DE HOOP NATURE RESERVE COMPLEX

Western Cape, South Africa

Protected Area Management Plan 2017 – 2022

DATE APPROVED: 02 February 2017

CapeNature

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CITATION
CapeNature. 2016. De Hoop Nature Reserve Complex: Protected Area Management Plan 2017 – 2022. Internal Report, CapeNature. Cape Town.

The De Hoop Nature Reserve Complex comprises of the following:

De Hoop Nature Reserve

The original De Hoop Nature Reserve (NR) was proclaimed as a Provincial Nature Reserve in 1976 by Proclamation No. 409/1976. The boundary of the nature reserve was extended during 1990 by way of Proclamation No. 29 of 1990 in terms of the Nature and Environmental Conservation Ordinance, 1974 (Ordinance 19 of 1974).

The De Hoop NR was also proclaimed a World Heritage Site in terms of the World Heritage Convention Act, 1999 (Act No. 49 of 1999) by way of Government Notice No. 71 of 2009. As one of the sites within the Cape Floral Region Protected Areas World Heritage Site it is a critical biodiversity site in the Western Cape Province, South Africa. The Cape Floral Region Protected Areas World Heritage Site is made up of eight protected areas, covering 553 000 ha (Department of Environmental Affairs and Tourism 2003).

The De Hoop Vlei has been registered as a Ramsar site in terms of the Ramsar Convention on Wetlands on 12 March 1975 and is number 34 on the present (2012) list of 2040 sites listed worldwide. The wetland's international site reference number is 1ZA001. The South African government as a signatory to the Ramsar Convention has committed itself to the protection of this site.

The eastern sector of the nature reserve as indicated on Map 3.2 is also declared an ammunition site in terms of the Explosives Act, 1956 (Act 26 of 1956) to allow missile testing to be done by Denel Overberg Test Range (OTR).

De Hoop Marine Protected Area

The De Hoop Marine Protected Area (MPA) was proclaimed in Government Gazette No. 12667, dated 27 July 1990 under Government Notice R. 1810. An amendment of the above Government Notice was published in Government Gazette 12805 dated 26 October 1990 per Government Notice R. 2497 of the same date, wherein sub paragraph 5 of paragraph 2 of Government Notice R. 1810 was substituted. Consequently this Act has been replaced by the Marine Living Resources Act, 1998 (Act No. 18 of 1998) and the De Hoop MPA was re-proclaimed in terms of section 43 of this act by Government Notice R. 1429 published in Government Gazette No. 21948, dated 29 December 2000.

AUTHORISATION

This management plan for DHNRC is recommended by:

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ACKNOWLEDGEMENTS

CapeNature would like to thank everybody who participated and had input in the formulation of this document.

This plan was prepared by Tierck Hoekstra, Alexis Olds and Dr.Lauren Waller with significant inputs from Scientific Services and wider support within CapeNature.

The authors would like to express their gratitude to:

- Mr Deon Geldenhuys (CapeNature – Conservation Management) for technical review
- Dr Ruida Stanvliet (Cape Nature – Scientist) for scientific review
- Prof Edmund February for external review
- All stakeholders for providing valuable comment

EXECUTIVE SUMMARY

In compliance with the National Environmental Management: Protected Areas Act (NEM: PAA), 2003 (Act No. 57 of 2003), CapeNature is required to develop management plans for each of its protected areas. The object 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 NEM: PAA and for the purpose for which it was declared. The approach to, and format of all CapeNature management plans is directed by the *Guidelines for the Development of a Management Plan for a Protected Area in terms of the National Environmental Management: Protected Areas Act* (Cowan & Mpongoma 2010). All CapeNature management plans must be read in conjunction with CapeNature's Co-ordinated Policy Framework (CapeNature, in prep.).

This management plan is comprised of 7 sections.

Section 1 outlines the background, structure and authorisation processes of the management plan.

Management plans are strategic documents that provide the framework for the development and operation of protected areas. They inform management at all levels, from the Conservation Manager, responsible for the management of the protected area, to support staff within CapeNature. The management plan indicates where reserve management intends to focus its efforts in the next five years (2017-2022). It focuses on strategic priorities rather than detailing all operational and potential reactive courses of action in the next five years. While planning for some emergencies is part of the management plan, it remains possible that unforeseen circumstances could disrupt the prioritisation established in this management plan. These should be addressed in the annual review and update of the management plan.

The management plan is drafted by the Reserve Management Committee (RMC), and then goes through an internal scientific and technical review. It is then sent for an independent external review before being recommended for stakeholder participation. The management plan is then reviewed by the CapeNature Executive and recommended by the Chief Executive Officer (CEO) to the Board Conservation Committee. Once approved by the Conservation Committee, it is referred to the Western Cape Nature Conservation Board (WCNCB) for approval before being submitted by the Chairman of the WCNCB to the Department of Environmental Affairs and Development Planning (DEA&DP) for ministerial approval. The protected area management plan is reviewed annually to track progress on the Strategic Implementation Framework (SIF) discussed in section 6 and the document will be updated and reviewed every five years.

Section 2 outlines the strategic management framework of the De Hoop Nature Reserve Complex (DHNRC), which is aimed at providing the basis for the protection, development and operation of the protected area over a five year period. It consists of the vision, purpose, values and objectives of the DHNRC and summarises its opportunities, challenges, weaknesses and threats.

The vision describes the overall long-term goal for the operation, protection and development of DHNRC. The vision of the DHNRC as part of the protected area network in the Overberg area is to conserve a system of sustainable living land- and seascapes that are representative of the region's biodiversity and ecosystem services through integrated management, for the benefit of all.

The purpose is the foundation on which all future actions are based and is in line with the overall management philosophy of the organisation. For the DHNRC the purpose is defined as follows: Conserve and maintain important coastal, wetland and terrestrial habitat for conservation, coastal ecosystem services, archaeological and geological features and provide opportunities and benefits for sustainable nature based tourism and access.

Values for the DHNRC are characteristics that deem the reserve complex unique in terms of its ecological, cultural and social aspects. The values of DHNRC are characterised according to natural, ecosystem services, social, cultural and historic and eco-tourism values. Natural values include: very good representative range of the habitat variation within Limestone Fynbos and a high number of rare, endangered and endemic plant species (many of which can be found on Potberg Mountain); it has a large marine/terrestrial interface of more than 43 km; if the full coastal length of the MPA is taken, it is more than 54 km; the terrestrial reserve is declared as a World Heritage Site as part of the Cape Floristic Region Protected Areas World Heritage Site; a colony of threatened Cape Vultures breed at Potberg and it is the only colony within the winter-rainfall region and the only colony still in existence within the Western Cape Province; the reserve contains viable populations of the threatened bontebok and Cape mountain zebra; high numbers of great white sharks aggregate with in the De Hoop MPA; the MPA is a critical nursery ground for smooth hammerhead sharks with aggregations of up to 1500 pups; De Hoop MPA together with St. Sebastian Bay supports 70-80% of cow-calf pairs of the endangered southern right whale; the Karst geological formation that occurs on the reserve provides roosting sites for large numbers of bats in numerous caves that are typical to this formation. Ecosystem services values include: MPA provides refuge for surf zone recreational line fish and intertidal species and a spill over for certain species such as red steenbras; the reserve provides a refuge for animals and plants and is a storehouse for genetic material; the reserve provides an intact mountain to coast ecosystem. Social values include: a partnership agreement exists between CapeNature, Denel OTR and the Overberg Air Force Base with regards to the conservation management of the

missile test range and airfield thus enlarging the total conserved area with app. 30 000 ha; the Potberg Environmental Education (EE) Centre on the reserve provides a facility for environmental education; Conservation and tourism activities provide approximately 180 job opportunities (2016) making a significant contribution to the local economy; the reserve provides for a variety of outdoor recreational activities and experiences. Eco-tourism values include: the reserve is aesthetically pleasing and therefore a sought after tourist destination; the reserve provides for popular activities including bird watching, hiking, mountain biking, whale watching etc; infrastructure includes high quality tourist accommodation managed within a private partnership agreement as well as the highly popular Whale Trail.

The objectives were derived from the vision and purpose and represent key performance areas in which achievement must be obtained in order to support the management intentions. Objectives, which are not measurable or testable, are then prioritised through the development of action plans and translated into strategic outcomes which are set out in the SIF. The prioritised objectives are: (1) to conserve the representative biodiversity of De Hoop NR and MPA with particular emphasis on local endemic and threatened species. (2) To implement the integrated management of the terrestrial and marine component of the DHNRC. (3) To ensure integrated, cooperative and compliant management including partnerships. (4) To conserve/maintain the ecosystem and its processes. (5) To conserve the cultural heritage within the NR and MPA. (6) To promote and enable conservation orientated research within the NR and MPA. (7) To provide access to quality environmental education, awareness and outreach programmes to the youth of the Western Cape Province. (8) To provide biodiversity access and benefit sharing opportunities for communities. (9) To provide for appropriate nature based recreation, tourism and sustainable income generation activities within the framework of the Green Economy.

Once these objectives were identified, a strengths, weaknesses, opportunities and threats (SWOT) analyses was completed. 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 that objective. Strengths of the DHNRC include: rich biodiversity both terrestrial and marine; the relative large size of the reserve; the De Hoop Vlei registered as a Ramsar site; supportive local community; strong existing partnerships and agreements. Weaknesses include: poor external and internal roads limiting recreational access and hindering effective management; poor and inadequate boundary fences causing game to escape; limited domestic water availability dampening tourism development; long distance to boat launch site. Opportunities include: job creation opportunities by alien clearing, road maintenance and other conservation tasks; income generation; partnerships in terms of game management with OTR and other neighbours; contribution to

scientific research, visitor experience and environmental education. Threats identified include: crop damage on neighbouring farms from escaping game; missile testing degrading visitor satisfaction and safety; poaching of natural resources, especially marine; risk (contractual and ecological) due to non-compliance with legislation; spread of invasive alien organisms; increased demand from tourism to provide additional visitor experiences. These opportunities, threats, strengths and weaknesses are then addressed in the reserve objectives, and activities identified to deal with them in the SIF.

Section 3 provides a description of the DHNRC and its ecological and operational context. The DHNRC, comprising De Hoop NR and De Hoop MPA, is situated in the Cape Agulhas Municipal Area that is part of the Overberg District in the Western Cape Province about 50 km East of Bredasdorp and 50 km South of Swellendam. The NR covers an area of 33 795 ha (338 km^2) between latitudes 34° 21' 38" S and 34° 30' 34" S, longitudes 20° 18' 47" E and 20° 52' 14" E. The midpoint is at approximate latitude 34° 25' 40" S and longitude 20° 35' 22" E. Adjacent to the reserve's coastal boundary and adjacent to a section of the Denel OTR's coastal boundary is the De Hoop MPA. It covers an area of 28 866 ha (288 km^2) and stretches along a coastline of approximately 45 km adjacent to the DHNRC and for a further approximately 12 km adjacent to the OTR (from Stilbaai Point in the east to a point between Ryspunt and Skipskop in the west) and extends three nautical miles (5 km) offshore into the Indian Ocean.

The ecological context of the DHNRC covers a number of aspects including climate and weather, topography and the geology of the soils within the area. A description of the aquatic systems is also provided. One major water body is found within the borders of the DHNR, namely, De Hoop Vlei. The De Hoop Vlei is a Ramsar site, which includes a series of wetland clusters of conservation importance. De Hoop MPA consists of approximately 12 km of sandy shores, 22 km of rocky shores and 21.5 km of mixed rocky/sandy shore, offshore rocky reefs. These are however, fairly sparse and offshore soft sediment areas occur close inshore between the offshore reefs. The MPA is also a critical breeding area for the southern right whale. The region from St. Sebastian Bay to De Hoop is regarded as the most important nursery area for southern right whales on the South African coastline. Individuals (particularly cows with calves) may spend up to four months on the coast. This region of the Cape represented 70 - 80% of the cow-calf pairs observed on the entire South African coast between 1981 and 1986 (Best & Scott 1993; Best 2000).

The DHNR is located within the Agulhas Plain Centre (one of the six phytogeographic centres of the CFR), an area covering only 30 000 km^3, that has an endemism rate of 14.9% (Goldblatt & Manning 2000). The DHNR comprises a number of different vegetation types of which the majority is De Hoop Limestone Fynbos with a conservation status of Least Threatened. Other types include Potberg Sandstone Fynbos (Least Threatened), Overberg Dune

Strandveld (Least Threatened), Eastern Rûens Shale Renosterveld (Critically Endangered), Central Rûens Shale Renosterveld (Critically Endangered), Albertinia Sand Fynbos (Vulnerable), Elim Ferricrete Fynbos (Endangered), Potberg Ferricrete Fynbos (Endangered), Western Coastal Shale Band Vegetation (Least Threatened), Cape Seashore Vegetation (Least Threatened), Freshwater Lakes (Not Applicable), Cape Lowland Freshwater Wetlands (Vulnerable), Cape Coastal Lagoons (Not Applicable), Cape Inland Salt Pans (Endangered), and small areas of Rûens Silcrete Renosterveld (Critically Endangered) (Map 3.6 - Mucina & Rutherford 2006).

In order to ensure the continued existence of the naturally occurring biodiversity on the reserve, an approximation of a natural burning regime will be followed with controlled fires in order to create a mosaic of veld ages. A fire cycle of between 20 and 25 years should be implemented depending on the fynbos type. Vegetation mapping needs to inform the fire cycle.

The entire DHNR is affected by invasive alien plants in varying degrees of density. Based on the 2015 density assessment of the reserve, it is estimated that 60% of the reserve is at an invasion density of 0 - 25%. With a suitable size team, this means that more than half the reserve could be cleared at a reasonable cost, and it is these areas that need to be the focus of the clearing programme in order to reduce further spread and density increases. The Working for Water programme has been in existence on the reserve for many years, but a larger budget is required to deal with the full extent.

A total of 68 species of indigenous mammals and four alien terrestrial mammals have been recorded in the DHNRC. Most notable are the bontebok (*Damaliscus pygargus pygargus*), Cape mountain zebra (*Equus zebra zebra*) and the southern right whales (*Eubalaena australis*). The DHNRC has five broad avifaunal habitats, namely the ocean, coastline, wetland, coastal and lowland fynbos and the mountain fynbos. The 277 bird species recorded for the reserve is indicative of this habitat diversity. Thirty-five species of birds are listed as threatened nationally and/or internationally. Forty six reptile species, comprising 7 chelonians, 23 snakes and 16 lizards have been recorded from DHNR. Two Threatened terrestrial reptile species occur on De Hoop, the southern adder (*Bitis armata*) (Vulnerable) and the Cape dwarf chameleon (*Bradypodion pumilum*) (Vulnerable). Ten amphibian species have been recorded from DHNR. None of these species are listed as threatened. A total of 84 species of marine fish have been sampled in the De Hoop MPA. Aerial surveys (January 2007 – March 2009) of the De Hoop MPA showed high numbers of great white sharks (*Carcharodon carcharias*) aggregating in the reserve. Between January and March each year, very high numbers (up to 1500 individuals) of smooth hammerhead shark (*Sphyrna zygaena*) pups are seen in the bay. The three species of fish known to be present in the MPA are listed as “Vulnerable” under the Draft List of Threatened and Protected Species issued in terms of NEMA: Biodiversity Act. These species are the great white

shark, white steenbras (*Lithognathus lithognathus*) and red steenbras (*Petrus rupestris*).

The communities near the DHNRC include Witsand, Infanta, Arniston, Swellendam, Bredasdorp, Malgas, and Ouplaas. Residents and businesses within these communities benefit directly from the reserve as approximately 180 work opportunities exist on the reserve. Posts vary from management positions, skilled and semi-skilled technical staff in the conservation and tourism industry to unskilled labour such as cleaners and conservation workers. Most of the workers reside in Bredasdorp with some in Swellendam. Between 2 000 and 2 500 people visit the reserve per month to enjoy the natural and cultural-historic environment. Because of its wild, unspoilt natural character, DHNRC represents one of the main attractions for nature-based recreation in the Overberg region, by both local and other communities. DHNRC plays a vital role in the EE of both local and provincial communities through its Potberg EE facility, as there are very few such facilities in the Western Cape. Amongst schools, this facility used to be extremely popular in this region and elsewhere, but due to rising costs and time constraints during the school year, schools find in more difficult to attend. This matter is addressed in section 6 (Strategic Implementation Framework). The programmes offered here fulfil more formalized EE needs in the local and broader communities.

The Denel OTR adjacent to the reserve has the right to use the eastern sector of the reserve for the testing of missiles. The Overberg Air Force Base at Bredasdorp also uses the airspace above the whole reserve and MPA extensively for weapons testing due to the remoteness of the area. These multi million rand operations would not have been possible if the area had not lent itself to these operations. The reserve therefore plays an integral part of the operations of both OTR and the Overberg Air Force Base and in doing so is part of this bigger contributor to the local economy.

Infrastructure on the DHNRC has been developed and maintained for (a) operations, which consist of numerous stores, garages, workshops, offices and signage; (b) tourism and EE, which consists of overnight facilities, picnic areas, entrance gates, stores, trails; (c) staff accommodation; and (d) access and services, which consists of roads, fences and water reticulation.

Section 4 sets out the regional and local planning context of the protected area.

The DHNRC falls under the Cape Agulhas Municipality and forms part of the Overberg District Municipality (ODM). The Integrated Development Framework (IDP) for the Cape Agulhas Municipality runs over a five year cycle and is currently a 3rd generation plan (2012 - 2016). It is a strategic plan guiding development in the Cape Agulhas Municipal Area and is also informed by the Overberg District Municipal Integrated Development Plan (ODM-IDP) for 2012-

2016. The Overberg District Municipal Spatial Development Framework 2014-2016 (ODM-SDF) is the spatial expression of the ODM-IDP. Consequently, the SDF is a policy document of the ODM to be used by organs of state as a guideline in decision-making towards land-use. The De Hoop Nature Reserve Complex falls within the recognized core conservation area. In terms of the land use classification plan, the reserve complex is classified as Wilderness area.

The expansion of protected areas in South Africa is informed by the National Protected Area Expansion Strategy (NPAES) and CapeNature's Protected Area Expansion Strategy and Implementation Plan has been developed in support of the NPAES. This CapeNature strategy addresses the formal proclamation of priority natural terrestrial habitats in the Western Cape Province as protected areas to secure biodiversity and ecosystem services for future generations.

Section 5 outlines the Conservation Development Framework (CDF) and the concept development plan for the protected area. Sensitivity mapping of reserve biodiversity and physical environment forms the main informant of spatial planning and decision-making in protected areas. It is intended to inform all planned and ad-hoc infrastructure development e.g. the location of management and tourism buildings and precincts, roads, trails and firebreaks inform whole reserve planning and formalisation of use and access as a reserve zonation scheme while also supporting conservation management decisions and prioritisation.

The sensitivity analysis for the DHNRC included physical and biodiversity features. Generally, the slope and vegetation status of the DHNRC has the lowest sensitivity score for 62 % and 87 % of the reserve respectively. A large portion of the coastline has been mapped as the highest sensitivity mostly due to the presence of archaeological remains which have been buffered by 100 m and also the 1: 100 year flood risk line. Even though the vulnerability status of the vegetation is largely low, the overall sensitivity of the DHNRC is predominantly moderate to very high

Protected area zonation provides a standard framework of formal guidelines for conservation, access and use for particular areas. Zonation goes beyond natural resource protection and must also provide for appropriate visitor experience; access and access control; environmental education; and commercial activities.

Access to the DHNRC is through the De Hoop Main Gate and the Potberg Gate. Access to the MPA, beach and facilities on the reserve are provided to the public at various points along the boundary of the MPA.

In terms of developments the following changes or upgrades of existing infrastructure are proposed at DHNRC: all development of tourism facilities are

already planned as part of the existing PPP agreement (Opstal, Melkkamer and Koppie Alleen) and the Whale Trail 2 and Lekkerwater PPP agreements, still to be finalised. No further tourism developments are proposed apart from one minor development with regards to a trail upgrade and vulture lookout point at Potberg.

With the vision to develop the existing Potberg Environmental Education Centre into a multi-purpose centre of learning as well as the development of an archaeological museum in the old milk shed and other historical buildings at Potberg, it might be necessary to add staff housing to the existing staff accommodation site. This is however subject to the necessary approvals and funding, but it should be mentioned that limited staff housing is available at the Potberg management site, and more should be built if funds are available.

The building of a permanent gate house at Potberg is also a necessity as well as the building of staff housing and satellite management facility at Sandhoogte. These needs are already listed in the provincial User Asset Management Plan (U-AMP).

Fencing also needs to be addressed as the reserve is not adequately fenced.

Section 6 outlines the SIF of the protected area and guides the implementation of the management plan over five years in order to ensure that it achieves its management objectives. The SIF translates the information described in Sections 3, 4 and 5 above into management activities and targets, which will be used to inform annual plans of operation as well as the resources required to implement them. The management targets will form the basis for monitoring of performance in implementing the plan and are thus measurable. The SIF contains the following sections: legal status and reserve expansion; regional integrated planning and cooperative governance; ecosystem and biodiversity management; wildlife management; fire management; invasive and non-invasive alien species management; cultural and heritage resources; law enforcement and compliance; infrastructure management; disaster management; socio-economic framework; management effectiveness; finance and administration management; human resources management; occupational health and safety management; risk management; visitor management, ending with the tourism development framework.

Finally, **section 7** contains the references relevant to the text.

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ABBREVIATIONS

APO	Annual Plan of Operations
BCLME	Benguela Current Large Marine Ecosystem
BMP	Biodiversity Management Plan
BMP-s	Biodiversity Management Plan for Species
BMS	Biodiversity Monitoring System
CBA	Critical Biodiversity Area
CDF	Conservation Development Framework
CEO	Chief Executive Officer
CFR	Cape Floristic Region
CMA	Catchment Management Agency
CPF	Coordinated Policy Framework
DAFF	Department of Agriculture, Forestry and Fisheries
DEA	Department of Environmental Affairs
DEA&DP	Department of Environmental Affairs and Development Planning
DEA: O&C	Department of Environmental Affairs: Oceans and Coast
DHNRC	De Hoop Nature Reserve Complex
DWA	Department of Water Affairs
EE	Environmental Education
DWS	Department of Water and Sanitation
EKZNW	Ezemvelo KZN Wildlife
EMI	Environmental Management Inspector
EMP	Environmental Management Plans/ Programme

EPWP	Expanded Public Works Programme
FEPA	Freshwater Ecosystem Priority Areas
FPA	Fire Protection Association in terms of the National Veld and Forest Fire Act (No.1 of 1998)
IAS	Invasive Alien Species
ICM	Integrated Catchment Management
IDP	Integrated Development Plan
KPA	Key Performance Area
MEC	Member of the Executive Council
METT-SA	Management Effectiveness Tracking Tool for South Africa
MOA	Memorandum of Agreement
MPA	Marine Protected Area
MUCP	Management Unit Clearing Plan
NEM: PAA	National Environmental Management: Protected Areas Act
NFEPA	National Freshwater Ecosystem Priority Areas
NPAES	National Protected Area Expansion Strategy
NR	Nature Reserve
NSBA	National Spatial Biodiversity Assessment
ODM	Overberg District Municipality
ODM: IDP	Overberg District Municipality: Integrated Development Plan
ODM: IDP	Overberg District Municipality: Spatial Development Framework
OHS	Operational Health and Safety
OTR	Denel Overberg Test Range
OHSA	Occupational Health and Safety Act
PA	Protected Area
PAAC	Protected Area Advisory Committee
PAM	Protected Areas Manager
PAMP	Protected Area Management Plan
PDP	Personal Development Plan
PFMA	Public Finance Management Act
PPP	Public Private Partnership
RHP	River Health Programme
RMC	Reserve Management Committee

SAHRA	South African Heritage Resources Agency
SANParks	South African National Parks
SDF	Spatial Development Framework
SMP	Strategic Management Plan
SOB	State of Biodiversity
SOP	Standard Operating Procedures
SWOT	Strengths, Weaknesses, Opportunities and Threats Analysis
TBD	To Be Determined
ToR	Terms of Reference
TPC	Thresholds of Potential Concern
U-AMP	User Asset Management Plan
UCT	University of Cape Town
WCNCB	Western Cape Nature Conservation Board
WfW	Working for Water
WMA	Water Management Area
WHS	World Heritage Site

1 INTRODUCTION

1.1 Background to CapeNature Protected Area Management Plans

In compliance with the National Environmental Management: Protected Areas Act (NEM: PAA), 2003 (Act No. 57 of 2003), CapeNature is required to develop management plans for each of its protected areas. The object 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 NEM: PAA and for the purpose for which it was declared. The approach to, and format of all CapeNature management plans is directed by the *Guidelines for the Development of a Management Plan for a Protected Area in terms of the National Environmental Management: Protected Area Act* (Cowan & Mpongoma 2010). All CapeNature management plans must be read in conjunction with CapeNature's Co-ordinated Policy Framework (CPF) (CapeNature, in prep) and this plan should also be read in conjunction with the Cultural Management Plan for the De Hoop Nature Reserve, 2009 and the Public Private Partnership (PPP) Management Plan of December 2009. These plans are subsidiary to this protected area management plan.

Management plans are strategic documents that provide the framework for the development and operation of protected areas. They inform management at all levels, from the Conservation Manager, responsible for the management of the protected area, to support staff within CapeNature. The purpose of the management plan is to:

- Provide the primary strategic tool for management of the protected area informing the need for specific programmes and operational procedures;
- Provide for capacity building, future thinking and continuity of management; and
- Enable the management of the protected area in such a way that its values and the purpose for which it has been established are protected.

When drafting management plans, CapeNature applies the adaptive management cycle, as shown in Figure 1.1. Adaptive management enables CapeNature to:

i) Learn through experience;

ii) Take account of, and respond to, changing factors that affect the protected area;

iii) Develop or refine management processes;

iv) Adopt best practices and new innovations in biodiversity conservation management; and

v) Demonstrate that management is appropriate and effective.

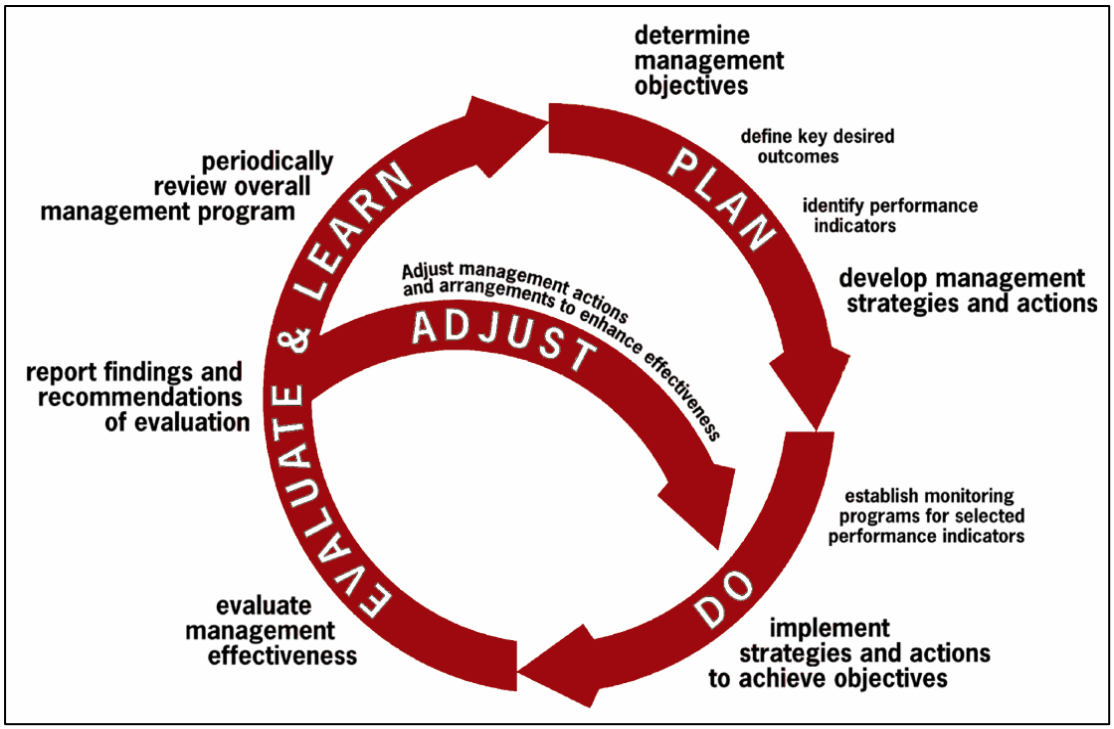


Figure 1.1: Adaptive management cycle (CSIRO 2012)

The management plan indicates where reserve management intends to focus its efforts in the next five years (2017 – 2022). The management plan thus provides the medium-term operational framework for the prioritised allocation of resources and capacity in the management, use and development of the reserve.

The management plan focuses on strategic priorities rather than detailing all operational and potential reactive courses of action in the next five years. The timeframe referenced in the Strategic Implementation Framework (SIF) follows financial years (1 April to 31 March), with Year 1 commencing from signing of the management plan by the Provincial Minister: Environmental Affairs and Development Planning. While planning for some emergencies is part of the management plan, it remains possible that unforeseen circumstances could disrupt the prioritisation established in this management plan. These should be addressed in the annual review and update of the management plan. The scope of the management plan for protected areas is constrained by a reserve's actual or potential performance capability (such as available personnel, funding, and any other external factors) to ensure that the plan is achievable and sustainable.

1.2 Structure of the management plan

All CapeNature management plans are structured as follows, see Figure 1.2:

Section 1:	Outlines the background, structure and authorisation processes of the management plan.
Section 2:	Outlines the strategic management framework, which sets out the vision, purpose, values and objectives for the protected area and summarises its opportunities, challenges, and threats.
Section 3:	Provides a description of the protected area and its ecological and operational context.
Section 4:	Sets out the regional and local planning context of the protected area.
Section 5:	Outlines the conservation development framework and the concept development plan for the protected area.
Section 6:	Outlines the strategic implementation framework of the protected area.
Section 7:	References and Glossary
Section 8	Appendixes

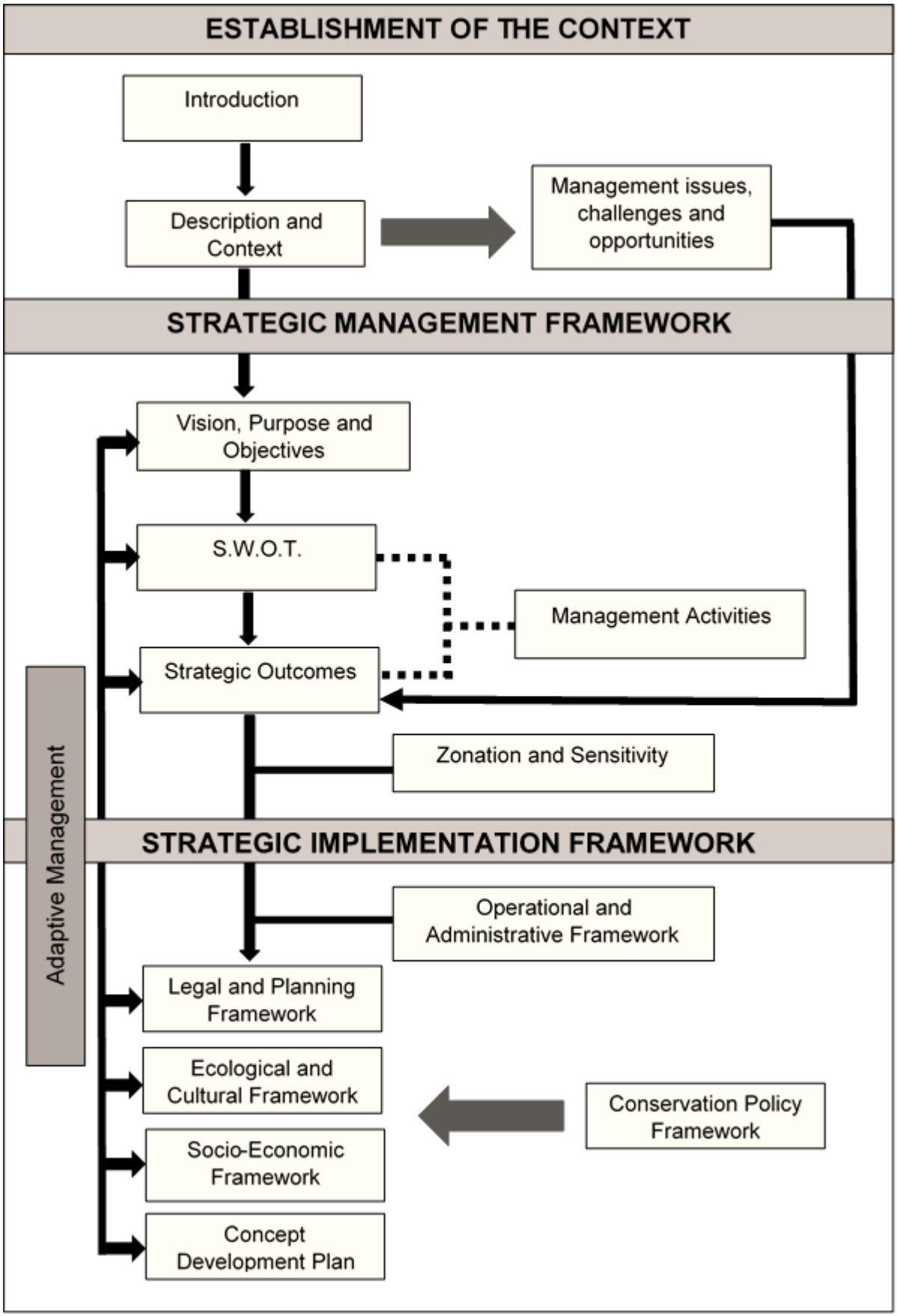


Figure 1.2:Structure of the Management Plan

1.3 Approval and revision of the management plan

The management plan is drafted by the RMC. The scientific and technical content of the management plan is then internally reviewed according to Waller (2011). The edited management plan then undergoes an independent external review before being recommended for stakeholder engagement where comments are considered and the management plan is once again edited where necessary. The management plan is then reviewed by the CapeNature Executive and recommended by the CEO to the CapeNature Conservation Committee. Once approved by the Conservation Committee, it is referred to the Western Cape Nature Conservation Board (WCNCB) for approval. The approval process of the protected area management plan is outlined in Figure 1.3.

The protected area management plan is reviewed annually to track progress on the SIF discussed in section 6 and the document will be updated and reviewed every five years.

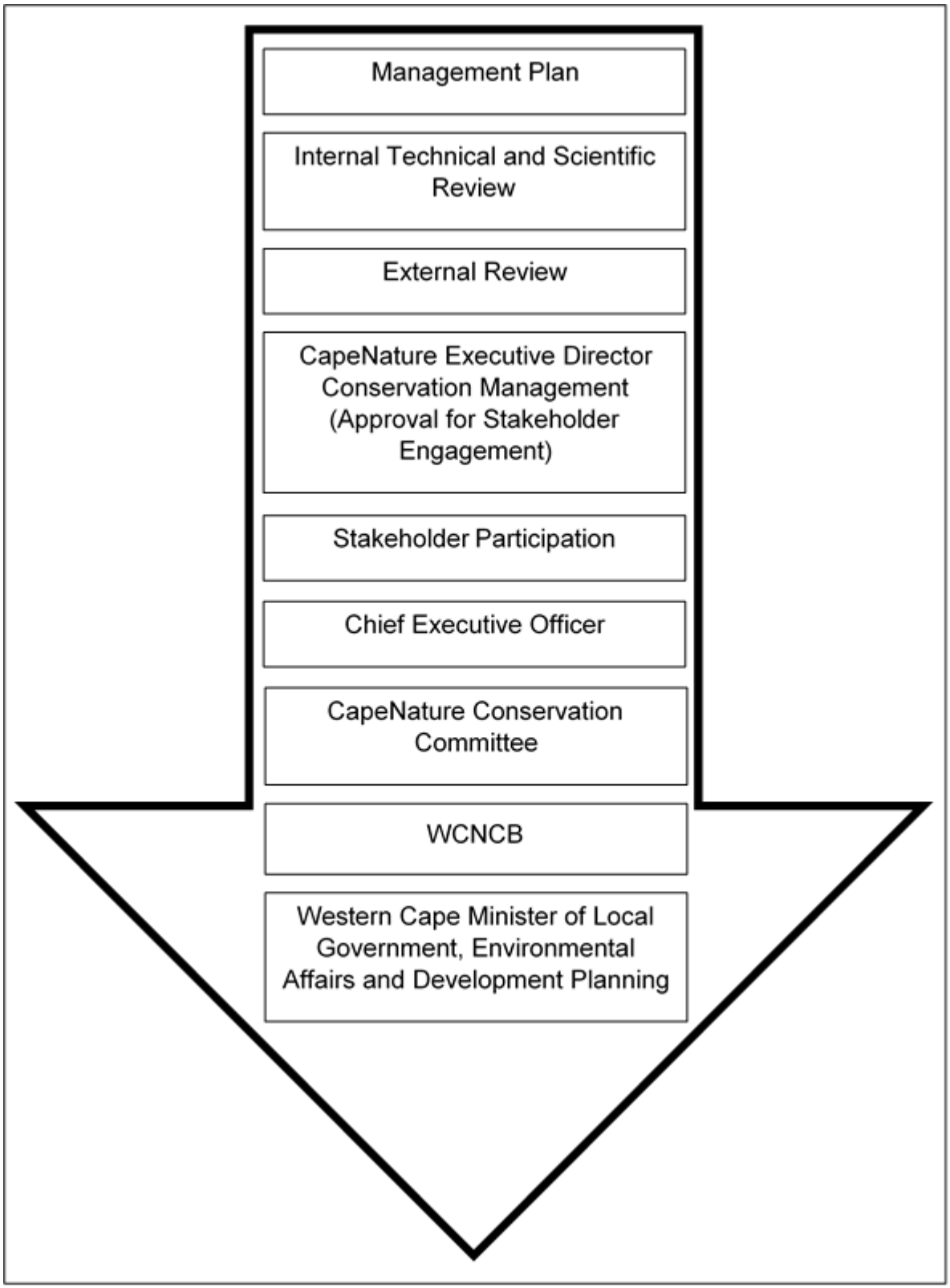


Figure 1.3: Approval and Review of the Management Plan

2 THE STRATEGIC MANAGEMENT FRAMEWORK OF DE HOOP NATURE RESERVE COMPLEX

The strategic management framework is aimed at providing the basis for the protection, development and operation of the protected area over a five year period. It consists of the vision, purpose, values and objectives of De Hoop Nature Reserve Complex (DHNRC) and summarises its opportunities, challenges, and threats.

A planning session, facilitated by the Regional Ecologist and guided by the Conservation Manager, defined the vision and purpose of the protected area. This statement indicates the management intent of the DHNRC which in turn defines the management objectives. The management objectives were evaluated using the *Procedure for Defining Conservation Management Objectives and Goals* (Coombes & Mentis 1992) and categorised into objectives, action plans and tasks. The management objectives were prioritised through a pairwise comparison process and the results were used to populate the SIF (see Section 6). Actions plans were associated with objectives, and tasks (activities) were identified within each action plan.

2.1. The vision of De Hoop Nature Reserve Complex

The vision describes the overall long-term goal for the operation, protection and development of DHNRC and is as follows:

A world recognised area for biodiversity conservation through the integrated landscape management of the De Hoop Nature Reserve and Marine Protected Area, allowing the sustainable use of resources, subject to the objectives of DHNRC, for the benefit of partners and communities and providing opportunities for research, education and appropriate nature-based recreation.

2.2 The purpose of De Hoop Nature Reserve Complex

The purpose is the foundation on which all future actions are based and is in line with the overall management philosophy of the organisation. The purpose of the DHNRC as follows:

The conservation of biodiversity (with the emphasis on priority species), ecosystems and cultural heritage and the provision of research, environmental education, sustainable socio-economic and appropriate access opportunities through natural resource management and tourism opportunities on the De Hoop Nature Reserve and Marine Protected Area, for the benefit of communities and partners.

National Environmental Management: Protected Areas Act, 2003 (No. 57 of 2003)

In terms of section 17 of the National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003) (NEM: PAA) the following purposes are relevant to DHNRC.

(a) To protect ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes in a system of protected areas;

(b) To preserve the ecological integrity of those areas;

(c) To conserve biodiversity in those areas;

(d) To protect areas representative of all ecosystems, habitats and species naturally occurring in South Africa;

(e) To protect South Africa's threatened or rare species;

(f) To protect an area that is vulnerable or ecologically sensitive;

(g) To assist in ensuring the sustained supply of environmental goods and services;

h) To provide for the sustainable use of natural and biological resources;

(i) To create or augment destinations for nature-based tourism;

(j) To manage the interrelationship between natural environmental biodiversity, human settlement and economic development;

(k) Generally, to contribute to human, social, cultural, spiritual and economic development; and

(l) To rehabilitate and restore degraded ecosystems and promote the recovery of endangered and vulnerable species.

Marine Living Resources Act, 1998 (Act No. 18 of 1998)

The purpose of a Marine Protected Area (MPA) in terms of section 43 (1) of the Marine Living Resources Act, 1998 (Act No. 18 of 1998) and applicable to De Hoop MPA is as follows:

(a) For the protection of fauna and flora or a particular species of fauna or flora and the physical features on which they depend;

(b) To facilitate fishery management by protecting spawning stock, allowing stock recovery, enhancing stock abundance in adjacent areas, and providing pristine communities for research; or

(c) To diminish any conflict that may arise from competing uses in that area.

The World Heritage Convention Act, 1999 (Act No. 49 of 1999)

The DHNRC has been proclaimed as part of the Cape Floral Region Protected Areas as a World Heritage Site and the criteria under which the inscription was proposed, are as follows (Department of Environmental Affairs and Tourism 2003):

a) Outstanding example representing significant ongoing ecological and biological processes in evolution.

b) The most important and significant natural habitats for *in situ* conservation of biological diversity.

Explosives Act, 1956 (Act No. 26 of 1956)

The eastern sector of the DHNRC has a purpose in terms of the Explosives Act (Act No. 26 of 1956) to provide opportunities for the testing of weapons, in particular missiles.

Aviation Act, 2009 (Act No. 13 of 2009) and the Defence Act, 2002 (Act No. 74 of 2002)

The airspace above the reserve has been declared as military restricted airspace in terms of the Aviation Act (No. 13 of 2009) together with the Defence Act (No. 74 of 2002) for the purpose of military training and the testing of weapons and military equipment.

Ramsar Convention

The De Hoop Vlei within the nature reserve has been internationally listed as a Ramsar Site (Ramsar site No. 34) in terms of the treaty that has been adopted by South Africa (Wetland International Site reference No. 1ZA001). Along with the De Hoop Vlei, the karst depressions and caves found in DHNRC are also listed as systems worthy of RAMSAR status (COP 7 1999. Resolution VII.13: Guidelines for identifying and designating karst and other subterranean hydrological systems as Wetlands of International Importance).

The Convention's mission is *"the conservation and wise use of all wetlands through local and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world".*

At the centre of the Ramsar philosophy is the *"wise use"* concept. The wise use of wetlands is defined as *"the maintenance of their ecological character, achieved through the implementation of ecosystem approaches, within the context of sustainable development". "Wise use"* therefore has at its heart the conservation and sustainable use of wetlands and their resources, for the benefit of humankind.

The purpose for listing it as a Ramsar site is to obtain international recognition and support with regards to the conservation and wise use of this wetland.

See also sections 3.3.4 “Aquatic systems” and 3.3.11 “Avifauna”.

Public Private Partnership Regulations

In terms of Treasury Regulation 16, of the Public Finance Management Act (No. 1 of 1999) (PFMA) seven tourism sites at De Hoop have been designated as Public Private Partnership (PPP) Tourism sites for a period not exceeding 45 years from date of signature, 09 December 2009. The regulations define a PPP as:

"A contract between a public sector institution and a private party, in which the private party assumes substantial financial, technical and operational risk in the design, financing, building and operation of a project."

Two types of PPP's are specifically defined:

- *"where the private party performs an institutional function;*
- *where the private party acquires the use of state property for its own commercial purposes".*

A PPP may also be a hybrid of these types, where the payment in any scenario involves one of the following three mechanisms:

- "*the institution paying the private party for the delivery of the service; or*
- *the private party collecting fees or charges from users of the service; or*
- *a combination of these."*

The purpose of the De Hoop PPP is to construct, maintain and operate a high value nature based tourism product, which is capable of generating sustainable income to CapeNature, whilst providing access, jobs and local economic development in an ecologically responsible manner. This purpose is aligned to objective (i), (j), (k) and (l) of the National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003) (NEM: PAA), as indicated above.

2.3 The values of De Hoop Nature Reserve Complex

Values are those characteristics that deem the protected area unique in terms of its ecological, cultural and social aspects. The values of DHNRC include:

Natural values	• The reserve includes a very good representative range of the habitat variation within Limestone Fynbos. • High number of rare, endangered and endemic plant species present.

	• It has a large marine/terrestrial interface of more than 43 km. If the full coastal length of the MPA is taken, it is more than 54 km. • The terrestrial reserve is declared as a World Heritage Site as part of the Cape Floristic Region Protected Areas World Heritage Site. • The MPA falls within the Agulhas ecoregion. • The reserve also has a functional dune system that adds to the ecological diversity. • De Hoop Vlei is an internationally recognised Ramsar site. • A colony of threatened Cape Vultures breed at Potberg, and it is the only colony within the winter-rainfall region and the only colony still in existence within the Western Cape Province. • The reserve contains viable populations of the threatened bontebok and Cape mountain zebra. High numbers of great white sharks aggregate with in the De Hoop MPA. • MPA is a critical nursery ground for smooth hammerhead sharks with aggregations of up to 1500 pups. • De Hoop MPA together with St. Sebastian Bay supports 70-80% of cow-calf pairs of the endangered southern right whale. • Important breeding caves hosting five species of bats exist in the reserve. • The Karst geological formation that occurs on the reserve provides roosting sites for large numbers of bats in numerous caves that are typical to this formation. • The De Hoop MPA contains unique intertidal systems of large, eroding, soft sandstone and limestone platforms. • Three species of fish known to be present in the MPA are listed as “vulnerable”. These species are the great white shark, white steenbras and red steenbras.
Ecosystem service values	• MPA provides refuge for surf zone recreational line fish and intertidal species and a spill over for certain species such as red steenbras. • The reserve provides a refuge for animals and plants and is a storehouse for genetic material. • The reserve provides an intact mountain to coast ecosystem.
Social values	• A partnership agreement exists between CapeNature, Denel OTR and the Overberg Air Force Base with regards to the conservation

	management of the missile test range and airfield thus enlarging the total conserved area with approximately 30 000 ha. • The Potberg EE Centre on the reserve provides a facility for environmental education. • Conservation and tourism activities provide approximately 180 job opportunities making a significant contribution to the local economy. • The reserve provides for a variety of outdoor recreational activities and experiences.
Cultural and historic values	• Archaeological sites of international significance exist on the reserve and some are presently excavated. • The reserve has a rich farming history with historical buildings of which some are declared as National Monuments.
Eco-tourism values	• The reserve is aesthetically pleasing and therefore a sought after tourist destination. • The reserve provides for popular activities including bird watching, hiking, mountain biking, whale watching etc. • Infrastructure includes high quality tourist accommodation managed within a private partnership agreement as well as the highly popular Whale Trail.

2.4 The objectives of De Hoop Nature Reserve Complex

The objectives were derived from the vision and purpose and represent Key Performance Areas (KPA) in which achievement must be obtained in order to support the management intention. Objectives, which are not measurable or testable, are then prioritised through the development of action plans and translated into strategic outcomes which are set out in the SIF.

The list of objectives for the DHNRC is in order of priority (using the pairwise method):

1 To conserve the representative biodiversity of De Hoop NR and MPA with particular emphasis on local endemic and threatened species.

2 To implement the integrated management of the terrestrial and marine component of the DHNRC.

3 To ensure integrated, cooperative and compliant management including partnerships.

4 To conserve/maintain the ecosystem and its processes.

5 To conserve the cultural heritage within the NR and MPA.

6 To promote and enable conservation orientated research within the NR and MPA.

7 To provide quality environmental education, awareness and outreach programmes to the youth.

8 To provide biodiversity access and benefit sharing opportunities for communities.

9 To provide for appropriate nature based recreation, tourism and sustainable income generation activities within the framework of the Green Economy.

2.5 Summary of management issues, challenges, opportunities and threats of De Hoop Nature Reserve Complex

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 that objective. The analysis identifies the DHNRC following strengths, weaknesses, opportunities and threats (Table 2.1).

Table 2.1: Management strengths, weaknesses, opportunities and threats of the De Hoop Nature Reserve Complex.

Strengths	Obj 1	Obj 2	Obj 3	Obj 4	Obj 5	Obj 6	Obj 7	Obj 8	Obj 9
The rich biodiversity in both terrestrial and marine environments with diverse ecosystems and habitats	✓	✓		✓		✓	✓		✓
Well protected through legal proclamations as a Marine Protected Area and Provincial Nature Reserve	✓	✓		✓	✓	✓			✓
Relative large size of the reserve	✓			✓		✓	✓	✓	✓
The De Hoop Vlei registered as a Ramsar site	✓		✓	✓		✓			✓
Terrestrial reserve proclaimed as a World Heritage Site	✓		✓	✓	✓	✓			✓
Location due to very limited urban development in the surrounding area	✓			✓	✓	✓			✓
Limited impact from surrounding land use	✓			✓		✓			✓

Attractive aesthetics enhancing visitor experience e.g. mountain, coast and inland waters							✓		✓
Supportive local community	✓		✓	✓	✓	✓	✓	✓	
Opportunities for income generation and community beneficiation through tourism									✓
Strong existing partnerships and agreements with Department of Environmental Affairs: Oceans and Coasts (DEA: O&C), De Hoop Collections (Pty.) Ltd. and Denel OTR	✓	✓	✓	✓	✓	✓			
180 jobs provided on the reserve from mostly from the Bredasdorp and Swellendam communities	✓	✓	✓	✓	✓			✓	✓
Weaknesses									
Poor external and internal roads limiting recreational access and hindering effective management	✓	✓	✓	✓			✓	✓	✓
Inappropriate routing of some roads and tracks in the reserve road network, due to the unacceptable impact on wetlands	✓			✓					
Poor and inadequate boundary fences causing game to escape	✓								
Limited domestic water availability dampening tourism development									✓
Limited funding, resources, staff especially for alien invader plant eradication, infrastructure development and maintenance and certain ecological monitoring procedures	✓			✓	✓	✓	✓		✓
High visitor expectations causing a burden on road maintenance							✓		✓
Abundant alien vegetation provides many management challenges and degrades the ecological value	✓		✓	✓	✓				✓
Management risk of wood cutting areas with regards to fire hazard and habitat degradation	✓			✓					
Poor management representation in various areas of the reserve and along the coast making it difficult to control access	✓	✓	✓	✓					✓

Insufficient staff accommodation on the reserve places a burden on resources as staff needs to be transported daily over long distances and limiting staff availability after hours	✓	✓	✓	✓					✓
Long distance to boat launch site. No launch site on the reserve	✓	✓	✓	✓					
Opportunities									
Increase job creation opportunities by alien clearing, road maintenance and other conservation tasks	✓	✓	✓	✓				✓	✓
Income generation e.g. from tourism, recreational activities and game sales	✓	✓	✓	✓	✓		✓		✓
Partnerships in terms of game management with OTR and other neighbours	✓		✓	✓		✓			
Relatively large natural areas outside the reserve create opportunities to enlarge buffer zones and ecological corridors through stewardship instruments	✓	✓	✓	✓					
Contribution to scientific (archaeological, fisheries, ecological, etc.) research, visitor experience and environmental education	✓	✓	✓	✓	✓	✓	✓		✓
Threats									
Climate change	✓			✓					
Crop damage on neighbouring farms from escaping game may result in claims and loss of goodwill			✓						
Missile testing degrading visitor satisfaction and safety and hampering the coordination of game monitoring procedures and other management activities			✓						✓
Poaching of natural resources, especially marine	✓	✓	✓	✓					

Unauthorised night driving and speeding leading towards animal mortalities, degradation of visitor safety and security and enhanced road deterioration	✓		✓	✓					✓
Groundwater overabstraction	✓	✓		✓					
Risk (contractual and ecological) due to non-compliance with legislation	✓		✓	✓	✓	✓			✓
Increased demand to provide additional visitor experiences	✓		✓	✓	✓				✓
The spread of invasive alien organisms	✓			✓	✓				✓
Potential oil and gas exploration and mining outside the MPA causing negative impact on marine animals	✓			✓					✓
Possibillity of oil spils and stranded ships causing negative impact on marine biodiversity and tourism.	✓			✓					✓
Wind farms with regards to the potential negative impact on bat colonies and birds	✓			✓					

3 DESCRIPTION AND CONTEXT OF DE HOOP NATURE RESERVE COMPLEX

3.1 Location and extent of De Hoop Nature Reserve Complex

De Hoop Nature Reserve:

The DHNRC is situated in the Cape Agulhas Municipal Area that is part of the Overberg District in the Western Cape Province about 50 km East of Bredasdorp and 50 km South of Swellendam. The NR covers an area of 33 795 ha (338 km^2) between latitudes 34° 21' 38" S and 34° 30' 34" S, longitudes 20° 18' 47" E and 20° 52' 14" E. The midpoint is at approximate latitude 34° 25' 40" S and longitude 20° 35' 22" E (Map 1).

Figure 3.1: De Hoop Nature Reserve from Opstal Area.

The size above is derived from the sum of all the farm sizes included in the reserve and derived from the title deed information, however the proclamation states that the area is 35 846 ha. The map referred to in the latest proclamation also includes the full extent of farm 323 in the district of Bredasdorp (Reimerskraal) as part of the reserve; however in terms of an agreement with the neighbouring OTR, only a small portion of this farm should have been part of the reserve. Farm no. 74/1 in the district of Bredasdorp has also been included in the reserve as per the map, but it is private land and should not be part of the reserve. A section of the reserve on farm no. 516/70 indicated in Map 2 is used by OTR and also should not be part of the nature reserve.

These amendments will have to be made by re-proclaiming the reserve according to a corrected full boundary description and size determination (Map 3).

Map 2 indicates the incorrect extent of the reserve as per current proclamation of DHNRC. Map 3 also shows the agreed boundary as per new agreement with OTR. This agreed boundary will be used for all further reserve planning purposes. The re-proclamation of this boundary is also listed as an activity in Table 6.1.

Adjacent to the western boundary of the reserve is the Denel OTR that was established for the purpose of missile testing and is still used as such. North of the reserve are farming areas with extensive wheat and canola farming as well as small stock and ostriches. To the east are natural areas used for recreation purposes and some farming. The St. Sebastian Private Nature Reserve borders onto the reserve in the far south-eastern corner of the reserve. The hamlet of Infanta is just east of the reserve.

The Breede River flows into the sea approximately 2 km east of the eastern boundary of the reserve.

De Hoop Marine Protected Area:

Adjacent to the reserve's coastal boundary and adjacent to a section of the Denel OTR's coastal boundary is the De Hoop MPA. It covers an area of 28 866 ha (288 km²) and stretches along a coastline of approximately 45 km adjacent to the DHNRC and for a further approximately 12 km adjacent to the OTR (from Stilbaai Point in the east to a point between Ryspunt and Skipskop in the west) and extends three nautical miles (5 km) offshore into the Indian Ocean (Map 1).

The boundary of De Hoop MPA is gazetted in Government Notice 1429 dated 20 December 2000 as follows:

The De Hoop Marine Protected Area in the Western Cape Province is bounded by the high water mark, a line (1 14° true bearing) drawn from the beacon marked D1-fl, situated near Stilbaai Point (34 °27'.13S; 020052 -.25 E), another line (150' true bearing) drawn from the beacon marked DH2, situated between Rys Point and Skipskop (34 °34'.94S; 020°21'.89E), and a seaward boundary, which is a series of straight lines joining the following positions, each three nautical miles from the shore:

34°28'.378 S; 20°55'.653E,

34°28'.385S; 20°55'.397E (incorrect),

34°30'.378S; 20°53'.904E,

34°31'.295S; 20°51'.277E,

34°31'.088S; 20°48'.865E,

34°30'.416S; 20°45'.593E,

34°29’.850S; 20°41’.128E,

34°30’.438S; 20°34’.900E,

34°32’ 329S; 20°29’.699E,

34°37’.600S; 20°23’.757E.

The coordinate 34°28’.385S; 20°55’.397E is however incorrect as it does not follow the description and is not three nautical miles from the shore. This needs to be corrected and is listed as an activity in Table 6.1. De Hoop MPA is gazetted as a no-take MPA which restricts any extractive use. No fishing (shore or boat based) is allowed between the beacon DH1 at Still Bay Point and the beacon DH2 between Rys Point and Skipskop, extending three nautical miles seawards from the high-water mark. Bait collection is also prohibited.

Figure 3.2: De Hoop MPA Coastline

The DHNRC is comprised of the following land parcels (Table 3.1):

Table 3.1 Land parcels constituting the De Hoop Nature Reserve Complex.

MAGISTERIAL DISTRICT	TYPE OF PROPERTY	PARCEL	PORTION	AREA (HA)	FARM NAME	SG DIAGRAM NR	TITLE DEED NR	REGISTERED OWNER	CONSERVATION STATUS
BREDASDORP	FARM	78	1	730.9550	WINDHOEK	2505/1913	T11809/1920	RSA	Provincial NR
BREDASDORP	FARM	78	2	473.6621	WINDHOEK	1942/1917	T14000/1958	RSA	Provincial NR
BREDASDORP	FARM	78	3	176.1028	WINDHOEK	A3038/1925	T10830/1960	RSA	Provincial NR
BREDASDORP	FARM	74	4	80.3500	DE HOOP	1640/1975	T30589/1975	RSA	Provincial NR
BREDASDORP	FARM	74		3503.989	DE HOOP	156/1850	T11958/1956	RSA	Provincial NR
BREDASDORP	FARM	337	2	55.1767	SKIHAVEN	8807/1976	T32644/1977	RSA	Provincial NR
BREDASDORP	FARM	74	2	5570.028	DE HOOP	A4003/1924	T1169/1978	RSA	Provincial NR
BREDASDORP	FARM	62	11	296.012	CUPIDO'S KRAAL	1575/1978	T14577/1978	RSA	Provincial NR
SWELLENDAM	FARM	516	15	518.1747	POTTEBERG ESTATES	1636/1914	T18793/1978	RSA	Provincial NR
SWELLENDAM	FARM	517		1258.368	UITVLUGT	485/1870	T18793/1978	RSA	Provincial NR
SWELLENDAM	FARM	516	17	762.3863	POTTEBERG ESTATES	617/1920	T18793/1978	RSA	Provincial NR
SWELLENDAM	FARM	516	16	4899.132	POTTEBERG ESTATES	1884/1914	T1188/1979	RSA	Provincial NR
BREDASDORP	FARM	516	1	1765.559	POTTEBERG ESTATES	2453/1912	T5375/1971	RSA	Provincial NR

SWELLENDAM	FARM	516	4	752.8264	POTTEBERG ESTATES	2454/1912	T23448/1966	RSA	Provincial NR
SWELLENDAM	FARM	516	5	373.4183	POTTEBERG ESTATES	2459/1912	T33349/1985	RSA	Provincial NR
SWELLENDAM	FARM	516	31	364.55	POTTEBERG ESTATES	2673/1943	T33349/1985	RSA	Provincial NR
SWELLENDAM	FARM	516	6	1179.642	POTTEBERG ESTATES	2455/1912	T33349/1985	RSA	Provincial NR
SWELLENDAM	FARM	516	9	1018.417	POTTEBERG ESTATES	2463/1942	T9910/1955	RSA	Provincial NR
SWELLENDAM	FARM	516	11	1195.006	POTTEBERG ESTATES	2461/1912	T9910/1955	RSA	Provincial NR
SWELLENDAM	FARM	516	14	1375.946	POTTEBERG ESTATES	489/1914	T50724/1987	RSA	Provincial NR
SWELLENDAM	FARM	516	27	230.4999	POTTEBERG ESTATES	1941/1940	T50724/1987	RSA	Provincial NR
SWELLENDAM	FARM	516	18	900.1609	POTTEBERG ESTATES	A572/1928	T50725/1987	RSA	Provincial NR
SWELLENDAM	FARM	516	20	3.6045	POTTEBERG ESTATES	A725/1930	T5400/1958	RSA	Provincial NR
SWELLENDAM	FARM	516	21	1.9951	POTTEBERG ESTATES	A3921/1931	T5400/1958	RSA	Provincial NR
SWELLENDAM	FARM	516	22	10.4557	POTTEBERG ESTATES	A3922/1958	T5400/1958	RSA	Provincial NR

SWELLENDAM	FARM	516	24	43.1687	POTTEBERG ESTATES	3961/1935	T5400/1958	RSA	Provincial NR
SWELLENDAM	FARM	516	26	3.9428	POTTEBERG ESTATES	3960/1935	T5400/1958	RSA	Provincial NR
SWELLENDAM	FARM	516	23	15.2741	POTTEBERG ESTATES	3348/1932	T50922/1981	RSA	Provincial NR
SWELLENDAM	FARM	516	35	3.5447	POTTEBERG ESTATES	10232/1946	T50922/1981	RSA	Provincial NR
SWELLENDAM	FARM	516	25	10.5912	POTTEBERG ESTATES	3962/1935	T29215/1987	RSA	Provincial NR
SWELLENDAM	FARM	516	28	839.3177	POTTEBERG ESTATES	1942/1940	T36676/1990	RSA	Provincial NR
SWELLENDAM	FARM	516	29	557.754	POTTEBERG ESTATES	1943/1940	T20128/1991	RSA	Provincial NR
SWELLENDAM	FARM	516	30	771.4891	POTTEBERG ESTATES	1941/1940	T5375/1971	RSA	Provincial NR
SWELLENDAM	FARM	516	37	411.6706	POTTEBERG ESTATES	3784/1950	T22525/1988	RSA	Provincial NR
SWELLENDAM	FARM	516	46	1178.653	POTTEBERG ESTATES	11416/1965	T18278/1991	RSA	Provincial NR
SWELLENDAM	FARM	516	57	25.4533	POTTEBERG ESTATES	9697/1970	T28818/1974	RSA	Provincial NR
SWELLENDAM	FARM	516	58	25.3712	POTTEBERG ESTATES	9698/1970	T28819/1974	RSA	Provincial NR

SWELLENDAM	FARM	516	59	25.3201	POTTEBERG ESTATES	9699/1970	T18892/1991	RSA	Provincial NR
SWELLENDAM	FARM	516	61	25.4169	POTTEBERG ESTATES	9701/1970	T9576/1988	RSA	Provincial NR
SWELLENDAM	FARM	516	70	566.9473	POTTEBERG ESTATES	10244/1985	T12682/1986	RSA	Provincial NR
BREDASDORP	FARM	75	Only a surveyed portion to be part of NR	7338.312	MELKKAMER HOMESTEAD		T44440/1985	RSA	Provincial NR
BREDASDORP	FARM	323	Only a surveyed portion to be part of NR	1625.516	REIMERSKRAAL		T3898/1985	RSA	Provincial NR
BREDASDORP	FARM	62	7	279.3812	CUPIDOSKRAAL		T11958/1956	RSA	Provincial NR
SWELLENDAM	FARM	516	60	28.1415	POTTEBERG ESTATES		T51045/1980	RSA	Provincial NR

3.2 History of De Hoop Nature Reserve Complex

The Overberg region including DHNRC has been intermittently occupied by humans since the Early Stone Age (ESA) (before 250 000 years) with later occupations in the Middle Stone Age (MSA) (c. 200 000 – 30 000 years) and the Later Stone Age (LSA) (after 30 000 years) (Henshilwood 2008). It is decribed in more detail in section 3.4.

A comprehensive study on the history of the reserve since early European occupation was published by Scott and Scott (2002) and the information below is a short extract from this document.

After the European occupation of the Cape, the Overberg became a thriving agricultural area from the 1730s. The history of the farm De Hoop (originally known as The Hope) dates back to 1739, when Frederick de Jager was granted grazing rights to the land by the Dutch East India Company. Subsequent owners included the Cloetes, De Jagers, Myburghs, De Wets, Humans, Albertyns, Neethlings, Woods and Gardiners. One of the last private owners, Harry Wood, was responsible for the restoration of the old buildings. These date back to the time of Pieter Lourens Cloete, who built the homestead complex during the late 18th century. The historic grave sites are part of the homestead complex. Amongst other activities, the farm was used for breeding horses. The dry packed stone walls, which are a feature of the area, are also very old and reputed to be built by convicts.

In 1956 and 1957, the Cape Provincial Administration purchased the properties De Hoop and Windhoek. Later the farm The Nook was added. The ruins of the hunting lodge of Axel Ohlsson (the son of Anders Ohlsson of Potberg, see below) may still be seen at Windhoek, north-east of the present building complex. A large guano (in this case, bat droppings) cave on the Windhoek farm was mined during the Second World War. The original DHNR was proclaimed in 1957 and used as an experimental game breeding farm.

The farm Dronkvlei and portions of the Potteberg Estates were added to the reserve in 1978, increasing the size of the reserve to 18 763 ha. Grazing rights were first granted on the Potteberg Estates in 1730. This farm was originally known as Brakkefontein and was purchased by Anders Ohlsson, of breweries' fame (Newlands, Cape Town), in 1905 for breeding race horses. Earlier owners included Gabriel van Dijk and Jan du Toit. Ohlsson’s son Axel later sold the farm to J.D. Albertyn, who in turn passed it on to Swart, Myburgh and Jan du Toit. The large white farmhouse was built by Van Dijk during the late 19th century. The large sandstone house was built for the farm manager by Ohlsson in 1906 and was also used as a school and post office. Ohlsson also built the large sandstone barns. There are several interesting grave sites at Potberg. The Cape Provincial Administration bought the farm in 1980, and the barn was modified and presently serves as an environmental education centre.

The establishment of the missile test range by ARMSCOR in 1984 in a large area west of the DHNR and now called the Denel OTR, resulted in a new era of co-operative management for De Hoop. Further additions were made to the reserve in the form of

the eastern section in 1990 and the Melkkamer homestead complex in 1990. This historic homestead was built in 1907 by John ("Biddy") Henry Anderson, and the foreman's house even earlier, before 1872. In the eastern sector the Elandspad farmhouse is of historical importance, being some 100+ years old. There are several smaller ruin sites. The coastline of the present-day De Hoop MPA was a popular holiday and angling destination in the past. According to Attwood *et al*. (1997), the MPA was proclaimed a reserve after expropriation of private land for a strategic military purpose.

There are twelve stone wall fish traps located adjacent to the Denel OTR and these are protected under the National Heritage Resources Act (Act No. 25 of 1999).

According to the South African Heritage Resource Agency (SAHRA), there are potentially eight shipwrecks within the vicinity of the MPA including: Bella Gambi 1974, Debonair 1964, Dirkie Uys 1968, James Shepherd 1851, Maid of the Thames 1848, Mary Ann 1965, Sri Rezeki 1971 and Texanita 1922.

3.3 Ecological context of De Hoop Nature Reserve Complex

This section reflects the ecological conditions of DHNRC.

3.3.1 Climate and weather

The reserve is situated in the eastern part of the temperate winter rainfall region that has a Mediterranean climate.

Precipitation:

The mean annual rainfall is approximately 572 mm (CapeNature unpubl. data) with the maximum mean monthly rainfall occurring in August and the minimum between December and January (Figure 3.3). Rainfall can, however, vary by 15%-17% from one year to the next. Summer rains commonly occur as cloudbursts, but rainfall is predominantly cyclonic, associated with the eastward movement of low pressure cells crossing the South-western and Southern Cape (Butcher 1984; Toens & Associates CC 1994). Orographic rainfall may account for large differences in rainfall between the lowlands and the high-lying ground such as the limestone hills ("harde duine") and the Potberg, particularly towards the eastern extremity of this mountain range. Rainfall on the limestone hills may exceed 400 mm and that on the Potberg 700 mm per year (1:250 000 isohyet value). The mean annual precipitation for the Sout River catchment is 369 mm (Toens & Associates CC 1994).

The wettest three months are June to August (12% of MAP per month) and the driest three months are December to February (4 to 5.5% of MAP per month). Rainfall is fairly evenly distributed throughout the year (7 to 12.5% of MAP per month) except for the three driest months (4 to 5.5% of MAP per month).

No incidences of snowfall have been recorded on the DHNRC. According to Butcher (1984), an incidence of snowfall was recorded only once this century in the “Rûens”, namely in 1906. Frost and hail occur occasionally.

Precipitation in the form of mist occurs in autumn and winter. At times the whole of the Overberg region may be covered in a thick mist bank.

Temperature:

The warm Agulhas current results in temperate winters and warm summers. The temperature averages 19.7°C per annum, with a mean summer maximum of 26.5°C and mean winter minimum of 13.0°C (CapeNature unpubl. data).

Warmest month on average is February, with a mean air temperature of 24°C and the coldest month on average is August, with a mean air temperature of 10°C (Figure 3.3).

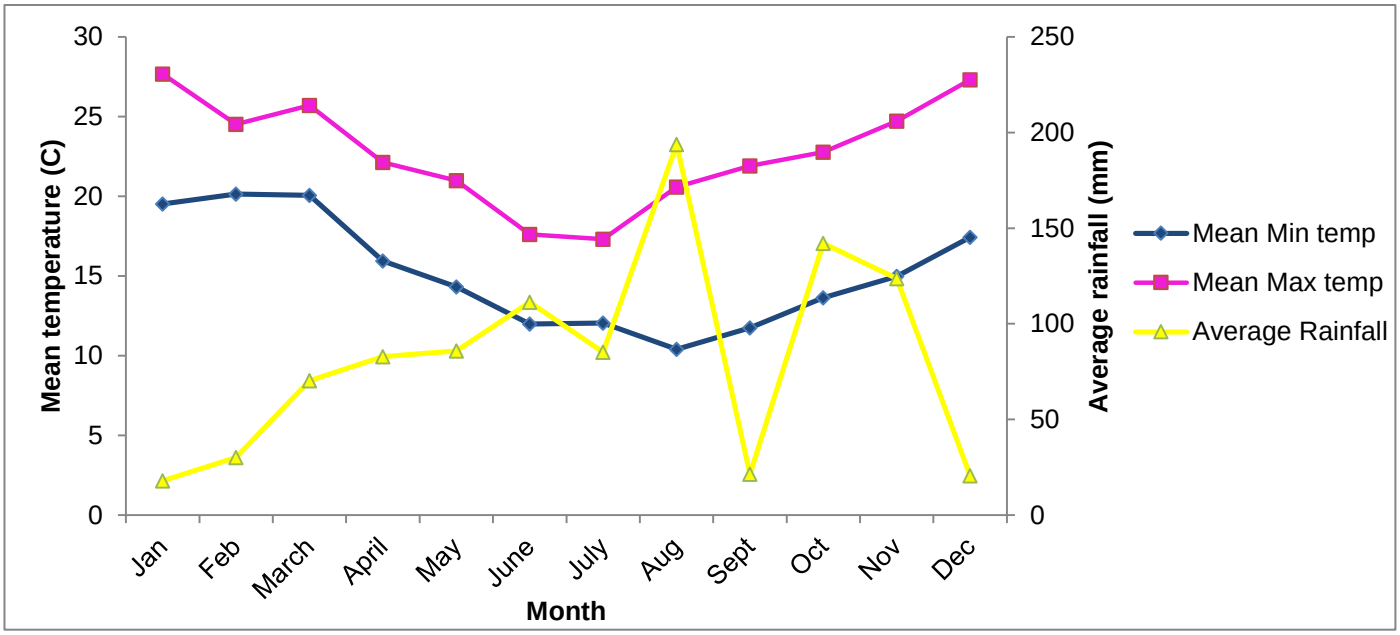


Figure 3.3: Climate of De Hoop Nature Reserve Complex (2012 - 2015).

Wind:

Windy conditions are common, particularly in summer when the prevailing wind direction is south-westerly, with an average velocity of 35 km/h. Wind speeds may reach 60 km/h or more at times (Butcher 1984).

3.3.2 Topography

The description below is taken from Toens and Associates CC (1994).

The Northern boundary of the reserve is characterised by the high-lying terrain of the Potberg range and the hard dunes (limestone hills) with a maximum height of 611 m and 224 m above sea level respectively. The land surface drops to the southwest in a series of four distinct terraces. These terraces, at elevations of 90 to 100 m; 60 m; 30 to 40 m and 15 to 20 m are a result of marine transgressions. Separating the hard

dunes from the Potberg range and the hard dunes from the gentle undulating topography to the north is a border depression which in the north west contains the Potbergs River. The Sout River has cut a deep, steep sided gorge through the hard dunes and discharges into De Hoop Vlei which is separated from the sea by the Witsand dune field (Map 4).

The limestone terrain exhibits typical karst topography which is developed to varying degrees on the different terraces. Solutions and subsidence features include dolines and uvalas (circular or oval depressions of moderate depression) and poljes (elongated enclosed depression of large dimensions). Caves occur within the limestone and are particularly extensive beneath the hard dunes. The predominant orientation is east-west.

The Table Mountain Group (TMG) quartzites form steep sided ridges with sharp apices separated by V-shaped valleys. These strata dip northwards, forming steeper slopes on the southern side of the ranges (scarp slopes) and more gentle dipping northerly slopes (dip slopes). Soil cover on the Potberg is sandy and generally limited. Thick boulder talus deposits and alluvial fans can be expected at the foot of the range. The Table Mountain Group quartzites form sea cliffs where they are exposed beneath the Bredasdorp limestone between Hamerkop and Infanta. Soil cover on the limestone terrain is generally thin; however there may be a thick cover of windblown sand in places. A hard calcretized soil horizon generally occurs on the surface (Map 4).

3.3.3 Geology and soils

Geology:

The following brief description of the geology of DHNR is from Toens and Associates CC (1994).

Most of the reserve is underlain by tertiary limestone of the Bredasdorp Group. These rocks form the hard dunes and the lower lying coastal terraces. This sedimentary formation was deposited in shallow marine and coastal environment on wave-cut platforms which had been cut into the underlying basement rocks. The basement geology comprises sedimentary rocks of the Table Mountain Group, the Bokkeveld Group and the Uitenhage Group.

Table Mountain Group sandstones underlie the Bredasdorp Group limestone beneath the northeast and eastern parts of the reserve, and form the Potberg Mountain Range. The Bokkeveld Group shales underlie much of the limestone in the central, western and north western portions of the reserve (Map 5). These shale outcrops at the surface on the northern edge of the hard dunes and may underlie parts of the De Hoop Vlei. Sedimentary rocks of the Uitenhage Group outcrop in parts of the cliffs forming the Sout River Gorge in the vicinity of Windhoek and at San Sebastian Point near Infanta. In the De Hoop area these sediments are overlain by Bredasdorp limestone and underlain by Bokkeveld shale, and are presumed to extend beneath much of the central and western areas of the reserve, south of the Potberg.

Within the Bredasdorp Group the following formations are represented in the reserve: De Hoopvlei, Wankoe, Waenhuiskrans and Strandveld formations and a description of the groups and formations is given in Toens and Associates CC (1994). See also Map 5 and Table 3.2.

Table 3.2 Geological Formations and Codes.

Group	Formation	Description	Map code
		Alluvium	
		High level terrace	
		Brackish, calcerous soil, saltpan	Qb
		Light-grey to pale-red sandy soil	Qg
		Calcrete	Qc
		Ferricrete	Qf
Bredasdorp	*Strandveld*	*Dune and beach sand with shell material*	Qsr
	Waenhuiskrans	*Partly calcified dune sand with calcrete lenses*	Qw
	Kleinbrak	*Partly calcified shelly sandstone with pebbles*	Qk
		Loam and sandy soil	T-Ql
		Talus grading into gritty sand	T-Qt
	Waenhuiskrans	*Calcareous sandstone with calcrete lenses*	Tw
	De Hoopvlei	*Calcareous shelly sandstone with conglomerate lense*	Td
	Grahamstown	*High-level silcrete and ferricrete*	Tg
Uitenhage	Enon	*Reddish conglomerate, sandstone, mudstone*	Je
	Robberg	*Silicified sandstone and conglomerate*	Jr
Witteberg	Wagen Drift	*Reddish sandstone*	Dwa
Bokkeveld	Klipbokkop	*Shale*	Dk
	Wuppertal	*Sandstone*	Dwu
	Waboomberg	*Shale*	Dw
	Boplaas	*Sandstone*	Db
	Tra-Tra	*Shale*	Dt
	Hex River	*Sandstone*	Dh
	Voorstehoek	*Shale with sandstone lenses*	Dv
	Gamka	*Sandstone*	Dga
	Gydo	*Mudrock, siltstone*	Dg
Table Mountain	Rietvlei	*Feldspathic sandstone*	Dr
	Skurweberg	*Quartzitic sandstone*	Ss
	Goudini	*Reddish quartzitic sandstone*	Sg
	Cedarberg	*Shale*	O-Sc
	Peninsula	*Quartzitic sandstone*	Ope

Soils:

Dominant land type units are classed as rock areas with miscellaneous shallow soils (mainly Mispah or Glenrosa soil forms). The substrate is either calcrete or quartzitic sandstone with a shallow sandy A-horizon. More limited areas of deep regic sands and other soils occur in the valley between Potberg and the hard dunes and unconsolidated calcareous dunes along the coast. Very limited areas of eutrophic red plinthic soils are also present (Macvicar 1984).

3.3.4 Aquatic systems

The DHNRC falls into the Breede Water Management Area (WMA), which includes the Breede and Overberg catchment areas. This WMA is now managed together with the Gouritz WMA through the Breede-Gouritz Catchment Management Agency (CMA). The catchments leading into the DHNRC are extensively covered in agricultural land use, including cultivated wheat fields and livestock farming (see Map 6). These land use practices have mostly greatly modified both the instream and riparian zones of the Sout River, which flows into the De Hoop Vlei. According to the River Health Programme (RHP) survey of the Overberg rivers, the rivers in the catchments surrounding the DHNRC were all in a fair condition (multiple disturbances) (River Health Programme 2011). Moreover, with regards to particularly the instream habitat integrity and the water quality measured at several sites in the Sout River catchment, it was found that these indices were mostly in a fair to poor condition (Herdien *et al*. 2006). Through the National Freshwater Priority Areas (NFEPA) (CSIR 2010; Nel *et al*. 2011) process, the Sout River sub-catchments directly upstream of the DHNRC boundary has been identified as Rehab-FEPA's, while the Potbergs River catchment and the rest of the upper Sout River have been classified as upstream support areas for the De Hoop Vlei, which serves as a fish sanctuary (or fish FEPA).

DHNRC has an extensive system of karst formation caves and subterranean caves. Karst refers to an ensamble of morphological and hydrological features and the dominant process responsible for them which is the dissolution of soluble rocks. In karst landscapes, surface and subsurface rock dissolution largely overrules mechanical erosion, leading to a distinctive morphology and hydrology (Forti 2015). Costal limestone karst is soft, variably poor, weakly jointed and dominantly micritic, sandy limestones (Marker & Gamble 1987). These systems outcrop discontinuously on land around the coast of southern Africa from Saldahna Bay to Zululand.

According to RAMSAR, the principal wetland conservation values of karst systems include:

- Uniqueness of karst phenomena/functions and functioning;
- Inter-dependency and fragility of karst systems and their hydrological and hydrogeological characteristics;
- Uniqueness of these ecosystems and endemism of their species;

- Importance for conserving particular taxa of fauna and flora.

In addition to their many natural values, karst systems also have important socio-economic values, which include the supply of drinking water, water for grazing animals, tourism and recreation.

3.3.4.1 Groundwater

According to the Department of Water Affairs and Sanitation (DWS) aquifer classification process, the majority of the aquifer systems underlying the DHNRC are minor, i.e. they are considered moderately yielding of good quality water (Department of Water Affairs 2012). Furthermore, in a west to east direction, the vulnerability of the aquifer systems ranges from least (west) to most (east) vulnerable (DWA 2013a). Here, the least vulnerable implies aquifer regions that are only vulnerable to conservative pollutants over a long time period; and the most vulnerable indicates an aquifer region that is vulnerable to many pollutants/contaminants. Both of these principles, i.e. classification and vulnerability, in turn, feed into the susceptibility of an aquifer region to be polluted by anthropogenic impacts. In the case of the aquifer systems supporting the De Hoop Vlei and surrounding freshwater ecosystems, the susceptibility ranges from low (west) to high (east, including most of the DHNRC) (DWA 2013b). Furthermore, according to a sea level rise and flood risk assessment conducted by the Department of Environment and Development Planning (DEA&DP 2012), the risk of groundwater contamination due to seawater intrusion along the coastline from Pearly Beach to De Hoop Vlei is low to moderate.

The groundwater quality, i.e. electrical conductivity, for the area ranges from marked to extremely salty in the west (370- >520 mS/m) to a mosaic of slightly salty to a noticeable salty taste (70-370 mS/m) across the eastern parts of the NRC (Groundwater Quality of South Africa 2012).

3.3.4.2 Rivers

The De Hoop catchment includes the largest section of the reserve with the northern side of the reserve falling into the Sout River catchment and the eastern side of the reserve including a small section of the lower Breede River catchment. The Sout River is the main river feeding the De Hoop Vlei. The upper section of the Potbergs River is located within the reserve boundary and this is the main tributary of the Sout River (Map 6). The confluence of these two rivers is situated outside the reserve boundary. Further the Melkhouts, Jacobs and the Ziekenhuis Rivers that feed into the Breede River have their origins inside the reserve along the northern slopes of the Potberg Mountain. The Klipdrifsfonteinspruit is located in the eastern sector of the reserve and feeds the Noetsie estuary (Scott & Scott 2001).

In terms of the NFEPA project (Nel *et al*. 2011), the De Hoop catchment (quaternary catchment G50J) is listed as a fish sanctuary. The Heuningnes catchment, situated

off-reserve to the west of this catchment is also a fish sanctuary and home to a number of indigenous and threatened freshwater fish species.

3.3.4.3 Other freshwater aquatic systems (wetlands, springs, pans)

Three wetland systems occur in the DHNRC: De Hoop Vlei, the Dronkvlei wetlands and the Buffelsfontein wetlands.

The De Hoop Vlei is a Ramsar site, which includes a series of wetland clusters of conservation importance (FEPA wetlands) (Nel *et al*. 2011). These wetland clusters not only includes the vlei itself, but also wetlands in the surrounding catchment, both on and off- reserve (see NFEPA map, Breede WMA 18; Nel *et al*. 2011). According to the Ramsar information sheet for the De Hoop Vlei, the wetland types present in this wetland cluster system include coastal freshwater lagoon, coastal brackish lagoon and seasonal freshwater marshes. A recent update of wetland classification for inland systems (SANBI 2009; Ollis *et al*. 2013) would classify these wetland clusters as coastal flats.

The vlei is unique in the south-western region as it is closed off from the ocean with varying levels of salinity. Here the inflow of freshwater from the Sout and Potbergs Rivers are important factors in creating the uniqueness of this wetland system. Moreover, the De Hoop Vlei itself and the other wetland clusters, including the FEPA wetlands, supports large communities of vertebrate and invertebrate species, not to mention the numerous wetland plants.

3.3.5 Estuaries

Klipdrifsfonteinspruit:

This small estuary is situated just west of the Noetsie site and forms the mouth of the Klipdrifsfonteinspruit that flows for its entire extent on the reserve. The mouth is closed most of the time due to low flow, but it breaks through to the sea during flood events, the last recorded event was November 2013. Little specific information is available.

Breede River estuary:

The Breede River mouth and estuary is approximately 4.5 km north of the far eastern boundary of the reserve. This is one of the larger estuaries in the Western Cape and is extensively used for recreational fishing and other water sport activities. Research conducted on the Breede Estuary and the De Hoop MPA suggests a link between the two systems in protecting important marine fish species. Dusky kob (*Argyrosomus japonicus*) show a high degree of residency with limited movement (Griffiths & Attwood 2005). Fish tagged in the De Hoop MPA have been recaptured in the Breede Estuary and vice versa showing the utilisation of both the MPA and estuary during critical stages in the fishes life history (L. Swart 2015, DEA: O&C, pers. comm.). Juvenile

dusky kob appear to be resident in their natal estuaries and adjacent surf zones (Griffiths 1996; Griffiths & Attwood 2005).

The study by McCord and Lamberth (2009) has shown the presence of large, female Zambezi sharks (*Carcharhinus leucas*) in the Breede Estuary. Male Zambezi sharks were also recorded in this study and they showed a high degree of residency before migrating up the South African coastline (McCord *et al.* 2013). Bennett *et al*. (2013) assessed the movement patterns of the estuarine dependent, overexploited, white steenbras (*Lithognathus lithognathus*) in the Breede Estuary. They found that high levels of residency within the coastal zone render late juvenile and sub-adult white steenbras vulnerable to localised overexploitation, but simultaneously provide the opportunity for effective protection through MPAs. Research by DEA: O&C indicates that white steenbras is following a consistent decrease in catches over a 30 year research period (L. Swart 2015, DEA: O&C, pers. comm.) illustrating a critical need to protect the estuarine nursery areas and existing no-take MPAs.

The link between estuaries which serve as nursery areas for overexploited fish species and no-take MPAs cannot be overstated and as such the link between the Breede Estuary and the De Hoop MPA is a critical one. More research on the relationship between these areas is needed to support the maintenance of De Hoop as a no-take MPA and the protection of the Breede Estuary.

3.3.6 Marine systems

The National Biodiversity Assessment 2011 (Sink et al. 2012), classified the South African coastal zone into 'ecoregions' and 'ecozones' which replace the previous classification of 'bioregions' and 'biozones'. The classification includes 6 ecoregions, Benguela, Ahulhas, Natal, Delgoa, Southeast Atlantic and Southwest Indian. De Hoop MPA falls within the Agulhas ecoregion which includes the coast, continental shelf and shelf edge (Sink et al. 2012).

The Waenhuiskrans/Cape Infanta region is situated adjacent to the broadest part of the continental shelf off the southern African continent, a feature known as the Agulhas Bank. Thus the 1000 m depth contour lies about 300 km offshore, south of Cape Infanta. The Agulhas Bank represents a large area on which marine life can respond to the mixing of waters of various origins which contributes to the high biotic diversity of this region.

The intertidal zone has faunal elements representing both warm-water east coast species and cold-water west coast species. There is also an endemic south coast component. The richness and diversity of intertidal organisms attracts a large variety of fish species to this coast.

De Hoop MPA has been successful in actively protecting populations of sought-after reef fishes (Bennett & Attwood 1993), and in providing migrant recruits of over-fished

fish species such as red steenbras (*Petrus rupestris*) to other areas. The importance of this area lies in the fact that it represents an intertidal system of large, eroding, soft sandstone and limestone platforms which have not been protected elsewhere on our coastline. The sandy beaches support a variety of intertidal bacteria, diatoms and invertebrates.

South Africa has various marine ecotypes including: (a) Rocky and sandy shores; (b) Offshore reefs; (c) Offshore soft sediment; and (d) Estuaries. In De Hoop MPA, there are three different coast types - these are: (i) Sandstone wave-cut rocky platforms; (ii) Exposed sandstone rocky-headlands; and (iii) Fine-grain sandy beaches (Attwood *et al.* 1997). The sub tidal part of the MPA includes low profile sandstone reef interspersed by large areas of soft sediment. The reefs are important for many endemic species of sea breams (Sparidae) (Attwood *et al.* 1997).

(i) Rocky and sandy shores

De Hoop MPA consists of approximately 12 km of sandy shores, 22 km of rocky shores and 21.5 km of mixed rocky/sandy shore.

(ii) Offshore reefs

De Hoop MPA contains offshore rocky reefs; however, these are fairly sparse.

(iii) Offshore soft sediment

De Hoop MPA contains offshore soft sediment areas close inshore between the offshore reefs. Very little is known about the invertebrate or fish communities of the soft sediment areas in De Hoop MPA.

3.3.7 Vegetation

3.3.7.1 Terrestrial vegetation

The flora of the DHNR forms part of the Cape Floristic Region (CFR), the smallest and most diverse of the six floral kingdoms of the World (Cowling & Hilton-Taylor 1994). The CFR is internationally renowned for its rich flora containing an estimated 9 000 species of vascular plants of which almost 69% are endemic (restricted to the region) (Goldblatt & Manning 2000). This makes it one of the richest regions in the World in terms of botanical diversity. The CFR includes different vegetation groups, such as Fynbos and Renosterveld. Fynbos is a fire-adapted mosaic vegetation characterized by Proteoid, Ericaceous, Restiod and Asteraceous growth forms (Cowling & Holmes 1992). It occurs on the leached, oligotrophic soils derived from the Table Mountain Group sandstones, but Asteraceous forms are also found on granites and shales of the Malmesbury and Bokkeveld Groups. The Fynbos Biome comprises only Fynbos, Renosterveld and Strandveld. Renosterveld occurs on the fertile shale-based soils of the Bokkeveld and Witteberg Groups (Cowling & Richardson 1995). In addition,

Fynbos is characterized by five endemic families (Penaeaceae; Stilbaceae; Grubbiaceae; Roridulaceae; Geissolomataceae) and by the conspicuous presence of, amongst others, species belonging to the families Aizoaceae, Ericaceae, Fabaceae, Iridaceae, Orchidaceae, Proteaceae, Restionaceae, Rutaceae and Scrophulariaceae (Goldblatt & Manning 2000).

The DHNR is located within the Agulhas Plain Centre (one of the six phytogeographic centres of the CFR), an area covering only 30 000 km^3, that has an endemism rate of 14.9% (Goldblatt & Manning 2000). The DHNR comprises a number of different vegetation types of which the majority is De Hoop Limestone Fynbos with a conservation status of Least Threatened. Other types include Potberg Sandstone Fynbos (Least Threatened), Overberg Dune Strandveld (Least Threatened), Eastern Rûens Shale Renosterveld (Critically Endangered), Central Rûens Shale Renosterveld (Critically Endangered), Albertinia Sand Fynbos (Vulnerable), Elim Ferricrete Fynbos (Endangered), Potberg Ferricrete Fynbos (Endangered), Western Coastal Shale Band Vegetation (Least Threatened), Cape Seashore Vegetation (Least Threatened), Freshwater Lakes (Not Applicable), Cape Lowland Freshwater Wetlands (Vulnerable), Cape Coastal Lagoons (Not Applicable), Cape Inland Salt Pans (Endangered), and small areas of Rûens Silcrete Renosterveld (Critically Endangered) (Map 3.6 - Mucina & Rutherford 2006). Limestone fynbos has a highly specialized and restricted nature of communities and species (Cowling & Holmes 1992; Willis *et al*. 1996), and 27% of this vegetation type is statutorily conserved in the DHNR (Mucina & Rutherford 2006).

The DHNR includes a good representative range of the habitat variation within Limestone Fynbos (and probably the most diverse range of habitats of this vegetation type throughout its range). This diversity is enhanced by the presence of a range of sandy forms of “Limestone” Fynbos, from calcareous to neutral and acid sands overlying the limestone bedrock. The only major habitat type of Limestone Fynbos which is not represented in the DHNR is the area of seasonally waterlogged limestone flats (which occur in the adjacent OTR, to the west). The DHNR includes all of the mesic Mountain Fynbos on the southern slopes and highest peaks of the Potberg, but the Mountain Fynbos of the drier lower northern slopes and foothills is poorly represented in the DHNR. Along the southern foothills of the Potberg stony, gravelly and deeper sandy soils occur, which increase the diversity of habitat types of Mountain Fynbos.

A large part of the ca. 200 ha of Renosterveld area had been cultivated (ploughed) for a number of years until 1980, at which time it became incorporated into the DHNR. Since then, the area has not been subjected to fire or any significant human disturbance for 25 years, and has turned into a mosaic of three structural states, namely grazing lawn (*Cynodon dactylon*), tussock grassland (*Cymbopogon pospischilii*) and shrubland (*Elytropappus rhinocerotis)*. This area of Renosterveld has been grazed by a large number of herbivores, most commonly bontebok (*Damaliscus pygargus pygargus*).

In a study documented in 1996, Scott and Burgers (2001) listed nine broad habitat categories as subdivisions of De Hoop, namely: Coast (Limestone Rocky Coast; Sandstone Rocky Coast; Beaches); Sand Dunes; De Hoop/Dronkvlei Coastal Plain; Limestone Hills; De Hoop vlei; Potberg Flats and Melkbosheuwel; Valley between Potberg Centre and Stilgat turnoff; Elandspad Flats; Potberg Mountain Range. They identified the most sensitive habitats as the Coast, Vlei, and the Valley between the Potberg Centre and Stilgat turnoff.

In the historical work by Acocks (1953), Veld Types 47 (Coastal Macchia) and 69 (Macchia) were recorded as the predominant veld types on the DHNR, with very small areas of Veld Type 46 (Coastal Renosterbosveld) and Veld Type 4 (Knysna Forest). According to a subsequent vegetation classification for South Africa (Low & Rebelo 1996) five major vegetation types are recognized in the DHNR, namely Limestone Fynbos, Mountain Fynbos, Sand Plain Fynbos, Grassy Fynbos, and Dune Fynbos and Dune Thicket. Only very small areas of Laterite Fynbos, South and South-west Coast Renosterveld and Afromontane (Knysna) Forest also occur. The greater part of the area mapped as "Dune Thicket" in this area by Low and Rebelo (1996) is in fact Dune Fynbos, with smaller interspersed patches of Dune Thicket. Milkwood (*Sideroxylon inerme*) thicket may also be regarded as a form of Dune Thicket.

A good representative sample of Dune Fynbos occurs in the DHNR along the coast on the system of recent dunes. Dune Thicket is present as interspersed patches in the Dune Fynbos as well as in coastal kloofs, and below limestone cliffs. Milkwood thicket is best developed along the De Hoop Vlei and on the limestone flats between De Hoop and Dronkvlei. Only very small remnants of South and South-west Coast Renosterveld (at Windhoek and west of the Potberg Education Centre) and Laterite Fynbos (near Melkbosheuwel, at Potberg, and at Elandspad, in the eastern section) are protected in the DHNR. Most of the globally and locally threatened plant species that require special conservation action occur in these Renosterveld remnants within the DHNR and vicinity. Only very small patches of Afromontane Forest occur in the Potberg, in the Vulture Kloof and at Weaver Falls (lower Potberg).

Along the lower northern slopes of the Potberg above Diepkloof, good examples of Fynbos and Renosterveld on silcretes occur, with several threatened plant species that are not represented in the DHNR. The inclusion of this area in the DHNR therefore represents an extremely high priority. It is important to note that for all practical purposes, all lands adjoining De Hoop, especially to the west and east, are included in CBAs (Critical Biodiversity Areas – see Map 17).

According to information previously available, the Bredasdorp/Agulhas and Infanta areas of which the DHNR is a part of, has an estimated 1 500 plant species of the approximately 9 000 species found in the CFR. Of these 1 500 species:

- 108 species are rare or threatened;
- 34 species occur only on the DHNR and nowhere else; and
- 14 species were recently discovered and are still undescribed.

A selected list of 126 plant species documented in 1996, contained 49 endemic species, 10 listed as globally endangered, and 19 as vulnerable (Burgers 2001). The list also indicated a need for special conservation measures. Of the 126 species, 24 were identified as in need of critical conservation status, and 22 species of high priority for special conservation measures.

The current plant species list for the DHNR, extracted from the plant database at Scientific Services, includes 1 409 names of indigenous plant taxa that have been collected in the DHNR. The list also includes about 75 alien plant taxa. In addition, the list also includes 267 taxa that have been collected in the vicinity of the DHNR (of which 128 taxa were collected west of De Hoop Vlei in the OTR and Overberg Air Force Base). The number of distinct indigenous taxa which have been collected in the DHNR may therefore be no more than about 1 100. Of the 1 409 taxa, 28 are listed as critically endangered in accordance with the IUCN Red Data List, 88 are endangered, 67 are vulnerable, 1 is listed as critically rare and 12 are listed as rare. Fourteen species are listed as data deficient and the majority are indicated as of least concern.

Plant species that may have become extinct in the area now included in the DHNR, are likely to have been species occurring in Renosterveld which were lost when this habitat at Potberg was ploughed late during the 19th century. The status of several species in the small remaining patch of Renosterveld just west of the Potberg Education Centre is precarious due to very small population sizes. Renosterveld on the limestone flats at De Hoop is also very rare in the DHNR and several plant species in this habitat type have precariously small populations. These include the endemics *Lachenalia dehoopensis* and *Pteronia diosmifolia*, both of which were represented by only a handful of plants which have been found in the DHNR. Only one plant of *P. diosmifolia* was originally seen on the limestone flats south-east of De Hoop homestead and no further plants could be found, although it may still be present in very small numbers. Only two very small populations of *L. dehoopensis* have been found on limestone flats near the De Hoop complex but no plants could be found in 1995 (A. Scott, 1995, CapeNature, pers. comm.). Another species of which only a handful of plants have ever been found in the DHNR is *Gladiolus vandermerwei*, found in Renosterveld on old ploughed lands at Windhoek.

Another plant community which contains several plant species which are locally very rare in the DHNR is the forest patches in kloofs in the Potberg Mountains. *Brachysiphon mundii* represents another species which might have become extinct on the DHNR. Once thought to be totally extinct, it was recently rediscovered just outside the boundary of the DHNR.

The DHNR is home to species belonging to three of the five endemic Fynbos families: Penaeaceae -*Brachysiphon mundii*, *Penaea cneorum ruscifolia*, and *Penaea mucronata*. The Stilbaceae - *Stilbe ericoides*. Grubbiaceae is a monotypic taxon,

including only the genus Grubbia. Of the three species, two occurs in the DHNR, namely *Grubbia rourkei* and *G. tomentosa*.

Mucina and Rutherford (2006) have listed endemic taxa of the De Hoop Limestone Fynbos. Following each species name is an indication whether it is included in the plant species list of the DHNR (Y) or not (N): *Acmadenia munciana* (Y), *Argyrolobium harmsianum* (N), *Aspalathus pallescens* (Y), *A. prostrata* (N), *Brachysiphon mundii* (Y), *Cliffortia burgersii* (N), *Erica scytophylla* (Y), *E. sperata* (N), *E. uysii* (Y), *Euchaetis intonsa* (Y), *Felicia ebracteata* (Y), *Lobostemon daltonii* (N), *Pteronia diosmifolia* (N), *Sutera titanophila* (N) and the herb *Galium bredasdorpense* (Y).

The biggest threat to the natural vegetation of the DHNR is the impact of invasive alien plants, particularly by Rooikrans (*Acacia cyclops*). This is indeed the primary management priority if the reserve (see Section 3.3.9 for more detail). The De Hoop management team is in the process (as of 2015) of re-assessing and revising its integrated fire and invasive alien management programme. This is being done in order to improve the clearing efficiency and effectivity to address the threat the invasive aliens pose to the DHNR vegetation. Fire will be used as a clearing tool, as well as ensure a variety of veld ages are present in the reserve (see Section 3.3.8), and together this integrated fire and invasive alien plant management will improve grazing for appropriate numbers of game (see Section 3.3.10).

3.3.7.2 Aquatic vegetation

De Hoop Vlei is classified by Ollis *et al*. 2013 as a coastal flat which appears to be highly productive. Under certain conditions the water has a yellow-green appearance due to phytoplanktonic blooms. The extensive areas of shallow water and the relatively high salinity normally favour the development and maintenance of extensive beds of submerged macrophytes. Fonteingras (*Potamogeton pectinatus)*, a robust underwater plant which flourishes in brackish eutrophic waters, occurs particularly abundantly at times and sometimes covers large areas of the vlei, with only a few open channels in the deeper portions of the vlei. These beds can become so dense that waders, and even Grey Herons and Yellow-billed Egrets, can walk on them whilst foraging. Other submerged macrophytes which occur here include ditchgrass (*Ruppia cirrhosa*) and a species of *Chara*. The former has a higher salt-water tolerance than fonteingras and is possibly the dominant submerged macrophyte when the fonteingras dies as a result of high salinities. According to Martin and Uhler (1951), fonteingras beds can still be in a good condition at salt concentrations of 53 ppt, although it is doubtful whether they can survive higher concentrations for extended periods.

It is well-known that fonteingras serves as a very important food resource for waterfowl in the family Anatidae (Martin & Uhler 1951). It is possibly also the staple food of indigenous duck species such as the Yellow-billed Duck, which eats the bulbs, leaves and stolons (Skead 1980) and the Red-knobbed Coot which utilizes it extensively (Fairall 1981). This plant, to a large extent, appears to determine the carrying capacity

of the vlei for primary consumers such as coots and other waterfowl. At the same time, fonteingras provides favourable habitats for other aquatic organisms such as zooplankton (Harrison 1957; Siegfried 1963) and abundant fish populations (Van Rensburg 1966).

3.3.7.3 Marine vegetation

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

Historical and recent evidence is documented to demonstrate that the eastern limit of the major kelp-bed forming sea bamboo has moved approximately 73 km eastward along the south coast of South Africa since 2006, after remaining unchanged for almost 70 years. A significant population has established at Koppie Alleen in the DHNR, which has been monitored from 2008 to 2011. It is hypothesised that the eastward spread is limited by aspects of the inshore water temperature regime, and recent evidence suggests that gradual cooling along this coast may have caused the change in distribution (Bolton *et al*. 2012).

3.3.8 Fire regime

Most of the vegetation types on the reserve are adapted to periodic veld fires. Exceptions are the patches of Afromontane Forest in the Vulture Kloof and at Weaver Falls in the Potberg, milkwood thicket along De Hoop Vlei and in kloofs, coastal foredune vegetation, and brackish flats. The probability of fires spreading would be expected to be maximal during the hottest and driest three-month period of the year from December to the end of February. The summer months from October to March are also the period with the strongest winds, when westerlies, easterlies and south-westerlies dominate.

Khoekhoen (Khoi) pastoralists used patch burning from about 2000 years ago and before then the San also used fire although the extent to which they changed the pattern and frequency of lightning-caused fires is unknown. Intensive patch burning was also practised by most farmers in the area before the reserve was established. This practice continues on many farms today, particularly in the limestone hills. It is noteworthy that, although certain species of reseeding Proteaceae were severely depleted locally in some areas with particularly frequent patch-burning (such as at Buffelsfontein and Elandspad, where the veld was at times burnt as frequently as possible), the majority of reseeding Proteaceae have survived in large populations in most of the area. Recovery of populations has been rapid within one or two fire cycles of intermediate fire intervals (between 15 – 20 years). These observations suggest that the fynbos of the area is very resilient to frequent burning. This observation is

further supported by the fact that even reseeders, that only occur in small isolated populations because suitable habitat is rare in the area, have survived past patch-burning regimes and are thriving. Examples include *Leucadendron cryptocephalum*, *Protea coronata* and *Protea aurea* subsp. *potbergensis*.

A fire management plan taking veld age and veld types in consideration, must be compiled. See Map 8 showing the fire history and Map 9 showing the veld age categories. The following principals are adopted and have to be addressed in the fire management plan:

- In order to ensure the continued existence of the naturally occurring biodiversity on the reserve, a burning regime will be followed with controlled fires in order to create a mosaic of veld ages. A fire cycle of between 20 and 25 years should be implemented depending on the fynbos type. Vegetation mapping needs to inform the fire cycle.
- Fire can be used as a management tool during the eradication of invasive alien vegetation.
- To restrict undesirable fires outside and within the boundaries of the reserve and to assist in controlling controlled burns, a system of fire breaks will be planned and implemented.
- Where wild fires occur in areas previously designated to be rejuvenated, the fire may be allowed to burn in a controlled manner taking season and local conditions in consideratuion.
- The annual burning schedule must make provision for research on ecological aspects and fire behaviour and take cognizance of the monitoring requirements of the CapeNature fire management policy.
- Where possible, pro-active liaison must take place with neighbours along the boundaries of the reserve to include their veld in the burning programme, and in the manipulation of desirable wildfires.
- Compliance with the National Veld and Forest Fire Act 1998 (Act No. 101 of 1998) is imperative and for this reason CapeNature should be an active member of the Fire Protection Associations around the reserve.

The compilation and implementation of a detailed fire management plan is listed as an activity in the SIF.

3.3.9 Invasive and non-invasive alien species

3.3.9.1 Flora

The natural fynbos in this area is mainly invaded by some species of alien trees. Rooikrans (*Acacia cyclops*) is the greatest threat since it covers the largest area and has the potential for invading all Limestone Fynbos and Dune Fynbos in the reserve. Port jackson (*Acacia saligna*) is also a major invader in the valley between the Potberg mountain and the limestone hills. Other major invasive species in order of priority include black wattle (*Acacia mearnsii*), cluster pine (*Pinus pinaster)*, golden wattle (*Acacia pycnantha*), long-leafed wattle (*Acacia longifolia*), and eucalypts (*Eucalyptus* spp.).

The eradication of invasive alien vegetation from the DHNR is considered one of the highest management priorities, and one of the most serious internal and external threats facing the reserve in terms of its objectives. The build-up of infestation levels, and thus biomass, increases the risk of wildfires on the reserve. When infested areas are burned, the high volumes of plant biomass increase the fire intensity thus negatively impacting the natural vegetation.

The entire DHNR is affected by invasive alien plants in varying degrees of density (see Map 10). Based on the 2015 density assessment of the reserve, it is estimated that 60% of the reserve is at an invasion density of 0-25%. With a suitable size team more than half the reserve could be cleared at a reasonable cost, and it is these areas that need to be the focus of the clearing programme in order to reduce further spread and density increases. The Working for Water programme has been in existence on the reserve for many years, but a larger budget is required to deal with the full extent.

While funds are likely to remain limited, CapeNature is in the process of improving its integrated fire and invasive alien management of the reserve, where fire and biological control agents will be used as tools to complement mechanical clearing. Furthermore, alternative methods of using human resources and contracting teams will be investigated to increase the area covered for clearing.

3.3.9.2 Biological control agents

Biological control agents are an additional method employed on the reserve to contain the spread of invasive alien plants and reduce the seed load. Table 3.3 indicates what biological control agents have been released or have spread in the DHNR. Sites where biological control agents have been released for research purposes will not be burnt or disturbed unless permission is given by the Plant Protection Research Institute at Stellenbosch. Additionally, reserve management is compiling a database to map the location of all biological control agents within the reserve, in order that the need for additional releases of these agents be identified and implemented.

The use of biological control agents needs to be fully integrated into the overall invader alien plant control strategy of the reserve and actions have to be included in the annual plan of operations. Further spread of control agents will have to be investigated with the focus on the denser areas that cannot be cleared in the near future.

Table 3.3: Biological control agents that have been released or spread into the De Hoop Nature Reserve.

IAP Species	BC agent	Lat	Long	Established
Acacia mearnsii	*Dasineura rubiformis*	34 23.799'S	20 32.446'E	Yes
	Melanterius maculatus	34 23.663'S	20 32.597'E	Yes
Acacia pycnantha	*Melanterius maculatus*	34 23.553'S	20 32.538'E	Yes
Acacia saligna	*Melanterius compactus*	34 24.131'S	20 32.805'E	Yes
	Uromycladium tepperianum	Stilgat		Yes
Acacia cyclops	*Melanterius servulus*	Widespread		Yes
	Dasineura dielsi	Widespread		Yes

3.3.9.3 Alien fauna

According to the CapeNature State of Biodiversity database, four listed alien/domestic species have been recorded on the reserve: donkey, house rat, house mouse and feral house cat. When observed, these species will be removed.

3.3.10 Mammalian fauna

A total of 68 species of indigenous and four alien terrestrial mammals and have been recorded in the DHNRC. A total of nine bat species have been recorded of which there are five specimen records for DHNRC. Eleven marine mammal species have been recorded in the De Hoop MPA boundaries. Species with special conservation or management concern are elaborated on below.

3.3.10.1 Terrestrial fauna

Bontebok are endemic to the southern south eastern Renosterveld regions of the Western Cape (Skinner and Chimimba 2005). The initial population of bontebok at DHNR included three rams (already on the property purchased in 1956) and ten juveniles which were introduced from Bontebok National Park (SANParks) in 1960 (Barnard & Van der Walt 1961; Scott & Scott 2002). The population has since grown and in November 2014 an estimate of 194 bontebok were recorded on DHNR and 245 on OTR. The bontebok population on the DHNR and OTR is the largest population of this species in its endemic range. The status of the De Hoop bontebok population is assessed through quarterly surveys that take place on both DHNR and OTR, which include recording numbers of adults and young and all known mortalities.

On a broad scale, habitat loss due to agriculture, hybridization with blesbok (*Damaliscus pygargus phillipsi*), small population sizes and climate change are threats to this species (Friedmann & Daly 2004). Hybridization is currently responsible for genetic contamination of many populations on private land.

On a more localised level the greatest threat to the bontebok population is access to suitable food. Radloff (2008) suggest that only 12% of the total area of DHNR is viable bontebok habitat. Most of this protected area is unsuitable for large antelope, except perhaps for short periods following a local fire and when they have access to sufficient grazing lawns (Radloff 2008; Kraaij & Novellie 2010).

Kraaij and Novellie (2010) suggest the implementation of meta-population management for this species within its natural distribution range. Management actions to conserve genetic variation at subspecies level and to avoid hybridization with blesbok (Birss & Palmer 2012) have been incorporated into the Western Cape Bontebok Conservation, Translocation and Utilization Policy as well a draft Biodiveristy Management Plan for this species in South Africa. The genetic research by the National Zoological Gardens, Centre for Conservation Science is incorporated into conservation policy throughout South Africa.

Cape mountain zebra (*Equus zebra zebra*) were listed as "Vulnerable" according to the South African Red Data Book (Friedman & Daly 2004) (Table 3.4). The population is currently considered stable and increasing, although still conservation dependent. The total population is estimated at just below 5000 individuals (Birss et al 2016). The populations are mainly distributed within its former range in the Northern, Eastern and Western Cape provinces, on mountainous terrain.

The Waenhuiskrans Limestone Fynbos is the preferred habitat type of Cape mountain zebra (CMZ) in DHNR and OTR as it has a large cover of grasses found in the karst sinkhole depressions (Smith *et al*. 2007).

The CMZ population of DHNR is considered the most genetically diverse population due to their origin as they were sourced from Kammanassie Nature Reserve and Mountain Zebra National Park. Given their genetic diversity they are subject to low incidence of Sarcoid tumour caused by the bovine papillomavirus (BPV) DNA types (Novellie *et al*. 2002; Sasidharan 2005).

The assessment by Hurzuk (2009) showed that the CMZ move freely between OTR and DHNR and this occurs irrespective of the water levels of the De Hoop Vlei. The form of the landscape of both areas is conducive to free movement and utilisation of the preferred habitats of CMZ. For the effective management of the population, these animals are managed by OTR and DHNR as one population moving freely between the two properties.

Due to the genetic make-up of the DHNR population in terms of a CMZ meta-population strategy (Novellie *et al*. 2002), the population of DHNR is a valuable source to establish founder populations in other areas. Subsequently, the current population status of the DHNR CMZ population affords it a high level of prioritization in the management objectives of DHNR (Hurzuk 2009). This population is monitored through quarterly game surveys. Future management of the CMZ population on DHNR will be governed by recommendations in the CMZ-BMP.

The population of eland located at DHNR and OTR has grown steadily over the past decade and in 2014 the population was estimated at 478 animals. Fluctuations have however been observed and in 2007 an eland die-off was noted. These numbers are above the suggested stocking potential of DHNR and OTR (C. Birss 2015, CapeNature, pers. comm.). This species occupies and utilises the same habitats as the bontebok and are thus in direct competition with a species of conservation concern. It is recommended that eland numbers need to be reduced and interventions will take place within the lifespan of this PAMP.

Eland have been known to escape the DHNRC onto neighbouring properties. Given that the fence around DHNR is currently inadequate, permission has been given to farmers (via permits) to shoot eland on their properties. The fence at DHNR is receiving attention and has been placed on the provincial User Asset Management Plan (U-AMP) and will be completed as and when funding becomes available.

All these aspects noted above relating to game management will be addressed in the De Hoop Game Management Plan. This has been identified as an activity in table 6.4.

Chacma baboons (*Papio cynocephalus ursinus*) are known to be attracted to human activities where they have a tendency to raid cars, restaurants, rubbish bins, and tables where they can cause significant amounts of damage. They can aggressively take food from people and thus pose a danger to the public. Baboon-human interactions of this nature negatively impact on the baboon's natural foraging pattern and the social interactions between individuals when they compete and fight over the human food. At least four baboon troops exist within the DHNR. Incidences of human-baboon interaction have been recorded at De Hoop within the development nodes e.g. baboons taking food from tents, raiding of kitchens and rubbish bins at the De Hoop tourism node and breaking into reserve offices and raiding the EE centre at Potberg. Additionally, individual baboons have become habituated to human presence in these areas and as a result have lost their fear of humans. In order to protect the public, these baboons have had to be euthanized.

In order to mitigate against these incidents having to be repeated, it is essential that all staff, tourists and researchers behave in a manner that does not encourage baboon-human interactions. Further, DHNR management and De Hoop Collections are required to ensure interim waste storage and removal conducted in a manner that prevents access to baboons. Since 2013, CapeNature have employed three baboon monitors through the Expanded Public Works Programme (EPWP). These monitors maintain a perimeter around the tourism node at De Hoop by chasing baboons away with the aid of suitable equipment e.g. whips and paint ball guns. This has reduced the number of baboon-human incidences.

Table 3.4 Mammal species of conservation concern that occur on the De Hoop Nature Reserve Complex.

English name	Scientific Name	Global IUCN Category (IUCN 2013)	South African Red Data Book Category (Friedman & Daily, 2004)
Bontebok	*Damaliscus pygargus pygargus*	Near Threatened	Vulnerable (D1)
Cape mountain zebra	*Equus zebra zebra*	Vulnerable (C1)	Vulnerable (D1)
Leopard	*Panthera pardus*	Near Threatened	Least Concern
Honey badger	*Mellivora capensis*	Least Concern	Near Threatened
Cape horseshoe bat	*Rhinolophus capensis*	Least Concern	Near Threatened
Geoffroy's horseshoe bat	*Rhinolophus clivosus*	Least Concern	Near Threatened
Schreiber's long-fingered bat	*Miniopterus schreibersii*	Near Threatened	Near Threatened
Temminck's hairy bat	*Myotis tricolor*	Least Concern	Near Threatened
Indo-pacific hump-backed dolphin	*Sousa plumbea*	Near Threatened	Vulnerable (B1ab(ii,iii))
Indian Ocean bottlenosed dolphin	*Tursiops aduncus*	Data Deficient	Vulnerable (B2ab(ii,iii,v)C2a(ii))
Humpback whale	*Megaptera novaeangliae*	Least Concern	Near Threatened
Southern elephant seal	*Mirounga leonina*	Least Concern	Endangered (A2b)

3.3.10.2. Marine mammals

Southern right whales (*Eubalaena australis*) have been recorded off the southern Cape coast every month of the year, mostly from April to January, with peak abundance in September and October. De Hoop MPA is one of the most important places along the South African coastline for southern right whales; they arrive in June, reach a peak in August/September and leave by December/ January (Best & Scott 1993; Best 1994; Elwen & Best 2004a). The region from St. Sebastian Bay to De Hoop is regarded as the most important nursery area for southern right whales on the South African coastline and one of the most important worldwide. Individuals (particularly cows with calves) may spend up to four months on the coast. This region of the Cape represented 70 - 80% of the cow-calf pairs observed on the entire South African coast between 1981 and 1998 (Best & Scott 1993; Best 2000). De Hoop MPA has the highest number and the highest density (1 - 3 pairs per kilometre) of cow-calf pairs along the South African coast (Elwen & Best 2004b). In the 2014 aerial surveys conducted by Findlay *et al*. (2015), a total of 382 southern right whales were counted over a 3 day period. This number comprised of 184 cow-calf pairs and 14 unaccompanied adults.

Various dolphin species are found in the coastal waters of De Hoop MPA, including the Indo-Pacific hump-backed dolphin (*Sousa chinensis*) and the Indo-Pacific bottlenose dolphin (*Tursiops aduncus*) which were listed as "Vulnerable" by the South African Red Data Book (Friedman & Daly 2004) (Table 3.4). The common bottlenose dolphin (*Tursiops truncates*) and long-beaked common dolphin (*Delphinus capensis*) are often observed in the MPA. The humpback whale (*Megaptera novaengliae*) classified as "Near Threatened" (Friedman & Daly 2004) could be observed during the winter period, when they migrate through the area on their route to Mozambique. The Bryde's whale (*Balaenoptera brydei*) listed as "Vulnerable" (Friedman & Daly 2004) is

also frequently observed in the area. The Pygmy sperm whale (*Kogia breviceps*) and True's beaked whale (*Mesoplodon mirus*) have been recorded in De Hoop and were both classified as "Data Deficient" with little information on their overall population size and distribution (Friedman & Daly 2004).

A small colony of young Cape fur seals (*Arctocephalus pusillus pussilus*) first established at Infanta Point in 2015 and is being monitored. The southern elephant seal (*Mirounga leonina*) listed as "Endangered" has been observed in De Hoop MPA.

3.3.11 Avifauna

The DHNRC has five broad avifaunal habitats, namely the ocean, coastline, wetland, coastal and lowland fynbos and the mountain fynbos. The 277 bird species recorded for the reserve is indicative of this habitat diversity (BIRP 2011, 2013). Thirty-five species of birds are listed as threatened nationally and/or internationally (Barnes 2000) (Table 3.5).

Table 3.5. Bird species of conservation concern that occur on the De Hoop Nature Reserve Complex.

English Name	Scientific Name	IUCN Category (IUCN 2015)	South African Red Data Book Category (Bates et al. 2014)
Damara Tern	*Sterna balaenarum*	Critically Endangered	Near Threatened
African Penguin	*Spheniscus demersus*	Endangered	Endangered
Bank Cormorant	*Phalacrocorax neglectus*	Endangered	Endangered
Black Harrier	*Circus maurus*	Endangered	Vulnerable
Cape Vulture	*Gyps coprotheres*	Endangered	Vulnerable
Lappet-faced Vulture	Aegypius tracheliotos	Endangered	Vulnerable
Cape Cormorant	*Phalacrocorax capensis*	Endangered	Near Threatened
Martial Eagle	*Polemaetus bellicosus*	Endangered	Near Threatened
African Marsh-Harrier	*Circus ranivorus*	Endangered	Least Concern
Yellow-billed Stork	*Mycteria ibis*	Endangered	Least Concern
Cape Gannet	*Morus capensis*	Vulnerable	Vulnerable
Knysna warbler	*Bradypterus sylvaticus*	Vulnerable	Vulnerable
Secretarybird	*Sagittarius serpentarius*	Vulnerable	Vulnerable
Southern Black Korhaan	*Afrotis afra*	Vulnerable	Vulnerable
Denham's Bustard	*Neotis denhami*	Vulnerable	Near Threatened
African Grass-Owl	*Tyto capensis*	Vulnerable	Least Concern
Black Stork	*Ciconia nigra*	Vulnerable	Least Concern
Caspian Tern	*Sterna caspia*	Vulnerable	Least Concern
Great White Pelican	*Pelecanus onocrotalus*	Vulnerable	Least Concern
Greater Painted-snipe	*Rostratula benghalensis*	Vulnerable	Least Concern
Lanner Falcon	*Falco biarmicus*	Vulnerable	Least Concern

Verreaux's Eagle	*Aquila verreauxii*	Vulnerable	Least Concern
Blue Crane	*Anthropoides paradiseus*	Near Threatened	Vulnerable
Chestnut-banded Plover	*Charadrius pallidus*	Near Threatened	Near Threatened
Crowned Cormorant	*Phalacrocorax coronatus*	Near Threatened	Near Threatened
Eurasian Curlew	*Numenius arquata*	Near Threatened	Near Threatened
European Roller	*Coracias garrulus*	Near Threatened	Near Threatened
Knysna Woodpecker	*Campethera notata*	Near Threatened	Near Threatened
Lesser Flamingo	*Phoenicopterus minor*	Near Threatened	Near Threatened
Maccoa Duck	*Oxyura maccoa*	Near Threatened	Near Threatened
Cape Rock-jumper	*Chaetops frenatus*	Near Threatened	Least Concern
Greater Flamingo	*Phoenicopterus ruber*	Near Threatened	Least Concern
Karoo Korhaan	*Eupodotis vigorsii*	Near Threatened	Least Concern
Agulhas Long-billed Lark	*Certhilauda brevirostris*	Near Threatened	Not Evaluated
African Black Oystercatcher	*Haematopus moquini*	Least Concern	Near Threatened

The Cape Vulture (*Gyps coprotheres*) is the most important avian threatened species on the reserve. There is a breeding colony in the Potberg Mountains on the eastern section of the reserve. Although small relative to some of the bigger northern colonies this colony is unique in that it is the only colony within the winter-rainfall region (Robertson 1984) and the only colony still in existence within the Western Cape Province (K. Shaw 2015, CapeNature, pers. obs.). Furthermore the number of birds at Potberg is currently increasing (CapeNature unpubl. data), while populations at many of the larger northern colonies are declining (Boshoff & Anderson 2006). Population data for the colony exists from the 1950's, but early data collection is sporadic and better data has been collected since 1977. Active banding of Cape Vulture nestlings was re-established in 1999 and is currently undertaken on an annual basis with support from High Angle Rescue and Access.

African Penguin (*Spheniscus demersus*), presumably from Dyer Island and Stony Point can be regularly found in relatively large numbers in the MPA. In the mid 2000's a small colony of breeding penguins established themselves on a small rocky peninsula in the eastern section of the reserve. The site was, however, abandoned presumably due to high predation by land-based predators. It has however been identified as a possible site requiring investigation for the potential establishment of an African Penguin colony. The investigation of the possibility to establish new penguin colonies is required as per the Gazetted African Penguin Biodiversity Management Plan (Republic of South Africa 2013).

Other threatened species that occur in relatively substantial numbers are the Black Harrier (*Circus maurus*), Denham's Bustard (*Neotis denhami*) and Cape Cormorant (*Phalacrocorax capensis*) (CapeNature unpubl. data). The Damara Tern (*Sternula balaenarum*) breeds in relatively low numbers along the coast further west and often strays into the DHNR.

The De Hoop Wetland is an important refuge and breeding area for numerous waterbird species especially during the dry periods when small waterbodies dry up in the surrounding areas. The wetland was declared a Ramsar site under the Convention on Wetlands of International Importance in 1975 (http://www.ramsar.org/pdf/sitelist_order.pdf). The wetland qualified in terms of its uniqueness (a coastal lake with no outlet to the sea), the number of waterfowl species it supported and the number of waterfowl species meeting the 1% population criteria (CapeNature unpubl. documents) (Table 3.5). Waterfowl censuses between 1977 and 2011 indicate that maximum counts of 15 species of waterfowl exceeded 1% of the population of that particular species (CapeNature unpubl. data). In this regard the De Hoop Wetland is important for especially Cape Shoveler (*Anas smithii*), but also for the Great Crested Grebe (*Podiceps cristatus*). Other waterbird species that meet the 1% criteria in order of importance are the White-breasted Cormorant (*Phalacrocorax carbo*), Black-winged Stilt (*Himantopus himantopus*) Red-knobbed Coot (*Fulica cristata*), Greater Flamingo (*Phoenicopterus ruber*),Caspian Tern (*Sterna caspia*), Maccoa Duck (*Oxyura maccoa*), Pied Avocet (*Recurvirostra avosetta*), Egyptian Goose (*Alopochen aegyptiaca*), Lesser Flamingo (*Phoenicopterus minor*), South African Shelduck (*Tadorna cana*) and Spur-winged goose (*Plecopterus gambensis*). While the wetland still qualifies as a Ramsar site in terms of bird numbers, analysis of waterbird surveys carried out on the wetland between 1979 and 2009 show that the overall mean abundance of waterfowl declined by 43% over this period (Harebottle 2012).

The Common Ostrich (*Struthio camelus*) which occurs in relatively high numbers on the reserve is currently considered to be competing directly with the threatened Cape mountain zebra and bontebok for resources. The sub species of the Common Ostrich *Struthio camelus australis* was once widespread throughout the Western Cape Province prior to the advent of ostrich farming in the 1850's and was recorded by earlier travellers in the Bredasdorp-Swellendam area and the coastal areas of Agulhas and Arniston (Brooke 1989). It is therefore highly probable that the species naturally occurred in the area now included in the DHNRC.

Historic introductions of small numbers of extra-limital ostriches were undertaken to improve the quality of domesticated stocks in the Oudtshoorn area (Smit 1963) resulting in concerns around the genetic purity of common ostriches in the Western Cape. Freitag and Robinson (1993), using mtDNA analysis, concluded that little evidence exists for the continued survival of extra-limital genes within the southern subspecies of the Common Ostrich (*Struthio camelus australis*). Furthermore they determined that the populations of the southern subspecies are genetically very similar and suggested that the species had gone through a bottle neck. However, Robinson and Matthee (1999) using a larger sample size and Miller *et al*. (2011) analysing both nuclear and mtDNA showed a high degree of diversity and their results showed no evidence of a bottle neck. The latter study also indicated that there is additional structure within the southern subspecies *S.camelus australis*, which in Miller *et al*'s (2011) opinion could not be explained by the inclusion of genetic material from

domestic stock, nor the correspondence thereof to specific geographical regions. Further genetic studies are therefore required to fully understand the genetic structure within the southern subspecies of the Common Ostrich. The domestication of the Common Ostrich has led to large scale movement of birds. Biological material from historically protected areas where existing populations are deemed to be descendants of birds that occurred in the area prior to fencing, will be important in future genetic studies. DHNR was selected as there was no evidence of any Common Ostrich introduction into the reserve (Prof T.J. Robinson, 2015, University of Stellenbosch, pers. comm.). The DHNR population is therefore important in any future genetic studies on the species and the future management of the Common Ostrich within the reserve needs to take the importance of the population into consideration.

3.3.12 Reptiles

Forty six reptile species, comprising 7 chelonians, 23 snakes and 16 lizards have been recorded from DHNR.

Two Threatened terrestrial species occur on De Hoop (Table 3.6):

1) The southern adder, *Bitis armata* (Vulnerable), is generally restricted to Sand Fynbos and Dune Thicket. The presumed primary threats to this species on DHNR are encroachment of woody invasive alien plants and associated effects of fire (Turner 2014). Appropriate restoration of fire regimes and removal of invasive alien species, especially *Acacia* spp., from the habitat is required.

2) The Cape dwarf chameleon, *Bradypodion pumilum* (Vulnerable). The occurrence of this species on DHNR is interesting given that Robertson dwarf chameleon (*Bradypodion gutturale*) also occurs on the reserve. The main threats to the Cape dwarf chameleon are habitat loss and destruction, predation by cats and capture for the pet trade (Tolley 2014). It is unlikely that any of these threats affect the De Hoop population of Cape chameleons and thus no specific management interventions are required at this stage.

Table 3.6 Reptilian species of conservation concern that occur on the De Hoop Nature Reserve Complex.

English Name	Scientific Name	IUCN Category (IUCN 2015)	South African Red Data Book Category (Bates et al. 2014)
southern adder	*Bitis armata*	Not Assessed	Vulnerable
Cape dwarf chameleon	*Bradypodion pumilum*	NULL	Vulnerable
loggerhead turtle	*Caretta caretta*	Endangered (A1abd)	Vulnerable
green turtle	*Chelonia mydas*	Endangered (A2bd)	Near Threatened
leatherback sea turtle	*Dermochelys coriacea*	Critically Endangered (A1abd)	Endangered

There are also three marine turtles recorded, all of which are regionally and globally threatened (see Table 3.6). It is unknown to what extent these species are dependent on the De Hoop MPA and no specific management actions are suggested at this time other than continued protection of the MPA as a no-take zone.

The following species have been recorded in the general vicinity of DHNRC, but their presence on the reserve has not been confirmed, or requires further confirmation before they can be listed: black thread snake (*Leptotyphlops nigricans*), short-legged seps (*Tetradactylus seps*), spotted rock snake (*Lamprophis guttatus*), many-spotted snake (*Amplorhinus multimaculatus*). Although the berg adder (*Bitis atropos*) has been included on the list, further confirmation of its occurrence is required. Many of the species are rarely seen as they bear one or more of the following characteristics: they have cryptic markings or habits, they are burrowing species that spend most of their lives underground, they naturally occur in low population densities, they are mainly active at night or are confined to a specific habitat type. There are two approaches that can be taken to overcome these difficulties in assembling a complete species list: a) specialist herpetofaunal surveys using drift fences and other methods; and b) accumulating ad hoc data over long periods of time.

The leopard (or mountain) tortoise (*Stigmochelys pardalis*) is an alien species that occurs on the reserve, but it is indigenous to South Africa. During earlier decades, unwanted pet tortoises of this species were occasionally released on the reserve. The nearest natural populations are in the Little Karoo. There is no immediate need to manage this species on the reserve but further introductions will not be considered.

A general threat to many reptiles in this reserve is the risk of being killed on the roads, particularly tarred roads which are often favoured by reptiles for basking; and due to the orientation of the roads in the reserve which frequently necessitate crossing by reptiles. Mitigation measures, such as signage to improve visitor and staff awareness and speed-control infrastructure will be improved and expanded.

3.3.13 Amphibians

Ten amphibian species have been recorded from DHNR. None of these species are listed as threatened (Minter *et al.* 2004). Two additional species are expected to occur on the reserve and future field work should focus on establishing their presence on the reserve, viz. rattling frog (*Semnodactylus wealii*) and arum lily frog (*Hyperolius horstockii*).

No specific management interventions are required for amphibian conservation on this reserve at present other than continued management of all wetland areas as sensitive habitats. However, should the threat status of arum lily frog deteriorate in the future, certain wetlands on DHNR may represent suitable habitat for a reintroduction/translocation programme should that become necessary.

3.3.14 Fish

3.3.14.1 Marine

The De Hoop MPA was declared in December 1985 and with this declaration, all fishing was terminated within the marine reserve. A total of 84 species of marine fish have been sampled in the De Hoop MPA.

Aerial surveys (January 2007 – March 2009) of the De Hoop MPA showed high numbers of great white sharks (*Carcharodon carcharias*) aggregating in the reserve. A total of 161 sharks were identified between 1 and 5 m long. Of those sharks that could be measured, 1% of the sharks were between 1 – 2 m, 35% between 3 – 4 m, 12% between 2 – 3 m and 7% between 4 – 5 m (CapeNature unpubl. data).

Between January and March each year, very high numbers (up to 1500 individuals) of smooth hammerhead shark (*Sphyrna zygaena*) pups are seen in the MPA. The sharks are between 1 and 2 m long and are generally seen congregating behind the backline feeding. This data suggests De Hoop MPA acts as a nursery ground for the sharks, offering a warm, sheltered environment with sufficient food.

The long term fish catch per unit effort research project conducted by DEA: Oceans and Coasts in conjunction with the University of Cape Town has been ongoing since May 1984. Sampling is conducted at two sites in the reserve, Koppie Alleen and Lekkerwater, three times per year at each site. The initial objective of this study was to collect samples of galjoen (*Dichistus capensis*) but was expanded to include all fish caught including sharks (Bennett & Attwood 1993). The results from this study have shown that the proclamation of marine reserves that exclude resource extraction has increased the stocks of recreationally exploited fishes (Bennett & Attwood 1991; Bennett & Attwood 1993). Bennett and Attwood (1991) showed improvements in catch rates of six important species (galjoen, *Dichistus capensis*; zebra, *Diplodus cervinus hottentotus*; blacktail, *D. sargus capensis*; white steenbras; Cape stumpnose, *Rhabdosargus holubi* and white musselcracker, *Sparodon durbanensis*) and this was

attributed to the closure of the MPA to fishing. These species contributed to 96.3% of the total catch and are thus highly dependent on and important to the MPA (Bennett & Attwood 1993).

Three species of fish known to be present in the MPA are listed as “Vulnerable” under the Draft List of Threatened and Protected Species issued in terms of NEMA: Biodiversity Act 2004 (Act No. 10 of 2004). These species are the great white shark, white steenbras and red steenbras.

3.3.14.2 Freshwater

The DHNR is located within the greater Breede-Overberg Water Management Area. The reserve is situated mainly in the De Hoop catchment with a small section of the Sout River catchment situated within the northern boundary of the reserve. Historically, the greater Breede River system is home to four indigenous fish species. These are three smaller species namely the Breede River redfin (*Pseudobarbus burchelli*), the Cape kurper (*Sandelia capensis*), the Cape galaxias (*Galaxias zebratus*) and one large cyprinid, the Berg-Breede River whitefish (*Barbus andrewi*) (Skelton 2001). All three of the smaller species are also associated with many of the catchments of the Overberg WMA. Historically these species were present throughout the greater Breede and Overberg systems but their distribution ranges have been dramatically reduced by the presence of alien invasive fish species. These non-native species, with special reference to rainbow trout (*Oncorhynchus mykiss*), black bass (*Micropterus* spp.), Mozambique tilapia (*Oreochromis mossambicus*), bluegill sunfish (*Lepomis macrochirus*) and, more recently, sharptooth catfish (*Clarias gariepinus*) have established in the majority of river systems of the CFR where they have exerted a serious impact on indigenous species (Clark *et al*. 2009; Tweddle *et al*. 2009; Van Rensburg *et al*. 2011).

In the DHNR, historical records exist for the presence of *S. capensis* at a number of sites on the Sout River (Herdien *et al*. 2006). The redfin (*P. burchelli*) occurs in the Potbergs River (Swartz, E. 2015, South African Institute for Aquatic Biodiversity, pers. comm.) and an unconfirmed report exists for the presence of *P. burchelli* in the Melkhout River. The alien species, Mozambique tilapia, has been introduced to the De Hoop Vlei and now occurs in large numbers (Van Rensburg 1966; Scott & Hamman 1988; Herdien *et al*. 2006). Potentially, black bass is also present but this needs to be confirmed.

Conservation status of fresh water fish species of the De Hoop Nature Reserve:

Genetic research by Swartz (2005) and Swartz *et al*. (2013) has presented evidence that the species currently described as *P. burchelli* is three distinct lineages of which the more widespread one occurs in the DHNR. The most recent IUCN conservation status of this lineage is “Near Threatened” (Tweddle *et al*. 2009). The conservation status of both *G. zebratus* and *S. capensis* is presently listed by the IUCN as “Data

Deficient" (Tweddle *et al*. 2009) (Table 3.7). The reason for this is that the taxonomic status of both species is in the process of being reviewed as recent genetic research has presented evidence for the existence of a number of unique lineages of which the exact distribution ranges have not been confirmed (Tweddle *et al*. 2009; Chakona *et al*. 2013). While the genetic research that has elucidated the existence of these lineages is still ongoing, it is estimated that *G. zebratus* is a species complex consisting of 14 distinct lineages and *S. capensis* a complex of at least three lineages (Skelton & Swartz 2011). These unique lineages are in the process of being described as new species, many of which will likely be listed as endangered or critically endangered due to the presence of invasive alien fish species and a loss of suitable habitat (Chakona & Swartz 2012; Swartz *et al*. unpubl. data). As the genetic clarity of two of the species needs to be ascertained and because of the low conservation status of the remaining species, it is envisaged that at this stage no further action proposed.

Table 3.7: Fish species of conservation concern that occur on the De Hoop Nature Reserve Complex.

English name	Scientific name	IUCN Category (IUCN 2009)
Cape kurper	*Sandelia capensis*	Data Deficient
Cape galaxias	*Galaxias zebratus*	Data Deficient
Breede River redfin	*Pseudobarbus* sp. *"burchelli* Breede*"*	Near Threatened

3.3.15 Invertebrates

3.3.15.1 Terrestrial

The focus on the Cape Floristic Region's exceptionally high floristic diversity has somewhat overshadowed its faunal diversity and, in consequence, there is a lack of information on insect species diversity within the CFR, although their functional significance is appreciated. The consensus view is that diversity is low (Johnson 1992), although several local scale studies of specific host plants and their herbivores suggest that insect richness might be much higher than is generally thought to be the case (e.g. Cicadellidae: Davies 1988, b; gall-forming insects: Wright & Samways 1998). However, few groups have been subject to careful surveys, and most comparisons have been qualitative and based on examinations of studies that differ substantially in their methods.

There is no comprehensive species list available for the DHNRC. Such lists are essential as inventories of what occurs in the Reserve, especially in terms of Red Data and endemic species, and as baseline information for long-term monitoring. The invertebrate species list is updated through baseline data collection. Additional

information on the insects of the Cape Floristic Region can be obtained from the Iziko Museums of South Africa (www.iziko.org.za).

To date, there have not been any major co-ordinated efforts to carry out Red List assessment of invertebrate taxa in South Africa (Samways *et al.* 2012). Nonetheless, Red Listing has been undertaken for a few specific taxa on an ad hoc basis by expert groups (Samways 2002). The butterflies of South Africa are currently being assessed according to the latest IUCN criteria (IUCN 2001) as part of the South African Butterfly Conservation Assessment (SABCA) project, and a preliminary assessment was published in 2009 (Henning *et al*. 2009). Eight butterfly species have been characterised as critically endangered in the Western Cape Province.

South Africa's dung beetle, *Circellium bacchus,* occurs on the DHNRC and the surrounding areas. It is the only species in the genus *Circellium* and was originally widespread in Southern Africa, but now its distribution is very restricted. While this species is not included on the IUCN list of threatened species, it complies with most of the criteria and therefore qualifies as "Vulnerable". This is due to its populations being small, restricted and isolated; the habitat is constantly under threat from agriculture and general human encroachment; climate change; low fecundity (it produces only one offspring per year); low dispersability as it is flightless; habitat specialisation; co-evolution with and dependence on falling numbers of vertebrates (especially elephant and buffalo) (Chown *et al.* 1995; Kryger *et al.* 2006). The flightless dung beetles mostly feed on elephant or buffalo faeces, but they have been recorded to also feed on dung from other species such as rabbits, baboons, antelopes, and ostriches (Kryger *et al.* 2006).

The Cape honey bee (*Apis mellifera capensis*) is widespread on the reserve, nests in caves, rocky overhangs and trees and can become a problem when they move in buildings occupied by people. Visitors and staff should always be aware of the potential danger of getting stung when swarms are disturbed. Bees may be removed from occupied buildings by qualified people, but should be released again away from the buildings and after the previously occupied site is treated with suitable repellents to prevent recolonization.

The policy of the Western Cape Nature Conservation Board regarding the placement of commercial beehives on Western Cape Provincial Nature Reserves states that CapeNature will not allow the artificial introduction of honey bees or beehives containing honey bees into their nature reserves. In addition, the artificial removal of honey bees or beehives containing honey bees wil also not be allowed. Currently, there are beehives at Potberg that is in contravention of the CapeNature policy on beekeeping on reserves. The decision has been made that the beehives must be left until they either rot away or the honey bees vacate the hives when the hives become too small. As soon as the honeybees move out of the hives the hives will be removed.

3.3.15.2 Marine

De Hoop MPA consists of approximately 12 km of sandy shores, 22 km of rocky shores and 21.5 km of mixed rocky/sandy shore with invertebrate species characteristic to each environment. The intertidal zone has faunal elements representing both warm-water east coast species and cold-water west coast species. There is also an endemic south coast component. Invertebrate surveys have been conducted on the rocky shoreline/intertidal area. A total of 24 marine invertebrate species have been sampled in DHNRC since 2002 (CapeNature unpubl. data). The alien Mediterranean mussel (*Mytilus galloprovincialis*) occurs on the intertidal zone of the rocky shoreline. Abalone (*Haliotis midae)* is also present in the low sandstone reef areas. The DHNRC is a no-take MPA which prohibits the collection of bait species and affords a level of protection for species exploited by bait harvesting along the coast.

There is no invertebrate species list for DHNRC.

3.4 Cultural Heritage context of De Hoop Nature Reserve Complex

The Overberg region including DHNRC has been intermittently occupied by humans since the Early Stone Age (ESA) (before 250 000 years) with later occupations in the Middle Stone Age (MSA) (c. 200 000 – 30 000 years) and the Later Stone Age (LSA) (after 30 000 years) (Henshilwood 2008). The hand-axes found in the ancient stream bed near Potberg attest to this ESA presence. During the MSA the earliest *Homo sapiens* hunted and foraged here living on marine and terrestrial mammals, reptiles, fish, shellfish and plant foods. More than seven archaeological sites including caves and shelters in De Hoop date to this time period. One of these, Klipdrift Shelter, located at Noetsie, contains deposits of the Howiesons Poort phase and dates to c. 65 000 years. Excavations commenced at this shelter in 2011 and it is likely to become a site of major importance in the study of human evolution in the region (Lombard & Henshilwood 2009; Tollefson 2012; Wehus 2012). More than 165 LSA sites have been recorded in the reserve (Lombard & Henshilwood 2009) and the recent excavation of the 12 000 year old levels at Klipdrift Cave provide unique insights into life here during the terminal Pleistocene. San hunter-gatherers occupied De Hoop during the LSA and after 2000 years ago it was also visited by Khoekhoen pastoralists. A rock painting at Black Eagle Cave likely dates to this latter period.

The anatomical and behavioural origins of *Homo sapiens*, our earliest direct ancestors, lie in Africa and the continuing excavations of the c. 100 – 60 000 year old archaeological deposits at Klipdrift Shelter and Blombos Cave, Still Bay (Henshilwood *et al*. 2011) are making a major contribution to understanding the early emergence of cognitively modern humans in southern Africa.

The Cultural Heritage Management Plan for De Hoop (Lombard & Henshilwood 2009) should be read in conjunction with this plan to give specific insight into the cultural heritage of the reserve and the management thereof. The People of De Hoop Nature Reserve: A Cultural-Historic Heritage (Scott & Scott 2002) also describes the more recent history of the reserve including previous owners and their stories as well as earlier or pre-history and archaeological finds on the reserve.

3.5 Socio-economic context

The DHNRC contributes towards the regional economy within the focus area "Resource Conservation and Management" of the Green Economy framework.

The communities near the DHNRC include Witsand, Infanta, Arniston, Swellendam, Bredasdorp, Malgas, and Ouplaas. Residents and businesses within these communities benefit directly from the reserve as approximately 190 work opportunities exist on the reserve. Posts vary from management positions, skilled and semi-skilled technical staff in the conservation and tourism industry to unskilled labour such as cleaners and conservation workers. Most of the workers reside in Bredasdorp with some in Swellendam.

Between 2011 and 2014 approximately R73 million has been invested in the reserve with regards to upgrading the tourism facilities. This increased the number of visitors to the area and enhanced the positive experience to the Overberg region as a whole. CapeNature together with its private tourism partner annually spend a substantial amount, mostly in Bredasdorp with regards to goods and services needed for the management of the tourism facilities and conservation management. This ranges from food for the restaurant in the reserve, maintenance materials, accommodation equipment to fuel and services for vehicles and other equipment. In the year from 1 March 2013 – 28 February 2014, De Hoop Collections alone spent approximately R5.1 million on commodities excluding wages in the Overberg to operate and maintain the tourism facilities. The reserve's annual budget is approximately R11 million including wages and goods and services. Together with the spending by visitors and tourists to the reserve, the DHNRC contributes a considerable amount directly to the local community.

Visitors to the reserve must pass through the centres of Bredasdorp or Swellendam en route to DHNRC. Although a restaurant is available on the reserve, many self-catering cottages and camping sites are available to visitors and therefore much of their purchases are done in one of these two towns. The proximity of the reserve to the local farms has also led to the development of a growing bed-and-breakfast industry. This brings in substantial capital into the area especially when larger events e.g. trail running and MTB marathons are held on and around the reserve.

Between 2 000 and 2 500 people visit the reserve per month to enjoy the natural and cultural-historic environment. Because of its wild, unspoilt natural character, DHNRC represents one of the main attractions for nature-based recreation in the Overberg region, by both local and other communities.

DHNRC plays a vital role in the environmental education of both local and provincial communities through its Potberg environmental education facility, as there are very few such facilities in the Western Cape. Amongst schools, this facility is extremely popular in this region and elsewhere. The programmes offered here fulfil more formalized environmental education (EE) needs in the local and broader communities. Presently the centre is used primarily by school groups for both guided and self-guided

EE programmes, but universities also use the centre for field work as part of the curriculum. Overnight accommodation is provided for up to 65 persons at the EE Centre and 15 - 20 at the Kliphuis facility.

Recreational and commercial fishing in the area contribute considerably to the local economy and recreational vessels are launched from Witsand/Infanta, the Breede River Mouth and Arniston. Commercial fishing boats are launched from Mossel Bay, Still Bay, Arniston, Struisbaai and Gansbaai. The marine protected area contributes substantially to the health of the fishing industries at both Witsand and Arniston. It is scientifically recognized as an important breeding site for many fish species, and some fish species move from here to restock adjoining areas.

The Denel OTR adjacent to the reserve has the right to use the eastern sector of the reserve for the testing of missiles. The Overberg Air Force Base at Bredasdorp also uses the airspace above the whole reserve and MPA extensively for weapons testing due to the remoteness of the area. These multi million rand operations would not have been possible if the area has not lent itself to these operations. The reserve therefore plays an integral part of the operations of both OTR and the Overberg Air Force Base and in doing so is part of this bigger contributor to the local economy.

3.6 Operational management within De Hoop Nature Reserve Complex

3.6.1 Infrastructure

3.6.1.1 Roads/Jeep Tracks

Access roads within the DHNR vary from roads with tarred surfaces, roads with gravel surfaces, tracks with double armour flex or concrete strips, to un-surfaced 2x4 and 4x4 tracks. Apart from the short distance of road provided with a tarred surface, the majority of the roads and tracks are in a poor state due to erosion, poor maintenance, poor road surfacing material used and very limited availability of gravel. Some roads and tracks are situated in seasonally wet areas and consideration should be given to re-routing where possible and when funds are available e.g. sections of the eastern sector main road, sections of the track from Elandspad to Witwater, Melkkamer road and western sector main road before it turns off towards Koppie Alleen. Some proposals were made during the Whale Trail 2 planning phase and authorised in terms of EIA regulations.

Although CapeNature has entered into a Public Private Partnership (PPP) for the management of most of the tourism facilities excluding the Whale Trail, it is still responsible for the maintenance of all the roads outside the concession areas including those accessed by tourist and visitors with private sedans and other vehicles. See Map 11 indicating the road and track network as well as the concession areas.

Roads that are extensively used by the visitors to De Hoop should be properly maintained and provided with a good gravel or tar surface. An Environmental Protection and Infrastructure Programme (EPIP) project for the surfacing of the gravel sections of the main road to the Opstal camp and to Koppie Alleen has been approved and will be funded by the Department of Environmental Affairs and is waiting implementation. If and when the planned second Whale Trail and Lekkerwater Lodge is developed, certain sections of road and tracks leading to the sites will have to be upgraded to allow access for 2X4 management and client vehicles. Widening of the roads and tracks are generally not supported, but surfacing with gravel and the use of armourflex concrete blocks and concrete strips is recommended. Drainage pipes and furrows have to be installed where water runoff can cause erosion. Re-aligning of some roads and short sections of additional roads have been authorised as part of the Whale Trail 2 EIA process.

Driving speed on the internal roads is limited to 40km/h and will be implemented by signage and speed calming measures on roads subject to speeding. Gate hours for visitor entry is from 07:00 to 18:00.

3.6.1.2 Trails (Hiking, horse, bicycle and quad bike)

CapeNature manages the five day Whale Hiking Trail (Whale Trail) of 57 km as well as two day trails namely the Klipspringer Trail and the Vlei Trail. At Koppie Alleen, there are short boardwalks to provide access for visitors to the beach (Map 14). There is an approved proposal to develop a hiking trail and observation deck to view the Cape Vulture Kloof.

Specific routes and trails are available for mountain biking, guided quad biking and horse riding. Details including maps of these routes and the conditions of use are described in the Visitor Activities Plan: De Hoop Nature Reserve, July 2014. The routes for these activities mainly follow existing jeep tracks with the exception of a section of the horse trail where it crosses the dunes and beach. Quad biking and horse riding activities will be administerd by De Hoop Collections and visitors will not be allowed to conduct these on their own.

Reserve management is responsible for the maintenance of all trails.

3.6.1.3 Buildings

There are an extensive number of buildings on DHNR mainly at the Potberg Management and Environmental Education Centre (see Map 15), the De Hoop Opstal visitor and tourist area (see Map 12), Melkkamer homestead (see Map 13), Koppie Alleen (see Map 14) as well as on the Whale Trail (see Map 16). The Department of Transport and Public Works is responsible for the maintenance of all buildings used by CapeNature and actions are guided by the U-AMP. Reserve management does minor and emergency repairs itself within the limitations of internal funds provided. Apart from three dwellings at the De Hoop Opstal (Conservation Manager's house and two houses to accommodate researchers), all buildings at this site as well as

Melkkamer, De Mond and Koppie Alleen are managed by De Hoop Collections (Pty.) Ltd. in terms of the PPP agreement. CapeNature is therefore not responsible for any maintenance of these buildings nor carries any risk.

Some unused buildings originating from previous private farming and recreational activities still exist on the DHNR, but are in disrepair and classified as ruins. No maintenance activity is planned for these ruins apart from the “Die Mond” dwelling in the south western corner of the reserve that is still in reasonable shape. The PPP has the right to renovate this building for visitor accommodation.

The restoration of the old and historical milk sheds at Potberg and to utilise these as a museum is presently being investigated in partnership with some academic and archaeological institutions.

Some new buildings are necessary for management purposes and are listed in the U-AMP compiled and implemented by the Department of Transport and Public Works. These include a gate house for the Potberg entrance and a nature conservator house and store at Sandhoogte.

In line with the PPP agreement for the De Hoop Opstal, Melkkamer and Koppie Alleen, additional tourist accommodation is and will be erected at Koppie Alleen. With regards to the Whale Trail 2 PPP agreement; new buildings may be erected at Hamerkop, Bloukrans and Mosselbank to allow for 12 tourist bed nights at each site. No maintenance activities are needed by CapeNature for these buildings.

The razed dwelling at Lekkerwater that was used by CapeNature for tourist accommodation will also be redeveloped and managed in terms of a PPP agreement.

A full list of infrastructure located in DHNRC can be seen in Appendix 1.

3.6.1.4 Fences

Although the DHNR has large game on it, the whole reserve is not fenced especially the eastern sector north and east of the Potberg Mountain. Most of the existing game fencing is old and deteriorating and requires replacement in certain areas. This has resulted in game including CMZ and eland escaping the reserve and occupy private land.

The boundary between OTR and CapeNature west of the De Hoop Vlei was fenced during 2014 due to OTR’s security requirements. This 8 km fence has been erected in order to prevent visitors from entering the land used for weapons testing. Opportunities however still exist for game e.g. eland and CMZ to move around the ends in order to migrate between OTR’s western range and the DHNR. This is desirable in order to provide a larger area for natural game movement. An additional fence and gate will be erected in order to prevent the game from entering and to become trapped in the Melkkamer development area (see Map 11).

The north-western sector has approximately 5 km of new fencing. This fence has been erected partly on private land in terms of an agreement with the neighbour.

3.6.1.5 Environmental Management

Waste:

No waste disposal sites are available within the DHNRC and all waste is transported on a weekly basis to the domestic waste disposal site in Bredasdorp. The old dump site should only be used for vegetation material and covered with soil when full. The use of primate proof dustbins is required at all camp and picnic sites. No open dustbins are permitted anywhere on the reserve. Domestic waste must be kept inside buildings until removed to an enclosed refuse collection site.

Water:

In general available water quantity, mainly derived from boreholes, is currently sufficient to support infrastructure at different sites where domestic water is required, however water saving actions need to be taken to prevent wastage. Only Noetsie, Hamerkop and Cupidoskraal derive water directly from a natural stream. At the Potberg site, the water is chlorinated and filtered to remove damage causing minerals. Maintenance on water systems is a regular activity. Water use at the tourism facilities is capped in terms of the PPP management plan based on permitted bed nights. The PPP is required to monitor water usage. Care must be taken at certain boreholes near the sea not to over abstract as this may lead to seawater intrusion, contaminating drinking water and the aquifer. A borehole and water use monitoring programme needs to be in place in order to prevent over utilisation (Toens & Associates CC. 1994).

Fuel and herbicide:

Only small amounts of fuel are stored on reserve. Gas is kept in cylinders to provide for hot water on the Whale Trail and cooking at the EE centre. Herbicide is kept on the reserve as part of the alien eradication programme and a dedicated fuel and herbicide store is available at Potberg. Gas cylinders are kept in a well-ventilated storage facility. Health and Safety standards need to be maintained.

Sewerage:

A biolytic sewerage system was built at the De Hoop Opstal during 2002 and is operating well. This system handles all sewerage generated at this site. Reserve management will fence off this system and re-vegetate the wetland.

The sewerage systems at the Potberg, Melkkamer and Koppie Alleen sites are still old septic tank and soak away systems. The new (2014) development at Koppie Alleen (Ocean House) has a BIOROCK® system.

All huts on the Whale Trail have biolytic systems that need regular servicing.

Old septic tank systems need to be replaced with more environmentally friendly systems and funds for this need to be made available.

Energy:

The Whale Trail huts are equipped with solar panels for generating electricity for lighting.

The Potberg EE centre and two new staff houses at Potberg are equipped with heat pump driven hot water systems that are designed to use less energy than conventional hot water cylinders. Due to high maintenance costs and water pressure challenges, the economic viability of these systems in the long term will need to be investigated.

The borehole pumps providing water to the Vaalkrans and Noetzie hiking huts are solar energy driven and the new borehole pump at Lekkerwater will also be working off solar energy.

The new tourist accommodation at Koppie Alleen and the new Whale Trail will be off the grid using solar and gas for energy. Diesel generators are used when not enough energy is generated by the solar systems.

Lekkerwater and Melkkamer have diesel driven generators for lighting and gas water heaters. The main energy source at De Hoop Opstal and Potberg is electricity from Eskom.

Future development or replacements of electrical equipment should consider making use of green technology.

3.6.1.6 High Sites

The peak of the Potberg Mountain is managed as a high site for a CapeNature radio repeater as well as equipment of one private company. Vodacom has erected a cellular transmission station in 2015. Construction was hampered by the condition of the road which was rerouted for a short section in order to avoid a wetland. Two other sites at Hamerkop and Infanta are used and managed by OTR and as they are completely surrounded by the reserve, should be excluded from the proclaimed nature reserve. Presently they are included. See section 3.1 and map 3.

6.1.7 Signage

Signboards are located at all major vehicle and hiking entrance points to the DHNRC. Regulatory and safety signage to inform visitors and management is maintained as per CapeNature and health and safety standards. Interpretation boards are displayed in the Whale trail huts and other tourism and visitor gathering points e.g. Koppie Alleen and should be erected where necessary as per CapeNature standards. All signage on the reserve will be recorded in a register.

4 THE PLANNING CONTEXT OF DE HOOP NATURE RESERVE COMPLEX

4.1 Regional and Provincial Planning of De Hoop Nature Reserve Complex

The DHNRC falls under the Cape Agulhas Municipality and forms part of the Overberg District Municipality (ODM). The Integrated Development Framework (IDP) for the Cape Agulhas Municipality runs over a five year cycle and is currently a 3rd generation plan (2012 - 2016). It is a strategic plan guiding development in the Cape Agulhas Municipal Area and is also informed by the Overberg District Municipal Integrated Development Plan (ODM-IDP) for 2012-2016.

The Overberg District Municipal Spatial Development Framework 2014-2016 (ODM-SDF) is the spatial expression of the ODM-IDP. Consequently, the SDF is a policy document of the ODM to be used by organs of state as a guideline in decision-making towards land-use. The De Hoop Nature Reserve Complex falls within the recognized core conservation area. In terms of the land use classification plan, the reserve complex is classified as Wilderness area.

Areas that might be considered in the reserve's expansion strategy for possible stewardship sites are identified in the SDF as either Core 1(b) private nature reserves and conservancies or core 1(c) critical biodiversity areas (CBA's) to be protected.

4.2 Expansion of the De Hoop Nature Reserve Complex

The expansion of protected areas in South Africa is informed by the National Protected Area Expansion Strategy (NPAES) (SANBI & DEA 2010). This strategy provides a broad national framework for protected area expansion in South Africa by identifying large areas which should be targeted for formal declaration and introduces a suite of mechanisms which could aid in achieving this. The NPAES however is currently under review.

In response to the NPAES which calls on provinces to develop implementation plans in support of the NPAES and in support of provincial conservation efforts and priorities, CapeNature has produced a Western Cape Protected Area Expansion Strategy (CapeNature 2015). The CapeNature strategy addresses the formal proclamation of priority natural habitats in the Western Cape Province as protected areas to secure biodiversity and ecosystem services for future generations.

CapeNature's primary tool to expand the terrestrial conservation estate and buffer zones around its reserves is through the promotion of stewardship options on private

land. This is however subject to willing landowners and CapeNature's resource capacity. The concept is explained in more detail in Purnell *et al.* (2010).

4.2.1 Expansion opportunities

Map 17 provides an overview of the protected and unprotected natural areas around the DHNRC. The reserve complex comprises of two separate protected areas namely the De Hoop Nature Reserve (terrestrial) and the De Hoop Marine Protected Area. Areas for possible expansion focus only on some areas surrounded with a light green line (hashed) on Map 17. It should be noted that this is a very rough indication and is depended on landowner willingness, CapeNature resource capacity that is presently very low and the initiatives from other conservation organisations supported by CapeNature.

The focus is to protect a critically endangered lowland corridor, with riverine elements connecting to the important De Hoop Vlei. Selected sites are in the most extensive remaining area of totally unconserved Rûens Silcrete Hills (Renosterveld) to the coast, via the existing DHNR and its mix of Strandveld and Limestone Fynbos. The Reserve currently protects very little Renosterveld, and one of the two highest priorities in the region is the Silcrete Hill area to the north. The other is the Potberg foot slopes in the east. The Silcrete Hills support many localised and threatened species, including a number of undescribed species. In addition, some of the rare species are succulents most closely related to Little Karoo and Worcester – Robertson Karoo species, indicating some sort of previous link in that direction (possibly via the Breede River valley to the east). The main ongoing threat to these areas is agriculture (ploughing, and trampling by livestock).

The existing San Sebastian Private Nature Reserve adjacent to the eastern boundary of the reserve is supported and will be assisted to comply with NEM: PAA regulations.

For the marine protected area, no additional actions are proposed within the next five years other than correcting the MPA coordinates. Future expansion will follow the National MPA Expansion Strategy.

4.2.2 Buffer zones

The only formal protected area adjacent to DHNRC that acts as a buffer zone for the reserve is the San Sebastian Private Nature Reserve adjacent to the south-easternmost boundary of the reserve. Furthermore the Denel OTR has adopted conservation principals and is monitored for environmental compliance by the Overberg Review Committee. OTR has also agreed to manage the Reimerskraal section of the test range that borders onto the western boundary of the reserve as a nature reserve. An agreement also exists between OTR and CapeNature to manage the larger game populations on both areas as single populations e.g. bontebok, CMZ and eland. Together with large portions of natural veld to the north of the reserve, the

reserve is fairly well buffered however the boundary between the farms Wydgeleë, Die Kop and Verfheuwel in the Potberg area is not buffered and can be subjected to farming influences mainly due to the small grain production adjacent to the reserve boundary.

The seaward side of the Marine Protected Area is not buffered and is subject to fishing pressure right up to the boundary. Illegal fishing also occurs inside the MPA due to the challenges in enforcing regulations. These challenges are however addressed by regular patrolling and observations although inadequate due to capacity constraints.

5 CONSERVATION DEVELOPMENT FRAMEWORK OF THE DE HOOP NATURE RESERVE COMPLEX

5.1 Sensitivity analysis

Sensitivity mapping of reserve biodiversity, heritage and physical environment forms is the main informant of spatial planning and decision-making in protected areas. It is intended to:

- inform all planned and ad-hoc infrastructure development e.g. location of management and tourism buildings and precincts, roads, trails, firebreaks;
- inform whole-reserve planning and formalisation of use and access as a Reserve Zonation Scheme; and
- support conservation management decisions and prioritisation.

The sensitivity maps allow for direct comparison of sites both within and between reserves to support CapeNature's planning at local and regional scales. The process highlights:

- sites with the highest regional conservation value;
- areas where human access or disturbance will have a negative impact on biodiversity or heritage, and specific environmental protection is required;
- areas where physical disturbance or infrastructure development will cause higher environmental impacts, and/or higher construction and on-going maintenance costs; as well as
- areas where there is significant environmental risk to infrastructure.

The method ensures that the location, nature and required mitigation for access, activities, and infrastructure development within protected areas can be guided by the best possible landscape-level biodiversity informants.

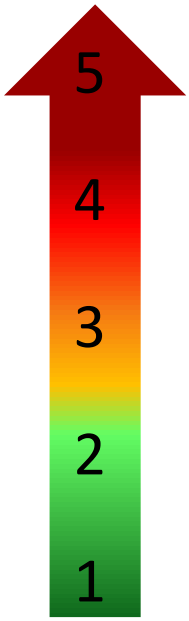
The process accommodates both expert-derived information and more objective scientific data and the decisions are defensible and based on a transparent process.

Biodiversity, heritage and physical features are rated on a standard scale of 1 to 5, where 1 represents no or minimal sensitivity and 5 indicates maximum sensitivity (see Figure 5.1). Additional features such as visual sensitivity, fire risk and transport costs

can also be included. Higher scores represent areas that should be avoided for conventional access and infrastructure, or where specific mitigation would be required in order to address identified environmental sensitivity. A score of 5 typically represents areas where mitigation for conventional access or infrastructure development would be extensive, costly or impractical enough to be avoided at all costs, or features so sensitive that they represent a 'no go' area. For biodiversity features highest scores represent high priority sites where conservation management cannot be compromised.

Sensitivity maps cannot replace all site-scale investigation, but they are ideal for rapidly reviewing known environmental risks, and guiding whole-reserve planning to minimise overall negative environmental impact.

A decision tree / hierarchical approach is used for the sensitivity analysis. This method is based on the premise that if a portion of the landscape is demarcated as highly sensitive in one of the categories considered in the analysis then, regardless of the sensitivity in other categories, that portion will be considered to be highly sensitive in the overall scoring. The decision tree approach thus allocates the highest allocated sensitivity in any of the input categories as the ultimate sensitivity class for that particular portion. The benefits of using this approach is that a landscape unit which is scored as highly sensitive for one feature category but has low sensitivity in all other feature categories will retain the high sensitivity scoring. Furthermore, as new and improved data becomes available, there is the possibility of adding this data to the sensitivity layer without having to re-analyse the data from the beginning. Physical and biodiversity sensitivities were included in the analysis as per Table 5.1.



- highest sensitivity/conservation importance
- features of global importance
- Features highly vulnerable to impacts from nearly any activity.
- E.g. intact habitat in Critically Endangered ecosystems, or natural wetland systems
- Off limits to any negative impact
- Management must be to the highest standard.
- Infrastructure development and maintenance not cost effective
- Access or infrastructure development is very strongly discouraged and unacceptable unless all negative impacts can be mitigated

- Not sensitive at all
- Not important for biodiversity conservation
- E.g. sites with highly degraded or no natural habitat in well-conserved, least threatened ecosystems
- More suitable for use, infrastructure development
- Habitats likely to be a lower priority for management action.

Figure 5.1: CapeNature Method for Sensitivity Scoring and Synthesis (Kirkwood in prep.)

Table 5.1: Physical and biodiversity sensitivities used in the De Hoop Nature Reserve Complex sensitivity analysis.

	Category	Dataset	Criteria	Sensitivity score	
Physical	Slope (degrees)	Slope calculated from 20m resolution DEM	> 30° Effectively off-limits for infrastructure development due to extreme risk of erosion and instability, or extreme engineering mitigation and associated construction costs required.	Highest sensitivity	**5**
			20°-30° Strongly avoid for infrastructure development – cut and fill or other difficult and expensive construction method required. Appropriate engineering mitigation essential to prevent erosion and slope instability. Highest initial and on-going cost due to slope stabilisation and erosion management required.	High sensitivity	4
			10°-20° Avoid for road, trail and firebreak construction if possible. Severe erosion will develop on exposed and unprotected substrates. Pave roads and tracks, and ensure adequate drainage and erosion management is implemented. May provide good views.	Moderate sensitivity	3
			5°-10° Low topographic sensitivity, likely still suitable for built infrastructure. Use of gentle slopes may provide improved views or allow access to higher areas.	Low sensitivity	2
			0°-5° Preferred areas for any built infrastructure, lowest risk of erosion or instability, lowest construction and on-going maintenance costs.	Lowest sensitivity	1
	Geology (formations found on steep slopes excluded)	Expert mapping Frederik Stapelberg (Council for Geoscience)	Loose sands, wind erosion possible	Highest sensitivity	5
			Calcrete/ Karst features Sand/ gravel/ boulders	Moderate sensitivity	3
			Calcarenite Gravel boulders Partly calcified /calcrete	Low sensitivity	2
			Clay soils	Lowest sensitivity	1
Bio.	Rivers	1: 50 000 NGI Rivers	Within 200m of perennial river	Highest sensitivity	5

			Within 100m of non-perennial river	Highest sensitivity	5
	Wetlands	CapeNature expert team desktop mapping	Wetland	Highest sensitivity	5
			Within 200m of wetlands	High sensitivity	4
	Flood / storm damage risk	1:100 year flood risk	Coastward of 1: 100 year flood risj	Highest sensitivity	5
	Vulnerability status of vegetation,	SA Vegetation map	Critical	Highest sensitivity	5
			Endangered	High sensitivity	4
			Vulnerable	Moderate sensitivity	3
			Least threatened	Lowest sensitivity	1
	Vulture nesting site	Location mapped by CapeNature expert team	Vulture nesting site and kloof around nesting site	Highest sensitivity	5
Culture and heritage	Heritage buildings	Mapped by CapeNature	Building footprint	Highest sensitivity	5
	Caves	CapeNature GIS data layer	Within 100m of a mapped cave	Highest sensitivity	5
			Underground caves – exact location unknown	Moderate sensitivity	3
	Archaeological site	CapeNature GIS data layer	Within 100m of archaeological site such as shell middens	Highest sensitivity	5

Results

Generally, the slope and vegetation status of the DHNRC has the lowest sensitivity score for 62 % and 87 % of the reserve respectively. A large portion of the coastline (see Map 18) has been mapped as the highest sensitivity mostly due to the presence of archaeological remains which have been buffered by 100 m and also the 1: 100 year flood risk line. However, the area covered by the highest sensitivity class at the coast could be reduced with accurate demarcation and exclusion of the archaeological sites. Nonetheless, any development including trail locations should take the 1: 100 year flood line into account. The karstic nature of the geology of the reserve has led to almost 40% of the reserve being deemed to have a moderate sensitivity on the geology alone. However only 1 % of the reserve is allocated the highest sensitivity on the basis of geology alone. Although prone to flooding, the presence of wetlands only accounts for 13% percent of sensitivity in the highest two categories with proximity to rivers accounting for a further 36% in the highest sensitivity class. Heritage sites, caves and vulnerable species (vultures) are all ranked as having highest sensitivity but due to the relatively small surface area occupied by these features, the impact on the overall sensitivity of the reserve is small. Thus even though the vulnerability status of

the vegetation is largely low, the overall sensitivity of the DHNRC is predominantly moderate to very high (see Map 18 and Table 5.2).

Table 5.2: Summary of total and percentage area captured by the main features contributing to the sensitivity analysis illustrated in Figure 5.1.

	Slope		Vegetation		Geology		River buffers		Wetlands	
Sensitivity score	Area (ha)	Area (% of total)	Area (ha)	Area (% of total)	Area (ha)	Area (% of total)	Area (ha)	Area (% of total)	Area (ha)	Area (% of total)
1	20315	62	27729	87	200	1				
2	5220	16	3435	11	12835	39				
3	4931	15		0	2267	7				
4	1821	6	223	1					3059	9
5	346	1	635	2	6381	19	11758	36	1387	4

Overall score	
Area (ha)	**Area (% of total)**
624	2
8322	25
3297	10
2680	8
18038	55

5.2 Zonation

Protected area zonation provides a standard framework of formal guidelines for conservation, access and use for particular areas. Zonation goes beyond natural resource protection and must also provide for:

- appropriate visitor experience;
- access and access control;
- environmental education; and
- commercial activities.

Ideally, zonation development should be conducted at the same time as infrastructure development planning. Good planning must aim to reduce cumulative environmental impacts and the long-term operating costs of all activities. Zonation and infrastructure development planning must be guided by:

- existing infrastructure and use;
- potential future infrastructure and access requirements; and
- careful evaluation of overall impact, construction costs and operating costs vs. likely benefits; for alternatives for every component.

CapeNature's zonation categories (see Table 5.3) were developed by an internal workshop process completed in September 2010. Existing protected area zoning schemes worldwide were examined to develop a simple and powerful scheme that provides for the required range of visitor experience, access and conservation management. Particular effort was made to maintain consistency with the best developed South African zonation schemes, in particular those of SANParks and Ezemvelo KZN Wildlife (EKZNW). CapeNature's zonation categories have fewer tourism-access categories, but provide more detailed and explicit guidelines with regard to zone objectives and characteristics. Furthermore, CapeNature's zonation includes new zones specifically required in the context of highly sensitive biodiversity sites and zoning of privately owned Contract Nature Reserves.

Table 5.3: Guide to CapeNature Zones on the De Hoop Nature Reserve Complex.

Zone	Zone Objective	Characteristics	Visitor Activities	Facilities / Infrastructure	Visitor Access	Management Guidelines
Wilderness / Wilderness (declared)	***Users:*** To provide an experience of solitude in pristine landscapes with minimal evidence of human presence or use. ***Conservation:*** To limit visitor numbers and use to minimise impact. Minimal management intervention for visitor or biodiversity management. Include sensitive or threatened habitats & species in this low use zone when contiguous sites meet the criteria for wilderness.	Completely wild and rugged landscapes (or being restored to this). Areas where users have little chance of encountering any other human presence or group. Sight or sound of human activities outside zone barely discernible and at far distance; Preferably no human impact or infrastructure inside the zone other than trails. Natural burning regimes, with no active fire management and road/firebreak infrastructure. Areas with minimal Invasive Alien Plant infestations, where IAP control can be done without vehicle access. Area must meet the definition and requirements of the National Environmental Management: Protected Areas Act 57 of 2003. If formally declared in terms of the act, zone = "Wilderness (declared)"; if not = "Wilderness".	"Leave-no-trace" activities: Overnight hiking, without any sleeping facilities, formal campsites, or with only basic, un-serviced shelters. "Carry in, Carry out" principle for all food and waste. Guided or unguided nature observation. --- No fires	No infrastructure of any type if possible. No roads or vehicle tracks. No structures except small existing buildings of cultural, historic or aesthetic value. These can be used as un-serviced sleeping shelters for hikers & provided with composting toilets. Narrow permanent walking trails. No signage except small, unobtrusive markers for closed routes, or at trail junctions. **NB** – in the mountainous, slow-growing fynbos of the Western Cape, the traditional wilderness concept of access without defined trails is unsafe and rapidly results in undesirable user-created trails and erosion.	Unguided visitor access only on foot. Visitors have freedom to use various trails. Use of donkeys, horses or other animals with an official guide only on designated historical routes and trails, or existing roads, and only where this will not cause trampling, erosion or any degradation. Limits on visitor numbers and/or control of routes and access so that zone objectives are met. Use of non-motorised canoe or flotation device on rivers can be acceptable where entry is by foot or by river from outside the zone. --- No fires No vehicle access No access without zone permit	***Visitor Management:*** Manage to conserve natural and cultural resources, ecological processes and wilderness integrity. Leave no trace ethic. Restrict numbers of visitors and allow for no-use rest periods if required. Limited management interventions. Management measures may be carried out in extreme conditions, but tread lightly principles must apply. Since visitor use cannot be intensively managed, re-route trails away from any areas with sensitive local habitats or plant and animal species. Trail layout, design and construction must reduce maintenance requirements. ***Conservation Management:*** Habitats with minimal management requirements, typically natural burning zones. Prevent or restore visible trampling or any other impact. Rehabilitate non-essential roads to natural vegetation. Re-zone essential roads out of Wilderness Zoning. ***Consumptive Use:*** Not compatible

Zone	Zone Objective	Characteristics	Visitor Activities	Facilities / Infrastructure	Visitor Access	Management Guidelines
Primitive	***Users:*** To provide an experience of solitude in natural landscapes with little nearby evidence of human presence. Can provide access to and buffer Wilderness Zones. ***Conservation:*** To limit visitor use, numbers and infrastructure to minimise impact in sensitive environments. To reduce need for management of users and visitor impacts. Allows for minimal or more intensive biodiversity management intervention. *Include extensive areas of sensitive or threatened habitats & species in this low use zone when sites do not meet the criteria for wilderness.*	Intrinsically wild appearance & character. Areas where users will seldom encounter other human groups or presence. Any visible human impact or infrastructure inside the zone is unobtrusive. Human activities outside zone may be audible or visible in places. Areas remote from management centres, or otherwise difficult or expensive to access for management. Areas that might not meet the criteria for Wilderness but can serve as undeveloped visual buffers for Wilderness. Areas that may have natural burning regimes, with no active fire management and road/firebreak infrastructure OR areas that require active fire management to stay within thresholds of concern.	Guided or unguided nature observation Primarily intended for hiking or walking access. Only allows for 4x4 routes or vehicle access if specifically considered and noted. Only allows for non-hiking accommodation node if specifically considered and noted.	Deviation from natural state to be minimised. Infrastructure should not be visible from Wilderness Zones. May provide isolated, small, unobtrusive accommodation facilities for up to 16 guests on restricted footprints, particularly for overnight hiking trails. May have defined or beaconed hiking routes, management access roads, tracks and firebreaks. All roads, tracks or trails to be located and constructed to reduce maintenance, visibility and erosion. Where un-surfaced tracks will result in erosion, use concrete strip or interlocking pavers to stabilise. Re-route unstable or erosion-prone road sections if this will lower long-term visual and environmental impact. New roads for visitor access only justified if also required for management access. Avoid wide surfaced roads or roads and tracks wider than required for a single vehicle.	Visitor access only by permit. Control of visitor numbers, frequency and group sizes to meet zone objectives. Only users of facilities/activities will access to this zone. Defined or non-defined hiking and day trail routes. On foot always. Bicycle, 2x4 or 4x4 vehicle, or horseback on designated routes only. --- No access without zone permit	***Visitor Management:*** Manage to conserve natural and cultural resources, ecological processes and wild appearance & character. Restrict numbers of visitors and allow for no-use rest periods if required. All facilities will be small, very basic, self-catering and distributed to avoid contact between users. There should be limited if any interaction between groups. Since visitor use usually cannot be intensively managed, re-route trails away from any areas with sensitive local habitats or plant and animal species. Trail layout, design and construction must reduce maintenance requirements. Visible & audible human impacts from adjacent zones should be mitigated. ***Conservation Management:*** Habitats with lower or higher management requirements. May be natural burning zones. Usually remote areas so roads and trails should be planned and constructed assuming infrequent maintenance. Prevent or restore visible trampling or any other visitor impact. Rehabilitate non-useful roads to natural vegetation. ***Consumptive Use:*** Sustainable use can be appropriate under controlled circumstances subject to a formal assessment and application in accordance with CapeNature policies.

Zone	Zone Objective	Characteristics	Visitor Activities	Facilities / Infrastructure	Visitor Access	Management Guidelines
Nature Access	***Users:*** To provide easy access to natural landscapes with low expectation of solitude at all times. Can buffer between development and wilderness or Primitive Zones. ***Conservation:*** To manage and direct visitor use, and plan infrastructure to minimise impact on sensitive environments. To actively manage users and visitor impacts. Allows for minimal or more intensive biodiversity management intervention. *Provide additional protection to localised sensitive or threatened habitats, species or other features by Special Management Overlays*	Areas with extensive lower sensitivity habitats: Areas able to accommodate higher numbers of visitors regularly, with no identified sensitive or regionally rare biodiversity. Popular view or access sites. Extensive areas able to accommodate roads, trails and tracks without high risk of erosion and degradation. Areas accessible for regular management of roads and trails. Areas where roads and trail infrastructure can be located with low visibility from the surrounding landscape, particularly from adjacent Primitive or Wilderness Zones. Usually areas that require active fire management with firebreaks to stay within thresholds of concern, but may also include natural burning regimes.	Guided or unguided nature observation. Day hiking trails and/or short trails. Bird hides, canoeing, mountain biking & rock-climbing where appropriate. Other activities if specifically considered and approved as part of specific reserve zoning scheme. Motorised 2x4 self-drive access on designated routes. No accommodation or camping. Frequent interaction with other users.	Some deviation from natural/pristine state allowed particularly on less sensitive or already disturbed/transformed sites. No accommodation; but ablution facilities may be provided. May have defined or beaconed hiking routes, tourism and management access roads, and management tracks and firebreaks. Infrastructure should be designed to reduce impacts of higher visitor numbers. Roads open to the public should be accessible by 2x4 sedan. Full width tarred or surfaced roads or roads and tracks to accommodate two vehicles are appropriate. Un-surfaced roads may be surfaced if a road planning exercise has confirmed that the location is suitable.	No special access control or permits required for this zone. Will cater for larger number of visitors than primitive zone. Vehicle access on dedicated routes, with pedestrian access from parking areas or adjacent Development Zones. On water – only non-motorised crafts allowed unless specifically noted.	***Visitor Management:*** More frequent monitoring of these areas is necessary to prevent damage or degradation. More frequent footpath maintenance must be scheduled for busy routes, with particular attention paid to use of railings or other access control to prevent damage to sensitive areas. Unless visitor access can definitely be intensively guided and managed, re-route trails away from any sensitive local habitats or plant and animal species. Trail layout, design and construction must be specified to reduce maintenance requirements under higher use. Visible & audible human impacts to adjacent Primitive or Wilderness Zones should be mitigated. ***Conservation Management:*** Habitats with lower or higher management requirements. May be natural burning zones. Prevent or restore visible trampling or any other visitor impact. Rehabilitate non-useful roads to natural vegetation. ***Consumptive Use:*** Sustainable use may be appropriate subject to a formal assessment and application in accordance with CapeNature policies.

Zone	Zone Objective	Characteristics	Visitor Activities	Facilities / Infrastructure	Visitor Access	Management Guidelines
Development – Low Intensity	***Users:*** To provide access to adjacent natural landscapes with no expectation of solitude. To provide primarily self-catering accommodation or camping. Can provide for Environmental Education accommodation and access into surrounding landscapes. ***Conservation:*** To locate the zone and infrastructure to minimise impact on sensitive environments. To actively manage users and visitor impacts on adjacent sensitive areas. *Provide additional protection to sensitive or threatened habitats, species or other features by Special Management Overlays*	Areas with existing degraded or transformed footprints. Natural or semi-natural habitats only where essential to minimise impacts over whole reserve. Areas able to accommodate high numbers of visitors regularly, with no identified sensitive or regionally rare biodiversity. Areas able to accommodate roads, trails and accommodation infrastructure without risk of erosion or degradation. Areas easily accessible from reserve management centre. Areas where risk of fire damage to infrastructure is low or can be mitigated without unacceptable impacts on surrounding environment. Areas where new infrastructure can be located with low visibility from the surrounding landscape. Areas not visible from Primitive or Wilderness Zones. Areas with available potable water, and not sensitive to disposal of treated wastewater via soak away.	Picnicking. Walking or bicycle access into adjacent areas. Self-catering accommodation and camping. Meeting, workshops or mini-conference activities for no more than the number of people that can be accommodated overnight in the zone. Can provide for Environmental Education accommodation and access into surrounding landscapes, but this must be carefully planned not to conflict with visitor use.	Reception offices. Self-catering accommodation and camping for up to 100 guests in total at any time[1] Single small lodges for up to 30 guests are permissible if all facilities are contained in a compact footprint, this represents the total accommodation for the zone, and any restaurant or catering facilities are for overnight guests only. If possible roads should be narrow with separate incoming and outgoing routes; otherwise double vehicle width roads are strongly advisable for safety and usability. Roads in this zone should be surfaced to reduce management cost and environmental impacts. Development and infrastructure may take up a significant proportion of the zone, but planning should ensure that area still provides relatively natural outdoor experience.	Motorised self-drive 2x4 sedan car access. Tour bus access. Parking areas. This zone should be used to provide parking and walk-in access for day visitors to adjacent Nature Access zone if possible.	***Visitor Management:*** Use infrastructure solutions such as railings, hard surfacing and boardwalks to manage undesirable visitor impacts. Accept negative impacts on natural habitats in this zone unless these are specifically addressed in a Special Management Overlay. Frequent footpath and road maintenance must be scheduled for high impact routes. Visible impacts to adjacent Zones should be considered and mitigated. ***Conservation Management:*** Provide access and generate revenue. Management should aim to mitigate the impacts of the high number of visitors. Largely transformed habitats with lower management requirements. Usually fire exclusion areas. Prevent or rehabilitate visible trampling or any other visitor impact. Plan for a compact overall development footprint, avoiding dispersed infrastructure that will increase fire risk and/or environmental footprint. This is most critical in fire-prone environments. ***Consumptive Use:*** Sustainable use may be appropriate subject to a formal assessment and application in accordance with CapeNature policies.

[1] Although 100 guests seem high this is in line with CapeNature sites that would fall within this zone definition, e.g. configured as 10 x 4-sleeper self-catering units and 15 campsites.

Zone	Zone Objective	Characteristics	Visitor Activities	Facilities / Infrastructure	Visitor Access	Management Guidelines
Development – High Intensity	***Users:*** To provide access to adjacent natural landscapes with no expectation of solitude. To provide low and/or higher density accommodation. May provide some conveniences such as restaurants and shops. ***Conservation:*** To locate the zone and infrastructure to minimise impact on sensitive environments. To actively manage users and visitor impacts on adjacent sensitive areas. *Provide additional protection to sensitive or threatened habitats, species or other features by Special Management Overlays*	Areas with extensive degraded or transformed footprints. Natural or semi-natural habitats only where benefits outweigh impacts. Areas able to accommodate very high numbers of visitors regularly, with no identified sensitive biodiversity. Areas able to accommodate roads, trails and accommodation infrastructure without risk. Areas easily accessible from reserve management centre. Areas where risk of fire damage to infrastructure is low or can be mitigated without unacceptable impacts on surrounding environment. Areas where new infrastructure can be located with low visibility from the surrounding landscape. Areas not visible from Primitive or Wilderness Zones. Areas with available potable water, and not sensitive to disposal of larger amounts of treated wastewater.	Restaurants and small shops. Picnicking. Walking or bicycle access into adjacent areas. Accommodation in small hotels, lodges and higher density self-catering accommodation and/or camping. Meetings, workshop or mini-conference activities for no more than the number of people that can be accommodated overnight in the zone.	High density tourism development nodes`. Modern amenities including restaurants & shops. Self-catering accommodation and camping for over 100 guests in total at any time. Lodges or small hotels. Roads in this zone must be surfaced to reduce management cost and environmental impacts. Development and infrastructure may take up a significant proportion of the zone, but planning should ensure that area still provides relatively natural outdoor experience.	Tour bus access. Motorised self-drive sedan car access. Parking areas. Air access only permitted if considered and approved as part of zoning scheme and there is no possibility of faunal disturbance.	***Visitor Management:*** Management action will focus mostly on maintenance of facilities & providing high quality experiences. Use infrastructure solutions such as railings, hard surfacing and boardwalks to manage undesirable visitor impacts. Accept substantial impact on natural habitats in this zone unless these are specifically addressed in a Special Management Overlay. Frequent landscape, footpath and road maintenance must be scheduled for high impact areas. Visible impacts to adjacent Zones should be mitigated. ***Conservation Management:*** Provide access and generate maximum revenue. 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. These are highly transformed habitats with lower management requirements. Natural fire exclusion areas. Prevent or rehabilitate visible trampling or any other visitor impact. Plan for a compact overall development footprint, avoiding dispersed infrastructure that will increase fire risk and/or environmental footprint. This is most critical in fire-prone environments. ***Consumptive Use:*** Sustainable use unlikely to be compatible.

Zone	Zone Objective	Characteristics	Visitor Activities	Facilities / Infrastructure	Visitor Access	Management Guidelines
Development - Management	Location of infrastructure and facilities for Reserve Administration & especially conservation management facilities Not compatible with tourism and tourism access.	Areas with extensive degraded or transformed footprints. Natural or semi-natural habitats only where benefits at reserve scale outweigh local impacts. Areas able to accommodate high disturbance, with no identified sensitive biodiversity. Areas providing easy access to reserve and infrastructure. Areas very close to zones requiring highest management intervention, especially Low/High Intensity Zones. Areas where risk of fire damage to infrastructure is low or can be mitigated without unacceptable impacts on surrounding environment. Areas where new infrastructure can be located with low visibility from the surrounding landscape. Areas not visible from Primitive or Wilderness Zones. Areas with available potable water, and not sensitive to disposal of treated wastewater.	n/a	Any reserve management infrastructure including offices, sheds, garages, stores, etc. Roads required to access these should be surfaced to reduce long-term maintenance costs and environmental impact. *NOTE* *Reserve administrative offices may also be located within visitor reception facilities in Development - Low/High Intensity Zones*	none	***Visitor Management:*** n/a ***Conservation Management:*** Frequent footpath and road maintenance must be scheduled for high impact routes. Accept some impact on natural habitats in this zone unless these are specifically addressed in a Special Management Overlay. Visible impacts to adjacent Zones should be mitigated. Management should aim to contain all activities within the smallest possible footprint. Largely transformed habitats with lower management requirements. Usually fire exclusion areas. Prevent or restore trampling or any other management impact. Plan for a compact overall development footprint, avoiding dispersed infrastructure that will increase fire risk and/or environmental footprint. This is most critical in fire-prone environments. ***Consumptive Use:*** Sustainable use unlikely to be possible in small zone.

Zone	Zone Objective	Characteristics	Visitor Activities	Facilities / Infrastructure	Visitor Access	Management Guidelines
Development - Production	Commercial or subsistence farming. (only applicable to privately owned & managed Contract Nature Reserves)	Areas identified for production farming. Areas with extensive degraded or transformed footprints. Natural or semi-natural habitats only when use of these areas is supported by a bioregional plan and specialist site assessment.	May allow agri-tourism	Any agricultural infrastructure.	May allow agri-tourism	Agricultural best practise to support surrounding natural areas, particularly with regard to river and wetland buffer areas.
Development – Private Areas	Private dwelling and surrounds. (only applicable to privately owned & managed Contract Nature Reserves)	Private homestead. Areas with existing degraded or transformed footprints. Natural or semi-natural habitats only when use of these areas is supported by a bioregional plan and specialist site assessment.	n/a	Dwellings and private accommodation areas. Roads to access these.	No access by the public without permission from landowner.	Should have no negative impacts on the surrounding conservation area.

Protection Zones

Zone	Zone Objective	Characteristics	Visitor Activities	Facilities / Infrastructure	Visitor Access	Management Guidelines
Species / Habitat / Cultural Protection	***Users:*** This zone's primary purpose is conservation and research. Limited tourism use only if compatible with conservation objective. ***Conservation:*** Protection of species or habitats of special conservation concern. Restrict access to prevent disturbance and/or damage.	Larger areas where uncontrolled public access is undesirable due to presence of regionally critically rare and endangered fauna, flora, habitat. Typical example would be a seabird breeding colony, particularly for threatened species.	Research. Nature observation under strictly controlled conditions only if specifically noted.	Usually none, but footpaths and tracks to allow management access may be permitted. Where visitor access is permitted, strict access control infrastructure is required to delimit access routes, and if necessary screen visitors. I.e. hides, boardwalks, screened routes, and paths with railings may be appropriate.	Public / Tourism access normally not allowed. May be permitted under very tightly controlled conditions, to be determined per site.	***Visitor Management:*** Prevent visitor access or restrict numbers of visitors and allow for no-use rest periods if required. Infrastructure layout, design and construction must be designed and maintained to highest environmental standards. ***Conservation Management:*** Feature specific – as required. Prevent any negative impacts on identified feature/s. Consider removal and/or rehabilitation of non-essential infrastructure. ***Consumptive Use:*** Not compatible.

Special Management Overlays

Special management overlays provide an indication of areas requiring special management intervention within the above zones. Overlays would typically only be applied where zoning does allow visitor or management access, but special measures are required, particularly to ensure protection of important and sensitive features or sites. Overlays should include specific indication of permitted activities, access, facilities/infrastructure and management guidelines that differ from the rest of that zone. Overlay requirements can be flexible, adapted to the requirements of the feature/s they protect.

Overlay	Overlay Objective	Characteristics	Visitor Activities	Facilities / Infrastructure	Visitor Access	Management Guidelines
Cultural	Protection of localised identified important Cultural Feature.	Can overlap any zone. Permanent, temporary or temporal zone to manage important cultural or heritage features.	Specific activities dependent on ability to manage activity and feature in question.	Usually none, but specific infrastructure dependent on feature in question.	Specific access dependent on ability to manage access and feature in question.	Feature specific – as required.
Species / Habitat	Protection of localised identified important Biodiversity Feature	Can overlap any zone. Permanent, temporary or temporal zone to manage important and sensitive species and/or habitats. Typically only applied where visitor impacts are expected.	Specific activities dependent on ability to manage activity and feature in question.	Usually none, but specific infrastructure dependent on feature in question.	Specific access dependent on ability to manage access and feature in question.	Feature specific – as required.
Visual	Protection of sensitive view sheds and particularly for Wilderness Zone view sheds.	Can overlap any zone. Sensitive view sheds and particularly for areas within Wilderness Zone view sheds.	Specific activities dependent on ability to manage activity and feature in question.	No roads, firebreaks or buildings. No visible infrastructure. Trails may be appropriate.	Walking access likely to be appropriate.	Feature specific – as required.

Overlay	Overlay Objective	Characteristics	Visitor Activities	Facilities / Infrastructure	Visitor Access	Management Guidelines
Natural Resource Access	Access to identified sustainable consumptive use resources as per a resource management plant.	Can overlap any zone except Wilderness and Protection zones. Areas with identified natural resources formally assessed as not sensitive to harvesting and where an approved sustainable harvesting plan is in place.	Harvesting of identified resources.	None	Specific access dependent on feature in question.	Feature specific – as required.

Research is usually permissible in all zones, except Species/Habitat protection or Cultural Protection where it may be restricted. Research that requires destructive harvesting or manipulation of more than a few square metres of habitat should not be considered in any of the Protection overlays, except where research outputs are considered essential for management of that ecosystem, research cannot be done at an equivalent site elsewhere, and research results are certain to contribute substantially to management objective.

The zonation of the DHNRC is shown in Map 19.

5.3 Access

Access points on DHNRC for the public are listed in Table 5.4. Access and specific facilities are spatially mapped in Map 20.

Illegal access into the reserve takes place in the eastern sector through Sandhoogte and Infanta.

Table 5.4: Public access points to the De Hoop Nature Reserve Complex.

No.	Locality	Name	Type of Access	Activity
1	20° 24' 31,24'' E 34° 25' 17,53'' S	De Hoop Main Gate	Vehicle access with control gate	Visitors, tourists, management
2	20° 31' 3,96'' E 34° 22' 23,34'' S	Potberg Gate	Vehicle access with control gate.	Visitors, tourists, management
3	20° 25' 2,00'' E 34° 27' 12,00'' S	De Hoop Opstal airstrip	Light aircraft and helicopters. Unpaved rough landing strip. Uncontrolled.	Visitors, tourists, management
4	20° 23' 54,40'' E 34° 27' 18,50'' S	De Hoop Opstal helipad	Helicopters	Visitors, tourists, management

CapeNature is a partner in a number of servitude agreements for which the respective partners are provided access to land managed as part of the DHNRC. Current servitudes and agreements are listed in Table 5.5.

Table 5.5: Servitudes and management agreements of the De Hoop Nature Reserve Complex.

Date of Agreement	Type of Agreement	Partner	Duration of Agreement (years)	Area Affected
	Lighthouse and access Servitude	Portnet	In perpetuity	Uiterstepunt and access from San Sebastian
9 December 2009	Tourism PPP	De Hoop Collections (Pty) Ltd.	45 yrs	De Hoop Opstal, Koppie Alleen, Melkkamer and Die Mond

Date of Agreement	Type of Agreement	Partner	Duration of Agreement (years)	Area Affected
Final approval pending	Tourism PPP	De Hoop Collections (Pty) Ltd.	45 yrs	Whale Trail 2
Final approval pending	Tourism PPP	De Hoop Collections (Pty) Ltd.	45 yrs	Lekkerwater Lodge
	Power lines Servitudes	Eskom	In perpetuity	1. Infanta instrumentation site to Lighthouse. 2. Game camp boundary to Potberg management area 3. Main Gate to De Hoop Opstal.
20 August 1991	Land Use Agreeement "Gebruiksooreenkoms" Inter departmental agreement for weapons testing	Denel Overberg Test Range	10 yrs renewal as needed	Eastern sector of the reserve.
13 October 2003	Protocol for Weapons Tests Affecting Dual Use Arras of De Hoop	Denel Overberg Test Range	As long as the Land Use Agreement is valid	Eastern sector of the reserve as well as Melkkamer and the De Hoop vlei area.
30 June 2009	Addendum to the Land Use Agrreement.	Denel Overberg Test Range	As long as the Land Use Agreement is valid	Melkkamer
18 June 2002	Memorandum of agreement. Booking preference for Lekkerwater	Green Family	In perpetuity	Lekkerwater
8 July 2013	License to use high site for communication equipment	Vodacom	Annually renewable	Potberg high site and road to highest point

5.4 Concept Development Plan

All development of tourism facilities are already planned as part of the existing PPP agreement (Opstal, Melkkamer and Koppie Alleen) or the Whale Trail 2 and Lekkerwater PPP agreements, still to be finalised. No further tourism developments are proposed apart from one minor development with regards to a trail upgrade and vulture lookout point at Potberg.

With the vision to develop the existing Potberg Environmental Education Centre into a multi-purpose centre of learning as well as the development of an archaeological museum in the old milk shed and other historical buildings at Potberg, it might be necessary to add staff housing to the existing staff accommodation site. This is however subject to the necessary approvals and funding, but it should be mentioned that limited staff housing is available at the Potberg management site, and more should be built if funds are available.

The building of a permanent gate house at Potberg is also a necessity as well as the building of staff housing and satellite management facility at Sandhoogte. These needs have been included in the U-AMP.

Fencing needs to be addressed as a matter of urgency. The reserve is not adequately fenced and animals escape. In order to reduce the length of new fencing and simplify fire management, opportunities to enter into agreements with neighbouring landowners will be investigated.

5.4.1 Visitor and tourism facilities.

CapeNature has entered into PPP agreements with De Hoop Collections (Pty.) Ltd. for the development and upgrading of tourism products due to the high tourism potential and the need for more appropriate and upgraded facilities. Resulting from this, seven concessions have already been established to manage various products. These are as follows: Opstal, Koppie Alleen Cottage, Koppie Alleen Coastal Lodge (Ocean House), Vlei Spa and Lodge, Melkkamer Weddings and Conferences, Melkkamer Manor and Whale Watch Café.

Activities already implemented revolved around the upgrading of old and existing facilities at the Opstal and Melkkamer as well as additional accommodation facilities at Koppie Alleen. Developments planned are more accommodation units (lodges) at Koppie Alleen, the development of the Whale Trail 2 and the rebuilding of the burnt down Lekkerwater house. Part of the Opstal upgrading includes the future restoration of the old dwelling at Die Mond to be used as a visitor accommodation unit.

The management of the PPP agreement and activities is documented in the PPP management plan dated 01 November 2013.

More information on specific sites is given below (Table 5.6) and bed nights given are restricted and based on previous activities, number of staff with families and visitors. The numbers are inclusive of staff staying on the reserve.

Table 5.6: Tourist options with available facilities and total beds offered at De Hoop Nature Reserve.

SITE	MARKET RANGE OF FACILITIES	TOTAL BEDS
KOPPIE ALLEEN	Coastal lodge (Ocean House) Koppie Alleen Cottage and additional lodge sites approved.	40
	Coffee shop	
	Boardwalk for day visitors	
	Day centre facilities	
MELKKAMER	Lodge	30
	Up-market exclusive facility centre for private groups or FITs.	
OPSTAL	Self-catering accommodation	320
	Restaurant	
	Camping	At least 10 sites with 6 persons per site
Day visitor facilities	Upgraded	
TOTAL BEDS	Total	390

Whale Trail 2:

Bed nights: 12 per site for three sites.

The PPP agreement for the take-over of this facility is not signed and accepted yet by the preferred bidder, but the four planned development sites are located at Mosselbank, Bloukrans, Hamerkop and Sandhoogte. Although the planned service hub at Sandhoogte has been approved as part of the total plan, it might not be developed as it is now considered to manage and service the sites from the Opstal. Cooking, guiding and cleaning staff will be staying at the individual lodges when occupied.

The final trail layout is still subject to detailed planning and surveys within the conditions of the environmental authorisation, but a proposal is shown in map 20.

The authorised layout of the service roads to be upgraded is shown in Map 21 also showing the proposed new sections.

The environmental impact report for the trail development is available at the reserve office.

Lekkerwater:

Bed nights: 12

No detail plans are available yet for the re-building of this previous self-catering facility that burned down in September 2015. The PPP agreement for the take-over of the site is not signed and accepted yet by the preferred bidder, but it is envisaged that a re-built facility will be managed as a fully serviced lodge. The existing footprint will be used and no extension is allowed.

5.4.2 Management and staff accommodation.

Potberg:

Presently an initiative is being investigated to restore the old milk sheds and stables within the management complex to house an archaeological museum linked to the archaeological excavations in the reserve at Klipdrift cave near Noetsie as well as Blombos cave near Still Bay. This will be done in partnership with involved academic and archaeological institutions.

A permanent structure is necessary at the Potberg entrance to the nature reserve in order to control movement of staff, visitors and contractors. This is already listed in the U-AMP and therefore funds have to be motivated for on a regular basis.

Most reserve staff live in Bredasdorp and Swellendam and therefore the cost of travelling or camping allowance is high. The poor availability of staff after hours to manage tourism facilities and undertake compliance patrols at night and over week-ends is hampering the effective management of the reserve. Family housing should be made available in order to have staff available when required.

The patrolling of the eastern sector of the reserve as well as the MPA is hampered due to long distances that need to be travelled. It is recommended that staff housing and basic management facilities (e.g. store and boat shelter) be built at Sandhoogte (the site is already authorised to serve as the management hub for Whale Trail 2). This will provide a CapeNature presence in the eastern sector and also make access to the MPA much faster and more effective. The need for this is already listed in the U-AMP.

6 STRATEGIC IMPLEMENTATION FRAMEWORK

The Strategic Implementation Framework (SIF) guides the implementation of the management plan over five years in order to ensure that it achieves its management objectives. The SIF translates the information described in Sections 3, 4 and 5 above into management activities and targets, which will be used to inform annual plans of operation as well as the resources required to implement them. The management targets will form the basis for monitoring of performance in implementing the plan and are thus measurable.

The SIF is discussed under the following sections. The guiding principles of these sections are discussed in the Co-ordinated Policy Framework.

6.1 Legal status and reserve expansion

6.2 Regional integrated planning and cooperative governance

6.3 Ecosystem and biodiversity management

6.4 Wildlife management

6.5 Fire management

6.6 Invasive and non-invasive alien species management

6.7 Cultural and heritage resources

6.8 Law enforcement and compliance

6.9 Infrastructure management

6.10 Disaster and risk management

6.11 Socio-economic framework

6.12 Awareness, youth development and volunteers

6.13 Management effectiveness

6.14 Finance and administration management

6.15 Human resources management

6.16 Occupational health and safety management

6.17 Visitor management

6.18 Tourism development framework

Table 6.1: Legal status and reserve expansion

Objective 3	To ensure integrated, cooperative and compliant management including partnerships				
Key Deliverables	**Management/Monitoring Activities**	**Responsibility**	**Indicators**	**Timeframe**	**Reference to Existing Procedures**
The DHNRC has secure permanent legal conservation status in terms of NEM: PAA.	Submit proclamation motivation for the DHNRC in terms of NEM: PAA as a nature reserve.	Protected Areas Manager Conservation Manager CapeNature Executive Law Administration	The DHNR & MPA is legally secure.	Year 1-2	DEA Management Plan Guidelines, National Norms and Standards for Management of Protected Areas, METT-SA Copies of title deeds, diagrams, noting sheets and proclamations
The DHNRC boundary is known and appropriately demarcated and secure (Subject to funding availablity)	Survey boundaries for inclusion in the gazetted proclamations especially the western boundary with Denel OTR as well as the Denel OTR instrumentation site at Sandhoogte that has to be excluded from the NR. Correct the MPA proclamation with regards to the incorrect published coordinate as indicated in the section number 3.1. Amend the CapeNature corporate GIS information database. Ensure the public are aware of location of gazetted surveyed boundaries.	Conservation Manager Protected Areas Manager GIS Technician Law Administration Denel OTR		Year 1-2	Nature Reserve Proclamations Marine Protected Area Proclamtion, CapeNature Corporate GIS database.

A buffer zone for the De Hoop NR has been established	Investigate the options for the establishment of stewardship sites bordering the De Hoop NR. As per reserve expansion strategy described in section 4.2	Conservation manager Programme Manager; Landscape Conservation	Stewardship Agreements	Year 1-5	CapeNature's Protected Area Expansion Strategy.
Conservation corridors have been established between other nearby conservation areas.	Investigate the options for the establishment of a corridor between De Hoop NR and the still to be established Rûensveld Cluster conservation area as per reserve expansion strategy.	Conservation Manager Conservation Services Manager Programme Manager: Landscape Conservation	Stewardship Agreements	Year 1-5	CapeNature's Protected Area Expansion Strategy.

Budget allocation	**Development**	
	Operation (5 Year Forecast)	R414 992

Table 6.2: Regional integrated planning and cooperative governance

Objective 2	To implement an intergrated landscape and seascape iniative approach				
Objective 3	To ensure intergrated, co-operative and compliant management including partnerships				
Key Deliverables	**Management/Monitoring Activities**	**Responsibility**	**Indicators**	**Timeframe**	**Reference to Existing Procedures**
The DHNRC is integrated into land-use planning outside of the nature reserve.	Maintain and implement the MOU with DEA: Oceans & Coast. Inform and integrate the management objectives for the DHNRC into the SDF's and IDP's of the Overberg District and Cape Agulhas Municipalities. Inform and integrate the management objectives for the DHNRC into provincial conservation plan and the SANBI marine conservation plans. Represent DHNRC on the Municipal Coastal Committee, Overberg intergrated Conservation Group (OICG) and Agulhas Biodiversity intiative in the Overberg (ABI2) and other relevant District and Local conservation bodies.	Conservation Manager Regional Manager, Programme Manager: Coastal Regional Ecologist Community Conservation Manager Scientist: Conservation Planner Scientist: Landuse	MOU with DEA; O&C The protected area is integrated into land-use planning outside of the protected area SANBI Marine Conservation Plan Minutes of meetings	Year 1 -5	MOUs (DEA: Oceans & Coast), TOR for Regional coastal Committee ABI2 constitution
Establish a functioning Advisory committee/forum for the DHNRC.	Establish a Protected Area Advisory Committee (PAAC) for the DHNRC and/or forums for specific stakeholder or user groups. Develop and apply a Terms of Reference for involvement of stakeholders in advising	Conservation Manager Community Conservation Manager	Advisory committee and or forums for the DHNRC has been established, is functioning and effective. Minutes of meetings.	Year 1-5	Regulations for the proper administration of nature reserves

	management according to their expertise/mandate. Attend and participate in PAAC/forum meetings.				CapeNature Stakeholder Process, ToRs (facilitator, PAAC), DHNRC Integrated Management Plan

Budget allocation	**Development**	
	Operation (5 Year Forecast)	R414 992

Table 6.3: Ecosystem and biodiversity management

Objective 1	**To conserve the representative biodiversity of De Hoop NR and MPA with particular emphasis on local endemic and threatened species**				
Objective 4	**To conserve/maintain ecosystems processes**				
Objective 6	**To promote and enable conservation orietated research within the HR and MPA.**				
Key Deliverables	**Management/Monitoring Activities**	**Responsibility**	**Indicators**	**Timeframe**	**Reference to Existing**
Compile an Ecological Plan of Operation and Ecological Matrix for DHNR & MPA.	Develop and implement an approved Ecological Matrix for the DHNR & MPA. Compile an Ecological Plan of Operations to support the Ecological Matrix.	Conservation Manager Ecological Coordinator Regional Ecologist	Approved and implemented annual ecological matrix. Monthly progress report on implemented matrix. Current site spesific project descriptions. APP targets met.	Year 1-5	Ecological Matrix Ecological Plan of Operations, Baseline data collection and monitoring manual (2010)
A biodiversity resource inventory for the DHNR & MPA is in place.	Collect specimens (where relevant) and submit to Scientific Services. Analyse data, re-assess and implement adaptive management strategies. Map and survey kelp forest distribution. Conduct an inter-tidal diversity assessment.	Conservation Manager Ecological Coordinator Regional Ecologist	Monthly progress report on implemented matrix. Biodiversity resource inventory: Focul point surveys conducted. Reports from researchers	Year 1-5	Baseline data collection and monitoring manual (2010)
A biodiversity monitoring programme for the DHNR & MPA is being implemented.	Prioritisation of species for inclusion in the Ecological Matrix. Implement the Ecological Matrix.	Conservation Manager	Approved and implemented annual ecological matrix.	Year 1-5	Baseline data collection and monitoring manual (2010)

Key Deliverables	Management/Monitoring Activities	Responsibility	Indicators	Timeframe	Reference to Existing
	Record all entanglements and strandings of cetaceans, whales, seals (excluding Cape Fur seal) and seabirds and document relevant morphometric measurements. Review monitoring protocols. Identify monitoring needs of the reserve in consultation with Scientific Services. Establish indicators for monitoring. Implement monitoring activities as per the Ecological Matrix. Analyse data, re-assess and implement adaptive management strategies. Collection of climatic data on the DHNR & MPA including sea temperature.	Ecological Coordinator Regional Ecologist Scientist: Ornithologist and Mammal Ecologist	Monthly progress report on implemented matrix.		
A research programme for the DHNR & MPA is being implemented.	Identify research needs for the reserve. Evaluate and comment on research permit applications Maintain a Research Register for DHNR & MPA Results of research projects are fed back to the management of the reserve.	Conservation Manager Ecological Coordinator Regional Ecologist	List of research needs and research register.	Year 1-5	African penguin BMP-s, CapeNature Research Permit Application Protocol, IUCN Guidelines

Key Deliverables	Management/Monitoring Activities	Responsibility	Indicators	Timeframe	Reference to Existing
	Results are used to adapt management of the nature reserve where relevant. Assist with access, data collection and supervision for approved research projects.				
The protection of flora	Implement monitoring actions as per ecological matrix including the post fire regeneration of identied Proteacea and the establishement of permanent plots with the emphasise of monitoring identified Proteacea flower production and growth. Monitor population status and health of identified rare and endagered species. Analyse monitoring data as per ecological matrix and adapt or apply approporiate management actions as decided by QEM and RMC.	Conservation Manager Ecological coordinator	Approved and implemented annual ecological matrix. Monthly progress report on implemented matrix.	Year 1-5	Ecological monitoring matrix and ecological management plan; Corporate fire management protocols and guidelines; Corporate alien eradication protocols and guidelines; Baseline data collection and monitoring manual (2010)
Prevent and mitigate soil erosion on the De Hoop NR & MPA.	Conduct a roads and footpath assessment. Close and rehabilitate inappropriate roads within the reserve and re-design road networks where applicable.	Conservation Manager Ecological Coordinator	Road and footpath assessment report.	Year 1-5	Baseline data collection and monitoring manual (2010)

Key Deliverables	Management/Monitoring Activities	Responsibility	Indicators	Timeframe	Reference to Existing
Mitigate the impacts of river water abstraction on the reserve in particular the De Hoop Vlei as Ramsar site	Liaise with BGCMA with regards to possible negative impacts on the ecology of the De Hoop Vlei by water extraction from the Sout and Potbergs Rivers and other possible actions that can have a negative impact. Investigate possible actions to mitigate identified impacts	Conservation Manager Protected Areas Manager Scientific Services	Formal request to BGCMA.	Year 1	BGCMA strategic plan.
Conserve and protect rivers in particular the rivers feeding into the De Hoop Vlei as Ramsar site.	Conduct SASS monitoring on the Sout and Potbergs Rivers and other identified rivers in conjunction with Scientific Services.	Conservation Manager Scientist: Aquatic		Annually	South African River Scoring System
Rehabilitate and conserve wetlands and in particular the De Hoop Vlei as a Ramsar site	The presence of CBA and/or FEPA wetlands should be verified in order to update these layers in the mapping process for the Fine Scale Planning and NFEPA program maps. Identify wetlands and seeps potentially impacted by groundwater abstraction. Investigate appropriate monitoring strategy for wetlands and seeps. Avifauna monitoring on the Ramsar site is already included in the reserve's ecological matrix Identify and prioritise wetlands that require future rehabilitation (use appropriate norms and standards to rehabilitate).	Conservation Manager Scientist: Aquatic		Year 1-5	Working for Wetlands protocols

Key Deliverables	Management/Monitoring Activities	Responsibility	Indicators	Timeframe	Reference to Existing
	Close, rehabilitate roads within wetland areas and re-design road networks where practically possible. Prohibate any boating on Buffelsvlei.				
Consumptive utilisation of biological resources.	Manage the harvesting of firewood within the alien eradication program and ensure minimum disturbance of the natural veld by allowing the use of vehicles only on approved tracks with SAL's.	Conservation Manager Ecological Co-ordinator Community Conservation Manager		Year 1-5	CapeNature Policy on consumptive utilisation (2007).

Budget allocation	**Development**	
	Operation (5 Year Forecast)	R7 469 863

Table 6.4: Wildlife management

Objective 1	**To conserve the representative faunal diversity of de hoop NR and MPA with particular emphasis on local endemic and threatened species**				
Key Deliverables	**Management/Monitoring Activities**	**Responsibility**	**Indicators**	**Timeframe**	**Reference to Existing Procedures**
Ensure effective game and other wildlife management on De Hoop NR and MPA.	Compile and implement a game management plan to address detailed management activities including habitat assessments, ecological reserve and carrying capacity, fencing, surplus animals, risk assessment and contingency planning. Implement an effective wildlife monitoring program including regular censuses of identified species e.g. Cape Vulture, Cape mountain zebra, bontebok, eland, ostrich, small game species, whales, Black Oyster Catcher, reef fishes (tag & release project) and apex marine predators. Record mortalities of all wildlife and collect samples where practical. Maintain the reserve game register	Conservation Manager Conservation Services Manager Programme Manager: Wildlife Ecological Coordinator Scientist: mammal Ecologist	Species specific. To be determined as required.	Year 1 and onging implementation	Game Translocation and Utilisation Policy for the Western Cape Province (2011); CMZ BMP-S Bontebok Conservation, Translocation and Utilization Policy Baseline data collection and monitoring manual (2010)
Manage damage causing/ nuisance fauna.	Comment on permit applications from neighbouring landowners to control and remove damage causing animals.	Conservation Manager Conservation Services Manager		Ongoing	

Key Deliverables	Management/Monitoring Activities	Responsibility	Indicators	Timeframe	Reference to Existing Procedures
	Compile and implement baboon management protocol. Manage pets kept by staff on the reserve as per CN policy.	Programme Manager: Wildlife			

Budget Allocation	**Development**	R0
	Operation (5 Year Forecast)	R4 149 924

Table 6.5: Fire management

Objective 4	**To conserve/maintain ecosystem and processes**				
Key Deliverables	**Management/Monitoring Activities**	**Responsibility**	**Indicators**	**Timeframe**	**Reference to Existing Procedures**
Reduce and prevent the spread of fires across the Reserve's boundaries when possible and minimize accidental and deliberate fires within the reserve.	Prevent accidental and deliberate fires from spreading in the reserve and from entering the reserve. Control the spread of natural fires across the reserve boundaries and minimise damage to infrastructure. Update and implement Fire Protection and Reaction Plans including risk assessments. Construct priority firebreaks according to schedule. Assess appropriateness of current firebreak network and re-align where appropriate. Negotiate firebreak agreements with neighbours where relevant. Ensure fuel reduction around infrastructure to minimise risk. Conduct a pre-fire season fire audit. Fire Reports completed.	Conservation Manager Catchment Manager	Reserve has a minimum pre-fire season audit score of 90% by Year 5. The distribution and range of veld age is within the limits of acceptable change (To be determined (TBD)).	Annually	Fire Management Policy and Guidelines; Fire break register ICM APO

	Mapping of all fires and capture on GIS. De-briefing sessions held after each fire and records kept.				
Establish and maintain partnerships to improve fire management on the DHNRC.	Ensure membership to and attend local FPA meetings. Maintain firebreak agreements with neighbouring landowners. Attend pre-fire season meetings with local Fire & Rescue Services.	Conservation Manager	Minutes of meetings. Agreements with neighbours	Year 1-5	Fire Management Policy and Guidelines; FPA operational rules and guidelines.
Determine and implement thresholds of potential concern (TPC's) for fire management on the DHNRC.	Conduct permanent protea plot monitoring as per monitoring protocol. Conduct post fire regeneration monitoring. Set and monitor TPC's.	Conservation Manager Ecological Co-ordinator Regional Ecologist	Implemented ecological matrix.	Year 1-5	Fire Management Policy and Guidelines; Baseline data collection and Monitoring Manual; Ecological Matrix.
Wildfires as a result of human negligence are reduced.	Create a fire awareness programme for tourists, local communities and staff through the Firewise initiative.	Community Conservation Manager	Developed and implemented programme	Year 1-5	Fire Management Policy and Guidelines; Fire wise Implementation Guidelines

Budget Allocation	**Development**	R0
	Operation (5 Year Forecast)	R2 904 947

Table 6.6: Invasive and non-invasive alien species management

Objective 4	**To conserve/maintain ecosystem and processes**				
Key Deliverables	**Management/Monitoring Activities**	**Responsibility**	**Indicators**	**Timeframe**	**Reference to Existing Procedures**
Invasive alien species					
Early Detection and rapid response	Report all alien fauna and flora to the Invasive Species Programme (ISP) of SANBI to add to their database.	REST, Conservation Manager	Reports	Year 1-5	SANBI ISP operations policy on early detections.
Invasive Alien Flora					
Eradicate alien and invasive species within the De Hoop NR on an Ongoing basis.	Compile a Management Unit Clearing Plan using the IAP prioritisation map. Compile and implement APO.	Conservation Manager Ecological Co-ordinator Regional Ecologist	Invasive species map. APO completed. % total area cleared where IAP's have been controlled to a maintenance phase by Year 5 (TBD).	Year 1-5	Ecological matrix
Monitoring of alien vegetation on the De Hoop NR informs adaptive management strategies.	Identify and map all alien and invasive flora within the DHNRC or threatening the Reserve.	Conservation Manager	Implementation of density mapping and invasive species map.	Year 1-5	Ecological matrix
Implement biological control as a method of IAP management.	Identify potential biological control sites and prioritise accordingly. Implement new and supplement existing biological control.	Conservation Manager Ecological Co-ordinator Regional Ecologist	Biological control sites mapped and updated. Updated records Implemented ecological matrix.	Year 1-5	Ecological matrix CapeNature Bio Control Strategy

	Ensure accurate record keeping of biological control data. Ensure biological control site security.				
Prevent the introduction of alien and invasive species from neighbouring landowners.	Ensure surrounding landowners are aware of relevant legislation.	Conservation Manager Community Conservation Manager Conservation Services Manager		Year 1-5	Working for Water and Dept Agriculture LandCare Guidelines
Invasive Alien Fauna					
Prevent the introduction of alien and invasive species.	Implement the guidelines with regards to domestic animals within the reserve. Tourists not permitted to bring in any domestic animals into the reserve.	Conservation Manager Community Conservation Manager	No new introduced free roaming alien invader species.	Year 1-5	CapeNature Policy on domestic animals on nature reserves Distribution of freshwater fish policy
Control alien and invasive species within the De Hoop NR and MPA	Identify alien fauna occurring on the reserve. Monitor populations of alien fauna on the reserve. Implement control measures where appropriate. Measure success of control methods utilised.	Conservation Manager Ecological Co-ordinator Regional Ecologist		Year 1-5	CapeNature Policy on domestic animals on nature reserves SASS methodology Distribution of freshwater fish policy

Budget Allocation	**Development**	R0

	Operation (5 Year Forecast)	R4 979 908

Table 6.7: Cultural heritage resource management

Objective 5	**To conserve the cultural heritage in the De Hoop NR and MPA.**				
Key Deliverable	**Management/Monitoring Activities**	**Responsibility**	**Indicators**	**Timeframe**	**Reference to Existing Procedures**
Conserve cultural heritage resources within the DHNR and MPA	Maintain and build on the cultural heritage resource inventory for the De Hoop NR and MPA.	Conservation Manager Community Conservation Manager	Heritage assets and values being managed consistent to objectives	Year 1-5	SAHRA Ecological matrix Cultural Management Plan for the De Hoop Nature Reserve (Lombard & Henshilwood 2009).
Cultural heritage resources are managed to meet the protected area objectives.	Implement the Cultural Heritage Resource Management Plan for the De Hoop NR. Revise the Cultural Heritage Management Plan during 2017.	Conservation Manager REST Community Conservation Manager	Updated and implemented Cultural Heritage Plan.	Year1-5	
Monitor cultural heritage resources.	Monitoring and control access to priority cultural heritage sites:	Conservation Manager	Updated and implemented Cultural Heritage Plan	Year 1-5	

Budget Allocation	**Development**	R0
	Operation (5 Year Forecast)	R414 992

Table 6.8: Law enforcement and compliance

Objective 3	**Ensure intergrated, co-operative and compliant management including partnerships**				
Key Deliverables	**Management/Monitoring Activities**	**Responsibility**	**Indicators**	**Timeframe**	**Reference to Existing Procedures**
Law enforcement for the DHNR & MPA is effective.	All staff must have a working knowledge of all legislation applicable to their function and mandate. Appoint sufficient capacity to enforce the Acts, regulations and internal rules. Ensure the DHNR & MPA staff is adequately capacitated to enforce legislation within the organisation's mandate and does so effectively. Ensure staff is formally designated to enforce the relevant legislation. Appropriate staff has been designated as environmental management inspectors/fishery control officers. Ensure staff has the necessary equipment to enable them to do law enforcement effectively. Ensure specific relevant training has been identified and staff has received relevant training.	Conservation Manager Protected Area Manager Programme Manager: Coastal Human Capital Development Manager Programme Manager: Biodiversity Crime	Number of peace officers trained and appointed Number of EMI's trained and appointed. Number of sea fisheries officers trained and appointed.	Year 1-5	Criminal Procedure Act 51 of 1977; Bill of Rights; Constitution of the Republic of South Africa

	Ensure adequate law enforcement support from other sections of the organization Local policing forum meetings are attended in priority areas in order to build partnerships with local law enforcement. All relevant cases are reported via BMS and documents submitted as verification.				
Protection systems are in place and operating effectively.	Enforce regulations, policies and standard operating procedures with regard to access. Maintain full time gate control at the main gate. Maintain gate control at the Potberg entrance. Lobby for funding and the building of a permanent gate house. Ensure that the system of access control for flying in vistors is maintained. Ensure that all other access gates are locked and keys controlled. Report on the Law Enforcement Indicators as stipulated in the MOU with DEA: O&C (Report to DEA: O&C and DEA & Development Planning) and in collaboration with DAFF.	Conservation Manager Protected Area Manager Programme Manager: Coastal Human Capital Development Manager Programme Manager: Biodiversity Crime Community Conservation Manager	Gate control at Potberg and main entrance. Place building of gate house on UAMP. Access registers MPA reports Liason committee minutes. Reserve zonation map. Patrol reports. Law enforcement filing system	Year 1-5	Criminal Procedure Act 51 of 1977; Bill of Rights; Constitution of the republic of South Africa

	Adjacent communities are engaged in order to promote the reserve, to build relationships and to identify priority areas. Areas in the nature reserve and MPA have been identified and prioritised in terms of conservation value or type of utilisation, etc. Regular routine patrols per vehicle, boat and on foot are performed in all areas, but empahsis is placed on priority areas. All compliance documentation is properly completed and retained as Means of verification.				

Budget allocation	**Development**	R0
	Operation (5 Year Forecast)	R2 904 947

Table 6.9: Infrastructure management

Objective 3	To ensure integrated, co-operative and compliant management including partners				
Key Deliverables	**Management/Monitoring Activities**	**Responsibility**	**Indicators**	**Timeframe**	**Reference to Existing Procedures**
Ensure maintenance of infrastructure and equipment.	Map all infrastructure, update and maintain infrastructure register. The infrastructure necessary to manage the nature reserve effectively is in place and additional needs listed in the U-AMP. Assess if staff facilities are adequate to perform critical management activities. Ensure that there is adequate operational equipment as required for operational management purposes. Maintenance of Infrastructure as scheduled in registers to ensure upkeep and prevent degradation. Equipment is maintained in good working condition. Liaise with Department of Transport and Public Works inspector where required.	Conservation Manager Catchment Manager Regional Manager	Infrastructure register and map. Public Works maintenance Schedule. U-AMP. Service schedules Pre-fire audit.	1-5 years.	User Asset Management Plan (U-AMP).
Align all infrastructures to the conservation development framework and zonation.	Assess infrastructure development appropriateness to the CDF.	Conservation Manager	CDF zonation.	1-5 years.	Infrastructure register.

		Ecological coordinator The Manager, Scietific Serices			
Roads/Jeep Tracks and Trails are managed to minimise impact on the environment and to allow for the management of tourism and visitor access	Conduct an assessment on the DHNRC with the aim of re-aligning certain roads as well as upgrading. Promote the implementation of the re-alignment and upgrading plan. Compile and implement maintenance plan. Rehabilitate where necessary. Borrow pits mapped, assessed and rehabilitated (where required). Monitor use and impact of identified roads, tracks and trails. Promote the tarring/paving of all the main roads especially those used by tourist and the adding of armour flex blocks or concrete strips where the tracks are prone to erosion.	Conservation Manager	Infrastructure maintenance schedule.	1-5 years.	Infrastructure register and Public Works schedule.
Buildings are effectively maintained.	Compile and maintain a building register. Provide Department of Transport and Public Works annually with works list to reflect maintenance requirements.	Conservation Manager Regional Manager	Maintenance schedule. EIA and EMP.	1-5 years.	Infrastructure register, QEM, NEMA EIA process.

	Minor maintenance undertaken with own resources e.g. staff, funding and contractors. Maintenance of or the erection of new buildings is appropriately planned (EMP), approved by the QEM and if required the Appropriate EIA completed. Promote the implementation and installation of energy saving and environmentally sound options. (Green Building principals).				
Maintain fences according to legislative requirements.	Conduct a fence assessment. Compile fence management plan. Monitor the condition and maintain when necessary. Promote the fencing of the open boundaries of the reserve and the replacement of old fencing. Investigate the possibility to enter into fencing agreements with neighbouring landowners.	Conservation Manager	Fence assessment has been completed and report compiled. Actions listed are being implemented.	1-5 years.	Infrastructure register and Public Works schedule.
Environmental Management: Energy	Promote the installation and use of energy and water saving devices and cost effective habits.	Conservation Manager	Energy and water saving devices in place.	1-5 years.	National Guidelines.
Environmental Management: Herbicide and Fuel Stores	Manage herbicide, fuel and gas stores according to required health	Conservation Manager	Comply with relevant legislation.	1-5 years.	OHS Act, Audits

	and safety standards and regulations.				
Management of High Sites used for communication equipment.	Map all High sites (with photos). Monitor impacts. Control access	Conservation Manager	Infrastructure map. Ecological monitoring matrix. Access registers	1-5 years.	CapeNature policy on high sites.
Signage is appropriate and effective to support management.	Compile a signage register with maintenance plan and new needs. Implement maintenance plan and erect new signs as determined by the audit.	Tourism officer	Signage register and implementation	1-5 years.	Corporate signage standards. Signage registers.

Budget Allocation	**Development**	
	Operation (5 Year Forecast)	R2 489 954

Table 6.10: Disaster and risk management

Objective 3	**To ensure intergrated, co-operative and compliant management including partnerships**				
Key Deliverables	**Management/Monitoring Activities**	**Responsibility**	**Indicators**	**Timeframe**	**Reference to Existing Procedures**
Disaster prevention and preparedness	Conduct and maintain a risk assessment and identify areas of potential concern Engage and assist with disaster management units from municipalities. Conduct an annual audit of disaster management plans and mitigation measure readiness. Annual review and exercise of contingency and evacuation plans.	Conservation Manager, Programme Manager: Coastal Community Conservation Manager OTR Manager Catchment Manager OHS officer	Risk assesments and mitigation plans implemented Compile and implement disaster management plan for DHNR & MPA which would include oil spill, on site fuel spill, disease outbreaks, missile testing accident etc.	Year 1-5	Regional Oil Spill Plan Ecological Matrix Ecological Plan of Operations, African Penguin BMP-s CapeNature Risk Management Policy and Strategy (2009) Fire Management Policy and Guidelines; CapeNature Health & Safety Policy and Guidelines.
Disaster response.	Train staff and NGOs to ensure capacity to manage and mitigate the effects of disasters. Procure equipment for disaster response and mitigation. Participate and assist district municipality disaster management structure. Activate evacuation and contingency plans.	Conservation Manager Programme Manager: Coastal Catchment Manager OHS officer	Trained staff Disasters are mitigated as quickly and efficiently as possible, to minimise impacts.	Year 1-5	Regional Oil Spill Plan, Ecological Matrix Ecological Plan of Operations African Penguin BMP-s CapeNature Risk Management Policy and Strategy (200) Fire Management Policy and Guidelines;

Ensure effective and integrated risk management within a framework of sound corporate governance.	On site risk identification and analysis. On site identification of controls/ mitigations. Monitoring of risks.	Protected Areas Manager Conservation Manager OHS officer	Disasters are mitigated as quickly and efficiently as possible, to minimise impacts.	Year1-5	PFMA Section 38. Risk Management Policy and Strategy.

Budget allocation	**Development**	
	Operation (5 Year Forecast)	R412 992

Table 6.11: Socio-economic framework

Objective 8	To provide biodiversity access and benefit sharing opportunities for communities				
Key Deliverables	**Management/Monitoring Activities**	**Responsibility**	**Indicators**	**Timeframe**	**Reference to Existing Procedures**
Create access to the conservation economy through the implementation and management of appropriate initiatives and projects.	Compile Integrated Workplan. Compile Annual Plan of Operations. (APO) Implement approved APO according to the required timeframes. Complete reporting on EPWP database monthly.	Conservation Manager Community Conservation Manager	Number of EPWP job opportunities (n). Number of EPWP full time equivalents (n). Number of people directly benefitting from Sustainable Livelihood Programmes (n). Number of person days employment created (n).	1-5 years.	BMS.
The De Hoop NR and MPA provides community development opportunities through various capacity building interventions, linked to job creation opportunities.	Determine training needs and facilitate the implementation of training plan. Promote the appointment and development of SMME's with appropriate training.	Conservation Manager Community Conservation Manager SMME Manager		1-5 years.	BMS.
Manage consumptive utilisation of biological resources.	All requests to utilise resources from the De Hoop NR & MPA will be dealt within terms of the CapeNature Policy on consumptive utilisation.	Conservation Manager Community Conservation Manager		1-5 years.	CapeNature Policy on consumptive utilisation (2007).
The De Hoop NR and MPA have spiritual or religious significance.	Access to the De Hoop NR & MPA for spiritual, cultural and traditional purposes will be allowed subject to permit conditions and with prior approval.	Conservation Manager Community Conservation Manager	Number of persons accessing CapeNature protected areas for cultural, traditional, spiritual, youth development and sustainable harvesting activities (n).	1-5 years.	

Budget Allocation	**Development**	
	Operation (5 Year Forecast)	R4 149 924

Table 6.12: Awareness, youth development and volunteers

Objective 7	**To provide quality environmental education, awareness and outreach programmes to support the youth within CapeNature's People and Conservation programme.**				
Key Deliverables	**Management/Monitoring Activities**	**Responsibility**	**Indicators**	**Timeframe**	**Reference to Existing Procedures**
Host youth and community development through environmental awareness that assists in developing the knowledge, skills, values and commitment necessary to achieve environmentally sustainable development. Ensure a specific focus on the DHNR & MPA.	Compile information and resource material on DHNR & MPA for dissemination and presentation on Environmental Awareness calendar days (e.g. Heritage day, National Marine Week and Marine Protected Area Awareness,). Collaborate with partners to arrange Environmental Awareness events and scheduled school activities.	Conservation Manager Community Conservation Manager Communications Manager Community Conservation Officer	Number of learners provided with environmental education opportunities (n). Number of awareness events. Number of EE resources developed for distribution.	Year 1 -5	People and Conservation Action Plan, CapeNature Communications Policy
Environmental education is provided to promote an understanding of biodiversity and the use of the natural environment as a vehicle for learning and personal development.	Develop and implement an education and awareness plan linked to the objectives of DHNR & MPA and general conservation & environmental management principles. Equip and maintain the Potberg EE centre and facilities in good functional working order to ensure it serve its objective. Internal staff trained and capacitated to facilitate EE. Co-facilitate the capacity building of teachers to provide EE to learners.	Conservation Manager Community Conservation Manager Community Conservation Officer Human Capital Development Manager	Number of learners provided with environmental education opportunities (n) Number of outreach and capacity building programs run. Number of schools visiting the EE centre.	Year 1 -5	

	Management will strive to raise the profile of DHNR & MPA through linked awareness and education programmes. Report on activities as per BMS register procedures. Investigate and promote the upgrading of the Potberg Estate to a multi purpose centre of learning towards excellence. Conduct awareness and outreach programmes. Monitor the quality of EE provided. Ensure that the content of material provided is accurate and compatable with the learners curriculum. Provide training and capacity building opportunities for conservation trainees (interns).				
Effective use of volunteers	Accommodate volunteers depending on the needs of the reserve, experience of the volunteer and in accordance with CapeNature policies and strategies.	Conservation Manager Community Conservation Manager	Number of volunteers.	Year 5	

Budget allocation	**Development**	
	Operation (5 Year Forecast)	R 414 992

Table 6.13: Management effectiveness

Objective 3	**To ensure intergrated co-operative and compliant management including partnerships**				
Key Deliverables	**Management/Monitoring Activities**	**Responsibility**	**Indicators**	**Timeframe**	**Reference to Existing**
Implement and maintain the METT-SA	Conduct METT-SA assessments every second year. Monitor and improve METT-SA Score through the development of action plans and implementation thereof. Report to DEA as per requirement for national evaluation of METT-SA scores.	Conservation Manager Ecological Coordinator Regional Ecologist Protected Areas Manager	The DHNR & MPA will complete METT-SA assesment as per standard operating procedure (SOP)	Year 1 -5	METT-SA
Auditing systems inform management.	Conduct CapeNature integrated auditing system. Compile actions lists to address audit issues. Track action list for progress. Apply adaptive management strategies.	Conservation Manager Regional Ecologist Protected Areas Manager	Completed audits as per protocol.	Year 1 -5	
Progress reports are compiled.	Compile quarterly BMS progress reports. Monthly report to the Protected area Manager on reserve activities. Bi-annual report to the Overberg Review committee. Quarterly report to DEA: O&C and per funding agreement. Report to the Natural Resource Management Programme and DEA	Conservation Manager	Reports as required	Year 1 -5	BMS Report

	on all alien eradication work done funded by DEA. Provide input towards all EPWP reporting.				
Implement and review the Management Plan for the DHNR & MPA.	Assess all PAM audit results and ensure adaptive management strategies are implemented. Compile annual report on the status of implementation of the PAMP and submit to the Member of the Executice Council (MEC).	Conservation Manager Ecological Coordinator Regional Ecologist Protected Areas Manager	Reports as required	Year 1 -5	

Budget allocation	**Development**	
	Operation (5 Year Forecast)	R414 992

Table 6.14: Finance and administration management

Objective 3	**To ensure intergrated co-operative and compliant management including partnerships**				
Key Deliverables	**Management/Monitoring Activities**	**Responsibility**	**Indicators**	**Timeframe**	**Reference to Existing Procedures**
To ensure financial accountability in terms of the PFMA and the Treasury Regulations.	Facilitate an annual internal audit of the nature reserve financial records. Internal audit report with findings and recommendations is tabled. External audit report with findings and recommendations communicated. Provide relevant financial information to reserve management. An operational budget is allocated to fund the critical management needs of the nature reserve. Ensure cash flow managed effectively. Ensure Supply Chain Management done according to procedures and policy Relevant SCM reports. Management of all expenditure and income done according to CapeNature policy and procedures to enable efficient and effective protected area management. Monthly management reports submitted to reserve management.	Finance Manager Conservation Manager	Percentage increase shown on revenue as a result of additional funding sourced. Reports as required	Year1-5	Budgeting process; APO. SAP system; Supply Chain Management Act. GRAP accounting standards

	Variance report acknkowledged signed and returned. Reserve Management provide input to monthly cash flow forecast. Signed and approved budgets provided by 1 April.				
Identify opportunities that are robust to create a diverse income base.	Identify sources of potential income. Maintain new and existing partnerships with external funders / stakeholders.	Conservation Manager Finance Manager Protected Areas Manager Regional Manager		Annually	National Treasury Regulations with regard to Donations, Sponsorships.
Fixed Asset Management	To manage the assets of the reserve in accordance with the relevant legislation. To ensure that all reserve assets are bar coded. To ensure that all reserve assets are verified bi-annually. To provide input into infrastructure asset management plan annually. Fixed Asset Register is approved by the Conservation Manager.	Conservation Manager Finance Manager	Reports and registers as required	Year 1-5	SOP's and policies. GRAP accounting standards. U-AMP guidelines.

	Verification Report is approved by the reserve management. Disposal of assets in line with policies. GIAMA requirement is met annually. Trip authorisation forms in place. To manage CapeNature and Government Motor Transport assets in accordance with policy.				
Capacity Building among staff.	Provide relevant financial and Administrative training to reserve staff.	Conservation Manager, Finance Manager	Trained staff	Year 1-5	SOP's and policies PFMA

Budget allocation	**Development**	
	Operation (5Year Forecast)	R2 074 962

Table 6.15: Human resource management

Objective 3	**To ensure intergrated co-operative and compliant management including partnerships**				
Key Deliverables	**Management/Monitoring Activities**	**Responsibility**	**Indicators**	**Timeframe**	**Reference to Existing Procedures**
Ensure an adequately resourced staff complement on the reserve.	Ensure current posts are filled and appointment of additional staff (subject to funding) in line with EE plan. Ensure resourced (tools and skills) staff in line with approved budget to manage the nature reserve effectively (subject to funding). Prioritise all critical posts for filling and develop a phased implementation plan in line with approved personnel budget. Ensure staff are aware of employee assistance programme. Employment relationship is in line with employment contract commitments. Implement an Employment Well-being Programme	Conservation Manager Protected Areas Manager Regional Manager Senior Manager: HR	All approved positions are filled.	Year1-5	Recruitment and Selection Policy; Standard Operating Procedures for Recruitment and Selection Labour Relations Act Basic Conditions of Employment Act Employment Equity Act Occupational Health & Safety Act Overtime Policy Leave Policy EE Plan
Integrate and align organisational and employee performance.	There is an effective Performance Management System in place. Ensure compliance with Code of Conduct. Performance agreements completed and signed for all employees.	Conservation Manager Protected Areas Manager Human Resources Manager	All employees performance at average of 3 or above.	Year1-5	Performance Management Handbook Annual Plan of Operations Rewards Foundation Policy

	Performance appraisals completed for all employees.				Disciplinary Code and Procedures (Managing poor performance) Code of Conduct
Skilled employees on the reserve	Develop and implement personal development plan for all staff on the reserve. Roll out of personal development plan for all staff on the reserve. Reflect capacity development interventions which are supported by mentorship and coaching agreements. Conduct skills audits as required. Develop personal development plan for all staff on the reserve. Mentorship and coaching agreements.	Conservation Manager Protected Areas Manager Human Resources manager Employment Equity and Training Committees		Year1-5	Individual PDPs Mentorship strategy and toolbox Skills Development Act Bursary Policy Internship Policy

Budget allocation	**Development**	
	Operation (5 Year Forecast)	R1 659 969

Table 6.16: Occupational health and safety management

Objective 3	**To ensure intergrated co-operative and compliant management including partnerships**				
Key Deliverables	**Management/Monitoring Activities**	**Responsibility**	**Indicators**	**Timeframe**	**Reference to Existing Procedures**
To implement OHS policies and procedures and to monitor its implementation in line with the requirements of the Occupational Health and Safety Act 85 of 1993	Implement the Occupational Health and Safety Management System. Assignment of legal appointments Accredited OHS training OHS Induction Injury and incident management Worksite health and safety meetings and toolbox talks Provision of safety signage and safe work instructions Documenting of safe work instructions and procedures Audit implementation of OHS policies, procedures and systems	Regional Manager Protected Area Manager Chief Risk Officer Conservation Manager OHS Officer	System uploaded to Google drive. Appointment letters, minutes, relevant registers, certificates Medical reports Audit reports	Year 1-5	Display of OHS Act and Policy on notice boards Availability of the Act in hard copy and Policy on the intranet Occupational Health and Safety Management System Incident Reporting procedure Safe operating procedures Safety work instructions Periodic inspection reports
To conduct Hazard Identification and Risk Assessment (HIRA)	Conduct task specific HIRA's Identify and develop control measures to mitigate risks and hazards identified. Conduct HIRA training. Continuous risk assessment	Protected Area Manager Conservation Manager Chief Risk Officer OHS Officer	Completed HIRA's Attendance registers, certificates Audit reports OREP	Year 1-5	Baseline risk assessment Continuous risk assessment Safe operating procedures

	Compilation of Occupational Risk Exposure Profile (OREP)				Safe work instructions OREP
To establish, implement and monitor the medical surveillance programme	Conduct medical surveillance based on job specific tasks and Occupational Risk Exposure Profile (OREP) Monitor and evaluate employee medical surveillance outcomes	Regional Manager Protected Area Manager Chief Risk Officer Conservation Manager OHS Officer Human Resources	Medical Surveillance Reports	Year 1-5	OREP

Budget allocation	**Development**	
	Operation (5 Year Forecast)	R414 992

Table 6.17: Visitor management and services

Objective 9	**To provide for appropriate nature based recreation, tourism and sustainable income generation activities within the framework of the Green Economy.**				
Key Deliverables	**Management/Monitoring Activities**	**Responsibility**	**Indicators**	**Timeframe**	**Reference to Existing Procedures**
Management of PPP agreements	Ensure that the PPP management plans are implemented Have regular management meetings as per agreement Ensure that activities are in line with the De Hoop NR & MPA Strategic Management Plan. Ensure activities are in line with the approved PPP Activities plan	Conservation Manager Tourism Manager	Income targets are met Visitors experience positive Reserve objectives are not compromised	Year1-5	De Hoop PPP Management Plan De Hoop PPP activities plan De Hoop PPP Concession Agreements for Opstal, Koppie Alleen Cottage, Koppie Alleen Coastal Lodge, Vei Spa and Lodge, Melkkamer Weddings and Conferences, Melkkamer Manor and Whale Watch Café EIA authorisations and conditions

Management of tourism facilities other than those managed by PPP.	Maintain the Whale Trail huts and all related facilities and equipment. Maintain communication channels with hikers by providing relevant information verbally and per pamphlets. Maintain and operate the curio shop at Potberg for the benefit of hikers and other visitors. Maintain the operation of cleaning, portage and shuttle services for the Whale Trail. Maintain a visitor information and control service at the De Hoop main gate . Maintain day visitor access to Koppie Alleen and control numbers. Determine the visitor capacity at Koppie Alleen and control according to the determination. Investigate the enlargement of the parking area at Koppie Alleen Train relevant staff in tourism handling and communication.	Conservation Manager Tourism Manager	Income targets are met Visitor experience positive Reserve objectives are not compromised	Year1-5	
To strive to ensure visitor safety.	Compile safety regulations for visitors to DHNR & MPA Ensure the safety of visitors Implement baboon management protocol.	Conservation Manager	Health & Safety audit. Baboon monitors in place	Year 1 - 5	OHS Act CapeNature OHS policy

Budget allocation	**Development**	
	Operation (5 Year Forecast)	R4 979 908

Table 6.18: Tourism development framework

Objective 9	To provide for appropriate nature based recreation, tourism and sustainable income generation activities within the framework of the Green Economy.				
Action plans	**Management/Monitoring Activities**	**Responsibility**	**Indicators**	**Timeframe**	**Reference to Existing Procedures**
To provide nature and cultural tourism and recreational opportunities within the Reserve without affecting the ecological processes negatively.	Consider concessionaire process when applicable. Identify and implement tourism development opportunities and activities within the Reserve according to zonation Monitor tourism related impacts and implement corrective management where necessary.	Conservation Manager Protected Areas Manager Tourism Manager PPP Officer Concessionaires	Concession of selected tourism opportunities Development priorities in place and implemented in the correct Zones within the Reserve Recommendations within these plans implemented Concessionaire compliance audited	Year 5	Reserve Zonation
Ensure tourism contributes to conservation through the DHNR & MPA	Monitor Tourist use and interest within the Reserve, including negative impacts, adapt where necessary. Identify the potential for negative consequences and their adverse effects on tourism (Risk assessment).	Conservation Manager	Tourist Use Monitoring Programme in place Management systems (financial, risk and asset register) are in place and implemented	Year 1-5	
Promote Community-Based Tourism and SMME initiatives in and around the Reserve.	Investigate possibilities for private / community sector involvement in the planning, design, financing and / or running of community based tourist facilities.	Tourism officer Conservation Manager Community Conservation Manager	Successful operation (stable tourist flow and financial success) of SMMEs and community-based tourist facilities	Year 1-5	Conservation Development Framework. Strategic Development Plan.

Budget allocation	**Development**	
	Operation (5 Year Forecast)	R829 985

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8. APPENDIXES

Appendix 1. Infrastructure located in the De Hoop Nature Reserve Complex.

Location on Reserve	Management Authority	ID	Feature Type	Description
Buffelsfontein	CapeNature	270	EE Facility	Buffelsfontein
Cape Infanta	PORTNET	252	Lighthouse	Communication Tower
Cape Infanta	PORTNET	255	Lighthouse	Garage
Cape Infanta	PORTNET	254	Lighthouse	House
Cape Infanta	PORTNET	256	Lighthouse	Cape Infanta Lighthouse
Cupidoskraal (Whale Trail)	CapeNature	263	Shelter	Cupidoskraal House
Cupidoskraal	CapeNature	260, 261	Staff Quarters	FTE Quarters
Cupidoskraal (Whale Trail)	CapeNature	257	Tourism Accommodation	Cupidoskraal House
De Hoop	CapeNature	290	Gate House	Main Gate House
De Hoop	CapeNature	212	Generator Room	Generator Shelter
De Hoop	Vodacom	295	Communication Tower	Vodacom Tower
De Hoop	Vodacom	296	Generator Room	Vodacom Generator
Die Opstal	CapeNature	59	Garage	Manager Garage
Die Opstal	CapeNature	21	Inspection Quarters	Research House 01
Die Opstal	CapeNature	28	Inspection Quarters	Research House 02
Die Opstal	CapeNature	30	Pump House	
Die Opstal	CapeNature	45	Staff Quarters	Managers House
Die Opstal	De Hoop Collection	76	Ablution	Camp Site Ablution
Die Opstal	De Hoop Collection	116, 141, 145	Ablution	Vlei Rondawel Ablution
Die Opstal	De Hoop Collection	286	Ablution	Restaurant Ablution
Die Opstal	De Hoop Collection	115	Boat House	Boat House
Die Opstal	De Hoop Collection	146	Camp Site	Die Opstal Campsite
Die Opstal	De Hoop Collection	287	Construction Storage	
Die Opstal	De Hoop Collection	131	Events Hall	
Die Opstal	De Hoop Collection	143	Fuel Store	
Die Opstal	De Hoop Collection	7, 18, 20, 98 - 102	Garage	
Die Opstal	De Hoop Collection	41	Garage	Garage
Die Opstal	De Hoop Collection	126	General Store	Dry store
Die Opstal	De Hoop Collection	118, 127, 129, 137	General Store	
Die Opstal	De Hoop Collection	136	General Store	Boma Store
Die Opstal	De Hoop Collection	15	Helipad	Helipad

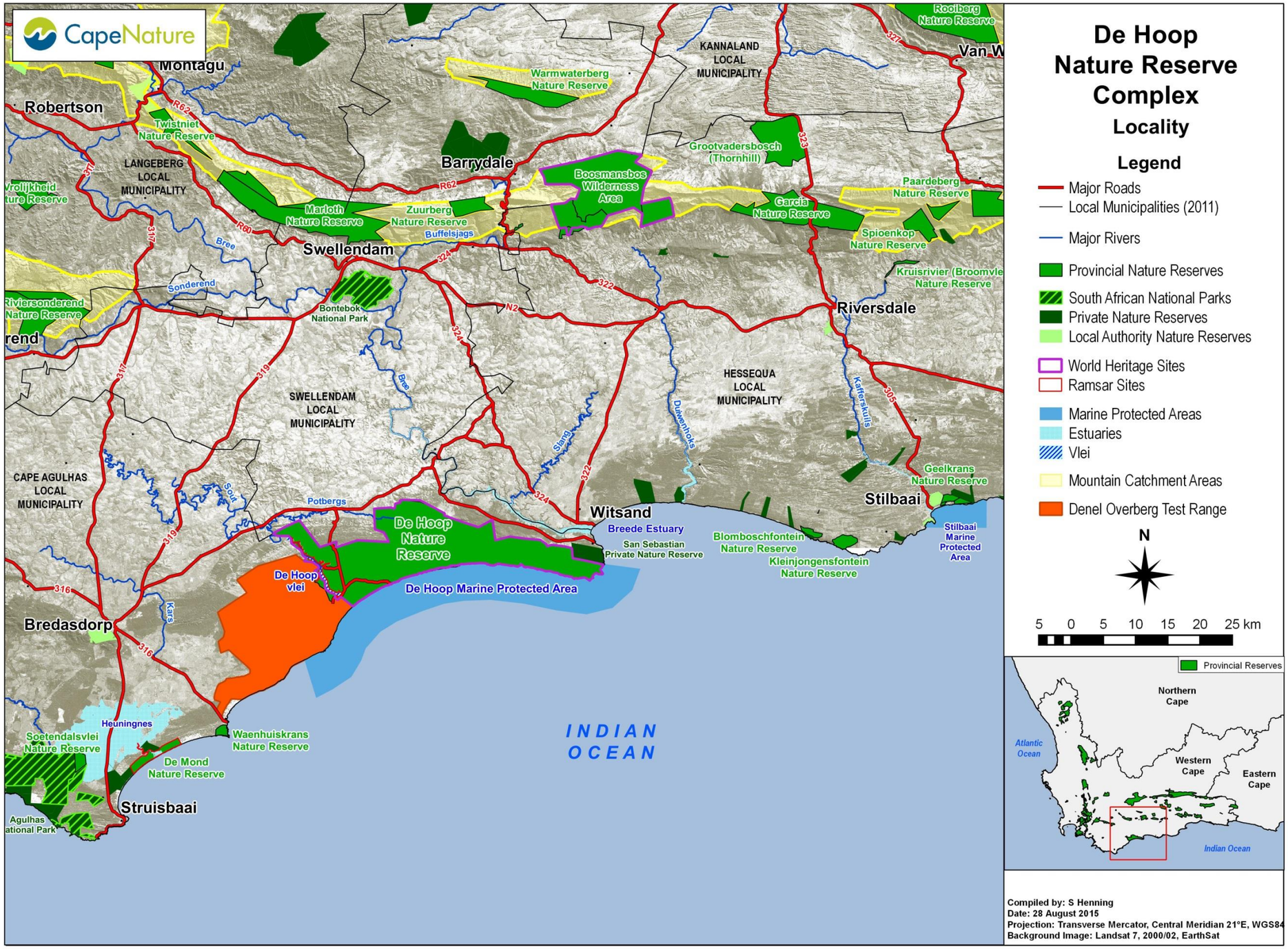
Die Opstal	De Hoop Collection	75	Kitchen	Camp Site Kitchen
Die Opstal	De Hoop Collection	144	Kitchen	Vlei Rondavel Kitchen
Die Opstal	De Hoop Collection	285	Kitchen	
Die Opstal	De Hoop Collection	3	Landing Strip	De Hoop Opstal Airstrip
Die Opstal	De Hoop Collection	48	Laundry	Laundry
Die Opstal	De Hoop Collection	132	Old Stables	
Die Opstal	De Hoop Collection	128	Outbuilding	
Die Opstal	De Hoop Collection	38	Pump House	Sewerage Pump
Die Opstal	De Hoop Collection	125	Restaurant	The Fig Tree Restaurant
Die Opstal	De Hoop Collection	31 - 35	Rondawel	Camp Site Rondawel
Die Opstal	De Hoop Collection	10	Sewage Pump	Sewage Pump
Die Opstal	De Hoop Collection	2	Sewage Treatment Plant	Sewage Treatment Plant
Die Opstal	De Hoop Collection	117	Silo	Silo
Die Opstal	De Hoop Collection	130	Silo	Silo
Die Opstal	De Hoop Collection	22 - 27, 29, 46, 47, 49- 58	Staff Quarters	De Hoop Collection
Die Opstal	De Hoop Collection	4, 5, 6, 8, 9, 11, 12, 17, 19	Tourism Accommodation	Accommodation Village
Die Opstal	De Hoop Collection	60	Tourism Accommodation	Opstal House (Sacred Ibis)
Die Opstal	De Hoop Collection	61	Tourism Accommodation	Opstal House (Blue Crane)
Die Opstal	De Hoop Collection	97	Tourism Accommodation	Opstal House (Giant Kingfisher)
Die Opstal	De Hoop Collection	101	Tourism Accommodation	Opstal House (Black Oystercatcher)
Die Opstal	De Hoop Collection	105 - 107	Tourism Accommodation	Vlei Cottage
Die Opstal	De Hoop Collection	108 - 114	Tourism Accommodation	Equipped Cottage
Die Opstal	De Hoop Collection	119	Tourism Accommodation	Opstal Suites
Die Opstal	De Hoop Collection	123	Tourism Accommodation	Opstal Manor House
Die Opstal	De Hoop Collection	120 - 122, 124, 135, 142, 283	Tourism Accommodation	
Die Opstal	De Hoop Collection	139, 140	Tourism Accommodation	Vlei Rondavel
Die Opstal	De Hoop Collection	284	Tourism Facility	Kitchen
Die Opstal	De Hoop Collection	36	Tourism Facility	
Die Opstal	De Hoop Collection	133	Tourism Facility	Boma
Die Opstal	De Hoop Collection	134	Tourism Facility	Swimming Pool
Die Opstal	De Hoop Collection	280	Tourism Facility	Vlei Rondavel Boma
Die Opstal	De Hoop Collection	281	Tourism Facility	Braai Area

Die Opstal	De Hoop Collection	282	Tourism Facility	Boulle Court Area
Hamerkop (Whale Trail)	CapeNature	216	Tourism Accommodation	Hamerkop
Hamerkop	Denel OTR	262	Testing Facility	
Infanta Instrumentation Site	Denel OTR	240	Communication Tower	
Koppie Alleen (Whale Trail)	De Hoop Collection	197	Ablution	Public Ablution
Koppie Alleen	De Hoop Collection	203	General Store	Koppie Alleen Lodge
Koppie Alleen	De Hoop Collection	79	Parking Area	Parking Area
Koppie Alleen	De Hoop Collection	198, 200, 204	Tourism Accommodation	Koppie Alleen Lodge
Koppie Alleen	De Hoop Collection	272	Tourism Accommodation	Morukuru Ocean House
Lekkerwater	CapeNature	209	Tourism Accommodation	Lekkerwater Flat
Lekkerwater	CapeNature	210	Tourism Accommodation	Lekkerwater House
Melkkamer	De Hoop Collection	92	General Store	
Melkkamer	De Hoop Collection	91	Generator Room	
Melkkamer	De Hoop Collection	89, 94, 95	Staff Quarters	De Hoop Collection Staff House
Melkkamer	De Hoop Collection	88	Tourism Accommodation	Vlei Cottage
Melkkamer	De Hoop Collection	90	Tourism Accommodation	Manor House
Melkkamer	De Hoop Collection	93	Tourism Accommodation	Foreman's Cottage
Melkkamer	De Hoop Collection	96	Tourism Facility	Stables
Mosselbank	CapeNature	266	Cottage	Mosselbank
Noetsie (Whale Trail)	CapeNature	230	Gas Store	
Noetsie (Whale Trail)	CapeNature	226	Shelter	
Noetsie (Whale Trail)	CapeNature	229	Tourism Accommodation	Noetsie
Noetsie (Whale Trail)	CapeNature	231	Tourism Facility	Noetsie
Potberg	CapeNature	151	Ablution	Bos Toilet
Potberg	CapeNature	171	Ablution	
Potberg	CapeNature	293	Ablution	Ablution
Potberg	CapeNature	170	Administration	Reserve Office
Potberg	CapeNature	158	Boiler Room	
Potberg	CapeNature	163, 189 - 191	Carport	
Potberg	CapeNature	274	Chemical Store	Used Gas Store
Potberg	CapeNature	180	Staff Quarters	CapeNature
Potberg	CapeNature	162	Conference Room	Conference Room
Potberg	CapeNature	156	Education Centre	
Potberg	CapeNature	182	Filtration Plant	
Potberg	CapeNature	292	Fire Pit	
Potberg	CapeNature	168	Fuel Store	
Potberg	CapeNature	177, 179	Garage	Staff Garage
Potberg	CapeNature	192, 194	Garage	

Potberg	CapeNature	196	Gate House	
Potberg	CapeNature	150	General Store	Fire Equipment Store
Potberg	CapeNature	153	General Store	Whale Trail House Keeping
Potberg	CapeNature	155	General Store	Whale Trail Store
Potberg	CapeNature	160, 167	General Store	
Potberg	CapeNature	294	Generator Room	Generator Room
Potberg	CapeNature	175, 176	Pump House	
Potberg	CapeNature	165, 275	Stables	
Potberg	CapeNature	178, 183 - 188, 193, 195	Staff Quarters	CN - Staff Quarters
Potberg (Whale Trail)	CapeNature	149	Tourism Accommodation	Potberg Hut
Potberg	CapeNature	172	Tourism Accommodation	Kliphuis
Potberg	CapeNature	173	Tourism Accommodation	Ramhok
Vaalkrans (Whale Trail)	CapeNature	206	Tourism Accommodation	Vaalkrans

Appendix 2. Maps of the DHNRC

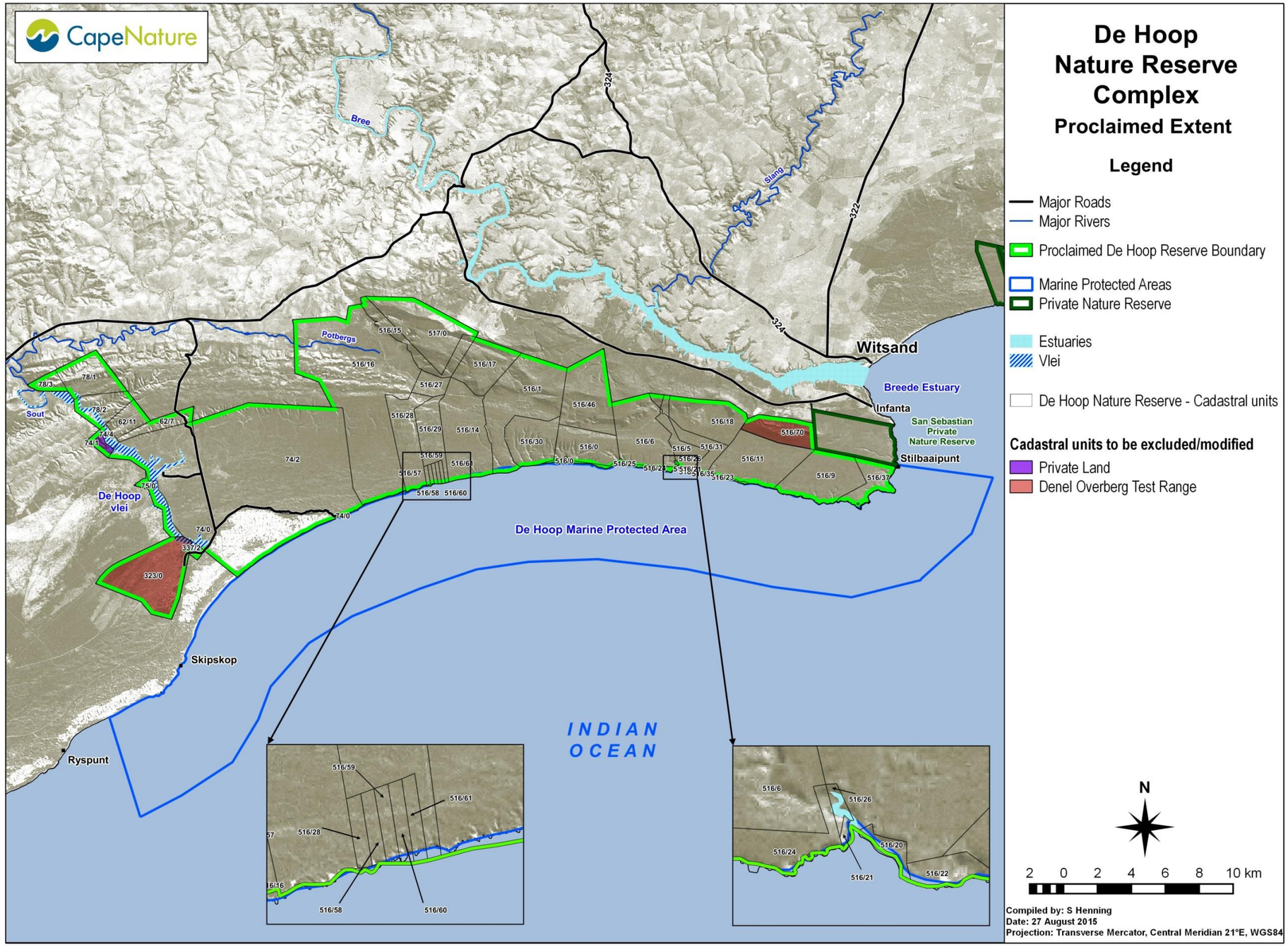
Map 1	Locality of De Hoop Nature Reserve Complex
Map 2	De Hoop Nature Reserve Complex proclaimed boundaries
Map 3	De Hoop Nature Reserve Complex proposed boundaries
Map 4	Topography of the De Hoop Nature Reserve Complex
Map 5	Geology of De Hoop Nature Reserve Complex
Map 6	Hydrology of De Hoop Nature Reserve Complex
Map 7	Vegetation of De Hoop Nature Reserve Complex (Mucina & Rutherford 2006)
Map 8	Fire history of De Hoop Nature Reserve Complex
Map 9	Veld age map of De Hoop Nature Reserve Complex
Map 10	Invasive vegetation map and management compartments of De Hoop Nature Reserve Complex
Map 11	Infrastructure (Main)
Map 12	Infrastructure (De Hoop Opstal) map of De Hoop Nature Reserve Complex
Map 13	Infrastructure (Melkkamer) map of De Hoop Nature Reserve Complex
Map 14	Infrastructure (Koppie Alleen) map of De Hoop Nature Reserve Complex
Map 15	Infrastructure (Potberg) map of De Hoop Nature Reserve Complex
Map 16	Infrastructure (Whale Trail) map of De Hoop Nature Reserve Complex
Map 17	Priority expansion map of De Hoop Nature Reserve Complex
Map 18	Sensitivity map of De Hoop Nature Reserve Complex
Map 19	Zonation map of De Hoop Nature Reserve Complex
Map 20	Access on De Hoop Nature Reserve Complex



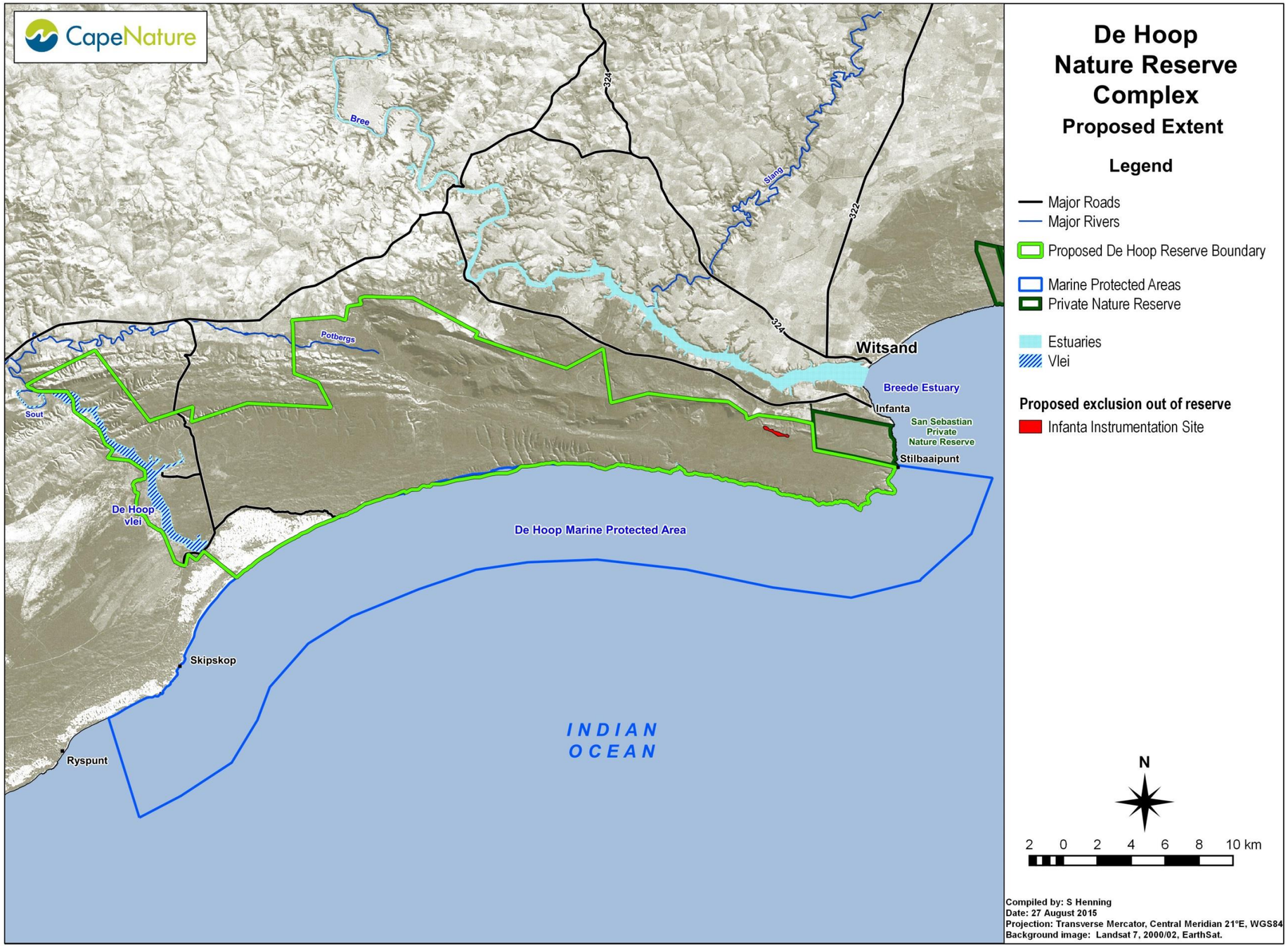
De Hoop Nature Reserve Complex

Locality

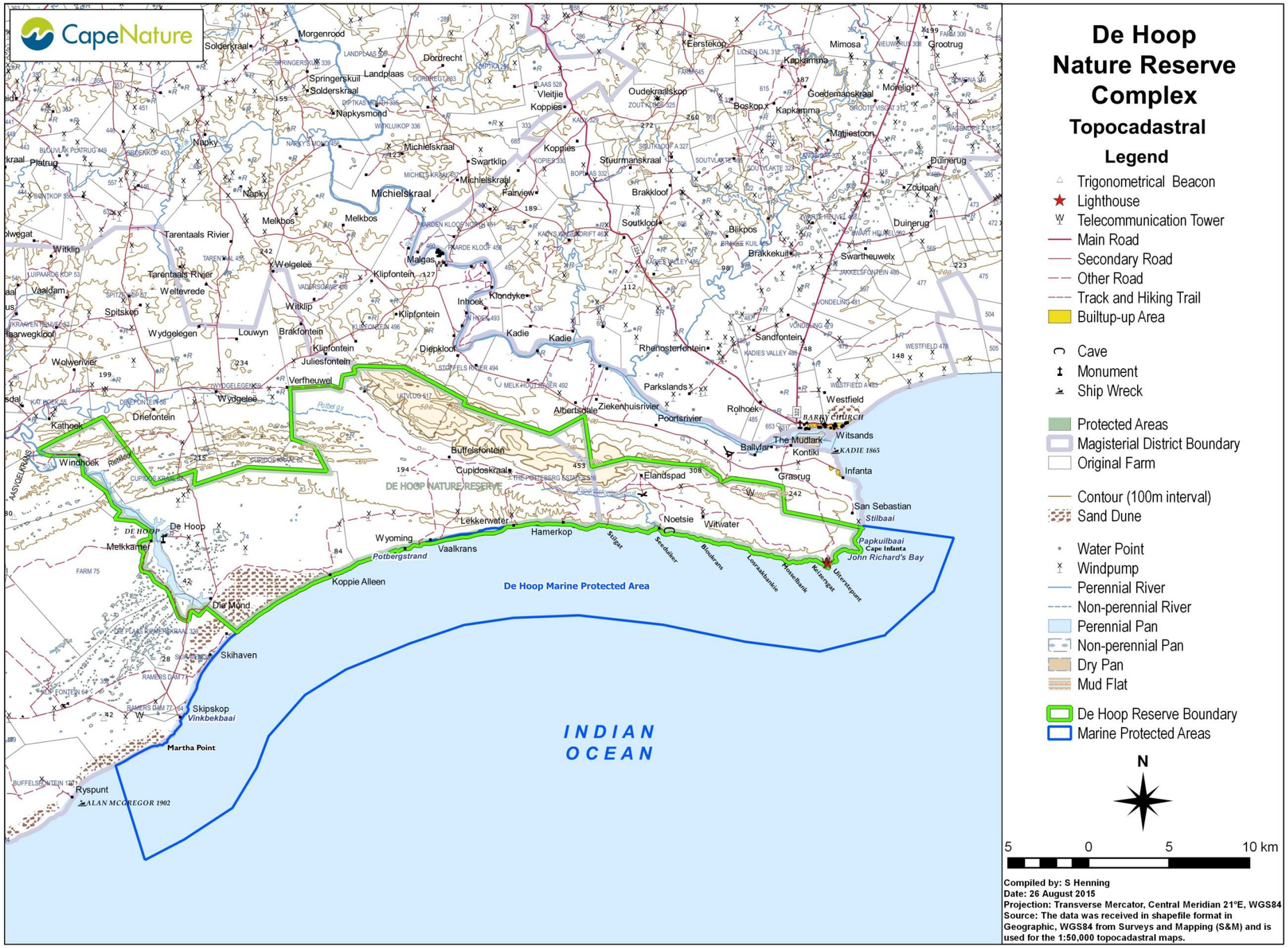
Map 1. Locality of De Hoop Nature Reserve Complex



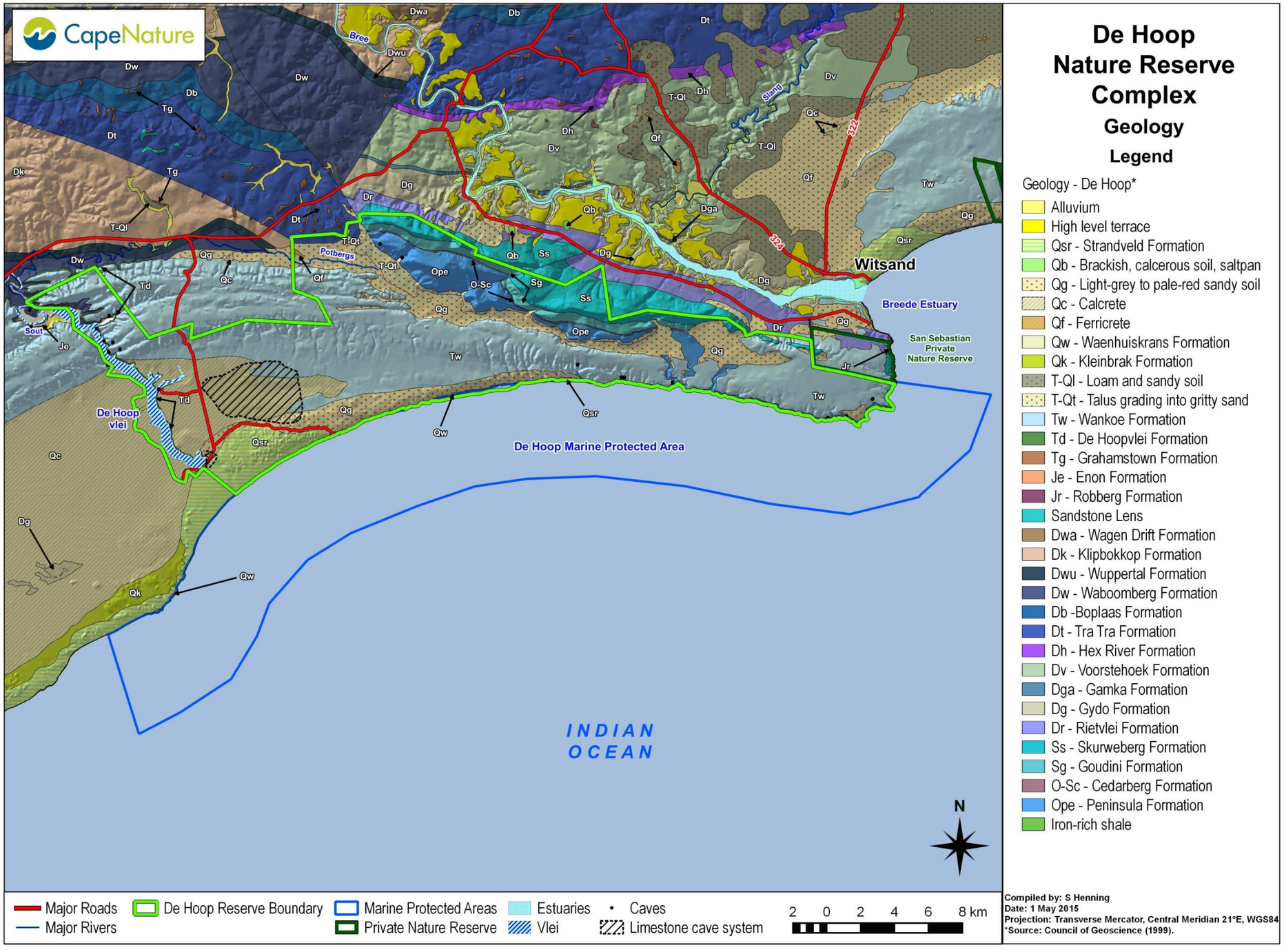
Map 2. De Hoop Nature Reserve Complex proclaimed boundaries



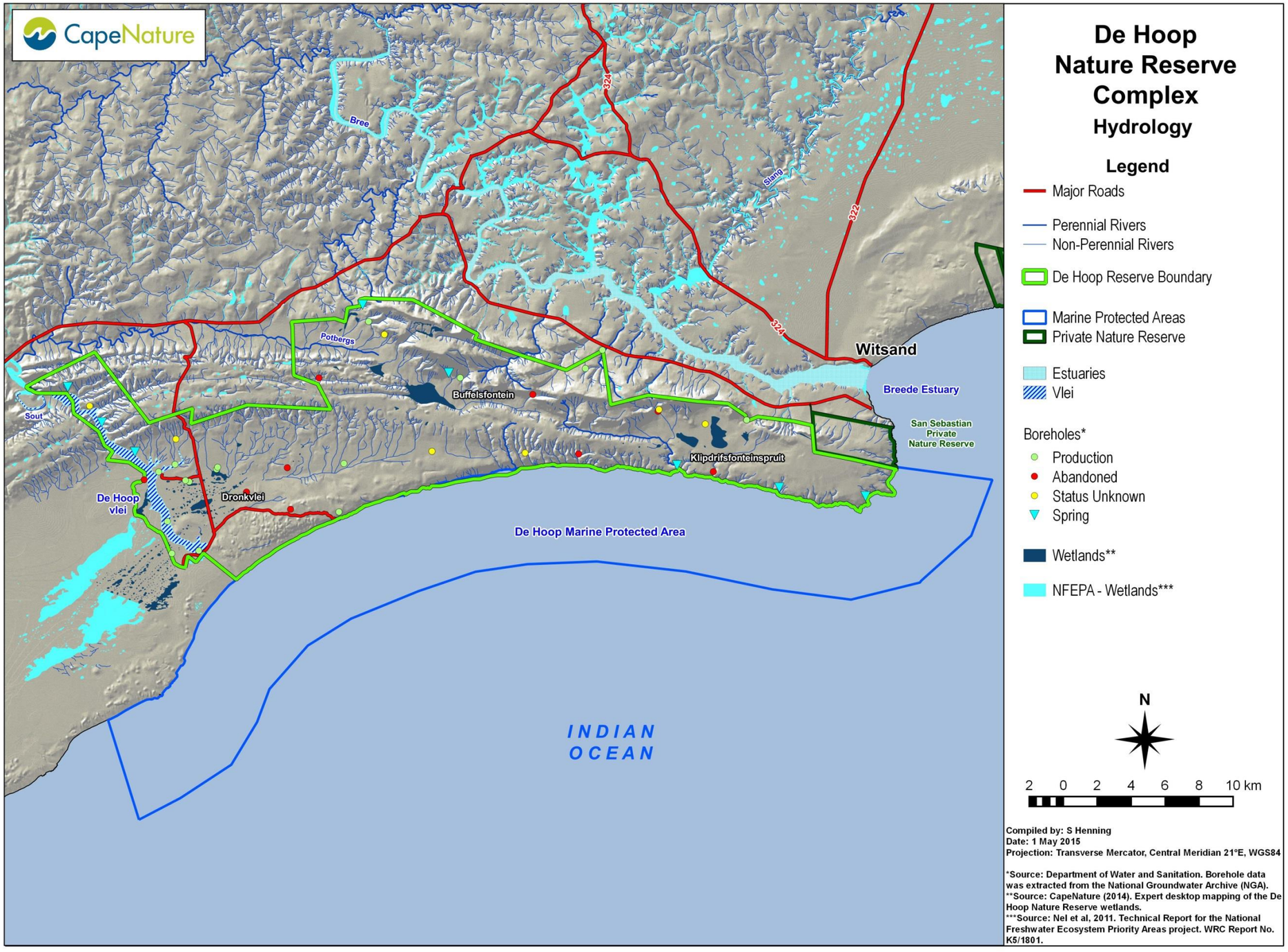
Map 3. De Hoop Nature Reserve Complex proposed boundaries



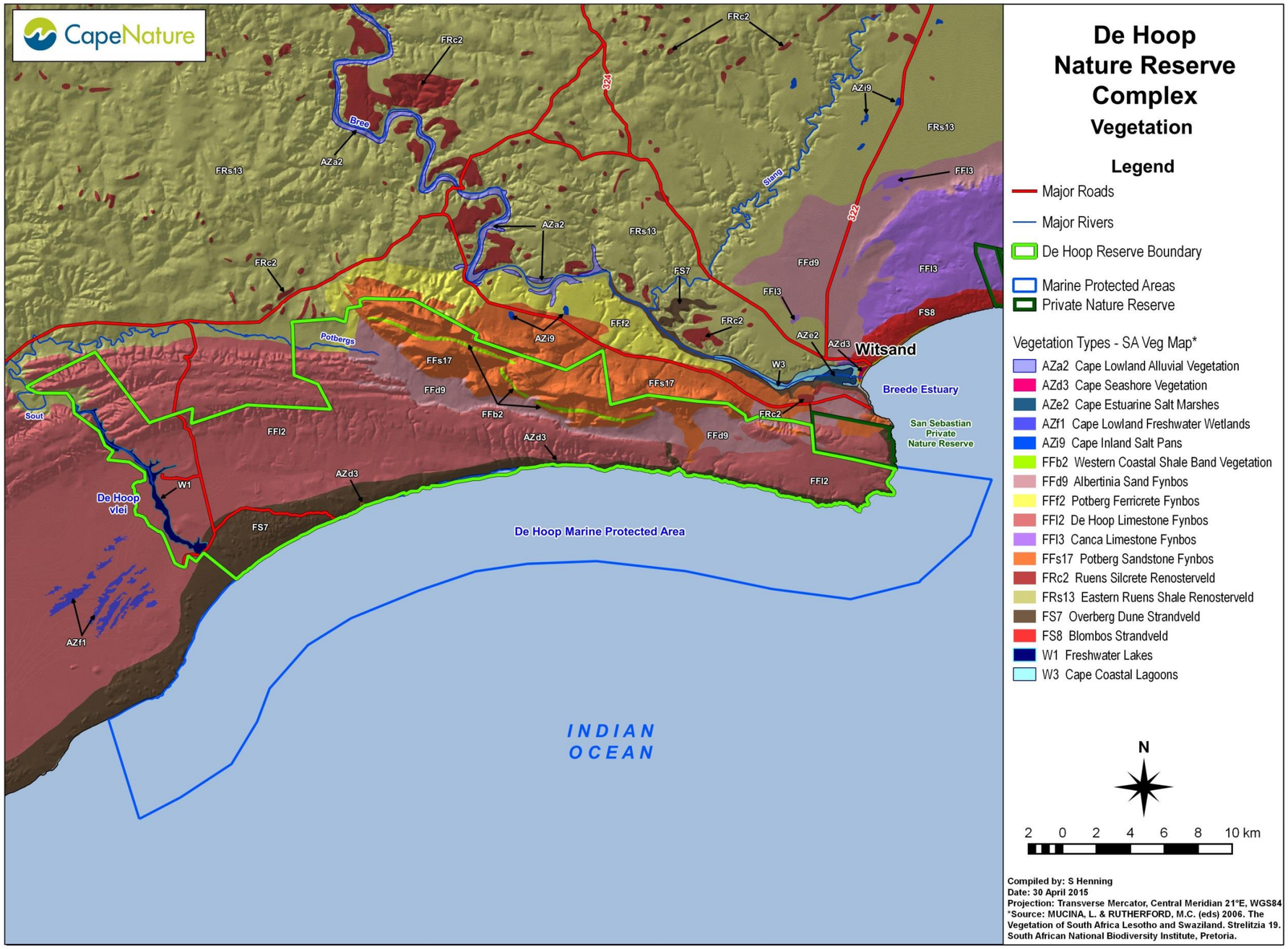
Map 4. Topography of the De Hoop Nature Reserve Complex



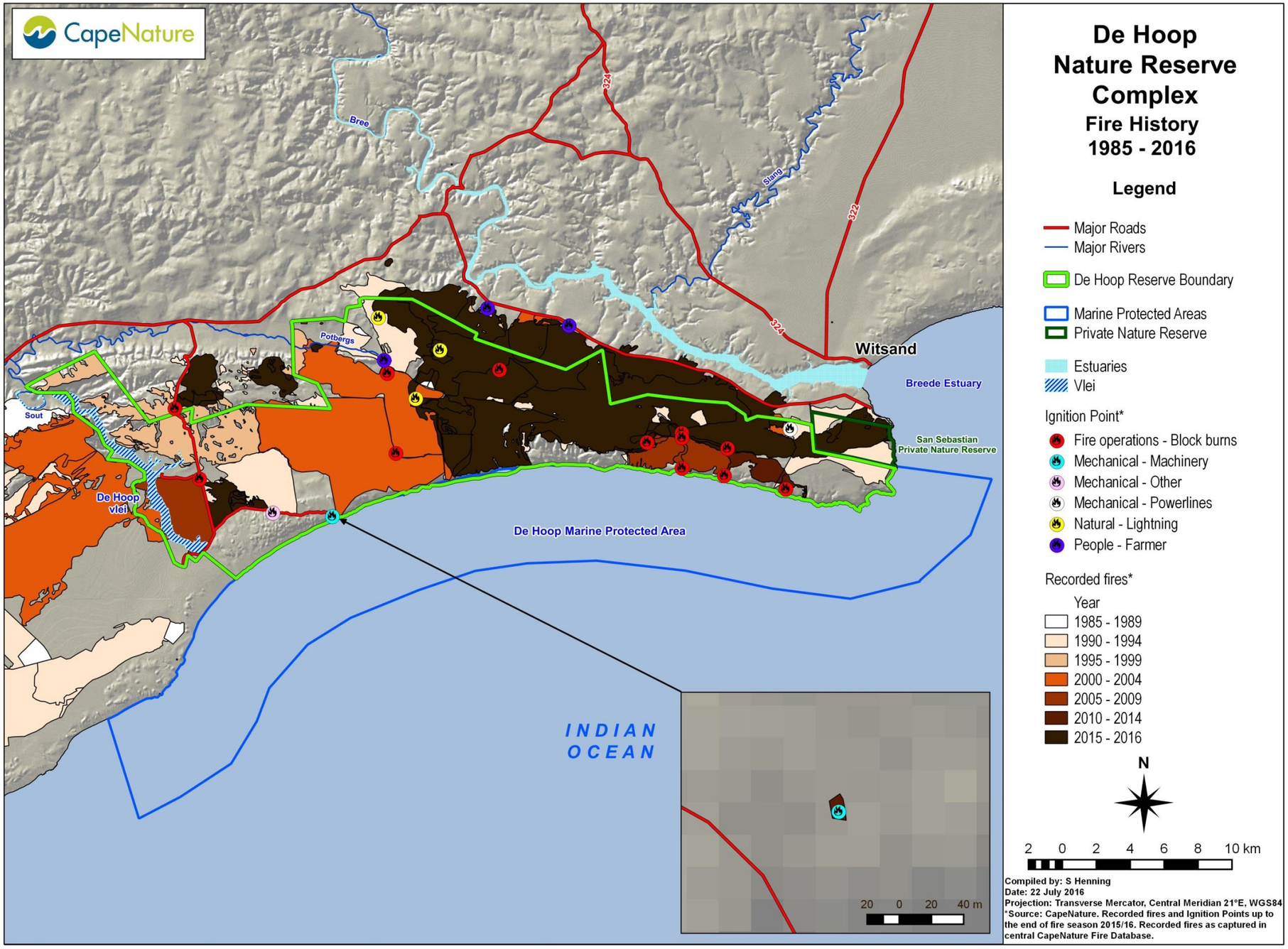
Map 5. Geology of De Hoop Nature Reserve Complex



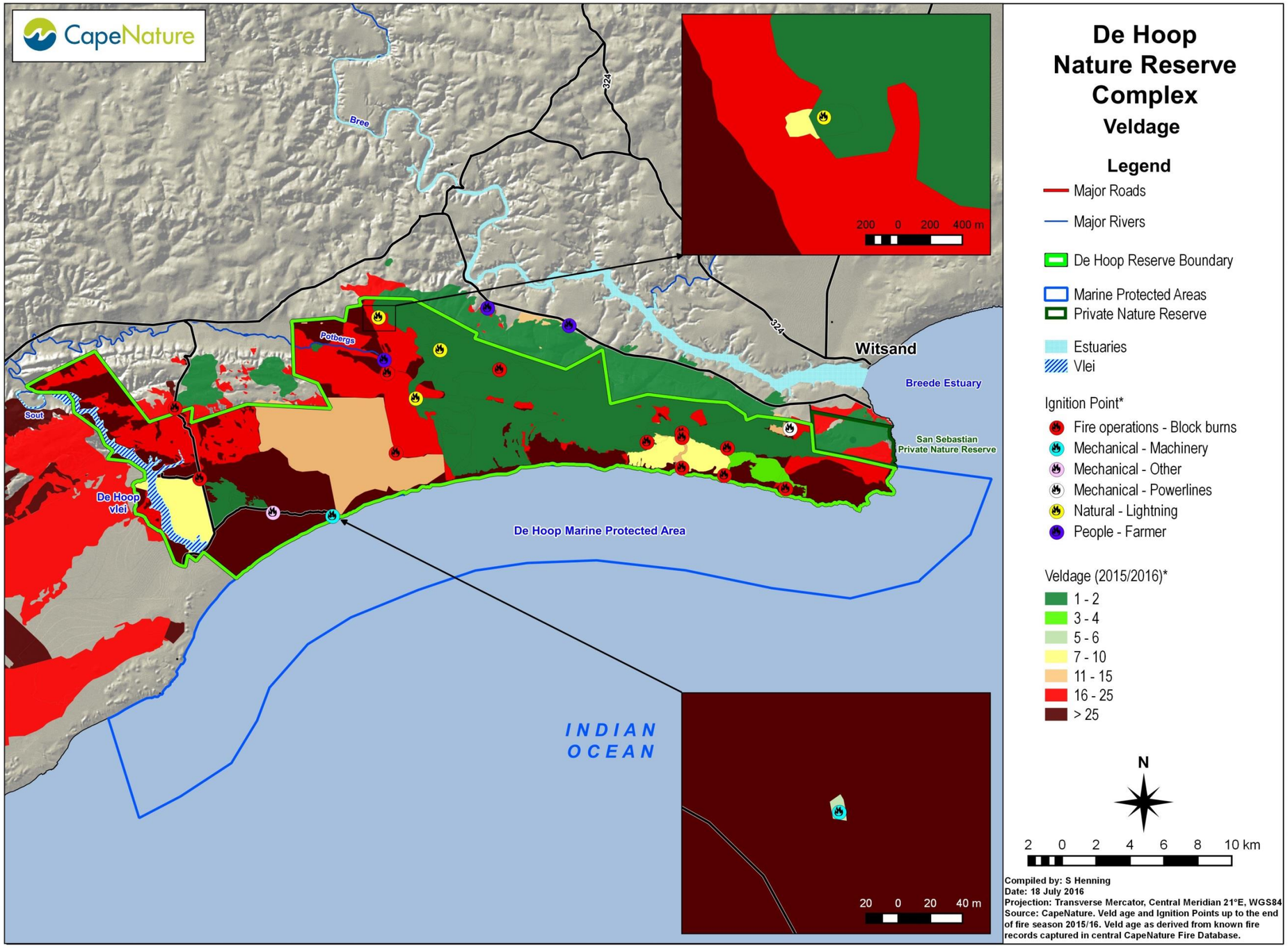
Map 6. Hydrology of De Hoop Nature Reserve Complex



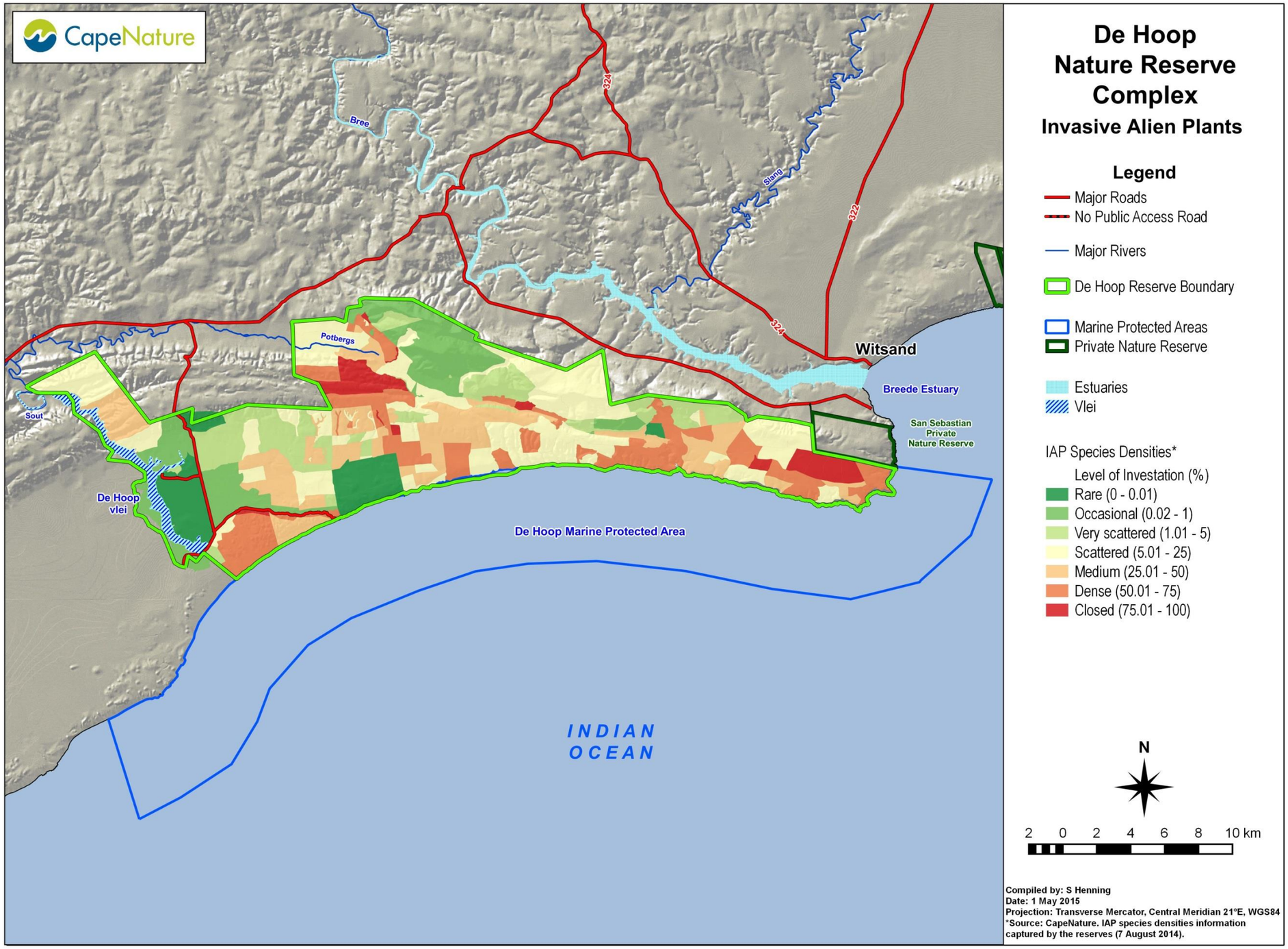
Map 7. Vegetation of De Hoop Nature Reserve Complex (Mucina & Rutherford 2006)



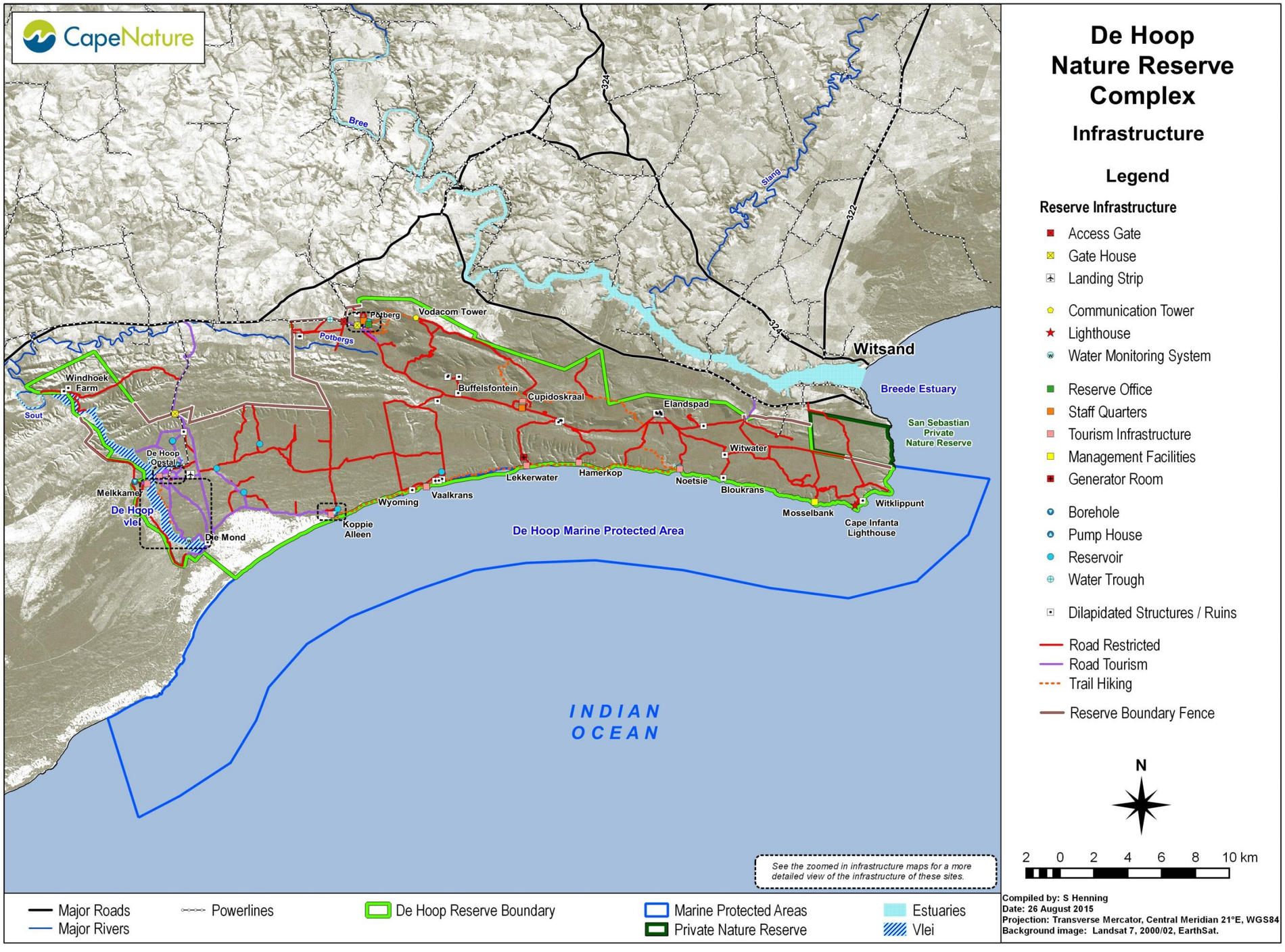
Map 8. Fire history of De Hoop Nature Reserve Complex



Map 9. Veld age map of De Hoop Nature Reserve Complex



Map 10. Invasive vegetation map and management compartments of De Hoop Nature Reserve Complex



De Hoop Nature Reserve Complex

Infrastructure

Legend

Reserve Infrastructure

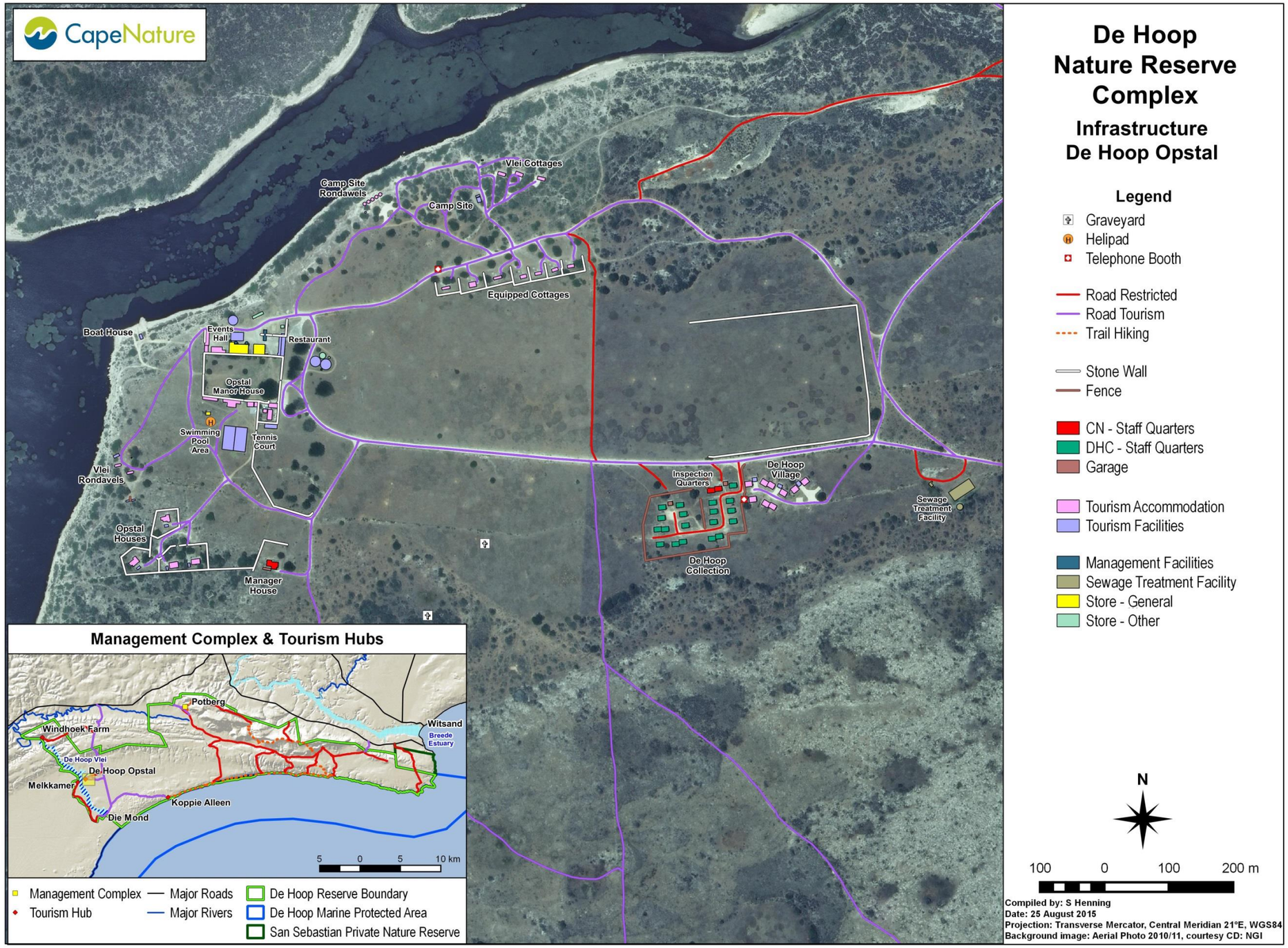
- Access Gate
- Gate House
- Landing Strip
- Communication Tower
- Lighthouse
- Water Monitoring System
- Reserve Office
- Staff Quarters
- Tourism Infrastructure
- Management Facilities
- Generator Room
- Borehole
- Pump House
- Reservoir
- Water Trough
- Dilapidated Structures / Ruins
- Road Restricted
- Road Tourism
- Trail Hiking
- Reserve Boundary Fence

N

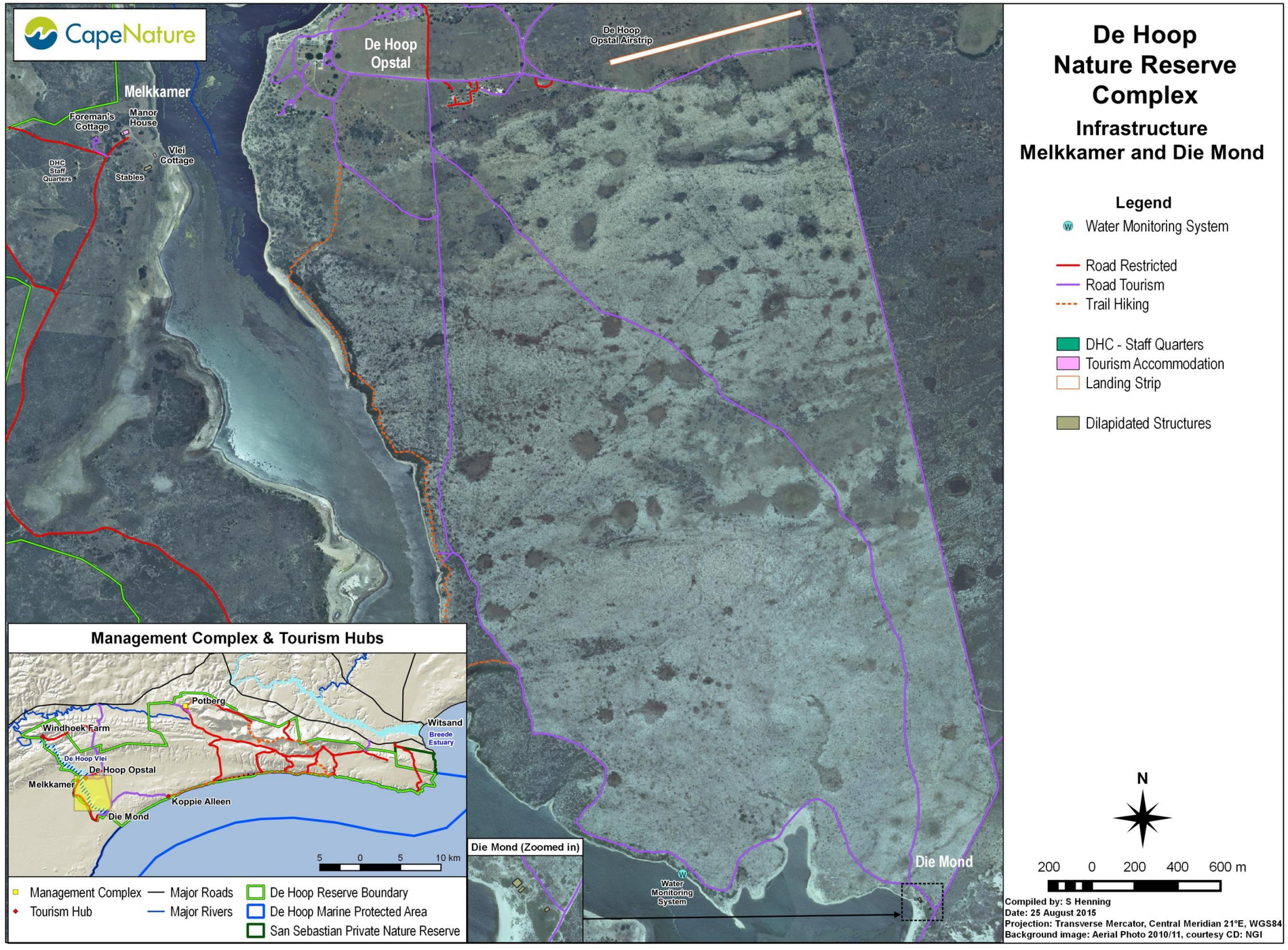
2 0 2 4 6 8 10 km

Compiled by: S Henning
Date: 26 August 2015
Projection: Transverse Mercator, Central Meridian 21°E, WGS84
Background image: Landsat 7, 2000/02, EarthSat.

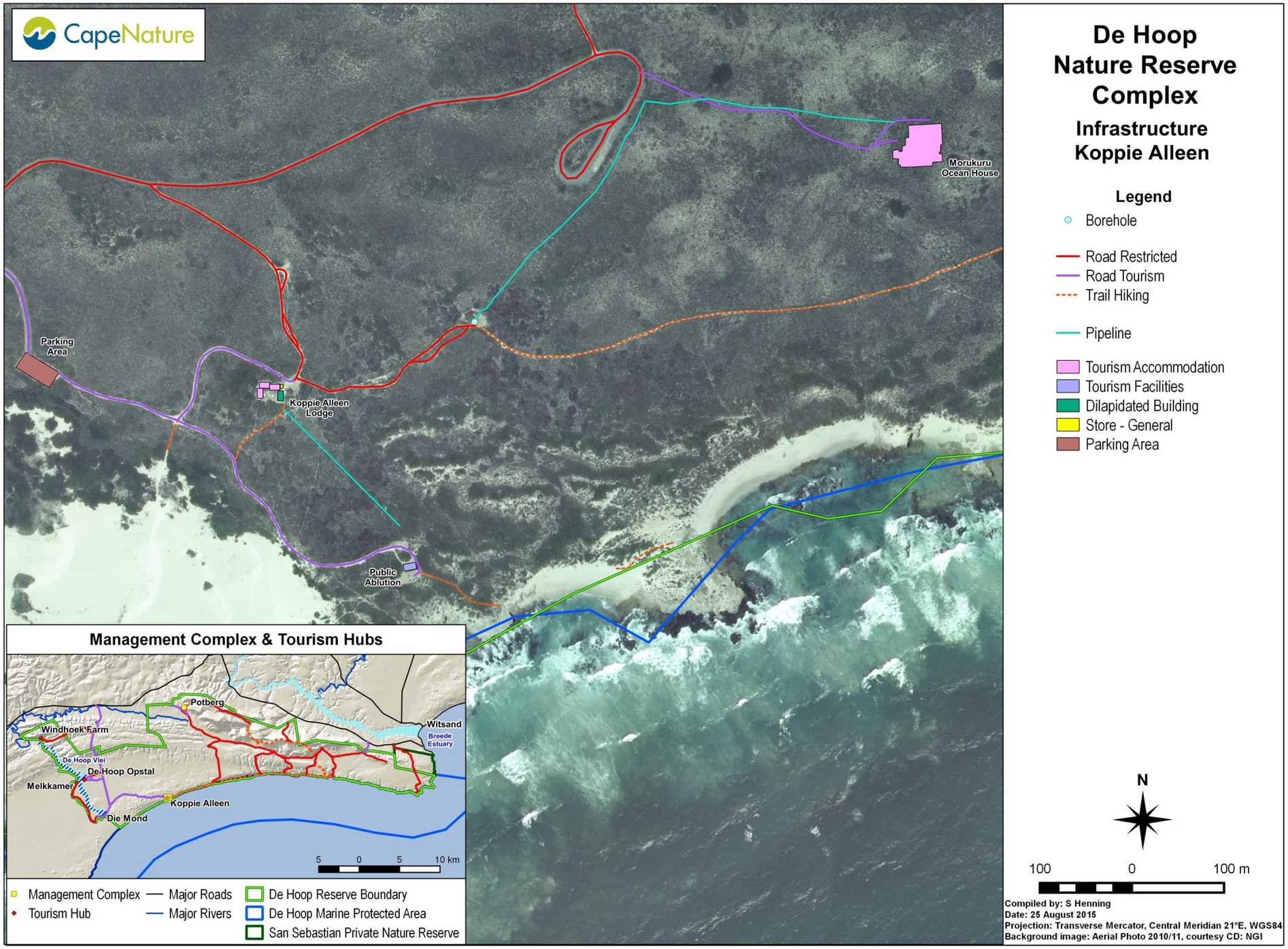
Map 11. Infrastructure (Main)



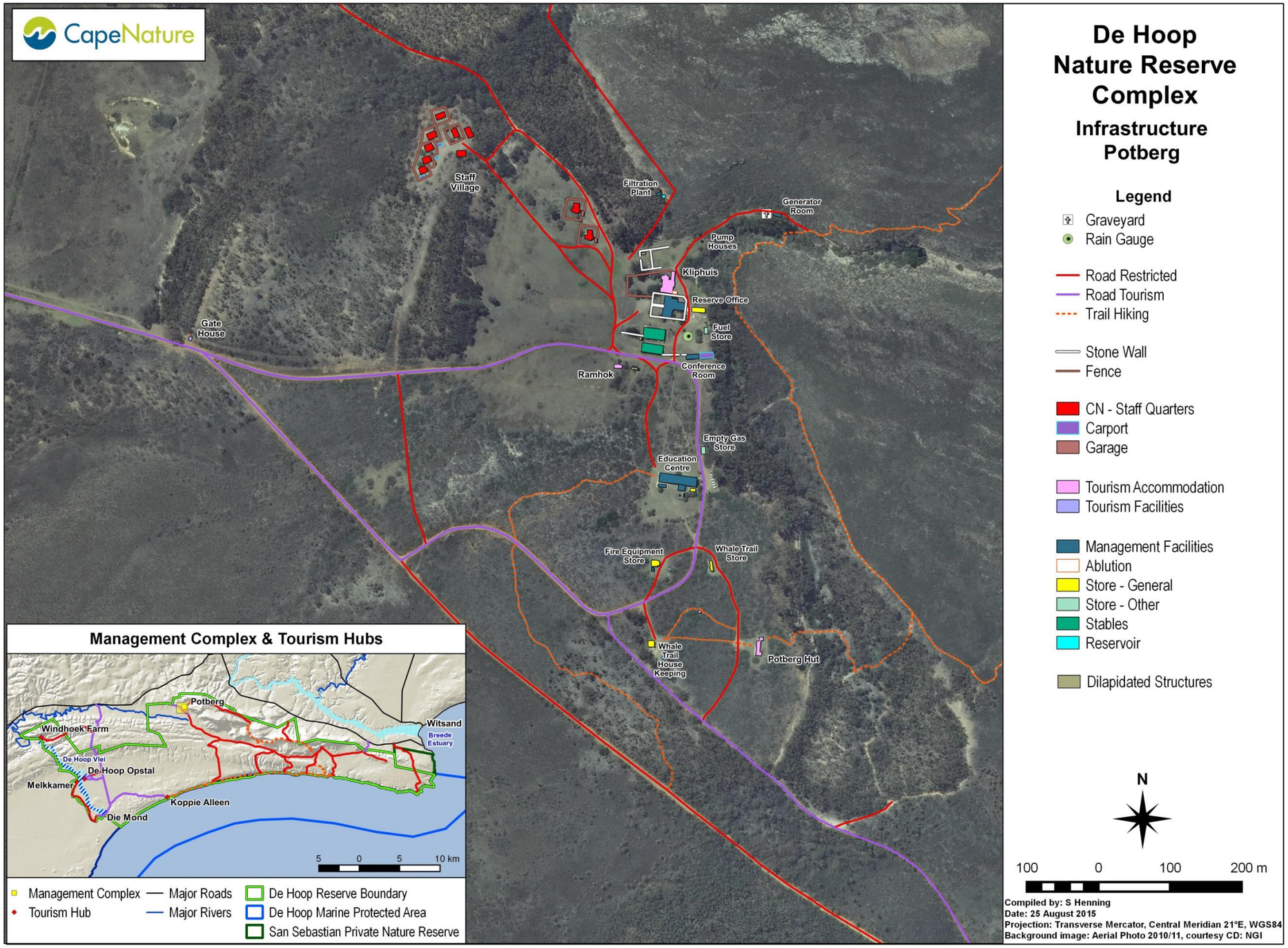
Map 12. Infrastructure (De Hoop Opstal) map of De Hoop Nature Reserve Complex



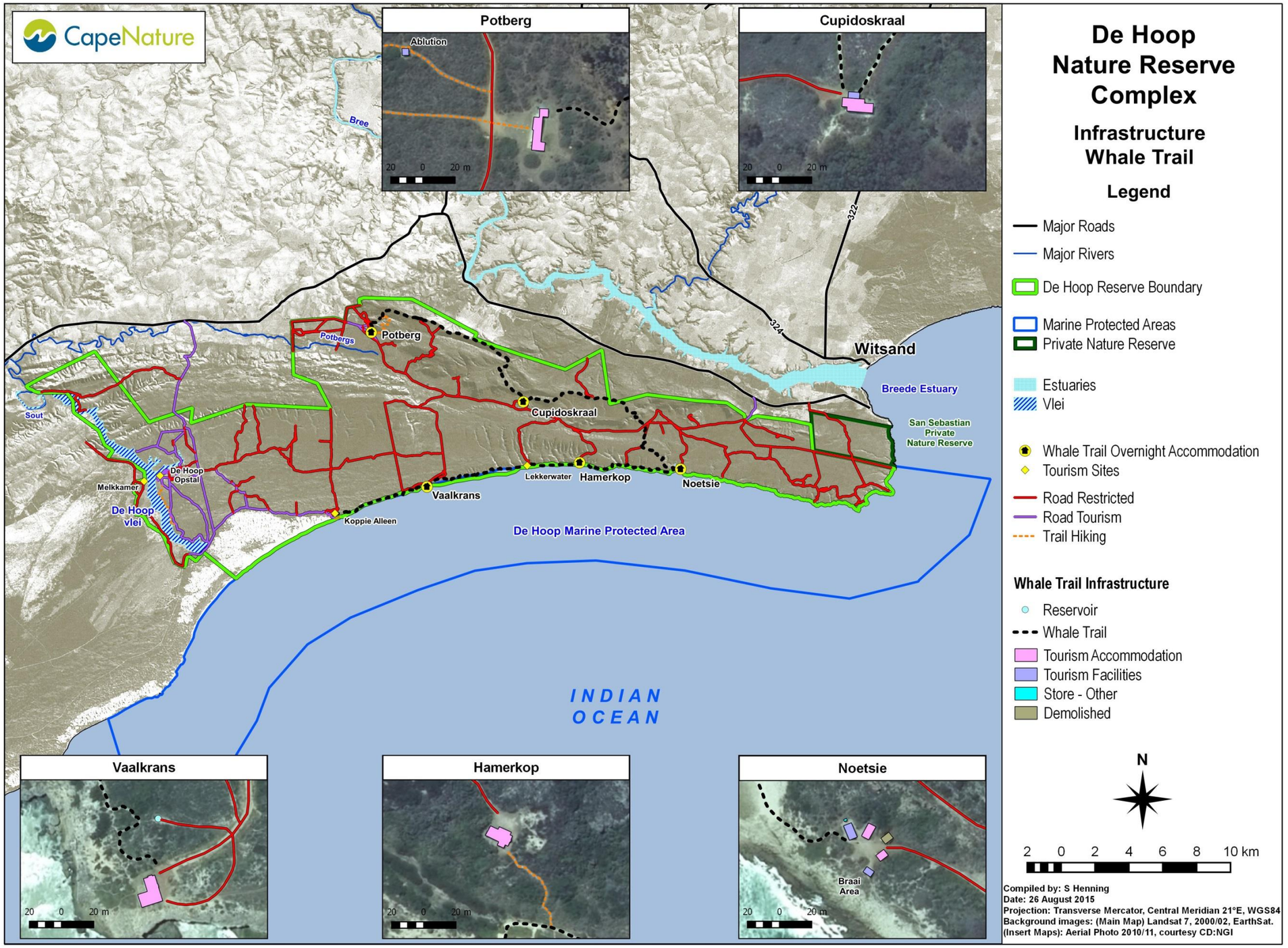
Map 13. Infrastructure (Melkkamer) map of De Hoop Nature Reserve Complex



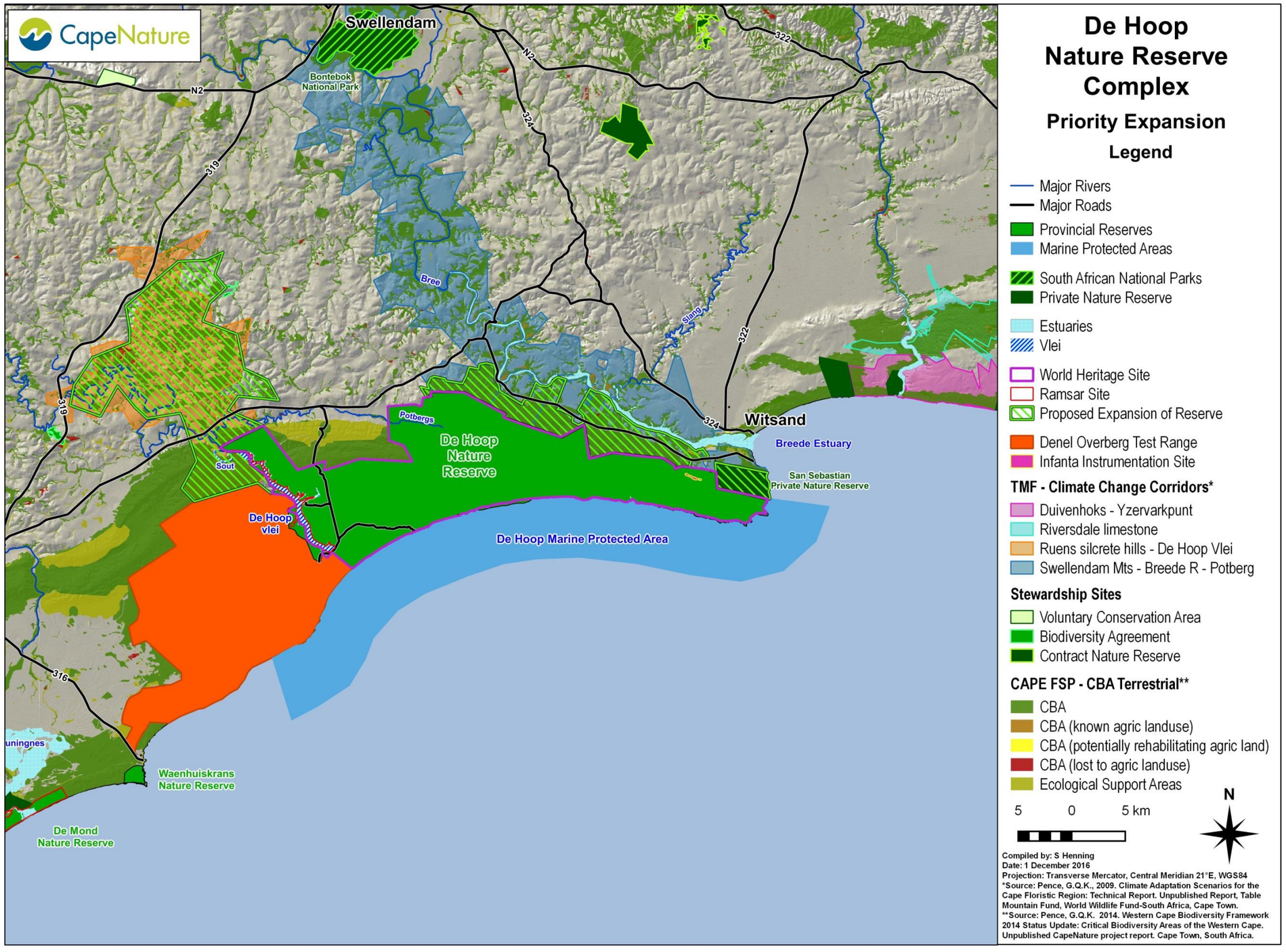
Map 14. Infrastructure (Koppie Alleen) map of De Hoop Nature Reserve Complex



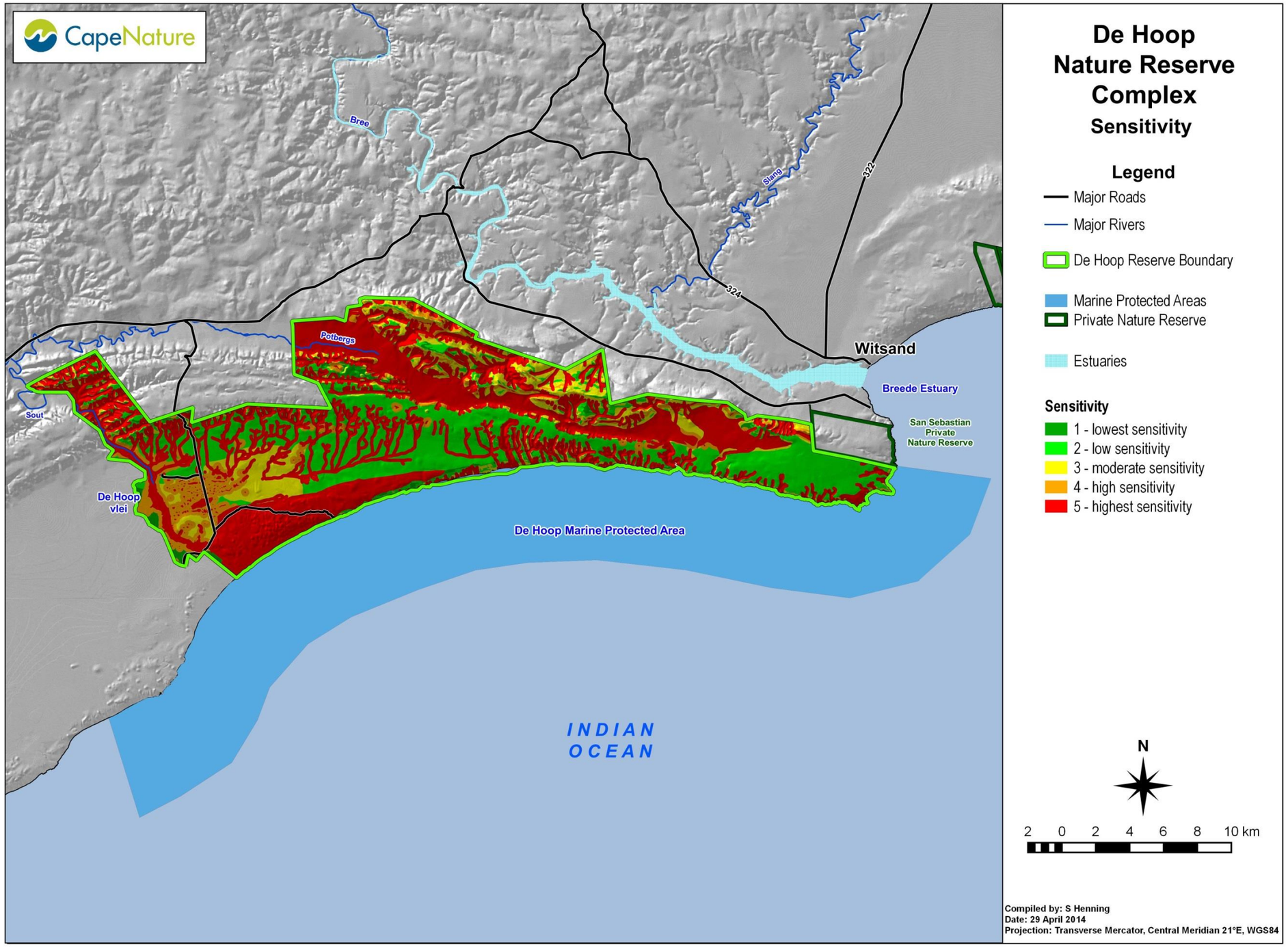
Map 15. Infrastructure (Potberg) map of De Hoop Nature Reserve Complex



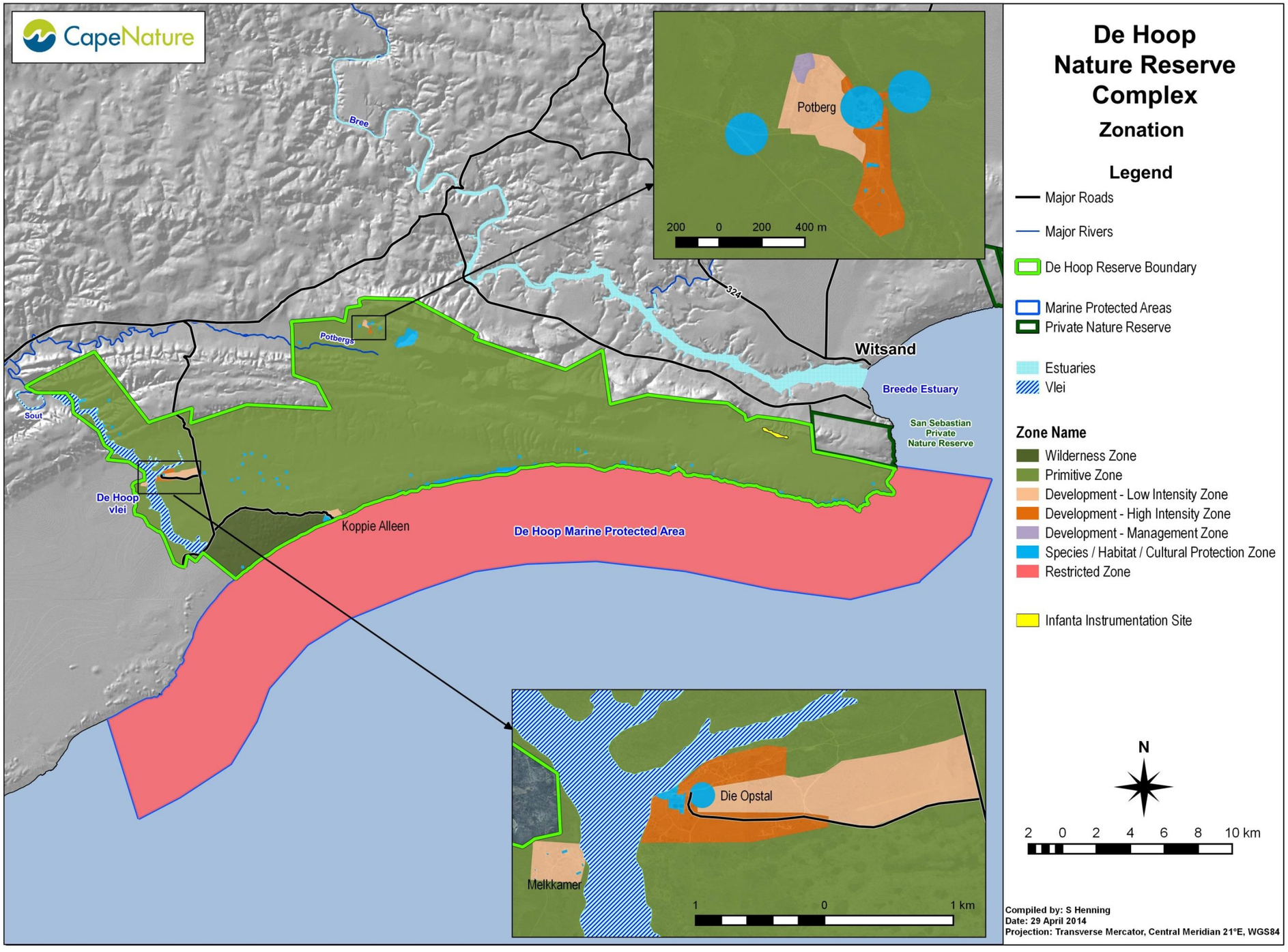
Map16. Infrastructure (Whale Trail) map of De Hoop Nature Reserve Complex



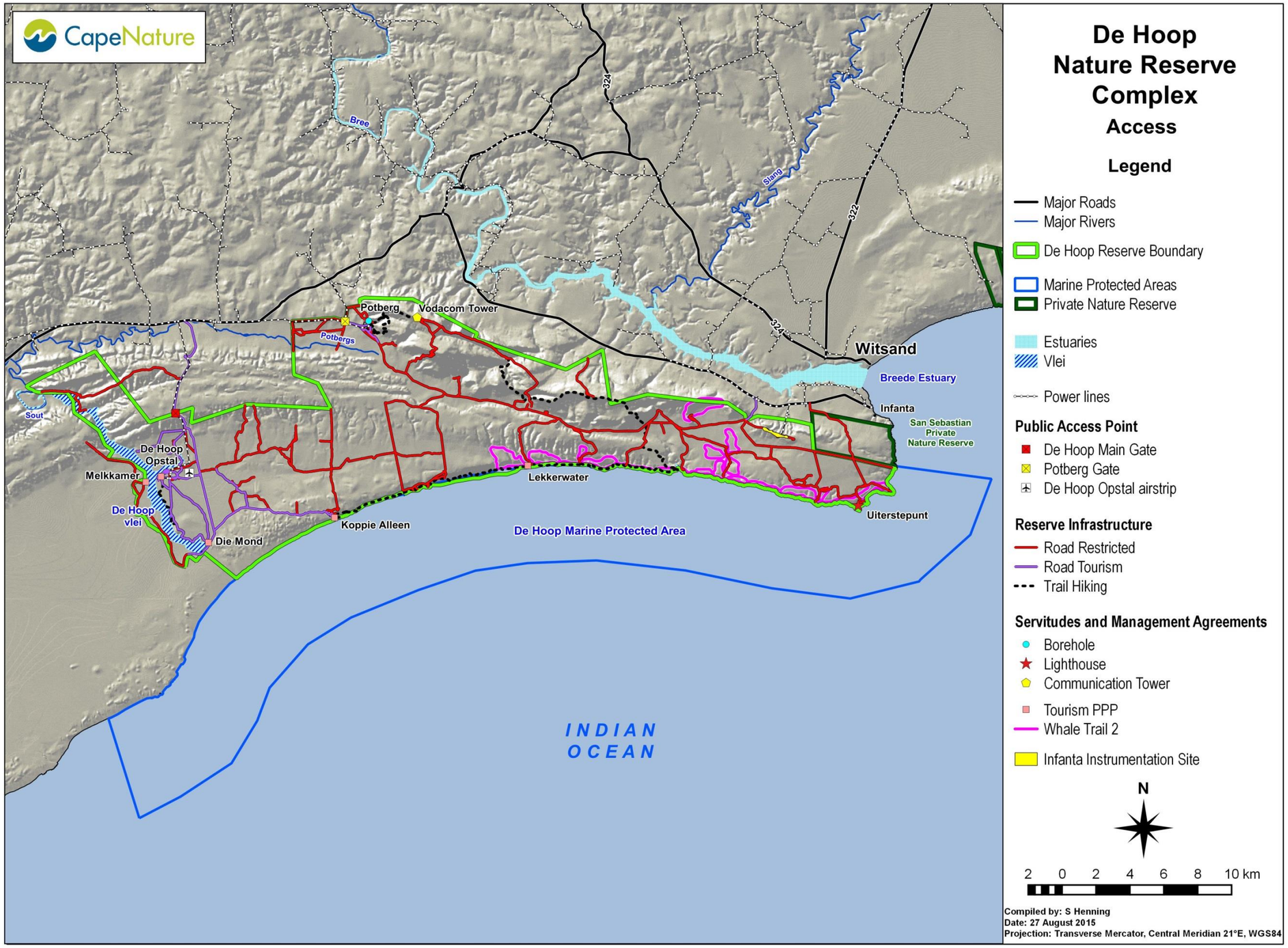
Map 17. Priority expansion map of De Hoop Nature Reserve Complex



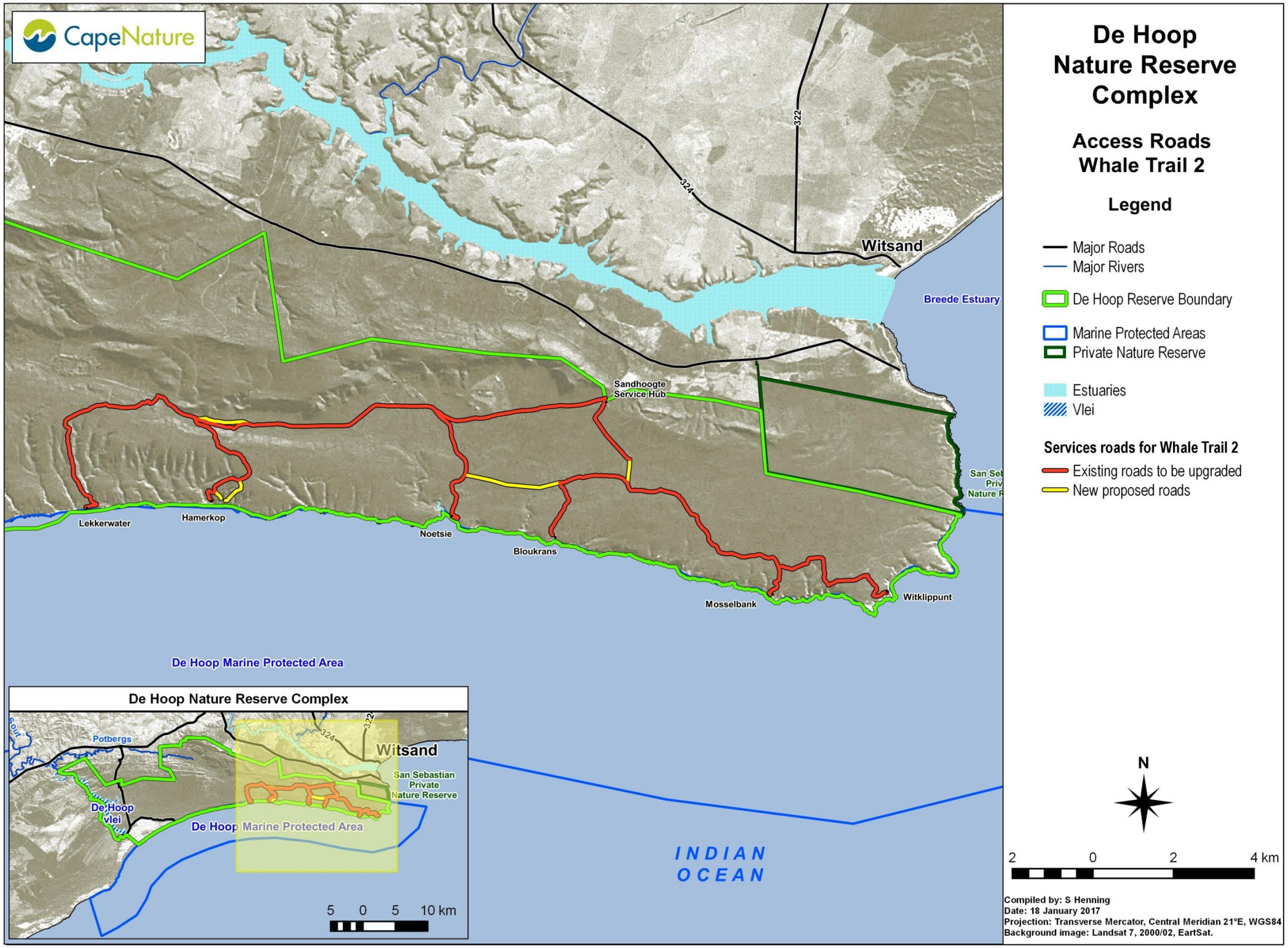
Map 18. Sensitivity map of De Hoop Nature Reserve Complex



Map 19. Zonation map of De Hoop Nature Reserve Complex



Map 20. Access on De Hoop Nature Reserve Complex



Map 21. Access Roads Whale Trail 2