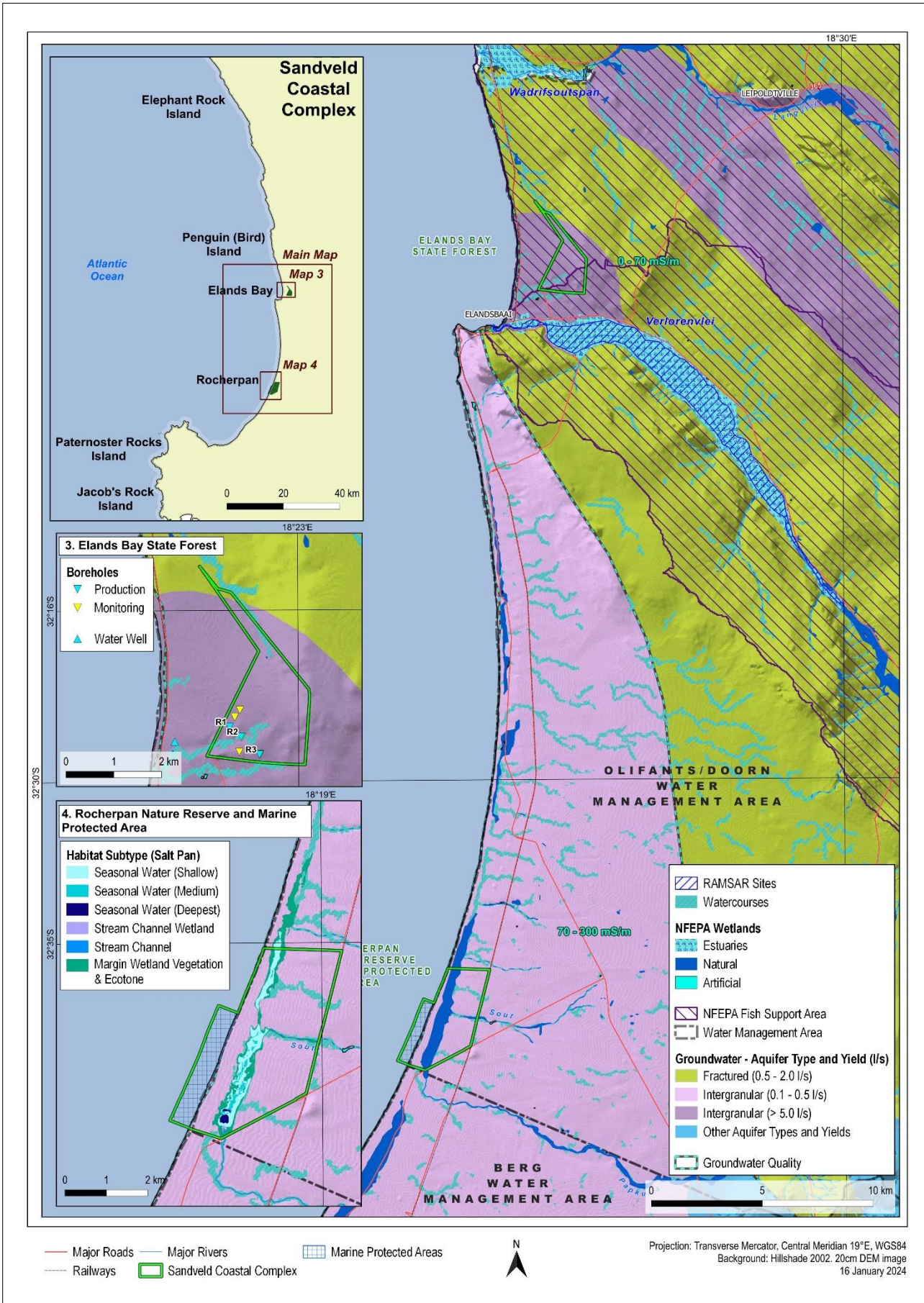
Map 3: Geology of the Sandveld Coastal Complex.



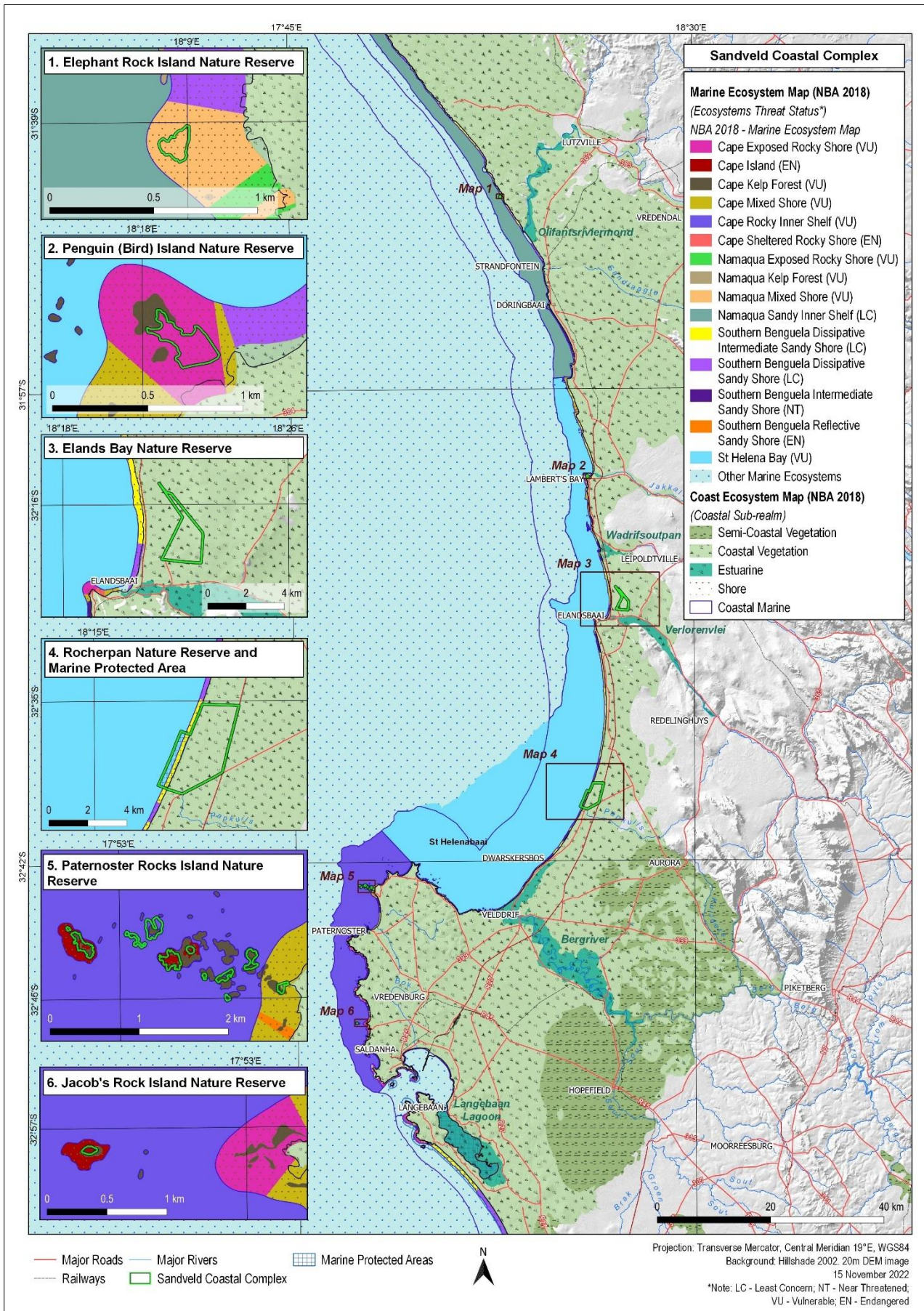
Map 4: Vegetation of the Sandveld Coastal Complex.



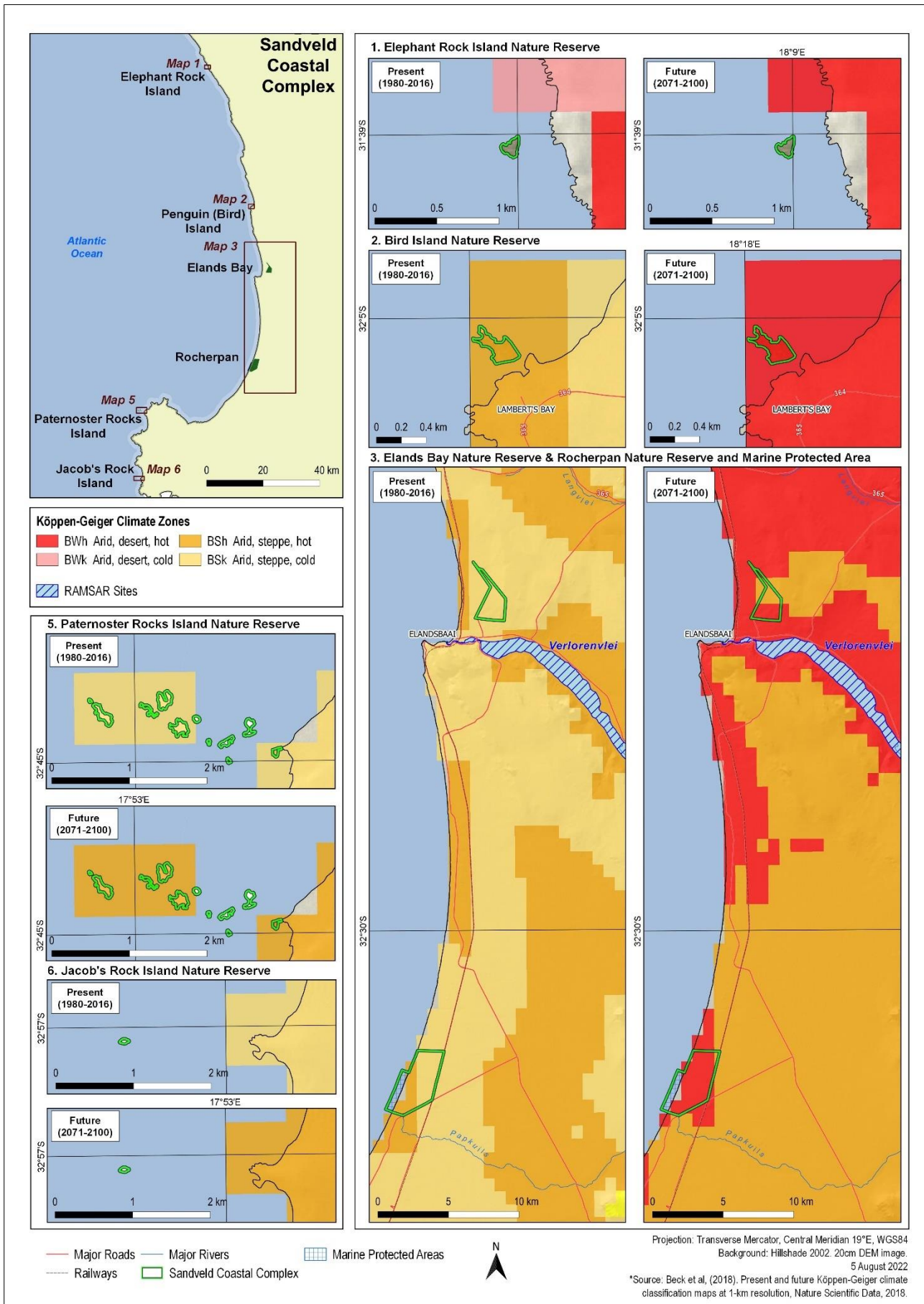
Map 5: Invasives and alien plant species of the Sandveld Coastal Complex.



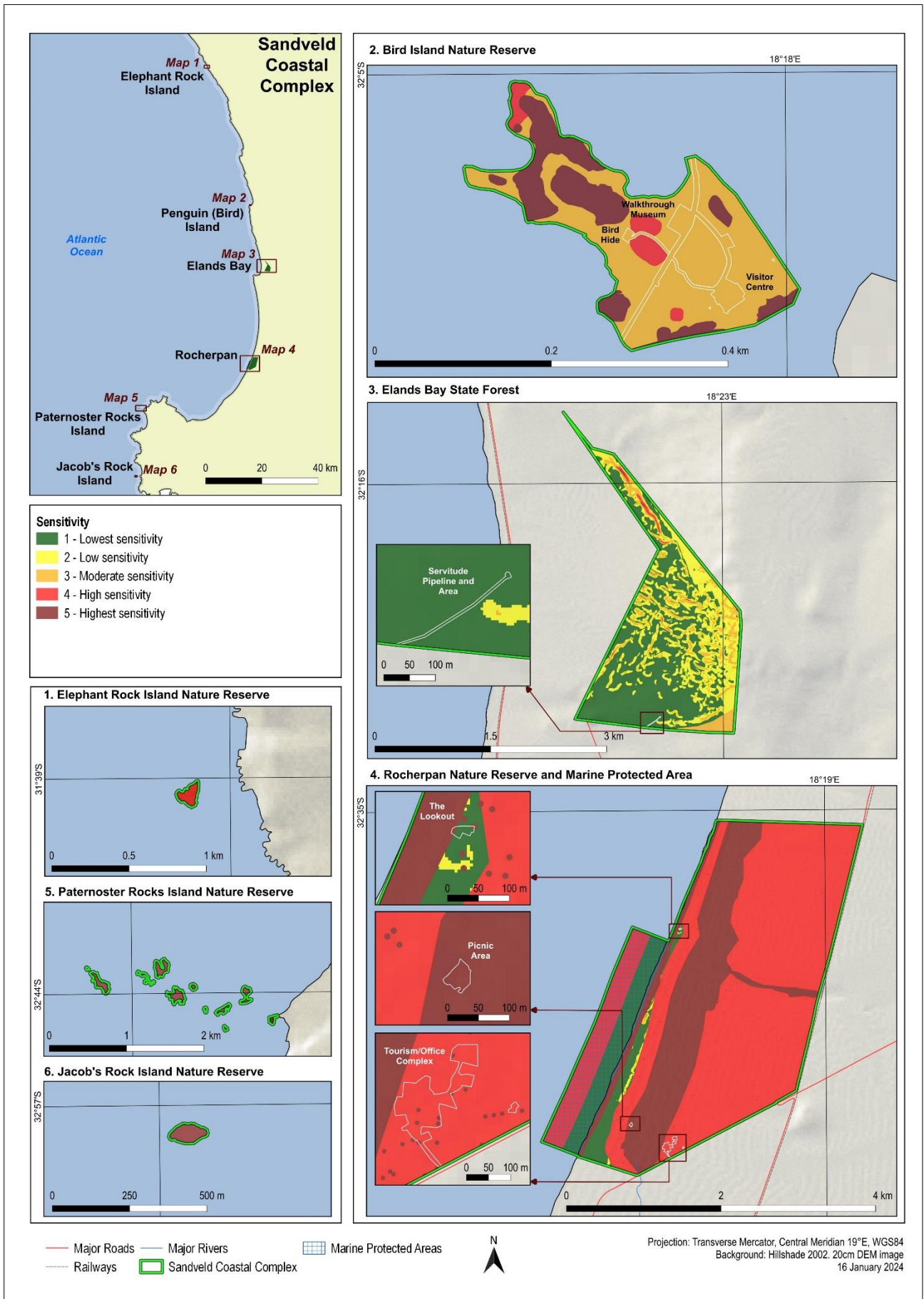
Map 6: Aquatic systems of the Sandveld Coastal Complex.



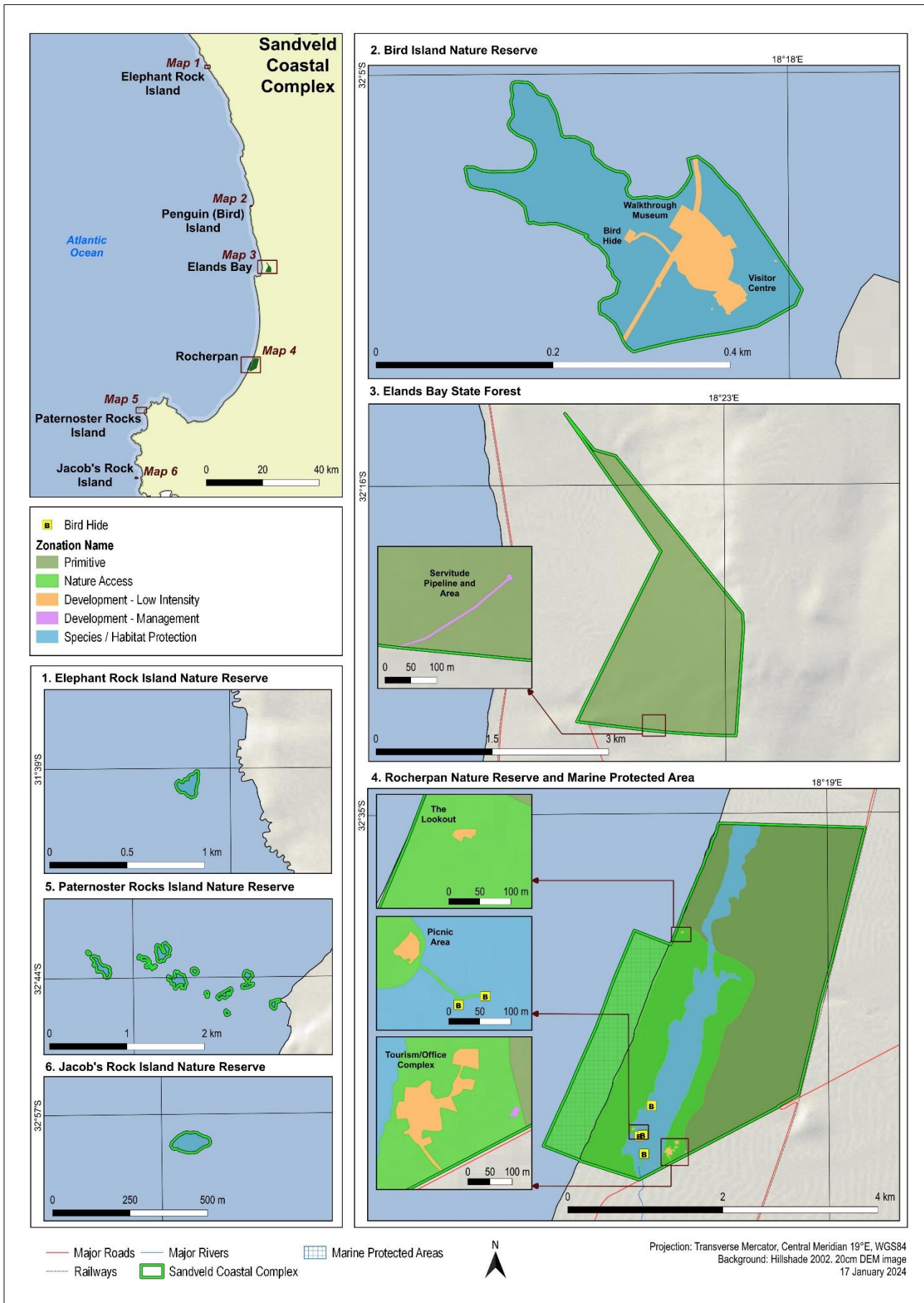
Map 7: Marine and coastal systems of the Sandveld Coastal Complex.



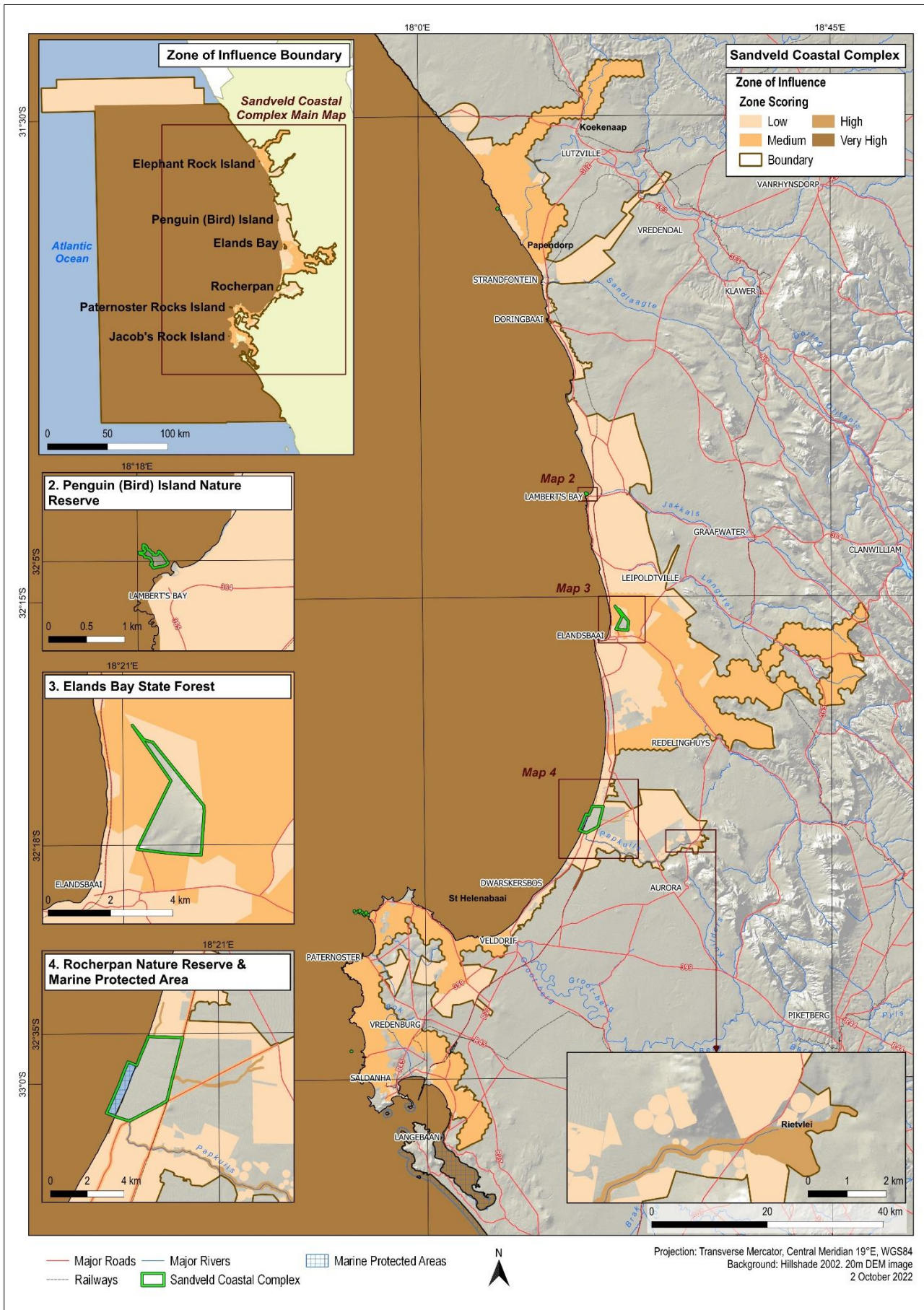
Map 8: Climate change prediction map for the Sandveld Coastal Complex.



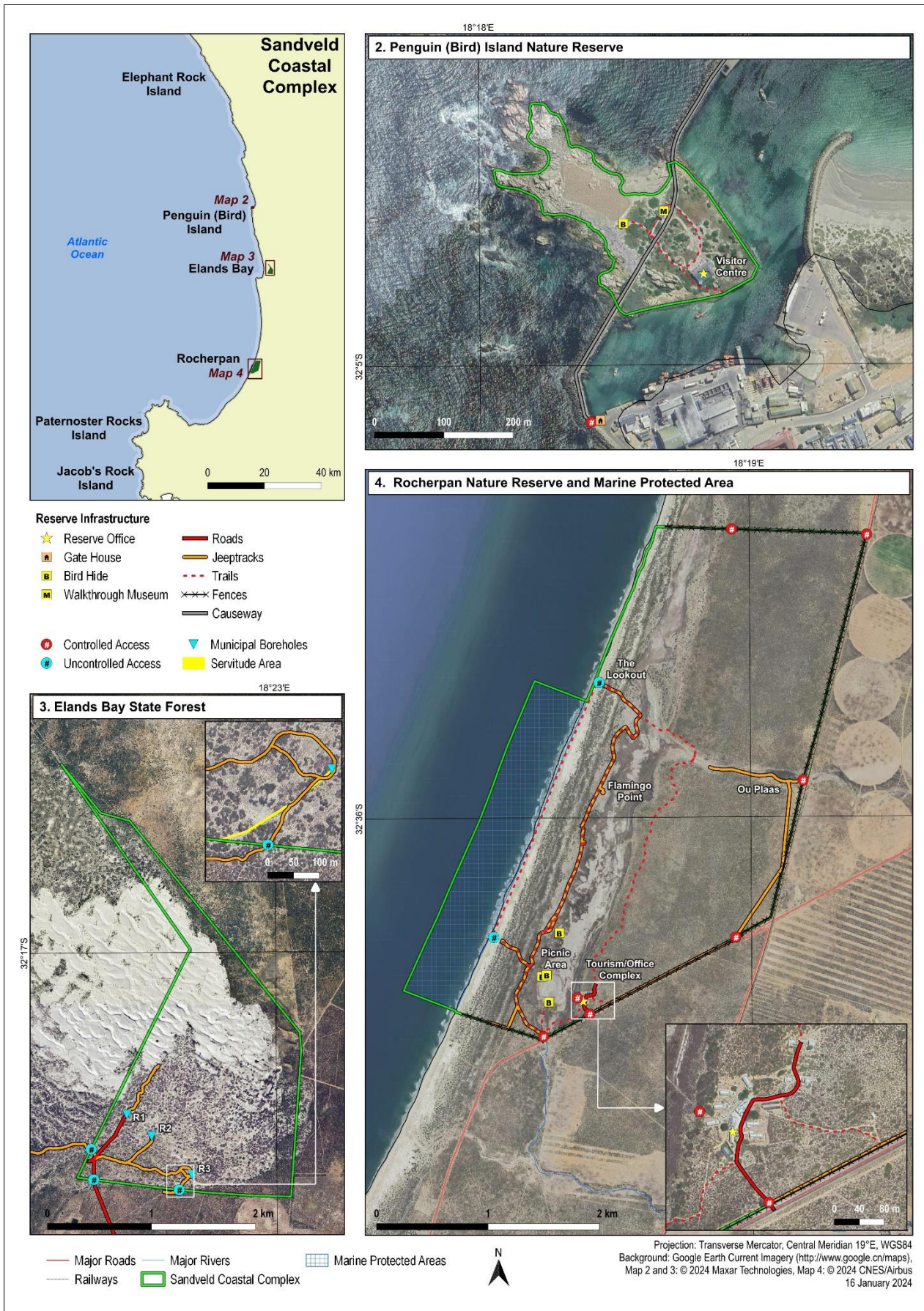
Map 9: Sensitivity of the Sandveld Coastal Complex.



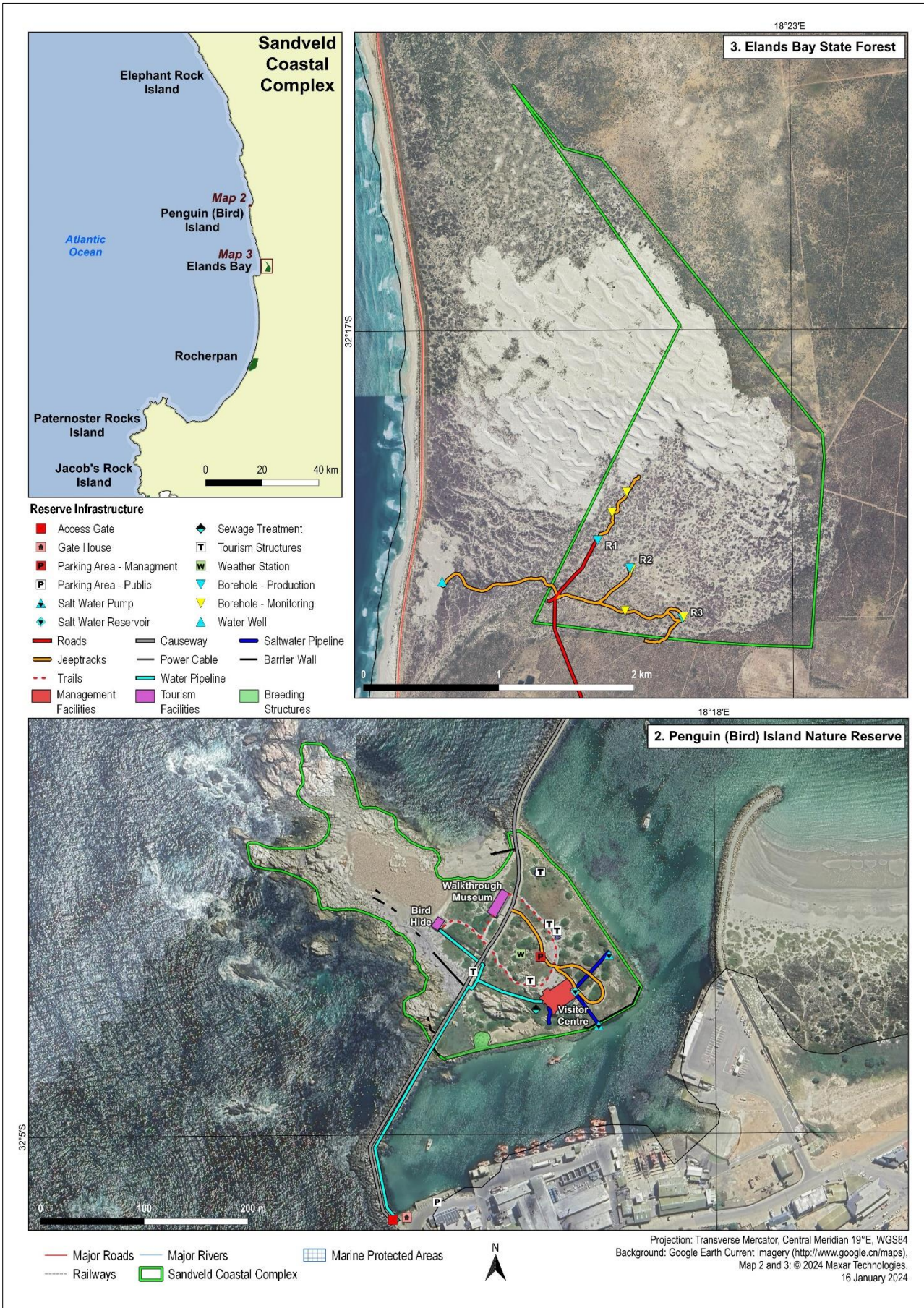
Map 10: Zonation of the Sandveld Coastal Complex.



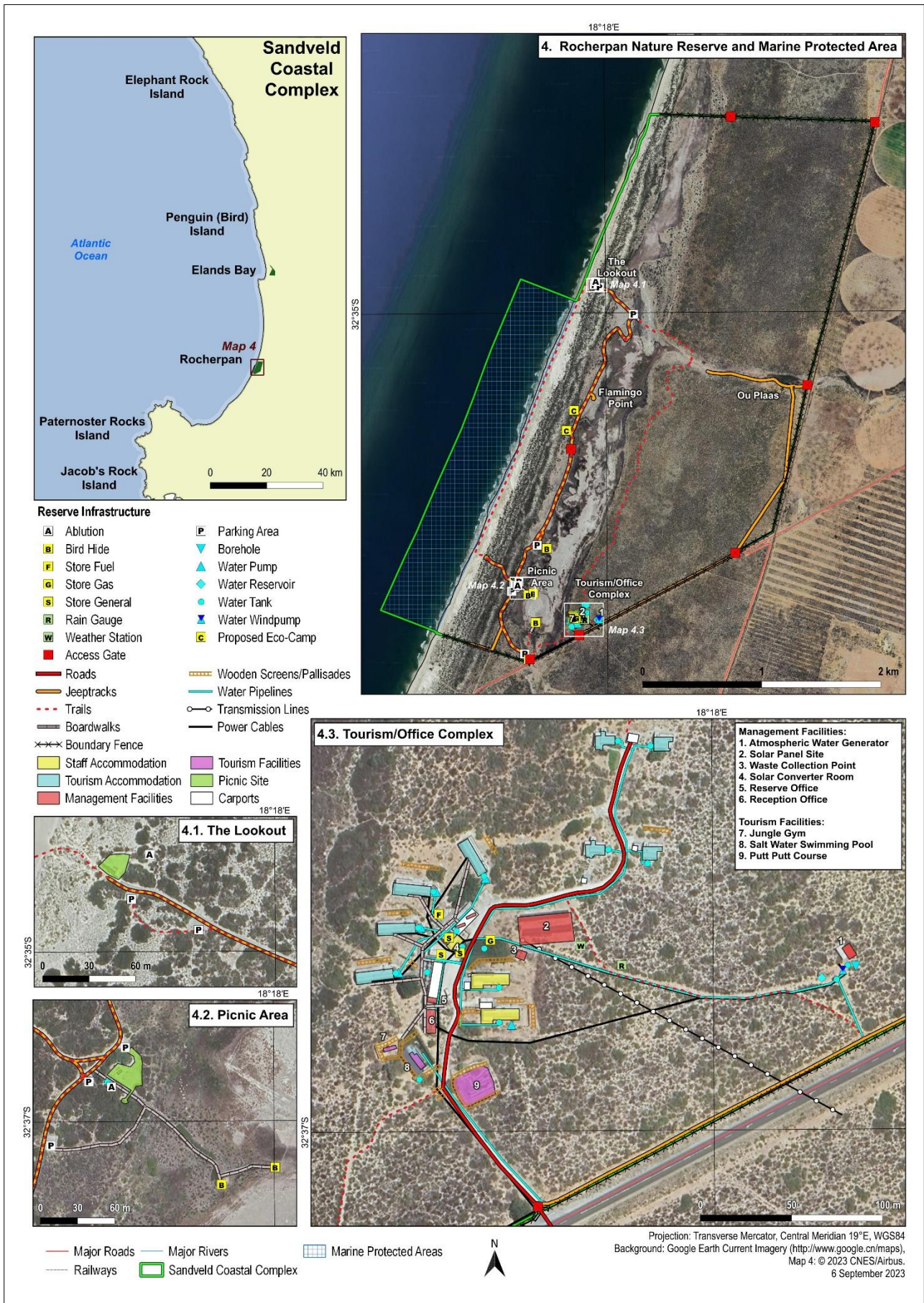
Map 11: Zone of influence & around the Sandveld Coastal Complex.



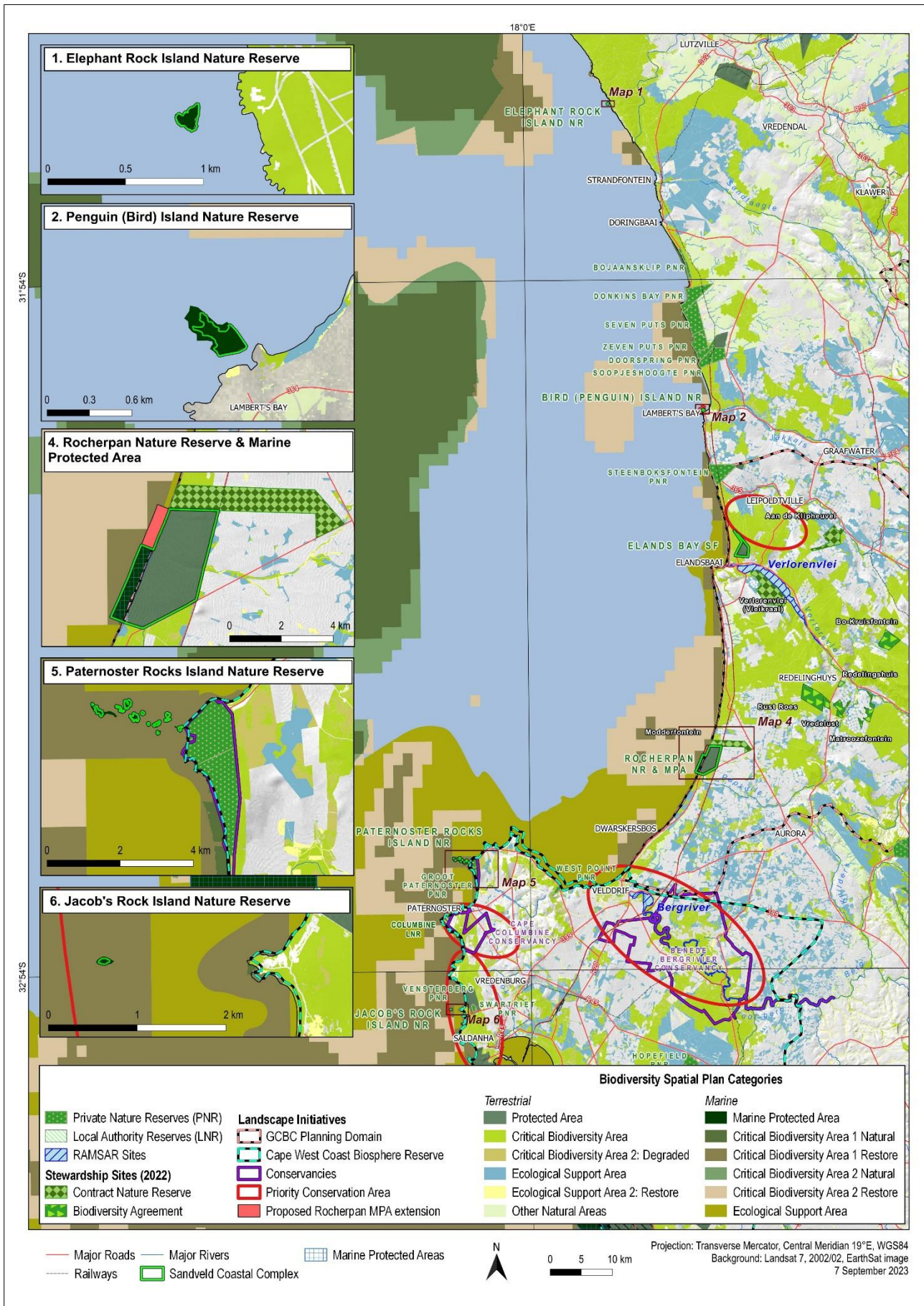
Map 12: Access and servitudes within the Sandveld Coastal Complex.



Map 13: Infrastructure within the Elands Bay and Penguin (Bird) Island Nature Reserves.



Map 14: Infrastructure within the Rocherpan Nature Reserve and Marine Protected Area.



Map 15: Expansion of the Sandveld Coastal Complex.

APPENDIX 2 Stakeholder Engagement Report for the Sandveld Coastal Complex

Stakeholder Engagement Report: Sandveld Complex



Stakeholder Engagement Report

Sandveld Coastal Complex

Compiled by
Contour Enviro Group
January 2024

