



FERNKLOOF NATURE RESERVE PROTECTED AREA MANAGEMENT PLAN 2023 – 2028

Hermanus, Western Cape, South Africa



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FERNKLOOF NATURE RESERVE

VISION STATEMENT

“The FNR is a showcase of the unique indigenous biodiversity of the Kleinriviersberg and the associated coastal lowlands for present and future generations.”



Image: *Leucospermum* species ©Hermanus Botanical Society

MISSION STATEMENT

“To sustainably manage and protect the natural assets and cultural heritage resources of the Fernkloof Nature Reserve, in partnership with relevant community organisations to conserve and ensure the continued existence of its rich biodiversity, and its associated ecological processes and services”.

MANAGEMENT OBJECTIVES

- *To implement an effective management framework through legislative compliance, corporative governance and the implementation of measurable strategies, policies, and procedures;*
- *To ensure the conservation of ecological processes, ecosystems, and species within the FNR are improved and maintained;*
- *To effectively conserve the cultural heritage of the FNR;*
- *To maintain and develop meaningful co-management and partnership agreements that benefits the FNR;*
- *To ensure any development that is required is undertaken in a sustainable manner*

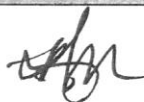






Authorisation Page

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Definitions

In this document, unless the context indicates otherwise-

Alien species means a species that is not an indigenous species; or an indigenous species translocated or intended to be translocated to a place outside its natural distribution range in nature, but not an indigenous species that has extended its natural distribution range by natural means of migration or dispersal without human intervention¹

Biological diversity or **biodiversity** means the variability among living organisms from all sources including, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part and includes diversity within species, between species, and of ecosystems¹

Authorised person means an employee of a management authority, or any other person, acting as such on the written authorisation of a management authority and includes and environmental management inspector¹¹

Biodiversity hotspot is a biographic region that is both a significant reservoir of biodiversity and is threatened with destruction. The term biodiversity hotspot specifically refers to 25 biologically rich areas around the world that have lost at least 70% of their original habitat¹⁵

Biome means a large, naturally occurring community of plants and animals which occupy a distinct region, and area often defined by the specific climate and dominant vegetation¹⁵

Bioprospecting means any research on, or development or application of, indigenous biological resources for commercial or industrial exploitation¹²

Buffer zone includes the immediate setting of the protected area and the attributes that are functionally important as a support to the protected area (adapted wording)⁸, The surrounding areas and properties can be in control of the State or private properties where collaborative projects and programmes are undertaken to afford additional protection to the FNR

Coastal dynamic processes mean all-natural processes continually reshaping the shoreline and near shore seabed and includes- (a) wind action; (b) wave action; (c) currents; (d) tidal action; and (e) river flows⁴

Coastal wetland means any wetland in the coastal zone; and includes (i) land adjacent to coastal waters that is regularly or periodically inundated by water, salt marshes, mangrove areas, inter-tidal sand and mud flats, marshes, and minor coastal streams regardless of whether they are of a saline, freshwater or brackish nature; and (ii) the water, subsoil, and substrata beneath, and beds and banks of any such wetland⁴

Coastal zone means the area comprising coastal public property, the coastal protection zone, coastal access land and coastal protected areas, the seashore, coastal waters, and the exclusive economic zone and includes any aspect of the environment on, in, under and above such area⁴

Control, in relation to an alien or invasive species, means (a) to combat or eradicate an alien or invasive species; or (b) where such eradication is not possible, to prevent, as far as may be practicable, the recurrence, re-establishment, re-growth, multiplication, propagation, regeneration or spreading of an alien or invasive species¹

Criterion A1* applied to threatened terrestrial ecosystems (national vegetation or DAFF recognised forests) has been identified as threatened due to an **irreversible loss of natural habitat** impacting on their structure, function, and composition. An ecosystem is classified as **A1 critically endangered** due

to the extent of the remaining natural habitat of ecosystem being less than or equal to its biodiversity target indicating a loss of species and change in species composition within the ecosystem. An ecosystem classified as **A1 endangered ecosystem** due to the extent of the remaining natural habitat of the ecosystem is less or equal to its biodiversity target plus 15%. Thresholds for these classifications are based on biodiversity targets developed in the 2004 National Spatial Biodiversity Assessment¹⁶

Criterion D1* applied to a threatened terrestrial ecosystem that has **threatened plant species** associated with the ecosystem. A D1 critically endangered ecosystem has 80 or more threatened National Red List plant species associated with the ecosystem, a D1 Endangered ecosystem has 60 or more threatened National Red List plant species associated with the ecosystem, and D1 Vulnerable if 40 or more threatened National Red List plant species are associated with the ecosystem. Only fynbos meets the high thresholds of Criterion D1¹⁶

Critically Endangered ecosystem meaning ecosystems that have undergone severe degradation of ecological structure, function, or composition as a result of human intervention and are subject to an extremely high risk irreversible transformation¹

Critically Endangered species (CR), being any indigenous species facing an extremely high risk of extinction in the wild in the immediate future¹. A species is Critically Endangered when the best available evidence indicates that it meets at least one of the five IUCN criteria for Critically Endangered, indicating that the species is facing an extremely high risk of extinction¹⁵

Critically Rare species is a National Red List category for species not in danger of extinction but considered of conservation concern, the IUCN equivalent of Least Concern. A species is Critically Rare when it is known to occur at a single site but is not exposed to any direct or plausible potential threat and does not otherwise qualify for a category of threat according to one of the five IUCN criteria¹⁵.

Cultural heritage As defined and adapted from Article 1 of the World Heritage Convention Act, 1999 (Act No. 49 of 1999): “Monuments, architectural works, works of monumental sculpture and painting, elements or structures of an archaeological nature, inscriptions, cave dwellings and combinations of features, which are of [outstanding universal] value from the point of view of history, art or science, groups of buildings, groups of separate or connected buildings which, because of their architecture, their homogeneity or their place in the landscape, are of value from the point of view of history, art or science, sites, works of man or the combined works of nature and man, and areas including landscapes and archaeological sites which are of outstanding universal value from the historical, aesthetic, ethnological or anthropological point of view”. For FNR Protected Area Management Plan (PAMP), features of “living heritage”, as well as grave sites (e.g., Hoy’s Graves) and archaeological features (Khoekoen middens) are also included under this definition.

Cultural significance means aesthetic, architectural, historical, scientific, social, spiritual, linguistic, or technological value or significance⁸

Data Deficient - Insufficient Information (DDD) means a species categorised by the National Red List when there is inadequate information to assess its risk of extinction, but the species is well defined. Listing of species in this category indicates that more information is required, and that future research could show that a threatened classification is appropriate¹⁵

Data Deficient - Taxonomically Problematic (DDT) means a species categorised by the National Red List when taxonomic problems hinder the distribution range and habitat from being well defined, so that an assessment of risk of extinction is not possible¹⁵

Development means any physical intervention, excavation or action, other than that caused by natural forces, which may result in the irreversible **transformation, disturbance** or change in the, appearance or physical nature of a site in a nature reserve or influence its stability and future well-being, including (a) the construction, alteration, demolition, removal or change of use of a site or a structure on the site; (b) the carrying out of any works on, over or under the site; (c) the construction or putting up for display of signs or notice boards; (d) any change to the natural or existing condition or topography of land; and (e) any removal, physical disturbance, clearing or destruction of trees or vegetation or the removal of topsoil¹¹;

Disturbed area, refer to Development in Definitions

Discovery phase of bioprospecting means any research on, or development or application of, indigenous biological resources where the nature and extent of any actual or potential commercial or industrial exploitation in relation to the project is not sufficiently clear or known to begin the process of commercialisation¹

Ecological community means an integrated group of species inhabiting a given area¹

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

Ecological integrity means the sum of the biological, physical, and chemical components of an ecosystem, and their interactions which maintain the ecosystem and its products, functions and attributes⁸

Ecosystem means a dynamic complex of animal, plant and micro-organism communities and their non-living environment interacting as a functional unit¹²

Eco-cultural tourism means environmentally responsible travel and visitation to relatively undisturbed natural areas to enjoy and appreciate nature as well as the past and present cultural and natural history of the area. Eco-cultural tourism promotes conservation, has low visitor impact, and provides for beneficially active socio-economic involvement of local populations⁵

Employee means a person in the employ of the management authority¹¹

Endangered ecosystem means any ecosystem listed as an endangered ecosystem in terms of NEM:BA Section 52(2) where it is defined as: (b) endangered ecosystems, being ecosystems that have undergone degradation of ecological structure, function, or composition as a result of human intervention, although they are not critically endangered ecosystems¹

Endangered species (EN) means any indigenous species listed as an endangered species in terms of NEM:BA Section 56 where it is defined as: (b) endangered species, being any indigenous species facing a high risk of extinction in the wild in the near future, although they are not a critically endangered species¹; A species is Endangered when the best available evidence indicates that it meets at least one of the five IUCN criteria for Endangered, indicating that the species is facing a very high risk of extinction¹⁵

Endemic means native or restricted to a certain area, region or country¹⁵

Environment means the surroundings within which humans exist and that are made up of: (i) the land; water and atmosphere of the earth; (ii) micro-organisms, plant and animal life; (iii) any part or combination of (i) and (ii) and the interrelationships among and between them; and (iv) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being¹²

Environmental goods and services include (a) benefits obtained from ecosystems such as food, fuel and fibre and genetic resources; (b) benefits from the regulation of ecosystem processes such as climate regulation, disease and flood control and detoxification; and (c) cultural non-material benefits obtained from ecosystems and such as benefits of a spiritual, recreational, aesthetic, inspirational, educational, community and symbolic nature¹²

Environmental Management Overlay Zone is a category of zoning applicable to an area which stipulates development rules in addition to the underlying zoning or base zone requirements and may include provisions for consent use limitations, environmental protection or any other purpose set out in the applicable bylaw

Estuary means a body of surface water (a) that is permanently or periodically open to the sea; (b) in which a rise and fall of a water level as result of the tides is measurable at spring tides when the water course is open to the sea; or (c) in respect of which salinity is measurably higher because of the influence of the sea⁴

Extent of occurrence (EEO) means the area in km² (measured by convex polygon) that contains all current sites of occurrence for a species (excluding vagrant individuals) classified on the National Red List of South African Plants¹⁵

Fire Control Belt means with due regard to the weather, climate, terrain, and vegetation of the area, is a break that: a) is wide enough and long enough to have a reasonable chance of preventing a Wild Fire from spreading to or from neighbouring land, b) will not cause soil erosion, and c) is reasonably free of inflammable material capable of carrying a wild fire across it¹³

Fire Protection Association (FPA) means a fire protection association registered in terms of the National Veld and Forest Fire Act, (Act No. 101 of 1998)¹³

Genetic material means any material of animal, plant, microbial or other biological origin containing functional units of heredity¹

Geographic information system (GIS). GIS is a system designed to capture, store, manipulate, analyse, manage, and present geographical data³

Habitat means a place where a species or ecological community naturally occurs¹

Hazard means a source of, or exposure to danger¹²

High-water mark means the highest line reached by coastal waters, but excluding any line reached as a result of (a) exceptional or abnormal floods or storms that occur no more than once in ten years; or an estuary being closed to the sea⁴

Indigenous biological resource when used in relation to bioprospecting, means any indigenous biological resource as defined in NEM:BA Section 80(2) and includes: (i) whether gathered from the wild or accessed from any other source, including any animals, plants or other organisms of an indigenous species cultivated bred or kept in captivity or cultivated or altered in any way by means of biotechnology; (ii) any cultivar, variety, strain, derivative, hybrid or fertile version of any indigenous

species or of any animals, plants or other organisms referred to in subparagraph (i); and (iii) any exotic animals, plants or other organisms, whether gathered from the wild or accessed from any other source which, through the use of biotechnology, have been altered with any genetic material or chemical compound in any indigenous species or any animals, plants or other organisms referred to in subparagraph (i) or (ii); but excludes: (i) genetic material of human origin; (ii) any exotic animals, plants or other organisms, other than exotic animals, plants or other Organisms referred to in paragraph (a)(iii); and (iii) indigenous biological resources listed in terms of the International Treaty on Plant Genetic Resources for Food and Agriculture¹

Indigenous species means a species that occurs, or has historically occurred, naturally in a free state in nature within the borders of the Republic, but excludes a species that has been introduced in the Republic because of human activity¹

Internal rules mean rules made under Section 52 of NEM: PAA¹¹

Introduction, in relation to a species, means the introduction by humans, whether deliberately or accidentally, of a species to a place outside the natural range or natural dispersal potential of that species¹

Invasive species means any species whose establishment and spread outside of its natural distribution range- (a) threaten ecosystems, habitats or other species or have demonstrable potential to threaten ecosystems, habitats, or other species; and (b) may result in economic or environmental harm or harm to human health¹

Keystone species means species, relative to its population, that is critical for the overall structure and function of a particular ecosystem²

Least Concern (LC) means a species categorised on the National Red List against the IUCN criteria and does not qualify for any categories. Species classified as Least Concern are considered at low risk of extinction. Widespread and abundant species are typically classified in this category¹⁵

Listed invasive species means any invasive species listed in terms of NEM: BA Section 70(1). Refer to NEM:BA (Act No. 10 of 2004). Alien and Invasive Species Regulations (Government Gazette No. 37885, September 2014)¹

Living heritage means the intangible aspects of inherited culture, and 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 relationships⁶

Local authority means any institution or body contemplated by section 84 (1) (f) of the Republic of South Africa Constitution Act, 1961 (Act 32 of 1961)⁷;

Local community means any community of people living or having rights or interests in a distinct geographical area¹²

Local protected area means a nature reserve or protected environment managed by a municipality¹²

Management authority, in relation to a protected area, means an authority to which the management of a protected area has been assigned¹

Management means, in relation to a protected area, includes control, protection, conservation, maintenance and rehabilitation of the protected area with due regard to the use and extraction of biological resources, community-based practices and benefit-sharing activities in the area in a manner consistent with the Biodiversity Act¹²

MEC means the member of the Executive Council of a province in whose portfolio provincial protected areas in the province fall (In the Western Cape Province the MEC is however officially referred to as the Minister of Environmental Affairs and Development Planning but to avoid confusion the PAMP text will refer to the MEC).

Migratory species means the entire population or any geographically separate part of the population of any species or lower taxon of wild animals, a significant proportion of whose members cyclically and predictably cross one or more national jurisdictional boundaries¹

Minister means the Cabinet member responsible for national environmental management¹

Municipality means a municipality established in terms of the Local Government: Municipal Structures Act; 1998 (Act No. 117 of 1998). In the context of this document, unless the context suggests otherwise, "the municipality" refers to the Overstrand Municipality¹

National Red List means the SANBI Red List of South African Plants that provides current information on the national conservation status of South Africa's indigenous plants¹⁵

Natural heritage means, for the purpose of this document, unless context dictates otherwise, as per the World Heritage Convention Act (49 of 1999) Article 1: natural features consisting of physical and biological formations or groups of such formations, which are of outstanding universal value from the aesthetic or scientific point of view; geological and physiographical formations and precisely delineated areas which constitute the habitat of threatened species of animals and plants of value from the point of view of science or conservation; natural sites or precisely delineated natural areas of outstanding universal value from the point of view of science, conservation or natural beauty; and Article 2: sites: works of man or the combined works of nature and man, and areas including archaeological sites which are of value from the historical, aesthetic, ethnological or anthropological point of view¹⁴;

Near Threatened (NT) means a species categorised on the National Red List when available evidence indicates that it nearly meets the IUCN criteria for Vulnerable and is therefore likely to become at risk of extinction in the near future¹⁵.

Point of entry means a place of entry to a nature reserve, including but not limited to access gates¹¹

Pollution means any change in the environment caused by (i) substances;(ii) radioactive or other waves; or (iii) noise, odours, dust or heat emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state, where that change has an adverse effect on human health or well-being or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future¹²

Prescribed burning means the controlled application of fire under specified environmental conditions to a predetermined area and at a time, intensity and rate of spread required to attain planned management objectives¹³

Prohibited alien species means an alien species listed by notice of the Minister, in respect of which a permit may not be issued in contemplation of NEM: BA Section 67 (1)⁹

Protected area means any of the protected areas referred to in NEM:PAA Section 9 where it is defined as: a) special nature reserves, national parks, nature reserves (including wilderness areas) and protected environments; (b) world heritage sites; (c) marine protected areas; d) specially protected forest areas, forest nature reserves and forest wilderness areas declared in terms of the National

Forests Act, 1998 (Act No. 84 of 1998); and (e) mountain catchment areas declared in terms of the Mountain Catchment Areas Act, 1970 (Act No. 63 of 1970)¹²;

Protected Area Notice means a written notification issued by a management authority¹¹

Protected ecosystems being ecosystems that are of high conservation value or of high national or provincial importance, although they are not listed in Section 52¹

Protected species meaning any species which are of high conservation value or national importance or require regulation to ensure that the species are managed in an ecologically sustainable manner¹

Rare species being a species categorised by the National Red List when it meets at least one of four South African criteria for rarity but is not exposed to any direct or plausible potential threat and does not qualify for a category of threat according to one of the five IUCN criteria. The criteria are as follows:

Restricted range: Extent of Occurrence (EOO) <500 km², or

- Habitat specialist: Species is restricted to a specialized microhabitat so that it has a very small Area of Occupancy (AOO), typically smaller than 20 km², OR
- Low densities of individuals: Species always occurs as single individuals or very small subpopulations (typically fewer than 50 mature individuals) scattered over a wide area, OR
- Small global population: Less than 10 000 mature individuals¹⁵

Recreation area means any area set aside in terms of the management plan for general use by the public¹¹

Reserve means Fernkloof Nature Reserve

Risk assessment means a scientific evaluation of the threat or potential threat to ecosystems, habitats, other species, the economy, the environment or human health or well-being posed by a restricted activity involving a specimen of an alien or listed invasive species in terms of Chapter 6 of NEM:BA¹⁰

Scientific institution means (a) an organ of state that is involved in research; (b) a registered research unit of a tertiary institution; or (c) a museum or herbarium¹⁰

Sense of Place means a geographic space that fosters a strong sense of authentic human attachment and belonging that is felt by the inhabitants and visitors to the area.

Species means an animal, plant or other organism that does not normally interbreed with individuals of another kind, and includes any sub-species, cultivar, variety, geographic race, strain, hybrid or geographically separate population¹

Specimen means: a) any living or dead animal, plant or organism; b) a seed, egg, gamete or propagule or part of an animal, plant or other organism capable of propagation or reproduction or in any way transferring genetic traits; any derivative of any animal, plant or other organism; or any goods which- (i) contain a derivative of any animal, plant or organism; or from an accompanying document, from the packaging or mark or label, or from any other indications, appear to be or contain a derivative of an animal, plant or other organism¹¹

Stakeholder means a natural or juristic person(s) that has an interest in, or may be affected by, a particular obligation or decision or activity, relating to or resulting from a management plan, either as individuals or representatives of a group, and include landowners where appropriate⁹

Sustainable development means the integration of social, economic, and environmental factors into planning; implementation and decision-making to ensure that development serves present and future generations¹²

In the context of FNR, it must be borne in mind that FNR is principally a protected conservation area with conservation management goals and objectives. The social and financial factors are therefore secondary. The focus of any proposed structural/man-made development on FNR must be to ensure that development is restricted/mitigated in such a manner that:

- the conservation objectives as articulated in this PAMP remain achievable
- structural development is restricted as far as is possible to the identified 'transformed units' described in this PAMP
- structural development does not impact negatively on the surrounding natural environment
- the FNR biodiversity and natural habitats remain sustainably conserved; and
- the natural aesthetic beauty and character of FNR is protected for the enjoyment of present and future generations.

Also refer the concepts of sustainable management discussed in 5.3. Mission Statement of the FNR; 5.4. Sustainable Development within the FNR

Sustainable, in relation to the use of a biological resource, means the use of such resource in a way and at a rate that (a) would not lead to its long-term decline; (b) would not disrupt the ecological integrity of the ecosystem in which it occurs; and (c) would ensure its continued use to meet the needs and aspirations of present and future generations of people¹

Transformed area, refer to **Development** in Definitions

Threat (or threatens) means any action that causes a decline and/or compromises the future survival of a species, or anything that has a detrimental effect on a species. Threats can be human induced or natural⁹

Vehicle means any conveyance designed or adapted principally to travel on wheels or tracks¹¹

Viable in relation to a species or population means the ability to survive or persist and develop or multiply over multiple generations or a long time period⁹

Vulnerable ecosystems, meaning ecosystems that have a high risk of undergoing significant degradation of degradation of ecological structure, function, or composition because of human intervention, although they are not critically endangered ecosystems or endangered ecosystems¹

Vulnerable species (VU), meaning any indigenous species facing an extremely high risk of extinction in the wild in the medium-term, although they are not a critically endangered species or an endangered species¹. A species is Vulnerable when the best available evidence indicates that it meets at least one of the five IUCN criteria for Vulnerable, indicating that the species is facing a high risk of extinction¹⁵

World heritage site means a world heritage site in terms of the World Heritage Convention Act, 1999 (Act No. 49 of 1999)¹².

*Please note: Criterion A1 and D1 relates to the 2011 National Environmental Management: Biodiversity Act (Act 10 of 2004, NEM:BA) list of threatened ecosystems which is relevant at the time of the drafting of the PAMP.

Definition References

1	National Environmental Management Biodiversity Act (Act No. 10 of 2004)
2	Biology Dictionary. Available online: https://biologydictionary.net/
3	University of Wisconsin-Madison Libraries, Research Guides. Available online: https://researchguides.library.wisc.edu/GIS ;
4	National Environmental Management Integrated Coastal Management Act (Act No. 24 of 2008);
5	International Union for the Conservation of Nature (IUCN). Tourism, Ecotourism and Protected Areas; Björk "Definition Paradoxes: From Concept to Definition" Page 26-27.
6	National Heritage Resource Act (Act No. 25 of 1999)
7	Nature Conservation Ordinance Act (19 of 1974)
8	National Environmental Management Protected Areas Act (Act 57 of 2003). Norms and Standards for the Management of Protected Areas in South Africa (Government Gazette No.39878, March 2016)
9	National Environmental Management Biodiversity Act (Act No. 10 of 2004) Norms and Standards for Biodiversity Management Plans for Species (Government Gazette No. 31968, March 2009)
10	National Environmental Management Biodiversity Act (Act No. 10 of 2004). Alien and Invasive Species Regulations (Government Gazette No. 37885, September 2014)
11	National Environmental Management Protected Areas Act (Act 57 of 2003). Regulations for the Proper Administration of Nature Reserves (No. 35021 of 2012)
12	National Environmental Management Act (107 of 1998)
13	National Veld and Forest Fire Act (Act 101 of 1998)
14	World Heritage Convention Act (Act 49 of 1999)
15	SANBI National Red List Categories. Available online: http://redlist.sanbi.org/redcat.php
16	National Environmental Management Biodiversity Act (Act No. 10 of 2004). National List of Ecosystems that are threatened and need of protection (Government Gazette No.34809, December 2012)

Abbreviations & Acronyms

The following abbreviations and acronyms are referred to in this document:

a.m.s.l.	Above mean sea level
ADU	Animal Demographic Unit
AHC	Annual Hermanus Camp
APO	Annual Plan of Operation
BMP	Biodiversity Management Plan
BRAHMS	Botanical Research and Herbarium Management System
CAPE	Cape Action Plan for People and the Environment
CARA	Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)
CCS	Core Cape Subregion
CDP	Conceptual Development Plan
CDF	Conservation Development Framework
CFR	Cape Floral Region
CITES	Convention on International Trade in Endangered Species
CPMG	Cliff Path Management Group
CR	Critically Endangered
CREW	Custodians of Rare and Endangered Wild Flowers (SANBI)
CWC	Cape Whale Coast
DDD	Data Deficient due to Insufficient Information
DDT	Data Deficient - Taxonomically Problematic
DFFE	Department of Fisheries, Forestry and the Environment
DEA&DP	Department Environmental Affairs and Development Planning
DEA	Department of Environmental Affairs

DWAS	Department of Water Affairs and Sanitation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EEO	Extent of occurrence
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
EMP	Environmental Management Plan
EMS	Environmental Management Services (Overstrand Municipality)
EMOZ	Environmental Management Overlay Zone
EN	Endangered
EPWP	Expanded Public Works Programme
FAB	Fernkloof (Nature Reserve) Advisory Board
FDI	Fire Danger Index
FMP	Fire Management Plan
FHR	Fernkloof Honorary Rangers
FNR	Fernkloof Nature Reserve
FPA	Fire Protection Association (refers to the Greater Overberg Fire Protection Association)
GIS	Geographic Information System
GO FPA	Greater Overberg Fire Protection Association
HBC	Hermanus Bird Club
HBI	Herpetofauna Biodiversity Inventory
HBS	Hermanus Botanical Society
HWC	Heritage Western Cape
I&AP	Interested and Affected Party
IBI	Invertebrate Biodiversity Inventory
ICLEI	International Council for Local Environmental Initiatives
IDP	Integrated Development Plan
LC	Least Concern
LED	Local Economic Development
LT	Least Threatened
LUPO	Land Use Planning Ordinance, (Ordinance 15 of 1985)
MBI	Mammal Biodiversity Inventory
MEC	Member of the Executive Council
METT-SA	The WWF/World Bank's Management Effectiveness Tracking Tool adapted for South Africa
MoA	Memorandum of Agreement
MoU	Memorandum of Understanding
NEM:BA	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
NEM: ICMA	National Environmental Management: Integrated Coastal Management Act, 2008 (Act No. 24 of 2008)
NEM: PAA	National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003)

NEM: WA	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NGO	Non-Governmental Organisation
NHRA	National Heritage Resources Act, 1999 (Act 25 of 1999)
NPAES	National Protected Area Expansion Strategy
NRF	National Research Foundation
NWA	National Water Act, 1998 (Act No. 36 of 1998)
ODM	Overberg District Municipality
OHS	Occupational Health and Safety
OHAC	Overstrand Heritage and Aesthetics Committee
OM	Overstrand Municipality
PAMP	Protected Area Management Plan
PPP	Public Participation Process
PSDF	Provincial Spatial Development Framework
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SANSA	South African National Survey of Arachnid
SDF	Spatial Development Framework
SIF	Strategic Implementation Framework
SMME	Small, Medium and Micro Enterprises
SOP	Standard Operating Procedure
SPC	Spatial Planning Category
TMG	Table Mountain Group
UCT	University of Cape Town
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
VBI	Vegetation Biodiversity Inventory
VBMP	Vegetation Biodiversity Monitoring Programme
VU	Vulnerable
WCC	Whale Coast Conservation
WCPAES	Western Cape Protected Area Expansion Strategy
WWF SA	World Wide Fund for Nature South Africa

1. The Declaration Status of the FNR

The FNR is a declared Protected Area in terms of Section 12 of the NEM: PAA under which nature reserves declared under previous provincial legislation are regarded to be nature reserves under NEM: PAA. The FNR was formally proclaimed (Proclamation No. 391 of 1971) in terms of the Nature Conservation Ordinance, 1965 (Ordinance No. 26 of 1965).¹ As such, the Municipality does not have to apply for the re-declaration of the Reserve in terms of the NEM: PAA.

A map dated September 1942 indicates a 165 hectare “*Existing Nature Reserve*”, and a “*Proposed Nature Reserve*” totalling 1 217 hectares. However, formal management for conservation purposes of a portion of the then “*Hermanus Commonage*” only began in September 1952, with the subsequent proclamation of a so-called “*Wildflower Reserve*” (Proclamation No. 129 of 1956).²

The area steadily increased in popularity and was thus declared a Nature Reserve on 22 November 1957 (Proclamation No. 182 of 1957). Proclamation No. 182 did not, however, describe the boundaries of the Nature Reserve, nor did it assign a name to it. The name “*Fernkloof Nature Reserve*” was assigned by the then Hermanus Municipality on 5 February 1958. On 23 January 1962, the FNR was extended by ± 19.7 hectares by the inclusion of the Municipal commonage known as “*Mossel River West*”.

Mr Harry Wood was then appointed as the first curator of the Nature Reserve and was instructed by the Municipality to establish a garden using plants from the Caledon Division. A small nursery (which is today run by the HBS) was started on-site for this purpose. Since the 1970s, the HBS’s efforts and funding succeeded in establishing the current Reserve infrastructure comprising an auditorium, office complex, staff accommodation, kitchen, storage space, toilet blocks, herbarium, visitor’s centre, nursery, Research Centre, and tourist accommodation. A small visitors’ centre was constructed, from which a network of hiking trails was established.

Following comments received from Dr J.P. (John) Rourke of the Compton Herbarium, Kirstenbosch, dated August 1970, the Municipality established a committee which proposed extensions to the Nature Reserve which included an additional mountainous area of commonage, the coastal Cliff Path, and Hoy’s Koppie. Proclamation No. 391 of 1971 which followed, named, and proclaimed the FNR as a “*Local Authority Nature Reserve*”, and described its boundaries in terms of the Nature Conservation Ordinance, 1965 (Ordinance No. 26 of 1965), but did not include the Cliff Path section, or Hoy’s Koppie.

The then Department of Nature and Environmental Conservation endorsed the inclusion of Hoy’s Koppie and the Mossel River Valley into the Reserve on 18 April 1984, and the FNR was officially opened by Mr J.C. Heunis, MEC, on 4 September 1985.

¹ The Nature Conservation Ordinance, 1965 (Ordinance No. 26 of 1965) has been superseded by the Nature and Environmental Conservation Ordinance, 1974 (Ordinance No. 19 of 1974).

² The description of the recent history of the FNR was largely sourced from: Overstrand Conservation Services. 2001. Fernkloof Nature Reserve Management Plan incorporating the Mossel River Valley, a section of the Cliff Path and Hoy’s Koppie. Unpublished report compiled for the Overstrand Municipality. 65pp.

An extension to the FNR was made on 2 June 2000 (Provincial Notice No. 242 of 2000 as contained in Provincial Gazette No. 5507) by incorporating the Mossel River Valley, a section of the Cliff Path, Piet se Bos and Hoy's Koppie into the reserve.

A further extension was added to the east of the Reserve during 2009, between Vogelgat Private Nature Reserve, the Kleinrivier estuary and Lagoon Farm, as described in Provincial Notice No. 37 of 2009 of 21 August 2009, as contained in Provincial Gazette No. 6651.

Also Refer to:

Appendix 1. Overstrand: Fernkloof Nature Reserve Regional Locality Map

Appendix 2. Overstrand: Fernkloof Nature Reserve Local Context Map

Appendix 3. Overstrand: Fernkloof Nature Reserve Cadastrals Map

Appendix 10: Fernkloof Nature Reserve Proclamations

2. The Management Framework of the FNR

Also refer to:

9.2. *Integrated Planning, Cooperative Governance and Co-management.*

Management Action Table 1.2. Integrated Planning, Cooperative Governance and Co-management.

2.1. The Overstrand Municipality

Under authorisation of the MEC of the Western Cape Department of Environmental Affairs and Development Planning, the Overstrand Municipality¹(OM) is the designated Management Authority of the FNR. Within the OM Infrastructure and Planning Directorate, the Environmental Management Services (EMS) is responsible for *inter alia* the effective management of Municipal Nature Reserves.

The FNR Management Authority is responsible for reporting an annual assessment of the achievement of or contributions to the management goals of the nature reserve to the designated Western Cape Provincial MEC of Environmental Affairs in terms of Chapter 4(15) of the Regulations for the Proper Administration of Nature Reserves promulgated in terms of the NEM: PAA in Government Notice No. R 99 on 8 February 2012, thus ensuring coordination of matters that may affect the FNR through the relevant Provincial Departments, District and Local Municipalities.

In terms of the requirement of NEM: PAA and the Local Government Municipal Systems Act 2000 (Act No. 32 of 2000), the FNR management and PAMP is aligned with the Overstrand Municipal Integrated Development Plan (IDP), Municipal Spatial Development Framework (SDF), the Overstrand: Towards 2050 Integrated Development Framework (IDF) and with the Western Cape Provincial SDF (PSDF).

To strengthen and support the management of the FNR, partnerships or management agreements should be sought with adjacent conservation orientated landowners, with CapeNature and local conservation orientated groups and organisations.

2.2. The Fernkloof Advisory Board (FAB)

According to the Western Cape's Nature and Environmental Conservation Ordinance, 1974 (Ordinance No. 19 of 1974) an advisory board must be established for the purpose of advising and making recommendations to the management authority in connection with the management, control, and development of a local nature reserve². In accordance with Section 8 of The Ordinance (19 of 1974)³, the Fernkloof Advisory Board (FAB) bylaw was promulgated by the Hermanus Municipality on 28

¹ The Overstrand Municipality is classified as a Category B Local Authority as per the Municipal Systems Act, 2000 (Act No. 32 of 2000), and therefore shares certain administrative functions with the Overberg District Municipality.

² The Western Cape's Nature and Environmental Conservation Ordinance (19 of 1974) and Amendment Act, 2000 (3 of 2000); Section 8.1

³ The Western Cape's Nature and Environmental Conservation Ordinance of 1974 has been repealed and replaced by the Western Cape Biodiversity Act once as promulgated in the Government Gazette

September 1979¹. The advisory board is constituted in accordance with bylaws or regulations made under section 9 of the Ordinance No. 19 of 1974.

As per NEM: PAA Regulations for the Proper Administration of Nature Reserves (Government Gazette No. 35021 February 2012), Chapter 3, the Overstrand Municipality in their capacity as the FNR management authority, may establish one or more advisory committees. The establishment of, mandate, terms of reference etc. of the committee are set out in the Regulations. According to the NEM: PAA: Norms and Standards for the management of protected areas in South Africa (528 of 2014)², advisory committees indicate the intention of a protected area to have a) sound neighbour relations and b) a strategy that enhances the socio-economic activities within their sphere. The FNR does not have an Advisory Committee.

2.3. CapeNature

Governed by the Department of Environmental Affairs and Development Planning (Western Cape Government), the Western Cape Nature Conservation Board (trading as CapeNature) is responsible for biodiversity conservation in the Western Cape with the mandate to *inter alia* promote and ensure nature conservation, generate income, render services and provide facilities for research and training. As such, management of the FNR consults with, and is guided by CapeNature's policies and implementation guidelines³.

2.4. The South African National Biodiversity Institute (SANBI)

Governed by the Department of Forestry, Fisheries and the Environment (DFFE) The South African National Biodiversity Institute (SANBI) is an institute that *inter alia* monitors and reports to the minister on the status of biodiversity, conservation, and invasive species in South Africa. As such, the FNR management are guided by SANBI policies and guidelines⁴.

2.5. The Department of Forestry, Fisheries and the Environment: Biodiversity and Conservation

The Biodiversity and Conservation unit of the DFFE is *inter alia* responsible for the "establishment, management and maintenance of ecologically representative national and cross-border systems of protected areas to advance the heritage of humankind". The function of the unit includes establishing, managing, and maintaining protected areas and World Heritages Sites, improving governance at national and international level, safe-guarding key ecological processes across

¹ Hermanus Municipality, P.N.667/1979, Bylaw Relating to the Advisory Board for the Fernkloof Nature Reserve. 28 September 1979

² South Africa. 2016 Government Gazette No. 39878. Government Notice No.382. Department of Environmental Affairs: National Environmental Management Act, 2003 (Act 57 of 2003): Norms. and Standards for the management of protected areas in South Africa.

³ Western Cape Government. Available online: <https://www.westerncape.gov.za/public-entity/capenature-0>

⁴ South African National Biodiversity Institute (SANBI). Available online: <https://www.sanbi.org/about/sanbi-mandate/>

ecosystems and landscapes, development and implementation of policy and legislation and support to the Chief Directorate¹.

2.6. Western Cape Department of Environmental Affairs and Development Planning: Biodiversity

As the Provincial Governing body of CapeNature, the Western Cape DEA&DP undertakes to preserve the environment for future generations by preventing environmental harm. Informed by South African environmental legislation, the DEA&DP impact decisions to enable resilient, sustainable, quality, and inclusive living environments. CapeNature reports to DEA&DP.

2.7. Co-Management Agreements

NEM: PAA (2003) Section 42 states that the protected area management authority may enter into Co-management agreements with another organ of state, a local community, an individual or other party for the co-management of the area by parties or the regulation of human activities that effect the environment in the area.

The FNR Management Authority encourage local and broader community involvement through collaboration with neighbouring communities and other stakeholders as described in the paragraphs below.

The following organisations have lease or co-management agreements with the Municipality:

2.7.1. The Hermanus Botanical Society (HBS)

Formed in 1960 with the purpose of protecting the fauna and flora of the FNR. HBS has assisted with designing and producing hiking maps, signage and points of interest management, alien vegetation clearing, establishing, colour coding and maintaining hiking trails as well as recording the plant species in the FNR. In 1977 the Hermanus Botanical Society applied to the Municipality for the lease of a portion of Municipal property 4780 and 591/1 for the purpose of managing, leasing, supervising, and maintaining the Fernkloof gardens and all infrastructures on a portion of the Fernkloof Nature Reserve.

The HBS herbarium is recognised internationally. The HBS has recruited and housed many undergraduate, graduates and post-graduates to undertake scientific research that has benefited FNR. In 2017 the Hermanus Botanical Society also entered into a Co-Management Agreement (Conservation Partnership) with the Environmental Services department of the Municipality to assist with infrastructure and vegetation maintenance on the reserve where they felt they could contribute.

2.7.2. Cliff Path Management Group (CPMG)

Formed in 2002, a Co-management Agreement with the OM was concluded in 2017. The CPMG has the following functions:

¹Department of Environmental Affairs: Biodiversity and Conservation. Available online: https://www.environment.gov.za/branches/biodiversity_conservation .

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- To restore the natural biodiversity of the Cliff Path (from the Hermanus New Harbour to Piet-se-Bos) through the eradication of alien vegetation and replanting of locally indigenous flora;
 - To preserve and improve the physical and aesthetic qualities of the Hermanus Cliff Path;
 - To work with the OM EMS to improve the physical attributes of the sites and maintain a coordinated directional signage programme;
 - To attain a litter-free environment working in conjunction with the OM;
 - To maintain archaeological sites along the Cliff Path;
 - To communicate with professional security structures to protect and safeguard Cliff Path users¹.

2.7.3. Hermanus Hacking Group (HHG)

The Hermanus Hacking Group is a Non-Profit Organisation funded by the HBS, the Table Mountain Fund, the OM, and individual sponsors. A Co-management Agreement with the OM was concluded in 2017. The HHG, through the Co-Management Agreement assists with the EMS Annual Alien Vegetation Clearing Plan for the FNR.

2.7.4. Overstrand Heritage and Aesthetics Committee (OHAC)

The OHAC is an advisory board appointed in terms of the National Heritage Resources Act, 1999. The OHAC advises on the conservation of the built and natural environment of the Overstrand. The Overstrand Heritage and Aesthetics Committee are consulted by the FNR on matters relating to develop and maintenance of heritage sites within the reserve.

2.7.5. Fernkloof Honorary Rangers (FHR)

FHR are individuals chosen by the EMS for their passion, commitment, and years of dedication towards the protection, conservation, and preservation of the FNR. Not only are the FHR protectors of the flora and fauna and all other ecological functioning that the reserve provides, but they carry many years of local knowledge and expertise. In 2018 the first four FHR were presented with certificates and badges at the Annual Mayoral Awards. Mr Frank Woodvine, Ms Priscilla Drewe, Ms Belle Barker and Ms Lee Burman are the luminaries who will lead the way forward for the Honorary Rangers of the FNR.

¹ Adapted from CPMG website: <https://www.fernkloof.org.za/index.php/cliff-path-management-group>

3. Legislation Guiding the Administration of the FNR

Legislation and regulations applicable to the various aspects of management for FNR are listed in the relevant subsections of Section 9, The FNR Strategic Implementation Framework.

As the Management Authority of the FNR, the Overstrand Municipality must, *inter alia*, implement all current and future legislation applicable to the FNR (e.g., the NEM: PAA, the NEM:BA, and Western Cape Biodiversity Act, 2021)¹. Note that, since the FNR is a formal Protected Area, any conflicts with other legislation must be dealt with in accordance with Section 7 of the NEM: PAA.

Regulations for the Proper Administration of Nature Reserves have been promulgated in terms of the NEM: PAA in Government Notice No. R 99 on 8 February 2012. The PAMP for the FNR must also be interpreted and applied in accordance with the provisions of the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA), with the 2014 Environmental Impact Assessment (EIA) Regulations and with the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).

The FNR management employees must familiarise themselves with the purpose and contents of the applicable legislation listed in Section 9, FNR Strategic Implementation Framework (which may not be exhaustive), with any subsequent amendments, and with the associated Regulations that may be revised from time to time.

¹The Western Cape's Nature and Environmental Conservation Ordinance of 1974 has been repealed in whole by the Western Cape Biodiversity Act as has been Gazette on 14 December 2021.

4. The FNR Protected Area Management Plan (PAMP)

4.1 Legislation guiding the FNR PAMP

The Management Authority's responsibility to formulate a management plan is enshrined in NEM: PAA (2003): 39) Preparation of a Management Plan.

The function of a management plan is described in NEM: PAA Section 41. Management Plans.

“The objective of a management plan is to ensure the protection, conservation and management of the protected area concerned in a manner which is consistent with the objectives of this Act and for the purpose it was declared.”

Management plans may include subsidiary plans, and the Minister or MEC may approve the management plan or any subsidiary plan in whole or part.

The Standard Indicators of a Protected Area Management Plan are set out in NEM: PAA Norms and Standards for the Management of Protected Areas in South Africa¹

4.2 The Primary Functions of the FNR PAMP

The FNR Protected Area Management Plan (PAMP) is a strategic document formulated to provide a framework for the operation and management of the FNR. The PAMP is an adaptive management tool that allows for adaptive/and or refined management processes to respond to the changing factors that may affect the FNR.

The Primary Functions of this PAMP are to:

- i. Be a strategic and adaptive instrument tool that informs the need of specific programmes and operational procedures for effective management of the FNR;*
- ii. Provide for empowerment, efficiency, progression and continuity of FNR management;*
- iii. Give FNR management the tools required to ensure the values and purposes of the FNR are protected.*

Although this PAMP outlines strategic priorities as well as the specific actions required to effectively manage the FNR and emergency situations that may arise, it does remain possible that - due to the inherent and unpredictable characteristics of the natural environment - the priorities outlined in this PAMP may require adaptation to meet the immediate needs of the reserve. Adaptive management strategies should be recorded and addressed in the annual review to update the PAMP and the Annual Plan of Action (APO) for the FNR.

¹South Africa. 2016 Government Gazette No. 39878. Government Notice No.382. Department of Environmental Affairs: National Environmental Management Act, 2003 (Act 57 of 2003): Norms and Standards for the management of protected areas in South Africa.

4.3 Procedures for the approval of the FNR PAMP

The FNR PAMP was adapted from outsourced environmental consultants Withers Environmental Consultants and Urban Dynamics Western Cape (The Integrated Management Plan for the Fernkloof Nature Reserve, 2014 and 2017). The document was redrafted and edited by the Overstrand Municipality's Environmental Management Services. Upon completion of this, the Fernkloof Nature PAMP Draft 1 was submitted to OM Director of Infrastructure and Planning. Upon acceptance by the Director, the subsequent procedure followed:

- 1) Document was submitted to the FAB, CapeNature and HBS for review and comment;
- 2) Comments received were incorporated into the PAMP;
- 3) Document was returned to the FAB, CapeNature and HBS for endorsement;
- 4) Document was then submitted to the OM Director, Infrastructure and Planning, Municipal Manager, Ward 3 Councillor and other Senior Management Staff involved with the PAMP;
- 5) Document was advertised for Stakeholder and I&AP engagement and comment;
- 6) Comments received were considered and incorporated into the PAMP;
- 7) Draft 2 was completed and prepared to be placed on the Municipal Website in order for the I&AP to view and to show the incorporation of comments received;
- 8) Submitted to OM Council for approval to follow; and upon approval
- 9) Submitted to DEADP for Ministerial Approval.

4.4 The PAMP Stakeholder Participation Process

A formalized and transparent Public Participation Process (PPP) for the PAMP is not only a legal requirement but also a valuable tool for the sustainable management of a protected area (as per the three pillars of sustainable development discussed in 5.3. FNR Mission Statement. A transparent and formalized PPP will ensure that the desires and concerns of stakeholders, communities and interested and affected parties (I&AP) are understood and considered and will ultimately provide better outcomes for the goals of the FNR.

4.5 Monitoring and Review of the FNR PAMP

Also refer to:

Management Action Table 1.12. Management Effectiveness.

According to Chapter 4 (15) of Government Notice No. R. 99 of 8 February 2012: NEM: PAA Regulations for the Proper Administration of Nature Reserves the Management authority is to monitor and report annually, **before the end of June each year** to the Member of the Executive Council (MEC) on the status of implementation of the management plan and may include an assessment of the achievement of, or contributions to, the management objectives of the nature reserve.

An annual environmental and management performance evaluation needs to be conducted by the Reserve Manager to measure performance against set objectives for the protected area. The result of this evaluation should become the focus of the Management Authority to assist with achieving the management goals and to gauge management effectiveness.

As such, it is suggested that the annual performance evaluation be undertaken in the first quarter of each year (April/May), to ensure that the audit and report can be submitted to the MEC before the June deadline.

An external environmental and management audit may also take place every five years. Monitoring of the effectiveness of management is an important mechanism for the Management Authority to ensure that set targets and objectives of the PAMP are met. Therefore, in addition to the above-mentioned annual performance evaluation, the METT – SA (Management Effectiveness Tracking Tool), a rapid, site-level assessment tool adapted from the World Bank and the World Wildlife Fund for Nature (WWF) system, will also be applied to evaluate the management effectiveness of the FNR’s PAMP¹.

4.5.1 Review and Amendment Procedures for the FNR PAMP

4.5.1.1 Document Control

The PAMP is a basic planning framework guiding key management aspects of the FNR. It is important for the PAMP to be revised and improved, if need be, by documenting all actions and management results in a structured format. It will be important for the PAMP and its supporting documents to be accessible to all the implementing and management persons/institutions responsible for implementing its Actions and Monitoring Programmes. The results of the assessments are to be submitted to the Advisory Board, CapeNature, and to the DEA&DP on an annual basis.

4.5.1.2 Management and Document Review

To maintain the relevance, appropriateness, and effectiveness of the PAMP, and thereby enhance its performance, the EMS should formally review, evaluate, and update the PAMP on an annual basis.

An external environmental and management audit, review, and update of the PAMP should occur every five years.

The scope of each review should be comprehensive, though not all elements of the PAMP need to be reviewed at once and the review process may take place over a defined period. The annual and five-yearly reviews should include the following:

- review the results of the monitoring analyses undertaken of Actions and of specific Monitoring Programmes throughout the year, and during the annual evaluations;
- review the extent to which the goals set in the PAMP have been met;
- review the applicability of the PAMP in relation to changing conditions (e.g., changes in legislation, climate change, natural disasters), circumstances, information, and technological advances;
- obtain and review any concerns amongst relevant authorities and role-players that may have arisen; and
- incorporate the results of, or management recommendations arising from, Actions and management programmes into the PAMP after their completion.

During the last year of applicability of this PAMP (2028), timeous steps shall be taken by the Management Authority to prepare for a new five-year iteration of this PAMP. Should the new iteration

¹ Wittridge, O. 2011. Integrated Reserve Management Plan. Helderberg Nature Reserve. City of Cape Town. 122 pp.

be delayed for any reason, this 2023 - 2028 MP will remain in force until the new five-year man plan has been authorised by the MEC.

5. Strategic Management Framework of the FNR

The Strategic Management Framework provides the basis for the management, conservation, and development of the FNR and consists of the purpose, vision, mission, values, and goals of the FNR which consequently defines the management objectives and actions.

Actions arising from the PAMP are described in detail in Section 9. The FNR Strategic Implementation Framework; and Management Action Tables 1.1. to 1.17.

5.1 The Purpose of the FNR

The FNR delivers important ecosystem services¹ and is a source of spiritual and cultural wellbeing, and outdoor recreation for the inhabitants of and visitors to Hermanus. Ecological infrastructure provides critical ecosystem services that support economic and social development including freshwater supply, buffers against flooding, as well as climate and air quality control². Growing human population has created an increased need for urban and economic development that is directly related to the partitioning and degradation of natural ecosystems and therefore increased pressure on ecological infrastructure. Equally important to this is the biodiversity and conservation value of the Fernkloof Nature Reserve boasting 1300 plant species in the 1800 ha reserve, an astounding number of plants for such a small reserve, with 12% of the plants IUCN red data listed.

The specific purpose for which the reserve was established, was spelled out by Mr Harry Wood, the then Curator of the reserve, on 25 April 1966 at the request of the Town Clerk. It read, "The specific purpose for which the reserve was established was to conserve the natural association between Fauna and Flora which are indigenous to this area, and to build up that which is becoming extinct in the Caledon Division. This includes the planting of forest trees, which when mature will encourage the natural Fauna of the surrounding districts to make a haven in the reserve".

In the Town Clerk's letter to the Director of Nature Conservation dated 12 November 1968 it was rephrased to read, "Specific purpose for which Reserve was established: As a nature reserve (particularly wildflowers) which includes the preservation and cultivation of Indigenous Flora, which grows, and which is known to have grown in the Caledon Division".

The purposes of a Protected Area are described in NEM: PAA Chapter 3. Section 23: Declaration of Protected Areas and must be used as a frame of reference for management. The FNR fulfills all of the purposes of a Protected Area as defined by NEM: PAA (Chapter 3, Section 17) and is especially valuable as a component of the Cape Floral Kingdom that conserves a unique combination of habitats, ecosystems, and species.

¹As defined in Section 1 of the NEM:PAA.

²Pool-Stanvliet, R., Duffell-Canham, A., Pence, G. & Smart, R. 2017. The Western Cape Biodiversity Spatial Plan Handbook. Stellenbosch: CapeNature. Available online: <http://bgis.sanbi.org/Projects/Detail/194>.

5.2 The Vision of the FNR

The FNR vision is a long-term inspirational determinant of the FNR for achievement of goals toward best management, conservation, and development of the FNR.

“The FNR is a showcase of the unique indigenous biodiversity of the Kleinriviersberg and the associated coastal lowlands for present and future generations.”

In achieving the above Vision, the FNR will contribute meaningfully to the realisation of the vision of the current Municipal Spatial Development Framework (SDF) and Integrated Development Plan (IDP) documents, which is as follows:

“Overstrand Municipality is striving to be the most desirable destination to visit, stay and do business in”.

The vision of the Overstrand Municipality’s Environmental Management Services Section (EMS), which is as follows:

“The Environmental Management Section strives towards sustainable environmental management by means of environmental best practice and apply adaptive and creative thinking to an ever-changing and unpredictable environment in an attempt to manage the future outcomes of a system that is beyond our control” (T. Dry)

“Accordingly, the section strives to coordinate, plan and manage all human activities in a defined environmental system to accommodate the broadest possible range of sustainable short and long term environmental, social and economic development objectives.”

5.3 Mission Statement of FNR

The Mission Statement of the FNR should be acknowledged as the Management Intent and thereby guide management actions:

“To sustainably manage and protect the natural assets and cultural heritage resources of the Fernkloof Nature Reserve, in partnership with relevant community organisations in order to conserve and ensure the continued existence of its rich biodiversity, and its associated ecological processes and services”.

5.4 Appropriate Development within the FNR

Also refer to:

8. *The FNR Conservation Development Framework;*

9.9. *Infrastructure Management; Management Action Table 1.9;*

9.13. *Financial and Administrative Management; Management Action Table 1.13.*

To ensure development of the FNR follows the concept of appropriate development, the following points of relevance have been adapted from The National Environmental Management Act (No. 19519 of 1998) Section 2 (4) (a) Principles must be adhered to:

- i. the disturbance of ecosystems and loss of biological diversity is avoided, or where it cannot be altogether avoided, is minimised and remedied;*
- ii. pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied;*
- iii. the disturbance of landscapes and any cultural sites on the FNR is avoided, or where it cannot be altogether avoided, is minimised and remedied;*
- iv. waste is avoided, or where it cannot be altogether avoided, minimised and reused or recycled where possible and otherwise disposed of in a responsible manner;*
- v. the development, use and exploitation of renewable resources and the ecosystems of which they are a part, do not exceed the level beyond which their integrity is jeopardised;*
- vi. a risk-averse and cautious approach is applied (also called the Precautionary Approach) to the general management of the FNR, which considers the limits of current knowledge about the consequences of decisions and actions; and*
- vii. negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied.*

5.5 The Values of the FNR

The following values of the FNR make the protected area exceptional in ecological, ecosystem, social and culture terms:

<i>Ecological Values</i>	<ul style="list-style-type: none"> • 78% of FNR consists of Critically Endangered Sandstone Fynbos and a further 7.4% of Vulnerable Agulhas Limestone Fynbos, this is over 85% of the reserve. • The Klein River mountains are classified as a Critical Biodiversity Area 1, with over 90% of the range consisting of the critically endangered vegetation type, Overberg Sandstone Fynbos. • Over 9000 plant species are found in South Africa's South Western region or Cape Floristic Region with a 70% endemism and several of these are endemic to the Klein River Mountains. • The Fernkloof Nature Reserve contains 1300 plant species in the 1800-hectare reserve, an astounding number of plant species for such a small reserve with 12% of the plants IUCN red data listed. • Aasvoëlkop is home to <i>Mimetes palustris</i> a critically endangered member of the Proteaceae family, found only in a few small
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	<p>populations in the area. The <i>Erica hermani</i>, an endangered Ericaceae, found only in the Hermanus area, is named after the town.</p> <ul style="list-style-type: none"> • Fernkloof also is a haven for buck species, snakes, rodents, frogs, lizards, tortoises, porcupine, mongoose and baboon and leopard. • Smaller creatures such as beetles, spiders, butterflies and ants are still to be discovered. • The best studied are the birds, not very well represented in fynbos but they are important pollinators, Grassbirds, Sunbirds, Sugarbirds, Siskins, Chats, Martins and Pipits and Thrushes to name some. • The Hermanus Botanical Society Herbarium and Research Centre contributes valuable research data to national and international organisations.
<p>Ecosystem Service Values</p>	<ul style="list-style-type: none"> • Carbon sequestration through diverse habitat types; • Water cycle regulation from vegetation management and alien vegetation removal; • Species diversity contributes to genetic diversity enabling adaptation to changing conditions; • Adjacent agricultural lands benefit from the protection of bird and insect species to pollinate crops; • Protected coastal dune habitats contribute to stability in coastal urban areas. • Catchment area for the Mossel River. A small estuary which is home to the more elusive otters.
<p>Cultural & Historical Values</p>	<ul style="list-style-type: none"> • The graves of Sir William and Lady Hoy on Hoy's Koppie a circa 1935; • Annual Hermanus Camp (AHC) a Grade IIIA Local Heritage Site by Heritage Western Cape declared in 2015; • The Archaeological findings in the Klip Kop Cave on Hoy's Koppie occupied in the Middle Stone Ages; • Khoekoen Shell Middens at Rietfontein and Rowweklip sites on the FNR Cliff Paths.
<p>Ecotourism values</p>	<ul style="list-style-type: none"> • Access to approximately 60km of walking, hiking and cycling trails; • Wheelchair accessible paths and resting benches suitable for all ages and levels of physical fitness; • Guided walks with local knowledge sharing; • Avi-tourism; • Land-based whale-watching from the Cliff Path portions of the FNR; • Galpin Hut hiker accommodation; • Fernkloof Indigenous Nursery; • Fernkloof gardens with wheelchair access, child-friendly play and picnic areas; • Significant attractor of tourists to Hermanus; • Visitors' Centre; • Fernkloof Hall for function hire.

Social Values	<ul style="list-style-type: none"> • Environmental Awareness programmes; • Scientific research opportunities; • Local economy job creation; • Aesthetical, recreational, spiritual, cultural, and therapeutic values.
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5.6 The Objectives of the Management of the FNR

The following prioritised objectives of the FNR represent Key Performance Areas (KPA) that mark achievements that must be met to support the management intent described in the Vision of the FNR:

- i. To conserve and manage biodiversity and natural ecological processes, ecosystems, and species within the FNR and its promoted expansion areas to included additional priority habitats.
- ii. To effectively conserve and protect the archaeological and cultural heritage of the FNR.
- iii. To maintain and develop meaningful co-management and partnership agreements that benefit the FNR.
- iv. To ensure any development that is required within the FNR is undertaken in a sustainable and appropriate manner that does not compromise natural environment or the sense of place.
- v. To implement an effective management framework through legislative compliance, corporative governance and the implementation of measurable strategies, policies, and procedures.

5.7 Summary of management issues, challenges, opportunities, and threats of Fernkloof Nature Reserve

A SWOT analysis is a strategic planning method used to evaluate the relevant strengths, weaknesses, opportunities, and threats. It involves specifying the objectives and identifying the internal and external factors that are favourable and adverse to achieving the objective. The analysis identifies the reserve's following strengths, weaknesses, opportunities, and threats (Table 1).

Table 1: Management strengths, weaknesses, opportunities, and threats of the Fernkloof Nature Reserve.

STRENGTHS	OBJ 1	OBJ 2	OBJ 3	OBJ 4	OBJ 5
	Partnerships with Hacking groups to assist with invasive alien plant clearing.	X		X	
Co-Management Agreement with Botsoc to manage the Fernkloof Garden and assist with research and education in the reserve.	X		X		
There is a formal Fernkloof Advisory Committee to advise on the management interventions of the reserve.	X	X	X	X	X
Committed and involved neighbours on the borders of the nature reserve.	X		X		X

Partnership with Working for the Coast to assist with labour and material towards the implementation of conservation objectives.	X		X		X
The existence of long-term monitoring programs on the reserve (Umvoto).	X		X	X	X
The presence of archaeological features such as "Hoy's Koppie" adds to the historical value of the reserve.		X	X	X	X
The reserve is a member of the GOFPA (Greater Overberg Fire Protection Agency).	X	X	X	X	X
The visitor accommodation at Galpin Hut bring conservation minded people to visit our nature reserve for overnight stays.			X	X	
The Fernkloof Gardens, Visitor Centre, Nursery and Research Centre brings many visitors to the reserve.	X		X	X	X
WEAKNESSES					
There is insufficient operational budget to manage all outstanding matters concerning reserve management.	X	X	X	X	X
There is limited capacity and skills for compliance enforcement.	X	X	X	X	X
There are inadequate resources in terms of vehicles and equipment for monitoring of reserve activities.	X	X			
The inability of the management authority to manage and control the public access due to open access of the reserve.	X	X			
OPPORTUNITIES					
Partnerships with NGO's for research opportunities.			X		
The long-term initiative to turn the Fernkloof Gardens into a registered Botanical Garden.		X	X	X	X
Upgrading of the current Fernkloof office Complex to improve the visitor experience to the nature reserve.	X		X	X	X
The opportunity to apply for Biosphere Reserve status.	X	X	X	X	X
Possible partnerships to improve tourism development and activities to maximise benefit from a well-established tourism destination.	X	X	X	X	X
THREATS					
Poaching of natural resources around and in the nature reserve.	X				X
Hunting with wild dog packs in the nature reserve.	X				X
High traffic R43 running through the Nature Reserve which has high impact on injury or death of animals.	X				X
Boundaries of reserve not fenced off which leads to uncontrolled access and habitat destruction.	X	X			X
Seasonality of visitor use may result in the over utilisation of natural resources during peak periods and puts pressure on limited visitor facilities.	X	X			X

Fragmentation of the reserve, due to Hoys Koppie, Maanskygbaai and Fernkloof Main Reserve not a continuous entity.		X			
Buffer areas are vulnerable to land use changes.	X	X	X	X	X
Invasion of alien invasive species.	X				X
Anthropogenic climate Change (rising sea level, increase in frequency and intensity of storms, shift in seasonal frequency).	X				X
Lack of public awareness with regards to conservation of marine and terrestrial ecosystems.	X	X			X
Pollution incidents of pump-station on the Mossel-River Estuary and Kleinriver Estuary.	X				X
Increased encroachments of gardens and other developments on the edges of the nature reserve.	X			X	X
Increased incidents of vagrants erecting temporary sleep site in the nature reserve.	X	X			X
Increased tourism activities without permit approvals.	X	X			X

6. The Description and Context of the FNR

6.1 Location and Extent of the FNR

Also refer to:

9.1. Legal Status and Reserve Expansion; Management Action Table 1.1. Legal Status and Reserve Expansion;

Appendix 1. Overstrand: Fernkloof Nature Reserve Regional Locality Map;

Appendix 2. Overstrand: Fernkloof Nature Reserve Local Context Map;

Appendix 3. Overstrand: Fernkloof Nature Reserve: Cadastrals;

Appendix 5. Overstrand: Fernkloof Nature Reserve Vegetation Map;

Appendix 10: Fernkloof Nature Reserve Proclamations;

Figure 15. Table: Current and proposed land parcels that constitute the FNR

The six portions that make up the FNR are located adjacent to and are partially surrounded by the town of Hermanus (Western Cape, South Africa). Hermanus is the centre of the jurisdiction area of the Overstrand Municipality, which forms part of the Overberg District Municipality in the Western Cape Province. The total area of the existing FNR is 1801.46ha. The FNR extends from sea-level to 823.7a.m.s.l at Galpinkop. The properties that make up the Reserve are referred to in this PAMP collectively as the FNR or referred to as individual portions as described below.

The Fernkloof Nature Reserve consists of six fragmented land parcels that make up the FNR in its entirety.

Portion 1: The main body of the FNR consists of a mountainous area (westernmost parts of the Kleinriviersberge mountain range), which directly abuts the urban edge of Hermanus on the southern

border, with no agricultural land or vacant erven in between. De Diepgat Conservancy and Vogelgat Private Nature Reserve on the eastern boundary of FNR Portion 1, (Erf 591/0) serve as a buffer zone and contribute to the critical mass of indigenous vegetation in the reserve. Alien vegetation and fire management is place for Vogelgat Reserve. On the western boarder of Portion 1 (FNR Erven 591/1; 591/2 and RE/4780), a subdivided portion Ashbourne Vineyards is rezoned from Agriculture I to Open Space III. The Ashbourne Conservation area is approximately 50ha A Stewardship Agreement between CapeNature and the Ashbourne conservation area is in place. Vineyards at Hamilton Russel and Southern Right Wine Estate Border Portion 1 (Erf 1253).

Portion 2: The Hoy's Koppie portion contains the graves of Sir and Lady William Hoy (circa 1930) (also refer to 6.2. Conservation History of the FNR) as well as archaeological evidence of the Khoekhoen occupation of the area. Vegetation types in the Hoy's Koppie portion of the FNR include the Critically Endangered Overberg Sandstone and a Milkwood tree grove. Unique plant species found in this area include Spinnekopblom (*Ferraria cripisa*) and the Bobbejaantjie (*Babiana ambigua*). Hoy's Koppie portion is surrounded by urban residential development.

Portion 3: An area directly north of the Kleinrivier Estuary was proclaimed into of the FNR in 2009. This area serves as a conservation corridor to the estuary and is bordered by Maanschynkop Provincial Nature Reserve and Vogelgat Private Nature Reserve;

Portion 4: The Cliff Path portion contains narrow strips of land in the Coastal Zone between the high-water mark and cadastral boundaries of erven between the Klein River Estuary and the Hermanus New Harbor. The Cliff Paths represent Overberg Dune Strandveld thicket and Cape Seashore vegetation types within the FNR and shell middens represent a heritage value of the FNR.

Portion 5: The Annual Hermanus Camp (AHC) portion of the reserve was declared as a Grade IIIA Living Heritage Feature Local Heritage Site in 2015. This portion of the FNR was included in the 2000 FNR proclamations. The area borders the Kleinrivier Estuary and protects the only portion of FNR that contains Cape Lowland Freshwater Wetlands vegetation;

Portion 6: The Piet-se-Bos portion of the reserve contains endangered Milkwood Forest and remnants of Southern Afrotemperate forests, like at "The Grotto". This portion of Fernkloof was proclaimed in 2000.

6.2 Conservation History of the FNR

In 1923 Mr William Hugh ("Meester") Paterson, schoolteacher, and later Mayor of Hermanus, collected examples of local wild flowers from the Hermanus vicinity and displayed them at a flower show in England. The flowers won a trophy, and kick-started public interest in conserving the rich floral diversity of the area. Meester Paterson was appointed as the first secretary of a local Hermanus Horticultural Society that was founded the following year.

A map dated September 1942 indicates a 165 hectare "Existing Nature Reserve", and a "Proposed Nature Reserve" totalling 1 217 hectares. However, formal management for conservation purposes of a portion of the then "Hermanus Commonage" only began in September 1952, with the subsequent proclamation of a so-called "Wild Flower Reserve" (Proclamation No. 129 of 1956).¹ The area steadily

¹The description of the recent history of the FNR was largely sourced from: Overstrand Conservation Services. 2001. Fernkloof Nature Reserve Management Plan incorporating the Mossel River Valley, a section of the Cliff Path and Hoy's Koppie. Unpublished report compiled for the Overstrand Municipality. 65pp.

increased in popularity and was thus declared a Nature Reserve on 22 November 1957 (Proclamation No. 182 of 1957). Proclamation No. 182 did not, however, describe the boundaries of the Nature Reserve, nor did it assign a name to it. The name “Fernkloof Nature Reserve” was assigned by the then Hermanus Municipality on 5 February 1958. On 23 January 1962, the FNR was extended by ± 19.7 hectares by the inclusion of the Municipal Commonage known as “Mossel River West”.

Mr Harry Wood was then appointed as the first curator of the Nature Reserve and was instructed by the Municipality to establish a garden using plants from the Caledon Division. A small nursery (which is today run by the HBS) was started on-site for this purpose. Since the 1970s, the HBS’s efforts and funding succeeded in establishing the current Reserve infrastructure comprising an auditorium, office complex, accommodation, kitchen, storage space, toilet blocks and herbarium), visitor’s centre, Research Centre, and a nursery. A small visitors’ centre was constructed, from which a network of hiking trails was established.

Following comments received from Dr J.P. Rourke of the Compton Herbarium, Kirstenbosch, dated August 1970, the Municipality established a committee which proposed extensions to the Nature Reserve which included an additional mountainous area of commonage, the coastal Cliff Path, and Hoy’s Koppie. Proclamation No. 391 of 1971 which followed, named, and proclaimed the FNR as a “Local Authority Nature Reserve”, and described its boundaries in terms of the Nature Conservation Ordinance, 1965 (Ordinance No. 26 of 1965), but did not include the Cliff Path section, or Hoy’s Koppie.

The then Department of Nature and Environmental Conservation endorsed the inclusion of Hoy’s Koppie and the Mossel River Valley into the Reserve on 18 April 1984, and the FNR was officially opened by Mr J.C. Heunis, MEC, on 4 September 1985. An extension to the FNR was made on 2 June 2000 (Provincial Notice No. 242 of 2000, Provincial Gazette No. 5507) by incorporating the Mossel River Valley, a section of the Cliff Path, Piet se Bos and Hoy’s Koppie into the reserve. A further extension was added to the east of the Reserve during 2009, between Vogelgat Private Nature Reserve, the Kleinrivier estuary and Lagoon Farm, as described in Provincial Notice No. 37 of 2009 of 21 August 2009, as contained in Provincial Gazette No. 6651 (refer to Appendix 1: FNR Proclamation and Extension Government Notices/Gazettes).

6.3 FNR Ecological Context

Also refer to:

9.1. Legal Status and Reserve Expansion;

9.3. Ecosystem & Biodiversity Management

9.14. UNESCO World Heritage Site Application;

Management Action Table 1.1. Legal Status and Reserve Expansion;

Management Action Table 1.3. a) Ecosystem & Biodiversity Management: General Actions

The FNR is located within the Cape Floral Region (CFR), which is globally recognized as the smallest but most diverse of the six Floral Kingdoms of the world. It is especially noteworthy for its diversity of threatened endemic plant species. The FNR constitutes 0.02% of the CFR yet 18 % of plant species

found within the CFR are also found within the FNR. The FNR conserves a unique combination of habitats, ecosystems, and species, some of which are classified as rare, critically endangered, endangered, or vulnerable in terms of their conservation status.

6.3.1 Climate

The climate of the area is described as a Mediterranean-type warm-temperate climate that is defined by fire-prone warm, dry summers and cooler wet winters. The area on average receives approximately 450 – 830 mm of rain per year (mean annual precipitation is approximately 480mm), which falls year-round, and peaks in the winter months from May to August. In summer, the prevalent south-easterly winds are responsible for the orographic mist precipitation on the eastern and southern slopes at higher altitudes. Winter is dominated by prefrontal north westerly winds and postfrontal south-westerly winds. Frost may occur on 2 or 3 days per year. Snowfalls on coastal mountains are not common due to the maritime climate¹.

For the main vegetation type of the FNR, namely Overberg Sandstone Fynbos, the mean average maximum and minimum temperatures for January and July are 25.6 °C and 6.3 °C, respectively.

6.3.2 Geology and Soils

The FNR contains mostly shallow acidic lithosol soils, comprising a high proportion of gravel and small boulders, derived from Ordovician quartzitic sandstones of the Table Mountain Group with Houwhoek, Glenrosa and Mispah soil forms being prominent.¹Such lithosol soils underlie Overberg Sandstone Fynbos, the main vegetation type of the FNR.

In the south-east of the FNR, the originally horizontal quartzite sandstone beds are conspicuously folded. Table Mountain quartzitic sandstone is extremely resistant to weathering, and hence gives rise to cliffs, screes, and coarse sandy soils.

Because of the rugged topography, and the slow rate of weathering of the quartzitic sandstone of the Peninsula Formation, there is little possibility for soil development. The soils are rarely deeper than 30 cm as bedrock is never far from the surface, and the landscape is punctuated with rock outcrops, or strewn with angular blocks.

Because of the acidic conditions, organic plant materials are slow to decompose, and so accumulate to form black, partly decomposed, peat-like material dispersed in the sub-surface horizon of the soil. The peat contributes little to soil fertility but improves the moisture holding capacity of the soil, and so in part accounts for the surprisingly green appearance of the vegetation in the warmer mid-summer months.

In some areas, colluvial weathered material accumulates to a depth of a metre or more. On such sites, which are often permanently wet, a considerable depth of peat with its characteristic flora may develop.

The FNR is also characterised by rust-coloured shale bands of 80 – 200m wide at an altitude of approximately 275m a.m.s.l. The shale bands weather readily to give rich, brown, loamy soil and provide the smooth slopes of the FNR. This band of clay, derived from shale of the Cedarberg

¹Mucina, L., Rutherford, M.C. (eds) (2006). *The Vegetation of Southern Africa, Lesotho and Swaziland*. Strelitzia 19. South African National Biodiversity Institute, Pretoria.

Formation, supports diverse fynbos shrublands of all structural types, namely Western Coastal Shale Band Vegetation.

Shallow alkaline bedrock and alkaline, grey, regic sands on limestones of the Bredasdorp Group underlie Agulhas Limestone Fynbos vegetation, which occurs chiefly in the south-eastern areas of the Reserve, nearer to the Klein River Estuary.

In the extreme western areas of the FNR, Hangklip Sand Fynbos is underlain by leached, acid Tertiary sand. The soils are either Lamotte or Houwhoek forms, or comprise grey, regic sands.

The Overberg Dune Strandveld, thicket and Milkwood Forest habitats of the Cliff Path area are underlain by deep, recent marine-derived calcareous sands forming dunes that line the coast (Quaternary Strandveld Formation of the Bredasdorp Group), to shelly, shallow-marine sandstones and limestones of the Bredasdorp Group deposited on underlying Table Mountain Group quartzitic sandstone.

The substrate of the Cape Lowlands Freshwater Wetlands vegetation type is built of fine sandy, silty, and clayey soils overlying young Quaternary sediments, largely derived from weathering of Cederberg Formation shales, Table Mountain Group quartzitic sandstones and Cape granites.

The soils of the Southern Afrotropical Forest Habitats, in the gorges and along streams, are for the most part shallow (and skeletal) Mispah, Glenrosa and Houwhoek forms, derived from Table Mountain Group quartzitic sandstones and shales of the Cederberg Formation.

6.3.3 Hydrology

Also refer to:

Appendix 4. Overstrand: Fernkloof Nature Reserve Hydrology Map;

9.3. Ecosystem and Biodiversity Management;

9.6. Invasive and Non-Invasive Alien Species Management;

Management Action Tables 1.3: Ecosystem & Biodiversity Management: h) Ecosystem Services;

Management Action Tables 1.3: Ecosystem & Biodiversity Management: j) Catchment, Groundwater & Rivers;

Management Action Table 1.6. Invasive and Non-Invasive Alien Species Management.

It is understood that inland aquatic systems within the Western Cape are generally highly threatened ecosystems and although some mountain streams are in relatively good ecological condition, many of the lower lying inland ecosystems are modified from their natural state and are degraded¹.

Due to the intensity of pressures, a strategic and systematic approach to the management of freshwater ecosystems must include the recognition of flow alteration from extraction, water pollution, the destruction and degradation of natural habitats, the impact of invasive and alien species and the effects of climate change¹. The aquatic systems of the FNR are described in more detail below.

¹Fynbos Forum.2016. Ecosystem Guidelines for Environmental Assessment in the Western Cape, Edition 2. ISBN 978-0-620-72215-5

6.3.4 Groundwater

The Peninsula Formation quartzite in the Hermanus area supports an aquifer, which has been exploited by the Gateway, Camphill and Volmoed Wellfield to supply Hermanus with potable water¹. According to Umvotu Africa, the Peninsula Formation quartzite unit is hydraulically separated into various fault-bounded compartments, named 'Structural Sub-Areas', across which it is interpreted that there is no hydraulic connection (i.e., no groundwater flow), due to the sealing nature of the annealed fault core (as such, the potential impacts of pumping of the water supply are likely to be insignificant on the biodiversity of the FNR).

In some of these compartments, the Peninsula Formation quartzite is overlain by Cedarberg Formation shale and the Goudini Formation fine sandstones/siltstones, which act as confining units. In other words, water cannot enter or escape from the quartzite through the overlying layers. In other compartments these overlying units are not present, and the Peninsula Formation is broadly unconfined, for example in "Sub-Area 3" (rainwater can recharge the aquifer system by infiltrating the Peninsula Formation quartzite unit in this area).

The Gateway Well-field (which augments the potable water supply to Hermanus) targets the Peninsula Formation within "Sub-Area 1". At the well-field, and on the coastal platform, the Peninsula Formation is confined at depth beneath the Cedarberg Formation shales and the Goudini Formation. The recharge zone (source of water) for Sub-Area 1 is where the Peninsula Formation outcrops in the western Kleinriviersberge Mountain range (i.e. in the Fernkloof Mountains).

The Skurweberg Formation quartzite, which overlays the confining beds of the Cedarberg Formation shale and Goudini Formation, is also an effective aquifer but is not targeted by the Gateway Well-field (the deeper Peninsula Formation aquifer yields better quality water than shallower layers and the yield is inferred to be more sustainable). In the Hermanus coastal platform the Skurweberg Formation is unconfined, and a monitoring borehole (GWE08b) targets this unit to monitor for potential links from pumping in the deep confined Peninsula Formation to the upper Skurweberg Formation aquifer across the Hermanus Fault. In the coastal platform the Skurweberg Formation (south of Hermanus Fault) and Goudini Formation (north of Hermanus Fault) are overlain by the Bredasdorp Group sediments, which forms the shallow alluvium or primary, unconfined aquifer. Many private well-points penetrate the alluvium for garden watering, and five monitoring points (WP1 to WP4 and GWE08a) penetrate the alluvium to monitor a potential link from pumping in the deep confined Peninsula Formation to the upper alluvium aquifer.

6.3.5 River and Catchment Areas

The FNR contains the entire catchment area of the Mossel River, from source to sea². Sixteen streams form tributaries of the Mossel River, namely: Robbeklipstroom, Roads End Stream, James's Stream, Vulture Stream, Dew Pond, Diastella Stream, Sunbird Swamp, Disa Stream, Roridula Stream, Retzia

¹ Umvotu Africa. 2011. Results of Monitoring Programme April 2011 to September 2011. Volume 1 Gateway Wellfield. Water Source Development and Management Plan for the Greater Hermanus Area, Overstrand Municipality. Draft May 2012.

² The Mossel River is located in the G40H Quaternary Drainage Region.

Stream, Waterkloof, Fisherman’s Kloof, Fernkloof, Droëkloof, Kantoorskloof, and an unnamed stream (which is important to hikers) north of ‘Galpinkop’. The Mossel River has three named waterfalls, the Assegaaibos Waterfall, Cave Falls and Roridula Falls. The Mossel River catchment area feeds the Gateway Well-Field which augments the potable water supply to Hermanus.

6.3.6 Coastal and Estuary Zones

The eastern boundary of the FNR abuts the Klein River Estuary, the catchment area of which falls outside the FNR.

The FNR includes various fragmented land parcels at or in proximity to the coast and to the Klein River Estuary. These areas are managed in terms of the applicable statutory management guideline documents and in terms of the relevant legislation (including, but not limited to, the NEM: ICMA, the NEM:PAA, the NEMA, and the NWA) as well as the OM Draft Environmental Overlay Zone Regulations (2016)¹ with the purpose of: “*Managing the integrity of coastal ecosystems, ecosystem services, coastal dynamic processes and biodiversity within Coastal Reserves*”. As per the OM Draft Environmental Overlay Zone Regulations (2016), a co-management agreement with the CPMG was concluded in 2017 to co-manage the restoration and maintenance of indigenous flora of the FNR Cliff Path portions of the FNR.

The Overberg District Municipality (ODM), of which the OM is a local municipality to, participates in the Local Action for Biodiversity (LAB): Wetlands South Africa in partnership with the International Council for Local Environmental Initiatives (ICLEI) with the objective to conserve wetlands and natural resources that provide ecosystem services that naturally control climate hazards such as water source shortages and flooding. A Wetland Report has been drafted for the Overberg and, after acceptance of the draft, a strategy and action plan will be developed to streamline wetland conservation and funding. The ODM has committed to extend the partnership with the ICLEI for another three years².

6.3.7 Vegetation

Also refer to:

Appendix 5. Overstrand: Fernkloof Nature Reserve Vegetation Map

9.3. Ecosystem and Biodiversity Management;

9.5. Fire Management;

9.6. Invasive and Non-Invasive Alien Species Management;

Management Action Table 1.3. a) General Actions;

Management Action Table 1.3 b) Indigenous Vegetation ;

Management Action Table 1.3 j) Catchment, Groundwater & Rivers;

Management Action Table 1.5. Fire Management.

The South African Biodiversity Institute (SANBI) has led the process to identify threatened ecosystems that are listed in the NEM:BA Government Gazette 1002 of 2011: National List of Ecosystems that are

¹ Overstrand Municipality: Draft Environmental Overlay Zone Regulations.2016. Available online: <https://www.overstrand.gov.za/en/documents/town-planning/overstrand-municipality-by-law-on-municipal-land-use-planning/3908-02-revision-of-overstrand-mun-by-law-2016-draft-env-man-a-overlay-zone-reg/file>

² Overberg District Municipality. Annual Report. 2016/17. Available online: https://www.odm.org.za/download_document/1475

Threatened and need of protection¹. Within the FNR the Critically Endangered (CR) Overberg Sandstone Fynbos; Vulnerable (V) Agulhas Limestone Fynbos and Endangered (E) Hangklip Sand Fynbos and Western Cape Milkwood Forest vegetation types are represented. Least Threatened (LT) Western Coastal Shale Band Vegetation, Hangklip Sand Fynbos, Cape Lowland Freshwater Wetland, Cape Seashore Vegetation and Overberg Dune Strandveld vegetation types are also represented in the FNR.

Note: Criterion D1 (Overberg Sandstone Fynbos and Agulhas Limestone Fynbos within the FNR) was developed to protect species that are not listed as endangered in terms of the restricted activities (for e.g. hunting, gathering, exporting trading in etc.) as defined in the NEM:BA but are at risk due to habitat degradation, the main driver of terrestrial species loss¹ In all ecosystems in South Africa, only fynbos ecosystems meet the D1 criteria which highlights the biodiversity and extent of pressure of the vegetation type.

Within the FNR, broader vegetation types include a large diversity of habitats including coastal and estuarine areas, seasonal wetlands, rivers and dams, forested gorges featuring spectacular waterfalls, forested rocky scree slopes, patches of Milkwood Forest, and fynbos-covered mountain slopes. This habitat diversity translates to a staggering record of more than 1250² indigenous plant species identified within the FNR². Approximately 78 plant species found within the FNR are classified in the Red List of South African Plants as Critically Endangered (CR), Endangered (E), Vulnerable (V), Near Threatened (NT) or Rare³.

The name of the principal vegetation type of this region, fynbos, is derived from the Dutch word 'fijn bosch' which is the collective name for a variety of evergreen shrub-like plants with small firm leaves, often turned, but also includes woody plants with hard leathery leaves, usually broad.

The Fernkloof Nature Reserve comprises 0.002% of the Cape Floral Kingdom but contains 18% of its plants in just 18 square kilometers. There is no other place on earth where so many different species can be seen growing in such proximity.

More than 1250 species² of plant have thus far been collected and identified in the Reserve itself. The species richness per km² and the threatened plant species profiles within its boundaries makes the FNR comparable with the Kogelberg Nature Reserve, one of the thirteen protected areas within the UNESCO World Heritage Site: Cape Floral Region.

HBS regularly contribute species specific flora data, information, and samples to the following national and international organisations:

- The SANBI Custodians of Rare and Endangered Wild Flower (CREW);
- The University of Oxford's Botanical Research and Herbarium Management System (BRAHMS);
- and

¹South Africa: Department of Environmental Affairs. Government Notice No.1002 of 2011: National Biodiversity Act , 2004 (Act No. 10 of 2004) National List of Ecosystems that are threatened and need of protection.

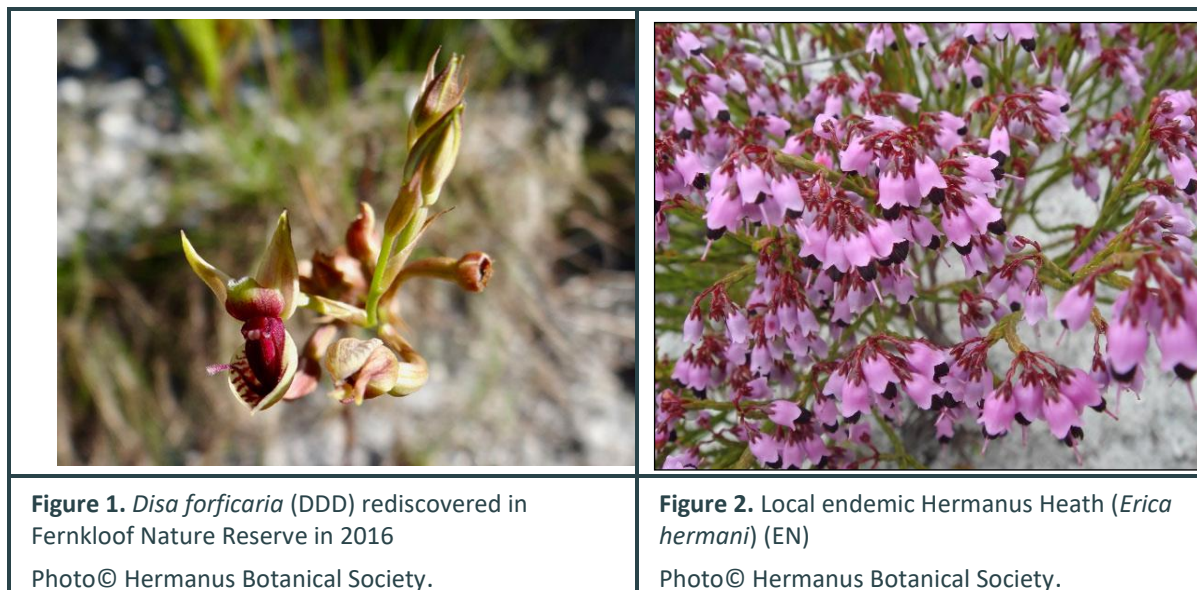
²Botsoc website. Available online: <https://botanicalsociety.org.za/a-botanists-paradise-exploring-fernkloof-nature-reserve>.

³South African National Biodiversity Institute (SANBI) Red List of South African Plants. Available online: <http://redlist.sanbi.org/index.php>

- Royal Botanical Kew Millennium Seed Bank.

In 2016, *Disa forficaria* (Figure 1) was rediscovered in the FNR; this species was previously only known from five herbarium specimens and, despite concerted efforts, had not been located in situ since 1966. This species is currently classified as DDD (Data Deficient due to Insufficient Information).

The paragraphs below describe the FNR vegetation types, their classifications as per the NEM: BA and the notable species found therein.



6.3.7.1 Overberg Sandstone Fynbos

Vegetation type and local description:

Overberg Sandstone Fynbos, defined as moderately tall, dense restioid, ericoid-leaved and proteoid shrublands, constitutes 78% of the total area of the reserve. Landscape features include low mountains with the highest point of 824m a.m.s.l. and undulating hills and plains¹.

National Conservation Status and Classification:

Overberg Sandstone Fynbos is listed by NEM:BA as Critically Endangered due to the D1 Criterion. Of the original 117 000ha of naturally occurring Overberg Sandstone Fynbos vegetation in South Africa, 86% percent remains, of which 6% is statutorily conserved in the Fernkloof Nature Reserve, Agulhas National Park, Babilonstoring, Heuningberg, Maanschynkop, Salmonsdam and Caledon Nature Reserves.

According to the SANBI Threatened Species Programme, of 110 plant species associated with Overberg Sandstone 14 are listed as Critically endangered (CR), 37 are listed as Endangered (EN) and 59 are listed as Vulnerable (VU).

¹ Mucina, L., Rutherford, M.C. (eds). 2006. The Vegetation of Southern Africa, Lesotho and Swaziland. Strelitzia 19. South African National Biodiversity Institute, Pretoria

A species of concern occurring in the FNR is the Hermanus Pincushion (*Leucospermum gracile*) (NT). 25 species are categorised as endemic flora species that are only associated with Overberg Sandstone Fynbos vegetation.

As such, the FNR has a vital role to play regarding achieving the desired National target of 30% formal protection for this vegetation type.

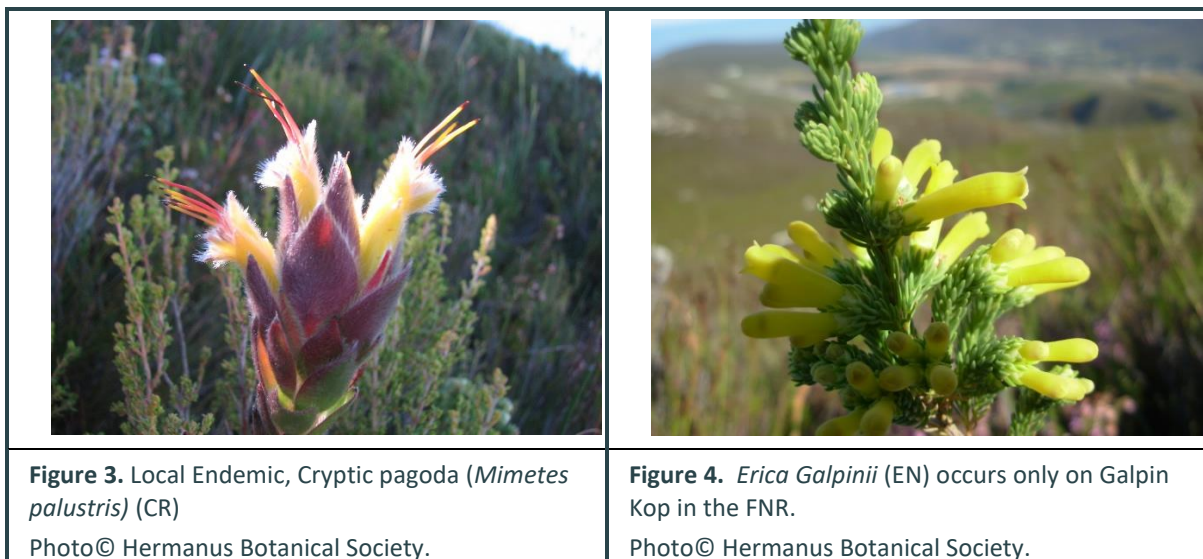
Notable species within the FNR:

The vegetation on Hoy's Koppie includes Overberg Sandstone Fynbos on the northern side, and a Milkwood grove on the southern side (in the vicinity of the Klip Kop Cave). Notable species include the Spinnekopblom (*Ferraria cripisa*) and the Bobbejaantjie (*Babiana ambigua*) (LC).

The Endangered Hermanus Heath (*Erica hermani*) (Figure 2) has an extent of occurrence (EOO) of 8km² at two or three locations and although some plants remain within the FNR, the individuals who occur in firebreaks are threatened by brush-cutting and on the lower slopes of the reserve and Babilonstoring alien vegetation continue to be a concern.

The Cryptic pagoda (*Mimetes palustris*) (Figure 3), listed as CR due to the species' EEO of 26km² within the Kleinrivier mountains and the threat of a decreasing population size due to the direct effects of invasive alien vegetation and habitat degradation¹.

The Endangered *Erica galpinii* (Figure 4.) is a rare localised, slow growing reseeder that is estimated to have less than 450 mature individuals from two subpopulations within a 4km² EEO. During the 1980's the Fernkloof subpopulation consisted of over 700 mature individuals, but due to too frequent fires, it is reported that approximately 200 matures specimens remain constituting a 50% decline in the subpopulation².



¹ Rebelo, A.G., Helme, N.A., Holmes, P.M., Forshaw, C.N., Richardson, S.H., Raimondo, D., Euston-Brown, D.I.W., Victor, J.E., Foden, W., Ebrahim, I., Bomhard, B., Oliver, E.G.H., Johns, A., van der Venter, J., van der Walt, R., von Witt, C., Low, A.B., Paterson-Jones, C., Rourke, J.P., Hitchcock, A.N., Potter, L., Vlok, J.H. & Pillay, D. 2006. *Mimetes palustris* Salisb. ex Knight. *National Assessment: Red List of South African Plants version 2017.1*.

² Turner, R.C. & von Staden, L. 2008. *Erica galpinii* T.M. Salter. *National Assessment: Red List of South African Plants version 2017.1*.

6.3.7.2 Western Coastal Shale Band Vegetation

Vegetation type and local description:

Rust-coloured bands of shale derived soils some 80 – 200m wide, at an altitude of approximately 275m a.m.s.l. occurring in two bands in the northernmost part of the FNR with a smaller occurrence south of the former distribution description¹. The shale bands in the FNR are limited in extent, contain small populations of several prominent plant species, and support small patches of Afro temperate Forest in gullies, and on saddles. This vegetation type is known to support diverse renosterveld and fynbos shrublands of all structural types.

National Conservation Status and Classification:

Least Threatened. The National Conservation Target of 30% has been achieved (45% in statutory and local authority reserves, and an additional 30% in mountain catchment areas). These shale bands are known to support at least 7 endemic species, although not yet described in the FNR. This area constitutes 4% of the FNR thereby contributing to the overall habitat and species biodiversity of the reserve.

Notable species within the FNR:

Skaapbostee species (*Otholobium dreweae*) (Synonym *Otholobium* sp.nov.) (Figure 5) is listed as Vulnerable due to the only known location of the species being in the FNR². The Endangered Witbergpypie (*Cyrtanthus leucanthus*) is found on FNR sandstone and limestone slopes and is associated with Western Coast Shale Band vegetation, this species has highly localised populations that are known to have less than 40 individuals per population. This species is known from 14 subpopulations which are all threatened by alien vegetation invasion, more than half of the population is threatened by coastal development and urban expansion³.

Argyrobium splendens (E), although not yet identified in the FNR, is a species that was previously known from one type specimen collected at an unspecified location near the Hemel-en-Aarde Valley over 100 years ago. In 2008 a small population (40-60 individuals) was identified in the Babilonstoring Mountains⁴ and after the January 2015 fires a population of over 500 plants were identified on shale band vegetation near the Babilonstoring Nature Reserve⁵.

The population is severely threatened by invasive *Hakea sericea* and *Hakea drupacea* that are common in this vegetation type. The species is likely to occur on lower north-facing slopes but is assumed to be a short-lived fire-dependant species that is likely to only be present a few years after a fire but absent in mature vegetation and may therefore yet be identified in the FNR.

¹Mucina, L., Rutherford, M.C. (eds). 2006. The Vegetation of Southern Africa, Lesotho and Swaziland. Strelitzia 19. South African National Biodiversity Institute, Pretoria

²Helme, N.A. & Raimondo, D. 2007. *Otholobium* sp. nov. (Drewe 450 HER, K). National Assessment: Red List of South African Plants version 2017.1.

³Snijman, D.A. & Raimondo, D. 2007. *Cyrtanthus leucanthus* Schltr. National Assessment: Red List of South African Plants version 2017.1.

⁴Helme, N.A. & von Staden, L. 2012. *Argyrobium splendens* (E. Mey.) Walp. National Assessment: Red List of South African Plants version 2017.1.

⁵ Helm, N. October 2015. iSpot share nature observation. *Argyrobium splendens*. Available online: <https://www.ispotnature.org/communities/southern-africa/view/observation/562976/argyrobium-splendens>



Figure 5. Skaapbostee (*Otholobium dreweae*) is named for Priscilla Brierly Drewe whose research led to the rediscovery of this species in the FNR.
Photo© Hermanus Botanical Society



Figure 6. Hermanus Cliff Lily (*Gladiolus carmineus*) (V) occurs mainly in Overberg Dune Strandveld on the Cliff Path portions of the FNR.
Photo© Hermanus Botanical Society

6.3.7.3 Hangklip Sand Fynbos

Vegetation type and local description:

Occurs in the extreme western area of the FNR and marginally adjacent to the start of Rotary Way. Hangklip Sand dunes and sandy bottomlands supporting moderately tall, dense ericoid shrubland, emergent tall shrubs in places. This area constitutes 0.14% of the vegetation types of the FNR and therefore contributes to the habitat and species diversity of the FNR.

National Conservation Status and Classification:

Endangered (Criterion A1). Only 45% of natural habitats remain, with 20% of the original habitat is formally conserved. The national target for formal conservation is 30%. Nationally five endemic and 32 Red Data List species are known to be supported by the Hangklip Sand Fynbos.

Notable species within the FNR:

Acropholia bolusii (V), occurs on the coastal sandy flats of the FNR and has a decreasing population trend due to the <10 known locations within the Western Cape impacted by coastal development and alien vegetation. *Amphithalea virgata* (V) is found on lower mountain slopes and now only occurs at six locations between De Hoop and Hermanus.

The Line-leaf Cone bush (*Leucadendron linifolium*) (V)¹ occurs on seasonally waterlogged sands and occurs from Riversdale to the Cape Flats . This species has a seen a population reduction of >30% in the past 60 years due to habitat loss from urbanisation, alien plant invasions, groundwater extraction, wetland drainage and wildflower harvesting².

¹ Low, A.B., Paterson-Jones, C., Rourke, J.P., Hitchcock, A.N., Potter, L., Vlok, J.H. & Pillay, D. 2006. *Leucadendron linifolium* (Jacq.) R.Br. National Assessment: Red List of South African Plants version 2017.1.

² Rebelo, A.G., Helme, N.A., Holmes, P.M., Forshaw, C.N., Richardson, S.H., Raimondo, D., Euston-Brown, D.I.W., Victor, J.E., Foden, W., Ebrahim, I., Bomhard, B., Oliver, E.G.H., Johns, A., van der Venter, J., van der Walt, R., von Witt, C., Low, A.B., Paterson-Jones, C., Rourke, J.P., Hitchcock, A.N., Potter, L., Vlok, J.H. & Pillay, D. 2006. *Leucadendron linifolium* (Jacq.) R.Br. National Assessment: Red List of South African Plants version 2017.1.

6.3.7.4 Agulhas Limestone Fynbos

Vegetation type and local description:

Overberg Sandstone Fynbos grades into Agulhas Limestone Fynbos and is easily differentiated by the species of Proteaceae. In Walker Bay, dune cone bush (*Leucadendron coniferum*) indicates limestone fynbos¹. Agulhas Limestone Fynbos occurs chiefly in the south-eastern areas of the reserve near the Klein River Estuary. Agulhas Limestone Fynbos comprises mainly asteraceous and proteoid fynbos, with restioid fynbos in sandy areas and on limestone pavements. Wetter areas, such as waterlogged bottomlands near the Klein River Estuary, are dominated by restioid fynbos. This vegetation type makes up 7.4 % of the FNR.

Compared to the other two types of limestone fynbos (De Hoop and Canca), Agulhas Limestone Fynbos is the smallest but the most species diverse vegetation type which occurs on the Agulhas Plain from Hermanus to Bredasdorp and Struisbaai with the largest expanses being between the Klein River estuary and Grootbos, around Hagelkraal, Heuningrug and Soetanyberg². Given the lack of distinct structural types recorded in this vegetation, the floristic diversity is astounding.

National Conservation Status and Classification:

Vulnerable under D1 Criterion (more than 40 threatened Red Data List plant species). 64% of the natural area of the ecosystem remains with 8% of the 32% national target officially protected in the Agulhas National Park and small patches in the Kogelberg Nature Reserve, Table Mountain National Park and Wolfgat Nature Reserve. A further 4% is found in private conservation areas such as Groot Hagelkraal and Oude Bosch.

Notable species within the FNR:

The Cape Gorse (*Aspalathus excelsa*) listed as Vulnerable due to habitat loss from urbanisation and alien species invasions, has a range from Hermanus to Stanford and is located on the slopes of the Kleinrivier Mountains. *Colpoon speciosum* (V) has a range from Houwhoek to Agulhas and only three subpopulations are protected within reserves³.

6.3.7.5 Southern Cape Afrotropical Forest

Vegetation type and local description:

Although occurring at a scale too small to be mapped in Mucina (2006)⁴, Southern Cape Afrotropical Forests (a subtype of Afrotropical Forest) occurs in gorges and along streams of the FNR and on the coast at Grotto Beach.

National Conservation Status and Classification:

Least Concern as 56% of the 74 848 hectares of Southern Cape Afrotropical Forests are protected in formal protected areas.

¹Jacobs, K. & Jangle, R. 2008. Coastal Ecosystem Management Plan: Western Cape. Unpublished, The Nature Conservation Corporation, Cape Town.

²South Africa: Department of Environmental Affairs. Government Notice No.1002 of 2011: National Biodiversity Act, 2004 (Act No. 10 of 2004) National List of Ecosystems that are threatened and need of protection.

³Helme, N.A. & Raimondo, D. 2007. *Colpoon speciosum* (A.W. Hill) P.A. Bean. National Assessment: Red List of South African Plants version 2017.1.

⁴Mucina, L., Rutherford, M.C. (eds) (2006). The Vegetation of Southern Africa, Lesotho and Swaziland. Strelitzia 19. South African National Biodiversity Institute, Pretoria.

Notable species within the FNR:

Southern Cape Afrotropical Forests within the FNR are dominated by tall trees: Butter-spoon Tree/Botterlepelboom (*Cunonia capensis*) (LC), Assegaaiboom (*Curtisia dentata*) (NT), Cape Beech/Beukeboom (*Rapanea melanophloeos*) (LT). Small trees including the South African endemics Cape Keurboom (*Virgilia oroboides*) (LT) occur along the middle and lower reaches of the Mossel River.

6.3.7.6 Overberg Dune Strandveld (and Western Cape Milkwood Forest)**Vegetation types and local description:**

Overberg Dune Strandveld is described by Mucina (2006) as closed, evergreen, hard-leaved shrublands up to 4m tall in wind protected valleys and moist dune slacks with coastal thickets up to 1m tall in wind exposed littoral areas. This vegetation type occurs on the Cliff Path areas of the FNR. The Western Cape Milkwood Forest is recognised as the westernmost forest type within the Southern Coastal Forest vegetation type.

Occurring as interrupted belt patches in sheltered areas at low altitudes, the Western Cape Milkwood Forest vegetation type is considered to be a late successional stage of Overberg Dune Strandveld and makes up <0.1% of the FNR. The Milkwood Forest at Piet-se-Bos is particularly conservation- worthy. The Cliff Path Management Group (CPMG) have been planting Milkwood trees and Coastal Camphor Bush (*Tarchonanthus littoralis*) (LC) in the Piet se Bos area since 2008, to rehabilitate degraded patches. These plants have been sourced near the sites under rehabilitation.

National Conservation Status and Classification:

Overberg Dune Strandveld is classified as Least Threatened, of the 36% National Conservation Target, 30% of the remaining vegetation type are preserved formal conservation areas and a further 11% are afforded in private reserves.

Western Cape Milkwood Forest is classified as Endangered due to Criterion C (limited geographic extent and imminent threat to the ecosystem based on coastal development pressure) due to in terms of its conservation status in Government Gazette No. 1002 of 9 Dec 2011. 2500 hectares remain of the original 77 535 hectares of Western Cape Milkwood Forest vegetation type; 621 hectares (2%) are conserved with 89% of the total area considered as High Threat due to urban expansion and land transformation¹.

Notable species within the FNR:

A mix of temperate and subtropical species for e.g., Cape Beech/Beukeboom (*Rapanea melanophloeos*) (LC) and White Milkwood (*Sideroxylon inerme*) (LC). The Confetti Bush/Cape May/Aasbossie (*Coleonema album*) (LC) dominated Overberg Dune Strandveld occurs on shallow base-rich sand and Hangertjie (*Erica plukenetii*) (LC) occurs on shallow leached sand on the coastal shelf. The Carrion Flower/Aasbloom (*Orbea variegata*) (LC) is also of interest. Succulent-rich wind-shorn dwarf shrublands along exposed littoral situations on skeletal soils include many examples of Stonecrop (Crassulaceae) and Stone Plants (Mesembryanthemaceae).²

¹ Republic of South Africa. Department of Water Affairs and Forestry. 2005. *Systematic conservation planning for the forest biome of South Africa*.

² Cowling, R.M. 1991. Management of Coastal Zone: Hermanus Cliff Path. Unpublished report for the Cliff Path Management Group of the Fernkloof Advisory Board.

The Hermanus Cliff Lilly (*Gladiolus carmineus*) (VU) (Figure 6) a habitat specialist, occurs on rocky outcrops mainly along the Cliff Path and is listed as Vulnerable due to limited range within a small coastal area between Hangklip and Cape Infanta¹.

6.3.7.7 Cape Seashore Vegetation

Vegetation type and local description:

Distributed throughout the Cliff Path portion of the FNR, Cape Seashore Vegetation is defined in Mucina (2006) by *inter alia* coastal cliffs of herbaceous, grassy and (to some extent) dwarf-shrubby vegetation that can include succulents.

Cape Seashore vegetation is often dominated by one pioneer species. The plant communities of this vegetation type are determined by the age of the substrate and the disturbance regimes (in the case of moving dunes), distance from the upper tidal zone².

National Conservation Status and Classification:

Least Threatened with a National Target of 20%. Approximately 1.7% has been transformed by urban development and almost half of the vegetation type is offered protection in the Western Cape.

Notable species within the FNR:

Psoralea repens is listed as NT due to a population reduction and habitat loss of 20% due to coastal urbanisation since the 1970's. The species has an approximately 15-year generation length and is also threatened by alien vegetation³.

Within the FNR, this species is found on coastal fore dunes. The Critically Endangered and possibly extinct *Jordaaniella anemoniflora* was described in 1924 from specimens collected in the Hermanus area. Specimens collected in Hermanus were introduced to Kirstenbosch Botanical Garden for cultivation. The range described for this species is from Macassar (Cape Town) to Hermanus. Specimens were removed for cultivation from a location in Macassar/Strand and it is unknown whether these specimens survived. Coastal development in Hermanus has degraded dune habitats although there are habitats east of Hermanus where wild populations could exist and should be investigated⁴.

6.3.8 Invasive and Alien Vegetation

Also refer to:

9.6. *Invasive and Non-Invasive Alien Species Management; Management Action Table 1.6. Invasive and Non-Invasive Alien Species Management.*

¹ Goldblatt, P. & Raimondo, D. 2006. *Gladiolus carmineus* C.H. Wright. National Assessment: Red List of South African Plants version 2017.1.

² Mucina, L., Rutherford, M.C. (eds) (2006). The Vegetation of Southern Africa, Lesotho and Swaziland. Strelitzia 19. South African National Biodiversity Institute, Pretoria.

³ Stirton, C.H. & Raimondo, D. 2008. *Psoralea repens* L. National Assessment: Red List of South African Plants version 2017.1.

⁴ von Staden, L. & van Jaarsveld, E.J. 2012. *Jordaaniella anemoniflora* (L.Bolus) Van Jaarsv. National Assessment: Red List of South African Plants version 2017.1.

Appendix 6. Overstrand: Fernkloof Nature Reserve Alien Vegetation Map spatially represents the alien and invasive vegetation densities within the reserve. Due to the complexities of mapping specific alien vegetation, FNR alien and invasive flora is mapped into clearing units in accordance with the DFFE standards. Alien vegetation monitoring and clearing is an ongoing priority for FNR, and emerging weeds are monitored.

Invasive aliens (IAP) are known to out-compete indigenous species, provide a high fuel load that intensifies veld fires, have high water demands and alter the nutrient composition of soil that indigenous vegetation rely on. The FNR also hosts several invasive alien plant species, including garden escapes, ruderal and cosmopolitan garden species, and serious plant invaders such as Acacia (*Acacia* spp.), Gum trees (*Eucalyptus* spp.), Pines (*Pinus* spp), Stink bean (*Paraserianthes lophantha*), and Australian myrtle (*Leptospermum laevigatum*) and Spreading Century-Plant (*Agave americana* var. *Expansa*). Dense infestations of invasive plant species disrupt natural burning regimes, use more water than indigenous vegetation, and are one of the biggest drivers of biodiversity loss.

Species such as Garden Route Keurboom (*Virgilia divaricata*), Thatching Reed (*Thamnochortus insignis*) and Garden Route Ragwort (*Senecio pterophorus*), are indigenous to South Africa, but not locally indigenous to the Hermanus region, can also become invasive and are monitored by the HBS. These indigenous invaders are presently confined to the lower riverine areas of the Reserve.

The invasive Spreading century plant (*Agave americana variant expansa*) has taken hold amongst the Aloes on Hoy's Koppie. In addition, Thatching Grass (*Thamnochortus insignis*), is fast becoming established on Hoy's Koppie, particularly on the northern side. The Madeira vine (*Anredera cordifolia*) is categorised 1b in the NEM: BA Alien and Invasive Species Lists (2016). The vine is difficult to eradicate and is quickly becoming a problem along the coastal cliff path portions of the FNR. Canary Creeper (*Hedera canariensis*) an evergreen perennial (Category 3) must be removed from infested areas of the FNR.

The term NBAL is defined as a Natural Biological Alien. As this requires mapping of same species of the same age and density, it makes it very challenging to maintain the mapping database. Overstrand Municipality (OM) thus opted for the term "Clearing Unit" as these unites can be standardised to ensure effective clearing and follow-up. The Clearing Unites are uniquely numbered in accordance with the National Mapping standards (10 Digit ID that includes the quaternary catchment) and example of this would be: G40H400319 – A clearing unite in the Mossel River of Fernkloof Nature Reserve. The OM Clearing Plan is GIS driven and has been submitted and approved by province.

From Mapping to clearing and monitoring, national Working for Water Standards are used. Person day calculation are also done in accordance with national norms and standards. A person day calculation tool, that draws directly from these norms have been developed for the use in Fernkloof Nature Reserve and all other municipal open spaces.

As density estimations are subjective and does not always take the entire workload into account, it was decided that a percentage workload would be used in the tool. The percentage levels are stated in the table below.

Figure 7. Percentage levels of alien plant infestations

0 – 5%	5 – 10%	10 – 20%	20 – 30%	30 – 40%	40 – 50%	50 – 60%	60 – 70%	70 – 80%	80 – 90%	90 – 100%
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Workload percentage also consider; Drive Time, Walk Time, Clearing Method, Stacking, etc. The workload does not take riparian calculations into consideration as this is a separate function of the calculation tool.

Figure 8. Table of the Person Day Calculation Tool (September 2022)

OVERSTRAND Overstrand Environmental Management - Invasive Plant Field Verification and Site Instruction Sheet										Total Adjusted Man Days			638,17		Estimated Calendar Days for a clearing Team of 8 People >>>	80
										Estimated Cost		R 87 939,83				
										Cost Per Man Day		R 137,80				
Entry	Clearing Unit ID	Area (Ha)	Growth Form	Dominant Spp	Work Load (%)	Size	Stage	Method	Riparian Code	Norm MD/ha	Unadjusted Man Days	Additional Calendar Days for Work Load (team of 8)	Adjusted ManDays (AMD)	AMD / Ha	Motivations - if a percentage adjustment has been entered	
a	G4DH400010	2,00	Sprouting Trees	Port Jackson Willow	60,00	Adult	Follow-up	Cutstump	Riparian	18,310	36,62	1	46,62	23,3	Trees must be cut and stacked for burning	
b	G4DH400319	8,00	Non Sprouting Trees	Hakea Spp	60,00	Adult	Follow-up	Cutstump	Riparian	60,000	480,00	1	490,00	61,3	Trees must be cut and stacked for burning	
c	G4DH400320	5,00	Sprouting Trees	Australian Myrtle	60,00	Adult	Follow-up	Cutstump	Riparian	18,310	91,55	1	101,55	20,3	Trees must be cut and stacked for burning	

In 2018, a detailed survey of 82 clearing units was conducted covering 1 084 hectares of the total 1 784 hectares of Fernkloof Nature reserve. The average density of the clearing units was 15% with the highest density recorded as 60%. Prior to a clearing contract to being generated, the clearing unit is reverified to ensure accuracy in workload.

6.3.9 Fire Management Regime

Also refer to: 9.5. Fire Management; Management Action Table 1.5. Fire Management.

Fire is a fundamental driving force in fynbos dynamics, being both inevitable and necessary in fynbos ecosystems. In modern fynbos, fire is the dominant natural disturbance, and managing fynbos equates to managing fire. Temperature and relative humidity strongly influence fuel moisture, which in turn determines whether and how the vegetation will burn, while wind velocity drives the spread of fires. The timing and frequency of fires is crucial. Many species such as proteas need at least 10 years between fires to build up a sufficient seed bank to re-seed. The ideal interval between fynbos fires is about 15 years. The time of year of the fire and the rainfall pattern during the first year after fire are critical to the survival of many small seedlings and newly sprouted plants. Differences in fire intensity and frequency, rainfall patterns in the ensuing year and many other factors will influence what species survive.

Projections of global changes to climate suggest that much of the CFR will become hotter and drier which has definite implications for fire regimes. Fire frequency is likely to increase under predicted changes in temperatures and rainfall. Synoptic states associated with fire occurrence (and in particular, strong high-pressure systems leading to berg winds) have increased in frequency during

the past four decades in the CFR. Many wildfires have started like this here in the Fernkloof Nature Reserve¹.

The existing wildfire management strategy focuses on protecting properties adjacent to the Reserve from wildfires that start on the FNR, and *vice versa*. Fire protection measures include using existing roads and fire control belts as access routes from for wildfire control and management.

The FNR management intent is to apply an ecological Fire Management Plan for the FNR, which not only considers fire safety in terms of infrastructure, but also aims to actively manage a shifting mosaic of different vegetation ages and patch sizes. Such a mosaic is achieved through controlling the spread of wildfires in the landscape, and through undertaking scientifically determined prescribed burns.

As a member of the Greater Overberg Fire Protection Association (GO FPA), the EMS can employ the assistance in the event of wildfires in and around the FNR.

Burning along the coast must be scientifically motivated. Current coastal thicket adds another habitat to the reserve. Management must clearly spell out what objectives they want to achieve with coastal burns and how it relates to the Management Plan objectives. To ensure that prescribed burns are scientifically scheduled, fire monitoring and record-keeping must be undertaken, and the extents of all prescribed burns and wildfires must be mapped on a geographic information system (GIS) for ease of updating and recording. Post-fire vegetation monitoring is currently performed by the FNR with assistance from the HBS. Post-fire vegetation monitoring should be mapped and captured on GIS to develop a veld age map for the FNR. The veld age map should be updated annually and added to the FNR annual audit and Annual Burning Plan.

6.3.10 Mammalian Fauna

Also refer to:

9.3. Ecosystem and Biodiversity Management

9.4. Wildlife Management

Management Action Table 1.3. a) Ecosystem & Biodiversity Management: General Actions.

Management Action Table 1.3. g) Mammals.

Management Action Table 1.4 Wildlife Management.

A well-documented characteristic of the fynbos biome is the relatively low number and biomass of herbivorous animals supported by the vegetation type¹. Fernkloof does not support any large game species only naturally occurring ecotypical small antelope.

The varied terrains of the FNR supports at approximately 58 mammalian species associated with the vegetation types and include Red List threatened² species *viz.* the Cape Clawless Otter (*Aonyx capensis*) (NT) (Figure 8), the Cape Mountain Leopard (*Panthera pardus*) (VU), the Grey rhebok (*Pelea*

¹ Kraaij, T., & van Wilgen B.W. 2014. Firebook: Drivers, ecology, and management of fire in fynbos.

²The Red List of Mammals of South Africa, Swaziland and Lesotho. South African National Biodiversity Institute and Endangered Wildlife Trust, South Africa.2016

capreolus) (NT) and the true fynbos endemic Cape Spiny mouse (*Acomys subspinosus*) (LC)¹. Verreaux's mouse (*Myomyscus verreauxii*) an important *Protea* pollinator is also likely to occur in the FNR. Other species recorded is the African wild cat, (*Felis lybica*) and the Honey Badger, (*Mellivora capensis*) (V), according to Smithers (1986), South African Red Data Book and the Chacma baboon (*Papio ursinus*), which will be discussed under the section Wildlife Management.



6.3.11 Avifauna

Also refer to:

9.3. *Ecosystem and Biodiversity Management.*

9.4. *Wildlife Management.*

Management Action Table 1.3. a) Ecosystem & Biodiversity Management: General Actions.

Management Action Table 1.3. f) Avifauna.

The FNR forms part of the Cape Whale Coast (CWC) Important Bird Area (IBA) that extends from the Stony Point seabird colony to the Klein River Estuary. The IBA is predominantly coastal, although it does incorporate important estuarine and inland systems. The Cape Whale Coast IBA supports more than 233 bird species, at least 86 of which are waterbirds. The wetlands across this IBA have historically held up to 25 000 birds and on occasion even more than 40 000. The Bot River–Kleinmond system and the Klein River estuary are important summer refuges for waterfowl when ephemeral waters dry up and birds are forced to seek permanent water.

The IBA regularly supports large numbers of Anatidae, including Yellow-billed Duck (*Anas undulata*) and Southern Pochard (*Netta erythrophthalma*). The estuarine systems also hold important numbers of Cape Shoveler (*Anas smithii*), Black-necked Grebe (*Podiceps nigricollis*) and Great Crested Grebe (*P. cristatus*), which breed here. The waterbodies are considered to be of vital importance for Great White Pelican (*Pelecanus onocrotalus*), as most of its regional population depends on them for long

¹Palmer, G., Midgley, J., Pence, G. & Avery, M. 2017. *Acomys subspinosus*. The IUCN Red List of Threatened Species 2017: e.T275A110016981. <http://dx.doi.org/10.2305/IUCN.UK.2017-2.RLTS.T275A110016981.en>. 8

periods when conditions elsewhere are unfavorable. Important numbers of Greater Flamingo (*Phoenicopterus roseus*), Hartlaub's Gull (*Chroicocephalus hartlaubii*) and Caspian Tern (*Sterna caspia*) occur regularly. African Marsh Harrier (*Circus ranivorus*) is occasionally present in small numbers.

In summer, the estuaries have historically supported more than 4 000 waders of at least 11 different species, of which Curlew Sandpiper (*Calidris ferruginea*) is dominant. Terns, which are at times very abundant, use the estuaries largely as a roosting area, from which they move to marine environments to feed. African Black Oystercatcher (*Haematopus moquini*) occurs near the estuary mouths and along sandy beaches on the seaward side of the coastal dune fields, where it has been recorded breeding. Important populations of Cape Cormorant (*Phalacrocorax capensis*), Bank Cormorant (*P. neglectus*), Crowned Cormorant (*P. coronatus*) and Cape Gannet (*Morus capensis*) also occur here¹. Other estuarine and aquatic species that occur in the FNR include Eurasian Curlew (*Numenius arquata*), Maccoa Duck (*Oxyura maccoa*) and Chestnut-banded Plover (*Charadrius pallidus*).

The Fernkloof Nature Reserve and its Garden is hugely underestimated as a birding destination and compares with similar destinations such as Harold Porter Botanical Gardens and the Karoo Botanical Gardens at Worcester. The vegetation of the FNR is predominantly fynbos and the bird species diversity is therefore typical of this habitat. Ornithophily (bird pollination) is common in the Fynbos Biome, and birds pollinate approximately 5% of fynbos taxa².

Of the 68 species of endemic birds found in South Africa, 48 species are known to occur in the CFR and six of the eight strictly fynbos endemic bird species³ are known to occur in the FNR. Figure 10. Fynbos Endemic Avifauna found within the FNR below shows the species of fynbos endemic birds known to occur in the FNR.

Figure 11. Fynbos Endemic Avifauna found within the FNR

Common Name (<i>Species name</i>)	IUCN Red List Status
Cape siskin (<i>Crithagra totta</i>)	Least Concern
Hottentot buttonquail (<i>Turnix hottentottus</i>)	Endangered
Victorin's Warbler (<i>Cryptillas victorini</i>)	Least Concern
Cape sugarbird (<i>Promerops cafer</i>) (Figure 9)	Least Concern
Orange-breasted sunbird (<i>Anthobaphes violacea</i>)	Least Concern
Cape Rockjumper (<i>Chaetops frenatus</i>)	Near Threatened

Raptor species that occur in the FNR include Jackal Buzzard (*Buteo rufofuscus*) (LC), Steppe Buzzard (*Buteo buteo*) (LC), Yellow-billed Kite (*Milvus aegyptius*) (not evaluated), African Marsh Harrier

¹ Birdlife South Africa. Cape Whale Coast. Available online: <https://www.cepf.net/sites/default/files/iba-statusreport2015.pdf>

² Mucina, L., Rutherford, M.C. (eds) (2006). The Vegetation of Southern Africa, Lesotho and Swaziland. Strelitzia 19. South African National Biodiversity Institute, Pretoria

³ Wright, D., and Lee, A. 2017. Bird-friendly Habitat Management Guidelines for the endemic birds of the Fynbos Biome BirdLife South Africa, Johannesburg.

(*Circus ranivorus*) (E), Black Harrier (*Circus maurus*) (E), Lanner Falcon (*Falco biarmicus*) (V) and a pair of Verreaux's Eagles (*Aquila verreauxii*) (LC).

Areas of thick scrub and forest alongside streams support seed and insect-eating species such as the African Olive-Pigeon (*Columba arquatrix*) (LC), Canaries, Flycatchers, Knysna Woodpecker (*Campethera notata*) (NT) and Cape White-eyes (*Zosterops pallidus*). The summer months herald the arrival of migrants such as swallows, cuckoos, and Steppe Buzzards.

The Hermanus Bird Club (HBC) maintains a list of over 100 species of the avifauna found in the FNR and contributes regular updates of FNR bird species lists to the University of Cape Town's Percy Fitzpatrick Institute.

The Fernkloof Birding Project initiated by the HBC and Birdlife South Africa and supported by various contributors and partners has designed and erected birding environmental educational poster boards within various areas of the FNR. Overberg Birdlife manages the project, raises fund, and provides and maintain signboards for the project. Within the FNR 11 education bird poster boards have been erected that display information regarding habitats, typical species, and threats to bird biodiversity.

6.3.12 Reptiles and Amphibians

Also refer to:

9.4. *Wildlife Management.*

9.3. *Ecosystem and Biodiversity Management.*

Management Action Table 1.3. a) Ecosystem & Biodiversity Management: General Actions;

Management Action Table 1.3. e) Herpetofauna.

Relatively little is known about the herpetofauna (reptiles and amphibians) of the FNR and monitoring and research is required. Amphibians and reptiles are considered indicator species and their presence or absence is indicative of the state of health of an ecosystem.

Snakes that may be encountered on FNR include Puff Adder (*Bitis arietans*)(LC), Berg Adder (*Bitis atropos*)(LC), Common Slug Eater (*Duberria lutrix*)(LC), Brown House Snake (*Lamprophis capensis*) (LC), Olive House Snake (*Lamprophis inornatus*) (LC), Mole Snake (*Pseudaspis cana*) (LC), Spotted or Rhombic Skaapsteker (*Psammophylax rhombeatus*) (LC), Common Egg-Eater (*Dasypeltis scabra*) (LC), Boomslang (*Dispholidus typus*) (LC), Cape Cobra (*Naja nivea*) (LC) and Rinkhals (*Hemachatus haemachatus*)(LC).

Lizards known to occur in the FNR include the Vulnerable Listed Cape Dwarf Chameleon (*Bradypodion pumilum*)¹ and other species such as the Cape Mountain Lizard (*Tropidosaura gularis*) (LC), Common Mountain Lizard (*Tropidosaura montana*) (LC), Cape Grass Lizard (*Chamaesaura anguina*)

¹The IUCN Red List of Threatened Species. Version 2018-1. <www.iucnredlist.org>.

(conservation status not assessed by the IUCN Red List), Cape Girdled Lizard (*Cordylus cordylus*) (LC), Southern Rock Agama (*Agama atra*) (LC).

Two species of tortoise are known to occur in the FNR, the endemic Angulate tortoise (*Chersina angulata*) (LC) and the Common Southern Padloper (*Homopus areolatus*) (LC).

Amphibian species known to occur in the FNR are Purcell's Ghost Frog (*Heleophryne purcelli*) (LC), the Arum Lily frog (*Hyperolius horstockii*) (LC), the Cape River frog (*Amieta fuscigula*) (conservation status not assessed by the IUCN Red List) and the Clicking Stream frog (*Strongylopus grayii*) (LC).

Notable Amphibian species:

At the present time, the known range of Drewes' Moss Frog (*Arthroleptella drewesii*) is not well established. Presently, the four species of the genus *Arthroleptella* that reside in the mountains of the south-western cape are believed to reside in different mountain ranges, but all of the mountains in the distribution of the genus have not been surveyed. *Arthroleptella drewesii* is currently only known from the Fernkloof Nature Reserve in Hermanus and adjacent wet areas on the Kleinrivier mountains above 200 meters elevation. The Drewes' Moss Frog is listed on the International Union for the Conservation of Nature (IUCN 2018) Red List of Threatened Species as Near Threatened (NT) due to its restricted range of approximately 101km¹.

The Cape Rain frog (*Breviceps gibbosus*), listed as NT due to endemism within the Southwestern portion of the Western Cape's Fynbos Biome, has an unknown population. The Cape rain frog lives underground and usually emerges just before rains, hence its name, but may also be seen in misty or damp conditions. Its burrowing provides an important role in aerating of soil.

The Rose's Mountain Toad (*Capensibufo rosei*) which was previously described as occurring within the FNR has been recently (Channing, Measey, De Villiers, Turner & Tolley, 2017) redescribed as the Moonlight Mountain Toadlet (*Capensibufo selenophos*)². Accounts of this species prior to 2017 require care in reading since the species was more wide-ranging and to include the morphologically distinct populations now named (*Capensibufo deceptus*), (*Capensibufo magistratus*), and (*Capensibufo selenophos*)³. There is still limited knowledge available on the population status and distribution range of this specific species, but approximate locations can be downloaded from Map Of Life (MOL)⁴. It is only found in fynbos heathland on the Cape and it does not seem to be adaptable to the changes in habitat associated with an increase in nonlocal plants and burning of the heathland that sometimes occurs. Although it is locally common at temporary pools in the breeding season, it occupies only

¹ IUCN SSC Amphibian Specialist Group & South African Frog Re-assessment Group (SA-FRoG). 2016. *Arthroleptella drewesii*. The IUCN Red List of Threatened Species 2016: e.T58058A77158328. <http://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T58058A77158328.en>.

² IUCN SSC Amphibian Specialist Group, South African Frog Re-assessment Group (SA-FRoG). 2017. *Capensibufo selenophos*. The IUCN Red List of Threatened Species 2017: e.T112716203A112716215. <http://dx.doi.org/10.2305/IUCN.UK.2017-2.RLTS.T112716203A112716215.en>.

³ THE AMERICAN MUSEUM OF NATURAL HISTORY. Amphibian Species of the World. (*Capensibufo rosei*) (Hewitt, 1926). <https://amphibiansoftheworld.amnh.org/Amphibia/Anura/Bufonidae/Capensibufo/Capensibufo-rosei>.

⁴ MAP OF LIFE (MOL). *Capensibufo selenophos*. https://amphibiaweb.org/cgi/amphib_query?where-genus=Capensibufo&where-species=selenophos.

about 2% of the suitable habitat in its range. The Cape Mountain toad is found at elevations of between 60 and 1,600 m above sea level, mostly at altitudes above 400 m.

6.3.13 Fish

Also refer to:

9.4. *Wildlife Management.*

9.3. *Ecosystem and Biodiversity Management.*

Management Action Table 1.3. a) Ecosystem & Biodiversity Management: General Actions.

Management Action Table 1.3. d) Fish & Aquatic Organisms.

Management Action Table 1.3. j) Catchment, Groundwater & Rivers.

Management Action Table 1.4. Wildlife Management.

The Cape Fold Mountains are associated with the CFR where isolated fish lineages with high levels of endemism have recently been acknowledged to occur¹. Indigenous fish species such as Data Deficient Cape Galaxias (*Galaxias zebratus*)² and Cape Kurper³ (*Sandelia capensis*) are both currently undergoing taxonomic review and, based on research in neighbouring catchments, unique lineages could possibly also still occur in FNR river systems.

As freshwater alien fish species were introduced into the Mossel River system in the past, species such as Smallmouth Bass (*Micropterus dolomieu*) and Trout (*Oncorhynchus* spp.) possibly still occur in the Mossel River and/or in the three dams on the reserve.

In terms of the above, a survey must be conducted to confirm the existence, status and distribution of the fish species presently occurring in and around the FNR, and to determine the potential extent of the impact of the alien fish species present on the natural aquatic systems or species.

If it is found that alien fish species do occur in the FNR, a management strategy to eradicate the specific species or to mitigate against the negative effects of the species on natural ecosystems, must be conducted.

6.3.14 Invertebrates

Also refer to:

9.4. *Wildlife Management.*

9.3. *Ecosystem and Biodiversity Management.*

Management Action Table 1.3. a) Ecosystem & Biodiversity Management: General Actions.

Management Action Table 1.3 c) Invertebrates.

¹ Skelton, Paul & Swartz, Ernst. (2011). Walking the tightrope: Trends in African freshwater systematic ichthyology. *Journal of fish biology*. 79. 1413-35. 10.1111/j.1095-8649.2011.03085. x.

² Swartz, E., Impson, D. & Cambray, J. 2007. *Galaxias zebratus*. The IUCN Red List of Threatened Species 2007: e.T8816A12934076. <http://dx.doi.org/10.2305/IUCN.UK.2007.RLTS.T8816A12934076.en>.

³ Chakona, A. 2018. *Sandelia capensis*. The IUCN Red List of Threatened Species 2018: e.T19890A99447632. <http://dx.doi.org/10.2305/IUCN.UK.2018-1.RLTS.T19890A99447632.en>.

Invertebrates play a critical role in the functioning of all ecosystems as they contribute to maintaining soil fertility, decomposition, water quality, pest control and pollination. Invertebrates, such as termites, are keystone species. Termites recycle large quantities of plant biomass into the soil and keep the soil porous with their tunnelling, allowing water to infiltrate the soil. Previous perceptions of low diversity indexes of insect groups in the fynbos biomes are now understood to have insect diversity levels comparable to grassland and subtropical thicket biomes. Leafhopper and gall-forming insects are thought to be previously under-represented in insect diversity surveys of the CFR¹.

Relatively little is known about the species diversity and abundance of arachnids in the FNR surveys, and it is important that surveys are regularly performed to better understand their significance.

A South African National Survey of Arachnida (SANSA) was performed as part of a public survey in the FNR in 2010². The aim of the survey was to compile the first species list of spiders found in the FNR. At least five surveys have been performed since. The relatively few surveys performed have resulted in at least 270 specimens from 39 families represented by 92 genera and 137 species. Salticidae (Jumping spiders) was found to be the most species rich with 17 species represented, followed by the Gnaphosidae (Ground Wanders) (13 species), Thomisidae (Ground spiders) were represented by 12 species and 11 species of tangle web spiders (Theridiidae) were collected. Species found represented by a single individual (singletons) were from 18 families. Fourteen species endemics to the Western Cape are known to occur in the FNR. Of the total species of arachnids identified in South Africa, 6.7% of these species have been identified in the FNR. Two species located are the first description of the species distribution in the Western Cape, a species of jumping spider *Rumburak lateripunctatus* and a Sac spider species *Fuchiba capensis*³. Postgraduate student, Lina Almeida-Silva collected a specimen of Drymusidae in FNR. In 2017 another specimen was collected. In her studies of this family, she found that the specimens from FNR belong to a new genus and possibly new species, *Izithunzi* sp.nov. The generic name means shadows (*Izithunzi*) in isXhosa which refers to the retiring nature and cryptic. During this period two new “incomer species” (well known in other areas) of the Rain spider, *Palystis* spp were collected. A third specimen of *Palystis* species collected from FNR could be a new species described for the Rain spiders⁴.

Other arachnid species found in the FNR include: the Golden Orb Spider (*Nephila fenestra*) Garden Orb Spider (*Argiope australis*), Bark Spiders (*Caerostris sexcuspidata*), the Nursery Web or Fishing Spider (*Euprosthonopsis pulchella*), Rain Spider (*Palystes superciliosus*), Black Jumping Spider (*Thyene ogdeni*), Jumping Spider (*Hyllus dotatus*), Flower Crab Spider (*Thomisus citrinellus*), and the False Violin Spider (*Drymusa capensis*)⁵.

¹ Procheş, Şerban & Cowling, Richard. (2006). Insect diversity in Cape fynbos and neighbouring South African vegetation. *Global Ecology and Biogeography*. 15. 445 - 451. 10.1111/j.1466-822X.2006.00239.x.

² Veldtman, A., Dippenaar-Schoeman, A.S., Samways, M.J., Veldtman, R. Du Plessis, D. State of Biodiversity Report. 2017. Chapter 10. Arthropods. online: <https://www.capenature.co.za/wp-content/uploads/2018/01/SOBD-Report-2017-Chapter-10.pdf>

³ Hamilton-Attwell, V.L. and Dippenaar-Schoeman, A. *Spiders of Fernkloof Nature Reserve (FNR)*. Paper Presentation. SANSA Workshop. February 2017.

⁴ Facudo, M., Larque, A.P.G and Griswold, C.E. 2017. Molecular phylogeny and revision of the false violin spiders (Araneae: Drymusidae) of Africa 2017 The Linnean Society of London, *Zoological Journal of the Linnean Society*, 2017, XX, 1–41.

⁵ Hermanus Botanical Society. Marais, D. (ed). 2017. *Fernkloof Nature Reserve. Hermanus*. ISBN. 978-0-620-75924-3

Little is known of the invertebrates of the FNR, although species present are expected to be typical of fynbos assemblages. Invertebrates known to occur within the FNR include the Mountain Cockroach (*Aptera fusca*) which are known to be widespread in the fynbos biome within the Western Cape, the fynbos endemic Tenspot Ground Beetle (*Thermophilum decemguttatum*), the Southern Dewstick Bug (*Pameridea roridulae*) that has a symbiotic relationship with carnivorous *Roridula* plant species, Dung beetles (*Scarabaeinae spp*), the Spotted Blister Beetle (*Ceroctis capensis*) and the Swollen Restio Beetle (*Pseudorupilia ruficollis*) that relies on restios and fynbos for their pollen diet. None of the invertebrates have been evaluated by the IUCN and their conservation status is unknown.

Although alien invasive species management is largely focussed on plants, numerous invertebrate species such as the Argentine ant (*Linepethema humile*) which are known to displace indigenous species that are important for the dispersal of fynbos seeds and the Varroa Mite (*Varroa destructor*) that invades Cape honeybee hives, should be monitored and eradicated if necessary¹.

6.3.15 Alien Faunal Species

Also refer to:

9.3. *Ecosystem and Biodiversity Management*

9.4. *Wildlife Management.*

Management Action Table 1.3. a) General Actions.

Management Action Table 1.3. e) Herpetofauna.

Management Action Table 1.3. j) Catchment, Groundwater & Rivers

Management Action Table 1.6. Invasive and Non-Invasive Alien Species Management.

Alien animal species may have a negative effect on species and processes within an ecosystem, can introduce disease and/or be responsible for the introduction of unnatural gene flow from non-indigenous to indigenous populations. Wherever possible and appropriate, such animals must be removed from the FNR or humanely euthanized. Alien animals present in the reserve pose a threat or potential threat to the ecological processes and/or experience in the FNR. Mallard ducks, feral ungulates, rats, and other species (e.g., feral domestic cats and dogs) are considered potential threats.

The Guttural Toad (*Amietophrynus gutturalis*) is known to occur in the FNR. The toad is listed as NEM:BA Category 1b, is highly adaptable and competes for habitats with species such as the endangered Western Leopard Toad. Such animals must be removed from the Reserve or humanely destroyed as soon as possible after their presence is detected.

Introductions of alien animals to the FNR will not be allowed, except as part of management (e.g., for biological control of alien plant species) or research projects recommended by the EMS in consultation with the FAB. All such introductions must be documented by the Biodiversity Conservation Manager. If the introduction of alien species as a biological control for management purposes is considered, NEM:BA, NEMA and associated regulations must be consulted and complied with, particularly

¹ Ecosystem Guidelines for Environmental Assessment in the Western Cape. Ed 2. Published by: The Fynbos Forum.2016. Available online: www.bqis.org.za

NEM:BA Alien and Invasive Species Regulations Section 10. Invasive species research and biological control¹.

It is critically important that such exceptions do not have the potential to negatively influence the integrity and sustainability of the FNR's species and ecological processes.

6.4 Cultural Heritage

Also refer to:

9.7. Cultural Heritage Management.

Management Action Table 1.7. Cultural Resource Management

Little is known about the pre-colonial history of the FNR, although it likely provided some degree of food, shelter, and seasonal grazing to nomadic groups of indigenous Khoekhoen people, who were both hunter-gatherers and herders.

Archeological findings of shell middens, debris and artifacts found in the Klip Kop Cave located on the southern side of Hoy's Koppie intimate occupation by the Khoekhoen (Quena) during the Middle Stone Ages (250 000 - 50 000 years ago). Shell middens are also located on areas of the Cliff Path locally known as Rowweklip and Rietfontein.

It is likely that the Khoekhoen herders, who used fire to improve grazing lands for their livestock, did so on the lower slopes of the FNR. It is also likely that the early European settlers continued this trend. The more accessible forested gorges were probably also exploited by the early European settlers for timber, to produce a wide variety of wood products (wagons and building materials). Man has therefore managed and/or impacted upon the vegetation structure and composition of the FNR over many thousands of years.

Sir William Hoy, a Scottish-born head of the South African Railways from 1910 visited Hermanus regularly for the fishing, and for the relaxed atmosphere. To help preserve the Hermanus lifestyle, Sir William actively opposed the then plans to build a railway line from Botriver to Hermanus. Sir William Hoy was especially fond of climbing the Koppie and was subsequently buried there after his death in 1930, as was his wish. His wife, Lady Hoy, who died in England, was buried next to him in 1935, and their graves are still situated at the top of the Koppie today are an attraction to tourist and locals alike. The, the well-maintained paths (maintained by the OM and the CPMG) are wheelchair friendly and offer views of Hermanus, Fernkloof Mountains and Walker Bay².

The Annual Hermanus Camp (AHC) was founded in 1908 at "Piet se Bos" by the Reverend Ernest William Lasbrey of St John's Parish, Wynberg. By 1912 the site had moved to its current location and was used by the 1st Kenilworth Boy Scout Troop and other Troops for their annual camps. In 1969 the AHC split from the Boy Scout movement and, until today, recruits its members from parishes, and

¹ NEM:BA (Act No. 10 of 2004). Alien and Invasive Species Regulations (Government Gazette No. 37885, September 2014)

² Adapted from the Hermanus Historical Society website. Available: <http://www.hermanus-history-society.co.za/2015/08/28/hoys-koppie-the-jewel-of-hermanus/>

from local Western Cape schools. The AHC is still based on scouting traditions, with a Christian ethos.¹ Due to the high significance of the AHC (Erf 4771) within the local context of Hermanus, the AHC has been designated as a “Grade IIIA” Living Heritage Feature Local Heritage Site by Heritage Western Cape (HWC) on 9 January 2015 and has been placed onto the HWC Heritage Register.

The cultural heritage of the FNR must be managed judiciously to ensure its preservation for future generations. As such any disturbance of landscapes or features that significantly impact upon cultural resources must be avoided (where such disturbance cannot be altogether avoided, the impacts must be minimised and remedied).

Any burial sites or archaeological material discovered on the FNR must be reported to the EMS and the Overstrand Heritage and Aesthetics Committee. If need be, the Overstrand Municipality will need to appoint an archaeologist to investigate any finds. HWC and/or South African Heritage Resources Agency (SAHRA) must be informed if finds are deemed to be significant by the archaeologist.

6.5 Socio-economics of the Overstrand

Also refer to:

9.11. Socio-Economic Framework.

Management Action Table 1.11. Socio-economic Framework Management

The Overstrand Municipality is demarcated into 13 wards across Hangklip/Kleinmond, Greater Hermanus, Stanford and Greater Gansbaai. The 1708km² area has a 230km coastline and is in the South West portion of the Overberg District Municipality². According to the Department of Social Development’s 2018 projection, the Overstrand has a population of 102 024, making it the second largest municipality in the Overberg District¹.

The 2nd Review of the 5-year Integrated Development Plan (2019/20) identifies the following main economic drivers in the Municipal area³:

Tourism: Marketed as the Cape Whale Coast, the OM is situated 120km from Cape Town International Airport, and is easily accessible to both national and international tourists. The municipality has well-developed infrastructure, and the area has a suite of tourist attractions that contribute significantly to the GDP. Tourism in the OM contributes to other economic sectors including retail, catering, and accommodation.

Aquaculture and Agriculture: The OM has a well-established aquaculture sector which is one of the fastest growing industries in the OM. The thriving agriculture industry includes a growing viticulture sector. In the OM the aquaculture and agriculture sectors have mitigated job losses in the turbulent commercial fishing industry sector.

Manufacturing: The OM has a successful light manufacturing industry that contributes to employment creation in the area.

¹ A History of the Annual Hermanus Camp (2010). Available from

http://hermanuscamp.org.za/index_files/History_of_the_AHCamp.htm

² Overstrand Integrated Development Plan. 2st review of 5 year IDP (2019/20). 27 March 2019. Available online: <https://www.overstrand.gov.za/en/documents/strategic-documents/integrated-development-plan/6253-draft-2019-20-idp-review-27-3-2019/file>

Finance, real estate, and business services: The largest contributor to the municipal GCPR, this sector highlights the attractiveness of the area to retirement and job availability that are demonstrated by the demographic (ages 15-64). The sector continues to grow and counters job losses in the agriculture sector and contributes significantly to skills development.

Secondary service industry: This sector has had significant growth due to the demand for services, support and information that deals with the growing development demands of the municipality.

The OM Local Economic Development (LED) has three approaches:

- a) **Community based projects** include Building Entrepreneurship Communities, Investment Promotion, Harbour Development, Support and Growth of the Informal Sector.
- b) **Innovative projects** include Supply Chain and Economic Development, Agri-parks Project Implementation, Youth Focussed Projects, Emerging Farmer Support Programmes and Expanded Public Works Programmes (EPWP),
- c) **Skills development** includes Capacity Building Initiatives and Collaborative Partnerships Orientated Training.

7 Operational Management of the FNR

7.1. Operational staff

Also refer to:

9.14. Human Resource Management; Management Action Table 1.14. Human Resource Management

The current “permanent” human resource structure and capacity is not adequate to ensure that FNR is managed effectively and able to meet its Management Goals or implement all the Actions set out in the Management Action Tables (Tables 1.1. to 1.16). Therefore, the Organogram for the Environmental Management Services is currently under review (EMS Organogram 2022-2029) to ensure a short, medium, and long-term plan to increase the capacity of the EMS over the next 7 years and to develop posts in all required sections of the department. Council is currently busy with the review and re-design of the organisational structure. These needs will be assessed as part of this process. Vacancies can only be filled when fully funded in the budget of the OM. Below is the current staff component for the FNR, permanent and contract positions.

Figure 12. FNR Staff Component

Job Title	Area of responsibility	Post Status
Biodiversity Conservation Manager (1)	OM	Filled (1)
Principal Conservation Practitioner (1)	Fernkloof Nature Reserve, Kleinmond Nature Reserve, and Rooiels Nature Reserve.	Filled (1)
Senior Field Ranger: Terrestrial (1)	FNR	Filled (1)
Senior Field Ranger: Coastal (1)	FNR	Filled (1)

Senior Field Ranger: Special Projects (1)	All areas	Filled (1)
Junior Field Rangers (2) + (2)	FNR	2 Filled (2) 2 Not Approved
Education/Tourism Monitors (4)	FNR	Not Approved
General Workers (6)	FNR	Not Approved
Administrative Assistant (1)	FNR	Not Approved
LED Alien Clearing Team (5)	FNR	Not Approved
TOTAL	REQUESTED 23	APPROVED 7

The management of FNR is a specialised function requiring specialist continuity and therefore requires a dedicated permanent personnel component. An appropriate minimum staff component must consist of at least a dedicated Principal Conservation Practitioner, an Administrative Assistant, 3 Senior Field Rangers (one coastal, one terrestrial and one for special projects), and four junior field rangers. Another essential human resource requirement is a dedicated six-person skilled work force with a dedicated supervisor to manage daily operational tasks on the FNR and a small Alien Plant Clearing team to assist with alien clearing on the reserve only.

The FNR implements the EPWP Working for the Coast initiative that provides a trained labour force of 92 beneficiaries who contribute to FNR management deliverables including daily boardwalk maintenance for the Cliff Path portions of the reserve, trail maintenance and alien invasive plant removal but the programme has been inactive since the end of 2019 and has put tremendous pressure on the capacity of the reserve’s workforce and budget.

7.2. Important contributors to the Operational Management of the FNR

Also refer to:

9.2. Integrated Planning, Cooperative Governance and Co-management;

9.3. Ecosystem & Biodiversity Management;

9.9. Infrastructure Management;

Management Action Table 1.2. Integrated Planning, Cooperative Governance and Co-management;

Management Action Table 1.3. a) Ecosystem & Biodiversity Management: General Actions;

Management Action Table 1.3. b) Indigenous Vegetation;

Management Action Table 1.5. Fire Management;

Management Action Table 1.6. Invasive and Non-Invasive Alien Species Management;

Management Action Table 1.9. Infrastructure Management

The FNR staff compliment is supported and strengthened by volunteer groups and societies who continue to provide invaluable expertise, knowledge, services, and dedication toward the management to the FNR. The FNR recognise and are grateful for the following groups and their contributions and support to management of the reserve.

The Hermanus Botanical Society (HBS) assist with:

-
- regularly contribute to international and national conservation monitoring, specimen, and data collection initiatives;
 - assist with the OM mandate to conserve and protect the of flora and fauna in the reserve;
 - assist the OM with post fire vegetation monitoring in the reserve;
 - contribute funds and coordinate volunteers for the Hermanus Hacking Group alien vegetation clearing project;
 - commissioned the development of the Cliff Path portion of the FNR, the Fernkloof Gardens, the Fernkloof Visitors' Centre, the Hermanus Botanical Society Herbarium, The Hermanus Botanical Society Research Centre, and the Fernkloof Indigenous Nursery;
 - develop and deliver outreach and education initiatives including (amongst other) guided fynbos walks, fynbos presentations and talks, the annual Hermanus Flower Festival held at the FNR and;
 - developed, and continue to maintain, the reserve's website (www.fernkloof.org.za);
 - are acclaimed for the concept, design, and printing of the Fernkloof Nature Reserve Book in commemoration of the FNR 60th anniversary of the reserve.

The Cliff Path Management Group (CPMG) who assist with the:

- manage and maintain the Cliff Path portion of the FNR;
- restore and rehabilitate the natural vegetation along the Coastal Cliff Paths through alien vegetation clearing and replanting of natural vegetation;
- maintain signage;
- conduct and coordinate clean-up projects;
- maintain cultural heritage sites;
- provide communication with professional security groups to improve the personal safety of visitors to the area.

The Hermanus Bird Club who assist with:

- monitor and maintain avifauna species lists for the FNR;
- provide valuable research through bird ringing in the reserve;
- contribute significantly to environmental education initiatives for birds in the FNR.

The Hermanus Annual Camp who assist with:

- the maintenance of the property and infrastructure on Portion 5 of the FNR;
- ecological monitoring and rehabilitation of Milkwood forests in Portion 5 of the FNR

7.3. Financial Management

Also refer to:

9.13. Financial and Administrative Management;

Management Action Table 1.13.

The FNR is managed according to an Annual Plan of Operations (APO). The FNR APO is guided by the annual budget allocation that is determined by the OM for the EMS and various specific projects including infrastructure maintenance, alien invasive species and fire management. These APO's will

be available as subsidiary documents that will be submitted and added to the Management Plan every year. An assessment to determine the direct and indirect economic value of the ecosystem services that the FNR provide will give additional motivation for supplementary funding.

7.4. Infrastructure

Also refer to:

8. *The FNR Conservation Development Framework;*

9.9. *Infrastructure Management;*

Management Action Table 1.9. Infrastructure Management;

Appendix 7. Overstrand: Fernkloof Nature Reserve Recreational Trails Map;

Appendix 8. Overstrand: Fernkloof Nature Reserve Infrastructure Map.

The FNR is fragmented into six portions of protected areas which contain various infrastructure types that are listed below in the Figure 12. below. Responsibilities for maintenance of infrastructure are largely the onus of the OM and FNR although Lease Agreements and Co-Management Agreements are in place for a number of sites and are described in the PAMP in Section 1.5. Co-Management Agreements.

Figure 13. Table of Infrastructure located within the FNR

Feature Name	Location	Feature Type	Maintained by
OM Staff House & Garage	Portion 1.	Building	OM
Staff House & Garage	Portion 1.	Building	HBS
HBS Boardroom	Portion 1.	Building	HBS
Kitchen	Portion 1.	Building	HBS
Garage	Portion 1.	Building	HBS
Garage & Storeroom	Portion 1.	Building	HBS
Galpin Hut	Portion 1.	Accommodation	HBS
Fernkloof Ranger's Office	Portion 1.	Building	HBS
Main Hall	Portion 1.	Building	HBS
Ablutions x 2	Portion 1.	Building	HBS
Gate: Jeep Track	Portion 1.	Access	OM
Fernkloof Tar Road and Parking Area	Portion 1.	Access	OM
Gate: Main	Portion 1.	Access	OM
Gate: Three Dams	Portion 1.	Access	OM
Ablutions Galpin Hut	Portion 1.	Composting Toilet	HBS
Ablutions	Portion 1.	Building	HBS
Ablutions	Portion 4.	Building	HBS
Reservoirs x 7	Portion 1.	Reservoirs	OM
Viewing Points x 6	Portion 1.	Parking	OM
Baboon Fence	Portion 1.	Fence	OM
Garage & Storeroom	Portion 5.	Building	OM
HBS Herbarium	Portion 1.	Building	HBS
Indigenous Nursery	Portion 1.	Retail	HBS
Fernkloof Indigenous Nursery Office	Portion 1.	Building	HBS
Visitors' Centre	Portion 1.	Building	HBS
Klip Kop Cave	Portion 2.	Heritage Site	OHAC

Grave sites	Portion 2	Heritage Site	OHAC
Gate: Hamilton Russel	Portion 1.	Access	Landowner
Towers/Masks	Portion 1.	Various	Various

7.5. Roads/Jeep tracks

Roads and Jeep tracks within the reserve are spatially represented in Appendix 8. Overstrand: Fernkloof Nature Reserve Infrastructure Map.

Rotary Drive lookout point is utilised and is impacted upon by the public (e.g. by trampling, littering and vandalism). Projects are planned to formalise the area around the communication tower / radio mast, which is located just off (south of) Rotary Drive in order to be more visitor friendly but to still protect the integrity of the surrounding natural vegetation and landscape. Rotary Drive is maintained by OM Area Management.

The FNR Jeep Track is utilised by hikers and serves as an emergency access point for FNR rangers and fire-fighting vehicles. The Jeep Track is not accessible to the public by motorised vehicles.

7.6. Recreational Trails and Footpaths

Recreational trails and footpaths are spatially represented in Appendix 7. Map: Recreational Trails of the FNR.

A total length of ± 65 km of recreational trails exist on the FNR, including:

- a) Mountain hiking trails and footpaths within the main portion of the FNR, some of which are constructed as wheel-chair friendly paved walkways with rest benches. The trails were originally laid out by the HBS and are maintained by the OM, with support from HBS. Portions of the hiking trails are available for dog owners to walk their dogs on lead.
- b) The coastal Cliff Path (which meanders ± 11 km along the coast from the New Harbour to Piet-se-Bos, complete with wheelchair paths and ± 220 in-memorial benches) is maintained by the OM, with support from the Cliff Path Management Group (CPMG).
- c) A path up Hoy's Koppie, a portion of which is wheelchair-friendly is maintained by the OM with support from the HBS.
- d) The Hermanus Cycle Trail was originally established by Hermanus Cycles, in association with other role-players such as the Hermanus Tourism Bureau, and the FNR. The cycle trail is a ± 17 km circular trail signposted for clockwise travel that may be joined at various points. The trail surface is mainly that of a jeep track or "twee-spoor" track, but a few substantial stretches of single track add to the attraction of the route. An average rider may complete the route (which is also open to hikers, joggers, and dog-walkers), in less than 90 minutes. In 2012 the Hermanus Cycle Trail was revamped by the Pedal Power Association.
- e) The Piet-se-Bos portion of the reserve contains anti-erosion wooden walkways which are maintained by the OM.

7.7. Buildings

Buildings within the FNR are spatially represented in Appendix 8. Overstrand: Fernkloof Nature Reserve Infrastructure Map.

Buildings within the FNR are in the following portions of the reserve:

The main portion of the FNR contains a Botanical Centre located near the main entrance to the FNR, off Fir Avenue. This facility was commissioned and constructed circa 1970 by the HBS and consists of an auditorium, office complex, staff accommodation, kitchen, storage space, toilet blocks, herbarium, research facility and a nursery. The land on which the Botanical Centre stands is leased to the HBS.

A small visitors' centre (Figure 13.) is located at the car park where the HBS maintains a wild flower exhibit throughout the year. The Galpin Hut (Figure 14.), a basic self-catering overnight hut, located near the summit of 'Galpinkop' was erected by the HBS circa 1970 and refurbished by the OM in 2013, including the residential dwelling occupied by Nursery Staff of HBS. An additional Municipal residential dwelling is located to the west of the entrance gate. These buildings are maintained by the OM.

The coastal portion of the FNR: The Annual Hermanus Camp (AHC) is located adjacent to De Mond, the eastern end of the Cliff Path, adjacent to the mouth of the Klein River Estuary. The campsite includes a double garage and a store room, and a generator building (which houses an auxiliary generator for a submersible sewage pump-station).



7.8. Fences

Fences and beacons are spatially represented in Appendix 8. Map: Infrastructure within the FNR.

The FNR has no fixed boundary fencing. A few beacons and only rusted boundary fence remain indicate the boundary between the FNR and some of the northern neighbouring farms, and between the FNR and Vogelgat Nature Reserve. In addition, the Municipality erected an electrified (baboon-management) fence above the suburb of Voëlklip in 2008. The management of the baboon fence is set out in Management Action Table: 1.4. Wildlife Management.

To allow the free movement of animals into and from the FNR, the reinstatement of boundary fencing and the sensitive use of strategic fences will be reviewed. Whilst 15 new entry point signs were put

up during 2011, public entry fees are not currently charged, and no access control is exercised, except for the main entrance at the Fernkloof Garden. Tourism and Reserve management barriers in the form of internal fences/gates with No Entry/Reserve Management signs are placed in places that aim to restrict unauthorised access and to ensure rehabilitation of burnt sites.

7.9. The Indigenous Nursery, Gardens and Botanical Research Centre

The Indigenous Nursery, Gardens and Research Centre is in Portion 1 of the FNR. The nursery is maintained and managed by the HBS. Proceeds from nursery sale are used to fund projects within the HBS mandate. The Fernkloof Garden is at the entrance to Portion 1 of the FNR and consists of indigenous and non-indigenous flowerbeds, lawns for recreational activities, wheelchair and pushchair friendly pathways, environmental educational boards, cultural history information boards and plant labels with botanical information.

A memorial arboretum was developed in 2010. The memorial arboretum is currently at full capacity and alternative options for memorial initiatives will be investigated for the future.

The HBS Research Centre (HBSRC), opened in 2019. The concept and motivation for a Research Centre, process of setting it up and equipping with scientific instruments was undertaken by the HBS. Research is being managed by the HBS. The HBSRC facility will assist with the identification, collection, and preparation of specimens for the Millennium seed bank collection, facilitate training for new members, house laboratory equipment (including digital microscopes) and plant identification references, provide a platform for arachnid and amphibian identification and research. SANBI funded the digitizing of the 4000 specimens in the HBS Herbarium onto the BRAHMS database in 2016-2017.

7.10. Water and Waste Management

Also refer to:

9.3. Ecosystem and Biodiversity Management;

Management Action Table: 1.3. j) Catchment, Groundwater & Rivers;

9.9 Infrastructure Management;

Management Action Table 1.9. Infrastructure Management;

Appendix 4. Overstrand: Fernkloof Nature Reserve Hydrology Map.

7.10.1 Fernkloof Ecological Monitoring Report (Umvoto 2021)

The Fernkloof Mountains constitute the main recharge area for the Overstrand Local Municipality's Gateway, and Volmoed wellfields. Ongoing ecological monitoring in Fernkloof Nature Reserve (FNR, Ecological Monitoring Zone A) is required to ensure groundwater abstraction from these wellfields does not result in negative ecological impacts, particularly on wetlands, stream flow and vegetation growth. The recharge zone for the Camphill wellfield is situated in the Onrus mountains (Ecological Monitoring Zone B), however no formal ecological sites are currently monitored. Indications of stress to groundwater dependent ecosystems (GDE) in the unconfined recharge areas of the Peninsula aquifer may also offer insight into specific recharge mechanisms and responses relevant to the confined portions of the Peninsula aquifer, from which abstraction takes place.

Due to terrain and access limitations, monitoring boreholes cannot be drilled in the mountainous recharge regions. To substitute for such monitoring data, groundwater discharge from the unconfined Peninsula aquifer, in the recharge area, is monitored. Any large decline in the potentiometric surface of the aquifer, due to over abstraction, will result in a reduction or cessation of baseflow (groundwater) contribution to streams, wetlands, and seeps. Hydrochemical monitoring of surface streams assists in differentiating between surface water and groundwater contributions. Early warning indications of this decline are likely to first present in the monitoring boreholes between the FNR and the wellfields, however, timeous detection of environmental warning signals is an added mitigation to support ongoing environmental management and responsible use of the wellfield.

Ecological monitoring of recharge areas that are hydraulically connected to the Peninsula aquifer and could experience drawdown due to abstraction at the Gateway, Camphill and Volmoed wellfields is done as outlined in the Monitoring Protocol V. This includes monitoring of stream flow, water level and hydrochemistry of three streams in the FNR, vegetation counts across numerous transects and quadrats, and remote sensing of wetland extents.

Monitoring data and interpretation supports that groundwater abstraction is not adversely impacting on the availability of groundwater in the FNR. Hydrochemical data from the streams is aligned with long term trends, indicating the continued contribution of groundwater in the summer months. Additionally, the absence of downward trends in the NDVI signals, indicates that changes to wetland size are a result of natural competition of species rather than impacts from groundwater abstraction¹.

7.10.2 Mossel River Dams Water Management

Also refer to Appendix 4. Overstrand: Fernkloof Nature Reserve: Hydrology Map

Two concrete dams (known as dams 1 and 2) were built in the upper reaches of the Mossel River Valley during the 1920s to supply potable water to the then Mossel River Township, which was established circa 1908. The water was stored in a downstream reservoir. As the residential areas expanded, so did the demand for potable water, and a pipeline was laid from the adjacent Vogelgat Nature Reserve to the reservoir. The additional water from Vogelgat proved to be insufficient, and a third rock fill dam was completed downstream of dams 1 and 2 in 1947. Use of the water from the 3 dams was reduced after construction of the De Bos dam in 1976. Water from the three dams is currently used for irrigation at the Hermanus Golf Course and the Fernkloof Gardens.

7.10.3 Waste Management

7.10.3.1 Solid Waste Management

The primary objective of integrated waste management planning is to combine and optimize waste management in order to maximise efficiency and minimise the associated environmental impacts and financial costs. The FNR and EMS offices should be a living example of best practices in waste management. The OM waste recovery of source separation (i.e., the two-bag system of separating recyclables from non-recyclables) is implemented to increase the recovery rate of recyclable items and environmental awareness through resident's hands-on participation with recycling initiatives in

¹Water Source Development and Management Plan for the Hermanus Area, Fernkloof Ecological Monitoring Report: April 2021, Report prepared for the Overstrand Municipality.

the area. Garden refuse is stockpiled in waste management facilities and is chipped and composted at the Karwyderskraal facility¹.

Waste avoidance refers to a proactive approach to minimise waste production by not creating waste in the first place. The FNR gardens have an experimental Bin Free Garden project where visitors are requested to remove all their waste when they leave. This system also contributes to baboon and other wildlife species (such as rock hyrax) management by reducing human-wildlife conflict and discouraging unhealthy foraging behavior in the wildlife that occupy the FNR. The concept of “leave only footprints, take only photographs” should be promoted.

Dog waste must be removed by owners and transgressors are controlled by the Overstrand By-law relating to the Keeping of Dogs and Cats (2009) Section 6 (3) requires dog owners in public places to remove dog waste by placing it in a suitable container and disposing of it responsibly. In the FNR, signage indicates that dog waste must be removed from the reserve by the owner. Dog waste bins in the FNR are provided by Whale Coast Conservation (WCC). Cigarette smoking in the FNR must be discouraged to reduce wildfire risks. The largest contributor of litter is discarded cigarette butts despite the presence of Butt Bins provided by WCC.

The Rotary Drive and Hoy’s Koppie portions of FNR require better waste management; refuse bins are inadequate and are often ignored. Awareness and educational signage to promote anti-litter campaigns should be implemented and source separation (recycling bins) should be implemented where appropriate.

The Cliff Path Portions of the FNR utilise Fishing Line Bins (supplied by WCC in partnership with Dyer Island Conservation Trust).

7.10.3.2 Water and Sewage Waste Management

Current sewage management includes antiquated septic tank/French drain systems that must be replaced by conservancy tanks and waste water recycling systems where appropriate. The composting toilet at Galpin hut is sufficient for the needs of the over-night hikers. Modern, eco-friendly water saving infrastructure in ablutions should be implemented. These requirements could be achieved through a contract with WCC to promote and advertise WCC Green House sustainable waste management products.

7.11. Signage

Also refer to:

9.8.3 Guiding Principles for Law Enforcement and Compliance

Management Action Table 1.9. Infrastructure Management;

Management Action Table 1.11. Socio-Economic Framework Management;

Management Action Table 1.16. Visitor and Services Management.

¹ Overstrand Municipality Integrated Waste Management Plan (4th Generation) (Final Report). May 2015. Compiled by Jan Palm Consulting Engineers. Specialist Waste Management Consultants. Available online: www.overstrand.gov.za

Directional signage: All recreational walking and hiking mountain trails are clearly mapped and marked with directional signage and colour coded ground markers that give information to visitors about the difficulty and length of hiking and walking trails as well as road types (dirt or tar), picnic and parking areas, points of interest etc.

Informational signage: Clearly displayed within the main portion of the FNR, signage that dictates the internal rules of the reserve including areas that are accessible for dog walking.

Interpretational signage: includes attractive and informative signage in main portion of the FNR as well as “Discover Biodiversity” educational signage on the Cliff Path portions of the FNR. There are four clusters of 11 educational posters that make up the Educational Birding Trail of the FNR.

7.12. Natural Resource Utilisation

Also refer to Management Action Table 1.11. Socio-Economic Framework Management

7.12.1. Fauna and Flora Natural Resource Utilisation

The NEMA (1998) Section 2. National Environmental Management Principles speaks to sustainable development and the required consideration of relevant factors specifically: *(4)(a)(vi) that the development, use and exploitation of renewable resources and the ecosystems of which they are part do not exceed the level beyond which their integrity is jeopardised; (vii) that a risk-adverse and cautious approach is applied, which takes into account the limits of current knowledge as well as the consequences of decisions and actions and; (viii) that negative impacts on the environment and on people’s environmental rights be anticipated and prevented, and where they cannot be altogether prevented are minimised and remedied.*

NEM: PAA Regulations for the proper administration of Nature Reserves. Chapter 5. The Use of biological resources in Nature Reserves guides the authorisation and utilisation of natural resources in a protected area.

The EMS will consider applications for the extractive use of plant resources (e.g., Buchu *AgathOMA* spp. and invasive Thatching Reed), provided that the Goals of the FNR are not compromised and the effects on species, ecological systems, and management functioning (including monitoring of the effects of extraction) are determined to be non-detrimental. The extractive use of animal resources will not be considered, except if such animals are alien or alien invasive species (e.g. fish) as listed by NEM: BA.

The EMS must evaluate all extractive resource use applications whilst ensuring:

- the necessary consultation and relevant permits are acquired from CapeNature and the DEA&DP;
- due consideration of alternatives;
- sustainable and wise use of the resource;
- ecological and social acceptability;
- benefit to local communities;

-
- equitable access to the resource;
 - that the harvesting operations are effectively controlled and monitored; and
 - if approved, a written agreement is issued to the resource user stipulating resource price and/or conditions of harvest.

7.12.2. Bioprospecting

Bioprospecting within a protected area is regulated in NEMA (Act 10 of 2004) Chapter 6. The Minister (DFFE) is the issuing authority for Bioprospecting Permits. Applications for such permits must be supported by a Project Proposal, a Material Sharing Agreement, and a Benefit Sharing Agreement. The aforementioned documents are reviewed by the Bioprospecting Advisory Committee before permits are issued. Bioprospecting regulations do not apply to alien species but does include exotic/alien species/organisms that are genetically altered by genetic materials or compounds from indigenous species. Bioprospecting Permits will only be issued if *inter alia* stakeholders are protected. Requests to collect indigenous biological resource from the FNR for the purpose of bioprospecting (including discovery phase research) will only be considered from *bone fide* South African scientific institutions in terms Government Notice No. R 138 of 8 February 2008: NEM:BA Regulations on Bioprospecting, Access, and Benefit-Sharing. Bioprospecting however should not be allowed in a protected area and therefore will not be allowed in the FNR.

7.12.3. Abiotic Natural Resources Resource Utilisation

Section 48 1a) of NEM:PAA states that “Despite other legislation, no person may conduct commercial prospecting or mining activities in a special nature reserve or nature reserve”, therefore this activity will not be permissible in Fernkloof Nature Reserve in accordance with NEM:PAA.

7.13. Research and Monitoring

Current research and monitoring activities that currently occur within the FNR are elaborated upon in the relevant paragraphs of Section 6. Description and Context of the FNR. Also refer to 9.3. Ecosystem and Biodiversity Management and the corresponding Management Action Tables 1.3 (a-j)

Research and monitoring activities that occur within a nature reserve are promulgated in NEM: PAA Regulations for the Proper Administration of Nature Reserves (No. 35021 of 2012) Section 35: Research and monitoring; Section 37. Use of biological resources in nature reserves

Various aspects of the biophysical and natural environment, the functioning of the ecosystems, natural resource management (e.g., alien vegetation), and heritage resources are presently inadequately understood. Research is necessary to provide such information that will assist in ensuring that the natural and cultural heritage management goals of the FNR are realised.

Priority will be given to research that will provide information and understanding that is of direct benefit to the FNR and will guide management interventions required to achieve the protected area’s biodiversity, conservation, and cultural heritage goals in the most cost-effective manner. Opportunities will, however, be considered and provided for both applied and theoretical research.

Long term research and monitoring (e.g., of alien vegetation clearing and other factors affecting the sustained flow of good quality water from the FNR supplying the three dams, and the Gateway Well-Field) is desirable and necessary as a result of the dynamic and stochastic nature of the different ecosystems of the FNR, and to ascertain whether management actions are having their desired effects in terms of achieving conservation and enhancing the provision of ecosystem services.

Baseline data collection, monitoring and evaluation are required to determine whether conservation, cultural heritage and tourism goals are being achieved, and to ascertain the effectiveness of management interventions.

Partnerships and agreements with accredited scientific institutions will be promoted to stimulate and encourage the desired research in the FNR. Researchers (local and international) must be registered with a South African scientific institution. All proposed research must be reviewed, endorsed, and supervised by an accredited South African scientific institution. All proposals to undertake research within the FNR will be submitted to EMS for evaluation and approval, with recommendation from FAB (or approved by the Overstrand Municipal Council, if need be).

The EMS and CapeNature as well as external researchers must be consulted to identify and prioritise research and monitoring requirements. This research priority list will then be circulated to tertiary scientific institutions and made available on the FNR website. CapeNature have various ecological monitoring and research protocols and systems that can be adopted by the FNR. If these systems are adopted and data collection is standardised, the FNR would contribute to regional and national biodiversity programmes toward improving understanding of the area.

All research and monitoring data (including GIS data) collected within the FNR, must be collated, and stored in a database that is managed by the Reserve Manager. All raw data collected during research and monitoring within the FNR will remain the property of the OM EMS. Upon the completion of research and monitoring in the FNR, two hard and two electronic copies of all research publications produced must be provided. One copy each must be kept within the FNR and one at the EMS office, in a reference library. All research publications identified as management supporting documentation should be added to the PAMP and included in the annual report submitted to the MEC. Any management recommendations that may arise from research and monitoring should be brought before management and the FAB for consideration.

Due to the stochastic nature (random behaviour) of the environment, the predicted effects of climate change, and the length of time for management interventions to result in measurable change, it is desirable and necessary to implement long-term baseline collection and monitoring programmes. It is also important to monitor and record all management interventions and any changes in the biophysical environment to better understand the possible causes of any biological and environmental changes.

The Reserve Manager will be responsible for continuing with all existing monitoring programmes, and for undertaking the monitoring actions listed in this PAMP, and for presenting the data to the EMS

and FAB on an annual basis. Any existing monitoring programmes must be continued with unless there is a specific written decision by the EMS to terminate a particular monitoring programme.

7.14. Public Events and Activities

Also refer to 9.16. Tourism Development Framework; Management Action Table 1.16. Tourism Development Framework

The Tourism Conceptual Development Plan as discussed in 9.16 should consider events and activities described below and investigate opportunities available to increase and generate income. Various recreational activities in the area need to be identified and regulated to reduce damage to vegetation and sensitive habitats.

7.14.1. FNR Filming Policy

Also refer to:

9.16. Tourism Development Framework; Management Action Table 1.16. Tourism Development Framework.

There is an increasing demand for wildlife and landscape photography and footage for film, television, books, and advertising in South Africa and the Overstrand area. Production companies often work with large budgets and, if managed correctly, this is an opportunity for the FNR to generate alternative revenue without a negative impact on natural and cultural resources. Section 49 and 50 of the NEM: PAA regulates commercial activities in protected areas. NEM: PAA Regulations for the Proper Administration of Nature Reserves (No. 35021, 2012), Section 34 specifies that filming, services, and events requiring permit, agreements and authorisations required in Protected Areas.

Tourists or members of the public who take film or photographs for private use and/or personal enjoyment are not considered a commercial enterprise and the FNR cedes the right to such material. If however, the material filmed by amateur or professionals is used (or is intended to be used) for broadcast, commercial, resale, marketing or advertising, the filmmakers will be charged a fee that includes a location fee and other fees that are dependent on the specific filming requirements.

All commercial filmmakers/photographers should sign a code of conduct developed by FNR management that govern the following behaviour while filming in the FNR:

- physical harm/stress to wild animals;
- minimal impact on the environment;
- accuracy of information portrayed;
- where necessary the use of expert advice in natural history filming;

An agreement between the filmmakers and the management authority should include:

-
- A free copy of the finished product or publication for the purpose of education and information (not for resale/commercial use) be made available to the FNR;
 - The filmmakers/photographers acknowledge the FNR and FNR officials (when deemed appropriate) in the broadcast version/publication of the product created with footage and material filmed in the FNR;
 - The rules and regulations of NEM: PAA and the internal rules of the FNR are complied with;
 - In the case of filming in sensitive areas, or for any reason deemed necessary by the FNR and at the cost to the filmmaker/photographer, an Environmental Control Officer must oversee and control filming in the FNR.

The OM, as the management authority of the FNR, is the legal authority for commercial filming in the FNR. Permits for commercial filming can be obtained from the OM website.

7.14.2. FNR Venue Hire

The Fernkloof Hall is available for event hire in the FNR. The 130m² stone building can accommodate approximately 80 people and includes chairs and trestle tables, crockery, and cutlery, and a recently refurbished, well-equipped kitchen. The hall is available for workshops, presentations, and functions and bookings are made through the Hermanus Botanical Society.

8. The FNR Conservation Development Framework

8.1. Protected Area and Municipal Landuse

Also refer to

9.1. Legal Status and Reserve Expansion; Management Action Table 1.1.

9.15. Visitor & Services Management; Management Action Table 1.15.

9.16. Tourism Development Framework; Management Action Table 1.16.

The FNR is classified as Spatial Planning Category (SPC) Core Conservation Zone: Conservation 1 in the Overstrand Municipal Wide Spatial Development Framework¹ and the Overstrand Environmental Management Framework (EMF). Although there are possible Consent Use (e.g. Tourist facilities) within the Development Rules, the consent uses of the above Municipal Zoning will only apply for the FNR if the Management Plan in terms of NEM: PAA has made provision for such activities. This means that as the FNR is declared and the PAMP is a legal binding document, once it is signed by the MEC, any development applications will be required to go through the standard process of NEMA, NEM: PAA and the Management Plan for consideration.

The concepts of sustainable development are also addressed in Section 8.3, Sensitivity Analysis of the FNR. A sensitivity analysis of the FNR inform and support:

- Future infrastructure development;
- Reserve planning;
- Use and access within the reserve; and

¹Overstrand Municipal Wide Spatial Development Framework (Vol 2). 2006. Final Draft. Pg 23

-
- Management priorities for the FNR.

The Overstrand Municipal Landuse Scheme, gazetted by the Western Cape Provincial Government in 2020, zones the FNR as Open Space Zone 1: Nature Reserve (OS1) where the primary use is listed as a nature reserve and consent uses are defined in conjunction with the Development Rules applicable.

The consent uses of the above Municipal Landuse Scheme will only apply to the FNR, which is declared in terms of NEM: PAA, where this Management Plan has made provision for such activities. Any infrastructure development or layout must follow due process regarding any environmental application and authorization required.

The Municipal Spatial Planning Categories must not be confused with “Landuse Management Units”, as determined in the PAMP. The “Landuse Management Units” describe, at a much finer scale, the allowable land-uses and activities in clearly defined areas as described in Table 2. The approved protected area management plan determines the allowable and prohibited activities within each management unit.

Chapter 15 of the OM Landuse Scheme Regulations¹ allows municipalities to prepare, approve, amend, or delete overlay zones for specific areas, therefore the OM adopted the Environmental Management Overlay Zone (EMOZ) Regulations. The EMOZ regulations provide a mechanism for land use management, additional to existing statutory land use controls, whereby Council may give effect to specific guidelines in a spatial development framework or policy plan or address as specific management issue.

The above regulations apply, in addition to any other laws that may apply, to the Environmental Management Overlay zones within the area of jurisdiction of the Overstrand Municipality and bind all persons and organs of state within this area of jurisdiction. These regulations do not invalidate any land use rights or authorisation that existed when these regulations came into effect but may place additional constraints on existing rights.

8.2. Zonation and Land use within the FNR

In terms of Section 41 of the NEM: PAA, (2) a management plan must contain at least (g) a zoning of the area indicating what activities may take place in different sections of the area, and the conservation objectives of those sections.

As such, the area of the FNR is divided into four Landuse Management Units:

1. Conservation Units;
2. Transformed Units;
3. Special Management Units for Cultural Feature Protection;
4. Buffer Zones.

Refer to Table 2. Fernkloof Nature Reserve Landuse Management Units and Parameters for the individual objectives, characteristics, visitor activities, facilities, and infrastructure as well as Management Guidelines for the zones within in the FNR.

FNR Landuse Management Units are spatially represented in Appendix 9. Overstrand: Fernkloof Nature Reserve: FNR Landuse Management Units.

8.3. Sensitivity Analysis of the FNR

Spatial planning and decision-making in a reserve must not only consider critical biodiversity areas (CBAs) but must include biophysical, aesthetic and heritage attributes to inform constraints and opportunities within the reserve. Addition factors such as fire risks, costs (for e.g. of development in areas that are more expensive due to inaccessibility versus easier access areas).

Sensitivity maps cannot replace all onsite investigation but are a rapid review of known risks and can guide reserve planning to minimise negative environmental impacts¹.

A sensitivity analysis of the FNR will inform and support:

- future infrastructure development;
- reserve planning;
- use and access within the reserve; and
- Management priorities for the FNR.

Comprehensive sensitivity analysis of the FNR requires:

- expert assessment of key informants (biodiversity, heritage etc.);
- data production, synthesis and compilation;
- expert GIS layer verification and scoring;
- sensitivity value analysis for the production of final summary layers

The above processes and methods are implemented by CapeNature to ensure that the location, characteristics and mitigation for access, infrastructure development and activities within reserves are influenced by the best possible information available to management.

The sensitivity analysis is based on various physical, biodiversity and heritage layers to guide the Overstrand Municipality (OM) in the correct management of the Fernkloof nature reserve. The scale for the analysis is a 1:5 scale where 1 represents less sensitive and 5 most sensitive.

This analysis will guide OM in the development of Fernkloof nature reserve in respect of key aspects, such as tourist facilities, roads, hiking trails firebreaks and all physical and lateral infrastructure necessary for the management of a nature reserve.

Sensitivity maps gives a direct visual perspective of what is currently on the reserve and what is planned and will aid OM in decision making for future projects such as the closing of existing trails in the most sensitive areas and in opening of new trails in least sensitive areas, if required.

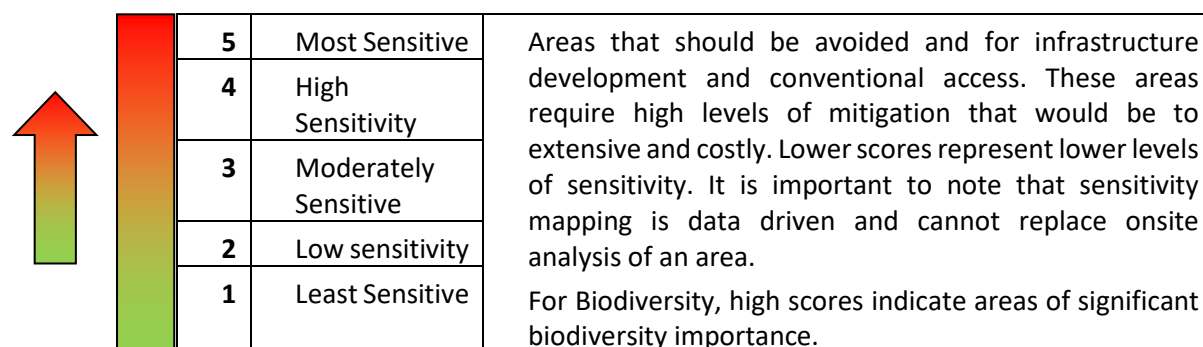
¹ Kirkwood, D. Ecological Planner, CapeNature. Biodiversity and Implementation Forum. Conservation Development Frameworks - Reserve Sensitivity Analysis and Zonation Process CapeNature's simplified approach. 2012. Available online: <http://biodiversityadvisor.sanbi.org/wp-content/uploads/2012/09/01SENS2.pdf>

Fernkloof Nature reserve is unique in that it surrounds the town of Hermanus, enclosing Hermanus from the northern mountain terrestrial side to the southern coastal zone. As such a sensitivity analysis is key in the mitigation of development of the town itself and the insurance of biodiversity of the Nature Reserve. Given the high slopes of Fernkloof and the low laying town of Hermanus on its borders, slope analysis is of particular importance given the risk of ember sparks during a wildfire.

It is imperative to note that the sensitivity analysis is only a guide for planning and cannot replace on-ground, site specific investigation prior to any final decision making.

Data used in this analysis is derived from scientific data and local knowledge to support this document. These resources are described in section 2 of this document.

Figure 16: Sensitivity sliding scale.



8.3.1 Desktop Resources

Figure 17: Desktop resources used for determining sensitivity analysis.

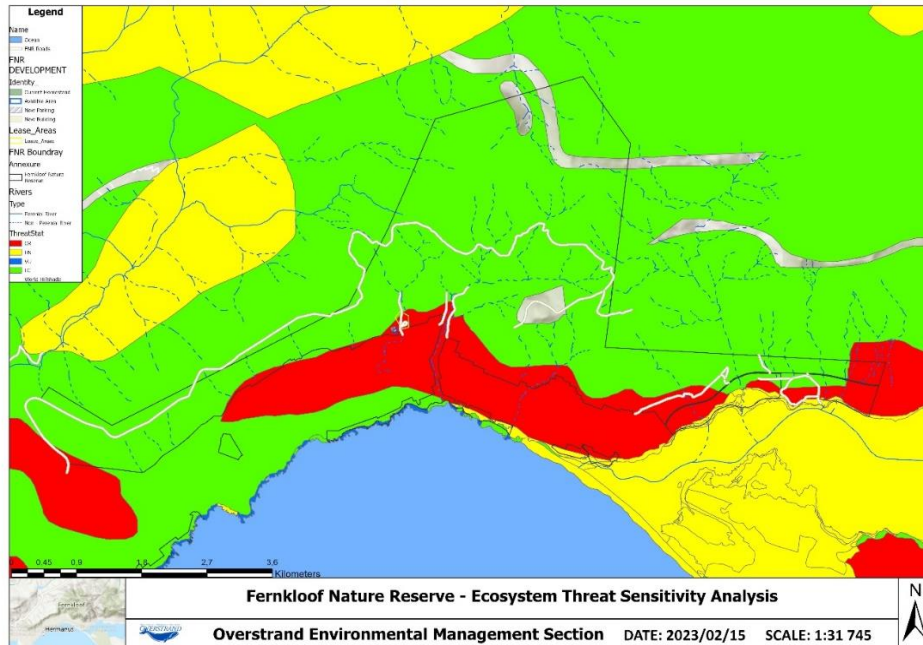
	Data Set	Type	Origen
2.2.	Biodiversity Layers		
2.2.1.	Ecosystem Threat Status 2018	GDB	SANBIGIS
	Vegetation Type	GDB	SANBIGIS
2.2.2.	Rivers	GDB	OM – GIS
	Wetlands	GDB	SANBIGIS
	Riparian Zones	GDB	OM – GIS
2.3.	Physical		
2.3.1.	Geology	GDB	SANBIGIS
2.3.2.	Slope		
	5 m Contour	GDB	OM – GIS
	FNR 5m TIN	TIN	Generated from 5 m Contour
	DEM 5m	Raster	Generated from FNR 5m TIN
	FNR Slope 5m	Raster	Generated from DEM 5m
2.4.	Additional Layers		
2.4.1.	Additional layers such as, but not limited Fernkloof boundary have also been used to define the area for the sensitivity study.	GDB	OM - GIS

8.3.2 Biodiversity

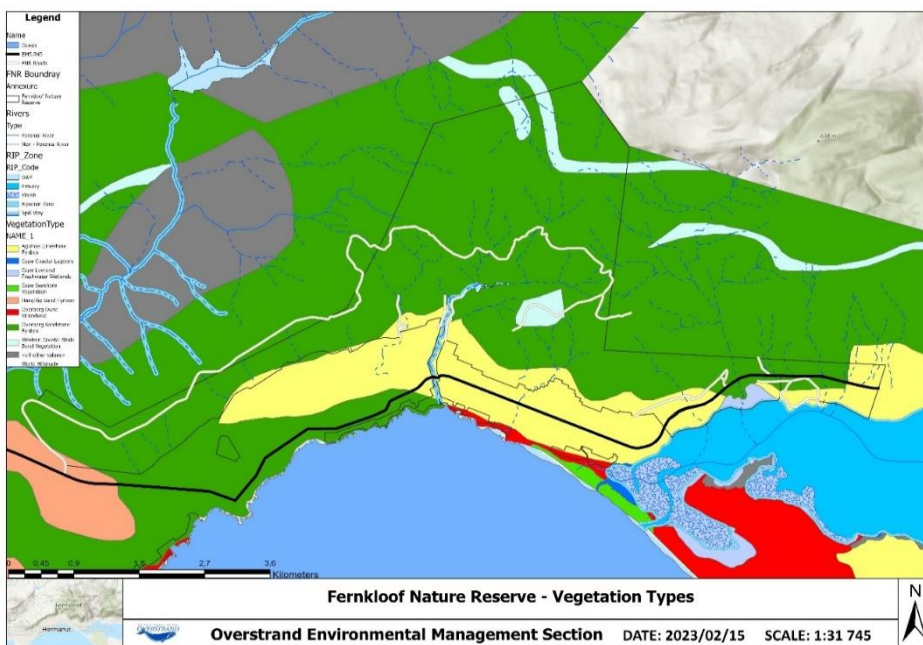
8.3.2.1 Ecosystem Threat Sensitivity Analysis and Vegetation Types

Fernkloof Nature Reserve (FNR) contains 8 individual ecosystems as described by The South African National Biodiversity Institute (SANBI). It is important to note that in 2018 a revision of the threat status of the vegetation types were adopted and the table below shows the difference.

Please see Map 1 and Map 2.



Map 1: Ecosystem Threat Sensitivity Analysis for FNR



Map 2: Vegetation Types for FNR

Figure 18: Ecosystem Threat Status, 2011/2022 adjustment table.

Ecosystem	Previous Status (2011)	Current Status (2022)	% Cover
Agulhas Limestone Fynbos	Vulnerable	Critically Endangered	12.19%
Cape Coastal Lagoons	Least Threatened	Least Threatened	0.01%
Cape Lowland Freshwater Wetlands	Least Threatened	Least Threatened	0.76%
Cape Seashore Vegetation	Least Threatened	Least Threatened	0.08%
Hangklip Sand Fynbos	Endangered	Critically Endangered	0.61%
Overberg Dune Strandveld	Least Threatened	Least Threatened	1.21%
Overberg Sandstone Fynbos	Least Threatened	Least Threatened	81.27%
Western Coastal Shale Band Vegetation	Least Threatened	Least Threatened	3.88%

Although 87.21% of FNR is listed as “Least Threatened” Fernkloof boasts over 1 250 plant species, of which an estimated 12% has some threat status. *Additional Information can be found in the Protected Area Manage Plan (PAMP), Section 6.3. FNR Context Vegetation*

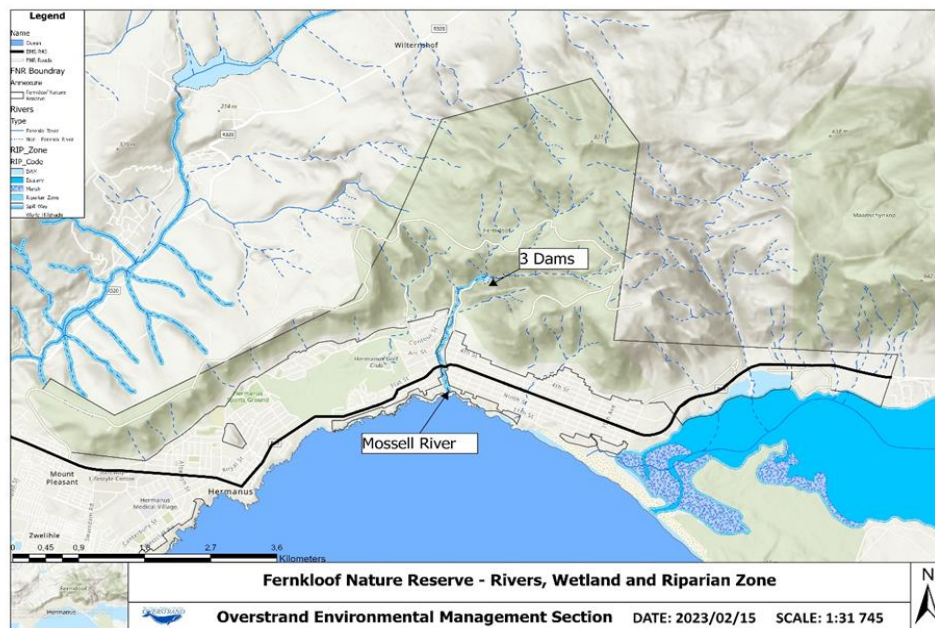
The Micro Ecosystems have not been sufficiently mapped for a proper analysis; however, these ecosystems are of great importance as species such as the Drewes’ Moss frog (*Arthroleptella drewesii*) with an IUCN status of near threatened utilise these habitats near the streams of Fernkloof Nature Reserve.

A full list of species biodiversity can be found in the PAMP, Sections.

- 6.3.9. FNR Context: Invasive and Alien Vegetation
- 6.3.10. FNR Context: Fire Management Regime
- 6.3.11. FNR Context: Mammalian Fauna
- 6.3.12. FNR Context: Avifauna
- 6.3.13. FNR Context: Reptiles and Amphibians
- 6.3.14. FNR Context: Fish
- 6.3.15 FNR Context: Invertebrates
- 6.3.16 FNR Context: Alien Faunal Species

8.3.2.2 Rivers, Wetland and Riparian Zone

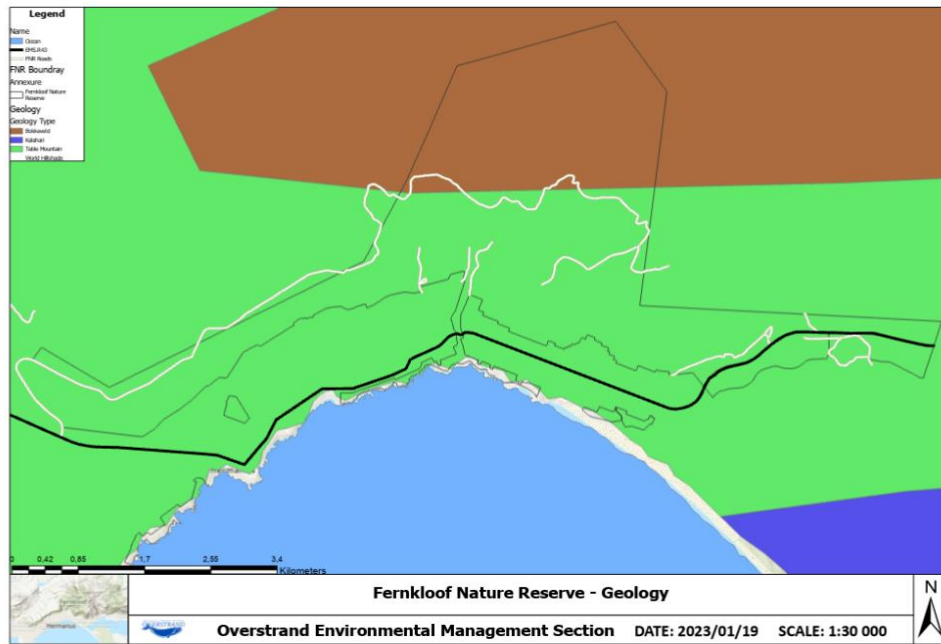
Fernkloof is characterised by a myriad of non-perennial streams, creating micro ecosystems for a host of fauna and flora. Only the Mossel River, flowing from the Three Dams can be seen as semi-perennial. The Mossel River terminates in the Mosel River Estuary, the smallest estuary in the Overstrand. Water from the three dams was traditionally used for the new town of Hermanus, but it is currently being used for the irrigation of the Golf Course and the Fernkloof Gardens. *Hydrology is fully discussed in the PAMP under section 6.3.3 FNR Context: Hydrology.* Development must avoid these sensitive areas. Please see Map 3.



Map 3: Rivers, Wetlands and Riparian Zones

8.3.2.3 Geology

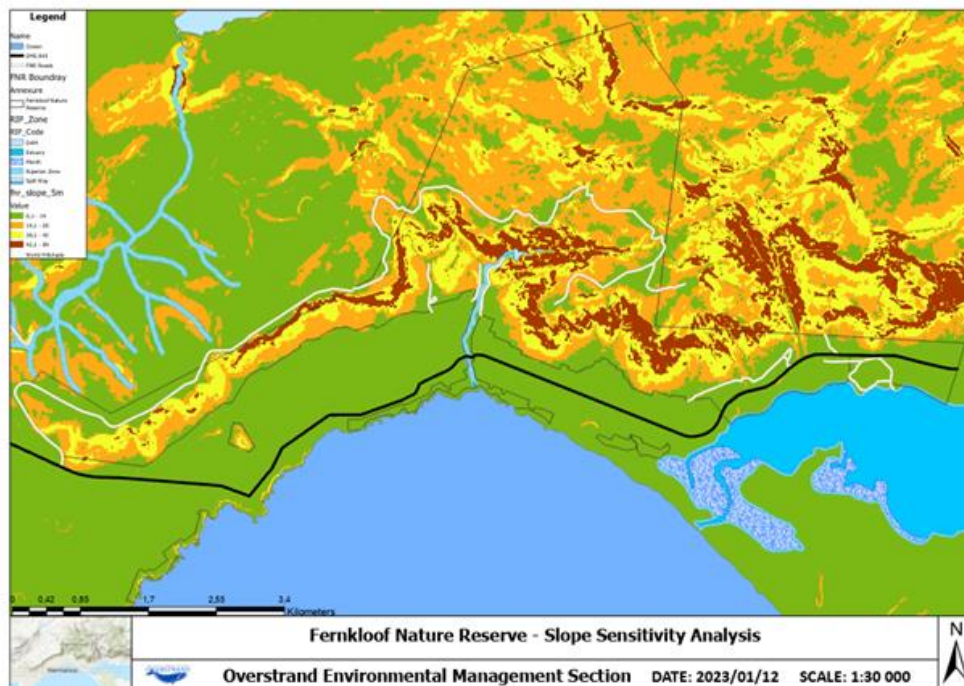
Fernkloof Nature Reserve geology was determined using the SANBI geology geo-database. The reserve only has two major geological features. The Bokkeveld group that overlays the Table Mountain group. These are also two of the three supergroups of the Western Cape. *Detailed Geological information is discussed under section 6.3. FNR Context: Geology and Soils of the FNR.* Please see Map 4.



Map 4: Geology of FNR

8.3.2.4 Slope Sensitivity

Slope sensitivity analysis was done using the 5-meter Fernkloof raster layer. This layer was created from the 5-meter contour layer and gives a detailed view of Fernkloof. Divided into 4 categories, the map shows the degree of slope, where 1:4 is the maximum for a development in the Overstrand.



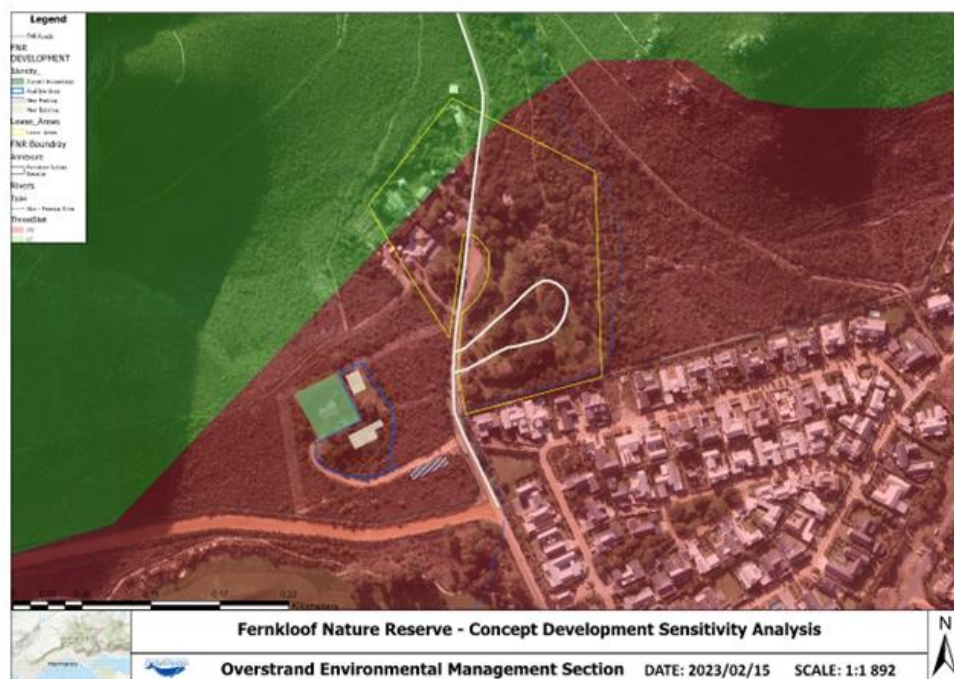
Map 5: Slope sensitivity of FNR

Fernkloof nature reserve has a maximum height of 821m above mean sea level and extends all the way to the coastline. The vast majority of Fernkloof is not suited for physical development of structures such as buildings, with only sections of the highland lowland interface falling within the 1:4 parameters. *Please see Map 5 above.*

8.3.2.5 Fernkloof Nature Reserve Concept Development Sensitivity Analysis

The concept development plan for Fernkloof Nature Reserve falls within the identified development nodes of the nature reserve. The area proposed for the small-scale development of an office block, workshop building, Outside building, Canteen and kitchen, Storage area and reserve entrance which will be the official entrance point to the reserve and reserve management complex, will be situated west of the main gate of the Nature Reserve. Although the proposed area is in a critically endangered ecosystem, Agulhas Limestone Fynbos, mitigating this factor would be that the area is previously disturbed (old homestead and associated roads), is away from rivers and streams and falls within the 1:4 slope regulations. In addition to this, the area is ideally situated to support the day-to-day management of Fernkloof Nature Reserve and would also be suited for a Joint Operations Command centre in the event of an emergency in Fernkloof.

The proposed development is also adjacent to the existing Fernkloof Gardens, managed by Hermanus Botanical Society, through a signed co-management agreement with the OM, which has proposed developing the gardens into a registered National Botanical Garden. *Please see Figure 6.*



Map 6: Concept Development Sensitivity Analysis for FNR

Planning is based on the high tourism potential of the reserve, and the need to upgrade the management infrastructure and provide more, and improved management access. The historical use of the Fernkloof garden as a tourism destination has provided the support for a co-

management agreement with Hermanus Botsoc to develop the site in a registered botanical garden. Botsoc signed the agreement in September 2022 and need to submit a Business Plan for the development of the Botanical Garden to the Municipality within 12 months of signing the agreement.

A conceptual design of the new office complex is visible in *Map 6 and Map 7* and the proposed size of the individual office blocks will be as follow:

- a) Office block
 - i) 16,5m x 11,5m = 190m²
 - ii) Veranda 2,5m x 16,5m = 41m²
- b) Workshop building
 - i) 21m x 10,5m = 220m²
- c) Outside building
 - i) 3,5m x 6,0m = 23m²
- d) Canteen and Kitchen
 - i) 4,5m x 11m = 49,5m²
- e) Storage area for sand, stone etc
 - i) 14m x 2,5m = 35m²
- f) Visitor Parking area
 - i) 10m x 30m = 300m²



Map 7: Concept development Plan for FNR

The proposed design and layout can be seen in Map 7. The current office is 3m x 3m and houses 4 rangers and the Principal Conservation Practitioner with all the office equipment (reserve management) and is not conducive to suitable staff working conditions. The stores for the equipment and tools are housed in temporary containers which does not allow enough space in

accordance with the Health and Safety Regulations. The agreement with Botsoc allows the use of the office by reserve staff up until a new office complex have been built because Botsoc will be occupying this office as a reception for the new Botanical Garden.

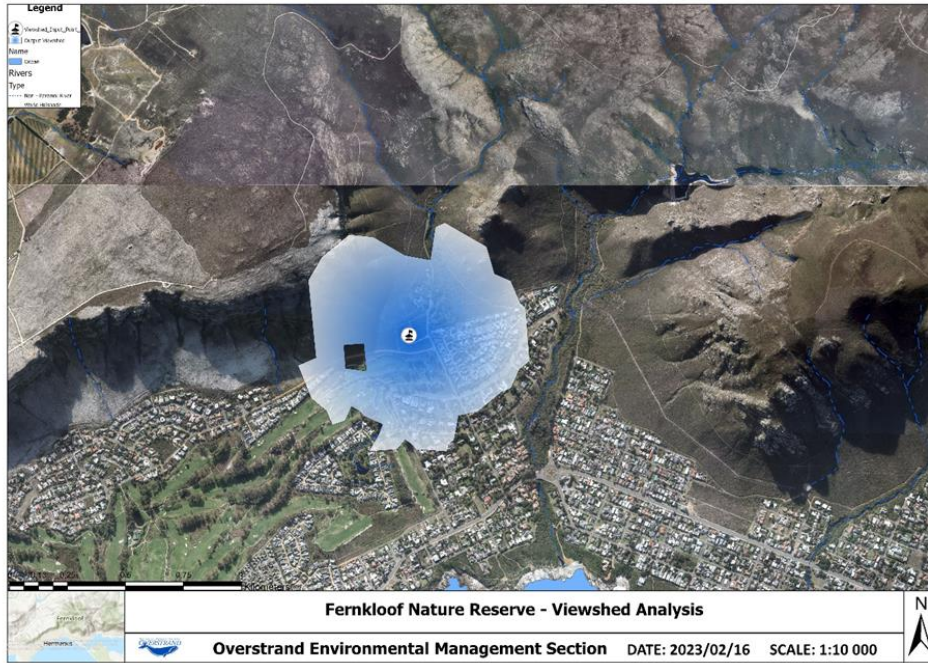
The new reserve office complex will allow for direct access to the nature reserve and will link to the current reserve house and homestead complex which already have a footprint for this purpose. The new reserve office complex will also allow for formalised storing space for all vehicles, equipment and tools and building materials for effective management of the reserve. All new infrastructure will require NEMA EIA authorisation, and this process will be initiated as soon as the budget approval for the complex has been finalised.

The Environmental Department assessed the suitability of the proposed office complex by:

- 1) Identifying an area that already has a reserve management footprint and that is adjacent to an existing road;
- 2) Considered the visual impact by setting the buildings into the ground and allowing for green building principles to be included in the building design;
- 3) Mitigation of identified risks, such as fire by building adjacent to a maintained firebreak and vehicle access;
- 4) Use of low embodied energy building materials;
- 5) Design for low energy use and comfort through passive heating and cooling, high levels of insulation, use of low water heating and low energy lighting.
- 6) Water supply to be supplemented by rainwater harvesting.

A view shed analysis was also conducted, with the proposed development height of 3.5 meters, observation height of 1.7 meters (average height of a human) and set to an observable distance of 500m. Existing development such as housing has not been considered but will influence the visibility of the development. The Structure will not be visible from the R43 and the proposed structures will be built according to Green Building Principles and set into the terrain, thus dropping the development height by approximately 1 meter to further minimise any visual impacts.

Please see Map 8.



Map 8: Viewshed Analysis for FNR

8.4. Development Applications

Development applications for new land uses and extension of existing land uses within the FNR must be aligned with the PAMP (particularly Section 5.3. Mission Statement of the FNR and Section 5.4. Appropriate Development of the FNR), OM Land-Use Planning By-law and other relevant regulations and legislation. Any development applications for Fernkloof must follow the municipal application procedures.

8.5. Implementation and Monitoring of Development

The Biodiversity Conservation Section shall be responsible, in association with the Town Planning, Property Administration and the Building Department to ensure that the conditions of approval with respect to each development application have been complied with.

8.6. Access

Also refer to:

7.8. Fences;

Management Action Table 1.1. Legal Status and Reserve Expansion;

Management Action Table 1.9. Infrastructure Management.

The OM EMS provides and maintains facilities that promote access to the FNR. The FNR's boundary is unfenced and at this stage a closed off boundary fence is not envisaged as there are no large game species that require containment in the reserve, and the high prohibitive cost of fencing for comparatively little or no benefit. The fencing probability can however be reviewed for specific areas of conflict. The reserve boundary points must, however, be surveyed and physically demarcated to

enable the easy on-site recognition of the reserve's boundary lines for legal compliance and effective law enforcement purposes.

8.7. Servitudes

The FNR has partnerships with several servitude arrangements for which the partners are provided access to the areas managed as the FNR. Servitudes are spatially represented in Appendix 2. Overstrand: Fernkloof Nature Reserve Local Context Map.

9. The FNR Strategic Implementation Framework (SIF)

The Strategic Implementation Framework guides the implementation of the FNR PAMP to ensure the Goals of the FNR are achieved. The SIF translates information from the sections above into management targets and actions that are measurable and can be used to inform annual operations and the resources required to implement and fulfil them.

The successful management of the FNR is dependent on the completion of the Actions tabled in Section 10. These Actions are achievable with the dedication and commitment of the OM EMS together with the groups, organisations and institutions that have co-management agreements with the OM EMS and the FNR. It is the responsibility of the OM to develop and maintain co-management agreements with the relevant institutions and partners to ensure that the Management Actions required to effectively managing the FNR are implemented.

As per the NEM: PAA Norms and Standards for the Management of Protected Areas in South Africa (Section 11.1. (c)(i) and (ii)) the standard indicator of an approved and implemented management plan is an annual work plan of operations implementing the management plan in place; and there is a detailed work plan identifying specific targets for achieving management objectives linked to the management plan.

The Management Actions derived from the Strategic Implementation Framework and tabled in Section 10 Management Actions derived from the Strategic Implementation Framework underpin the goals listed below which in turn supports the mission and the long-term vision of the FNR.

The goals will be implemented within this framework through the execution of the various Actions and through the development of a FNR Annual Plan of Operations / Business Plan (which may be submitted to the MEC annually in terms of Section 41[4] of the NEM: PAA [which deals with “*subsidiary plans*”]).

9.1. Legal Status and Reserve Expansion

9.1.1. Management Goals

- i. All areas of the reserve are awarded legal status in terms of NEM: PAA;
- ii. Reserve boundaries are clearly demarcated and known to local residents;
- iii. Identify and prioritise potential areas for FNR expansion in accordance with the National Protected Area Expansion Strategy.

9.1.2. The Existing FNR Protected Areas

The original boundaries of the FNR were officially proclaimed (Proclamation No. 391 of 1971) in terms of the Nature Conservation Ordinance, 1965 (Ordinance No. 26 of 1965).¹

The Hoy's Koppie and Mossel River Valley portions of the FNR were formally included into the reserve on 18 April 1984 and added approximately 6.94 hectares to the reserve.

An extension to the FNR was made on 2 June 2000 (Provincial Notice No. 242 of 2000 as contained in Provincial Gazette No. 5507) by incorporating the Mossel River Valley, a section of the Cliff Path, Piet se Bos and Hoy's Koppie into the reserve.

A further extension was added to the east of the reserve during 2009, between Vogelgat Private Nature Reserve, the Kleinrivier estuary and Lagoon Farm, as described in Provincial Notice No. 37 of 2009 of 21 August 2009, as contained in Provincial Gazette No. 6651.

The total area of the current (2018) FNR is 1801.46 hectares.

9.1.3. The Proposed Expansions of FNR

Opportunities to establish new protected and/or conservation management areas in collaboration with private and/or provincial organisations bordering or in the locale of the reserve can contribute to conservation management goals and result in socio-economic benefits for the OM communities.

If the Municipality plans to extend or amend the boundaries of the reserve, the MEC may, in terms of Section 23 of the NEM: PAA, declare an area, as specified in a notice published in the Government Gazette, to be part of the existing nature reserve. Upon approval from the Municipal Council for the extension of the FNR, the Overstrand Municipality will apply for the declaration of the full extent of the FNR and consolidation as a Protected Area in terms of the NEM: PAA, and for the registration of the full extent of the FNR in the National Register of Protected Areas

The OM EMS therefore recommends the Municipal properties listed in Figure 15 below are included in the FNR. Copies of the title deeds are available from the EMS. The properties to be proposed as extensions of the FNR are spatially represented in Appendix 9. Map: FNR Management Units.

Figure 19. Current and proposed land parcels that constitute the FNR

The proposed full extent of the FNR will include the following properties. The proposed extension will add approximately 230.95 hectares to the existing extent of the Fernkloof Nature Reserve. The full extent of the FNR should be approximately 2032 ha if the full extension is approved.

Farm portion and number	Farm name	Part of current FNR
591/0	Glenvarloch	Yes
591/1	Glenvarloch	Yes

¹ The Nature Conservation Ordinance, 1965 (Ordinance No. 26 of 1965) has been superseded by the Nature and Environmental Conservation Ordinance, 1974 (Ordinance No. 19 of 1974).

591/2	Glenvarloch	Yes
RE/1253		Yes – not full extent. The mountain section is included above the Hermanus Sports grounds with a fragmented coastal strip, east of Mollengren Park towards Sievers Point.
RE/1253		Proposed extension in front of The Marine Hotel.
RE/4780		Yes
RE 4833		Yes
RE/243		Yes -not full extent, but including the mountain section, Hoy's Koppie and the Westcliff section of Cliff Path, next to New Harbour.
RE/243		Proposed extension, North-west of Preekstoel, North of Rotary Way leading into the Hemel and Aarde valley.
RE/4771		Yes -not full extent, but including the mountain section, Mossel River and the Eastern and Western coastal sections at the mouth of the Mossel River and the far Eastern section of Piet-se-Bos leading to the Klein River Estuary.
RE/4771		Proposed extension, including the Northern section of the Robbeklip Stream, a highland-lowland interface section above 5 th Street Voelklip and the remainder of Piet-se-Bos, The Grotto's and a coastal section West of Grotto Beach.
Erf 4831		Yes -not full extent, excluding the area East of the Scout Camp (De Mond Caravan Park) up to the Voelklip transfer station and the area presently known as Maansckynbaai.
Erf 4831		Proposed extension, including a portion presently known as Maansckynbaai.
3/585	Hemel en Aarde Valley	Proposed extension, including the north-western mountain section, divided by a line on the current firebreak.
5/585	Hemel en Aarde Valley	Proposed extension, including the north-western mountain section, divided by a line on the current firebreak.
8/585	Hemel en Aarde Valley	Proposed extension, including the north-western mountain section, divided by a line on the current firebreak.

9.1.4. UNESCO World Heritage Site Application

The FNR may qualify to be included as an extension of the UNESCO World Heritage Site: The Cape Floral Region Protected Areas¹ due to:

Criterion (ix): *“to be outstanding examples representing significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals”*; and

Criterion (x): *“to 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 or conservation.”*

9.1.5. Legislation, Initiatives and Strategies for Protected Area Expansion

- National Environmental Management: Protected Areas Act (Act No. 57 of 2003);
- Nature Conservation Ordinance (Ordinance No. 19 of 1974);
- Western Cape Protected Area Expansion Strategy (WCPAES);
- National Protected Area Expansion Strategy for South Africa 2016 (NPAES)²;
- National Protected Area Expansion Strategy: Resource Document³;
- Protected Area Expansions Strategy and Implementation Plan for the Western Cape⁴
- Western Cape Protected Area Strategy: Stewardship Programme;
- SANBI CAPE: Biodiversity for Development⁵

9.1.6. Guiding Principles for Reserve Expansion

The expansion of Protected Areas in South Africa is informed by the 2008 NPAES. The goal of the NPAES is to achieve cost effective protected area expansion for ecological sustainability and adaptation to climate change. The NPAES explains inter alia the mechanisms and financial tools available for protected area expansion. The NPAES Resource Document provides technical information for the implementation of the expansion of a protected area.

The CapeNature Protected Area Expansion Strategy and Implementation Plan for the Western Cape (WCPAES 2015) is endorsed by Minister of Local Government, Environmental Affairs and Development planning, and provides province-specific ecological specific goals:

¹ The Cape Floral Region Protected Areas. Available online: <https://whc.unesco.org/en/list/1007>

² National Protected Area Expansion Strategy for South Africa 2016. *Priorities for expanding the protected area network for ecological sustainability and climate change adaptation*. Prepared by the Government of South Africa. Published by the Government of South Africa, Pretoria, Available online: <https://www.environment.gov.za/>

³ National Protected Area Expansion Strategy Resource Document. 2009. Department of Environmental Affairs, South African National Biodiversity Institute. Available online: https://www.environment.gov.za/sites/default/files/docs/npaes_resource_document.pdf

⁴ Maree, K.S., Pence, G.Q.K. & Purnell, K. 2015. Western Cape Protected Areas Expansion Strategy: 2015 – 2020. Unpublished report. Produced by CapeNature. Cape Town, South Africa.

⁵ Cadman, M., Petersen, C., Driver, A., Sekhran, N., Maze, K. and Munzhedzi, S. 2010. Biodiversity for Development: South Africa's landscape approach to conserving biodiversity and promoting ecosystem resilience. South African National Biodiversity Institute, Pretoria. Available online: <https://www.sanbi.org/biodiversity/science-into-policy-action/mainstreaming-biodiversity/cape-programme/cape-programme-landscape-initiatives/#>

“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 unprotected as yet; and to regularise existing Protected Areas so that environmental security is ensured for everyone in South Africa, and the costs and benefits of appropriation accrue to the proper entity”.

The SANBI CAPE Landscape Initiative programme promotes biodiversity conservation and sustainable development that engages with local role-players (including government, private sector, communities, NGOs, and conservation organisations) to strategically coordinate and embark on joint projects to maximise biodiversity in and outside of protected areas¹.

9.1.7. Management Actions

Refer to Section 10. Management Action Table 1.1. Legal Status & Reserve Expansion.

9.2. Integrated Planning, Cooperative Governance and Co-Management Agreements

9.2.1. Management Goals

- i. To promote the conservation of the buffer zone around the FNR by formally entering into Conservation Management Agreements and Fire Management Agreements with CapeNature and with neighbouring property owners.
- ii. To continue to refine and develop the FNR PAMP in consultation with the FAB, whilst considering inputs from CapeNature, the CPMG, the HBS, the Hermanus Tourism Bureau, and from any other Non-Governmental Organisations (NGOs) or authorities who wish to assist with the management of the reserve.

9.2.2. Legislation, Initiatives and Strategies

- Intergovernmental Relations Framework Act, (Act No. 13 of 2005);
- NEM: PAA 2003 (Section 40.1.b);
- Municipal Systems Act 2000 (Section 35 1.b and Section 37.1b);
- National Protected Area Expansion Strategy Resource Document²;
- NEM: PAA Proper Administration of Protected Areas. Regulations. 2012 (Notice 105 of Government Gazette No. 35019).

9.2.3. The FNR PAMP Alignment

It is essential that cooperative governance, co-management agreements and partnerships are developed, maintained, and improved with national, regional and local government, stakeholders and direct and indirect contributors to the vision and goals of the FNR. Collaborative/co-management agreements and partnerships that comply with the management and legal framework

¹ SANBI CAPE Landscape Initiative. Available online: <https://www.sanbi.org/biodiversity/science-into-policy-action/mainstreaming-biodiversity/cape-programme/>

² SANBI: National Protected Area Expansion Strategy Resource Document. Department of Environmental Affairs. 2009. Available online: https://www.environment.gov.za/sites/default/files/docs/npaes_resource_document.pdf

of this PAMP increase and improve management capacity, enhance communication efforts, and benefit natural and heritage conservation management within and around the FNR.

Formal Lease Agreements, Collaborative Management Agreements and Partnerships (including commercial partnerships), along with a written recommendation of the agreement from FAB and EMS, must be submitted to the relevant OM municipal official for authorisation. All partnerships and agreements should be legally binding, contain clauses for cancellation/non-renewal for non-compliance of agreement and include a review period of between 1-3 years or an otherwise stipulated timeframe for review.

The Biodiversity Conservation Manager is responsible for ensuring that any FNR partnership agreement (commercial or otherwise) is monitored and that agreement conditions are strictly complied with. All signed agreements are available at the offices of the Biodiversity Conservation Manager and can be viewed on request.

9.2.4. Management Actions

Refer to Section 10. Management Action Table 1.2: Integrated Planning, Cooperative Governance & Co-Management.

9.3. Ecosystem and Biodiversity Management

9.3.1. Management Goals

- i. To effectively conserve and manage the biophysical environment and the biodiversity of the FNR;
- ii. To develop and implement an ecologically sound fire management programme using input and recommendations from CapeNature and the Greater Overberg Fire Protection Association;
- iii. To institute sound catchment management to ensure sustained flow of good quality water from the Mossel River's natural catchment area;
- iv. To implement alien / invasive vegetation clearing and management on the FNR according to an on-going time-bound management programme as required in terms section 76 of NEM:BA;
- v. To develop a monitoring programme at relevant temporal and spatial scale to support management objectives and provide for review of the management plan;
- vi. To encourage, promote and improve scientific research in the FNR;
- vii. To protect and conserve the ecological integrity, natural character, and the economic, social and aesthetic value of the Cliff Path section of the FNR.
- viii. To provide access to the coastal protected areas within the FNR, and to manage such land in accordance with the National Environmental Management: Integrated Coastal Management Act, 2008 (Act No. 24 of 2008) (NEM:ICMA).

9.3.2. Legislation, Policies and Strategies

- Lima Action Plan for UNESCO's Man and the Biosphere Programme (2016)¹;

¹ UNESCO Lima Action Plan as endorsed by 4th World Congress of Biosphere Reserves. Available online: http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/SC/pdf/Lima_Action_Plan_en_final.pdf

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- Madrid Action Plan for Biosphere Reserves (2008 - 2013)¹
 - Nature Conservation Ordinance (Ordinance No. 19 of 1974);
 - National Environmental Management Act, (Act No. 107 of 1998) (NEMA);
 - National Environmental Management: Protected Areas Act (Act No. 57 of 2003) (NEM:PAA);
 - NEM: PAA (Act No. 57 of 2003). Regulation 99. Proper Administration of Nature Reserves (Government Gazette No. 35021, February 2012);
 - NEM: PAA (Act No. 57 of 2003). Norms and Standards for the Management of Protected Areas in South Africa (Government Gazette No.39878, March 2016);
 - National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (NEM:BA);
 - NEM:BA (Act No. 10 of 2004). Alien and Invasive Species Regulations (Government Gazette No. 37885, September 2014);
 - NEM:BA (Act No. 10 of 2004). Schedule: National List of Ecosystems that are Threatened and in need of protection (Government Gazette No. 34809, December 2011);
 - NEM:BA (Act No. 10 of 2004): Draft Norms and Standards for the Management of Damage-Causing Animals in South Africa (Notice 1084 of 2010);
 - NEM:BA (Act No. 10 of 2004) Norms and Standards for Biodiversity Management Plans for Species (Government Gazette No. 31968, March 2009);
 - NEM:BA (Act 10 of 2004) Part 2 Co-ordination and alignment of plans , monitoring and research
 - National Environmental Management: Integrated Coastal Management Act (Act No. 24 of 2008);
 - Conservation of Agricultural Resources Act, (Act No. 43 of 1983);
 - CITES Regulations, 2009;
 - South Africa's Fifth National Report to the Convention of Biological Diversity, March 2014²;
 - Western Cape Nature Conservation Board Act (Act No. 15 of 1998) and Regulations;
 - CapeNature: Western Cape Biodiversity Spatial Plan Handbook (CapeNature)³;
 - Provincial Biodiversity Strategy and Action Plan, 2015 – 2025.
 - SANBI: Biodiversity Advisor online resource⁴;
 - CapeNature: Baseline data collection and monitoring (2010) Unpublished;
 - Fynbos Ecosystem Management Plan: Western Cape (2008)⁵

9.3.3. Guiding Principles for Ecosystem and Biodiversity Management

The FNR must be scientifically and adaptively managed to maintain the ecological integrity of ecosystems and habitats within the boundaries of the FNR, and to conserve its natural landscapes, habitats and species.

The diversity of indigenous plants and animals on the FNR will be conserved, *inter alia*, by:

¹ UNESCO Madrid Action Plan (2008 - 2013) available online:

<http://unesdoc.unesco.org/images/0016/001633/163301e.pdf>

² Convention on Biological Diversity. Fifth National Report. South Africa. Available online: <https://www.cbd.int/reports/nr5/>

³ Pool-Stanvliet, R., Duffell-Canham, A., Pence, G. & Smart, R. 2017. The Western Cape Biodiversity Spatial Plan Handbook. Stellenbosch: CapeNature.

⁴ SANBI: Biodiversity Advisor online resource available: <http://biodiversityadvisor.sanbi.org/>

⁵ Jacobs, K. & Jangle, R. 2008. Fynbos Ecosystem Management Plan: Western Cape. Unpublished, The Nature Conservation Corporation, Cape Town. Available online: <http://www.conservationatwork.co.za/sites/default/files/conservation-guidelines/Fynbos%20EMP.pdf>

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- Managing the reserve in terms of the relevant governing legislation and guidelines;
 - Preventing the spread of alien and invasive species;
 - Restoring degraded ecosystems;
 - Scientifically based fire, catchment, and coastal area management;
 - Protecting indigenous animals and possibly introducing historically occurring species;
 - Preventing the destruction of natural habitat by tourists, staff, contractors, and by any other external factors (e.g. fire);
 - Instituting measures to prevent soil erosion and pollution (contamination of soil) from taking place;
 - Controlling illegal use of natural resources; and
 - Monitoring and evaluating natural resources, and the success of the various management actions.

Adaptive management making use of the best scientific understanding includes implementing management actions, monitoring progress, and adapting the natural resource management strategy accordingly. Natural resource management aims to conserve biodiversity through identifying and addressing threats and ensuring the maintenance and/or re-instatement of those ecological processes that are considered the main determinants of ecosystem structure and function. Where such ecological processes have been disrupted and cannot be re-instated, management should attempt to simulate their effects; otherwise, management intervention in the system should be minimised.

Soil erosion and deposition are natural, dynamic processes. However, soil erosion can be increased / aggravated due to human activity (e.g., along trails and pathways, and following alien vegetation clearing operations). In the case of human induced and/or aggravated erosion, appropriate remedial management action must be taken. Potential soil erosion must be avoided through appropriate planning (e.g., alien vegetation clearing accompanied by phased rehabilitation of natural vegetation), and through scheduled maintenance of infrastructure such as roads, cycle trails and pathways. Steep denuded areas should be stabilised against erosion by packing of logs parallel to the slope before undertaking vegetation rehabilitation work.

Other management interventions required to effectively conserve biodiversity and ensure sustained delivery of water are the control of alien and invasive species, soil erosion, wildlife management and minimising illegal activities (e.g., illegal hunting and plant collecting).

9.3.4. Management Actions

Refer to Section 10. Management Action in Tables 1. 3.

- j) Ecosystem & Biodiversity Management: General Actions;
- k) Ecosystem & Biodiversity Management: Indigenous Vegetation;
- l) Ecosystem & Biodiversity Management: Invertebrates;
- m) Ecosystem & Biodiversity Management: Fish & Aquatic Organisms;
- n) Ecosystem & Biodiversity Management: Herpetofauna;
- o) Ecosystem & Biodiversity Management: Avifauna;
- p) Ecosystem & Biodiversity Management: Mammals;
- q) Ecosystem & Biodiversity Management: Ecosystem Services;

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- r) Ecosystem & Biodiversity Management: Soil Erosion;
 - s) Ecosystem & Biodiversity Management: Catchment, Groundwater & Rivers.

9.4. Wildlife Management

9.4.1. Management Goals

- i. To maintain the diversity of indigenous animals that characterize habitats of the FNR;
- ii. To investigate the reintroduction of previously naturally occurring species;
- iii. To effectively manage damage causing/problem fauna.

9.4.2. Legislation

As per Ecosystem and Biodiversity Management Legislation

- NEM:BA (Act No. 10 of 2004): Draft Norms and Standards for the Management of Damage-Causing Animals in South Africa (Notice 1084 of 2010).

9.4.3. Guiding Principles for Wildlife Management

A minimal intervention strategy will be followed in terms of indigenous wildlife management. Exceptions will only be considered for the following purposes:

- achieving management and conservation goals;
- research and monitoring purposes;
- translocation to or from other state or private protected areas; and
- Safe-guarding populations of threatened species.

Wildlife that has been injured and are highly unlikely to survive, can be destroyed on the authority of the Biodiversity Conservation Manager who will consult with CapeNature.

The Biodiversity Conservation Manager must ensure that all relevant information is recorded, and the relevant data / specimens / material is provided to CapeNature scientific staff responsible for processing and recording such information. A copy of these records must be maintained in the reserve office.

The reintroduction of previously occurring species to the FNR requires careful planning and consideration. A reintroduction species plan must be commissioned in consultation with CapeNature. Before the reintroduction of previously naturally occurring species within the FNR, the following points should be investigated/considered for each potential species introduction:

- Why did the animal become locally extinct?
- Is the causal factor still a threat?
- Is the habitat still suitable for the species?
- What are the potential negative effects of reintroduction?
- Where is the nearest naturally occurring population?

9.4.4. Damage Causing/Problem Fauna Management Guiding Principles

9.4.4.1. Background to Baboon Management within and around the FNR

The mountains behind Hermanus are home to at least three troops of Chacma Baboons. One of these troops is resident in the FNR, whilst the two other larger troops frequent the Hemel-en-Aarde Valley and the Vogelgat Nature Reserve¹

The Chacma baboon (*Papio ursinus*) will remain an important and integral part of the natural ecosystem of the Overstrand area by forming part of the rich biodiversity of the area. They play a significant ecological role in the Cape Floristic Region as one of the mayor seed dispersers for the Fynbos ecosystem. The coastal plains have always been an important food source for baboons, and they have frequented the Overstrand coastal plains as part of their normal feeding pattern for thousands of years.

As a result of living in an urban area enclosed between the sea and mountain, the food supplies of the troops are limited, and their continued existence is under threat. They are exposed to injury and illness through being fed inappropriate foods by humans and exposure to motor vehicles, being shot and poisoning etc. Partly due to the stresses under which they exist, they have become a threat to human society in that they raid homes and garbage facilities and may harm humans in attempts to find food. Poor land use planning decisions in the past have contributed to conflict as the available natural vegetation and areas available to support the baboon population have been reduced by allowing encroachment of human settlements into pristine natural areas with established wildlife populations.

In 2014 the Municipality also had to stop their involvement with the management of the troops after external funding for the management of the project ended. But after a 5-year negotiation with the Provincial Department and CapeNature, the assignment for Baboon Management was handed over to the Municipality in September 2019. In November 2019, the Overstrand Municipality appointed a specialised service provider to manage the baboon programme in Hermanus through the implementation of the Virtual Fence system.

Several other measures have also been put in place by the Municipality to decrease and manage potential conflict situations between man and baboon, including the installation of baboon-proof refuse bins, the strategic and timed removal of residential waste on a weekly basis, the provision of signage, and the distribution of informative pamphlets to the public. This has all been done with the assistance and support of the Hermanus Baboon Action Group (HBAG).

9.4.4.2. Regulations and Guidelines for Damage Causing Animals

The NEM:BA Draft Norms and Standards for the Management of Damage Causing Animals in South Africa gives provision for the management of problem animals using standardized guidelines to assess the impact of damage caused by the problem animal ².

¹ <http://www.hermanustimes.co.za/local-guide>.

² South Africa. 2010. General Notice No 1084 of 2010. Staatskoerant, 26 November 2010. Department of Environmental Affairs National Environmental Biodiversity Act, 2004 (Act 10 of 2004): Draft Norms and Standards for the Management of Damage Causing Animals in South Africa. Available online: https://www.environment.gov.za/sites/default/files/gazetted_notices/nemba_draftnormsandstandards_g33806gen1084.pdf

9.4.5. Management Actions

Refer to Section 10. Management Action Table 1.4. Wildlife Management

9.5. Fire Management

9.5.1. Management Goals

Also refer to Ecosystem and Biodiversity Management Goals (9.3.1.)

The overall goals of Fire Management in the Western Cape are¹:

- To ensure conservation of species and processes by maintaining and improving ecosystem functioning;
- To allow for natural fire processes to occur without impacting on safety and infrastructure;
- To implement effective Integrated Catchment Management.

9.5.2. Legislation and Guidelines

- National Veld and Forest Fire Act, (Act No. 101 of 1998);
- National Forests Act, (Act No. 84 of 1998);
- Articles 4, 34 of the Overstrand Municipality Community Fire Safety By-law, P.N. 6454/2007 – Prevention of fire hazards on properties;
- Fire Brigade Services Act, No. 99 of 1987 and amendments up to Act 14 of 2000 – Prevention of fires;
- OM Veld Fire Management Plan;
- OM Fire Management Plan;
- The Integrated Fire Management Handbook. Establishing Fire Protection Associations in South Africa².

9.5.3. Guiding Principles for Fire Management

Fire is a key ecological process influencing biodiversity and sustained water delivery. Although it is not possible to reconstruct the “natural” fire regime, it is generally accepted that the natural frequency, intensity, seasonality and spread of fire through the landscape is variable in fynbos-dominated landscapes.

Scientific fire management, that mimics natural fire regimes maximise fynbos rejuvenation and subsequent biodiversity. Judicious alien vegetation and catchment management with the aim of providing sustained water delivery to the Gateway Well-Field and to the Mossel River is also paramount.

Given the above, the goal is to actively manage for a shifting mosaic of vegetation patches of ages and sizes - thereby creating a diversity of habitats that should ensure the conservation of the biodiversity representative of the area. This approach will also provide the best insurance policy for organisms for which habitat requirements and responses to fire are unknown. Such a mosaic is achieved through

¹ Cape Nature Stewardship PA Management Plan

² The Integrated Fire Management Handbook. 2016. Fynbos Fire. Available online:
http://fynbosfire.org.za/development/wp-content/uploads/2015/02/A-Guide-to-IFM_Complete_Display.pdf

controlling the spread of wildfires in the landscape, and through undertaking scientifically determined prescribed burns.

9.5.4. Management Actions

Refer to Section 10. Management Action Table 1.5. Fire Management

9.6. Invasive and Non-Invasive Alien Species Management

9.6.1. Management Goals

Refer to Ecosystem and Biodiversity Management Goals (Section 9.3.1.)

9.6.2. Legislation and Regulations

Ecosystem and Biodiversity Legislation, and specifically:

- NEM:BA (Act No. 10 of 2004). Alien and Invasive Species Regulations (Government Gazette No. 37885, September 2014);
- NEM: BA (Act No. 10 of 2004). Alien and Invasive Species List (Government Gazette No. 40166, July 2016);
- Conservation of Agricultural Resources Act, (Act No. 43 of 1983) with Amendments published in the Government Gazette Vol. 429, No 22166 of 30 March 2001.

Alien and Invasive plants listed under Section 70 of NEM:BA (2004) and in NEM: BA Alien and Invasive Species List (2016) are a serious threat to the ecological functioning of natural ecosystems as well as water production. The control of Alien and Invasive species is promulgated in NEM: BA (2004), the NEM:BA Alien and Invasive Species Regulations (2014). In addition, the requirements of Sections 76 and 77 of the NEM:BA should be noted in terms of the legal obligations of the Overstrand Municipality to control invasive species on the FNR.

Section 77 of NEM:BA (2004) states that the Management Authority of a protected area must at regular intervals prepare and submit to the Minister or the MEC for Environmental Affairs in the Province a report on the status of any listed invasive species that occurs in that area. A status report must include a detailed list and description of all listed invasive species that occur in the protected area; a detailed description of the parts of the area that are infested with listed invasive species; an assessment of the extent of such infestation; and a report on the efficacy of previous control and eradication measures.

The OM EMS Department is accountable for the planning, initiation and supervision of all alien and invasive plant clearing operations in FNR. Therefore, an annual budget and APO must be compiled for annual alien / invasive vegetation clearing. The Reserve Manager must supervise alien clearing operations to ensure that the correct methodologies are used, and to avoid any environmental damage resulting from injudicious clearing operations.

9.6.3. Guiding Principles for Invasive and Non-Invasive Alien Species Management

The following management guidelines apply:

(i) Alien Plant Introductions

Plants that are not locally indigenous will not be allowed to be used for landscaping in the garden areas of the FNR. The HBS shall submit a species list, for approval, to the Reserve Management before any new plants are planted in the garden.

The Protected Area Buffer Environmental Management overlay Zone (EMOZ) also identifies activities that are prohibited within the Protected Area Buffer EMOZ as listed in Schedule “A” of the Regulations. The buffer area identifies an “zone” along the entire edge/boundary of the Fernkloof Nature Reserve that needs to be clear from all invasive alien plants.

(ii) Existing non-invasive alien plants

An Invasive Plant Clearing Plan must be developed for Fernkloof to address the existence of non-invasive alien plants within the reserve. If considered appropriate by the Management Authority of the reserve, certain non-invasive alien plants may be retained within appropriately zoned areas for horticultural purposes (e.g. trees within the Arboretum or Fernkloof Garden). Such plants should, however, not be replaced should they die. All seedlings of existing non-invasive alien plants must be removed annually.

9.6.4. Management Actions

Refer to Section 10. Management Action Table 1.6. Invasive and Non-Invasive Species Management.

9.7. Cultural Heritage Management

9.7.1. Management Goals

- i. To incorporate the cultural and heritage features and attributes of the FNR into decision-making with regard to the development of infrastructure within the FNR, and to consider such aspects along with biodiversity management.

9.7.2. Legislation

- National Heritage Resource Act, (Act No. 25 of 1999) which has repealed the National Monuments Act, (Act No. 28 of 1969);
- World Heritage Convention Act, (Act No. 49 of 1999).

9.7.3. Guiding Principles for Cultural Heritage Management

Management of the cultural heritage is guided by the National Heritage Resources Act, 1999 (Act 25 of 1999) (NHRA) and must aim to promote the conservation and public appreciation of the cultural heritage found in the FNR. FNR cultural heritage features include grave sites (e.g. Hoy’s Graves), archaeological features (Khoekhoen middens), living heritage features such as the AHC, and significant historical inputs such as the history of the FNR and the longstanding contribution of the HBS.

The cultural heritage of the FNR must be managed judiciously to ensure its preservation for future generations. As such any disturbance of landscapes or features that significantly impact upon cultural resources must be avoided (where such disturbance cannot be altogether avoided, the impacts must be minimised and remedied).

Any burial sites or archaeological material discovered on the FNR must be reported to the EMS and the Overstrand Heritage and Aesthetics Committee. If need be, the Overstrand Municipality will need to appoint an archaeologist to investigate any finds. HWC and/or SAHRA must be informed if finds are deemed to be significant by the archaeologist.

9.7.4. Management Actions

Refer to Section 10. Management Action Table 1.7. Cultural Resource Heritage Management.

9.8. Law Enforcement and Compliance

9.8.1. Management Goals

- i. To improve law enforcement and compliance capacity of reserve staff.

9.8.2. Legislation and Regulations

- National Environmental Management Act, (Act No. 107 of 1998);
- National Environmental Management: Protected Areas Act, (Act No. 57 of 2003);
- National Environmental Management: Biodiversity Act, (Act No. 10 of 2004);
- NEM:BA Threatened or Protected Species (ToPS) Regulations (2007);
- Marine Living Resources Act, (Act No. 18 of 1998);
- Government Notice R1111 of 1998 - Marine Living Resource Regulations;
- National Environmental Management: Integrated Coastal Management Act, (Act No 24 of 2008);
- Western Cape Nature Conservation Ordinance, (Ordinance 19 of 1974);
- Regulations proclaimed in terms of the Ordinance, Provincial Notice 955 of 1975.

9.8.3. Guiding Principles for Law Enforcement and Compliance

The EMS recognises that illegal activities within and around the FNR can be a severe threat to:

- the integrity of its natural and cultural heritage;
- its supply of ecosystem services;
- the safety of FNR staff and visitors;
- and the attainment of the FNR's stated Vision, Mission and Management Goals.

The EMS and Reserve staff should remain aware of the ever-present threat posed by poaching, and by the illegal trade in fauna and flora (especially poaching of bulbs from the naturally vegetated areas). Such illegal utilisation of the FNR's natural resources is not quantified and must be considered a threat that has the potential to increase if not managed early enough.

The Reserve staff should maintain on-going vigilance whilst conducting routine patrols, especially in those areas most likely to be targeted by poachers. Criminal activities will be noted and communicated

to the Municipal Law Enforcement Department. These security forces should also assist in terms of patrolling certain high-risk areas within the FNR.

All incidents of poaching must be recorded and taken seriously, and criminal charges lodged against the perpetrators. This will enable the EMS to determine whether the Reserve staff contingent is sufficient to perform this key management task. Co-ordination of the various security and enforcement agencies will be facilitated formally through the Hermanus Security Forum. The Municipality must ensure that enough staff are available to effectively manage the FNR from a security/patrolling point of view. A dedicated component of Safe Officers is to undertake patrols to improve Reserve management capacity.

Another way in which illegal utilisation of natural resources may be combated is to create understanding and awareness through pro-active education and by means of providing informative signage and information pamphlets. The FNR must lead by example, by ensuring that products sold (e.g., at the existing nursery shop) have originated from sustainable, environmentally friendly sources.

9.8.4. Management Actions

Refer to Section 10. Management Action Table 1.8 Law Enforcement and Compliance

9.9. Infrastructure Management

9.9.1. Management Goals

- i. To plan, site and design all future buildings and infrastructure according to relevant environmental and heritage authority guidelines¹ and legislation.

9.9.2. Legislation

- Occupational Health and Safety Act, (Act No 85 of 1993);
- Water Services Act, (Act No.108 of 1997);
- National Water Act, (Act No. 36 of 1998);
- Constitution of the Republic of South Africa (1996);
- National Environmental Management Act, (Act No. 107 of 1998);
- White Paper on Integrated Pollution and Waste Management, 1998.

9.9.3. Guiding Principles for Infrastructure Management

9.9.3.1. Infrastructure

Refer to Section 8.2 Zonation and Land use and Table 2. Fernkloof Nature Reserve Management Units and Parameters.

All existing and new infrastructure in the FNR must be modernized to utilise water and energy-saving techniques and equipment, where possible. In addition to environmental benefits, the installation of water and energy-saving devices has the potential to bring about significant financial savings in the long-term.

¹ Baumann, N. (2009). Overstrand Heritage Survey: Draft report. The Overstrand Heritage Landscape Group. Available from <http://www.overstrand.gov.za>.

Where possible, future development within the FNR should be confined to within the already developed footprint of the reserve to ensure current undeveloped areas continue to be conserved and biodiversity, species and ecosystems are not impacted. The existing and new reserve infrastructure within the FNR must always be maintained in a safe, functional, clean, serviceable and aesthetically acceptable condition.

9.9.3.2. Access Points

In general, the EMS will provide and maintain facilities that promote access to the FNR. The FNR's boundary is unfenced and at this stage a complete closed boundary fence is not envisaged as there are no large game species that require containment in the Reserve. Strategic fences for security and access control will be investigated. The reserve boundary points must, however, be surveyed and physically demarcated to enable the easy on-site recognition of the Reserve's boundary lines for legal compliance and effective law enforcement purposes.

9.9.3.3. Roads, Tracks and Paths

Roads and tracks must be kept to a minimum to maintain the natural character of the landscape as far as possible and to avoid unnecessary negative impacts on the natural and cultural heritage of the FNR. In terms of this management guideline, a critical evaluation of the existing road/track and footpath network needs to be undertaken to identify whether any need to be closed or re-aligned. Any section that is approved for closure must be rehabilitated according to a documented rehabilitation programme.

Proposed development of new roads/tracks and footpaths or their closure must be aligned with the Management Units specified in this PAMP and must follow the appropriate legal and other procedures. The FNR management must ensure that the existing vehicle road/tracks and footpaths on the FNR are effectively maintained to the appropriate standards to support their relevant use, and to avoid soil erosion and other negative impacts on the environment.

Roads and tracks that are heavily used by vehicles or sections prone to accelerated soil erosion should be assessed, and if required, be tarred, paved, concreted, provided with boardwalks or upgraded to avoid soil erosion and/or excessive maintenance costs.

9.9.3.4. Domestic Solid Waste Management

The FNR Management must ensure that all the applicable provisions of the NEM: WA are complied with. All domestic waste must preferably be sorted for recycling and must be removed from the FNR to the Municipal Solid Waste Transfer Station in Hermanus.

Solid waste management procedures must be closely monitored by the FNR management to prevent pollution and other adverse impacts, especially of the water resources. All staff and public waste receptacles must be animal-proof (especially for baboons) and maintained as such. Reserve staff must, where practical, collect and remove litter during routine patrols.

9.9.3.5. Sewage

The FNR Management must ensure that all the applicable provisions of the NEM: WA and the NWA are met in terms of the provision of ablution facilities, and for the on-site processing of sewage. No pollution of surface or groundwater may occur due to any activity on the FNR.

As such, all sewage systems in the FNR must be investigated and their compliance with the above legislation must be verified. New systems should be installed where there is non-compliance (e.g., where septic tank / French drain sewage systems are known to be causing pollution). Septic tank / French drain systems will not be installed at future developments within the FNR.

9.9.4. Management Actions

Refer to Section 10. Management Action Table 1.9. Infrastructure Management

9.10. Disaster and Risk Management

9.10.1. Management Goals

- i. To improve collaborative risk management partnerships with Government and Municipal Departments, and with neighbouring property owners.
- ii. To develop policies, partnerships, and bylaws for the FNR in order to minimise risks and crime.

9.10.2. Legislation

- Disaster Management Act, (Act No. 57 of 2002);
- Occupational Health and Safety Act, (Act No. 85 of 1993).

As per the NEM: PAA Norms and Standards for the Management of Protected Areas in South Africa Section 8.1 (c) (iv) annual risk assessments are completed, and proactive mitigating interventions applied where appropriate; and Section 13.1. (b)(iv), a standard indicator is that a protected area has a disaster management plan in place.

9.10.3. Guiding Principles for Disaster and Risk Management

To maintain a high level of internal security so that visitors and their belongings can be safe and secure, the EMS must initiate and institutionalise a security strategy that ensures co-ordinated participation in all possible security forums and networks whilst optimising security in and around the FNR. This strategy must ensure sufficient human resources capacity to deal with conservation-related illegal activities in the FNR.

9.10.4. Management Actions

Refer to Section 10. Management Action Table 1. 10. Risk and Disaster Management.

9.11. Socio Economic Framework

9.11.1. Management Goals

- i. To encourage, promote and improve research and environmental education at the FNR;
- ii. To develop a monitoring programme at relevant temporal and spatial scale to support management objectives and provide for review of the management plan.

9.11.2. Guiding Principles for Socio Economic Framework

Environmental education programmes for neighbouring communities and other stakeholders need to be continued in collaboration with Whale Coast Conservation (WCC), the HBS and/or CapeNature and/or the local branches of Environmental NGOs or clubs, where staff capacity allows. Such programmes should strive to proactively engage, inform, and benefit the FNR's neighbouring communities.

Programmes for groups and communities from other areas should be accommodated on request whenever possible. In addition, members of the neighbouring community (e.g., community tour guides) should be empowered and used to run appropriate environmental education tours.

Environmental awareness and education (including interpretative signage and information pamphlets) of the FNR's natural and cultural heritage resources is aimed at creating awareness, understanding and appreciation of the value of these resources amongst the public and visitors to the Nature Reserve.

An interpretation programme using signage, displays and information media must effectively direct and inform visitors in respect of appropriate natural and cultural features of the area.

9.11.3. Management Actions

Refer to Section 10. Management Action Table 1.11. Disaster and Risk Management

9.12. Management Effectiveness

9.12.1. Management Goals

- i. To implement and review the FNR PAMP annually using the METT-SA assessment system;
- ii. To implement and submit an annual assessment report that depicts the achievement of/or contributions of management actions of the nature reserve to the designated Western Cape Provincial MEC of Environmental Affairs as per NEM: PAA¹ thus ensuring coordination of matters that may affect the FNR through the relevant Provincial Departments, District and Local Municipalities;
- iii. To implement APO for the FNR. The FNR must be managed according to the APO. Annual budgets for specific goals must be incorporated in the APO.
- iv. If required, the Municipality will engage with CapeNature regarding capacity building for the implementation of the METT.

9.12.2. Legislation

- The Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996);
- Public Finance Management Act (PFMA), (Act No.1 of 1999);
- National Environmental Management: Protected Areas Act, (Act No. 57 of 2003).

¹South Africa. 2016 Government Gazette No. 39878. Government Notice No.382. Department of Environmental Affairs: National Environmental Management Act, 2003 (Act 57 of 2003): Norms and Standards for the management of protected areas in South Africa

9.12.3. Guiding Principles for Management Effectiveness

- Department of Environmental Affairs Report: Management Effectiveness of South Africa's Protected Areas¹
- METT Handbook. A Guide to using the Management Effectiveness Tracking Tool (METT)²

9.12.4. Management Actions

Refer to Section 10. Management Action Table 1.12. Management Effectiveness.

9.13. Financial and Administration Management

9.13.1. Management Goals

- i. To receive an Annual Budget from Council specifically for the FNR that includes allocations for running costs and projects that are required to effectively manage the reserve;
- ii. To compile a five-year business plan for the FNR that includes costs and identifies sources of income generation and external funding opportunities;
- iii. To implement an APO for the FNR. The FNR must be managed according the APO. Annual budgets for specific goals must be incorporated in the APO;
- iv. To identify other funding opportunities for specific projects;
- v. To use the results of an Ecosystem Services Values Assessment as motivation for funding (refer to Management Action Table 3. h) Ecosystem and Biodiversity: Ecosystem Services).

9.13.2. Legislation

- Municipal Finance Management Act, (Act No.1 of 1999);
- Government Immovable Assets Management Act (Act No. 19 of 2007);
- Local Government: Municipal Systems Act (Act No. 32 of 2000).

9.13.3. Guiding Principles for Financial Management

- Financial management of the reserve is line with the Municipal Finance Management Act (1999) and the Local Government Municipal Systems Act (2000);
- The reserve strives to develop an improved income base while conserving the integrity of cultural, ecological and natural resources;

9.13.4. Management Actions

Refer to Section 10. Management Action Table 1.13. Financial and Administrative Management.

9.14. Human Resource Management

¹G. I. Cowan, Nobusika Mpongoma, P Britton, (eds) 2010. Management effectiveness of South Africa's protected areas. Department of Environmental Affairs, Pretoria. Available online: <http://www.gisp.org/whatsnew/docs/AfricaIASProtectedAreas.pdf>

²Stolton, S. and N. Dudley. 2016. METT Handbook: A guide to using the Management Effectiveness Tracking Tool (METT), WWF-UK, Woking. Available online: https://www.protectedplanet.net/system/comfy/cms/files/files/000/000/045/original/WWF_METT_Handbook_2016_FINAL.pdf

9.14.1. Management Goals

- i. To ensure human resource capacity is adequate to manage the FNR effectively;
- ii. To continue to supplement and improve limited human resource capacity through the use of voluntary inputs from reputable and knowledgeable sources such as FAB, HBS and CPMG and other co-management agreements;
- iii. To implement mechanisms to enable an Honorary Ranger volunteer programme to assist and improve law enforcement and monitoring programmes within the FNR.

9.14.2. Legislation

As a minimum, all the requirements of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993) must be met to provide for the safety of staff and visitors, especially in and around infrastructure installations at the FNR.

- The Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996);
- The Western Cape Nature Conservation Board Act, (Act No.15 of 1998);
- Labour Relations Act, (Act No. 66 of 1995);
- Basic Conditions of Employment Act, (Act No. 75 of 1997);
- Employment Equity Act, (Act No 55 of 1998);
- Occupational Health and Safety Act, (Act No. 85 of 1993);
- Skills Development Act, (Act No. 97 of 1998);
- The Protected Disclosures Act, (Act No. 26 of 2000);
- The Promotion of Access to Information Act, (Act No. 2 of 2000);
- The Promotion of Administrative Justice Act, (Act No. 3 of 2000);
- Local Government: Municipal Systems Act (Act No. 32 of 2000).

9.14.3. Guiding Principles for Human Resource Management

Human Resource Management within the FNR is the responsibility of OM. The main purposes of the OM Human Resource Management Services are¹:

- Determine and acquire the right quantity and quality of employees and;
- Ensure the optimal development and utilisation of employee resources.

9.14.4. Management Actions

Refer to Section 10. Management Action Table 1.14. Human Resource Management

9.15. Visitor Management and Services

9.15.1. Management Goals

¹Overstrand Municipality Management Services. Available online: <http://overstrand.gov.za/en/management-services-human-resources> Accessed: 27 August 2018.

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- i. Ensure the FNR visitor facilities and infrastructure are sustainably developed and maintained within the zonation policies of the FNR;
 - ii. Improve the safety and security of visitors to the reserve (refer to 12. Disaster and Risk Management and 10. Law Enforcement and Compliance);
 - iii. Safeguard cultural and natural heritage resources through adequate visitor management and low impact recreational activities within the FNR.

9.15.2. Legislation

- Tourism Act, (Act No. 72 of 1993)

9.15.3. Management Actions

Refer to Section 10. Management Action Table 1.16. Visitor & Services Management.

9.16. Tourism Development Framework

9.16.1. Management Goals

- i. To develop a Tourism Conceptual Development Plan (CDP) for the FNR;
- ii. To develop the eco-cultural tourism potential of the FNR without compromising the biodiversity of the nature reserve;
- iii. To develop and maintain high quality visitor infrastructure, facilities and recreational activities.

9.16.2. Legislation

The key areas of legislation that speak to infrastructure use and development within a protected area are:

- National Environmental Management Act, (Act No. 107 of 1998);
- National Environmental Management: Protected Areas Act, (Act No. 57 of 2003);
- NEMA Environmental Impact Assessment Regulations (Government Notice No. R. 543 of June 2010 as corrected by Correction Notices 1 (Government Notice No. R. 660 of July 2010) and 2 (Government Notice R. 1159 of December 2010);
- National Water Act (Act 36 of 1998, as amended by Act 45 of 1999);
- National Heritage Resources Act, (Act No. 25 of 1999);
- The National Waste Act, (Act No. 59 of 2008);
- Tourism Act, (Act No. 72 of 1993);
- Occupational Health and Safety Act, (Act No 85 of 1993).

9.16.3. Guiding Principles for Tourism Development Frameworks

The objectives for the Tourism CDP should be as follows:

- To guide tourism infrastructure development in line with the zonation within the FNR;
- Be aligned with the visions, mission, management goals and management guidelines of this PAMP.

9.16.4. Management Actions

Refer to Section 10. Management Action Table 1.17. Tourism Development Framework. None of the key deliverables or monitoring activities have due dates at this point. These will only be added once the deliverables and activities have been identified according to their priority importance.

SECTION 10. Management Action Tables derived from the Strategic Implementation Framework (Section 9);

Refer to the Index of Tables on page vii

MANAGEMENT ACTION TABLE 1.1. LEGAL STATUS AND RESERVE EXPANSION			
<p>Objective 1) To implement an effective management framework through legislative compliance, corporative governance and the implementation of measurable strategies, policies, bylaws, and procedures.</p> <p>Objective 2) To ensure the conservation of ecological processes, ecosystems and species within the FNR are improved and maintained;</p> <p>Objective 3) To effectively conserve the cultural heritage of the FNR</p> <p>Objective 4) To maintain and develop meaningful co-management and partnership agreements that benefit the FNR.</p>			
	Key Deliverables	Monitoring Activities	Indicators
1.	The FNR has secure permanent legal conservation status in terms of NEM: PAA	<ul style="list-style-type: none"> i. Upon approval from the OM Municipal Council for the inclusion of the proposed properties (Refer to Figure 15 Current and proposed land parcels that constitute the FNR and Appendix 3. Overstrand: Fernkloof Nature Reserve Cadastral Map) as an extension of the FNR, the OM will apply to the DEA&DP for the declaration of all parcels of land in the Government Gazette; ii. The Registrar of Deeds must be informed in writing of the declaration and record such declaration in the relevant registers and documents; iii. The Fernkloof Nature Reserve (including all land parcels) is listed in the National Register of Protected Areas. 	a) The FNR is legally secure.
2.	The FNR boundary is surveyed and demarcated. This will inform the buffer zone surrounding the protected area in accordance with the Draft EMOZ 2016	<ul style="list-style-type: none"> i. Survey all boundaries for inclusion in the extension of the FNR. ii. Boundaries must be demarcated and known to management and neighbouring property-owners. 	<ul style="list-style-type: none"> a) The FNR boundary is demarcated; b) A Buffer Zone surrounding the FNR is in place.
3.	The OM EMS considers opportunities for FNR extension and/or protected areas/conservation management areas in collaboration with organisations and private landowners.	<ul style="list-style-type: none"> i. Identify possible stewardship agreements with surrounding land owners; ii. Investigate the SANBI CAPE Programme: Landscape Initiatives programme that advises on biodiversity stewardship and agreements between protected area management and voluntary commitment, landowner focussed extension etc. using systematic biodiversity site selection⁹⁶ 	a) The FNR has increased in size and has improved buffer zones.

4.	The FNR is included in the UNESCO World Heritage Site: Cape Floral Region Protected Area (WHS CFRPA)	i. Collaborate with the CapeNature Western Cape Protected Area Expansion Programme to have the FNR included in the listing of the Cape Floral Kingdom World Heritage Site.	a) The FNR has been submitted for the inclusion as a WHS CFRPA cluster.
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MANAGEMENT ACTION TABLE 1.2. INTEGRATED PLANNING, COOPERATIVE GOVERNANCE & CO-MANAGEMENT AGREEMENTS

Objective 1) To implement an effective management framework through legislative compliance, corporative governance and the implementation of measurable strategies, policies and procedures;

Objective 2) To ensure the conservation of ecological processes, ecosystems and species within the FNR are improved and maintained;

Objective 3) To effectively conserve the cultural heritage of the FNR

Objective 4) To maintain and develop meaningful co-management and partnership agreements that benefit the FNR.

	Key Deliverables	Monitoring Activities	Indicators
5.	Integrate FNR land-use and planning with the OM IDP; SDF; IDF and EMF	i. The EMS participates in the review of the Municipal IDP, SDF, IDF and EMF documents to ensure the maintenance of an effective buffer zone through appropriate land-uses adjacent to the FNR.	a) The FNR is integrated into land-use and planning and has an effective buffer zones.
6.	Investigate and formalise beneficial Collaborative, Co-management, private and commercial partnership agreements.	i. Ensure all existing partnerships, co-management and collaborative agreements with state bodies, NGOs, Conservation Organisations, private landowners, institutions and persons are formalised and signed off by relevant OM officials; ii. Investigate and facilitate co-management agreements with long-standing non-commercial institutions (e.g., HBS and AHC) regarding their leases on the FNR; iii. The list of properties and land status directly adjacent to the FNR should continually be updated to reflect the latest information.	a) FNR partnerships and agreements are formalised and if necessary, legally binding.
7.	Investigate and formalise private and public agreements, co-management,	i. Annually investigate any potentially beneficial and desirable partnerships with neighbouring landowners, state bodies, institutions, or persons and, where	a) The FNR has increased management effectiveness

⁹⁶ Cadman, M., Petersen, C., Driver, A., Sekhran, N., Maze, K. and Munzhedzi, S. 2010. Biodiversity for Development: South Africa's landscape approach to conserving biodiversity and promoting ecosystem resilience. South African National Biodiversity Institute, Pretoria. Available online: <https://www.sanbi.org/biodiversity/science-into-policy-action/mainstreaming-biodiversity/cape-programme/cape-programme-landscape-initiatives/#>

	collaborative management, cooperative governance, and Key Partners	feasible, formalise through written agreements according to Municipal protocols and the PAMP management framework.	through partnerships and agreements
8.	Update and formalise existing leases and privately owned buildings within the FNR.	<ul style="list-style-type: none"> i. The inventory of existing lease-holdings and of privately owned buildings within the boundaries of the FNR is up to date; ii. Compile and/or update written agreements with all such leaseholders and landowners within the FNR; iii. All FNR lease agreements are legally binding and complied with. 	a) FNR leases and privately owned buildings within FNR are up to date and complied with by both signatories.
9.	Update the Fernkloof Advisory Board (FAB) bylaw.	<ul style="list-style-type: none"> i. The FAB bylaw is updated to be applicable and effective for the management of the FNR; ii. FAB can advise on the management of the FNR. 	a) The FAB bylaw is amended.
10.	Develop and Implement FNR Bylaws	As the management authority, the OM has the authority to administer bylaws for effective management (through adequate overlay zones as per Chapter 15 of the OM Zoning Scheme Regulations), law enforcement and compliance: The FAB and OM investigate the need for bylaws to effectively manage, enforce laws and ensure compliance within the FNR;	a) The FNR has specific bylaws in place to effectively manage and enforce compliance of management decisions

MANAGEMENT ACTION TABLE 1.3. ECOSYSTEM & BIODIVERSITY MANAGEMENT

Objective 1) To implement an effective management framework through legislative compliance, corporative governance and the implementation of measurable strategies, policies and procedures;

Objective 2) To ensure the conservation of ecological processes, ecosystems and species within the FNR are improved and maintained;

Objective 4) To maintain and develop meaningful co-management and partnership agreements that benefit the FNR;

Objective 5) To promote and provide sustainable development within the FNR.

a) ECOSYSTEM & BIODIVERSITY MANAGEMENT: GENERAL ACTIONS

	Key Deliverables	Monitoring Activities	Indicators
11.	A Sensitivity Analysis is performed for the FNR	i. CapeNature is consulted to determine the protocols and procedures for Sensitivity Analysis for the FNR; ii. The zonation of areas within the FNR are accurately represented and comply with the CapeNature Management Zone requirements.	a) The FNR Management Units/Zones are categorised according to a Sensitivity Analysis.
12.	Management of ecosystems and biodiversity are audited.	i. The Biodiversity Conservation Manager must assess the results from the Key Deliverables and Monitoring Activities as part of the environmental and management audit in April / May of each calendar year (Refer to Table 1.12. Management Effectiveness and Table 1.13. Finance and Administration Management).	a) Ecosystem and Biodiversity Management Actions of the FNR are reported in the annual Management Audit.
13.	A FNR Priority Research List is compiled	i. Using information from existing species lists for fauna and flora in the FNR, and information gathered during Biodiversity and Ecosystem Inventories and Surveys set out in this Action Table, a Priority Research List should be developed by the FNR.	a) The FNR has a prioritised list of biodiversity and ecosystem research requirements.
14.	Volunteers and Students contribute to Reserve Management	i. Investigate formal agreements with reputable scientific institutions that require conservation, environmental education, biological and/or ecological research, reserve management or cultural heritage projects to complete student qualifications;	a) Research and monitoring capacity of the FNR are increased by student and volunteer contributions

		<ul style="list-style-type: none"> ii. Promote/advertise the FNR Priority Research List to scientific institutions to generate capacity in research and reserve management; iii. Investigate possible agreements with local volunteer organisations or develop a FNR volunteer organisation that contributes financially to the FNR for research opportunities in the FNR; iv. The FNR Honorary Rangers Programme (HRP) is utilised to contribute to law enforcement (refer Action 66), management, monitoring and research within the FNR; v. Develop and define the Terms of Reference (ToR) for The FNR HRP. 	
15.	Standard Operating Procedures (SOP) for Research and Monitoring are implemented in the FNR.	<ul style="list-style-type: none"> i. Consult with CapeNature and SANBI for advice/requirements for formalised SOPs for all FNR monitoring and research programmes to ensure these programmes add value to regional, provincial and national databases; ii. Train FNR management, staff and relevant citizen science/co-management groups to implement research and monitoring SOPs to ensure data collection is standardised; iii. Students and academics wishing to perform research at the FNR must submit a research proposal to be reviewed by the relevant management authorities, organisations and/or scientific institutions. 	<ul style="list-style-type: none"> a) All monitoring programmes are standardised; b) SOPs for all research and monitoring are in place; c) Monitors are trained to collect data according to the relevant SOP.
16.	Ensure that all FNR Research Data and intellectual property is protected by legal contract.	<ul style="list-style-type: none"> i. Registered scientific institutions are made aware of the availability of research and monitoring data from the FNR; ii. FNR data are protected by legal contracts that include the ownership and right of intellectual property (IP) including raw data, scientific journal publication expectations of the FNR and the contribution of research to FNR management actions. 	<ul style="list-style-type: none"> a) Research and conservation institutions are aware of research opportunities available at the FNR; b) A contract for research to be conducted in the FNR is developed and implemented.
17.	Research and monitoring data contributes to the relevant	<ul style="list-style-type: none"> i. All monitoring and research data collected at the FNR are forwarded to the relevant institutions, provincial and national government bodies for inclusion in the relevant biodiversity and monitoring programmes and reports. 	<ul style="list-style-type: none"> a) The relevant institutions reliably receive monitoring and research data from the FNR.

	institutional, provincial and national programmes		
18.	Monitoring and Research data is collated, analysed and submitted with the Protected Area Annual Management Report to the MEC	<ul style="list-style-type: none"> i. FNR management ensures that monitoring and research data is analysed and included in the annual report to the MEC; ii. FNR management uses monitoring and research data in the annual METT-SA scoring system; 	<ul style="list-style-type: none"> a) Valuable research is encouraged by FNR management; b) The FNR annually indicates an upward trend in the METT-SA score.
19.	Monitoring and Research Database Management	<ul style="list-style-type: none"> i. Research and monitoring databases must be collated with historical data, for e.g. 2010 SANSA Public Survey (Hamilton-Atwell 2010) and post fire monitoring data (HBS); ii. Databases must be formatted to be scientifically sound; iii. Databases must be backed-up to external and/or online systems to ensure security thereof; iv. All species monitoring lists must regularly be updated and sent to the EMS; 	<ul style="list-style-type: none"> a) Databases are current; b) Databases are formatted correctly; c) Databases are securely backed-up.
20.	Monitoring and Research Data contributes to adaptive management strategies.	<ul style="list-style-type: none"> i. The data collected during monitoring and/or research within the reserve is used to inform management strategies to better conserve and protect species and habitats within the FNR. 	a) Management uses monitoring and research results to better protect species and habitats.
21.	FNR Ecosystem GIS Systems are up to date	<ul style="list-style-type: none"> i. All monitoring and research data should, where applicable, be overlaid to FNR GIS systems. 	a) FNR GIS data is current

b) ECOSYSTEMS & BIODIVERSITY MANAGEMENT: INDIGENOUS VEGETATION			
	Key Deliverables	Monitoring Activities	Indicators
22.	The Piet-se-Bos restoration programme continues successfully	i. The CPMG should continue to plant White milkwood (<i>Sideroxylon inerme</i>), Coastal Camphor Bush (<i>Tarchonanthus littoralis</i>) and other species indigenous to the Western Cape Milkwood Forest vegetation type on the Piet se Bos portion of the FNR;	a) The natural vegetation of the FNR Piet-se-Bos site continues to be restored.
23.	Conduct a Vegetation Biodiversity Inventory (VBI) for the FNR.	i. The FNR vegetation types of the FNR are surveyed, mapped, and described using procedures and recommendations from the SANBI and CapeNature Biodiversity programmes. ii. Wetland community vegetation types are identified and classified to community level (as per Sieben et al 2014); iii. The VBI and subsequent Vegetation Biodiversity Monitoring Programme records flora species per FNR quarter degree square (3419AC and 3419AD) and submit data to the SANBI.	a) A FNR VBI is designed and conducted.
24.	The FNR Herbarium contributes to the BRAHMS	i. The HBS Botanical Research Centre with SANBI and Millennium Seed Bank partnerships contribute data and samples to the University of Oxford's BRAHMS database of herbaria, botanic gardens, seed bank and botanical surveys for taxonomic research and seed bank curation.	a) The FNR Herbarium specimens are loaded onto the BRAHMS database.
25.	Implement a FNR Vegetation Biodiversity Monitoring Programme (VBMP)	i. Using a SOP for FNR VBMP, regular and scientifically sound vegetation monitoring occurs in all FNR areas; ii. Monitoring includes Rare and Endangered vegetation types/species in all areas of the FNR (including areas that are difficult to access); iii. Monitoring data collection should include the collection of environmental and other relevant abiotic data; iv. Data collected during VBMP are added to FNR GIS data layers;	a) The FNR VBMP contributes to the development of an BMP for the FNR; b) GIS and Monitoring databases are current;

		v. VBMP data is analysed to re-assess and adapt FNR management strategies for <i>inter alia</i> fire and alien vegetation management;	c) Adaptive management occurs in response to VBMP information;
26.	Identify FNR vegetation research priorities and needs.	<ul style="list-style-type: none"> i. Using the VBMP database, species of concern and research needs are identified with specific scientific research questions that require clarification/research; ii. Calls for identified research are advertised on applicable forums i.e. SANBI, National Research Foundation (NRF) and scientific institutions 	a) The FNR has dedicated researchers who contribute to the identification of management strategy requirements.
27.	Develop and maintain a scientifically valuable post-fire vegetation monitoring programme.	<ul style="list-style-type: none"> i. CapeNature is consulted to determine scientifically sound protocols for post-fire vegetation monitoring; ii. The data collected during post-fire vegetation monitoring is used to develop GIS overlays for Veld Age Maps of the FNR; iii. Veld Age Maps are updated annually; iv. Annually updated Veld Age Maps are added to the FNR Annual Audit and Annual Burning Plan (refer to Management Action Table 1.5. Fire Management) 	<ul style="list-style-type: none"> a) The protocols for post-fire monitoring are scientifically sound; b) Post-fire vegetation surveys contribute to Veld Age Maps for the FNR.
c) ECOSYSTEMS AND BIODIVERSITY MANAGEMENT: INVERTEBRATES			
	Key Deliverables	Monitoring Activities	Indicators
28.	Design and compile an Invertebrate Biodiversity Inventory (IBI) for the FNR.	<ul style="list-style-type: none"> i. Consult with the UCT Animal Demographic Unit (ADU), Iziko Entomology Dpt, SANSA, AfriBugs, SANBI and/or CapeNature to design and implement an Invertebrate (Lepidoptera, Arthropoda and Arachnida) Biodiversity Inventory (IBI) for the FNR; ii. Investigate the cost/benefit of a contracted professional baseline (inventory) invertebrate survey (e.g., AfriBugs) and training programmes for citizen science contributions to ongoing invertebrate monitoring for the FNR. 	a) An FNR IBI is conducted and contributes to the development of the BMP of the FNR

29.	Design and implement Invertebrate Monitoring and Research Programmes for the FNR	<ul style="list-style-type: none"> i. Design and implement a regular monitoring programme for invertebrates in the FNR using citizen science, FNR staff and/or research students. ii. Investigate and identify research needs and opportunities for invertebrates in the FNR. 	<ul style="list-style-type: none"> a) Regular invertebrate monitoring is conducted; b) Invertebrate research is conducted.
30.	Use invertebrate monitoring data to identify management needs and prioritise research requirements	<ul style="list-style-type: none"> i. Use IBI to identify invertebrate species and habitats of concern/priority (including alien species) to advise future research and ecological and biodiversity management strategies. 	<ul style="list-style-type: none"> a) Priority species are identified; b) Management strategies are adapted to protect or eradicate species as required.

d) ECOSYSTEMS & BIODIVERSITY MANAGEMENT: FISH & AQUATIC ORGANISMS

	Key Deliverables	Monitoring Activities	Indicators
31.	Conduct a comprehensive Fish Survey for the FNR.	<ul style="list-style-type: none"> i. Consult with CapeNature to design and implement a comprehensive fish survey for the FNR; ii. Investigate the benefit/cost of a specialist contract to design and conduct the survey 	<ul style="list-style-type: none"> a) Specialists are consulted to design a fish survey for the FNR; b) A fish survey is conducted in the FNR.
32.	Design and implement a Fish/Aquatic Monitoring and Research Programmes for the FNR	<ul style="list-style-type: none"> i. Investigate and identify future research needs and opportunities for fish and other aquatic organisms in the FNR; ii. Investigate the potential of other (e.g., macro/micro aquatic invertebrate surveys) to develop a holistic aquatic survey of the FNR 	<ul style="list-style-type: none"> a) Research and monitoring are regularly conducted on aquatic species/habitats within the FNR.
33.	Use Fish/Aquatic monitoring data to identify management needs and prioritise research requirements	<ul style="list-style-type: none"> i. Using the data collected during the fish survey, assess and mitigate potential negative threats (vegetation encroachment, water pollution/extraction, illegal harvesting etc.) on endemic fish and their habitats; ii. If alien fish species are identified, a management strategy must be developed to eradicate and/or minimise the negative impacts of alien fish on aquatic species and ecosystems; 	<ul style="list-style-type: none"> a) A Fisheries Management Plan for the FNR is designed and implemented.

		<p>iii. Following the results of the survey, investigate (in conjunction with DWA and CapeNature) the merit/risk of the reintroduction of indigenous fish species to aquatic systems within the FNR;</p> <p>iv. Using the data collected during the Fish Inventory, develop a long-term Fisheries Management Strategy for the FNR.</p>	
e) ECOSYSTEMS & BIODIVERSITY MANAGEMENT: HERPETOFAUNA			
	Key Deliverables	Monitoring Activities	Indicators
34.	Design and compile a Herpetofauna Biodiversity Inventory (HBI) for the FNR	<p>i. Consult with UCT ADU, CapeNature and SANBI to design and develop a species inventory of reptiles and amphibians in the FNR;</p> <p>ii. Using the results of the HBI, investigate the viability of research and/or monitoring opportunities in the FNR</p>	a) A Herpetofauna survey of the FNR is designed and implemented
35.	Use Herpetofauna Inventory to prioritise key conservation species and habitats.	<p>iii. Endangered and/or rare species identified in the HBI should be seen as indicators for adaptive management strategies to protect areas/habitats/species of concern.</p>	a) Management strategies are adapted to conserve Herpetofauna of the FNR.
f) ECOSYSTEMS & BIODIVERSITY MANAGEMENT: AVIFAUNA			
	Key Deliverables	Monitoring Activities	Indicators
36.	Avifauna Species lists are regularly updated.	<p>i. The Avifauna species list for the FNR must be regularly updated (for e.g., by the HBC) and submitted to the OM EMS.</p>	a) The Avifauna Species List for the FNR is current.
37.	Formalise an MoU with the Hermanus Bird Club	<p>i. A formal MoU between the HBC and OM EMS is signed to formalise Avifauna database management and responsibilities of both parties.</p>	a) A formal MoU between HBC and OM EMS is agreed upon and signed by both parties.
38.	b) Avifauna Species observations are regularly recorded and uploaded to the relevant online databases	<p>i. Avifauna species lists are regularly updated on UCT ADU and/or SANBI iNaturalist websites</p>	<p>a) FNR contribute avifaunal species lists to online biodiversity platforms.</p> <p>b)</p>

g) ECOSYSTEMS & BIODIVERSITY MANAGEMENT: MAMMALS			
	Key Deliverables	Monitoring Activities	Indicators
39.	A Mammal Biodiversity Inventory (MBI) (species list) database is current	i. The MBI database is up to date and securely stored as per SOPs for monitoring and research.	a) MBI are up to date
40.	Mammal observations within the FNR are added to the MBI	i. Mammal monitoring is routinely performed and opportunistic observations by FNR staff, citizen science groups etc. are uploaded to the MBI database.	a) Mammal observations are recorded.
41.	The FNR MBI contributes to mammal biodiversity platforms.	i. The MBI contributes to a mammal biodiversity online database (for e.g. SANBI iNaturalist or UCT ADU Mammal Map)	a) FNR MBI contribute to relevant biodiversity online platforms
42.	Management strategies are adapted to protect species and habitats	i. Identified endemic mammal species/species of concern contribute to adaptive management strategies to protect and conserve the species and their habitats	a) FNR Management Strategies are adapted to conserve/protect species of concern.
h) ECOSYSTEMS & BIODIVERSITY MANAGEMENT: ECOSYSTEM SERVICES			
	Key Deliverables	Monitoring Activities	Indicators
43.	Quantify FNR Ecosystem Services	i. Perform a formal Ecosystem Services Value Assessment of the FNR to determine the present and potential value of services delivered to the local and regional economy by the FNR.	FNR annually indicates an upward trend in METT-SA score
i) ECOSYSTEMS & BIODIVERSITY MANAGEMENT: SOIL EROSION			
	Key Deliverables	Monitoring Activities	Indicators
44.	c) Prevent and mitigate soil erosion in the FNR	i. Identify areas in the FNR that may be susceptible to soil erosion for monitoring purposes, based on local geology and soils; ii. Extensive sites of potential or aggravated soil erosion must be mapped; iii. Potential soil erosion must be prevented with appropriate planning (e.g., Alien Vegetation removal);	Soil erosion areas are mapped, monitored, and rehabilitated.

		iv. Areas prioritised for rehabilitation are in the APO and budget for the management of the FNR. (Refer to Management Action Table 1.9. Infrastructure Management)	
j) ECOSYSTEMS & BIODIVERSITY MANAGEMENT: CATCHMENT, GROUNDWATER & RIVERS			
	Key Deliverables	Monitoring Activities	Indicators
45.	Groundwater is routinely monitored	i. Ensure the continued scheduled monitoring of groundwater (by Umvoto Africa) to ensure protection of groundwater quality and quantity at the FNR. ii. File the groundwater monitoring reports produced at the EMS offices, and at the FNR.	a) FNR annually indicates an upward trend in METT-SA score b) Long-term monitoring and research of the effects of water extraction on vegetation within the FNR occurs.
46.	Monitor the effects of groundwater extraction on vegetation in the FNR	i. Undertake long-term monitoring of vegetation within the FNR for any negative effects resulting from groundwater extraction (e.g., by recording phenological changes in monitoring plots). Such monitoring could be undertaken in collaboration with scientific institutions.	
47.	Ensure a sustained supply and good quality of water from the Mossel River Catchment	i. A good indigenous vegetative canopy and basal cover must be maintained to sustain the flow of surface water, and to prevent turbidity in streams and rivers; ii. Strict pollution control and waste management standards must be applied (refer to Table 1.9. Infrastructure Management); iii. Natural wetlands in the catchment are maintained, and any damaged wetlands are rehabilitated; iv. Invasive alien plants are removed / controlled; v. Aquifer water quality and quantity are monitored; vi. Ensure the continued monitoring of surface water quality (e.g., in collaboration with CapeNature's River Health Programme). File the monitoring reports produced at the EMS offices, and at the FNR. vii. Table and discuss adaptive management actions at FAB meetings, if required.	a) The Mossel River Catchment is managed effectively.

48.	FNR Management participates and contributes to surrounding water management forums	i. FNR Management should attend the Klein River Estuary Forum (KREF) meetings to remain informed of current affairs affecting natural resource surrounding and neighbouring the FNR	a) FNR contributes to the management of the Klein River Estuary.
49.	Hydrology of the FNR is well understood	i. All water courses, including seepages are mapped in the FNR.	a) The Hydrology of the FNR is accurately mapped.

MANAGEMENT ACTION TABLE 1.4. WILDLIFE MANAGEMENT

Objective 1) To implement an effective management framework through legislative compliance, corporative governance and the implementation of measurable strategies, policies and procedures;

Objective 2) To ensure the conservation of ecological processes, ecosystems, and species within the FNR are improved and maintained

	Key Deliverables	Monitoring Activities	Indicators
(Refer to Management Action Table 1.3. for abiotic and taxa-specific ecosystem and biodiversity management strategies)			
50.	Investigate the reintroduction of naturally occurring wildlife in the FNR	i. Consult with CapeNature to determine what research and/or investigations are required to determine the feasibility of the reintroduction of wildlife (including fish) that are suitable to the habitats/ecosystems of the FNR.	A precautionary approach is applied to the introduction of wildlife in the FNR.
51.	Manage damage causing/problem fauna	i. The FNR investigates and implements best practises regarding damage causing wildlife and promotes partnerships to assist with the management thereof; ii. To ensure the coordination with the Overstrand Baboon Management Programme within the Environmental Management Services Department. iii. The baboon-proof fence above Voëlklip is ineffective. The fence needs to be upgraded in order to be more effectiveness to control baboons in and around the FNR.	a) Partnerships to mitigate damage from wildlife are investigated; b) The upgrade of the baboon-proof fence.

MANAGEMENT ACTION TABLE 1.5. FIRE MANAGEMENT

Objective 1) To implement an effective management framework through legislative compliance, corporative governance and the implementation of measurable strategies, policies and procedures;

Objective 2) To ensure the conservation of ecological processes, ecosystems and species within the FNR are improved and maintained;

Objective 3) To effectively conserve the cultural heritage of the FNR

Objective 4) To maintain and develop meaningful co-management and partnership agreements that benefit the FNR.

	Key Deliverables	Monitoring Activities	Indicators
<p>Due to the dependence of sound fire management on effective alien vegetation management, many Monitoring Activities for Management Action Table 1.5 Fire Management and Management Action Table 1.6. Invasive and Non-Invasive Species Management will occur concurrently.</p>			
52.	<p>Develop a Fire Management Plan (FMP) for the FNR</p>	<ul style="list-style-type: none"> i. In consultation with CapeNature and guiding documentation (Veldfire Management Policy and CapeNature Veldfire Management Guidelines), develop and maintain a FNR Fire Management Plan (FMP) to guide fire management including: the objectives of, scientific understanding, management actions, legal compliance, personnel training requirements, monitoring and research required; ii. Develop a 5-year Burning Programme based on objectives, scientific understanding, and management actions outlined in the FNR MP; iii. Within the 5 year Burning Programme, an Annual Burning Plan must be developed; iv. The size of burning blocks, and the season in which burning is undertaken should take into consideration the limited distributions of various plant and animal species (e.g. distribution records of rare and endemic plant and animal species, such as Drewe’s Moss Frog), to be sure that such species are not extirpated by prescribed burning operations. 	<p>a) A FNR FMP is in place</p>
53.	<p>Develop and Maintain a Wildfire Database Showing Historical Fire Scars</p>	<ul style="list-style-type: none"> Develop a wildfire scar database, going back as far as possible to get the veldt age of FNR: i. In consultation with CapeNature, map all historical fire scars for FNR, Going back as far as possible ii. The mapping of wildfire scars are directly linked with veldt age 	<p>a) A Wildfire Database has been developed in is maintained</p>

		<ul style="list-style-type: none"> iii. Veldt age must be considered when developing a Fire Management Plan (FMP) for FNR iv. Maintain the wildfire database 	
54.	Convene an Annual Fire Management Workshop	<p>Convene an Annual Fire Management Workshop with OM Fire and Disaster Management Department and all relevant stakeholders. The purpose of the workshop will be to:</p> <ul style="list-style-type: none"> i. Review the previous fire season’s prescribed burns and wildfires must be reviewed; ii. Determine the upcoming Annual Burning Plan for management units within the FNR 	a) An Annual Fire Management Workshop is held to review and determine the Annual Burning Plan for the FNR
55.	Formalise a MoA with Greater Overberg Fire Protection Association (FPA)	<p>Formalise Fire Management Agreements with neighbouring members of the FPA to allow for:</p> <ul style="list-style-type: none"> i. legal compliance in the event of a wildfire starting on the FNR and crossing over to a neighbouring property or vice versa. ii. co-operative firefighting on each other’s properties in the event of a wildfire; and iii. agreement regarding the positioning and width of fire control belts (in collaboration with CapeNature, FPAs, and with the Overstrand Fire and Disaster Management Department). 	<ul style="list-style-type: none"> a) The FNR is legally compliant as per national regulations; b) FNR receives assistance during fire events; c) Fire control belts surrounding the FNR are sufficient.
56.	Minimise the effects of fires within and around the FNR	<ul style="list-style-type: none"> i. Serve notice on property owners adjacent to the coastal areas of the FNR, specifically in terms of preventing encroachment into and/or edge effects on the FNR, and regarding necessary fire management of the coastal precinct of the FNR 	a) FNR coastal boundary areas are better protected from the spread of fire
57.	FNR staff are prepared and trained to manage prescribed burns and wild fires	<ul style="list-style-type: none"> i. Personal Protective Equipment (PPE) is provided to FNR staff; ii. Fire training for emergency and prescribed burns is provided to FNR staff 	a) FNR staff are equipped to respond to wildfires and prescribed burns

MANAGEMENT ACTION TABLE 1.6. INVASIVE AND NON-INVASIVE ALIEN SPECIES MANAGEMENT

Objective 1) To implement an effective management framework through legislative compliance, corporative governance and the implementation of measurable strategies, policies and procedures;

Objective 2) To ensure the conservation of ecological processes, ecosystems and species within the FNR are improved and maintained;

Objective 4) To maintain and develop meaningful co-management and partnership agreements that benefit the FNR.

	Key Deliverables	Monitoring Activities	Indicators
58.	Manage invasive alien and alien vegetation species within the FNR on an on-going basis.	<p>Develop an on-going time-bound programme to effectively:</p> <ul style="list-style-type: none"> i. Identify, map and monitor alien and invasive flora in the FNR and in areas which threaten the FNR; ii. Control declared alien weeds and invasive species within the FNR. iii. Address the re-planting / rehabilitation of relevant areas with indigenous plants; iv. Ensure that alien clearing, especially in steep areas is accompanied by phased rehabilitation of natural vegetation, to aid natural succession and prevent erosion; v. Develop a phased 5-year plan to address the existing non-invasive alien plants in the FNR. <p>The FNR Invasive and Alien Plant (IAP) Management Plan should be part of the FNR APO and results/progress of this management plan should be submitted in the annual report to the MEC as per NEM: PAA</p>	<ul style="list-style-type: none"> a) The FNR has an Invasive and Alien Plant Management Plan; b) FNR annually indicates an upward trend in METT-SA score.
59.	Use effective control methods to manage Invasive Alien Plants in the FNR	<p>Alien vegetation must be controlled by competent authority as per Section 42 of NEMA (1998).</p> <p>In addition to clearing declared alien and invasive alien plants, the following must be undertaken:</p> <ul style="list-style-type: none"> i. Garden Route Keurboom (<i>Virgilia divaricata</i>) is an indigenous invasive species, and should be removed from the Reserve; 	<ul style="list-style-type: none"> a) Alien and Invasive Plant Species are effectively controlled in the FNR.

		<p>ii. Canary Creeper (<i>Hedera canariensis</i>) and Madeira Vine (<i>Anredera cordifolia</i>) must be removed from all areas of the FNR</p> <p>iii. Spreading Century-Plants (<i>Agave americana</i> var. <i>expansa</i>), and Thatching Grass (<i>Thamnochortus insignis</i>), are to be removed from Hoy's Koppie before they spread further.</p>	
60.	Prevent alien and invasive plants from entering the FNR	<p>i. Monitor the encroachment / edge effects of private properties abutting the FNR (e.g., with respect to pruning of coastal vegetation along the Cliff Path by private landowners, invasion of garden plants into the FNR etc.).</p> <p>ii. Serve notice on property owners adjacent to the coastal areas of the FNR, specifically in terms of preventing encroachment into and/or edge effects on the FNR.</p>	a) The Alien and Invasive plants species in areas surrounding the FNR are monitored and managed.
61.	Form co-management/partnerships to effectively manage alien and invasive species in the FNR.	<p>i. Applications should be made to the relevant EPWPs such as "Landcare", "Working for Water", "Working on Fire", "Working for Wetlands" and the Water Fund where applicable for assistance with alien plant clearing.</p>	a) The FNR contributes to poverty relief programmes that assist with effective vegetation and fire management.

MANAGEMENT ACTION TABLE 1.7. CULTURAL HERITAGE RESOURCE MANAGEMENT

Objective 1) To implement an effective management framework through legislative compliance, corporative governance and the implementation of measurable strategies, policies and procedures;

Objective 3) To effectively conserve the cultural heritage of the FNR

Objective 4) To maintain and develop meaningful co-management and partnership agreements that benefit the FNR;

Objective 5) To promote and provide sustainable development within the FNR.

	Key Deliverables	Monitoring Activities	Indicators
62.	To protect cultural resources within the FNR.	Compile a comprehensive Cultural Heritage Inventory and Management Plan for FNR in collaboration with Overstrand Heritage and Aesthetics Committee and HWC.	a) Cultural Heritage Resources are being managed as per the objective of the FNR.

		This plan must include guidelines for the conservation, curation, interpretation, and monitoring of the various features and, where possible, must recommend sites for legal cultural heritage registration (e.g., registration as a Provincial Heritage Site).	
63.	Monitor Cultural Heritage resource of the FNR.	Ensure that existing sites of historical significance are regularly monitored for any signs of degradation and are checked during the annual environmental and management audit.	
64.	Manage Cultural Heritage resources effectively	<ul style="list-style-type: none"> i. Include the management and maintenance of heritage and cultural resources in the APO and budget for the FNR. ii. Ensure that a detailed Memorandum of Agreement is signed between the AHC and the Overstrand Municipality which sets out the rights and obligations of each party. 	

MANAGEMENT ACTION TABLE 1.8. LAW ENFORCEMENT AND COMPLIANCE MANAGEMENT

Objective 1) To implement an effective management framework through legislative compliance, corporative governance and the implementation of measurable strategies, policies and procedures;

Objective 4) To maintain and develop meaningful co-management and partnership agreements that benefit the FNR

	Key Deliverables	Monitoring Activities	Indicators
65.	Law Enforcement within the FNR is effective	<ul style="list-style-type: none"> i. Investigate the compilation of formal agreements with the Overstrand Protection Services Directorate and/or with the South African Police Services regarding patrolling of the FNR. In particular, the problems of vagrancy and theft / vandalism need to be addressed (especially along the Cliff Path, along Rotary Drive, and on Hoy's Koppie); ii. Develop and implement an integrated emergency strategy for the FNR with all relevant institutions. The strategy should include <i>inter alia</i> measures with respect 	a) Law enforcement and Monitoring and Compliance within the FNR are improved

		<p>to wildfires, emergencies, and criminal incidences (refer to Management Action Table 1.10. Disaster and Risk Management);</p> <p>iii. Investigate the implementation of restricted night-time vehicular access to Rotary Drive, in collaboration with the relevant Departments and adjacent landowners in this area.</p> <p>iv. The existing FNR Security Forum, under the Chairmanship of the Overstrand Protection Services Directorate, must be maintained to promote security co-ordination and affectivity;</p> <p>v. Ensure that the APO includes prioritised safety and security management actions.</p>	
66.	FNR Staff know regulations and contribute to compliance and law enforcement in the FNR	<p>i. Improve law enforcement and compliance capacity of the FNR staff;</p> <p>ii. Revision of the current Honorary Rangers programme for the FNR to improve staff capacity of law enforcement and compliance in the FNR.</p>	

MANAGEMENT ACTION TABLE 1.9. INFRASTRUCTURE MANAGEMENT

Objective 1) To implement an effective management framework through legislative compliance, corporative governance and the implementation of measurable strategies, policies and procedures;

Objective 3) To effectively conserve the cultural heritage of the FNR

Objective 4) To maintain and develop meaningful co-management and partnership agreements that benefit the FNR;

Objective 5) To promote and provide sustainable development within the FNR.

	Key Deliverables	Monitoring Activities	Indicators
67.	Transformed Management Units are accurately mapped with infield demarcations	i. A detailed, spatial representation of infrastructure and development within the FNR Transformed Management Units is compiled.	a) FNR Transformed Management Units are spatially represented
68.	Ensure the maintenance of infrastructure on the FNR.	ii. Include infrastructure development and maintenance in the APO and budget for the FNR.	a) The APO includes infrastructure development and maintenance;

		<p>iii. Compile and maintain a built infrastructure resource inventory / register for trails; pathways; servitudes; communication structures; water lines; reservoirs; valve chambers; fire control belts; fences; roads; memorial benches; and buildings etc.</p> <p>iv. Update the Infrastructure Map of the FNR to include the location of all built infrastructure, roads, tracks etc.;</p> <p>v. Local service providers should be used where possible to maintain buildings and provide services (plumbing, electrical, mechanical);</p> <p>vi. Areas that are heavily utilised during the holiday season, e.g., vehicle parking areas and vistas along Rotary Drive must be equipped with the necessary (preferably aesthetically pleasing) ablution facilities, and with baboon-proof bins. Existing ablution facilities that are unsightly must be screened;</p> <p>Review the desirability and effectiveness of all present FNR infrastructure regarding:</p> <ul style="list-style-type: none"> ○ Adequacy; ○ State of repair; ○ Existing maintenance plans and programmes; ○ Visitor and staff use; ○ Environmental impacts (negative and positive); ○ Income generation; ○ Possibilities of outsourcing 	<p>b) Infrastructure Inventories are up to date.</p>
<p>69.</p>	<p>Manage Roads, tracks and paths so impacts on the FNR environment are minimised.</p>	<p>i. Beacons are only in place at some points along the boundary of the FNR. As per NEM: PAA Norms and Standards for the Management of Protected Areas in South Africa (Government Gazette, March 2016), it is essential that the Reserve boundary points are demarcated, secured and publicly known;</p> <p>ii. Maintenance of the trails is urgently required in certain areas. Such maintenance must be on-going.</p>	<p>a) Roads, tracks, paths, and walkways are monitored, evaluated and maintained.</p>

		<p>iii. All vehicle roads and tracks must be regularly monitored, evaluated and recommendations made for new vehicle roads and tracks / hiking trails/cycling and repair or closure (with rehabilitation measures) of existing ones;</p> <p>iv. All unnecessary and/or informal pathways should be closed off and rehabilitated (e.g., from the surfaced area of the Cliff Path to the coastline). Similarly, sections of existing tracks and trails that pose on-going erosion control problems should be closed off and rehabilitated before their re-opening.</p> <p>v. Provide and manage coastal access points in terms of Section 20 of the NEM: ICMA</p>	
70.	Controlled access points for the FNR are investigated.	<p>i. Investigate the feasibility of constructing a controlled access point at the main entrance to the FNR.</p> <p>ii. Controlled pathways (e.g., steps and boardwalks) should be identified and constructed (e.g. for access to the seashore or viewpoints).</p>	a) Controlled Access of the FNR is investigated.
71.	Signage is appropriate and effective, supporting management goals.	Assess the existing interpretive, security, emergency, safety, and informative signpost system on the FNR (including access signage) and provide additional signage or update / improve the existing signage in terms of the APO. It is important that all signage should be standardised in terms of design.	a) Signage design standardised, in place and effective.
72.	Solid Waste is managed effectively.	<p>i. A waste management Audit must be performed to quantify effectiveness and identify weakness of waste management in all portions of the FNR;</p> <p>ii. Develop, install and maintain effective standardised solid waste receptacles for the FNR that are animal and baboon-proof, including fishing-line bins where required;</p> <p>iii. Reserve staff must, where practical, collect and remove litter during routine patrols.</p>	a) Solid waste management is effective.
73.	Sewage systems are effectively managed.	i. All existing sewage systems in the FNR must be investigated for legal compliance, and must be replaced / upgraded with appropriate sewage systems as funding permits;	a) Sewage and water pipeline systems are legally compliant and registered.

		<ul style="list-style-type: none"> ii. All leaking sewage and water pipelines, taps and valves must be replaced as soon as their malfunction has been noticed; iii. Ensure that all sewage and potable water pipelines / servitudes are registered with the relevant authorities, are mapped and placed on the appropriate GIS system for easy reference; 	b) Sewage and water pipelines are mapped.
74.	The FNR considers environmentally friendly infrastructure alternatives.	<ul style="list-style-type: none"> i. Effective environmentally friendly sewage facilities, energy and water-saving devices and technologies should be fitted in existing and new buildings wherever possible; ii. Investigate a partnership with NGO organisations to implement water-wise energy saving infrastructure in ablutions throughout the FNR. iii. All new bulk engineering services such as electricity, sewage and potable water pipelines must be located to minimise any negative environmental impacts, including negative aesthetic impacts. 	a) The FNR strives to use environmentally friendly technologies.

MANAGEMENT ACTION TABLE 1.10. DISASTER & RISK MANAGEMENT

Objective 1) To implement an effective management framework through legislative compliance, corporative governance and the implementation of measurable strategies, policies and procedures;

Objective 4) To maintain and develop meaningful co-management and partnership agreements that benefit the FNR

	Key Deliverables	Monitoring Activities	Indicators
75.	Identify potential risk areas in the FNR	i. Conduct a risk assessment and identify areas of potential concern (for e.g., recreational use of the Mossel River Dams)	a) Risks are identified and reduced.
76.	Disaster Response is integrated with cooperative governance.	i. Develop and implement an integrated emergency strategy for the FNR with all relevant institutions. The strategy should include <i>inter alia</i> measures with respect to wildfires, emergencies, and criminal incidences (refer to Management Action Table 1.8. Law Enforcement and Compliance)	a) Reduced risks and increased readiness and preparedness in the FNR

MANAGEMENT ACTION TABLE 1.11. SOCIO-ECONOMIC FRAMEWORK MANAGEMENT

Objective 1) To implement an effective management framework through legislative compliance, corporative governance and the implementation of measurable strategies, policies and procedures;

Objective 4) To maintain and develop meaningful co-management and partnership agreements that benefit the FNR

	Key Deliverables	Monitoring Activities	Indicators
77.	Ensure education and awareness raising programmes increase awareness of the FNR.	i. Where possible, sustain the FNR environmental education and awareness programmes specifically for surrounding neighbouring communities and general public interest groups; ii. Collaboration between outdoor adventure operators, the HBS, and environmental education service providers should be facilitated; iii. The use of FNR facilities by the WCC Eco-Schools Programme and by the Boy Scouts, school groups etc. should also be promoted.	a) The number of visitors for educational programmes is increased in the FNR.
78.	Manage consumptive utilisation of resources in the FNR.	Review any existing CapeNature and DEA&DP policies and develop a Policy Guideline Document for the Evaluation of extractive resource use applications within the FNR.	a) The FNR has an extractive resource policy in place.

MANAGEMENT ACTION TABLE 1.12. MANAGEMENT EFFECTIVENESS

Objective 1) To implement an effective management framework through legislative compliance, corporative governance and the implementation of measurable strategies, policies, and procedures.

	Key Deliverables	Monitoring Activities	Indicators
79.	EMS reports to the MEC Annually	i. Management authority to monitor and report annually, before the end of June each year to the Western Cape MEC on the status of implementation of the IMP and may include the following:	a) The OM submits an annual report the MEC

		(a) an assessment of the achievement of or contributions to the management objectives of the nature reserve (e.g., the results of an annual audit).	
80.	Implement the METT-SA	<ul style="list-style-type: none"> ii. Conduct the annual management effectiveness tracking tool - South Africa (METT-SA) annually; iii. Monitor and improve METT-SA through development and implementation of the FNR APO; iv. Report to the DFFE as per requirements for national evaluation of the METT-SA 	<p>a) The required METT-SA scoring is completed; b) The FNR METT-SA continues to show upward trends.</p>
81.	Implement, review and update the FNR PAMP	<ul style="list-style-type: none"> i. In the last year of applicability (2024), the Management Authority updates the FNR PAMP to ensure the succeeding five-year PAMP is prepared timeously; ii. Using the results of the METT-SA, review and amend the FNR PAMP to ensure adaptive management strategies are in effect. iii. In terms of NEM: PAA Norms and Standards for the Management of Protected Areas in South Africa (Government Gazette, March 2016): Municipalities responsible for protected are to include in their annual reports the MEC, their progress toward meeting and maintaining norms and standards of the NEM: PAA. 	
82.	An Annual Plan of Operations are developed for the implementation of approved programmes in the FNR	<ul style="list-style-type: none"> i. An Annual Plan of Operations (APO), as subsidiary plan (as per NEM: PAA 2003) to the FNR PAMP, may be developed in accordance with the Management plan and may be submitted to the MEC each year; ii. Management Actions (including costings) from this PAMP should be used to formulate the APO; iii. The APO may also be submitted to CapeNature to keep them informed of activities on the FNR. iv. The development of Specific APOs will be used for implementing approved task-specific management programmes (e.g. alien / invasive vegetation clearing, fire management). 	<p>a) An APO for specific areas of management within the FNR are used to implement and track management programmes</p>

83.	The Biodiversity Manager implements and contributes to the FNR APO.	The Biodiversity Manager (or an appointed environmental consulting firm) must: i. Implement the various agreed APOs throughout each financial year; ii. Undertake an annual environmental and management audit during the first quarter of each calendar year to assess the effectiveness of the Actions and Monitoring programmes listed in this PAMP; iii. The annual audit must be submitted to the OM Environmental Manager within four weeks of the audit date; iv. implement any adaptive management, corrective or mitigation measures that are required; v. The PAMP must be revised in accordance with the findings of the environmental and management audit, if revision is necessary.	a) The effectiveness of the PAMP and management actions are measured and adapted.
84.	The Overstrand community supports and is involved in the management of the FNR.	Arrange and advertise an annual public meeting in July each year to give feedback on progress, planned projects and encourage informal local community participation.	a) A sense of stewardship for the FNR from local communities is increased

MANAGEMENT ACTION TABLE 1.13. FINANCE & ADMINISTRATION MANAGEMENT

Objective 1) To implement an effective management framework through legislative compliance, corporative governance and the implementation of measurable strategies, policies, and procedures.

	Key Deliverables	Monitoring Activities	Indicators
85.	An Annual Budget is allocated to the FNR by the OM	i. The EMS appeal to Council for an FNR specific Annual Budget; ii. A detailed 5-year Cost Budget / Business Plan should be compiled for the FNR, which should consider potential income streams such as extended Municipal Public Works Programmes.	a) The FNR receives an Annual Budget that is specifically allocated to projects and running costs required to manage the reserve effectively
86.	Investigate funding opportunities for the FNR	Identify potential funding institutions for FNR projects identified by the FAB and by the EMS, to compile the necessary motivations / applications (e.g., to the United	a) The FNR applies for funding specific projects.

		Nations Environment Programme's Global Environment Facility; the World Bank; the Table Mountain Fund).	
87.	Identify opportunities that create a diverse income for the FNR	<ul style="list-style-type: none"> i. Investigate sponsorship from private enterprises to sponsor projects such as the Honorary Rangers Programme and pamphlet and brochure sponsorship; ii. Investigate the creation of a Trust / Donation Fund for the FNR. 	a) The FNR explores alternative sources of income for the reserve.
88.	Fixed Asset Management	<ul style="list-style-type: none"> i. To manage the assets of the reserve in accordance with the relevant Municipal legislation; ii. To ensure all reserve assets are barcoded; iii. To ensure that all reserve assets are verified bi-annually; iv. To provide input into infrastructure asset register; v. Disposal of assets in line with Asset Policy; vi. Immovable Assets Management Act requirement is met annually. 	a) Fixed Asset Policy is adhered to.

MANAGEMENT ACTION TABLE 1.14. HUMAN RESOURCE MANAGEMENT

Objective 1) To implement an effective management framework through legislative compliance, corporative governance and the implementation of measurable strategies, policies and procedures.

	Key Deliverables	Monitoring Activities	Indicators
89.	The Staff complement of the FNR is adequate.	<ul style="list-style-type: none"> i. Ensure that an appropriate human resource structure and capacity for the FNR is in place, with a view to improving effectiveness and efficiency in achieving FNR goals, and informing the detailed 5-year Cost Budget/Business Plan (refer to Table 1.13); ii. Investigate the establishment of a trained Field Ranger staff component to patrol the FNR and undertake environmental monitoring. 	a) The FNR has the staff it requires to fulfil management goals.
90.	Secure funding for additional staff requirements.	Investigate the sourcing of funding (e.g. Municipal Treasury and LED Programmes/ EPWP) to appoint additional staff as required.	a) Funding is sourced to fill staff gaps in the FNR.

91.	Staff are well trained and have the required resources and tools available to them.	<ul style="list-style-type: none"> i. Ensure that capacity building across the FNR staff contingent takes place; ii. Appropriate training courses should be identified on an annual basis; iii. The attendance of training courses pertaining to Nature Reserve and Environmental Management should be mandatory for all FNR staff. iv. Appropriate training must be given to new staff by the FNR management where applicable 	a) Capacity building and training occur within the FNR staff contingent.
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MANAGEMENT ACTION TABLE 1.15. VISITOR & SERVICES MANAGEMENT

Objective 1) To implement an effective management framework through legislative compliance, corporative governance and the implementation of measurable strategies, policies and procedures;

Objective 2) To ensure the conservation of ecological processes, ecosystems and species within the FNR are improved and maintained;

Objective 3) To effectively conserve the cultural heritage of the FNR.

	Key Deliverables	Monitoring Activities	Indicators
92.	Investigate the negative effects (soil erosion, pollution) from visitors utilising the Mossel River dams.	<ul style="list-style-type: none"> i. The FNR must investigate the public use of the Mossel River dams for recreational use, to improve safety, to avoid soil erosion and pollution of the area. 	a) The effects of visitor activity at the dams are understood, management strategy is developed accordingly.
93.	The number of visitors to the FNR are accurately recorded	<ul style="list-style-type: none"> i. Visitors to the FNR is recorded through a self-issuing permit book/slip system (To be investigated). ii. Visitor numbers inform the planning and development of visitor activity centres. 	<ul style="list-style-type: none"> a) The number of visitors to the FNR are included in the Annual Report. b) Visitor numbers inform planning and development within the FNR.
94.	Information pamphlets and signage are informative and updated to be current to management issues as they arise.	<ul style="list-style-type: none"> i. Continue to make informative pamphlets available to the public at the Visitors Centre in the FNR, Hermanus Tourism Bureau, and the Old Harbour Museum. ii. Assess and update the informative pamphlets and signage to include Code of Conduct for visitors to the reserve; 	a) Visitors can make informed decisions regarding compliance and personal safety while using the FNR.

	<p>iii. Update information pamphlets and signage to include any current/changes in management activities that visitors should be aware of (e.g., closure of paths/access ways for rehabilitation).</p> <p>iv. Include unsafe areas and security rules and regulations in information pamphlets and signage.</p>	
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MANAGEMENT ACTION TABLE 1.16. TOURISM DEVELOPMENT FRAMEWORK

Objective 3) To effectively conserve the cultural heritage of the FNR;

Objective 5) To promote and provide sustainable development within the FNR.

	Key Deliverables	Monitoring Activities	Indicators
95.	Provide ecologically-safe natural and cultural recreational opportunities within the FNR.	<p>i. Develop a CDP, to feed into a Marketing and Tourism Infrastructure Development Plan / Strategy in association with the Hermanus Tourism sectors;</p> <p>ii. Such a plan should include conceptual future development options for identified development nodes; branding strategies; what the target markets are; the attainment of professional tourism service delivery standards; public / private partnerships; linkages with other tourist initiatives; visitor awareness, orientation and interpretation; events and activities (e.g., weddings, team building, use of the lagoon, hiking, mountain biking, conferences);</p> <p>iii. After completion of the Marketing and Tourism Infrastructure Development Plan / Strategy, specific identified business opportunities for Lessees must be advertised for proposal calls. Lessees are to submit detailed project proposals (complete with architectural guidelines, conceptual site development plans, graphics, and business plans) to the Municipal EMS Department.</p> <p>iv. Any construction activities may require prior approvals in terms of the relevant legislation. The costs for such applications (e.g., Environmental Impact</p>	a) The FNR has a CDP for Marketing and Tourism in the FNR.

		<p>Assessments in terms of the NEMA) should be carried by the prospective concessionaire.</p> <p>v. Where applicable, ensure that Reserve tourist facilities are graded by the Tourism Grading Council of South Africa (TGCSA).</p> <p>vi. Complete an APO and budget for the development of Eco-cultural tourism and Marketing (including professional fees for the appointment of a tourism and marketing consultant). Include the tourism grading application process in the APO.</p> <p>vii. Investigate the establishment and registering of Fernkloof Garden as a Botanical Garden.</p>	
96.	Paragliding and Drone Activity inside of- and surrounding the FNR is regulated	<p>i. The OM develops and implements an Airspace Policy for the FNR;</p> <p>ii. The Airspace Policy rules and regulations are known to public through signage and education and awareness campaigns.</p>	a) The use of aircraft within and around the FNR is regulated
97.	Filming and Events within the FNR are promoted and properly regulated.	<p>i. The OM develops a Filming and Events policy specific to the FNR;</p>	a) Filming and Events in the FNR are beneficial to the reserve

Table 2. Fernkloof Nature Reserve Landuse Management Units and Parameters (also refer to Appendix 9. Overstrand: Fernkloof Nature Reserve Landuse Management Units Map)

UNIT	OBJECTIVE	CHARACTERISTICS	VISITOR ACTIVITIES	FACILITIES/INFRASTRUCTURE	VISITOR ACCESS	MANAGEMENT GUIDELINES
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">CONSERVATION UNITS</p>	<p><i>Minimal or more intensive biodiversity management intervention.</i></p> <p>Conservation: to manage and direct visitor use and plan infrastructure to minimise impacts on sensitive environments.</p> <p>Allows for minimal or more intensive biodiversity management intervention</p> <p>Users: To provide easy access to natural landscapes with a high expectation of solitude.</p>	<p>Natural area for the conservation of endemic and threatened species and the implementation of management activities for the protection of natural areas.</p> <p>This area is designated for the conservation and enjoyment of nature.</p> <p>Areas with high sensitivity but can accommodate limited access for trails and tracks.</p> <p>Areas accessible for management of roads, trails, and tracks and where these can be located with low visibility from the surrounding landscape.</p> <p>Usually, areas that require active fire management with fire control belts to stay within thresholds of concern but may also include natural burning regimes.</p>	<p>Low impact nature-based recreation. For example (but not limited to):</p> <p>Environmental education and interpretation (including guiding), hiking, bird watching, photography, mountain biking (in designated areas), flower picking (for exhibitions only).</p> <p>Guided/unguided nature observation.</p> <p>Day hiking trails and/or short trails.</p> <p>Bird hides, mountain biking and rock climbing where appropriate.</p> <p>Other activities if specifically considered and approved as part of specific reserve zoning scheme eg. Overnight hiking hut (Galpin Hut).</p>	<p>Access routes, entrance walls, vehicle tracks, gravel roads, jeep tracks, hiking trails, mountain bike trails, bird hides, overnight huts, fences, gates, benches, sign boards and posts, fire tracks/control belts, dams, borehole monitoring, bridges, power lines, boardwalks, safety and security cameras, gateway and relay stations.</p> <p>Development parameters for buildings such as overnight huts: Maximum of 20m² footprint, single story.</p> <p>May have defined or beacons hiking routes, tourism and management access roads and management tracks and fire belts.</p> <p>Infrastructure should be designed to reduce impacts of high visitor numbers.</p> <p>Roads open to the public should be accessible by 2 x 4 sedan.</p> <p>Full width tarred or surfaced roads or roads and tracks to accommodate two vehicles where appropriate.</p> <p>Unsurfaced roads may be surfaced if road planning exercise has confirmed that the location is suitable.</p>	<p>No special access control or permits required for this zone except for permits allowing hikers to overnight at Galpin hut or in areas where dogs on a leash and accompanied by an owner) may be walked.</p> <p>Vehicle access on dedicated routes, with permission from the Management Authority.</p> <p>Pedestrian access from parking areas or adjacent Development zones.</p>	<p>Visitor Management</p> <p>Frequent monitoring necessary to prevent damage or degradation.</p> <p>Frequent footpath maintenance must be scheduled for busy routes with particular attention to use of railings or other access controls to prevent damage to sensitive areas.</p> <p>Unless visitor access can be intensively guided and managed, re-route trails away from sensitive habitats or plant and animal species.</p> <p>Trail layout, design and construction must be identified to reduce maintenance requirements under higher use.</p> <p>Conservation Management</p> <p>Habitats with lower or higher management requirements. May be natural burning zones.</p> <p>Prevent or restore visible trampling or any other visitor impact.</p> <p>Rehabilitate non-useful roads to natural vegetation.</p>

UNIT	OBJECTIVE	CHARACTERISTICS	VISITOR ACTIVITIES	FACILITIES/INFRASTRUCTURE	VISITOR ACCESS	MANAGEMENT GUIDELINES
TRANSFORMED UNITS	<p><i>Low/High intensity management and recreational use.</i></p> <p>Conservation: To locate the zone and infrastructure to minimise impact on sensitive environments.</p> <p>To actively manage users and visitor impacts on adjacent sensitive areas.</p> <p>Provide additional protection to sensitive or threatened habitats, species or other features by Special Management Overlays</p> <p>Users: To provide access to adjacent natural landscapes with no expectation of solitude.</p> <p>To provide low and/or higher density accommodation.</p>	<p>Developed areas for the provision of access, management infrastructure, accommodation, high intensity recreation and commercial use.</p> <p>This area is designated for the provision of facilities which promote access to the nature reserve for recreational activities, but which do not impact negatively on the conservation area.</p> <p>Areas with extensive degraded or transformed footprints.</p> <p>Natural or semi-natural habitats only when use of these areas is essential to minimise infrastructure/use impacts over whole reserve.</p> <p>Areas able to accommodate high numbers of visitors regularly, with no identified sensitive or regionally rare biodiversity.</p> <p>Areas able to accommodate roads, trails, and tourism infrastructure without risk of erosion or degradation.</p> <p>Areas easily accessible from reserve management centre.</p> <p>Areas where risk of fire damage to infrastructure is low or can be mitigated without unacceptable impacts on surrounding environment.</p> <p>Areas where new infrastructure can be located with low impact on the surrounding landscape.</p>	<p>For example (but not limited to):</p> <p><i>Low intensity:</i> Adventure, team-building, small commercial and community activities, educational, tourism and research activities. Picnicking, hiking, bicycle access and landscape viewing.</p> <p><i>High intensity:</i> Restaurant/tea garden. Meetings, workshops, or mini-conference facilities. Accommodation such as overnight hiking hut/ self-catering accommodation for no more than the number of people that can be accommodated in the area.</p>	<p>Management offices, nursery, herbarium, tourism office, Fernkloof gardens, model aircraft flying sites, utility areas, tarred roads and management infrastructure.</p> <p>High density tourist development nodes.</p> <p>Self-catering accommodation/overnight hiking huts or camping for no more than the number of people that can be accommodated in this area.</p> <p>Roads in this unit should be surfaced (formalised) wherever possible to reduce management cost and environmental impacts.</p> <p>Development and infrastructure may take up a significant proportion of the zone, but planning should ensure that the area still provides a relatively natural outdoor experience that retains the sense of place for visitors to the FNR.</p>	<p>Tour bus access. Motorised self-drive sedan car access. Parking areas.</p> <p>Air access only permitted if considered and approved as part of zoning scheme and no possibility of faunal disturbance.</p>	<p>Visitor Management:</p> <p>Management action will focus mostly on maintenance of facilities & providing high quality experiences that retain a “sense of place”</p> <p>Use built and infrastructure solutions to such as railings, fencing, hard surfacing, and boardwalks to manage undesirable visitor impacts.</p> <p>Accept substantial impact on natural habitats in this zone unless these are specifically addressed in a Special Management Overlay.</p> <p>Frequent footpath and road maintenance must be scheduled for high impact routes. Visible impacts to adjacent units should be mitigated.</p> <p>Conservation Management</p> <p>Management should aim to mitigate the biodiversity impacts of the high number of visitors only in sensitive areas (if any) identified by Special Management Overlay.</p> <p>These are highly transformed habitats with lower management requirements.</p> <p>Usually fire exclusion areas.</p> <p>Prevent or restore visible trampling or any other visitor impact.</p>

UNIT	OBJECTIVE	CHARACTERISTICS	VISITOR ACTIVITIES	FACILITIES/INFRASTRUCTURE	VISITOR ACCESS	MANAGEMENT GUIDELINES
BUFFER ZONE	<p><i>To prevent encroachment and protect natural ecosystems within the FNR.</i></p> <p>Conservation: Buffer transition zones to guard the boundaries of Protected Areas against invasion by alien species, encroachments, and footprints of residential and other infrastructure areas.</p> <p>Users: Current lease agreements for encroachments and all other properties abutting the Nature Reserve.</p>	<p>Natural or developed areas beyond and adjacent to the boundaries of the FNR.</p>	<p>Residential properties, gardens and infrastructure may not encroach on Protected Area, unless through an approved lease agreement.</p> <p>The Municipality may issue notices for restoration/rehabilitation on any such encroachment.</p> <p>Visitor access to these areas will therefore be minimised and controlled.</p>	<p>Management infrastructure such as vehicle tracks and tarred roads, fences, gates, fire access routes, dams, pump stations, bridges, power line servitudes, boardwalks, and road servitudes.</p> <p>Residential gardens.</p>	<p>Visitor access to these areas will be minimised and controlled.</p>	<p>Visitor Management: Visitor access to these areas will be minimised and controlled. Implementation of the Environmental Management Overlay Zone Regulations EMOZ.</p> <p>Management and rehabilitation of natural vegetation.</p> <p>Actions to alleviate urban and natural hazards.</p> <p>Conservation Management: Fire management, alien invasive species management, infrastructure management, monitoring, enforcement & compliance.</p> <p>Limiting and/or prohibiting inappropriate land uses in the buffer zone.</p>
SPECIAL MANAGEMENT Cultural Feature Protection	<p><i>Protection of localised identified important Cultural Feature.</i></p> <p>Conservation: Protection of heritage sites and objects of heritage significance, traditional or complementary use and interpretation of such sites according to approved heritage studies and applications.</p>	<p>Natural or developed area which contains heritage features that warrant specific management and protection.</p> <p>Could overlap any other zone.</p> <p>Permanent, temporary, or temporal zone to manage important cultural or heritage features</p>	<p>Low impact use in compliance with Heritage or similar authorisation under any applicable law.</p> <p>Specific activities dependent on ability to manage activity and feature in question.</p>	<p>Buildings, structures and demarcation measures necessary to protect features in accordance with NEMA, NEM: PAA, NEM:BA and NHRA.</p> <p>Usually none, but specific infrastructure dependent on feature in question.</p>	<p>Specific access dependent on ability to manage access and feature in question.</p>	<p>Feature specific – as required</p>

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