WALKER BAY COMPLEX

PART OF THE
CAPE FLORAL REGION PROTECTED AREAS WORLD HERITAGE SITE
Western Cape, South Africa

Protected Area Management Plan 2024 – 2034

DATE APPROVED:

MOST RECENT UPDATE: 15 December 2023

CapeNature

Western Cape Government

forestry, fisheries and the environment
Department:
Forestry, Fisheries and the Environment
REPUBLIC OF SOUTH AFRICA

United Nations Educational, Scientific and Cultural Organization

World Heritage Convention

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CITATION
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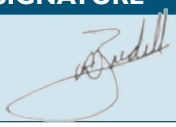
AUTHORISATIONS

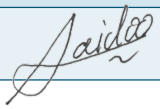
In terms of section 41(4) the Minister hereby approves part of the Protected Area Management Plan for the Walker Bay Complex designated as World Heritage Site (See Table 2.1).

TITLE	NAME	SIGNATURE	DATE
NATIONAL MINISTER: Forestry, Fisheries and Environment	Ms Barbara Creecy		

In terms of section 41(4) the Member of Executive Council (MEC) hereby approves part of the Protected Area Management Plan for the Walker Bay Complex designated as State Land, Provincial Nature Reserve, and Provincial Island Nature Reserve (everything not included above – see Table 2.2).

TITLE	NAME	SIGNATURE	DATE
PROVINCIAL MINISTER: Department of Environmental Affairs and Development Planning	Mr Anton Bredell		22/02/2024

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 MEC and Minister.

ACKNOWLEDGEMENTS

CapeNature would like to thank everybody who participated and had input in the formulation of the Walker Bay Complex management plan.

The Walker Bay Complex management plan was prepared by the core reserve management planning team consisting of Daleen Burger, Vicki Hudson, Johan Burger, Danielle Bowen, and Andrae Marais. The planning team was supported with inputs from various internal and external partners.

A special word of thanks to colleagues from within CapeNature for their significant contributions.

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The authors would also like to express their gratitude to the South African Weather Service for supplying climatic information.

Dr Antoinette Veldtman (Landscape Ecologist – Landscape Central: Conservation Operations, CapeNature) is thanked for the internal review.

Mr Tierck Hoekstra (Emeritus Regional Manager, CapeNature) is thanked for the external review.

Cover page images courtesy of Daleen Burger.

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GLOSSARY

Derived from: Conservation Measures Partnership 2020; SANParks.

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 Conservation Standards explicitly bring adaptive management principles into conservation practice.
Conservation Target	An element of biodiversity (natural target) or heritage (cultural target) 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/value. A good goal meets the criteria of being linked to targets, impact oriented, measurable, time bound and specific.
Heritage Resources	Means any place or object of cultural significance as per the Heritage Resources Act, 1999 (Act No. 25 of 1999).
Human Well-being Value	In the context of a conservation project, human well-being values focus on 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 dependent on the conservation targets
Indicator	A measurable entity related to a specific information need such as the status of a target / 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 measurable, precise, consistent, and sensitive.
Key Ecological Attribute	An aspect of a focal conservation target's biology or ecology that if present, define a healthy conservation target and if missing or altered, would lead to the outright loss or extreme degradation of that focal target over time.
Living Heritage	The intangible aspects of inherited culture which may include: a. cultural tradition; b. oral history; c. performance; d. ritual; e. popular memory; f. skills and techniques; g. indigenous knowledge systems; and h. the holistic approach to nature, society, and social relationships; in terms of the Heritage Resources Act, 1999 (Act No. 25 of 1999).
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 results oriented, measurable, time limited, specific, and practical. 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.

Term	Explanation
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 targets. 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 focal 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

ABI	Agulhas Biodiversity Initiative
BMP	Biodiversity Management Plan
BMP-S	Biodiversity Management Plan for Species
BRUV	Baited Remote Underwater Video
CBA	Critical Biodiversity Area
CDP	Concept Development Plan
CFE	Cape Fold Ecoregion
CFR	Cape Floristic Region
CFRPA	Cape Floral Region Protected Areas
CMP	Conservation Measures Partnership
CoAE	Certificate of Adequate Enclosure
CREW	Custodians of Rare and Endangered Wildflowers
DEA	Department of Environmental Affairs
DEA: O&C	Department of Environmental Affairs: Oceans and Coast
DFFE	Department of Forestry, Fisheries and Environment
DICT	Dyer Island Conservation Trust
DWAF	Department of Water Affairs and Forestry (now Dept of Water and Sanitation)
EIA	Environmental Impact Assessment
EPWP	Expanded Public Works Programme
FEPA	Freshwater Ecosystem Priority Area
FPA	Fire Protection Association
GIS	Geographic Information System
IAPO	Integrated Annual Plan of Operations
ICM	Integrated Catchment Management
IDP	Integrated Development Plan
IUCN	International Union for Conservation of Nature
MEC	Member of Executive Council
METT-SA	Management Effectiveness Tracking Tool - South Africa
MoA	Memorandum of Agreement
MoU	Memorandum of Understanding

MPA	Marine Protected Area
MTEF	Medium-Term Expenditure Framework
NBA	National Biodiversity Assessment
NBAL	Natural Biological Alien Land Cover Attribute
NEM: BA	National Environmental Management: Biodiversity Act
NEM: ICMA	National Environmental Management: Integrated Coastal Management Act
NEM: PAA	National Environmental Management: Protected Areas Act
NFEPA	National Freshwater Ecosystem Priority Area
NGO	Non-Governmental Organisation
NPAES	National Protected Area Expansion Strategy
NRM	Natural Resource Management
NRUG	Natural Resource User Group
OGMS	Overstrand Growth Management Strategy
PAAC	Protected Area Advisory Committee
REDZ	Renewable Energy Development Zones
SABAP	South African Bird Atlas Project
SANBI	South Africa National Biodiversity Institute
SASS	South African Scoring System
SAWS	South African Weather Service
SDF	Spatial Development Framework
SEP	Socio-Economic Profiling
SG	Surveyor-General
SMME	Small, Medium, and Micro-sized Enterprise
SWA	Strategic Water Source Area
TMG	Table Mountain Group
UNESCO	United Nations Educational, Scientific, and Cultural Organisation
WCBSP	Western Cape Biodiversity Spatial Plan
WCPAES	Western Cape Protected Area Expansion Strategy
WIMS **WHS**	Water Information Management System World Heritage Site
WMA	Water Management Area
WoF	Working on Fire

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EXECUTIVE SUMMARY

In compliance with the National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003) and Chapter 4 of the World Heritage Convention Act, 1999 (Act No. 49 of 1999), 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 this management plan for the Walker Bay Complex, CapeNature as the management authority strives to establish biodiversity conservation as a foundation for a sustainable economy, providing ecosystem services, access, and opportunities for all.

An Overview of the Walker Bay Complex

The Walker Bay Complex is approximately 8 645 ha in extent and comprises of the inland land parcels (Babilonstoring State Land, Maanschynkop Provincial Nature Reserve, Salmonsdam Provincial Nature Reserve), the coastal land parcels (Walker Bay State Land, Uilkraalsmond State Land, Pearly Beach State Land, Soetfontein State Land, Quoin Point State Land), and the island land parcels (Dyer Island Provincial Island Nature Reserve, Geyser Island Provincial Island Nature Reserve, and Quoin Rock Provincial Island Nature Reserve). These land parcels are jointly managed by CapeNature from the Walker Bay base station offices located in Voëlklip, Hermanus.

The inland, mountainous land parcels run along the following east-west gradient mountain ranges: Babilonstoring Mountain (Babilonstoring) which is the western mountain range of the Hemel-en-Aarde Valley; Kleinrivier Mountain (Maanschynkop); and Salmonsdam which runs along the Perdeberg Mountain to the north and Tafelberg Mountain to the south. These land parcels are near the towns of Fisherhaven, Hermanus, and Stanford. The various coastal land parcels are separated along the extent of the coast, from Walker Bay at the eastern border of the Kleinrivier, all the way to the eastern boundary of Quoin Point, near Die Dam. Dyer Island lies off the south-western Cape coast. Boat access is possible from Kleinbaai which is approximately 8 km northwest of the island. Geyser Island is a rocky outcrop that lies about 150 m south-west of Dyer Island and is separated by a sandy bottom channel known as Shark Alley. Quoin Rock is located just offshore from the Quoin Point.

The Complex is located within a winter rainfall area, with the mountains receiving higher rainfall than the adjacent low-lying areas and with rainfall decreasing in an easterly direction. The Complex also falls within a Mediterranean climate region, with hot, dry summers from December to March, and mild to cold, wet winters from June to September.

The Complex falls within the Core Cape Subregion (previously termed the Cape Floristic Kingdom) of the Greater Cape Floristic Region. The Core Cape Subregion is divided into seven phytogeographic centres of endemism. The three inland nature reserves are part of the Southwest Centre of Endemism, which contains the highest level of endemism of the seven centres. The five coastal nature reserves are part of the Agulhas Plain Centre of Endemism.

A total of nine different vegetation units occur within the Walker Bay Complex. Of these vegetation units, one is listed as Critically Endangered (Agulhas Limestone Fynbos), four are listed as Endangered (Overberg Dune Strandveld, Overberg Sandstone Fynbos, Western Shale Band Vegetation and Elim Ferricrete Fynbos), and four are listed as Least Concern. Within the Complex, the main vegetation unit occurring within the mountainous, inland land parcels is Overberg Sandstone Fynbos, while Overberg Dune Strandveld dominates the coastal land parcels. The other seven vegetation units occur marginally within the Complex. The Kleinrivier Mountains are known to have rich biodiversity within the Cape Core Subregion, with over 1 500 species records and many species are endemic or near endemic to the range.

The land parcels within the Walker Bay Complex are located within the Overberg West and East sub-Water Management Areas (sub-WMAs) of the recently amalgamated Breede-Gouritz WMA. The freshwater ecosystems of the Complex fall into the Southern Folded Mountains and the Southern Coastal Belt level 1 ecoregions. Furthermore, Babilonstoring, Pearly Beach, Soetfontein, Quoin Point and Maanschynkop fall into the Boland Strategic Water Source Areas (SWAs) for surface water. These protected areas, together with Walker Bay, also fall into the Overberg Region groundwater SWA. They offer an ecosystem service within their catchments in the form of provision of surface and groundwater for local agricultural and urban areas, including the towns of Hermanus, Stanford, Gansbaai, Pearly Beach, and their surrounding areas.

The marine component of the Walker Bay Complex around Dyer Island falls within the Agulhas Shelf ecoregion, which hosts the greatest number of South African endemics, including sparid reef fishes, octocorals and algae. It is a spawning and nursery ground for many species. Dyer Island, Geyser Rock, and Quoin Rock fall within the Benguela Upwelling System, which is one of four major eastern boundary current systems in the southern hemisphere. This ecosystem is one of the most productive areas of ocean in the world. It is characterised by coastal wind-induced upwelling which results in cold, nutrient-rich water being transported to the surface.

Dyer Island Provincial Nature Reserve and Geyser Island Provincial Nature Reserve were designated as a Ramsar Wetland of International Importance site on 29 March 2019. The extent of the Ramsar site corresponds to the sections which are declared as a nature reserve including the 500 m of ocean surrounding the islands extending from the high-water mark, totalling 288 ha in extent. BirdLife International considers Dyer Island Provincial Nature Reserve to be an Important Bird Area in South Africa, as it hosts approximately forty-eight bird species and is the breeding area for twenty-one of these.

Quoin Point is the only component in the Walker Bay Complex which was part of the proposed extension of the Cape Floral Region Protected Areas World Heritage Site. This World Heritage Site extension was proclaimed in Government Gazette 47632 Government Notice 2816, 2 December 2022. Quoin Point State Land is one of seven components that form part of the Agulhas Complex of the CFRPA World Heritage Site extension nomination (IVC 2015). The primary reasons for inclusion of the Agulhas Complex into the extension of the CFRPA World Heritage Site are to increase the number of CFR vegetation types represented in addition to increasing and improving the overall size, connectivity, and integrity of the CFRPA WHS. The Agulhas Complex possesses unique Agulhas Plain habitats and fynbos vegetation. Four of the eight vegetation types are exclusively protected within the Agulhas Complex, which supports a high floral species diversity, endemism (flora and some invertebrate groups), and several threatened floral species, some of which are found in the Quoin Point section of the Agulhas Complex. Quoin Point contains Strandveld vegetation and coastal habitats which contribute to the outstanding universal value of the Walker Bay Complex.

Fire is a major ecological driver in the system and plays an important role in the regeneration of the constituent plant species. Integrated catchment management encompassing both fire and aliens is therefore essential to maintain biodiversity and the provision of ecosystem services. Water generated by the catchments and the projects associated with the conservation management of the areas, provides for significant socio-economic opportunities for the surrounding communities.

Planning, Policy, Implementation, and Review

To develop this management plan, CapeNature applied the Conservation Standards process. The Conservation Standards 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 public at large. 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 conservation targets and human well-being values representative of the protected area, 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.

This management plan provides the basis for the management, development, and operation of the Walker Bay 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 reserve.

Regular reviews are a fundamental step in pursuing the achievement of conservation outcomes. Strategic adaptive management integrates planning, management, and monitoring, and is used to systematically evaluate results, thus enabling management to "change direction" when required. Key to this process is the sharing of results, respectfully, honestly, and transparently to facilitate learning through the critical appraisal of conservation efforts. CapeNature uses an internationally recognised review system, the Management Effectiveness Tracking Tool – South Africa (METT-SA), adopted by the National Department of Forestry, Fisheries, and the Environment (DFFE), 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 Walker Bay Complex in accordance with its organisational vision, and in agreement with the vision, goals and strategies derived through the planning process. The vision of the Complex is:

> *"The Walker Bay Complex, including the World Heritage Site, conserves living landscapes and seascapes, preserves heritage, and promotes eco-tourism through integrated management and partnerships, for the benefit of all."*

Protected area targets include healthy catchments and providing ecosystem services and human well-being benefits. Seven focal conservation targets that incorporate several nested aspects have been identified and prioritised for the Walker Bay Complex for the ten-year period of this management plan. These are:

1. **Fynbos Mosaic**
2. **Freshwater Ecosystems**
3. **Estuarine Functional Zone**
4. **Coastal Ecosystems**
5. **Marine Ecosystems**
6. **Marine Birds**
7. **Heritage**

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; the promotion of local economic development, job creation and skills development; growing diversified nature-based revenue streams; access to environmental education, advocacy and to the natural and cultural heritage. Three focal human well-being values have been identified for the Walker Bay Complex for this ten-year period of this management plan. These include:

1. **Freedom and choice & capacity to act independently within the legislated rules and regulations of the Protected Areas, tourism & nature-based economic opportunities**
2. **Spiritual and physical health & cultural Identity**
3. **Responsible utilisation of natural resources**

Ten goals have been formulated to maintain or enhance the focal conservation targets and human well-being values of the Walker Bay Complex. An asterisk * indicates the availability of detailed information in Section 5.

1. By 2034, the Fynbos Mosaic in the Walker Bay Complex has an ecologically healthy fire regime* and comprises 90-99% indigenous plant species.
2. By 2034, the vegetation units in the Coastal Ecosystem have an ecologically healthy fire regime* and the indigenous species cover of between 50-75% has been maintained.
3. By 2034, all rivers within the Walker Bay Complex are maintained in a healthy state*.

4. By 2034, the Uilkraals and Klein River estuary mouths close temporarily, open naturally, and stay open for 65-95% of the time.
5. By 2034, the population size* and breeding success* of the African Penguin on Dyer Island within the Walker Bay Complex has been managed and maintained through collaboration and partnerships.
6. By 2034, Dyer Island continues to sustain viable populations of priority seabirds* and the extent of characteristic ecosystems* remains stable.
7. By 2034, heritage resources, within the Walker Bay Complex, of cultural significance or other special value are sustainably enhanced, valued* by and of benefit* to visitors and local inhabitants.
8. By 2034, the Walker Bay Complex continues to provide and support job opportunities in partnership with role-players and contribute to economic development and social upliftment in and around the Complex.
9. By 2034, the Walker Bay Complex Environmental Awareness and Interpretation Plan promotes the identified conservation targets and human well-being values.
10. By 2034, the Walker Bay Complex continues to enable access and the sustainable utilisation of indigenous natural resources within the Complex.

Threats

Threats and contributing factors that degrade or destroy the Walker Bay Complex focal conservation targets 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 threats have been determined to have a high and medium impact on the focal conservation targets of the Complex:

1. **Invasive Alien Plant Species**
2. **Inappropriate Fire Regime**
3. **Illegal Abalone Harvesting**
4. **Human Activities & Disturbance**
5. **Vandalism and Weathering**
6. **Poor Water Quality & Excessive Nutrient Load**

To assist the Walker Bay Complex to mitigate and manage threats and contributing factors effectively, both inside and outside the reserve boundaries, the reserve will incorporate spatial planning tools which include the Sensitivity, Zonation and Zone of Influence.

Strategic Plan

A thorough analysis of the Walker Bay Complex's conservation situation, inclusive of the biological, social, economic, cultural, and institutional systems that affect the protected area's focal conservation targets, 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 greatest positive impact towards achieving goals. CapeNature will lead the implementation of the management plan, although achieving the reserve's vision requires coordinated effort between various key external stakeholders. Ten key strategies have been identified to ensure the effective conservation of the Walker Bay Complex. These are:

Strategy 1: Improve the efficiency of the implementation of invasive alien plant eradication through the integration of fire and invasive alien plant management in the Walker Bay Complex.

Strategy 2: Implement an Integrated Fire Management Strategy to maintain an acceptable fire regime in the Walker Bay Complex in consultation with stakeholders and partners to support management decisions.

Strategy 3: Enhance and maintain partnerships for the collaboration and implementation of best practice in the management of terrestrial, marine, and estuarine ecosystems, and for coordinated disaster mitigation and response in the Walker Bay Complex and associated Zone of Influence.

Strategy 4: Develop and implement an integrated monitoring plan for the freshwater ecosystems within the Walker Bay Complex and where necessary investigate partnerships to augment the process.

Strategy 5: Implement an integrated environmental education and awareness plan aimed at neighbours, natural resource users, learner groups, and visitors in collaboration with partners, to nurture respect and care for the natural, cultural, and historical values of the Walker Bay Complex.

Strategy 6: Minimise the degradation of heritage resources within the Walker Bay Complex.

Strategy 7: Facilitate sustainable and responsible development, access, and activities within the Walker Bay Complex in collaboration with relevant partners and stakeholders.

Strategy 8: Contribute to economic and social development by providing job and training opportunities to the Expanded Public Works Programme (EPWP), contract, and small, medium, and micro-sized enterprise (SMME) staff.

Strategy 9: Enhance the monitoring and management of the African Penguin and priority seabirds on Dyer Island to ensure the persistence of the species.

Strategy 10: Promote co-operative governance and legislative compliance by implementing the Walker Bay Integrated Compliance Plan through the inter-governmental and relevant Non-Governmental Organisations relationships that mitigate negative impacts on biodiversity associated with non-compliance with legislation.

1 INTRODUCTION

Towards CapeNature's vision of conserving nature for resilience and sustainability, 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, and
- 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 are dependent upon, and promote, stakeholder engagement and participatory planning in the development of the plan. The framework further requires the incorporation of mechanisms to facilitate stakeholder engagement and participation during operationalisation of the plan.

The Walker Bay 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, and
- Performance indicators and accountability measures that provides for regular review and adaptive management.

2 LEGAL STATUS AND BACKGROUND

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

2.1 Legal Status

2.1.1 Name and Legal Designations

The Walker Bay Complex, in accordance with the terminology as indicated in the declarations of 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), 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), is comprised of:

- Babilonstoring State Land (hereafter referred to as Babilonstoring),
- Maanschynkop Provincial Nature Reserve (hereafter referred to as Maanschynkop),
- Salmonsdam Provincial Nature Reserve (hereafter referred to as Salmonsdam),

- Walker Bay State Land (hereafter referred to as Walker Bay),
- Uilkraalsmond State Land (hereafter referred to as Uilkraalsmond),
- Pearly Beach State Land (hereafter referred to as Pearly Beach),
- Soetfontein State Land (hereafter referred to as Soetfontein),
- Quoin Point State Land (hereafter referred to as Quoin Point),
- Dyer Island Provincial Island Nature Reserve (hereafter referred to as Dyer Island),
- Geyser Island Provincial Island Nature Reserve (hereafter referred to as Geyser Island), and
- Quoin Rock Provincial Island Nature Reserve (hereafter referred to as Quoin Rock).

Apart from the declaration of Quoin Point as a WHS, there have not been any further proclamations for the Complex since the NEM: PAA, 2003 (Act No. 57 of 2003) was promulgated, however this Act takes precedence over the former mentioned legislation with regards to protected areas, and all nature reserves are therefore considered to be nature reserves in terms of NEM: PAA.

The Protected Areas Register held by DFFE reflects the five provincial nature reserves listed above, with the other components indicated on the map, but not assigned a status. The Pearly Beach, Soetfontein, Quoin Point and Quoin Rock land parcels are indicated as within the 10 km buffer of the Agulhas National Park and the Dyer Island and Geyser Island Ramsar Site are also reflected (refer to Section 2.1.5 for more detail).

Quoin Point forms part of the 2015 extension to the CFRPA World Heritage Site (WHS), inscribed by United Nations Educational, Scientific, and Cultural Organisation (UNESCO), and proclaimed in terms of the World Heritage Convention Act, 1999 (Act No. 49 of 1999) in the Government Gazette 47632 Government Notice 2816 on the 2nd of December 2022. According to NEM: PAA, WHSs are deemed to be one of the types of protected areas in South Africa, however WHSs are governed by the World Heritage Convention Act, 1999 (Act No. 49 of 1999).

The outstanding universal value of the CFRPA WHS, including both the existing inscribed WHS and extension can be briefly summarised as follows (IVC 2015): "The Cape Floristic Region (CFR) is a highly distinctive phytogeographic unit which is regarded as one of the six Floral Kingdoms of the world and is by far the smallest and relatively the most diverse. It is also recognised as the worlds "hottest hotspot" for its diversity of endemic plants and contains outstanding examples of significant ongoing ecological, biological, and evolutionary processes. It also has some of the most important natural habitats for in-situ conservation of biological diversity." The criteria for WHS status which the CFRPA extension meets are (IVC 2015):

- Criterion (ix): Outstanding examples representing significant on-going ecological and biological processes in the evolution and development of terrestrial ecosystems and communities of plants and animals; and
- Criterion (x): Contain the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science and conservation.

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

Table 2.1: Land parcels that make up the Walker Bay Complex and their status.

Title Deed	Farm Name	Farm No.	Portion No.	Extent (ha)	Registration Division	SG Code	Landowner	Proc. Date	Proc. No.	Govt. Gazette	Status
Quoin Point Cluster: Land parcels that comprise World Heritage Sites inscribed in 2015.											
Unallocated State Land	Forest Reserve	301	Portion 0	42.61	Bredasdorp	C01100000000030100000	Republic of South Africa	N/A	N/A	N/A	State Land
Unallocated State Land	Forest Reserve	303	Portion 0	15.64	Bredasdorp	C01100000000030300000	Republic of South Africa	N/A	N/A	N/A	State Land
Unallocated State Land	Place of Public Resort	304	Portion 0	49.93	Bredasdorp	C01100000000030400000	Republic of South Africa	N/A	N/A	N/A	State Land
T8057/1965	Farm 305	305	Portion 0	713.80	Bredasdorp	C01100000000030500000	Republic of South Africa	N/A	N/A	N/A	State Land
Unallocated State Land	Farm 305	305	Portion 1	188.89	Bredasdorp	C01100000000030500001	Republic of South Africa	N/A	N/A	N/A	State Land
Unallocated State Land	Quoin Point Sands Forest Reserve	306	Portion 0	113.02	Bredasdorp	C01100000000030600000	Republic of South Africa	20 May 1895	525	7714	State Land released from State Forest
G146/1956	Quoin Point Sands Quoinlig	307	Portion 0	0.09	Bredasdorp	C01100000000030700000	Transnet LTD	N/A	N/A	N/A	State Land
Land parcels that do not comprise World Heritage Site											
Babilonstoring State Land:											
Unallocated State Land	Paarde Poort	539	Portion 0	785.043	Caledon	C01300000000053900000	Republic of South Africa	01 March 1940	322 of 1940	2738	State Land released from State Forest
Maanschynkop Provincial Nature Reserve:											
T4916/1990	Paddas Gat	590	Portion 1	353.7394	Caledon	C01300000000059000001	Republic of South Africa	07 September 1990	60 of 1990	4659	Provincial Nature Reserve
T4915/1990	Farm 590	590	Portion 2	12.2411	Caledon	C01300000000059000002	Republic of South Africa	07 September 1990	60 of 1990	4659	Provincial Nature Reserve
T14080/1980	Vogel Gat	592	Remainder	417.9662	Caledon	C01300000000059200000	PGWC*	07 September 1990	60 of 1990	4659	Provincial Nature Reserve
Salmonsdam Provincial Nature Reserve:											
T56315/2013	Farm 665	665	Portion 0	415.3605	Caledon	C01300000000066500000	PGWC*	09 March 1990	20 of 1990	4632	Provincial Nature Reserve
T56315/2013	Annex Paardeberg	666	Portion 2	90.7109	Caledon	C01300000000066600002	PGWC*	09 March 1990	20 of 1990	4632	Provincial Nature Reserve
T56315/2013	Farm 667	667	Portion 3	110.0037	Caledon	C01300000000066700003	PGWC*	09 March 1990	20 of 1990	4632	Provincial Nature Reserve

Title Deed	Farm Name	Farm No.	Portion No.	Extent (ha)	Registration Division	SG Code	Landowner	Proc. Date	Proc. No.	Govt. Gazette	Status
T56315/2013	Farm 731	731	Portion 1	96.1005	Caledon	C01300000000073100001	PGWC*	09 March 1990	20 of 1990	4632	Provincial Nature Reserve
Walker Bay State Land:											
Unallocated State Land	Schildpadsfontein Fishery	441	Portion 0	148.3401	Caledon	C01300000000044100000	Republic of South Africa	N/A	N/A	N/A	State Land
T27577/1965	Walkers Bay	713	Portion 0	3297.9623	Caledon	C01300000000071300000	Republic of South Africa	N/A	N/A	N/A	State Land
Unallocated State Land	Walkers Bay Forest Reserve	724	Portion 0	151.7390	Caledon	C01300000000072400000	Republic of South Africa	N/A	N/A	N/A	State Land
Uilkraalsmond State Land:											
T8719/1963	Sand Down Estate	220	Portion 1	207.2188	Bredasdorp	C01100000000022000001	Republic of South Africa	N/A	N/A	N/A	State Land
Unallocated State Land	Duine Fontein Sands Forest Reserve	221	Portion 0	412.578	Bredasdorp	C01100000000022100000	Republic of South Africa	N/A	N/A	N/A	State Land
T29169/1970	Klipdam Downs	222	Portion 3	40.003	Bredasdorp	C01100000000022200003	Republic of South Africa	N/A	N/A	N/A	State Land
T14304/1963	Klipdam Downs	222	Portion 4	47.748	Bredasdorp	C01100000000022200004	Republic of South Africa	N/A	N/A	N/A	State Land
T14304/1963	Klipdam Downs	222	Portion 5	45.611	Bredasdorp	C01100000000022200005	Republic of South Africa	N/A	N/A	N/A	State Land
Unallocated State Land	Farm 706	706	Portion 0	47.045	Caledon	C01300000000070600000	Republic of South Africa	N/A	N/A	N/A	State Land
Pearly Beach State Land:											
T26643/1968	Hagelkraal	318	Portion 1	301.989	Bredasdorp	C01100000000031800001	Republic of South Africa	N/A	N/A	N/A	State Land
T26043/1980	Kleyn Hagel Kraal	321	Portion 6	85.610	Bredasdorp	C01100000000032100006	Republic of South Africa	N/A	N/A	N/A	State Land
T30967/1969	Kleyn Hagel Kraal	321	Portion 19	239.605	Bredasdorp	C01100000000032100019	Republic of South Africa	N/A	N/A	N/A	State Land
Soetfontein State Land:											
Unallocated State Land	Buffel Jagt Sands	311	Portion 0	75.77	Bredasdorp	C01100000000031100000	Republic of South Africa	28 May 1895	525 of 1895	7714	State Land released from State Forest
Dyer Island Provincial Island Nature Reserve											
Unallocated State Land	Dyer Island Nature Reserve	1018	Portion 0	182.065	Bredasdorp	N/A	Republic of South Africa	18 March 1988	23 of 1988	4524	Provincial Island Nature Reserve
Geyser Island Provincial Island Nature Reserve											
N/A	Geyser Island Nature Reserve			107.465	Bredasdorp	N/A	Republic of South Africa	18 March 1988	23 of 1988	4524	Provincial Island Nature Reserve
Quoin Rock Provincial Island Nature Reserve											
Unallocated State Land	Quoin Rock Island Nature Reserve			0.510	Bredasdorp	N/A	Republic of South Africa	18 March 1988	23 of 1988	4524	Provincial Island Nature Reserve

In the table above, all state land released from state forest needs to be reserved for the Western Cape Government to be declared as provincial nature reserves.

2.1.2 Contractual Agreements

CapeNature contractual agreements with non-governmental organisations (NGO's) and Government Departments for the Walker Bay Complex are as follows:

- Memorandum of Agreement with the Department of Forestry, Fisheries and the Environment: Oceans and Coast (DFFE: O&C) regarding the management of Dyer Island as a seabird breeding site by CapeNature for the period November 2022 – November 2027.
- Memorandum of Understanding (MoU) (October 2021) with the NGO, Dyer Island Conservation Trust (DICT), to support CapeNature with the management functions of Dyer Island.
- MoU with the NGO, Southern African Foundation for the Conservation of Coastal Birds (SANCCOB), to support CapeNature with the management functions of Dyer Island.
- Grootbos Foundation have signed a MoU for a two-year period based on a trade exchange proposal. Annual tourism hospitality training will be provided to CapeNature staff by Grootbos in exchange for a discounted entrance fee for Grootbos guests entering Walker Bay. This MoU includes invasive alien plant clearing by a team supplied and managed by Grootbos on 936 hectares in the Walker Bay.
- Lease agreement with Southern Cape Fire Protection Association (FPA) to lease property situated at the Walker Bay Nature Reserve office located in Hermanus, in the form of office space for the Working on Fire (WoF) teams. The WoF teams utilise the office space as a base from where they are activated and operate within the larger Overberg landscape and beyond as necessary. This lease agreement is typically renewed every three years.
- The WoF MoA with CapeNature was renewed in August 2023. This agreement allows for integrated fire management across the landscape through the planning, supervision and control of firefighting teams and associated resource allocation. It puts suitably trained teams in appropriate working environments in place according to both party's Best Operating Practices, Standard Operating Guidelines, Standard Operating Procedures, policies, standards and procedures.
- Contract with the Government through the 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 new contract period commenced on 01 April 2022 and will be running for a three-year period.

2.1.3 Location, Extent, and Highest Point

The Walker Bay Complex is situated in the Western Cape, South Africa. It is approximately 8 645 ha in extent and situated between latitudes 34° 18.6' S and 34° 47.4' S, and longitudes 19° 12.6' E and 19° 43.8' E. The Complex is comprised of three mountain land parcels (Babilonstoring, Maanschynkop, and Salmonsdam), five coastal land parcels (Walker Bay, Uilkraalsmond, Pearly Beach, Soetfontein, and Quoin Point), two island land parcels (Dyer Island and Geyser Island), and one rock known as Quoin Rock.

The inland, mountainous land parcels run along the following east-west gradient mountain ranges: Babilonstoring Mountain (Babilonstoring) which is the western mountain range of the Hemel-en-Aarde Valley; Kleinrivier Mountain (Maanschynkop); and Salmonsdam run along the Perdeberg Mountain to the north and Tafelberg Mountain to the south. These are near the towns of Fisherhaven, Hermanus, and Stanford.

The mountain land parcels are respectively surrounded by the R43, R321, and R326. Babilonstoring is accessible from the R43, between Fisherhaven and the R44 turn-off, via the Karwyderskraal road and leading through private property, Diepekloof, into the reserve. Access to Maanschynkop is provided via the R321, running through the Hemel-en-Aarde Valley, and Diepgat Farm turn-off. Salmonsdam is accessible via the R326, from Stanford, and the Modderivier turn-off on the western side of the reserve.

The coastal land parcels extend along the coast with Walker Bay stretching 17 km from the eastern border of the Kleinrivier at Le Bos to De Kelders near Gansbaai, with the town of Stanford to the east. Uilkraalsmond lies between the Uilkraalsmond lagoon and the town of Pearly Beach. Pearly Beach lies along the coast between the town of Pearly Beach and Bantamsklip, while

Soetfontein is located between Bantamsklip and Celt Bay. Quoin Point stretches from the western point of the Hoewalle beach to just after Dirk se Klip, near Die Dam.

The coastal sections are all accessible from the north via the R43.

Dyer Island is approximately 20 ha in size and lies 4 km offshore from Kleinbaai. The island reserve is accessible only by boat via the Kleinbaai slipway in Gansbaai.

The highest peak, Babilonstoring trig beacon 2, situated on the most eastern point of the Babilonstoring land parcel is 1 167.5 metres above sea level. Maanskynkop trig beacon 28, situated in the south-eastern section, is the highest peak of the Maanschynkop at 963.7 metres above sea level. Perdeberg trig beacon 123, situated on the north-western boundary of the Salmonsdam, is the highest peak in the reserve at 635.9 metres above sea level.

The highest points for Walker Bay, Uilkraalsmond, Pearly Beach, Soetfontein, and Quoin Point are respectively 189, 56.2, 50, 15, and 45 metres above sea level.

The location and extent of the Walker Bay Complex is illustrated in Appendix 1, Map 1.

2.1.4 Municipal Jurisdiction

The Walker Bay Complex is situated within the following district and local municipal boundaries (Appendix 1, Map 1):

- Overberg District Municipality:
  - Overstrand Local Municipality
  - Theewaterskloof Local Municipality

2.1.5 International, National, and Provincial Listings

UNESCO World Heritage Site:

Quoin Point is the only component in the Walker Bay Complex which is part of the extension nomination of the CFRPA WHS. World Heritage Sites are governed by the World Heritage Convention Act, 1999 (Act No. 49 of 1999). The existing CFRPA WHS inscribed in July 2004 comprised of a serial property of eight initial protected areas covering a total area of approximately 557 584.19 ha. In 2015, the extension nomination, comprised of 150 components (within thirteen clusters of Protected Areas) covering 537 157.31 ha, was approved by UNESCO. The extension includes a buffer zone of 798 513.85 ha, designed to facilitate functional connectivity, and mitigate the effects of global climate change and other anthropogenic influences (IVC 2015; IUCN 2015; WHC 2015). The public consultation for declaration of the extension in terms of the World Heritage Convention Act (Act No. 49 of 1999) was gazetted for public comment on 26 February 2021 (Government of South Africa 2021). The World Heritage Site extension was proclaimed in Government Gazette 47632 Government Notice 2816, 2 December 2022

Quoin Point is one of seven components that formed part of the Agulhas Complex of the CFRPA WHS extension nomination (IVC 2015). The primary reason for inclusion of the Agulhas Complex into the extension of the CFRPA WHS was to increase the number of CFR vegetation types represented, in addition, to increasing and improving the overall size, connectivity, and integrity of the CFRPA WHS. The Agulhas Complex possesses unique Agulhas Plain habitats and fynbos vegetation. Four of the eight vegetation types are exclusively protected within the Agulhas Complex, boasting a high floral species diversity, endemism (flora and some invertebrate groups), and several threatened floral species, although not all are found in the Quoin Point section of the Agulhas Complex (IVC 2015). Quoin Point contains Strandveld vegetation and coastal habitats which contribute to the outstanding universal value of the Walker Bay Complex.

RAMSAR Site:

Dyer Island Provincial Nature Reserve and Geyser Rock Provincial Nature Reserve were designated as a Ramsar Wetland of International Importance site on 29 March 2019. The extent of the Ramsar site corresponds to the sections which are declared

as a nature reserve including the 500 m of ocean surrounding the islands extending from the high-water mark, totalling 288 ha in extent (Ramsar 2019).

The criteria met for which Dyer Island and Geyser Island are eligible as a Ramsar site are as follows (Ramsar 2019):

- Criterion 2: Rare species and threatened ecological communities,
- Criterion 3: Biological diversity,
- Criterion 4: Support during critical life cycle stage or in adverse conditions,
- Criterion 5: > 20 000 waterbirds,
- Criterion 6: >= 1% of the global population of a waterbird species, and
- Criterion 7: Significant and representative fish.

There are ten bird species, thirteen fish species (including the shark species), two invertebrate species and one mammal species which specifically contribute to the above criteria.

Waterfowl species for which the criterion of "1% of the individuals of the global population are regularly present at the site" include the African Penguin (*Spheniscus demersus*), Cape Cormorant (*Phalacrocorax capensis*), Crowned Cormorant (*Phalacrocorax coronatus*), Swift Tern (*Sterna bergii*), and Roseate Tern (*Sterna dougallii*). BirdLife International considers Dyer Island to be an Important Bird Area in South Africa, as it hosts approximately forty-eight bird species and is the breeding area for twenty-one of these species (Ramsar 2019).

2.2 Biophysical Description

2.2.1 Climate

The Walker Bay Complex falls within the winter-rainfall zone of South Africa, and in a Mediterranean climate region, with hot, dry summers from December to March, and mild to cold, wet winters from June to September.

The mean daily maximum and minimum temperatures, for the five coastal areas, increases slightly from the west to the east of the Complex. For example, in Hermanus (North-western section of the Complex) it is cooler in winter with an average minimum monthly temperature going as low as 11°C, while temperatures below 10°C are not uncommon (Figure 2.1). Whereas temperatures at Die Dam (most South-easterly section of the Complex), have slightly higher average minimum monthly temperatures at 12°C, and slightly lower average maximum monthly temperatures (Mucina & Rutherford 2006).

During spring (September to December) the temperatures gradually increase into the summer months, providing warm to hot days with average maximum monthly temperatures around 23°C (Hermanus) and 22°C (Die Dam), while extreme temperatures above 30°C may occur. Figure 2.1 and Figure 2.2 indicates the average maximum and minimum monthly temperatures recorded for Hermanus and Die Dam, respectively.

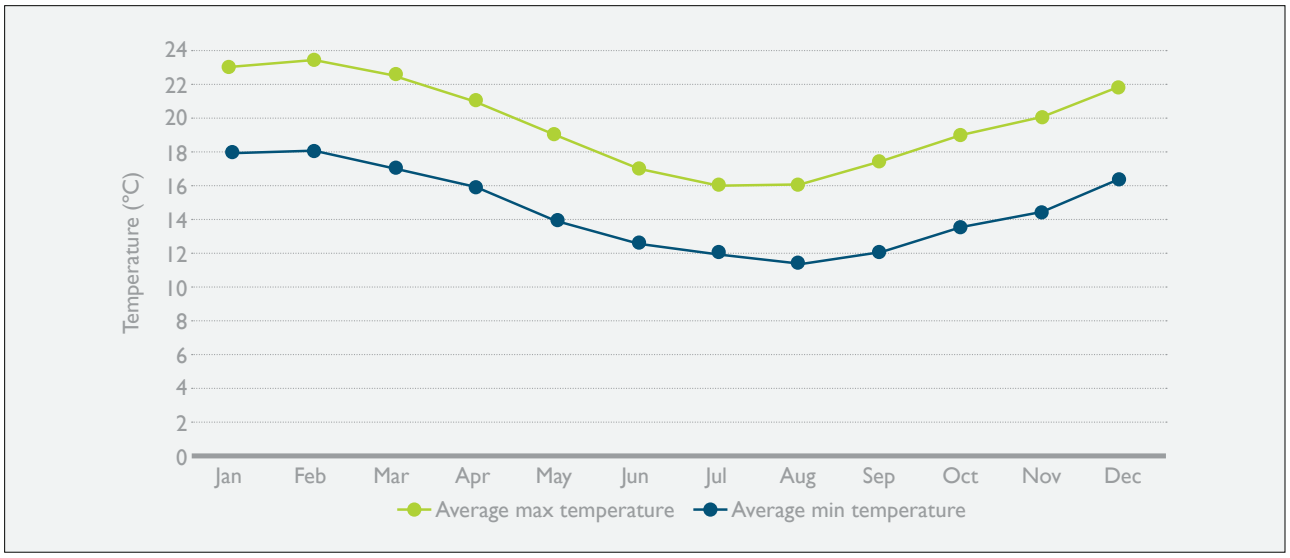


Figure 2.1: Average maximum and minimum monthly temperature for Hermanus for the period 2009-2020 (CapeNature 2021a, unpublished data).

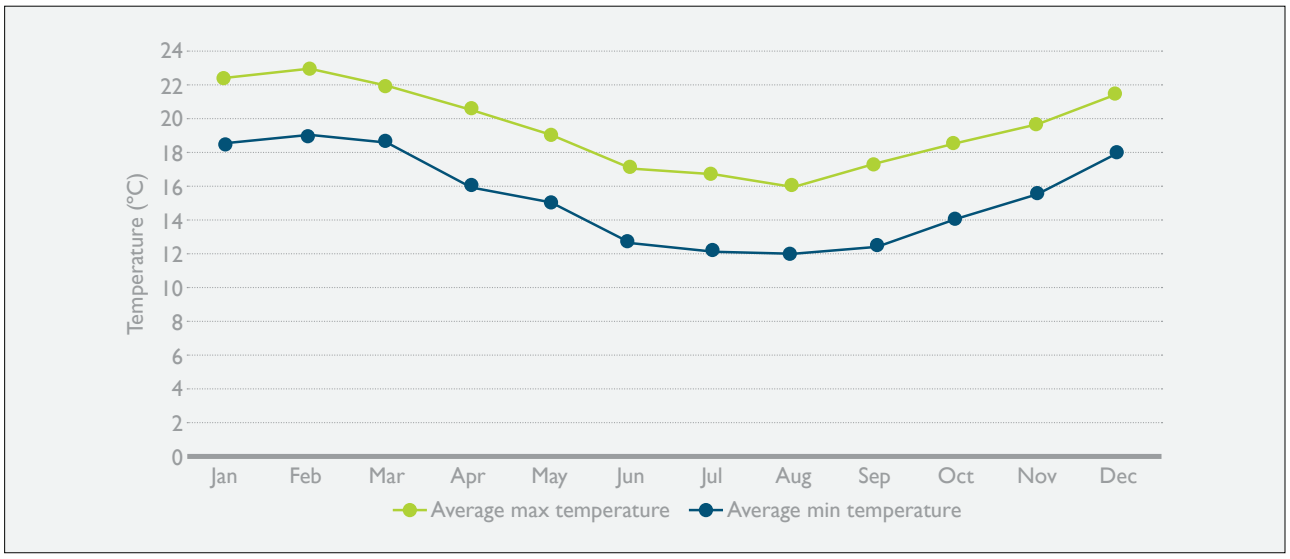


Figure 2.2: Average maximum and minimum monthly temperatures for Die Dam for the period 2009 – 2020. Data obtained from WorldWeatherOnline (2021, unpublished data).

The mountainous inland areas experience higher mean annual precipitation, especially during the winter months (May to August). During the summer months, at higher altitudes, the eastern and southern slopes obtain mist precipitation by south-easterly clouds. The incidence of frost may be for two to three days per year (Mucina & Rutherford 2006).

The five coastal land parcels experience cyclonic rainfall, mainly in winter, which varies from approximately 400 mm in the east to 600 mm in the west. Strong north-westerly winds and cooler temperatures are associated with the winter rainfall. In turn, during the summer months strong south-westerly winds occur. Frost occurs infrequently along the coast, with occasional occurrences of hail. During autumn and winter, occurrences of dense mist banks are found throughout the Overberg region (Mucina & Rutherford 2006).

The mean annual rainfall recorded at the Walker Bay base station is 621 mm per annum over the last 10-year period (2011-2020), but data indicates that there is considerable variability in annual rainfall (Figure 2.3). In 2013, a total of 913 mm was recorded, whereas during the drought period which started in 2015, a total of 447 mm was recorded. During the period from 2016-2019, the mean annual rainfall ranged from 556 mm to 575 mm. Total annual rainfall is also seen slightly decreasing over the reporting period (Figure 2.3). Climate change could disrupt rainfall patterns throughout the winter-rainfall regions which is expected to hold negative consequences for many endemic species.

Dyer Island and Geyser Island lie within the Atlantic Ocean, which is characterised by cold seawater and frequent upwelling events. This area is influenced by the occasional eddies of the Agulhas Current, but the water remains cold. The precipitation on the islands is for the most part, the same as that of the coastal land parcels (Mucina & Rutherford 2006).

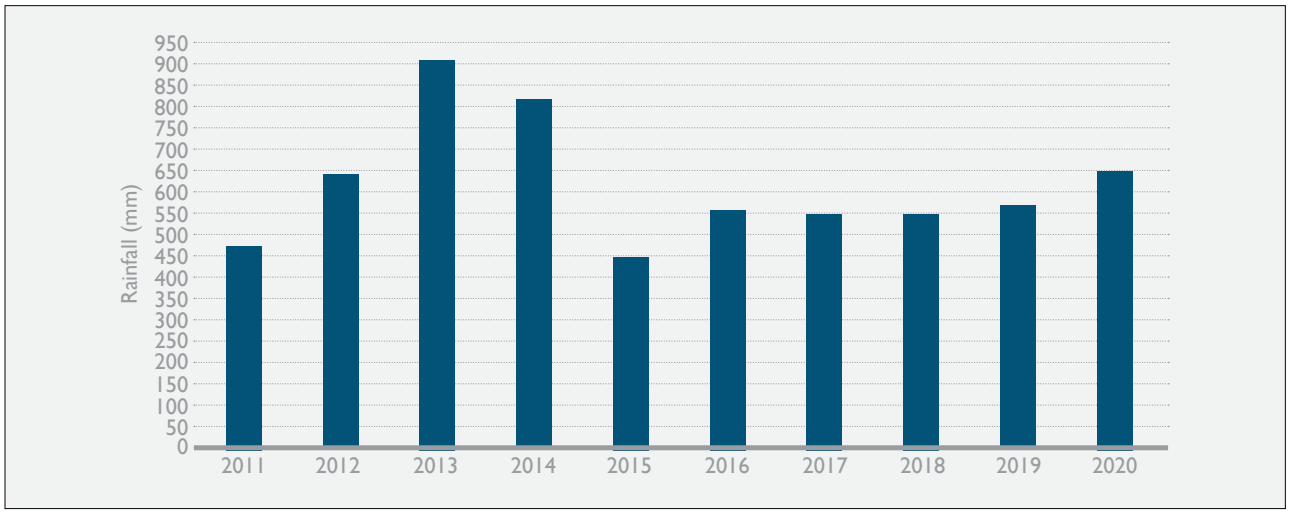


Figure 2.3: Total annual rainfall for the Walker Bay office weather station in Hermanus for the period 2011 -2020 (CapeNature 2021a, unpublished data).

The mean annual rainfall recorded at the Die Dam station, located on the eastern boundary of Quoin Point land parcel, is 688 mm per annum over the last 10-year period (2011-2020) but data indicates that there is considerable variability in annual rainfall. In 2013, a total of 1005 mm was recorded, whereas in 2017 and 2019 only 498 mm and 497 mm was recorded, respectively. Total annual rainfall is seen decreasing considerably over the reporting period (Figure 2.4).

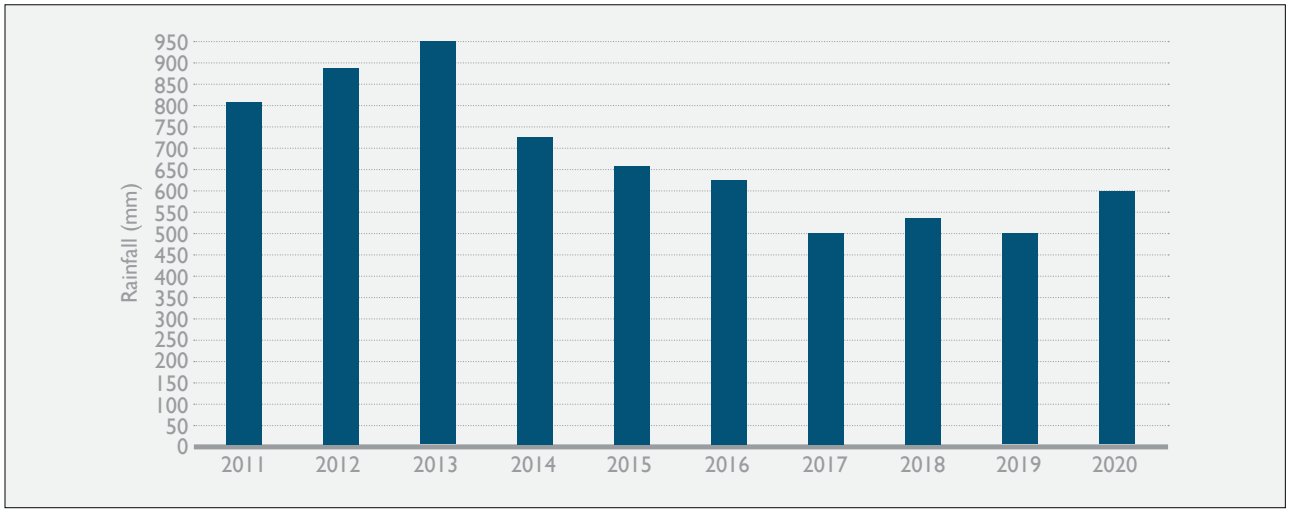


Figure 2.4: Total annual rainfall for the Die Dam station for the period 2011 – 2020 (South African Weather Service 2020, unpublished data).

The average monthly rainfall recorded at the Hermanus base station indicates a distinct peak during June-August. Due to summer rainfall events during the reporting period, a higher-than-average rainfall was experienced for the month of January (2014 - 158,10 mm; 2017 - 57,00 mm; 2020 - 126,9 mm), October (2012 - 118,5 mm; 2013 - 77,5 mm; 2019 - 119,00 mm; 2020 - 52,3 mm), and November (2013 - 178,2 mm; 2017 - 81,5 mm; 2020 - 58,6 mm) (Figure 2.5).

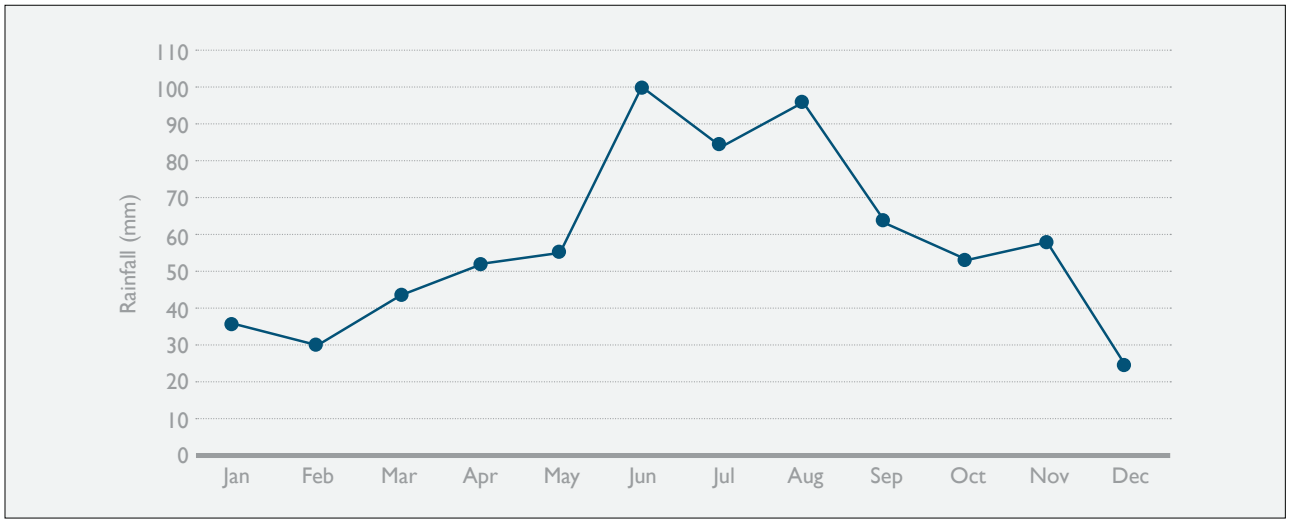


Figure 2.5: Average monthly rainfall for the Walker Bay office weather station for the period 2011 – 2020 (CapeNature 2021a, unpublished data).

The average monthly rainfall recorded at the Die Dam station indicates a distinct peak during June-August, with a decrease in July. Rainfall data compared between the Walker Bay base station and the Die Dam station indicates an increase in monthly average rainfall from the west to the east. Due to the location of the Die Dam station, the increase in rainfall during the summer (except for January), autumn, and spring months, can be attributed to the cloudy coastal conditions. Summer rainfall events during the reporting period, were experienced during the months of January (2014 - 65,27 mm; 217 - 46,78 mm), March (2012 - 77,3 mm; 2016 - 77,65 mm; 2019 - 61,3 mm), and November (2011 - 70,00 mm; 2013 - 156,5 mm; 2014 - 71,81 mm; 2015 - 54,14 mm; 2017 - 71,9 mm) (Figure 2.6).

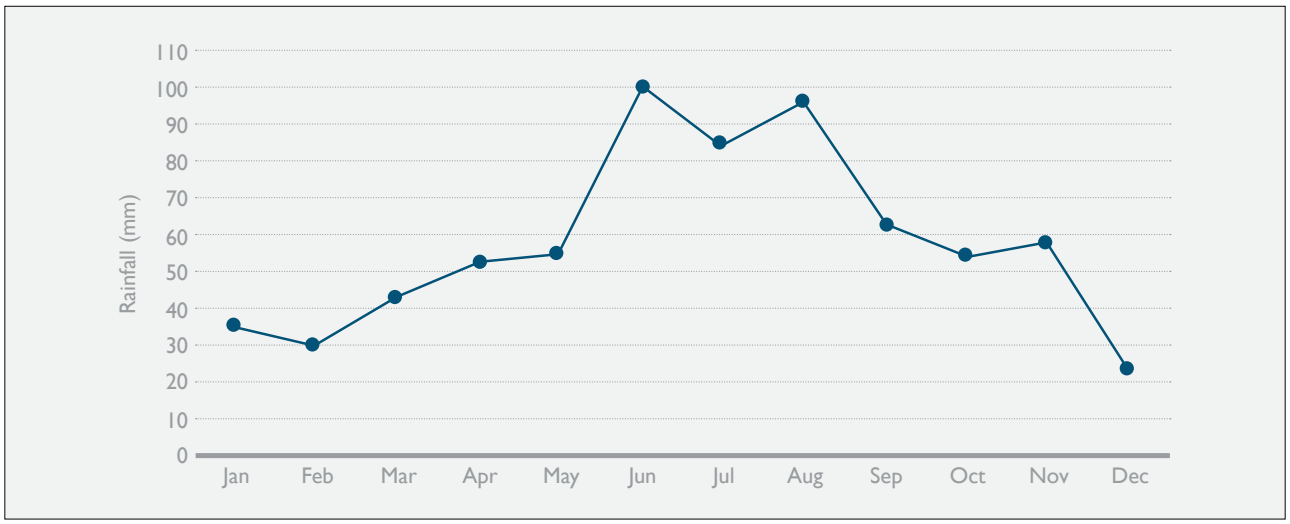


Figure 2.6: Average monthly rainfall for the Die Dam station for the period 2011 – 2020 (South African Weather Service 2020, unpublished data).

2.2.2 Topography

The Overstrand, within which the Walker Bay Complex is situated, is comprised of three different landscape types, namely the mountains, foothills, and coastal terrace. The first landscape, within which Babilonstoring, Maanschynkop, and Salmonsdam are found, is mountainous, with cliffs and steep slopes. The foothills consist mainly of rolling and gentle slopes, where agriculture mainly takes place due to the productive soils. Lastly, the coastal terrace, is generally flat with localised coastal dunes and dune fields, cliffs, caves, estuaries, and lagoons (OHLG 2009).

Babilonstoring is situated on the northern slopes of the rugged mountains of the Babilonstoring Mountain range, which forms part of the Cape Fold Belt. Running in a north-eastern direction for 17,6 km, the mountain range is characterised by high mountain peaks with steep cliffs on the southern aspect leading into the upper Hemel-en-Aarde Valley, while the northern slopes gently lead into the Theewaterskloof municipal area. The highest peak in this mountain range is Babilonstoring at 1167 metres above sea level (Mucina & Rutherford 2006).

Maanschynkop is situated on the Kleinrivier Mountain range, which also forms part of the Cape Fold Belt. The Kleinrivier Mountain range runs in a west-east direction and stretches from the eastern edge of Hermanus through to the Akkedisberg Pass. The mountain range is also characterised by south-facing cliffs which lead into the coastal plains, while the northern slopes gently lead into the Hemel-en-Aarde Valley. The highest peak is Maanschynkop at 963.7 metres above sea level (Mucina & Rutherford 2006).

Figure 2.7: The topography of the Babilonstoring within the Walker Bay Complex. Photo: D. Burger.

Salmonsdam is characterised by low mountains, undulating hills and is situated along the western section of the Perdeberg Mountain to the north and Tafelberg Mountain to the south.

Figure 2.8: The topography of the Salmonsdam within the Walker Bay Complex. Photo: D. Burger.

The valley of the Paardensberg River is located within this nature reserve which feeds into the Uilkraals River. The highest peak, which is located just outside of the reserve boundary, is Akkedisberg at 635.9 metres above sea level (Mucina & Rutherford 2006).

Walker Bay is characterised by flat or slightly undulating dune fields, rocky headlands, calcrete overhangs, and sandy beaches stretching for 17 km from the eastern boundary of the Kleinrivier Estuary to the western edge of the town of De Kelders. The elevation of Walker Bay varies from 5 to 189 metres above sea level (De Decker 1989; Bristow 1991; Mucina & Rutherford 2006).

Figure 2.9: The topography of the Walker Bay within the Walker Bay Complex. Photo: D. Burger.

Uilkraalsmond, Pearly Beach, Soetfontein, and Quoin Point are characterised by flat or slightly undulating dune fields, shifting coastal dunes, dune slacks, and beaches. Pearly Beach is also characterised by rugged limestone hills. The elevation for these areas varies from 5 to 56 metres above sea level (Burman 1989; Mucina & Rutherford 2006).

The topography of Dyer Island, Geyser Island, and Quoin Rock is flat and low-lying. Dyer Island is the largest of these and the only one with soil on the surface. Geyser Island is a rocky outcrop which lies 150m to the southwest of Dyer Island. These two islands are separated by a sandy bottom channel known as Shark Alley. Quoin Rock is characterised by granite rocks, which lies off the coast of Quoin Point, and is predominantly inaccessible.

Figure 2.10: The topography of the Dyer Island within the Walker Bay Complex. Photo: D. Burger.

The topography of the Walker Bay Complex is shown in Appendix 1, Map 2.

2.2.3 Geology and soils

Babilonstoring is entirely comprised of the Table Mountain Group (TMG), derived from the Cape Supergroup, which is characterised by quartzitic sandstone (CGS 2012). The quartzitic sandstone was laid down between 510 and 400 million years ago and is the hardest and most erosion resistant layer of the Cape Supergroup. It forms most of the highest and most conspicuous peaks in the Western Cape, as well as the steepest cliffs of the Cape Fold Mountains, despite being the oldest, and therefore, lowermost of the Cape Supergroup sequence (Norman & Whitfield 2006).

Maanschynkop is comprised of both the TMG (approximately 60% of the area) and the Nardouw Subgroup. The Nardouw Subgroup, derived from the TMG, is characterised by quartzitic sandstone with minor shale (CGS 2012). This subgroup comprises the three upper Formations of the TMG.

Salmonsdam is comprised of both the TMG (approximately 70% of the area) and the Tygerberg Formation. The Tygerberg Formation, derived from the Malmesbury Group, is characterised by shale, greywacke, quartzite, and minor volcanic rocks (CGS 2012).

The Bredasdorp Group has been classified by Malan (1990) as "shallow marine and aeolian" and is found within the coastal reserves, namely Walker Bay, Uilkraalsmond, and Pearly Beach. The Bredasdorp Group is further divided into five Formations, namely the De Hoopvlei Formation, Wankoe Formation, Klein Brak Formation, Waenhuiskrans Formation, and the Strandveld Formation. The Strandveld Formation comprises the coastal aeolian deposits, forming extensive coastal dune fields (unconsolidated,

partially vegetated to unvegetated windblown sand), which is still being deposited and making it the youngest formation of the Bredasdorp Group. These Strandveld Formation coastal dune fields occur in Walker Bay, Pearly Beach, and Soetfontein (Malan 1990).

The Quoin Point Cluster is mostly comprised of the TMG (approximately 25% of the area), Bredasdorp Group, and Strandveld Formation.

Dyer Island consists of the Table Mountain sandstone formations which is surrounded by a granite coastline with a few shingle stone beaches. Geyser Island and Quoin Rock is primarily comprised of granite rocks, with Geyser Rock having a small sandy beach on the North facing side (CapeNature 2012).

Two major soil groups, with their associated soil units are represented within the Walker Bay Complex (Table 2.2).

Table 2.2: The major soil groups, and their associated soil units, represented within the Walker Bay Complex.

Soil Group	Soil Unit	Location
Leptosols	Lithic Leptosols	Babilonstoring State Land Maanschynkop Provincial Nature Reserve Salmonsdam Provincial Nature Reserve
Arenosols	Albic Arenosols	Walker Bay State Land Uilkraalsmond State Land Pearly Beach State Land Soetfontein State Land Quoin Point Cluster

The Leptosols group (also called Mispah soil form by the South African soil taxonomic system) consists of very shallow soils over hard rock, or highly calcareous material, but also deeper soils that are extremely gravelly and/or stony (Driessen *et al.* 2001; Jones *et al.* 2013; Strohbach & Kutuahurina 2014). This soil type is characterised by an ochric A-horison over fractured rocks. The ochric A-horison has a brownish black to dark brown moist colour, fine sand to loamy sand texture, slightly to highly alkaline pH, and is well drained. Lithic Leptosols have a low water-holding capacity due to their shallowness (peat layer less than 10 cm deep) and gravelly nature, which also renders them with very limited agricultural potential (Strohbach & Kutuahurina 2014). This group is particularly common in mountain regions (Driessen *et al.* 2001).

The Arenosols group is comprised of sandy soils, which have developed after the weathering of old, quartzite-rich soil material or rock (Driessen *et al.* 2001). Arenosols have a loamy sand or coarser texture, a low amount of rock fragments, and have no diagnostic horisons except for Ochric, Yermic, or Albic horisons. Due to the structure of this soil, and the absence of organic matter, Arenosols have good aeration, rapid drainage, and a low moisture-holding capacity. The Albic Arenosol are characterised as soil consisting of albic material (Driessen *et al.* 2001).

The Geology of the Walker Bay Complex is illustrated in Appendix 1, Map 3.

2.3 Biodiversity Context: Ecosystems

2.3.1 Vegetation

The Walker Bay Complex falls within the Core Cape Subregion (previously termed the Cape Floristic Kingdom) of the Greater Cape Floristic Region (Manning & Goldblatt 2012).

The Core Cape Subregion is one of the world's smallest but richest floral kingdoms, encompassing a land area of approximately 90 760 km^2 (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. Most 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 (two largest families), and Iridaceae, Aizoaceae, Ericaceae, Proteaceae, and Restionaceae (Manning & Goldblatt 2012). The Core Cape Subregion is notable for its array of ecosystems ranging from coastal foredunes through strandveld, lowland and mountain fynbos.

The Core Cape Subregion is divided into seven phytogeographic centres of endemism which are delimited by high numbers of plant species endemic to each centre (Goldblatt & Manning 2000). The three inland nature reserves are part of the Southwest Centre of Endemism, which contains the highest level of endemism of the seven centres of endemism. The five coastal nature reserves are part of the Agulhas Plain Centre of Endemism.

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 2.3). 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 most 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).

A threat status is provided for each ecosystem (see Table 2.3). Ecosystem threat statuses are provided in the most recent National Biodiversity Assessment (SANBI 2019). Following the completion of the National Biodiversity Assessment in 2018 the red list of terrestrial ecosystems was updated in 2021 based on recent national and provincial land cover data and threatened species data (see Skowno and Monyeki 2021; RSA 2022, Notice 2747, Government Gazette 47526).

The vegetation of the Complex has been mapped nationally at a 1:1 000 000 scale (Mucina & Rutherford 2006; SANBI 2006). The original 2006 national vegetation map (Mucina & Rutherford 2006) 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 this publication a total of nine different vegetation units occurs within the Walker Bay Complex. These are listed in Table 2.3 and illustrated in Appendix 1, Map 4.

The vegetation of the Walker Bay Complex is categorised as follows:

- Fynbos Biome: Agulhas Limestone Fynbos; Elim Ferricrete Fynbos; Overberg Dune Strandveld; Overberg Sandstone Fynbos; Western Coastal Shale Band Vegetation
- Azonal Vegetation Biome: Cape Seashore Vegetation; Cape Estuarine Salt Marshes
- Forest Biome: Southern Afrotemperate Forest; Southern Coastal Forest (Western Cape Milkwood Forests)

Of these vegetation units, one is listed as Critically Endangered (Agulhas Limestone Fynbos), four are listed as Endangered (Overberg Dune Strandveld, Overberg Sandstone Fynbos, Western Coastal Shale Band Vegetation and Elim Ferricrete Fynbos), and four are listed as Least Concern (Cape Estuarine Salt Marshes; Cape Seashore Vegetation; Southern Afrotemperate Forest and Southern Coastal Forest).

Within the Complex, the main vegetation unit occurring on Babilonstoring, Maanschynkop, and Salmonsdam is Overberg Sandstone Fynbos, while Overberg Dune Strandveld dominate the coastal sections (Walker Bay, Uilkraalsmond, Pearly Beach, Soetfontein, and Quoin Point). The other seven vegetation units occur marginally within the Complex (Table 2.3).

Table 2.3: Vegetation types conserved by the Walker Bay Complex and their threat status according to Skowno and Monyeki (2021).

Vegetation Unit	WC Provincial Protection Target (ha)	Ha conserved in Walker Bay Complex	% of WC Target conserved in Walker Bay Complex	Ecosystem Status (2021)
Agulhas Limestone Fynbos	79 389.72	6.25	0.008	Critically Endangered
Overberg Dune Strandveld	34 734.57	5 988.73	17.24	Endangered
Elim Ferricrete Fynbos	69 365.09	142.82	0.21	Endangered
Cape Estuarine Salt Marshes	35 918.63	17.99	0.06	Least Concern
Cape Seashore Vegetation	22 101.69	158.83	0.72	Least Concern
Overberg Sandstone Fynbos	117 909.55	1 316.04	1.12	Endangered
Southern Afrotemperate Forest	77 557.85	6.82	0.009	Least Concern
Southern Coastal Forest	18 614.45	12.04	0.06	Least Concern
Western Coastal Shale Band Vegetation	165.09	27.43	16.62	Endangered

The Complex supports at least 661 different plant species (CapeNature State of Biodiversity 2019). The number of species per land parcel is as follows (it should be noted that the sampling effort differs per land parcel):

- Babilonstoring: 52 species;
- Maanschynkop: 110 species;
- Salmonsdam: 247 species;
- Walker Bay: 265 species;
- Uilkraalsmond: 121 species;
- Pearly Beach: 91 species;
- Soetfontein: 4 species;
- Quoin Point: 189 species; and
- Dyer Island: 6 species.

There is no vegetation on Geyser Island and Quoin Rock.

2.3.1.1 Vegetation Unit Descriptions

The following is a description of the various vegetation units according to Mucina and Rutherford (2006) occurring in the Walker Bay Complex as shown in Table 2.2 and Appendix 1, Map 4.

Overberg Dune Strandveld

This vegetation unit has a conservation status of Endangered with a conservation target of 36% (Mucina *et al.* 2007) and is found in scattered patches from Rooiels to Cape Infanta at the mouth of the Breede River at altitudes from 1-100 m. It occurs in the coastal cluster of land parcels within the Complex, namely Walker Bay, Quoin Point, Soetfontein, and Pearly Beach. A further 11% of the unit is protected in private conservation areas. More than 5% has been transformed by urban development and cultivation. Established thickets of alien *Acacia cyclops*, *Acacia saligna* and *Leptospermum laevigatum* are of serious concern.

The general landscape comprises flat or slightly undulating dune supporting up to 4 m tall, closed, evergreen, hard-leaved shrublands in moist dune slacks and wind-protected valleys, and up to 1 m tall, coastal thicket.

Important taxa include the coastal tree, *Sideroxylon inerme* and tall shrubs such as *Euclea racemose*, *Metalasia muricata*, *Searsia crenata*, *Olea exasperata*, *Passerina corymbosa*, *Osteospermum moniliferum* subsp. *Moniliferum*, and *Tarchonanthus littoralis*. The vegetation also includes low shrubs, succulent shrubs, semi-parasitic shrubs, herbs, geophytes, herbaceous climbers and graminoids. Endemic taxa include the succulent shrub *Lampranthus salteri* and the Vulnerable geophytic herb *Gladiolus carmineus* (Rebelo *et al*. 2006).

The provincial conservation target for this vegetation unit is 37 734.57 ha. It covers 5 988.73 ha in the Walker Bay Complex, which relates to 17.24% of the target (Table 2.2).

Overberg Sandstone Fynbos

This vegetation unit has a conservation status of Endangered (previously listed in National Environmental Management: Biodiversity Act (NEM: BA), 2004 (Act No. 10 of 2004) as Critically Endangered) with a conservation target of 30% (Mucina *et al*. 2007).

The landscapes comprise of low mountains, undulating hills and moderately undulating plains supporting moderately tall, dense restioid, erocoid-leaved and proteoid shrublands. Structurally these are mainly proteoid and ericaceous fynbos, with restioid fynbos also occurring locally.

This vegetation unit is spread irregularly from Bot River and Hawston in the north-west to the Soetanysberg and Bredasdorp in the south-east. In the Complex it occurs on Maanschynkop, Babilonstoring, and Salmonsdam. The Babilonstoring and Kleinrivier Mountains, on which these land parcels are located, have many local endemic taxa (Rebelo *et al*. 2006). This vegetation unit includes endemic Cape genera such as *Retzia*, *Orothamnus*, *Pillansia* and *Sonderothamnus* that are shared only with Kogelberg Sandstone Fynbos. Endemic taxa including the Vulnerable *Aspalathus excelsa*, *Erica lanuginosa*, Endangered *Gnidia sonderiana*, *Leucospermum gracile*, Critically Endangered *Mimetes palustris*, and *Sonderothamnus speciosus* (Rebelo *et al.* 2006).

Only 6% of the vegetation unit is statutorily conserved in the Agulhas National Park, Fernkloof, Babilonstoring, Heuningberg, Maanschynkop, Salmonsdam, and Caledon Nature Reserves. Additional areas are protected in small private conservation areas. About 6% is transformed mainly due to cultivation. Invasive alien plants such as *Pinus pinaster*, *Acacia saligna*, *Hakea sericea*, *Hakea gibbosa* and *Leptospermum laevigatum* occur in places.

The provincial conservation target for this vegetation unit is 117 909.55 ha. It covers 1 316.04 ha in the Walker Bay Complex which relates to 1.12% of the target (Table 2.2).

Elim Ferricrete Fynbos

This vegetation unit has a conservation status of Endangered with a conservation target of 30% (Mucina *et al*. 2007). It occurs between the Bot River Valley, Hemel-en-Aarde Valley, Stanford environs, Salmonsdam, and Baardskeerdersbos areas. This vegetation unit is known to be a major node of Red Data plant taxa. Sections are statutorily conserved on Salmonsdam and the Agulhas National Park. Some 42% is transformed (for the cultivation of wheat, pastures, and vineyards). Alien *Acacia cyclops*, *A. saligna*, *Pinus pinaster*, *Hakea gibbose*, *Hakea sericea*, species of *Eucalyptus* and *Leptospermum laevigatum* are common invaders.

The landscapes comprise of undulating hills and plains covered with open to closed dwarf shrubland with occasional scattered tall shrubs. It is diverse, with all structural fynbos types present, but with extensive areas of asteraceous fynbos dominated by low proteoid elements. When degraded, this vegetation unit becomes dominated by renosterbos, *Elypropappus rhinocerotis*.

The provincial conservation target for this vegetation unit is 69 365.09 ha. It covers 142.82 ha in the Walker Bay Complex which relates to 0.21% of the target (Table 2.2).

Agulhas Limestone Fynbos

This vegetation unit has a conservation status of Critically Endangered with a conservation target of 32% (Mucina *et al*. 2007). The unit occurs on the Agulhas Plain from the vicinity of Hermanus to Bredasdorp and Struisbaai. The largest expanses are

found between the Klein River Lagoon and Grootbos, around Hagelkraal, Heuningrug and Soetanysberg, at altitudes of 20-400 m. The landscapes feature low hills in plains, fragmented on the coastal margin of the Agulhas coastal forelands. Compared to the other two areas of limestone fynbos (De Hoop and Canca), Agulhas Limestone Fynbos is the smallest but most diverse. Given the lack of distinct structural types recorded in this vegetation unit, the floristic diversity is significant. In fire-safe habitats, such as depressions and on calcrete ridges, milkwood forests occur. Structurally it is mainly asteraceous and proteoid fynbos, with restioid fynbos in sandy areas and on limestone placements.

Important taxa include tall shrubs such as *Osteospermum moniliferum* and *Protea obtusifolia*, as well as low shrubs such as *Leucadendron meridianum*, *Adenandra obtusata* and *Erica propinqua*, herbs and graminoids. The vegetation unit also includes many endemic taxa such as *Erica calcareophila* (Vulnerable), *Erica occulta* (Vulnerable), and *Diosma haelkraalensis* (Endangered) (Rebelo *et al*. 2006).

Only 8% is statutorily conserved in national parks and nature reserves with a further 4% protected in smaller private conservation areas such as Groot Hagelkraal. In the Complex, small patches of this vegetation unit occur on the borders of Maanschynkop, Walker Bay, Uilkraalsmond, and Pearly Beach. Only 5% has been transformed for cultivation and by urban development. The presence of woody aliens *Acacia cyclops*, *Acacia saligna* and *Leptospermum laevigatum* are of conservation concern.

The provincial conservation target for this vegetation unit is 79 389.72 ha. It covers 6.25 ha in the Walker Bay Complex which relates to 0.008% of the target (Table 2.2).

Western Coastal Shale Band Vegetation

This vegetation unit has a conservation status of Endangered with a conservation target of 30% (Mucina *et al*. 2007).

The unit is embedded within various mountain ranges of the Western Cape and extends eastwards through the Kleinrivier, Caledon, Swartberg and Bredasdorp mountains It occurs at altitudes of 50 – 1 800 m and is found on Maanschynkop.

The landscape is a narrow 80 – 200 m linear feature of up to 1 km wide in places, smooth and flat profile compared to surrounding areas. The band supports diverse renosterveld and fynbos shrublands of all structural types including waboomveld at lower altitudes.

Almost 45% of the unit is protected in statutory and local authority reserves with smaller patches protected within some private nature reserves. Some 6% is transformed by pine plantations and *Hakea sericea* is also found scattered throughout the area.

Important taxa include small trees such as *Protea nitida* and *Widdringtonia nodiflora*, tall shrubs such as *Leucadendron salicifolium*, *Montinia caryophyllacea*, *Protea neriifolia*, *Curtisia dentata* and *Diospyros glabra*, low shrubs such as *Aulax umbellate* and *Berzelia lanuginose*, as well as various herbs and graminoids. Endemic taxa include the two Vulnerable proteas, *Protea lacticolor* and *Protea caespitosa* (Rebelo *et al*. 2006).

The provincial conservation target for this vegetation unit is 165.09 ha. It covers 27.43 ha in the Walker Bay Complex which relates to 16.62% of the target (Table 2.2).

Cape Estuarine Salt Marshes

This vegetation unit has a conservation status of Least Concern with a conservation target of 24% (Mucina *et al*. 2007) and occurs in the Western and Eastern Cape Provinces from Lambert's Bay to the mouth of the Great Kei River. The unit has high variability in rainfall and climate.

The salt marshes located at Uilkraalsmond are several of the most important estuarine systems of this type. The Uilkraalsmond estuary is one of six national estuaries where the largest number of macrophyte species are found (Adams *et al.* 2016). It is also the only site outside of the Cape Flats were *Erepsia dunensis* has been recorded (Euston-Brown 2004).

The landscapes feature estuarine flats and systems of low riverine terraces supporting complexes of low herb lands and shrublands dominated by succulent chenopods and other flood-tolerant halophytes, and salt-marsh meadows dominated by rushes and sedges.

Reeds and sedges are the most important habitat type with the dominant families being the Cyperaceae, Chenopodiaceae, and Juncaceae. Bio-climatically important taxa in this vegetation unit are *Sarcocornia natalensis* subsp. *natalensis* and *Limonium linifolium* var. *maritimum*. The species *Poecilolepis ficoidea* is endemic to this unit (Adams *et al.* 2016). Other important taxa include graminoids such as *Ruppia cirrhosa*, *Sporobolus virginicus*, *Stenotaphrum seecundatum* and *Zostera capensis*, shrubs such as *Bassia diffusa* and *Samolus porosus* and herbs such as *Sarcocornia capensis* (Mucina *et al*. 2006).

21% of this vegetation unit is statutorily conserved with approximately 14% transformed for cultivation, by urban sprawl, mining, or road building.

The provincial conservation target for this vegetation unit is 35 918.63 ha. It covers 17.99 ha in the Walker Bay Complex which relates to 0.06% of the target (Table 2.2).

Cape Seashore Vegetation

This vegetation unit has a conservation status of Least Concern with a conservation target of 20% (Mucina *et al*. 2007). The unit is distributed along the temperate coasts of the Atlantic and Indian Oceans of the Western and Eastern Cape Provinces. Almost half of the vegetation unit is statutorily conserved in several national parks and nature reserves, including on the coastal land parcels in the Complex and Dyer Island. Extensive dune fields are found along certain stretches of coast. Only about 1.7% has been transformed, mainly by urban development.

The landscapes comprise of beaches, coastal dunes, dune slacks and coastal cliffs of open grassy, herbaceous and to some extent also dwarf-shrub (sometimes succulent) vegetation, often dominated by a single pioneer species.

Important taxa include succulent shrubs such as *Tetragonia decumbens* and *Pelargonium capitatum*, low shrubs such as *Hebenstretia cordata* and *Oncosiphon sabulosum*, herbs such as *Senecio littoreus*, *Gazania rigens* and *Amellus asteroids*, geophytic herbs such as *Trachyandra divaricate*, succulent herbs such as *Carpobrotus edulis*, and graminoids such as *Ehrharta villosa* and *Stipagrostis zeyheri*. Endemic taxa include *Psoralea repens*, *Silene crassifolia* and *Prenia vanrensburgii* (Mucina *et al*. 2006a).

The provincial conservation target for this vegetation unit is 22 101.69 ha. It covers 158.83 ha in the Walker Bay Complex which relates to 0.72% of the target (Table 2.2).

Southern Afrotemperate Forest

This vegetation unit has a conservation status of Least Concern with a conservation target of 34% (Mucina *et al*. 2007). The unit occurs in the Western and Eastern Cape Provinces with the largest complex found in the southern Cape. More than half of the extent of these forests are statutorily conserved in several national parks, nature reserves, and protected forests.

The only land parcel where this unit is found in the Complex is on Salmonsdam. Species of importance in this unit include: *Heeria argentea*, *Metrosideros angustifolia*, *Pterocelastrus tricuspidatus*, *Rapanea melanophloeos*, *Ilex mitis*, *Olea capensis* subsp. *Macrocarpa*, *Cassine peragua*, and *Brabejum stellatifolium* (Mucina & Geldenhuys 2006).

The provincial conservation target for this vegetation unit is 77 557.85 ha. It covers 6.82 ha in the Walker Bay Complex which relates to 0.009% of the target (Table 2.2).

Southern Coastal Forest (Western Cape Milkwood Forests)

This vegetation unit has a conservation status of Least Concern with a conservation target of 40% (Mucina *et al*. 2007). The national classification of Western Cape Milkwood Forests is included in the Southern Coastal Forest vegetation unit. The Western Cape Milkwood Forests are well preserved and are found on Walker Bay.

The landscape features generally low forests dominated by white stinkwood (*Celtis Africana*) and white milkwood (*Sideroxylon inerme*). Other important taxa include *Euclea racemosa*, *Maytenus lucida*, *Olea exasperate*, and *Searsia glauca* (Mucina & Geldenhuys 2006).

About 6% of this vegetation unit has been transformed mainly for cultivation or by urbanisation. Invasion by woody aliens such as *Acacia cyclops*, *Acacia. saligna* and *Casuarina equisetifolia* are a serious concern especially on the dunes. The most serious threat to these forests is posed by coastal development and accidental fires.

The provincial conservation target for this vegetation unit is 18 614.45 ha. It covers 12.04 ha in the Walker Bay Complex which relates to 0.06% of the target (Table 2.2).

2.3.1.2 Plant endemism and species of conservation concern

A list of 39 species of conservation concern that occur in the Walker Bay Complex are recorded in Table 2.4 (Raimondo *et al*. 2009). This list may not be exhaustive.

The Kleinrivier Mountains are known to have rich biodiversity within the Cape Core Subregion, with over 1 500 species records and many species are endemic or near endemic to the range (Whitehouse 2020). The South Africa National Biodiversity Institute (SANBI) Custodians of Rare and Endangered Wildflowers (CREW) have undertaken site surveys within the Complex.

Surveys conducted in 2019 and 2020 on fourteen properties within the Klein River Mountains resulted in observations of 846 species, including 81 Red Listed Species of Conservation Concern. Many threatened taxa have been recorded over the years on Fernkloof Nature Reserve by the members of the Hermanus Botanical Society. It can therefore be deduced that the neighbouring areas, such as Maanschynkop, are likely to have a similar diversity of threatened taxa.

Table 2.4: List of Threatened Species (Critically Endangered, Endangered and Vulnerable) for the Walker Bay Complex obtained from the SANBI Threatened Species Programme (Raimondo *et al.* 2009; SANBI 2015).

Species	Family	Threatened Status according to Raimondo *et al.* (2009)
Babilonstoring		
Berzelia incurve Pillans	Bruniaceae	Vulnerable
Erica floccifera Zahlbr.	Ericaceae	Vulnerable
Erica turrisbabylonica H.A. Baker	Ericaceae	Vulnerable
Gladiolus acuminatus F. Bolus	Iridaceae	Endangered
Gladiolus trichonemifolius Ker Gawl.	Iridaceae	Vulnerable
Gnidia humilis Meisn.	Thymelaeaceae	Endangered
Gnidia sonderiana Meisn.	Thymelaeaceae	Endangered
Leucospermum prostratum (Thunb.) Stapf	Proteaceae	Vulnerable
Mimetes hirtus (L.) Salisb. Ex Knight	Proteaceae	Vulnerable
Maanschynkop		
Amphithalea virgata Eckl. & Zeyh.	Fabaceae	Vulnerable
Berzelia incurva Pillans	Bruniaceae	Vulnerable
Berzelia rubra Schltdl.	Bruniaceae	Vulnerable

Species	Family	Threatened Status according to Raimondo *et al.* (2009)
Cyrtanthus carneus Lindl.	Amaryllidaceae	Vulnerable
Erica galpinii T. M. Salter	Ericaceae	Endangered
Mimetes palustris Salisb. ex Knight	Proteaceae	Critically Endangered
Orothamnus zeyheri Pappe ex Hook.f.	Proteaceae	Vulnerable
Protea angustata R. Br.	Proteaceae	Vulnerable
Roella uncinate C. N. Cupido	Campanulaceae	Vulnerable
Salmonsdam		
Aspalathus chenopoda L. subsp. *gracilis* (Eckl. & Zeyh.) R. Dahlgren	Fabaceae	Vulnerable
Otholobium rotundifolium (L. f.) C. H. Stirt.	Fabaceae	Vulnerable
Protea aspera E. Phillips	Proteaceae	Vulnerable
Protea longifolia Andrews	Proteaceae	Vulnerable
Roella arenaria Schltr.	Campanulaceae	Vulnerable
Serruria rebeloi Rourke	Proteaceae	Endangered
Walker Bay		
Amellus asteroids (L.) Druce subsp. *mollis* Rommel	Asteraceae	Vulnerable
Amellus capensis (Walp.) Hutch.	Asteraceae	Vulnerable
Diosma subulata J. C. Wendl.	Rutaceae	Vulnerable
Erica irregularis Benth.	Ericaceae	Endangered
Erica radicans (L. Guthrie) E.G.H. Oliv. Subsp. *schlechteri* (N.E.Br.) E.G.H. Oliv.	Ericaceae	Endangered
Heliophila linearis (Thunb.) DC. Var. *reticulata* (Eckl. & Zeyh.) Marais	Brassicaceae	Vulnerable
Leucadendron coniferum (L.) Meisn.	Proteaceae	Vulnerable
Pteronia tenuifolia DC.	Asteraceae	Vulnerable
Uilkraalsmond		
Diosma subulate J.C. Wendl.	Rutaceae	Vulnerable
Erepsia dunensis (Sond.) Klak	Aizoaceae	Endangered
Leucadendron linifolium (Jacq.) R.Br.	Proteaceae	Vulnerable
Quoin Point		
Agathosma riversdalensis Dummer	Rutaceae	Vulnerable
Elegia verreauxii Mast.	Restionaceae	Vulnerable
Restio sabulosus Pillans	Restionaceae	Endangered
Zygophyllum fuscatum Van Zyl	Zygophyllaceae	Vulnerable

2.3.1.3 Fire Regime

Fynbos is a fire-driven ecosystem, and all fynbos species require periodic fires to stimulate regeneration and maintain species richness (Van Wilgen & Forsyth 2008; Forsyth *et al.* 2010; Holmes *et al.* 2016). However, in an increasingly fragmented, transformed, and risk-averse landscape, natural fire cycles are becoming rare (Holmes *et al.* 2016). Research indicates that globally and within the CFR, many areas have experienced increases in fire frequency and size (Kraaij & van Wilgen 2014). Ecologically sound fire management is thus imperative and involves managing fire regimes, which include varying the frequency, season, intensity and size of fires, and reconciling ecological and practical requirements.

Van Wilgen and Forsyth (2008) divided the Western Cape into five fire eco-zones, based on the fire potential as defined by climate (Van Wilgen 1984). The Walker Bay Complex falls within the southwestern coastal zone, where fire potential is highest

in summer. It is important to note that Van Wilgen and Forsyth (2008) advocate that fire management should be adapted to site-specific needs, rather than purely on those of the eco-zone it is situated in.

Fire regime is a landscape level attribute and should thus be analysed across the landscape. Therefore, analyses were done by including the mountain catchment areas surrounding the Walker Bay Complex.

Over the last 42 years, 58 fires have burnt approximately 94 272 ha in the Walker Bay Complex and the surrounding catchment area. In 2006, five fires resulted in the largest area (approximately 43 638 ha) being burnt within the Complex (Fig. 2.11). The total area burnt and number of fires in the Complex, resulting from various cases of ignition, is shown in Figure 2.12. Only 3 of the 58 fires that burnt between 1980 and 2022 were due to natural causes (i.e., lightning strikes). Fire operations (e.g., block burns, burning of fire breaks etc.) and mechanical ignitions (fires caused by machinery, vehicles, powerlines, etc.) resulted in a small number of fires and relatively small areas being burnt (Fig. 2.12). Most fires, and consequently the largest areas burnt, are anthropogenic by nature (Fig. 2.12). In addition, most of the fires for which the cause has been recorded as 'unknown', could probably also be added to this category, as it is often difficult to pinpoint human induced fires with certainty.

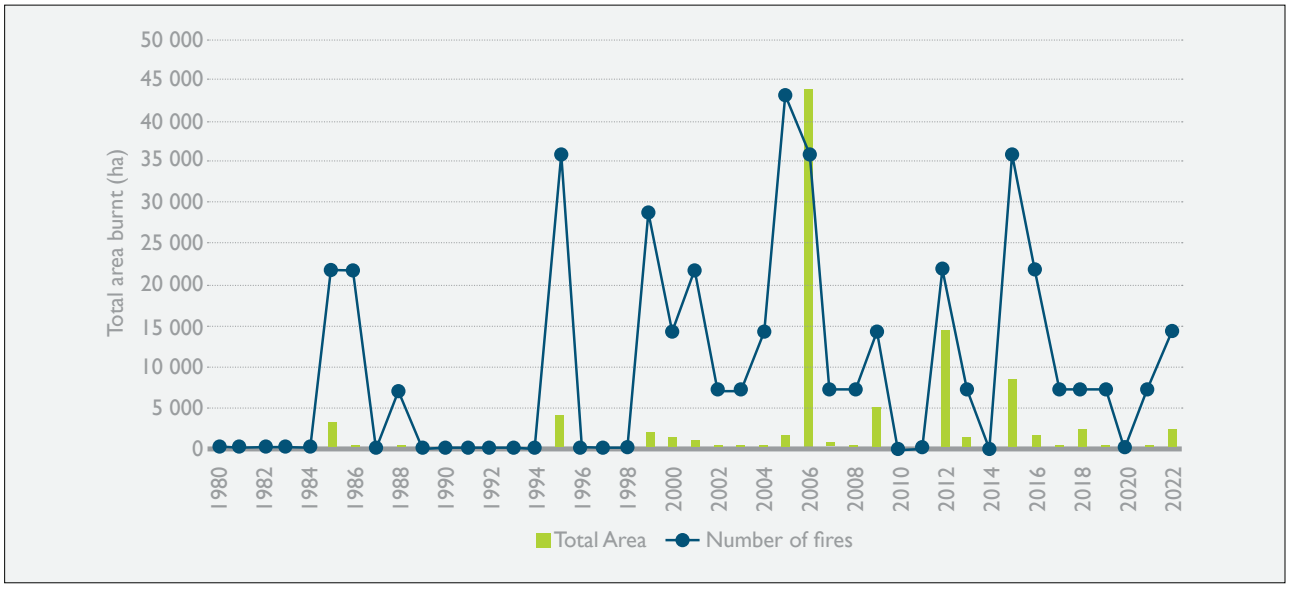


Figure 2.11: Total area burnt and total number of fires per year in the Walker Bay Complex and surrounding catchment for the period 1980 - 2022.

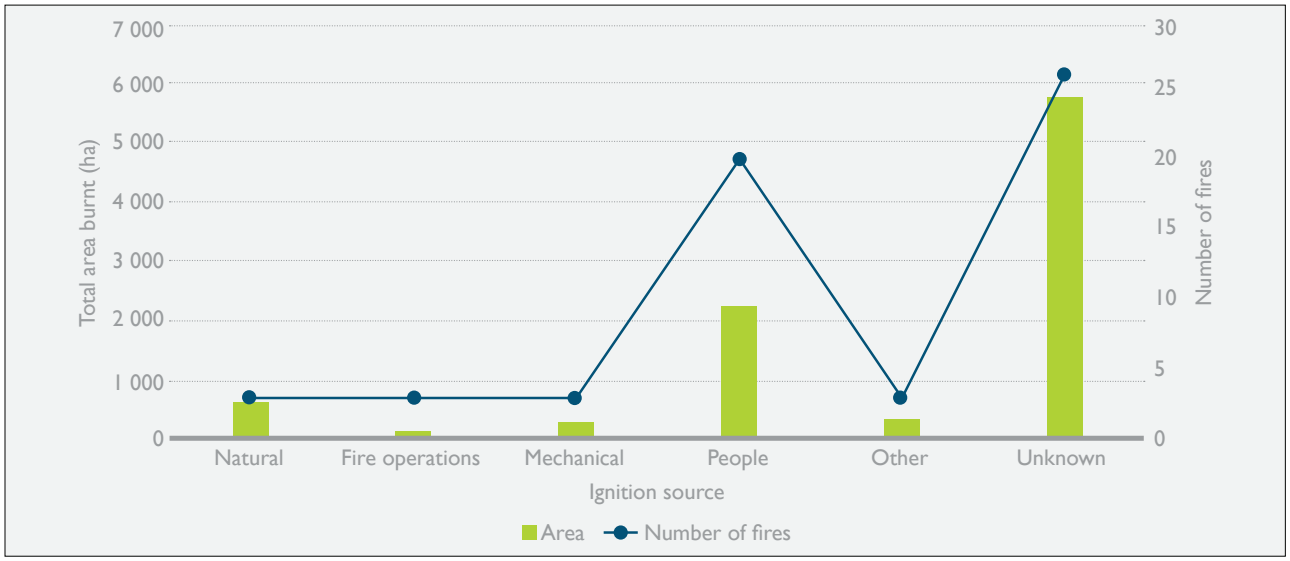


Figure 2.12: Total area burnt and number of fires resulting from various cases of ignition in the Walker Bay Complex over the period 1980 - 2022.

2.3.1.3.1 Fire Season

Fynbos in the Walker Bay Complex is adapted to a fire regime whereby fires occur during the dry summer and autumn seasons. Winter fires, although they rarely occur, are possible under exceptional and rare circumstances (Van Wilgen & Forsyth 2008). Maximum flowering activity occurs in late winter and spring (Van Wilgen *et al.* 1992), and optimal seedling regeneration of serotinous Proteaceae is achieved after fires that occur between December and early April (Bond *et al.* 1984). Furthermore, research has shown that even the fynbos fauna species are adapted to late summer - early autumn fires (Viviers 1983), and that their breeding seasons are generally synchronised with the non-fire seasons. For example, fynbos birds (e.g., sugar birds and sunbirds) generally breed in winter (May to November), thus winter fires would destroy a whole year's breeding attempt (Winterbottom 1968). Adults of the typical fynbos reptiles, survive summer fires by hiding in deep crevices, under rocks, boulders, rock slabs, in the ground, or in deep plant litter. Most of these species lay eggs in summer that hatch in early autumn, or are viviparous, with the young being produced in early autumn (Broadley 1983; Branch 1998). With both these reproductive strategies the young have the winter months to grow and become mobile before the fires of the next summer.

The proportion of area in the Walker Bay Complex catchment that burns in summer should be >80% (i.e., less than 20% of the area should burn in winter fires) (Van Wilgen & Forsyth 2008). According to the data from the last 42 years, approximately 88% of the area has burnt in the summer and most of the fires occur in the summer months (see Figure 2.13). Furthermore, the most fires occur between December and March, with virtually no fires in the winter months (Figure 2.13).

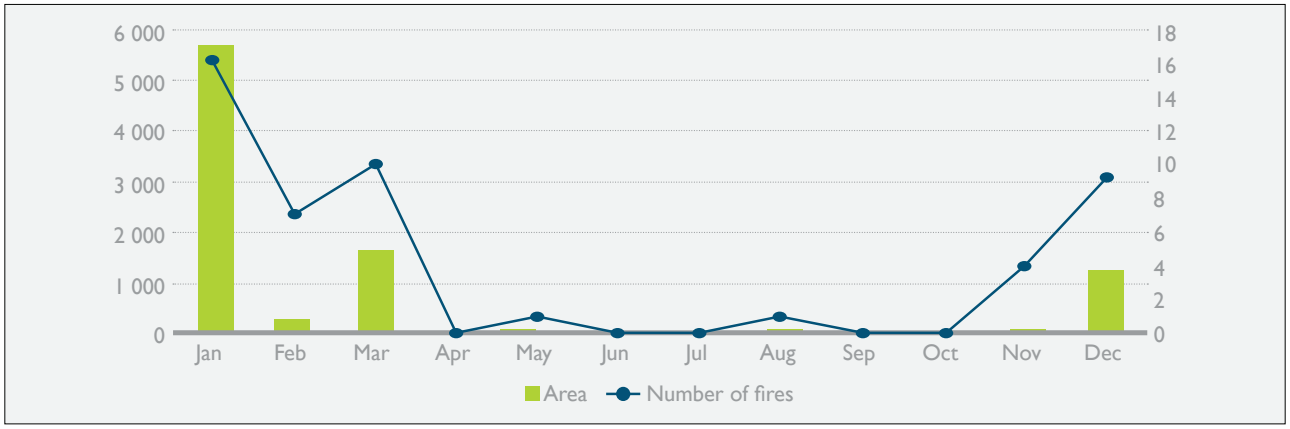


Figure 2.13: Proportion of the area burnt and the number of fires in the Walker Bay Complex per month for the period 1980 to 2022.

2.3.1.3.2 Fire Size

Areas burning in quick succession, a few large fires, or many small fires, will all have undesired effects. Too many small fires are difficult and costly to manage and will result in greater edge effects (e.g., predation of seed by rodents). Very large fires will upset the desired goal of maintaining an even distribution of veld ages (Van Wilgen & Forsyth 2008). Fire size is also important to the faunal elements of the fynbos. Large fires that result in vast areas of young veld can reduce food availability and pose a problem to the dispersal of animals. It is therefore critical to have a size mosaic of young and old veld (De Klerk *et al*. 2009). Large fires and a lack of mosaics also creates difficulties for seed dispersal into the burnt area and may leave large areas vulnerable to seed production collapse. Consequently, it is imperative to keep fire out of such an area (De Klerk *et al.* 2009).

Large fires have become increasingly common in recent times with fynbos fire regimes typically dominated by a few, very large fires (Kraaij & Van Wilgen 2014). According to Van Wilgen and Forsyth (2008), for fires larger than 1000 ha, more than 75% of the total area should be burnt. Since 1980, most of the fires in the Walker Bay Complex were small to medium with approximately 89% of the catchment burnt in 15 fires larger than 1000 ha (26% of all fires between 1980 and 2022). However, it was also suggested that no fire should exceed 5 000 ha (Van Wilgen & Forsyth 2008). The catchment area has experienced only 3 fires larger than this since 1980.

2.3.1.3.3 Veld Age

The veld age across the Complex varies widely between the different land parcels. It is also important to consider that these small, fragmented parcels of the Complex form part of greater areas of natural vegetation. The individual veld age of a land parcel is not indicative of the overall veld age mosaic. The analysis of veld age was therefore, conducted across the entire catchment area and not restricted to the CapeNature land parcels that constitute the Complex.

The 2022 veld age map for the Walker Bay Complex is shown in Appendix 1, Map 5, and the proportions of veld in different veld age classes in Figure 2.14. CapeNature uses seven veld age categories (1-2 years, 3-4 years, 5-6 years, 7-10 years, 11-15 years, 16-25 years, and >25 years), and the desired state is an even distribution of area in the different veld age classes. The proportion of area in each veld age category should be between 5% and 20% (Van Wilgen & Forsyth 2008). This should provide sufficient habitat for a full range of species requiring access to vegetation of different ages. More than half of the catchment has a veld age of between 16 and 25 years (Fig. 2.15), and less than 10% is classified as young veld. Local expert botanist Sean Privett, suggests that Fig 2.15 shows that fire suppression, rather than too frequent fires is becoming a threat to the area. While there may be too frequent fires in certain areas such as in Walker Bay Reserve west of Stanford, other areas are suffering from too few fires.

A recent paleo project undertaken in the Baviaansfontein valley between Grootbos and Bodhi Khaya tracked changes in vegetation since 1700 through pollen records. The results clearly show that fire suppression is resulting in a change in composition and structure of the vegetation from asteraceous fynbos to a proteoid fynbos/thicket mosaic (Footprint Environmental Services, 2023).

It must be highlighted that biodiversity is threatened when risk mitigation measures result in the immediate extinguishing of all fires in the region. It is concerning that 56% of the vegetation in the Walker Bay Complex is over 15 years old and some much older. Strategically allowing wildfires to burn old veld should be proactively part of the planning in terms of wildfire management.

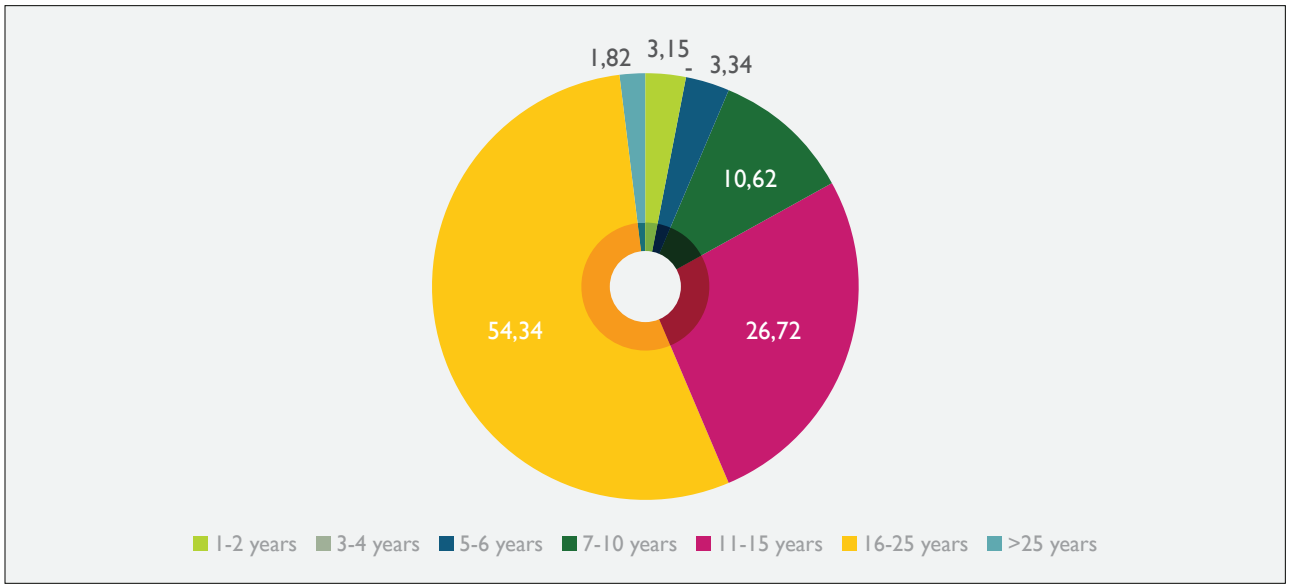


Figure 2.14: The proportion (percentage) of veld falling into the seven CapeNature veld age categories within the Walker Bay Complex.

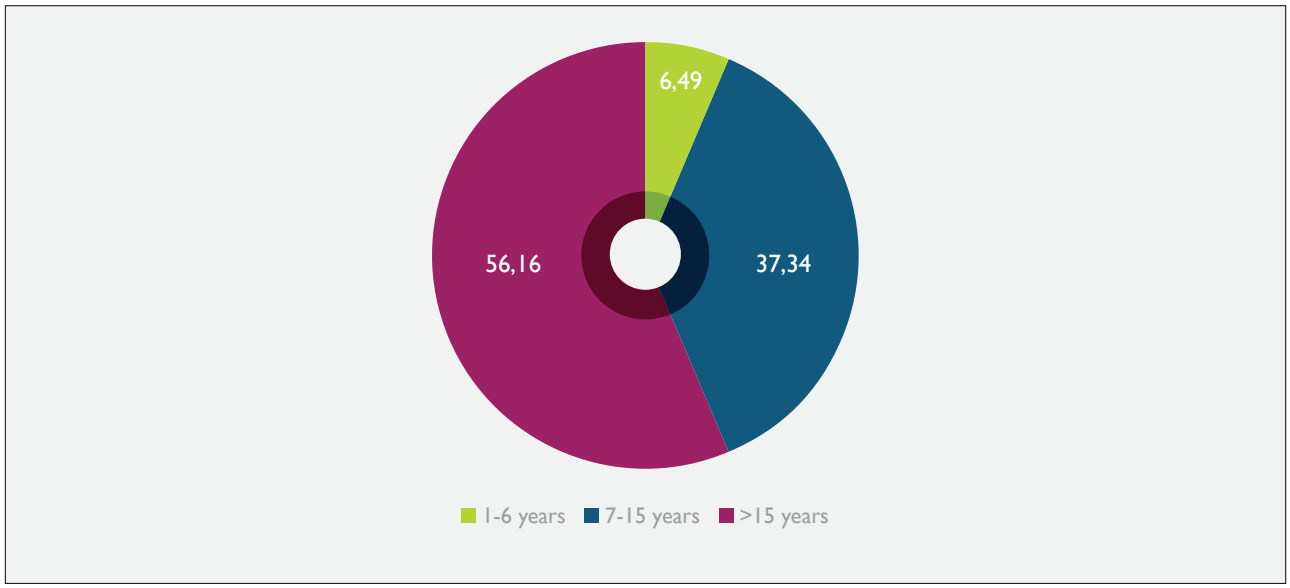


Figure 2.15: The proportion (percentage) of veld classified as young (1-6 years), medium (7-15 years), and old (>15 years) within the Walker Bay Complex.

An integrated fire management plan will be developed to address the biodiversity implications of the current veld age mosaic which must include the implementation of early or late summer management burns in old vegetation.

2.3.1.3.4 Fire Frequency and Return Interval

Fire return intervals should neither be too long, nor too short (Holmes *et al.* 2016). Slow maturing, serotinous Proteaceae species are used as indicator species to determine acceptable fire return intervals (Van Wilgen *et al.* 1992). These species have been shown to be good indicators for total ecosystem diversity (Vlok & Yeaton 1999, 2000). The minimum fire return period is dependent on the time it takes before 50% of the slowest maturing non-sprouting Proteaceae species in the population have flowered at least three times (Kruger & Lamb 1978, Kruger 1983, Le Maitre & Midgley 1992, Geerts 2021).

On the rare occasion when the fire return periods become too long, populations of serotinous Proteaceae will reach senescence, which results in declines in seed production. Short return interval fires that occur before insufficient numbers of serotinous

Proteaceae have reached maturity and set seed can lead to population declines or local extinction and cause dramatic structural changes in communities (Van Wilgen 1984, Van Wilgen & Forsyth 2008). It has also been shown that increased fire frequency can benefit sprouting species, and that increases in sprouters lead to overall decreases in plant diversity (Vlok & Yeaton 1999).

The sandstone fynbos vegetation of the Walker Bay Complex is a fire-dependant ecosystem where many species are dependent on fire for regeneration. However, the coastal strandveld vegetation consisting of a mosaic of thicket, fynbos, and succulent elements is less dependent on fire for regeneration, and hence the desired fire regime for the inland and the coastal reserves differ. Long-term monitoring of slow maturing serotinous Proteaceae has not taken place within the Complex, and therefore the Thresholds of Potential Concern to determine the ideal fire regime have not been determined for the Complex. Based on inputs from an experienced botanist, who has conducted extensive research in the area, the ideal fire return interval for the fynbos in the Complex's coastal land parcels should be between 12 and 18 years (S. Privett pers. comm.).

The dune strandveld does not contain serotinous Proteaceae and has fewer fire-dependant species. The determination of the ideal fire regime was therefore based on the opinion of a botanical specialist of the area and is considered to be between 20 and 30 years (S. Privett pers. comm.). It is perceived that the greater the interval between fires, the more dominant the thicket element will become. The fire interval of 100 years, as recommended in the Ecosystems Guidelines for Environmental Assessment in the Western Cape (Helme and Rebelo 2016) for strandveld ecosystems, was not considered appropriate for this area as this is likely to suppress the annuals and geophytes which are prominent in this vegetation type.

Approximately 84% of the Complex and surrounding catchment area has burnt only once in 42 years. The fire frequency across the Walker Bay Complex Catchment is shown in Figure 2.16 and Appendix 1, Map 6.

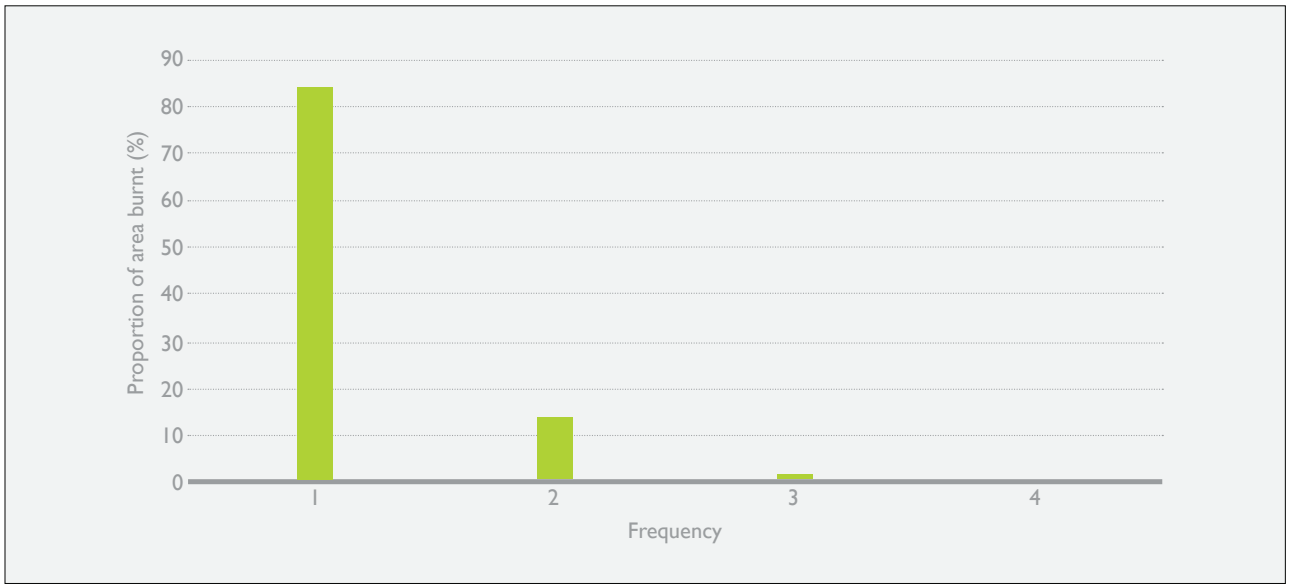


Figure 2.16: Proportion (percentage) of the Walker Bay Complex and Catchment Area burnt against the fire frequency for the period 1980-2022.

2.3.1.4 Invasive Alien Plants

Invasive alien plants have a major negative impact on South Africa's limited water resources. It is estimated that 6.7% of the water runoff of the entire country is lost to invasive alien plants (Le Maitre *et al.* 2000; Van Wilgen *et al.* 2008; Van Wilgen & De Lange 2011). It is expected that the future impacts of invasive alien species may be much higher than anticipated, especially on surface water runoff, groundwater recharge, and biodiversity. These plants will, likely, continue to spread faster than they can be cleared (Van Wilgen *et al.* 2008). The water yield from mountain catchments invaded by invasive alien plant species may reduce by more than 30% over 20 years of invasion (Van Wilgen *et al.* 2001). Invasive alien plants coupled with an inappropriate fire regime are the two dominant threats to both the Fynbos and Coastal Ecosystem targets in the Complex.

Invasive alien plant species recorded in the Walker Bay Complex are listed in Table 2.4. The overall density of invasive alien plants of the Walker Bay Complex is shown in Map 7, per alien clearing compartment (Natural Biological Alien Land Cover Attribute, NBAL).

The Walker Bay Complex and surrounding areas have never been used for commercial forestry unlike much of the state land in the mountain catchment areas. However, previous management stabilised the shifting sand dunes using Rooikrans (*Acacia cyclops*) in the 1970's, which has resulted in the dense invasion of this plant species throughout the Walker Bay, Quoin Point, Pearly Beach, and Soetfontein land parcels. Alien species sea grass (*Agropyron distichum*) and marram (*Ammophila arenaria*) were also introduced to stabilise shifting dune sand, but do not appear to have become invasive (CapeNature 2003a).

Overall, the infestation of invasive alien plants varies in extent across the Complex. The alien density on Babilonstoring is classified as scattered, while that on Maanschynkop is classified as very scattered. The majority of Salmonsdam has a scattered density with a small section of very scattered density. The land parcels in the coastal cluster range in density from occasional to closed. This range can be attributed to the higher fire frequency as well as alien clearing efforts. Rooikrans (*Acacia cyclops*) is the most common and widespread species throughout the coastal reserves, while *Pinus* and *Hakea* species are predominantly associated with the mountain catchment areas.

Invasive alien plant clearing in the Complex has been done through the Working for Water Programme in the past and is currently done by teams employed through the Extended Public Works Programme. Alien plant clearing over the past five years has been focused on Quoin Point due to the effect and opportunity that fires have brought.

In addition, wood harvesters from the community, harvest mature Rooikrans trees in the coastal land parcels to sell as firewood. While this assists with removal of mature trees, it does not constitute comprehensive alien clearing.

Many areas adjacent to the Complex are also invaded by invasive alien plants and are a continual source of re-infestation. However, the reverse is also in effect whereby invasive alien plants from Walker Bay are a source of re-infestation to neighbouring properties (Footprint Environmental Services, 2023). It is important that ongoing follow up be implemented and that the other lightly infested areas in Walker Bay are planned and prioritized in terms of the Complex's IAPO.

The Plant Protection Research Institute of the Agricultural Research Council has carried out numerous biological control releases in the general vicinity of the Complex. Biocontrol has been observed on Rooikrans in Pearly Beach and Walker Bay.

The relevant species released include:

- *Aphanasium austral*, *Dicomada rufa*, *Carposina autologa* for Silky hakea
- *Erytenna consputa*, *Aphanasium austral* for Rocky hakea
- *Melanterius compactus* for Port Jackson, and
- *Melanterius servulus* for Rooikrans

Table 2.5: Most prevalent invasive alien plant species present within the Walker Bay Complex.

Scientific Name	Common Name	Distribution
Acacia cyclops	Rooikrans	**Maanschynkop; Salmonsdam; Walker Bay; Uilkraalsmond; Pearly Beach; Soetfontein; Quoin Point.**
Acacia longifolia	Long-leafed Wattle	**Salmonsdam; Pearly Beach.**
Acacia saligna	Port Jackson Willow	**Salmonsdam; Walker Bay; Uilkraalsmond; Pearly Beach; Quoin Point.**
Eucalyptus cladocalyx	Sugar Gum	**Walker Bay; Uilkraalsmond.**
Hakea gibbosa	Rock Hakea	**Babilonstoring; Maanschynkop; Salmonsdam.**
Hakea sericea	Silky Hakea	**Salmonsdam.**
Leptospermum laevigatum	Australian Myrtle	**Walker Bay.**
Myoporum tenuifoloium	Manakota	**Walker Bay; Uilkraalsmond; Pearly Beach; Quoin Point.**
Pinus pinaster	Cluster Pine	**Babilonstoring; Maanschynkop; Salmonsdam.**
Rubus fruticosus	European Blackberry	**Walker Bay.**

2.3.2 Freshwater ecosystems

The Walker Bay Complex is located within the Overberg West and East sub-Water Management Areas (sub-WMAs) of the recently amalgamated Breede-Gouritz WMA (BGCMA 2017). The freshwater ecosystems of the Complex fall into the Southern Folded Mountains and the Southern Coastal Belt level 1 aquatic ecoregions (Kleynhans *et al.* 2005). Furthermore, Babilonstoring and Maanschynkop fall into the Boland Strategic Water Source Areas (SWAs) for surface water (Le Maitre *et al.* 2018). These protected areas, together with Walker Bay, also fall into the Overberg Region groundwater SWA (Le Maitre *et al.* 2018). They offer an ecosystem service within their catchments in the form of provision of surface and groundwater for local agricultural and urban areas, including the towns of Hermanus, Stanford, Gansbaai, Pearly Beach, and their surrounding areas.

The two largest dams in the area are the De Bos and Kraaibosch dams. The De Bos dam supplies water to numerous farm dams (for irrigation) in the Hemel-en-Aarde Valley, as well as the Greater Hermanus urban area. The Babilonstoring Mountain is located above the De Bos Dam, however Babilonstoring is located on the northern slope, and it is located within the Bot River catchment. Maanschynkop is located within the Klein River catchment. The water supply within the Hermanus and Stanford areas are also augmented with groundwater from the underlying aquifers, with both towns having well developed wellfields. Regular monitoring of the groundwater system and the ecosystems they support is implemented for both wellfield projects (UA 2019; UA 2020). Gansbaai and surrounds receives bulk water supply from an integrated system, including the Kraaibosch and Franskraal dams and two water sources (springs) at the De Kelder caves and Stanford Bay (WP 2019). Salmonsdam forms part of the Uilkraal River upper catchment, which ultimately feeds directly into the Kraaibosch Dam and the Uilkraals Estuary.

Several of the river catchments found within the Walker Bay Complex have been identified as supporting priorities for the conservation of different ecosystem functions and habitats for fauna and flora that inhabit these freshwater ecosystems, through the National Freshwater Ecosystem Priority Areas (NFEPA) projects (Nel *et al.* 2011a & 2011b). Certain areas in the Complex also form part of a potential ecological corridor. Provincial, municipal, and private nature reserves are located adjacent to and along the mountain catchment from Hermanus to the east side of Stanford. This currently fragmented corridor starts with Fernkloof Nature Reserve and continues eastwards to includes Maanschynkop, Vogelgat Private Nature Reserve, Waterfall Private Nature Reserve, Oudebosch Nature Reserve, and the Coppull Private Nature Reserve complexes. These areas fall into surface- and groundwater SWA's of the Boland (west) and Overberg Region (east).

A mosaic of wetland types, including the sensitive hillslope seeps and valley-bottom wetlands, form part of the freshwater ecosystems found within the Walker Bay Complex. Some of these wetlands are dependent on groundwater and/or aquifer water sources and may also contribute to the sustained base flow in at least some of the perennial rivers of these catchments. They also serve as important recharge zones for the underlying aquifers in the mountains and lower lying areas. The Hermanus and Stanford wellfields could possibly impact the hydrological function of these systems to some degree.
The rivers, wetlands, and their buffer zones, that are located within the protected area boundaries, are expected to be in at least a near natural or natural condition.

An important factor regarding catchment management is the clearing of invasive alien plant within the Complex's boundaries, specifically within riparian zones and wetlands. This is also important in any mountain catchment and lowland areas adjacent to the protected area sites (i.e., Zone of Influence). The conservation of the recharge potential of these catchments, to surface water ecosystems and aquifers underlying and extending from the mountains, is becoming increasingly important. Beyond the boundaries of the Complex, there are additional factors that have an impact on the freshwater ecosystems. The lowland sites are also under increased threat from unsustainable landuse activities related to agricultural practices within the rivers and wetlands and their buffer zones.

All the above impacts are also exacerbated by the effects of climate change. Mitigation for the effects of climate change is difficult, and here adaptive management, that is informed by thorough long-term monitoring, is of the utmost importance.

2.3.2.1 Groundwater/Aquifers

The groundwater systems associated with the Walker Bay Complex mainly fall within the TMG and Bokkeveld Group aquifers inland, with the calcareous sediments of the Bredasdorp Group dominating along the coast (see Thamm & Johnson 2006, Gresse & Theron 1992).

The high relief mountainous area within which Babilonstoring, Maanschynkop and Salmonsdam are located, are dominated by the quartzitic sandstones of the Peninsula Formation (lower TMG). The lower lying area of the northern slopes consists of upper TMG sandstones, while the lower southern slopes (northern section of Hemel-en-Aarde Valley) consist of the basement Cape Granite Suite (west and centre) and shales of the downfaulted Bokkeveld Group (CGS 1997; Gresse & Theron 1992). The TMG layers includes the fractured Peninsula and Nardouw (Rietvlei and Skurweberg Formations) aquifers, while the Cape Granite Suite and Bokkeveld Group shales form aquicludes/aquitards (i.e., flow restrictive, poor aquifers).

Walker Bay is underlain by the Strandveld (mobile dunes) and Waenhuiskrans (calcareous dune sand and calcrete/aeolianite) Formations together with basal fluvial channels and estuarine deposits of the Klein Brak Formations. These are all formations of the Bredasdorp Group, which overlies the Bokkeveld Group shales (at depth). The TMG outcrops are to the north and south of the Kleinrivierberge and Swartkransberge. The major primary Stanford Aquifer is formed by the lower Waenhuiskrans and basal Klein Brak Formations within Walker Bay, with the major TMG fractures aquifers to either side of the area (Roberts *et al.* 2006). The freshwater springs in the Klipgat cave areas in Walker Bay, for example, are caused by discharge from the Waenhuiskrans and Klein Brak Formations, where they are in contact with the TMG rocks.

The west and north-eastern areas of Uilkraalsmond are underlain by the TMG sandstones, which forms moderate and major fractured aquifers. The Strandveld and Waenhuiskrans Formations of the Bredasdorp Group overlie the Bokkeveld Group shales in the east, along the coast, forming minor coastal primary aquifers. In the area where Pearly Beach and Soetfontein are located, the Strandveld and Waenhuiskrans Formations overlie the TMG sandstones along the coast (Roberts *et al.* 2006), which forms minor coastal primary aquifers that overlie moderate to major TMG fractured aquifers.

The aquifers underlying the Walker Bay Complex are mostly major aquifer types (high yielding with good quality water) (Parsons & Conrad 1998; Meyer *et al.* 2000; Meyer 2001). These classifications are reflected in the Department of Water Affairs and Sanitation's Aquifer Classification Map (DWAF 2012a). Some poor (low to negligible yield of moderate to poor water quality) aquifers are present in the Cape Granite Suite and Bokkeveld Group shales, for example those present along the lower slopes of Babilonstoring. According to the map on vulnerability of aquifers to contamination by pollutants, most of the Complex's land parcels are classified as the most vulnerable to many pollutants (with some exceptions; DWAF 2012b). Similar patterns are prevalent in the Complex for aquifer susceptibility to anthropogenic contamination, where there is a variation between areas of medium versus high susceptibility (DWAF 2012c). Groundwater quality is mapped as good in the areas where Babilonstoring and Maanschynkop are located (0-70 mS/m), with slight decreases in quality being mapped for Salmonsdam and Walker Bay (70-150 mS/m) and along the coast at Uilkraalsmond, Pearly Beach and Soetfontein (DWAF 2012d). For the coastal land parcels this is likely due to their proximity to the ocean.

Monitoring of the five boreholes (which target the confined Peninsula Aquifer along the Hermanus Fault) within the existing Hermanus Gateway Wellfield have shown yields of ~5-25 l/s. The five Camphill Wellfield and two Volmoed Wellfield production boreholes in the Hemel-en-Aarde Valley (targets confined and unconfined Peninsula Aquifer, respectively, along the Attakwaskloof Fault) have shown yields of ~3-15 l/s. Both yield results exceed the values given in the moderate sustainable borehole yields (values ranging from ~0.5-2 l/s) presented in the 1:500 000 Cape Town 3317 hydrogeological map (Meyer *et al.* 2000; WP 2019).

As a result of these characteristics (*i.e.,* moderate to high yield of good and medium quality water), together with the pressures imposed by drought events, the use of groundwater to augment water supply for rural and urban areas have become a threat to aquifer and groundwater dependent ecosystems (see Section 5.5 for further information).

2.3.2.2 Rivers

The river ecosystems of the Walker Bay Complex fall into the Southern Folded Mountains (Babilonstoring, northern half of Maanschynkop, Salmonsdam, and Uilkraalsmond) and the Southern Coastal Belt (southern half of Maanschynkop, Walker Bay, Pearly Beach, and Soetfontein) level 1 ecoregions (Kleynhans *et al*. 2005). Most of the rivers draining off the slopes within Babilonstoring and Maanschynkop have been mapped as non-perennial systems, while the perennial Paardensberg River is present on Salmonsdam (see Appendix 1, Map 8). The rivers present on Babilonstoring mainly drain in a north-westerly direction into the Leeu and Swart River systems within the Bot River catchment. A few watercourses in the eastern part of Babilonstoring possibly drain into the Onrus River catchment, upstream of the De Bos Dam. The Onrus River catchment is a Fish Support Area (NFEPA; Nel *et al*. 2011a & b; see Table 2.6 for the NFEPA and condition status of these rivers). The headwaters of the perennial Hartbees River are located on Maanschynkop. The Hartbees River drains in a north-easterly direction and joins the Klein River far upstream of Stanford. Several smaller, non-perennial streams, including the Maanskynspruit River drain south of the slopes within Maanschynkop into the Klein River Estuary. None of these systems have been mapped as priorities in the NFEPA process (Nel *et al*. 2011a & b). This will have to be reconsidered considering the importance of this catchment as a SWA, especially for groundwater (Le Maitre *et al*. 2018). The headwaters of the Paardensberg River (a tributary of the Uilkraals River) are located within Salmonsdam. This catchment has been identified as a Fish Support Area and a Phase 2 Freshwater Ecosystem Priority Area (FEPA) (rehabilitation).

No major river systems have been mapped within the coastal nature reserves. However, there is some seepage of water taking place in these properties. Walker Bay is located at the mouth of the Klein River Estuary, along the south-western edge. This lower part of the Klein River catchment falls into a Phase 2 FEPA (rehabilitation). The eastern edge of Uilkraalsmond is located adjacent to the mouth and south-western edge of the Uilkraals River, while Pearly Beach's western border falls just east of the Haelkraal River mouth. The lower section of the Uilkraals River catchment has been identified to be a Fish Support Area and a Phase 2 FEPA (rehabilitation).

Extensive agricultural development in the region, has resulted in most river reaches outside of protected area properties, being severely affected by over-abstraction of water, impaired riparian zones, instream structures, and agrichemical pollution. Several invasive alien plants are common in the general area and many rivers, especially outside of protected areas, have riparian zones dominated by non-native plants. The plants include wattle species (*Acacia cyclops*, *Acacia. mearnsii* and *Acacia. saligna*), *Eucalyptus* spp., silverleaf nightshade (*Solanum elaeagnifolium*, e.g., Paardensberg River), including Spanish reed (*Arundo donax*) and Poplar species (*Populus x canescens*) in the lower reaches (e.g., the Swart River). Similarly, invasive alien fish species are present in most of the rivers in the region and often dominate foothill and mainstem river reaches (see Herdien *et al*. 2007).

Table 2.6: The National Freshwater Ecosystem Priority Area status and estimated health condition of the rivers of the Walker Bay Complex, from west to east. Health scores are defined as follows: natural (A), good-natural (AB), good (B), fair (C), and degraded (D).

River	Condition[1]	NFEPA Status	River Reach / Type
Babilonstoring			
Unnamed non-perennial headwater tributaries of Swart River	AB[2]	No NFEPA status	Mountain stream
Unnamed non-perennial headwater tributaries of Bot River	AB[2]	No NFEPA status	Mountain stream
Maanschynkop			
Headwaters of Hartebees	AB[2]	No NFEPA status	Mountain stream
Maanskynspruit	AB[2]	No NFEPA status	Mountain stream – foothills
Unnamed non-perennial tributaries of Klein River Estuary	AB[2]	No NFEPA status	Mountain stream – foothills

River	Condition[1]	NFEPA Status	River Reach / Type
Salmonsdam			
Paardensberg	B	Fish Support Area Rehab FEPA	Mountain stream – foothills
Walker Bay			
No surface water mapped	N/A	No FEPA status	Coastal
Uilkraalsmond			
No surface water mapped	N/A	Fish Support Area Rehab FEPA	Coastal
Pearly Beach			
No surface water mapped	N/A	Fish Support Area	Coastal
Soetfontein			
No surface water mapped	N/A	Fish Support Area	Coastal

[1]Condition estimated through a combination of real data, desktop study and specialist input.
**Condition unknown, but expected value given.

One of the threats identified for the river ecosystems located in the Walker Bay Complex is the presence of invasive alien plant species within the riparian zones and in wetlands. On protected area properties, maintenance of the riparian zones of rivers is needed to some degree and entails the removal of invasive alien trees. Not only will this improve the health of the riparian zones and the instream environments, but it will also allow for the release of more good quality water. Moreover, the establishment of indigenous vegetation after alien clearing should be encouraged to also enable the re-establishment of faunal groups, such as for example aquatic macro-invertebrates (Samways *et al.* 2010).

Other threats include modifications to the riparian and instream zones, as well as pollution, however, these threats are all located in the Zone of Influence. Moreover, the reduction in river flow, in the form of over-abstraction of surface and groundwater, is also a threat, more so within the Zone of Influence surrounding the Walker Bay Complex. The over-abstraction of water is often linked to over allocation of water from the relevant authorities, or in the case of the increasing threat of groundwater over-abstraction and unregulated water use.

2.3.2.3 Other Freshwater Aquatic Systems (Wetlands, Springs, Pans)

Only a few wetlands have been mapped within the boundaries of the Walker Bay Complex (Nel *et al.* 2011a & b). However, due to the steep relief in certain areas of the Complex, as well as the topographical changes in the landscape from the mountains to the coast, there are bound to be wetlands present, even in the coastal areas.

The topography of the mountainous terrain on Babilonstoring and Maanschynkop allows for the presence of various hydro-geomorphic zones (i.e., different interaction between hydrological movement of water and certain landforms). These systems could be associated with the perennial and non-perennial (or seasonal) water courses that drain the mountain slopes. These are likely to include wetland seeps, bench flats (hilltop, saddle, or shelf; see Ollis *et al.* 2013 for descriptions) and possibly even a valley-bottom wetland (Maanschynkop). The wetlands systems on Babilonstoring would probably fall into the Southwest Sandstone Fynbos wetland vegetation units where seeps and flats are Least Threatened, and moderately (seeps) and well (flats) protected (Gouws *et al.* 2012; Van Deventer *et al.* 2019). The wetlands draining to the south on Maanschynkop likely fall into the South Coast Limestone Fynbos wetland vegetation unit (seeps are Least Threatened and moderately protected). The systems draining northwards into the Hartbees River, is likely to fall into the East Coast Shale Renosterveld wetland vegetation unit, where seep and valley-bottom wetlands are Critically Endangered and poorly protected (Gouws *et al.* 2012; Van Deventer *et al.* 2019).

All the wetland systems present on Salmonsdam drain into the channelled valley-bottom wetland system at the top of the Paardensberg River. These wetlands could include seeps and bench flats that would fall into the Southwest Sandstone Fynbos wetland vegetation unit. Within this vegetation unit, seeps and bench flats are Least Threatened, and moderately (seeps) and well

(flats) protected (Gouws *et al.* 2012; Van Deventer *et al.* 2019). The channelled valley-bottom wetland (least threatened and well protected) is mapped to start just outside the border of Salmonsdam, but this still needs to be confirmed in field.

No wetlands have been mapped on the coastal areas in the Complex. However, the topography of these lower lying areas could allow for at least some dune slack wetland types where the water table is high enough. At Walker Bay, the wetlands would fall into the South Strandveld and Western Strandveld wetland vegetation units, where flats are Endangered and poorly protected, and depressions are Least Threatened and moderately protected (Gouws *et al.* 2012; Van Deventer *et al.* 2019). Uilkraalsmond, Pearly Beach, and Soetfontein fall into an ecotone of wetland vegetation units, between Southwest Sandstone Fynbos (West), Southwest Ferricrete Fynbos (North), and South Coast Limestone Fynbos (East). Flats and depression wetlands are Least Threatened and well protected for Southwest Sandstone Fynbos. For the Southwest Ferricrete Fynbos, flats and depression wetlands are Least Threatened and moderately well protected (flats) and Endangered, but well protected (depressions). It is Least Threatened and poorly protected (flats) or moderately well protected (depressions) for the South Coast Limestone Fynbos (Gouws *et al.* 2012; Van Deventer *et al.* 2019).

It is expected that most, if not all, wetlands within protected area properties would be in, at least, a good condition, if not natural, with very few modifications of limited impact. However, the presence of any possible wetlands in the Walker Bay Complex still needs to be investigated. Some impacts on wetlands and their buffer zones, would include the presence of invasive alien plants and access roads through wetland systems.

Wetlands outside of the protected areas are generally considered to be impacted in some way, with either modified, degraded, or transformed health conditions. The effects of certain impacts have been addressed through wetland rehabilitation, done in some areas through the projects of the Working for Wetlands Programme, but no work has been done near the Walker Bay Complex.

Wetlands in general are one of the most highly threatened freshwater ecosystems globally, especially those located in the lowland areas (Gouws *et al.* 2012; Gouws and Gordon 2017; Van Deventer *et al.* 2019). Despite these levels of threat, they continue to be the least studied and monitored freshwater ecosystem in the country. It is with this in mind that a greater understanding of the health of wetlands and other freshwater ecosystems located within the boundaries of the Walker Bay Complex is needed. This is important, especially when managing a protected area within a SWA (Le Maitre *et al.* 2018), with the whole catchment in mind.

To conduct initial baseline assessments and biomonitoring of strategically selected wetland ecosystems, the simplified version of the WetHealth (McFarlane *et al.* 2008) assessment method should be used (see Wetland Monitoring Protocol). Initial steps would include a desktop wetland census, where all available spatial Geographic Information System (GIS) layers are considered, including NFEPA, Biodiversity Fine-Scale Planning and NBA layers. This will be followed with field verification and ground-truthing to set a baseline and subsequent identification of sites for possible long-term monitoring. Long-term monitoring sites should represent a variety of different wetland types and be chosen based on their threat status (e.g., vulnerable, endangered, or critically endangered), whether they are groundwater or aquifer dependent ecosystems or where they might be impacted on by any development within the protected area. If a wetland might be impacted on by threats from outside the boundaries of the protected area, for example groundwater abstraction, these sites should also be considered for long-term monitoring.

Assessments should include aspects concerning the health condition and extent (size) of each chosen wetland ecosystem, considering, for example, the water source, basic soil characteristics, and dominant plant community. Where the presence of specific or threatened amphibian species that depend on these ecosystems are known, the presence and population estimate of these species could also be monitored (see Section 2.4.2 below). With the additional threats associated with invasive alien vegetation and the physical impacts, the vegetation structure of the buffer areas of the wetland systems should also be maintained as close to natural as possible within the first 32 m of any wetland (National Environmental Act, 1998 (Act 107 of 1998). Listing Notice 1 of 2014 (as amended).

2.3.3 Marine & Coastal Ecosystems

The marine system around Dyer Island falls entirely within the Agulhas Shelf ecoregion. The warm temperate Agulhas ecoregion incorporates the shelf area from Cape Point to the Mbashe River in the Eastern Cape and includes the central and eastern Agulhas Bank (Sink *et al.* 2019). The continental shelf is at its widest in the Agulhas Shelf ecoregion, extending up to 260 km offshore, south of Cape Infanta on the Agulhas Bank. The Agulhas Shelf ecoregion hosts the greatest number of South African endemics, including sparid reef fishes, octocorals, algae, and is a spawning and nursery ground for many species (Sink *et al.* 2019). Dyer Island, Geyser Rock, and Quoin Rock fall within the Benguela Upwelling System, which is one of four major eastern boundary current systems in the southern hemisphere. This ecosystem is one of the most productive areas of ocean in the world. It is characterised by coastal wind-induced upwelling which results in cold, nutrient-rich water being transported to the surface.

The Complex's coastal areas (Walker Bay, Uilkraalsmond, Pearly Beach, Soetfontein, and Quoin Point) consist primarily of sandy beach components. Beach morpho-dynamics and biogeography are the two biggest drivers of sandy beach communities. Importantly, because conditions on beaches are generally so harsh, the abiotic environment is far more important in structuring beach communities than are biological interactions (Harris *et al.* 2019). Interactions between tidal range, wave action, and particle size, distinguish two extreme beach types (dissipative and reflective) and a range of intermediate forms (Branch & Branch 2018). Dissipative beaches are exposed to strong wave action that flattens the profile leading up to the beach. The surf zone is therefore wide, and wave energy is largely 'spent' before reaching the beach. The beach consists of fine sediments that retain water and hence are damp most of the time. The beaches are flat, wide, and often backed by large dunes.

The coastal zone in the Walker Bay Complex is made up of a mosaic of seven marine ecosystem types, with three dissipative sandy shores, two types of rocky shores, and one intermediate sandy shore. These coastal marine ecosystem types occur both below and above the high-water mark, hence it is applicable to the Complex, although it is limited in extent. All the coastal land parcels have a mixture of sandy shores, mixed shores, and exposed rocky shores. The coastal "beach" zones consist of rocky shores and sandy shores, which is managed by CapeNature up to the high-water mark. Below the high-water mark, the coastal zone is managed by DFFE.

The Agulhas Dissipative Sandy Shore is listed as Near Threatened. It is a fine grained, sloping sandy beach with a wide surf zone (Harris *et al.* 2019). The Agulhas Dissipative Intermediate Sandy Shore ecosystem type is listed as Least Concern and is a fine grained, sloping sandy shore with a moderately wide beach and surf zone. Intermediate sandy shores tend to have a shallow sandbar parallel to the coast, just off the beach. The Agulhas Intermediate Sandy Shore is a beach with medium grain size and moderate slope, often with cusps on the shore, and sandbars and rips in the surf. The ecosystem type is listed as Least Concern. The macrofauna that inhabit the different types of sandy shores is determined by the sand grain size and the wave action. Species typically found on dissipative and intermediate sandy shores include white mussels, *Donax* spp., and delicate specialist species, such as polychaetes. Furthermore, both species richness and abundance are higher in dissipative sandy shores in comparison to reflective sandy shores (Branch & Branch 2018; Harris *et al.* 2019).

South African rocky shores are among the most diverse in the world. Within ecoregions, biotic communities on rocky shores are shaped by tides, wave exposure, shoreline configuration, and rock type (Harris *et al.* 2019). As tides rise and fall, the intertidal zone alternates between being exposed to air and being submerged in the ocean. There are four basic zones that can be recognised on most shores, but with species assemblages changing from the west coast to the south and east coast. In the south coast Agulhas ecoregion, there are five zones (Littorina, Upper and Lower Balanoid, Cochlear, and Infratidal) that are the same as the west coast, but with different species (Branch & Branch 2018).

The Littorina Zone is dominated by the southern periwinkle, *Afrolittorina knysnaensis*, and the purple laver, *Porphyra capensis*. The Upper Balanoid has a host of dense stands of indigenous barnacles, particularly the toothed barnacle, *Chthamalus dentatus,* at the top zone and the eight-shell barnacle, *Octomeris angulosa,* on exposed rocky shores which face very high wave action. The granular limpet, *Scutellastra granularis*, is abundant on all types of shores, and the goat's-eye limpet, *Cymbula oculus*, is also common. On exposed shores in the Lower Balanoid, the brown mussel, *Perna*, takes over most of the lower half of the shore.

Higher up, the invasive Mediterranean mussel, *Mytilus galloprovincialis*, dominates. Within the Cochlear Zone, the pear limpet, *Scutellastra cochlear*, is dominant and Argenville's limpet, *Scutellastra argenvillei*, is present but not abundant. The Infratidal Zone supports redbait, *Pyura stolonifera*, and algae such as corallines, wracks, green tips, species of *Zonaria*, and the spiny kelp, *Ecklonia radiata*. Agulhas Exposed Rocky Shore is listed as Vulnerable and is a rocky shore type that is exposed to moderate wave intensity. The Agulhas Very Exposed Rocky Shore is listed as Vulnerable and is a rocky shore type that is exposed to high wave intensity. Agulhas Mixed Shore is listed as Near Threatened and is a shore with both rocky and sandy habitat.

Quoin Rock, Geyser Island, and Dyer Island are classified as Agulhas Islands and are listed as Vulnerable. There are extensive kelp forests offshore of the Complex and in the buffer zones around the islands which form the Agulhas Kelp Forest ecosystem type. This unique ecosystem is listed as Vulnerable and plays a very important role in supporting a wide range of important and endemic marine taxa. Regulated kelp harvesting takes place around Dyer Island through permits issued by DFFE.

The Uilkraals River estuary falls just outside of the Uilkraalsmond boundary, but a small section of the Estuarine Functional Zone does fall within the land parcel's boundary. The Estuarine Functional Zone is described by Van Niekerk *et al.* (2019) as "the open water area of an estuary together with the associated floodplain, incorporating estuarine habitat (such as sand and mudflats, salt marshes, rock, and plant communities) and key physical and biological processes that are essential for estuarine ecological functioning". In terms of the Estuarine Functional Zone for the Uilkraals River estuary, this will include the intertidal salt marsh, supratidal salt marsh, and typical estuarine reeds and sedges. The only areas that fall within the Uilkraalsmond land parcel is the Overberg Dune Strandveld vegetation and some supratidal salt marsh. The dominant macrophyte in the supratidal salt marsh is *Sarcocornia capensis,* with other species being found in areas that are waterlogged or exposed to drying out (AEC 2012). However, Mucina *et al.* (2003) also noted communities such as the '*Crassula glomerata* - *Sarcocornia capensis*' which may not be a member of estuarine systems of other marshes of the Western and Eastern Cape. For this reason, Adams *et al.* (2010) classified this community as 'Supratidal Fringe'; a transition between terrestrial and salt marsh vegetation. The species included in this habitat contain a mixture of salt marsh elements with several short-lived herbs and grasses such as *Crassula glomerata* P. J. Bergius, *Bromus pectinatus* Thunb, *Tribolium hispidum* (thumb.) Desv., *Silene clandestina* Jaq., *Senecio elegans* L., *Ruschia lineolata* (Haw.) Schwantes, *Romulea tabularis* Eckl. Ex Beg, *Pteronia uncinata* DC, *Nidorella foetida* (L.) DC, *Cerastium capense* Sond, and *Apium prostratum* Vent.

Aquatic vegetation (marine)

The marine vegetation around the islands is largely dominated by kelp forest, and consists of three main species: sea bamboo, *Ecklonia maxima*, split fan kelp, *Laminaria pallida*, and spined kelp, *Ecklonia radiata*. These kelp forests create the environment for other marine plant groups to flourish, namely *Sargassum* – like algae, bladders and strings, flat red algae, membranous algae, balloon and tongue like red algae, fork branched red algae, gelatinous red algae, spike, and iridescent red algae, branching red algae, epiphytic and fine algae, upright coralline algae, and encrusting algae.

The Marine and Estuarine Systems of the Walker Bay Complex is illustrated in Appendix 1, Map 9.

2.4 Biodiversity Context: Taxa

2.4.1 Invertebrates

The core of the CFR represents a distinct zoogeographic zone, the Cape Faunal Centre (Stuckenberg 1962), which is 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.

Invertebrates comprise more than 80% of animal diversity, yet they are grossly under-represented in studies of African diversity. Site biodiversity estimates that do not consider invertebrates omit the greatest component of what they are attempting to measure and ignore groups that are very significant contributors to ecosystem processes (McGeoch 2002; Samways *et al.* 2010, 2012). These include primary production, nutrient recycling, predation, herbivory, and competition.

There is no comprehensive invertebrate species list for the Walker Bay Complex, but 108 invertebrate taxa, belonging to nine orders, have been recorded in the Complex, or within a 2 km buffer around it. Records for the Complex and surrounds are obtained through baseline data collection by CapeNature personnel, and by members of the public via citizen science platforms such as the online Virtual Museums (http://vmus.adu.org.za/) and iNaturalist (https://www.inaturalist.org/).

On the Grootbos property adjacent to Walker Bay, over 900 morphospecies of insect have been recorded in the last 5 years (Footprint Environmental Services, 2023). Estimates are that there are thousands of species in the region, many of which are unidentified. This poses an opportunity for collaboration between Grootbos and CapeNature to develop a better knowledge of insect species within the Walker Bay Complex.

Some protection might be provided to certain arthropod groups in protected areas, given that there are correlations between insect species richness and biome-related plant diversity in the Western Cape (e.g., Proches & Cowling 2006, 2007; Proches *et al.* 2009). The attention and protection that the area receives in terms of its floral diversity might thus provide a degree of protection for its insect diversity (Samways *et al.* 2012).

2.4.1.1 Terrestrial Invertebrates

The Cape flora is dependent on specialised pollination guilds and insect-driven ecological processes. The biggest threat to insect pollinators is habitat destruction or transformation, resulting in a decrease in available forage. Other threats include agricultural pesticides such as neonicotinoids, other volatile pollutants, pests, diseases, and climate change. An important pollinator in the Walker Bay Complex is the Cape honeybee, *Apis mellifera capensis*. Bees are affected by all the above threats. The primary objective of CapeNature's 2020 bee policy (CapeNature 2020a) is to protect wild honeybees on provincial reserves from genetic, ecological, pathogenic, and parasitic threats. Reserves thus serve as refugia for locally adapted bee populations and contribute towards a network of healthy source honeybee populations that can disperse naturally throughout the rest of the province, thereby providing support to apiculture. Because of the risks posed by commercial beekeeping to wild bee populations (e.g., the introduction of pests or diseases), commercial beekeeping, including the use of catch boxes, is not permitted in the Complex.

In the Fynbos Biome myrmecochory, or seed dispersal by ants, is another important ecological function performed by invertebrates (Le Maitre & Midgley 1992). Approximately 20% of strictly Fynbos plant species are dependent on this process (Johnson 1992), with 78 genera containing species that are ant-dispersed (Bond & Slingsby 1983). Four ant species have been recorded within 2 km of the Complex, including the myrmecochorous black cocktail ant (*Crematogaster peringuevi*). Threats to ants include invasive alien species (ant species richness in Southern Cape Fynbos is inversely related to *Hakea sericea* infestation levels), and inappropriate fire regimes (Koen & Breytenbach 1988). An additional threat in protected areas is invasion by the aggressive Argentine ant (*Linepithema humile*), which has been recorded on Dyer Island affecting Leach's Storm Petrel (*Oceanodroma leucorhoa*).

The butterflies of South Africa were assessed according to 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). Two of the 49 butterfly species recorded in or near the Walker Bay Complex are of conservation concern, and both are Western Cape endemics. The Red Hill russet (*Aloeides egerides*, Vulnerable) is a Western Cape endemic known from only six locations, one of which is Karwyderskraal in the vicinity of Babilonstoring. Too-frequent fires and encroachment by alien vegetation are major threats to this species (Selb 2018). The giant russet (*A. pallida littoralis*) is Near Threatened and has been recorded in Vogelgat Private Nature Reserve, which borders Maanschynkop. Several subpopulations of this taxon have vanished in recent years, and others are declining because of habitat loss caused by agriculture and coastal development, as well as habitat degradation from fire suppression, and invasive alien plants (Edge 2018). One of the butterfly species recorded on or near the Complex is the alien cabbage white (*Pieris brassicae*), a pest of wild and cultivated Brassicaceae (Picker & Griffiths 2011).

Another ecologically important invertebrate group is the Arachnida. A total of 954 spider species have been recorded in the Western Cape (A. Dippenaar-Schoeman pers. comm), and more than one-third of these are endemic to the province. There have been no spider surveys in the Complex, but five species have been recorded in or near these land parcels, including the copper baboon spider (*Harpactira cafreriana*), a Western Cape endemic. There is a single record of a scorpion for the Complex (granulated thick-tailed scorpion, *Parabuthus capensis*).

2.4.1.2 Freshwater Macro-invertebrates

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

Table 2.7: Ecological categories for interpreting SASS 5 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

SASS 5 data provides only a snapshot of water quality and biotope/habitat availability at a site. To date, no sampling has taken place in the Complex, and baseline surveys are needed to determine the current state of the rivers. Seasonal and more in-depth invertebrate surveys are also needed, to get a complete picture of the species that are present, the community structure, as well as to determine the effects of certain impacts (see Barber-James & Pereira-da-Conceicoa 2016). An initial baseline survey will only allow for preliminary analysis of the data. Patterns of seasonal, temporal, and impact effect variance, will only be detected with long-term monitoring of selected sites. SASS 5 data provides valuable information on water quality at the time of sampling and gives an indication of instream habitat availability as depicted by invertebrate taxon diversity and biotopes present.

Another taxon useful for measuring freshwater quality is the Order Odonata, comprising dragonflies and damselflies. Western Cape dragonflies and damselflies represent ancient lineages e.g., species in the genus *Syncordulia* (Corduliidae or Emeralds), diverged about 60 million years ago. They currently survive in small populations, but are more resilient than expected, recovering quickly when invasive alien trees are removed. In the Western Cape, invasive alien trees are the biggest threat to dragonflies, shading out essential sunny habitat. There is a wide range of sensitivity of South African dragonfly's habitat disturbance (Samways & Simaika 2016). The Dragonfly Biotic Index (DBI) is an index of freshwater conditions. Each dragonfly species is rated according to distribution, threat category, and sensitivity to change. The total of DBI scores for a site divided by the number of species can be used to compare sites and to track change per site over time (Samways & Simaika 2016).

Of the 76 Odonata taxa in the Western Cape (Underhill *et al.* 2018), 25 have been recorded in or adjacent to the Walker Bay Complex. Only one of these, the Cape thorntail (*Ceratogomphus triceraticus*, Near Threatened) is of conservation concern. This species is a highly localised and rare Western Cape endemic that occurs up to an elevation of about 800 m along wide, shallow, bush-lined, and rocky streams and rivers (Samways & Simaika 2016). Threats include habitat degradation due to alien invasive trees, habitat loss caused by viticulture, and to a lesser extent, cattle farming, and plantation forestry. Over-abstraction of water from streams, and possibly pollution, is increasing threats. Alien invasive trout may also be a problem. Species such as the Cape thorntail and Palmiet sprite (*Pseudagrion furcigerum*), another Western Cape endemic, have been recorded from Vogelgat Nature Reserve, and score seven on the DBI and could serve as useful indicators of habitat change (Samways & Simaika 2016).

2.4.1.3 Marine Invertebrates

The inter-tidal zones and kelp forests around Dyer Island create suitable habitats for a large variety of marine invertebrates. These include sponges, sea anemones, zoanthids, soft corals, sea fans and sea pens, hard corals, sea firs, flat worms, bristle worms, sea spiders, barnacles, isopods, amphipods, rock lobster, rock crabs, various mollusc species, sea hares, nudibranchs, and octopus.

The kelp forest areas create a habitat for commercially exploited marine species such as abalone or commonly known as perlemoen (*Haliotis midae*), alikreukel (*Turbo sarmaticus*), and the West Coast rock lobster (*Jasus lalandii*). While none of these species have an IUCN threat status, they are all subject to heavy exploitation through legal and illegal means. Abalone is a slow-growing species in this genus that occurs on shallow reefs and in the kelp forests in the ocean around Dyer Island and Geyser Island. The survival rate of abalone from larvae to maturity is very low and is estimated at less than one in 10 000. It can take an abalone approximately seven years to reach sexual maturity, thus it is already under much pressure due to its life cycle and environment. Annual perlemoen counts are done around Dyer Island as part of the annual surveys conducted by DFFE along the coast.

There have been no formal baseline surveys of marine invertebrates within the Complex, so no species lists are available.

2.4.2 Amphibians

Fourteen amphibian species have been recorded in the Complex, but this is likely to be underestimated by at least five species. Winter surveys of the coastal areas will greatly improve the state of knowledge. Of the frog species that have been recorded, the Western leopard toad (*Sclerophrys pantherina*) is a Western Cape endemic and is listed as Endangered. It would be informative to establish whether this species has any breeding sites within the Complex, particularly on Pearly Beach. Specimens have been observed adjacent to Pearly Beach along the Hagelkraal River (N. Terblanche pers. comm.). A further two species are provincial endemics which are listed as Near Threatened namely Drewes's moss frog (*Arthroleptella drewesii*), and the montane marsh frog (*Poyntonia paludicola*).

In the mountainous, inland parts of the Complex, the moonlight mountain toadlet (*Capensibufo selenophos*) occurs. The common name relates to the type locality for this species, Maanschynkop, roughly translated as Moonlight Peak (Channing *et al.* 2017). This is a relatively recently described species that has been assessed as Data Deficient. Two threatened species occur in the close vicinity of the Complex, more specifically Pearly Beach and Quoin Point: Cape platanna (*Xenopus gilli, Endangered*), and micro frog (*Microbatrachella capensis, Critically Endangered*). Both these species have lost much of their habitat in the past, and all remaining populations should be conserved. Recent surveys for *C. selenophos* did not reveal any records from Maanschynkop or Salmonsdam land parcels (K. Lynch pers. comm).

The conservation of amphibians in the Walker Bay Complex is reliant on ensuring the persistence of wetland breeding habitat, sufficient surrounding foraging, and sheltering habitat for frogs. This will primarily be achieved by the effective control of invasive alien woody plant species, and by ensuring an appropriate fire-return interval. These management actions should be sufficiently measured and monitored under the vegetation and fire indicators, to ensure persistence of the amphibian diversity in the Complex. They will also need to be informed by the presence of the moonlight mountain toadlet, a fynbos and fire-dependent species. The presence of this species in conjunction with Drewes's moss frog and montane marsh frog, should be even more informative.

2.4.3 Fish

2.4.3.1 Freshwater Fish

The Cape Fold Ecoregion (CFE) is home to four families of indigenous freshwater fish, which is comprised of 44 fish taxa, including both described species and novel lineages (Ellender *et al.* 2017; Table 2.8). The Walker Bay Complex span four discrete river systems, namely the Bot, Klein, Uilenkraals and Ratels systems. Within these systems, indigenous fish records are limited to two species, namely the Cape kurper, *Sandelia* capensis (Family Anabantidae), and the Cape galaxias, *Galaxias zebratus* (Family Galaxidae). Both species are listed as Data Deficient due to taxonomic revision. In a review by Skelton & Swartz (2011), several genetically unique lineages were reported within South African freshwater fish, with 14 lineages reported for *G. zebratus*, and three for *S. capensis*. Subsequently, the work of Chakona *et al.* (2013) provided evidence that the four river systems relevant to the Complex, along with the adjoining Heuningnes system, are a hotspot for indigenous fish diversity. These five river systems are home to three genetically unique *Sandelia* lineages and six *Galaxias* lineages. Of the latter, five are range restricted (Chakona *et al.* 2013).

Despite the rich fish diversity and conservation importance of the area, the current configuration of the Complex does not function to effectively protect indigenous fish species. Jordaan *et al.* (2020) reported the same for most of other indigenous freshwater fish species of the CFE. This is because the Complex is located either in the headwaters of catchments (e.g., Salmonsdam) or at the coast adjacent to estuarine habitat (e.g., Uilkraalsmond). While the poor representation of fish in the Complex can largely be explained by its location in the landscape, this may be exacerbated by limited sampling efforts in or adjacent to Complex. Fine-scale surveys on the Complex land parcels and within the Zone of Influence may yield new distribution records for indigenous fish species. Threats to indigenous fish of this region and the wider CFE include the presence of predatory invasive fish and loss of habitat from water over-abstraction, poor land use practices, and pollution. Known invasive fish species from the area include black bass (*Micropterus* spp.) and bluegill sunfish, (*Lepomis macrochirus)*.

Table 2.8: Fine scale distribution of novel freshwater fish lineages within the river systems associated with the Walker Bay Complex (after Chakona *et al*. 2013).

River System	Taxa Present
Bot River	*Galaxias* sp. 'nebula'
Klein River	*Galaxias* sp. 'klein' *Sandelia* sp. 'klein'; *Sandelia* sp. 'agulhas'
Uilkraals River	*Galaxias* sp. 'nebula'; *Galaxias* sp. 'klein'; *Galaxias* sp. 'slender' *Sandelia* sp. 'uilkraals'; *Sandelia* sp. 'agulhas'
Ratel River	*Galaxias* sp. 'nebula'; *Galaxias* sp. 'klein'; *Galaxias* sp. 'heuningnes' *Sandelia* sp. 'agulhas'

2.4.3.2 Marine Fish

A total of 37 marine fish species have been recorded in the Complex. This is not an exhaustive list, as limited monitoring has been conducted in the marine environment of the Complex. Baited Remote Underwater Video (BRUV) surveys have been undertaken around Dyer Island and Geyser Rock, driven by a partner organisation, DICT. Most of the species' records are from the BRUV surveys. Six shark species have been recorded, including soupfin shark (*Galeorhinus galeus*, Critically Endangered), great white shark (*Carcharodon carcharias*, Vulnerable), and ragged tooth shark (*Carcharias taurus*, Vulnerable). The waters around Dyer Island are an important seasonal feeding ground for great white sharks (Towner *et al*. 2013). Researchers working through DICT, have demonstrated a decrease in white shark sightings around the island since 2017. This has raised concerns that the local population may be declining, and it has been postulated that this is due to predation by orcas (*Orcinus orca*), as well as over-fishing, pollution, and climate change (Micarelli *et al*. 2021). The puffadder shyshark (*Haploblepharus edwardsii*, Endangered), dark shyshark (*Haploblepharus pictus*, Least Concern), and the leopard catshark (*Poroderma pantherinum*, Least Concern) are all endemic to South Africa and Namibia. The common eagle ray (*Myliobatis aquila*) has also been recorded and is Data Deficient according to the IUCN red list.

Eleven Sparid species have been recorded, including white steenbras (*Lithognathus lithognathus*, Endangered), black musselcracker (*Cymatoceps nasutus*, Vulnerable), Roman (*Chrysoblephus laticeps*, Near Threatened), and white musselcracker (*Sparodon durbanensis*, Near Threatened). The Sparid family is especially popular as recreational angling target species, and most species in this family are over-exploited. The protected buffer area around the Dyer- and Geyser islands is important for the protection of threatened and over-exploited linefish species. Other marine fish species found in the Complex with IUCN threat statuses include dusky kob (*Argyrosomus japonicus*, Endangered), and geelbek (*Atractoscion aequidens*, Near Threatened), both of which are heavily impacted by recreational fishing.

2.4.4 Reptiles

The Walker Bay Complex has 16 reptile species recorded. This is far fewer species than expected for the area, and surveys to improve the knowledge on the representation of reptiles are recommended. The Cape dwarf chameleon (*Bradypodion pumilum*) is listed as Near Threatened. All the other recorded reptile species are listed as Least Concern. Of the reptiles that could occur in the Complex, it would be particularly valuable to know if the Vulnerable southern adder (*Bitis armata*) is present.

The conservation of reptiles in the Complex is reliant on ensuring the effective control of invasive alien woody plant species, and an appropriate fire regime. These management actions should be sufficiently measured and monitored under the vegetation and fire indicators, to ensure persistence of the reptile diversity of the Complex, but ideally the relationship between management actions and diversity should be tested.

2.4.5 Avifauna

The Walker Bay Complex has numerous different avifaunal habitats, with a total of 182 bird species recorded (SABAP2). The three offshore islands (Dyer Island, Geyser Island, and Quoin Rock) cater for several coastal and marine species. Many of these species breed on the islands, especially Dyer Island. Three portions of the Complex on the mainland are further inland and at higher altitudes, mostly covered with mountain fynbos. Species recorded on these properties are typical of mountainous habitat and include endemics such as Cape Rockjumper (*Chaetops frenatus*) and Orange-breasted Sunbird (*Anthobaphes violaces*). The other five land parcels are situated along the coast and are entirely comprised of lowland Dune Strandveld. This vegetation type contains several fruiting plants and provides habitat for a suite of frugivorous bird species such as Cape Bulbul (*Pycnonotus capensis*) and Red-faced Mousebird (*Urocolius indicus*). Their proximity to the Klein and Uilkraalsmond estuary mouths and coastal wetlands account for some of the wetland bird species recorded on the Complex, e.g., Greater Flamingo (*Phoenicopterus roseus*) and Red-knobbed Coot (*Fulica cristata*).

Twenty-one threatened bird species have been recorded from the various sections constituting the Walker Bay Complex (Table 2.9). Many of the species recorded on the mainland sections, either have relatively large territories (e.g., Verreaux's Eagle, *Aquila verreauxii*, and Secretarybird, *Sagittarius serpentarius*), or they occur in habitats adjacent to the protected areas (e.g., African Marsh Harrier, *Circus ranivorus*, and Greater Flamingo, *Phoenicopterus roseus*).

The fragmentation of the Complex, the relatively small size of each of the individual land parcels, and/or the low reporting rates of the other terrestrial birds does not lend itself to the conservation of these species. The Black Harrier (*Circus maurus*) is the only threatened terrestrial bird species that has been recorded at relatively high levels (SABAP 2) on the Complex, most notably on the Quoin Point land parcel. The average reporting rate for the Quoin Point portion of the reserve is 33.5%, which is substantially more than the lower limit of 5% used by Taylor *et al.* (2015) to identify areas of high densities for this species.

Dyer Island serves as an important conservation area for many threatened seabirds predominantly as a breeding locality. The island provides breeding habitat for thirteen species of seabirds and is recognised by BirdLife International as a Globally Important Bird Areas. It has been designated as a Ramsar Wetland of International Importance as it meets the thresholds of 1% of the global population for several waterbird species (refer to Section 2.1.5).

The African Penguin (*Spheniscus demersus*) is classified as Endangered, because of a rapid population decline. This is thought to be due to the impact of commercial fisheries, particularly those targeting anchovy (*Engraulis capensis*) and sardine (*Sardinops sagax*), and the shifts in prey populations (BirdLife International 2021a). Seventy percent of the South African breeding population of this species occurs on Dyer Island (DFFE, unpublished data), which plays a critical role in the conservation of the species. The general trend of the Dyer Island population, over the last 40 years, is a steep continual decline from ± 23 000 pairs (1979) to ± 2 300 (1999), and further to ± 1 050 in 2019 (Sherley *et al.* 2020). These declines have been offset to a small extent by the establishment and growth of land-based colonies at Boulders and Stony Point. However, this is not enough to offset the overall 95% decline on Dyer Island over the past 40 years.

Studies on penguin foraging behaviour at Dyer Island have shown that adult penguins have a larger foraging range, and that chicks are in poorer condition and grow slower than at other breeding colonies. This suggests that access to food is a limiting factor (CapeNature 2012). To better understand the impact of pelagic fisheries in the vicinity of African Penguin breeding colonies, CapeNature participated in an island closure feasibility study that included Dyer Island (CapeNature 2012). In 2023, an expert international review panel on fishing closures and limitations around key African Penguin colonies resulted in a decision by the DFFE to implement fishing limitations for the small pelagic fishery (sardines and anchovies) around six offshore islands, including Dyer Island. The 10-year restrictions will address threats such as competition with fisheries for food, ship traffic with its associated noise and vibrations, pollution, and degradation of suitable nesting habitats.

The offshore land parcels of the Complex, particularly Dyer Island, also provide important breeding habitat for four species of cormorant. Dyer Island supports 11-75% of the South African breeding population of Cape Cormorant (*Phalacrocorax capensis*), and 10% of the South African breeding population of Crowned Cormorant (*Phalacrocorax coronatus*) (DFFE, unpublished data).

Together, Dyer Island and Quoin Rock support 4% of the South African breeding population of Bank Cormorant (*Phalacrocorax neglectus*) (DFFE, unpublished data) and several breeding pairs of White-breasted Cormorant (*Phalacrocorax carbo lucidus*). The global populations of both Cape and Bank Cormorants (both Endangered) have undergone rapid declines. For the Cape Cormorant, this is primarily attributed to collapsing epipelagic fish stocks, but also oiling and avian cholera outbreaks (BirdLife International 2021b). For the bank cormorants, the decrease is thought to be due to human disturbance, displacement by seals, and food shortages (BirdLife International 2021c).

On Dyer Island, threats to cormorants are in line with those identified above i.e., insufficient food resource. Cape Cormorants feed on pelagic shoaling fish up to 10-20 km offshore and up to 40 km from breeding colonies and, like African Penguins, will benefit from the 10-year fisheries restrictions around the island. Bank Cormorants feed close inshore on bottom- and reef-dwelling marine invertebrates such as rock lobster, octopuses, and cuttlefish. Other threats include drowning in lobster traps, avian cholera, human disturbance at nest sites, oil pollution, plastic pollution, predation by Cape fur seals, nest blowing during storms and extreme weather conditions resulting in chick mortalities (CapeNature 2012).

Leach's Storm Petrel (*Oceanodroma leucorhoa*), which is currently listed as globally Vulnerable, is a common summer visitor to the west and south coasts of southern Africa. They primarily breed on islands in the northern Pacific, and northern and southern Atlantic Oceans (CapeNature 2012). Breeding by Leach's Storm Petrel on Dyer Island was first recorded in 1997, and unpublished DFFE data indicated that the island supports the entire South African breeding population of this species. Threats to the Dyer Island colony include predation by Kelp Gulls, human disturbance, lack of protected breeding sites, competition for breeding sites by cormorants, and the Argentine ant (*Linepithema humile*) (CapeNature 2012).

Three species of tern breed on Dyer Island. The most numerous of these is the Swift Tern (*Sterna bergii*). Twelve percent of the South African breeding population of regionally Endangered Roseate Tern (*Sterna dougallii*) occurs on the island, which is one of only three locations for the species in South Africa. One of the threats to the species is human disturbance at breeding colonies, and as a result, access and staff patrols are restricted on the island during the breeding season of the species. Dyer Island is not a key site for the conservation of the third species of tern, Caspian Tern (*Sterna caspia*), as the numbers of breeding pairs are low compared to other breeding colonies (DFFE, unpublished data).

Monitoring of seabirds according to national monitoring protocols, especially of the threatened species breeding on Dyer Island and Quoin Rock, is imperative to determine population trends and the success of mitigation measures to reduce the threats impacting these species. There have been several monitoring activities which have taken place to date for the African Penguin and priority seabirds on Dyer Island.

Data extracted for Dyer Island from a recent report by Makhado *et al.* (2023) on certain seabird population trends and effects at various Cape Nature sites is shown in Figure 2.17.

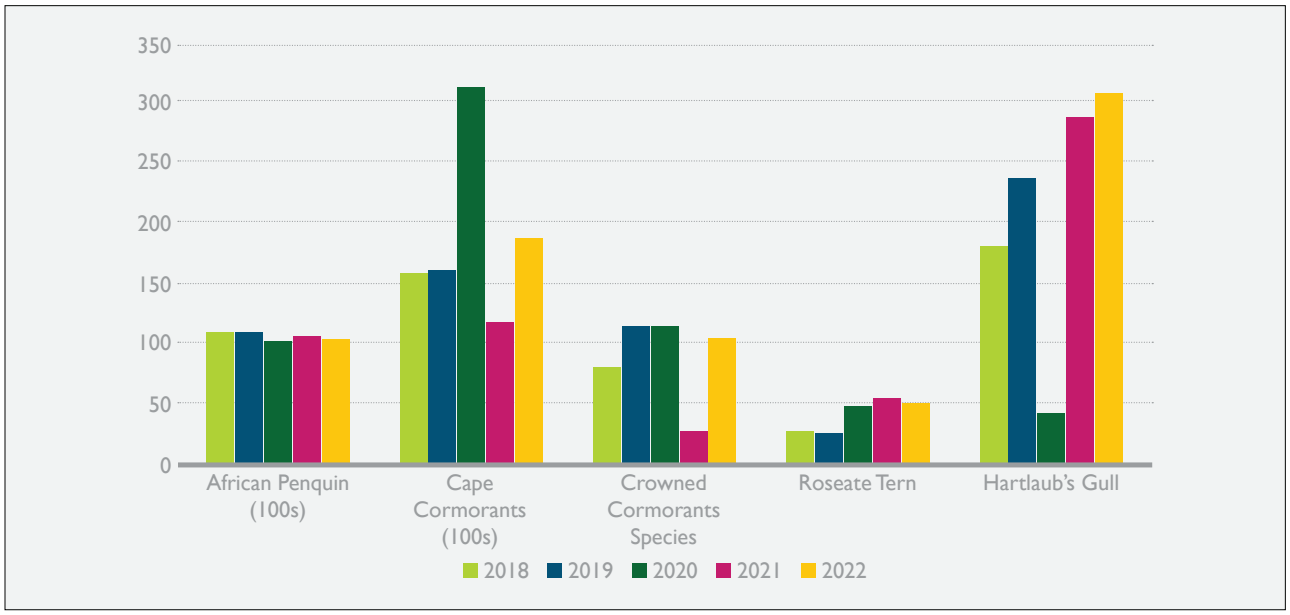


Figure 2.17: Selected seabird population trends on Dyer Island (Makhado *et al* 2023).

For other threatened species, surveillance monitoring is encouraged to track population and distributional changes, and is achieved through participation in national programs, especially the South African Bird Atlas Project (SABAP).

Table 2.9: Regionally and globally threatened species recorded within the Walker Bay Complex.

Scientific Name	Common Name	Conservation Status (Regional) Taylor *et al*. 2015	Conservation Status (Global IUCN 2023)
Hydrobates leucorhous	Leach's Storm Petrel[1,2]	Critically Endangered	Vulnerable
Spheniscus demersus	African Penguin[1,2]	Endangered	Endangered
Phalacrocorax neglectus	Bank Cormorant[1,2]	Endangered	Endangered
Circus maurus	Black Harrier[1]	Endangered	Endangered
Phalacrocorax capensis	Cape Cormorant[1,2]	Endangered	Endangered
Circus ranivorus	African Marsh-harrier	Endangered	Least Concern
Sterna dougallii	Roseate Tern[1,2]	Endangered	Least Concern
Sagittarius serpentarius	Secretarybird	Vulnerable	Endangered
Neotis denhami	Denham's Bustard	Vulnerable	Near Threatened
Falco biarmicus	Lanner Falcon	Vulnerable	Least Concern
Hydroprogne caspia	Caspian Tern[2]	Vulnerable	Least Concern
Aquila verreauxii	Verreaux's Eagle	Vulnerable	Least Concern
Chaetops frenatus	Cape Rock-jumper	Near Threatened	Near Threatened
Numenius arquata	Eurasian Curlew[2]	Near Threatened	Near Threatened
Campethera notata	Knysna Woodpecker	Near Threatened	Near Threatened
Microcarbo coronatus	Crowned Cormorant[1,2]	Near Threatened	Least Concern
Certhilauda brevirostris	Agulhas Long-billed Lark	Near Threatened	Not Recognised
Phoenicopterus roseus	Greater Flamingo	Near Threatened	Least Concern
Limosa lapponica	Bar-tailed Godwit[2]	Not Recognised	Near Threatened
Calidris ferruginea	Curlew Sandpiper[2]	Least Concern	Near Threatened
Geocolaptes olivaceus	Ground Woodpecker	Least Concern	Near Threatened

[1] Denotes those species for which the Complex is important.
[2] Denotes coastal, estuarine, and marine species.

2.4.6 Mammals

2.4.6.1 Terrestrial Mammals

Twenty-seven indigenous terrestrial mammal species have been recorded in the Complex. All are Least Concern, except for leopard (*Panthera pardus*), grey rhebok (*Pelea capreolus*), and African striped weasel (*Poecilogale albinucha*). None of these species are endemic to the Western Cape, except for the Cape grysbok (*Raphicerus melanotis*) which is near-endemic to the Western Cape province (Table 2.10). Some of the species which occurred historically in or around the Complex, but are no longer present in wild form, are the African elephant (*Loxodonta africana*), African buffalo (*Syncerus caffer caffer*), black rhinoceros (*Diceros bicornis bicornis*), blue antelope (*Hippotragus leucophaeus*, Extinct), Cape zebra (*Equus capensis*, Extinct), giant buffalo (*Pelocovis antiquus*), hippopotamus (*Hippopotamus amphibius capensis*, Extinct), quagga (*Equus quagga*, Extinct), and probably also lion (*Panthera leo*) (Kraaij *et al.* 2008; Skead 2011).

Table 2.10: Priority mammal species of the Walker Bay Complex.

Scientific Name	Common Name	Conservation Status (Regional) Child *et al.* 2016	Conservation Status (Global IUCN 2023)	Ecotypical Species
Oreotragus oreotragus	Klipspringer	Least Concern	Least Concern	Yes
Panthera pardus	Leopard	Vulnerable	Vulnerable	-
Pelea capreolus	Grey Rhebok	Near Threatened	Near Threatened	Yes
Poecilogale albinucha	African striped weasel	Near Threatened	Least Concern	-
Raphicerus campestris	Steenbok	Least Concern	Least Concern	Yes
Raphicerus melanotis[1]	Cape grysbok	Least Concern	Least Concern	Yes
Sylvicapra grimmia	Common duiker	Least Concern	Least Concern	Yes

[1]Near-endemic to the Western Cape

The leopard (*Panthera pardus*) is a keystone species which regulates terrestrial ecosystems through its role as an apex predator. The main threats to leopards are unsustainable levels of persecution, illegal hunting, habitat loss, and fragmentation (Swanepoel *et al.* 2016). Leopard genetic variability depends on gene flow (dispersal) between subpopulations over large areas (Swanepoel *et al.* 2016). Studies suggest that in the Agulhas region, stretching from Walker Bay in the west to De Hoop in the east, the leopard subpopulation is genetically distinct from populations elsewhere in the Western Cape (Landmark Foundation, pers. comm.). It may be that this subpopulation has become isolated over time, because of habitat transformation and fragmentation due to urban development. Research suggests that leopards avoid modified environments, and males select areas with fewer threats. However, female habitat selection is also strongly affected by social factors (Landmark Foundation, pers. comm.). Straight-line movements, recorded from leopard satellite tracking data, indicate the importance of corridors linking patches of suitable habitat, particularly riverine corridors (Landmark Foundation, pers. comm.), and thus the importance of ecological connectivity between the components of the Complex. Collared leopards have been recorded moving across the mountain ranges encompassing Babilonstoring, Maanschynkop, and Salmonsdam. The Agulhas region is thought to be able to support a maximum of 14 leopards, with leopard density estimated at about 0.69 individuals/100 km^2 (Landmark Foundation, pers. comm.).

A single species of mesopredator, caracal (*Caracal caracal*), has been recorded in the Complex. The presence of leopard and mesopredators can serve as a useful representative for overall mammalian species diversity (Tshabalala *et al.* 2021). Smaller omnivorous species, which are also important predators, include honey badger (*Mellivora capensis*), Cape genet (*Genetta tigrine*), and striped polecat (*Ictonyx striatus*).

There are relatively few game species in the Complex and most of these are small to medium antelope which are ecotypical (i.e., comprise discrete populations below the level of subspecies that can be recognised on genetic, phenotypic, or zoogeographic grounds), and are thus of conservation concern (Table 2.10). Some of these game species, such as the common duiker (*Sylvicapra grimmia*) and klipspringer (*Oreotragus oreotragus*), are important contributors to the diet of leopards in the Western Cape (Swanepoel *et al.* 2016). Small game species, such as the abovementioned, are important indicators of the overall

ecological state of the Complex. Cape grysbok, for example, is sensitive to human disturbance, vulnerable to illegal snaring and hunting with dogs, and may also be impacted by invasive alien vegetation (Palmer *et al.* 2016). Another priority game species in the Complex, the grey rhebok (*Pelea capreolus*), is threatened by illegal hunting for sport and for bush meat, predation by feral dogs, habitat loss, and fragmentation (Taylor *et al.* 2016).

Sightings of large game, such as ostrich, bushbuck, and eland, within the Complex are either a result of the game which previously occurred on Salmonsdam, or because of escapees from game farms. Prior to 1981, when Salmonsdam was taken over by the then Department of Nature and Environmental Conservation, it was managed as a game park with a 100-ha camp, in the southern section, planted with pastures for imported game, sheep, and cattle (CapeNature 2003b).

Some of the common and widespread, but ecologically important, species recorded in the Complex include Cape porcupine (*Hystrix africaeaustralis*), rock hyrax (*Procavia capensis*), and baboon (*Papio capensis*). Wide-ranging species, such as leopard and baboon can serve as indicators of ecosystem health (Cadman 2016). Micromammals also play important ecological roles and can serve as indicators of ecosystem condition. Three terrestrial micromammal species have been recorded in the Complex, namely the forest shrew (*Myosorex varius*) last recorded in 1988 within Walker Bay and Pearly Beach, the striped mouse (*Rhabdomys pumilio*) within the Complex (last record 2019), and the lesser dwarf shrew (*Suncus varilla*) recorded on Dyer Island in 1999. There are no bat records for the Complex in the CapeNature State of Biodiversity database, but there are Virtual Museum records of three common and widespread insectivorous bat species (MammalMap, http://vmus.adu.org.za/). Although there are no records of Cape clawless otter, *Aonyx capensis,* (Near Threatened, Okes *et al.* 2016) in the Complex, this species has been recorded near Walker Bay and Uilkraalsmond, and likely uses the coastal areas of the Complex.

The only recent records of domestic animals within the Complex, are of domestic dogs (*Canis familiaris*) in Maanschynkop (2014 and 2020). There are no records of NEM:BA listed invasive alien mammals (Government of South Africa 2016) in the Complex. Seabirds on offshore islands, such as Dyer Island, are however, extremely vulnerable to invasion by domestic rats and mice. These rodents are strong swimmers and could easily reach the islands from fishing boats that are within the vicinity of the island. It is thus essential that a close watch be kept for their presence.

The State of Biodiversity database contains records of all taxa recorded by, or reported to, CapeNature within the Western Cape Province, including the Walker Bay Complex. About four-fifths of the records for the Walker Bay Complex were obtained in the last 10 years indicating increased effort during the last decade. Around two-thirds of records are from three land parcels within the Complex, namely Dyer Island (only one record not of Cape fur seals, *Arctocephalus pusillus*), Maanschynkop (mostly collected during 2011), and Salmonsdam (mostly collected during 1999 and post-2016). The number of records for the Complex could be increased through increased use of camera traps. Camera traps are currently in use at Maanschynkop, with several years of data collected to date. A short-term camera trap project was conducted within Salmonsdam in 2014 by a Work Integrated Learning student. Camera traps are particularly helpful for obtaining records of species that are difficult to observe, e.g., nocturnal, and cryptic animals. Indirect observations of scat or spoor can also be informative. More systematic biodiversity surveys, in combination with the camera traps, can reduce the bias in terms of recording both the presence and relative abundance of species within the Complex.

2.4.6.2 Marine Mammals

Marine mammals found in the Walker Bay Complex include both a terrestrial and marine component. Several marine mammal species have been recorded in and around the Complex. A large breeding colony of Cape fur seals (*Arctocephalus pusillus pusillus*) is found on Geyser Island and Quoin Rock. The seals breed on land but forage within the ocean space around the island and coastal land parcels. Cape fur seals are listed as Least Concern, and the global population is increasing. In 2010, Geyser Island was one of the four largest seal colonies in South Africa (Kirkman 2010). Seal predation on seabirds at Dyer Island has been recorded and is a concern because of its impact on threatened species, particularly the African Penguin and Cape Cormorant. The rate of seal predation on these two species is thought to be unsustainable (Makhado 2009). The removal of individual seals which regularly hunt seabirds is a management intervention that is supported.

Several whale and dolphin species occur in the marine area around the Complex. The southern right whale (*Eubalaena australis*, Least Concern) occupies seasonal calving and nursery grounds in the nearshore and protected waters of the southern Cape. Single animals start to arrive in May each year. Most mating and calving occur between June and December, after which the whales return to the Antarctic and sub-Antarctic regions. Satellite data from four females tagged in Walker Bay in 2021 revealed that while some whales from this population do utilize the well-known foraging grounds around the islands of Crozet, Bouvet and Tristan da Cunha, they also occasionally undertake long-distance migrations (one whale covered a path distance of over 15 000 km) to foraging grounds typically used by western South Atlantic right whales around the Falkland, South Georgia and South Sandwich islands (Vermeulen et al. 2023a).

Low numbers of mother and calf pairs are seen at the beginning of January. Between Hermanus and Witsand, the number of cow-calf pairs is highest in August and September as opposed to October in other areas (Vermeulen *et al.* 2019; 2020). The South African population of southern right whales is believed to be the largest breeding stock of the global population, comprising some 6116 individuals (Brandão *et al.* 2018; Vermeulen *et al.* 2019) or >30% of the total population. However, the number of whales can fluctuate greatly. There were record numbers of whales present along the coastline in 2018, but in 2019 researchers recorded the second lowest count of cow-calf pairs along the southern Cape coast since 1995 (Vermeulen *et al.* 2019; 2020). Since then, however, the population appears to have increased steadily. A five-year maximum of 556 mothers with calves was recorded between Hermanus and Witsand in 2023 with 55 of these sighted in the Walker Bay area (University Pretoria Mammal Research Institute, 2023).

Southern right whale cows generally exhibit a strong 3-year calving interval, but it appears to be increasing to between 4 and 5 years. A 4-year interval suggests either a failure to initiate gestation, or foetal loss early in gestation, after which the female switches to resting until the next breeding season. A 5-year interval is likely due to foetal loss late in gestation, or the loss of a newborn calf. At other breeding grounds, an increase in calving interval has resulted in a decreased population growth rate. In South Africa, a slight decrease in population growth rate has already been observed from 7.1% (per annum in 2001, Best *et al.* 2001), to 6.8% in 2011, 6.6% in 2012, and to 6.5% in 2017 (Brandão *et al.* 2018). The reproductive success of southern right whales is dependent on their body condition, and therefore their foraging success. A recent study has demonstrated a 23% reduction in maternal body condition of South African southern right whales since the late 1980s, indicating a significant reduction in foraging success and/or prey availability (Vermeulen et al. 2023b).

Humpback whales (*Megaptera novaengliae*, Least Concern), Bryde's whales (*Balaenoptera brydei*, inshore population assessed as Vulnerable and offshore population as Data Deficient), and killer whales (*Orcinus orca*, Least Concern) are also regularly sighted in the coastal waters of the Complex. Bryde's whales are susceptible to entanglement in bottom-mounted fishing gear initially used by South Africa's experimental octopus fishery but the implementation of mandatory changes to fishing hear have drastically reduced the number of entanglements (Segre et al. 2022). There have also been two sightings of sperm whales (*Physeter macrocephalus*, Vulnerable) in the coastal waters off the coast of Walker Bay. The bay areas at Pearly Beach and Franskraal, as well as the adjacent Walker Bay Whale Sanctuary Marine Protected Area (MPA) provide protection and sanctuary to whales during the breeding season.

Dolphin species are found in the coastal waters of the Complex, include a resident pod of Indian Ocean humpback dolphins (*Sousa plumbea*, Endangered). Research into the use of acoustic technologies to define signature whistles, for the monitoring of individuals, is being carried out by SeaSearch in collaboration with DICT. These dolphins are usually found along the coast in the shallows or inshore waters. They tend to prefer areas with open river mouths and have mainly been observed feeding in the area, such as near the mouth of the Uilkraals Estuary. They are rarely found in water deeper than 20 m, which places them in frequent contact with human activities. The same applies to the common bottlenose dolphin (*Tursiops truncatus*, Least Concern), which are usually found in coastal waters and rarely in waters deeper than 30 m. Hence, they are at risk from alteration or loss of habitat, and direct injury by vessels. Another dolphin species that is often spotted in the waters around the Walker Bay Complex is the long-beaked common dolphin (*Delphinus capensis, Least Concern)*.

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 of this Act outlines responsibilities of the state and supported bodies.

2.5.1 Heritage resources

Kaplan (1990) stated that the southern Cape is rich in archaeological resources and most of the research on the precolonial history has taken place at the coast and near-coastal zones. Research has taken place in the Overstrand's coastal plain, and the area is considered to be rich archaeological heritage with features such as shell middens, open sites, cave sites, and fish traps (Webley & Hart 2011).

2.5.1.1 Klipgat Cave (De Kelders Cave)

The Klipgat Cave, which can be found along the coast within the eastern section of Walker Bay, has been surveyed and various Middle- and Late Stone Age artefacts have been identified. These artefacts are comprised of bone, shell, pottery, and stone artefacts that are further elaborated on below (Schweitzer 1979).

Bone artefacts

In total, 383 pieces of bone artefacts were found, of which 238 were whole or broken formal tools and ornaments, while the rest were fragments, splinters and teeth showing signs of modification. It was noted that there was a high degree of craftmanship of various types of tools that were crafted from a diverse pool of animal bones. The following formal bone tools were identified: projectile parts (points; link shafts; unclassified points or linkshafts), spatulae (skin-working tools; flat spatulae; round spatulae), spoons (two pieces of rib shaped into spoons), awls (common awls; needle awls), utilised pieces (modified fragments; scapulae of sheep; animal teeth; miscellaneous utilised pieces), ornaments (tubes; rings), and tortoise carapace bowls. The most common type of bone tool was the awls, which suggests the importance of manufacturing of skin garments. The tortoise carapace bowls found have been used as containers, while the bone points and linkshafts was used for projectile hunting, as is supported by observations of Bushmen groups (Schweitzer 1979).

Shell artefacts

The shell artefacts identified were ornaments (perforated shells; perforated discs and pendants; marine shell beads; ostrich egg-shell beads), containers, and shell tools (Donax serra 'scrapers'; shell 'crescents') (Schweitzer 1979).

Pottery artefacts

The pottery artefacts identified were sherds with shale/siltstone inclusions, and sherds with quartz and other inclusions. The pottery identified within the Klipgat Cave indicates to a well-developed craft at around 2 000 years ago, as shown by skilfully made pottery pieces used during that time (Schweitzer 1979).

Stone artefacts

The stone artefacts identified were waste (chips; chunks; cores; and untrimmed flakes), utilised pieces (trimmed flakes; heavy edge-damaged pieces; single and multi-flaked cobbles; lower grindstones; rubbers combination tools; hammerstones; milled-edge pebbles; Ochre-stained pebbles and cobbles; anvils; grooved stones; and utilised quartz crystals), and formal tools (scrapers; backed tools: segments, borers, other; miscellaneous retouch) (Schweitzer 1979).

Plant and animal remnants.

Plant and animal remnants identified during the survey comprised of shellfish, fish, birds, reptiles, mammals (domestic animals: sheep, cattle, domestic dog; non-domestic animals: seals, small Bovidae, dune mole-rats; micro-mammalian fauna), and the plant species Zostera capensis (estuarine grass). It was found that between the two occupation layers (Upper Pleistocene times at approximately 13 000 years ago, and late Holocene time at approximately 2 000 years ago), there was a distinct difference in

shellfish diversity and richness. This could be as a result of either a reduction in the richness and diversity of shellfish species populations, or it could be attributed to the change in importance of shellfish during the later occupations (who relied more on domestic animals) as opposed to the earlier occupants who were primarily hunter-gatherers that only visited the coast during certain seasons (mostly winter). This is further substantiated with the appearance of the Khoekhoen with their herding practices in the southern Cape, which correlated to a decrease in the importance of hunting. There was also an increase in the length of occupation at the cave where the occupants would stay until late spring or even early summer, which might be due to their reliance on domestic stock for food (Schweitzer 1979).

2.5.1.2 Fish Traps

There are six localities (Hermanus, Gansbaai, Danger Point, Haaiklip, Pearly Beach, and Die Dam) where fish traps can be found within the inter-tidal zone adjacent to the Complex boundaries. These fish traps are made up of low stone walls constructed in semi-circles, which are then filled-up twice a month during spring high-tide, brining in the fish, after which they are trapped in the pools when the tide recedes. It is theorised that these fish traps were constructed and utilised by hunter-gatherer communities, which meant that they would have had a good understanding of the shoreline dynamics (Gribble 2006; Hine *et al*. 2010).

2.5.1.3 Shell Middens

Shell middens and associated stone features have been found on dune sand near rocky areas along the coast and further inland within the Pearly Beach and Soetfontein area. Three distinct middens, based on the predominant species found, have been identified, namely *Haliotis* (Perlemoen), *Turbo* (Alikreukel), and *Oxystele*, *Patella*, *Turbo* (Periwinkle, limpet, alikreukel) (Avery 1974).

The Heritage Features of the Walker Bay Complex is illustrated in Appendix 1, Map 15.

2.5.2 Living heritage

2.5.2.1 Stone Age

Pre-historic settlements within the Overstrand area existed along the coastline and further inland where caves were present. The settlements dated as between 70 000 and 30 000 years ago (Late Stone Age), have been found a few hundred meters inland due to the change in sea level since about 70 000 years ago (Lee 2021). With the placement of the settlements on the coastline, the cave-dwellers had a marine diet. Within and around these caves, sophisticated stone tools were found in abundance. Material that was found within the caves indicates to the first signs of religion or art. Furthermore, fish traps are found within the areas, indicating the capture and use of fish to substitute their diet. The other portion of their diet was shellfish, which is available from the rocks in the area (Lee 2021).

The most important cave, the Klipgat Cave at De Kelders, and the lesser-known cave, Klipkop Cave at Hoy's Koppie inside the town of Hermanus, have both been dated to approximately 70 000 years old. Within both caves, stone tools and refuse have been found, which authenticated the idea that cave-dwellers used the caves about 70 000 years ago (Lee 2015; Lee 2020; Lee 2021).

2.5.2.2 Soaqua and Khoekhoen

Two distinct groups have been documented in the Cape: the one following a herding way of life (Khoekhoen) and the other, a hunting-and-gathering (Soaqua or Bushmen). Archaeological evidence indicates that Soaqua or Bushmen, were the original inhabitants of the Cape and their ancestors occupied the region extending back thousands of years, whereby they subsisted through hunting game and gathering plant foods (Clift 2001). Within the Overberg area, this has been confirmed by the discovery of sites containing their paintings.

The arrival of the Khoekhoen in the Overberg area can be dated back to around 2000 years ago through evidence of sheep and pottery gathered from at least two sites in the area, namely Die Kelders (dated to about 1960) and Hawston (dated to between 1860 and 1900) (Humphreys 1989; Clift 2001). Very little is known about the social organisation of the Cape Khoekhoen and the little that is known is based on Dutch records (Clift 2001).

As identified in the earliest historical records, the Khoekhoen were comprised of several groups. However, within the south-western Cape, the two main groups that were living in the Overberg were the Hessequas and Chainoquas (Le Roux 1984; Humphreys 1989). The Chainoquas were the Khoekhoen group that occupied kraals that were mostly located along the rivers and fertile valleys of the Riviersonderend Mountains (Le Roux 1984). However, Chainoqua area can be roughly described as the area from the Hottentots Holland Mountains to around Cape Agulhas and inland to the Riviersonderend Mountains (Humphreys 1989; Clift 2001; SAHO 2020). This is one of the largest Khoekhoen areas in the order of 12 242 square kilometres (Humphreys 1989). On the other hand, the Hessequas occupied the areas to the east of the Breede River to the Keurbooms River, which divided the Chainoqua and Hessequas (Humphreys 1989). Le Roux (1984) has spatially documented the approximate areas that were occupied by the various groups at the time of the first colonial expeditions into the interior.

Within the Chainoqua area, there were four main concentration points where the Khoekhoen kraals were found (Le Roux 1984). The first group occupied the area between Grabouw and Bot River, where Chainoquas and Hessequas could be found living side by side. A Chainoqua captain, Klaas, had his kraal in the higher lying Groenland area, while Gaukau, the Hessequa leader, lived along the Bot River. The second group was under the leadership of Soeswa (who died during 1663) as the main Chainoqua leader who occupied the Villiersdorp valley along the upper reaches of the Riviersonderend. The third group occupied the land between the Riviersonderend River and the Riviersonderend mountains and smaller kraals within the area from the present towns of Genadendal and Riviersonderend. It is within this area where reports of Khoekhoen kraals occur as late as 1803. The last main concentration of Khoekhoen kraals in the Overberg is that of a group of Chainoqua captains who occupied the land adjoining the Sout River (Le Roux 1984; Clift 2001).

The Khoekhoen lived in kraals or camps (Figure 2.17), each consisting of the members of the same clan and a variety of hangers-on, which included Bushmen clients. These camps were mobile and very flexible in terms of size. Kraal size would vary depending on the availability of natural resources, seasonal migration patterns and the need for defence during raiding activities. Historical records document Khoekhoe camps that vary from about 20 huts, also called matjieshuise, to over 100 huts. Each kraal had a headman, or chief, who made decisions regarding the general well-being of the kraal (Clift 2001).

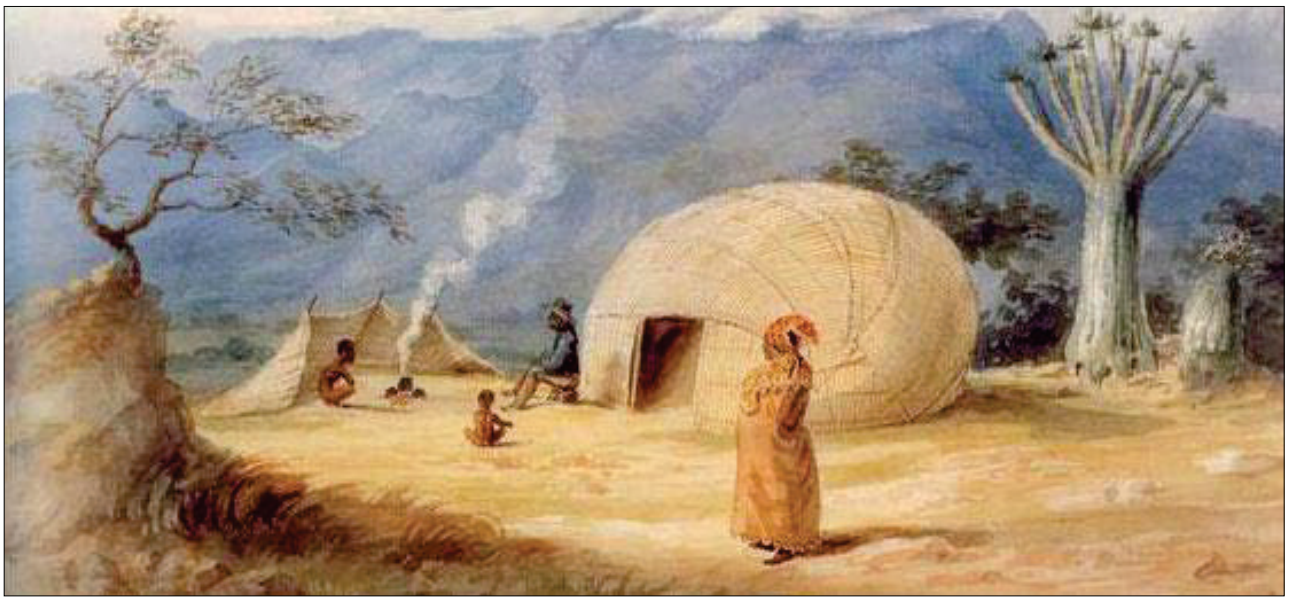
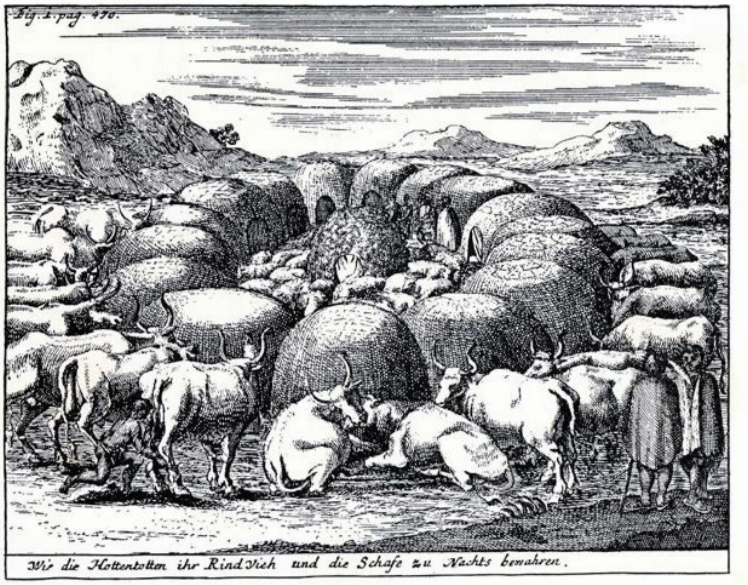


Figure 2.18: Watercolour painting (1835) by Charles Bell of a Khoekhoen settlement (McCallum 2016).

Livestock, in particular cattle, played an important role in Khoekhoen society as being the main criterion through which wealth was measured (Figure 2.18). In a society where land could not be divided amongst individuals, livestock was the most valued form of private property. The ownership of livestock was the main characteristic distinguishing Khoekhoen from Soaqua, however some groups of Soaqua did own small numbers of livestock, as confirmed through historical records. The hunting of wild game for meat and the gathering of plant food by women remained important economic activities in the Khoekhoe society (Clift 2001).



GUARDING SHEEP AND CATTLE AT NIGHT

Figure 2.19: Historical drawing (1719) by Peter Kolbe of a Khoekhoen settlement guarding their sheep and cattle at night (Sekonya 2017).

Archaeological evidence of the social and ecological impact of domestic animals, and the herding lifestyle of the Khoekhoen, on the indigenous Soaqua have been found within the Cape west coast but not yet for the Chainoqua area. Within the west coast, it was suggested that the Soaqua were forced to shift their settlements into the mountains where pasture was less attractive, with the introduction of pastoralism into the area. Early historical records from 1488 described large herds of cattle, because of the movement of Khoekhoen into the area, which would have created competition between the herds of cattle and the wild game for grazing and water (Clift 2001). Within the mountains, the Soaqua concentrated on plant foods and small but abundant animals such as tortoises and dassies rather than the larger game species they exploited before the Khoekhoen arrived. As there is evidence of the Soaqua in the mountains north of Genadendal, it is suggested that a similar pattern as the west coast could have occurred in the Chainoqua area (Humphreys 1989).

2.5.2.3 Colonialism

With the spread of pastoralism into the Cape some 2000 years ago, and more recently through the emphasis of the Khoekhoen with cattle, it can be assumed that the Soaqua had already been experiencing some degree of strain by 1652 (Humphreys 1989; Clift 2001). By this time, the Portuguese as well as English and Dutch ships, had been bartering with the local Khoekhoen for fresh meat (Figure 2.19). Indigenous stock was readily exchanged for iron, copper, beads and 'trinkets' (Clift 2001). However, the Dutch did not actively approach the Soaqua as they did with the Khoekhoen due to the perception that the Soaqua would not have anything worth trading (Clift 2001). During 1652, a European settlement (refreshment station) was established in the Cape which attracted the Chainoqua and other Khoekhoen groups. The first Dutch contact with the Chainoqua took place on 14 November 1657 where after regular trading and hunting expeditions into the Overberg region occurred (Humphreys 1989; Clift 2001). Le Roux (1984) stated that the Chief of the Chainoqua, Soeswa, visited Jan van Riebeeck in the year 1661,

establishing a stock trade agreement between the Chainoquas and the Dutch. During the years 1662 to 1713, the Chainoqua and the Hessequa were the main cattle suppliers to the refreshment station. This is evident by the size of the area they occupied and its suitability for grazing (Humphreys 1989; Clift 2001).

Figure 2.20: Historical drawing of Khoekhoen bartering their sheep and cattle with the colonists (SAHO 2019).

Since 1669, during the regular expeditions into the Overberg region, the Dutch settlers started to look for grazing areas of their own. The nomadic lifestyle of the Khoekhoen around the landscape, necessitated by the need for fresh grazing due to the relatively low nutrient value of the natural veld, made it seem to the Dutch settlers that the land was unoccupied and free for the taking (Clift 2001). During the years 1679 to 1693, the Chainoqua 'Captain' Dohra, also known as Klaas, was the go-between person in the trade relations between the Dutch East India Company officials at the Cape and the Chainoqua and the Hessequa. Dohra had a kraal at Knoflokskloof, which is near the present-day Lebanon forestry station in the Grabouw area (Clift 2001). Towards the end of the seventeenth century, the Company had many cattle-stations in the Overberg where they kept animals, bartered from the Khoekhoen, until they are needed in the Cape (Le Roux 1984).

During 1713, an outbreak of smallpox, brought on by passing ships and settlers, had a major impact on the Khoekhoen population. This, in turn, left land unoccupied. The result was an increase of European immigrants to the area and posts established by the Company within the Overberg to aid people through the provision of supplies and healthcare (Xplorio 2020).

The movement of the Khoekhoen within the Overberg were greatly limited by the escalation in the number of farms granted in freehold from the mid-18th century as this barred their access to water resources and grazing (Clift 2001). Increasing pressures on the natural resources and the limits on free access to grazing in the area became more evident in the later parts of the 18th century. Khoekhoen faced difficulty with gaining access to grazing and water resources to maintain and replenish their herds, which as suggested by Guelke & Shell (1992) was the main factor in the decline of the Khoekhoen. The only options for the Khoekhoen were to either move into territories further away, or to go into service of freeburgher stock farmers. By going into service of freeburgher stock farmers, the Khoekhoen were allowed to graze their stock on the farmers land, but this came with its own issues, such as farmers refusing to release the stock once the Khoekhoen decided to move on (Clift 2001).

During 1809, the British colonial government passed the "Hottentot Proclamation", which saw the Khoi being forced to have a fixed address and carry a magistrate issued pass to be able to travel in the colony (Schoeman 2017).

Alienation from land and its resources because of colonial expansion through the different perceptions of land ownership had a major impact on the local indigenous groups. This ultimately resulted into the disintegration of traditional Khoekhoen society (Clift 2001). Despite varying degrees of resistance to colonial domination, the Khoekhoen and the Soaqua alike lost their independence and were ultimately consumed by colonial society becoming part of the lower class occupied by slaves (Clift 2001).

2.5.2.4 Historical Points of Importance

Tesselaarsdal

Tesselaarsdal (previously spelled Teslaarsdal), located on the northern side of the Klein River Mountains within the Overberg district, was first owned by Johannes Jacobus Tesselaar, who was the first land baron, after Governor Willem Adriaan van der Stel, in the Overberg. Johannes Tesselaar was a lieutenant in the Cape Cavalry, and during this time he received two farms, Steenboksrivier and the loan farm Hartebeesrivier, as payment from Van der Stel. Johannes Tesselaar and his wife, Aaltje van der Heyde lived on the farm Hartebeesrivier with nine servants and their descendants. The servants and their descendants were as follows: Barend and Jan Frederik Bredenkamp (parents were Jan Frederick Bredenkamp and Maria Heysenberg, whose father was Antonie Heysenberg), Joggom Koert, Gert and Jan Gertse, and the Heysenberg sisters, Alida, Christina, Elizabeth, and Aletta. All the children mentioned above, as well as Maria Heysenberg, were baptised and witnessed by Johannes and Aaltje Tesselaar. There are verbal accounts indicating to the children being the illegitimate children of Johannes Tesselaar. It has been stated that Johannes Tesselaar has changed his testament through the years, and by 1804 it indicated that Hartebeesrivier farm was to be left to the Bredenkamp brothers and Heysenberg sisters. In 1809, Johannes Tesselaar's testament was changed again to include Jan and Gert Gertse and Joggom Koert as the beneficiaries of the farm Hartebeesrivier (Mouton 2014).

On his death in 1810, Johannes Tesselaar left an estate, jewels, 38 servants, and 150 horses among other things to his wife Aaltje. The Nicobar, which stranded near Quoin Point in 1783, was salvaged by Johannes Tesselaar, among others, and it is known that several wagonloads of salvaged goods were loaded off at Hartebeesrivier (Mouton 2014).

Until her death in 1832, Aaltje Tesselaar continued to farm on Steenboksrivier. The Tesselaar estate was then given to Johannes Tesselaar's nephew, of the same name. The only part of the estate that was not given to his nephew was the farm Hartebeesrivier, which was given to the servants of Tesselaar. The servants and their descendants used, exchanged, and transferred the land of Hartebeesrivier between themselves and families also occupied land through marriage. Due to confusion with another Hartebeesrivier, the Post Office changed the name of Johannes Tesselaar's Hartebeesrivier farm to Teslaarsdal, thus born the beginnings of the town of Tesselaarsdal (Mouton 2014).

Elim

The Moravian Church established the first mission station in a town later known as Genadendal in 1737 in the Western Cape of South Africa (Humphreys 1989). Due to the increase of applications to the mission station at Genadendal, a further two stations were built in Mamre (1808) and Enon (Eastern Cape) in 1818. With the ever-increasing numbers of people flocking to the mission stations, a fourth station was required. Vogelstruyskraal farm, owned by Johannes Petrus Schonke, was the first property bought by the Moravian church to build a mission station in 1824. Vogelstruyskraal was ideal as it had adequate water, fertile soil, and its location and price were good. Due to this, the property was renamed to Elim in 1825 as homage to the "place with the twelve springs and seventy palm trees where the Israelites rested on the journey to the promised land (Exodus 15:27, 16:1)". (Van der Hoven 2001; MCSA 2019).

Swiss-born, Hans Peter, founded Elim in 1824 as the head of the Moravian Missions. Before moving to the Elim mission station, Hans Peter was stationed at the Genadendal mission station between 1817 and 1840. He played a big part in the development of various aspects of the town of Elim, such as the physical layout, education, law, etc. In terms of the law and order of the town, Peter compiled a set of rules to regulate the temporal and spiritual life of the mission station (Van der Hoven 2001). Two missionaries, Reverend Bonatz and Thompson, were called to Elim, which became home to missionaries, Khoekhoen, slaves, and white farmers (MCSA 2019).

With the colonisation of the area by Europeans and the passing of the Hottentot laws, the Khoekhoen were forced out of their areas, and their geographic isolation was disrupted, which resulted in them seeking refuge at the mission stations. Here they had to give up their way of life and get baptised to receive a European Christian identity (Van der Hoven 2001). The mission station provided them with a permanent address, as was required by law, and they could work on nearby farms. Elim's first residents were a family of westernised Khoekhoen who were living at Genadendal and obtained permission to move. On 09 October 1825, Cobus Britts became the first christened individual at Elim, being baptised by Reverend Bonatz (Van der Hoven 2001).

Due to the proximity of Elim to the sea, the men would go fishing and seal pup clubbing at Dyer Island when work was scarce in the Elim surrounds. From one account by a Mr Samuel Schippers (1915), fishing and camping trips were done at Quoin Point. Elim families, who own dwellings at Quoin Point, would travel from Elim to Quoin Point to catch mullet, air-dry the fish, and sell it for income, until the 1980's. (Van der Hoven 2000). These families have made claims that they have been granted permission by Queen Victoria to occupy the property. It has been mentioned by Van der Hoven (Van der Hoven 2001) that "the authorities may well have reasoned that to grant a few Elim families the right to live here was a cost-effective way of assuring assistance to shipwrecked survivors and cargo while connecting to the existing infrastructure at Elim. However, only a thorough and lengthy search through the Colonial Letters in the Archives of the Colonial Secretary at the Cape Archives Depot would conclusively verify the claim".

Furthermore, with the proximity of Elim to the coast, the community of Elim assisted in various ways, such as the provision of food, to occupants of ships wrecked along the coast. It was also a source of income for the people of Elim as they would collect valuable cargo, which washed ashore, for the Cape authorities. In 1938, Samuel Schippers witnessed the stranding of the Avala off the coast of Quoin Point, and together with a Herman Oktober and his family they made a fire and used a flag to indicate to the surviving crew where they had to go and, in the process, saved the crews lives (Van der Hoven 2001; CWC 2014a).

Walker Bay

The Walker Bay coastline may be linked to Admiral Sir Baldwin Wake Walker who at a young 10-years old joined the Royal Navy. By 1848, Walker was the Surveyor (later called the Controller) of the Navy, an officer who was a member of the Navy Board. and held the overall responsibility for the design of British warships for the Royal Navy at Portsmouth, Britain. In this position, Walker influenced and persuaded the Admiralty to use ironclad hulls and steam power rather than wooden hulls and sails. Arriving in the Cape, Walker had already been granted a baronetcy and received various decorations. He was promptly promoted to Commander-in-Chief of the Cape of Good Hope and the West Coast of Africa Station on the Royal Navy in Cape Town (HHS 2017).

Dyer Island

During the early nineteenth century, 1806 to be precise, Samson Dyer, an African American seaman, was stationed on the now known Dyer Island (Portuguese sailors called it 'Isla da Fera in the early 1500's), by an American company called 'Cloete, Reitz and Anderson'. Samson was the first person to be stationed on the island, primarily to harvest seals for their meat, fat/oil, and skin. In addition, Samson gathered the guano (a mixture of eggshells, feathers, decayed corpses, and bird excrement) on Dyer Island to sell to farmers in the Overberg area for use as fertiliser. After guano was discovered by an American sailor, Benjamin Morrel, in 1832, it became popular and by the mid-nineteenth century there was a boom in the harvesting of guano. This resulted in the removal of guano from various islands along the South African coastline, including Dyer Island, until 1983. The removal of guano had a great impact on the African penguin population on Dyer Island, which was further exacerbated when their eggs became a popular delicacy by the late nineteenth century. This led to an increase in the collection of penguin eggs lasting from 1875 until 1968 (Shelton *et al.* 1984; Fourie 2002; DIC 2012; APSS 2019; CWC 2020; Percy Tours 2021).

2.5.2.5 Shipwrecks

Joanna/Johanna 1682

The East Indiaman Joanna, named after the Johanna Islands in the Comores, was on its six and last voyage, commanded by Captain Robert Brown, as part of a convoy from The Downs, England, bound for Surat and Bengal, India. The ship was carrying

110 crew, 36 guns, lead, copper, European-made trade goods, and 70 chests of silver pieces of eight. The lead, copper, and European-made goods would be used in India to obtain valuable raw materials, such as spice, timber, tin, porcelain, and silk cloths (Shipwreckhunter 2016). Unfortunately, due to bad weather, poor visibility and navigation, the Joanna was moving closer to the coast of South Africa, and on 08 June 1682 the Joanna went aground resting on a reef off the coast of the Die Dam. This made the Joanna the first British East Indiaman to go aground off the coast of South Africa. Fortunately, a 104 of the 110 crew members were able to save themselves and started the journey to the Cape on foot. Fortunately, they encountered Khoekhoen on their way who assisted them to the kraal of the Khoekhoen Chief, Klaas. While at the kraal, they were provided with food and guides for the journey to the Cape of Good Hope (Theal 1897; CBCT 2021). On arrival in the Cape, the Governor, Simon van der Stel, sent a group headed by a Swedish explorer, Olaf Bergh, to the wreck of the Joanna to recover any coins and other materials they could find (Shipwreckhunter 2016) (Fig. 2.20). Three hundred years later, in 1982, the Joanna was found with 44 iron cannon, over 23 000 cob coins, and a few hundred pounds of silver disc ingots (Shipwreckhunter 2016; CBCT 2021).

Figure 2.21: Historical drawing of the Joanna/Johanna (1682), and coins found on the shipwreck (Shipwreckhunter 2016).

Jessie 1829

The Jessie, a British ship built in 1826 captained by Thomas Winter, was sailing from London, via Table Bay, to Algoa Bay and Mauritius when tragedy struck on 07 October 1829, west off the coast of Quoin Point. Of the approximate 30 people who were onboard the Jessie, only three seamen survived the wrecking (TSG 1829). Since then, the sandy beach stretching from the Buffeljags settlement to Quoin Point has been called Jessies Bay by the locals (CWC 2014a). It is said that after the wrecking of the Jessie, Queen Victoria decided to grant the people of Elim the right to use the land at Quoin Point in order to provide assistance whenever a ship wreck occurred within the vicinity of Quoin Point (CWC 2014a; BG 2019).

Doncaster 1836

The Doncaster (Fig. 2.21), under the command of Captain Pritchard, began its final voyage from Mauritius to London on 20 June 1836. Around the 17th of July 1836, the Doncaster wrecked in the vicinity of the southern-most tip of South Africa, where the weather and sea conditions are known to be treacherous. Unfortunately, there were no survivors, and the bodies of the deceased were discovered on the shore by Hans Adventure. The name of ship was only known by August 1836, when the part of the stern, which held the name, washed up (Pocock 2014; BG 2019).

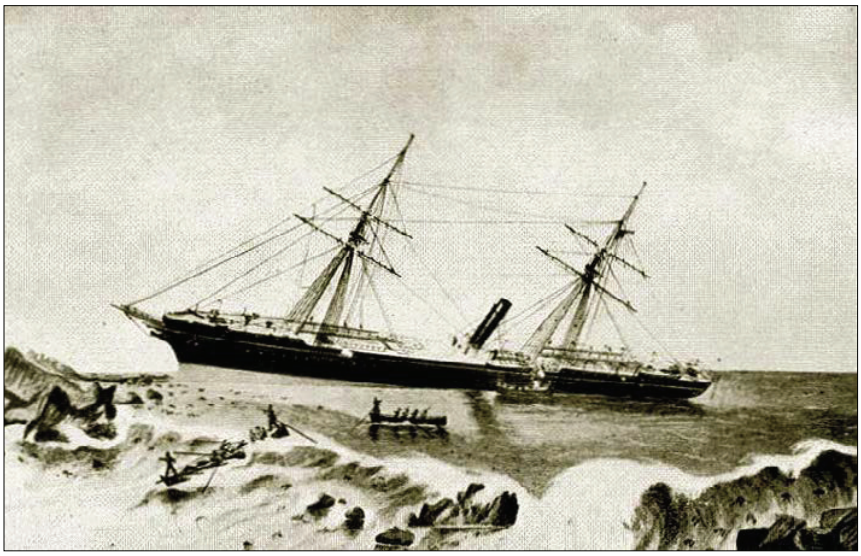


Figure 2.22: Historical drawing of the Doncaster shipwreck (1836) (BG 2019).

HMS Birkenhead 1852

The HMS Birkenhead (Fig. 2.22), under the command of Captain Robert Salmond, was the last part of its voyage from Cape Town to Port Elizabeth (CWC 2021). The Birkenhead was carrying troops and their families, nine cavalry horses, bales of hay, and 35 tons of coal. The Birkenhead struck an uncharted rock about one-and-a-half kilometres off the coast of Danger Point on the morning of 26 February 1852 (CWC 2014b; CWC 2021). The "women and children first" protocol was applied when the Birkenhead was shipwrecked and became known as the "Birkenhead Drill" because those who died where only men. It was recorded that over 440 men died with the sinking of the Birkenhead, while eight of the nine horses swam to shore (CWC 2014b; BG 2019; Vorster 2019).

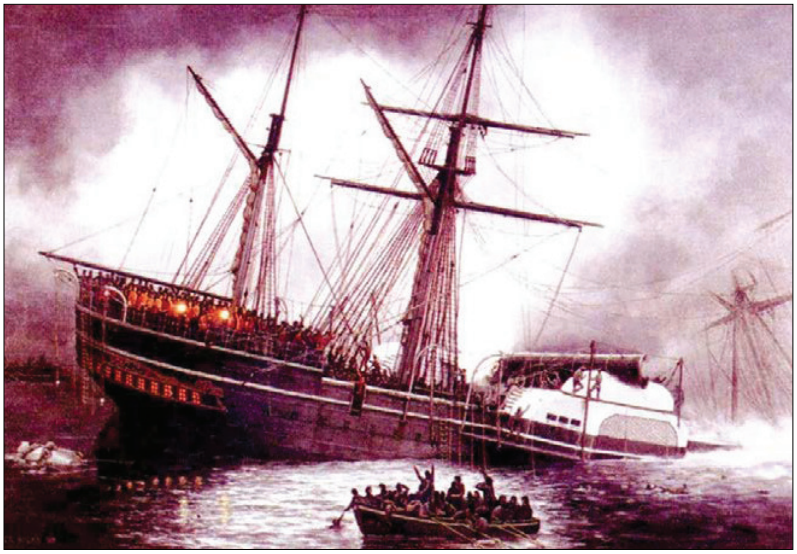


Figure 2.23: Historical drawing of the HMS Birkenhead shipwreck (1852) (CWC 2021).

Teuton 1881

On 30 August 1881, the Teuton (Fig. 2.23) was in the Danger Point area, enroute to Algoa Bay from Table Bay, when tragedy struck. The Teuton was carrying 157 passengers, of which 95 were women and children. Even though the weather conditions

were favourable, the Teuton struck the charted outermost rocks off Quoin Point, which may be attributed to Captain Edward Manning making an error when checking the heading of the ship, the instruments being faulty, or the helmsman making an error. Once the ship struck the rocks, the captain assessed the damage and with confidence in the sturdily built ship, decided to head back to Simons Bay. Unfortunately, the circumstances changed and by 21:30 the ship's bows had been flooded, causing the propeller of the ship to hover above the water. At 22:15, the captain ordered the lifeboats to be lowered and the women and children to disembark from the ship. Further tragedy struck, when the rope of the lifeboat carrying some of the women and children became entangled with the ship's pilot ladder, and the Teuton suddenly flipped almost vertically and within a minute, the ship disappeared into the water, sparing only 36, including one child of the approximately 242 passengers and crew. Even though the three lifeboats were launched and survived, they were rendered useless being upside down, making it possible for only a few to cling on. The ship's carpenter managed to upturn one lifeboat, and started to assist survivors throughout the night, after which they upturned the other two lifeboats and started sailing to Simons Bay (Warr 2015; BCSC 2021).

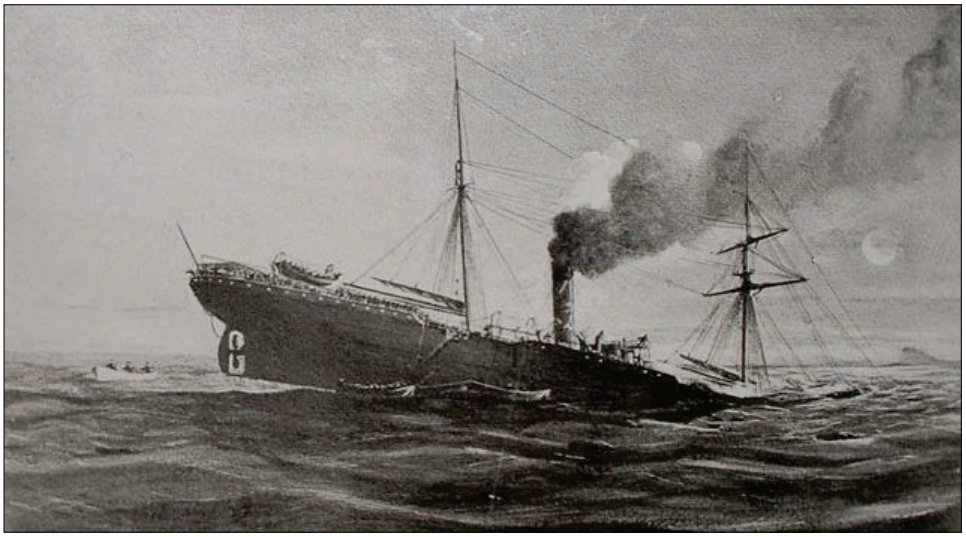


Figure 2.24: Historical illustration of the sinking of the Teuton (1881) by P. H. Siems (Warr 2015).
A list of the shipwrecks located along the coast of the Walker Bay Complex appears in Table 2.11.

Table 2.11: List of shipwrecks located along the coast of the Walker Bay Complex (DMP 2004).

Ship	Area	Vessel-category (Type)	Nation	Date Wrecked
Nicobar	Ratel River Mouth	Wooden Sailing Vessel (East Indiaman)	Danish	07/11/1783
John	Between Klein River and Franskraal – Die Kelders	Wooden Sailing Vessel (Brig)	British	09/16/1803
Jessie	Near Ratel River	Wooden Sailing Vessel (Ship)	British	10/07/1829
George	Dyer Island	Wooden Sailing Vessel (Cutter)	-	05/13/1831
Linnaeus	Reef (Dyer Island)	Wooden Sailing Vessel (Barque	British	01/16/1834
Malton	Walker Bay	Wooden Sailing Vessel (Snow)	British	10/18/1841
John and James	Danger Point	Wooden Sailing Vessel (Barque)	British	09/01/1844
Birkenhead	Birkenhead Rock	Iron Paddle Steamship (Frigate)	British	02/26/1852
Japarra	Off Quoin Point	Sailing Vessel (Barque)	Dutch	10/03/1856
Albert	Danger Point	Wooden Sailing Vessel (Schooner)	South African	02/01/1857
Lucy	Birkenhead Rock	Sailing Vessel (Brig)	South African	02/16/1864
La Souvenance	Quoin Point	Wooden Sailing Vessel (Barque)	French	05/19/1871
Souvenance	East of Quoin Point	-	-	05/22/1871
Albatros	Danger Point	Sailing Vessel (Schooner)	Norwegian	03/24/1874
Emelia	North-east of Dyer Island	Sailing Vessel (Schooner)	British	02/03/1877
Charmer	North-west of Point of Dyer Island	Wooden Sailing Vessel (Full-rigged ship)	British	08/24/1877
Racer	9 miles off Quoin Point	Wooden Sailing Vessel (Brigantine)	British	01/27/1879
Eagle Wing	Quoin Point	Wooden Sailing Vessel (Schooner/Brig)	British	02/22/1879
Clyde	Reef (1km north of Dyer Island)	Iron Screw Steamship (Transport)	British	04/03/1879
Teuton	8 miles from Danger Point	Iron Screw Steamship (Mailship)	British	08/30/1881
Kolstrop	Dyer Island	Sailing Vessel (Brigantine/Schooner)	German	05/11/1883
Princeport	Reef (Dyer Island)	Wooden Sailing Vessel (Ship)	British	03/19/1885
Imerina	Dyer Island	Iron Screw Steamship (Cargo Ship)	South African	10/11/1885
Adele	Dyer Island	Sailing Vessel (Schooner)	South African	05/21/1888
Galina	Danger Point	Sailing Vessel (Barque)	-	01/01/1892
Cumeria	Quoin Point	Steel Steamship	British	07/02/1900
Verona	Off Danger Point	Sailing Vessel (Barque)	Norwegian	08/11/1902
Boela	Off Danger Point	Fishing Vessel	-	06/15/1905
Star of the Peace	Quoin Point	Steel Steamship (Trawler)	British	11/16/1906
Star of the Isles	Off Quoin Point	Steel Steamship (Trawler)	British	02/07/1908
Tasmania	Near Danger Point	Steel Steamship (Whaler)	British	10/13/1912
Hektor	South of Dyer Island	Steel Steamship	Norwegian	03/23/1913
Tyndereus	Off Danger Point	Steamship (Troopship)	British	02/06/1917
Avala	1km west of Quoin Point	Steel Screw Steamship (Tramp)	Yugoslavian	02/03/1939
Jimmy Le Roux	Dyer's Island	-	-	04/28/1943
Hannington Court	10 Miles off Dyer's Island	Steel Motor Vessel (Cargo Ship)	British	07/14/1941
City of Lincoln	Quoin Point	Steamer (Tramp)	British	11/09/1946
Swona	Near 'City of Lincoln'	Motor Vessel (Salvage Vessel)	South African	12/08/1946
Fynd	Quoin Point	Motor Vessel (Salvage Vessel)	South African	12/18/1946
Esso Wheeling	The Point	Motor Vessel (Tanker – Oil)	American	11/05/1948

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 plan for 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), which indicates this on a broader spatial dimension.

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. The Walker Bay Complex falls within the Overberg District Municipality (Appendix 1, Map 1). The Overstrand and Theewaterskloof Local Municipal IDP's are relevant to the Complex.

The primary land use in the Theewaterskloof Municipal area is agriculture, with the agriculture, forestry and fishing sector providing the major source of employment opportunities (29,4% in 2017) within this municipal area. One of the Overberg District's largest fruit and vegetable export economies falls within the Theewaterskloof Municipal area (UDWC 2019).

The Overstrand Municipal area consists of three broad landscape zones. The first is the coastline, which stretches from False Bay to the Cape Agulhas Peninsula, where thirteen coastal towns are located within. The second, the coastal plain forms the base for mainly extensive agricultural activities, such as the farming of wheat, flowers, canola, and dairy products. The third and final landscape zone, the mountainous zone, is comprised of amongst other, expansive protected natural areas, privately owned forest plantations, small-holdings, and larger agricultural holdings, including wine farms. Within the Overstrand Municipal area, tourism is the second major economic driver, while the 'Wholesale & Retail Trade, Catering & Accommodation' sector contributing the most, with 26.6%, to employment in 2017 (OM 2021). Agricultural land use contributes significantly to the Overberg District economy, however within the Overstrand Municipality, due to economically non-viable agricultural operations, the agricultural land use areas are being replaced with other land use types to supplement the farming activities and provide alternative income sources. The main categories of non-agricultural land uses are game lodges, resorts, small holdings, farm stalls, guest accommodation, extensive industries, and agri-industries (UDSC 2020).

The Overstrand Municipal area's population density can be classified as high and is the most densely populated in the Overberg District with 61 people/km^2, which is mainly driven by the influx of lower income job seekers. Zwelihle contributes significantly to this number with the highest population (18 210) and a population density of 8 615 people/km^2 (UDSC 2020; WCG 2020a).

Population density in the Theewaterskloof Municipal Area can be classified as medium and is the second most populated in the Overberg District with 38 people/km^2. Due to the agricultural sector being the largest source of employment within the Theewaterskloof Municipal area, the rural population makes up 26% of the Theewaterskloof Municipal area's total population (WCG 2020b; UDWC 2019).

Urban sprawl is applicable to towns in the Overstrand Municipal area that fall within the Walker Bay Complex Zone of Influence, due to the proximity of several settlements. In the Overstrand Municipal area, available land suitable for development is extremely scarce in part due to the mountainous topography on one side and ocean on the other. Sustainable development, with minimum negative impact on natural resources, is a challenge in the Overstrand Municipal area (UDSC 2020).

The Overstrand Municipality's spatial management concept is to direct growth and development, within a well-defined land use management framework, to areas with high potential and physical capacity that could accommodate long term sustainable growth. The Growth Management Strategy, developed by the Overstrand Municipality, forms part of the Municipality's SDF and focuses on using densification as the main tool to mitigate urban sprawl (UDSC 2020). Such urban extension areas have been identified in Kleinmond, Fisherhaven, the Greater Hermanus area, Stanford, and the Greater Gansbaai area (UDSC 2020).

The focus within this management plan is on the towns that are found within the Complex's Zone of Influence, namely the Greater Hermanus, Greater Gansbaai - De Kelders, Pearly Beach, and Buffelsjags. The Greater Hermanus area requires the provision of a range of residential housing types and appropriate densification, as per the provisions of the Overstrand Growth Management Strategy (OGMS), to retain the character of the Greater Hermanus, while ensuring appropriate growth to address the growing population's household needs. No new urban development areas/urban edge amendments are proposed for the Hermanus areas. No new development is proposed for the towns of De Kelders, Franskraal, and Pearly Beach, however it is recommended that these towns be densified in accordance with the OGMS to accommodate the housing need within the Overstrand area. Buffelsjags has not been proposed for densification as the urban edge has been amended to accommodate future growth (UDSC 2020).

Socio-economic information for the Overberg District Municipality as well as Overstrand Municipality, and Theewaterskloof Municipality is provided below (Table 2.12) as obtained from the Western Cape Government Socio-Economic Profiling (SEP) (WCG 2020a-c).

Table 2.12: Socio-economic information for the District and Local Municipalities relevant to the Walker Bay Complex (WCG 2020a-c).

Municipality	No of Residents (2020)	Households (2019)	Unemployment Rate[1] (2019)	Indigent Households (2016)	Summary of Socio-economic Risks (According to SEP 2020)
District Municipality					
Overberg	300 043	85 754	10.4%	20 058	• Low Economic Growth • Low Skills Level • Low Learner Retention Rates
Local Municipality					
Overstrand	104 748	29 441	15.4%	7 665	• Low Economic Growth • Low Skills Level • Low Learner Retention Rates
Theewaters-kloof	121 473	34 610	11.3%	7 959	• Rising Unemployment • Informal Sector Expansion • Low Skills Base (Labour)

[1]Economically active people.

Considering the above demographics and challenges, economic and social development in many of the communities around the Walker Bay Complex remain a challenge, particularly those situated in isolated rural settlements. The management of this Complex therefore must strive towards job creation to help mitigate the unemployment and poverty rates. It is currently done through the central government EPWP programme together with the CapeNature Integrated Catchment Management (ICM) programme. The programmes strive to employ a high number unskilled and semi-skilled youths (55%), women (55%) and disabled persons (2%). The threat of invasive alien plants to the Complex as described in Section 2.3.1.3 provides for opportunities for employment within these programmes while simultaneously addressing ecological concerns.

Local economic development is also promoted through the appointment and development of local services providers (Small, Medium, and Micro-sized Enterprise, SMME's). A further aim of the employment of unskilled workers is to up-skill them through specific training sessions to be able to be permanently employed within various economic sectors. Strategies related to job creation and local economic development are described in Section 10.

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 NEM: PAAt, 2003 (Act No. 57 of 2003), National World Heritage Convention Act, 1999 (Act No. 49 of 1999), and 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 (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 Walker Bay 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, and
- 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, and
- 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 (CCNet 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 facilitate strategic adaptive management through a systematic evidence based participatory process with stakeholders (CMP 2020). The systematic approach makes explicit the links between goals, conservation targets, threats, strategies, and actions, enabling management to define and measure success of their actions in the protected area 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), and
- 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 targets will ensure the conservation of all indigenous biodiversity and cultural historic heritage within the protected area 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 wellbeing. 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 goals and conservation strategies with associated objectives, indicators, and work plans.

As such, step one of the adaptive management framework, illustrated in Figure 3.1, is foundational to effective management of the area.

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 protected area. 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 protected area. They can also include the physical, cultural and/or historic features from which human wellbeing values are derived.
- Human wellbeing values are the intangible or non-material values derived from tangible values, and which collectively represent the array of human wellbeing 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 conservation targets and achieving objectives (Hockings *et al.* 2015). The following questions underpin management effectiveness evaluation (Leverington & Hockings 2004):

- Is the protected area effectively conserving the conservation targets 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 – South Africa (METT-SA) which is based on the six elements of good management:

- It begins with understanding the **context** of existing conservation targets 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 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 conservation targets and effectiveness of strategies. Results contribute to the 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.

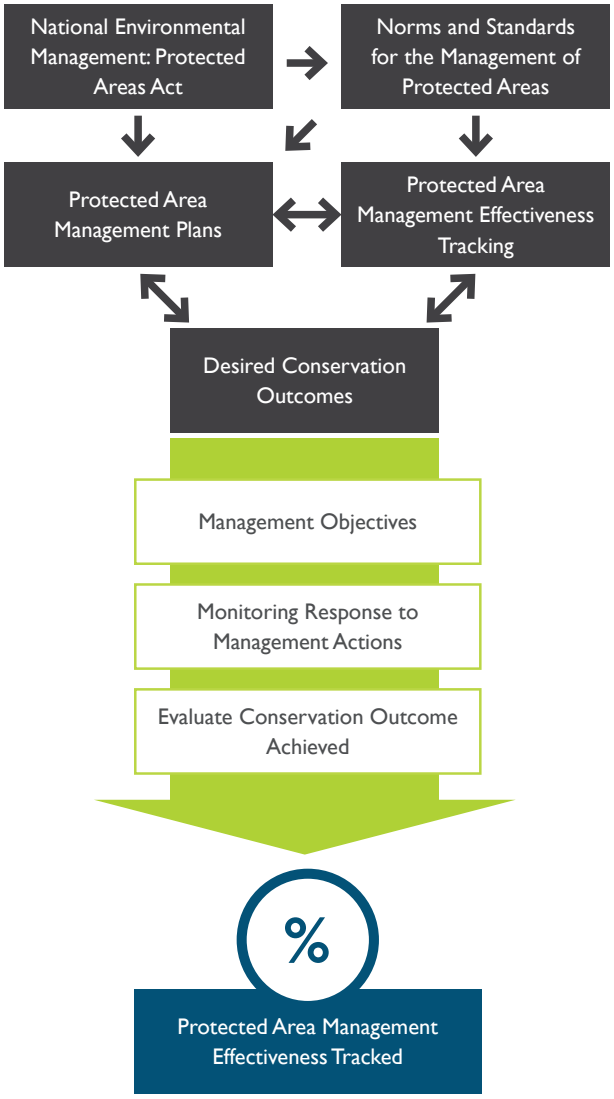


Figure 3.2: Protected area monitoring and evaluation framework.

3.5 Policy Frameworks

Protected area management is guided by CapeNature policies, procedures, and guidelines for use across the organisation. 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 prescribed norms and standards, make rules for the proper administration of the area.

In addition to the Regulations for the Proper Administration of Nature Reserves, as gazetted on 12 February 2012 in Government Gazette 35021, and Regulations for the Proper Administration of Special Nature Reserves, National Parks and WHSs, as gazetted on 28 October 2005 in Government Gazette 28181, the Walker Bay Complex is also subject to the Western Cape Biodiversity Act, 2021 (Act No. 6 of 2021), the Provincial Notice 955 of 1975, 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 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. This 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 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 shall be:

- 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, and
- To generate income, within the framework of the applicable policy framework.

Funding for the entity comprises three main revenue streams. Most of the funding, which equates to approximately 80% of funding, 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 the entity.

The organisation 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 2023) establishes and provides emergency response procedures and protocols which need to be implemented should an event significantly disrupt the operations of the organisation, or an emergency is declared by management. The plan identifies critical services, how it will be maintained, how to minimise the impact, increase preparedness and initiate an effective response.

Integrated Compliance Plan: The Integrated Compliance Plan for the Walker Bay Complex details how compliance and enforcement will be implemented in the Complex to:

- Prevent biodiversity loss caused by human activities in the Complex through the implementation of active and passive compliance and enforcement operations.
- Gather data regarding species targeted and illegal activities for future planning.
- Ensure compliance with legislation through the monitoring of activities in the Complex.
- Address and combat illegal activities through the institution of criminal proceedings.
- Report illegal activities to the delegated authority where activities have a negative impact on the Complex.

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

Fire Protection Associations: CapeNature is obliged in terms of the National Veld and Forest Act (Act No. 101 of 1998) to be a member of the local FPA. Within the Western Cape, five large FPAs have been established that cover the whole province. The Walker Bay Complex is a member of the Kleinriviersberg Fire Management Unit and Greater Overberg FPA. FPAs are the primary partnership tool in veldfire management in South Africa.

Integrated Fire Management Plan: The Integrated Fire Management Plan is essentially a derivative and part of the management plan, of which the latter details the objectives of the Walker Bay Complex. 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 Walker Bay Complex. This plan is compiled annually at a landscape level according to the CapeNature Fire Policy to ensure that there is complete co-operation and co-ordination at a higher level. Resource lists updated includes names and telephone numbers of all contact persons and radio frequencies for emergency notifications.

Oil Spill Contingency Plans: Oil spills pose a significant threat to Dyer Island and Geyser Island, as well as the Uilkraals River and Klein River estuaries. The possibility of an oil spill is perceived as a significant threat posed by shipping and the petroleum industry to marine and coastal systems. The probability of this occurring is considered low, although the environmental consequences of oil spills can be severe (Sink *et al.* 2012). Participation by protected area management in oil spill contingency planning and implementations is thus crucial. Coordinated rapid response is essential, thus making the development and implementation of integrated disaster management and contingency plans, in the event of oil spills at sea, a critical aspect.

Unlawful Invasion and/or Occupation of Land Plan: To prevent the unlawful invasion and/or occupation of land within the Walker Bay Complex, a co-operative agreement with the local authority needs to be established and reviewed periodically for the optimisation of any combination of their resources to expeditiously deal with threats and incidents of unlawful occupation within and adjacent to all CapeNature managed protected areas. A Strategy: Unlawful Occupation of Protected Areas (CapeNature, 2020b) and an Early Detection and Rapid Response Strategy and Protocol (CapeNature, 2022b) has been drawn up for all protected areas in the landscape which includes the Walker Bay Complex.

The objective of such an agreement with the local authority will include:

- To regulate and formalise such 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; and
- Rapid response with regards to the prevention of unlawful invasion and/or occupation of land.

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 indigenous resources can lead to the loss of biodiversity, and less benefits to people, with resultant compromised delivery of ecosystem services for the benefit of people. Consumptive utilisation of wild flora can, however, provide socio-economic benefits to people.

According to NEM: PAA, Section 50, the management authorities of protected areas, including WHSs may, subject to the management plan of the protected area or site, 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 or site.

Many communities and individuals rely on and use indigenous plants, animals, and their by-products for traditional medicine, craftwork, building, fuel, and food supplements. This leads to a demand and consequently an increase in harvesting from natural areas inside and around formally protected areas. CapeNature supports effective representative stakeholder engagement and equitable sharing as it relates to the consumptive use of wild flora on protected areas.

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 the 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 harvesting on protected areas.

The policy on consumptive use of wild flora differentiates between consumptive and non-consumptive use of biological resources. The non-consumptive use of wild flora in CapeNature managed protected areas can occur unconditionally. 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 a permit.
A special management zone layer must be identified for the Walker Bay Complex to demarcate consumptive use areas for wild flora within the Complex as an overlay on primitive and/or nature access zoned areas. The demarcation of such consumptive use zones would have to be based on demand, conservation intelligence, the nature of the resources, species involves, and site sensitivity. A precautionary approach must be applied when considering consumptive use of wild flora within a protected area.

Sustainable use can only be allowed under controlled circumstances subject to a formal assessment and application in accordance with CapeNature policies. This is to ensure that resource utilisation is in keeping with the purpose of the protected area. Walker Bay Complex will monitor any harvesting activities by resource users, the impact of the activity on the protected area and its biodiversity and enforce compliance. The Complex will be guided by an internal scientific decision support function towards advising on in-field resource assessments, monitoring, and recommendations on thresholds of potential concern of plant resources affected. All permit applications will be considered via the CapeNature permit application process. The applicant will also be subject to the general access rules of the protected area or as agreed with the conservation manager.

Through the stakeholder engagement function, the Walker Bay Complex will undertake 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 the complex.

3.5.5 Biodiversity management

Catchment to Coast Strategy: Guided by the Provincial Biodiversity Strategy and Action Plan (2015-2025) and CapeNature's 5-year Strategy (2020-2025), the Catchment to Coast Strategy (2022-2026) (CapeNature 2022a) aims to guide CapeNature's actions on improving, maintaining, and restoring ecological infrastructure in priority areas to ensure ecological resilience and ecosystem functioning 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, but throughout the province. The Catchment to Coast Strategy will focus CapeNature's resources to address priorities in the province.

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: Leveraging 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.

Invasive Species Monitoring, Control and Eradication Plan: The Invasive Species Monitoring, Control and Eradication Plan for the Walker Bay Complex was compiled according to the requirements and regulations of the NEM: BA 2004 (Act No. 10 of 2004), Alien and Invasive Species Regulations and Lists (September 2020). The plans aim to guide management actions to reduce infestation densities and rates of invasive and alien fauna and flora species within the Complex through systematic integrated control methods.

Western Cape Protected Area Expansion Strategy: This strategy 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 still unprotected.

The Western Cape Protected Area Expansion Strategy (WCPAES) (CapeNature 2021b) aims to enhance biodiversity conservation and landscape resilience, and this strategy is affected in CapeNature defined Landscape-level Implementation Plans. Landscape South will facilitate the development of these plans in partnership with the relevant key role-players to ensure effective implementation of priorities and the efficient use of available resources through a collaborative approach with partners.

The specific spatial priority areas for focussed landscape-scale protected area expansion in the Southern Landscape will be identified through Conservation Action Priorities (CAP). The latter is underpinned by the Critical Biodiversity Area (CBA) information and by comprehensive operational data related to objectives, mechanisms, responsible organisation, and capacity also relating to the Walker Bay Complex.

Involvement by the Walker Bay Complex in other areas for conservation expansion through stewardship or other forms of conservation land tenure (easements, Other Effective Conservation Measures known as OECMs) or planning systems (farm planning), species conservation or biodiversity corridor development outside of these priorities will be carried out in collaboration with partnerships in the Landscape.

Klein River and Uilkraals River Estuarine Management Plans: The National Environmental Management: Integrated Coastal Management Act (NEM: ICMA), 2008 (Act No. 24 of 2008, as amended by Act No. 36 of 2014), via the prescriptions of the South African National Estuarine Management Protocol, require Estuary Management Plans (EMPs) to be prepared for estuaries to create informed platforms for efficient and coordinated estuarine management. EMPs have been drafted for the Klein River and Uilkraals River estuaries which border onto the Walker Bay Complex. These have been officially approved and are being implemented. CapeNature has been assigned as the management authority for the implementation of these EMPs. It should be noted that these EMPs and this management plan take cognisance of each other as the planning domains overlap.

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.

Management of Large Game: All large game species on neighbouring properties will be dealt with according to the following principles:

- All game farms bordering the Walker Bay Complex that have extra-limital or historic alien animals, must be enclosed to the standards as stipulated in the CapeNature fencing policy. CapeNature personnel must do regular inspections on the reserve side of the fence and escapees must be reported to the owner immediately.
- If the owner is in possession of a Certificate of Adequate Enclosure (CoAE), they must be given reasonable time to remove the animals as soon as possible. Game animals escaping from properties without a valid CoAE are *res nullius* and must be dealt with accordingly. Conservation Managers must stipulate and regulate the actions to remove the animals (*i.e.,* flying with a helicopter to recapture or to herd back).
- In cases where *res nullius* game animals enter the Complex, the Conservation Manager must report it immediately and a decision must be taken to either have the animals removed, culled or allow that they may remain on the protected area.
- All protected areas with game animals who wish to remove surplus animals, must follow approved CapeNature protocols.
- Where invasive alien game (*e.g.,* fallow deer) are observed in the Complex, Conservation Managers must take immediate action by removing these animals in a humane manner.

Damage Causing Wild Animals: CapeNature aims to ensure coexistence of humans and indigenous wild animals and considers human-wildlife conflict as situations where artificially induced interactions between humans and wildlife lead to situations requiring mitigation of loss, disturbance, or damage. CapeNature requires that human-wildlife conflict be managed, taking into consideration all legal, ethical and welfare implications and that interventions are carried out within an ecologically

sound framework (CapeNature position statement on human-wildlife conflict, 2015). There is a provincial co-operative agreement between CapeNature and the Predation Management Forum to facilitate the management of predators on private land to ensure best practice and self-regulation.

CapeNature advocates the five-step approach to holistic wildlife management of damage causing wildlife namely (1) understanding the origin of the problem; (2) maintaining the correct attitude and respect towards the animal; (3) the responsible species and/or individual must be identified correctly; (4) implement suitable mitigation measures; and (5) implement effective selective control methods as per the information contained in the "The Landowner's Guide: Human-wildlife conflict - sensible solutions to living with wildlife" (CapeNature 2015). This handbook supplies basic and cost-effective mitigation methods to landowners who report damage caused by wildlife. By implementing the suggested interventions and understanding the ecological role of each species, this will enable the Conservation Manager to deal with wildlife conflict situations both on and off protected areas.

Furthermore, the National Predation Management Manual (TPMF 2016) prepared by the Predation Management Forum is also available to give management guidance on dealing with predation problems on and off protected areas. 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 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.

The Complex does not currently have a specific Cultural Historic Heritage Management Plan. The aim of such a document would be to ensure that cultural and heritage sites within the Complex are managed and preserved in a sustainable manner for future generations and to guide appropriate awareness of such sites. This document would include information on the identification and recording of specific sites, controlling access to the sites and management activities. However, ground-truthing of possible cultural and heritage sites in the Complex has been done to some extent and is highlighted below for further investigation regarding its cultural and historic significance.

- **Salmonsdam:** In 2004, the Luiperdsgrot was identified, but might not indicate to any cultural importance. The Elandskrans cave has also been identified to be investigated further.
- **Walker Bay:** In 1998, the Klipgat Cave Trust compiled a management plan for the Klipgat Cave, however this management plan needs to be reviewed and updated especially due to the cultural importance of the Klipgat Cave to the area. There is currently a process underway for a Provincial Heritage Declaration of Klipgat Cave, which was initiated in 2018.

- **Uilkraalsmond:** A few shell middens have been identified within Uilkraalsmond that might be of historical significance. It is of importance that these shell middens be mapped, investigated, and appropriately demarcated as it is found within an area currently impacted by vehicles.
- **Dyer Island:** Several old buildings, structures, and a grave site have been identified on the island as older than 60 and/or 100 years. Due to the history and the environmental conditions on the island, it is important that further research is done on the historical significance of the infrastructure.
- **Babilonstoring:** Historic stone walls which formed kraals used to contain livestock are reported to occur and may be of historical signficance.

Due to the number of cultural and historical findings within the Complex, additional investigations are required to indicate the importance of developing a Cultural Historic Heritage Management Plan for the Complex.

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 CapeNature 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 from both parties.

Within the structure of CapeNature, firebreak registers are used as a management tool to assist with the prioritisation and maintenance schedule for each firebreak. The firebreak register is updated annually and indicates whether a firebreak has been maintained or realigned to aid with fire suppression operations. Where firebreaks are constructed by the reserve away from the reserve boundary it is required to have a mutual agreement in place with the adjacent landowner. Currently, there are no such agreements in place with the neighbours of the Walker Bay Complex.

Due to a proposed re-alignment of the Babilonstoring firebreak, multiple firebreak agreements will need to be drawn up in the future with the respective neighbouring landowners. The proposed firebreak will run along the length of the Hemel-en-Aarde Valley at the base of the mountain bordering numerous farms.

The Walker Bay Complex is a member of the Greater Overberg FPA. Furthermore, Salmonsdam Nature Reserve is included in the Wortelgat and the Sondagskloof / Perdeberg Fire Management Units, both of which are active. A WoF team is based at the Walker Bay Complex base station in Hermanus and many private landowners in this region are actively involved in fire prevention, detection, and firefighting through their membership with the FPAs.

Vogelgat Private Nature Reserve Agreement: Currently, there is an informal verbal agreement between Vogelgat Private Nature Reserve and CapeNature, which stemmed from discussions held in the early 1980's between CapeNature and Vogelgat. Included in this agreement, is that Vogelgat Private Nature Reserve would maintain the hiking trails and carry out invasive alien plant clearing on Maanschynkop. This informal verbal agreement is currently under review.

Accommodation Agreement with Vogelgat Private Nature Reserve: "Refuge" hut and "Leopard" camp are two small permanent dwellings falling within Maanschynkop, which are utilised by members of the Vogelgat Private Nature Reserve. Moon Refuge was an old shepherd's hut which was repaired with a new roof and door in 1992 by CapeNature. Leopard Camp, which was formally known as Black Wattle Camp, was built by CapeNature in 1988.

An informal agreement is currently in place for the use of Leopard Camp and Moon Refuge by Vogelgat Private Nature Reserve.

Figure 3.3: Leopard hut (left) and Moon Refuge (right) situated on the Maanschynkop Photo: D. Bowen.

Water Abstraction License: A neighbouring property to Maanschynkop has a servitude agreement which permits a pipeline through Maanschynkop from the water source on the Hartbees River. This abstraction takes place through a pipe which has been laid and extends half-way up the waterfall. The lower section of the pipe runs underground below the Maanschynkop firebreak and feeds into a dam on the neighbouring property. A process is underway with the Breede-Olifants Catchment Management Agency to determine authorisation requirements for the abstraction of water from the Hartbees River.

Grootbos Private Nature Reserve Agreement: An informal verbal agreement exists with Grootbos Private Nature Reserve which permits entry into Walker Bay for their staff and guests for the purposes of guided activities in the reserve. This agreement needs to be formalised.

Access Agreements:

Several of the Walker Bay Complex are only accessible through private land. As such, access agreements need to be formalised with the relevant landowners. Once agreements have been established, access servitudes will be registered to cross these private properties to enable formal entrance for CapeNature staff and visitors to certain land parcels (Quoin Point, Soetfontein, and Pearly Beach) of the Walker Bay Complex.

Protected Area Advisory Committee:

The Walker Bay Complex Protected Area Advisory Committee (PAAC) was established on the 18th of November 2022. The forum facilitates communication between the Complex and neighbouring communities including landowners. The committee represents the interest of registered stakeholders.

3.5.8 Research and development

The National Biodiversity Research Development and Evidence Strategy (2015-2025) 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 (DEA 2016a). In response to this CapeNature developed an Ecological Surveillance, Monitoring and Research Framework (2022-2026) (CapeNature 2022c). The purpose of the Ecological Surveillance, Monitoring & Research Framework is to provide the foundation for a biodiversity surveillance and monitoring system, in collaboration with its partners, that allows for provincial level reporting on key aspects of the State of Biodiversity to inform policies, support decision making, and to guide research. This provincial information will be provided to support national and global reporting on the State of Biodiversity.

Structured monitoring programmes need to be put in place and carried out consistently over time to monitor the state of biodiversity and ecosystem functioning. This allows tracking of ecosystem health and allows for critical evaluation of management practices by employing strategic adaptive management. There is a strong focus on applied scientific research that is driven by protected area management requirements. The strategy emphasises research and monitoring that measures biodiversity outcomes so that management can be clearly linked to the biodiversity and ecosystem function targets.

The guiding principles of the strategy are good science (robust and defensible), alignment with management requirements, taking an integrated management and ecosystems approach, employing a full monitoring lifecycle approach to planning, and implementing monitoring programmes and considered (evidence-based) prioritisation of research and monitoring actions.

Key objectives of the Ecological Surveillance, Monitoring & Research Framework (2022-2026) (CapeNature 2022) are to ensure that:

- CapeNature is aligned with South Africa's national and international monitoring and reporting commitments.
- All data underpinning the 5-yearly Western Cape State of Biodiversity and the Annual State of Conservation Report, including any national and international indicators that CapeNature contribute to, are clear and the methods of data collection, quality control, and analysis are robust and repeatable across the four CapeNature landscapes.
- Key biodiversity research required in the province is identified to contribute to understanding the functioning of ecosystems, the impact of threats, and to measure the effectiveness of management actions/interventions.

This framework facilitates research and monitoring that guide management actions in the Walker Bay Complex pertaining to the following:

- Priority species (invasive alien, threatened, endemic, keystone, and indicator species, specifically with focus on Marine Avifauna),
- Damage Causing Animals (DCAs) (Seabird mortality and predation),
- Integrated Catchment Management both regarding to fynbos and coastal ecosystems (fire ecological management, freshwater, invasive alien species),
- Effects of resources use (e.g., kelp harvesting, wood harvesting, sourfig harvesting, water-abstraction),
- Land-use change and associated activities in the Zone of Influence,
- Ecosystem services and functioning,
- Climate change,
- Conservation management effectiveness,
- Cultural, historical and heritage sites, especially on Dyer Island and De Kelders,
- Social effects of conservation initiatives (indicators of change, awareness, value of nature as place of learning, healing, and self-discovery), and
- The socio-economic effects of implementing EPWP like work opportunities and resource economics.

3.5.9 Access

CapeNature strives to establish a differentiated and leading brand of products in outdoor nature-based tourism across the Western Cape Province 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, and
- Strengthen existing and developing new products with special attention to the provision of broader access for all people of the Western Cape Province.

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

- Developing the capacity of local people to participate in the management and enjoyment of protected areas meaningfully and responsibly, and
- Educating relevant stakeholders and creating awareness around key environmental issues to increase knowledge about the environment, develop inga deeper understanding about environmental principles and encourage environmentally conscious values that allow for more informed and environmentally responsible decision making.

As part of its multi-sectoral approach, CapeNature aims to support the Western Cape Education Department's efforts through presenting curriculum aligned environmental education programmes to schools. CapeNature will endeavour to collaborate with like-minded partners in pursuit of environmentally sustainable development goals as platforms for involving citizens and groups with the aim of expressing a "call to action". Behaviour change efforts will be optimised through targeting specific audiences with innovative, transformative, quality assured programmes and interventions.

3.5.10 Administrative framework

CapeNature's provincial biodiversity functions, both within protected areas and across the province, are supported by several staff and systems located at various offices. The organisation's Head Office is in Cape Town and provides strategic support services.

In terms of CapeNature's administrative operating footprint, the province is divided into two regions, namely Region East and Region West. Each region is further sub-divided into two landscapes, resulting in four landscapes: Landscape West, Landscape Central, Landscape South and Landscape East. Each individual landscape is further subdivided into three landscape units, resulting in twelve landscape units.

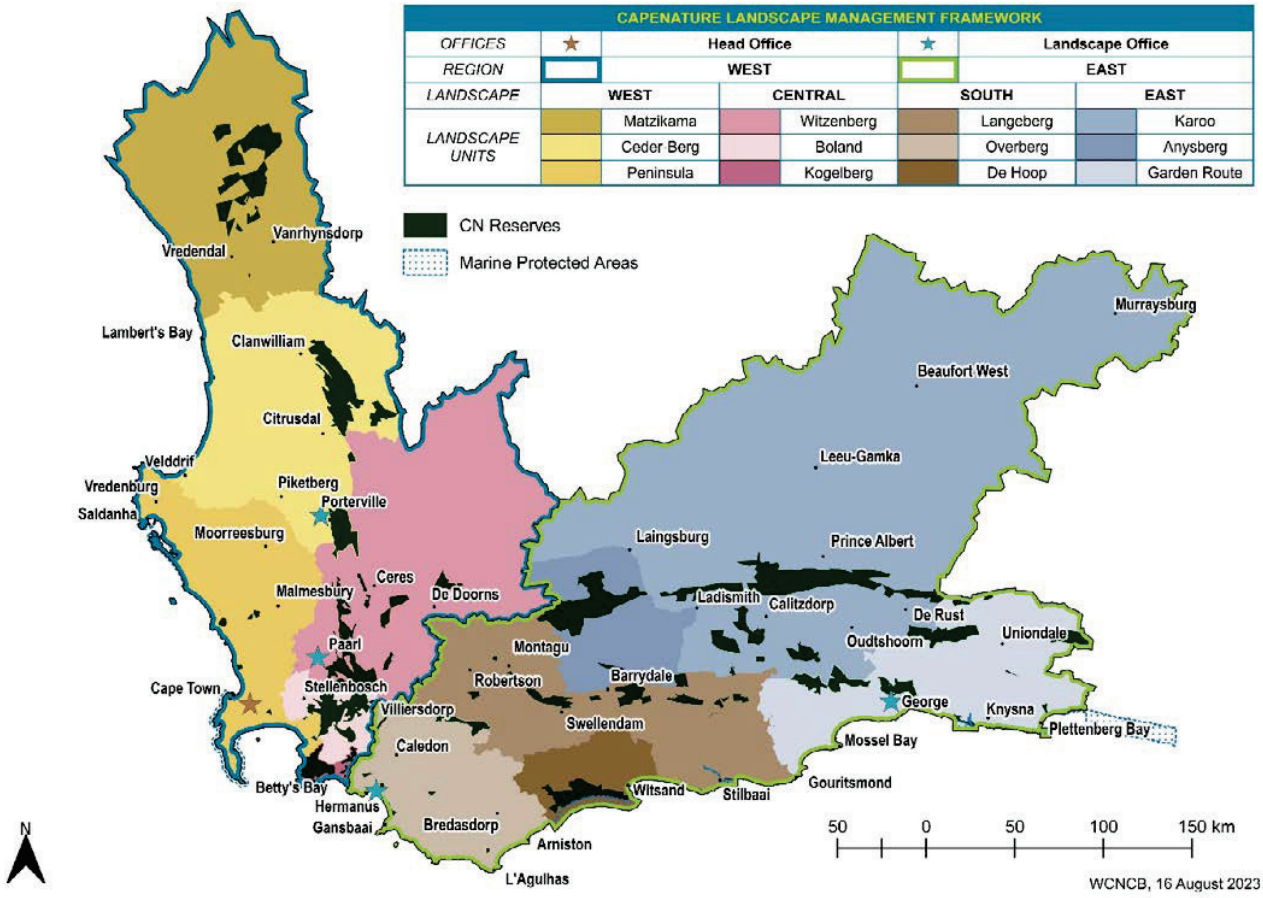


Figure 3.4: CapeNature's landscape management framework.

The Walker Bay Complex is one of six protected area complexes that occurs within the organisation's East Region (Figure 3.4). It falls into Landscape South, located within the Overberg Landscape Unit. The reserve is supported primarily through the Landscape Office located on the Walker Bay management station in Hermanus.

The Walker Bay Complex staff component is primarily based on the Walker Bay management station on Hermanus and report to the Conservation Manager On-Reserve who in turn reports to the Overberg Landscape Unit Manager.

The staffing structure for the Walker Bay Complex is depicted in Figure 3.5.

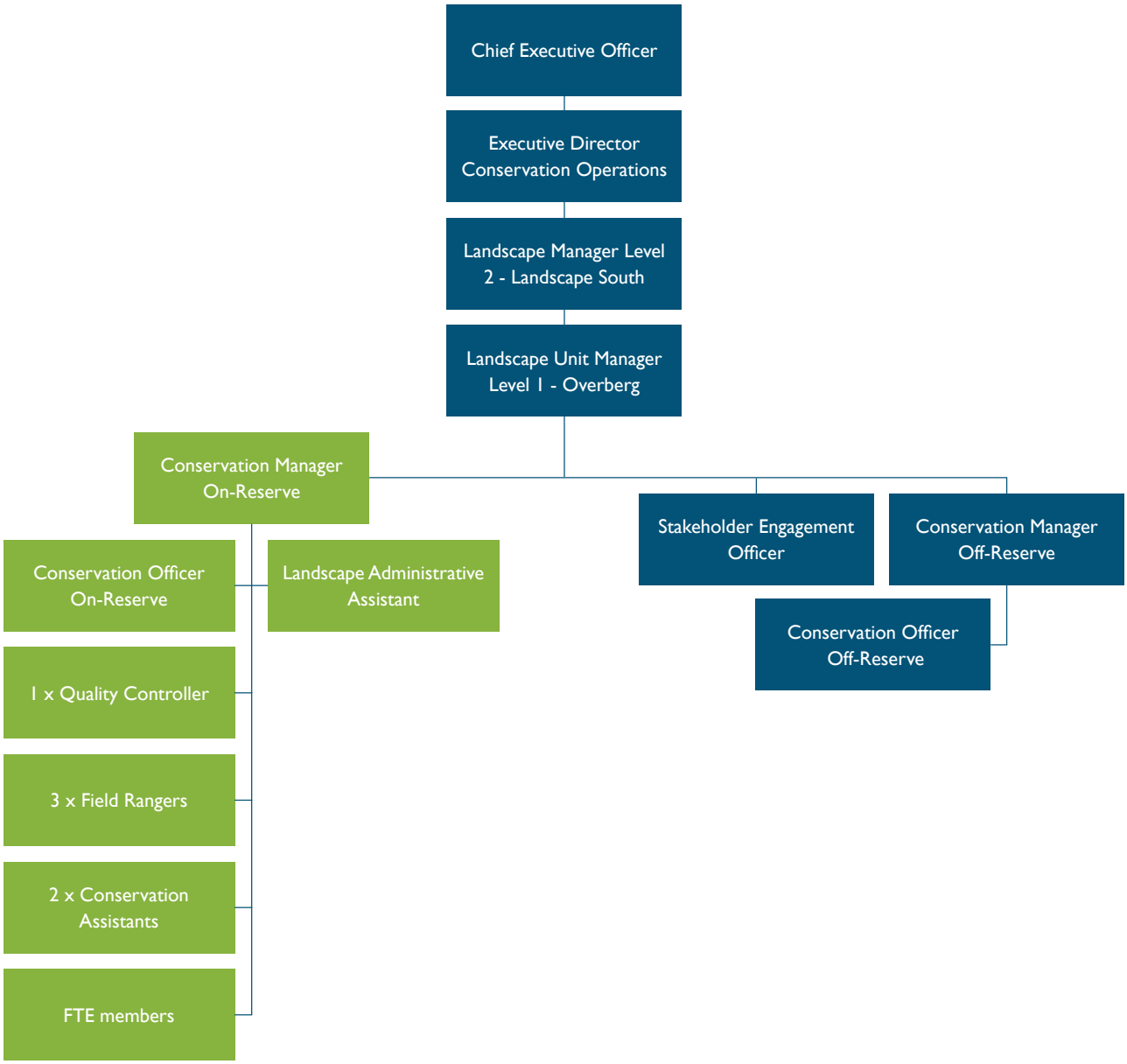


Figure 3.5: Approved organogram for the Walker Bay Complex.

4 CONSULTATION

This section outlines procedures for public participation during the development of the 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.

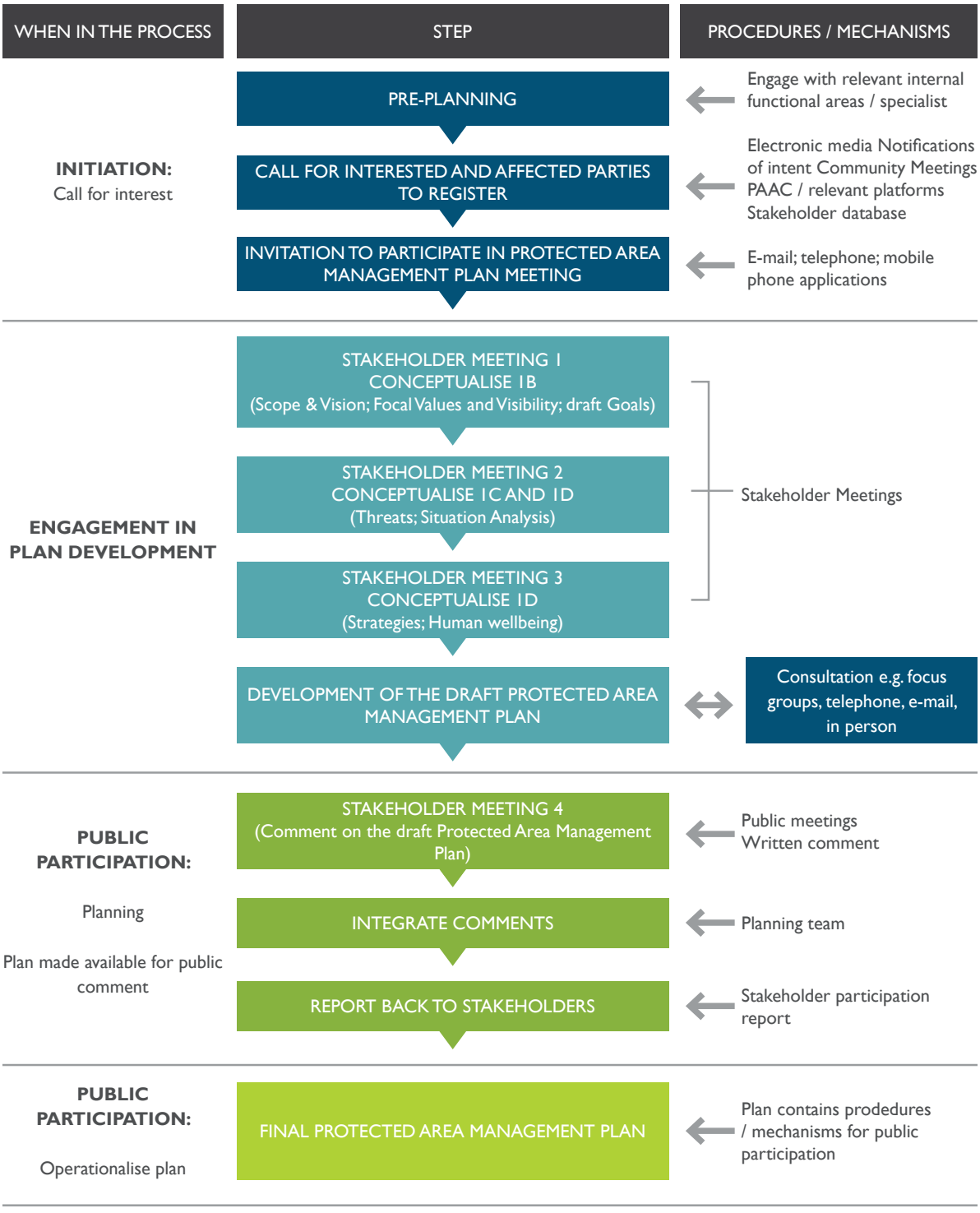


Figure 4.1: Process flow for protected area stakeholder engagement.

Stakeholder engagement takes place throughout the adaptive management cycle and enables public participation, which is 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, a stakeholder analysis identified relevant internal and external stakeholders, and defined the scope and purpose of 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. Different stakeholders were engaged 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.).

Between 2020 and 2022, a series of expert-facilitated stakeholder workshops were coordinated and hosted by CapeNature. Due to budget and COVID-19 constraints, certain stakeholder engagements took place remotely via telephone and online meetings. A range of stakeholders representing individuals or agencies with an interest in, and/or knowledge/expertise of the landscape, and individuals or agencies with the capability to support the implementation of the Walker Bay Complex management plan were involved. Workshops were aimed at developing a strategic framework for the Complex to help coordinate efforts in the landscape towards a common vision for the stipulated period of the management plan. The desired outcomes were to capacitate stakeholders in the understanding of the natural and cultural conservation targets and values in the Walker Bay Complex and to identify mechanisms to maintain those targets and values over time.

The outcomes of the above-mentioned process were precursors to the site-specific management planning process for the protected area and formed the foundation for smaller working groups towards the development of the management plan. The Walker Bay Complex management planning process was further facilitated by the core CapeNature planning team comprised of the Conservation Manager On-Reserve, Conservation Officer On-Reserve, Landscape Unit Manager, Landscape Conservation Intelligence Manager, Landscape Ecologist, Ecological Technician, and the Stakeholder Engagement Officer.

4.1.1.1 Key stakeholder groups engaged.

- Communities (Gansbaai, Stanford, Pearly Beach, Buffelsjags, Quoin Point, Hermanus).
- Neighbouring private landowners.
- Resource managers mandated to manage the land for conservation:
  - Greater Overberg Fire Protection Association
  - SANParks – Agulhas National Park
- Government agencies mandated to support and regulate land and water management and other relevant affairs:
  - Department of Forestry, Fisheries, and the Environment: Working for
  - Eskom
- Government agencies mandated to support and regulate heritage management:
  - Heritage Western Cape
- Local authorities:
  - Overberg District Municipality
  - Theewaterskloof Municipality
  - Overstrand Municipality
- Non-governmental organisations (NGO):
  - Dyer Island Conservation Trust
  - Whale Coast Conservation

- BirdLife International and affiliated Birdlife Overberg
- Working on Fire
- Botanical Society
- Fernkloof Advisory Committee
- Stanford Tourism

• Other interested and affected parties who support and/or work in the planning domain:
  - Vogelgat Private Nature Reserve
  - Grootbos Private Nature Reserve
  - Agulhas Biodiversity Initiative

Examples of the targeted stakeholder engagements with the above-mentioned stakeholder groupings are shown in Figure 4.2.

Figure 4.2: Stakeholder participation. Photo D Bowen and P Xhegwana.

4.1.1.2 Workshops and Engagements

Stakeholder workshops had the following key themes:

- Planning purpose: introducing stakeholders to planning for adaptive management; planning scope and vision,
- Conceptualisation: capacitating stakeholders in adaptive management planning; selecting focal conservation targets and assessing the condition of focal conservation targets; threats assessment and conservation situation analysis,
- Planning actions: identifying strategies; developing theories of change and developing objectives and indicators, and
- Internal stakeholder engagement: scientific and technical 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 in workshops, smaller teams engaged and/or public meetings were facilitated to:

- Share workshop outputs and progress, and test the rationale of situational analyses, for example meetings with internal stakeholders related to taxon and habitat specific planning,
- Address relevant knowledge gaps and test rationale, for example, program managers and taxon specialists were consulted to find mechanisms to address knowledge gaps in areas where needed. Internal stakeholders were consulted to address knowledge gaps,
- Provide opportunities for specific community engagements to reach as many individuals as possible via platforms such as the Walker Bay PAAC, and
- Facilitate information sessions and registration of interest with community members.

4.1.2 Procedures for public comment

The formal stakeholder participation process was initiated on 9th October 2023 and concluded on 10th November 2023. The process was facilitated by an external service provider, Footprint Environmental Services. 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 were placed in three local newspapers (Gans-Berg News, Gansbaai Courant, Hermanus Times and The Village News) and in electronic media (CapeNature website).

Furthermore, copies of the draft management plan were placed at the public libraries in Hermanus and Gansbaai, Stanford Tourism Office and Overstrand Municipal Offices in Hermanus and Gansbaai. The draft management plan was also available at the CapeNature Walker Bay Office in Hermanus, and on the CapeNature website for the duration of the stakeholder participation process. 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 public meetings and afforded the opportunity to provide information and express their opinion. Three meetings were held:

- 25th October 2023 – Gansbaai Tourism Information Centre, Gansbaai at 13:00
- 26th October 2023 – Stanford Community Hall (Die Stoor), Stanford at 09:00
- 26th October 2023 – Fernkloof Hall (Fernkloof Nature Reserve), Hermanus at 14:00

The Hermanus meeting was attended by four stakeholders, while three stakeholders attended the Gansbaai and Stanford meetings respectively. Several comments from the stakeholder meetings as well as the general public were received during the stakeholder participation process. Based on a comprehensive stakeholder engagement report containing all inputs received from the public meetings, written comments, and comments and responses received by email, the draft management plan was amended where relevant.

Feedback was provided to registered interested and affected parties.

A comprehensive stakeholder register, maintained by the Walker Bay 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 Walker Bay 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 PAACs and Estuary Advisory Forums with the aim of regular interaction with stakeholders and a mechanism to evaluate stakeholder feedback, to promote good neighbour relations and to influence beyond protected area boundaries.

Previously, the Walker Bay Complex made use of the Dyer Island PAAC, which was established in 2012 and functioned for the majority of its first year of establishment. This PAAC however lapsed due to conflicting views on matters discussed by attendees and only focused on one of the Walker Bay Complex land parcels.
Subsequently the Walker Bay Complex PAAC was established on the 18th of November 2022. The Complex-specific CapeNature Protected Area Advisory Forum Terms of Reference have not been compiled but is an action to completed (refer Section 10: Strategic Plan). This document will follow the standard CapeNature format and template as drawn up by the CapeNature Stakeholder Engagement and Access component in 2019. The current PAAC represents the interest of registered stakeholders and consists of Government Departments, Local Authorities, neighbouring communities and landowners, NGO's, tourism, education, and research partners. Persons interested in joining are required to complete a nomination form prior to acceptance onto the PAAC.

The committee membership is based on a genuine interest demonstrated by the member in respect of the Walker Bay Complex. Members must be the nominated delegates from the organisations represented and are expected to provide feedback to their respective organisations in terms of meetings and progress.

PAAC's are expected to:

- Provide input into management decisions relating to protected area management,
- Act as a forum to provide advice on protected area issues,
- Play a role in educating the community and various interest groups about the importance of preservation, protection and management of natural resources and the objectives of the protected area management plan that are intended to pursue these goals,
- Monitor and evaluate progress on implementation of programmes in the protected area management plan,
- Make recommendations on how CapeNature can improve programmes and policies,
- Promote involvement in assisting in decision-making around the management of natural and cultural heritage resources within the scope of the protected area management plan,
- Promote the integration of conservation activities within the Complex with those of surrounding areas,
- Identify opportunities and constraints pertaining to the bio-prospecting access and benefit sharing, where applicable; and
- Establish and maintain links between CapeNature and other stakeholders.

4.1.3.2 Other mechanisms for stakeholder engagement

Enhancing engagement and participation by relevant stakeholders throughout the Walker Bay Complex is a key focus area going forward. In addition to the Walker Bay Complex PAAC, current local structures for stakeholder engagement include:

- Landscape NRUG meetings: Sour fig and wood harvesting programs facilitated by the Complex require quarterly engagements with the participants and ensure alignment with the CapeNature's Consumptive Use of Wild Flora from CapeNature-managed Protected Areas Policy (2019). Regular community drives are arranged to raise awareness on the permit application process to improve compliance amongst interested community members and participants in these programs. Fire awareness in communities has gained momentum through these engagement sessions and assist the Complex in reducing human induced fire inside the protected areas and from adjacent communities.
- The National People and Parks Programme implemented by CapeNature has established a regional structure in the area to enable community engagement (https://www.dffe.gov.za/AboutPeopleandParksProgramme). 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. The programme is also designed to capacitate communities about relevant legislation, policies, and regulations.

- Through the Comprehensive Rural Development Programme, CapeNature partners with NGOs, government departments and communities (https://www.gov.za/about-government/government-programmes/comprehensive-rural-development-programme-crdp). The Council of Stakeholders is an elected structure of representatives from communities and focus areas include access, job creation opportunities, youth development, and SMME development.
- Greater Overberg Fire Protection Association: CapeNature is a statutory member of this integrated wildfire management body. This FPA which was established in terms of the National Veld and Forest Fire Act, 1998 (Act No. 101 of 1998). helps landowners practice Integrated Fire Management on their land. Through the FPA, landowners in the Overberg work strategically with partners to better prevent wildfires, react quicker and more effectively to suppress runaway fires.
- The Complex is represented at the monthly Local Joint Operation meetings. This is a forum where crime related matters in communities and projects towards combating crime in the Overberg are discussed between partners and relevant stakeholders.
- CapeNature is represented on the Fernkloof Advisory Board. Fernkloof Nature Reserve is an important neighbouring property owned and managed by the Overstrand Municipality. The Advisory Boards was established in terms of the Environmental Conservation Ordinance, 1974 (Ordinance No. 19 of 1974). The Advisory Board provide advice and makes recommendations to the management authority in connection with the management, control, and development of this local authority nature reserve.
- The MoU with DICT enables a working relationship on coastal and marine related issues and includes a Dyer Island management focus. An MoU steering committee was established and collaborates on the following:
  - A rescue facility for rehabilitation and release of oiled, injured, and sick marine- and coastal birds,
  - Generating data, systems, and processes in support of the African Penguin Biodiversity Management Plan (BMP),
  - Prioritise research and monitoring of marine- and coastal birds,
  - Education and awareness for the conservation of marine- and coastal birds,
  - Ensure and support sustainable capacity building with the emphasis on skills development and transfer,
  - Partner in actively sourcing and securing funding,
  - Development of policy document, management plans, and standard operating procedures, and
  - Collaborative conservation projects.
- The Western Cape Stewardship Reference Group serves as a platform for conservation implementation by partners.
- The Klein River and Uilkraal Estuary Advisory Forums fall within the Complex and have been established as per the National Estuary Management Protocol (NEMP 2021) to mobilise civil society and empower participation in governance and management. Stakeholder engagement remains critical during the implementation of the Estuarine Management Plans and provides a knowledge sharing platform.

5 PURPOSE AND VISION

This section makes provision for CapeNature to manage the protected area for the purpose for which it was declared. It presents the vision, purpose, conservation targets and key threats foundational to developing the desired state for the Walker Bay 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 ongoing monitoring and evaluation to assess management effectiveness.

5.1 Management Intent and Desired State

The Walker Bay Complex supports diverse and important marine, coastal, and terrestrial habitats which include mountain fynbos, coastal strandveld, estuaries, rivers, and island environments for biodiversity and species conservation. The management extent of this Complex is extensive from Babilonstoring in the West to Quoin Point in the South-East, and thus plays a critical role in the broader Overberg coastal landscape.

The aims for the Walker Bay Complex are to strategically, and adaptively, manage biodiversity towards ensuring the expansion and persistence of terrestrial biodiversity of international importance, intact natural climate change corridors, freshwater, island, and estuarine ecosystems, and the unique cultural heritage of the region through:

- The prioritised strategic management of threats;
- Maximizing ecosystem service provision of freshwater resources and sustaining biodiversity with regard to SWAs;
- Ensuring that the properties comprising the Complex are legally secured and protected area design is augmented by expansion/consolidation through stewardship or other effective means;
- Cooperative governance across all tiers and sectors of government and associated agencies;
- Sustainable use of identified natural resources coupled with effective illegal natural resource use control;
- Managed access to facilitate sustainable and sensitive access and tourism;
- Providing valuable research and learning space along ecological gradients informing climate change adaptation with specific focus on threatened marine species;
- Contributing meaningfully to socio-economic development of the region and its people; and
- Ensuring the conservation and protection of the unique endemic and sensitive biodiversity and ecological processes on, and surrounding, the island, as well as the scenic, historical, archaeological, biological, and geological features of these islands.

5.2 Purpose

CapeNature manages the Walker Bay Complex in accordance with its organisational vision, and in accordance with the vision, goals and strategies derived in consultation with stakeholders, as set out in this section.

The Walker Bay Complex was declared for the following purposes (Section 17 of the NEM: PAA):

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, or
l) to rehabilitate and restore degraded ecosystems and promote the recovery of endangered and vulnerable species.

5.3 Vision

The vision for the Walker Bay Complex is:

> *The Walker Bay Complex including the World Heritage Site conserves living landscapes and seascapes, preserves heritage, and promotes eco-tourism through integrated management and partnerships, for the benefit of all.*

5.4 Focal Conservation Targets

In consultation with stakeholders, natural and cultural historic conservation targets were proposed, explicitly defined, and selected for their ability to represent the full suite of biodiversity and cultural historic heritage found within the Walker Bay Complex.

Following on from a prioritisation process, the key focal conservation targets were identified and are summarised in Table 5.1. Features considered to be nested within or catered for by the conservation of the focal conservation target, are noted. Key human well-being values derived from the tangible natural and cultural focal targets are also noted. Since human well-being values are those components of wellbeing affected by the status of tangible natural or cultural targets, their 'health' or status is not assessed separately but seen as contingent upon the status of the natural and cultural focal targets selected.

Table 5.1: Summary of the Walker Bay Complex focal conservation targets and viability as of 2021.

Conservation Target	Description, Nested Targets, Key Attributes & Associated Human Well-being Values	Current Status
Fynbos Mosaic	**Description:** A healthy fynbos mosaic and vegetation structure supports numerous fauna and flora species. Supported by connectivity, it promotes ecological functioning and resilience. The fynbos vegetation mosaic in the Walker Bay Complex (Babilonstoring, Maanschynkop, and Salmonsdam) includes five vegetation types that include among other sandstone fynbos, limestone fynbos, ferricrete fynbos, afrotemperate forest, and shale band vegetation. **Nested targets of note:** Afrotemperate forest; associated fauna and flora communities. **Key attributes:** Fire frequency; fire return interval; fire season; post-fire recruitment; indigenous vegetation species composition. **Associated human well-being value(s):** Freedom and choice & capacity to act independently within the legislated rules and regulations of the Protected Areas, tourism & nature-based economic opportunities, spiritual and physical health & cultural identity, responsible utilisation of natural resources.	**Good**[2]
Freshwater Ecosystems	**Description:** Freshwater Ecosystems includes the river channel and associated buffer that supports riparian fauna and flora assemblages. Included are seasonal tributaries, seeps, wetlands, and springs. **Nested targets of note:** Indigenous fish; freshwater invertebrates; riparian vegetation; riparian fauna; seeps; wetlands; springs; rivers. **Key attributes:** River health - indigenous invertebrate species composition; indigenous vegetation species composition within the riparian zone; wetland ecosystem health; indigenous vegetation species composition within wetland zone; groundwater health. **Associated human well-being value(s):** Freedom and choice & capacity to act independently within the legislated rules and regulations of the Protected Areas, tourism & nature-based economic opportunities, spiritual and physical health & cultural identity, responsible utilisation of natural resources.	**Not Specified**[1]
Estuarine Functional Zone	**Description:** A healthy Estuarine Functional Zone supports numerous fauna and flora species. The Estuarine Functional Zone is found at the Klein River Estuary and Uilkraalsmond Estuary within the Walker Bay Complex. Included in the Estuarine Functional Zones of the Klein and Uilkraals River estuaries, are the intertidal salt marsh, supratidal salt marsh and typical estuarine reeds and sedges. **Nested targets of note:** Associated fauna and flora; migratory fish species; estuarine systems and estuarine fish. **Key Attributes:** Water quality; state of the mouth. **Associated human well-being value(s):** Freedom and choice & capacity to act independently within the legislated rules and regulations of the Protected Areas, tourism & nature-based economic opportunities, spiritual and physical health & cultural Identity, responsible utilisation of natural resources.	**Fair**

Conservation Target	Description, Nested Targets, Key Attributes & Associated Human Well-being Values	Current Status
Coastal Ecosystems	**Description:** A healthy coastal vegetation structure supports numerous fauna and flora species. Supported by connectivity it promotes ecological functioning and resilience. The coastal vegetation in the Walker Bay Complex (Walker Bay, Uilkraalsmond, Pearly Beach, Soetfontein, and Quoin Point) includes five vegetation types namely strandveld, coastal forest, seashore vegetation, limestone fynbos, estuarine vegetation. **Nested targets of note:** Coastal Forest; associated fauna and flora communities. **Key attributes:** Strandveld health; Fire frequency; Fire return interval. **Associated human well-being value(s):** Freedom and choice & capacity to act independently within the legislated rules and regulations of the Protected Areas, tourism & nature-based economic opportunities, spiritual and physical health & cultural identity, responsible utilisation of natural resources.	**Fair**
Marine Ecosystems	**Description:** A healthy Marine Ecosystem supports numerous terrestrial and marine fauna and flora communities. The Marine Ecosystems includes the area from the high-water mark down and the 500 m buffer area around Dyer Island and Geyser Island. **Nested targets of note:** Associated terrestrial flora and fauna species; abalone; reef fish; rocky shore species; kelp forests. **Key attributes:** Reef fish diversity and community composition; abalone; rocky shore communities. **Associated human well-being value(s):** Freedom and choice & capacity to act independently within the legislated rules and regulations of the Protected Areas, tourism & nature-based economic opportunities, spiritual and physical health & cultural identity.	**Not Specified**[1]
Marine Birds	**Description:** Marine Birds include the African Penguin, Cape Cormorant, Crowned Cormorant, White-breasted Cormorant, Bank Cormorant, Swift Tern, Roseate Tern, Caspian Tern and Hartlaub's Gull populations persist and breed successfully on Dyer Island and the rocks, as well as within the Coastal Ecosystem and Estuarine Functional Zone target areas. **Nested targets of note:** Associated flora and fauna communities; coastal and island ecosystems. **Key attributes:** Population size - African Penguin; Population size - Cape Cormorant; Population size - Crowned Cormorant; African Penguin chick condition; African Penguin breeding success. **Associated human well-being value(s):** Freedom and choice & capacity to act independently within the legislated rules and regulations of the Protected Areas, tourism & nature-based economic opportunities, spiritual and physical health & cultural identity.	**Poor**

Conservation Target	Description, Nested Targets, Key Attributes & Associated Human Well-being Values	Current Status
Heritage	**Description:** All heritage assets including pre-colonial heritage and historical structures such as graves, fossils, rock art, artefacts and historical structures and ruins found within the Walker Bay Complex. **Nested targets of note:** Pre-colonial history, colonial history, cultural history and living heritage. **Key attributes:** Pre-colonial heritage condition (the conservation state of Klipgat Cave, Sopiesklip, shell midden); colonial heritage condition (the conservation state of colonial buildings, structures, shipwrecks, and gravesites). **Associated human well-being value(s):** Freedom and choice & capacity to act independently within the legislated rules and regulations of the Protected Areas, tourism & nature-based economic opportunities, spiritual and physical health & cultural identity.	**Fair**

[1] All key ecological attributes indicated as "Not Specified", baselines required.
[2] One key ecological attribute indicated as "Not Specified".

As the public entity responsible for biodiversity conservation in the Western Cape, CapeNature delivers a suite of core services which result in the following outcomes: resilient ecosystems; the promotion of local economic development, job creation and skills development; growing diversified nature-based revenue streams; access to environmental education, advocacy and education, and 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 achievement of goals.

Table 5.2: Human wellbeing values of the Walker Bay Complex.

Human Well-being Values	Description and Associated Benefits	Current Status
Freedom and choice & capacity to act independently within the legislated rules and regulations of the Protected Areas, tourism & nature-based economic opportunities	**Description:** The Walker Bay Complex contributes to local economic development by providing several job opportunities to local people in the area, mostly of an operational nature. Tourism expansion in the reserve can increase employment availability in the Complex. Social development and empowerment of people within and surrounding the is critical. Collaboration and engagement with partners in the landscape is key to identify and promote job and training opportunities; a lack of which ultimately has an impact on the whole landscape, including the Complex. The Complex aims to provide its contract staff, contractors and SMMEs with meaningful, functional and life-skills training during their employment, contributing to their social upliftment and employability. It also strives to provide an effective environmental education, awareness and interpretation programme that supports all the conservation targets of the Complex and promotes respect and care for the natural environment. This is particularly relevant to local schools, communities, and landowners. **Key attributes:** Operational/tourism job opportunities; training and skills development opportunities created; comprehensive environmental interpretation and awareness plan.	**Good**

Human Well-being Values	Description and Associated Benefits	Current Status
Spiritual and Physical Health & Cultural Identity	**Description:** The landscape, seascape, open spaces, historical assets, and ecological diversity of the Walker Bay Complex promotes a sense of place allowing for physical and spiritual health to be instilled, restored, and refreshed. This value is also focused on the rich cultural heritage found within the Walker Bay Complex, dating back millions of years. **Key attributes:** Aesthetic experience, and reconnecting with nature; Indigenous cultural knowledge.	**Fair**
Responsible utilisation of natural resources	**Description:** The Walker Bay Complex aims to promote and provide access for consumptive and non-consumptive natural resource use, underpinned by structures that promote and enable responsible and sustainable use. **Key attributes:** Permits issued (research, day visitors, filming, harvesting).	**Fair**

5.5 Threats

CapeNature aims to mitigate threats to focal conservation targets, either through direct threat mitigation, or through mitigation or management of a factor contributing to or driving the threat. Threats to focal conservation targets and the relevant contributing factors of key threats need to be described in sufficient detail to support effective planning and management. Threat assessments influence the direction and effectiveness of management options. Rating threats according to scope, severity and irreversibility of impact, facilitates the allocation of limited resources, simplifies complex scenarios, and provides a systematic decision support method to focus efforts (Table 5.3).

Table 5.3: Summary of critical current threats highlighting the focal conservation targets of the Walker Bay Complex at greatest risk.

Focal Conservation Targets	Critical Threats	Threat Rating
Fynbos	Inappropriate fire regime; invasive alien plant species; unauthorised resource use.	**High**
Coastal Ecosystems	Inappropriate fire regime; invasive alien plant species; over abstraction of ground water; unauthorised resource use; human activities & disturbance.	**High**
Marine Ecosystems	Industrial & military effluent (oil spills etc.); human activities & disturbance, illegal abalone harvesting.	**High**
Heritage	Vandalism and weathering; human activities & disturbance.	**High**
Estuarine Functional Zone	Prolonged inappropriate water level; poor water quality and excessive nutrient load.	**Medium**
Freshwater Ecosystems	Invasive alien plant species; over abstraction of ground water, human activities & disturbance.	**Low**
Marine Birds	Human activities & disturbance; predation (gulls & seals); disease, industrial & military effluent (oil spills etc.).	**Low**

The results of the above threat rating highlighted the following key threats affecting the focal conservation targets of the Walker Bay Complex as outlined below in Table 5.4:

Table 5.4: Summary rating of key current threats for the Walker Bay Complex.

Threats	Associated Focal Targets	Summary Threat rating
Invasive Alien Plant Species	Fynbos; Freshwater Ecosystems; Coastal Ecosystems	**High**
Inappropriate Fire Regime	Fynbos; Freshwater Ecosystems; Coastal Ecosystems	**High**
Illegal Abalone Harvesting	Marine Ecosystems	**High**
Human Activities & Disturbance	Coastal Ecosystems; Marine Ecosystems; Marine Birds; Heritage. Freshwater Ecosystems	**Medium**
Vandalism and Weathering	Heritage	**Medium**
Poor Water Quality and Excessive Nutrient Load	Estuarine Functional Zone	**Medium**
Industrial & Military Effluent (Oil spills etc.)	Marine Ecosystems	**Low**
Prolonged inappropriate water level	Estuarine Functional Zone	**Low**
Over Abstraction of Ground Water	Freshwater Ecosystems; Coastal Ecosystems	**Low**
Predation by Gulls & Seals	Marine Birds	**Low**
Disease	Marine Birds	**Low**
Unauthorised Resource Use	Fynbos; Coastal Ecosystems	**Low**

Invasive Alien Plant Species (High):

Australian *Acacia*, *Hakea*, and *Pinus* species are amongst the most problematic woody invasive species in the CapeNature managed protected areas, although several other species are also problematic in the riparian zones, mountain catchment and lowland areas adjacent to the protected area sites (i.e. Zone of Influence).

Overall, the infestation of invasive alien plants varies in extent across the Complex. The alien plant density on Babilonstoring is classified as scattered, while that of Maanschynkop is classified as very scattered. The majority of Salmonsdam has a scattered density with a small section of very scattered density.

In the 1970s, the reserve management stabilised the shifting sand dunes using Rooikrans (*Acacia cyclops*), which has resulted in the dense invasion of this plant species throughout Walker Bay, Quoin Point, Pearly Beach, and Soetfontein (see Section 2.3.1.4 for more details). The coastal areas range in density from occasional to closed. The presence of invasive alien plant species within the coastal zones is a threat to the coastal ecosystems both within and outside of the Walker Bay Complex.

Sustained active management intervention over a considerable length of time at high cost is required to prevent it from negatively affecting species diversity and ecosystem services.

Inappropriate Fire Regime (High):

Too frequent, too large and fires burning outside of the appropriate fire season have severe ecological impacts (Holmes et al. 2016) and severely degrades ecological infrastructure delivery. Research indicates that globally and within the CFR, many areas have experienced increases in fire frequency and size (Kraaij & van Wilgen 2014). Generally, most fires are human induced either through accidental ignition or are intentionally set.

Over the past 42 years, the size of fires in and around the Walker Bay Complex has increased significantly (section 2.3.1.3), resulting in very large proportions of the Complex consisting of veld between 11 and 25 years. In addition, fires have become more frequent with large areas burning at too short fire-return intervals. This is impacting negatively on the Complex's ecosystems. These habitats are sensitive to inappropriate fire regimes with both too short and too long fire-return intervals

being problematic. Inappropriate fire regimes also negatively impact indicator species, biodiversity, and water supply. There is a general lack of knowledge about the direct and indirect impacts of uncontrolled fires in the Strandveld vegetation type and enforcement is limited.

Ecologically sound fire management is thus imperative and involves managing fire regimes, which include varying the frequency, season, intensity, size of fires, and reconciling ecological and practical requirements.

Human Activities & Disturbance (Medium):

Human activities and disturbance relate to both legal and illegal activities that have an impact on the terrestrial, coastal, estuarine, and marine ecosystems, marine birds, and heritage features within the Complex. Human activities identified as having an impact on the associated conservation targets are described below.

Marine, Coastal and Estuarine Functional Zone targets.

Recreational activities such as hiking, fishing, and off-road vehicles impact the Coastal Ecosystem target as these coastal areas are easily accessed by the public. This illegal off-road driving on the beach and dunes in the Complex is ecologically detrimental and exacerbated by compliance and enforcement constraints. The public take advantage of this, particularly over weekends, with repetitive dune obstacle driving (Footprint Environmental Services, 2023). Patrolling of the coastal areas outside of office hours must be strengthened.

The severity of the impact may moderately degrade the target within a period of ten years if no interventions are implemented. The effects of the impact may be reversed, and the target restored, if interventions are implemented.

The Walker Bay section is not completely fenced and due to the access points via Stanford being unmanned, it allows for uncontrolled access into the reserve. This has adverse impacts on the reserve, such as the creation and use of illegal/unauthorised roads, illegal harvesting of wood and white mussel (*Donax serra*), and increased fire risks. These challenges are also experienced at Quoin Point where beach driving, damage to shell middens and disturbance to breeding birds.

Salmonsdam, Pearly Beach and Soetfontein are closed to the public and only accessed by the reserve for management purposes. Unfortunately, due to the isolated locations of these reserves, illegal access and the associated creation of unauthorised roads has become a major challenge.

Surface pollution such as litter impacts the coastal and marine ecosystems and its associated fauna. Litter entering the ocean by either direct deposit, being carried by wind, and through stormwater, is transferred by ocean currents to islands and other coastal areas. It is also noted that ships generate a large amount of both domestic and cargo operational waste. Pollution and litter are problematic at Dyer Island, Geyser Island, and along coastal areas within the Complex, resulting in entanglement and death through ingestion by seabirds.

The Estuarine Functional Zone is easily accessed by the public, and disturbance may be caused by recreational activities such as off-road vehicles, fat bikes, and dogs.

Legal activities such as whale-watchers, shark-cage diving, subsistence fishing, and illegal activities may cause disturbance to the Marine Ecosystems target (which includes whales, sharks, etc.) within the 500 m buffer around the Dyer and Geyser Islands. These activities may also only occur within certain areas of this 500 m buffer. This has the potential to degrade the Marine Ecosystems target only slightly, and the effects of the threat will easily be reversible, and the target restored within this 500 m buffer.

Marine Birds target.

The Marine Birds target encompasses Dyer Island, the rocks, the coastal ecosystems, and Estuarine Functional Zone. Dyer Island is easily accessed by poachers, conservation staff, and researchers, all of whom may cause a disturbance to breeding birds. Human disturbance is likely to slightly reduce the population size of marine bird species within a certain period, if there are no interventions. The effects of this threat will be easily reversed if management interventions are put in place to reduce the level of disturbance.

Heritage target.

The Heritage target is comprised of the Klipgat Cave at De Kelders, shell middens, and historical buildings. Activities that can negatively affect this target include vandalism, illegal alterations, illegal removal, fire damage, and off-road vehicles. The contributing factors to activities are the ease of access to the features, and a lack of awareness to the sensitivity and value of these heritage features.

The potential effect from a lack of information, may be that heritage features not yet identified, could thus be lost unintentionally. There is also limited information to ensure the protection and maintenance of the identified heritage features. Physical heritage features are often irreplaceable and once destroyed or altered their heritage significance diminishes. Hence, a full heritage inventory and assessment carried out by an accredited heritage practitioner is of utmost importance to identify all heritage features in the Complex. This must be accompanied by a specific management plan on how to manage these features for future generations and implemented accordingly.

Freshwater target.

Weirs and other instream structures cause upstream inundation (pooling) and alter the natural flow velocity and pattern of a stream or river. It is often standard practice that rivers are blocked in varying degrees by the presence of diversion weirs just outside of the protected area boundaries. These weirs may block off all the natural flow to downstream areas during the dry months and divert it to, for example, farm dams. This would be the same for instream dams. Furthermore, these structures negatively impact indigenous fish species through habitat loss resulting from the disturbance of instream habitat by earthmoving equipment.

Overall, the impacts of this cluster of threats on the associated targets are of a medium level.

Unauthorised Resource Use (Low):

The utilisation of natural resources (harvesting) without authorisation undermines appropriate resource management. The threat of unauthorised resource use (intentionally and unintentionally) of terrestrial fauna and flora is found within both the Fynbos, and Coastal Ecosystems targets. Due to the fragmented nature of the Complex, and the ease of access to most of these terrestrial protected areas, the scope of this threat has been found to be high. A lack of awareness to the sensitivity of the environment, the monetary value of rare and endangered species, and poverty contribute to the occurrence of this threat within the Complex. More information is required to determine the severity of the threat and decide on the most effective management interventions to minimise the negative consequences within the Complex. Several interventions have been highlighted in this management plan to enhance compliance and to address and promote controlled access to, and increase awareness of, the unique biodiversity in the Complex (section 10).

Vandalism and weathering (Medium):

Tangible cultural and historic features are subject to natural weathering, although neglect and a lack of resources to restore or maintain features may be a contributing factor to deteriorating conditions. Historical structures not used for operational purposes are left unattended in the landscape. These are then exposed to the natural elements (rain, wind, and wildlife) which cause damage. It must be noted that physical heritage features are often irreplaceable and once destroyed or altered their heritage significance diminishes.

Over Abstraction of Ground Water (Low):

The use of groundwater to augment water supply for rural and urban areas has become a threat to aquifer and groundwater dependent ecosystems. This is taking place outside the borders of the Walker Bay Complex, through the development of wellfields to augment the water supply for the greater Hermanus and Stanford areas. Despite long-term water level and ecosystem monitoring taking place for these wellfields (e.g., see the latest monitoring reports for the Hermanus (UA 2019) and Stanford areas (UA 2020), the threat of over-abstraction of groundwater by the municipality and private landowners remains. Aspects to be monitored on the Complex would include the identification and long-term monitoring of groundwater/aquifer

dependent ecosystems that might be linked to the aquifers where abstraction is taking place. Some ecosystem monitoring sites already exist in Fernkloof Nature Reserve for example, which abuts Maanschynkop to the south (see UA 2019).

Poor Water Quality and Excessive Nutrient Load (Medium):

Excessive nutrient load.

Extensive agricultural development, together with expanding urban development and recreational activities, within the region of the Complex has resulted in water bodies having an increased nutrient load. The Klein River Estuary and Uilkraalsmond Estuary are located within the Zone of Influence of the Complex and managed by CapeNature, while their Estuarine Functional Zone s are found within the defined boundaries of the Complex. The Estuarine Functional Zone s are adversely impacted by an increased nutrient load, which in turn changes the composition of flora and fauna species. Even though the Estuarine Functional Zone in its entirety is impacted, and the severity of the impact is high, if measures are put in place to mitigate the nutrient load the effects of the threat can be easily reversed, and the target restored.

Poor water quality.

The water quality parameters used to assess this threat include salinity, temperature, turbidity (suspended solids), pH, and dissolved oxygen.

The salinity level of an estuary is increased due to irrigation, industrialisation, and urbanisation. An example of this occurs when an estuary receives water from reservoirs with a high concentration of salts. Hence freshwater flowing into the estuary is not fulfilling its function of diluting the saltwater coming in from the ocean, which in turn impacts the overall health of the estuarine system (Schlacher and Wooldridge 1996). It is important to note that the salinity level varies depending on the time of year and whether the estuary mouth is open or closed. For instance, when the mouth is closed and the freshwater inflow and rainfall is higher during the winter months, the salinity level of the estuary will be lower. On the other hand, the salinity level increases during the summer months when the mouth was closed (Waldron 1986).

The level of turbidity is impacted by erosion and the transfer of silt from the catchment area down into the estuary. A high level of turbidity reduces the availability of light in the water, which is important for primary production in the estuary. Furthermore, fish species are adversely impacted by uniformly high turbidity levels (Schlacher and Wooldridge 1996).

This threat impacts the entire Estuarine Functional Zone target and is likely to cause serious degradation. The effects of this threat may possibly be reversed over a very long period and with high costs.

Prolonged Inappropriate Water Level (Low):

As stated by Schlacher and Wooldridge (1996), "adequate frequency and magnitude of floods coupled with stable freshwater baseflows are absolute prerequisites to maintain the physical habitat integrity of all estuarine types", such as the temporarily open/closed Uilkraals and Klein River Estuaries.

The water level becomes a threat to the estuary and its components as soon as it reaches the extreme limits, and for prolonged periods of time. With high volumes of freshwater inflow, the mouth of the estuary is breached naturally and at the correct time. Unfortunately, the volume of freshwater inflows into the estuaries are decreased due to reservoirs, dams, and water abstraction within the catchment areas. This leads to the closing of the estuary mouth. The estuary water level increases steadily and remains high for longer periods of time as there are no high-volume floods occurring to cause the breaching of the estuary mouth (Schlacher and Wooldridge 1996).

Salt marsh vegetation composition changes with a closed estuary mouth and prolonged high freshwater levels. Due to the low salinity of the water in the salt marsh, the vegetation will rapidly decompose, and flowering and seed production will not occur. This means that when the water level lowers, the chances of the salt marsh vegetation recovering is very low (Schlacher and Wooldridge 1996).

When the estuary mouth is closed and the freshwater inflow is very low due to drought (high evaporation) or over abstraction, subtidal areas (salt marshes) within the estuary may become exposed, leading to an increase in salt content (hypersaline conditions). Many species within the salt marsh die due to the low moisture content and being exposed to high salinity levels (Schlacher and Wooldridge 1996).

This threat is widespread over the target and is likely to moderately degrade the target. The effects of the threat may possibly be reversed over a very long period and with high costs.

Industrial & Military Effluent (Low):

The industrial and military effluent threat is comprised of vessel-sourced pollution (garbage, air emissions, sewage, ballast water, and accidental and operational oil pollution), discharge from land-based sources (industrial effluent pipes, industrial stack emissions, municipal sewage and wastewater pipes, and agricultural runoff), ocean dumping, and offshore oil and gas installations (Rantsoabe 2014).

Residues from cargo tanks, which have been used for ballast purposes, are also a source of marine pollution. For example, the oil additive, polyisobutylene, changes into a waxy glue-like consistency when it encounters water, impacting various seabird species (Rantsoabe 2014).

Oil pollution can be categorised into accidental discharge and operational discharge. Accidental discharge is mainly comprised of oil tanker disasters, which can be seen as major events only happening sporadically. Operational discharge (comprised of poor maintenance, human error, and deliberate illicit acts) occurs daily. For example, oil and oily water deliberately discharged into the sea from the ships as oil from the engines, collects into the bilges during day-to-day operations causing a steady stream of pollution (Rantsoabe 2014).

The impact of this threat can be both immediate (direct) and long-term (indirect). 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).

Any magnitude of oil spill on or near Dyer and Geyser Islands, can have detrimental effects on the animals inhabiting the waters around the islands. Oil causes the breakdown of the thermal insulation of birds and mammals, while it can also inhibit their mobility hence ability to feed. Furthermore, the components of crude oil can occur long term in the sediment in marine environments, which causes physiological and behavioural changes (Rantsoabe 2014).

This threat is likely to impact most of the Marine Ecosystem and Marine Birds targets through moderate degradation. The effects of this threat may be easily reversed, and the target restored at a cost.

Predation by Gulls and Seals on Seabirds (Low):

Predation by gulls and seals affects several marine bird species found within the Complex, including the African penguin. This specific type of predation can be attributed to both food shortages, and changes in behaviour by certain individuals within a population. There is also the possibility of an increase in seal numbers within the Zone of Influence of the Complex, which in turn puts pressure on the population to find alternative food sources. The increase in gull numbers can be attributed to the easily available food sources created by urban development. The growing population of gulls increases the probability of their predation on the eggs of other marine birds. With ongoing management intervention, this threat can be minimised, and its impact reduced around Dyer Island. Figures 5.1 and 5.2 show the effect of CapeNature management actions of Kelp Gull and seal populations and the seabird mortalities caused by their predation on Dyer Island.

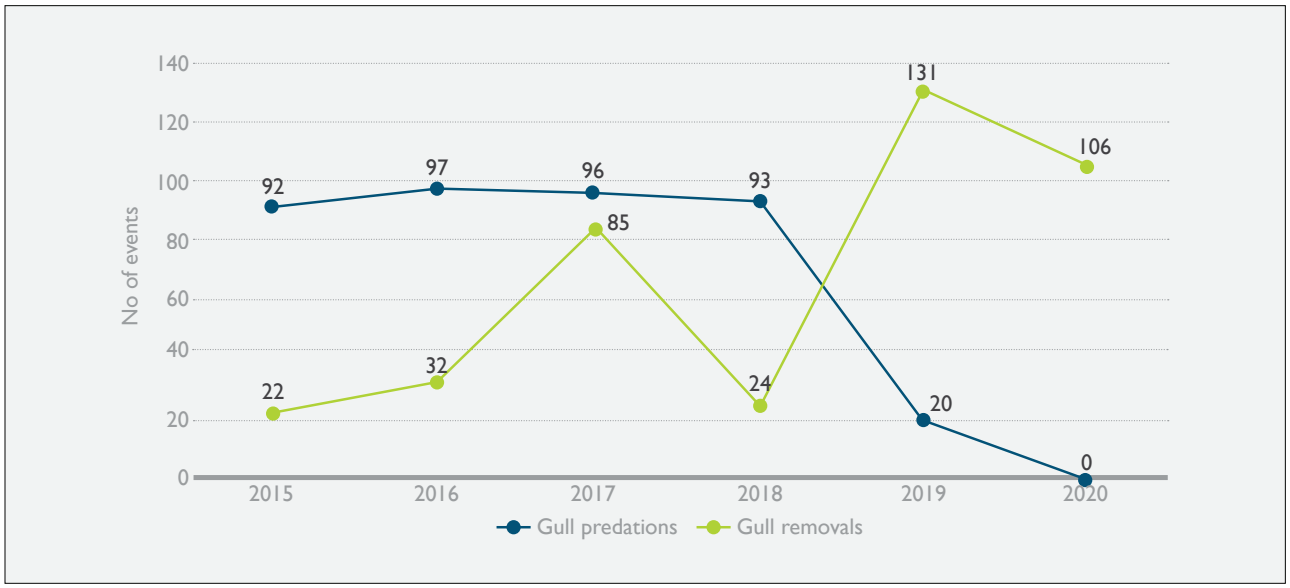


Figure 5.1: Correlation between Kelp Gull predation and removal on Dyer Island (CapeNature 2023, unpublished data).

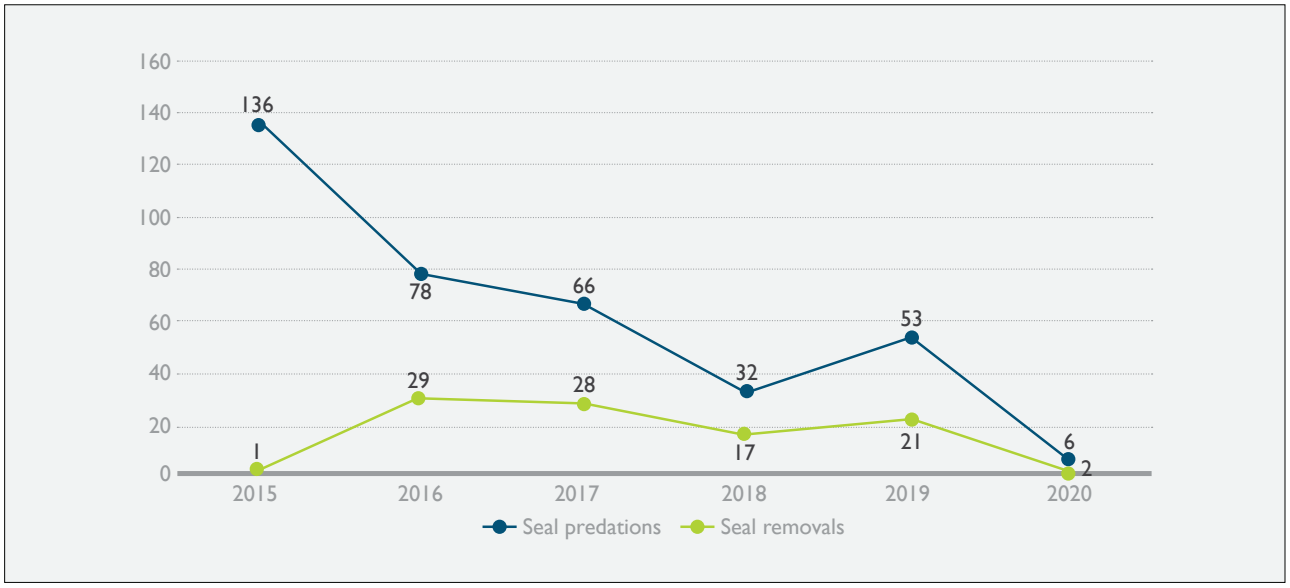


Figure 5.2: Correlation between Cape Fur seal predation and removal on Dyer Island (CapeNature 2023, unpublished data).

Disease (Low):

Diseases, such as the highly infectious avian influenza, can be a threat to several marine birds within the Complex. A recent (2021-2022) avian influenza outbreak resulted in the deaths of about 24 000 Cape cormorants, more than 300 African penguins Spheniscus demersus in southern Africa (Abolnik *et al.* 2023). Diseases are transmitted to marine birds through various vectors, for example, infected migratory passerine birds and waterbirds, mosquitoes, and humans. The impacts of disease are exacerbated in colonial breeders, because of the number of individuals near each other. Marine birds are also more susceptible to disease when they are in poor condition (compromised immune function) due to factors such as inadequate nutrition and high parasite loads caused by inadequate nesting sites and structures. Even though the scope of the threat is high (scope includes Dyer Island, the rocks, and the coastal and estuarine areas), the overall impact of the threat on the Marine Birds target is low. With the correct management interventions, the target should be able to restore itself within a short period.

Illegal Abalone Harvesting (High):

Abalone is threatened by human activities such as unauthorised resource use, poor fishery management, and the invasion of non-endemic species. Unfortunately, regulations governing the harvesting of abalone do not ensure that the abalone have enough time to reproduce and grow (8-10 years to reach legal harvesting size) in the wild before they are harvested. With the increase in market value, an increase in illegal abalone harvesting has occurred. Harvesting of a natural resource, specifically abalone, without authorisation undermines appropriate resource management. Illegal abalone harvesting is a significant threat to the abalone species, to the marine environment, and the species that are dependent on the abalone.

Future threats likely to occur highlight the requirement for surveillance, contingency planning, and close cooperation between relevant entities to ensure coordinated disaster management efforts when required.

Climate Change as a Contributing Factor to the identified Direct Threats:

As the planet experiences increased pressure from population growth, economic development, and a warming climate, species, habitats, ecosystems, and ecological infrastructure are stressed to the point where radical alteration, change or collapse occurs. Catastrophic weather events and variable climates can wreak havoc with human food and water supplies (Huntjens & Nachbar 2015). Consequently, basic human needs such as water, food, shelter, and health are threatened. 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, risk, 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). The latter 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). 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 well-managed natural systems that reduce climate vulnerability and improve resilience to climate change as critical climate change adaptation outcome, with no less than three biodiversity related focus areas:

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

In the Walker Bay Complex, climate change has been identified as a key contributing factor that could have substantial environmental, social, cultural, and economic consequences over time on several of the identified direct threats, and their associated conservation targets and human well-being values. This indirect threat is likely to have significant impacts such as an increase in the frequency of extreme weather events (for example droughts, flooding, and storm surges), fire frequency and size, habitat shifting and alteration, a rise in sea level and a hotter and drier climate. The predicted climate change zone shifts for the Walker Bay Complex are illustrated in Appendix 1, Map 18.

Island systems are particularly vulnerable especially small islands, such as Dyer Island. Nurse *et al.* (2014) confirms the high vulnerability of small islands to multiple stressors with a sea level rise as one of the most widely recognised climate change threats to small island systems. Furthermore, small islands do not have uniform climate change risk profiles. Extreme climatic events (heat and flooding due to high rainfall events and storm surges) could result in decrease in breeding success and chick

mortalities of marine birds such as the African penguin (Ludynia *et al* 2014). 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).

The conservation targets and human well-being values of the Complex link to the landscape being a priority climate change adaptation and mitigation corridor within the Western Cape.

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 core service areas by setting measurable, time-bound goals directly linked to the targets and their key attributes.

Walker Bay Complex Goals:

To maintain and build healthy and resilient ecological infrastructure, that supports the focal conservation targets and human wellbeing values of the Walker Bay Complex, management needs to achieve the following:

1. By 2034, the Fynbos Mosaic in the Walker Bay Complex has an ecologically healthy fire regime[1] and comprises 90-99% indigenous plant species.

   [1]A minimum fire return interval of 18 years, 3-4 veld age classes represented, >80% of the area burnt during December-April.
2. By 2034, the vegetation unit of the Coastal Ecosystems has an ecologically healthy fire regime[1] and the indigenous species cover of between 50-75% has been maintained.

   [1]A fire return interval a minimum of 20 years, 4 veld age classes represented, >80% of the area burnt during December-April.
3. By 2034, all rivers within the Walker Bay Complex are maintained in a healthy state[1].

   [1]Rivers that support macro-invertebrate species communities, representing an Average Score Per Taxon of 6-8, with >50% of expected indigenous fish species present in at least two age classes, and have a natural flow regime.
4. By 2034, the Uilkraals and Klein River estuary mouths close temporarily, open naturally, and stay open for 65-95% of the time.
5. By 2034, the population size[1] and breeding success[2] of the African Penguin on Dyer Island within the Walker Bay Complex has been managed and maintained through collaboration and partnerships.

   [1]Number of Breeding Pairs between 2000-5000.
   [2]Number of chicks fledged per breeding pair >0.5.
6. By 2034, Dyer Island continues to sustain populations of priority seabirds[1] and the extent of characteristic ecosystems[2] remains stable.

   [1]Cape Cormorants, Kelp Gulls, Hartlaub's Gull, Swift Tern, Roseate Tern, Caspian Tern, White-breasted Cormorant, Bank Cormorants, Crowned Cormorants.

   [2]Cape Kelp Forest, Marine Fish Species diversity.
7. By 2034, heritage resources, within the Walker Bay Complex, of cultural significance or other special value are sustainably enhanced, valued[1] by and of benefit[2] to visitors and local inhabitants.

   [1] Documented, interpreted, understood, and maintained.

   [2] Culturally and / or economically whereby human well-being is derived from healthy, responsibly managed ecological infrastructure and heritage features.

Achieving human wellbeing, derived from healthy responsibly managed ecological infrastructure and heritage, requires that:

8. By 2034, the Walker Bay Complex continues to provide and support job opportunities in partnership with role-players and contribute to economic development and social upliftment in and around the Complex.
9. By 2034, the Walker Bay Complex Environmental Awareness and Interpretation Plan promotes conservation targets and human well-being values.
10. By 2034, the Walker Bay Complex continues to enable access and the sustainable utilisation of indigenous natural resources within the Complex.

5.7 Sensitivity Analysis

A sensitivity analysis based on the Walker Bay Complex's biodiversity, heritage and physical environment is a key informant for spatial planning and decision-making in protected areas. A 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, firebreaks,
- Facilitate holistic reserve planning and zonation, and
- 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, and
- 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 Complex 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 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 portion. As new and improved data become available, it 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' (see Figure 5.1). 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 features so sensitive that they represent a 'no go' area.

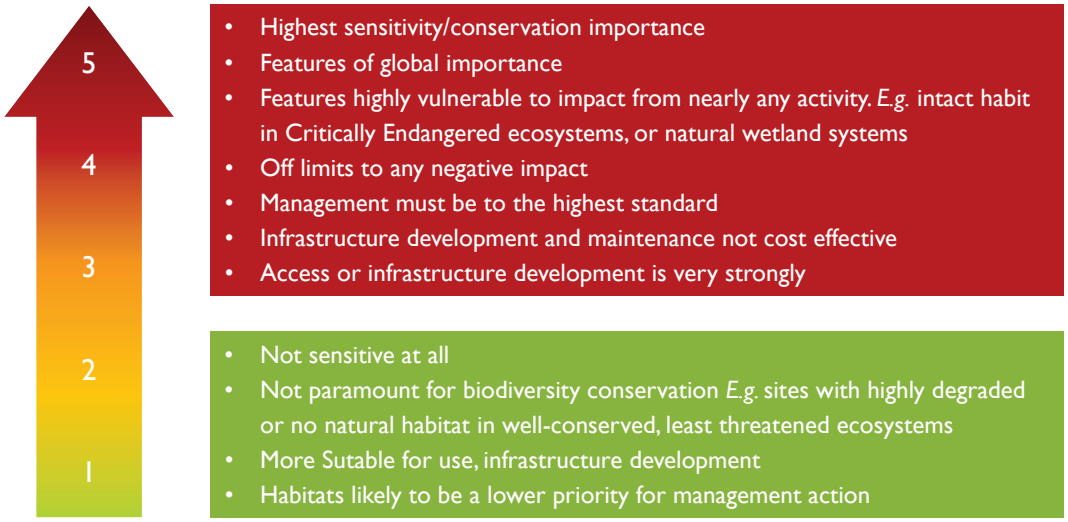


Figure 5.3: CapeNature method for sensitivity scoring and synthesis.

Physical, biodiversity and heritage features included in the sensitivity analysis for the Walker Bay Complex are illustrated in Table 5.5.

Table 5.5: Physical, biodiversity and heritage factors included in the sensitivity analysis of the Walker Bay Complex.

	Category	Dataset	Criteria	Sensitivity Score	
Physical	Slope (degrees)	Slope calculated from 5 m resolution digital elevation model generated from 5 m and 10 m contours.	> 30° Effectively off-limits for infrastructure development due to extreme risk of erosion and 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 method required. Appropriate engineering mitigation essential to prevent erosion and slope instability. Highest initial and on-going cost due to slope stabilization and erosion management required.	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 slopes may provide improved views or allow access to higher areas.	Low sensitivity	2
			0°-5° Preferred areas for any built infrastructure, lowest risk of erosion or instability, lowest construction, and on-going maintenance costs.	Lowest sensitivity	1

	Category	Dataset	Criteria	Sensitivity Score	
Physical	Soil erodibility	Soil erodibility categories per the SA Atlas of Climatology and Agrohydrology (Schulze 2007)	Soil erodibility categories according to the soil K-factor are (i) Very High > 0.7, (ii) High 0.5-0.7, (iii) Moderate 0.25-0.5, (iv) Low 0.13-0.25, and (v) Very Low < 0.13. All reserves within the Complex are identified as high soil erodibility according to the SA Atlas of Climatology and Agrohydrology report (Schulze 2007).	High sensitivity	5
Biodiversity	Rivers	1: 50 000 National Geo-Spatial Information Rivers	Within 200 m of a perennial river. Rivers only feature in Babilonstoring, Maanschynkop, and Salmonsdam, not in coastal reserves. No NFEPA rated rivers. According to NBA 2018, only a small portion of "Endangered" river plots within Maanschynkop.	Highest sensitivity	5
			Within 100 m of non-perennial rivers.	High sensitivity	4
	Wetlands and seeps	South African National Biodiversity Assessment 2018 wetlands (Van Deventer *et al.* 2018) and Seeps	Wetlands and seeps, according to the NBA 2018, inland aquatic (freshwater) mapping. This layer includes only natural wetlands.	Highest sensitivity	5
			Within 200 m of wetlands and seeps, according to the NBA 2018, inland aquatic (freshwater) mapping.	High sensitivity	4
	Red-Listing Ecosystems (RLE) (previously referred to as ecosystems threat status)	Red-List of Ecosystems for the NBA 2018; the Integrated Coast layer incorporating terrestrial, coastal, and marine ecosystems (Harris *et al.* 2019).	Critically Endangered – Agulhas Limestone Fynbos.	Highest sensitivity	5
			Endangered – Cool Temperate Estuarine Lake, Cool Temperate Predominantly Open Estuary, Elim ferricrete Fynbos, Overberg Dune Strandveld.	High sensitivity	4
			Vulnerable – Agulhas Inner Shelf Mosaic, Agulhas Island, Agulhas Kelp Forest, Cape Seashore Vegetation.	Moderate sensitivity	3
			Near Threatened – None	Low sensitivity	2
			Least Concern – Agulhas Dissipative Intermediate Sandy Shore, Agulhas Dissipative Sandy Shore, Agulhas Intermediate Sandy Shore, Agulhas Mixed Shore, Cape Seashore Vegetation, Overberg Sandstone Fynbos, Southern Afrotemperate Forest. Not assessed – Cool Temperate Micro-estuary.	Lowest sensitivity	1
	Protection levels per Vegetation type	Protection levels as done for the National Biodiversity Assessment 2018; Integrated Coast Layer (SANBI 2006-2018).	Not Protected – Cool Temperate Predominantly Open Estuary.	High sensitivity	4
			Poorly Protected – Agulhas Limestone Fynbos, Cool Temperate Estuarine Lake, Elim Ferricrete Fynbos, Overberg Sandstone Fynbos.	Moderate sensitivity	3
			Moderately Protected – Agulhas Inner Shelf Mosaic, Agulhas Kelp Forest.	Low sensitivity	2
			Well Protected – Agulhas Island, Cape Seashore Vegetation, Overberg Dune Strandveld, Southern Afrotemperate Forest Not assessed – Cool Temperate Micro-estuary.	Lowest sensitivity	1

	Category	Dataset	Criteria	Sensitivity Score	
Biodiversity	Vegetation Status / Ecosystems Threat Status	Ecosystem Threat Status based on Cape's 2016 assessments per vegetation type 2012 (Mucina & Rutherford 2006)	Critically Endangered – Elim Ferricrete Fynbos, Overberg Sandstone Fynbos.	Highest sensitivity	5
			Endangered – Western Cape Milkwood Forests.	High sensitivity	4
			Vulnerable – Agulhas Limestone Fynbos	Moderate sensitivity	3
			Threatened – None	Low sensitivity	2
			Least Threatened – Cape Estuarine Salt Marshes, Cape Seashore Vegetation, Overberg Dune Strandveld, Southern Afrotemperate Forest, Southern Coastal Forest, Western Coastal Shale Band Vegetation. Not assessed – Cape Coastal Lagoons, Cape Lowland Freshwater Wetlands, Western Cape Afrotemperate Forests.	Lowest sensitivity	1
	Rare and endangered plant species	Rare and endangered plant species extracted from CapeNature State of Biodiversity Data Base inclusive of the Custodians of Rare and Endangered Wildflowers (CREW) data; All threatened Species (SANBI 2015)	All plant species rated as Critically Endangered, Critically Rare, Declining, Endangered, Near Threatened, Rare or Vulnerable. Point localities were buffered by 5 m.	Highest sensitivity	5
	Special Habitat: Dyer Island coastal and marine bird breeding habitat	Special habitat from sensitivity analysis (from Dyer Island Protected Area Management Plan 2012)	Area above High-Water Mark and inter-tidal zone are used by multiple highly threatened seabird species pp for breeding, roosting, and moulting. Data extracted from the Dyer Island sensitivity analyses done in May 2012 by Donovan Kirkwood for the Dyer Island management plan was used.	Highest sensitivity	5
			The 500 m buffer zone around Dyer Island is used by seabirds such as the critically endangered African Penguin for foraging and is thus a very important marine access zone. In addition, the area around the island infrastructure is also important for the threatened seabird species.	High sensitivity	4
Heritage	Archaeological and cultural sites	Cultural and heritage sites (CapeNature Infrastructure Register and Heritage Inventory)	Heritage sites were mapped by CapeNature and buffered by 100 m. Heritage sites on Dyer Island mapped in the Dyer Island management plan 2012 were included and buffered by 25 m.	Highest sensitivity	5

The sensitivity analysis for the Walker Bay Complex resulted in 99% of the Complex being categorised as either of Highest (30%) of High sensitivity (69%). This is due to following main key drivers:

- The high erodibility of the coastal soil types found in the land parcels along the coast, coupled with the Red Listing Ecosystems' rating of Endangered for Overberg Dune Strandveld which occupies most of these areas.
- The steep slopes of the terrestrial inland areas of Maanschynkop, Babilonstoring and Salmonsdam.
- The high conservation status of flora and fauna species and their associated ecosystem habitats throughout the Complex.

Endangered ecosystems according to the Red Listing Ecosystems, are rated as High sensitivity and occupy 70.4% of the Complex. Critically Endangered ecosystems as Highest sensitivity, occupy 25.4% of the Complex. Rivers, wetlands, and seeps do not feature prominently in the overall analysis for this Complex. The rivers found on Maanschynkop, Babilonstoring, and Salmonsdam were the only rivers identified for the Complex, none of which were NFEPA rated rivers.

Estuaries that are mapped as Estuarine Functional Zone s, were incorporated into the Integrated Coast layer (Harris *et al.* 2019) and thus were included in this sensitivity analysis. The sections of Walker Bay and Uilkraalsmond which fall within the Estuarine Functional Zone were included in the South African NBA 2018 wetland mapping and resulted in a Highest sensitivity rating.

Dyer and Geyser Islands, with the associated 500 m buffer, were classified as Special Habitat to highlight their importance in terms of securing critically endangered species such as the African Penguin and other seabirds of conservation importance.

It is important to note that there are different threat statuses for Overberg Sandstone Fynbos. This vegetation type has undergone various classifications from Least Concern to Critically Endangered over the past decade and hence the inconsistency in rating. However, the analysis was run with each category with negligible results to the overall sensitivity ratings.

Sensitivity for the Walker Bay Complex is illustrated in Table 5.6, 5.7 and in Appendix 1, Map 10.

Table 5.6: Sensitivity scores for the Walker Bay Complex.

Sensitivity Score	Area (ha)	Area (% of total)
1 = lowest sensitivity	66.9	0.8
2 = low sensitivity	25.5	0.3
3 = moderate sensitivity	15.5	0.2
4 = high sensitivity	6 088.1	69.2
5 = highest sensitivity	2 603.5	29.6

Table 5.7: Summary of sensitivity scores for the Walker Bay Complex.

Score	Total sensitivity score		Main features							
	Area (ha) = 8799.3	% of total	Slope sensitivity % of total	Soil erodibility % of total	River buffers % of total	Red Listing ecosystems area % of total	Protection levels per vegetation type % of total	Species of special concern % of total	Special habitats % of total	Heritage % of total
1	66.9	0.8	51.0	-	-	25.9	69.4	-	-	-
2	25.5	0.3	18.6	-	-	-	1.6	-	-	-
3	15.5	0.2	17.3	-	-	3.4	27.4	-	-	-
4	6 088.1	69.2	8.2	92.7	8.9	70.4	1.3	-	2.7	-
5	2 603.5	29.6	4.9	-	3.2	0.0	-	0.019	0.6	0.1

6 ZONING PLAN

This section outlines the zoning plan for the Walker Bay Complex. The Complex forms part of a planning matrix and locating the Complex in terms of the municipal IDP and SDF is aimed at minimising conflicting development in either the Complex or the neighbouring municipal area.

The primary objective of the zoning plan is to establish a coherent spatial framework within and around the 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 does conflict with the goals and objectives of the Complex.

6.1 The Walker Bay Complex in the Context of Municipal Integrated Development Planning

The Walker Bay Complex is located within two local municipalities, namely the Overstrand and Theewaterskloof Local Municipalities, which fall within the Overberg District Municipality area. The SDFs and IDPs of the district and two local municipalities must be taken into consideration. These publications contribute to determining the Zone of Influence and establishing potential threats and opportunities in these areas. There is also the opportunity to identify projects and interventions that need to be included in the IDPs and SDFs where appropriate and within the legislated stakeholder engagement process.

The IDP (2017/18 – 2021/22) indicates that in response to climate change adaptation, the municipality is implementing the following actions which could be to the benefit of the Complex: alien vegetation removal on municipal properties, promotion of wetland conservation, municipal fire services, and a disaster management plan. The municipality's Coastal Management Programme is also relevant to the Complex.

The Overberg District Municipality convenes the Municipal Coastal Committee which includes all relevant stakeholders, including CapeNature, and attendance at the estuary management forums, including the Klein and Uilkraal estuaries. The Coastal Management Line will define the coastal setback for all future development.

The Overberg Fire and Rescue Services, falling under the municipal disaster management services, play an important role in assisting with the control and management of fires in the area.

The municipality has an Alien Invasive Species Monitoring, Control and Eradication Plan in accordance with the Department of Environmental Affairs (DEA) guideline, with the implementation according to the municipal budget process. Challenges identified for the environmental management section include the relevant mandate and adequate budget to fulfil their duties. Environmental sector projects implemented within the 2017-2022 period of the IDP include Working for the Coast: Rooi-els - Quoin Point project by DFFE and an alien clearing programme by the Agulhas Biodiversity Initiative (ABI).

In the SDF (2014), the Western Cape Biodiversity Framework has been used as it pre-dates the publication of the Western Cape Biodiversity Spatial Plan (WCBSP). The Spatial Planning Categories have not consistently followed the recommended categorisation of CBAs as Core 2, which have instead been classified as 'Buffer', although in other sections the CBA is classified as Core 1c, with Core 1b consisting of private nature reserves and conservancies. Mountain Catchment Areas have been accurately depicted as protected area (Overberg District Municipality 2014).

The Walker Bay Complex is surrounded by natural vegetation which was classified as CBA and therefore assigned as Core 1c: CBAs (to be protected) or where abutting conservancy and private nature reserves, assigned the category of Core 1b: Private Nature Reserves and Conservancies.

The designation within the SDF provides for a level of protection from large scale development adjacent to the nature reserves of the Complex. With regards to the broad conceptual planning, the Complex has been included in the urban coastal corridor which promoted the tourism potential of the Kleinrivier mountains through to the coastal reserves.

The SDF includes a section dedicated to estuaries. It acknowledges those of national importance such as the Klein River estuary and advocates that developments along the edges of estuaries must adhere to the Integrated Coastal Management Act and that no development may take place within determined setback lines.

Overstrand Municipality:

The municipality acknowledges the importance of the environment as its greatest asset in the IDP (2017/18-2021/22). It lists CapeNature as a partner to assist the municipality with natural resource management. This enables engagement and collaboration between the two organisations such as protected area management, coastal management, estuary management, alien clearing, and environmental planning. This contributes to the holistic management of the conservation of the Complex, its Zone of Influence and corridors, for example Fernkloof Nature Reserve connecting to Maanschynkop through Vogelgat Private Nature Reserve, and coastal and estuary management.

A Strategic Environmental Management Framework has been compiled for the municipality as part of their IDP and aims to provide guidance with regards to forward planning in terms of environmental sensitivities and considerations.

The Overstrand SDF (2020) uses the WCBSP (2017) as the primary informant for biodiversity constraints. Environmental Management Overlay Zones (EMOZs) have been developed as a component of the Overstrand SDF, which provides for an

additional level of protection in terms of land use planning. The EMOZs contribute to coastal protection, mountain catchment, protected area buffer, riverine and urban conservation. The mountain catchment and protected area buffer EMOZs provides for the control of development and activities adjacent to the Complex which could have a negative impact. The composite Environmental Management Overlay Zone provides for both buffers and connectivity between the various components of the Complex and supports a landscape conservation approach.

With regards to future development proposals, there are no new service provision projects indicated which could impact on the Complex. In addition, the edge effect has been reduced for Maanschynkop and Walker Bay as the Fernkloof Nature Reserve has been extended to the edge of the Klein River estuary and effectively provides a barrier for the expansion of Hermanus eastwards towards Maanschynkop. The urban edge however abuts directly onto the boundary of Walker Bay at De Kelders. Ideally there should be a buffer between hard development and the boundary of the protected area when development proposals are developed. A buffer exists between the urban edges elsewhere in the Complex e.g., Pearly Beach.

Theewaterskloof Municipality:

The IDP (4th IDP Review 2021/22) for the local municipality falls within the framework of the district municipality. The IDP refers to CapeNature protected areas as an economic advantage and opportunity for the municipality. There is also reference to conservation on private land through the CapeNature stewardship programme, conservation easements and conservancies.

Climate change is addressed in the Climate Change Adaptation Summary Report and was developed through the Local Government Climate Change Support (in partnership with the Western Cape Climate Change Municipal Support Programme) and encompasses impacts on biodiversity. Flood mitigation is one of the main components to address due to the predicted increase in extreme rainfall events.

Water resources are identified as important natural resources to serve the local community, incorporating six main catchments, including the Klein River, with the headwaters in Maanschynkop.

Alien clearing is identified as a priority activity to address climate change, drought, biodiversity loss, fuel reduction and fire prevention and increasing the water table.

The SDF (2019) is informed by the concept of bioregional planning and therefore has used the WCBSP as a key informant, as described above, by aligning the spatial planning categories to the WCBSP categories. Permissible land uses are then explicitly aligned to the spatial planning categories.

The section of Maanschynkop within the Theewaterskloof Municipality is not within the vicinity of any urban areas or rural development focus areas and associated development proposals. The R320 road between Hermanus and Caledon passing through the Hemel-en-Aarde Valley to the north of Maanschynkop has been identified as one of the major tourism routes within the municipality.

The SDF indicates strategies for development adjacent to sensitive natural areas, steep slopes, and floodplains, which would support minimising impacts on protected areas and the Zone of Influence.

Table 6.1: Aspects of the municipal Integrated Development Plans applicable to the Walker Bay Complex.

Municipality	Aspect in IDP to be Addressed	Proposed Intervention
All Municipalities	Provide for protection of important biodiversity areas and identification of natural corridors in forward planning documents	• Incorporate the WCBSP to inform the spatial planning categories in the SDF. • Provide for adequate development controls for the spatial planning categories.

Municipality	Aspect in IDP to be Addressed	Proposed Intervention
Overstrand Municipality & Theewaterskloof Municipality	Invasive alien vegetation on both public and private properties	• Implement a municipal-wide alien clearing plan on all municipal properties. • Budgeting for alien clearing in the IDP. • Facilitate implementation of alien clearing programmes from various funding sources through partnership. • Encourage and enforce landowner compliance.
All Municipalities	Integrated fire management across the landscape	• Ensure municipal properties implement appropriate fire management. • Fire-fighting partnerships, in particular the FPAs and associated strategies.
All Municipalities	Provide for nature-based tourism development opportunities and associated infrastructure	• Identify nature-based tourism opportunities that benefit the local community and support conservation of biodiversity. • Identify infrastructure needs to support nature-based tourism development.
Overstrand Municipality & Theewaterskloof Municipality	Ensure the natural resources required for service provision are sustainable and minimise ecological impact, in particular for water resources.	• Ensure that water sources are monitored to ensure sustainability and minimise impact. • Thorough investigation of new water sources to ensure impact of abstraction is minimised.

6.2 Protected Area Zonation

The primary function of the Walker Bay 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 sensitivity 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, and
- Confines development within the Complex to areas deemed appropriate to tolerate transformation without detracting from the sense of place.

CapeNature's zonation categories, illustrated 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 conservation management zones.

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, and environmental education facilities.
Development – High intensity	Area extensively degraded. Providing low and/or higher density accommodation, and maybe some conveniences, such as shops and restaurants.
Development – Management	Location of infrastructure and facilities for reserve administration and management.
Development – Production	Commercial or subsistence farming (applicable to privately owned and managed nature reserves).
Development – Private Areas	Private dwellings and surrounds (only 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 of the Complex to meet broader economic and social objectives of the protected area.
2. Consider existing development footprints and tourism access routes based on:
    - The principle that all else being equal, an existing transformed site is preferable to a green fields site from a biodiversity perspective,
    - Increase in 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 put into stronger protection zones and peripheral development is favoured.

The majority of the Walker Bay Complex is zoned as Primitive, with only the footprints of selected infrastructure and buildings zoned differently and occupying a very small percentage of the Complex. This aligns with the sensitivity analysis as described above, whereby approximately 99% of the Complex is rated as high or as highest sensitivity. The high sensitivity presents constraints to developments and activities, therefore Primitive zoning, where there is minimal development or human activity, is most appropriate. Permitted infrastructure includes, low intensity uses such as hiking trails and small-scale rustic overnight huts (e.g., Maanschynkop). There are no areas zoned as Wilderness, as the Complex's land parcels are too small and surrounded by areas of human activity, including both urban and agricultural land use, which impact on the sense of place.

There are two nodes within the Complex zoned as Development - Low Intensity. These are at the tourism accommodation facilities on Salmonsdam, and the tourism/administration node at the De Kelders (eastern) gate of Walker Bay. Both nodes are

proposed for tourism accommodation upgrades, which may or may not be implemented within the management plan timeframes. These nodes are existing disturbed footprints which are currently under-utilised. There are no areas zoned as Development - High Intensity, which should, in general, be minimised as far as possible within protected areas. Development - Management zone mainly consists of management roads and jeep tracks on Maanschynkop, Salmonsdam, Walker Bay, Uilkraalsmond, Soetfontein, and Quoin Point. Other Development - Management nodes are at the access gatehouse of Uilkraalsmond, the lighthouse and associated buildings on Quoin Point, and the management buildings and infrastructure on Dyer Island.

Nature Access zoning has been assigned to the access road of Salmonsdam for tourism access and to cater for potential future upgrades. Nature access has also been assigned to the provincial road, which traverses Uilkraalsmond, linking Gansbaai with Pearly Beach and Die Dam. The fishing trail, within Walker Bay, is a popular 4x4 route providing access to the coastline for angling, therefore it is classified as Nature Access. The fishing trail is proposed for further upgrade. Die Dam, a resort owned by the Overberg District Municipality, requires access through Quoin Point and therefore the access road was zoned as Nature Access.

Dyer Island and Geyser Island have been zoned as Species/Habitat/Cultural Protection. In this case, it is specifically Habitat Protection, as the primary management objective of these islands is the protection of roosting and breeding seabirds (particularly the threatened species, e.g., African Penguin). However, the 500 m buffer around the islands is zoned as Primitive, which accommodates the frequent tourism boast traffic. The other location categorised under the Species/Habitat/Cultural Protection zonation is the Klipgat Cave, specifically for Cultural Protection. The Klipgat Cave is an important archaeological feature; therefore, the management objective is focussed on the protection of the archaeological and cultural aspects of this locality.

A summary of the zonation scheme applicable to the Walker Bay Complex is depicted in Table 6.3 and illustrated in Appendix 1, Map 11.

Table 6.3: Summary of CapeNature zonation categories applicable to the Walker Bay Complex.

Zonation Category	Explanation
Primitive	The majority of the Complex is zoned as Primitive, with only very small proportions that are not. The only land parcels within the Complex that are not predominantly zoned as Primitive are Dyer Island and Geyser Island. However, the 500 m buffer zone around Dyer Island and Geyser Island is zoned as Primitive.
Nature Access	The areas which are zoned as Nature Access within the Complex are: the access road into Salmonsdam to the existing tourist facilities; the Fishing Trail in Walker Bay, including the proposed extension to create a circuit; the R43 public road traversing the Uilkraalsmond, including a 25 m buffer; and the access road through Quoin Point to the Die Dam resort.
Development – Low intensity	Areas zoned as Development - Low Intensity within the Complex are those which are currently occupied by tourism facilities and the areas considered for future proposals. These areas are the existing footprint of the camp site and tourism accommodation on Salmonsdam, and the area identified as acceptable for development in the preliminary opportunity and biodiversity impact analysis for the proposed tourism accommodation development at Klipgat Cave, on Walker Bay (mainly within existing disturbance footprint).

Zonation Category	Explanation
Development – Management	There are several management roads/jeep tracks located throughout the Complex, in addition to associated infrastructure, which are zoned as Development – Management. This includes: the jeep track access to the Leopard Hiking Hut on Maanschynkop; the jeep track in the eastern section on Salmonsdam leading from the camp site; a number of jeep tracks throughout Walker Bay; the access gatehouse and various jeep tracks at Uilkraalsmond; the existing buildings and infrastructure on Dyer Island; jeep tracks on Pearly Beach; buildings and jeep tracks on Soetfontein; the lighthouse and associated buildings and jeep tracks at the Quoin Point.
Species/Habitat/Cultural Protection	There were two locations within the Complex which were zoned for Special Protection. The Klipgat Cave and associated tourism infrastructure was zoned for Cultural Protection. Dyer Island and Geyser Island was zoned as Habitat Protection (only excluding management buildings and infrastructure), due to the importance of these islands for seabird breeding and roosting.

6.3 Protected Area Zone of Influence

CapeNature seeks to maximise positive influences and/or minimise direct and indirect negative pressures on 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 conservation 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) used to delineate the zone include:

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

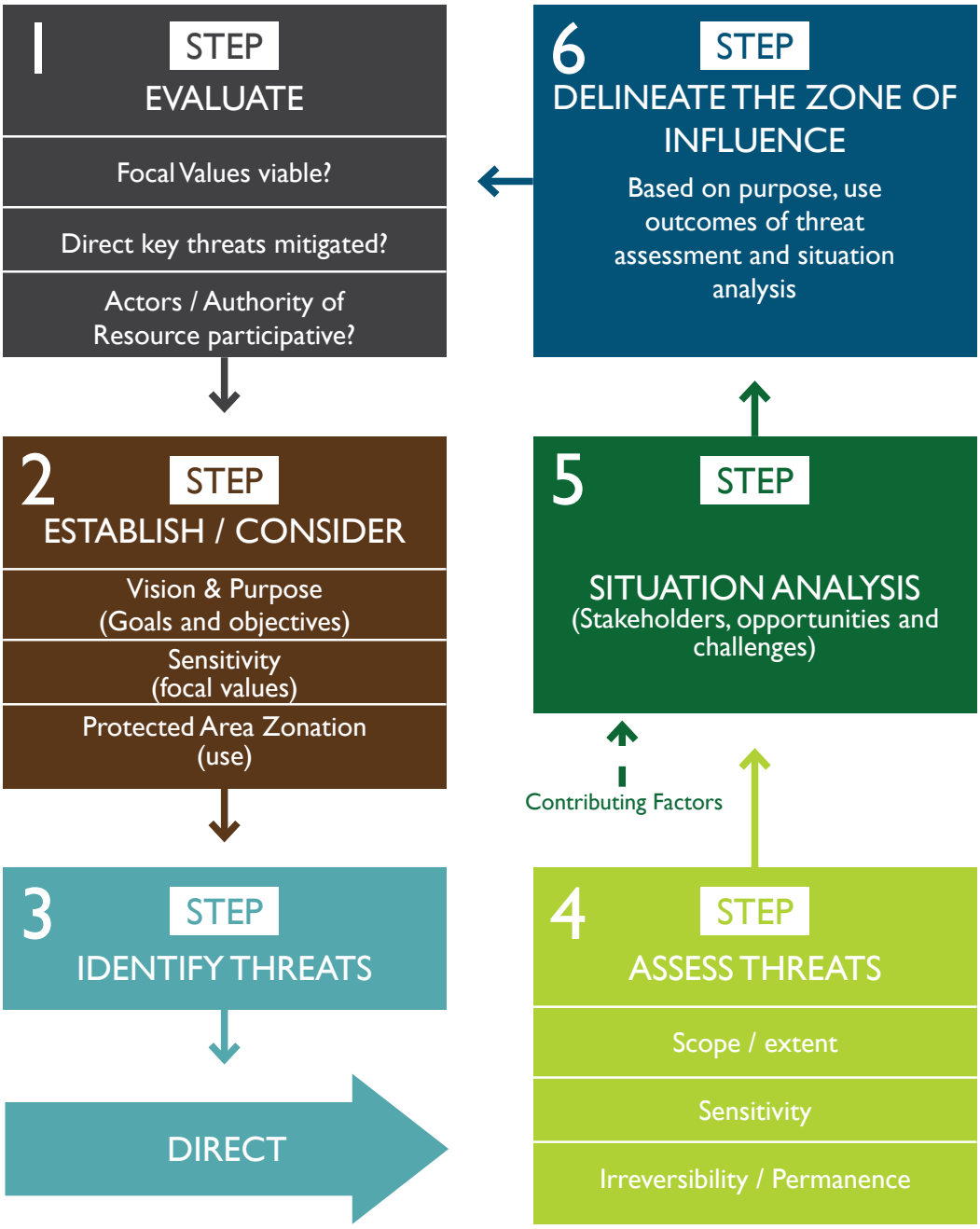


Figure 6.1: Process flow for the delineation of the Zone of Influence.

The Zone of Influence is a non-legislated area spatially depicted around the Walker Bay 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 goals and objectives of the Complex, and enhances the benefits derived from the Complex. The process of delineation helps to identify:

1) Actions to directly restore a target/value or mitigate a threat,
2) Actions designed for people to continue positive behaviours or halt direct threats, and/or
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 positive behaviours,
- A spatial prioritisation of where to collaborate and with whom,
- A mechanism to prioritise support to landowners or managers of priority landscapes, and
- 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 rating applied to delineate the Zone of Influence of the Walker Bay Complex. Appendix 1, Map 12 illustrates the Zone of Influence for the Complex.

Table 6.4: The criteria used for defining the Zone of Influence of the Walker Bay Complex.

Feature	Criteria	Rating	Zone area (ha)	% of zone
Fire hazards (high fire frequency)	Inappropriate fire frequency due to anthropogenic fires. Irrespective of the ignition sources, the flammability of the vegetation determines the fire hazard for fires occurring from outside the reserve moving into the reserve. Natural fire prone vegetation is therefore considered as a source that can lead to uncontrolled fire events. The fynbos biome, from the NBA 2018 terrestrial layer with transformed areas (agriculture and towns) removed, was used to determine natural fire prone vegetation. This was applied to a 5 km buffer around the Complex's inland land parcels. Fire hotspot areas are determined annually based on various factors, such as frequent ignitions and causes. The natural fire prone vegetation within the fire hotspots, adjacent to the Complex's coastal areas, was used.	High (3)	42 789.6	18.34
Invasive alien plants	Stands of invasive alien plants or plantations, within a radius of the Complex, is a source of re-infestation for areas cleared in the Complex. The risk is mainly identified for the Complex's inland land parcels. The Planted Forests class, from the National Landcover 2020, was used for plantations. The National Invasive Alien Plant Survey (Kotze *et al.* 2010) was used as grid cells to record percentage abundance of invasive alien plants falling within 3 km from any of the Complex's boundaries. Transformed areas were excluded.	High (3)	32 391.7	13.88

Feature	Criteria	Rating	Zone area (ha)	% of zone
Invasive alien fauna	The presence of the invasive and alien, Giant African Snail (*Achatina Fulica*), near Salmonsdam and Pearly Beach was used. Properties adjacent to the Complex were included. Currently the status of invasive alien fish is unknown and therefore wasn't included.	High (3)	7 361.6	3.15
Over abstraction of water (surface and groundwater)	Abstraction of water which may affect the Complex were identified. Groundwater abstraction by the Overstrand Municipality is taking place at Pearly Beach, De Kelders, and Stanford. Abstraction is taking place from a weir and pipeline within Maanschynkop by landowners for agricultural purposes. The urban areas for Pearly Beach, De Kelders, and Stanford were identified as the end users. The farm portions that use water abstracted from the weir within Maanschynkop were included. The abstraction of water is required for irrigated agriculture. The irrigated fields within the G40M (Uilkraals) and G40J (Upper Klein) catchments, as indicated on the agricultural field layers, was used. All known boreholes were buffered by 100 m.	Medium (2)	1 800.3	0.77
Prolonged inappropriate water levels	Prolonged inappropriate water levels pose a direct impact on salt marshes. Only the Uilkraalsmond Estuary has a salt marsh. Buffered the entire Uilkraals River system from Salmonsdam to Uilkraalsmond by 100 m. This system is classified as critically endangered in the NBA 2018.	Medium (2)	1 938.4	0.83
Estuaries – Water quality	Poor water quality (excluding nutrient loads) is a threat to estuaries and is therefore monitored. The Klein and Uilkraals are major estuaries adjacent to Walker Bay and Uilkraalsmond, respectively. The estuaries as delineated for the National Biodiversity Assessment: Estuarine Component (Van Niekerk and Turpie 2012).	High (3)	2 517.2	1.08
Excessive nutrient load from agricultural activities	Excessive nutrient load from agricultural activities enters run-off which affects the water quality within estuaries. The catchments of the two rivers traverse agricultural lands. The critically endangered Uilkraals River system has recorded indigenous fish species. The Critically Endangered Klein River system within the G40M catchment has no records of indigenous fish species. These river systems and its tributaries as delineated in the NBA 2018 wetlands layer were included with a buffer of 50 m.	Low (1)	7 467.7	3.20

Feature	Criteria	Rating	Zone area (ha)	% of zone
Human Activities & Disturbances	Illegal resource use includes illegal harvesting of fauna and flora. Urban expansion of towns (Hermanus, Pearly Beach, Gansbaai, Franskraalstrand) near the Complex increases the potential for illegal access. Illegal resource use activities emanate from human settlements in proximity of the Complex. The layer was generated by buffering identified human settlements by 1500 m. Also included are known illegal access points to the Complex (buffered by 500 m).	Medium (2)	9 847.7	4.22
	Recreational access and activities around the islands can have an impact. For the whale watching and shark cage diving, a 500 m buffer was delineated around the Dyer and Geyser islands.	Medium (2)		
	Illegal recreational access and activities along the coastline adjacent to the Complex's coastal sections, such as off-road vehicles (quadbikes, scramblers, and 4x4 vehicles), have an impact on the coastal systems. The coastline between protected areas and the high-water mark was included for off-road vehicles within the coastal zone.	Low (1)		
	Illegal recreational access and activities to heritage sites. A 500 m buffer was applied around the access point to the Klipgat Cave near De Kelders, which is a popular tourism location often accessed illegally.	High (3)		
Climate Change	The climate adaptation corridors as delineated in the Western Cape Biodiversity Spatial Plan (WCBSP) and identified in the Table Mountain Fund project for the CFR, were included. The corridors incorporate important landscape features that provide climate change resilience. Three of these corridors occur within the area namely: Bot River to Shaws Mountain, Klein River to De Mond, and Agulhas. The Klein River to De Mond corridor was not extended further east than the G50B catchment.	Low (1)	39 368.4	16.87
Illegal fish and marine resources harvesting (poaching)	Areas where illegal fishing and unauthorised resource use of marine living resources occur along the coastline of the Complex's coastal sections and islands were identified by reserve staff. A 1 km buffer along the identified sections of coastline were included.	Very High (4)	100 673.1	43.14
	The proposed long-term closure area of 20 km around Dyer Island, excluding purse seine fishing as recommended in the African Penguin Biodiversity Management Plan, has been included.	Low (1)		
Pollution (oil spills, plastic, etc.)	Pollution of the sea and coastline from passing ships, including oil spills, plastic, etc. The area impacted is sensitive for the African penguins. The proposed exclusion zone of 20 km for Dyer Island is used.	Low (1)	98 040.7	42.01

Feature	Criteria	Rating	Zone area (ha)	% of zone
Renewable energy	Installation of renewable energy, both wind and solar, can have an impact on the Complex. Renewable energy infrastructure, such as wind turbines, can have an impact on black harriers (*Circus maurus*, Endangered) at Salmonsdam. Renewable energy development zones (REDZs) were identified through a Strategic Environmental Assessment. Phase 1 has been approved and the sections of the Overberg REDZ within a 5 km buffer of the Complex were included. None of the sites in Phase 2 plots are within the 5 km buffer zone.	Low (1)	15 908.4	6.82
Corridors for fauna movement	Leopard movements are tracked by external researchers (e.g., Landmark Foundation). Movement has been recorded between Salmonsdam and Hemel-en-Aarde, along the Kleinrivier Mountains. Areas above 300 m between Salmonsdam and Maanschynkop were used to delineate the corridor along the Kleinrivier Mountains. This corridor correlates with the climate adaptation corridor.	Low (1)	13 903.4	5.96
Game farming	Introduction of extralimital game species is a potential threat from game farming adjacent to the Complex. All game farms adjacent to the Complex's boundary, from the Western Cape Game Database (November 2020), were included.	Low (1)	21 134.8	9.06
Local Authority Nature Reserves	Included all the adjacent local authority nature reserves into the Zone of Influence, which consists of Fernkloof Nature Reserve (proclaimed area according to the CapeNature database).	Low (1)	1 681.4	0.72
Stewardship sites and private nature reserves	Stewardship sites and verified private nature reserves were included. This consisted of all the signed and designated stewardship sites that are adjacent to the protected areas, and those directly connected to them.	Low (1)	1 654.8	0.71
Areas identified in PAES (CAPMap)	Areas identified within the provincial protected areas expansion strategy, termed the Conservation Action Priorities Map (CAPMap). All the adjacent properties to the protected areas, and those directly connected to them were included.	Low (1)	4 623.5	1.98
Conservancies	Several conservancies are present adjacent or nearby the Complex. These include Akkedisberg, Blinkwater, De Diepegat, Kleinrivierberg, Onrust Mountain, Pearly Beach and Walker Bay Fynbos. All the adjacent properties to the protected areas, and those directly connected to them were included.	Low (1)	27 757.7	11.89

The Zone of Influence for the Walker Bay Complex has a total extent of 233 362.4 ha (Appendix 1, Map 12).

Illegal fishing and the unauthorised resource use of marine living resources is the feature which received the rating of high. The section of coastline fronting the Complex's coastal areas, in addition to the intervening coastline, is one of the most targeted for unauthorised resource use, in particular abalone (*Haliotis midae*), which is a high value product occurring within the offshore kelp forests (Operation Phakisa Initiative 5 Annual Operational Report 2021). The unauthorised resource use operates as a high-level criminal activity which requires considerable resources and co-operation with law enforcement agencies to address. The

targeted species' long-term survival is therefore under severe threat. The percentage area of the Zone of Influence occupied by the poaching hotspots was combined with the 20 km exclusion zone around Dyer Island, covering a relatively extensive area which accounts for the high percentage of 43.14%. The exclusion zone was also used for coastal and marine pollution (e.g., oil spills), and on both cases was rated as low (covering 42.01%).

Fire hazard and invasive alien plants are both features that scored high, as they encompass a large percentage of the Zone of Influence (18.34% and 13.88%, respectively). These features were also identified as primary threats (Section 5.5) within the Complex's boundaries. Additional features with a high rating were invasive alien fauna, estuary water quality (excluding nutrient load), and human disturbance at the Klipgat Cave. These features encompass a smaller percentage of the Zone of Influence (3.15%, 1.08%, and 4.22%, respectively, with the latter including other areas of human disturbance).

The features which covered a relatively large extent of the Zone of Influence are the climate adaptation corridors (16.87%), game farms (9.06%), and conservancies (11.89%), each of which was rated as low. The climate change adaptation corridors and conservancies provide for landscape connectivity and are features which can mitigate against threats such as climate change and lack of connectivity. Landscape connectivity is particularly relevant to the Walker Bay Complex as it consists of several small land parcels scattered across the landscape. The features which relate to connectivity are corridors for fauna movement (5.96%), local authority nature reserves (0.72%), stewardship sites (0.71%), and the protected area expansion strategy (1.98%), all of which are also rated as low.

Features which are rated as medium were abstraction of water, prolonged inappropriate inundation of salt marshes, human settlements which are sources of illegal resource use, and boat-based tourism around Dyer and Geyser Islands. Renewable energy is reflected within the designated REDZ, which are zones where there are reduced authorisation requirements, and it includes the Overberg REDZ. The rating for the REDZ is low and it encroaches in the vicinity of Salmonsdam. There are currently no commercial renewable energy facilities within the vicinity of the Complex. The Buffelsjags Abalone Farm near Quoin Point however has three wind turbines for the operation of the facility.

The features which were most prominent in defining the Zone of Influence are also highlighted within the IDPs and SDFs for the affected municipalities, and therefore the Zone of Influence reflected the IDP and SDF priorities (refer to Section 6.1). These include estuaries, fire management, alien invasive species management, and landscape corridors of natural habitat.

7 ACCESS AND FACILITIES

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

7.1 Public Access and Management

The three mountain sections (Babilonstoring, Maanschynkop, and Salmonsdam) of the Walker Bay Complex are closed to the public and only accessible by reserve management. These sections, except for Salmonsdam, are not completely fenced, but all are surrounded by privately owned land which provide a level of protection against illegal entry. Maanschynkop is adjacent to the Vogelgat Private Nature Reserve, whose members have access to Maanschynkop to assist with the control of invasive alien plants, hiking trail maintenance, and ecological data collection.

Walker Bay has four access points (Appendix 1, Map 14) that are accessible by reserve management, the municipality, private landowners, and the public. The De Kelders access point, located at the eastern boundary, provides access to the public through an entry-fee controlled gate. The public gains access to fishing, birding, hiking, whale watching, and the historic Klipgat Cave. The second access point is via a gravel road from the town of Stanford, which leads onto the Walker Bay Fishing Trail to the west

(Le Bos area). The third access point is via Wortelgat private farm to the Mierkom area. The fourth access point is to the east of the Mierkom access, via Wortelgat Private Farm and the Kleinrivier Private Nature Reserve, to the Dadelkom area. The Fishing Trail leads the public to four demarcated parking areas whereby people can access the beach, while the Mierkom and Dadelkom roads lead to one parking area each and access to the beach.

The main access to Uilkraalsmond (Appendix 1, Map 14) is within the western section where the public may enter through an entry-fee controlled gate. The reserve provides access to fishing, birding, hiking, and whale watching activities. The reserve is not completely fenced and can be illegally entered at different points.

Pearly Beach and Soetfontein are closed to the public and only accessed by the reserve for management purposes. Pearly Beach is accessed by the local municipality due to their water rights on the property.

Quoin Point, which is adjacent to the Agulhas National Park, is closed to the public however there are several unmanned access points.

Dyer Island terrestrial component is closed to the public, and only accessed by boat from the Kleinbaai Harbour for ecological and management purposes. The only other legal access on land provided is to enable permitted external research. There is open access to the declared 500m marine buffer surrounding the islands for commercial tourism activities such as shark cage diving run by private operators. Geyser Island is closed to the public, and not regularly accessed by reserve management.

Quoin Rock is closed to the public and has no access points.

Controlled and uncontrolled access points to the Complex are listed in Table 7.1 and illustrated in Appendix 1, Map 14.

Table 7.1: Managed access points to the Walker Bay Complex.

Locality	Name	Type of Access	Activity
DECMARCATED INLAND ACCESS POINTS			
Babilonstoring (Closed Reserve)	Management Entrance	Authorised unmanned access; No public access	Management access only, through private property
Maanschynkop (Closed Reserve)	Management Entrance	Authorised unmanned access; No public access	Management access only, through private property
Maanschynkop (Closed Reserve)	Vogelgat Hiking Trail (North-West Entrance)	Authorised unmanned access; No public access	Management and Vogelgat access only
Maanschynkop (Closed Reserve)	Vogelgat Hiking Trail (South-West Entrance)	Authorised unmanned access; No public access	Management and Vogelgat access only
Salmonsdam (Closed Reserve)	Management Entrance	Authorised unmanned access; No public access	Management access only, through private property
Salmonsdam (Closed Reserve)	Management Firebreak Entrance	Authorised unmanned access; No public access	Management access only, through private property
Salmonsdam (Closed Reserve)	Management Eastern Entrance	Authorised unmanned access; No public access	Management access only, through private property
Salmonsdam (Closed Reserve)	Access Point 1: Farm 1/666	Authorised unmanned access; No public access	Management access only, into private property
Salmonsdam (Closed Reserve)	Access Point 2: Farm 1/666	Authorised unmanned access; No public access	Management access only, through private property
DEMARCATED COASTAL ACCESS POINTS			
Walker Bay: Stanford entrance	Le Bos Entrance	Authorised unmanned access	Management and tourism access

Locality	Name	Type of Access	Activity
Walker Bay: Stanford entrance	Mierkom Entrance	Authorised unmanned access	Management and tourism access
Walker Bay: Stanford entrance	Dadelkom Entrance	Authorised unmanned access	Management and tourism access through private property
Walker Bay	Grootbos Entrance	Authorised unmanned access; No public access	Management and Grootbos access only
Walker Bay: De Kelders entrance	De Kelders Entrance	Authorised manned access	Management and tourism access
Walker Bay: De Kelders entrance	Die Plaat Entrance	Authorised manned access	Management and tourism access
Walker Bay: De Kelders entrance	Management Entrance	Authorised unmanned access	Management access only
Uilkraalsmond	Main Entrance	Authorised manned access	Management and tourism access
Pearly Beach (Closed Reserve)	Management Entrance (North)	Authorised unmanned access; No public access	Management access only, through private property
Pearly Beach (Closed Reserve)	Management Entrance (South)	Authorised unmanned access; No public access	Management access only, through private property
Soetfontein (Closed Reserve)	Management Entrance (West)	Authorised unmanned access, No public access	Management access only, through private property
Soetfontein (Closed Reserve)	Management Entrance (East)	Authorised unmanned access, No public access	Management access only, through private property
Quoin Point (Closed Reserve)	Management Entrance (SANParks)	Authorised unmanned access; No public access	Management access only, through private property
Quoin Point (Closed Reserve)	Management Entrance (Buffeljagsbaai 1)	Authorised unmanned access; No public access	Management access only, through private property
Quoin Point (Closed Reserve)	Management Entrance (Buffeljagsbaai 2)	Authorised unmanned access; No public access	Management access only, through private property
Quoin Point (Closed Reserve)	Management Entrance (North-East)	Authorised unmanned access	Management and Die Dam access
Quoin Point (Closed Reserve)	Management Entrance (Die Dam 1)	Authorised unmanned access; No public access	Management access only
Quoin Point (Closed Reserve)	Management Entrance (Die Dam 2)	Authorised unmanned access; No public access	Management access only
Dyer Island	Dyer Island Jetty and slipway	Authorised Management access; No public access	Management access only by boat from Kleinbaai Harbour
Geyser Island	Closed area	No access to the public	Breeding site for animals
Quoin Rock	Closed area	No access to the public	Breeding site for animals

7.2 Airfields and Flight Corridors

Section 47 of NEM: PAA stipulates prescriptions for the use of aircraft in a WHS. A helicopter landing area for emergency rescue services and for WoF use is located on the Walker Bay Complex's office base in Hermanus. This landing space is mainly utilised for re-fuelling and for emergency rescue operations. If emergencies that necessitate the use of a helicopter, occur within the other areas of the Complex, emergency landing areas will be allocated within those areas where safely possible.

The Walker Bay Complex, specifically Walker Bay, is a flight path for the Airforce, from Bredasdorp through to Hermanus and beyond. The coastal sections are sporadically passed over by private charters during holiday periods for whale watching and general scenic viewing.

7.3 Facilities for Vessels

Vessel storage facilities are located on the Walker Bay Complex's office base. The boat store houses the 9 m vessel "Swift Tern" with additional space to accommodate other vehicles, such as a tractor. The boat store is fitted with an alarm system to provide consistent security against theft. A designated vehicle, Toyota Land Cruiser, is used for the towing of the vessel.

On Dyer Island there is a boat store that can store a 3m vessel, if needed, and is fitted with a hand winch to pull a boat into the store.

The slipway in Kleinbaai, Gansbaai, is mainly used to launch the vessel from, however, the Hermanus harbour has been utilised from time to time.

7.4 Administrative and Other Facilities

The Walker Bay Complex is managed from the Walker Bay offices situated on a 5-ha property in the suburb of Voëlklip, on the eastern edge of the town of Hermanus, towards Stanford. The offices consist of a series of buildings that are also utilised by various components working within the Overberg and broader landscapes.

Infrastructure and associated building maintenance requirements are captured and managed in the Complex's infrastructure register for implementation. The CapeNature User Asset Management Plan, administered in collaboration with the Department of Transport and Public Works is updated annually. Major infrastructure is illustrated in Appendix 1, Map 16 and Map 17.

The Concept Development Plan (CDP), the associated zonation scheme, and strategic framework guide proposed infrastructure development over the planning period. Focus areas include infrastructure evaluation, environmental scoping, and land use advice to define environmentally responsible development options. This includes feasibility studies and costings for proposed new developments and repurposing of existing buildings for operational and tourism management.

7.4.1 Roads / Jeep Tracks

The road network within the Walker Bay Complex comprises of jeep tracks that are utilised for operational purposes and as access to demarcated tourism points. Where possible the jeep tracks are aligned with boundary fences and follow the network of fire breaks on the boundary of the Complex. Jeep tracks are accessible by 4x4 vehicles only due to deep sandy areas or rocky terrain (Figure 7.1). Walker Bay and Uilkraalsmond provide jeep track access to the coast as part of the Fishing Trail which is open to visitors.

All roads and jeep tracks need regular maintenance as they are prone to erosion and/or overgrown by adjacent vegetation. Some roads may require filling of potholes, repairs to erosion furrows, new layers of gravel, placing of concrete culverts, paving bricks, or *in-situ* casted concrete strips. This is done as part of a maintenance schedule for the Complex.

Rehabilitation and maintenance of roads and jeep tracks are depended on operational needs, financial availability, and ecological sensitivity. Maintenance of roads and jeep tracks are focused on providing access for operational and tourism purposes, such as ecological monitoring, firefighting, and tourism.

Figure 7.1: The types of jeep tracks found within the Walker Bay Complex. The mountainous land parcels with their rocky jeep tracks (left), and the coastal land parcels with their sandy jeep tracks (right). Photos: D. Burger.

7.4.2 Hiking trails

There are several hiking trails within the Walker Bay Complex. Due to the geographic spread of the Complex, hiking occurs mostly through open access.

There are several hiking trails within Salmonsdam, and they generally begin at the parking area and lead up to the highest point in the protected area at 637 m. The trail traverse sections of the neighbouring property. Due to land ownership change on this property, the trail is currently closed to the public and not in use. Future reopening and management of the trail will be negotiated with the new owner.

Maanschynkop also offer a few hiking trails, but these are only accessible through the Vogelgat Private Nature Reserve. There are two huts on the trails that provide basic overnight accommodation to hikers. These trails are maintained by Vogelgat Private Nature Reserve and are indicated on Map 16 in Appendix 1.

Hiking trails pass nearby the border of Babilonstoring and are maintained privately. Another popular hiking option can be found within Walker Bay along the beach from the De Kelders gate to the Klein River estuary mouth in Hermanus. This route should only be attempted at low tide when hiking along the beach would be easier.

All trails need regular maintenance to clear overgrowing vegetation, replace broken poles, create, and maintain water flow contour berms, and for the filling of eroded areas. Maintenance schedules are updated and implemented on an annual basis through the Integrated Annual Plan of Operations (IAPO) for the Complex.

Figure 7.2: Hiking trails near Babilonstoring (left) and within the Walker Bay (right). Photos: D. Burger.

7.4.3 Buildings

Buildings in the Complex are designed, utilised, and maintained by CapeNature for operations, tourism, and staff accommodation. The CDP, its associated zonation scheme, and strategic framework identify existing development footprints and focus areas for management and future tourism needs.

Most built infrastructure is situated on the office base in Voëlklip, Hermanus. The buildings include the management offices for the Complex and Overberg landscape components, staff house, stores, small workshop, and WoF office base.

There are various buildings located at the De Kelders section of Walker Bay. A gate house utilised by CapeNature is located outside the boundary, while the visitor's ablution building is located on the boundary. Adjacent to the ablution, within the Complex boundary, is the interpretation centre which is also being used as a small satellite office. An occupied municipal house and a municipal pump house, managed by the Overstrand Municipality, are located near to the other buildings within the Complex's boundary (Figure 7.3).

Figure 7.3: Various buildings at De Kelders area within Walker Bay. Photos: D. Burger

Within the Le Bos section of Walker Bay, is an old forester station building, which is unfortunately dilapidated and not fit for use. There are several old buildings near the entrance of Uilkraalsmond. These wooden buildings were previously used as staff accommodation, the housing of vehicles (garage), storing of items (storeroom), and as offices. Unfortunately, when staff vacated these housing facilities, vandalism occurred, and all the buildings have been stripped of windows, doors, roofing, and walls. Two of the structures have since burnt down and only the foundation remains. The gatehouse located at the entrance was recently renovated, and an eco-toilet was constructed on-site (Figure 7.4).

Figure 7.4: The various old, dilapidated buildings (top), the renovated gatehouse, and newly constructed eco-toilet within Uilkraalsmond (bottom). Photos: D. Burger.

Several buildings, comprised of two units and one ablution facility, are located within Salmonsdam (Figure 7.5). These buildings require maintenance work. Future co-management agreements, with the new landowners around Salmonsdam, to utilise the facilities can be investigated as an opportunity for collaborative conservation and eco-tourism.

Figure 7.5: The two units and ablution facilities located on Salmonsdam within the Walker Bay Complex. Photos: D. Burger.

Two trail huts, providing basic overnight accommodation to hikers, are located on Maanschynkop. These units are being maintained by Vogelgat Private Nature Reserve.

The buildings on the Dyer Island are utilised for management operations and staff accommodation. The buildings are supplied with solar power, a backup generator, rainwater harvesting tanks, and a desalination plant to produce fresh water for staff use. Most of the operational infrastructure on Dyer Island is of historic significance (Figure 7.6; see Appendix 1, Map 17

Figure 7.6: The buildings located on Dyer Island. Photos: D. Burger.

There are five structures situated in the Admiralty Reserve bordering on Quoin Point. These buildings fall within the category of Coastal Public Property under the jurisdiction of DFFE and hence do not form part of CapeNature's infrastructure.

7.4.4 Fences

The boundary of the Walker Bay base office is fenced and clearly demarcated. This fence serves as the first line of security for the office.

Salmonsdam is partially fenced (Figure 7.7), and Walker Bay is fully fenced along the boundaries with 1.4 and 1.8 m tock proof and bonnox fencing. Sections of boundary fencing at Uilkraalsmond, Pearly Beach, Soetfontein, and Quoin Point are down. This creates opportunity for open and uncontrolled access to these land parcels of the Complex, thus they are in urgent need of replacement. Babilonstoring has no fencing along its entire boundary, while Maanschynkop is partially fenced at the northern entrance of the reserve.

Fence maintenance is carried out as part of the annual maintenance schedule and included into the annual plan of operation. *Ad hoc* maintenance is carried out by the field rangers when necessary.

Figure 7.7: Fence along the eastern boundary of Salmonsdam requiring maintenance. Photo: D. Burger.

7.4.5 High sites

There is only one high site within the Complex, and it is located within Salmonsdam.

7.4.6 Signage

Signage is located at all major entrance points to the Walker Bay Complex (Figure 7.8) and indicates when visitors are entering the Complex. The primary purpose of signage is to demarcate protected areas, stipulate conditions for access, and provide contact details for the management authority.

Directional and informative signage is situated at De Kelders and along the Fishing Trail in Walker Bay. Interpretive signage is also placed at selected sites and points of interest, especially along and within the coastal zone, to regulate the use of off-road recreational vehicles. Signage for the Dyer Island is located at the Kleinbaai slipway.

The strategic framework identifies the need for additional informative and interpretive signage at strategic points, and at tourism nature access areas. All signage must conform to the CapeNature brand, as per the signage manual, and designed and approved by the Communication Section of CapeNature. Signage pollution needs to be avoided and the use of information points are encouraged. Indemnity notices are essential at all visitor entry points. The placing of signage should also be done in collaboration with the Communications Section. Signage is maintained and replaced if it becomes weathered or is vandalised.

Figure 7.8: The various signage located within the Walker Bay Complex. Photos: D. Burger.

7.4.7 Utilities

7.4.7.1 Water supply

The primary water supply, for irrigation and domestic use, to the Walker Bay Complex is derived from the Overstrand Municipal water supply. The Walker Bay base office and the De Kelders facilities make use of municipal water. The main water supply for the town of Hermanus within which the Walker Bay base office is situated, receives its water from the Die Bos Dam situated in the Hemel-en-Aarde Valley. The Walker Bay base office also harvest rainwater from the roofs of the office buildings into water tanks. Harvested rainwater is used for irrigation and cleaning of vehicles and boats.

There is no freshwater available on the Dyer Island and a new water desalination plant was recently installed. This freshwater is used for domestic use. The system does require regular maintenance to function optimally. When the desalination plant is offline, freshwater needs to be transported to the island from the mainland in water containers.

7.4.7.2 Electricity supply

The Walker Bay Complex base offices and the De Kelders gate house and facilities make use of electricity supplied by the Overstrand Municipality. The internal reticulation infrastructure for electricity is the responsibility of CapeNature. The Dyer Island's electricity needs are supplied from a solar system installed on the island (Figure 7.9). There is an alternative diesel

operated generator to help supply electricity when weather conditions are not favourable for the solar system. This system also needs regular maintenance, and future upgrades are planned.

The future use of solar energy needs to be encouraged in all buildings on the Walker Bay Complex. As operational facilities are upgraded, these should be equipped with solar power systems to provide basic electricity needs for offices and future tourism accommodation facilities. Although initial capital investment for solar or wind electricity systems are high, the use of such systems are a sustainable alternative to grid electricity supply and challenges experienced due to load shedding.

Figure 7.9: The solar panel located on Dyer Island to provide electricity to the buildings used for operations. Photo: N. Barry.

7.4.7.3 Waste management

There are no waste disposal sites within the Walker Bay Complex. Waste from the Complex is disposed of at the registered waste transfer stations of the Overstrand Municipality. All waste collected by reserve staff or volunteers as part of clean-up events, is transported to these transfer stations.

Sewage systems at the Walker Bay base office and the De Kelders gate facilities mainly comprise of septic tanks. In general, septic tank systems do not function optimally and should be replaced with a "SOG trickling filter system" which removes organic matter from wastewater and are suited to off-grid environments. An eco-toilet system was installed at the gatehouse of the Uilkraalsmond.

Figure 7.10: The eco-toilet located at the entrance of the Uilkraalsmond. Photo: D. Burger.

7.4.8 Visitor facilities

Salmonsdam has visitor facilities comprised of two chalets and ablution facilities however these require maintenance work before they can be utilised.

Well-maintained ablution facilities and an interpretation centre have been provided for visitors to De Kelders and the Klipgat Cave section of Walker Bay. A boardwalk and viewing platform provide access for visitors to the Klipgat Cave (Figure 7.11). Due to the proximity of these facilities to the sea and it being prone to storm damage, it requires regular maintenance.

Figure 7.11: A boardwalk and viewing platform towards the Klipgat Cave (left) and the boardwalk within the Klipgat Cave (right). Photos: D. Burger.

7.5 Commercial Activities

Due to its scenic beauty, many commercial tourism operators visit certain parts of the Complex throughout the year. CapeNature is very fortunate to have developed good working relations with commercial partners that make use of its protected areas, while contributing significantly to human wellbeing. The whale watching and shark cage diving commercial activities which take place within the declared 500m marine buffer around Dyer Island, are regulated through the DFFE permitting process. There are also fat-bike tours (off-road bicycles with wide tyres) run by a private operator inside Walker Bay.

7.6 Community Use

Two community use activities currently exist for natural resource utilisation in the Walker Bay Complex, namely the harvesting of sour figs (*Carpobrotus acinaciformis and Carpobrotus edulis*) (Figure 7.12), and Rooikrans (*Acacia cyclops*) wood harvesting.

Figure 7.12: Sour fig harvesters sorting and packaging sour figs for use in a variety of products including jam and preserves. Photo: P Xhegwana.

The Walker Bay Complex is one of two CapeNature reserves in the Overberg that enables access to neighbouring communities to harvest the sour fig resource sustainably. The project was piloted in 2006 with an NGO which was based at the informal settlement of Eluxolweni in Pearly Beach. It was supported by several sponsors, including the National Development Agency. Communities living adjacent to the Complex are given first option when harvesting permits are allocated. Permit applications are usually received from Stanford, Pearly Beach, Buffelsjagsbaai, and Gansbaai. Permits are valid for the harvesting season and need to be applied for annually. Successful permit applicants receive detailed briefings regarding the permit conditions and rules of the Complex. A maximum of 40 harvesters are allowed on a single permit with only four permits issued annually. This allows for controlled and responsible harvesting to be implemented.

During community engagements, proposals have been made to explore bioprospecting in relation to sour fig harvesting. This harvesting has cultural and historic significance for the local communities around the Complex. Through bioprospecting recognition, the traditional uses of sour figs can be acknowledged. The Buffeljagsbaai community expressed interest in a samphire (*Crithmum*) harvesting project, which requires a resource-based assessment to advise if sustainable harvesting will be possible. The harvesting of Rooikrans wood has been implemented on Walker Bay. Up to three woodcutting teams have been provided access to this alien-wood biomass resource in pre-allocated NBALs. These woodcutting teams sign a MoU with CapeNature which allows for harvesting under strict terms and conditions. The volume of alien biomass suitable for firewood use is low and the programme has a limited life expectancy.

7.7 Servitudes

Several servitude agreements are registered on properties in the Walker Bay Complex. Conditional access regulated through servitudes includes agreements with the municipality, neighbouring landowners for water user-rights, pipelines, powerlines, and access for infrastructure maintenance. All registered and known servitudes are listed in Table 7.2.

Table 7.2: Servitudes applicable to the Walker Bay Complex.

Date of Agreement	Type of Agreement	Partner	Duration of Agreement (years)	Area Affected	Conditions of Use
08/05/1985	Right of Way Servitude Road	Unknown	Perpetuity	Salmonsdam Portion 1 of Farm 731	Road servitude of 6 meters wide.
08/05/1985	Right of Way Servitude Road	Unknown	Perpetuity	Salmonsdam Portion 3 of Farm 667	Road servitude of 6 meters wide.
08/05/1985	Right of Way Servitude Road	Unknown	Perpetuity	Salmonsdam Portion 2 of Farm 666	Road servitude of 6 meters wide.
08/05/1985	Right of Way Servitude Road	Unknown	Perpetuity	Salmonsdam Farm 665	Road servitude of 6 meters wide.
13/11/1975	Water pipeline	Private landowner	Unknown	Maanschynkop Portion 1 of Farm 590	Unknown

Informal servitudes have been identified with investigation and facilitation processes currently underway to bring these servitudes into legislation alignment.

The following structures have been identified within the Complex which would require a servitude, but do not have the necessary supporting documentation:

- Pipelines;
- Weirs;
- Roads; and
- Telecommunication and other towers.

8 EXPANSION STRATEGY

Protected area expansion in South Africa is guided by the National Protected Area Expansion Strategy (NPAES) (DEA 2016b). In response to the NPAES, CapeNature has produced a WCPAES 2021-2025 (CapeNature 2021b). The WCPAES has not highlighted priority marine zones for expansion. Planning for protected area expansion into the marine environment is guided by the NPAES and led by the Department of Forestry, Fisheries, and the Environment (DFFE). The WCPAES is supported by a Landscape Protected Area Expansion Implementation Plan that is updated annually.

Protected area expansion in terms of the Stewardship Programme refers to the wise use, management, and protection of that which has been entrusted to you or is rightfully yours. Within the context of conservation, stewardship means protecting important ecosystems, effectively managing invasive alien species and fires, and grazing or harvesting without damaging the veld.

Mechanisms for protected area expansion include the promotion of stewardship options on both private and communal land in collaboration with landowners, regularising existing private nature reserves, and the consolidation of state land managed by authorities, such as municipalities and CapeNature, as formal protected areas. There is also the process where the Department Public Works' state land is to be vested with CapeNature and declared as formally protected areas. The four stewardship options available to landowners are Conservation Areas, Biodiversity Agreements, Protected Environments, and Nature Reserves.

The Walker Bay Complex forms part of a network of conservation areas within the Overberg. The conserved areas range from a National Park, Provincial Nature Reserves, Local Authority Nature Reserves, Private Nature Reserves, stewardship sites, and conservancies. The eight terrestrial land parcels managed by CapeNature are either adjoining or disjunct from other conservation areas. Adjoining conservation areas help to buffer the Walker Bay Complex and it should be noted that each of these land parcels, excluding Dyer Island, has the potential to form part of various landscape corridors through stewardship and other conservation mechanisms.

The Walker Bay Complex is an integral part of the landscape-based Agulhas Biodiversity Initiative that is being supported and implemented through various communities, landowners, NGO's, agri-industries and CapeNature. The Complex is strategically placed to form a core part of this initiative and presents an opportunity for achieving a multitude of conservation gains to expand the conservation estate. Building on the existing protected area complex through various role players using stewardship and other conservation mechanisms, can help conserve important biotic and abiotic corridors collectively managed for biodiversity and ecosystem goods and services.

Corridors help mitigate the effects of climatic changes providing opportunities for species movement, resilience, and adaptation in the long-term. However certain corridors in the Walker Bay Complex that traverse private property are tenuous and threatened by activities such as the unauthorised ploughing of natural veld, urban expansion, and alien plant infestation. These threats are imminent and could well cut off any natural linkages between specifically Walker Bay and Uilkraalsmond in the next ten years (Footprint Environmental Services, 2023). A dedicated focus must be placed on these key conservation corridors linking the CapeNature land parcels via private land and partnerships with private landowners.

The Table Mountain Fund identified three climate change adaptation corridors within the Overberg landscape directly linked to the land parcels that make up the Walker Bay Complex namely: the Klein River Mountains to De Mond via the Salmonsdam Mountains; Quoin Point to Uilkraalsmond including the Agulhas National Park and lastly from Bot River to Shaw's Mountain via Babilonstoring. Further connection between with the Complex, is established through the conservancies in the landscape. Onrus, Hemel and Aarde, De Diepegat, Walker Bay and Akkedisberg are five conservancies that help connect, surround, and buffer the Complex. Scattered between these larger initiatives are Private Nature Reserves and stewardship sites that further help secure links between the conservation areas. An initiative by the Walker Bay Conservancy to investigate the formation of a Protected Environment consisting of properties surrounding Walker Bay was finalised with the signing of a Protected Area Management Agreement. This will further enhance corridor conservation in that area.

Mechanisms for protected area expansion for the Walker Bay Complex include the promotion of stewardship options on private land in collaboration with landowners, and facilitation with Department of Public Works for state land managed by CapeNature to be vested with CapeNature and declared as a formal protected area.

Three focus areas for expansion include:

1. The Walker Bay coastline, including various river courses and the Klein River and Uilenkraals River estuaries, represent important corridors for migrating species. Walker Bay and Uilkraalsmond link directly onto these river and estuarine corridors. Special efforts should therefore be given to the conservation of these corridors through stewardship with the help of the various role players in the landscape.:.
2. Support of the establishment of stewardship sites within the Table Mountain Fund identified climate change adaptation corridors that will help link the Walker Bay Complex across the Overberg Landscape. These corridors form important upland-lowland links from the mountains onto the coastal plains and will include Babilonstoring, Maanschynkop, Salmonsdam and Quoin Point.
3. The transfer of the Walker Bay Whale Sanctuary Marine Protected Area from DFFE to CapeNature to manage as part of the Walker Bay Complex. The Walker Bay Whale Sanctuary MPA stretches between the Westcliffe beacon near the new harbour in Hermanus to the Gansbaai North breakwater at the harbour. The MPA was proclaimed in 2001 and comprises of two zones, a Whale Sanctuary Area, and a Restricted Area. The MPA is 108 km² and provides an important refuge for Southern Right Whales and their calves to rest from July to November. The MPA protects rocky and sandy shore habitats and kelp forests immediately offshore that offer protection for over exploited species like abalone and rock lobster.

Collaboration with DFFE to identify and pursue the appropriate mechanisms for enhanced protection and management of Dyer Island and Geyser Island, will be undertaken. This can include the establishment of an MPA around the island with zoning to increase 'no-take' buffer areas.

The expansion map is indicated in Appendix 1, Map 13.

9 CONCEPT DEVELOPMENT PLAN

The CDP sets out the long-term plan for the development of a protected area, in keeping with its purpose and with due consideration for protected area expansion and the zonation plan.

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: Concept development framework implemented by CapeNature.

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. These include off-grid bulk water and energy services; passive design efficiencies; 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 successfully been sought.

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

Due to its location along a scenic coastline and with its proximity to prevalent tourism destinations, the Walker Bay Complex has been identified as having the potential to support viable tourism opportunities, enhancing what is currently offered. Presently tourism activities include Walker Bay's 4x4 Fishing Trail and the Klipgat Cave at De Kelders, with its surrounding beach, is a popular tourist attraction.

Proposals have been formulated identifying opportunities to unlock further tourism potential in the Complex. These proposals need to be considered within a defined context as most of the Complex has been classified as being Sensitive to Highly Sensitive and zoned accordingly (Section 5.7 and Section 6.2; Appendix 1, Map 10).

Any new development proposals within the management plan timeframe must be informed by the sensitivity analysis and zonation, which function as a constraint analysis for any development proposals. There is also likely to be maintenance and minor upgrades required for any of the buildings and infrastructure within the Complex, which will not incur any disturbance outside of existing footprints.

Any upgrades required for the management office would therefore not be relevant to the CDP. Other infrastructural upgrades that may be required would be within the context of the tourism proposals. CapeNature is not aware of any external development proposals which may affect the Complex.

9.3.1 Development nodes

There are two proposed development nodes which have been included within the CDP which could be initiated within the 10-year timeframe of the management plan. These two proposed tourism developments were identified more than a decade ago and will be located within existing nodes and associated footprints, which are currently not being utilised or are under-utilised.

9.3.1.1 Salmonsdam

Most of the accommodation facilities on Salmonsdam used for tourism purposes, found on cadastre 1/666 were previously owned by the Overberg District Municipality, before being recently sold. Two chalets and an ablution block remain on the CapeNature managed cadastre 665. Tourism development on Salmonsdam is currently on hold and pending further discussions with adjacent landowners. The existing transformed footprint has been zoned as Development – Low Intensity. Should there be any tourism development proposals within the management plan timeframe they will need to be restricted to the existing disturbance footprint.

9.3.1.2 Walker Bay: Klipgat Cave

There is a proposal to provide tourism accommodation in the southern section of Walker Bay in the vicinity of the Klipgat Cave, adjacent to the suburb of De Kelders, Gansbaai. A tourism feasibility study was compiled in 2011 to evaluate this proposal, and it included a recommendation for a small lodge comprised of 20 beds, which would provide a positive return on investment (Seaton Thomson & Associates cc, 2011). A preliminary opportunity and biodiversity impact analysis study was undertaken by CapeNature as an informant to the feasibility study and was included as an appendix to the report.

This analysis study identified existing transformed footprints, consisting of the buildings associated with water provision by the Overstrand Municipality, existing ablution facilities, associated roads, parking areas, and areas of disturbance. Adjacent disturbed areas were also identified, resulting in a total footprint of approximately 2 ha of transformed and disturbed habitat which could potentially be developed.

The current initial proposal for this site includes three to five accommodation units and one large luxury accommodation unit. The ablution block is proposed to be converted into a coffee shop, reserve office, and smaller ablution facilities. The initial footprint of 2 ha included the Overstrand Municipality buildings, but this has now been taken out of the current proposal. Layouts have not yet been determined; however, the development will be restricted to the disturbed footprint as initially

identified. Further investigation and consultation are required before this proposal can be approved, as there are concerns, such as whether there will be sufficient parking. It should be noted that the proposal may be developed either by CapeNature or through a Public Private Partnership mechanism.

The sensitivity of the footprint is classified as High Sensitivity, due to the Endangered threat status of the vegetation and the soil erodibility. As the area has already been transformed there is no natural vegetation on the proposed site. The soil erodibility would not play an important role on an existing disturbance footprint provided that standard construction control measures are adhered to. The buffer around the Klipgat Cave classified as Highest Sensitivity is outside of the identified development footprint.

The zonation of the identified footprint for the tourism development, as delineated in the biodiversity impact analysis, has been zoned as development - low intensity, which both accounts for the existing development present on the site and makes provision should the tourism development be realised within the timeframes of the management plan.

9.3.2 Communication Routes

There are no current proposals for new telecommunication towers within the Complex. There are no servitudes currently for communication infrastructure nor proposals for new linear telecommunications infrastructure.

9.3.3 Service Supply Routes

The two new development nodes may require additional service supply which would need to be aligned within or adjacent to existing footprints and infrastructure.

9.3.4 Infrastructure Development Proposals

There is old infrastructure on Uilkraalsmond that needs to be demolished and removed. The re-alignment of a management road, within the land parcel, which encroaches into a wetland and is affected by high rainfall events needs to be actioned.

A section of the R43 road which traverses Uilkraalsmond could potentially be upgraded within the management plan timeframe. The zonation has provided for a 25 m buffer from this road.

There is a need to provide controlled visitor access to the three coastal sections (Pearly Beach, Soetfontein, and Quoin Point). Gate houses and entrance gates would need to be upgraded and installed in the future and the access roads upgraded with parking areas demarcated on the coast. A possible rustic campsite could be added at Quoin Point.

A potential overnight hiking trail linking all the coastal land parcels from Uilkraalsmond through to Quoin Point has been suggested. The feasibility of such a route will be explored. This could include the development of a trail and overnight facilities.

Access to the existing jetty on the western side of Dyer Island can be challenging under certain weather conditions, therefore it has been proposed to construct an additional jetty on the eastern side of the island to allow for emergency access to the island during difficult weather conditions. The proposal includes the construction of a boardwalk from the jetty to the management and research buildings along the shortest distance. The proposed new jetty and boardwalk could be compatible with the existing zoning, provided that the project was undertaken according to very strict guidelines to minimise disturbance to the breeding and roosting birds on the island.

9.3.5 Administration and Other Facilities

The administration and management buildings for the Complex may require expansion and upgrading, depending on organisational need. This will remain within the existing transformed footprint of the 5-ha urban erf. This erf has the potential to generate income for CapeNature through new tourism products that can be developed. Off-grid products proposed can demonstrate green building concepts. The development of new operational offices for staff combined with a "CapeNature Gateway Info Centre" can be included as part of the future development plans here. The possibility of leasing or procuring adjacent erven to the current Walker Bay Office for inclusion into future tourism developments can be considered.

Future operational development options are being considered for the De Kelders site, as mentioned in Section 9.3.1.2. This will include a satellite office with stores, boat storage, and staff accommodation.

9.3.6 Visitor facilities

9.3.6.1 Maanschynkop

There are two small huts for overnight hikers located on Maanschynkop as already described which are currently utilised by Vogelgat.

9.3.6.2 Salmonsdam

There are existing hiking trails and tourism access roads on Salmonsdam, which have been discontinued for tourism access. This infrastructure is however in place should the reserve be re-opened for tourists.

9.3.6.3 Walker Bay

Future tourism development options are being considered for De Kelders which were identified in 2011 through a feasibility study. Future development of this site must highlight Klipgat Cave as an important heritage destination. The declaration of the Klipgat Cave as a Provincial Heritage site is being pursued and can be showcased through a future interpretive visitor centre.

The Walker Bay Fishing Trail as referred to in Section 7.4.1 is a 4x4 jeep track that provides access to a wide variety of shore-angling opportunities. It follows the coastline between Le Bos and Mierkom.

There is a proposal to upgrade an existing disused jeep track, to link the Fishing Trail to the existing public road, to provide access to Mierkom in the east and create a circular Fishing Trail route. Other proposals for the Fishing Trail are to provide formalised camping, to address the current challenge of illegal camping, improve access control at entrance points, and to put measures in place that will prevent vehicles deviating from the official routes.

The proposed linkage, of the Fishing Trail to the existing public road, traverses an area classified as High Sensitivity due to the Endangered status of the vegetation and soil erodibility. However, the impacts of the proposed jeep track upgrade will be minimal as it will only entail routine track maintenance i.e., trimming back of shrubs along the disused jeep track. The Fishing Trail circuit has been zoned as nature access to provide for the appropriate zonation for a 4x4 jeep track.

Other possible future developments for Walker Bay may be the development of accommodation units on previously disturbed footprints (old buildings and foundations), but at this stage it is only a proposal for further investigation.

9.3.6.4 Uilkraalsmond

Uilkraalsmond is a popular destination for fishermen. Future development for this site could include staff housing, upgraded gate facilities, a picnic site with parking, and ablutions. There is a proposal to develop a new Fishing Trail for Uilkraalsmond due to the demand at this location. The proposal is to utilise the existing management roads for the alignment of the new Fishing Trail. However, this will require further investigation finalisation. There are existing abandoned buildings at this location which can be used for accommodation, but at this stage it is only a proposal for further investigation. The sensitivity would not be relevant as the proposal will be on existing roads that are already zoned as nature access, with only a moderate increase of usage.

9.3.6.5 Pearly Beach and Soetfontein

Possible future development for Pearly Beach and Soetfontein may be to open the existing management roads to provide access for the public to the beach. However, this will require further investigation before finalisation.

9.3.6.6 Quoin Point

Potential future development may be to provide access for the public to the beach by allowing entry through the existing management roads. Other possible future developments may be low-maintenance designated campsites within Quoin Point. At this stage it is only a proposal for further investigation.

9.3.6.7 Dyer Island

Dyer Island is an important seabird breeding locality as outlined in Section 2.4.5. Seabird colonies can be popular tourist attractions, as observed at the land-based African penguin colonies at Stony Point and Boulders. The Endangered status and continuing population decline of the African Penguin, in addition to other threatened seabird species, takes precedence over the tourism potential. It must be ensured that there is no negative impact on breeding populations because of any tourism activities.

Should tourism be considered on Dyer Island, these activities must not impact the seabird breeding colonies in any way. Tourism options on Dyer Island are being investigated, however there are no proposals for inclusion within the CDP for the timeframes of this management plan. There is currently no public entry onto Geyser Island or Quoin Rock, and no future access is planned.

9.3.6.8 Babilonstoring

There are currently no tourism activities offered at Babilonstoring, and there are no proposals for future tourism development here.

9.3.7 Commercial Facilities and Activities

Future potential commercial activities proposed within the Klipgat Cave development node at De Kelders include a coffee shop or restaurant, and guided informative tours into the cave. Interest have been expressed to resume horse-riding tours within Walker Bay.

9.3.8 Environmental Authorisations

Environmental authorisations have been issued for the developments listed below which are located on the boundary of the Complex:

- Proposed Rehabilitation and Upgrading of Trunk Road 28 Section 2 (Tr28/2) (R43) and Related Existing Degraded Stormwater Infrastructure (Culverts), from km 23.83 to km 43.88, between Stanford and Gansbaai, 12 March 2021 (DEA&DP ref. no.: 16/3/3/6/7/1/E2/37/1016/20).

It has been confirmed that none of the following are proposed within the next 10 years, and consequently do not require environmental authorisation:

- Communication routes; and
- Service supply routes.

10 STRATEGIC PLAN

This section presents the strategic plan for the protected area. 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; and
- Establishing / promoting enabling conditions.

A summary of selected strategies and objectives for the Walker Bay 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 identified for the Walker Bay Complex.

Threats Abated	Strategy Type	Strategy	Objectives
Invasive alien plant species; inappropriate fire regime	Threat reduction/ Focal conservation target restoration	**Strategy 1:** Improve the efficiency of the implementation of invasive alien plant eradication through the integration of fire and invasive alien plant management in the Walker Bay Complex.	**Objective 1.1:** By 2025 and beyond, the Walker Bay Complex Invasive Alien Species control plan is fully implemented.
			Objective 1.2: By 2026 and beyond, alien clearing staff are properly trained, and quality control is implemented.
			Objective 1.3: By 2025 and beyond, CapeNature has prioritised neighbouring properties within the Walker Bay Complex Zone of Influence for invasive alien plant clearing and/or compliance action.
			Objective 1.4: By 2027 and beyond, CapeNature has obtained commitment from partners to assist with invasive alien plant clearing and compliance within the Walker Bay Complex Zone of Influence.
Invasive alien plant species; inappropriate fire regime	Threat reduction/ Focal conservation target restoration	**Strategy 2:** Implement an Integrated Fire Management Strategy to maintain an acceptable fire regime in the Walker Bay Complex in consultation with stakeholders and partners to support management decisions	**Objective 2.1:** By 2025 and beyond, ecologically sound fire management principles inform integrated fire management operations within the Walker Bay Complex and Zone of Influence.
			Objective 2.2: By 2026 and beyond, consultations regarding Integrated Fire Management are conducted with relevant stakeholders, including municipalities and Fire Protection Associations.
			Objective 2.3: By 2025 and beyond, awareness raising of direct and indirect impacts of fire within the relevant communities is consistently improved and maintained.

Threats Abated	Strategy Type	Strategy	Objectives
Invasive alien plant species; inappropriate fire regime; illegal abalone harvesting; human activities & disturbance (legal and illegal); vandalism and weathering; poor water quality and excessive nutrient load; industrial & military effluent (oil spills etc.); prolonged inappropriate water level; over abstraction of ground water; predation (by gulls & seals); disease; unauthorised resource use.	Establishing and promoting enabling conditions/ Behavioural change / threat reduction	**Strategy 3:** Enhance and maintain partnerships for collaboration and implementation of best practice in the management of terrestrial, marine, and estuarine ecosystems, and for coordinated disaster mitigation and response in the Walker Bay Complex and associated Zone of Influence.	**Objective 3.1:** By 2025 and beyond, the WCPAES is promoted and implemented in collaboration with relevant partners to support ecological processes and maintain living land and seascapes through the establishment of ecological buffer areas and corridors.
			Objective 3.2: By 2025 and beyond, the Walker Bay Complex and its Zone of Influence is integrated into Municipal Land Use Planning products.
			Objective 3.3: By 2025 and beyond, the Walker Bay Complex has strong and active partnerships with all stakeholders in the Zone of Influence with functional and effective communication channels between the Complex and community.
			Objective 3.4: By 2025 and beyond, CapeNature advocates and facilitates Catchment to Coast best practice within the Zone of Influence in collaboration with its partners.
			Objective 3.5: By 2025 and beyond, the conservation status of CapeNature managed land is secure and protected in perpetuity.
Over abstraction of ground water; inappropriate fire regime; invasive alien plant species; poor water quality and excessive nutrient load, prolonged inappropriate water level	Focal conservation target restoration	**Strategy 4:** Develop and implement an integrated monitoring plan for the freshwater ecosystems within the Walker Bay Complex and where necessary investigate partnerships to augment the process.	**Objective 4.1:** By 2025 and beyond, the freshwater ecosystems of the Walker Bay Complex are monitored to determine variation of river health in identified systems using selected bio-indicators from the River Eco-Status Monitoring programme.
			Objective 4.2: By 2026 and beyond, water abstraction quantity and water quality of the Walker Bay Complex water sources and Zone of Influence is monitored and the relevant registration and/or licenses are in place.

Threats Abated	Strategy Type	Strategy	Objectives
Human activities & disturbance; inappropriate fire regime, unauthorised resource use.	Behavioural change	**Strategy 5:** Implement an integrated Environmental Education and Awareness Plan aimed at neighbours, natural resource users, learner groups, and visitors in collaboration with partners, to nurture respect and care for the natural, cultural, and historical values of the Walker Bay Complex.	**Objective 5.1:** By 2025 and beyond, CapeNature has developed and implemented the Walker Bay Complex Environmental Education and Awareness Plan.
			Objective 5.2: By 2025 and beyond, CapeNature has developed and implemented a Walker Bay Complex informational signage plan to raise awareness of all Conservation Targets and Human Well-being Values.
			Objective 5.3: By 2025 and beyond, Natural Resource User Groups in the Walker Bay Complex have extensive awareness of the CapeNature Natural Resource Utilisation Policy and Permitting System.
Vandalism and weathering; human activities & disturbance.	Focal conservation target restoration / Behavioural change	**Strategy 6:** Minimise the degradation of heritage resources within the Walker Bay Complex.	**Objective 6.1:** By 2026 and beyond, the Walker Bay Complex's reserve team has appropriate heritage management and monitoring skills.
			Objective 6.2: By 2026 and beyond, a heritage management plan for the Walker Bay Complex has been developed and implemented
Invasive alien plant species; unauthorised resource use; human activities & disturbance.	Behavioural change / threat reduction	**Strategy 7:** Facilitate sustainable and responsible development, access, and activities within the Walker Bay Complex in collaboration with relevant partners and stakeholders.	**Objective 7.1:** By 2025 and beyond, harvesting, and commercial activities within the Walker Bay Complex are compliant, where relevant, both internally and externally, and documented in an Activity Plan.
			Objective 7.2: By 2025 and beyond, access for sustainable spiritual and cultural uses has been identified and evaluated.
			Objective 7.3: By 2025 and beyond, future development (commercial and non-commercial) within the Walker Bay Complex is undertaken in accordance with the Concept Development Framework, is compatible with the zonation, and is legislatively compliant.

Threats Abated	Strategy Type	Strategy	Objectives
Human activities & disturbance; inappropriate fire regime, unauthorised resource use; invasive alien plant species.	Focal conservation target restoration / threat reduction	**Strategy 8:** Contribute to economic and social development by providing job and training opportunities to Expanded Public Works Programme (EPWP), contract, and small, medium, and micro-sized enterprise (SMME) staff within the Walker Bay Complex.	**Objective 8.1:** By 2025 and beyond, CapeNature has engaged with partners to identify and promote job and training opportunities within the Walker Bay Complex.
			Objective 8.2: By 2025 and beyond, Walker Bay Complex has developed a skills development plan.
Human activities & disturbance; predation (gulls & seals); disease.	Focal conservation target restoration / threat reduction	**Strategy 9:** Enhance the monitoring and management of African penguin and priority sea birds on Dyer Island to ensure the persistence of the species.	**Objective 9.1:** By 2025 and beyond, the conservation management of the African Penguin and priority threatened seabirds on Dyer Island is informed by sound monitoring in line with national requirements enabling strategic adaptive management.
			Objective 9.2: By 2025 and beyond, provision has been made for the mitigation of extreme weather, other natural disasters, and oil spills for the African Penguin and species of concern on Dyer Island.
			Objective 9.3: By 2025 and beyond, predation of the African Penguin and priority seabirds on Dyer Island is controlled through effective predation monitoring and the implementation of rapid response management actions.
Unauthorised resource use; illegal abalone harvesting; human activities & disturbance; prolonged inappropriate water level; poor water quality and excessive nutrient load; over abstraction of ground water.	Behavioural change / threat reduction	**Strategy 10:** Promote co-operative governance and legislative compliance by implementing the Walker Bay Integrated Compliance Plan through the inter-governmental and relevant Non-Governmental Organisations relationships that mitigate negative impacts on biodiversity associated with non-compliance with legislation.	**Objective 10.1:** By 2025 and beyond, the revised Integrated Compliance Plan for the Walker Bay Complex has been implemented.
			Objective 10.2: By 2025 and beyond, unlawful development, land clearing, and any other relevant unauthorised activities within the Walker Bay Zone of Influence are reported and support given to associated organisations.

Table 10.2: Strategic Plan for the Walker Bay Complex.

ALIEN INVASIVE SPECIES MANAGEMENT - FLORA	
STRATEGY 1:	Improve the efficiency of the implementation of invasive alien plant eradication through the integration of fire and invasive alien plant management in the Walker Bay Complex.
LINKED GOALS:	1; 2; 3.
THREATS:	Invasive alien plant species; inappropriate fire regime

Objectives	Actions	Responsibility	Timeframe	Measurable Indicators / Outputs	References / Existing Procedures
Objective 1.1: By 2025 and beyond, the Walker Bay Complex Invasive Alien Species Control Plan is fully implemented.	Collect density verification data for all NBALs within the Walker Bay Complex boundary, quality check data and submit to Biodiversity Innovations.	**Lead:** Conservation Manager On-Reserve. **Enablers:** Ecological Technician; Conservation Officer On-Reserve; Field Rangers; Quality Controller.	Year 1 and onwards	Density data spreadsheet.	Internal Standard Operating Procedures.
	Determine any sites for clearing by High Altitude Teams on Babilonstoring, Salmonsdam, and Maanschynkop. Ensure these are clearly differentiated in separate NBALs and included in the database and maps.	**Lead:** Conservation Manager On-Reserve. **Enablers:** Ecological Technician; Conservation Officer On-Reserve; Field Rangers; Quality Controller.	Year 1 and 2	High Altitude Team NBALs; Density data spreadsheet.	WIMS.
	Compile and implement the Integrated Work Plan, IAPO, of the Walker Bay Complex.	**Lead:** Conservation Manager On-Reserve. **Enablers:** Conservation Officer On-Reserve, Integrated Catchment Specialist.	Annually	Integrated Work Plan and Annual Plan of Operation.	
	Compile progress report on implementation of IAPOs.	**Lead:** Conservation Manager On-Reserve. **Enablers:** Conservation Officer On-Reserve; Integrated Catchment Specialist.	Annually	Progress report; Management Information System report.	

Objectives	Actions	Responsibility	Timeframe	Measurable Indicators / Outputs	References / Existing Procedures
Objective 1.1: By 2025 and beyond, the Walker Bay Complex Invasive Alien Species Control Plan is fully implemented.	Monitor the costs, impact, and effectiveness of invasive alien plant clearing in the Complex and implement strategic adaptive management measures as per highlighted in the report.	**Lead:** Conservation Manager On-Reserve. **Enablers:** Integrated Catchment Specialist; Conservation Intelligence Manager; Restoration Ecologist, Landscape Unit Manager.	Year 1-10	IWP; Updated database and maps; Management Information System reports.	CapeNature Catchment to Coast Strategy; IAPO; Monthly/ weekly planning and reporting; Invasive Species Monitoring, Control and Eradication Plan for Walker Bay.
Objective 1.2: By 2026 and beyond, alien clearing staff are properly trained, and quality control is implemented.	Train all staff involved with alien plant clearing to ensure enhanced delivery and adherence to the set operating standards.	**Lead:** Conservation Manager On-Reserve. **Enablers:** Conservation Officer On-Reserve.	Annually	Number and percentage of staff undertaken training.	
	Update functional training certification and confirm compliance.	**Lead:** Conservation Manager On-Reserve. **Enablers:** Conservation Officer On-Reserve.	Annually	Number and percentage of staff compliant with certification.	
	Perform quality control checks on alien clearing work to ensure it is undertaken according to Standard Operating Protocols.	**Lead:** Conservation Manager On-Reserve. **Enablers:** Conservation Officer On-Reserve; Field Rangers; Quality Controller.	Annually	Percentage of NBALs cleared to satisfaction.	Relevant Standard Operational Principles.
Objective 1.3: By 2025 and beyond, CapeNature has prioritised neighbouring properties within the Walker Bay Complex Zone of Influence for invasive alien plant clearing and/or compliance action.	Identify neighbouring properties for invasive alien clearing and/or compliance action.	**Lead:** Conservation Manager Off-Reserve. **Enablers:** Conservation Manager On-Reserve, Conservation Officer On-Reserve; Integrated Catchment Specialist; Landscape Unit Manager; Field Rangers.	Year 2	List of priority properties.	

Objectives	Actions	Responsibility	Timeframe	Measurable Indicators / Outputs	References / Existing Procedures
Objective 1.4: By 2027 and beyond, CapeNature has obtained commitment from partners to assist with invasive alien plant clearing and compliance within the Walker Bay Complex Zone of Influence.	Inform surrounding landowners of relevant legislation and provide guidance regarding the effective and most efficient methods for the removal of invasive alien plants on their property.	**Lead:** Conservation Manager Off-Reserve **Enablers:** Stakeholder Engagement Officer; Conservation Manager On-Reserve; Conservation Officer On-Reserve; Field Rangers.	Year 1-10	Fence and boundary patrol reports; PAAC meetings; Records of engagements with landowners (such as fire-break discussion).	Fence and boundary patrols; PAAC meetings; CapeNature Stakeholder Engagement register.
	Promote a buffer zone of 100 m adjacent to protected areas to limit the infestation of invasive alien plants from neighbouring properties.				

FIRE MANAGEMENT	
STRATEGY 2:	Implement an Integrated Fire Management Strategy to maintain an acceptable fire regime in the Walker Bay Complex in consultation with stakeholders and partners to support management decisions.
LINKED GOALS:	1; 2; 9.
THREATS:	Invasive alien species (flora); inappropriate fire regime.

Objectives	Actions	Responsibility	Timeframe	Measurable Indicators / Outputs	References / Existing Procedures
Objective 2.1: By 2025 and beyond, ecologically sound fire management principles inform integrated fire management operations within the Walker Bay Complex and Zone of Influence.	Develop an Integrated Fire Management Plan for the Walker Bay Complex, considering the opportunities and threats within the Invasive Alien Plant Control Plan.	**Lead:** Conservation Manager On-Reserve. **Enablers:** Integrated Catchment Manager; Integrated Catchment Specialist; Landscape Unit Manager.	Year 1	Walker Bay Complex Integrated Fire Management Plan.	CapeNature Integrated Veldfire Management Policy.
	Ensure regular, ongoing engagement with the Greater Overberg Fire Protection Association and associated fire management units to enable an integrated approach to landscape fire management.				
	Implement the Integrated Fire Management Plan for the Walker Bay Complex.	**Lead:** Conservation Manager On-Reserve. **Enablers:** Integrated Catchment Manager; Landscape Unit Manager; Integrated Catchment Specialist.	Year 2 and onwards	A healthy fire regime in the Walker Bay Complex.	Integrated Fire Management Plan for the Walker Bay Complex.
	Update and implement Fire Protection and Reaction Plans including risk assessments, ecologically sensitive mapping, and fire management maps.	**Lead:** Conservation Manager On-Reserve. **Enablers:** Integrated Catchment Specialist; Landscape Conservation Intelligence Manager; Ecological Co-ordinator; Landscape Unit Manager.	Year 1-10	Fire reports; Veld age maps; Firebreak registers; Pre-fire audit reports and fire de-briefing minutes; Maps; Meeting minutes; Firebreak agreements; Portfolio of evidence; Threshold of Potential Concern report.	CapeNature Integrated Veldfire Management Policy; Guidelines; SOGs; Firebreak register; ICM-IAPO; Academic publications.

Objectives	Actions	Responsibility	Timeframe	Measurable Indicators / Outputs	References / Existing Procedures
	Assess appropriateness of current firebreak network and re-align where required based on negotiated firebreak agreements with neighbours.	**Lead:** Conservation Manager On-Reserve. **Enablers:** Conservation Officer On-Reserve; Field Rangers; Quality Controller; Integrated Catchment Specialist.			
	Construct priority firebreaks according to firebreak register schedule and keep updated.				
	Conduct pre-fire season fire audits.				
	Complete fire reports as stipulated in the FireWeb reporting system including the mapping of all fires.				
	Conduct de-briefing sessions after each fire and keep records (including a Portfolio of Evidence).				
	Update Infrastructure Risk Assessment and Maintenance schedules for incorporation into fire mapping products and IAPO.				
	Determine the Thresholds of Potential Concern for the terrestrial and coastal vegetation types through permanent protea plot and post-fire regeneration monitoring, conduct the analyses of fire frequency, fire return intervals, fire size and season.	**Lead:** Landscape Ecologist. **Enablers:** Integrated Catchment Specialist; Conservation Officer On-Reserve; Ecological Coordinator; Restoration Ecologist; Flora Ecologist; Conservation Manager On-Reserve; Landscape Conservation Intelligence Manager.			

Objectives	Actions	Responsibility	Timeframe	Measurable Indicators / Outputs	References / Existing Procedures
	Incorporate this information and related fire-fighting actions into fire mapping products for use during fire-fighting activities.				
	Ensure that ecological principles are incorporated during fire-fighting planning in Incident Command System.	**Lead:** Conservation Manager On-Reserve. **Enablers:** Integrated Catchment Specialist; Conservation Officer On-Reserve; Field Rangers.			
	Respond to all fires within the Walker Bay Complex and assist in the Zone of Influence as required according to the Fire Response Plan.	**Lead:** Conservation Manager On-Reserve. **Enablers:** Integrated Catchment Specialist; Landscape Unit Manager; Conservation Officer On-Reserve; Field Rangers.			
Objective 2.2: By 2026 and beyond, consultations regarding Integrated Fire Management are conducted with relevant stakeholders, including municipalities and Fire Protection Associations.	Engage with relevant stakeholders regarding integrated fire management in the Walker Bay Complex and Zone of Influence to inform the Integrated Fire Management Plan.	**Lead:** Conservation Manager On-Reserve. **Enablers:** Landscape Unit Manager; Integrated Catchment Specialist; Stakeholder Engagement Officer; Conservation Officer On-Reserve.	Year 1 and onwards	Minutes of meetings with stakeholders which will inform Integrated Fire Management Plan.	
Objective 2.3: By 2025 and beyond, awareness raising of direct and indirect impacts of fire within the relevant communities is consistently improved and maintained.	In collaboration with partners, create and implement a fire awareness programme for neighbouring communities and landowners, visitors, and staff members.	**Lead:** Conservation Manager On-Reserve. **Enablers:** Stakeholder Engagement Officer; Stakeholder Engagement Manager; Integrated Catchment Specialist	Annually	Media products (videos; radio broadcasting, posters, etc.).	CapeNature Media Management Policy.

BIODIVERSITY AND ECOSYSTEM MANAGEMENT	
STRATEGY 3:	Enhance and maintain partnerships for collaboration and implementation of best practice in the management of terrestrial, marine, and estuarine ecosystems, and for coordinated disaster mitigation and response in the Walker Bay Complex and associated Zone of Influence.
LINKED GOALS:	1; 2; 3; 4; 5; 6; 7; 10.
THREATS:	Invasive alien species; inappropriate fire regime; illegal abalone harvesting; human activities & disturbance; Vandalism and weathering; poor water quality and excessive nutrient load; industrial & military effluent (oil spills etc.); prolonged inappropriate water level; over abstraction of ground water; predation (gulls & seals); disease; unauthorised resource use.

Objectives	Actions	Responsibility	Timeframe	Measurable Indicators / Outputs	References / Existing Procedures
Objective 3.1: By 2025 and beyond, the WCPAES is promoted and implemented in collaboration with relevant partners to support ecological processes and maintain living land and seascapes (through the establishment of ecological buffer areas and corridors).	Identify priority properties for reserve expansion in line with WCPAES.	**Lead:** Conservation Manager Off-Reserve. **Enablers:** Landscape Conservation Intelligence Manager; Landscape Unit Manager; Conservation Manager On-Reserve, Conservation Stewardship Specialist, Marine and Coasts Senior Manager.	Dependant on PAES timeframes –5-year intervals	Hectares added to the conservation estate. Number of stewardship agreements signed and maintained. Staff component in place with stewardship listed Key Performance Areas.	WCPAES; Landscape PAES.
	Investigate, with partners, potential stewardship agreements with surrounding landowners in line with priority corridors.				
	Maintain stewardship agreements with relevant landowners.				
	Ensure sufficient staff in place to carry out stewardship responsibilities in the landscape (Zone of Influence).				

Objectives	Actions	Responsibility	Timeframe	Measurable Indicators / Outputs	References / Existing Procedures
Objective 3.2: By 2025 and beyond, the Walker Bay Complex and its Zone of Influence is integrated into Municipal Land Use Planning products.	Through engagement with external parties, ensure that the Walker Bay Complex and Zone of Influence is accurately reflected in the Overstrand and Theewaterskloof SDF and that key public investment projects are accurately reflected in the IDP.	**Lead:** Land Use Scientist. **Enablers:** Landscape Conservation Intelligence Manager; Landscape Unit Manager; Conservation Manager On-Reserve.	Dependent on municipal timeframes for SDF and IDP	Overstrand SDF, Overstrand IDP	Overstrand and Theewaterskloof SDF; Overstrand and Theewaterskloof IDP
	Engage with Department of Agriculture: LandCare and DEA&DP to identify pilot areas for area wide planning.				
	Participate in the area-wide planning process and product development.				
	Assist and review with the implementation of associated partner driven projects.				
	Through engagement with external parties, facilitate that development which occurs within the Walker Bay Complex and surrounding areas is compliant with legislation.	**Lead:** Land Use Scientist. **Enablers:** Landscape Conservation Intelligence Manager; Landscape Unit Manager; Conservation Manager On-Reserve, Marine and Coasts Senior Manager.	Year 1	Environmental authorisations – Comment on EIAs within Zone of Influence; Town planning approvals	Overstrand and Theewaterskloof SDF; Overstrand Protected Area Buffer Environmental Management Overlay Zone (EMOZ); Regulations; CDP.
	Engage and collaborate with marine resource regulatory authorities for the sustainable management of marine and coastal resources	**Lead:** Conservation On-Reserve Manager. **Enablers:** Marine and Coast Technical Specialist, Marine and Coasts Senior Manager. Landscape Unit Manager.	Year 1	MOUs; MoAs	Relevant legislation

Objectives	Actions	Responsibility	Timeframe	Measurable Indicators / Outputs	References / Existing Procedures
	Address the contravention of marine related legislation in the Complex and its Zone of Influence through Phakisa operations with other law enforcement agencies. .	**Lead:** Conservation On-Reserve Manager. **Enablers:** Marine and Coast Technical Specialist, Landscape Unit Manager, Marine and Coast Manager.	Year 1	Quarterly MPA reports submitted to DFFE.	Relevant legislation
Objective 3.3: By 2025 and beyond, the Walker Bay Complex has strong and active partnerships with all stakeholders in the Zone of Influence with functional and effective communication channels between the Complex and community.	Compile and finalise the Terms of Reference for the Walker Bay Complex PAAC.	**Lead:** Stakeholder Engagement Officer. **Enablers:** Conservation Manager On-Reserve, Marine and Coast Senior Manager.	Year 1	Number of functional interactions – digital or in person. Minutes of Protected Area Advisory Committee meetings.	CapeNature generic PAAC Terms of Reference templates
	Maintain a functioning Walker Bay Complex Protected Area Advisory Committee.				
	Maintain membership within adjacent established conservancies and landscape initiatives such as ABI.	**Lead:** Conservation On-Reserve Manager. **Enablers:** Landscape Unit Manager.	Year 1	Minutes of meetings.	Conservancy specific documentation
	Investigate and source any existing management plans for the Walker Bay Whale Sanctuary MPA.	**Lead:** Conservation On-Reserve Manager. **Enablers:** Marine and Coast Manager; Marine and Coast Technical Specialist.	Year 1	Management plan.	Unknown
	Review, integrate and implement, as relevant, actions from the Walker Bay Whale Sanctuary MPA management plans.	**Lead:** Conservation On-Reserve Manager. **Enablers:** Landscape Unit Manager, Marine and Coast Manager; Marine and Coast Technical Specialist.	Year 1	Eco-matrix, compliance plans.	Existing management plans.

Objectives	Actions	Responsibility	Timeframe	Measurable Indicators / Outputs	References / Existing Procedures
Objective 3.4: By 2025 and beyond, CapeNature advocates and facilitates Catchment to Coast best practice within the Zone of Influence in collaboration with its partners.	Ensure that identified terrestrial, marine, and estuarine ecological monitoring is being implemented in collaboration with relevant partners.	**Lead:** Conservation Manager On-Reserve. **Enablers:** Landscape Conservation Intelligence Manager and Unit; Landscape Unit Manager; Marine and Coast Technical Specialist, Integrated Catchment Specialist.	Year 1	Minutes of meetings, data, information produced and documented from data analysis.	CapeNature Catchment to Coast Implementation Plan; Estuary Management Plans; Mouth Management Plans, Estuary Governance Tools.
	As the assigned management authority, lead the implementation of the Klein and Uilkraal Estuary Management Plans and associated documents such as the Mouth Management Plans and Estuary Governance Tools.				
	Contribute towards implementation of the CapeNature ICM Catchment to Coast Implementation Plan within the Zone of Influence of the Complex.				
Objective 3.5: By 2025 and beyond, the conservation status of CapeNature managed land is secure and protected in perpetuity.	Ensure all land parcels in the Complex have legal conservation status in terms of NEM: PAA including formulising the legal status of State Forest land.	**Lead:** Law Manager. **Enablers:** Executive Director: Conservation Management; Landscape Manager; Conservation Stewardship Specialist; Law Manager, Law Administrator, Conservation Manager On-Reserve.	Year 1-10	Proclamations.	National Protected Areas Register; Government Gazette Notices. NEM: PAA; Deeds Office; Government Gazette.
	Ensure that all protected areas are listed in the National Protected Areas register as required by NEM: PAA.				

Objectives	Actions	Responsibility	Timeframe	Measurable Indicators / Outputs	References / Existing Procedures
Objective 3.6: **By 2025 and beyond, disaster management & contingency planning enables early detection and coordinated rapid response**	Collaborate with relevant entities (e.g., local and district municipalities, DEA:O&C; local stakeholders) to develop disaster management & contingency plans	**Lead**: Conservation Manager On-Reserve. **Enablers:** Integrated Catchment Manager; Landscape Unit Manager; Marine and Coast Manager, Marine and Coast Technical Specialist.	Year 2 and as per timeframe of review	Risk Assessment & Contingency Plan makes provision for coordinated rapid response.	Regional Oil Spill Contingency plan. MOU/agreements

BIODIVERSITY AND ECOSYSTEM MANAGEMENT - FRESHWATER	
STRATEGY 4:	Develop and implement an integrated monitoring plan for the freshwater ecosystems within the Walker Bay Complex and where necessary investigate partnerships to augment the process.
LINKED GOALS:	3.
THREATS:	Over abstraction of ground water; inappropriate fire regime; invasive alien plant species.

Objectives	Actions	Responsibility	Timeframe	Measurable Indicators / Outputs	References / Existing Procedures
Objective 4.1: By 2025 and beyond, the freshwater ecosystems of the Walker Bay Complex are monitored to determine variation of river health in identified systems using selected bio-indicators from the River Eco-Status Monitoring Programme.	Conduct baseline surveys to inform future monitoring.	**Lead:** Freshwater Ecologist. **Enablers:** Conservation Manager On-Reserve; Conservation Officer On-Reserve; Ecological Technician; Ecological Coordinator; Field Rangers; Fauna Ecologist.	Year 1	Baseline data.	SOB; Ecological Monitoring Protocols.

Objectives	Actions	Responsibility	Timeframe	Measurable Indicators / Outputs	References / Existing Procedures
	Formulate monitoring projects in line with existing relevant monitoring protocols and include on eco-matrix.	**Lead:** Freshwater Ecologist. **Enablers:** Landscape Unit Manager; Conservation; Landscape Conservation Intelligence Manager; Manager On-Reserve.	Year 2	Site specific monitoring project.	Eco-matrix; Ecological Monitoring Protocols; SASS5.
	Facilitate and conduct training of personnel to carry out monitoring activities.	**Lead:** Freshwater Ecologist. **Enablers:** Conservation Officer On-Reserve; Ecological Technician; Field Rangers.	Year 1 and 2	Attendance registers.	SASS5.
	Implement monitoring on identified priority river systems.	**Lead:** Conservation Manager On-Reserve. **Enablers:** Freshwater Ecologist; Conservation Officer On-Reserve; Ecological Technician; Field Rangers; Landscape Unit Manager.	Year 3 and onwards	SOB data; Internal Reports.	SOB; Ecological Monitoring Protocols.
Objective 4.2: By 2026 and beyond, water abstraction quantity and water quality of the Walker Bay Complex water sources and Zone of Influence is monitored and the relevant registration and/or licenses are in place.	Monitor water abstraction quantity and ensure legal compliance in the Walker Bay Complex according to the CapeNature and site-specific monitoring protocols.	**Lead:** Conservation Officer On-Reserve. **Enablers:** Field Rangers Freshwater Ecologist; Conservation Manager On-Reserve; Ecological Technician; Land Use Scientist.	Year 1-10	Monitoring report; Abstraction monitoring and analysis information; licenses; minutes of meetings attended.	CapeNature Groundwater Monitoring Protocol.
	Maintain active participation in groundwater monitoring frameworks and their implementation within the Walker Bay Complex Zone of Influence.	**Lead:** Land Use Scientist. **Enablers:** Conservation Manager On-Reserve; Freshwater Ecologist.	Year 2 and onwards	Abstraction monitoring and analysis information; Minutes of meetings attended.	CapeNature Groundwater Monitoring Protocol.

Objectives	Actions	Responsibility	Timeframe	Measurable Indicators / Outputs	References / Existing Procedures
	Identify and investigate the long-term monitoring of additional groundwater and/or aquifer dependant ecosystems that might be linked to the aquifers where abstraction is taking place.	**Lead:** Freshwater Ecologist. **Enablers:** Conservation Officer On-Reserve; Ecological Technician; Conservation Manager On-Reserve; Landscape Ecologist.	Year 3 and onwards	Ground-truthing report; Expert communication.	CapeNature Groundwater Monitoring Protocol.

ENVIRONMENTAL EDUCATION AND AWARENESS	
STRATEGY 5:	Implement an integrated environmental education and awareness programme aimed at neighbours, natural resource users, learner groups, and visitors in collaboration with partners, to nurture respect and care for the natural, cultural, and historic values of the Walker Bay Complex.
LINKED GOALS:	9.
THREATS:	Human activities & disturbance; inappropriate fire regime, unauthorised resource use.

Objectives	Actions	Responsibility	Timeframe	Measurable Indicators / Outputs	References / Existing Procedures
Objective 5.1: By 2025 and beyond, CapeNature has developed and implemented the Walker Bay Complex Environmental Education and Awareness Plan.	Develop and implement a 5-year Walker Bay Complex Environmental Education and Awareness Plan.	**Lead:** Stakeholder Engagement Officer. **Enablers:** Team Leader Learning and Awareness; Conservation Manager On-Reserve; Conservation Officer On-Reserve; Field Rangers.	Year 2-10	Approved Walker Bay Complex Environmental Education and Awareness Plan 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; CapeNature Learning & Awareness Annual Plan; CapeNature Advocacy Strategy.
	Develop reserve-specific environmental education and awareness resources for use on environmental themed calendar days.				

Objectives	Actions	Responsibility	Timeframe	Measurable Indicators / Outputs	References / Existing Procedures
	Review and revise the approved Walker Bay Complex Environmental Education and Awareness Programmes after five years.				
Objective 5.2: By 2025 and beyond, CapeNature has developed and implemented a Walker Bay Complex informational signage plan to raise awareness of all Conservation Targets and Human Well-being Values.	Completed a signage needs assessment for the Walker Bay Complex.	**Lead:** Conservation Manager On-Reserve. **Enablers:** Tourism Officer; Conservation Officer On-Reserve; Stakeholder Engagement Officer; Marketing & Promotions Manager Eco-Tourism & Access.	Year 1-2	Signage register.	Corporate Identity Manual; Communications Policy.
	Collate information material for signage development.		Year 1-3		
	Design and erect signage according to the Signage Plan and revise every four years.				
Objective 5.3: By 2025 and beyond, Natural Resource User Groups in the Walker Bay Complex have extensive awareness of the natural resource use and compliance.	Identify the natural resource user groups in the Walker Bay Complex Zone of Influence.	**Lead:** Stakeholder Engagement Officer. **Enablers:** Conservation Officer On-Reserve; Field Rangers; Landscape Conservation Intelligence Management; Landscape Unit Manager; Conservation Manager Off-Reserve; Conservation Manager On-Reserve.	Year 2-10	Database of natural resource user groups. Information sharing sessions and engagements conducted annually regarding the natural resource use. Permits issued to natural resource user groups.	Consumptive Use of Wild Flora from CapeNature-managed Protected Areas Policy (2019); Sustainable harvesting technique manual; CapeNature Position Statement on the Consumptive Use of Wild Flora.

Objectives	Actions	Responsibility	Timeframe	Measurable Indicators / Outputs	References / Existing Procedures
	Conduct workshops on the content and compliance with the approved Consumptive Use of Wild Flora from CapeNature-managed Protected Areas Policy (2019).				
	Identify and communicate with partners to provide sustainable harvesting technique training to natural resource user groups.				

HERITAGE RESOURCE MANAGEMENT	
STRATEGY 6:	Minimise degradation of heritage resources within the Walker Bay Complex.
LINKED GOALS:	7.
THREATS:	Vandalism and weathering; human activities & disturbance.

Objectives	Actions	Responsibility	Timeframe	Measurable Indicators / Outputs	References / Existing Procedures
Objective 6.1: By 2026 and beyond, the Walker Bay Complex reserve team has appropriate heritage management and monitoring skills.	Investigate and conduct heritage awareness, management, and monitoring training for all Walker Bay Complex staff in conjunction with Heritage Western Cape or an independent heritage specialist.	**Lead:** Conservation Manager On-Reserve. **Enablers:** Stakeholder Engagement Officer; Landscape Unit Manager; Talent Optimisation Human Resource Manager.	Year 7	Approved heritage training programme; Number of training events.	CapeNature Skills Development Programme; Personal Development Plans.
	Ensure all new appointed staff receive appropriate training within their first year.				

Objectives	Actions	Responsibility	Timeframe	Measurable Indicators / Outputs	References / Existing Procedures
Objective 6.2: By 2026 and beyond, a heritage management plan for the Walker Bay Complex has been developed and implemented.	In partnership with Heritage Western Cape, develop and implement an approved all-encompassing Heritage Management Plan for the Walker Bay Complex which covers and incorporates heritage resources found in all land parcels of the Complex in one document.	**Lead:** Conservation Manager On-Reserve. **Enablers:** Conservation Officer On-Reserve; Stakeholder Engagement Officer; Landscape Unit Manager; Landscape Conservation Intelligence Manager; Field Rangers; Landscape Ecologist.	Year 6	Approved Walker Bay Heritage Management Plan; Number of monitoring or management interventions.	Heritage Management Guidelines; Eco-matrix; Integrated Work Plan.

NATURAL RESOURCE USE	
STRATEGY 7:	Facilitate sustainable and responsible development, access, and activities within the Walker Bay Complex in collaboration with relevant partners and stakeholders.
LINKED GOALS:	10.
THREATS:	Invasive alien plant species; unauthorised resource use; human activities & disturbance.

Objectives	Actions	Responsibility	Timeframe	Measurable Indicators / Outputs	References / Existing Procedures
Objective 7.1: By 2025 and beyond, harvesting, and commercial activities within the Walker Bay Complex are compliant, where relevant, both internally and externally, and documented in an Activity Plan.	Review current and proposed activities within the Walker Bay Complex and compile an Activity Plan of approved activities detailing specifically the terms of use, associated authorisations, and zonation compatibility.	**Lead:** Conservation Manager On-Reserve. **Enablers:** Tourism Operations Manager; Land Use Scientist; Landscape Unit Manager.	Year 3	Activity Plan.	Zonation; Activity Plan.

Objectives	Actions	Responsibility	Timeframe	Measurable Indicators / Outputs	References / Existing Procedures
	Determine the sustainable resource yield for existing, and potential future, natural resource uses within the Complex.	**Lead:** Landscape Ecologist. **Enablers:** Conservation Manager Off-reserve, Landscape Conservation Intelligence Unit, Stakeholder Engagement Manager; Stakeholder Engagement Officer; Flora Ecologist, Conservation Manager On-Reserve.	Year 2	Harvesting thresholds of potential concern for relevant species. NRUG Resource Utilisation Guideline document for decision support and awareness	Zonation. Consumptive Use of Wild Flora from CapeNature-managed Protected Areas Policy (2019); CapeNature Position Statement on the Consumptive Use of Wild Flora.
	Ensure that existing and future natural resource use projects in the Complex are compliant with zonation, the CapeNature policies and relevant legislation.	**Lead:** Stakeholder Engagement Officer. **Enablers:** Conservation Manager On-Reserve; Conservation Officer On-Reserve.			
	Develop and implement a NRUG compliance guideline.				
	Engage with NRUGs, to facilitate, capacitate and support the implementation of natural resource projects where relevant.		Year 1 and annually thereafter	Attendance registers (site briefings); NRUG resource utilisation training interventions with relevant staff and NRUGs NRUG database depicting NRUGs and inventory.	People and Parks Committee meeting minutes; People and Parks Implementation Plan.

Objectives	Actions	Responsibility	Timeframe	Measurable Indicators / Outputs	References / Existing Procedures
	Maintain an inventory of NRUGs and resources utilised for the Complex				
Objective 7.2: By 2025 and beyond, access for sustainable spiritual and cultural uses has been identified and evaluated	Identify suitable sites for spiritual and cultural use.	**Lead:** Stakeholder Engagement Officer. **Enablers:** Conservation Manager On-Reserve; Conservation Officer On-Reserve.	Year 1	Sites with carrying capacities suitable for spiritual and cultural use have been identified.	Zonation.
Objective 7.3: By 2025 and beyond, future development (commercial and non-commercial) within the Walker Bay Complex is undertaken in accordance with the Concept Development Framework, is compatible with the zonation, and is legislatively compliant.	Ensure that developments within the Walker Bay Complex, both for commercial and non-commercial purposes, are undertaken in accordance with the Concept Development Framework.	**Lead:** Conservation Manager On-Reserve. **Enablers:** Tourism Development Manager; Infrastructure/Tourism Development Specialist; Land Use Scientist.	Year 1-10	Compliant developments	Zonation; Concept Development Framework.
	Identify, investigate, and evaluate responsible tourism facilities and products.	**Lead:** Conservation Manager On-Reserve. **Enablers:** Tourism Development Manager; Infrastructure/Tourism Development Specialist; Land Use Scientist.	Year 9	Environmental authorisations	Zonation; Concept Development Framework; National Environmental Management Act, No. 107 of 1998

Objectives	Actions	Responsibility	Timeframe	Measurable Indicators / Outputs	References / Existing Procedures
	Identify development needs for management purposes.	**Lead:** Conservation Manager On-Reserve. **Enablers:** Tourism Development Manager; Infrastructure/Tourism Development Specialist.			
	Ensure that all development that within the Walker Bay Complex is legislatively compliant.	**Lead:** Land Use Scientist. **Enablers:** Tourism Development Manager; Infrastructure/Tourism Development Specialist			

ECONOMIC AND SOCIAL DEVELOPMENT	
STRATEGY 8:	Contribute to economic and social development by providing job and training opportunities to Expanded Public Works Programme (EPWP), contract, and small, medium, and micro-sized enterprise (SMME) staff.
LINKED GOALS:	8.
THREATS:	Human activities & disturbance; inappropriate fire regime, unauthorised resource use; invasive alien plant species.

Objectives	Actions	Responsibility	Timeframe	Measurable Indicators / Outputs	References / Existing Procedures
Objective 8.1: By 2025 and beyond, CapeNature has engaged with partners to identify and promote job and training opportunities within the Walker Bay Complex.	Facilitate meetings with relevant role players to identify and promote job and training opportunities for the Walker Bay Complex.	**Lead:** Stakeholder Engagement Officer. **Enablers:** Team Leader: Compliance and Monitoring; Conservation Manager On-Reserve; Talent Optimisation; Specialist: SMME Development; People and Parks Officer; EPWP Projects Officer.	Year 1-10	SMME register; Management Information System report	Municipal Integrated Development Plans and Strategic Development Frameworks

Objectives	Actions	Responsibility	Timeframe	Measurable Indicators / Outputs	References / Existing Procedures
Objective 8.2: By 2025 and beyond, Walker Bay Complex has developed a skills development plan.	Evaluated the current training plan and needs of EPWP staff, contractors, and SMME's.	**Lead:** Conservation Manager On-Reserve. **Enablers:** Stakeholder Engagement Officer; Specialist: SMME Development; People and Parks Officer; EPWP Projects Officer.	Year 1-10	Management Information System report; training register; Personal Development Plans for EPWP staff; Skills Development plan.	Personal Development Plans; EPWP Recruitment and Selection Guidelines 2019.
	Develop a skills development plan according to individual needs of EPWP staff, contractors, and SMME's.				

MARINE AVIFAUNA MANAGEMENT	
STRATEGY 9:	Enhance the monitoring and management of the African Penguin and priority seabirds on Dyer Island to ensure the persistence of the species.
LINKED GOALS:	5; 6.
THREATS:	Human activities & disturbance; predation (gulls & seals); disease, industrial and military effluent (oil spills).

Objectives	Actions	Responsibility	Timeframe	Measurable Indicators / Outputs	References / Existing Procedures
Objective 9.1: By 2025 and beyond, the conservation management of the African Penguin and priority threatened seabirds on Dyer Island is informed by sound monitoring in line with national requirements enabling strategic adaptive management.	Continue long-term monitoring of population demographics parameters, and efficacy of management interventions for African Penguin (population census, survival rates, emigration, immigration, breeding success, chick condition etc.).	**Lead:** Conservation Manager On-Reserve. **Enablers:** Conservation Officer On-Reserve; Field Rangers; Landscape Conservation Intelligence Manager; Landscape Ecologist; Marine & Coast Technical Specialist.	Year 1 and beyond	African Penguin Database; BMP-S	Eco-matrix; BMP-S; previous protected area management plans; MOUs

Objectives	Actions	Responsibility	Timeframe	Measurable Indicators / Outputs	References / Existing Procedures
	Minimise the rate of decline of the colony by enabling the capture, raising and release of chicks that are unlikely to survive without intervention.	**Lead:** Conservation Manager On-Reserve. **Enablers:** Conservation Officer On-Reserve; Field Rangers; Marine and Coast Technical Specialist.	Year 1 and beyond	Chick Condition Data Spreadsheet; African Penguin and Seabird Sanctuary Annual Report	BMP-S; MOUs
	Improve breeding success by enhancing the breeding habitat through artificial nests.	**Lead:** Conservation Manager On-Reserve **Enablers:** Conservation Officer On-Reserve; Field Rangers; Landscape Ecologist; Marine & Coastal Technical Specialist.	Year 1 and beyond	Assessment of artificial nest boxes	BMP-S; MOUs
	Continue with long-term persistence population demographic monitoring of Cape Cormorants, Bank Cormorants, Crown Cormorants, White-breasted Cormorant, Swift Terns, Roseate Terns, Caspian Terns, Kelp Gulls and Hartlaub Gulls.	**Lead:** Conservation Manager On-Reserve. **Enablers:** Conservation Officer On-Reserve; Field Rangers; Landscape Ecologist; Marine and Coast Technical Specialist.	Year 1 and beyond	Coastal Seabird Population Census; CWAC	Eco-matrix
	Conduct and support research which results in information that feeds into strategic adaptive management for the African Penguin and priority threatened seabirds on Dyer Island.	**Lead:** Conservation Manager On-Reserve. **Enablers:** Conservation Officer On-Reserve; Field Ranger; Landscape Ecologist; Marine & Coast Technical Specialist.	Year 1	Research information informs conservation management.	Eco-matrix; EMPs; previous protected area management plans, published research.

Objectives	Actions	Responsibility	Timeframe	Measurable Indicators / Outputs	References / Existing Procedures
Objective 9.2: By 2025 and beyond, provision has been made for the mitigation of extreme weather, other natural disasters, and oil spills for the African Penguin and species of concern on Dyer Island.	Convene an oiled wildlife response working group – CapeNature personnel feed into national disaster working groups.	**Lead:** Landscape Unit Manager. **Enablers:** Conservation Manager On-Reserve; Marine & Coast Technical Specialist.	Year 2	Minutes; Attendance Register	National Oil Spill Contingency Plan (2019-2024); National Oiled Marine Wildlife Preparedness and Response Contingency Plan.
	Ensure that Dyer Island has a specific oil spill & extreme weather and natural disaster contingency plan.	**Lead:** Conservation Manager On-Reserve. **Enablers:** Landscape Unit Manager; Marine & Coast Technical Specialist.	Year 3	Dyer Island Oil Spill & Extreme Weather and Natural Disaster contingency plan.	National Oil Spill Contingency Plan (2019-2024); National Oiled Marine Wildlife Preparedness and Response Contingency Plan.
	Address any associated training and equipment needs associated with the contingency plan.	**Lead:** Conservation Manager On-Reserve. **Enablers:** Landscape Unit Manager; Marine & Coast Technical Specialist.	Year 3	Training Register; Attendance Register; Purchase Orders; Asset Register	National Oil Spill Contingency Plan (2019-2024); National Oiled Marine Wildlife Preparedness and Response Contingency Plan.
Objective 9.3: By 2025 and beyond, predation of the African Penguin and priority seabirds on Dyer Island is controlled through effective predation monitoring and the implementation of rapid response management actions.	Review and improve the implementation and monitoring of predator management on Dyer Island.	**Lead:** Conservation Manager On-Reserve. **Enablers:** Conservation Officer On-Reserve; Field Rangers; Landscape Ecologist; Marine & Coast Technical Specialist.	Year 2	Dyer Island Seabird Predation & Mortality Spreadsheet Damage Causing Animals monitoring file	Eco-matrix; BMP-S
	Ensure that all relevant data is captured accurately in the CapeNature Mortality and Predation Database and that this is submitted annually.	**Lead:** Conservation Manager On-Reserve. **Enablers:** Conservation Officer On-Reserve; Field Rangers; Ecological Coordinator.	Year 1 and beyond	CapeNature Mortality & Predation Database	Eco-matrix; BMP-S

LANDSCAPE INTEGRATED PLANNING, COMPLIANCE AND CO-OPERATIVE GOVERNANCE	
STRATEGY 10:	Promote co-operative governance and legislative compliance by implementing the Walker Bay Integrated Compliance Plan through the inter-governmental and relevant Non-Governmental Organisations relationships that mitigate negative impacts on biodiversity associated with non-compliance with legislation.
LINKED GOALS:	10.
THREATS:	Unauthorised resource use; illegal abalone harvesting; human activities and disturbance; prolonged inappropriate water level; poor water quality and excessive nutrient load; unmonitored abstraction.

Objectives	Actions	Responsibility	Timeframe	Measurable Indicators / Outputs	References / Existing Procedures
Objective 10.1: By 2025 and beyond, the revised Integrated Compliance Plan for the Walker Bay Complex has been implemented.	Implement the Walker Bay Integrated Compliance Plan.	**Lead:** Conservation Manager On-Reserve. **Enablers:** Conservation Officer On-Reserve; Conservation Manager Off-Reserve; Field Rangers; Stakeholder Engagement Officer; Landscape Unit Manager; Marine & Coast Technical Specialist, Marine and Coast Manager.	Annually from Year 1	Number of compliance activities and cases/fines; Number of Environmental Management Inspectors trained and appointed; Number of Peace Officers trained and appointed.	Criminal Procedure Act, 1977 (Act No. 51 of 1977); Integrated Work Plan; Integrated Compliance Plan; Compliance and Enforcement Training Strategy/Audit; ORV regulations; Estuary Management Plans; Nature Conservation Ordinance, 1974.
	Identify specific target groups within the hotspots/high threat areas of the Walker Bay Complex and Zone of Influence (e.g., communities, landowners, partners, schools etc.) for either compliance or compliance awareness action.				
	Identify and communicate with potential partners to assist with compliance within the Walker Bay Complex and its Zone of Influence.				

Objectives	Actions	Responsibility	Timeframe	Measurable Indicators / Outputs	References / Existing Procedures
	Provide relevant compliance training to protected area staff applicable to their function and mandate.				
	Review the Walker Bay Integrated Compliance Plan when required in line with the latest management plan information.				
	Ensure the Integrated Compliance Plan adequately addresses the threat of unauthorised resource use (e.g., sourfigs, abalone) and illegal activities (e.g., off road driving, unauthorised access, and wood cutting) within the reserve and Zone of Influence.				
Objective 10.2: By 2025 and beyond, unlawful development, land clearing, and any other relevant unauthorised activities within the Walker Bay Zone of Influence are reported and support given to associated organisations.	Follow up on unauthorised development, land clearing and other relevant illicit activities within the Zone of Influence, either reported or observed, regarding legal compliance and report, where necessary, in the approved format.	**Lead:** Conservation Manager Off-Reserve. **Enablers:** Land Use Scientist; Landscape Unit Manager; Conservation Manager On-Reserve; Marine & Coast Technical Specialist.	Annually from Year 1	Record of reporting on correct forms to the competent authority.	Relevant and various legislation under the National Environmental Management Act, No. 107 of 1998; Conservation of Agricultural Resources Act, 1983.

11 COSTING

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

11.1 Finance and Asset Management

In line with the legal requirement, the strategies identified for implementation within the Walker Bay Complex, to achieve the desired state, have been costed below.

The Complex will adhere to the following 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 plan; and
- Compliance with the Public Finance Management Act, 1999 (Act No. 1 of 1999) as well as CapeNature's financial policies and procedures.

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

- Those costs and associated resources which could be allocated to specific activities, and which were of a recurring nature;
- Those costs and associated resources which could be allocated to specific activities, but which were of a once-off nature;
- Unallocated fixed costs (water, electricity, GG vehicle use, phones, bank fees, etc.);
- Maintenance of infrastructure and equipment; and
- Provision for replacement of minor and major assets, (furniture, electronic equipment, vehicles, boats, etc.).

Once items above a specified value have been procured, they are recorded on the Finance Asset Register for the Complex. The assets are verified twice annually. New custodians are allocated and recorded when staff are appointed or change positions within the organisation. Minor assets below a specific value are recorded on the Complex's minor asset register. Broken or obsolete assets are disposed of as per CapeNature's protocol.

11.1.1 Income

CapeNature's budget is funded by the Medium-Term Expenditure Framework (MTEF) allocation, other government grants and generated from own revenue sources derived from 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, communications, marketing and learning, finance, biodiversity capabilities, conservation operations, eco-tourism and access, legal services, etc. which is not allocated to individual protected area complexes and must also be funded through grant funding or own revenue generated.

This management plan is for a dedicated 10-year timeframe, and thus straddles multiple MTEF periods that impact on actual budget allocation and projection. Due to the challenging fiscal position the country faces, and additional strain brought on by the COVID-19 pandemic, the organisation is facing constant budget cuts and uncertainty in tourism income that will have to be considered during the implementation of this management plan.

The total zero-based budget needs projected for 2023/24 is R 3 459 012. This excludes Board staff TCOE's. The summary as allocated for 2023/24 is presented in Table 11.1, excluding staff TCOE's.

Table 11.1: Annual summary of the total income for the Walker Bay Complex.

Allocation	2023/24
Total Income	R 3 459 012.00
MTEF Allocation	R 1 840 770.00
Own Funding	R 0.00
External Funding	R 1 618 242.00

11.1.2 Expenditure

11.1.2.1 Recurring costs

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

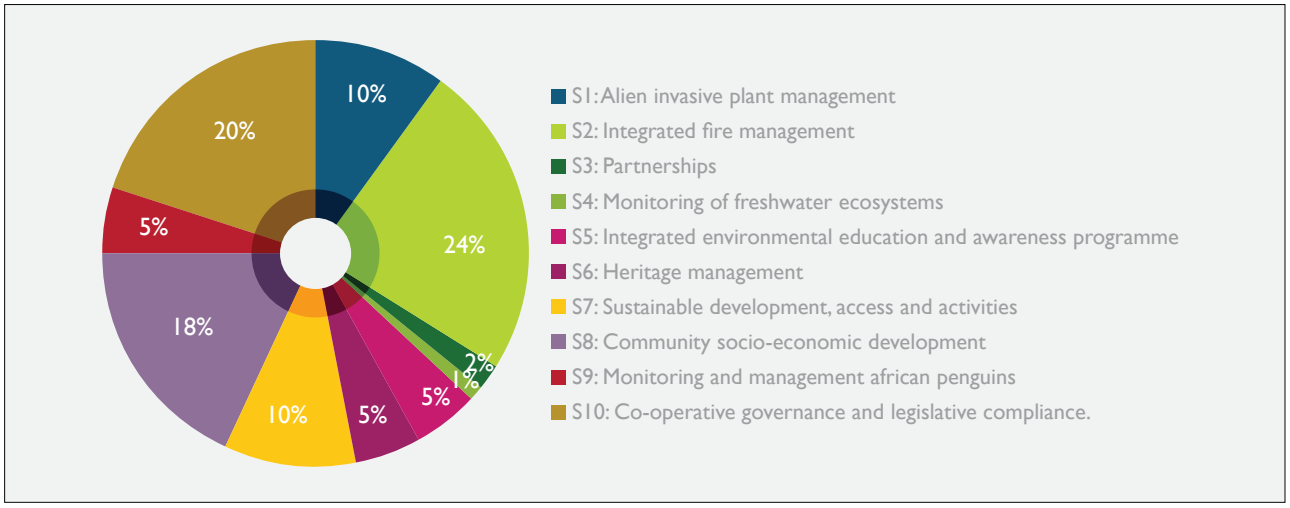


Figure 11.1: The estimated proportion of annual operational costs for the Walker Bay Complex for year 2023/24 aligned with the identified and prioritised strategies.

11.1.22.2 Once off costs

In addition to the recurring costs there might be once-off replacement costs of assets, e.g., tractor, boat, fencing equipment, field equipment, etc. 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 infrastructure, upgrades and maintenance of existing tourism and management infrastructure. Tourism projects are prioritised across all CapeNature facilities and maintenance is scheduled accordingly.

11.1.2.4 Implications

Unsuccessful securing of external funding and replacement of crucial capital equipment could lead to potential shortfalls and will have a negative impact on strategies throughout. Further reductions in organisational budget can be expected during the management plan cycle. The implications of this could be that the strategic plan may not be fully achieved. Available funding will have to be prioritised accordingly.

A zero-based budget approach is needed to determine the true financial needs of the Complex, as indicated above.

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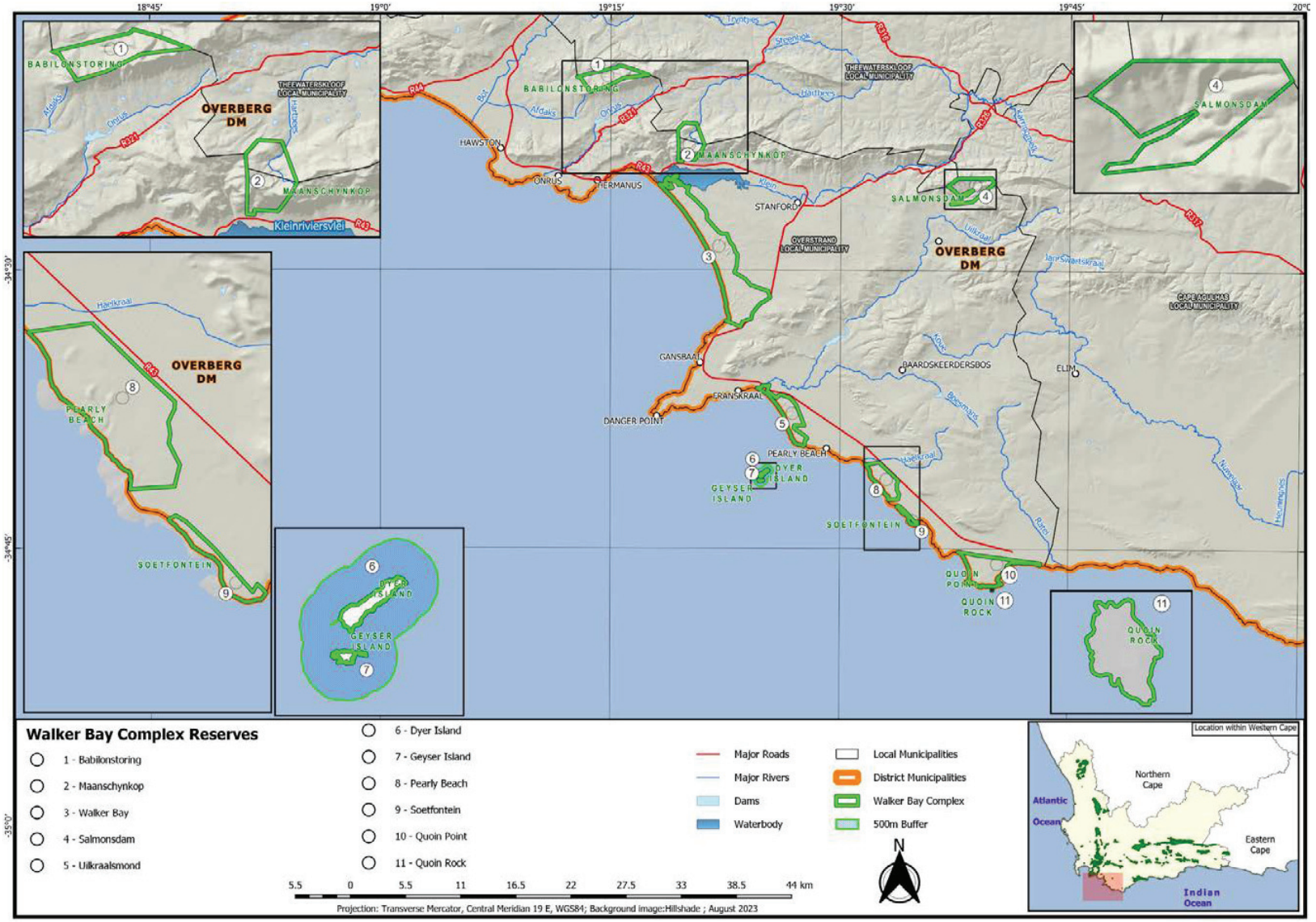
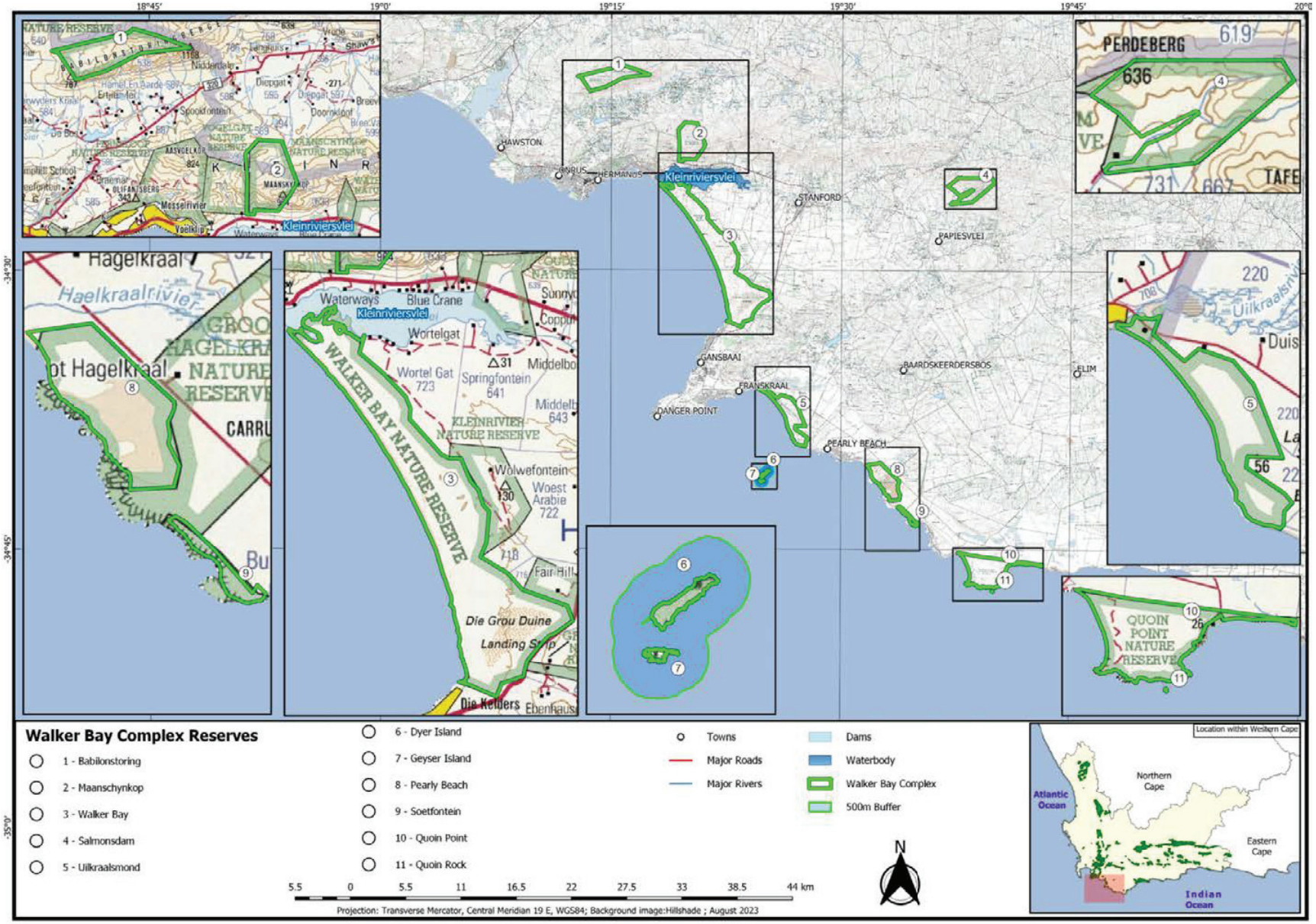
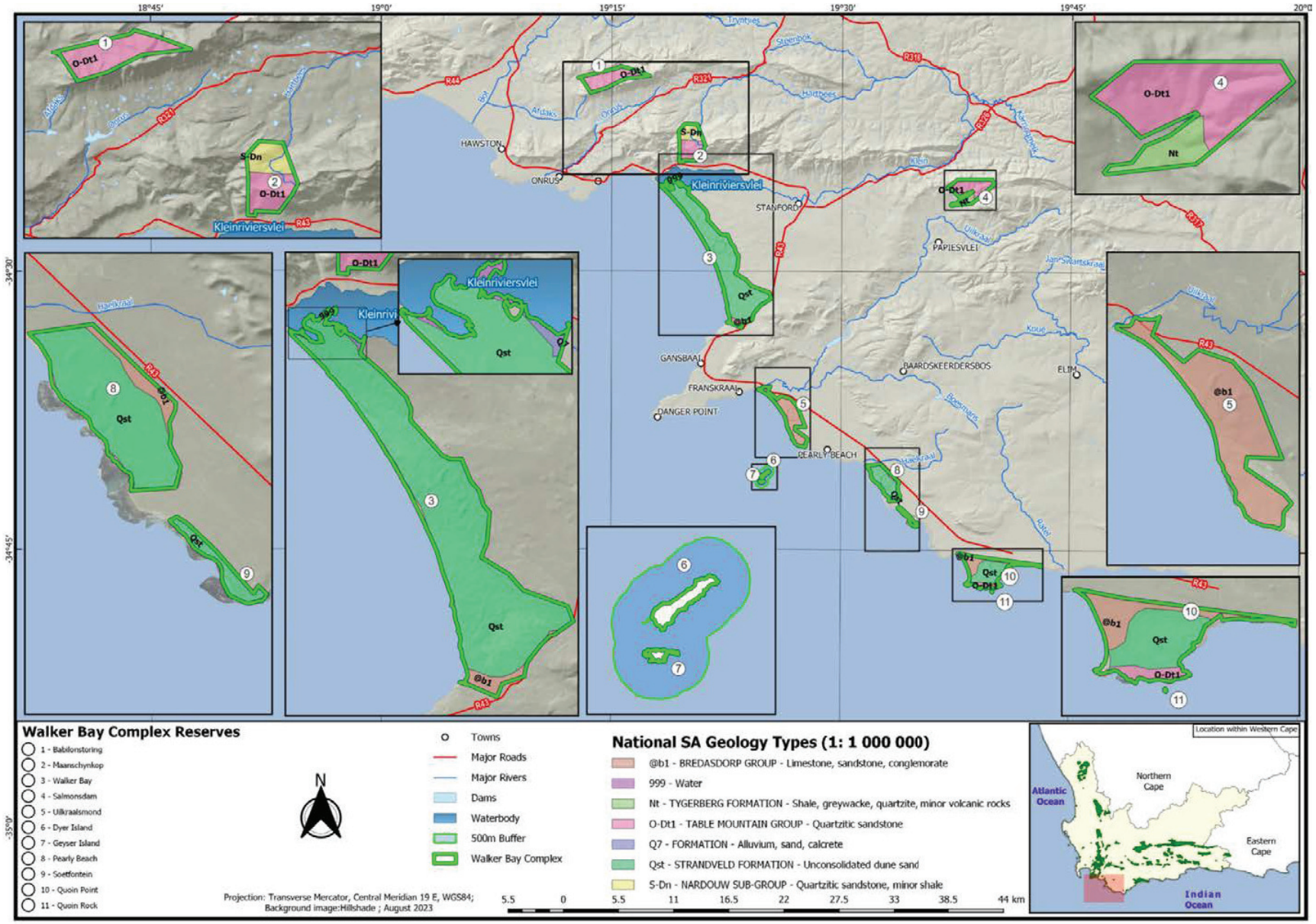
APPENDIX 1 MAPS OF THE WALKER BAY COMPLEX.



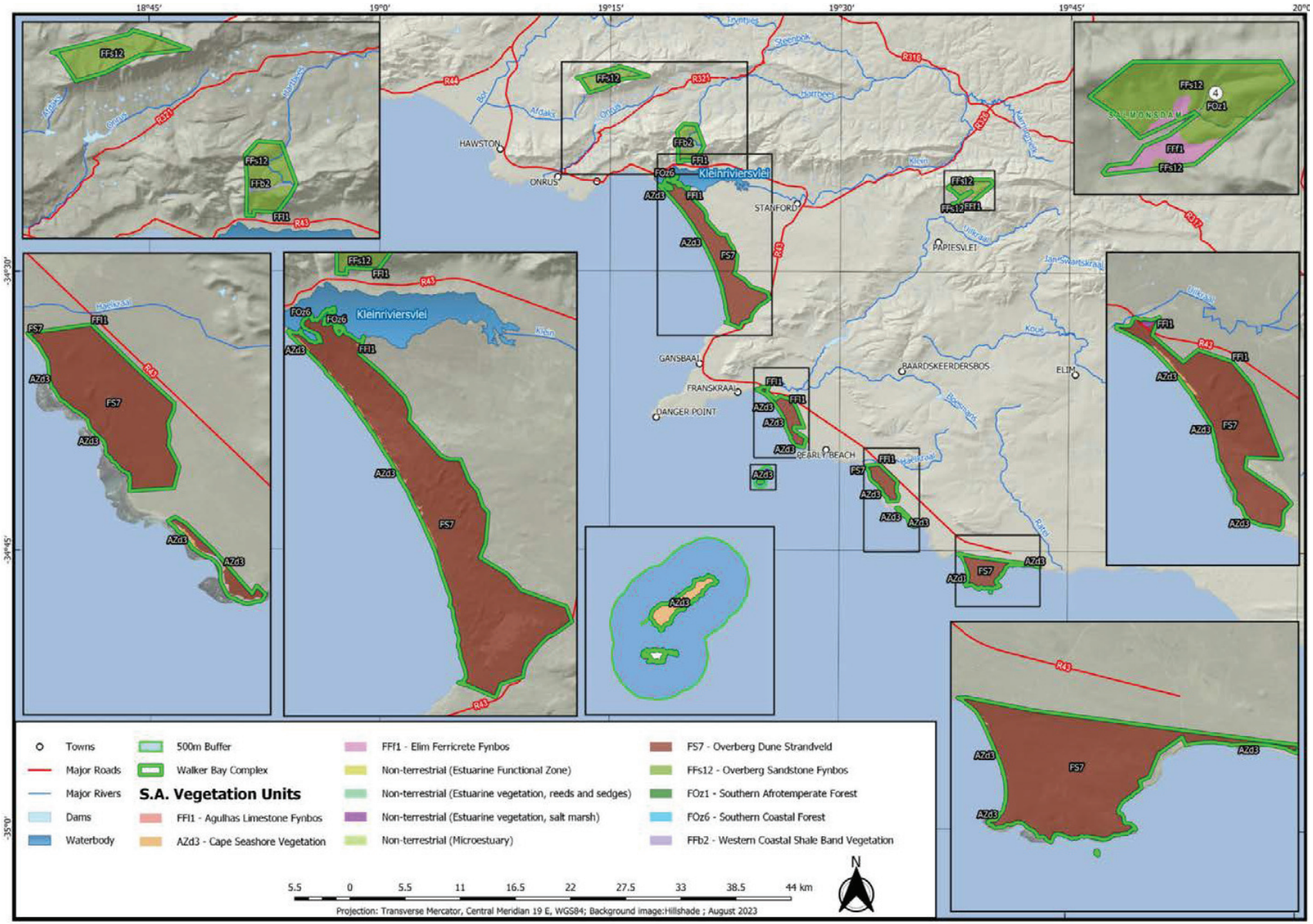
Map 1: Location and extent of the Walker Bay Complex



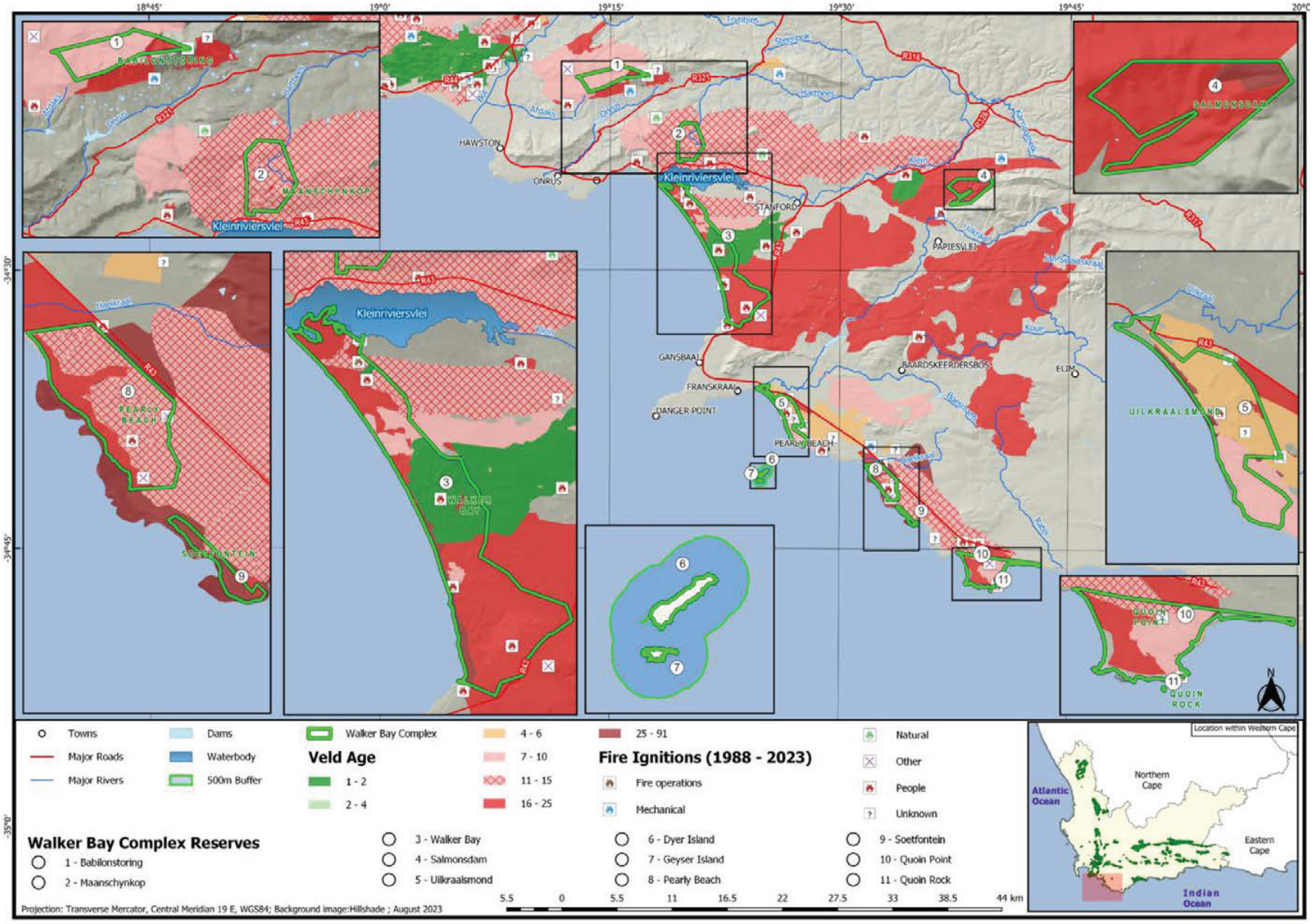
Map 2: Topography of the Walker Bay Complex



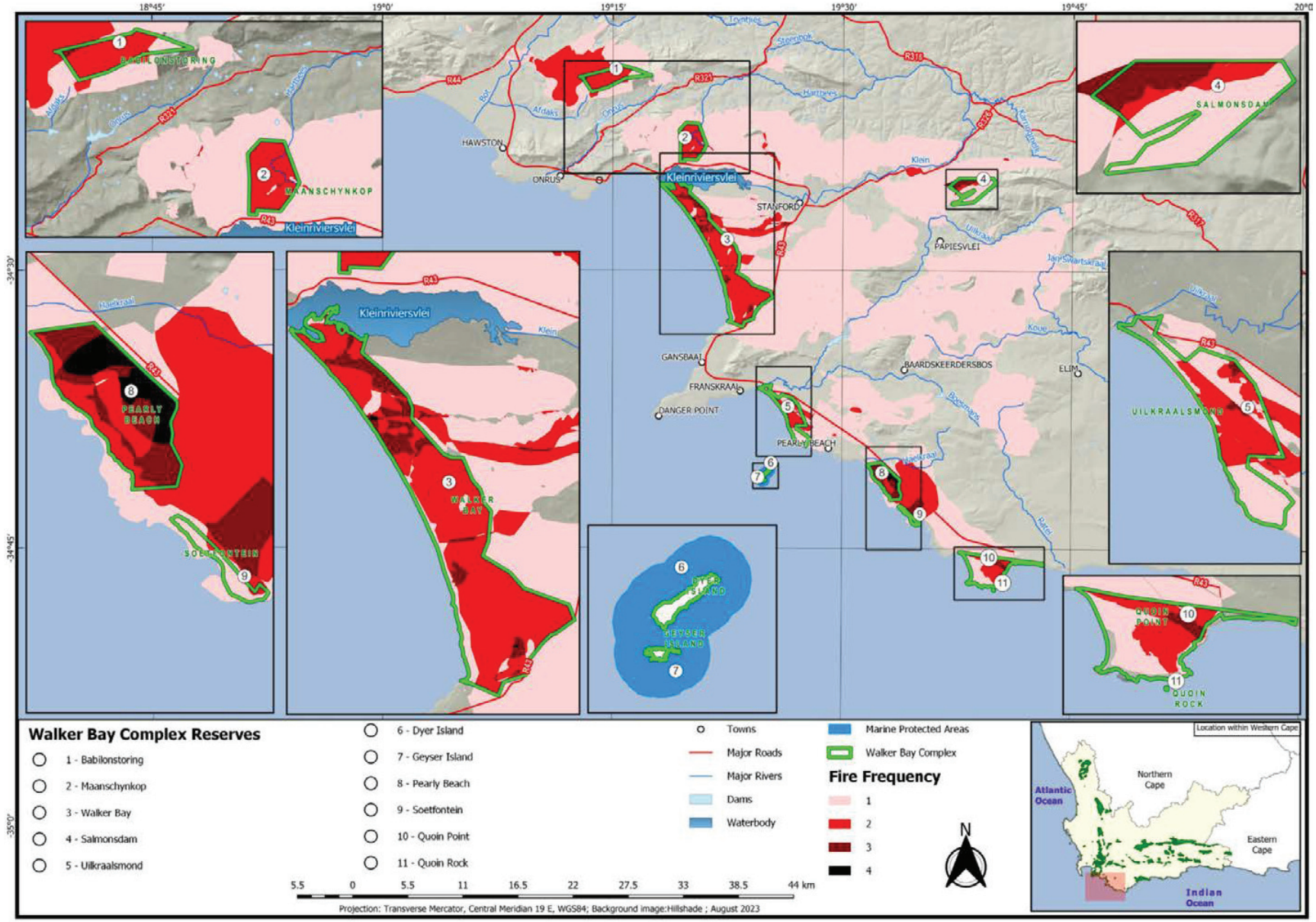
Map 3: Geology of the Walker Bay Complex



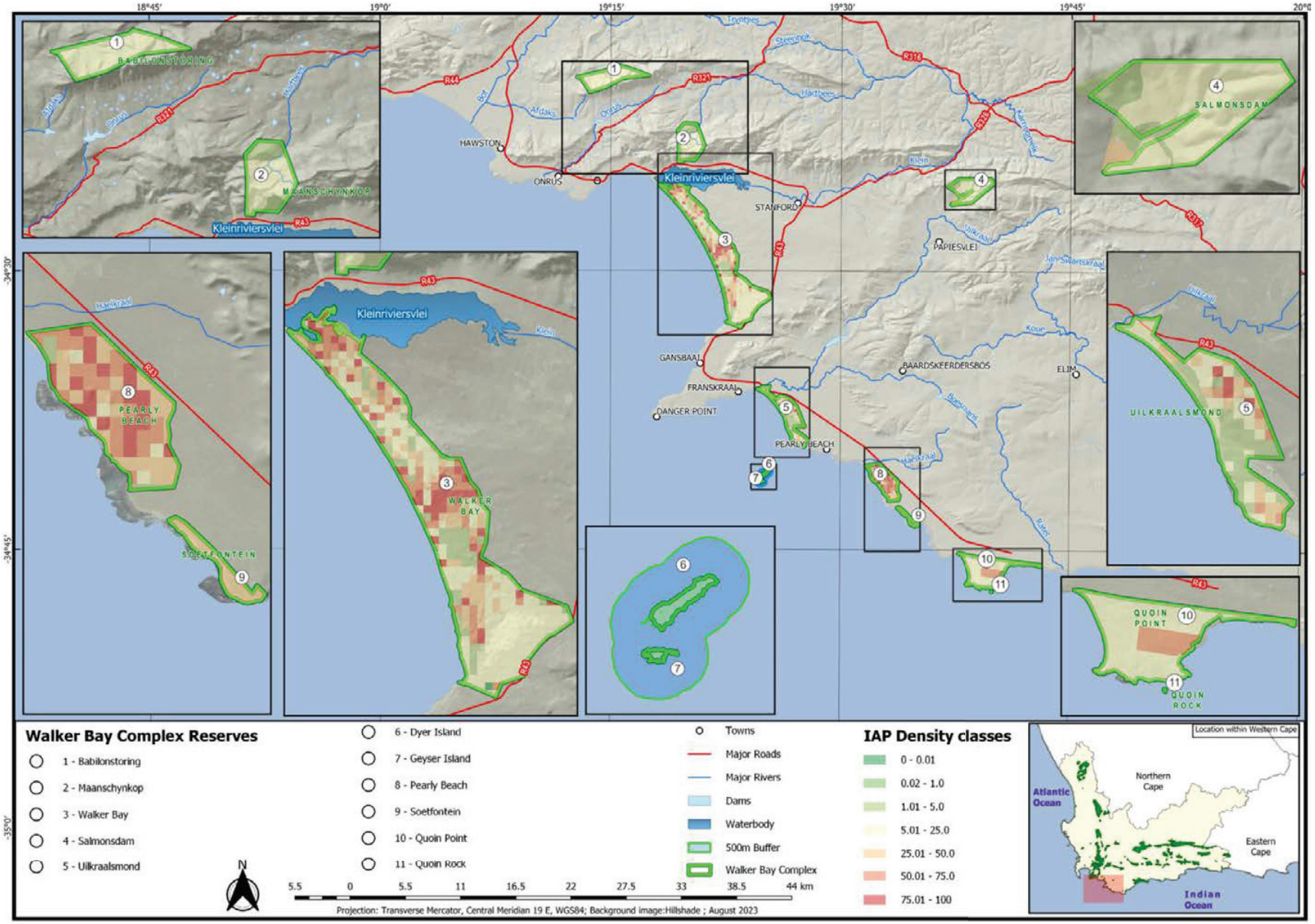
Map 4: Vegetation of the Walker Bay Complex.



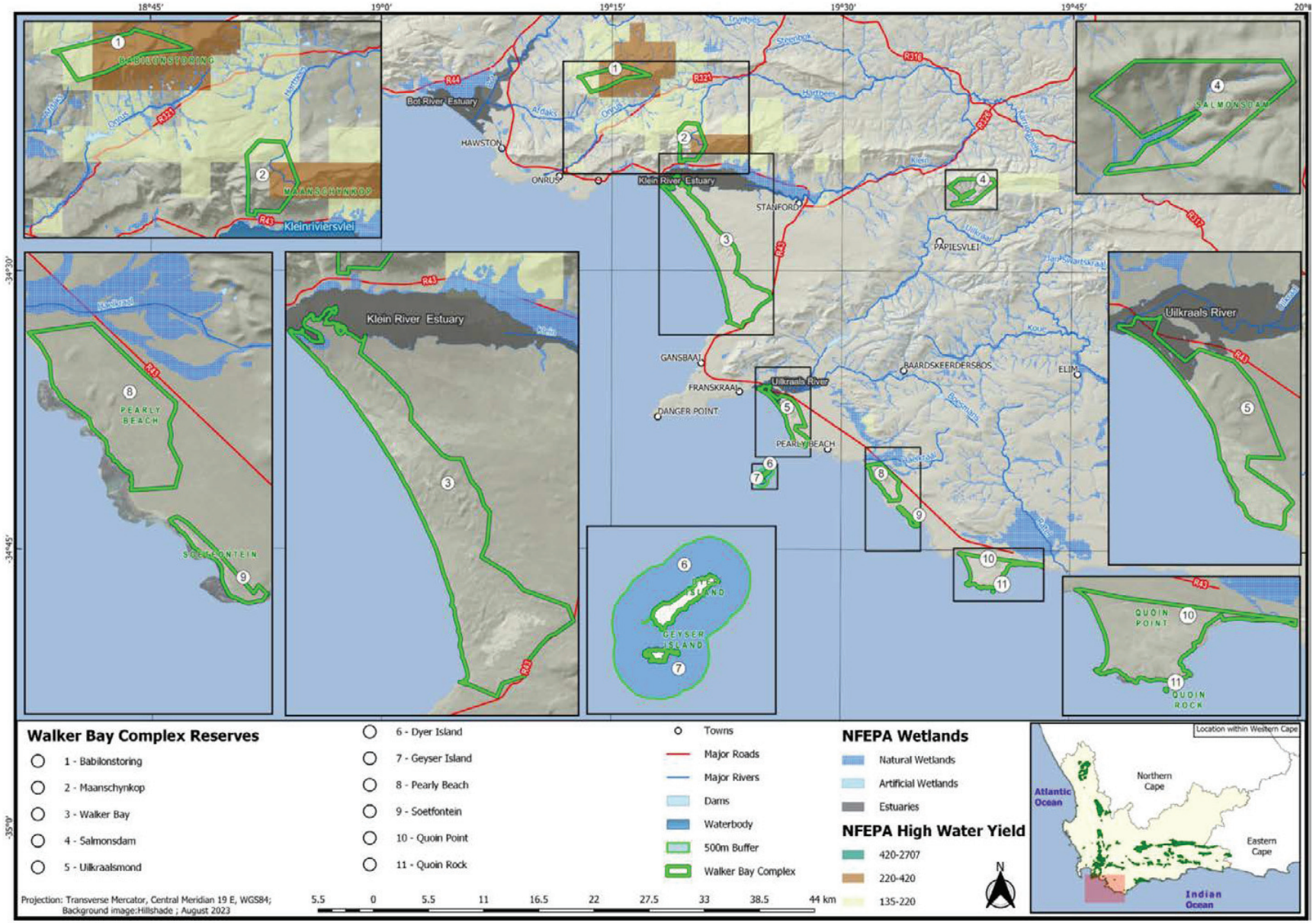
Map 5: Veld age and ignition points of the Walker Bay Complex.



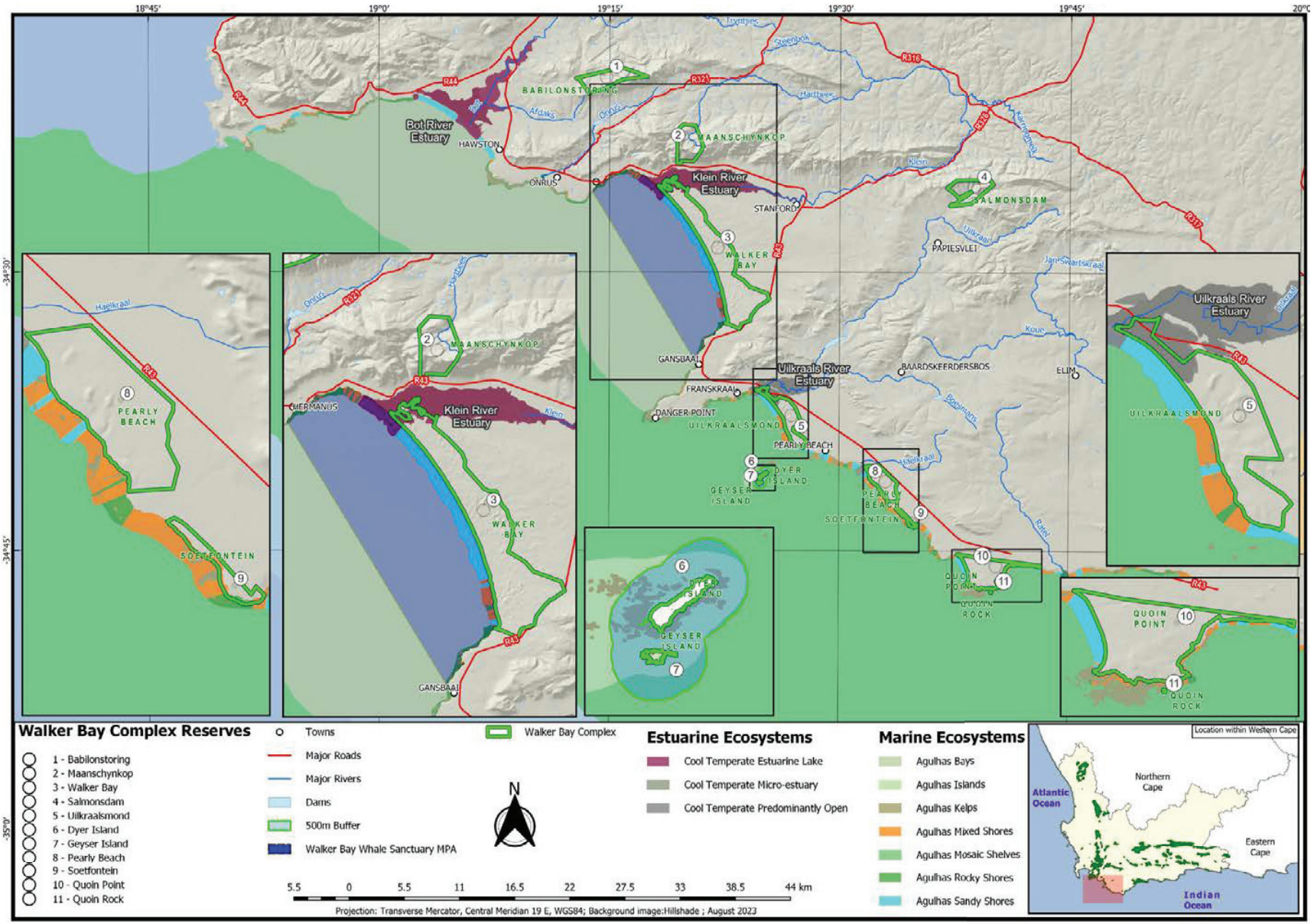
Map 6: Fire frequency of the Walker Bay Complex.



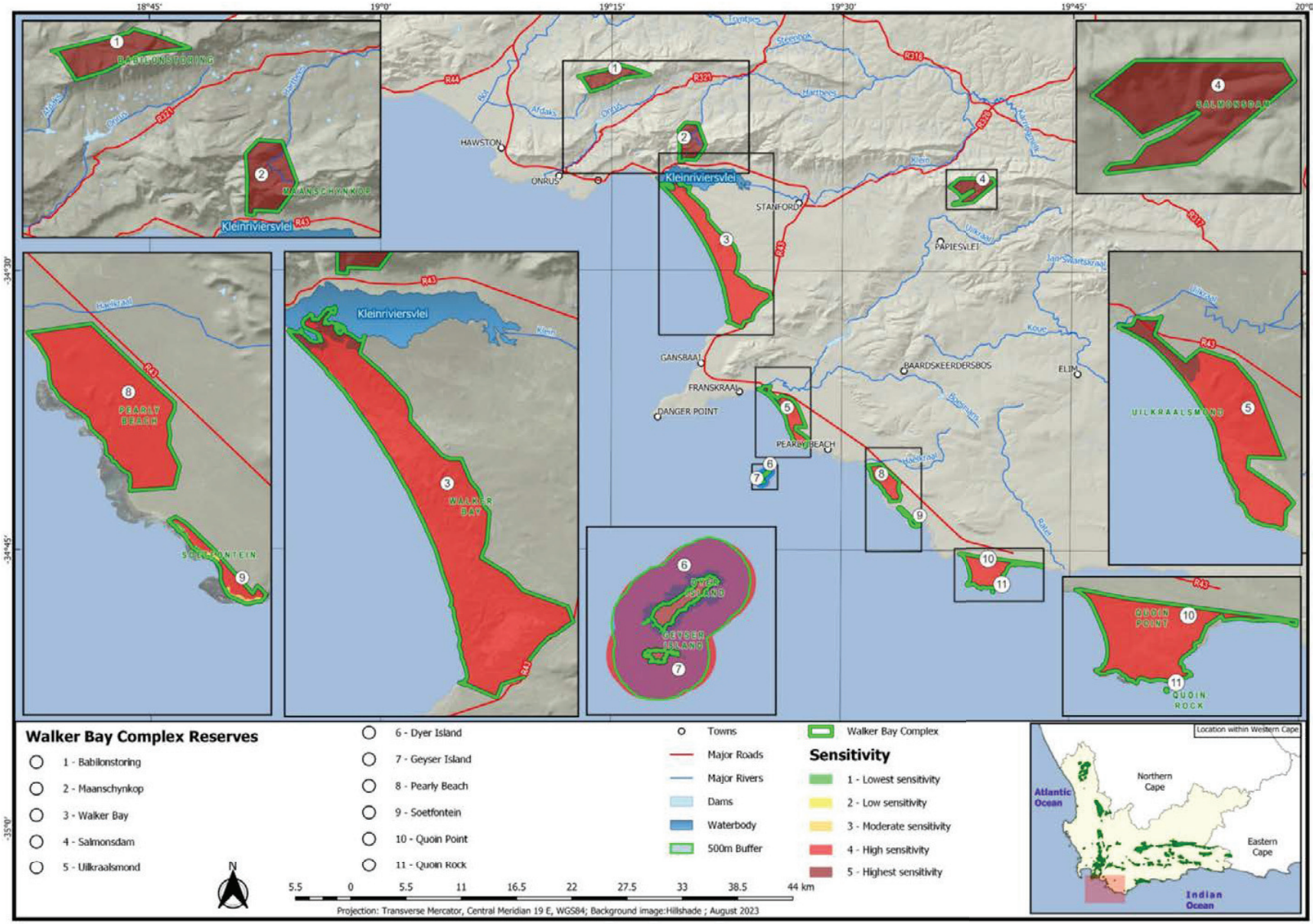
Map 7: Invasive alien plant densities of the Walker Bay Complex.



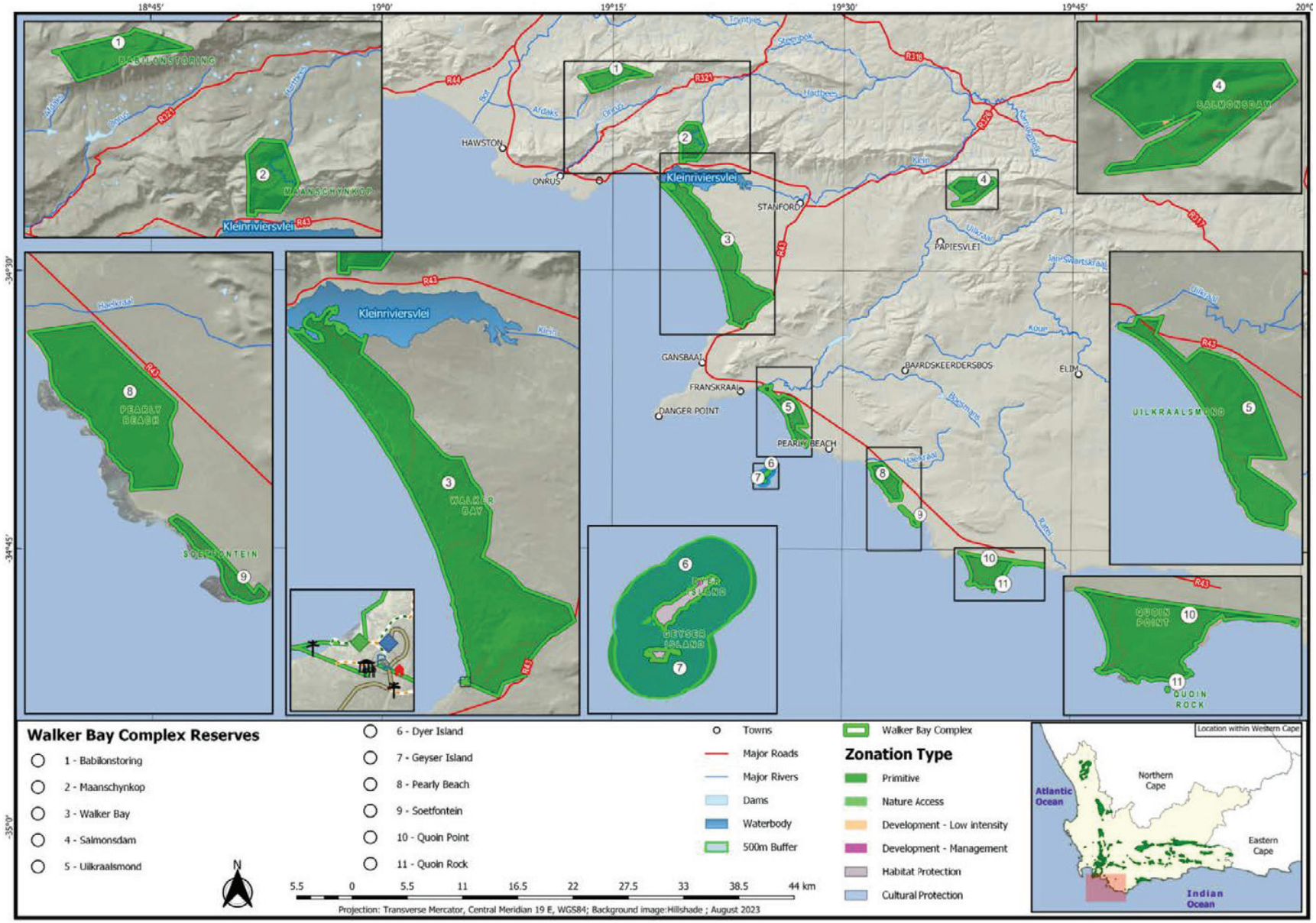
Map 8: Aquatic systems of the Walker Bay Complex.



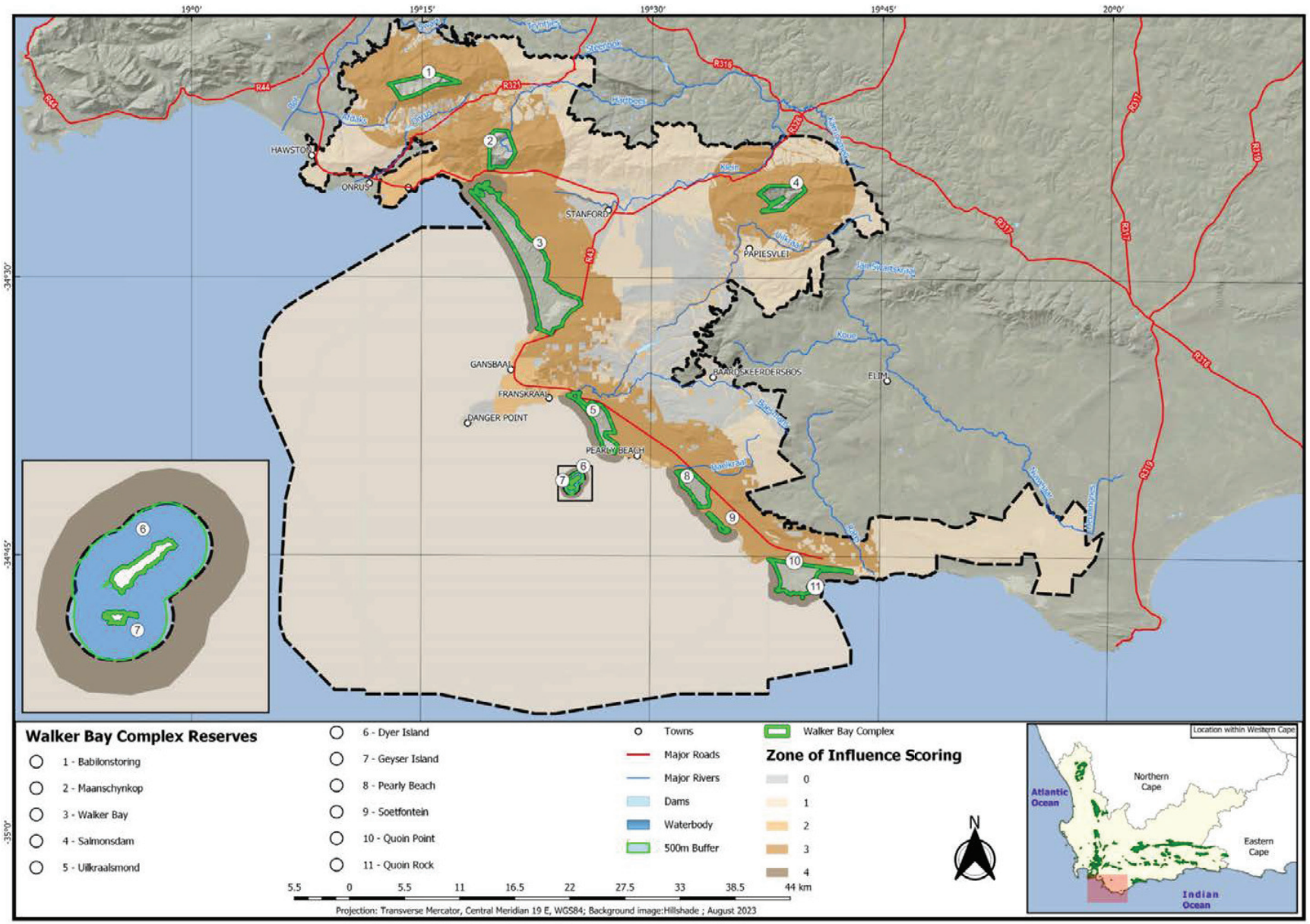
Map 9: Marine and estuarine systems surrounding the Walker Bay Complex.



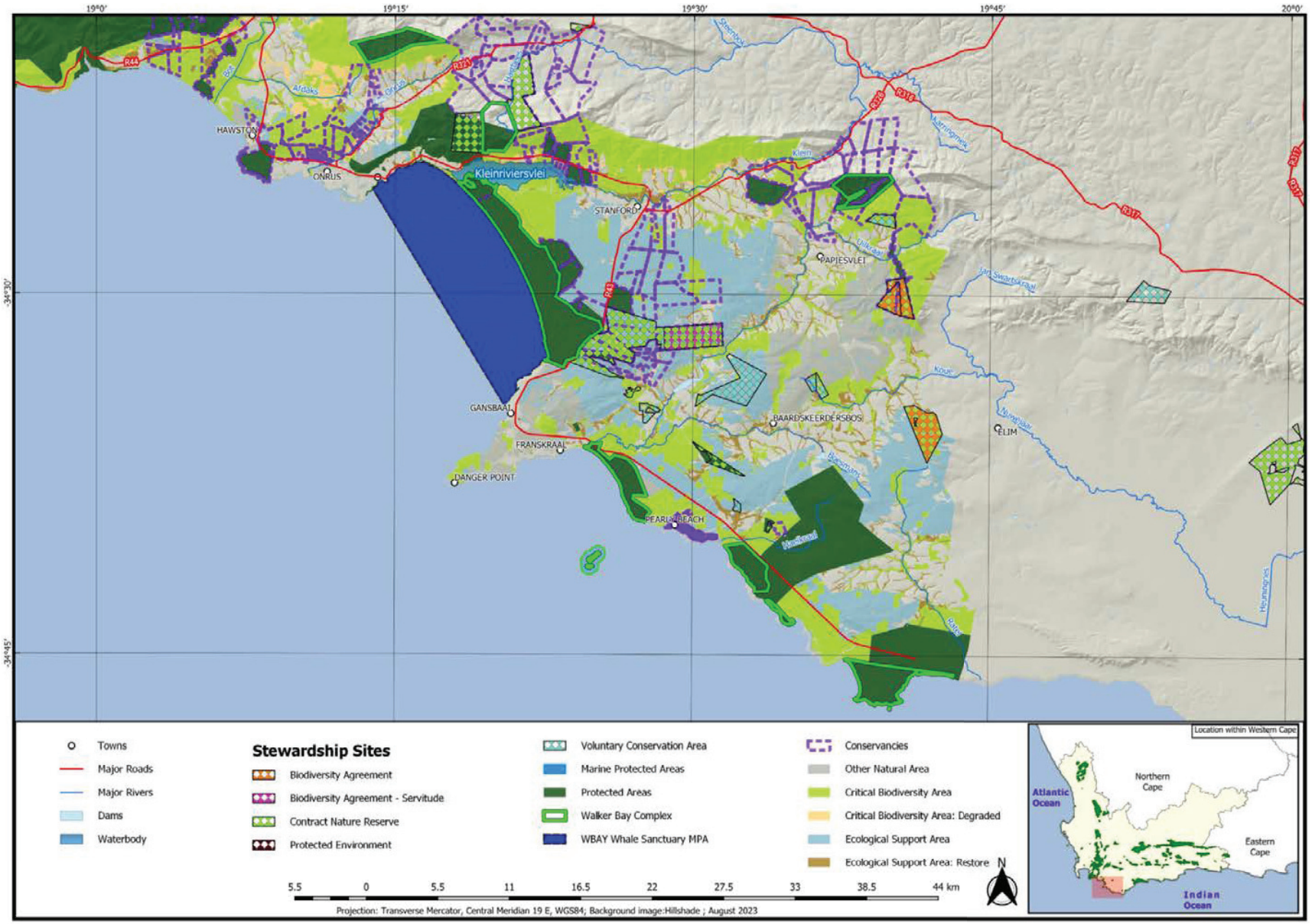
Map 10: Sensitivity of the Walker Bay Complex.



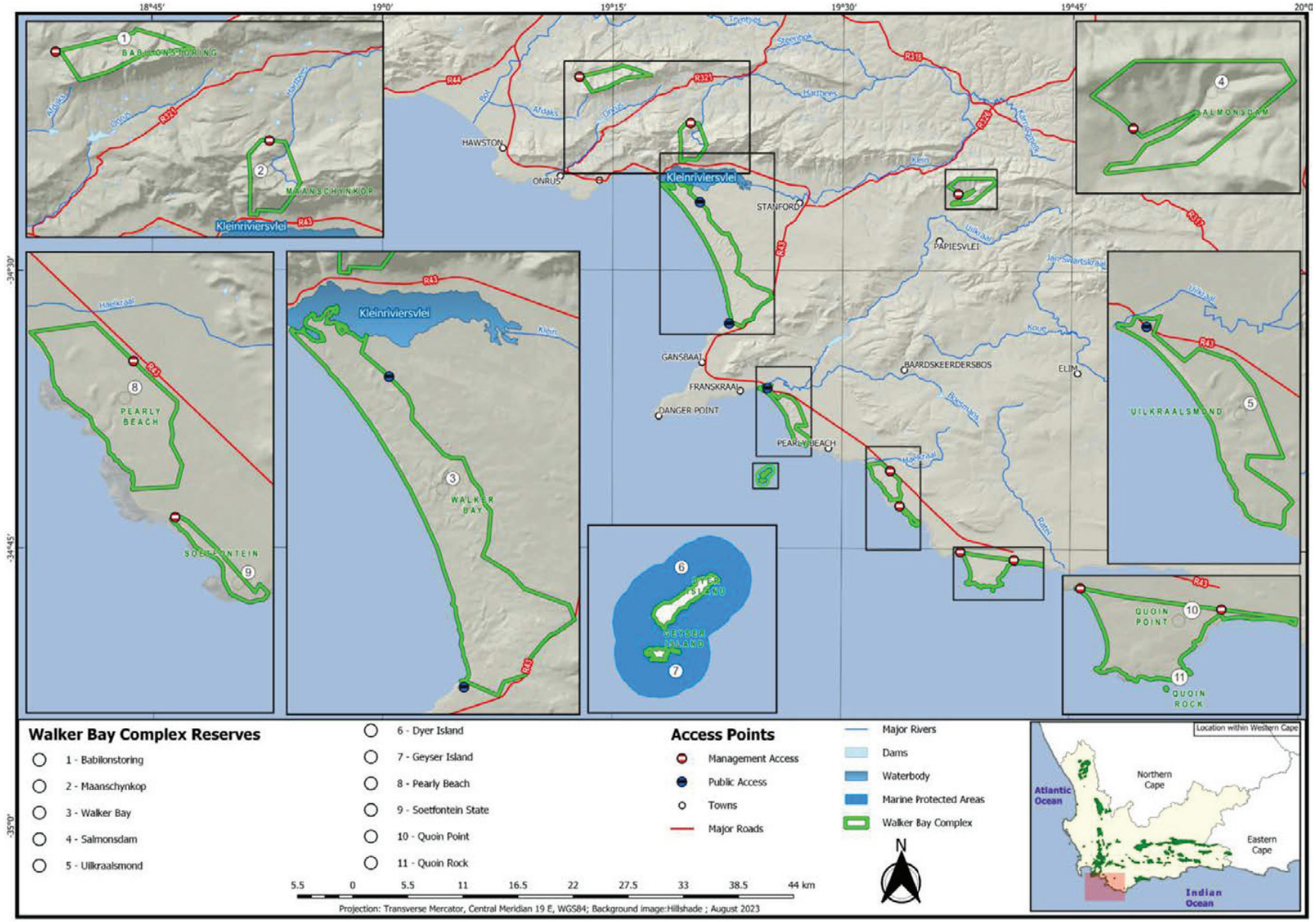
Map 11: Zonation of the Walker Bay Complex.



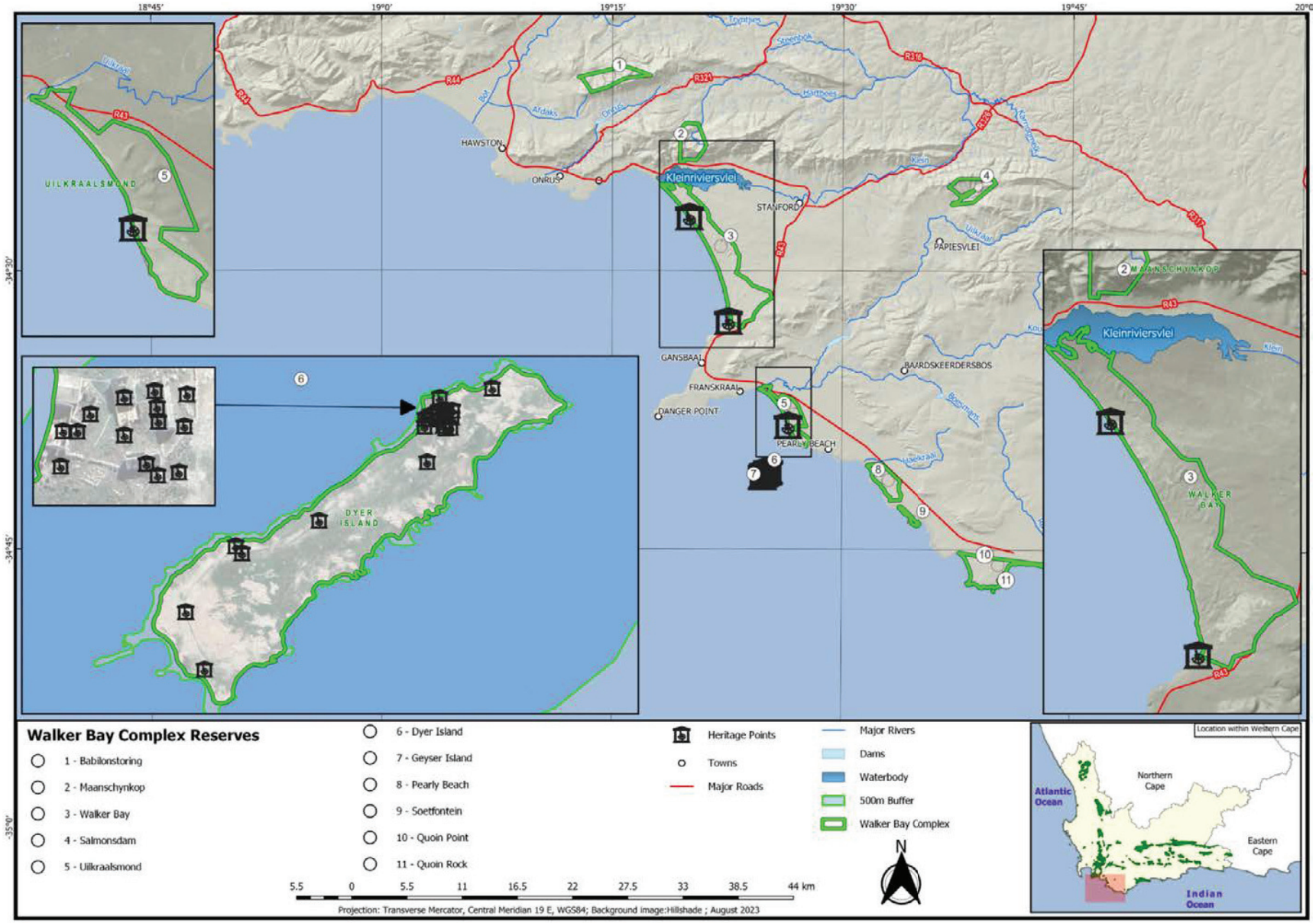
Map 12: Zone of Influence of the Walker Bay Complex



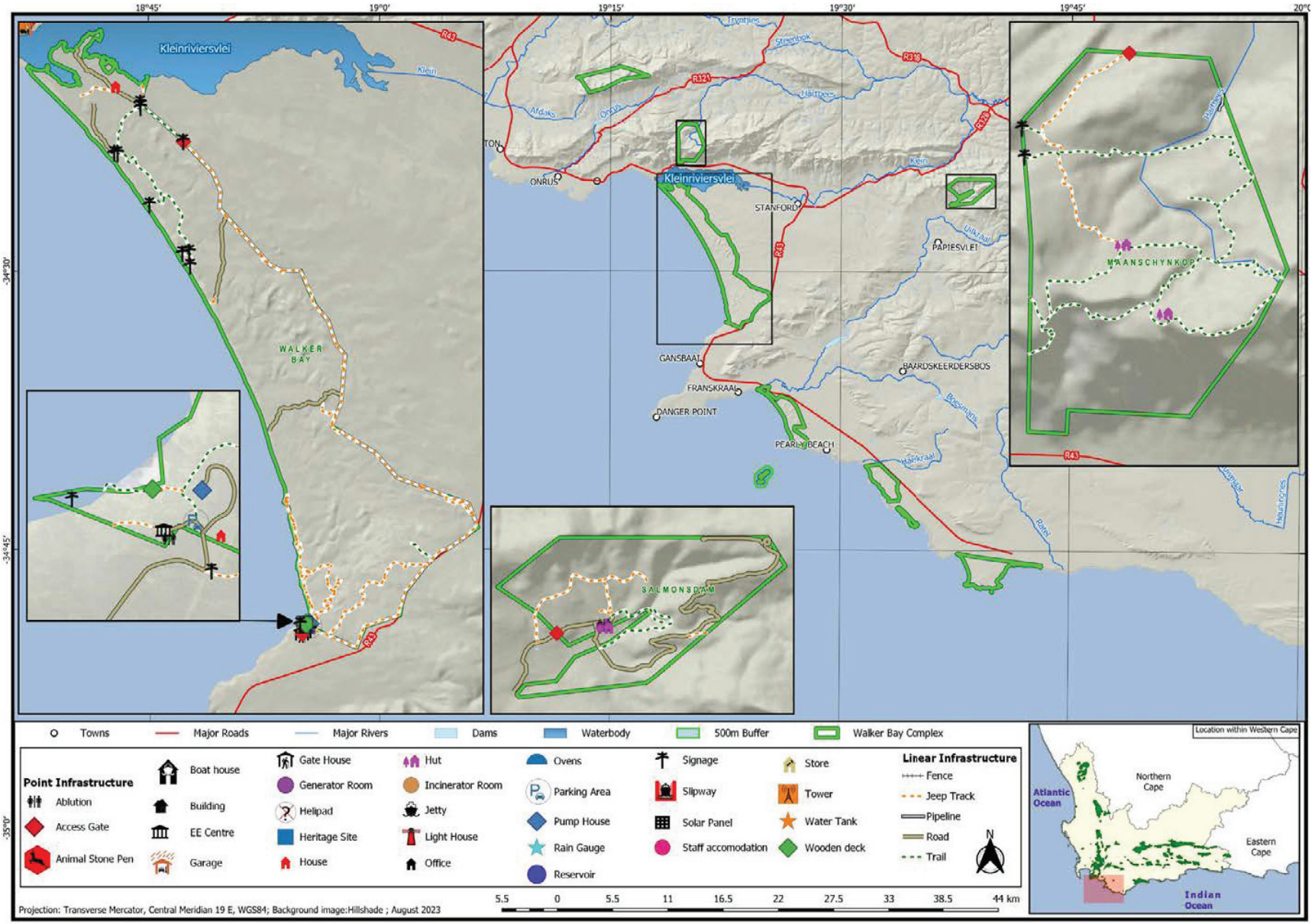
Map 13: Expansion of the Walker Bay Complex.



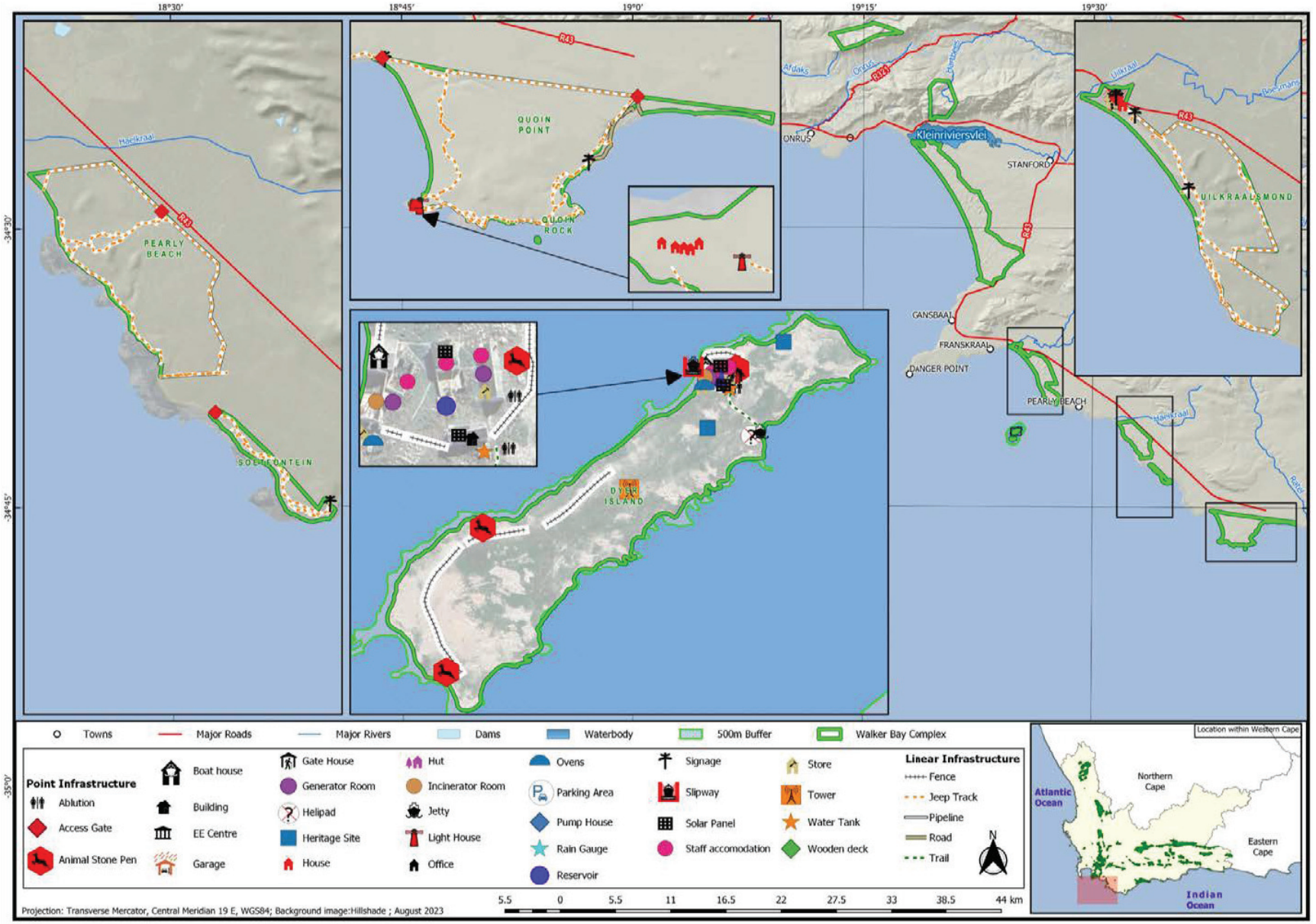
Map 14: Access points of the Walker Bay Complex.



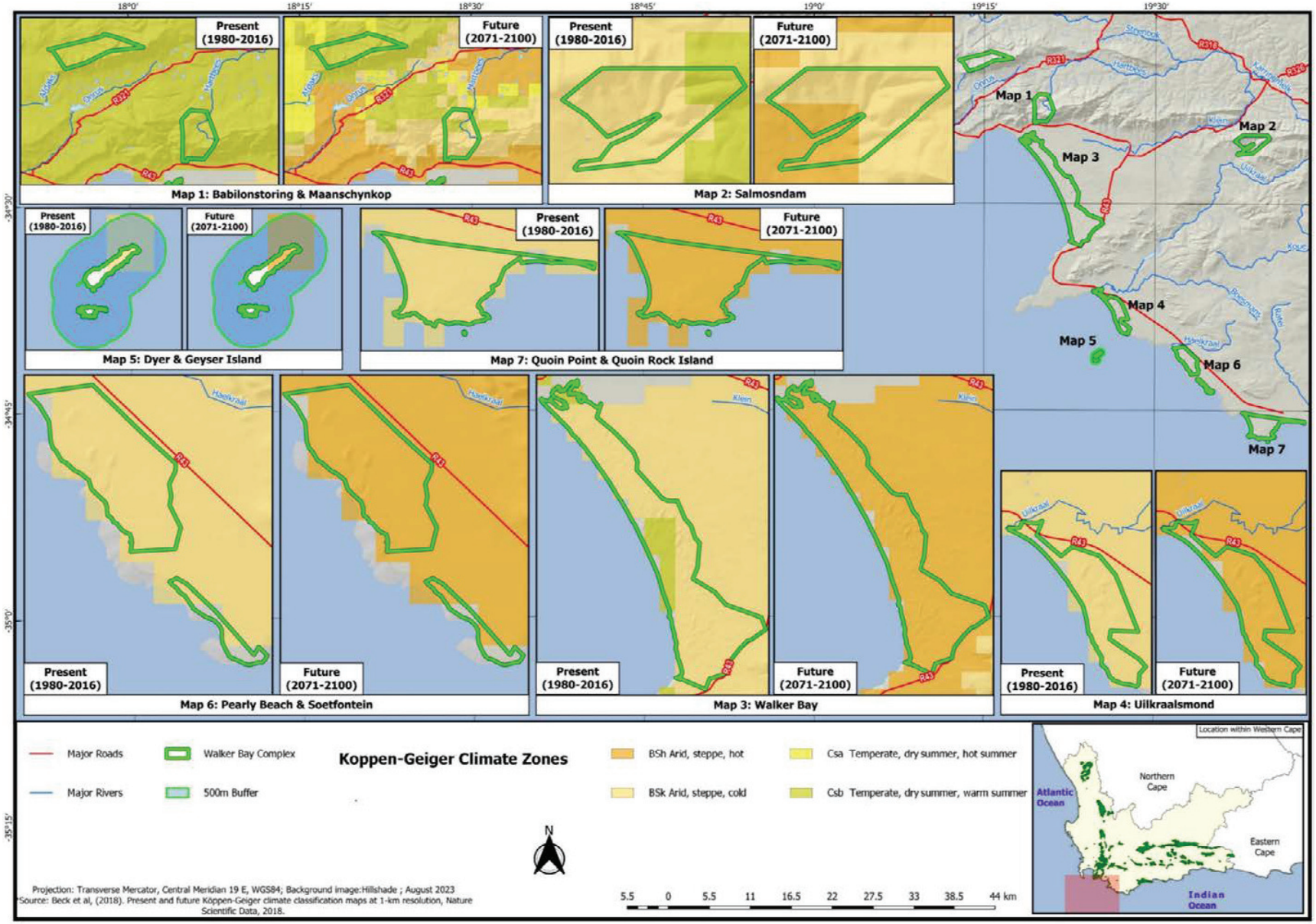
Map 15: Heritage features of the Walker Bay Complex.



Map 16: Infrastructure of the Walker Bay Complex (Walker Bay, Salmonsdam and Maanschynkop).



Map 17: Infrastructure of the Walker Bay Complex (Dyer Island, Pearly Beach, Soetfontein, Quoin Point and Uilkraalsmond).



Map 18: Climate change predictions for the Walker Bay Complex (Beck *et al*, 2018).

APPENDIX 2 STAKEHOLDER ENGAGEMENT REPORT FOR WALKER BAY COMPLEX.

WALKER BAY COMPLEX

PART OF THE

CAPE FLORAL REGION PROTECTED AREAS WORLD HERITAGE SITE

Western Cape, South Africa

STAKEHOLDER ENGAGEMENT REPORT

COMPILED BY FOOTPRINT ENVIRONMENTAL SERVICES

DATE: DECEMBER 2023