

MANAGEMENT PLAN FOR PLEROMA NATURE RESERVE



Strategic Management Plan

2021 – 2026

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STATUS

The Pleroma Nature Reserve has been declared as a Section 23 Nature Reserve, under the National Environmental Management: Protected Areas Act (No. 57 of 2003).

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AUTHORISATION

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Strategic Management Plan Review Date: 2026

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ABBREVIATIONS

APO	Annual Plan of Operation
CARA	Conservation of Agricultural Resources Act
CBA	Critical Biodiversity Area
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMA	Catchment Management Authority
CR	Critically Endangered
CREW	Custodians of Rare and Endangered Wildflowers
DEFF	Department of Environment, Forestry and Fisheries
DWA	National Department of Water Affairs
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
EMP	Environmental Management Plan
EN	Endangered
ESA	Ecological Support Area
FEPA	Freshwater Ecosystem Priority Area
FPA	Fire Protection Association
GIS	Geographical Information System
IDP	Integrated Development Plan (Municipal)
IUCN	International Union for the Conservation of Nature
LC	Least Concern
LHSKT	Leslie Hill Succulent Karoo Trust
LT	Least Threatened
MA	Management Authority
MCA	Mountain Catchment Area
MEC	Member of the Executive Council
METT	Management Effectiveness Tracking Tool
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
NBA	National Biodiversity Assessment
NEM:BA	National Environmental Management: Biodiversity Act
NEM:PAA	National Environmental Management: Protected Areas Act
NEMA	National Environmental Management Act
NFEPA	National Freshwater Ecosystem Priority Area
NGO	Non-governmental Organisation
NPAES	National Protected Area Expansion Strategy
NCPAES	Northern Cape Protected Area Expansion Strategy
NR	Nature Reserve
NSBA	National Spatial Biodiversity Assessment
NWA	National Water Act
ONA	Other Natural Area
PA	Protected Area
PAMP	Protected Area Management Plan

PNR	Pleroma Nature Reserve
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SANParks	South African National Parks
SDF	Spatial Development Framework
SKEP	Succulent Karoo Ecosystem Programme
SMP	Strategic Management Plan
SDF	Municipal Spatial Development Framework
SMME	Small, Micro and Medium Enterprises
SMP	Strategic Management Plan
The Department	Northern Cape Department of Agriculture, Environmental Affairs, Rural Development and Land Reform
VU	Vulnerable
WFA	Wilderness Foundation Africa
WWF	WWF South Africa

1. BACKGROUND

1.1 Purpose of the plan

Management plans for biodiversity stewardship sites are strategic documents that provide the framework for the development and operation of biodiversity stewardship sites. They inform management at all levels, from the landowner through to support staff within the Northern Cape Department of Agriculture, Environmental Affairs, Rural Development and Land Reform. The purpose of the management plan is to:

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

1.2 Structure of the plan

Section 1:	Introduction and background to the Pleroma Nature Reserve.
Section 2:	Vision and aim of the Pleroma Nature Reserve.
Section 3:	Site description and context of the biodiversity stewardship site, providing the basis for the strategic management framework that follows.
Section 4:	The zonation of Pleroma Nature Reserve and description of land use activities in the determined zones.
Section 5:	Administrative structure of the Pleroma Nature Reserve.
Section 6:	Operational Management Framework which sets out the management targets that must be achieved in managing the reserve.
Section 7:	Overview of the Annual Plan of Operations and management plan.

1.3 Adaptive Management

The preparation of this management plan has been undertaken based on the guiding principles of adaptive management, which is a structured, iterative process in which decisions are made using the best available information, with the aim of obtaining better information through monitoring of performance (Figure 1.1). In this way, decision making is aimed at achieving the best outcome based on current understanding, whilst accruing the information needed to improve future management. Adaptive management can lead to revision of a part or, if necessary, the whole management plan



Figure 1.3 The adaptive management cycle

Adaptive management enables landowners and managers to:

- Learn through experience.
- Take account of, and respond to, changing factors that affect the biodiversity stewardship site.
- Develop or refine management processes.
- Adopt best practices and new innovations in biodiversity conservation management.
- Demonstrate that management is appropriate and effective.

1.4 Introduction

Pleroma Nature Reserve (PNR) is situated within the Nama Khoi local, and Namakwa district municipality of the Northern Cape Province, South Africa. The regionally important Buffelsrivier forms the southern border of the reserve, where it also partially neighbours with Namaqua National Park. PNR is further wedged between the N7 national road to the east, and the locally well-known Messelpad and Wildeperdehoek pass to the west. The closest towns include Springbok, which is approximately 40 km north of the property, and Kamieskroon 30km to the south.

Pleroma Nature Reserve is a collection of six neighbouring farm portions covering a total area of 5172.64 hectares. The farm portions of which PNR comprises is as follows:

- Koornhuis 4/342, 7/342, 19/342 and 20/342, owned by Ms. Elsie Van Tonder
- Koornhuis 16/342 and 17/342, owned by Mr. Koos Van der Lende

Pleroma Nature Reserve was proclaimed to enable the landowners to take appropriate action to conserve and protect the biodiversity and natural ecological resources found across the properties, while also maintaining the unique wilderness characteristics of the area. The proclamation has also ensured that the owners receive legal recognition for their contributions towards conservation.

After interest was shown by the landowners to seek Protected Area status for the property, Wilderness Foundation Africa (WFA), in cooperation with the Northern Cape Department of Agriculture, Environmental Affairs, Rural Development and Land Reform (hereafter referred to as “the Department”), conducted the initial biodiversity site assessment in 2016. The additional farm portions purchased afterwards (16/342 and 17/342) were assessed in early 2018. During the review of both assessment findings, all parties agreed that the properties qualified for the highest possible protection level as a Nature Reserve in terms of Section 23 of the National Environmental Management: Protected Areas Act (Act 57 of 2003).

In view of the above findings, the declaration process was initiated towards the end of 2018, with the notice of proclamation for Pleroma Nature Reserve appearing in the Northern Cape Provincial Government Gazette (No. 2394) on 22 February 2021. Although the declaration process was initiated and driven through the Department, SANParks will be responsible for maintaining the Nature Reserve by conducting annual audits and supporting the landowner with technical advice. This agreement was reached through a Memorandum of Understanding which was signed by both parties on 18 July 2019 (SANParks & the Department).

Pleroma Nature Reserve contributes 5 172.64 hectares towards the protection of the Namaqualand Klipkoppe Shrubland (SKn1) vegetation type, while also covering approximately 850 hectares of Critical Biodiversity One, and 4 323 hectares Critical Biodiversity Two areas. Apart from being a biodiversity investment priority for the Leslie Hill Succulent Karoo Trust (LHST), PNR is also strategically placed in terms of the Northern Cape Protected Area Expansion Strategy (NCPAES). PNR is not only situated in the ‘Namaqua National Park core focus area’, but could possibly also form an important link within the ‘Goegap to Melkrivier’ expansion corridor, as well as the Succulent Karoo Ecosystem Programme (SKEP), Buffelsrivier Priority Corridor.

Through its proclamation, Pleroma Nature Reserve is subject to the provisions of the Protected Areas Act. The Act requires that the management authority of the Nature Reserve must, within 12 months of the proclamation, submit a strategic management plan for the Nature Reserve to the Honourable

MEC, for approval. This document forms the foundation for the management of Pleroma Nature Reserve, and was developed in fulfilment of requirements of the Protected Areas Act.

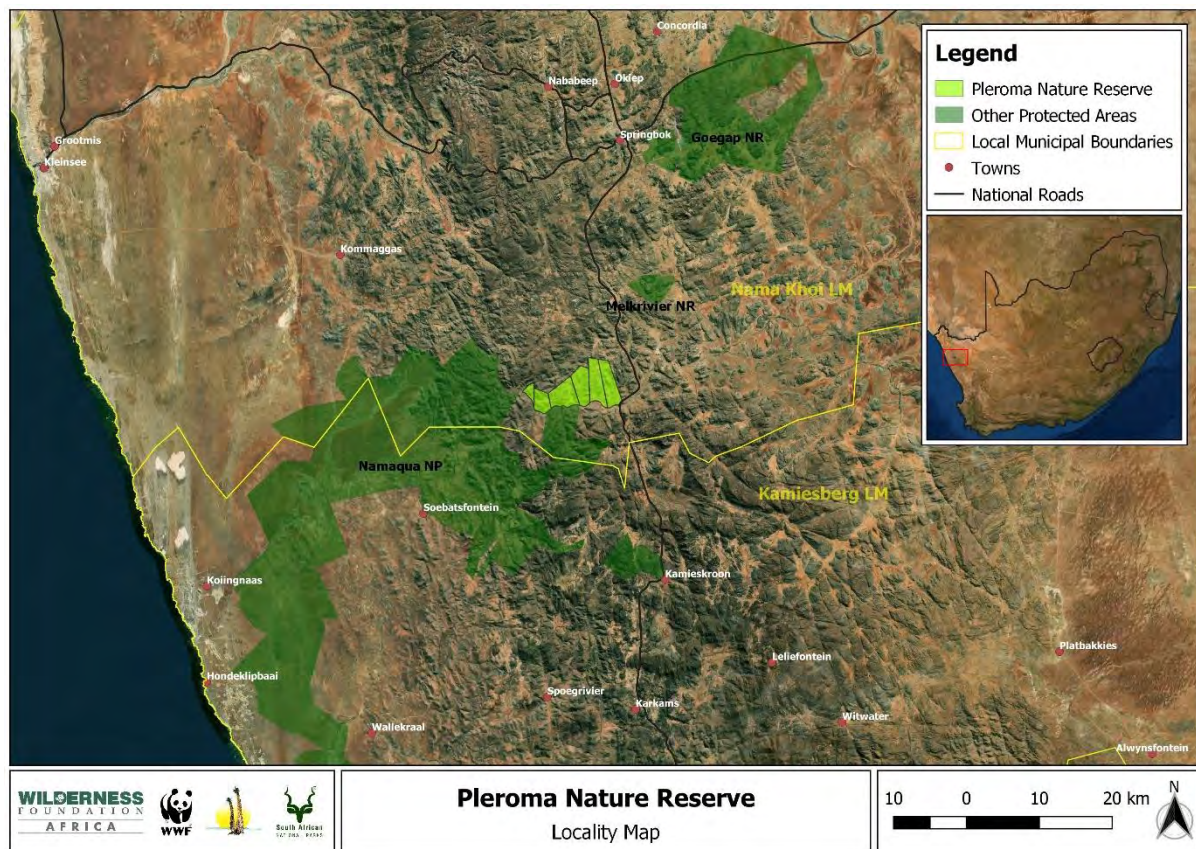


Figure 1.4 Locality Map for Pleroma Nature Reserve

1.5 Key values of Pleroma Nature Reserve

The values of a site are those remarkable attributes that led to it being identified as a priority for the Northern Cape Biodiversity Stewardship Programme and Protected Areas Expansion Strategy. The values are important in planning and management, as they are the aspects of the place that must be protected. The values of Pleroma Nature Reserve include:

Key Value	Description
Natural values	<ul style="list-style-type: none"> - The PNR contributes a total of 1.69% towards the national conservation target of the poorly protected, Namaqualand Klipkoppe Shrubland (SKn1) vegetation type. - A total of 849.66 hectares, or 16% of the PNR is classified as a Critical Biodiversity Area 1 (CBA1), while the remainder is all classified as Critical Biodiversity Area 2 (CBA2). - Contains two National Freshwater Ecosystem Priority Areas (NFEPA's) namely the Buffelsrivier, which runs for approximately 16 kilometres along the reserves southern border, and the Koornhuisrivier which passes through the reserve before entering the Buffelsrivier.

Ecosystem service values	<ul style="list-style-type: none"> - The locality of the PNR contributes significantly towards connectivity with other protected areas, and thus landscape ecological processes. PNR borders directly with Namaqua National Park and is also situated within the proposed corridor between NNP and Goegap Nature Reserve. - PNR spans across four separate National Freshwater Ecosystem Priority Area (NFEPA) quaternary catchment systems. These catchments are classified as upstream management areas and are required to prevent the degradation of freshwater ecosystems downstream. - Includes riverine corridors (Buffels and Koornhuis rivers) which facilitate the movement of numerous animal species, while also providing habitat and refuge e.g. Kudu. - Low occurrence of alien invasive plant species in important riverine corridors. - Large, healthy populations of <i>Vachellia karroo</i> present in riparian systems play an important role through nitrogen fixation and increasing palatability of undergrowth. - The diverse landscape provides suitable habitat to numerous animal species including apex predators such as leopard and Verreaux's eagle.
Tourism values	<ul style="list-style-type: none"> - Pleroma Nature Reserve offers possible tourism opportunities through photographic courses, mountain biking, hiking and stargazing.
Cultural and heritage values	<ul style="list-style-type: none"> - The ruins of two historic farms homesteads, as well as cemeteries, are found on PNR. These remains are a critical part of the early agricultural history in the Namaqualand area. - Ethno botanical characteristics of numerous plant species found across the PNR offer great insight into the cultural heritage of the local people.
Socio-Economic values	<ul style="list-style-type: none"> - Job creation opportunities through possible rehabilitation, alien clearing and fencing projects. - Temporary employment opportunities to assist the management authority with certain management activities.

1.6 Summary of management challenges and opportunities

A summary of the key management challenges and opportunities, addressed in the management plan are highlighted in the table below.

Table 1.6 Management challenges and opportunities

Management Focus Area	Challenges and Opportunities
Vegetation Management	Although overall condition of vegetation on the PNR is good, areas surrounding old kraals have poor plant cover, as a result of historic overgrazing and trampling.

	<p>Monitoring of these areas is required to track improvement and inform management interventions, such as game utilization and erosion control activities.</p>
Wildlife Management	<p>One of the objectives of PNR is to reintroduce and establish historically, naturally occurring game species. In order to adequately manage existing, as well as newly introduced game populations, a comprehensive Game Management Plan needs to be drafted and implemented.</p> <p>Hartmann's Mountain Zebra (<i>Equus zebra subsp. hartmannae</i>) is one of the species PNR aims to reintroduce. However, it first needs to be established whether the reserve possesses enough suitable habitat to maintain a feasible population.</p> <p>Due to the reserves close proximity to Namaqua National Park, SANParks can be engaged to have PNR form part of their biennial aerial survey. Smaller and more elusive animal species can be monitored through camera trapping.</p>
Invasive Alien Plant Control	<p>The management of invasive alien plant species is a legal requirement on any private property. Most invasive alien plant species on PNR are restricted to riparian areas and homesteads, with <i>Prosopis glandulosa</i> the most common.</p> <p>Although infestations only occur at extremely low densities, an adequate strategic alien clearing plan is required to identify and accordingly manage all alien plants on the property.</p>
Rehabilitation and Erosion Control	<p>Historic grazing practises and poorly maintained road infrastructure has resulted in some large soil erosion systems. Due to the extent of the erosion, treatment and rehabilitation thereof will not be possible through the management authority alone.</p> <p>Since PNR is situated within the core buffer zone of Namaqua National Park, SANParks can possibly be engaged to gain access to their Expanded Public Works funded Biodiversity and Social Projects, to assist with erosion control work. This will in turn also provide temporary job creation opportunities.</p>
Illegal Plant Harvesting	<p>Although no incidents of illegal succulent plant poaching have been recorded on PNR, the occurrence of such activities has started to increase in the Namaqualand area. Regular patrols to look for signs and prevent such activities could be restricted due to limited capacity.</p> <p>Collaboration with local authorities and stakeholders in this regard will assist with reporting and notification of illegal activities, thus limiting effectiveness of potential poachers.</p>

<p>Connectivity and Expansion</p>	<p>Strategically situated within the proposed “Goegap Nature Reserve to Namaqua National Park” corridor The PNR’s location along the N7 and Buffelsrivier bridge could facilitate the movement of large mammal species under the national road while offering the opportunity to improve landscape connectivity.</p> <p>This improved landscape connectivity is however subject to the continued acquisition of suitable properties, landowner willingness, conservation authority capacity and the removal/upgrading of fencing within the proposed corridor.</p>
<p>Grazing and Browsing by Game</p>	<p>Game numbers need to be managed in line with veld condition and carrying capacity. In order to determine optimum game numbers and species, a comprehensive veld condition assessment needs to be carried out.</p>
<p>Infrastructure Management</p>	<p>Although much work has been done to maintain and upgrade the essential infrastructure on the reserve, continual maintenance thereof will be required.</p> <p>Overall condition of border fences is currently good, and needs to be kept in this state as part of existing game management and to allow the possible introduction of new game species.</p> <p>Roads across the reserve require maintenance work to not only improve usage quality, but also to mitigate and control water run-off, which has resulted in erosion networks. Implementation of the above offers the opportunity for temporary job creation.</p>
<p>Monitoring and Baseline Data Collection</p>	<p>Historic data for the properties which make up the PNR is not available. As current capacity for monitoring activities is very limited, stakeholders and institutions such as CREW/SANBI, SANParks and the Department can be engaged to assist in this regard. The PNR also offers possible research and monitoring opportunities to students and academic institutions.</p> <p>The management authority can start with simple data collection, including record keeping of rainfall and game numbers.</p>
<p>Signage, Access Control and Security</p>	<p>Being a private property, access to most of the reserve is limited apart from the servitude road running through the eastern-section.</p> <p>Access can be further controlled through locking gates, maintaining the border fence and installing appropriate signage.</p>

2. STRATEGIC MANAGEMENT FRAMEWORK

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 and objectives of Pleroma Nature Reserve.

2.1 Purpose of Pleroma Nature Reserve

The purpose of the nature reserve is the foundation on which all future actions are based and is in line with the key ecological attributes of the reserve and the overall management philosophy of the management authority. According to Section 17 of the National Environmental Management: Protected Areas Act, the purpose of declaring Protected Areas is to:

- 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.

Purpose

In light of the above, Pleroma Nature Reserve strives to protect South Africa's threatened and rare species through the preservation of landscape driven ecological processes and the rehabilitation of degraded ecosystems.

2.2 Vision of Pleroma Nature Reserve

The vision statement below describes the desired long-term, over-arching outcome that is a result of the effective management of the reserve:

Vision

An ecologically sound Nature Reserve, preserving wilderness characteristics of the unique environment and contributing towards landscape-scale conservation.

2.3 Management Objectives under Key Performance Areas

The objectives are derived from the vision and purpose and are grouped under four Key Performance Areas (KPA's). Tables 2.3.1-4 below set out the key performance areas, the objective for each key performance area, and the key deliverables of each objectives.

In the Annual Plan of Operations, the objectives below are prioritised in terms of importance and urgency and detailed management activities are described that will deliver the desired outcomes under each objective.

Table 2.3.1 Biodiversity Management Objectives and Deliverables

KPA 1: BIODIVERSITY MANAGEMENT		
Objective	Objective Statement	Key Deliverables
Vegetation Management	To ensure the overall conservation of the floral species on Pleroma Nature Reserve by improving understanding of the vegetation types as well as overall veld condition.	<ul style="list-style-type: none"> ▪ Fine scale map of vegetation units with individual management recommendations and guidelines. ▪ Use of erosion control activities and game utilization as management tools to improve vegetation condition and diversity. ▪ Full inventory of plant species, including those of special concern.
Riparian System Management	To conserve and improve the biodiversity and ecosystem function of riparian systems on the reserve.	<ul style="list-style-type: none"> ▪ Monitoring programme identifying threats and changes to riparian systems in the PNR. ▪ Implementation of management activities which will improve the overall health of riparian systems within the PNR. ▪ Monitoring of water extraction from boreholes situated in riparian systems.
Wildlife Management	To improve biodiversity and ecosystem functioning through the effective management of wildlife species.	<ul style="list-style-type: none"> ▪ Wildlife numbers and population health monitored on continual basis. ▪ Up to date species list. ▪ Impact of wildlife on the ecosystem is monitored. ▪ Introduction of indigenous wildlife to the reserve to ensure optimum population functioning. ▪ Reintroduction of historically occurring wildlife species in line with prescribed protocols and best practises.
Alien Invasive Plant Control	To manage alien invasive plants (AIP's) and limit their impacts on biodiversity and ecosystem function.	<ul style="list-style-type: none"> ▪ Clear management strategy detailing the extent of AIP's with applicable control and containment measures. ▪ Eradication of invasive alien plant species through the most effective mechanical, chemical and biocontrol measures. ▪ Effective monitoring to prevent new introductions and inform follow-up operations. ▪ Support invasive alien plant control programmes in the PNR's core buffer zone.
Rehabilitation and Restoration	To identify areas across the reserve showing signs of degradation, and implement suitable and effective control measures where	<ul style="list-style-type: none"> ▪ Clear management strategy in which degradation across the reserve is identified, quantified and adequate, effective control measures prescribed. ▪ Mitigate habitat and biodiversity loss as a direct result of soil degradation.

	required, to improve overall ecosystem function.	<ul style="list-style-type: none"> ▪ Monitoring of degraded sites to measure further degradation, as well as the effectiveness of implemented rehabilitation measures. ▪ Sound relationships with key stakeholders assisting with rehabilitation programmes and activities.
Illegal Harvesting	To control access and prevent the illegal harvesting of flora and fauna from the reserve.	<ul style="list-style-type: none"> ▪ Effective collaboration with local authorities and stakeholders, improving communication of-, and reaction to illegal poaching activities. ▪ Monitor for poaching activities through regular patrols. ▪ Identification of the location of potential target species.
Connectivity and Expansion	To improve landscape ecological patterns and processes through the strategic acquisition of viable properties, increasing the extent and influence of Pleroma Nature Reserve.	<ul style="list-style-type: none"> ▪ Liaison with relevant stakeholders, conservation bodies and neighbouring landowners to identify and discuss expansion opportunities. ▪ Perusal of opportunities which will improve landscape and ecological connectivity.

Table 2.3.2 Sustainable Utilisation of Natural Resources Objectives and Deliverables

KPA 2: SUSTAINABLE UTILISATION OF NATURAL RESOURCES		
Objective	Objective Statement	Key Deliverables
Grazing and Browsing by Game	To effectively monitor and manage the impact of game on natural vegetation, with the aim of ensuring optimal veld condition.	<ul style="list-style-type: none"> ▪ Conduct veld condition assessments to determine optimal carrying capacity. ▪ Game numbers managed according to changing climatic conditions, informed by veld condition assessments. ▪ Monitoring activities recording the effect of game utilization on veld condition.

Table 2.3.3 Socio-economic and Heritage Objectives and Deliverables

KPA 3: SOCIO-ECONOMIC AND HERITAGE		
Objective	Objective Statement	Key Deliverables
Socio-economic Development Initiatives	To contribute towards the improvement of socio-economic circumstances in local communities through the implementation of conservation activities in partnership key stakeholders.	<ul style="list-style-type: none"> ▪ Implementation of conservation orientated poverty relief projects through government and parastatal partnerships. ▪ Employment of workers from local communities when assistance with management activities is required. ▪ Positive relationships with key community role players and groups.
Heritage Features	To preserve heritage features contributing towards the cultural, archaeological and paleontological history of Pleroma Nature Reserve and the Namaqualand district.	<ul style="list-style-type: none"> ▪ Up to date inventory of all heritage features found across PNR, including a map showing the location the location thereof. ▪ Measures in place to conserve the integrity of all archaeological and heritage features on the reserve. ▪ Allow knowledge sharing and consider expert studies to take place upon request.

Table 2.3.4 Management Authority Effectiveness Objectives and Deliverables

KPA 4: MANAGEMENT AUTHORITY EFFECTIVENESS		
Objective	Objective Statement	Key Deliverables
Legal Compliance	To ensure compliance with all legal requirements applicable to the Nature Reserve.	<ul style="list-style-type: none"> ▪ All future developments meet the requirements of the National Environmental Management Act (NEMA). ▪ Adherence to the Norms and Standards for the inclusion of Private Nature Reserves in the Register of Protected Areas in South Africa. ▪ Overall compliance with applicable legislation. ▪ All declaration documents submitted and up-to-date.
Infrastructure and Equipment	Procurement and maintenance of equipment and infrastructure essential to continually ensuring productive and effective	<ul style="list-style-type: none"> ▪ All infrastructure and equipment essential to the management of the PNR is in place. ▪ Equipment is serviced on a regular basis to ensure safe and cost effective implementation of management activities.

	implementation of management activities on Pleroma Nature Reserve.	<ul style="list-style-type: none"> ▪ Maintenance schedule is followed to ensure continued functioning of essential infrastructure
Stakeholder Engagement	Sound partnerships with all applicable stakeholders to ensure the effective management of Pleroma Nature Reserve.	<ul style="list-style-type: none"> ▪ All possible stakeholders are identified which can assist with achieving the goals and objectives of the PNR. ▪ Maintain open and effective communication lines with stakeholders.
Security and Access Control	To ensure improved safety of the natural resources of Pleroma Nature Reserve, through adequate and effective access control and security measures.	<ul style="list-style-type: none"> ▪ Identify possible threats and implement required mitigating activities. ▪ Ensure access to the PNR is restricted through marked entrance gates, while remaining gates are locked to prevent unauthorized access. ▪ Boundary fence maintained in proper working order at all times.
Financial Management	To ensure sufficient funds are available and accurately managed, in order to implement the strategic management plan.	<ul style="list-style-type: none"> ▪ Sufficient funding available to implement the APO. ▪ Financial management systems in place to ensure budgets are effectively and accurately managed.
Monitoring and Evaluation	To adapt, inform and evaluate the management strategy through monitoring and data collection activities, thus ensuring the continued effective functioning of Pleroma Nature Reserve.	<ul style="list-style-type: none"> ▪ Liaison with key stakeholders to assist with implementing monitoring activities and capturing data. ▪ Collected data is evaluated and areas of concern identified. ▪ Management practises and strategy are adapted accordingly.
Management Effectiveness and Reporting	To implement an adaptive management strategy by using findings from monitoring activities and annual audits to inform and update the annual plan of operations and revise the strategic management plan.	<ul style="list-style-type: none"> ▪ Continual monitoring of management outcomes. ▪ APO reviewed on an annual basis, informed by audit findings. ▪ Strategic management plan revised on a five-year basis.

3. DESCRIPTION OF PLEROMA NATURE RESERVE

3.1 Legislative basis for the management of Pleroma Nature Reserve

There is a large body of legislation that is relevant to the management of Pleroma Nature Reserve, but the primary legislation guiding the management of protected areas, is the National Environmental Management: Protected Areas Act (No.57 of 2003) (Hereafter referred to as the Act).

The Act establishes the legal basis for the creation and administration of protected areas in South Africa, as its objectives include provisions “for the protection and conservation of ecologically viable areas representative of South Africa’s biological diversity and its natural landscapes”. The Act sets out the mechanisms for the declaration of protected areas and the requirements for their management.

In the Northern Cape, the Department of Agriculture, Environmental Affairs, Rural Development and Land Reform is the Provincial Conservation Authority and its Biodiversity Stewardship Programme facilitates the establishment and management of protected areas on private land.

A detailed list of relevant legislation is provided in Appendix A. Landowners should familiarize themselves with the purpose and contents of the statutes and their subsequent amendments and regulations.

3.1.1 Proclamation status of the Pleroma Nature Reserve

Pleroma Nature Reserve is proclaimed under Section 23 (1) of the National Environmental Management: Protected Areas Act (Act 57 of 2003). See Appendix B for copy of the Pleroma Nature Reserve Proclamation Notice.

3.1.2 Invasive species control in terms of the Biodiversity Act

In terms of Section 76 of the National Environmental Management: Biodiversity Act (No.10 of 2004), the management authority of a protected area must incorporate an invasive species control plan in the protected area management plan. This is addressed in Sections 6 and 8 of this management plan.

3.2 Regional and local planning context of Pleroma Nature Reserve

3.2.1 The protected area expansion strategy and implementation plan

The Protected Area Expansion Strategy and Implementation Plan is a response to the National Protected Area Expansion Strategy (NPAES) (SANBI & DEAT, 2010) which calls on provinces to develop implementation plans in support of the NPAES and in support of provincial conservation efforts and priorities. The NPAES, which provides a broad national framework for Protected Area expansion in South Africa, also identifies areas of importance to be targeted for Protected Area expansion in the country, and mechanisms to achieve this.

The Northern Cape Protected Area Expansion Strategy (NCPAES) addresses the formal proclamation of priority natural habitats as protected areas to secure biodiversity and ecosystem services for future generations. This strategy is aligned to the concepts and goals of the National Protected Areas Expansion Strategy (NPAES).

Pleroma Nature Reserve is situated in the 'Namaqua National Park and Coastal Focus Area', as included in the NCPAES, and could possibly form an important link within the 'Goegap to Melkrivier' expansion corridor. This area has also been identified as a priority, by the LHSKT. A section of the Pleroma Nature Reserve is furthermore classified as a Category 1 – Critical Biodiversity Area. This classification is mainly due to high levels endemic succulent diversity, its inclusion of the priority Buffelsrivier riparian corridor, and the key role it plays in the persistence and functioning of the ecosystem (Figure 3.2.1).

Table 3.2.1 Critical Biodiversity Areas in Pleroma Nature Reserve

Critical Biodiversity Area Category (CBA)	Hectares	Surface Area %
CBA1	849.66	16%
CBA2	4 322.98	84%
Total	5 172.64	

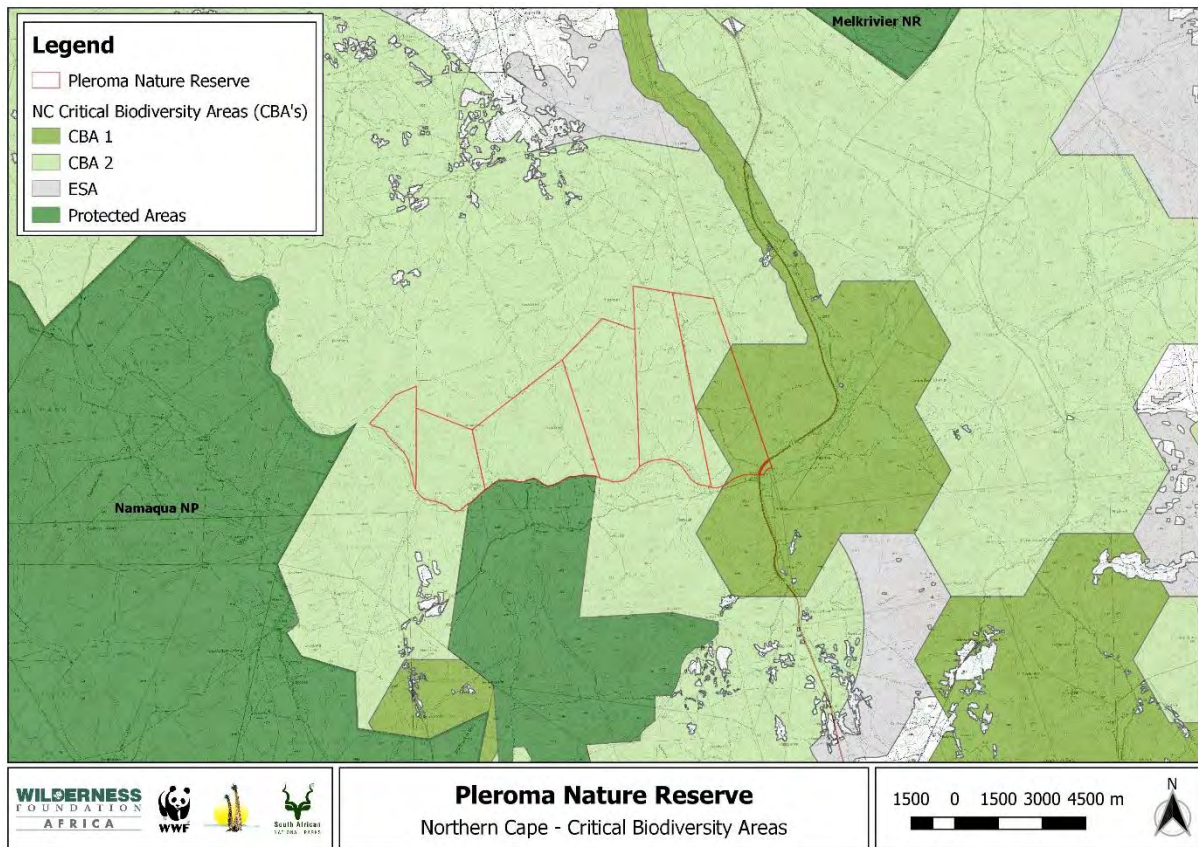


Figure 3.2.1 Critical Biodiversity Area Map for the Pleroma Nature Reserve

3.3 History of Pleroma Nature Reserve

Pleroma Nature Reserve is situated in a broad geographical area known as Namaqualand, which roughly stretches from the Orange River in the north, to Vanrhynsdorp in the south.

Namaqualand has a long history of agriculture which dates back more than 2000 years, when the nomadic Khoekhoen people first entered the area with small herds of livestock (Webly, 1992). In the mid-18th century, colonial farmers started moving in, which resulted in more intensive grazing, and other agricultural practices including tillage for the cultivation of grains (Rhode, 2008). Evidence of historically cultivated lands are still visible in places on PNR, even though they have not been ploughed since 2005. During the 1950's and 1960's, through the assistance of state subsidies, land owners started to fence off their properties in an attempt to control problem causing predators. This had an impact on many of the smaller farmers. Before fencing was introduced, geographical "markers" such as riverbeds and ridges were used to demarcate grazing borders, however the introduction of new hard borders, through fencing, resulted in the loss of rangeland in some cases, specifically having an impact on the smaller farmers and in turn resulting in increased grazing pressures. A large number of commercial farmers still practice transhumance, moving their livestock to the Bushmanland during the summer months, simulating historic natural grazing patterns.

In January 2016, Elsie Van Tonder purchased portions 342/4, 342/7 of the farm Koornhuis 342, and in October later that year, portions 342/19 and 342/20. Two years later, Koos Van der Lende, purchased portions 342/16 and 342/17 of the same parent farm, Koornhuis 342. Collectively these properties are now known as Pleroma, with all six portions managed jointly as one Nature Reserve. Since purchase,

all agricultural practices have ceased on the properties, and certain conservation activities were already implemented, before declaration as a Nature Reserve. This included the removal of all internal fences across the six properties to promote the movement of game, provision of water points for wildlife, as well as localized soil erosion- and alien plant control.

3.4 Ecological Context of Pleroma Nature Reserve

3.4.1 Climate and Weather

The PNR falls under the winter rainfall area of the Northern Cape, within the Namaqualand Hardeveld Bioregion (Mucina et al, 2006). Predictable winter rainfall, from May to September, ranges between 100 – 160 mm per annum, driven by cold fronts off the coast (Cowling et. al, 1999). Dew occurs throughout the winter, and contributes towards the annual precipitation (Mucina et. al, 2006).

Due to the regions' close proximity to the Atlantic Ocean and cold Benguela current, temperatures remain relatively moderate throughout the year (Desmet & Cowling, 1999). Summers are warm and dry with an average maximum temperature of 30°C. Winters are cold and wet with an average minimum temperature of 5°C (Mucina et. al, 2006). Temperatures can however increase significantly when warm easterly winds blow from the inland plateau, with recordings of up to 40°C (Cowling et. al, 1999).

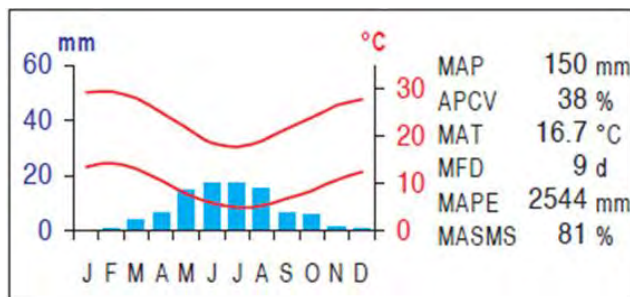


Figure 3.4.1.1 Climate diagram for the Namaqualand Hardeveld Bioregion (Mucina et. al. 2006)

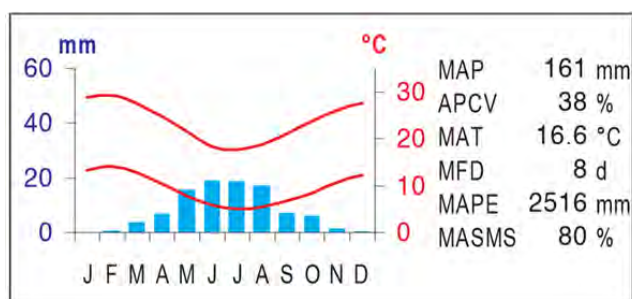


Figure 3.4.1.2 Climate diagram for SKn1 - Namaqualand Klipkoppe Shrubland (Mucina et. al. 2006)

[MAP = Mean Annual Precipitation; APCV = Annual Precipitation Coefficient of Variance; MAT = Mean Annual Temperature; MFD = Mean Frost Days; MAPE = Mean Annual Potential Evaporation; MASMS = Mean Annual Soil Moisture]

3.4.2 Topography, geology & soils

The Pleroma Nature Reserve falls within the Namaqualand Metamorphic Complex, with an underlying geology consisting of highly deformed and metamorphosed granite-gneiss and other sedimentary and volcanic rocks (Watkeys, 1999).

The topography of the PNR landscape is mostly made up of rocky slopes with varying gradients. Rock domes and sheets characteristic of the Hardeveld occur throughout, with Kamieskroon Gneiss the dominant geology type. (Mucina et. al, 2006) (Figure 3.4.2.1).

The formation of soils is slow, and they are thus coarse in texture. Soils are well drained, however, due to low clay and organic material content, have poor moisture retention (Watkeys 1999).

The PNR falls within two main land types namely, IB124 and IB127, which mostly consist of rock (60 – 80%) with the remaining substrate made up of mixed soil types (Figure 3.4.2.2) (Mucina et. al 2006).

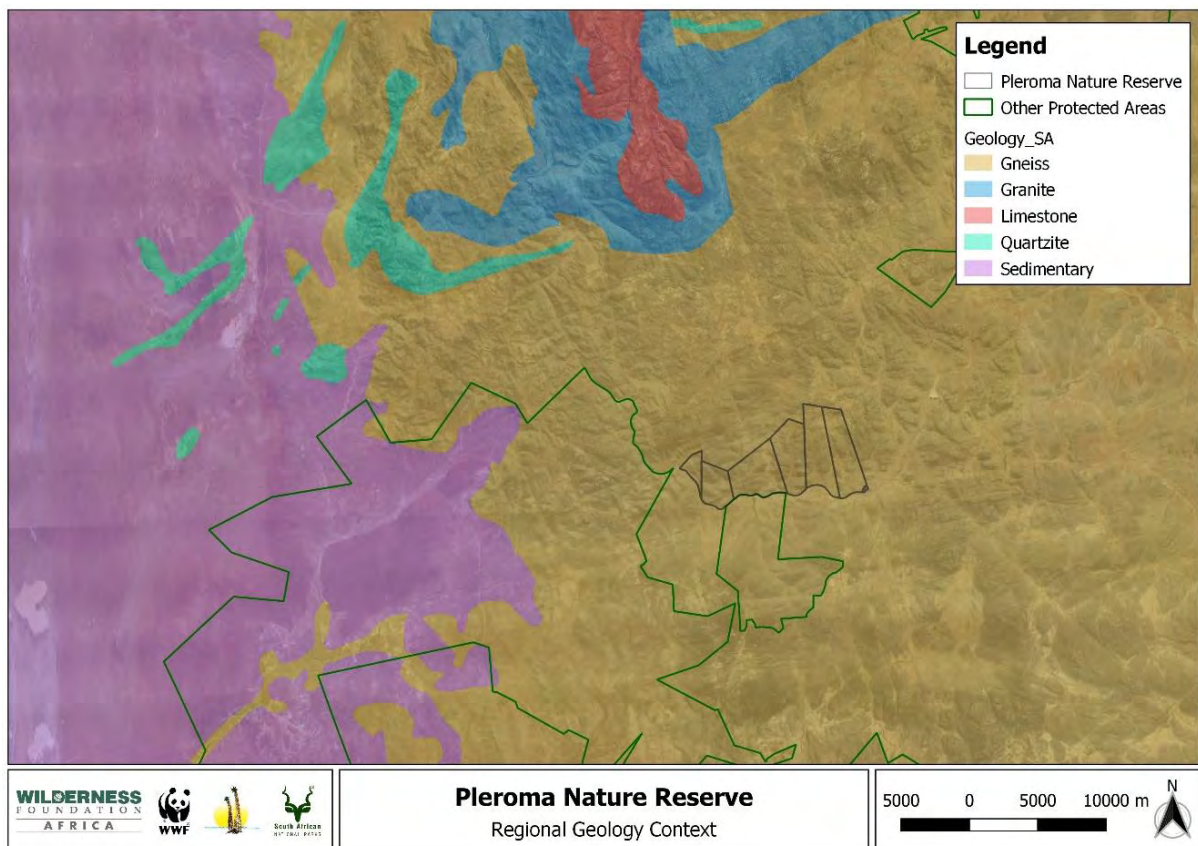


Figure 3.4.2.1 Map showing the regional geology of the Pleroma Nature Reserve

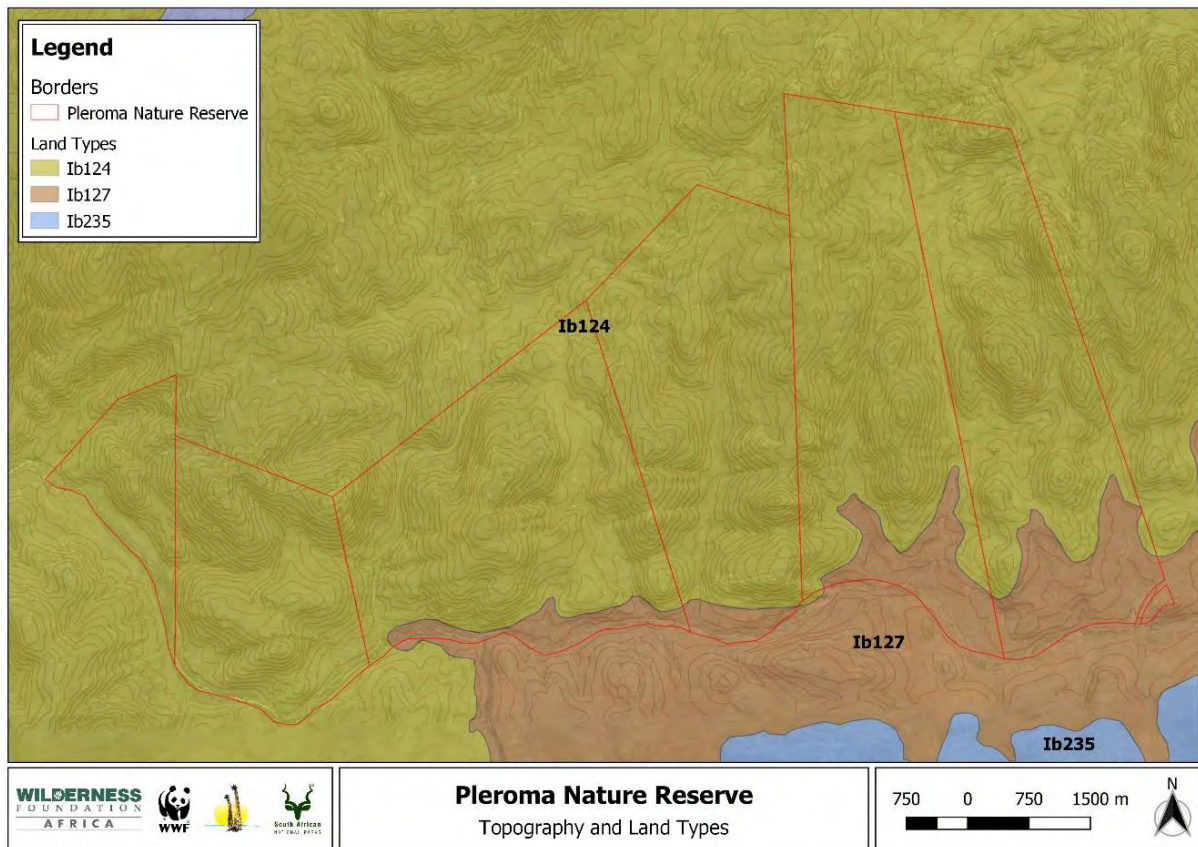


Figure 3.4.2.2 Topography and Land Type map the for Pleroma Nature Reserve

3.4.3 Soil interfaces

Where two soil types meet there is often a “tension zone”. Different soils support different vegetation types and the meeting point is known as an ecotone. The vegetation here is often a unique combination of both parent types. These ecotones are biologically important because they are often areas of active speciation. For this reason, disturbance in this zone must be avoided, and rehabilitation thereof encouraged.

Edaphic interfaces occur on the Pleroma Nature Reserve where deeper loamy soils meet with shallow lithosols, below granite-gneiss outcrops and sheets. Where these soil types meet there is often unique speciation and biodiversity to be found. These areas are, however, susceptible to erosion, and thus the rehabilitation and management thereof will be seen as priority.

3.4.4 Hydrology

The hydrological importance of the PNR in the landscape is highlighted by the four sub-quaternary catchment areas in which it occurs (Figure 3.4.4). These four catchments (nos. 4823, 4781, 4891 & 4684), are all listed as category 4 National Freshwater Ecosystem Priority Areas (NFEPA’s). Category 4 NFEPA’s are ‘upstream management’ areas, and have been identified as strategic priorities for the conservation and management of freshwater ecosystems and associated biodiversity.

The PNR falls within the Coastal Orange sub Water Management Area (WMA 43) as part of the larger, Lower Orange Water Management Area (WMA 6). A network of small ephemeral rivers and drainage

systems occur across the landscape. These usually flow when good winter rains are experienced, and drain into larger rivers which eventually flow into the Atlantic Ocean. Two main rivers flow through the PNR, namely the Koringhuis and Buffelsrivier, with their confluence also situated within the reserves boundaries. The Buffelsrivier, which forms the PNR’s southern boundary is listed as a SKEP priority river corridor.

These drainage channels and ephemeral river beds do not only support a diversity of plant species, but also serve as corridors for species movement, with the Buffelsrivier, which forms the border between PNR and Namaqua National Park, of extreme importance in this context. During dry summer months’ dry river beds also serve as a refuge, in terms of shade, food and water. Animals, such as Gemsbok, dig holes in the riverbed which fill up as water seeps in from below. These natural waterholes’ or “gorras”, serve as an important source of hydration during dry seasons.

Numerous external factors further up and downstream threaten the riparian ecosystems of the Buffelsrivier. These include:

- Modifications such as small dams and weirs.
- Siltation due to ploughing of lands in catchments and decreased plant cover.
- Sand and diamond mining.
- Excessive water extraction through boreholes.
- Removal of riparian vegetation through harvesting of wood (*Vachellia karroo*), and overgrazing.
- Invasive Alien Plant infestations.

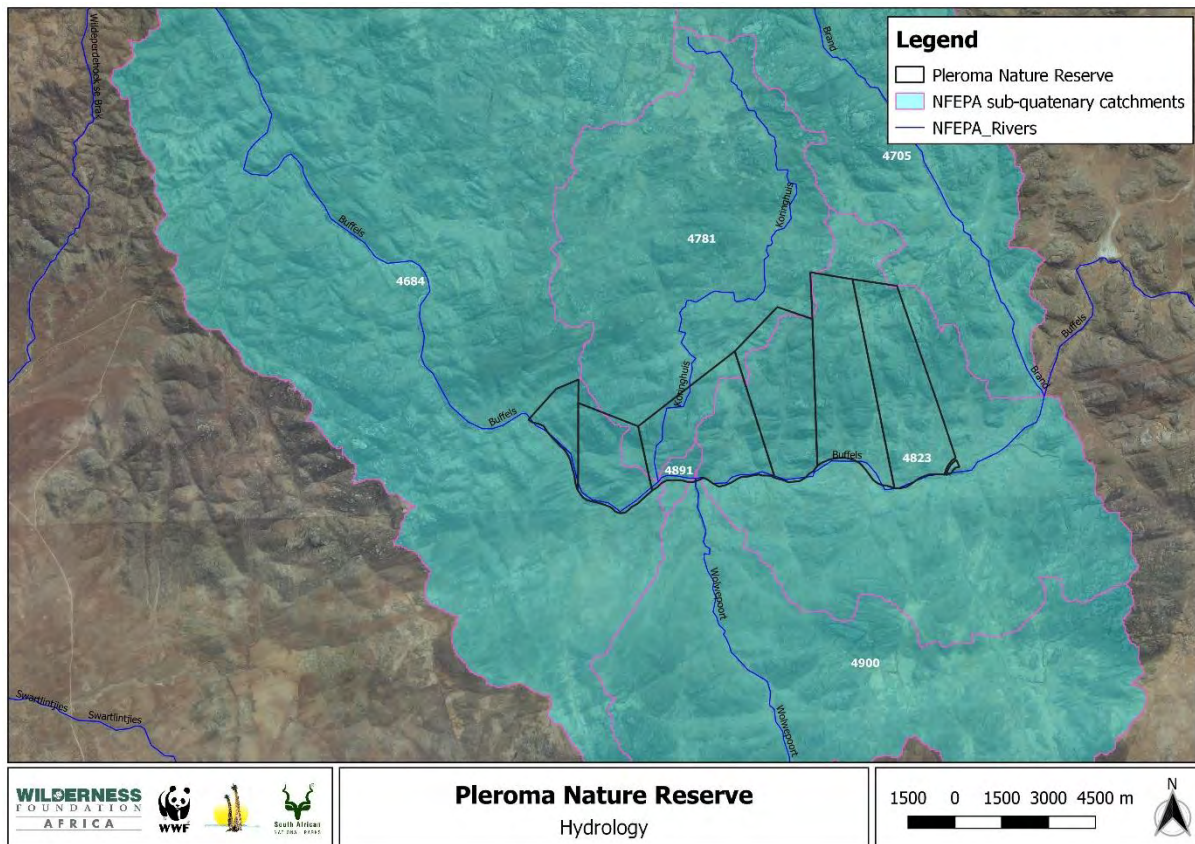


Figure 3.4.4 Hydrology of Pleroma Nature Reserve

3.4.5 Vegetation

The Pleroma Nature Reserve is found in the Namaqualand Hardeveld Bioregion of the Succulent Karoo. This winter rainfall area with hot dry summers and cold wet winters is mostly mountainous and hilly with massif rounded granite-gneiss domes (Figure 3.4.5.1), that weather into large boulders with Namaqualand Klipkoppe Shrubland vegetation. In between are valleys and plains, the topography becomes slightly undulating, to flat with deep loamy sand where Namaqualand Klipkoppe Shrubland and Namaqualand Blomveld vegetation occurs. Dry intermittent water courses and rivers are also found here. These valleys produce spectacular spring flower displays. Old abandoned wheat fields will often give a mass, colourful flower display, consisting only of one to two or three annual species, while on the undisturbed plains, flower displays are much more varied with many species of annuals, as well as perennials, together creating a kaleidoscope of colours.

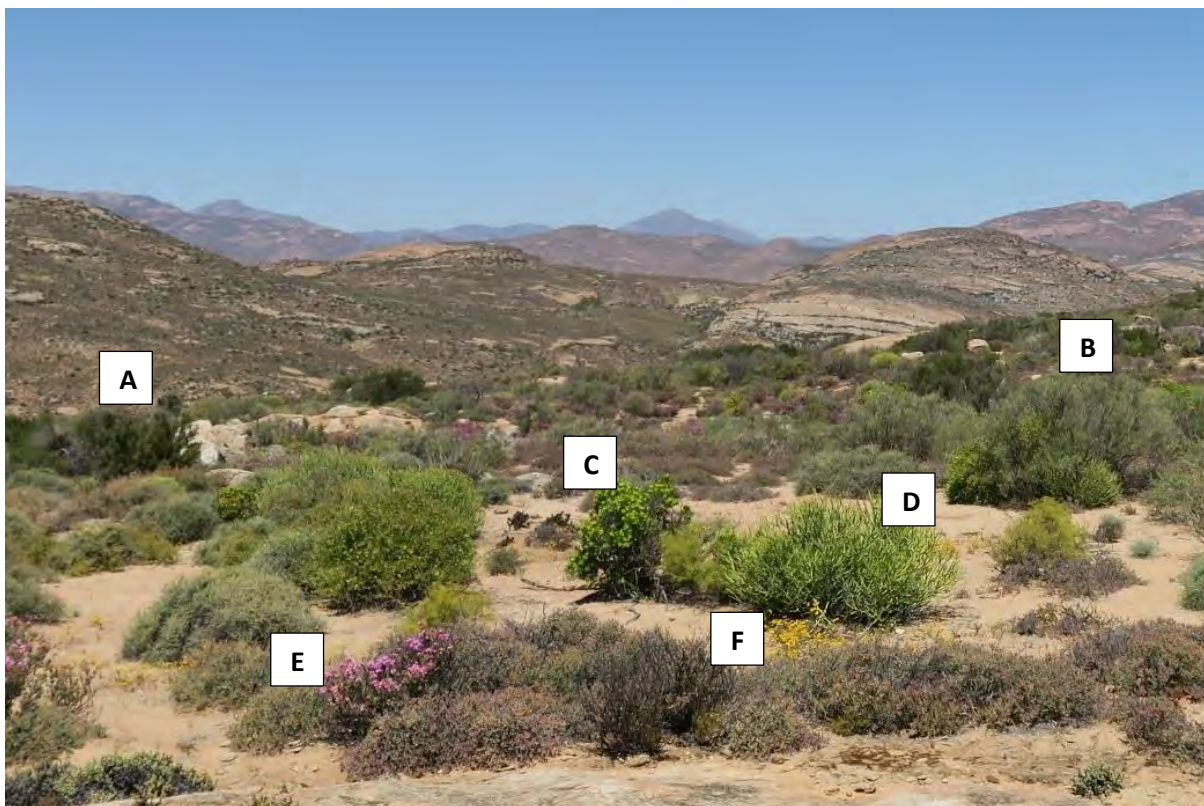


Figure 3.4.5.1 Landscape on PNR supporting Namaqualand Klipkoppe Shrubland. (Photo: A. le Roux) **A:** taaibos (*Searsia undulata*); **B:** fluitjiesbos (*Calobota sericea*); **C:** perdebos (*Didelta spinosa*); **D:** gifmelkbos (*Euphorbia mauritanica*); **E:** t'nouroe-bos (*Ruschia elineata*); **F:** kleinknoppies-stinkkruid (*Oncosiphon suffruticosus*)

According to the South African National Biodiversity Institute Vegetation Map (2006 - 2018), only Namaqualand Klipkoppe Shrubland (SKn1) is found on PNR (Figure 3.4.5.2). However, looking at it on a finer scale, Namaqualand Blomveld (SKn3) and Namaqualand Riviere (AZi1) can also be found on the Reserve. Figure 3.4.5.3 identifies the various vegetation types found across the PNR. Habitats were visualised using at 1:50000 scale using a combination of Google (2018) and ESRI satellite (ARCGIS) world imagery. However, it should be noted that this is a draft map, and further ground truthing is required to accurately delineate the extent of these vegetation units. This will form part of the proposed management intervention identified in Section 6.1.1 of this Management Plan.

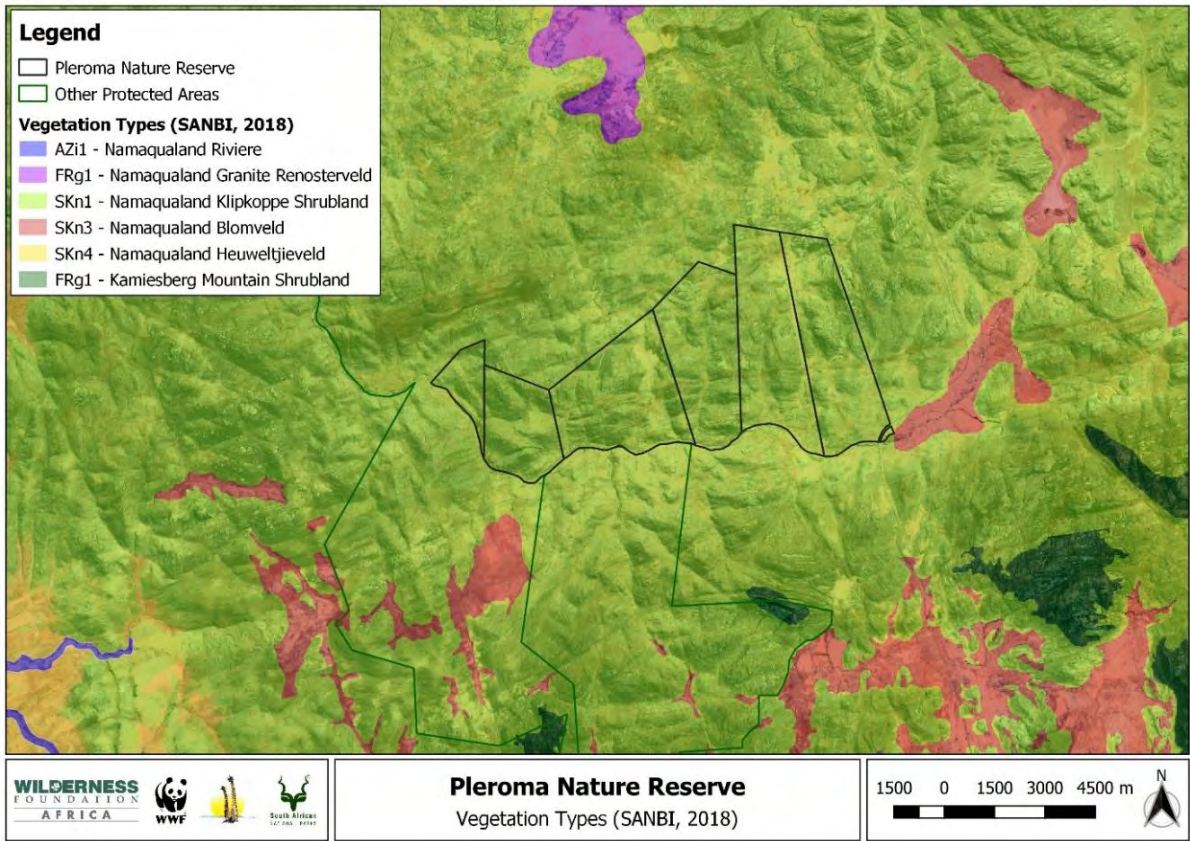


Figure 3.4.5.2 Regional vegetation map of Pleroma Nature Reserve (SANBI, 2018).

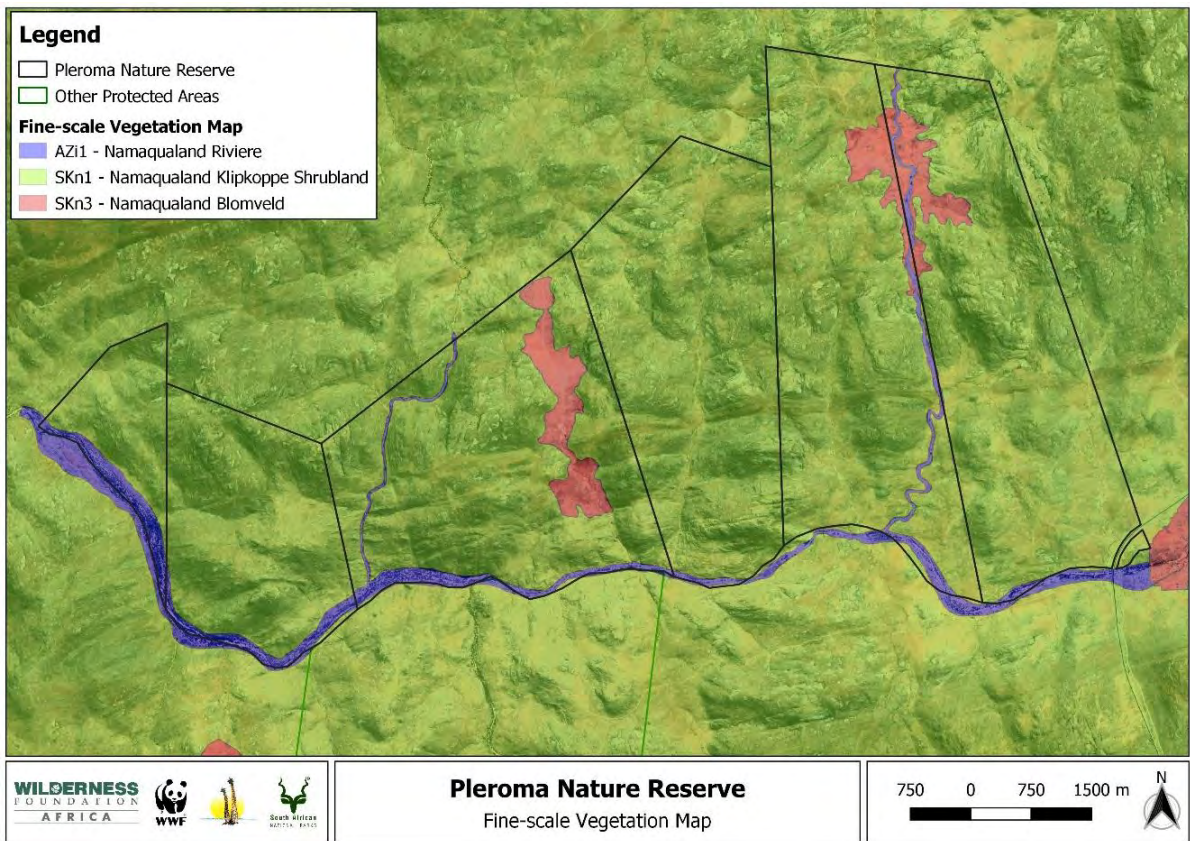


Figure 3.4.5.3 Preliminary fine scale vegetation map of the Pleroma Nature Reserve (de Beer, 2020).

SKn1 - Namaqualand Klipkoppe Shrubland

Trees occur between larger rocks or boulders on the steeper slopes, like kokerboom (*Aloidendron dichotomum*), witgat (*Boscia albitrunca*), and kliphout, t'ôrrieboom (*Ozoroa dispar*) (Figure 3.4.5.4).



Figure 3.4.5.4 Trees (Left - witgat, *Boscia albitrunca* and right - kokerboom, *Aloidendron dichotomum*) in between larger rocks. (Photo: A. le Roux)

Shrubs of up to 1.5 m high are found on slopes of the mountains and steep hills. They vary from evergreen shrubs (up to 1.5 m high) such as taaibos (*Searsia undulata*), kalwertaibos (*Searsia incisa* var. *effusa*), bloubos (*Antizoma miersiana*), t'koeoebe of jakkalsbessie (*Diospyros ramulosa*) and jeukbos (*Hermannia disermifolia*), to shorter evergreen shrubs up to like kapokbos (*Eriocephalus brevifolius*), gifmelkbos (*Euphorbia mauritanica*) and t'nouroe-bosse or vygie-bosse. Deciduous shrubs up to 1m high include perdebos (*Dideleta spinosa*), fluitjiesbos (*Calobota sericea*), skaapbos (*Osteospermum oppositifolium*) (Figure 3.4.5.1). The deciduous shrubs tend to be more palatable, whether in their green state or when leaves have dried during the summer months.

Domes or rock sheets on the slopes of the mountains are usually flat to almost flat and have much smaller succulents including, *Conophytum pagaeae*, *Conophytum roodiae* subsp. *cylindratum*, *Crassula hirtipes*, *Crassula brevifolia*, *Schlechteranthus albiflorus*, pêpê-bos, (*Cotyledon orbiculata*), boesmankers (*Monsonia crassicaulis*), sifkopkandelaar (*Tylecodon reticulatus*) and krimpsiek (*Tylecodon wallichii*) (Figure 3.4.5.5).

On the lower slopes or foothills of the mountains moving into the valleys, the shrubs become shorter with species like t'noutsiamia (*Cheiridopsis denticulata*), skaapbos (*Osteospermum sinuatum*), broodbos (*Hermannia trifurca*) and t'nouroeboos (*Leipoldtia schultzei*) (Figure 3.4.5.6).



Figure 3.4.5.5 Vegetation on the flatter areas of domes or rock sheets on the mountain slopes.
(Photo: A. le Roux)

SKn3 - Namaqualand Blomveld

In the more level to slightly undulating landscape in the valleys, Namaqualand Blomveld (Figure 3.4.5.6) represents the more spectacular flower displays that Namaqualand is known for. For large areas in this vegetation unit, these flower displays are found on historic, abandoned wheat fields and are usually a mass of one or two annual species of one or two colours as well as kraalbos (*Galenia africana*). These fields of annuals usually consist of galsiekslaai (*Aizoon canariense*), soetgousblom (*Arctotheca calendula*), jakalsblom or more commonly known as the Namakwaland daisy (*Dimorphotheca sinuate*), kougoed (*Gazania lichtensteinii*), pietsnot (*Grielum humifusum*), teesbossie (*Leysera tenella*), hongerblom (*Senecio arenarius*) and *Ursinia nana*. Kraalbos is the dominant and sometimes only perennial shrub found on abandoned fields amongst the annual flowers. The annual species tend to be very nutritious and sought after by animals, both domestic and wild, even in the dry, dead state of the plant and is preferred for grazing by livestock. Perennial species that might germinate and are palatable, are usually grazed completely to the ground and thus never given a chance to mature into shrubs. In these areas kraalbos, a poisonous plant, is avoided by animals and thus becomes the only shrub to survive on abandoned fields.

However, undisturbed areas represent other plant communities with fyn t'nouroebos (*Drosanthemum hispidum*), beslyn (*Galenia sarcophylla*), haassuring (*Hypertelis salsoloides*), viooltjie (*Aptosimum indivisum*), t'nouroe-bos (*Leipoldtia schultzei*), swartstamvy (*Ruschia robusta*) and donkiebos (*Aridaria noctiflora*).



Figure 3.4.5.6 Lower slopes or foothills of the mountains of Namaqualand Shrublands with skaapbos (*Osteospermum sinuatum*) and t'nourou-bos (*Leipoldtia schulzei*) in flower in the foreground and Namaqualand Blomveld in the valley in the middle. (Photo: A. le Roux)

Azi 1 - Namaqualand Riviere

The Buffelsrivier, one of the main rivers in Namaqualand, is found on the southern boundary of the Pleroma Nature Reserve (Figure 3.4.5.3). The Buffelsrivier is also the northern boundary of the Namaqua National Park, and thus links the Pleroma Nature Reserve with the National Park. Because of the sporadic flow of the Buffelsrivier, the soet-doring (*Vachellia karroo*), is dominant in the river bed. Other typical species found along the dry watercourses are inkbos (*Suaeda fruticosa*), soetdoringbos (*Codon royenii*), kraalbos (*Galenia africana*), and kriedoring (*Lycium amoenum*)

Unfortunately, this vegetation unit is susceptible to alien invasive species such as Jantwak (*Nicotiana glauca*) and mesquite (*Prosopis glandulosa*), which can be found in dense stands. Other common invasive alien plant species are the kasterolieboom or castor oil bean (*Ricinus communis*), thorn apple or moon flower (*Datura inoxia*) and the bloudissel or Mexican poppy (*Argemone ochroleuca*).

The annuals soetgousblom (*Arctotheca calendula*), large and small knoppiesstinkkruid (*Oncosiphon grandiflorus* and *O. suffruticosus*) also often occur here.

3.4.6 Fire regime

Pleroma Nature Reserve is not situated within a fire driven ecosystem. The relatively low rainfall experienced in the Succulent Karoo results in limited and sparsely spread plant material. Natural veld fires are thus uncommon. However, in the summer months' fires can occur during thunder storms as a result of lightning, especially at higher altitudes with denser plant cover. The impact of these fires is localised, and only affects a small area. In the case that a fire does occur, steps will be taken and measures put in place to ensure minimal disturbance, and allow the vegetation to re-establish.

3.4.7 Invasive species

The harsh arid environment in which PNR is situated, only allows for the survival of highly specialized plant and animal species which are specifically adapted to the extreme climatic conditions experienced in the region. Thus, only highly competitive alien invasive species are able to come from outside the system to successfully survive, propagate and colonise. In comparison with high rainfall regions such as the Western Cape, Eastern Cape and Kwa-Zulu Natal, the PNR and Namaqualand, as a whole, are not as susceptible to high density alien plant infestations.

A variety of invasive plant species occur on Pleroma Nature Reserve, although not in high densities. This includes species such as *Schinus molle*, *Atriplex nummularia*, *Nicotiana glauca* and *Prosopis glandulosa*, which mostly occur around the old farm homesteads, -kraals and riparian areas such as the Buffelsrivier and other drainage channels. It should, however, be noted that not all the species listed above have the potential to become invasive, with *Prosopis glandulosa* and *Atriplex nummularia* in riparian zones the most notable risk.

The status of all invasive alien species on PNR will be evaluated and prioritised, as part of an Invasive Alien Species Control Plan, with control measures allocated accordingly.

3.4.8 Mammals

Namaqualand and the Succulent Karoo as a whole, host a variety mammal species, with Pleroma Nature Reserve no exception. Small mammals, especially, often play an important role in most arid and semi-arid environments (Van Den Venter & Nel, 2006).

In 2002, The Succulent Karoo Ecosystem Programme (SKEP) released a regional 'expert map'/ database, which describes and presents priority conservation areas for mammal, bird, amphibian, reptile, insect and invertebrate groups in the Succulent Karoo. Pleroma Nature Reserve falls within the Namaqualand priority area (group mg9), for the possible distribution of an endemic mole rat species.

Larger herbivores such as klipspringer (*Oreotragus oreotragus*), steenbok (*Raphicerus campestris*) gemsbok (*Oryx gazella*), springbok (*Antidorcas marsupialis*) and common duiker (*Sylvicapra grimmia*) occur naturally across PNR, while kudu (*Tragelaphus strepsiceros*) have also been recorded moving seasonally through the Reserve. Other mammal species recorded on PNR include leopard (*Panthera pardus*), african wild cat (*Felis lybica*), caracal (*Felis caracal*), honey badger (*Mellivora capensis*), porcupine (*Hystrix africae australis*), aardvark (*Orycteropus afer*), black-backed jackal (*Canis mesomelas*), bat-eared fox (*Otocyon megalotis*), chacma baboon (*Papio ursinus*), rock hyrax (*Procavia capensis*), cape grey mongoose (*Galerella pulverulenta*) and yellow mongoose (*Cynictis penicillata*)

Although a comprehensive inventory for the fauna of Pleroma Nature Reserve is not yet in place, species lists can be obtained for specific loci from the FitzPatrick Institute of African Ornithology's, Virtual Museum. See Appendix C for locus 2917DD's mammal list, in which PNR is situated. As part of the management outcomes a PNR, specific species lists will be developed through sightings and recordings captured by camera traps used on the reserve.

3.4.9 Avifauna

The 'South African Bird Atlas Project' (SABAP) possesses a coverage map made up of geographical "pentads". These pentads are 5-minute by 5-minute coordinate grids which are overlain across Southern Africa, and contain records of bird species which have previously been identified in a specific pentad.

Pleroma Nature Reserve falls within two pentads, namely 2955_1740 and 2955_1750, with the following recorded in these areas:

- 61 Different bird species of which:
- 1 Endemic to South Africa
- 14 Near endemic to South Africa
- 1 Endemic to South Africa, Lesotho and Swaziland

Although the pentads do not completely overlap PNR, all species listed should occur across the Reserve, as habitat types are fairly homogeneous throughout. It should thus be noted that the bird list for PNR (Appendix C) is not complete, and records will be added as sightings occur.

3.4.10 Herpetofauna & Invertebrates

Namaqualand, as part of the Succulent Karoo, is known worldwide for both its reptile and insect diversity, with many species endemic to the area (Desmet, 2007).

Pleroma Nature Reserve falls within the known distribution of numerous endemic reptile species, such as the speckled padloper (*Homopus signatus signatus*), Namaqualand-tent tortoise (*Psammobates tentorius tremeni*) and the Many-horned adder (*Bitis cornuta*). SKEP's expert database for priority conservation areas also indicates that PNR overlaps with their insect priority map, as a possible local centre for endemism and diversity. Future fine scale mapping and data collection could possibly result in the inclusion of DWNR in various other databases, for use in conservation planning.

Although a complete fine scale record of insects, amphibians and reptiles is not yet available for PNR species lists can be obtained for the locus in which PNR is situated from the FitzPatrick Institute of African Ornithology's, Virtual Museum (Appendix C). Partnerships with academic and conservation organizations will be pursued in order to assist with the compilation of specie lists and other natural resource inventories.

3.5 Cultural Heritage Context of Pleroma Nature Reserve (Namaqualand)

Namaqualand has a rich cultural heritage dating back thousands of years to the first Holocene period, when the San hunter-gatherers occupied the area. About 2000 years ago, Nama speaking KhoeKhoen pastoralists migrated from the north (Webley 1992, Orton 2012). Although it is thought that the KhoeKhoen pastoralists mostly stayed in the Kamiesberge, they would seasonally move their livestock between the “sandveld” and western Bushmanland. Through this movement they would have in all likelihood come in contact with the hunter gatherers along the coast.

Evidence of these early inhabitants is visible across the landscape, with the Spoegrivier caves perhaps the most well-known. After archaeological excavations, bones were discovered which now serve as the oldest proof of domesticated sheep in South Africa (Orton, 2012).

While, expeditions for minerals such as gold and copper were already being led into the area since the 16th century by the Cape Colony, the first commercial mining practices only started in mid-18th century. This also coincided with the arrival of the first “trekboere”. Towns such as Springbok, Okiep and Port Nolloth were established directly as a result of mining activities, while mission stations resulted in smaller towns such as Leliefontein and Soebatsfontein.

As previously mentioned, all six portions of Pleroma Nature Reserve are subdivisions of the original farm, Koornhuis. Two of the subdivisions were known as Brakkies and Arregas. According to Burger (1986), the name Koornhuis is the original Dutch adaption of the Nama word “!Uri-/uis” pronounced “Kuri Kuis”, which roughly translates to ‘white rock’ or “white mountain”, and possibly refers to the numerous quartz outcrops found across the original farm extent. Today Koornhuis, has mostly been replaced by the Afrikaans pronunciation “Koringhuis”. “Koring” meaning wheat, however, has nothing to do with the original farm name, even though small scale planting of the crop still occurs in the region.

The name of the subdivision Brakkies, in all likelihood refers to the quality of the water which was found in springs and fountains on the farm, with “Brak” meaning brackish or salty. The superlative “ies”, which was added to “brak”, implies a smaller size, possibly referring to the extent of the subdivision. Unfortunately, no information could be obtained on the meaning of “Arregas”. Ruins of the historical homesteads of the farms are still visible on parts of Pleroma Nature Reserve.

3.6 Socio-Economic Context

Pleroma Nature Reserve is situated within the Nama Khoi local municipality, which is the largest municipal area under the Namaqua District. The main economical drivers in the area include agriculture (both commercial and subsistence livestock farming), mining (heavy metals and diamonds), and tourism which is mostly driven by the seasonal flower displays in the area.

Results from a local community survey conducted in 2016, shows the following figures for the Nama Khoi local municipality:

- Total population of 46 513 people
- Only 39% of the local population is permanently employed and economically active
- Unemployment rate of 12%
- Average annual income per household is R29,400.00

The Biodiversity Sector Plan (2008) for the Namakwa District Municipality, states that the socio-economic wellbeing of the district will profit more from conservation than mining activities. This statement was made due to the temporary and volatile nature of the mining industry, as well as its impact on the natural ecosystems and biodiversity of the area. The protection of key biodiversity areas, such as the Pleroma Nature Reserve, will contribute towards the local economy through possible tourism and temporary employment opportunities.

Pleroma Nature Reserve contributes to at least two of the goals listed in the Nama Khoi - Spatial Development Framework (2014):

Goal # 3: To explore new economic and development opportunities and ventures, and to encourage and support local economic development and job creation strategies.

Goal # 7: To improve the management and conservation of the pristine natural environment and agricultural land for tourism, local opportunities and for future generations (the sound, holistic management approach implemented in the PNR will ensure conservation of the area).

Section 1.5 of the management plan describes the values of Pleroma Nature Reserve, one of which is socio-economic values. PNR plans to contribute through:

- Job creation opportunities through possible rehabilitation, alien clearing and fencing projects.
- Temporary employment opportunities to assist the management authority with certain management activities.

4. ZONATION PLAN

The aim of the Pleroma Nature Reserve zonation plan is to provide spatial guidelines which inform the various management and usage activities which can take place within the Nature Reserve, while ensuring that these activities do not contradict each other, or the values of the PNR. It is, furthermore, also a requirement of the National Environmental Management act (No. 57 of 2003), that the management plan for a protected area includes a zonation plan, which indicates which activities are allowed on the property.

PNR has been divided into two zones, namely:

- **Primitive zone**
- **Administration zone**

A detailed explanation of each zone with allowed activities is set out in table 4.1 below.

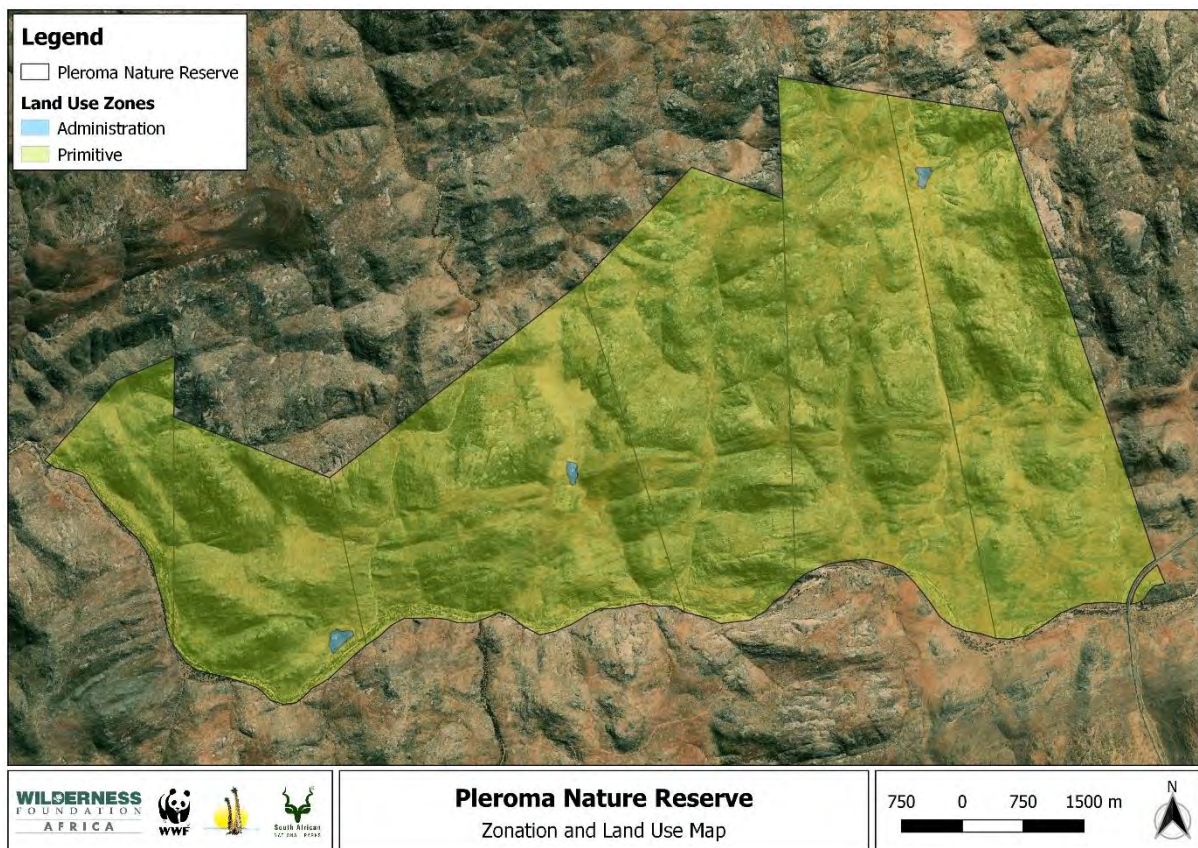


Figure 4.1 Zonation and land use map for Pleroma Nature Reserve

Table 4.1 Zone description, conservation goals and allowed land use activities

ZONE	ZONE OBJECTIVES	CHARACTERISTICS	VISITOR ACTIVITIES	FACILITIES / INFRASTRUCTURE	VISITOR ACCESS	MANAGEMENT GUIDELINES
PRIMITIVE	<ul style="list-style-type: none"> Maintain area in as near natural state as possible, with limited interference of, and impact on, biological and ecological patterns and processes. Limit management activities, unless crucial for the functioning of ecological processes, or threats due to unnatural causes. Limit visitor use, numbers and infrastructure to minimise impact in sensitive environments. Areas showing signs of degradation to be rehabilitated where applicable, through the use of low impact restoration interventions. Limit the influence of external and neighbouring land use activities. Provide access to visitors only through low impact motorized and non-motorized activities on designated and existing paths. 	<ul style="list-style-type: none"> Inherent wilderness qualities and characteristics with the addition of controlled visitor access and basic infrastructure. Users will seldom encounter other human groups or presence. Human impact or infrastructure inside the zone is visibly unobtrusive with limited to no ecological impact. In places, human activities outside of the zone may be audible or visible. Areas remote from Administration zone, or otherwise difficult or expensive to access for management. 	<ul style="list-style-type: none"> Guided or unguided nature observation. Primarily intended for hiking or walking access. Vehicle and bicycle access only allowed on existing, designated paths. Only allows for existing, low impact, self-catering accommodation facilities. 	<ul style="list-style-type: none"> Deviation from the natural and/or pristine state to be minimised. Provides isolated, small, unobtrusive accommodation facility for up to 10 guests on restricted footprint. No construction or development of new infrastructure. May have defined or beacons hiking routes, visitor access roads and management tracks. Roads for visitor use may only be existing roads which have specifically been designated for such purposes. All roads, tracks or trails should be located and constructed to reduce maintenance, visibility and erosion. Unstable or erosion-prone road sections should be closed and preventative erosion control measures put in place. Width of roads and tracks only allow for single vehicle use. 	<ul style="list-style-type: none"> Authorization by Management Authority required for any visitor access. Visitor numbers, frequency and group sizes controlled to meet zone objectives. Only users of facilities/activities will access to this zone. Defined or non-defined hiking and day trail routes. Vehicle and bicycle access only on designated routes. 	<p>Visitor Management:</p> <ul style="list-style-type: none"> 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 very basic and self-catering. (low impact) There should be limited if any interaction between groups. Since visitor use, usually cannot be intensively managed, trails should be away from any areas with sensitive local habitats or plant and animal species. Trail layout, design and construction must reduce maintenance requirements. Bicycle and vehicle use may only occur on existing roads, specifically demarcated for such purposes. Visible & audible human impacts from adjacent zones should be mitigated. <p>Conservation Management:</p> <ul style="list-style-type: none"> Habitats with lower or higher management requirements. Prevent or restore visible trampling or any other visitor impact. Rehabilitate non-useful roads to natural vegetation.

ADMINISTRATION	<ul style="list-style-type: none"> • Provision of infrastructure essential for the management and sustainable use of the Pleroma Nature Reserve. • To provide an allocated space for possible future low intensity developments, subject to all relevant legislative procedures and requirements. • Maintain as much of the natural characteristics of the surrounding property as possible. • Keep impact of development on ecological processes to the minimum. 	<ul style="list-style-type: none"> • Area covers an existing degraded and transformed footprint. • Contains personal/management and self-catering accommodation. • Areas previously transformed by past agricultural activities e.g. old fields. 	<ul style="list-style-type: none"> • Controlled access into neighbouring Primitive zone. • Self-catering accommodation. 	<ul style="list-style-type: none"> • Self-catering accommodation. • Reserve management infrastructure including private homestead, sheds, stores, etc. • Infrastructure essential for the provision of potable water. • Renovation of infrastructure within existing footprint. • Small scale infrastructure development compliant with all relevant legislative requirements. 	<p>Motorised vehicle access subject to authorization by Management Authority.</p>	<p>Visitor Management:</p> <ul style="list-style-type: none"> • Management actions will focus mostly on maintenance of facilities & providing high quality experiences. • Visible impacts to adjacent Zones should be mitigated. <p>Conservation Management:</p> <ul style="list-style-type: none"> • Management Authority should aim to mitigate impact on surrounding biodiversity and contain all activities within the smallest possible footprint. • Prevent or restore trampling and any other management impacts.
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5. ADMINISTRATIVE STRUCTURE

The landowners have been appointed as the Management Authorities of the respective portions of Pleroma Nature Reserve, as per the Protected Area Management Agreement signed between the Department and the landowners. Elsie van Tonder has been appointed as the Management Authority of Section 1 of PNR, while Koos Van der Lende is the Management Authority of Section 2. These two sections are made up of the following respective farm portions:

- Section 1 = portions 4/342, 7/342, 19/342 and 20/342
- Section 2 = portions 16/342 and 17/342

The Department is the provincial conservation body responsible for proclaiming PNR as a Nature Reserve under Section 23(1) of the National Environmental Management: Protected Areas Act (Act 57 of 2003). However, due to its geographic proximity to Namaqua National Park, SANParks will be responsible for maintaining the Nature Reserve by conducting annual audits and supporting the landowner with technical advice. This agreement was reached through a Memorandum of Agreement which was signed by SANParks and the Department.

Management decisions can be made through liaison between the Management Authority, the Department, and SANParks, however the Management Authority will ultimately remain responsible for final decisions made and the overall management of the Nature Reserve.

6. OPERATIONAL MANAGEMENT FRAMEWORK

This section outlines the strategic framework and technical guidelines for the drafting of each management objective as listed in Section 2, above. These detailed management actions will be used to inform the Annual Plan of Operations, as well as the resources which will be required for the implementation thereof. The operational management framework will form the basis for the effective management of Pleroma Nature Reserve.

6.1 Biodiversity Management

6.1.1 Vegetation Management

The health of the naturally occurring vegetation types and their associated species populations and plant communities is the foundation of biodiversity conservation and ecosystem function in the reserve. The Management Authority should thus aim to ensure the overall conservation of the floral species on Pleroma Nature Reserve, by improving understanding of the vegetation types, as well as overall veld condition. The following interventions will allow for the accurate interpretation of observations and monitoring data and to adapt management practices accordingly.

Table 6.1.1 Operational Management Framework: Vegetation Management

KPA 1.1 VEGETATION MANAGEMENT		
Objective: <i>To ensure the overall conservation of the floral species on Pleroma Nature Reserve by improving understanding of the vegetation type's as well as overall veld condition.</i>		
Management Activity	Key Performance Indicator	Timeframe
Ground truth and delineate the various vegetation units as identified in the draft fine-scale vegetation map for Pleroma Nature Reserve.	Fine-scale vegetation map	Year 1 - 2
Complete biennial vegetation assessments to monitor the overall condition and species composition of vegetation and inform management strategies.	Completed vegetation assessment with management recommendations	Year 2 - 5
Record plants found on PNR to create a full species inventory, including those of special concern.	Up-to-date plant species list	Year 2 - 5

6.1.2 Riparian Systems

Water is one of the most important natural resources in South Africa, and is becoming increasingly scarce due to changes in climatic conditions. For this reason, the effective management of catchments and ephemeral river systems in PNR is required to secure the availability of this resource for current and future generations.

The impact of siltation due to erosion, as well as pollution and eutrophication, have significant negative impacts on riparian systems. For this reason, erosion and pollution control measures should always be a priority management objective.

Table 6.1.2 Operational Management Framework: Riparian Systems

KPA 1.2 RIPARIAN SYSTEMS		
Objective: <i>To conserve and improve the biodiversity and ecosystem functioning of riparian systems on the reserve.</i>		
Management Activity	Key Performance Indicator	Timeframe
Identify existing and potential threats to riparian systems in Pleroma Nature Reserve and monitor impact on ecosystem functioning.	List of threats and monitoring findings.	Year 1
Liaise with relevant government department / authority to ensure threats are mitigated and addressed.	Threats addressed in accordance with the National Water Act.	Year 1 - 5
Ensure compliance of water extraction points (boreholes) with relevant legislation.	Compliant water extraction points. (borehole registrations, water use registrations etc.)	Year 1 - 2

6.1.3 Wildlife Management

To promote the conservation of indigenous wildlife through the implementation of effective game management, while contributing towards the rehabilitation of plant growth and overall ecosystem functioning of Pleroma Nature Reserve.

Herbivores

The arid climate, extensive livestock farming practices and lack of high value game species occurring in the Namaqualand region are in all likelihood the reason why large populations of game and the game farming industry as a whole, has not yet been established. Historically most large game species would have migrated through the area without staying in one place for too long, with the vegetation adapting accordingly. For this reason, high numbers of confined game could easily result in permanent damage to the cover and condition of vegetation.

In order to adequately manage game populations in Pleroma Nature Reserve, veld condition and carrying capacity first needs to be established. Simple veld condition assessments can be conducted to establish the vegetation health and composition, while carrying capacities recommended in the ***Grazing Guidelines for Namaqualand***, can be used by converting small livestock units to the applicable game species. Further discussion on this topic will follow under the Grazing and Browsing by Game section below.

Small antelope (Klipspringer, Steenbok, Common Duiker) occur naturally in the area in relatively low numbers, however, the numbers of larger antelope species such as Gemsbok and Springbok need to be established. This can be achieved by recording sightings during vehicle and foot patrols, however, due to the rugged and varying terrain of PNR, it is recommended that the management authority consult with SANParks to possibly include PNR in their biennial aerial game census.

Reintroduction of Game

Before reintroduction the following points need to be considered:

- Was the desired species naturally resident in the area?
- Why did the animal become extinct in the area?
- Is that causal factor still a threat?
- Is the habitat still suitable for the species?
- What are the potential negative effects of the reintroduction?
- Where is the nearest existing population?

Furthermore, a game reintroduction policy needs to be drafted which includes all of the above factors with guidelines and recommendations to ensure best practice and successful establishment. It should also be noted that the re-establishment of game species, based on sound ecological practices, has the potential to improve the overall ecosystem functioning of PNR. The Northern Cape Department of Agriculture, Environmental Affairs, Rural Development and Land Reform needs to be informed and consulted on the translocation and reintroduction of all fauna.

Table 6.1.3 Operational Management Framework: Wildlife Management

KPA 1.3 WILDLIFE MANAGEMENT		
Objective: <i>To improve biodiversity and ecosystem functioning through the effective management of wildlife species.</i>		
Management Activity	Key Performance Indicator	Timeframe
Prevent the introduction of exotic game species and ensure all introductions comply with the Department policies and permit requirements.	No exotic game species. Compliance with Departmental policies.	Year 1 - 5
Conduct annual veld condition assessments to establish the carrying capacity.	Carrying capacity known / revised.	Year 2 - 5
Monitor population densities of game species and control numbers accordingly through hunting, culling or capture.	Up-to-date record of game numbers. Record of hunting/culling/capture.	Year 1 - 5
Research and establish the feasibility of reintroducing Hartmann's Mountain Zebra to Pleroma Nature Reserve.	Feasibility study / Expert input. Habitat Analysis Guideline	Year 3
Establish list of faunal species found on PNR, include species of special concern.	Species list. Camera trap data.	Year 1 - 5

6.1.4 Alien Invasive Plant Control

The arid climate in the region in which Pleroma Nature Reserve is situated results in a limited number of alien invasive plant species (AIP's) which are able to establish productive populations. Most invasive plant species found in PNR are limited riparian, or other areas where water was artificially provided (e.g. homesteads, kraals and water points), as can be seen in Figure 6.1.4.

The following AIP's have been recorded within PNR:

Species	Common name	NEMBA Category*
<i>Argemone ochroleuca</i>	White-flowered Mexican poppy	1b
<i>Atriplex nummularia</i>	Old man saltbush	2
<i>Datura innoxia</i>	Downy thorn apple	1b
<i>Nicotiana glauca</i>	Wild tobacco	1b
<i>Prosopis glandulosa</i>	Honey mesquite	3 (in NC)*
<i>Ricinus communis</i>	Castor oil plant	2
<i>Schinus molle</i>	Pepper tree	Not listed
<i>Salsola tragus</i>	Russian tumbleweed	1b

*Any species which occurs in a riparian area must be treated as category 1b

Alien invasive plant species which occur in Pleroma Nature Reserve will be treated according to the categories listed above, through implementation of a strategic clearing plan. This plan will prioritise species according to objectives, with effective management techniques and monitoring guidelines. The plan will also allow, as applicable, for the management authority to exclude individual plants/trees, from clearing operations. This includes species such as *Prosopis glandulosa* which are often utilised for shade around homesteads. The MA will, however, still have the responsibility of demarcating such individuals/groups of plants, and ensuring systems are in place to control their spread, as required by the National Environmental Management: Biodiversity Act (No. 10 of 2004).

Table 6.1.4 Operational Management Framework: Alien Invasive Plant Control

KPA 1.4 ALIEN INVASIVE PLANT CONTROL		
Objective: <i>To manage invasive alien plants and limit their impacts on biodiversity and ecosystem function.</i>		
Management Activity	Key Performance Indicator	Timeframe
Identify, quantify and map all invasive alien plant species and use data to draft a Strategic Clearing Plan. This plan should include specie densities, control methods and follow-up activities.	Strategic Alien Invasive Plant. Clearing Plan.	Year 2
Implement Strategic Alien Invasive Plant Clearing Plan.	Treatment records.	Year 3 - 5
Monitor treatment effectiveness.	Monitoring findings. Follow-up plan.	Year 3 - 5

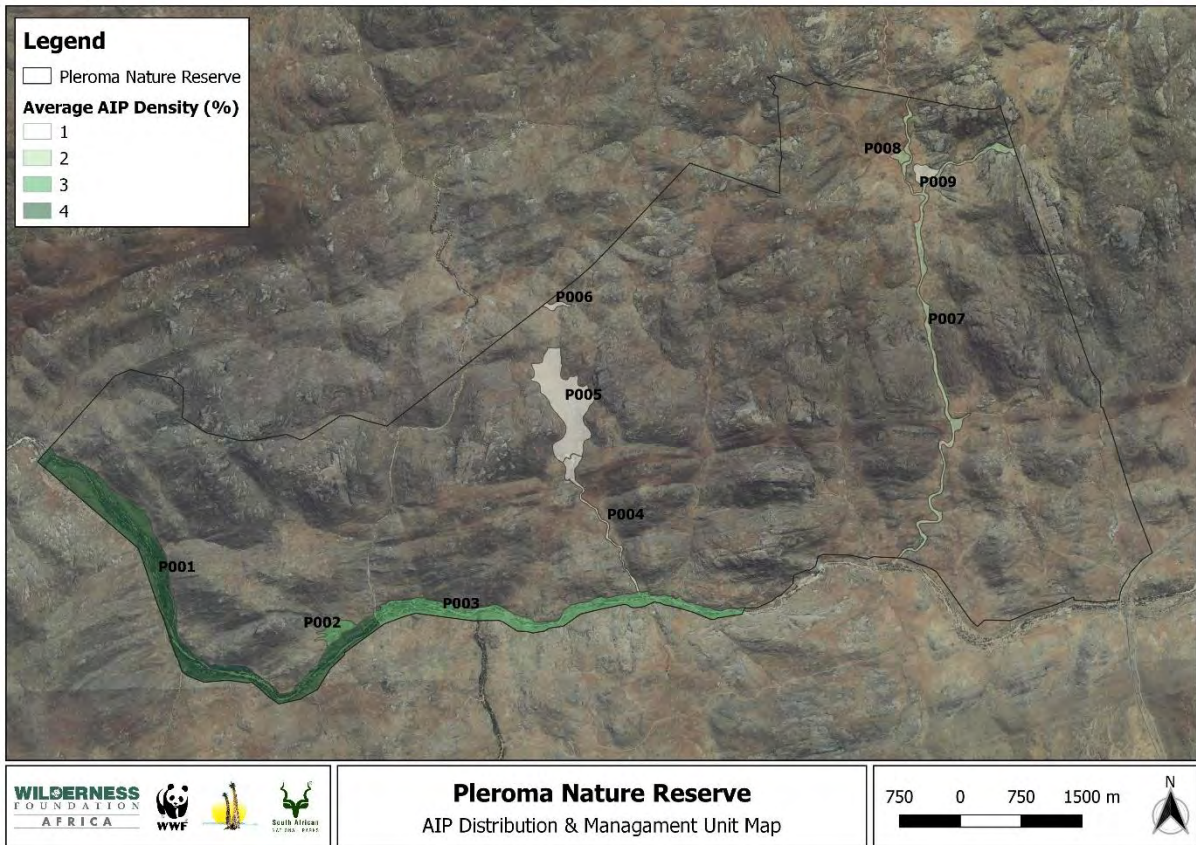


Figure 6.1.4 Alien invasive plant distribution in the Pleroma Nature Reserve (*% Density relates to the total percentage cover of all AIP's combined.*)

6.1.5 Rehabilitation and Restoration

Pleroma Nature Reserve, although minimal, shows signs of localised soil degradation across various areas, with the loss of topsoil in some sections especially noticeable.

The varying topography of PNR, together with shallow, poorly structured soils makes the area susceptible to soil erosion, while the impact of historical droughts and grazing practises over the last decade is clearly visible in some places, especially around old kraals and homesteads. This has resulted in an increased velocity of water flow, and thus soil loss. Although some of the erosion systems on Pleroma Nature Reserve still appear to be active, many of the larger gullies would have been formed during once off abnormal rain events, and are now seemingly stable.

The large granite and gneiss rock faces which are symbolic of Namaqualand, also play a role in increasing the velocity of rainwater flowing over them. Usually, plant growth found below these rock faces decreases the speed of flow, and increases infiltration. However, grazing pressure during times of drought, especially through species like rock hyrax, has decreased this plant cover. Hardpan layers found below shallow soils along foothills across the PNR, has presumably also played a role in erosion. During high rainfall events these shallow soils quickly become saturated. At this point, water can no longer infiltrate the soil, and thus begins to flow over the impermeable hardpan layer, which leads to increased soil movement and loss.

The following types of water driven soil erosion occur on Pleroma Nature Reserve:

- Splash erosion
- Rill erosion
- Gully/donga erosion
- Sheet erosion

The impact of soil erosion on PNR will be mitigated and controlled through the implementation of a versatile rehabilitation strategy which includes a combination of the following control methods:

- Agronomic: These methods comprise the use of plants and organic material to protect the soil. This includes organic soil covers which retain moisture and create a micro climate for seed germination, as well as the sowing of indigenous plant seed on treated areas. Agronomical methods can also include the use of woven geo-textiles, such as Bio-jute etc.
- Mechanical: Mechanical methods involve the manipulation of soil topography and the construction of structures which manage water flow, and facilitate sediment catchment (e.g. silt fences and gabions)
- Land management: Holistic management methods which stimulate plant growth and manipulate soil structure. In the case of PNR, grazing and browsing by indigenous game will play an important role in breaking soil crusts and stimulating seed germination.

The rehabilitation strategy for Pleroma Nature Reserve will include monitoring actions to evaluate the effectiveness of control measures implemented.

Table 6.1.5 Operational Management Framework: Rehabilitation and Restoration

KPA 1.5 REHABILITATION AND RESTORATION		
Objective: <i>To identify areas across the reserve showing signs of degradation, and implement suitable and effective control measures where required, to improve overall ecosystem function.</i>		
Management Activity	Key Performance Indicator	Timeframe
Establish the extent of soil erosion across PNR by identifying and mapping eroded / degraded areas.	Fine-scale soil erosion/degradation map.	Year 1
Draft a Soil Erosion Control plan which prioritises eroded sites for treatment, and includes site specific rehabilitation strategies, time-frames and estimated costs.	Soil Erosion Control Plan.	Year 1
Implement Soil Erosion Control Plan according to priority and funding available.	Treatment records.	Year 2 - 5
Monitor effectiveness of implemented treatment activities and use findings to inform management strategy and follow-up treatments.	Monitoring findings / records. Follow-up treatment schedule.	Year 2 - 5

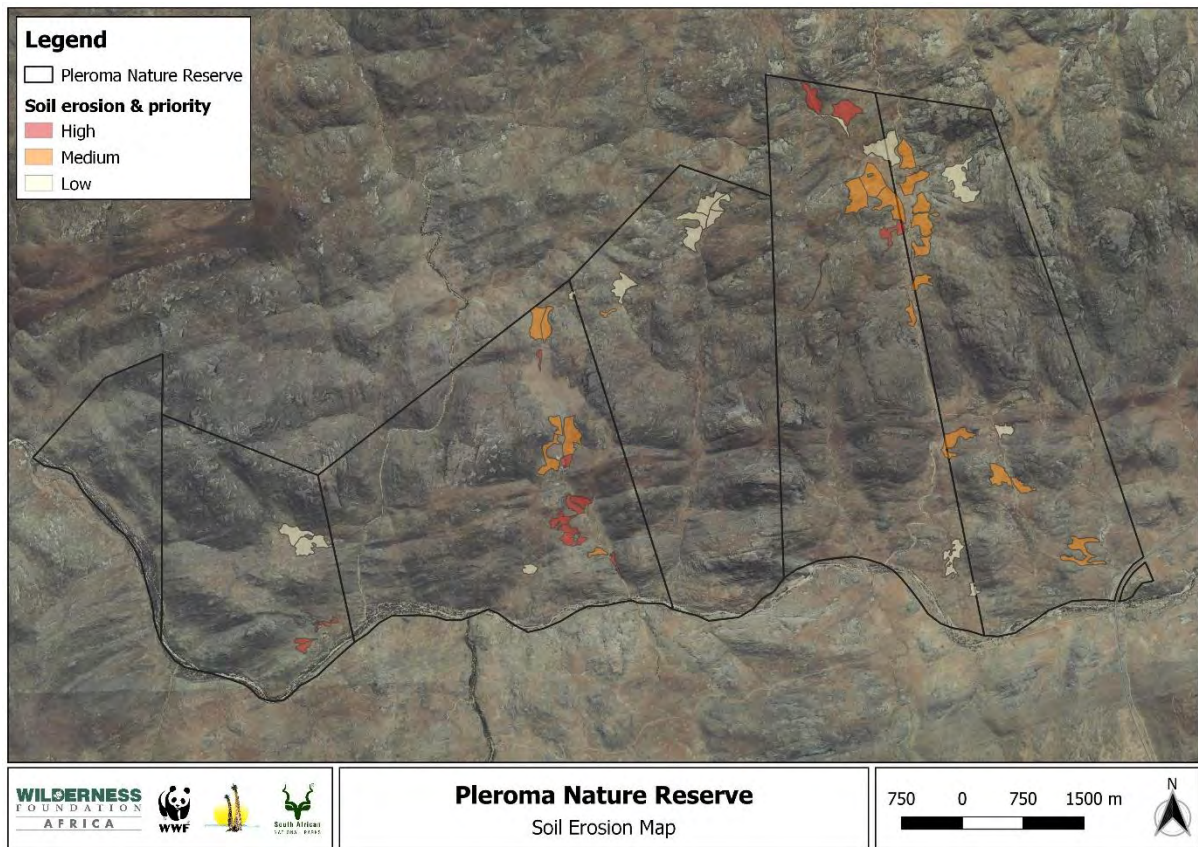


Figure 6.1.5 Soil erosion map for Pleroma Nature Reserve

6.1.6 Illegal Harvesting

The illegal collection of indigenous succulent, caudiciform plants and small reptiles has become of increasing concern in the Succulent Karoo. Due to the high biodiversity of endemic species found in Namaqualand, the area is targeted by poachers for illegal trade. Detecting such illegal activity can be difficult due to the small size of the species being collected and the remoteness of the area. However, efforts should be made and systems put in place to detect and prevent any unlawful collection of flora and fauna. The collection and harvesting of certain species is permitted if the required permits and permissions are in place.

Table 6.1 6 Operational Management Framework: Illegal Harvesting

KPA 1.6 ILLEGAL HARVESTING		
Objective: <i>To control access and prevent the illegal harvesting of flora and fauna from the reserve.</i>		
Management Activity	Key Performance Indicator	Timeframe
Collaborate with stakeholders and applicable authorities to improve communication and reaction regarding illegal poaching activities.	Effective partnerships are in place.	Year 1 - 5
Identify potential target species and vulnerable locations to improve prevention and reaction.	Target species and locations are known.	Year 1 - 5
Monitor for signs of illegal harvesting and report incidences to the relevant authorities.	Document findings and record of reporting.	Year 1 - 5

6.1.7 Connectivity and Expansion

Pleroma Nature Reserve is situated in the ‘Namaqua National Park and Coastal Focus Area’, as included in the NCPAES, and could possibly form an important link within the ‘Goegap to Melkrivier’ expansion corridor. Strategic expansion of the reserve will thus contribute towards improved protected area connectivity and ecological functioning. To ensure that expansion efforts are focussed in the right areas, open communication between relevant stakeholders is essential.

Table 6.1.7 Operational Management Framework: Connectivity and Expansion

KPA 1.7 CONNECTIVITY AND EXPANSION		
Objective: <i>To improve landscape ecological patterns and processes through the strategic acquisition of viable properties, increasing the extent and influence of Pleroma Nature Reserve.</i>		
Management Activity	Key Performance Indicator	Timeframe
Liaise with partners, stakeholders and neighbours to identify expansion opportunities and priorities adjacent to Pleroma Nature Reserve.	Expansion opportunities known.	Year 1 - 3
Recommend expansion opportunities to partners and stakeholders to be pursued through applicable protection mechanisms (biodiversity stewardship, purchase).	Hectares under protection.	Year 3 - 5

6.2 Sustainable Utilization of Natural Resources

6.2.1 Grazing and Browsing by Game

Grazing and browsing forms an essential part of ecological functioning, however great care should be taken to avoid the degradation of vegetation health and composition. Although numerous game and wildlife species would have historically occurred in the region, they would in all likelihood only have moved through, depending on food and water availability. For this reason, the plant growth did not adapt for long periods of intensive grazing and browsing by large numbers of herbivores. It is thus important to correctly manage vegetation utilization by herbivores in Pleroma Nature Reserve.

Before game numbers can be managed, veld condition and carrying capacity per vegetation unit need to be determined. Although only one official vegetation type (Namaqualand Klipkoppe Shrubland) spans across PNR according to the SA vegetation map (2018), it is essential to determine the various vegetation units on a fine scale level, as carrying capacity could differ between them. For example, plant species composition and density will differ between the shrubland on koppies, ephemeral riverbeds and old ploughed fields, while also having different resilience to impacts from grazing and browsing. Veld condition assessments will be conducted per vegetation unit to determine health, composition and carrying capacity. Recommended stocking rates listed in the Grazing Guidelines for Namaqualand document could be used as reference and converted from small stock units to the applicable game species. However, findings from veld assessments should ultimately inform carrying capacity with game numbers managed accordingly.

A long-term monitoring programme will be put in place to continue assessing the veld condition and the impact of game species on it. Game numbers will be managed through hunting, culling, or re-introductions, depending on monitoring findings.

Table 6.2.1 Operational Management Framework: Grazing and Browsing by Game

KPA 2.1 Grazing and Browsing by Game		
Objective: <i>To effectively monitor and manage the impact of game on natural vegetation, with the aim of ensuring optimal veld condition.</i>		
Management Activity	Key Performance Indicator	Timeframe
Conduct biennial veld condition assessments to determine carrying capacity, and species composition of vegetation.	Veld condition assessment with findings.	Year 1 - 5
Manage game at optimal numbers according to findings from veld condition assessment.	Record of estimated game numbers.	Year 2 - 5
Continual monitoring of veld condition.	Monitoring records and management recommendations.	Year 2 - 5

6.3 Socio-economic and Heritage

6.3.1 Socio-economic Development Initiatives

Extreme levels of poverty and accompanying social issues are experienced in the Namaqualand district, and Northern Cape as a whole. Although Pleroma Nature Reserve cannot alleviate the issue through large scale employment and other activities, there is still opportunity to contribute towards the socio-economic development in the district. This can be achieved by supporting local SMME's where possible, and partnering with organizations and stakeholders to implement poverty relief projects.

Table 6.3.1 Operational Management Framework: Socio-economic Development Initiatives

KPA 3.1 Socio-economic Development Initiatives		
Objective: <i>To contribute towards the improvement of socio-economic circumstances in local communities through the implementation of conservation activities in partnership key stakeholders.</i>		
Management Activity	Key Performance Indicator	Timeframe
Engage with Government and Parastatal partners regarding the implementation of Natural Resource Management poverty relief projects. (SANParks Biodiversity & Social Projects).	Minutes from planning / discussion meetings. Land Owner Agreement.	Year - 1
Assist with the implementation of NRM project on Pleroma Nature Reserve.	% Of project implemented.	Year 2 - 5
Make use of local work force when labour assistance is required implementing management activities.	Number of temporary local workers employed.	Year 1 - 5

6.3.2 Heritage Features

Although Pleroma Nature Reserve was mainly declared in order to conserve its unique ecological components, there are also a number of paleontological, archaeological and cultural features in the landscape that need to be discovered, understood and adequately managed. Partnering with specialists in these fields is necessary to identify these features and ensure they are not damaged and that the sites are suitably preserved for further study.

Table 6.3.2 Operational Management Framework: Heritage Features

KPA 3.2 Heritage Features		
Objective: <i>To preserve heritage features contributing towards the cultural, archaeological and paleontological history of Pleroma Nature Reserve and the Namaqualand district.</i>		
Management Activity	Key Performance Indicator	Timeframe
Create an inventory by identifying and documenting all heritage features on Pleroma Nature Reserve.	Inventory of all heritage features. Map indicating location of heritage features.	Year - 1
Engage with academics and local residents to gain more information on the heritage features of PNR.	Information gathered. Topic specific research papers.	Year 1 - 5
Preservation of heritage assets.	Periodic photographs documenting damage/degradation/restoration. Access restriction and signage.	Year 1 - 5

6.4 Management Authority Effectiveness

6.4.1 Legal Compliance

As landowner of a biodiversity stewardship site which has been declared under section 23 of the National Environmental Management: Protected Areas Act, the management authority has been mandated to enforce laws related to the conservation of Pleroma Nature Reserve, which prohibit certain activities.

Table 6.4.1 Operational Management Framework: Legal Compliance

KPA 4.1 Legal Compliance		
Objective: <i>To ensure compliance with all legal requirements applicable to the Pleroma Nature Reserve.</i>		
Management Activity	Key Performance Indicator	Timeframe
Ensure all future developments meet the requirements of the National Environmental Management Act (NEMA).	NEMA compliance.	Year 1 - 5
Applicable policies and regulations of the relevant stakeholders and authorities are followed.	Northern Cape Nature Conservation Regulations compliance.	Year 1 - 5
All declaration documents submitted and up-to-date. Notarial Deed with title deed restrictions registered with the Notary and Surveyor General against the property.	Documents submitted and registered.	Year 1

6.4.2 Infrastructure and Equipment

To ensure that Pleroma Nature Reserve is managed as effectively as possible, new and existing infrastructure needs to be maintained and developed. In order to address the infrastructure needs of Pleroma Nature Reserve, the following guidelines will be adhered to:

- Infrastructure must be adequately maintained to avoid any damage to the environment and ensure the safety of staff and visitors to the site.
- Infrastructure must be provided to ensure the effective management and operation of the nature reserve.

Table 6.4.2 Operational Management Framework: Infrastructure and Equipment

KPA 4.2 Infrastructure and Equipment		
Objective: Procurement and maintenance of equipment and infrastructure essential to continually ensuring productive and effective implementation of management activities on Pleroma Nature Reserve.		
Management Activity	Key Performance Indicator	Timeframe
Annually assess state of infrastructure and use findings to draft a list of development and maintenance requirements.	Infrastructure requirements identified.	Year 1 - 5
Maintain all reserve infrastructure to ensure continued functioning and compliance with relevant legislation.	Record of maintenance activities.	Year 1 - 5
Purchase of equipment essential for the day to day management of Pleroma Nature Reserve.	Equipment inventory.	Year 1 - 5

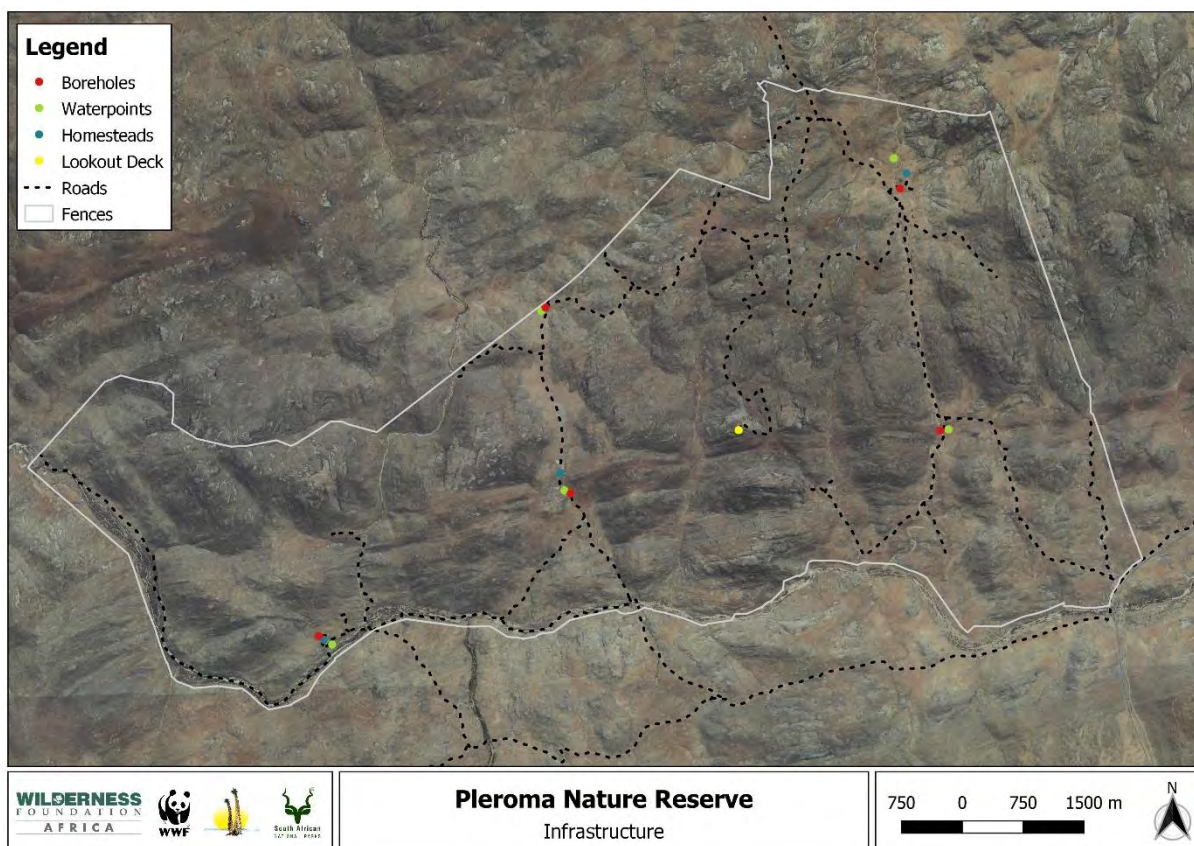


Figure 6.4.2 Basic infrastructure of Pleroma Nature Reserve

6.4.3 Stakeholder Engagement

Pleroma Nature Reserve should not be seen as isolated from the local social, economic and ecological systems, but rather as an integral role player which contributes towards growth within the relevant sectors. For this reason, PNR should pursue proactively engaging, and forming sound relationships with all applicable stakeholders. By doing so, mutually beneficial partnerships can be formed which will assist the management authority in achieving the goals of the reserve.

Table 6.4.3 Operational Management Framework: Stakeholder Engagement

KPA 4.3 Stakeholder Engagement		
Objective: <i>Sound partnerships with all applicable stakeholders to ensure the effective management of Pleroma Nature Reserve.</i>		
Management Activity	Key Performance Indicator	Timeframe
Identify and engage with all key stakeholders in the landscape through the attendance of meetings and direct communication.	Meeting minutes. Stakeholder database.	Year 1 - 5
Identify and pursue joint project opportunities with stakeholders to achieve the goals of Pleroma Nature Reserve.	Project proposals. MOU's and LO agreements. Meeting minutes.	Year 2 - 5

6.4.4 Security and Access Control

A security strategy is required in order to ensure the safety of biodiversity resources on Pleroma Nature Reserve. The strategy will place emphasis on managing access control in order to prevent any illegal and un-authorized activities from taking place. Access management rules will be stipulated through the strategic placement of signage and lockable gates, while border fences will be maintained to restrict both animal and human movement over the reserves boundaries.

Table 6.4.4 Operational Management Framework: Security and Access Control

KPA 4.4 Security and Access Control		
Objective: <i>To ensure improved safety of the natural resources of Pleroma Nature Reserve, through adequate and effective access control and security measures.</i>		
Management Activity	Key Performance Indicator	Timeframe
Maintain Pleroma Nature Reserve boundary fence.	Total kilometres maintained.	Year 1 - 5
Conduct regular patrols of boundary fence to record signs of illegal access and state of fence.	Number of patrols completed. Record of findings.	Year 1 - 5
Install lockable gates at all access points.	Lockable gates.	Year 1

6.4.5 Monitoring and Evaluation

Monitoring and data collection is essential to the implementation of an adaptive management strategy. The aim of monitoring activities on Pleroma Nature Reserve is to gather and manage knowledge of the local ecology, while also measuring the effectiveness of implemented management activities. Information gathered is used in informing biodiversity management decisions, and improving overall reserve management. Opportunities also exist for area specific research

programmes, which will contribute towards the perpetuation of species and ecological systems within Pleroma Nature Reserve.

Table 6.4.5 Operational Management Framework: Monitoring and Evaluation

KPA 4.5 Monitoring and Evaluation		
Objective: <i>To adapt, inform and evaluate the management strategy through monitoring and data collection activities, thus ensuring the continued effective functioning of Pleroma Nature Reserve.</i>		
Management Activity	Key Performance Indicator	Timeframe
Identify monitoring needs and opportunities applicable to PNR.	List of monitoring needs and requirements.	Year 1 - 2
Liaise with stakeholders and partners to assist and implement monitoring activities.	Minutes from meetings.	Year 2
Draft a monitoring plan which addresses the monitoring needs of PNR, and includes specific protocols and relevant data collection sheets.	Monitoring Plan, protocols, data collection sheets.	Year 2
Implementation of monitoring plan. (Data collection, data management and data analysis)	% Of plan implemented. Data sheets (fixed point photographs, veld condition assessment, species lists etc.).	Year 2 - 5
Adapt management practises and strategies based on monitoring findings.	Reviewed management plan. Annual Plan of Operations.	Year 2 - 5

6.4.6 Financial Management

Although no high cost developments and activities are currently planned for Pleroma Nature Reserve, adequate funding still needs to be secured in order to implement the strategic management plan and ensure the objectives of PNR are met. These funds need to be managed through sound financial systems in order to achieve the following goals:

- Have a sustainable, long-term plan to secure the funds necessary to implement the management plan from a range of reliable sources and income streams;
- to manage financial risks through careful budgeting and sourcing funding from a range of reliable sources;
- to implement effective financial management controls.

Table 6.4.6 Operational Management Framework: Financial Management

KPA 4.6 Financial Management		
Objective: <i>To ensure sufficient funding is available and accurately managed, in order to implement the strategic management plan.</i>		
Management Activity	Key Performance Indicator	Timeframe
Secure sufficient funding to implement Annual Plan of Operations.	Funding available.	Year 1 - 5
Sound financial management system to ensure budget is accurately and effectively managed.	Financial system in place.	Year 1

6.4.7 Management Effectiveness and Reporting

Table 6.4.7 Operational Management Framework: Management Effectiveness and Reporting

KPA 4.7 Management Effectiveness and Reporting		
Objective: <i>To implement an adaptive management strategy by using findings from monitoring activities and annual audits to inform and update the annual plan of operations and revise the strategic management plan.</i>		
Management Activity	Key Performance Indicator	Timeframe
Measure and review progress on planned management activities and key performance indicators on a monthly basis.	Progress captured.	Year 1 - 5
Investigate reasons for targets not being met. Identify solutions and adapt strategies to deal with challenges.	Record of challenges with recommended solutions.	Year 1 - 5
Assist delegated authority with annual audit to measure management effectiveness and achieved deliverables.	Completed audit with findings.	Year 1 - 5
Review audit findings with relevant conservation authority and stakeholders to identify focus areas, find solutions to challenges and adapt management strategy.	Minutes from review meeting.	Year 1 - 5
Review and signoff annual plan of operations with all audit and monitoring findings considered.	APO signed off.	Year 1 - 5

7. MANAGEMENT PLAN IMPLEMENTATION, REVIEW AND ANNUAL PLAN OF OPERATIONS

Monitoring and reporting assists with the evaluation of overall reserve management. Depending on the outcomes, it can be used to directly adapt management strategies and activities in order to achieve the desired outcomes.

7.1 Annual Plan of Operations

The Annual Plan of Operation (APO) forms an integral part of the Protected Area Management Plan. The APO gives life to the Operational Management Framework in the Strategic Management Plan by listing specific management actions. To facilitate effective review, each management action comprises the following components:

- a description of the management actions
- the Key Performance Indicator (KPI)
- the KPI target
- the person responsible for implementation
- the budget assigned to the activity
- the deadline for completion.

The APO for Pleroma Nature Reserve will be captured in a separate document which is directly linked to the management plan and will be one of the main tools used to measure management effectiveness during annual audits and evaluations. Pending the findings of these audits and reviews, the Management Authority will draft a list of management activities to be included in the next year's APO with revised KPI targets, budgets, deadlines and responsible persons. SANParks and the Department will assist the Management Authority in this regard.

7.2 Management Plan Review

The purpose of undertaking an annual review of implementation of the protected area management plan will be to:

- Determine how effectively the management plan has been implemented.
- Assist in determining the focus for the annual plan of operation and the setting of appropriate time frames and budgets.
- Enable effective adaptive management by identifying changes and modifying management interventions.

The annual audit will form the basis of the management plan review. This should include records of recommendations for update/changes to the annual revision of the management schedules as well as the five-year plan. The Annual Plan of Operation (APO) is in a similar format to the Annual Audit See Appendix D below, allowing for a seamless transition of information from Audit to new APO.

7.3 Five-year Costing Plan

The below table provides an estimated breakdown of the various implementation costs for management objectives under Key Performance Areas over the five-year period of this Strategic Management Plan. Detailed budgets will follow in the successive Annual Plans of Operation which will override this costing estimate.

Table 7.3.1 Estimated Annual Management Cost

Key Performance Area	Management Objective	2021/22	2022/23	2023/24	2024/25	2025/26
Biodiversity Management	Wildlife Management	R25 000.00	R26 750.00	R28 622.50	R55 326.75	R32 769.90
	Alien Invasive Plant Control*	R21 578.40	R16 281.56	R11 356.31	-	-
	Rehabilitation and Restoration**	R142 272.00	R206 733.60	R225 504.00	R184 512.00	R267 456.00
Management Authority Effectiveness	Infrastructure and Equipment	R69 500.00	R74 365.00	R79 570.22	R85 140.50	R91 100.33
	Security and Access Control	R5 760.00	R6 163.20	R6 594.62	R7 056.24	R7 550.20
Estimated Annual Management Cost		R264 110.40	R330 283.36	R351 647.65	R332 035.49	R398 876.43
Total Estimated Five-year Management Cost		R1 676 953.33				

* Expenditure on Alien Invasive Plant Control in years 2024/25 and 2025/26 pending revision of strategic control plan and assessment of invasive plant species populations.

** Rehabilitation activities and costs pending inclusion into Namaqua National Park rehabilitation plan for possible assistance from the SANParks Biodiversity and Social Projects.

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9. APPENDICES

9.1 APPENDIX A: List of statutes to which the Nature Reserve is subject

Biodiversity and Cultural Resource Management and Development:

- Animals Protection Act [No. 71 of 1962]
- Atmospheric Pollution Prevention Act [No. 45 of 1965]
- Conservation of Agricultural Resources Act [No. 43 of 1983]
- Constitution of the Republic of South Africa [No. 108 of 1996]
- Criminal Procedures Act [1977]
- Environment Conservation Act [No. 73 of 1989]
- Forest Act [No. 122 of 1984]
- Hazardous Substances Act [No. 15 of 1973]
- National Environmental Management Act [No. 107 of 1998]
- National Environmental Management: Biodiversity Act [No. 10 of 2004]
- National Environmental Management: Protected Areas Act [No. 57 of 2003]
- National Forests Act [No. 84 of 1998]
- National Heritage Resources Act [No. 25 of 1999]
- National Water Act [No. 36 of 1998]
- National Water Amendment Act [No. 45 of 1999]
- National Veld and Forest Fire Act [No 101 of 1998]
- Nature Conservation Ordinance [No. 15 of 1974]

General Management:

- Companies Act [No.71 of 2008]
- Promotion of Access to Information Act [No. 2 of 2000]
- Occupational Health and Safety Act [No. 85 of 1993]
- Development Facilitation Act [No. 67 of 1995]
- Disaster Management Act [No. 57 of 2002]
- Fire Brigade Services Act [No. 99 of 1987]
- Local Government: Municipal Systems Act [No. 32 of 2000]
- National Road Traffic Act [No. 93 of 1996]
- National Building Standards Act [No. 103 of 1977]
- Water Services Act [No. 108 of 1997]

Human Resource Management:

- Basic Conditions of Employment Act [No. 75 of 1997]
- Broad-Based Black Economic Empowerment Act [No. 53 of 2003]
- Compensation for Occupational Injuries and Diseases Act [No. 130 of 1993]
- Employment Equity Act [No. 55 of 1998]
- Labour Relations Act [No. 66 of 1995]
- Occupational Health and Safety Act [No. 85 of 1993]
- Pension Funds Act [No. 24 of 1956]
- Skills Development Act [No. 97 of 1998]

- Skills Development Levies Act [No. 9 of 1999]
- Unemployment Insurance Act [No. 63 of 2001]

A brief summary of the most applicable legislation:

Protected Areas are proclaimed under section 23(1) of the National Environmental Protected Areas Act, 57 of 2003, (“the Protected Areas Act”).

- **Protected Areas Act (Act No. 57 of 2003)**

The [Minister/MEC] is empowered, under section 23(1) of the National Environmental Protected Areas Act, 57 of 2003, (“the Protected Areas Act”) to declare an area as a Conservation Area if:

1. It has significant natural features or biodiversity;
2. Is in need of long-term protection for the maintenance of its biodiversity or for the provision of environmental goods and services.

Biodiversity management agreements

The Minister may enter into a biodiversity management agreement with the person, organization or organ of state identified in terms of section 43(2), or any other suitable person, organization or organ of state, regarding the implementation of a biodiversity management plan, or any aspect of it.

- **Biodiversity Act (Act No. 10 Of 2004)**

Objectives of Act

- a) within the framework of the National Environmental Management Act, to provide for—
 - i. the management and conservation of biological diversity within the Republic and of the components of such biological diversity;
 - ii. the use of indigenous biological resources in a sustainable manner; and
 - iii. the fair and equitable sharing among stakeholders of benefits arising from bio-prospecting involving indigenous biological resources;
- b) to give effect to ratified international agreements relating to biodiversity which are binding on the Republic;
- c) to provide for co-operative governance in biodiversity management and conservation; and
- d) to provide for a South African National Biodiversity Institute to assist in achieving the objectives of this Act.

- **National Veld and Forest Fire Act (Act No. 101 of 1998)**

Purpose

‘The purpose of the Act is to prevent and combat veld, forest and mountain fires throughout the Republic.’

Firebreaks

In terms of section 12 and 14 every landowner must prepare and maintain a firebreak as determined in section 13. Failure to do so is an offence in terms of section 25(3), unless he has been exempted by the Minister in terms of section 15.

Fighting Preparedness

There is also a further duty on landowners to have equipment, protective clothing and trained personnel available in the eventuality that there may be fire on their property (section 17). Failure to

meet this requirement is an offence in terms of section 25(4).

- **Conservation of Agricultural Resources Act, 1983 (No 43 of 1983)**

Purpose

CARA is an act of the National Department of Agriculture and makes provision for the conservation of the natural agricultural resources of South Africa through:





- i. Maintaining the production potential of land;
- ii. Combating and preventing erosion;
- iii. Preventing the weakening or destruction of water sources;
- iv. Protecting the vegetation; and
- v. Combating weeds and invader plants.

Other Relevant Legislation:

- Municipal Systems Act
- National Water Act, 1998 (No 36 of 1998)
- Constitution of the Republic of South Africa Act, 1996 (No 108 of 1996)
- Environment Conservation Act No 73 of 1989
- Forest Act No 122 of 1984
- National Environmental Management Act, 1998 (No 107 of 1998)
- National Heritage Resources Act, 1999 (No 25 of 1999)
- World Heritage Convention Act, 1999 (No 109 of 1999)
- Mountain Catchment Areas Act, 1970 (Act No. 63 of 1970)
- The administration of the Act has been assigned to the Board by virtue of Act 3 of 2000 as published in Provincial Gazette Extraordinary No. 5442 dated 24 March 2000
- Land Use Planning Ordinance 15/1985 (section 29)

There may be other legislation applicable to the Contract Nature Reserve and it is the landowner's/Management Authority's responsibility to identify and comply with applicable legislation.

9.2 APPENDIX B: Copy of Pleroma Nature Reserve proclamation

NORTHERN CAPE PROVINCE		
PROFENSI YA KAPA-BOKONE		NOORD-KAAP PROVINSIE
IPHONDO LOMNTLA KOLOMI		
Provincial Gazette Kasete ya Profensi	iGazethi YePhondo Provinsiale Koerant	
Vol: 28	KIMBERLEY 22 February 2021 22 Februarie 2021	No: 2394
We all have the power to prevent AIDS		
AIDS affects us all		A new struggle
Prevention is the cure		
AIDS HELPLINE		
0800 012 322		
DEPARTMENT OF HEALTH		
<small>N.B. The Government Printing Works will not be held responsible for the quality of "Hard Copies" or "Electronic Files" submitted for publication purposes</small>		
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NOTICE 10 OF 2021
PROVINCIAL NOTICE
DEPARTMENT OF AGRICULTURE ENVIRONMENTAL AFFAIRS RURAL
DEVELOPMENT AND LAND REFORM
NATIONAL ENVIRONMENTAL MANAGEMENT: PROTECTED AREAS ACT, 2003 (ACT
57 OF 2003): DECLARATION OF PROTECTED AREAS

I, Galerekwe Mase Manopola, in my capacity as Member of the Executive Council ("MEC"), responsible for Agriculture, Environmental Affairs, Rural Development and Land Reform in the Northern Cape, under Section 23(1)(a), 23(1)(b), 28(1)(a), 28(1)(b) and Section 38(2) of the National Environmental Management: Protected Areas Act, 2003 (Act 57 of 2003), give notice that—

- (a) I declare the properties as indicated in the Schedule as protected areas;
- (b) I declare the properties indicated in the Schedule as part of an existing nature reserve;
- (c) I assign names to the protected areas as indicated in the Schedule; and
- (d) I appoint the management authorities as indicated in the Schedule.

SCHEDULE

Rooikoppies Nature Reserve: Situated in the Namaqua District Municipality, Nama-Khoi Local Municipality, Northern Cape Province. Comprises of the farm Goraap No.323; in extent 1181,46 (One thousand one hundred and eighty one comma four six) hectares; held by title deed No. T17903/2016. Management Authority: Strandveld Conservation Club

High Karoo Park Protected Environment: Situated in the Pixley ka Seme District Municipality, Ubuntu Local Municipality, Northern Cape Province; comprises of the following properties; the Farm Zoete Valey No 115; in extent: 3180,1163 (three thousand one hundred and eighty comma one one six three) hectares, held by title deed No. T73445/2007, portion 7 of the Farm Zoete Valey No. 115, in extent 1767,2639 (one thousand seven hundred and sixty seven comma two six three nine) hectares, held by title deed No. T73445/2007; and Portion 4 of the Farm Riel Valley No. 112, in extent 300,5161 (three hundred comma five one six one) hectares, held by title deed No. T73445/2007. Management Authority: Mystic Pearl 153 (Pty) Ltd.

Hanover Aardvark Nature Reserve: Situated in the Pixley ka Seme District Municipality, Emthanjeni Local Municipality, Northern Cape Province; comprises of the Farm Andriesfontein No. 154; in extent: 2715,4147 (two thousand seven hundred and fifteen comma four one four seven) hectares, held by title deed No. T2549/1955 CTN. Management Authority: Ferreira Piet Cronje Trust

Brakputs Nature Reserve: Situated in the Namaqua District Municipality, Nama-Khoi Local Municipality, Northern Cape Province; comprises of the following properties; Brakputs Farm No. 311; in extent: 935,8754 (nine hundred and thirty five comma eight seven five four) hectares, held by title deed No. T22363/2013; and Portion 8 (Rooihoog) (a portion of portion 1) of the Farm Keerom Nr. 341; in extent: 308,2802 (three hundred and eight comma two eight zero two) hectares, held by title deed No. T22362/20123. Management Authority: Martelia du Preez and Kevin Murray

Pleroma Nature Reserve: Situated in the Namakwa District Municipality, Nama-Khoi Local Municipality, Northern Cape Province; comprises of the following properties; Portion 16 (a portion of portion 7) (Onder Drift) of the Farm Koornhuis No. 342; in extent: 1103,4559 (one thousand one hundred and three commas four five five nine) hectares; and Remainder of Portion-17 (portion of portion 7) (Boven Drift) of the Farm Koornhuis No. 342; in extent: 1130,3230 (one thousand one hundred and thirty commas three two three zero) hectares, held by title deed No. T1482/2018; Portion 4 (Brakkies) of the Farm Koornhuis No. 342; in extent: 1094,9748 (one thousand ninety four comma nine seven four eight) hectares; portion of Portion 7 (De Drift) of the Farm Koornhuis No. 342, in extent: 1022,4221 (one thousand twenty two commas four two two one) hectares; Portion 19 (a portion of portion 10) of the Farm Koornhuis No. 342; in extent: 591,5884 (five hundred and ninety-one comma five eight eight four) hectares; and Portion 20 (a portion of portion 3)

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of the Farm Koornhuis No. 342; in extent: 229,8709 (two hundred and twenty-nine comma eight seven zero nine) hectares, held by title deed No. T2962/2018.

Management Authority: Elsie van Tonder and Jacobus van der Lende

Kamnap Oos Protected Environment : Situated in the Namaqua District Municipality, Nama-Khoi Local Municipality, Northern Cape Province; comprises of the following properties; Portion 2 of the Farm Kamnap 137; in extent: 712,1945 (seven hundred and twelve comma one nine four five) hectares, held by title deed No. T19622/2010; and Portion 7 of the Farm Kamnap 137; in extent: 712,1897 (seven hundred and twelve comma one eight nine seven) hectares, held by title deed No. T17078/2011.

Management Authority: GP N Prop. Development

Expansion of Goegap Nature Reserve: Situated in the Namaqua District Municipality, Nama-Khoi Municipality, Northern Cape Province; comprises of the following properties; Remainder of Farm Ratelkraal No 131, in extent 4 443.6861 (four thousand four hundred and forty three comma six eight six one) hectares, held by title deed No. T3161/2009; and Portion 1 of the Farm Ratelkraal No 131 in extent 4 443.6329 (four thousand four hundred and forty three comma six three two nine) hectares, held by title deed No. T5164/2009.

Management Authority: Department of Agriculture, Environmental Affairs, Rural Development and Land Reform

Expansion of Dorlogskloof Nature Reserve: Situated in the Namaqua District Municipality, Hantam Local Municipality, Northern Cape Province; comprises of the following properties; Remainder of the Farm Gannaga No 1029; in extent 1028,1565 (one thousand and twenty eight comma one five six five) hectares, held by title deed No. T29542/2010; Farm Groot Tuin No 653; in extent 315,0453 (three hundred and fifteen comma zero four five three) hectares, held by title deed No. T22911/2010; and Farm Zaalkloof No. 652; in extent 595,3340 (five hundred and ninety five comma three three four zero) hectares, held by title deed No. T22911/2010.

Management Authority: Department of Agriculture, Environmental Affairs, Rural Development and Land Reform

Signed at Kimberley on this 16th day of December 2020


G.M. MANOPOLE (MPL)

MEC FOR AGRICULTURE ENVIRONMENTAL AFFAIRS LAND REFORM AND RURAL DEVELOPMENT

9.3 APPENDIX C: Species Lists

9.3.1 Plant species list for Pleroma Nature Reserve

STATUS ¹	FAMILY	SPECIES
VU	ASPHODELACEAE	<i>Aloidendron dichotomum</i>
LC	ANACAMPSEROTACEAE	<i>Anacampseros namaquensis</i>
LC	MENISPERMACEAE	<i>Antizoma miersiana</i>
LC	ASTERACEAE	<i>Arctotis fastuosa</i>
LC	CAPPARACEAE	<i>Boscia albitrunca</i>
LC	AIZOACEAE	<i>Cheirodopsis denticulata</i>
LC	AGAVACEAE	<i>Chlorophytum crassinerve</i>
LC	AIZOACEAE	<i>Conophytum pagaeae</i>
Rare	AIZOACEAE	<i>Conophytum roodiae subsp. cylindratum</i>
LC	ASTERACEAE	<i>Cotyledon orbiculata</i>
LC	CRASSULACEAE	<i>Crassula brevifolia subsp. brevifolia</i>
LC	CRASSULACEAE	<i>Crassula hirtipes</i>
LC	CRASSULACEAE	<i>Crassula muscosa var. muscosa</i>
LC	CRASSULACEAE	<i>Crassula namaquensis subsp. namaquensis</i>
LC	ASTERACEAE	<i>Didelta carnosa var. carnosa</i>
LC	EBENACEAE	<i>Diospyros ramulosa</i>
LC	AIZOACEAE	<i>Drosanthemum hispidum</i>
LC	EUPHORBIACEAE	<i>Euphorbia dregeana</i>
LC	EUPHORBIACEAE	<i>Euphorbia mauritanica</i>
LC	EUPHORBIACEAE	<i>Euphorbia rhombifolia</i>
LC	MORACEAE	<i>Ficus cordata</i>
LC	MORACEAE	<i>Ficus ilicina</i>
LC	MALVACEAE	<i>Hermannia disermifolia</i>
LC	MALVACEAE	<i>Hermannia trifurca</i>
LC	AMARANTHACEAE	<i>Hermbstaedia glauca</i>
LC	SCROPHULARIACEAE	<i>Jamesbrittenia racemosa</i>
LC	KEWACEAE	<i>Kewa salsoloides</i>
LC	HYACINTHACEAE	<i>Lachenalia carnosa</i>
LC	AIZOACEAE	<i>Lampranthus watermeyeri</i>
LC	IRIDACEAE	<i>Lapeirousia silenoides</i>
LC	AIZOACEAE	<i>Leipoldtia schultzei</i>
LC	ASTERACEAE	<i>Leysera tenella</i>
LC	AIZOACEAE	<i>Mesembryanthemum guerichianum</i>
LC	ACANTHACEAE	<i>Monechma spartioides</i>
LC	GERANIACEAE	<i>Monsonia crassicaulis</i>
LC	IRIDACEAE	<i>Moraea filicaulis</i>
Alien	SOLANACEAE	<i>Nicotiana glauca</i>
LC	ASTERACEAE	<i>Osteospermum sinuatum</i>
LC	FABACEAE	<i>Otholobium striatum</i>

LC	ANACARDIACEAE	<i>Ozoroa dispar</i>
LC	GERANIACEAE	<i>Peliostomum virgatum</i>
Alien	FABACEAE	<i>Prosopis glandulosa</i>
Alien	EUPHORBIACEAE	<i>Ricinus communis</i>
LC	ZYGOPHYLLACEAE	<i>Roepera foetida</i>
LC	ZYGOPHYLLACEAE	<i>Roepera leptopetala</i>
LC	ZYGOPHYLLACEAE	<i>Roepera morgsana</i>
LC	AIZOACEAE	<i>Ruschia elineata</i>
LC	AIZOACEAE	<i>Ruschia viridifolia</i>
LC	AIZOACEAE	<i>Schlechteranthus albiflorus</i>
LC	ANACARDIACEAE	<i>Searsia undulata</i>
LC	ASTERACEAE	<i>Senecio sarcoides</i>
LC	LAMIACEAE	<i>Stachys flavescens</i>
LC	POACEAE	<i>Stipagrostis namaquensis</i>
LC	AIZOACEAE	<i>Stoeberia frutescens</i>
LC	AIZOACEAE	<i>Stoeberia utilis subsp. lerouxiae</i>
LC	AMARANTHACEAE	<i>Suaeda fruticosa</i>
LC	LORANTHACEAE	<i>Tapinanthus oleifolius</i>
LC	ZYGOPHYLLACEAE	<i>Tetraena retrofracta</i>
LC	SANTALACEAE	<i>Thesium lineatum</i>
LC	ASPHODELACEAE	<i>Trachyandra flexifolia</i>
LC	CRASSULACEAE	<i>Tylecodon paniculatus</i>
LC	CRASSULACEAE	<i>Tylecodon reticulatus subsp. reticulatus</i>
LC	CRASSULACEAE	<i>Tylecodon wallichii subsp. wallichii</i>
LC	FABACEAE	<i>Vachellia karroo</i>

¹**LC** = Least Concern; **VU** = Vulnerable

9.3.2 Bird species list

Provisional bird species list for Pleroma Nature Reserve (South African Bird Atlas Project, SABAP 2, Pentads: 2955_1740 & 2955_1750)

Common Name	Scientific Name	Red Data ¹	Endemism ²
Barbet, Acacia Pied	<i>Tricholaema leucomelas</i>		
Batis, Pririt	<i>Batis pririt</i>		
Bee-eater, European	<i>Merops apiaster</i>		
Bishop, Yellow	<i>Euplectes capensis</i>		
Bokmakierie	<i>Telophorus zeylonus</i>		
Bulbul, Cape	<i>Pycnonotus capensis</i>		E
Bunting, Cape	<i>Emberiza capensis</i>		
Bunting, Lark-like	<i>Emberiza impetuani</i>		
Buzzard, Jackal	<i>Buteo rufofuscus</i>		NE
Canary, Black-headed	<i>Serinus alario</i>		NE
Canary, White-throated	<i>Crithagra albogularis</i>		
Canary, Yellow	<i>Crithagra flaviventris</i>		
Chat, Ant-eating	<i>Myrmecocichla formicivora</i>		
Chat, Familiar	<i>Oenathe familiaris</i>		
Chat, Karoo	<i>Emarginata schlegelii</i>		
Cisticola, Grey-backed	<i>Cisticola subruficapilla</i>		
Crombec, Long-billed	<i>Sylvietta rufescens</i>		
Crow, Pied	<i>Corvus albus</i>		
Dove, Cape Turtle (Ring-necked)	<i>Streptopelia capicola</i>		
Dove, Laughing	<i>Spilopelia senegalensis</i>		
Dove, Namaqua	<i>Oena capensis</i>		
Eagle, Booted	<i>Hieraaetus pennatus</i>		
Eagle, Verreaux's	<i>Aquila verreauxii</i>	VU, LC	
Fiscal, Southern (Common)	<i>Lanius collaris</i>		
Flycatcher, Fairy	<i>Stenostira scita</i>		NE
Goshawk, Pale Chanting	<i>Melierax canorus</i>		
Hoopoe, African	<i>Upupa africana</i>		
Kestrel, Rock	<i>Falco rupicolus</i>		
Lark, Cape Clapper	<i>Mirafrapa apiata</i>		NE
Lark, Karoo	<i>Calendulauda albescens</i>		NE
Lark, Large-billed	<i>Galerida magnirostris</i>		NE
Martin, Rock	<i>Ptyonoprogne fuligula</i>		
Mousebird, White-backed	<i>Colius colius</i>		
Ostrich, Common	<i>Struthio camelus</i>		
Pigeon, Speckled	<i>Columba guinea</i>		
Plover, Three-banded	<i>Charadrius tricollaris</i>		
Prinia, Karoo	<i>Prinia maculosa</i>		NE
Robin-chat, Cape	<i>Cossypha caffra</i>		
Robin, Karoo Scrub	<i>Cercotrichas coryphoeus</i>		
Sparrow, Cape	<i>Passer melanurus</i>		

Spurfowl, Cape	<i>Pternistis capensis</i>		NE
Starling, Cape Glossy (Cape)	<i>Lamprotornis nitens</i>		
Starling, Pale-winged	<i>Onychognathus naboroupp</i>		
Sunbird, Dusky	<i>Cinnyris fuscus</i>		
Sunbird, Malachite	<i>Nectarinia famosa</i>		
Sunbird, Southern Double-collared	<i>Cinnyris chalybeus</i>		NE
Swallow, Greater Striped	<i>Cecropis cucullata</i>		
Swift, Alpine	<i>Tachymarptis melba</i>		
Swift, Little	<i>Apus affinis</i>		
Swift, White-rumped	<i>Apus caffer</i>		
Thrush, Karoo	<i>Turdus smithi</i>		NE
Tit-Babbler (Warbler), Chestnut-vented	<i>Sylvia subcoerulea</i>		
Tit-Babbler (Warbler), Layard's	<i>Sylvia layardi</i>		NE
Tit, Grey	<i>Melaniparus afer</i>		NE
Wagtail, Cape	<i>Motacilla capensis</i>		
Warbler, Rufous-eared	<i>Malcorus pectoralis</i>		
Waxbill, Common	<i>Estrilda astrild</i>		
Weaver, Cape	<i>Ploceus capensis</i>		NE
Wheatear, Mountain	<i>Oenanthe monticola</i>		
White-eye, Cape	<i>Zosterops virens</i>		NE
Woodpecker, Ground	<i>Geocolaptes olivaceus</i>	LC, NT	SLS

¹**LC** = Least Concern; **VU** = Vulnerable; **NT** = Near Threatened

²**E** = Endemic to South Africa; **NE** = Near Endemic to South Africa; **SLS** = Endemic to South Africa, Lesotho and Swaziland

9.3.3 Mammal list

Provisional mammal species list for Pleroma Nature Reserve (Fitzpatrick Institute of African Ornithology, 2019. MammalMAP Virtual Museum)

Family	Scientific name	Common name	Red list ¹
Bathyergidae	<i>Bathyergus janetta</i>	Namaqua Dune Mole-rat	LC
Bathyergidae	<i>Cryptomys hottentotus</i>	Southern African Mole-rat	LC
Canidae	<i>Otocyon megalotis</i>	Bat-eared Fox	LC
Herpestidae	<i>Herpestes pulverulentus</i>	Cape Gray Mongoose	LC
Leporidae	<i>Lepus capensis</i>	Cape Hare	LC
Leporidae	<i>Pronolagus rupestris</i>	Smith's Red Rock Hare	LC
Macroscelididae	<i>Elephantulus rupestris</i>	Western Rock Elephant Shrew	LC
Molossidae	<i>Tadarida aegyptiaca</i>	Egyptian Free-tailed Bat	LC
Muridae	<i>Aethomys namaquensis</i>	Namaqua Rock Mouse	LC
Muridae	<i>Gerbilliscus paeba</i>	Paeba Hairy-footed Gerbil	LC
Muridae	<i>Otomys unisulcatus</i>	Karoo Bush Rat	LC
Muridae	<i>Parotomys brantsii</i>	Brants's Whistling Rat	LC
Muridae	<i>Rhabdomys pumilio</i>	Xeric Four-striped Grass Rat	LC
Mustelidae	<i>Ictonyx striatus</i>	Striped Polecat	LC
Mustelidae	<i>Mellivora capensis</i>	Honey Badger	LC
Nesomyidae	<i>Petromyscus barbouri</i>	Barbour's Pygmy Rock Mouse	LC
Nesomyidae	<i>Petromyscus monticularis</i>	Brukkaros Pygmy Rock Mouse	LC
Petromuridae	<i>Petromus typicus</i>	Dassie Rat	LC
Soricidae	<i>Crocidura cyanea</i>	Reddish-gray Musk Shrew	LC
Soricidae	<i>Suncus varilla</i>	Lesser Dwarf Shrew	LC
Vespertilionidae	<i>Neoromicia capensis</i>	Cape Serotine	LC
Vespertilionidae	<i>Pipistrellus melckorum</i>	Melcks' Serotine	

¹LC = Least Concern

9.3.3 Reptile list

Provisional reptile species list for Pleroma Nature Reserve (Fitzpatrick Institute of African Ornithology, 2019. ReptileMAP Virtual Museum)

Family	Scientific name	Common name	Red list ¹
Agamidae	<i>Agama atra</i>	Southern Rock Agama	LC
Agamidae	<i>Agama knobeli</i>	Knobel's Rock Agama	
Colubridae	<i>Dipsina multimaculata</i>	Dwarf Beaked Snake	LC
Colubridae	<i>Telescopus beetzii</i>	Beetz's Tiger Snake	LC
Cordylidae	<i>Karusasaurus polyzonus</i>	Karoo Girdled Lizard	LC
Cordylidae	<i>Namazonurus peersi</i>	Peers' Girdled Lizard	LC
Gekkonidae	<i>Chondrodactylus bibronii</i>	Bibron's Gecko	LC
Gekkonidae	<i>Goggia rupicola</i>	Namaqua Pygmy Gecko	LC
Gekkonidae	<i>Pachydactylus namaquensis</i>	Namaqua Gecko	LC
Gekkonidae	<i>Pachydactylus weberi</i>	Weber's Gecko	LC
Gekkonidae	<i>Ptenopus garrulus maculatus</i>	Spotted Barking Gecko	LC
Gerrhosauridae	<i>Cordylosaurus subtessellatus</i>	Dwarf Plated Lizard	LC
Lacertidae	<i>Meroles ctenodactylus</i>	Giant Desert Lizard	LC
Lacertidae	<i>Meroles knoxii</i>	Knox's Desert Lizard	LC
Lacertidae	<i>Nucras tessellata</i>	Western Sandveld Lizard	LC
Lacertidae	<i>Pedioplanis sp.</i>		
Lacertidae	<i>Pedioplanis inornata</i>	Plain Sand Lizard	LC
Lacertidae	<i>Pedioplanis namaquensis</i>	Namaqua Sand Lizard	LC
Lamprophiidae	<i>Psammophis notostictus</i>	Karoo Sand Snake	LC
Scincidae	<i>Acontias tristis</i>	Namaqua Dwarf Legless Skink	LC
Scincidae	<i>Trachylepis occidentalis</i>	Western Three-striped Skink	LC
Scincidae	<i>Trachylepis sulcata sulcata</i>	Western Rock Skink	LC
Scincidae	<i>Trachylepis variegata</i>	Variegated Skink	LC
Testudinidae	<i>Chersina angulata</i>	Angulate Tortoise	LC
Testudinidae	<i>Chersobius signatus</i>	Speckled Padloper	LC
Typhlopidae	<i>Rhinotyphlops schinzi</i>	Schinz's Beaked Blind Snake	LC
Viperidae	<i>Bitis arietans arietans</i>	Puff Adder	LC

¹LC = Least Concern