Rocherpan Nature Reserve Complex

Western Cape
South Africa

Protected Area Management Plan 2014-2019

Prepared by
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The Rocherpan Nature Reserve Complex comprises the following:

Rocherpan Provincial Nature Reserve was established as a Provincial Nature Reserve in terms of Section 6 of the Nature Conservation Ordinance, 1974, on 10 December 1976 and proclaimed in the Provincial Gazette of 10 December 1976 by Proclamation No. 409/1976.

On 27 July 1990, the coast and sea 500 m seaward from the high water mark was proclaimed a marine reserve under the Sea Fisheries Act 1988 in Government Gazette No. 12667, pages 46-48 (Proclamation No. R1810).

Rocherpan Provincial Nature Reserve, amendment of the boundaries by the inclusion of the remainder of Portion 1 of the farm St. Helenafontein A No. 29 on 02 June 1992 by Proclamation No. 42/1992.

The Sea Fishery Act, 1988, was repealed by the Marine Living Resources Act, 1998, which commenced on 1 September 1998.

Rocherpan Marine Reserve has been declared as a marine protected area (i.e. in Rocherpan Marine Protected Area) in terms of subsection 84(4) of the Marine Living Resources Act, 1998. Subsection 84(4) of the Marine Living Resources Act, 1998, states that an area set aside as a marine reserve under the provisions of the Sea Fishery Act, 1988, shall be deemed to have been declared a marine protected area in terms of the Marine Living Resources Act, 1998.

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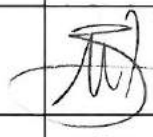
CapeNature – Western Region Mr M. Floris PROTECTED AREA MANAGEMENT MANAGER		23/10/2014
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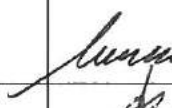
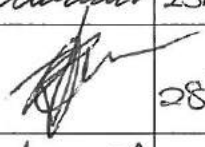
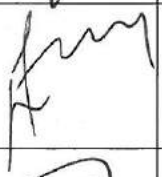
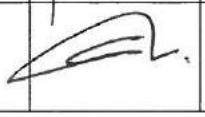
CapeNature – Directorate: Conservation Management Ms G. Cleaver-Christie EXECUTIVE DIRECTOR		23/10/2014
CapeNature Dr. R. Omar CHIEF EXECUTIVE OFFICER		28/10/2014
Western Cape Nature Conservation Board Conservation Committee Dr. E. February CHAIRPERSON OF THE BOARD CONSERVATION COMMITTEE		28/10/2014
Western Cape Nature Conservation Board Mr E. Kok CHAIRPERSON OF THE BOARD		28/10/2014

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EXECUTIVE SUMMARY

The Rocherpan Nature Reserve Complex is situated approximately 180 km north of Cape Town on the R27 West Coast road, in the Western Cape Province. The reserve is bound on the west by the Atlantic Ocean. The northern and southern boundaries have adjoining landowners, while the eastern boundary is formed in part by the Sishen-Saldanha Spoornet private road and the public road between Velddrif and Elands Bay. The Nature Reserve Complex falls within the West Coast District Municipality and the Bergrivier Local Municipality. The reserve experiences a Mediterranean-type climate with warm dry summer, and relatively cool and wet winter seasons. The Atlantic Ocean and associated cold Benguela current has a moderating effect on temperatures. Although Rocherpan Nature Reserve was originally procured because of the conservation value of the seasonal wetland and the importance thereof for waterbirds, the reserve also offers protection to several other species and is one of only two locations where the Critically Endangered aquatic plant, *Pseudalthenia aschersoniana* is known to have survived. Rocherpan Nature Reserve Complex is one of only a few major pans along the West Coast of South Africa and offers protection and access to marine, freshwater and terrestrial habitats, which present good opportunities for tourism.

Since the original proclamation in 1976, the reserve boundaries have been extended twice. On 27 July 1990, the coast and sea 500 m seaward from the high-water mark was proclaimed a marine reserve under the Sea Fisheries Act, 1988, in the Government Gazette No. 12667 (Proclamation No. 1810). Then, on 02 June 1992 the boundary was enlarged through the inclusion of the remainder of Portion 1 of the farm St. Helenafontein A No. 29, Proclamation No. 42/1992. The Sea Fishery Act, 1988, was repealed by the Marine Living Resources Act, 1998, which commenced on 1 September 1998. Subsection 84(4) of the Marine Living Resources Act, 1998, states that an area set aside as a marine reserve under the provisions of the Sea Fishery Act, 1988, shall be deemed to have been declared a marine protected area in terms of the Marine Living Resources Act, 1998. Rocherpan Marine Reserve was subsequently declared as a marine protected area (i.e. in Rocherpan Marine Protected Area) in terms of subsection 84(4) of the Marine Living Resources Act, 1998. At present Rocherpan Nature Reserve Complex is comprised of a 930 ha terrestrial Nature Reserve and a 150 ha proclaimed Marine Protected Area (MPA). The investigation of the expansion of the MPA is discussed under section 4, to align with conservation objectives. The CapeNature Protected Area Expansion Strategy and the National Protected Areas Expansion Strategy will be considered for the expansion of the terrestrial and marine components respectively.

In compliance with the National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003), CapeNature is required to develop management plans for each of its nature reserves. In developing the management plan for the Rocherpan Nature Reserve Complex, CapeNature strives to establish biodiversity conservation as a foundation of a sustainable economy providing ecosystem services, access and opportunities for all. South Africa has a global responsibility in protecting the resident and migratory bird species that occur within its borders. Several of the bird species that regularly occur on the reserve are listed under the

International Union for Conservation of Nature and Natural Resources (IUCN) Red Data criteria, are listed in Appendix II of the Bonn Convention on Migratory Species and/or listed under the African Eurasian Waterbird Agreement. Rocherpan Nature Reserve Complex supports important populations of several threatened bird species throughout the year. The Cape shoveler *Anas smithii*, a near endemic to southern Africa, utilises the wetland as a moulting refuge and can occur in large numbers when the area has received abundant rain and the wetland is full. Wetlands International (2012) considers water bodies holding more than 1% of a species population as important. At times Rocherpan hosts between 3 and 5% of the global population of Cape shoveler and regularly exceeds the 1% level.

This management plan is divided into seven sections. The first section provides background information to the compilation of CapeNature Protected Area Management Plans (PAMPs) and details the structure, approval and revision of these plans.

The second section outlines the strategic management framework of Rocherpan Nature Reserve Complex. The vision and purpose was developed to guide reserve management in its daily operations and longer term planning. The vision for Rocherpan is the maintenance of the conservation value and ecological integrity of the reserve, and the recognition of Rocherpan Nature Reserve Complex as a unique low volume tourism experience on the West Coast. The purpose of the reserve is to conserve and maintain the important marine, coastal, wetland and terrestrial habitats important for bird conservation, and to provide opportunities for nature based tourism.

The objectives for the Rocherpan Nature Reserve Complex were developed in line with CapeNature's strategic goals, objectives and key measurable objectives. The objectives were derived from the vision and purpose and represent Key Performance Areas which must be achieved in order to support the management intention. The prioritised objectives for Rocherpan Nature Reserve Complex are as follows:

1. To conserve and maintain important marine, coastal, wetland and terrestrial habitats of Rocherpan Nature Reserve Complex.
2. To encourage sustainable visitor access and provide overnight accommodation for a limited number of guests within the existing tourism footprint.

The management plan then identifies the strengths, weaknesses, opportunities and threats (SWOTs) for Rocherpan Nature Reserve Complex. A SWOT analysis involves specifying the objectives and identifying the internal and external factors that are favourable or averse to achieving those. Some of the strengths identified are a minimal management requirement due to the reserve's small size, limited ecological threats and low volume tourism. Both the terrestrial and marine components have known and verified boundaries. Minimal alien invasive plant species occur and pose an insignificant threat and the tourism footprint and layout is situated in a way that compliments the reserve and exhibits the natural assets. Some of the weaknesses identified are the lack of adequate fencing and fire breaks, the isolated nature of the

reserve making on-site management difficult, the lack of provision for field staff in the regional human resources organogram and difficulties in regulating reserve access.

The key opportunities identified through SWOT were as follows: a diversity of habitats fall within the reserve including marine, freshwater and terrestrial habitats, which present good opportunities for tourism and environmental education. The reserve is buffered by natural habitats to the north and south, decreasing the impact of edge effects and habitat fragmentation. Although the reserve is isolated, job creation is feasible in the form of services for cleaning and maintenance as communities are situated nearby; and the isolated nature of the reserve make it an ideal tourism destination. Some of the threats identified were uncontrolled beach access, crime and vandalism, illegal hunting, driving on the pan and fore dunes and the lack of marine law enforcement. River abstraction upstream is not regulated and does not take into consideration the water needs of the protected area. Water use rights and servitudes on the reserve result in illegal access and grazing by livestock. Climate change may result in changing sea levels and change in species distribution and abundance. Strandveld habitat types are well represented and conserved in other protected areas like West Coast National Park, decreasing the conservation value of the reserve.

Section three highlights the legal framework under which CapeNature and the Rocherpan Nature Reserve Complex operates and details the reserve's history and legal status, ecological context and information, cultural heritage, socio economic context and infrastructure development programs.

Section four details the planning context for Rocherpan Nature Reserve Complex and relates it to regional and provincial planning processes. Rocherpan falls within the boundaries of the West Coast District Municipality (WCDM) as well as the Bergrivier Local Municipality. The Integrated Development Plan (IDP) and Spatial Development Framework (SDF) for the WCDM run on a five year cycle, the current cycle being 2007 - 2012. The WCDM-IDP guides strategic development within the area; this part also deals with protected area expansion. Although expansion towards the north of Rocherpan is possible, future expansion will be focused on enlarging the MPA to align its borders with the current terrestrial borders.

Section five sets out the Conservation Development Framework (CDF) developed for Rocherpan Nature Reserve Complex. The CDF includes sensitivity analysis, zonation, access and a concept development plan. Rocherpan Nature Reserve Complex is a small coastal reserve, with significant areas of Saldanha Flats Strandveld vegetation, which is poorly conserved and formally recognised as Vulnerable due to habitat loss throughout the historical range (Government Gazette 2011). The seasonally inundated Cape Inland Salt Pans provide important foraging and breeding habitat for a number of waterfowl species, and although this habitat is not threatened, the system is highly vulnerable to disturbance. Sandy coastal substrates and wetlands are also important risk factors for road and built infrastructure and as such, any proposed infrastructure or activity must take the relevant sensitivity features into account. Fortunately, there are sufficient areas of low sensitivity to accommodate current demand for recreational access and nature based tourism. There are also existing transformed footprints with tourism and management infrastructure,

outside the reserve. This is ideal with regard to sustainable land-use best practise within nature reserves, although it does compromise the tourism experience to some extent. During 2010-2011, CapeNature embarked on a tourism upgrade project on the reserve. After consultation with the National Department of Environmental Affairs (DEA) to confirm that certain tourism components could proceed without National Environmental Management Act (NEMA); Environmental Impact Assessment (EIA) authorisation, Phase 1 of the project was started. During this phase, old and obsolete management and tourism infrastructure were upgraded, and/or demolished and replaced. NEMA EIA authorisation for Phase 2 was received in January 2013 and it is envisaged that construction of Phase 2 will be completed by the end of the 2013 financial year.

Section six summarises the reserve's Strategic Implementation Framework (SIF). The SIF guides the implementation of the PAMP over five years to ensure that it achieves its objectives. The SIF translates the information described in sections 3, 4 and 5 into management activities and targets, which will be used to inform annual planning; including the allocation of resources required for implementation. The SIF is divided into a number of tables which detail the key deliverables and monitoring and management activities that the responsible CapeNature staff members will be required to pursue within the next 5 years. These tables cover aspects such as biodiversity and wildlife management, infrastructure management, finance and administration functions and the tourism development framework.

The last section of the PAMP lists the references and definitions of terms as used in the document.

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ABBREVIATIONS

APO	Annual Plan of Operations
BCU	Biodiversity Crime Unit
BRM	Bergrivier Local Municipality
BMS	Biodiversity Monitoring System
CBA	Critical Biodiversity Area
CDF	Conservation Development Framework
DEA	Department of Environmental Affairs
DWAF	Department of Water Affairs (now DWA)
DWA	National Department of Water Affairs
EIA	Environmental Impact Assessment
EPWP	Expanded Public Works Programme
FEPA	Freshwater Ecosystem Priority Area
GIS	Geographical Information System
HR	Human Resources
HRM	Human Resource Manager
ICM	Integrated Catchment Management
IDP	Integrated Development Plan
IUCN	International Union for Conservation of Nature and Natural Resources
MEC	Member of Executive Council
METT-SA	Management Effectiveness Tracking Tool for South Africa
MOU	Memorandum of Understanding
MPA	Marine Protected Area
NEM: PAA	National Environmental Management: Protected Areas Act
NEMA	National Environmental Management Act
NFEPA	National Freshwater Ecosystem Priority Areas
NGO	Non-governmental Organisation
NPAES	National Protected Area Expansion Strategy
OHS	Occupational Health and Safety
OHSA	Occupational Health and Safety Act
PAAC	Protected Area Advisory Committee
PAMP	Protected Area Management Plan
PDP	Personal Development Plan
PFMA	Public Finance Management Act
RMC	Reserve Management Committee
SANBI	South Africa National Biodiversity Institute
SANParks	South African National Parks
SDF	Spatial Development Framework
SIF	Strategic Implementation Framework
SOB	State of Biodiversity
SOP	Standard Operating Procedures
SWOT	Strengths, weaknesses, opportunities and threats analysis
U-AMP	User Asset Management Plan
UNESCO	United Nations Educational, Scientific and Cultural Organisation
WCDM	West Coast District Municipality
WCNCB	Western Cape Nature Conservation Board
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 (Cleaver-Christie *et al.* in prep.).

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 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.

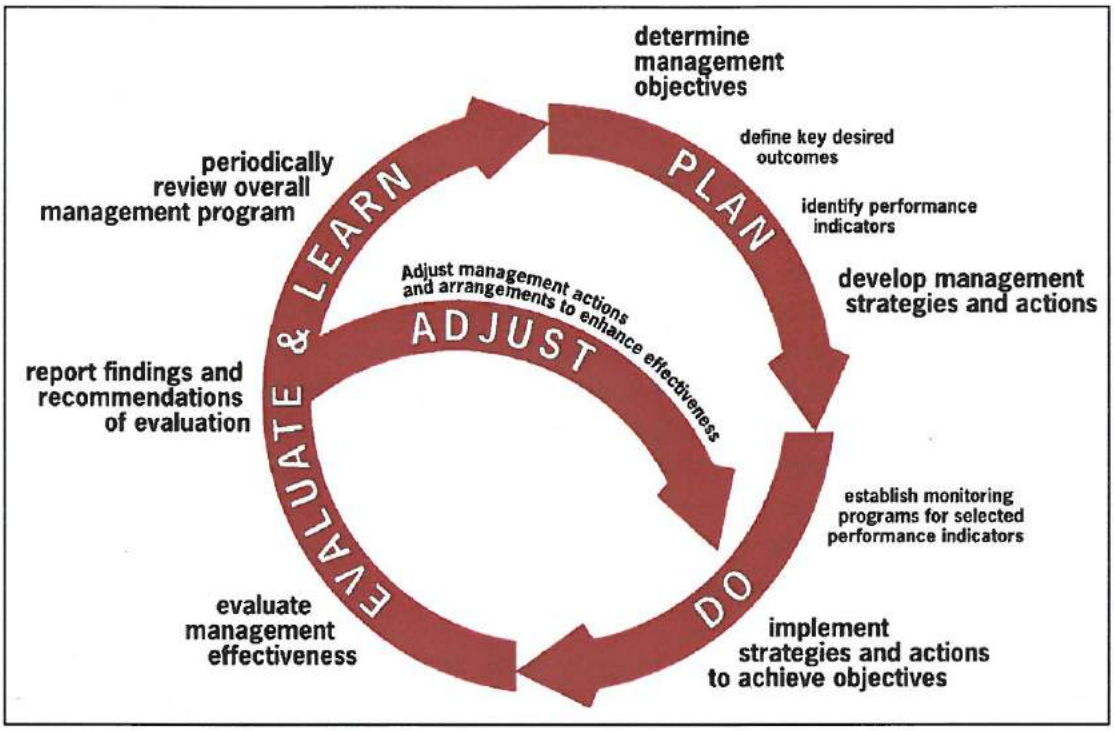

Figure 1.1: Adaptive management cycle (CSIRO 2012)

The management plan indicates where reserve management intends to focus its efforts in the next five years (2013-2018). 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 SIF follows financial years (1 April to 31 March); with year one 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 (also 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 Definition of terms

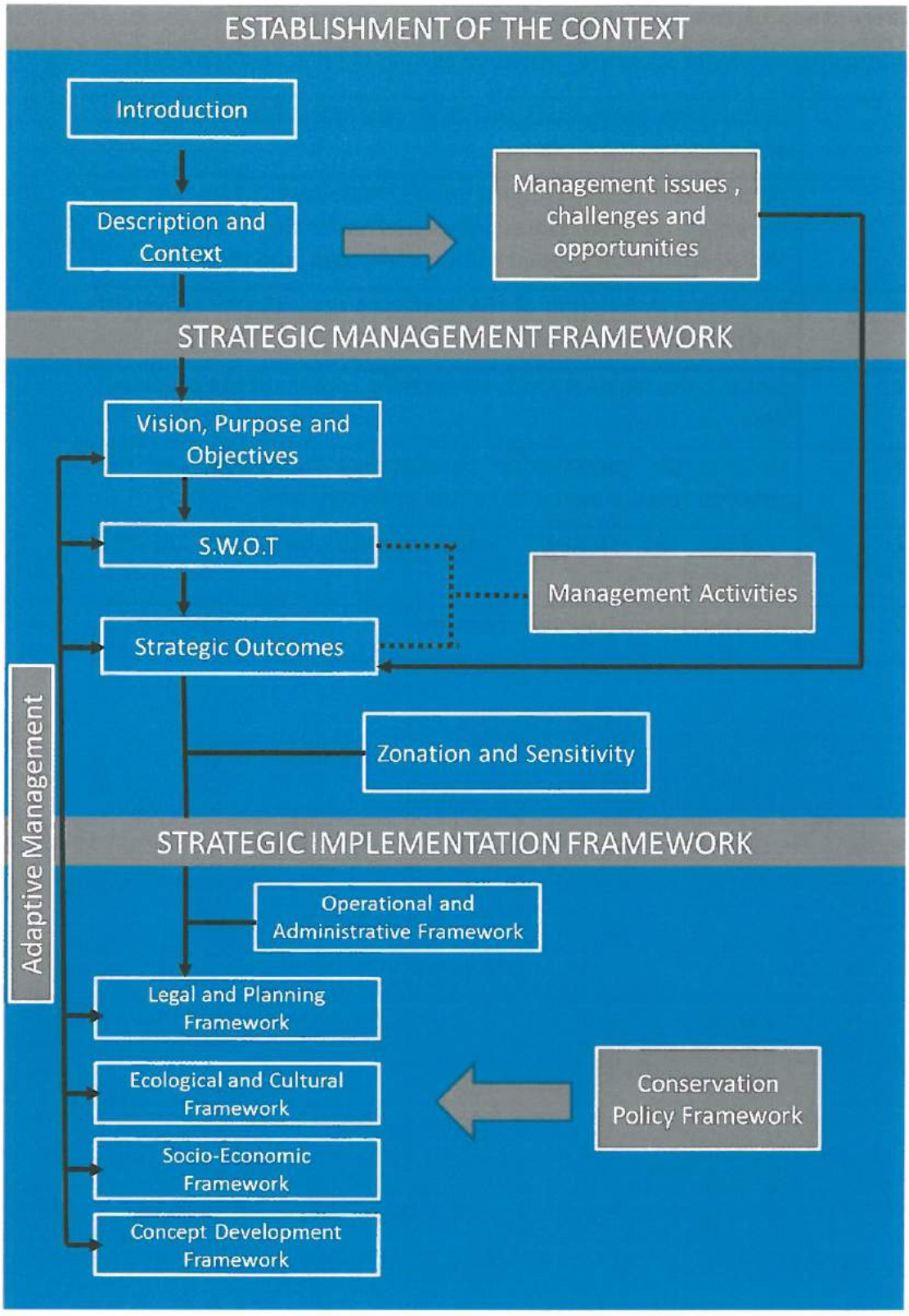

Figure 1.2: Structure of the management plan

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 (2013). The edited management plan then undergoes an independent external review before being recommended for stakeholder participation 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 Chief Executive Officer to the CapeNature Conservation Committee. Once approved by the Conservation Committee, it is referred to the Western Cape Nature Conservation Board for approval before being submitted by the Chairman of the Board to the Department of Environmental Affairs and Development Planning for ministerial approval. The Western Cape Minister of Local Government, Environmental Affairs and Development Planning then sends the management plan out for public participation and only thereafter and based on the inputs received, can the plan be gazetted. 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 six and the document will be reviewed and updated every five years.

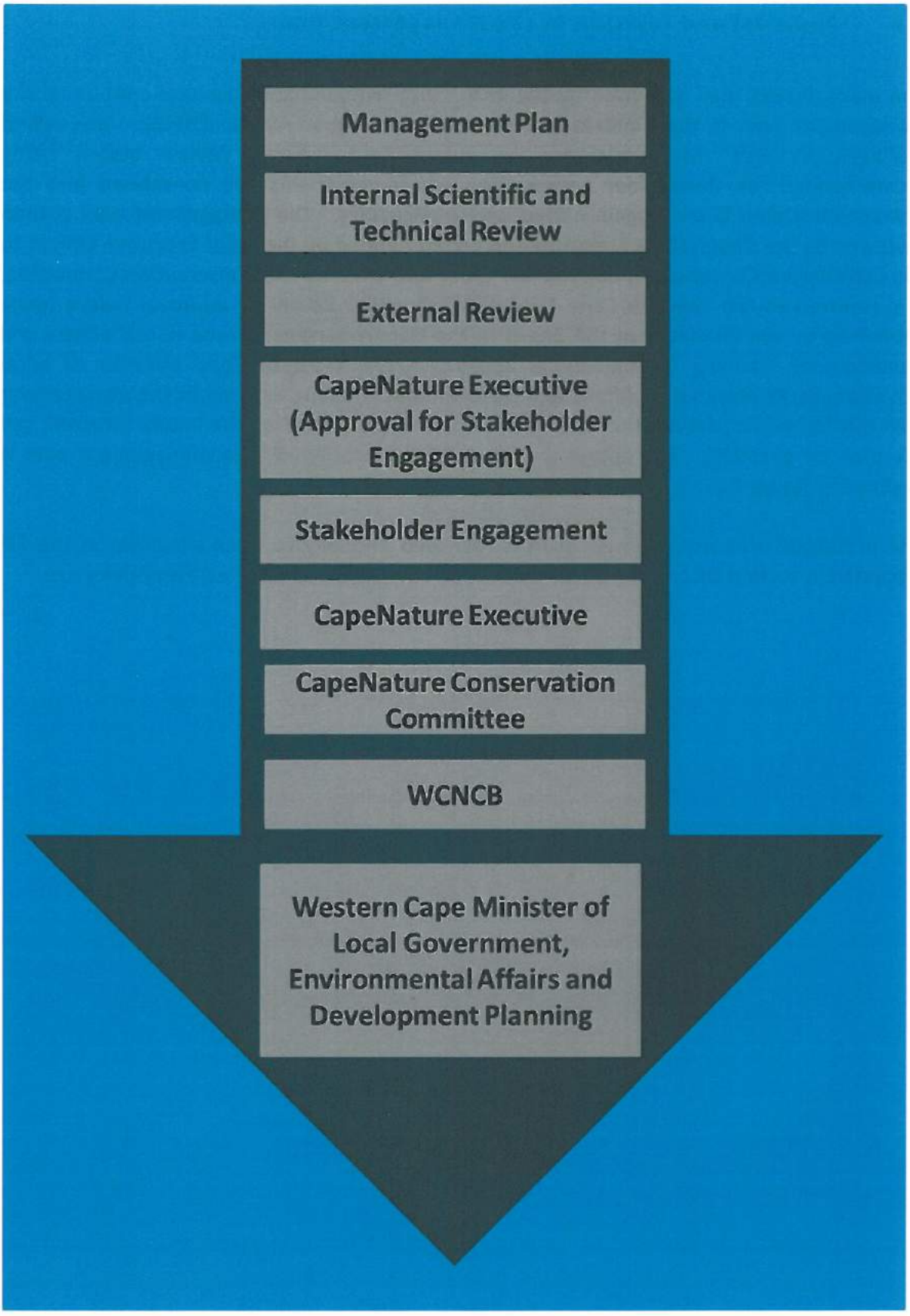

Figure 1.3 Approval and review of the management plan

2) THE STRATEGIC MANAGEMENT FRAMEWORK OF ROCHERPAN 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 Rocherpan Nature Reserve Complex and summarises its opportunities, strengths, 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 umbrella statement indicates the management intent of the Rocherpan Nature Reserve Complex 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 (section 6). Action plans were associated with objectives, and tasks (activities) were identified within each action plan.

2.1. The vision of Rocherpan Nature Reserve Complex

The vision describes the overall long-term goal for the operation, protection and development of Rocherpan Nature Reserve Complex.

The vision of Rocherpan Nature Reserve Complex is: The maintenance of the conservation value and ecological integrity of the reserve, and the recognition of Rocherpan Nature Reserve Complex as a unique low volume tourism experience on the West Coast.

2.2 The purpose of Rocherpan 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.

According to Section 17 of NEM: PAA, the purpose of declaring an area as a protected area is:

a) to protect ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes in a system of protected areas;
b) to preserve the ecological integrity of those areas;
c) to conserve biodiversity in those areas;
d) to protect areas representative of all ecosystems, habitats and species naturally occurring in South Africa;
e) to protect South Africa's threatened or rare species;
f) to protect an area which is vulnerable or ecologically sensitive;
g) to assist in ensuring the sustained supply of environmental goods and services;
h) to provide for the sustainable use of natural and biological resources;
i) to create or augment destinations for nature-based tourism;
j) to manage the interrelationship between natural environmental biodiversity, human settlement and economic development;
k) generally, to contribute to human, social, cultural, spiritual and economic development; or

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

The Rocherpan Nature Reserve Complex was declared for all purposes listed in the Act and its specific purpose is to:

Conserve and maintain important marine, coastal, wetland and terrestrial habitats important for bird conservation, and provide opportunities for nature based tourism.

2.3 The values of Rocherpan 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 Rocherpan Nature Reserve Complex include:

Natural values	Rocherpan Nature Reserve Complex necessitates a low management requirement due to its small size (1081 ha), limited ecological threats and low volume tourism. The Reserve was originally identified as an important habitat for Cape shoveler, *Anas smithii.* Threatened avifauna that utilise the reserve include African black oystercatcher *Haematopus moquinii,* lesser flamingo *Phoenicopterus minor,* greater flamingo *Phoenicopterus roseus,* African marsh harrier *Circus ranivorous ,* black harrier *Circus maurus and* great white pelican *Pelecanus onocrotalus.* Rocherpan is one of a few major pans along the south western coast and is identified as a Critical Biodiversity Area (CBA), while the Papkuils River that feeds the pan is identified as a Critical Ecological Support Area and buffer. Rocherpan Nature Reserve Complex forms a conservation anchor for a CBA network that runs along the coast A diversity of habitats fall within the reserve including marine, freshwater and terrestrial habitats, which present good opportunities for tourism. Rare and threatened plant species, like *Pseudalthenia aschersoniana* are offered protection within the reserve. The occurrence of invasive alien plant species is minimal and can therefore be easily managed.
Ecosystem service values	The seasonal wetland provides habitat for resident and migratory species of waterbirds and serve as an important breeding habitat for especially the Cape shoveler
Social values	Recreational experience; contribution to the local economy through job creation

Eco-tourism values	Tourism provides an opportunity for accomplishment of ecological management objectives through interest groups, volunteers and bird clubs. The tourism footprint is restricted to degraded areas and the layout is situated in a way that complements the reserve and exhibits its natural assets.

2.4 The objectives of Rocherpan Nature Reserve Complex

The objectives were derived from the vision and purpose and represent Key Performance Areas which should be achieved 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 prioritised objectives are:

Objective 1: To conserve and maintain important marine, coastal, wetland and terrestrial habitats of Rocherpan Nature Reserve Complex.

Objective 2: To encourage sustainable visitor access and provide overnight accommodation for a limited number of guests within the existing tourism footprint.

2.5 Summary of management issues, challenges, opportunities and threats of Rocherpan 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 averse to achieving that objective. The following analysis identifies the Rocherpan Nature Reserve Complex strengths, weaknesses, opportunities and threats (Table 2.1).

Table 2.1 Management strengths, weaknesses, opportunities and threats related to the objectives of Rocherpan Nature Reserve Complex

S.W.O.T Analysis of Rocherpan Nature Reserve Complex **Strengths**	**Objective 1**	**Objective 2**
Minimal management requirement due to small size (1081 ha), limited ecological threats and low volume tourism.	✓	✓
The boundary extension 500 m seawards for the Marine Protected Area is known and confirmed.	✓	
Conservation Development Framework is complete.	✓	✓
A detailed vegetation map has been compiled which includes detailed mapping of the pan which indicates water depth.	✓	✓
Identification of sensitive areas and sensitivity mapping is complete.	✓	✓
The reserve boundary has been verified by a surveyor.	✓	
Minimal alien invasive plant species occur and pose an insignificant threat for invasion.	✓	
The tourism footprint and layout is restricted to degraded areas and situated in a way that complements the reserve and exhibits natural assets.	✓	✓
A Tourism Liaison Officer has been appointed.		✓
Weaknesses		
Fences are in a state of disrepair or absent resulting in impacts on natural vegetation through grazing by livestock.	✓	✓
Water use rights and servitudes have not been formally or officially noted in a CapeNature document signed by the Executive, outlining agreements between CapeNature and landowners which indicates responsibilities and agreed rights/activities per party and which will be clear to successors in title and CapeNature for future reference.	✓	
The staff organogram does not make provision for field rangers or field staff	✓	✓
The isolated nature of the reserve restricts on-site management	✓	✓
The ecological matrix has been put on hold due to uncertainty regarding future management and the absence of field staff.	✓	
Firebreaks are not in place as ICM funding has not been obtained for this reserve.	✓	
Access is not regulated and there are difficulties in enforcing access control.	✓	✓
Opportunities		
A diversity of habitats fall within the reserve including marine, freshwater and terrestrial habitats, which present good opportunities for tourism and environmental education.	✓	✓
Opportunities for protected area expansion exist towards the north of the reserve (Modderfontein).	✓	✓
Tourism provides an opportunity for accomplishment of ecological management objectives through interest groups, volunteers and bird clubs.	✓	✓

S.W.O.T Analysis of Rocherpan Nature Reserve Complex		
Opportunities		
Recreational shore angling is allowed on the reserve.	✓	✓
The reserve is buffered by natural habitats to the north and south, decreasing the impact of edge effects and habitat fragmentation.	✓	
The isolated nature of the reserve makes it an ideal tourism destination.		✓
Although the reserve is isolated, job creation is feasible in the form of services for cleaning and maintenance from nearby communities.		✓
The Protected Area Advisory Committee (PAAC) is represented by the Dwarskerbos, Velddrif and Aurora communities.	✓	✓
Threats		
The reserve is relatively isolated but still close enough to towns for uncontrolled access, crime and vandalism, illegal hunting and illegal driving to take place within the reserve.	✓	✓
Uncontrolled beach access and no marine law enforcement.	✓	✓
Habitat types are well represented and conserved in other protected areas, decreasing the conservation value of the reserve.	✓	✓
Water use rights and servitudes result in illegal access and grazing by livestock.	✓	✓
River abstraction upstream is not regulated and does not take into consideration the needs of the protected area.	✓	
Climate change may result in changing sea levels and change in species distribution and abundance.	✓	

3) DESCRIPTION AND CONTEXT OF ROCHERPAN NATURE RESERVE COMPLEX

3.1 Location and extent of Rocherpan Nature Reserve Complex

The Rocherpan Nature Reserve Complex is situated about 180 km north of Cape Town on the R27, West Coast road. The closest town is Velddrif, approximately 25 km to the south (Figure 3.1). It falls within the 3318 CB quarter degree grid squares. Rocherpan Nature Reserve Complex is comprised of a 930 ha terrestrial Nature Reserve and a 151 ha proclaimed Marine Protected Area giving the reserve a total area of 1 081 ha.

The reserve is bound on the west by the Atlantic Ocean. The northern and southern boundaries adjoin private landowners. The eastern boundary is formed in part by the Sishen-Saldanha Spoornet private road and the public road between Velddrif and Elands Bay.

Rocherpan Nature Reserve is situated within the West Coast District Municipality (WCDM). The district is made up of five municipalities, which are Matzikama (North), Cederberg in the centre and Bergrivier, Saldanha Bay and Swartland Municipalities in the South. It is further located within the Bergrivier Local Municipal area (BRM) that is approximately 4 264 km^2 in size with nine settlements of which three can be classified within the context of Bergrivier, as major towns namely Piketberg, Porterville and Velddrif. (Bergrivier Municipality, 2008).

The BRM is generally described as a low-growth area in the Western Cape. The economic activities consist mainly of agriculture, fishing, and forestry. Agriculture, the dominant sector, has been hampered by droughts, lower profitability and rationalisation of production techniques. Commercial fishing has also declined as a result of lower catches and tighter quota controls. Located to the northwest of Cape Town, the area does not fall within the in-migration corridor from the Eastern Cape (Bergrivier Municipality, 2008).

Factors such as the distance from Cape Town, low population densities, low levels of formal education, shortage of skilled labour, poor and expensive public transport and limited access to communication facilities are currently generic issues that are undermining economic development in the region. A concern is that the natural resources have limited capacity to support and service further development opportunities within the BRM. Eco-tourism is seen as a potential avenue for the generation of additional revenue in the BRM. Given the relatively small population of the area and the constraints in the two core economic sectors, tourism must be seen as the only significant driving force or growth of the Bergrivier towns (Ranger & Du Plessis, 2010).

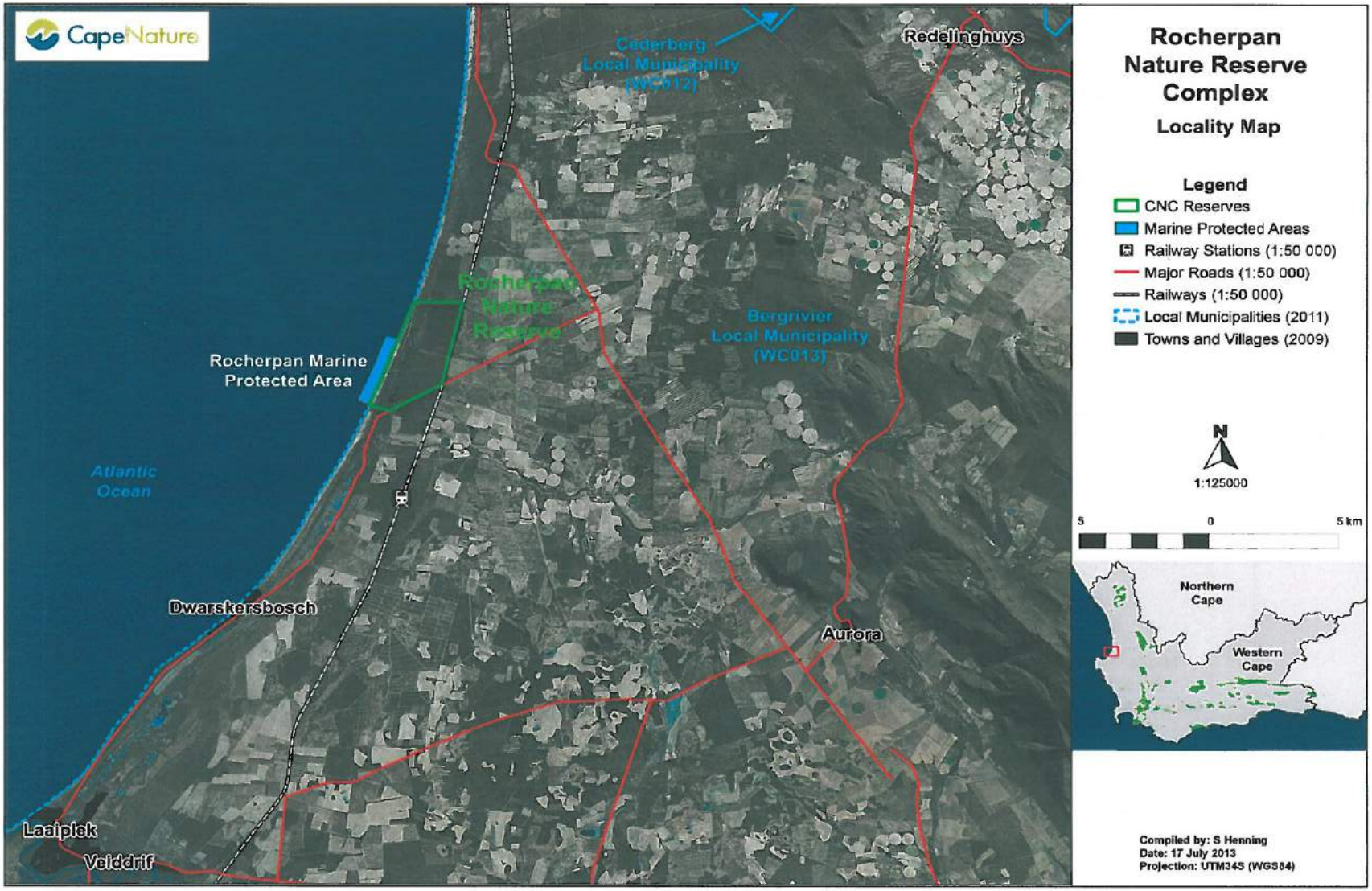

Figure 3.1: Location and extent of Rocherpan Nature Reserve Complex

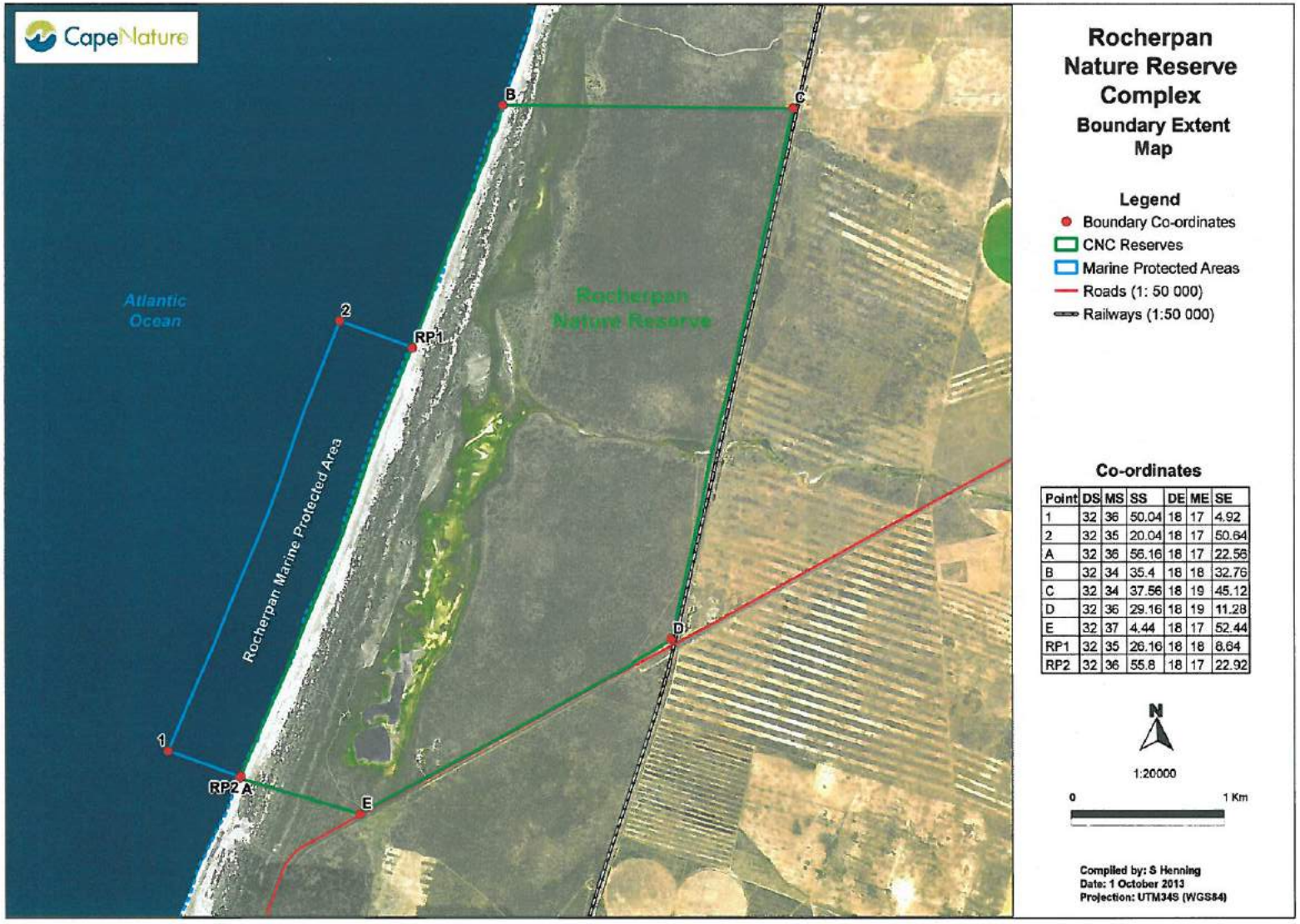

Figure 3.2: Boundary extent of Rocherpan Nature Reserve Complex

Rocherpan Nature Reserve Complex is comprised of the following three land parcels:

Table 3.1: Land parcels constituting the Rocherpan Nature Reserve Complex

Farm name and number	Title deed number	Diagram number	Noting sheet number	Conservation status
St Helenafontein No 29 A, Portion 2 (portion of Portion 1)	T15643/1967	8315/1966	CH-5B	Provincial Nature Reserve
Bookram No 30; Portion 2	T15644/1967	8316/1966	CH-5B	Provincial Nature Reserve
St Helenafontein No 29 A, Portion 3 (portion of Portion 1)	T66517/1991	6779/1990	CH-5B	Provincial Nature Reserve

The above three farms was consolidated and now has one Diagram number 6780/1990. The three consolidated portions are now known as the Farm 272, Piketberg. This happened only on paper as the consolidation was not registered, so the property information for the three portions above will still be relevant.

3.2 History of Rocherpan Nature Reserve Complex

Rocherpan Nature Reserve Complex was named after Mr Pierre Rocher who arrived in the Sandveld area in 1839 after leaving his first farm, Slangkop, which is the site of the present day Kommetjie lighthouse near Fish Hoek, Cape Town.

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

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

The wetland on the reserve is an anthropogenic system, in that it was created when Pierre Rocher closed off the mouth of the Papkuils River between 1840 and 1880. The river was forced to flow in behind the dunes, in order to improve summer grazing and water for domestic livestock on the farm. Thus a habitat for waterbirds was inadvertently created. Duck hunts were organised once a year on New Year's Day by invitation only. Provision was also made in all the Title Deeds, as a special condition, to secure adequate water for the wetland. The Title Deeds state: "*that the periodical stream shown on the Diagram ..... shall continue to flow, undisturbed as at present for the benefit of the owner of the portion of St Helenafontein (and his successors in title) as well as the owner of the remaining extent of Bookram (and his successors in title)*".

The wetland is fed by the Papkuils River, which arises in the mountains 25 km east of the reserve above the town of Aurora. The river is seasonal, only flowing in winter, and reaches the vlei around May and dries up again around September depending on rainfall. The vlei is shallow (1.7 m at its deepest) and usually dries up completely before the start of the next rainy season. When full, it covers an area of 110 ha and is 6.5 km long.

On 27 July 1990, the coast and sea 500 m seawards from the high water mark were proclaimed a marine reserve under the Sea Fisheries Act 1988 in Government Gazette No. 12667, pages 46-48 (Proclamation No. R1810).

The Sea Fishery Act, 1988, was repealed by the Marine Living Resources Act, 1998, which commenced on 1 September 1998. This led to Rocherpan Marine Reserve being declared as a marine protected area (i.e. in Rocherpan Marine Protected Area) in terms of subsection 84(4) of the Marine Living Resources Act, 1998. Subsection 84(4) of the Marine Living Resources Act, 1998, states that an area set aside as a marine reserve under the provisions of the Sea Fishery Act, 1988, shall be deemed to have been declared a marine protected area in terms of the Marine Living Resources Act, 1998.

Historical management activities that took place on Rocherpan Nature Reserve Complex since its proclamation in 1967 are listed in Table 3.2.

Table 3.2: Historical management activities on Rocherpan Nature Reserve Complex (Heyl, 1989 and Wessels, 1997)

Activity or incident	Date
Reserve fenced to stop grazing by cattle from neighbouring farms	1968
Islands in vlei altered to increase breeding success of birds	1976
337 artificially bred teals released as part of research project	1971/72
Rodents on islands were caught and islands burned to decrease predation on nests	1972
More artificially bred teals released	1972/73
Predators caught to decrease predation on nests	1972/73
Facilities for day visitors erected	1972/73
10 springbok *Antidorcas marsupialis* form Goegab Nature Reserve released on Rocherpan	1974
Rain gauge installed to monitor rainfall and correlate with river run-off	1974
Pumping of water from the pan to the sea and the scraping of deposited sediments form the pan's floor	1980's

3.3 Ecological context of Rocherpan Nature Reserve Complex

This section reflects the ecological conditions of Rocherpan Nature Reserve Complex.

3.3.1 Climate and weather

Rocherpan Nature Reserve Complex experiences a temperate, Mediterranean-type climate, with warm, dry summer and cool, relatively wet winter seasons. The warmest mean monthly temperatures of 23^{0}C are normally recorded from January until March, with the lowest of 13^{0}C, recorded from June to August (Figure 3.3). The Atlantic Ocean and associated cold Benguela current has a tempering effect on temperatures.

Rainfall generally occurs as a result of cold fronts moving in from the South Atlantic Ocean. Most of the rain occurs from June until August, normally peaking in July, although there is some inter-annual variation in the time of this peak. The mean annual rainfall for the period 2001 – 2010 at Rocherpan Nature Reserve Complex was about 255 mm. Northerly and north-westerly winds predominate in winter. In summer southerly and south-easterly winds dominate. The incidence of calms is greatest in the spring and autumn months, from September until November and March until May (Jürgens *et al.* 2010).

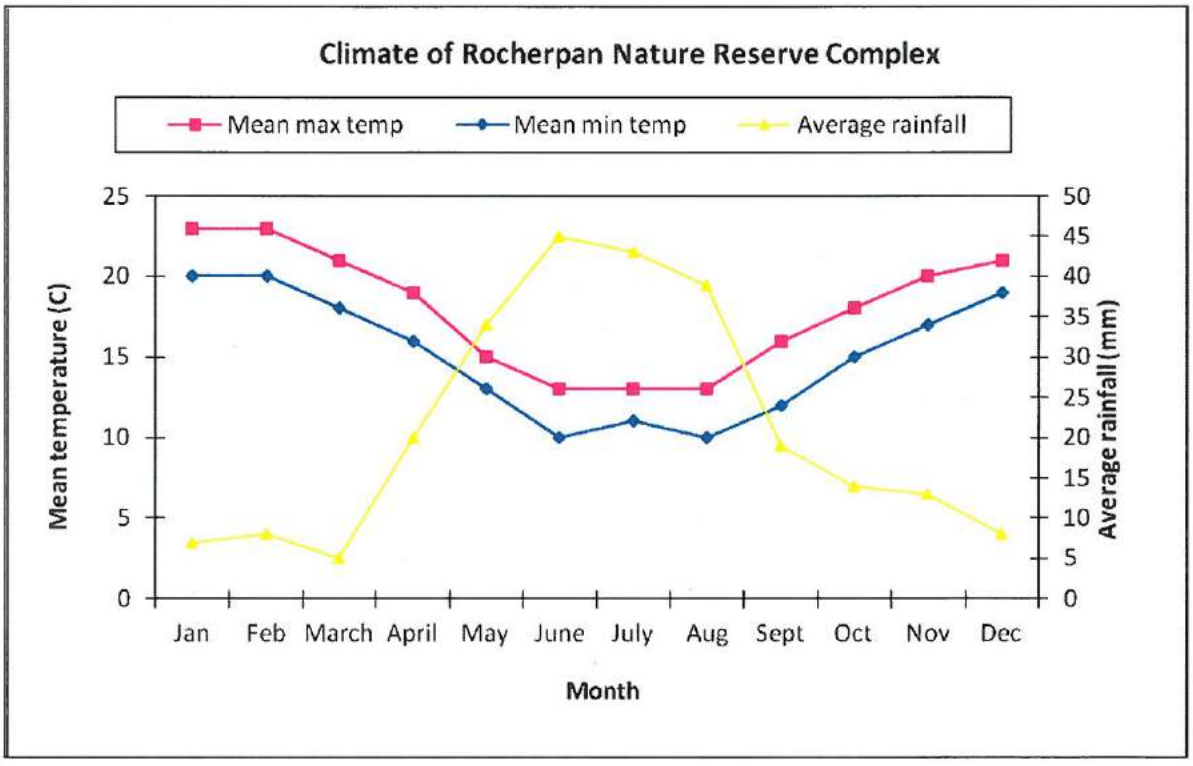

Figure 3.3: Climate of Rocherpan Nature Reserve Complex (2001 - 2010) (Jürgens *et al.* 2010)

3.3.2 Topography

Rocherpan Nature Reserve Complex is fairly flat and low lying with only the coastal dune system providing some elevation. The lowest elevation is the actual sea level because the reserve includes a marine reserve that stretches 500 m seawards. The highest elevation is 20 m above sea level.

3.3.3 Geology and soils

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

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

There is an abundance of aeolian deposited tertiary to residual sands. The dune slacks have been formed on granite-gneiss (Wessels 1997). The deposits consist of mostly conglomerates, sandstone, limestone, marble, gravel and sand. Small deposits of gypsum are present. Figure 3.4 illustrates the different kind of substrates present on the reserve.

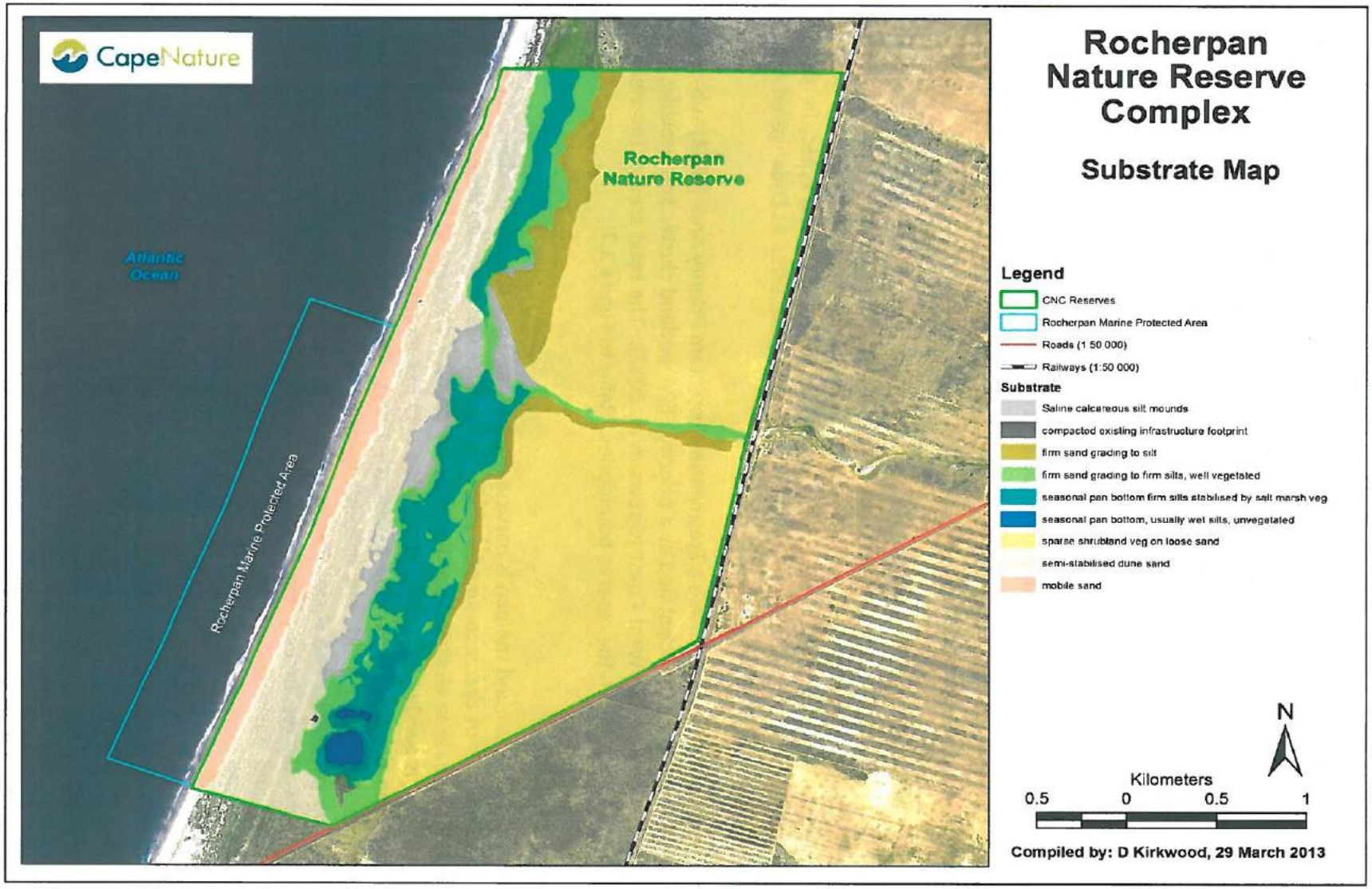

Figure 3.4: Geology of Rocherpan Nature Reserve Complex

3.3.4 Aquatic systems

Figure 3.5: Central vlei area of Rocherpan Nature Reserve Complex. (Photo: D Kirkwood)

Rocherpan Nature Reserve Complex is dominated by the large central vlei (Figure 3.5) and a 4.7 km stretch of sandy Atlantic coastline to the west.

Two rivers flow into the reserve, namely the Papkuils River and the Sout River. The Papkuils River directly feeds the vlei after which the reserve is named. It is a vlei, not a pan, as the reserve name would suggest. This Western Strandveld wetland cluster is largely saline, with freshwater entering the system seasonally through the two rivers. The Western Strandveld wetland types, in general, are moderately to poorly protected, with these systems mostly being classified as Endangered or Critically Endangered ecosystems (Gouws *et al.* 2012).

Although the reserve does not fall within a Freshwater Ecosystem Priority Area (FEPA) sub-catchment, the cluster of wetlands has been identified as a priority FEPA wetland cluster and provides important habitat for waterfowl along the West Coast (Gouws *et al.* 2012). The total area of the vlei is 160 ha, with 110 ha of this falling within the reserve boundaries. Refer to Figure 3.7.

3.3.4.1 Groundwater

The groundwater quality around the pan is particularly poor and not suitable for domestic use (DWAF 1998). The groundwater of the unconfined aquifer and surface water quality improves during winter with a significant decrease in electrical conductivity; indicating a decrease in the total dissolved solids concentration in the groundwater. However, during summer months, the electrical conductivity of the water more than doubles (Toens and Associates 1994). The geohydrological setting comprises unconsolidated tertiary dune sand and brackish calcareous sand which in turn is underlain by Malmesbury Group greywacke and shale. The unconsolidated deposits are approximately 15 - 20 m thick. The groundwater resources occur within the unconsolidated deposits and the groundwater quality is variable and particularly saline in the vicinity of the pan. The groundwater becomes increasingly saline with increasing depth below the groundwater level. The water level is shallow at approximately 2.5 m below ground level (Conrad *et al.* 2011).

3.3.4.2 Catchments

Rocherpan Nature Reserve Complex falls within the Berg and south western Cape drainage region (King 1995). According to the Department of Water Affairs (River Health Programme, 2006), water management division, this catchment also falls within the Olifants/Doring Water Management Area, with its southern parts extending into the Berg Water Management Area.

3.3.4.3 Rivers

Two small seasonal rivers flow into the reserve, namely the Papkuils River and the Sout River. The wetland is almost entirely dependent on the inflow of water from the Papkuils River that has its source on the farm Rietvlei in the catchment area of the Aurora Mountains. It flows a distance of 24 km through 15 farms before reaching the reserve. It only flows over its complete course down to Rocherpan Nature Reserve Complex in the rainy season, between April and September. Of relevance however, is that three riparian farms closest to the source of the Papkuils River may abstract water directly from the river during the summer months, significantly decreasing run-off to Rocherpan Nature Reserve Complex. The river does flow throughout the year up until the farm Papkuilsfontein where it disappears underground. Farmers adjoining the river have also begun planting citrus orchards and vineyards, both of which will require substantial irrigation during the drier summer months. No dams are allowed to be built in the river system, unless a permit has been granted in terms of the National Water Act, 1998 (Act No.36. 1998). The storage of winter water will have a negative impact on the wetland area of Rocherpan Nature Reserve Complex.

According to the National Freshwater Ecosystems Priority Area project, the Papkuils River is classified as being moderately modified, i.e. in a class C (Nel *et al.* 2011). However, it is not classified as a FEPA river sub-catchment.

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

3.3.4.4a Cape Inland Salt Pans

In Rocherpan Nature Reserve Complex, this is essentially a seasonal wetland vegetation type in a sandy area where the wetland nature of this habitat is due to underlying clay and calcrete, which are less porous than the sands. The pan is extremely saline, and saltmarsh vegetation grows in zones or terraces determined by the seasonality of the inundated parts with no vegetation in the end of the pan in the south. The deeper the terrace, the less botanical diverse the vegetation becomes.

The vegetation around the salt pan is discussed according to the habitats mapped from the outside to the middle of the pan based on Van Rooyen (1981) and Gray (1997) with modifications.

3.3.4.4b Salt Pan - Stream Channel

This stream is where the Papkuils River runs into the pan.

3.3.4.4c Dry Salt Flats (artificial)

This habitat is composed of highly saline, calcareous fine silt. Based on both its occurrence as raised beds above the level of the immediate surroundings, and its soil composition, this mapped habitat subtype seems to be derived from historical scraping or excavation of the pan bottom. The presence of a good diversity of plants, including several geophytes, suggests that if this habitat is indeed artificial, it was created well before the establishment of the reserve in 1967, and possible as long ago as the original closing of the mouth of the Papkuils River by Pierre Rocher who settled in the area in 1839 (Kirkwood 2010/2013). This unit is mostly found on the western side of the pan.

Two strata are found in this succulent-leafed dwarf shrubland of the limestone areas: a dwarf stratum no higher than 60 cm dominated by *Sueda fruticosa, Lycium tetrandrum* and *Sarcocornea pillansii*, while the 10 – 20 cm stratum makes up the largest portion of cover and is dominated by *Psilocaulon junceum, Galenia sarcophylla, Drosanthemum intermedium, Drosanthemum marinum, Mesembryanthemum crystallinum, Spergularia marginata* and *Salsola zeyheri.*

3.3.4.4d Saldanha Flats Strandveld / Salt Pan ecotone

Found on the eastern side of the pan, this ecotone unit is found between the reed peripheral or margin wetland and ecotone and the Saldanha Flats Strandveld. It has many of the same species as the Saldanha Flats Strandveld but the structure is different (lower shrubland with sparser vegetation) and this unit is a lower diversity. *Roepera morgsana, Osteospermum moniliferum, Ruschia bolusiae* and *Limonium peregrinum* are the most obvious plant species here.

3.3.4.4e Salt Pan - Margin Wetland Vegetation & Ecotone

The species distribution in this ecotone is patchy. This ecotone is dominated by *Sarcocornia pillansii* and *Ficinia nodosa* and is situated around the entire pan next to the *Juncus acutus* fringe directly bordering water during the wet season. There are also large patches of *Phragmites australis* with 100% cover of 3 m or taller. Along the southern end of the pan *Senecio hamilifolius* forms a stratum of 2 m tall. The 1 m stratum is recognised by *Ficinia nodosus* and the 0.5 m stratum by *Sarcocornia pillansii*. The plant growth of this community is thick with an almost 100% canopy cover throughout.

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

3.3.4.4f Salt Pan - seasonal water (shallow)

Two 10 cm high mat-forming species, *Sarcocornia natalensis* subsp. *affinis* and *Sporobolus virginicus*, dominate this vegetation - the former is prolific throughout the community while the latter is more prominent in the northern sections of the pan that dries out quicker. As the pan dries out and *Sarcocornia natalensis* subsp. *affinis* becomes more drought stressed, the plants become redder, sometimes forming a spectacular display.

3.3.4.4g Salt Pan - seasonal water (medium)

This zone may only support occasional plant species when the pan dries out.

3.3.4.4h Salt Pan - seasonal water (deepest)

This area of the pan does not dry up entirely for most years. *Pseudalthenia aschersoniana*, a Critically Endangered aquatic species, is found at the edges of the water.

3.3.5 Marine systems

Figure 3.6: View of foredunes and Marine Protected Area (Photo: D Kirkwood)

South Africa has three major bio-geographic zones: (a) the cool temperate West Coast; (b) the warm temperate South Coast; and (c) the sub-tropical East Coast. Rocherpan Nature Reserve Complex falls within the cool temperate West Coast zone which covers the area from Cape Point northwards through to Namibia (Branch & Branch 1981). The West Coast is characterised by long sandy beaches broken by rocky outcrops and prolific kelp forests. The region is influenced and driven by the cold, upwelling Benguela current. These nutrient-rich upwelled waters fertilise floating phytoplankton and the prolific kelp forests. Both phytoplankton and seaweeds are far more productive on the West Coast than on the South and East Coasts, and fuel more productive food-chains, culminating in the lucrative fisheries that are concentrated in this region.

The western boundary of Rocherpan Nature Reserve Complex consists of a 4.7 km stretch of sandy beach of which the southern 3 km and the area 500m seaward, is a declared MPA (Figure 3.7). The Rocherpan MPA covers a total area of 150.86 ha. The MPA was originally declared as a Marine Reserve on 27 July 1990 and was re-declared as Rocherpan Marine Protected Area under the Marine Living Resources Act on 27 May 1998. The beach is representative of the West Coast's high energy sandy beaches with waves continuously rushing up the beach (Figure 3.6). Only shore angling with rod and reel is allowed within the Rocherpan MPA. No other exploitation, like the collection of bait organisms, is allowed. Future reserve expansion will focus on consolidating the northern section of beach as part of the Rocherpan MPA (see section 4.2).

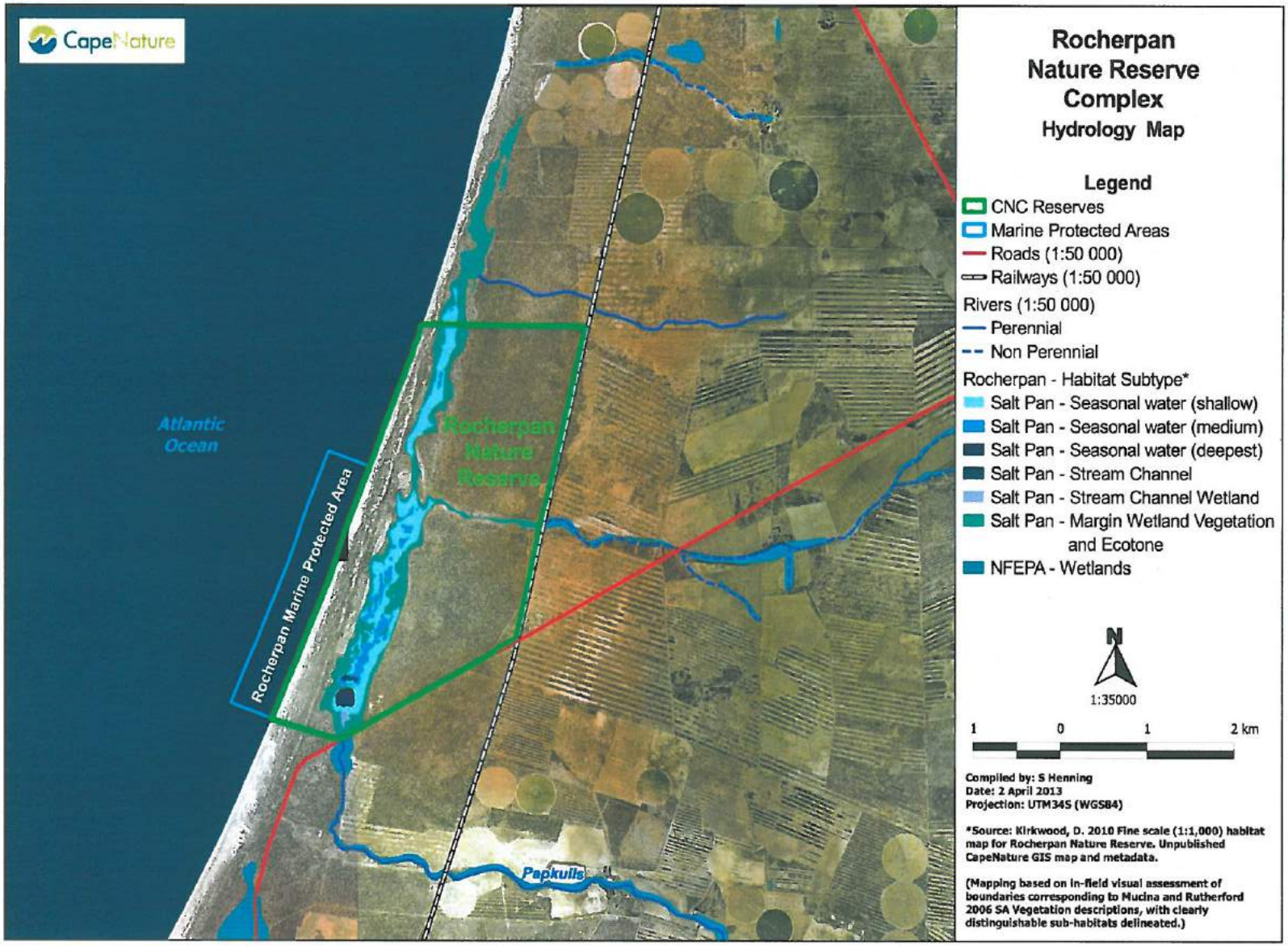

Figure 3.7: Aquatic systems of Rocherpan Nature Reserve Complex

3.3.7 Vegetation

Figure 3.8: Typical strandveld vegetation of Rocherpan Nature Reserve Complex (Photo: D Kirkwood)

The Rocherpan Nature Reserve Complex falls within the Greater Cape Floristic Kingdom. It is still the smallest and richest in plant species of the six floral kingdoms in the world even though it now includes the Fynbos Biome and the Succulent Karoo Biome. The Fynbos Biome was previously placed in the Cape Floristic Kingdom, or the Cape Floristic Region (CFR), and is now placed in the Core Cape Subregion (Manning & Goldblatt 2013) of the Greater Cape Floristic Kingdom. Its rich biodiversity is under serious threat for a variety of reasons and, in the case of the vegetation in the Rocherpan Nature Reserve Complex surroundings, these include conversion of natural habitat to permanent agriculture, rapid and insensitive development, over exploitation of water resources, marine resources, and infestation by alien species.

The vegetation of the Rocherpan Nature Reserve Complex consists of three main types: 1) Western Strandveld (Langebaan Dune Strandveld and Saldanha Flats Strandveld) within the Fynbos Biome as well as 2) Cape Seashore Vegetation and 3) Cape Inland Salt Pan Vegetation, the latter two within the Azonal Vegetation (Mucina *et al.* 2005; Mucina & Rutherford 2006 (Figure 3.10) with adaptations by Helme (2007) and the WCDM's Integrated Vegetation Map for the Bergrivier Local Municipality (2007a). These vegetation maps were then refined for this document (Kirkwood 2010/2013, Figure 3.11), and communities are described to mapping units according to and with adaptations to Van Rooyen (1981) and Gray (1997). The communities are described from west (sea) to east (inland).

3.3.7.1 Cape Seashore Vegetation

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

The vegetation consists of low shrubs (<50 cm) and graminoids. There is a relatively high degree of succulence, (e.g. *Senecio littoreus*), and a number of genera whose only succulent species occur in this coastal habitat (e.g. *Hebenstreitia, Dischisma*). Annuals may be common. Many species adapted to

being covered by mobile sands, and thus able to root at nodes. Few geophyte species, but those that there are may be prominent (e.g. *Trachyandra divaricata*) (Helme 2007).

The vegetation on the different habitat types within this unit is a compilation from Van Rooyen (1981) and Gray (1997).

3.3.7.1a Foredune vegetation

This is a single stratum of specialised pioneer species of about 30 cm high, with a total cover of up to 40%. Species found on the foredune are *Tetragonia decumbens, Didelta carnosa, Oncosiphon sabulosum, Dasispermum suffruticosum, Trachyandra divaricata, Felicia hyssopifolia* subsp. *hyssopifolia* and *Cladoraphis cyperoides.*

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

3.3.7.1b Leeward dune vegetation

Occupying the leeward side of the primary dunes at Rocherpan this sub-community comprised of two main strata. The vegetation cover is up to 65%. The first and most abundant was at 30 cm with *Cladoraphis cyperoides* (dominant), *Pharnaceum microphyllum* var. *microphyllum, Felicia hyssopifolia* subsp. *hyssopifolia, Odeyssea paucinervis* and *Helichrysum dunense*. The taller stratum of 50 cm or slightly higher is represented by *Stoeberia utilis* and *Roepera morgsana* characterised the upper stratum at about 50 cm.

Recorded red listed species on Rocherpan Nature Reserve Complex, like the Vulnerable *Dischisma crassum, Limonium acuminatum* and *Helichrysum dunense* and the Near Threatened *Babiana hirsuta*, are found in this vegetation.

3.3.7.2 Western Strandveld

Strandveld is characterised by medium dense to closed shrublands dominated by sclerophyllous, broad-leaved shrubs with a succulent shrubby element (Figure 3.8). Strandveld vegetation is usually found close to the sea but never in habitats under direct influence of sea spray and other factors associated with the influence of the sea water. Azonal coastal vegetation inhabits these areas instead. Unlike in fynbos or renosterveld, fire plays a lesser role in the strandveld. Despite high cover of the strandveld shrublands, fire frequency is low. However, the succulent nature of strandveld impedes the spread of fire, except under exceptional conditions (Mucina & Rutherford 2006).

The major portion of the Rocherpan Nature Reserve Complex is covered by strandveld and is subdivided in two vegetation units.

3.3.7.3 Langebaan Dune Strandveld

This unit is widely distributed, ranging from Bokbaai in the south to Rocherpan and Dwarskersbos in the north. Found on calcareous (alkaline) dune sands and poorly developed calcretes mixed with sand (Helme 2007).

Langebaan Dune Strandveld is found on slightly undulating old coastal dune systems and stabilised inland duneveld supporting mixed shrubland of 0.5 – 2 m tall, with Thicket elements especially common where there are shallow sands over calcretes. The total period of stability and substrate type are important dynamics drivers. Younger areas with much less Thicket component, may be dominated by low shrubs and grasses. There is a relatively low succulent diversity, although they may be common. Geophytes are not a major feature, but spring annuals can be spectacular on the sandy soils (Mucina & Rutherford 2006; Helme 2007).

Previously listed as Vulnerable this ecosystem is no longer recognised as being Threatened in the National Gazette No 34809 of 09-December-2011, Volume 558 (Part 1 and 2 of 4)).

The vegetation on the different dune types within the Langebaan Dune Strandveld is a compilation from Van Rooyen (1981) and Gray (1997).

In Rocherpan Nature Reserve Complex, the Langebaan Dune Strandveld of the secondary dunes are characterised by the following species: *Osteospermum moniliferum [=Chrysanthemoides monilifera], Euphorbia burmanii, E. caput-medusae, E. mauritanica, Pterocelastrus tricuspidatus, Limonium perigrinum, Euclea racemosa, Roepera morgsana [=Zygophyllum morgsana], Tetragonia fruticosa, Stoeberia utilis, Searsia glauca* and *Trachyandra divaricata.*

Three stratum were recognised; the tallest of 2.5 – 4 m dominated by *Pterocelastrus tricuspidatus* and *Euclea racemosa* followed by *Osteospermum moniliferum* and *Roepera morgsana* at heights of 1.5 – 2 m while *Tetragonia fruticosa* occupy the stratum below 1 m in height. At Rocherpan Nature Reserve Complex the Langebaan Dune Strandveld can be divided into two subunits:

3.3.7.3a Central dune vegetation

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

3.3.7.3b Eastern dune vegetation

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

3.3.7.4 Saldanha Flats Strandveld

Figure 3.9: Saldanha Flats Strandveld on Rocherpan Nature Reserve Complex (Photo: D Kirkwood)

The Saldanha Flats Strandveld occurs on the sandy coastal flats, on the sea side of the Sand Fynbos habitats, both north and south of the Berg River. Soils are alkaline to neutral sands, south of the Berg river often overlying shallow limestone (frequently visible in ploughed lands as piles of stone), and in rare instances the sands overly shallow granites. The vegetation is usually a fairly dense shrubland up to 1.4 m, with regular emergents (1.5 – 3m). There is an abundance of leaf deciduous shrubs, succulents, and restios, but very few of the other typical fynbos elements like Rutaceae, Rhamnaceae, Polygalaceae or Proteaceae, and no Ericaceae). Thicket elements nearly always present, often emergent and spiny, and usually make up 5 – 15% of canopy cover (Figure 3.9). Annuals are common, and geophytes are not diverse, although a few species may be locally common (Mucina & Rutherford 2006; Helme 2007).

Heavy grazing (often by cattle) is a feature of this vegetation type, and this may substantially modify the structure and composition, leaving only the unpalatable (e.g. *Euphorbia* spp.) and spiny species. Previously ploughed fallow areas are often colonised by *Willdenowia incurvata* (Helme 2007). There were two small fallow fields in the early 70's that are not recognisable at present.

According to the National Gazette No 34809 of 09-December-2011, Volume 558 (Part 1 and 2 of 4)) Saldanha Flats Strandveld is a Threatened Ecosystems classified as Vulnerable (A1).

This dense shrubland can have up to 70% total canopy cover with two main strata. The tallest of 2 – 3 m is dominated by *Euclea racemosa* and *Stoeberia utilis* and the lower 1 – 2 m stratum is dominated by *Eriocepahlus africanus, Melianthus elongates, Willdenowia striata* and *Ballota africana. Pteronia onobromoides, Pteronia divaricata, Calobota angustifolia, Calobota spinescens, Salvia lanceolata, Hermannia scordifolia. Hermannia trifurca, Eriocephalus racemosus, Searsia glauca. Searsia laevigata, Tetragonia fruticosa, Putterlickia pyracantha, Othonna cylindrical, Cissampelos capensis* and Aspargus spp. were noted as other important species in this community.

3.3.7.5 Cape Inland Salt Pans

At Rocherpan Nature Reserve Complex this is essentially a seasonal wetland vegetation type in a sandy area where the wetland nature of this habitat is due to underlying clay and calcrete, which are less porous than the sands. The pan is extremely saline, and saltmarsh vegetation grows in zones or terraces determined by the seasonality of the inundated parts with no vegetation in the end of the pan in the south. The deeper the terrace, the less botanical divers the vegetation becomes.

The vegetation around the salt pan is discussed according to the habitats mapped from the outside to the middle of the pan based on Van Rooyen (1981) and Gray (1997), with modifications.

3.3.7.5a Salt Pan - Stream Channel

This stream is where the Papkuils River runs into the pan.

3.3.7.5b Salt Pan - Stream Channel Wetland

Wetland vegetation associated with the brackish stream channel and similar in structure and composition to unit 1.1.4e Salt Pan - Margin Wetland Vegetation & Ecotone

3.3.7.5c Saline calcareous silt mounds

This habitat is composed of highly saline, calcareous fine silt. Based on both its occurrence as raised beds above the level of the immediate surroundings, and its soil composition, this mapped habitat subtype seems to be derived from historical scraping or excavation of the pan bottom. The presence of a good diversity of plants, including several geophytes, suggests that if this habitat is indeed artificial, it was created well before the establishment of the reserve in 1967, and possible as long ago as the original closing of the mouth of the Papkuils river by Pierre Rocher who settled in the area in 1839 (Kirkwood 2010/2013). This unit is mostly found on the western side of the pan.

Two strata are found in this succulent-leafed dwarf shrubland of the limestone areas: a dwarf stratum no higher than 60 cm dominated by *Sueda fruticosa, Lycium tetrandrum, Sarcocornea pillansii*, and the exotic *Atriplex lindleyi* subsp. *inflata* while the 10 – 20 cm stratum makes up the largest portion of cover and is dominated by *Psilocaulon junceum, Galenia sarcophylla, Drosanthemum intermedium, Drosanthemum marinum, Mesembryanthemum crystallinum, Spergularia marginata* and *Salsola zeyheri*.

3.3.7.5d Saldanha Flats Strandveld / Salt Pan ecotone

Found on the eastern side of the pan, this ecotone unit is found between the reed peripheral or margin wetland and ecotone and the Saldanha Flats Strandveld. It has many of the same species as the Saldanha Flats Strandveld but the structure is different (lower shrubland with sparser vegetation) and this unit is a lower diversity. *Roepera morgsana, Osteospermum moniliferum, Ruschia bolusiae* and *Limonium peregrinum* are the most obvious plant species here.

3.3.7.5e Salt Pan - Margin Wetland Vegetation & Ecotone

The species distribution in this ecotone is patchy. This ecotone is dominated by *Sarcocornia pillansii* and *Ficinia nodosa* and is situated around the entire pan next to the *Juncus acutus* fringe directly bordering water during the wet season. There are also large patches of *Phragmites australis* with 100% cover of 3 m or taller. Along the southern end of the pan *Senecio hamilifolius* forms a stratum of 2 m tall. The 1 m stratum is recognised by *Ficinia nodosus* and the 0.5 m stratum by *Sarcocornia pillansii*. The plant growth of this community is thick with an almost 100% canopy cover throughout.

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

3.3.7.5f Salt Pan - seasonal water (shallow)

Two 10 cm high mat-forming species, *Sarcocornia natalensis* subsp. *affinis* and *Sporobolus virginicus,* dominate this vegetation; the former is prolific throughout the community while the latter is more prominent in the northern sections of the pan that dries out quicker. As the pan dries out and *Sarcocornia natalensis* subsp. *affinis* becomes more drought stressed, the plants become redder, sometimes forming a spectacular display.

3.3.7.5g Salt Pan - seasonal water (medium)

This zone might only get occasional accidental species when the pan dries out.

3.3.7.6 Species of conservation concern

Although these species of conservation concern in Table 3.3 are on the Rocherpan Nature Reserve Complex plant checklist, the identification of species marked with (*) needs to be vetted. The aquatic *Pseudalthenia aschersoniana* was only found on Rocherpan Nature Reserve Complex last year (2012) and is only the second known locality where it still survives. Most of these species are of conservation concern due to urban development and agriculture along the coast.

Table 3.3: List of plant species recorded on the Rocherpan Nature Reserve Complex that are of conservation concern (SANBI 2013)

Family	Species	Status
ASTERACEAE	*Cotula vulgaris*	Critically Endangered
POTAMOGETONACEAE	*Pseudalthenia aschersoniana*	Critically Endangered
AIZOACEAE	**Ruschia indecora*	Endangered
FABACEAE	*Argyrolobium velutinum*	Endangered
AIZOACEAE	**Ruschia amicorum*	Vulnerable
ASTERACEAE	*Helichrysum dunense*	Vulnerable
IRIDACEAE	**Babiana tubulosa*	Vulnerable
PLUMBAGINACEAE	*Limonium acuminatum*	Vulnerable
SCROPHULARIACEAE	*Dischisma crassum*	Vulnerable
AIZOACEAE	**Drosanthemum calycinum*	Near Threatened
AIZOACEAE	**Drosanthemum marinum*	Near Threatened
APIACEAE	*Capnophyllum africanum*	Near Threatened
ASTERACEAE	*Helichrysum tricostatum*	Near Threatened
IRIDACEAE	*Babiana hirsuta*	Near Threatened

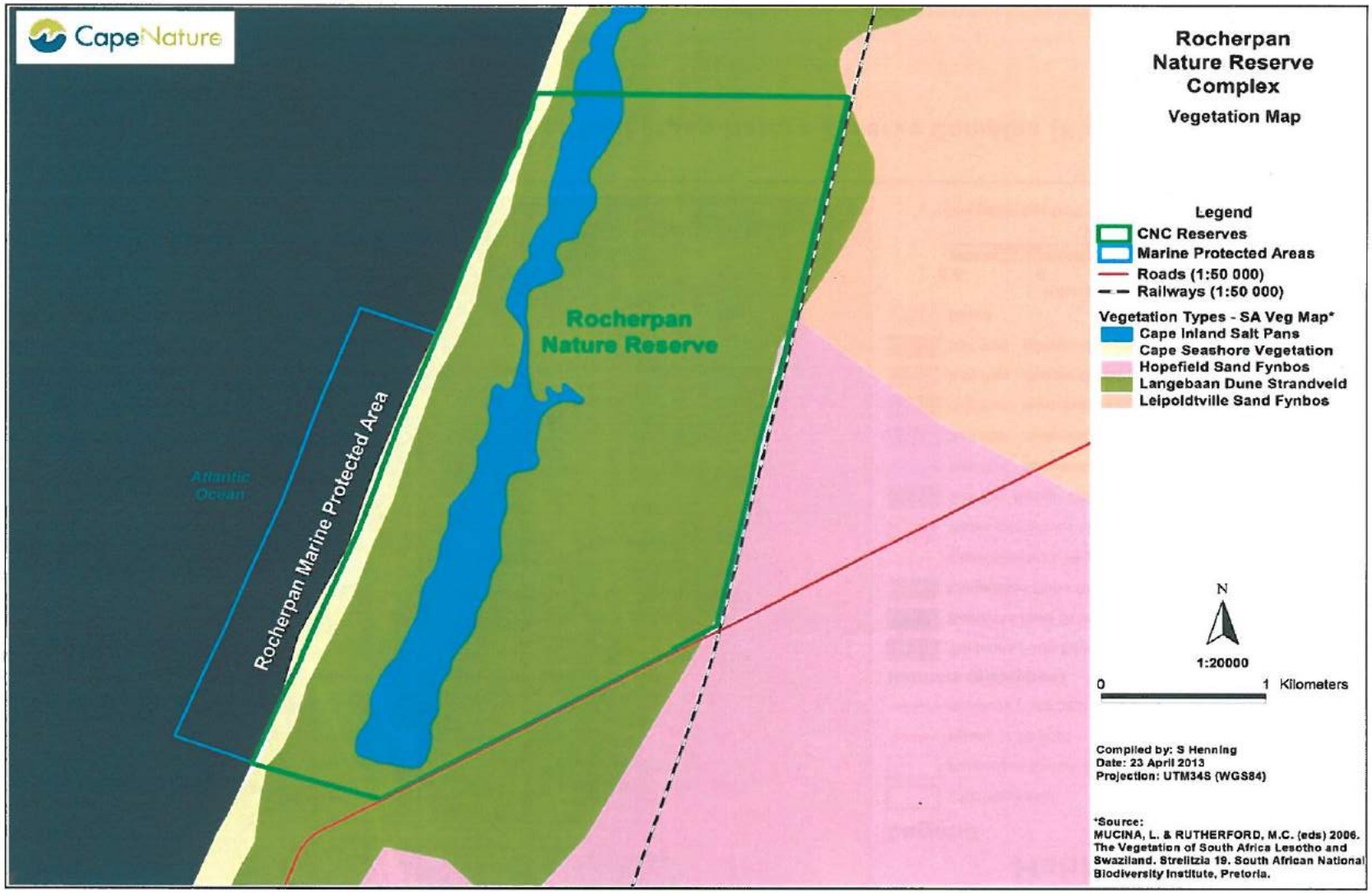

Figure 3.10: Vegetation of Rocherpan Nature Reserve Complex (Mucina & Rutherford 2006)

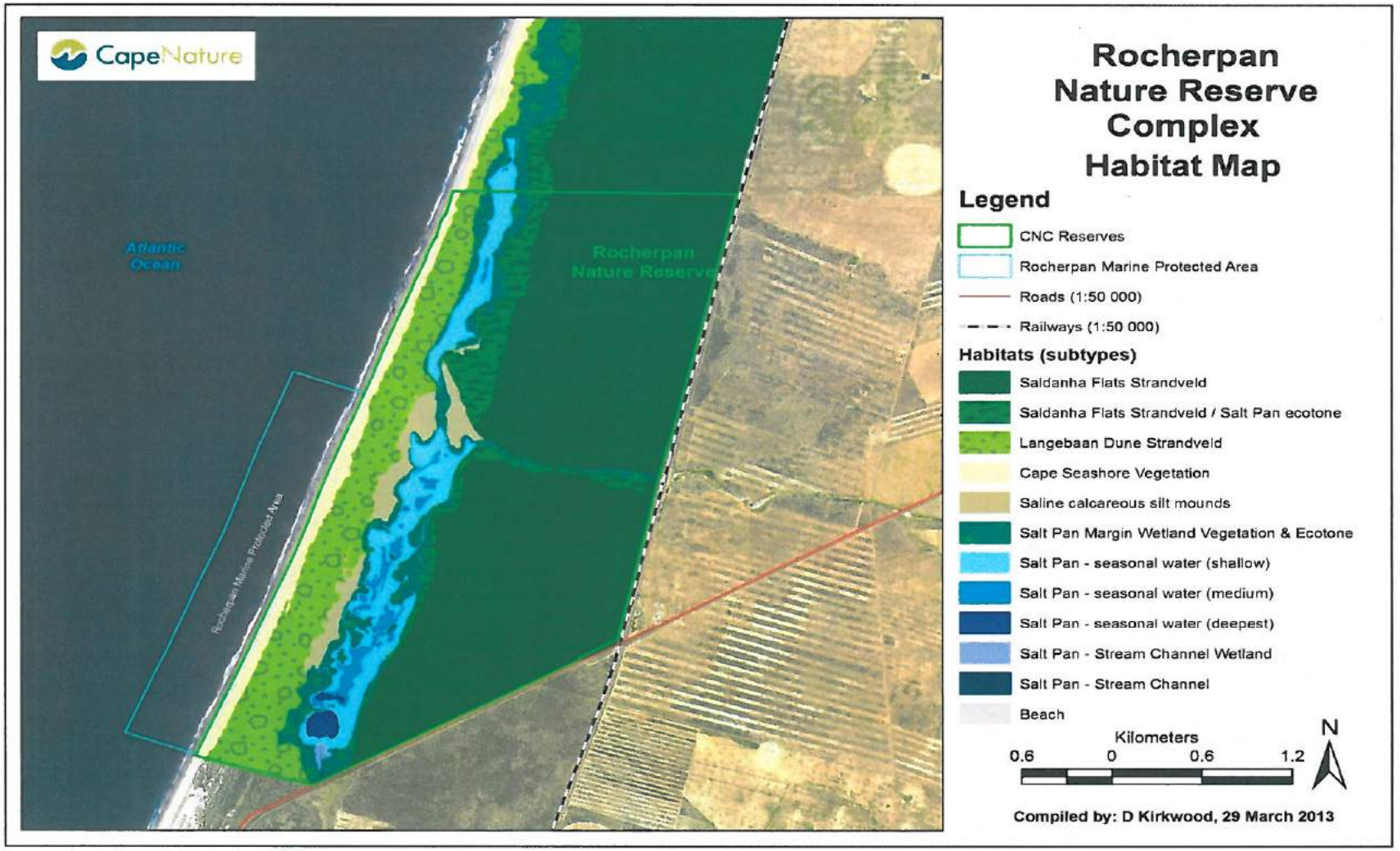

Figure 3.11: Habitat and associated vegetation of Rocherpan Nature Reserve Complex (Kirkwood 2013)

3.3.8 Fire regime

Rocherpan Nature Reserve Complex is mainly comprised of Strandveld vegetation and the large vlei. Despite high vegetation cover of the Strandveld shrublands, fire frequency is low as the succulent nature of Strandveld impedes the spread of fire, except under exceptional conditions (Mucina & Rutherford 2006). Therefore no active fire management occurs on the reserve. Firebreaks should however, still be in place, and maintained, along the southern, eastern and northern boundaries for protection from accidental fires.

3.3.9 Invasive species

3.3.9.1. Invasive alien plants

The threat posed to the reserve by invasive alien plants is limited due to their small numbers and clustered occurrence at the old farmstead, the CapeNature office buildings and tourism infrastructure (Figure 3.17). Therefore the invasive vegetation map (Figure 3.12) shows only rare or occasional infestation. These areas will be controlled/treated. The alien plant species listed in Table 3.4 are known to occur within the reserve. The table also refers to each species problem status as listed in the Alien and Invasive Species Regulations (2014). Most do not pose an active threat to the natural habitats of the reserve

Table 3.4: List of alien plant species known to occur in the Rocherpan Nature Reserve Complex .

Family	Scientific Name	English Name	Category (AISR 2014)
AMARANTHACEAE	*Atriplex nummularia*	old man salt bush	1
ANACARDIACEAE	*Schinus terebinthifolius*	Brazilian pepper tree	3
ASTERACEAE	*Anthemis cotula*	stinking chamomile	Not listed
ASTERACEAE	*Hypochaeris glabra*	smooth cat's ear	Not listed
ASTERACEAE	*Senecio vulgaris*	common groundsel	Not listed
ASTERACEAE	*Sonchus asper*	spiny sow thistle	Not listed
BORAGINACEAE	*Heliotropium curassavicum*	salt Heliotrope	Not listed
CARYOPHYLLACEAE	*Spergularia media*	greater sea-spurry	Not listed
FABACEAE	*Acacia cyclops*	rooikrans	1b
FABACEAE	*Melilotus albus*	sweet clover	Not listed
FABACEAE	*Prosopis glandulosa*	honey mesquite	1b
GERANIACEAE	*Erodium cicutarium*	pinweed	Not listed
MORACEAE	*Ficus spp.*		Not listed
MYOPORACEAE	*Myoporum tenuifolium*	manitoka	3
MYRTACEAE	*Leptospermum laevigatum*	Australian myrtle	1b
ARAUCARIACEAE	*Araucaria heterophylla*	Norfolk Island pine	Not listed
POACEAE	*Polypogon monspeliensis*	annual beard grass	Not listed
POACEAE	*Thinopyrum distichum*	maritime wheatgrass	Not listed
SOLANACEAE	*Nicotiana glauca*	wild tobacco	1b
SOLANACEAE	*Solanum nigrum*	black nightshade	N/A

3.3.9.2. Invasive alien fauna

Only one listed alien invasive species, the house mouse, *Mus musculus*, occurs at Rocherpan Nature Reserve Complex. The house mouse, originally from Eurasia (India), is listed as one of the top 100 worst invasive species by the IUCN (Picker & Griffiths 2011).

Figure 3.12: Invasive vegetation map and management compartments of Rocherpan Nature Reserve Complex

3.3.10 Mammalian fauna

Ten springbok were introduced to Rocherpan Nature Reserve Complex from the Goegap Nature Reserve in 1974. The animals originally did very well and numbers increased to 98 by 1990. Their numbers then declined dramatically from 98 in 1990 to only 30 in 1995. There were numerous reports of the animals being in a visibly poor condition and many carcasses were observed (Wessels 1997). The remainder of the springbok population all eventually died or moved off onto neighbouring properties by the early 2000's (G. Palmer, pers. comm.). Steenbok *Raphicerus campestris*, and common duiker *Sylvicapra grimmis*, are present on Rocherpan Nature Reserve Complex and are regularly observed. Predators on the reserve are represented by caracal *Felis caracal*, African wild cat *Felis silvestris*, small-spotted genet *Genetta genetta*, and several mongoose species. Twenty three listed indigenous terrestrial mammals and one marine mammal (10 from specimen records and 14 from observation records contained in the CapeNature State of Biodiversity Database) have been recorded for Rocherpan Nature Reserve Complex. An additional 31 species are listed from references relating to the distribution of these species and therefore could potentially occur in the reserve. A further 19 listed whale and dolphin species, of which 2 are coastal/inshore species occur in the MPA. Of the 23 listed indigenous terrestrial mammals, only the white-tailed mouse, *Mystromys albicaudatus*, is considered Endangered. The white-tailed mouse has a widespread but patchy distribution throughout South Africa and Lesotho from the Western Cape to KwaZulu-Natal and north to Gauteng. It inhabits areas with sandy soils and good ground cover but habitat is being severely fragmented and is decreasing in size due to agriculture and other developments. Grant's golden mole, *Eremitalpa granti*, (Vulnerable) is distributed along the western coast of South Africa and Namibia. In South Africa it occurs from Langebaan in the Western Cape to the Orange River mouth in the Northern Cape. They prefer sand dune habitats, particularly the fore dunes adjacent to the coast, and are primarily threatened by diamond mining as well as disturbance to dune habitats through indiscriminate development and use, and by kelp harvesting and the subsequent removal of the prey base which is supported by kelp (Friedmann & Daly 2004).

Threatened species that occur or are likely to occur at Rocherpan Nature Reserve Complex are listed in Table 3.4.

Table 3.4: Mammal species of conservation concern that may occur on the Rocherpan Nature Reserve Complex

Scientific Name	English name	Global IUCN Category (IUCN 2012)	Regional IUCN Category (Friedman & Daly 2004)
Mystromys albicaudatus	white-tailed mouse	Endangered	Endangered
Eremitalpa granti	Grant's golden mole	Least Concern	Vulnerable
Mellivora capensis	honey badger	Least Concern	Near Threatened

3.3.11 Avifauna

Figure 3.13: *Circus maurus,* black harrier with chicks (Photo: R Simmons). *Anas smithii,* Cape shoveler at Rocherpan Nature Reserve Complex (Photo: W Didloft)

Rocherpan Nature Reserve was originally procured because of the conservation value of the seasonal wetland and the importance thereof for waterbirds. The seasonal wetland provides habitat for resident and migratory species of waterbirds. In total, 194 bird species have been recorded on Rocherpan Nature Reserve Complex (SABAP2 2012). Cape shoveler (Figure 3.13), a near endemic to southern Africa, utilises the wetland as a moulting refuge and can occur in large numbers when the area has received abundant rain and the wetland is full. Wetlands International considers waterbodies holding more than 1% of a species population as important (Wetlands International 2012). At times Rocherpan hosts between 3 and 5% of the global population of Cape shoveler and regularly exceeds the 1% level. Other species of special importance that visit the wetland include the greater flamingo, lesser flamingo, Caspian tern *Sterna caspia* and great white pelican. While the African black oystercatcher *Haematopus moquini* is predominantly a coastal bird, small groups of two to ten birds often roost on one of the islands in the wetland during high tide. During late spring and summer, provided there is sufficient water, substantial numbers of migratory waders, mostly little stint *Calidris minuta* and curlew sandpiper *Calidris ferruginea*, can be seen foraging in the shallow waters.
The reserve also contains areas of terrestrial vegetation, predominantly strandveld vegetation and a 4.7 km coastal strip along its western boundary. There are between 2 and 4 breeding pairs of African black oystercatchers that breed along this coastline, while various species of seabirds can be seen foraging out to sea, some using the beach to roost on.

The strandveld vegetation because of its fruit bearing component is host to a number of frugivorous bird species such as the speckled mousebird *Colius striatus*, red-faced mousebird *Urocolius indicus*, Cape bulbul *Pycnonotus capensis* and red-winged starling *Onychognathus morio*. The open areas adjacent to the wetland especially those between the wetland and the coastal dune provide habitat for a number of ground dwelling birds like the Cape longclaw *Macronyx capensis* and various species of larks.

Nineteen threatened species of birds have been recorded on Rocherpan (Table 3.5). None of these species with the exception of the lesser and greater flamingo occur in substantial numbers. These two species only occur on the reserve when there is sufficient water in the

wetland. Other species like the African penguin *Spheniscus demersus* occasionally come ashore to rest before returning to sea, while others like the Cape gannet *Morus capensis* and the marine cormorants forage offshore from the reserve. The African black oystercatcher and the black harrier are the only breeding threatened species on the reserve, the other species using the reserve for foraging and roosting.

Table 3.5: Avifaunal species of conservation concern that occur on the Rocherpan Nature Reserve Complex

Scientific Name	English Name	Global IUCN Category (Taylor 2014)	Regional IUCN Category (Taylor 2014)
Haematopus moquini	African black oystercatcher	Near Threatened	Least Concern
Circus maurus	black harrier (Figure 3.13)	Vulnerable	Endangered
Phalacrocorax capensis	Cape cormorant	Endangered	Endangered
Sterna caspia	Caspian tern	Least Concern	Vulnerable
Charadrius pallidus	chestnut-banded plover	Near Threatened	Near Threatened
Pelecanus onocrotalus	great white pelican	Least Concern	Vulnerable
Phoenicopterus ruber	greater flamingo	Least Concern	Near Threatened
Falco biarmicus	lanner falcon	Least Concern	Vulnerable
Phoenicopterus minor	lesser flamingo	Near Threatened	Near Threatened
Falco peregrinus	peregrine falcon	Least Concern	Near Threatened
Sagittarius serpentarius	secretary bird	Vulnerable	Vulnerable
Numenius arquata	Eurasian curlew	Near Threatened	Near Threatened
Oxyura maccoa	maccoa duck	Near Threatened	Near Threatened
Circus ranivorus	African marsh-harrier	Least Concern	Endangered
Spheniscus demersus	African penguin	Endangered	Endangered
Phalacrocorax neglectus	bank cormorant	Endangered	Endangered
Anthropoides paradiseus	blue crane	Vulnerable	Near Threatened
Morus capensis	Cape gannet	Vulnerable	Vulnerable
Neotis ludwigii	Ludwig's bustard	Endangered	Endangered

3.3.12 Reptiles

Twelve reptile species have been recorded on Rocherpan Nature Reserve Complex although this list is incomplete. None of the recorded species are listed as Threatened (Table 3.6).

Figure 3.14: *Dispholidus typus typus,* boomslang (Photo: D Kirkwood)

Table 3.6: Reptilian species of conservation concern that occur on the Rocherpan Nature Reserve Complex

Scientific Name	English Name	Global IUCN Category (IUCN 2012)	Regional IUCN Category (Barnes 2000)
Bradypodion occidentale	Namaqua dwarf chameleon	N/A	Null
Chersina angulata	angulate tortoise	Null	Null
Dispholidus typus typus (Figure 3.14)	boomslang	Null	Null
Homoroselaps lacteus	spotted harlequin snake	Null	Null
Lamprophis capensis	brown house snake	Null	Null
Microacontias lineatus grayi	striped legless skink	Null	Null
Naja nivea	Cape cobra	Null	Null
Psammophis crucifer	cross-marked grass snake	Null	Null
Psammophis notostictus	Karoo whip snake	Null	Null
Psammophylax rhombeatus rhombeatus	spotted skaapsteker	Null	Null
Pseudaspis cana	mole snake	Null	Null
Typhlosaurus caecus	Cuvier's blind legless skink	Null	Null

3.3.13 Amphibians

Six frog species have been recorded in Rocherpan Nature Reserve Complex (Table 3.6). None of the species are Threatened.

Figure 3.15: *Amietia fuscigula* the Cape river frog (Photo: P Lane)

Table 3.7: Amphibian species of conservation concern that occur on the Rocherpan Nature Reserve Complex

Scientific Name	English Name	Global IUCN Category (IUCN 2012)	Regional IUCN Category (Friedman & Daly 2004)
Amietia fuscigula (Figure 3.15)	Cape river frog	Least Concern	Least Concern
Breviceps namaquensis	Namaqua rain frog	Least Concern	Least Concern
Strongylopus grayii	clicking stream frog	Least Concern	Least Concern
Tomopterna delalandii	Cape sand frog	Least Concern	Least Concern
Vandijkophrynus angusticeps	sand toad	Least Concern	Least Concern
Xenopus laevis laevis	common platanna	Least Concern	Least Concern

3.3.14 Fish

Due to the seasonal nature and high salinity of the water, no fish species has been recorded in the vlei at Rocherpan Nature Reserve Complex. The Rocherpan Marine Protected Area does allow for shore angling, but excludes any other form of exploitation. Some of the species regularly caught from shore include galjoen *Dichistius capensis,* silver cob *Argyrosomus inodorus* and lesser guitarfish *Rhinobatos annulatus.* Survey work using catch record cards should be conducted to properly assess species diversity and the potential presence of Threatened species.

3.3.15 Invertebrates

The focus on the CFR's exceptionally high floristic diversity has somewhat overshadowed its faunal diversity and, as a 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 1988a,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 Rocherpan Nature Reserve Complex. 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. Aquatic insects (especially dragonflies and damselflies) are very sensitive to environmental changes and can thus successfully be used as indicator species. However, quantitative conservation assessments will have to be carried out on this group as was done by Simaika & Samways (2010) and Suhling *et al.* (2009).

The invertebrate species list must be updated through baseline data collection. Additional information on the insects of the CFR can be obtained from the Iziko Museums of South Africa (www.iziko.org.za).

3.4 Cultural Heritage context of Rocherpan Nature Reserve Complex

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

3.5 Socio-economic context

The objective of the Community Conservation component in the Breede Berg Area is to provide the community with opportunities to interact and benefit from reserve programs through the PAAC, environmental education and awareness, youth development, volunteering and employment opportunities. The core community area for Rocherpan Nature Reserve Complex includes the 3 closest towns (Aurora, Dwarskersbos and Velddrif) and the immediate agricultural community. Peripheral geographic communities includes the St. Helena Bay area (St. Helena Bay, Stompneus Bay), Vredenburg and Elands Bay.

The PAAC will serve as a support mechanism for representative cooperation and interaction between communities and the reserve management. The Rocherpan Nature Reserve Complex has an established PAAC comprising a range of representative local stakeholders with the primary mandate of advising the reserve management on the strategic direction and community involvement in the reserve.

Community Conservation will also be assisting the Marketing and Eco-tourism component with employment generation, with the aim of improving the quality of life especially for people from the core communities. Further work opportunities can also be created through externally funded projects managed by CapeNature. These include alien vegetation removal

as well as fire break maintenance projects through the CapeNature ICM project. Although most of these projects only provide temporary work opportunities with CapeNature, they contribute significantly to contractor and skills development.

The Youth Development program will endeavour to create in the youth a keen appreciation of, and respect for, biodiversity and social conservation, and to contribute to the development of knowledge and skills that will enable them to successfully fulfil the leadership challenges of tomorrow. The overarching theme of youth development at Rocherpan Nature Reserve Complex for the next 5 year period will be focused on skills development.

The importance of Rocherpan Nature Reserve Complex will be highlighted through activities focused on creating awareness, clarifying values with the ultimate goal of behavioural change towards our natural environment.

Principles which will be part of the program:

- ensure environmental education and promotion for all communities of Rocherpan Nature Reserve Complex;
- empower the communities and promote opportunities and participation; and
- develop an ethical awareness of all forms of life with which humans share the planet, respect all life cycles and impose limits on human exploitation of other forms of lives.

Environmental awareness and education programs will mostly consist of thematic programs around environmental and heritage calendar events. This will be either a day event or could be extended to run over several days. A yearly open day during October will serve as a community awareness opportunity and will be arranged with the assistance of the Rocherpan PAAC.

Volunteers will only be recruited once the need for such volunteers have been identified and evaluated by a designated staff member of CapeNature, and once a volunteer supervisor or co-ordinator has been appointed for Rocherpan Nature Reserve Complex. A Friends of Rocherpan Nature Reserve Complex, to assist with various tasks as well as to promote the nature reserve throughout the community and tourism fraternity, will be established by 2014.

3.6 Infrastructure Development of Rocherpan Nature Reserve Complex

3.6.1 Infrastructure

3.6.1.1 Roads/Jeep Tracks

The roads around the CapeNature office and tourism infrastructure are gravel and are accessible by all vehicles. A jeep track runs along the western side of the pan (Figure 3.16), this track is accessible by normal vehicles, but can become difficult to negotiate with low sedan vehicles especially during the wet season. Two shorter jeep tracks lead to the sea. Due to the high risk of soil erosion through heavy vehicular use the grading of jeep tracks within the Rocherpan Nature Reserve Complex is not encouraged. Regular assessments and maintenance work is conducted as part of ICM. Due to the sensitivity of the wetland ecosystem, all roads leading through the wetland should be closed and rehabilitated.

3.6.1.2 Trails

Figure 3.16: The recently constructed board walked trail. Trail running over saline calcareous silt mounds. (Photos: D Kirkwood)

Rocherpan Nature Reserve Complex has only one day trail that runs northwards from the office and cabins, around the eastern (inland) side of the pan to link up again with the jeep track on the western side of the pan (Figure 3.16) and the beach (Figure 3.17). This provides the hiker with three possible return routes: along the trail, the jeep track or the beach. The distance from the start of the trail to where the trail meets up with the return routes is just over 3 km. Refer to Figure 3.17. Boardwalks have been put in place in areas where the trail is vulnerable to erosion and where seasonal flooding occurs (Figure 3.16). Maintenance is conducted as part of ICM.

3.6.1.3 Buildings

Maintenance and repairs of buildings are prioritised and included on the schedule of Department of Public Works. Minor maintenance and repairs to buildings are identified and attended to by management. Refer to Table 3.8.

3.6.1.4 Fences

The boundary fences of Rocherpan Nature Reserve Complex are in need of repair and replacement and some sections are not fenced at all. This can potentially result in tourism, operational and/or ecological problems. The fences along the roads will be replaced with normal 1.2m, 3-strand fence to allow for the free movement of smaller native animals, but restrict access by domestic livestock. All internal fences have been removed. However, the old section of internal fence along the dune-ridge should be removed as and where it becomes exposed.

3.6.1.5 Environmental Management

No waste disposal sites are available within the Rocherpan Nature Reserve Complex. All waste from Rocherpan Nature Reserve Complex is removed off the reserve and disposed of at the municipal refuse site in Velddrif.

All potable water for staff and visitors are supplied by rainwater harvesting from the rooftops and distributed to different points via pressure pumps. In the case of extremely limited rainfall or a broken pump system, water will be transported to the reserve from the neighbouring town, Dwarskersbos. Transporting water from Dwarskersbos is not the best and most sustainable method.

All accommodation and office facilities on Rocherpan Nature Reserve Complex make use of self-contained dry-composting toilets to prevent water waste and leaching of any nutrients or pathogens into the ground.

3.6.1.6 Signage

Signage en route to Rocherpan Nature Reserve Complex, as well as on the reserve itself is inadequate. Existing signage will be upgraded while additional signage will be established.

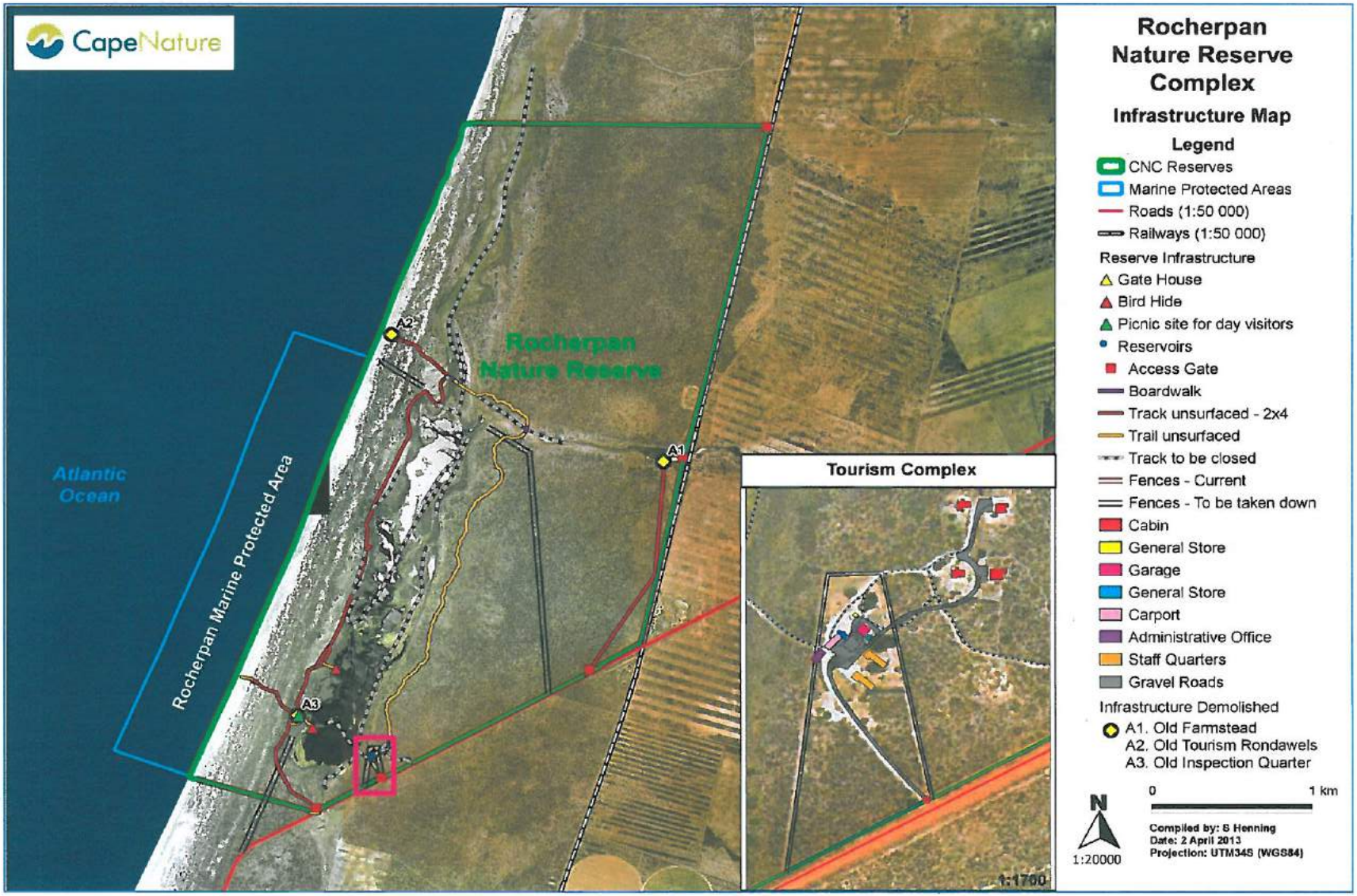

Figure 3.17: Infrastructure map of Rocherpan Nature Reserve Complex

Table 3.8: Infrastructure located within the Rocherpan Nature Reserve Complex

Reserve Name	Feature Name	Location	Feature Type
Rocherpan Nature Reserve Complex	Office	East of pan, main entrance	Office
Rocherpan Nature Reserve Complex	Tool Store	East of pan, main entrance	Store
Rocherpan Nature Reserve Complex	Main Store	East of pan, main entrance	Store
Rocherpan Nature Reserve Complex	Fuel Store	East of pan, main entrance	Store
Rocherpan Nature Reserve Complex	Staff House 1	East of pan, main entrance	Staff housing
Rocherpan Nature Reserve Complex	Staff House 2	East of pan, main entrance	Staff housing
Rocherpan Nature Reserve Complex	Tourism Cabin 1	East of pan, main entrance	Tourism
Rocherpan Nature Reserve Complex	Tourism Cabin 2	East of pan, main entrance	Tourism
Rocherpan Nature Reserve Complex	Tourism Cabin 3	East of pan, main entrance	Tourism
Rocherpan Nature Reserve Complex	Tourism Cabin 4	East of pan, main entrance	Tourism
Rocherpan Nature Reserve Complex	Bird Hide 1	West of pan, gate house	Tourism
Rocherpan Nature Reserve Complex	Bird Hide 2	West of pan, gate house	Tourism
Rocherpan Nature Reserve Complex	Interpretation Building	West of pan, gate house	Tourism

4) THE PLANNING CONTEXT OF ROCHERPAN NATURE RESERVE COMPLEX

4.1 Regional and Provincial Planning of Rocherpan Nature Reserve Complex

The Rocherpan Nature Reserve Complex falls within the boundaries of the West Coast District Municipality. The district is made up of five municipalities which are Matzikama (North), Cederberg in the centre and Bergrivier, Saldanha Bay and Swartland Municipalities in the South. It is further located within the Bergrivier Local Municipal area (BRM) that is approximately 4 264 km² in size with nine settlements of which three can be classified within the context of Bergrivier, as major towns namely Piketberg, Porterville and Velddrif. (Bergrivier Municipality, 2008).

The economic activities in towns surrounding Rocherpan Nature Reserve Complex can be described as follows:

a) Aurora

The economic base of Aurora revolves around its role as low-order service centre for the agricultural activities on the surrounding farms. (Bergrivier Municipality, 2008)

b) Dwarskersbos

There has been strong growth in Dwarskersbos recently, particularly in the property market, holiday accommodation and tourism. The main function of the town is to provide holiday accommodation and hence there has been very little diversification of economic activities in Dwarskersbos. (Bergrivier Municipality, 2008)

c) Velddrif

Velddrif (incorporating Laaiplek) functions as a focal point for the fishing industry along the West Coast. This is why the economic base is strongly geared towards this economic activity, with tourism and residency for workers from Vredenburg and other towns as growing centres of enterprise. The most important resources are the sea, the coastal environment and the Berg River estuary. (Bergrivier Municipality, 2008)

The IDP and SDF for the WCDM run on a five year cycle, the current cycle is 2007 - 2012. The IDP is a basic strategic plan for the development in the WCDM. The WCDM-SDF is the spatial expression of the WCDM-IDP. Consequently, the SDF is a policy document to be used by organs of state as a guideline in decision-making. According to the WCDM-SDF (WCDM 2007b) six objectives were identified of which four speaks directly to the operations of CapeNature within the WCDM.

- Objective 2 – Facilitate job creation;
- Objective 4 – Conserve and strengthen a sense of place for all;
- Objective 5 – Ensure wise use of existing resources;
- Objective 6 – Conserve biodiversity resources.

The main components of this SDF pertaining to Rocherpan Nature Reserve Complex are:

- the conservation of the heritage of the area;
- the conservation of the biodiversity resources of the area;
- the development of tourism opportunities;
- and the creation of jobs.

4.2 Expansion of the Rocherpan Nature Reserve Complex

The expansion of protected areas in South Africa is informed by the National Protected Area Expansion Strategy (NPAES), (NPAES 2008). 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.

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 Protected Area Expansion Strategy and Implementation Plan (Purnell *et al.* 2010). 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. Although aligned to the concepts and goals of the NPAES, this strategy is informed by immediately available resources and therefore highlights some different spatial priorities.

Due to limited expertise and resources, the current CapeNature Protected Areas Expansion Strategy and Implementation plan does not highlight priority marine zones for expansion nor appropriate mechanisms to be applied in marine environments. As a result thereof we are guided by the NPAES only when considering areas for Marine Protected Areas expansion.

There are very few immediate protected area expansion priorities near the Rocherpan Nature Reserve Complex. For further, more detailed, information please refer to the CapeNature Protected Area Expansion Strategy (Purnell *et al.* 2010).

The priority conservation habitat map below (Figure 4.1) shows the Rocherpan Nature Reserve Complex in relation to stewardship sites and both aquatic and terrestrial CBAs in the area. Although there are no plans to formally proclaim any of these CBAs for the duration of this plan, reserve staff should support appropriate conservation practises and management of these CBAs.

All future expansion for the Rocherpan Marine Protected Area will be focussed on consolidating the northern 1.7 km of the beach area. This will greatly facilitate the management of the reserve as a whole and will eliminate fragmentation.

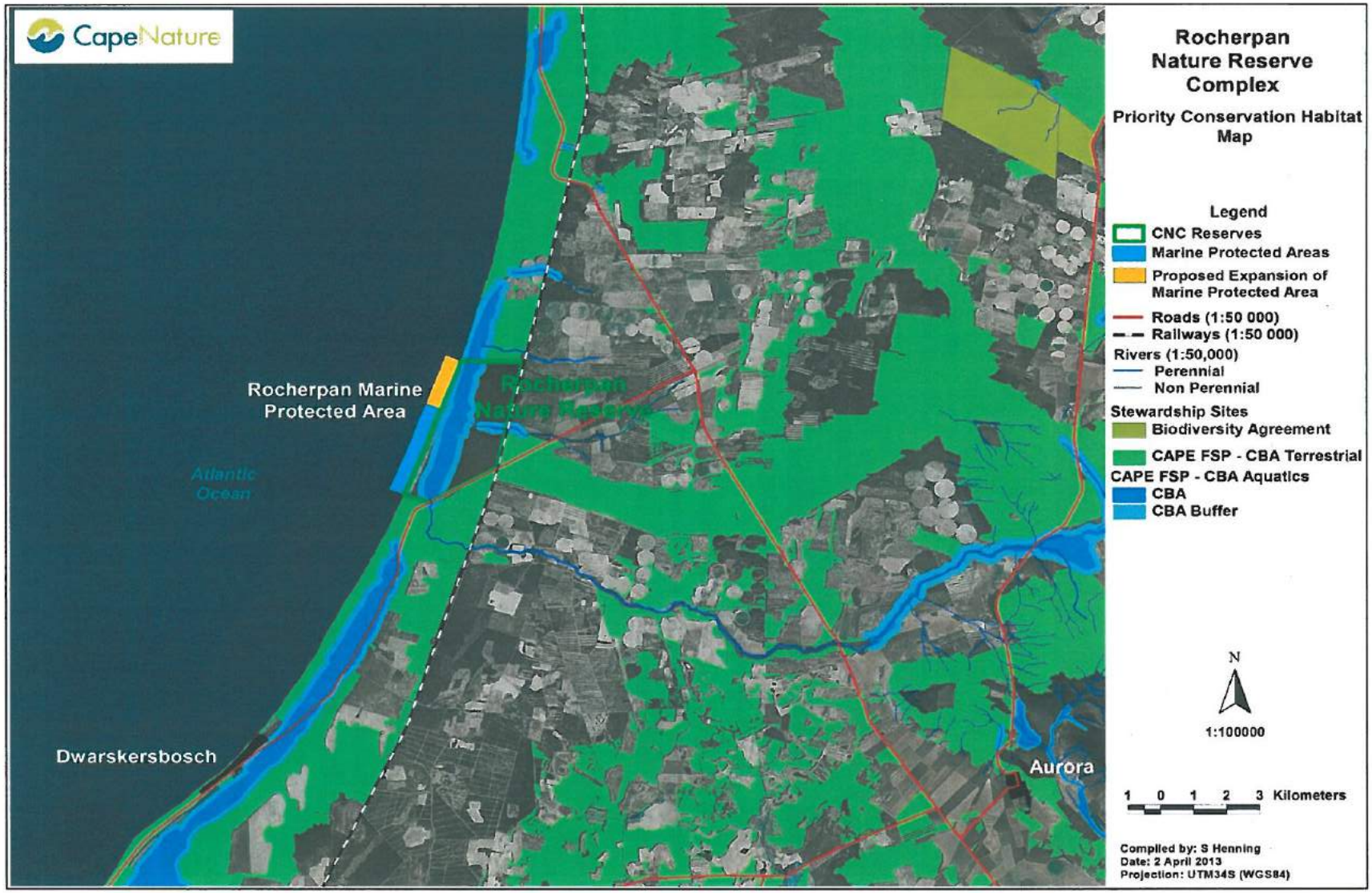

Figure 4.1: Priority biodiversity areas around Rocherpan Nature Reserve Complex

	Class	Sensitivity layer	Description
Biophysical sensitivity: ANY infrastructure or access	**Biodiversity**	Ecosystem representivity	No site-scale, spatially accurate vegetation map was available. Given the small size and potential high tourism use of the reserve, it was necessary to develop a 1:1000 scale map of relevant habitat types and subtypes. Fortunately units corresponded well to the Vegetation of South Africa, Lesotho and Swaziland Ecosystem unit descriptions (Mucina & Rutherford 2006) allowing derivation of threat and conservation status. Although spatial location of these units mapped differ substantially from SA Vegetation Map, the Rocherpan mapping is supported by Helme's recent (2007) vegetation mapping in the West Coast.
		Special Habitat	The Papkuils River channel and associated wetlands, and the pan itself are mapped as Critical Biodiversity Areas and Ecological Support Areas in the 2010 West Coast Fine Scale Plans (Pence 2010; Maree & Vromans 2010) and are therefore recognised as moderate to high sensitivity Special Habitats.
		Species	Very few records of species of conservation concern are known for the reserve: A single breeding record for the black harrier (*Circus maurus*) Vu D1 (small global population) was incorporated. Likewise a single location for the wetland plant *Pseudalthenia aschersoniana* Cr B2 was incorporated. The seasonally inundated Cape Inland Salt Pans provide important foraging and breeding habitat for a number of waterfowl species (see bird lists), and although none of these are threatened, the system is highly vulnerable to disturbance and is therefore recognised as high sensitivity, with wetland margin vegetation providing a moderate sensitivity buffer.

	Heritage	Heritage	No heritage features are known despite previous surveys in the area. It is unlikely that significant features are present
	Physical	Slope	The Western Cape Digital Elevation Model provides inadequate resolution to usefully map slope in flat coastal environments. However, based on an in-field survey covering the entire reserve, it was reasonable to assign all areas to the lowest slope class.
		Substrate	Mobile sands and beaches, and other loose sands correspond to vegetation units; identify unstable and highly erodible features that pose a risk to infrastructure, or where infrastructure may cause environmental degradation.
		Hydrological	Seasonally inundated Cape Inland Salt Pans, drainage lines and associated habitat, and areas potentially affected by storm surge seas were all mapped as sensitive hydrological features.

No analysis of view sheds or visual sensitivity could be performed due to flat terrain and poor resolution of available Digital Elevation Model, but it should be noted that any tall structure would be visible from most of the reserve. The visual sensitivity of the reserve should be considered highest sensitivity throughout, unless specifically demonstrated otherwise by proper analysis.

For further information, please see the Rocherpan Nature Reserve 2013 Conservation Development Framework Report, which includes a detailed description of the Sensitivity Analysis components and analysis.

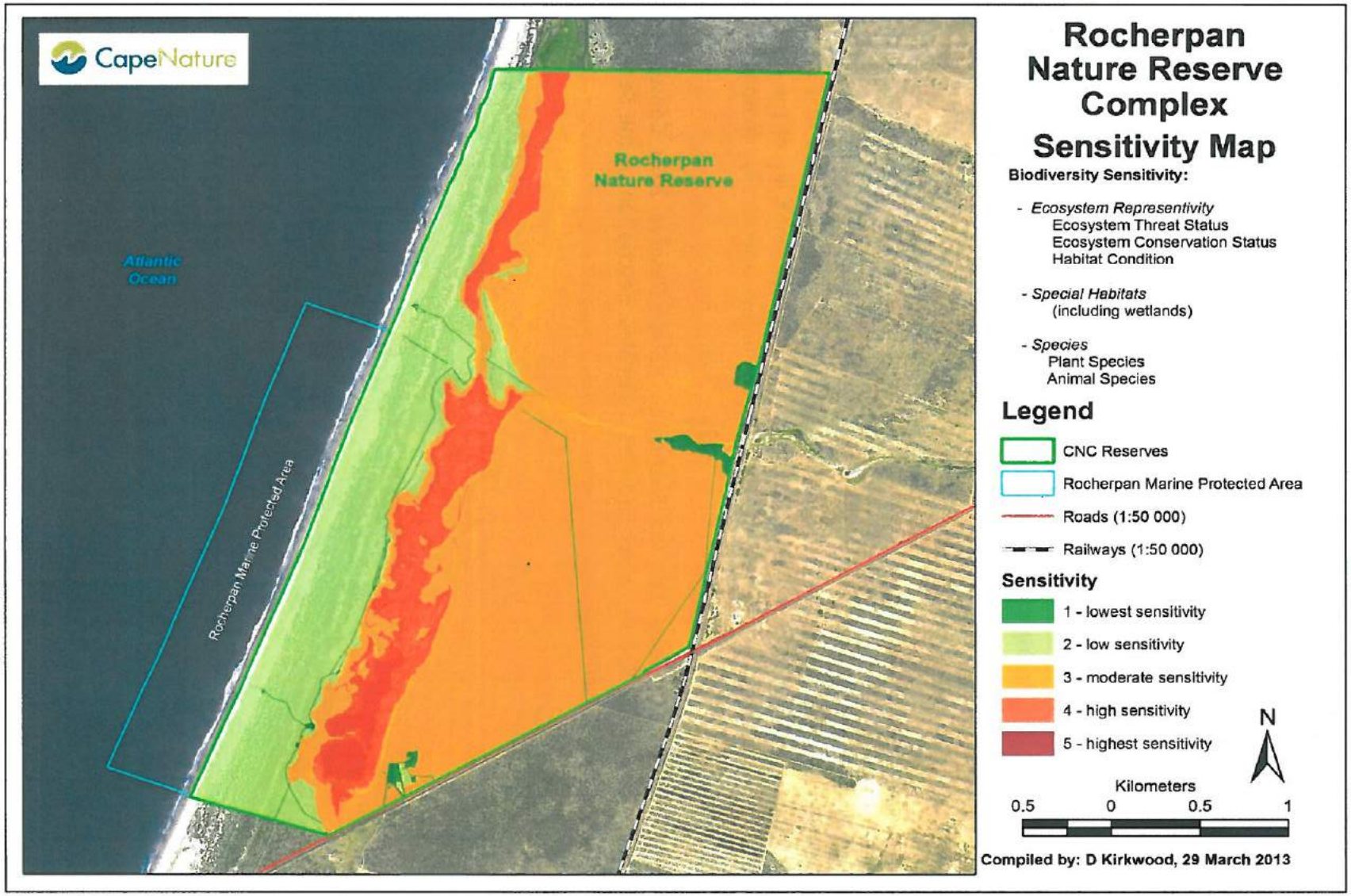

Figure 5.2: Biodiversity sensitivity map of Rocherpan Nature Reserve Complex

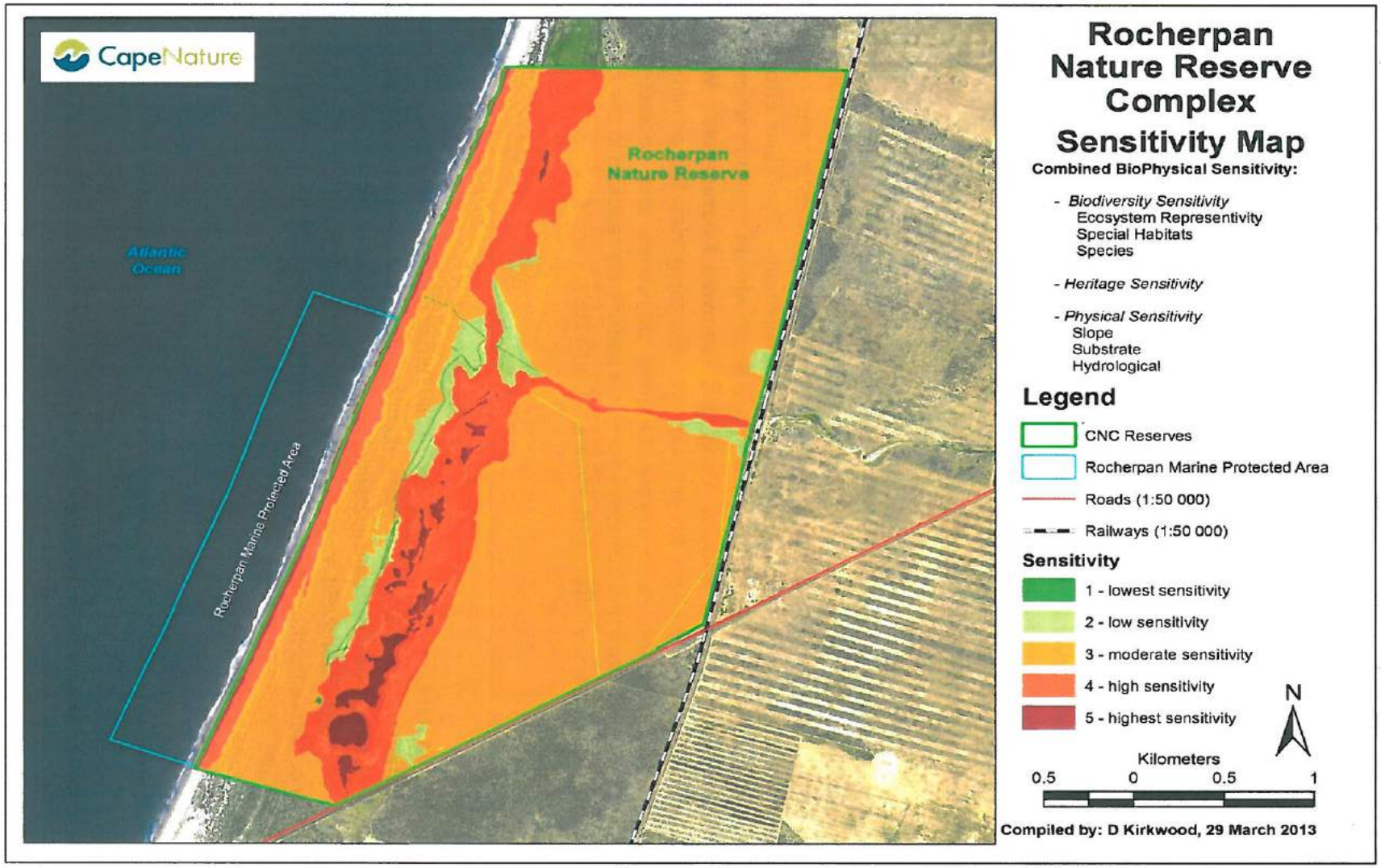

Figure 5.3: Combined bio-physical sensitivity map of Rocherpan Nature Reserve Complex

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 done 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.

Zonation requires input from all appropriate internal CapeNature stakeholders, and is a key component of the management plan which is to be evaluated during the public participation process.

CapeNature's zonation categories (Table 5.1) 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 South African National Parks and Ezemvelo Kwazulu-Natal Wildlife. 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.

Key Zonation Drivers:

- Rocherpan Nature Reserve Complex is a small 1080 hectare coastal Nature Reserve that includes a substantial proportion of habitats of conservation importance that should not be negatively impacted by disturbance, trampling or habitat loss:
    - Saldanha Flats Strandveld vegetation, nationally recognised as Vulnerable and poorly conserved comprises nearly half of the terrestrial habitat
    - Seasonally inundated Cape Inland Salt Pans providing seasonal habitat for waterfowl highly vulnerable to disturbance.
- The reserve is popular, both for overnight guests and day visitors, creating demand for areas for recreation and nature based activities.
- Limited staffing means that use and access must be confined to a manageable area.
- In terms of the proclamation of the 500 m MPA associated with Rocherpan Nature Reserve Complex, no marine organism may be harvested or collected, with the exception of shore-based angling using a rod and line.

Fortunately, sufficient low sensitivity area is available to accommodate current demand for access for recreation and nature based tourism. There are also existing transformed footprints with tourism and management infrastructure, outside the reserve. This is ideal with regard to sustainable land-use best practise within nature reserves, although it does compromise the tourism experience to some extent. The zonation for the Rocherpan Nature Reserve Complex is illustrated in Figure 5.4.

Table 5.1: Guide to CapeNature zones on the Rocherpan Nature Reserve Complex. Zones applicable to the reserve are highlighted

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.
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.

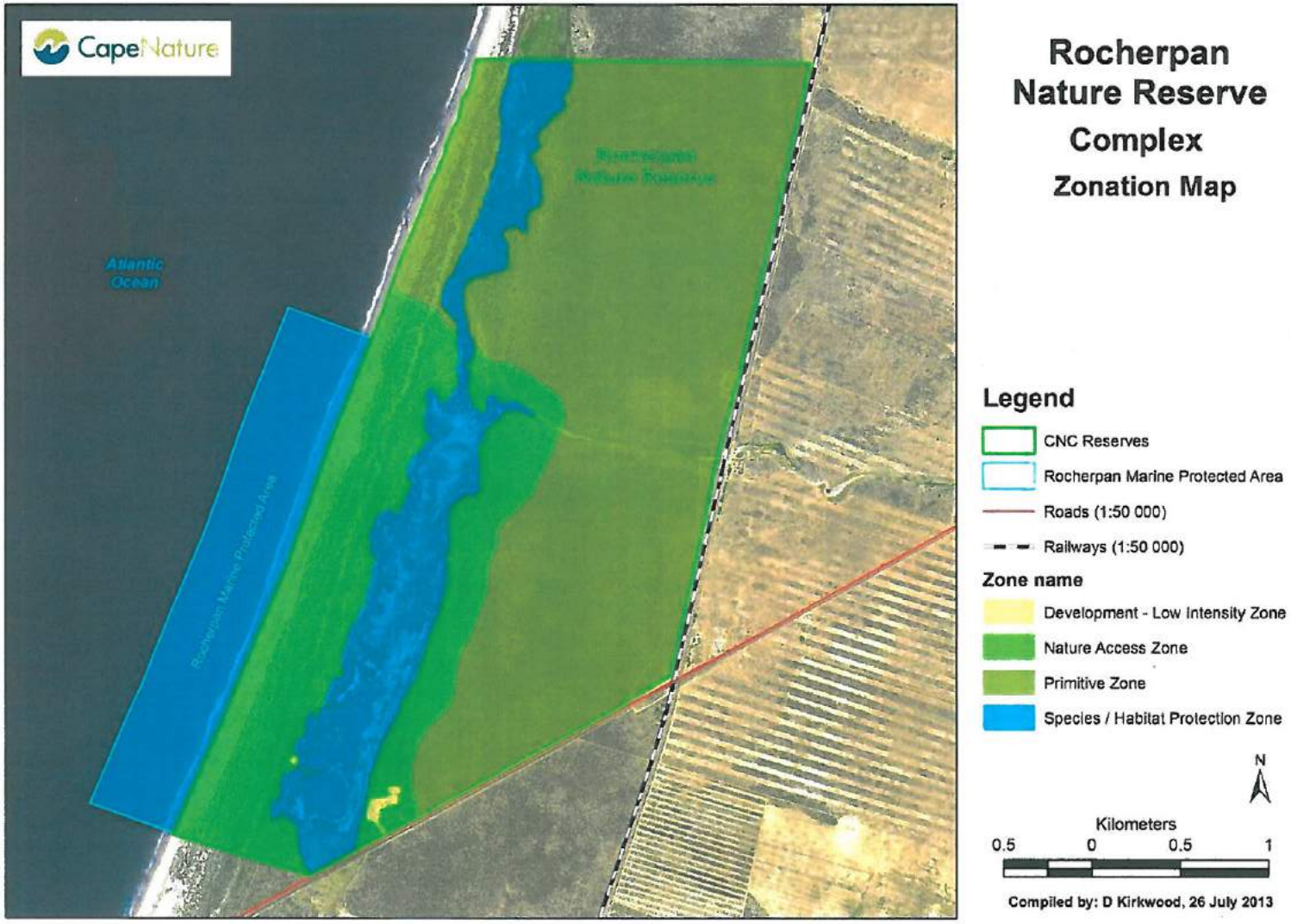

Figure 5.4: Zonation map of Rocherpan Nature Reserve Complex

5.3 Access

The general public should be provided with sustainable and controlled access to all protected areas. Access points must be easily accessible to relevant user groups, but controlled by protected area staff. Access points on Rocherpan Nature Reserve Complex for the public are listed in Table 5.2. Access and specific facilities are spatially mapped in Figure 5.5.

Table 5.2: Public access points to the Rocherpan Nature Reserve Complex

No.	Locality	Name	Type of Access	Activity
1	R27, west (seaward) of the pan	Gate House	Gated, unmanned	Leads to bird hides, picnic areas and the beach
2	R27, east (inland) of the pan	Main Gate	Gated, unmanned	Leads to offices, accommodation and day trail

There are two main, gated access points to the Rocherpan Nature Reserve Complex. Both these are along the R27 West Coast road and lead to the office and tourism infrastructure and the bird hides and picnic areas respectively (Figure 5.4). Illegal access along the beach for fishing or for the purpose of off road driving does occur as access is not controlled. This activity could lead to severe trampling of the dunes, coastal vegetation and African black oystercatcher breeding habitat.

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 Rocherpan Nature Reserve Complex. The owner of the farm Bookram asserted his right to water in the vlei for the purpose of supplying his livestock as per the Title Deed T83572/2004. An agreement with the landowner has been brokered. Current servitudes are listed in Table 5.3.

Table 5.3 Servitudes and management agreements of the Rocherpan Nature Reserve Complex

Date of Agreement	Type of Agreement	Partner	Duration of Agreement (years)	Area Affected
Pending	Water rights as per Title Deed T83572/2004	Owner of Farm Bookram	Pending	Water in the pan

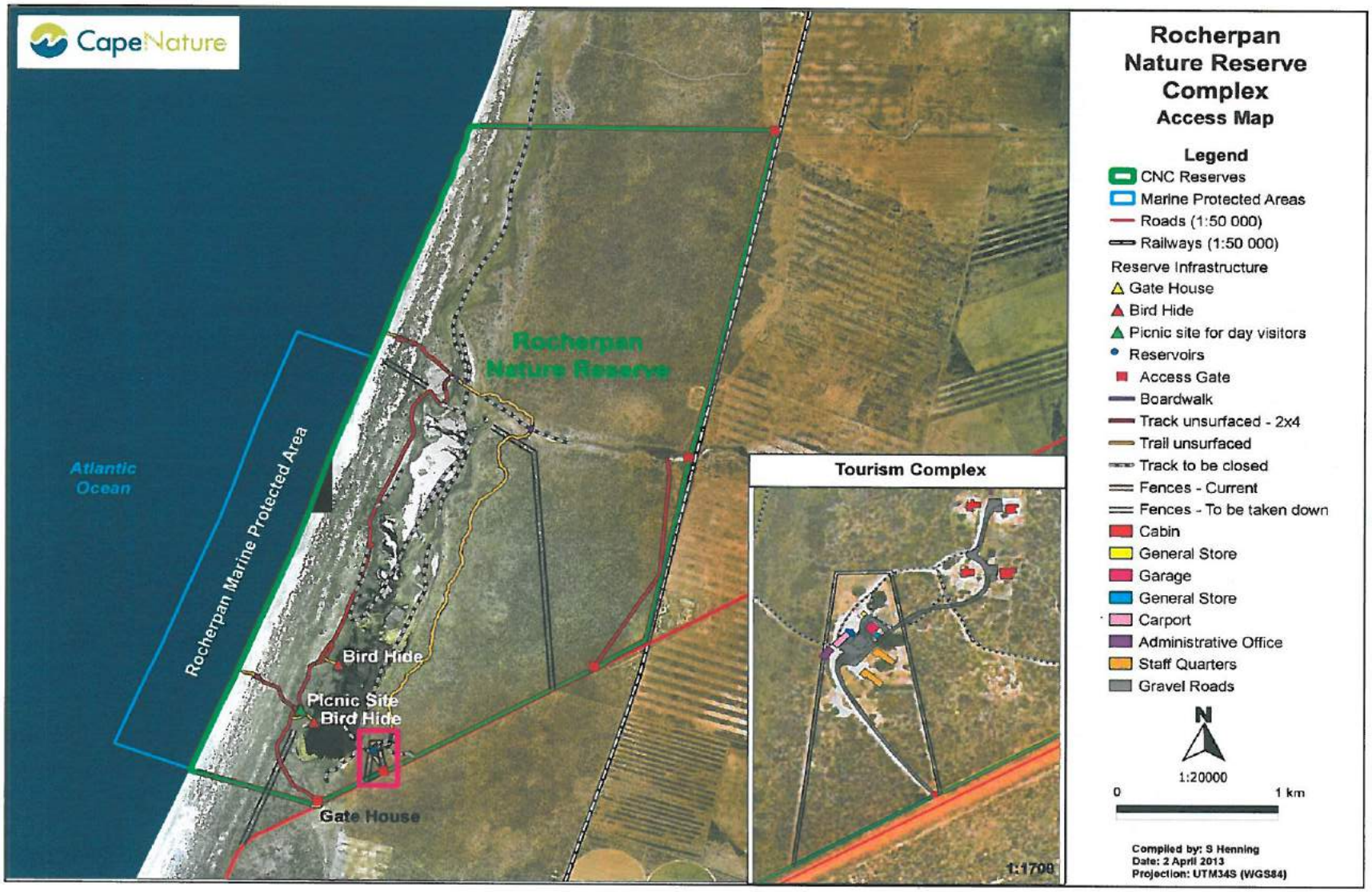

Figure 5.5: Access on Rocherpan Nature Reserve Complex

5.4 Concept Development Plan

In the years 2010 to 2011, CapeNature upgraded, and/or demolished and replaced most of the obsolete and run-down management and tourism infrastructure at Rocherpan. This followed planning by the CapeNature Marketing and Eco-tourism unit in consultation with the Department of Public Works and the project architect and professional team.

Figure 5.6: Existing (A, B, C & D) and planned (E) infrastructure at the main management and tourism complex at the Rocherpan Nature Reserve Complex

After consultation with the National Department of Environment to confirm that certain components could proceed without NEMA EIA authorisation, phase 1 was initiated in 2010:

- Office and tourism complex, east side of pan:
    - Existing corrugated iron tourism cabins (A in Figure 5.6) were originally built as staff cottages, and required extensive upgrading and retrofitting to suit modern tourism market.
    - Existing staff housing, offices and some stores were extremely dilapidated, with extensive fibreboard and asbestos panel construction and had to be entirely demolished.
    - These were replaced with two new staff houses (B), and a purpose-built office/visitor reception facility (C).
    - The existing store (D) and attached out building was renovated.
- "Inspection Quarters" and other structures, west side of pan:
    - The prefabricated asbestos structure (I in Figure 5.7) was demolished.
- Construction of day trail and associated boardwalks.

All asbestos waste was properly disposed of by a licenced hazardous waste contractor.

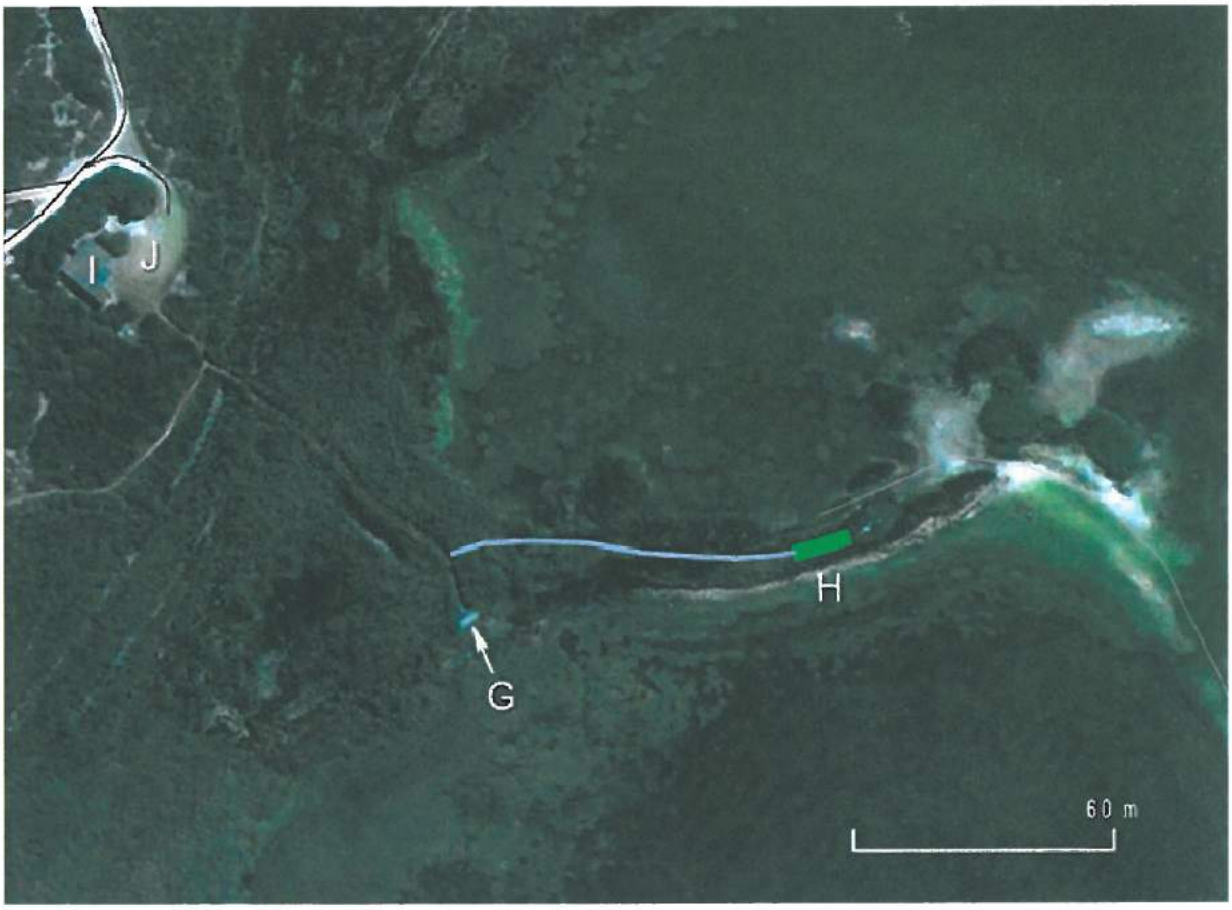

Figure 5.7: Existing (G) and planned (I, J, H) infrastructure at the west side of the pan, site of old "Inspection Quarters"

NEMA EIA authorisation for phase 2 was received in January of 2013, and it is envisaged that construction of the following will be completed by the end of the 2013 financial year:

- Office and tourism complex, east side of pan:
  - Construction of four new 2-bedroom, 4-sleeper universal access cabins (E in Figure 5.6)
- "Inspection Quarters" and other structures, west side of pan:
  - Construction of two composting toilets for day visitors (position I in Figure 5.7)
  - Construction of braai and picnic facilities, and provision for parking for day visitors (J)
  - Upgrade of pathway to boardwalk to existing small bird hide (G)
  - Construction of new double sided bird hide (H) and access board walk on existing artificial embankment, to provide views to both north and south onto deepest areas of pan.

Existing public road route will be retained and upgraded as required. The extensive network of informal vehicle tracks and paths will be closed and allowed to rehabilitate.

The gentle terrain, small size of the reserve, and suitability for bird watching make this an appropriate site to provide universal/disabled access to phase 2 facilities.

Sustainable design principles incorporated into phase 1 and 2:

- Assessment of suitability, and identification of lowest impact footprints by whole reserve sensitivity analysis;
- re-use of existing infrastructure and materials where possible;
- Use of low embodied energy building materials;
- Use of timber frame construction with minimal footings to minimise construction impacts, and allow very low impact future decommissioning, and easy site restoration if ever required;
- Design for low energy use and comfort through passive heating and cooling, high levels of insulation, use of solar water heating, use of clean-burning wood stoves, use of low-energy lighting;
- Use of quality, low energy appliances and lighting;
- All water to be supplied by rainwater harvesting and distribution via pressure pumps;
- Use of self-contained dry-composting toilets to prevent water waste and leaching of any nutrients or pathogens into ground.

Figure 5.8: Upgraded existing tourism cabins, phase 1 (Photos: D Kirkwood)

Recreational and tourism services

Apart from the above mentioned tourism and overnight facilities, Rocherpan Nature Reserve Complex also contributes to the recreational needs of day-visitors. The nature reserve is zoned to accommodate a wide variety of recreational activities. Although the area 500m from the high water mark seaward is a declared MPA, angling from the shore is still allowed. A broad spectrum of outdoor recreational opportunities exists, with bird-watching from either of the two bird hides, photography and shore angling being amongst the most popular. The proposed bird hide and picnic area will complement current activities and facilities.

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 (Cleaver-Christie *et al.* in prep.).

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 Management effectiveness

6.13.1 Finance and administration management

6.13.2 Human resources management

6.13.3 Occupational health and safety management

6.14 Visitor management

6.15 Tourism development framework

Table 6.1	LEGAL STATUS AND RESERVE EXPANSION				
Objective 1 Objective 2	To conserve and maintain important marine, coastal, wetland and terrestrial habitats of Rocherpan Nature Reserve Complex. To encourage sustainable visitor access and provide overnight accommodation for a limited number of guests within the existing tourism footprint				
Key Deliverables	**Management/Monitoring Activities**	**Responsibility**	**Indicators**	**Timeframe**	**Existing Procedures**
1. The Rocherpan Nature Reserve Complex has secured permanent legal conservation status in terms of NEM: PAA.	Confirm that the Marine Reserve is listed in the National Register as required by the Act.	Law Admin Manager, Area Manager, Conservation Manager, Regional Ecologist.	The Rocherpan Nature Reserve Complex is legally secure.	Year 1-2	
2. The Rocherpan Nature Reserve Complex boundary is known and appropriately demarcated and secure.	Inform all relevant stakeholders of boundary demarcation and associated zonation. Investigate and action any disputes or conflicts regarding servitude rights and usage on the reserve.	Business Development Area Manager, Conservation Manager, Community Conservation Manager.		Year 1-5	
3. To consolidate all possible land within the Rocherpan Nature Reserve Complex, as well as other identified conservation-worthy areas adjacent to and contiguous with the reserve.	Investigate the possible expansion in line with the CapeNature Protected Area Expansion Strategy. Investigate the consolidation of the northern 1.7km of beach into the existing MPA.	Programme Manager: Corridors, WHS & Biosphere Reserves, Conservation Manager.	Hectares added to the conservation estate	Year 1-5	CapeNature Protected Area Expansion Strategy and Implementation Plan 2010-2015; Extension nomination for the Cape Floral Region Protected Areas World Heritage Site.

Budget Allocation	**Development**	
	Operation (5 Year Forecast)	R 49 085.00

TABLE 6.2	REGIONAL INTEGRATED PLANNING AND COOPERATIVE GOVERNANCE				
Objective 1	**To conserve and maintain important marine, coastal, wetland and terrestrial habitats of Rocherpan Nature Reserve Complex.**				
Objective 2	To encourage sustainable visitor access and provide overnight accommodation for a limited number of guests within the existing tourism footprint				
Key Deliverables	**Management/Monitoring Activities**	**Responsibility**	**Indicators**	**Timeframe**	**Existing Procedures**
1. The Rocherpan Nature Reserve Complex is integrated into land-use planning outside of the nature reserve.	Inform and integrate the management objectives for the Rocherpan Nature Reserve Complex into the SDF's and IDP's of the West Coast District Municipality and the local Bergriver Local Municipality. Represent Rocherpan Nature Reserve Complex on the West Coast Tourism Board	Area Manager, Scientist: Ornithologist, Conservation Manager, Regional Ecologist, Ecological Co-ordinator. Tourism Liaison Officer	The protected area is integrated into land-use planning outside of the protected area	Year 1-Ongoing	SDF and IDP
2. Water-use planning outside the Rocherpan Nature Reserve Complex takes into account the objectives of the nature reserve.	Attend relevant Water User's Association meetings regarding water abstraction. Engage with Dept. Water Affairs regarding usage rights and compliance monitoring.	Conservation Manager,	Number of meetings attended.	Ongoing	National Water (Act No. 36 of 1998)
3. Maintain a functioning Advisory committee for the Rocherpan Nature Reserve Complex.	Formalise the existing PAAC according to the terms of reference. Clarify roles and responsibilities. Manage and maintain partnerships.	Community Conservation Manager, Conservation Manager.	Advisory committee for the Rocherpan Nature Reserve Complex has been established, is functioning and effective.	Year 1-Ongoing	

Budget Allocation	**Development**	
	Operation (5 Year Forecast)	R 98 170.00

Table 6.3	ECOSYSTEM AND BIODIVERSITY MANAGEMENT				
Objective 1 Objective 2	To conserve and maintain important marine, coastal, wetland and terrestrial habitats of Rocherpan Nature Reserve Complex. To encourage sustainable visitor access and provide overnight accommodation for a limited number of guests within the existing tourism footprint				
Key Deliverables	**Management/Monitoring Activities**	**Responsibility**	**Indicators**	**Timeframe**	**Existing Procedures**
1. Compile an Ecological Matrix and Ecological Plan of Operation for Rocherpan Nature Reserve Complex.	Develop and implement an approved Ecological Matrix for the Rocherpan Nature Reserve Complex. Compile an Ecological Plan of Operations to support the Ecological Matrix. Collate all relevant monitoring and research protocols and data sheets to inform the Ecological Plan of Operations.	Area Manager, Conservation Manager, Regional Ecologist, Ecological Co-ordinator.	The Rocherpan Nature Reserve Complex will annually indicate an upward trend in METT-SA score. 100% of actions identified in the integrated auditing system will be implemented.	Year 1 – Ongoing	Ecological Matrix, Ecological Plan of Operations
2. A biodiversity resource inventory for the Rocherpan Nature Reserve Complex is in place (SOB).	Prioritisation of species for inclusion on the Ecological Matrix. Collect specimens (where relevant) and submit to Scientific Services. Analyse data, re-assess and implement adaptive management strategies. Record all entanglements and strandings of cetaceans, whales and seals (excluding Cape fur seals) and document relevant morphometric measurements.	Conservation Manager, Regional Ecologist, Ecological Co-ordinator.		Year 1 – Ongoing	Baseline data collection and monitoring manual (2010).
3. A monitoring programme for the Rocherpan Nature Reserve Complex is being implemented.	Review monitoring protocols. Identify and prioritise monitoring needs of the reserve in consultation with Scientific Services. Establish indicators for monitoring. Implement monitoring activities as per the Ecological Matrix. Review and implement the Ecological Matrix. Conduct quarterly waterbird counts (CWAC) Analyse data, re-assess and implement adaptive management strategies. Implement monitoring programme as per the relevant national monitoring projects/programmes. Collation of climatic data on the Rocherpan Nature Reserve Complex.	Conservation Manager, Regional Ecologist, Ecological Co-ordinator,		Year 1 – Ongoing	Baseline data collection and monitoring manual (2010)
4. A research programme for the Rocherpan Nature Reserve Complex is being	Identify research needs for the reserve. Develop and implement a management for *Phragmites australis* on the reserve Develop and implement an applied research	Conservation Manager, Regional Ecologist, Ecological Co-		Year 1 – Ongoing	Ecological Matrix, Ecological Plan of Operations.

Key Deliverables	Management/Monitoring Activities	Responsibility	Indicators	Timeframe	Existing Procedures
implemented.	programme for the reserve in consultation with Scientific Services and relevant tertiary and research institutions. Evaluate and comment on research permit applications. Maintain a research register for Rocherpan Nature Reserve Complex. Results are used to adapt management of the nature reserve where relevant. Assist with access and data collection and supervision.	ordinator.			
5. The Rocherpan Nature Reserve Complex contributes to the maintenance of ecosystem services.	Design and implement appropriate alien invasive management programmes. (Refer to Table 6.6) Conduct road and trail assessments. Close and rehabilitate inappropriate roads within the reserve and re-design road networks where needed.	Conservation Manager, Regional Ecologist, Ecological Co-ordinator.		Year 1- Ongoing	Integrated Catchment Management Protocols
6. Conservation of threatened and endemic Fauna.	Investigate and document black harrier nesting sites/nesting frequency.	Ornithologist, Conservation Manager, Ecological Co-ordinator, Tourism Liaison Officer, Maintenance Officer		Year 1 – Ongoing	Ecological Matrix, Ecological Plan of Operations,

Budget Allocation	**Development**	
	Operation (5 Year Forecast)	R 147 255.00

Table 6.4	WILDLIFE MANAGEMENT				
Objective 1 Objective 2	To conserve and maintain important marine, coastal, wetland and terrestrial habitats of Rocherpan Nature Reserve Complex. To encourage sustainable visitor access and provide overnight accommodation for a limited number of guests within the existing tourism footprint				
Key Deliverables	**Management/Monitoring Activities**	**Responsibility**	**Indicators**	**Timeframe**	**Existing Procedures**
1. Manage damage causing animals.	Comment on permit applications from neighbouring land owners. Respond to requests for assistance regarding damage causing animals off the reserve complex. Remove illegal dogs, cats or other pets and domestic stock found in the reserve complex. Manage pets kept by staff on the reserve complex.	Conservation Manager, Conservation Services Manager, Tourism Liaison Officer, Maintenance Officer	Damage causing animals register	Ongoing	Ordinance, Regulations for the proper administration of Nature Reserves 2012, Game Translocation and Utilisation Policy for the WC Province (2011). CapeNature Wildlife Advisory Committee

Budget Allocation	**Development**	
	Operation (5 Year Forecast)	R 245 424.00

Table 6.5	FIRE MANAGEMENT				
Objective 1	**To conserve and maintain important marine, coastal, wetland and terrestrial habitats of Rocherpan Nature Reserve Complex.**				
Key Deliverables	**Management/Monitoring Activities**	**Responsibility**	**Indicators**	**Timeframe**	**Existing Procedures**
1. Reduce / avoid the spread of fires across the reserves borders and minimize accidental/deliberate fires within the reserve.	Ensure adequate and effective biomass management as and when necessary. Implement fuel reduction around infrastructure to minimise risk. Maintain all firebreaks as per the firebreak register. Assess appropriateness of current firebreak network and re-align where appropriate. Negotiate firebreak agreement with neighbours where relevant. Ensure necessary fire fighting equipment is available and maintained. Undertake risk assessments. Update and implement Fire Protection and Reaction Plans according to risk assessments.	Catchment Manager, Area Manager, Conservation Manager, Tourism Liaison Officer, Maintenance Officer		Ongoing	Fire Management Policy and Guidelines; Fire break register
2. Wildfires as a result of human negligence are reduced.	Create a fire awareness programme for tourists, local communities and staff.	Conservation Manager, Community Conservation Manager, Tourism Liaison Officer		Ongoing	Fire Management Policy and Guidelines; Fire wise Implementation Guidelines

Budget Allocation	**Development**	
	Operation (5 Year Forecast)	R 171 797.00

Table 6.6	INVASIVE AND NON-INVASIVE ALIEN SPECIES MANAGEMENT				
Objective 1 Objective 2	To conserve and maintain important marine, coastal, wetland and terrestrial habitats of Rocherpan Nature Reserve Complex. To encourage sustainable visitor access and provide overnight accommodation for a limited number of guests within the existing tourism footprint				
Key Deliverables	**Management/Monitoring Activities**	**Responsibility**	**Indicators**	**Timeframe**	**Existing Procedures**
Invasive Alien Flora					
1. Eradicate alien and invasive species within the Rocherpan Nature Reserve Complex on an on-going basis.	Eradicate the isolated alien invasive flora cluster at location of old homestead. Clearing of invasive Phragmites near/around bird hides and paths according to the Phragmites Management Plan.	Conservation Manager, Ecological Co-ordinator, Scientist: Botanist/Ornithologist and Maintenance Officer	100% of identified areas cleared annually versus planned.	Year 1 – Ongoing	
2. Monitoring of alien and invasive species on Rocherpan Nature Reserve Complex to inform adaptive management strategies.	Investigate clearing method effectiveness and impact. (Phragmites). Monitor natural spread of Phragmites. Investigate herbicides to be used for the control of Phragmites.	Conservation Manager, Ecological Co-ordinator, Scientist: Botanist, Maintenance Officer		Year 1 – Ongoing	
Invasive Alien Fauna					
3. Prevent the introduction of alien and invasive species.	Implement pets on the reserve policy. No domestic livestock will be permitted in the reserve. Tourists not permitted to bring any domestic animals into the reserve. Investigate MoU's with neighbouring communities where domestic livestock is a potential risk.	Conservation Manager, Community Conservation Manager, Tourism Liaison Officer	No of incidents of alien fauna recorded	Ongoing	CapeNature Policy on domestic animals on nature reserves

Budget Allocation	**Development**	
	Operation (5 Year Forecast)	R 245 424.00

Table 6.7	CULTURAL HERITAGE RESOURCE MANAGEMENT				
Objective 1 Objective 2	To conserve and maintain important marine, coastal, wetland and terrestrial habitats of Rocherpan Nature Reserve Complex. To encourage sustainable visitor access and provide overnight accommodation for a limited number of guests within the existing tourism footprint				
Key Deliverable	**Management/Monitoring Activities**	**Responsibility**	**Indicators**	**Timeframe**	**Existing Procedures**
1. Cultural Heritage resources are managed to meet the protected area objectives.	Baseline data collection as and where applicable. Develop and maintain a functioning database with up to date information.	Conservation Manager, Tourism Liaison Officer, Maintenance Officer	METT-SA	Year 1 – 2	CapeNature Baseline Manual, Heritage Management Plan.

Budget Allocation	**Development**	
	Operation (5 Year Forecast)	R 220 882.00

Table 6.13.1	FINANCE AND ADMINISTRATION MANAGEMENT				
Objective 1 Objective 2	To conserve and maintain important marine, coastal, wetland and terrestrial habitats of Rocherpan Nature Reserve Complex. To encourage sustainable visitor access and provide overnight accommodation for a limited number of guests within the existing tourism footprint				
Key Deliverables	**Management/Monitoring Activities**	**Responsibility**	**Indicators**	**Timeframe**	**Existing Procedures**
1. To ensure financial accountability in terms of the PFMA and the Treasury Regulations.	Participate in an annual internal audit of the nature reserve financial records. 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. Manage cash flow Implement Supply Chain Management Provide input to relevant Supply Chain Management reports. Financial management practice enables efficient and effective protected area management. Monthly management reports submitted to reserve management. Acknowledgement of report by Conservation Manager. Variance report signed and returned. Reserve Management provide input to monthly cash flow forecast. Signed and approved budget provided by 1 April.	Finance and Admin Manager, Finance Manager, Finance and Admin Officer, Conservation Manager	Percentage increase shown on revenue as a result of additional funding sourced. Annual increase in visitor numbers.	Ongoing	Budgeting process; APO. SAP system; Supply Chain Management Act. Statements of GRAP.
2. Identify realistic 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, Executive Director: Business Development, Foundation Manager		Annually	National Treasury Regulations with regard to Donations, Sponsorships.
3. 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.	Finance and Admin Manager, Finance and Admin Officer, Conservation Manager		Bi-anually / monthly	SOP's and policies. Statement of GRAP, UAMP guidelines.

Table 6.12	MANAGEMENT EFFECTIVENESS				
Objective 1 **Objective 2**	**To conserve and maintain important marine, coastal, wetland and terrestrial habitats of Rocherpan Nature Reserve Complex.** To encourage sustainable visitor access and provide overnight accommodation for a limited number of guests within the existing tourism footprint				
Key Deliverables	**Management/Monitoring Activities**	**Responsibility**	**Indicators**	**Timeframe**	**Existing Procedures**
1. Implement and maintain the METT-SA	Conduct annual METT-SA assessments. 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.	Programme Manager: Quality Management, Conservation Manager, Ecological Co-ordinator, Regional Ecologist, Area Manager.	The Rocherpan Nature Reserve Complex will annually indicate an upward trend in METT-SA score.	Ongoing	Standard Operation Procedures.
2. 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.	Programme Manager: Quality Management, Scientific Manager: Biodiversity, Conservation Manager, Ecological Co-ordinator, Regional Ecologist, Area Manager.		Ongoing	Integrated Audit
3. A detailed work plan or Annual Plan of Operations (APO) identifying specific targets for achieving management objectives is approved by CapeNature.	Assess and prioritise actions from audit results into APO. Compile APO in terms of actions identified in the Management Plan.	Conservation Manager, Area Manager, Ecological Co-ordinator		Ongoing	APO guideline document.
4. Progress reports are compiled.	Compile quarterly BMS progress reports. Progress reports as required for EPWP.	Conservation Manager		Ongoing	BMS, EPWP reporting system.
5. Implement and review the Management Plan for the Rocherpan Nature Reserve Complex.	Assess all PAMP audit results and ensure adaptive management strategies are implemented. Bi-annual assessment on progress of PAMP actions. Compile annual report on the status of implementation of the PAMP and submit to the MEC. Complete review of PAMP.	Programme Manager: Quality Management, Reserve Management Committee		Ongoing Ongoing Ongoing Year 5	PAMP document, Standard Operating Procedures.

Budget Allocation	**Development**	
	Operation (5 Year Forecast)	R24 542.00

Key Deliverables	Management/Monitoring Activities	Responsibility	Indicators	Timeframe	Existing Procedures
6. Environmental education is provided to promote an understanding of biodiversity and the use of the natural environment as a vehicle for learning and development.	Provide access for Formal and Informal EE programmes as per pre-arranged agreements. Assist with formal and Informal EE programmes conducted in the Rocherpan Nature Reserve Complex. Assist with the development and implementation of an environmental education plan linked to the objectives of Rocherpan Nature Reserve Complex. Management will strive to raise the profile of World Heritage Site through linked awareness and education programmes.	Conservation Manager, Community Conservation Manager, Conservation Services Manager.		Ongoing	People and Parks Action Plan, CapeNature Communications Policy, The Development of Educational Resources (Corporate Strategic Plan), Youth Development & Environmental Education Programme Strategic Plan.
7. Volunteers actively assist in the management of the Rocherpan Nature Reserve Complex.	Investigate opportunities to engage with volunteers in a range of projects.	Conservation Manager, Community Conservation Manager, Conservation Services Manager.	Number of volunteer hours worked (n).	Ongoing	Volunteer Policy

Budget Allocation	**Development**	
	Operation (5 Year Forecast)	R 24 542.00

Table 6.11	SOCIO-ECONOMIC FRAMEWORK				
Objective 1	To conserve and maintain important marine, coastal, wetland and terrestrial habitats of Rocherpan Nature Reserve Complex.				
Objective 2	To encourage sustainable visitor access and provide overnight accommodation for a limited number of guests within the existing tourism footprint				
Key Deliverables	**Management/Monitoring Activities**	**Responsibility**	**Indicators**	**Timeframe**	**Existing Procedures**
1. Create access to the conservation economy through the implementation and management of appropriate initiatives and projects.	Create jobs through a range of projects. Partaking in the recruitment of contractors and employees for the following opportunities : Phase II of Tourism Building of 4 Accommodation Units ; Bird hide; boardwalk and landscaping. Complete reporting on Expanded Public Works Programme (EPWP) database monthly.	Area Manager, 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). 4 contracting opportunities for building of tourism infrastructure. Employment opportunities for maintenance of tourism and reserve infrastructure (possibly 4 to 5 persons employed) after completion of phase II of tourism development	Year 1 – Ongoing	
2. The Rocherpan Nature Reserve Complex provides community development opportunities through various capacity building interventions, linked to job creation opportunities.	Training and capacity building of staff as needed.	Area Manager, Conservation Manager, Community Conservation Manager.		Year 1 – Ongoing	
3. Manage consumptive utilisation of biological resources.	Database established indicating all utilisable species and the extent of their use within the reserve. All requests to utilise resources from the Rocherpan Nature Reserve Complex will be dealt with in terms of the CapeNature Policy on consumptive utilisation.	Area Manager, Conservation Manager, Community Conservation Manager		Year 1 – 2	CapeNature Policy on consumptive utilisation (2007).
4. The Rocherpan Nature Reserve Complex has spiritual or religious significance.	Access to the Rocherpan Nature Reserve Complex for spiritual, cultural and traditional purposes will be allowed subject to permit conditions and with prior approval.	Area Manager, Conservation Manager, Community Conservation Manager	Number of persons accessing CapeNature protected areas for cultural, traditional, spiritual, and sustainable harvesting activities (n).	Year 1 – Ongoing	
5. Representative cooperation and interaction between communities and the reserve management.	PAAC meetings Annual water abstraction survey on the Papkuils River Annual Open Day Friends of Rocherpan established and maintained	Area Manager, Conservation Manager, Community Conservation Manager	Half yearly general meetings and 4 focus group meetings	2 per annum	In terms of the proposed regulations for the proper administration of nature reserves (2009) CapeNature PAAC Terms of Reference (2011)

Table 6.10	DISASTER and RISK MANAGEMENT				
Objective 1 Objective 2	To conserve and maintain important marine, coastal, wetland and terrestrial habitats of Rocherpan Nature Reserve Complex. To encourage sustainable visitor access and provide overnight accommodation for a limited number of guests within the existing tourism footprint				
Key Deliverables	**Management/Monitoring Activities**	**Responsibility**	**Indicators**	**Timeframe**	**Reference to Existing Procedures**
1. Disaster prevention and preparedness	Conduct a risk assessment and identify areas of potential concern Compile and implement disaster management plan for Rocherpan Nature Reserve Complex. Attend DEA: Oil Pollution Contingency Planning meetings for Swartland / Zone 2 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.	Area Manager, Conservation Manager, Community Conservation Manager,	None.	Year 1 – 2, Ongoing	Risk Assessment Completed, Coastal oil spill contingency plan, CapeNature Health & safety Policy
2. 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. Implement the collection protocol for carcasses and samples as per the Disaster Management Plan and record data as required.	Conservation Manager, Community Conservation Manager,		Year 1 – Ongoing	Human Resource Policies, Volunteer Programme, Procurement Policies,
3. Ensure effective and integrated risk management within a framework of sound corporate governance.	Documenting of business processes. On site risk identification and analysis. On site identification of controls/ mitigations. Monitoring of risks.	Area Manager, Conservation Manager, Tourism Liaison Officer, Chief Risk Officer.	Risks in the Risk Register mitigated in a cost effective manner and to an acceptable level.	Year 1-5	PFMA Section 38. Risk Management Policy and Strategy.

Budget Allocation	**Development**	
	Operation (5 Year Forecast)	R 73 627.00

Budget Allocation	**Development**	
	Operation (5 Year Forecast)	R 98 170.00

Key Deliverables	Management/Monitoring Activities	Responsibility	Indicators	Timeframe	Existing Procedures
maintained.	works list to reflect maintenance requirements. Ensure any painting and other surface treatment match existing colour schemes as at 2012. Maintenance or new infrastructure is appropriately planned (EMP), approved by the Quarterly Ecological Meeting and if required the appropriate EIA completed. Ensure energy saving and environmentally sound options are being implemented by Department of Public Works (Green Building principals).	Works.	Maintenance of buildings schedule is in place, METT-SA.		Guidelines, Standard Operating Procedures.
5. Environmental Management: Waste Disposal	Implement sound Waste Management. Maintenance of storage bins Conduct an annual audit of compliance with the Occupational Health and Safety Programme for the Reserve (Occupational Health and Safety Act 83 of 1995).	Conservation Manager, Maintenance Officer.	Necessary operational equipment and infrastructure is in place; Final waste contains no recyclable products; Compliance successful, minimal waste production and impact on the surrounding environment; METT-SA.	Year 1 – Ongoing	Standard Operating Guidelines for Waste Management.
6. Environmental Management: Water	Maintain the water tanks, gutters and downpipes according to the schedule to ensure upkeep and prevent degradation. Educate visitors and staff regarding water conservation. Schedule regular inspections for water quality and treat accordingly.	Conservation Manager, Maintenance Officer,	Necessary operational equipment and infrastructure is in place; METT-SA.	Year 1 – Ongoing	Department of Public Works Policies and Guidelines, Standard Operating Procedures.
7. Environmental Management: Sewage	Maintain Eco toilets	Conservation Manager, Maintenance Officer	Compliance successful, minimal impact on the surrounding environment.	Year 1 – 5	
8. Environmental Management: Herbicide and Fuel Stores	Ensure that the storage of herbicide, fuel and gas is in compliance with the Occupational Health and Safety Programme for the Reserve (Occupational Health and Safety Act 83 of 1995).	Conservation Manager, Maintenance Officer	Successful compliance with legislation.	Year 1 – Ongoing	Occupational Health and Safety Act 83 of 1995.
9. Signage is appropriate and effective to support management.	Conduct a signage audit and implement the findings. Compile a signage register and implement maintenance plan.	Conservation Manager, Maintenance Officer	Signage is in place at strategic points.	Year 1 – Ongoing	

Table 6.9	INFRASTRUCTURE MANAGEMENT				
Objective 1 Objective 2	To conserve and maintain important marine, coastal, wetland and terrestrial habitats of Rocherpan Nature Reserve Complex. To encourage sustainable visitor access and provide overnight accommodation for a limited number of guests within the existing tourism footprint				
Key Deliverables	**Management/Monitoring Activities**	**Responsibility**	**Indicators**	**Timeframe**	**Existing Procedures**
1. Ensure maintenance of infrastructure and equipment.	Map all infrastructure and compile infrastructure register. The infrastructure necessary to manage the nature reserve effectively is in place (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 Public Works where required.	Conservation Manager, GIS Technician; Tourism Liaison Officer, Maintenance Officer	Infrastructure Register is in place. Infrastructure is sufficient and maintained. Operational equipment is adequate and in good working condition. METT-SA.	Year 1 – Ongoing	
2. Align all infrastructure to the conservation development framework and zonation	Assess infrastructure development appropriateness to the CDF. Compile a re-alignment plan. Implement the re-alignment plan.	Conservation Manager, Conservation Planner, Regional Ecologist, Ecological Co-ordinator.	Conservation development Framework is implemented. METT-SA.	Year 1 – Ongoing	
3. Roads/Jeep Tracks and Trails are managed to minimise impact on the environment.	Evaluate and assess linear infrastructure of the Rocherpan Nature Reserve Complex. Compile maintenance plan. Re –align road network in keeping with the CDF. Rehabilitate where necessary. Source sustainable shell grit from nearby areas to maintain visitor access roads and parking areas Install and maintain bollards at all points that may be used for turning and/or parking e.g. at the second bird hide and the end of the new trail Monitor use, impact and cost-effectiveness of maintenance.	Conservation Manager, Regional Ecologist, Ecological Co-ordinator	Necessary operational equipment and infrastructure is in place. Maintenance of equipment and infrastructure schedule is in place, METT-SA	Year 1 – Ongoing	
4. Buildings are effectively	Compile and maintain a building register. Provide Department of Public Works with	Conservation Manager, Department of Public	Necessary operational equipment and infrastructure is in place.	Year 1 – Ongoing	Department of Public Works Policies and

Table 6.8	LAW ENFORCEMENT AND COMPLIANCE				
Objective 1 Objective 2	To conserve and maintain important marine, coastal, wetland and terrestrial habitats of Rocherpan Nature Reserve Complex. To encourage sustainable visitor access and provide overnight accommodation for a limited number of guests within the existing tourism footprint				
Key Deliverables	**Management/Monitoring Activities**	**Responsibility**	**Indicators**	**Timeframe**	**Existing Procedures**
1. Law enforcement for the Rocherpan Nature Reserve Complex is effective.	Ensure staff has a working knowledge of all legislation applicable to their function and mandate. Ensure reserve staff are adequately capacitated to enforce legislation within the organisation's mandate, effectively. Ensure adequate law enforcement support from other Reserves within the Region Ensure staff are formally designated to enforce the relevant legislation. Appoint appropriate staff as environmental management inspectors / fisheries control officers. Ensure the necessary equipment to enable staff to do law enforcement effectively is available.	Area Manager – Breede Berg, Area Manager – North West, Conservation Manager Rocherpan, Conservation Manager Bird Island Tourism liaison Officer, Programme Manager: Biodiversity Crime Unit (BCU), Conservation Services Manager, Maintenance Officer	Number of peace officers trained and appointed. Number of Environmental Management Inspector'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 Conservation Services Management Plan; Human Resource Policies, Procurement Policies; Biodiversity Crime Unit Management Plan.
2. Protection systems are in place and operating effectively.	Ensure regular routine patrols are performed in all identified priority areas. Set up and implement combined compliance operations (CapeNature Biodiversity Crime Unit, Department of Agriculture, Forestry and Fisheries as needed. Control illegal access by enforcing regulations, policies and standard operating procedures. Ensure all compliance documentation is properly completed and retained as Means of Verification. Ensure relevant cases are reported via the Biodiversity Monitoring System (BMS) and documents submitted as verification.	Area Manager – Breede Berg, Area Manager – North West, Conservation Manager Rocherpan, Conservation Manager Bird Island Tourism liaison Officer, Programme Manager: BCU, Conservation Services Manager, Maintenance Officer		Year 1-5	Conservation Services Management Plan; Human Resource Policies, Procurement Policies; Biodiversity Crime Unit Management Plan.

Budget Allocation	**Development**	
	Operation (5 Year Forecast)	R 245 424.00

Key Deliverables	Management/Monitoring Activities	Responsibility	Indicators	Timeframe	Existing Procedures
	Fixed Asset Register is approved by the Conservation Manager. Verification Report is approved by the Conservation Manager. 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.				
4. Capacity building among staff.	Provide relevant financial and Administrative training to reserve staff.	Conservation Manager, Finance and Admin Manager		Annually	SOP's and policies PFMA

Budget Allocation	**Development**	
	Operation (5Year Forecast)	R24 542.00

Table 6.13.2	HUMAN RESOURCE MANAGEMENT				
Objective 1 Objective 2	To conserve and maintain important marine, coastal, wetland and terrestrial habitats of Rocherpan Nature Reserve Complex. To encourage sustainable visitor access and provide overnight accommodation for a limited number of guests within the existing tourism footprint				
Key Deliverables	**Management/Monitoring Activities**	**Responsibility**	**Indicators**	**Timeframe**	**Reference to Existing Procedures**
1. Ensure an adequately resourced staff complement on the reserve.	Investigate optimum staff structure and responsibilities and how current staff shortages can be addressed. Ensure current posts are filled and appoint additional staff (subject to funding). Ensure resourced (tools and skills) staff in line with approved budget to manage the Rocherpan Nature Reserve Complex effectively (subject to funding). Prioritise all critical posts for filling and develop a phased implementation plan in line with approved personnel budget. Employment relationship is in line with employment contract commitments	Conservation Manager, Area Manager, Executive Director: Conservation Management. Executive Directors: Operations and HRM	Human resource capacity is adequate to manage the protected area effectively subject to funding	Ongoing	Recruitment and Selection Policy; Standard Operating Procedures for Recruitment and Selection SA Constitution Labour Relations Act Basic Conditions of Employment Act Employment Equity Act Occupational Health & Safety Act Overtime Policy Equate System for Job Evaluation Leave Policy
2. Integrate and align organisational and employee performance.	Implement effective Performance Management System in place. Ensure compliance with Code of Conduct.	Conservation Manager, Area Manager, Executive Directors: Operations, HRM, Chief Executive Officer	Performance agreements completed and signed for all employees. Performance appraisals completed for all employees.	Annually	Performance Management Handbook Annual Plan of Operations Rewards Foundation Policy Disciplinary Code and Procedures (Managing poor performance) Code of Conduct
3. Skilled employees on the reserve	All staff is skilled to perform according to job specification in the roles they occupy in line with mandatory legislative requirements. Develop and implement personal development plan for all staff on the reserve. Reflect capacity development interventions which are supported by mentorship and coaching agreements. Conduct annual Skills audit.	Conservation manager, Area Manager, HR and Employment Equity and Training Committees	Develop personal development plan for all staff on the reserve. Mentorship and coaching agreements. Implement Skills Plan according to priorities and budget availability	Annually	Individual PDPs Mentorship strategy and toolbox Skills Development Act Training Policy Bursary Policy Internship Policy

Budget Allocation	**Development**	
	Operation (5 Year Forecast)	R 122 712.00

Table 6.13.3	OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT				
Objective 1 Objective 2	To conserve and maintain important marine, coastal, wetland and terrestrial habitats of Rocherpan Nature Reserve Complex. To encourage sustainable visitor access and provide overnight accommodation for a limited number of guests within the existing tourism footprint				
Key Deliverables	**Management/Monitoring Activities**	**Responsibility**	**Indicators**	**Timeframe**	**Existing Procedures**
1. To implement policies, procedures and systems to ensure compliance to the Occupational Health and Safety Act. (OS4909H Act).	Implement Occupational Health and Safety System. Ensure an adequate number of First Aid Officers.	Area Manager. Conservation Manager. OHSA Manager.	No disabling injuries occur.	Year 1-5	OHS Act, Internal Health and Safety System
2. To inform the workers, contractors, volunteers, students and the public of these dangers, how exposure could be prevented, and how to work safely.	Attend Accredited OHS Training Attend Accredited OHS Training to renew certificates (OHS Reps & First Aid Officers). Attend in-house OHS Training Workshops. Conduct monthly Toolbox Talks.	Area Manager, Conservation Manager, OHSA Reps, Operators of equipment and machinery, First Aid Officers; Designated OHSA risk specific appointments, OHSA Officer, OHSA Manager		Year 1 ongoing	OHS Training Needs Analysis (conducted annually and aligned with available legislative requirements and available resources)
3. Hazard Identification, Risk Assessment and Risk Management and Risk Control are implemented on the Rocherpan Nature Reserve Complex.	Conduct regular HIRA processes to determine key risks with highest impact potential. Recommend remedial action plans to address key risks. Follow-up to ensure effective implementation.	Area Manager, Conservation Manager, OHSA Manager		Year 1 ongoing	HIRA Report, Safe Operating Procedure
4. Monitor and review to ensure adaptive management strategies are applied to improve health and safety on the Rocherpan Nature Reserve Complex.	Assist in conducting of internal Audit Process to determine effectiveness and level of compliance of implementation of OHS Management Control System.	Conservation Manager, OHSA Officer, OHSA Manager		Year 1	Worksite Audit Report

Budget Allocation	**Development**	
	Operation (5 Year Forecast)	R 171 797.00

Table 6.14	VISITOR MANAGEMENT AND SERVICES				
Objective 1 Objective 2	To conserve and maintain important coastal, wetland and terrestrial habitats of Rocherpan Nature Reserve Complex. To encourage sustainable visitor access and provide overnight accommodation for a limited number of guests within the existing tourism footprint				
Key Deliverables	**Management/Monitoring Activities**	**Responsibility**	**Indicators**	**Timeframe**	**Existing Procedures**
1. To plan for and manage visitor facilities.	Monitor and manage visitor numbers and their environmental impact. Plan for and develop visitor facilities within CDF and local area plans. Survey visitor opinions. Ensure tourism facilities are accessible for disabled persons. (where possible)	Tourism Manager. Tourism Officer. Conservation Manager. Marketing & Eco-tourism	Annual increase in visitor numbers. Annual increase in tourism income.	Ongoing	Conservation Development Framework. Strategic Development Plan.
2. To strive to ensure visitor safety.	Outsource hosting services. Establish collaborative relationships with policing authorities. Implement appropriate gate control to ensure safety and compliance. Liaise with local authorities and stakeholders on security issues.	Tourism Manager. Tourism Officer. Conservation Manager.		Ongoing	Strategic Development Plan.
3. To promote and manage access to the Reserve.	Set management guidelines for different use zones. Identify areas requiring special management strategies and protection from visitor use. Facilitate access for disadvantaged groups on request.	Tourism Manager. Tourism Officer. Conservation Manager.		Ongoing	Strategic Development Plan. PMFA.

Budget Allocation	**Development**	
	Operation (5 Year Forecast)	R 294 509.00

Table 6.15	TOURISM DEVELOPMENT FRAMEWORK				
Objective 1 Objective 2	To conserve and maintain important coastal, wetland and terrestrial habitats of Rocherpan Nature Reserve Complex. To encourage sustainable visitor access and provide overnight accommodation for a limited number of guests within the existing tourism footprint				
Action plans	Management/Monitoring Activities	Responsibility	Indicators	Timeframe	Existing Procedures
1. To provide nature and cultural tourism and recreational opportunities within the Reserve without negatively impacting on ecological processes.	Prioritise different types of tourism development within the Rocherpan Nature Reserve Complex according to the CDF. Implement Strategic Development Plan. Conduct infrastructure and visitor monitoring to inform where mitigation is necessary.	Tourism Manager. Conservation Manager. Community Conservation Manager.	Concession of selected tourism opportunities Standards are set in specified and approved schedules (including hospitality standards based on those by the South African Grading Council). Standards Committee established for monitoring tourist facilities within the Reserve Development priorities in place and implemented in the correct Zones within the Reserve Recommendations within these plans implemented Concessionaire compliance audited	Ongoing	Conservation Development Framework. Strategic Development Plan.

Budget Allocation		
	Development	R 8 970 344.00
	Operation (5 Year Forecast)	R 196 340.00

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DEFINITION OF TERMS

Alien species	Species or genotypes, which are not indigenous to this protected area and the surrounding area, including hybrids and genetically altered organisms.
Biodiversity	The variability among living organisms from all sources including, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part and also includes diversity within species, between species, and of ecosystems (as per the National Environmental Management: Biodiversity Act, 2004 [Act No. 10 of 2004]).
Bioprospecting	In relation to indigenous biological resources, means any research on, or development or application of, indigenous biological resources for commercial or industrial exploitation, and includes – the systematic search, collection or gathering of such resources or making extractions from such resources for purposes of such research, development or application (as per the National Environmental Management: Biodiversity Act, 2004 [Act No. 10 of 2004]).
Board	The Western Cape Nature Conservation Board as defined by the Western Cape Nature Conservation Management Act, 1997 (Act No.9 of 1997).
Buffer zone	An area surrounding a protected area that has restrictions placed on its use or where collaborative projects and programmes are undertaken to afford additional protection to the nature reserve.
Co-management	The term 'Co-management' must be understood within the context of Section 42 of the National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003).
Cultural heritage	As defined in Article 1 of the World Heritage Convention (UNESCO) 1972 , 'cultural heritage' is considered as "monuments, architectural works, works of monumental sculpture and painting, elements or structures of an archaeological nature, inscriptions, cave dwellings and combinations of features, which are of value from the point of view of history, art or science, groups of buildings, groups of separate or connected buildings which, because of their architecture, their homogeneity or their place in the landscape, are of significance from the point of view of history, art or science, sites, works of man or the combined works of nature and man, and areas including archaeological sites which are of value from the historical, aesthetic, ethnological or anthropological point of view." For the purpose of this PAMP, living heritage features such as mountains, pools, rivers, boulders, etc. as well as palaeontological features are included under this definition.
Ecotourism	The travel to natural areas to learn about the way of life and cultural history of people, the natural history of the environment, while taking care not to change the environment and contributing to the economic welfare of the local people (adapted from a definition of ecotourism by Hecto Ceballos Lascurain).
Ecological integrity	The sum of the biological, physical and chemical components of an ecosystem and its products, functions and attributes (as per the National Environmental Management: Protected Areas Act, 2003 [Act No. 57 of 2003]).
Ecosystem	A dynamic complex of animal, plant and micro-organism communities and their non-living environment interacting as a functional unit (as per the National Environmental Management: Protected Areas Act, 2003 [Act No. 57 of 2003]).
Ecosystem services	As defined in Section 1 of the National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003) as "environmental goods and services"

	meaning: a. Benefits obtained from ecosystems such as food, fuel and fibre and genetic resources. b. Benefits from the regulation of ecosystem processes such as climate regulation, disease and flood control and detoxification. c. Cultural non-material benefits obtained from ecosystems such as benefits of a spiritual, recreational, aesthetic, inspirational, educational, community and symbolic nature;" For the purposes of this PAMP, sustainable water production is also specifically included under this definition.
Environmental degradation	The deterioration of the environment through depletion of resources such as air, water and soil; the destruction of ecosystems and the loss of species or undesirable reduction of species population numbers from a specific area from an environmental health perspective.
CapeNature	Nature Conservation Service as established in terms of the Western Cape Nature Conservation Management Act No. 9 of 1997.
Indigenous species	In relation to a specific protected area, means a species that occurs, or has historically occurred, naturally in a free state of nature within that specific protected area, but excludes a species introduced in that protected area as a result of human activity (as per the National Environmental Management: Protected Areas Act, 2003 [Act No. 57 of 2003]).
Invasive species	Means any species whose establishment and spread outside of its natural distribution range – a. Threaten ecosystems, habitats or other species or have a demonstrable potential to threaten ecosystems, habitats or other species. b. May result in economic and environmental harm or harm to human health. (As per the National Environmental Management: Protected Areas Act, 2003 [Act No. 57 of 2003]).
Joint management	The agreed co-ordination of management and/or management actions by landowners and/or mandated managers on their individual or combined properties in order to achieve common management objectives.
Local community	Any community of people living or having rights or interests in a distinct geographical area (as per the National Environmental Management: Protected Areas Act, 2003 [Act No. 57 of 2003]).
Management	In relation to a protected area, includes control, protection, conservation, maintenance and rehabilitation of the protected area with due regard to the use and extraction of biological resources, community-based practices and benefit sharing activities in the area in a manner consistent with the Biodiversity Act (as per the National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003).
Management authority	In relation to a protected area, means the organ of state or other institution or person in which the authority to manage the protected area is vested (as per the National Environmental Management: Protected Areas Act, 2003 [Act No. 57 of 2003]).
Monitoring	The collection and analysis of repeated observations or measurements to evaluate change in status, distribution or integrity in order to track the impacts of directed

	management implemented to achieve a stated management objective.
Nature conservation	The conservation of naturally occurring ecological systems, the sustainable utilisation of indigenous plants and animals therein, and the promotion and maintenance of biological diversity (as per the Western Cape Nature Conservation Management Act, 1997 [Act No.9 of 1997]).
Neighbouring community	The communities and people permanently living in the local municipal area/s bordering onto the protected area.
Natural heritage	As defined in Article 2 of the World Heritage Convention (UNESCO) 1972 'natural heritage' is as: "natural features consisting of physical and biological formations or groups of such formations, which are of value from the aesthetic or scientific point of view, geological and physiographical formations and precisely delineated areas which constitute the habitat of threatened species of animals and plants of value from the point of view of science or conservation, natural sites or precisely delineated natural areas of value from the point of view of science, conservation or natural beauty." For the purposes of this PAMP, this would include the required ecological integrity of the protected area for the production of ecosystem services.
Partnerships	A co-operative and / or collaborative arrangement between the protected area's management / CapeNature and a third party that supports the achievement of the protected area's / CapeNature objectives.
Protected areas	• Means any area declared or proclaimed as such in terms of Section 3 or listed in the Second Schedule to the Western Cape Nature Conservation Management Act, 1997 (Act No. 9 of 1997); or • Means any of the protected areas referred to in Section 9 of the National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003).
Ramsar Convention	Means: "The Convention on Wetlands of International Importance, signed in Ramsar, Iran, in 1971, is an intergovernmental treaty, which provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources." (There are presently 158 Contracting Parties to the Convention, the Convention has broadened its scope to cover all aspects of wetland conservation and wise use, recognising wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities.)
Stakeholders/ interested parties	These are interested individuals or groups concerned with or affected by an activity and its consequences. These include the authorities, local communities, investors, work force, consumers, environmental interest groups and the general public. According to the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004), "stakeholder" means a person, an organ of state or a community contemplated in Section 82 (1) (a), or an indigenous community contemplated in Section 82(1) (b).
Surveillance	The collection and analysis of single or repeated measurements to establish status or distribution or integrity at a point in time in the absence of a specific management context or objective.
Sustainable	In relation to the use of a biological resource, means the use of such resource in a way and at a rate that would not lead to its long-term decline; would not disrupt the ecological integrity of the ecosystem in which it occurs; and would ensure its continued use to meet the needs and aspirations of present and future generations of people (as per National Environmental Management: Biodiversity Act, 2004 (Act

	No. 10 of 2004).
Wilderness area	Means an area designated in terms of Section 22 or 26 for the purpose of retaining an intrinsically wild appearance and character, or capable of being restored to such and which is undeveloped and roadless, without permanent improvements or human habitation (as defined by the National Environmental Management: Protected Areas Act, 2003 [Act No. 57 of 2003]).
World Heritage Site	Means a World Heritage Site as defined in the World Heritage Convention Act, No. 49 of 1999 under Chapter 1, Section 1 Subsection (xxiv).