



Meerkat National Park



Park Management Plan



For the period
2022 - 2031





Acknowledgement

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Section 1: Authorisation

This management plan is hereby internally accepted and authorised as required for managing the Meerkat National Park in terms of Sections 39, 40 and 41 of the National Environmental Management: Protected Areas Act No. 57 of 2003 (NEM: PAA).



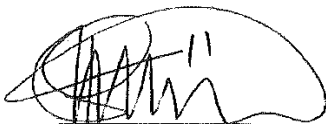
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Glossary

Aircraft	Means an airborne craft of any type whatsoever, whether self-propelled or not, and includes hovercraft and drones.
Budget	A budget is a quantification of all expenses and revenues for the specific year and should be aligned to the organisation's strategic plan to be achieved in the specific year. A park budget is the park's funding allocation.
Contractual park	An area which has been declared as National Park through the Minister and which contributes to the objectives of a National Park, but of which SANParks is not the land owner. Contractual National Park agreements and/or co-management agreements are signed, and SANParks may be assigned to be part of a joint management authority through a range of possible institutional arrangements.
Costing	An indication of the resources required to implement the Park Management Plan (PMP).
Desired state	The park's desired state is based on a collectively developed vision and set of objectives of the desired future conditions (that are necessarily varying, across the full V-STEEP range) that stakeholders desire.
Interpretation	Interpretation is the communication of information about, or the explanation of, the nature, origin, and purpose of historical, natural, or cultural resources, objects, sites and phenomena using personal or non-personal methods.
MeerKAT	The MeerKAT telescope is an array of 64 interlinked receptors (a receptor is the complete antenna structure, with the main reflector, sub-reflector and all receivers, digitisers and other electronics installed).
Mission	An articulation of the Vision that describes why the park exists and its overall philosophy on how to achieve its Vision.
Objectives hierarchy	The objectives for a park, with the most important, high-level objectives at the top, cascading down to objectives at finer levels of detail, and eventually to operational actions at the lowest level.
Servitude	A "servitude" shows a registered right that an entity / person has over the immovable property of another. It allows the holder of the servitude to do something with the other person's property, which may infringe upon the rights of the owner of that property.
Stakeholder	A person, an organ of state or a community contemplated in section 82(1)(a); or an indigenous community contemplated in section 82(1)(b) of the National Environmental Management: Biodiversity Act, (Act No. 10 of 2004) (NEM: BA).
Strategic adaptive management	Strategic adaptive management integrates research, planning, management and monitoring in repeated cycles of learning how to better define and achieve goals. Built on the assumption that natural systems are complex, our knowledge is imperfect but we can learn from purposeful goals and actions.
Vision	A word 'picture' of the future, or what the stakeholders see as the desired long-term future for the park.
Vital attributes	Unique or special characteristics of the park, the determinants of which management should strive to protect, and the threats towards which management should strive to minimise.
V-STEEP	The values (social – including cultural heritage, technological, ecological, economic and political), used to understand, with stakeholders, the social, economic and ecological context of the system to be managed, and the principles / values that guide management. These aspects provide context and are used to develop a broadly acceptable vision for the future.
Techno-ecosystems	A techno-ecosystem is a landscape interfacing technological developments and natural ecosystems.



Acronyms and abbreviations

1	°C	Degrees Celsius
2	AMSL	Above Mean Sea Level
3	AGA	Astronomy Geographic Advantage Act (Act No. 21 of 2007)
4	ARC	Agricultural Research Council
6	APO	Annual Plan of Operations
7	BSC	Balance Scorecard
8	BSP	Biodiversity Social Projects
9	CARA	Conservation of Agricultural Resources Act (Act No. 43 of 1983)
10	CBD	Convention on Biological Diversity
11	CDF	Conservation Development Framework
13	CH	Cultural Heritage
14	CPF	Co-ordinated Policy Framework
15	CRMF	Corporate Risk Management Framework
16	CSD	Conservation Services Division
17	CSIR	Council for Scientific and Industrial Research
18	DAFF	Department of Agriculture, Forestry and Fisheries
19	DBE	Department of Basic Education
20	DCA	Damage Causing Animal
21	DEA	Department of Environmental Affairs
22	DEAT	Department of Environment Affairs and Tourism
23	DPW	Department of Public Works
24	DWS	Department of Water and Sanitation
25	EDRRP	Early Detection and Rapid Repose Programme
26	EE	Environmental Education
27	EIA	Environmental Impact Assessment
28	EMP	Environmental Management Plan
29	EPWP	Expanded Public Works Programme
30	ESA	Early Stone Age
31	FEPA	Freshwater Ecosystem Priority Area
32	GG	Government Gazette
33	GN	Government Notice
34	HERA	Hydrogen Epoch of Reionisation Array
35	HIL	High Intensity Leisure
36	HIRAX	Real-time Analysis eXperiment
37	HRM	Human Resource Management
38	IAS	Invasive and Alien Species
39	IEMP	Integrated Environmental Management Plan
40	IDP	Integrated Development Plan
41	KLM	Kareeberg Local Municipality
42	KHLM	Karoo-Hoogland Local Municipality
47	PKSDM	Pixley Ka Seme District Municipality
48	l	Litre
49	LED	Local Economic Development
50	LIL	Low Intensity Leisure
51	LLP	Lower Level Plan
52	LSA	Late Stone Age
53	m	Metre
54	METT	Management Effectiveness Tracking Tool
55	mm	Millimetre

56	m/s	Millimeter per second
57	MSA	Middle Stone Age
58	NDM	Namaqua District Municipality
59	NEMA	National Environmental Management Act (Act No. 107 of 1998)
60	NDP	National Development Plan
61	NEM: BA	National Environmental Management: Biodiversity Act (Act No. 10 of 2004)
62	NEM: PAA	National Environmental Management: Protected Areas Act (Act No. 57 of 2003)
63	NHRA	National Heritage Resources Act (Act No. 25 of 1999)
64	NRF	National Research Foundation
65	OPEX	Operational Expenditure
66	PFMA	Public Finance Management Act (Act No. 01 of 1999)
67	PMP	Park Management Plan
68	POE	Portfolio of Evidence
69	PPD	Park Planning and Development
70	SAEON	South African Environmental Observation Network
71	SAHRA	South African Heritage Resources Agency
72	SAHRIS	South African Heritage Resources Information System
73	SAM	Strategic Adaptive Management
74	SANBI	South African National Biodiversity Institute
75	SANParks	South African National Parks
77	SAPS	South African Police Service
78	SARAO	South African Radio Astronomy Observatory
79	SDF	Spatial Development Framework
80	SED	Socio-Economic Development
81	SHEQ	Safety, Health, Environment and Quality
82	SMME	Small, Medium and Micro Enterprise
83	SOP	Standard Operating Procedure
84	SSC	Species of Special Concern
85	TOPS	Threatened or Protected Species
86	UA	Universal access
87	UNESCO	United Nations Educational, Scientific and Cultural Organisation
88	V-STEOP	Values - Social, Technological, Ecological, Economic and Political
89	WfW	Working for Water



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Executive summary

In compliance with the NEM: PAA, SANParks is required to develop a management plan for each of its protected areas. SANParks and South African Radio Astronomy Observatory (SARAO) have jointly developed the management plan for this park.

This park is a unique approach to conservation in general, the National Research Foundation (NRF) and SANParks have joined forces in a partnership to promote conservation and research. SANParks has been appointed by the NRF as the land manager to ensure biodiversity conservation. The primary function of this park will be to support research across the astronomy, biophysical and social spheres while ensuring the mandate of SANParks is achieved.

This park will not be a “traditional” national park where there is a strong emphasis on tourism experiences through the provision of tourism products and activities. However, SANParks is committed to the prioritisation of the conservation of biodiversity and cultural heritage and facilitating socio-economic development. It is acknowledged that the first five years will be challenging for park management due to the steep learning curve, working in partnership with SARAO and “developing” the park. Being a new park it will be essential for park management to reach out and build stakeholder relationships with various entities and groupings to ensure that the objectives in this plan can be achieved.

The desired state of the park is based on the mission, vital attributes and objectives. It encompasses the characteristic Nama Karoo biodiversity components, including ecological patterns and processes, as well as associated cultural, historical and scenic resources while facilitating benefits to the neighbouring communities by creating job opportunities and other forms of income generation, while remaining informed and constrained by its biodiversity values. Programmes to achieve the desired state, fall within five categories, *i.e.* biodiversity; cultural heritage; social and economic development; partnerships and effective park management.

The layout of the plan follows the format provided in the guideline drawn up by the Department of Environmental Affairs (DEA) (Cowan and Mpongoma, 2010) while also incorporating the adaptive planning process adopted by SANParks. Local and district municipalities and other organs of state, as well as other stakeholders were consulted as required (Appendix 2).



Introduction

This Management Plan will provide the broad strategic and operational framework for the management of the park, thereby ensuring the protection of the SANParks values and achievement of the goals and objectives of the park within the context of the broader regional landscape over the next five years. The plan serves as the key driving document and as a reference to the management and development of the park in its current and envisaged future form with information on the background, biophysical context, desired state, programmes at strategic and operational levels and costing.

This Management Plan will come into effect following the approval by the Minister of Environmental Affairs in terms of sections 39, 40 and 41 of the NEM: PAA. It is intended to be implemented over a timeframe of 10 years after commencement but may be replaced earlier by a subsequently approved plan. SANParks will review this plan no later than 10 years after the commencement date.

The plan contains the following sections:

- **Section 1** - provides for the required authorisation;
- **Section 2** - provides a record of the legal status of the park, descriptions of its context as well as relevant local, regional, national and international agreements;
- **Section 3** - sets out the framework of legislation, national policies, SANParks structures, policies, guidelines, practices regarding management;
- **Section 4** - describes the consultation process followed in the preparation of this plan;
- **Section 5** - presents the vision, purpose, values, principles and attributes considered in developing a desired state for the park and provides the high-level objectives as basis for the management programmes contained in Section 10 of the plan;
- **Section 6** - outlines the zoning plan;
- **Section 7** - describes access and facilities;
- **Section 8** - summarises the expansion and consolidation strategy;
- **Section 9** - sets out the concept development plan;
- **Section 10** - provides a strategic plan with programmes, objectives and activities with cost estimates. Monitoring and evaluation are integrated into the actions;
- **Section 11** - contains detailed costing of the programmes; and
- **Appendices** to this plan contain further details such as declarations, stakeholder participation report, park development framework, internal rules and maps.

In the interim period from when the contract is signed between the NRF and SANParks and the Management Plan is approved by the Minister, a Project Implementation Plan with an associated budget, will be implemented.

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Section 2: Legal status

2.1 Name of the area

The Meerkat National Park was declared on 27 March 2020 (Proclamation No. 15 / Government Gazette 43415 dated 27 March 2020). A full list of the declarations appears in Appendix 1.

2.2 Location

The Square Kilometre Array (SKA) core site is located in the Northern Cape Province. It is approximately 650 km from Cape Town, 900 km from Johannesburg and 90 km from Carnarvon. Access to the site is via a provincial tar road. The site consists of the 'core' area (SKA core) and three spiral arms.

2.3 History of establishment

The NRF and the SARAO, as it is currently known, initiated engagements with SANParks in 2010 to determine whether SANParks could be appointed as the land management authority in the event that South Africa and its eight African partner countries were awarded the right to host the SKA. The primary motivation for this engagement was that SANParks has the experience and expertise and would be able to manage the area. At the time, SANParks indicated that a minimum size of 100,000 hectares (ha) would be considered viable, given the need for large consolidated landscapes in arid environments.

Subsequent to the SKA site announcement in 2012, SARAO continued its interaction with SANParks on the basis that the land to be acquired by the NRF / SARAO is ±135,000 ha in extent, and that management of this land is not within SARAO / NRF's core competency. SANParks has, through its Executive Committee and Board, confirmed its interest in managing the protected area on behalf of the NRF / SARAO.

Land management responsibility is derived from South Africa's offer to host the SKA telescope and provide a site for the construction and operation of the facility. Whilst the offer pertains to the provision of a site, the final responsibility concerning management of the land in accordance with statutory requirements resulting from permits and licenses associated with the construction and operation of the SKA telescope (in particular, environmental authorisations) lies with the international SKA Observatory. Such responsibility would be delegated to SANParks through SARAO. As a result, a large proportion of the costs associated with this agreement would be recoverable through a separate partnership agreement between SARAO and the international SKA Observatory, which has been established as an intergovernmental organisation in 2019 / 2020.

Apart from the protection of the SKA site through the Astronomy Geographic Advantage Act, No 21 of 2007 (AGA), also applicable to the national park, SARAO wants to ensure the protection of the environment / ecosystem through biodiversity conservation and the promotion of long-term environmental research and monitoring, including global climate change. This was in fulfilment of its environmental obligations in terms of the management outcomes of the Integrated Environmental Management Plan for the SKA radio telescope. The national park thus falls within the Karoo Core Astronomy Advantage Area and the Karoo Central Radio Astronomy Advantage Area 3 in terms of the AGA.

The declaration of the NRF-owned land as a National Park will allow for the creation of multi-disciplinary research platforms, combining Astronomy and Earth Sciences in the SKA Observatory. The National Park will enhance heritage, archaeological, ecological, aquatic, flora and fauna conservation and will promote resource management.

The proposed declaration of the SKA Core as a protected area has already been included in the Northern Cape Department of Environment and Nature Conservation's Protected Area Expansion Strategy which is in line with the objectives of the National Protected Area Expansion Strategy (DEA, 2015) to promote national ecological and climate change resilience by guiding protected area expansion in a cost-effective manner.

The protection status of South Africa gives an indication of how well the vegetation types are represented and thus conserved within the protected area network. Considering the protection status of the SKA site, it is clear that the majority of the vegetation types present are not protected and only a small portion of the site is protected. The protection status suggests that the SKA site is located within a part of South Africa that is still under represented environmentally. Four vegetation types occurring in the park. Bushmanland Basin Shrubland and Bushmanland Vloere are not protected at all, while the Western Upper Karoo is only <0.5 % protected (DEA, 2015). The Upper Karoo Hardeveld is in a better position with 23 % of the vegetation type protected. With the proposed park covered by 95 % of the poorly to not protected vegetation types, it would have a significant impact on the protection of the Nama Karoo, increasing the overall protection in the biozone by a further 38.64 % in addition to increasing the representation of poorly conserved vegetation.

2.4 Contractual agreements

The whole park is a contractual National Park. Table 1 below provides a summary of the land that was contractually included.

Table 1. Land included, by declaration, into the park.

Title deed	Farm name	Portion No	Extent (Ha)	Owner	Government Gazette	Proclamation date	Period
T47450/2008	Mey's Dam No 68	Full farm	7,046.0463	NRF	43415	27/03/2020	As per contract
T45934/2008	Los Berg No 73	Portion 1	1,825.2707				
	Los Berg No 73	Remainder of	4,535.4929				
T49289/2016	Blauuw Heuvel No 96	Full farm	5,465.0025				
T46437/2016	Groot Paarde Kloof No 74	Full farm	7,779.9230				
T63456/2016	Schiet Poort No 64	Portion 1	1,571.9601				
T67474/2016	Waterkloof 69	Full farm	6,494.0401				
	De Hoek 70	Full farm	4,667.1001				
T70250/2016	Schiet Poort 64	Portion 2	1,571.9747				
T74872/2016	Boter Leegte 65	Portion 2	5,382.0434				
T882/2017	Visserskloof 69	Portion 3	4,355.4745				
T1381/2017	Zout Rivier 71	Portion 2	1,462.0489				
	Zout Rivier 71	Remainder of	1,487.3191				
T3495/2017	Rooi Zand 72	Portion 1	3,809.8590				
T793/2017	Rooizand 72	Remainder of	3,809.9209				
T1292/2017	Visserskloof 69	Portion 2	4,364.4744				
	Dubbelde Vlei 63	Remainder of	3,471.6445				
T3702/2017	Farm Zout Rivier 71	Portion 3	1,462.0469				
T2916/2017	Farm Jas Kloof 76	Remainder of	3,681.6733				
	Farm Jas Kloof 76	Portion 1	3,660.8330				
T2838/2017	Farm Visserskloof 69	Portion 1	8,730.1999				
T3318/2017	Farm Swartfontein 496	Remainder of Portion 1	2,288.3589				



Title deed	Farm name	Portion No	Extent (Ha)	Owner	Government Gazette	Proclamation date	Period
T2915/2017	Zout Rivier 71	Portion 1	4,386.0966	NRF	43415	27/03/2020	As per contract
T2921/2017	Pofadderfontein 494	Portion 1	2,220.2674				
	Pofadderfontein 494	Portion 2	2,220.2627				
T2132/2017	Poffadderfontein 495	Portion 2	1,882.1315				
	Poffadderfontein 495	Portion 3	1,756.9467				
T4271/2017	Schiet Poort 64	Remainder of	3,165.0657				
T5584/2017	Pofadderfontein 495	Remainder of	1,522.9723				
T882/2017	Snyman's Hoop 71	Portion 2	2,753.9231				
	Erf No 4 Van Wyks Vlei Settlement	Remainder of	1,827.867				
	Erf 149 Van Wyks Vlei Settlement	Full farm	913.9345				
T1117/2018	Farm Bitter Water 67	Remainder of Portion 1	2,080.7051				
	Farm Swartfontein 496	Remainder of	3,234.1240				
	Farm Boter Leegte 65	Remainder of	5,494.0742				
	Farm Swartfontein 496	Portion 2	945.8000				
	Farm Brakputs 66	Portion 1	263.6305				
	Farm Bitter Water 67	Portion 2	3,368.7443				
	Farm Brak Puts 66	Remainder of	7,996.1359				
	Farm Botterleegte 65	Portion 1	289.976				

2.5 Co-management agreements

There are currently no co-management agreements in effect.

2.6 Total area

The park is currently 135,245 ha in size, all of which is declared (Appendix 5, Map 3).

2.7 Highest point

The highest point in the park is in the south-western corner of the park at 1,418 m (4,651 feet) AMSL. The latter is of note, for the airspace above the park up to 2,500 feet above the highest point, as per legislation, is also deemed National Park (Appendix 5, Map 2). Therefore, the park's airspace ranges from ground level to 7,151 feet AMSL.

2.8 Municipalities in which the park falls

The park is situated within the following local and district authority boundaries:

- Namaqua District Municipality (NDM);
- Karoo-Hoogland Local Municipality (KHLM);
- Pixley Ka Seme District Municipality (PKSDM); and
- Kareeberg Local Municipality (KLM).

2.9 Land claims

There are no land claims registered against any portion of land within the park.

2.10 International, national and provincial listings

There are no relevant international, provincial or local listings applicable to the park.

2.11 Environmental authorisations

No environmental authorisation had been issued to SANParks when this document was approved. Environmental authorisations applicable to SARAO and SKA are included in the Integrated Environmental Management Plan (IEMP).

2.12 Biophysical description

2.12.1 Climate

2.12.1.1 Historic

The Nama-Karoo can be described as a semi-arid to arid environment. The climate of the Nama-Karoo is determined by 1) the degree of latitude, in this case falling within the sub-tropical high pressure belt that brings with it dry air and open skies; 2) the distance from the sea, meaning a moderate maritime climate is lacking (it thus has a continental-type climate); and 3) elevation and topography as it influences both rainfall and temperature (Venter *et al.*, 1986; Desmet and Cowling, 1999).

The Carnarvon-Van Wyksvlei-Williston-Brandvlei region, which surrounds the park, falls predominantly in a summer-autumn rainfall area (Esler *et al.*, 2006). 53-year rainfall data (1953 - 2006) obtained from a private farmer adjacent to the SKA core radio astronomy observatory (Uitspan Kolk; J. Jacobs), confirms predominantly summer and autumn rains, divided almost equally between the seasons. The mean annual precipitation recorded on this private farm was 224 mm per year, with a standard deviation of +/-110 mm. Mean annual precipitation measured closer to the town of Carnarvon between 1932 and 2013, <50 km away from Uitspan Kolk, was 215 mm (Du Toit *et al.*, 2015), but with a lower standard deviation of +/-85 mm.

Lastly, Venter *et al.* (1986) calculated the geographic distribution of the reliability of annual rainfall in the Karoo and the Carnarvon district. A rainfall reliability index of between 60 - 65 % of the mean was calculated. Venter *et al.* (1986) further documented 10 - 15 year oscillations from one wet spell to another, but more recently Du Toit *et al.* (2015) calculated 22-year cycles for Carnarvon. As rainfall events drive primary and secondary production in the Karoo system, both temporal and spatial variability of rainfall would thus cause large fluctuations in animal population sizes and dispersion across the area.

The Nama-Karoo is known to be an area of great temperature extremes (Mucina *et al.*, 2006). A temperature difference of 25 °C between day and night is not extraordinary (Venter *et al.*, 1986). Maximum temperatures range from 33 °C in summer to 16 °C in winter, and minimum temperatures from 16 °C in summer to 1 °C in winter. In extreme years, Venter *et al.* (1986) found that the region surrounding Carnarvon can have between 120 - 150 days a year where maximum temperatures are above 30 °C.

Temperatures may also reach below freezing (Palmer and Hoffman, 1997). Ellis (1988) predicted the Carnarvon district would lose about 3,201 mm of water through evaporation. This greatly exceeds the average annual rainfall of around 200 mm. Moreover, this area was measured having the second highest evaporation rate, with only Pofadder to the west having higher evaporation of 3,536 mm (Ellis, 1988).



Average annual wind speeds measured for the Carnarvon district between 1978 and 1994 were mostly between 5.6 and 8.7 m/s, but can reach up to 15 m/s. West and northwest winds are the most common. Winds are thus moderately strong to strong in nature, and although good for wind pumps and favouring seed distribution, it could in turn aggravate evaporation, dust generation and transport. Wind-driven dust devils are also common (Desmet and Cowling, 1999). In particular, strong and persisting winds in the summer rainfall season may negatively affect plant water uptake by drying out the air and thus increasing evapotranspiration. On average only 27,4 % wind still days are recorded annually. The windiest months are October to January, with wind still days dropping to 14.7 % in November.

2.12.1.2 Future

Average minimum and maximum temperatures in summer are currently around 16 - 17 °C and 32 - 33 °C respectively, while winter days have minima around 2 - 4 °C and maxima around 20 - 22 °C (Fortescue & Breetzke, 2011). However, among the fastest national rates of change in maximum temperature have been measured at Van Wyksvlei between 1960 and 2003 (>0.4°C/per decade, Kruger & Shongwe, 2004). Very hot days (>35 °C), hot day events (maximum temperature >30 °C for 3 or more days) and warm night events (minimum temperature >15 °C for 3 or more days) have also increased significantly in this region over the last 50 years, while cool days (maximum temperature below 15 °C) are less frequent (Kruger & Shongwe, 2004). An increase in average annual temperature of 1 - 3 °C is predicted by 2050, with increases in excess of 5 °C expected by the end of the century (DEA, 2013), but the changes that have already been observed suggest that a further 1 °C increase is highly conservative.

Increased temperatures will shift hot extremes to uncomfortable levels significantly more frequently, reducing the ability of people to work outdoors. Most likely scenarios of change predict reduced rainfall regionally which will be further exacerbated by higher temperatures. In certain areas, the predicted changes in climatic conditions may move outside of ranges previously recorded in the Nama Karoo, and more closely resemble climates associated with desert areas. The impact of reduced water and increased temperatures on plants and animals remain uncertain, but biodiversity loss and species turnover is likely.

Information on other changes in the region is, however, not available as there are not enough weather stations with a sufficiently long record of climate information to analyse trends. The SARAO started recording information on a number of climatic variables in 2011, and will provide useful information in the future on changing weather patterns.

2.12.2 Topography

The SKA area mostly lies between 950 m and 1400 m AMSL. Although popularly thought of as largely flat, the topography of the Nama-Karoo, including the SKA area, is heterogeneous. Landscapes may consist of a gradient of depressions where pans form, large open plains that occasionally flood, and steep-sloped sandstone, shale and dolerite containing buttes and mesas (the classic Karoo koppies landscape). In fact, mesas and buttes in the SKA area introduce many sun-exposed and shaded micro-sites. Dolerite rocky outcrops further add to the ruggedness of the SKA terrain.

2.12.3 Geology and soils

The geology of the park is typical of the Nama-Karoo. The deepest layers represent the Cape Supergroup, with subsequent layers of Dwyka tillites and later the Karoo Supergroup, the latter consisting of the Ecca and Beaufort Groups (Mucina *et al.*, 2006). The Beaufort group is especially characteristic in this part of the Nama-Karoo, comprising shale with intrusions of dolerite (Visser, 1986). Another distinct characteristic of the Beaufort Group is also its richness

in fossils (Cluver, 1978; Esler *et al.*, 2006). The significance of dolerite intrusions to the topography in the park, such as sills and dykes, is creating an uneven plane via forming prominent buttes and mesas. This is due to the dolerite being more resistant to weathering than the surrounding shale (Visser, 1986).

The aridity of the area provides only small amounts of water for the weathering of rocks through chemical reactions. Thus, a lot of the rocks get weathered slower than in humid areas. This eventually leads to the Karoo soil having a soil morphology still inherited from the parent material (Ellis, 1988). The landscape may thus be full of rocks and pebbles (Mucina *et al.*, 2016). Specifically, top soils in the park are considered Orthic A, meaning young soils with no special features and that are distinctly depauperate in organic matter (Watkeys, 1999). Furthermore, soils would typically be red and yellow apedal soils (sandy soils), that are lime rich, and shallow (<300 mm; except alluvial soils in the mighty Sak River, that can be 1,000 mm thick; Watkeys, 1999). The major underlying soil material for Carnarvon is thus shallow Limestone (57.3 %) followed by deeper Limestone (13.9 %). Top soil is also likely to be 57.6 % sandy, 40.9 % loamy and only 1.5 % very sandy (Ellis, 1988). Butte and mesa slopes can be high in scree. The soil derived from the shale should be rich in plant nutrients (Esler *et al.*, 2006).

2.12.4 Freshwater ecosystem

Most of the interior basins in the Nama-Karoo area are drained by ephemeral rivers (Palmer and Hoffman, 1997). However, mean annual runoff in the Carnarvon region should be very low (0.65 mm). Görgens and Hughes (1986) attribute low runoff to the flatness of the area, which rather drives the forming of many localised pans. These pans further contribute to the already high evaporative losses in the area.

Transient aquatic biotopes, such as rivers and pans, are all interlinked as each component forms part of the area's stream and drainage system. However, each component differs in its anatomy and function, hosting plant communities more suitable to each (Milton, 1990). Micro tributaries in the park, that is, small streams <1 m in diameter, add disproportionately higher ecological value than the larger and comparatively drier matrix, the former hosting considerably more species and biomass, especially water-loving grasses such as *Fingerhuthia africana*, *Eragrostis capensis* and *Cenchrus ciliaris* (Crous *et al.*, unpublished data). Large to very large streams and channels are more prominently noticeable in the Karoo landscape, which is evident in the SKA area. These conduits form an important riparian biotope for trees and other water-demanding species, e.g. reeds, and are also critical in distributing water throughout the wider landscape, finally reaching individual base levels (e.g. pans).

Ephemeral pans are essentially temporary (or local) stream erosion bases; that is, they represent the lowest terrestrial elevation in the landscape. Ephemeral pans thus signify low-level areas in the landscape below which the stream can no longer erode its channel, until major geological shifts change the landscape topology. Therefore, apart from being really important to maintain hydrological regimes, these pans are also important biotopes. Water accumulates here for extensive periods, offering habitats for biota varying from birds to isopods (pill bugs), and numerous phyllopods, e.g. fairy shrimps (Hamer and Rayner, 1996). But many other small arthropods are to be found in these pans, some that have up to now hardly ever been studied (Dr Betsie Milne, *pers. comm.*). In the park, these pans cover ca. 70 km² (Todd and Henschel, 2016).

2.12.5 Terrestrial flora

The park encompasses four major vegetation types in the Nama-Karoo Biome. Three of these are terrestrial, *namely* Western Upper Karoo (NKu1), Upper Karoo Hardeveld (NKu2), and Bushmanland Basin Shrubland (NKb6); one vegetation type is aquatic, or azonal zone, called Bushmanland Vloere (AZi5) (Mucina *et al.*, 2006).

The main drivers of current plant structure and function in the Nama-Karoo are considered to be aridity and grazing. The main growth forms of the Nama-Karoo are classified as large and dwarf shrubs, leaf succulents, bulbous monocotyledons, bulbous dicotyledons, grasses, and annuals. From these growth forms, annuals are most prominent, followed by shrubs <1 m (Palmer and Hoffman, 1997).

The Nama-Karoo has low species diversity and endemism. A total of 223 plant species were recorded in the park between 2016 and 2018 (Van der Merwe 2017, unpublished data; Crous *et al.*, 2018, unpublished data). Of these, 3 % (five species) were considered trees. Where frost occurs, as in this region, trees usually constitute less than 3 % of the species (Palmer and Hoffman, 1997). However, of the few tree species present, most are typically vulnerable to environmental degradation and some are even under formal protection. For example, there are many populations of shepherd's tree *Boscia albitrunca* in the landscape, a tree protected by the National Forest Act (Act No. 84 of 1998). Another significant species in the landscape is the quiver tree *Aloidendron dichotomum*. The Red data list for South African plants



categorises *A. dichotomum* as Vulnerable (Foden, 2005). A classification as vulnerable means quiver trees meet at least one of the five International Union for the Conservation of Nature (IUCN) criteria for Vulnerable, indicating populations are facing a high risk of extinction. Indeed, considerable population dieback is predicted for some regions due to drought (Foden *et al.*, 2007), particularly seen in juveniles, thus threatening site recruitment dynamics (Jack *et al.*, 2016). Even though the populations of quiver trees in the park appear to be in a healthy condition, this location is at the boundary of the species' range (van der Merwe and Geldenhuys, 2017). Large populations of ghaap *Hoodia gordonii*, which is of high cultural value to the San people, are also present (Wynberg and Chennels, 2009). Furthermore, six species of the geophyte *Oxalis* were also found on rocky southern slopes (Crous *et al.*, 2018, unpublished data). Of these, one could be new to science (to be confirmed with DNA analysis), and two represent range extensions for South Africa. Lastly, because plant coverage is low (20 – 40 %), soil erosion can be high during heavy rainfall years (Esler *et al.*, 2006; Mucina *et al.*, 2006), and plant cover loss and later soil erosion will thus remain a major risk to manage in the park. Table 2 below describes the identified vegetation types.

Table 2: Vegetation types in the park.

Vegetation types	Description
Bushmanland Basin Shrubland	Areas consisting of this vegetation type are characterised by slightly irregular plains dominated by a dwarf shrubland, with succulent shrubs or perennial grasses in places. There are few endemic species present and only three species are listed as being endemic to this vegetation type, which is very few considering the extent of this vegetation type. Typical and dominant genera include shrubs such as <i>Lycium</i> , <i>Rhigozum</i> , <i>Pentzia</i> , <i>Eriosephalus</i> , <i>Osteospermum</i> , <i>Ruschia</i> , <i>Pteronia</i> , <i>Zygophyllum</i> , <i>Salsola</i> and grasses including <i>Stipagrostis</i> , <i>Aristida</i> , <i>Enneapogon</i> and <i>Tragus</i> . Within the park large parts of this vegetation type are degraded as a result of historical overgrazing and dominated by extensive stands of <i>Rhigozum trichotomum</i> .
Upper Karoo Hardeveld	This vegetation type occurs as discrete areas associated with slopes and ridges as well as most south-facing slopes and crests. Mucina and Rutherford (2006) list 17 species known to be endemic to this vegetation type. This is a high number given the wide distribution of most Nama Karoo species and illustrates the relative diversity of this vegetation type compared to the surrounding vegetation types. Typical and dominant species characteristic of these areas include grasses such as <i>Themeda triandra</i> , <i>Heteropogon contortus</i> , <i>Enneapogon scaber</i> , <i>Digitaria eriantha</i> , <i>Eragrostis lehmanniana</i> and <i>Aristida diffusa</i> subsp. <i>burkei</i> ; shrubs such as <i>Felicia filifolia</i> , <i>Pentzia globosa</i> , <i>Hermannia filifolia</i> , <i>H. munitiflora</i> , <i>Melolobium candicans</i> , <i>Nenax microphylla</i> , <i>Eriosephalus ericoides</i> , <i>Asparagus suaveolens</i> and <i>Chrysocoma ciliata</i> and low trees and large shrubs such as <i>Searsia burchellii</i> , <i>Ehretia rigida</i> and <i>Lycium oxycarpum</i> , <i>Cadaba aphylla</i> , <i>Melanthus comosus</i> and <i>Buddleja glomerata</i> . Within the park, this is an important vegetation type that significantly contributes to the diversity of the area, and many of the fauna and flora here are associated with the rocky hills characteristic of this vegetation unit.
Bushmanland Vloere	This vegetation type is associated with the flat and very even surfaces of pans and broad bottoms of intermittent rivers. Although the centre of the pans are often devoid of vegetation, the margins are usually vegetated with species such as <i>Rhigozum</i> , <i>Lycium</i> and <i>Salsola</i> . This vegetation type is classified as Least Threatened and about 2 % has been transformed largely for crop production. According to Mucina and Rutherford (2006), a reliable floristic characterisation of this unit is not feasible at this stage as it has been very poorly studied and the genus <i>Salsola</i> which dominates many of these areas is also under revision. Within the park, there are extensive pan systems along the north-eastern boundary and this is an important landscape features of the park.

Vegetation types	Description
Western Upper Karoo	This vegetation type is associated with Karoo sediments of the Beaufort Group and to a lesser extent the Waterford Formation, with dolerite intrusions in places. Important genera include various shrubs such as <i>Lycium</i> , <i>Eriosephalus</i> , <i>Pentzia</i> , <i>Pteronia</i> , <i>Rosenia</i> , <i>Ruschia</i> and <i>Salsola</i> as well as grasses including <i>Stipagrostis</i> , <i>Aristida</i> and <i>Eragrostis</i> . Typically, this vegetation consists of a mix of grasses and shrubs and has a higher proportion of grasses than Bushmanland Basin Shrubland.

2.12.6 Terrestrial fauna

Mammals

A total of 29 mammal species have been recorded in the park (Blanckenberg, 2018, unpublished data; Crous 2018, unpublished data). This includes mainly meso-predators such as black-backed jackal *Canis mesomelas* and caracal *Caracal caracal*, smaller antelope such as steenbok *Raphicerus campestris* and springbok *Antidorcas marsupialis*, aardwolf *Proteles cristata*, aardvark *Orycteropus afer*, porcupine *Hystrix cristata*, rock hyrax *Procavia capensis*, and three bat species. None of the recorded mammals are considered threatened or vulnerable, except for the Natal long-fingered bat *Miniopterus natalensis*, which is considered Near-Threatened in South Africa (Monadjem *et al.*, 2010). These migrating animals were recorded near rocky crevices of dolerite mesas and buttes in the park (Crous, 2018, unpublished data), and are likely hibernating in these areas during winter (Monadjem *et al.*, 2010). Brown hyena *Hyaena brunnea* and leopard *Panthera pardus* historically occurred in this area, and the establishment of a large protected area in Upper Karoo Hardeveld mesas, is highly likely to attract these scarce Karoo mammals again (Drouilly *et al.*, 2018). Many mammals were driven out of the SKA area due to fencing and killing, as well as the fragmentation of the area. Other important species that could occur here are the black-footed cat *Felis nigripes*, listed by the IUCN Cat Specialist Group as rare and vulnerable, and most importantly the riverine rabbit *Bunolagus monticularis*, listed by the IUCN as critically endangered.

Reptiles

The area has been extremely poorly sampled for reptiles and while the literature suggests that as many as 40 reptiles may occur in the wider area, the ReptileMAP database lists only seven species for the degree square 3021, highlighting the poor historical sampling of the area. Clearly, additional sampling in the area is required to better characterise the reptile community of the area. It is likely that the rocky hills will contain the greatest reptile diversity as it offers the greatest variety of habitats and shelter sites and species such as geckos, skinks and snakes are likely to be fairly diverse in these areas. Although the occurrence of reptile species of high conservation concern is not anticipated in the area, some range extensions can probably be confirmed with reptile sampling at the site. The Karoo tent tortoise *Psammobates tentorius tentorius* is one of the more common reptiles in the park and is regionally endemic but fairly widespread in the Karoo.

Amphibians

The majority of species present in the area are relatively independent of water. Species include the sand frog *Tomopterna cryptotis* that does not require water to breed, and the Karoo toad *Bufo gariensis* or common caco *Cacosternum boettgeri* that breeds in temporary pools. The key natural perennial water body in the park is located at Groot Paardekloof, in the form of a natural spring that does not dry up in the river bed. Areas like these are therefore of critical conservation value for frogs in a landscape that is otherwise generally hostile for amphibians. The role of subsurface water toward amphibian presence and persistence in this landscape is unknown, and needs further investigation.

Birds

The total bird species richness associated with the park was estimated to be between 215 and 264 (Dean, 2017). The majority of these are resident species and not rare in the landscape. However, there are 25 near-endemic species associated with the park, and two endemics namely the red lark *Calendulauda burra* (Vulnerable) and Sclater's lark *Spizocorys sclateri* (Near-threatened) (Dean, 2017). The former is especially associated with the rare red dune ecosystems found in the upper western parts of the park, and these dunes are therefore of special conservation concern. Apart from the two larks, Dean (2017) suggested the cinnamon-breasted warbler *Euryptila subcinnamomea* is the third priority species that deserves conservation in the park. Dean (2017) also highlighted how bird species richness diminishes with the rainfall gradient from low to higher as one traverses from west to east in the Karoo.



The following bird species would further be of conservation concern and could thus benefit from a protected area: Martial Eagle (Vulnerable), Lanner Falcon (Near-threatened), Secretary bird (Vulnerable), Kori Bustard (Near-threatened), Ludwig's Bustard (Endangered), Karoo Korhaan (Near-threatened), Chestnut-banded Plover (Near-threatened), Verreaux's Eagle (Vulnerable), Black Harrier (Endangered) and Lanner Falcon (Vulnerable). Flamingo species (Near-threatened) may also occasionally be present at the pans when they hold water (Todd and Henschel, 2016; Dean, 2017).

Invertebrates

Often overlooked, invertebrates play a vital role in ecosystem functioning (Samways, 2005). Insects like the honeybee *Apis mellifera* and ants like the harvester ant *Messor capensis* are just some of the species found in the park, and play a cardinal role in the pollination of plants and dispersal of seeds (Dean and Yeaton, 1993). Many insects like termites are also essential for nutrient recycling in the soil. The presence of "heuweltjies" in the park suggest termites had historically been active and important ecosystem engineers. Invertebrate surveys and studies are overall underrepresented in this area.

2.13 Cultural heritage

The geological context of the Northern Cape is associated with sediments of the Karoo Supergroup of Early to Middle Permian age (Le Roux & Keyser, 1988; Viljoen, 1989; Prinsloo, 1989; Johnson, *et al.*, 2006; Almond, 2016; Bamford, 2018). In general, the Karoo Supergroup is associated with fossil remains. In the SKA area and environs, a few fossils have been found and recorded, these include flora e.g. petrified wood, fauna e.g. dinocephalians, aquatic fauna e.g. temnospondyl and trace fossils e.g. tetrapod trackways (Digby Wells Environmental, 2018).

Beaumont *et al.* (1995) describes the archaeology of the Northern Cape as rich and varied with many Stone Age tools scattered in the landscape. The Early Stone Age (ESA), Middle Stone Age (MSA) and Late Stone Age (LSA) are well represented in the Northern Cape and the SKA in particular. The ESA tools in this area may include long blades, cores and low incidence of formal tools such as hand axes and cleavers. Most of these MSA tools are minimally modified blades and points produced from good quality raw material, including hornfels (which is highly patinated) and quartz (Orton, 2016). Generally, there are very few well-researched MSA sites in the Northern Cape. However, stone tools are, in association with pans, dispersed throughout the landscape (Beaumont, *et al.*, 1995). In most instances these stone tools will be heavily weathered mainly because of the raw material used as well as the morphology of the area (Beaumont *et al.*, 1995).

There are LSA sites in the SKA area that are associated with the period when the area was occupied the Bushmen and the Khoekhoe pastoralists. Stone tools associated with the LSA are specialised tools created for specific purposes, however, bone tools were also introduced into the assemblages (Mitchell, 2002). LSA tools of the Northern Cape and the SKA in particular, are commonly represented by expression of the Final LSA the latest LSA techno-complex. These techno-complexes represent tangible material culture markers of different socio-economic identities associated with the San and Khoekhoe respectively. Archaeologically, these commonly correlate with the Swartkop (*i.e.* hunter-gatherer) and Doornfontein (*i.e.* pastoralist) variants (Beaumont & Vogel, 1984; Beaumont, *et al.*, 1995; Parsons, 2003, 2006, 2008).

The LSA period in the SKA area is also characterised by rock art sites. These rock art sites are believed to have been used for ritual practices (Deacon & Deacon, 1999; Morris, 2012). The rock art within the Northern Cape and the SKA area includes both engravings and paintings. Rock engravings are commonly found in the open, on boulders or exposed glaciated pavements within the central plateau of the interior of South Africa (Morris, 1988; Smith & Ouzman, 2004; Morris, 2012). In addition, the sites are commonly identified in escarpment and mountainous

areas and valleys where shelters occur and provide panels for paintings (Hollmann & Hykkerud, 2004; Morris, 2012). A total of 105 archaeological sites were recorded in surveys between 2015 and 2016. The survey of 2018 recorded another 30 archaeological sites consisting of graves, rock painting, rock engravings, early, middle and late Stone Age tools (Digby Wells Environmental, 2018).

The area between Kenhardt and Carnarvon is believed to have been occupied mainly by the /Xam hunter-gatherers. This area was known as /Xam-ka-lau. Significantly, Wilhelm Bleek and Lucy Lloyd recorded the folklore and beliefs of this group in their language during the 1870s (Deacon & Foster, 2005). This is the only example where this occurred in South Africa, providing insights into the /Xam worldview, rock art of the region and relationship with the landscape (Deacon, 1988; Deacon, 1996; Deacon & Foster, 2005). Some important and significant areas associated with the Bleek and Lloyd manuscripts include Abiquaputs in the Brandvlei Spiral, and Groot Paardekloof within the SKA core area.

The Khoekhoe pastoralist groups later arrived in the landscape and lived with the /Xam. The Khoekhoe main group were the Korana also known as Koranner, Corana, Koranna and the Kora (Coplan, 2000; Landau, 2010). Their arrival in the region is subject to debate, centred on models of either migration or diffusion of the “pastoralist package” into the Cape (Ehret, 1982; Elphick, 1985; Schrire & Deacon, 1989; Smith, 1992; Sealy & Yates, 1994; Ehret, 1998; Smith & Ouzman, 2004; Fauvelle-Aymar & Sadr, 2008). The Khoekhoe had a distinctive lifestyle and material culture, and this can be identified in the SKA area and surroundings. Some of the material culture is however biodegradable and is no longer visible. They lived in temporary camps made from mat huts and built stone structures amongst which sheep and goats were kept safe at night, and they used LSA stone tools and ceramics (Sadr, 2008). The pastoralists are thought to have moved quickly across the landscape in search for new pastures commonly along well watered and fertile inland river valleys (Arthur, 2008).

The Xhosa people also settled in the SKA area and surroundings by 1830. They moved up north in search of independence from the Cape Colony, and to exploit the cattle and ivory trade. They settled throughout the landscape amongst groups of San, Korana and Griquas, along, amongst other, the Zak River (Sak River), and Schietfontein (Carnarvon) (Anderson, 1985). The Xhosa settled mainly along rivers to sustain their agricultural practices and married indigenous San women, Korana and Griqua pastoralist, increasing the population significantly over the following years. This increase in population within an already harsh environment, led to competition for resources (Anderson, 1985). The significant increase of sheep and cattle associated with the Xhosa, Korana and Griquas’ resulted in overgrazing of grass seeds, which was a common food staple for the /Xam. This, in and of itself, exacerbated the raiding of livestock by the /Xam (Deacon & Foster, 2005), and consequent skirmishes between the Xhosa and /Xam (Anderson, 1985). These circumstances worsened with the influx of Europeans from the south.

Missionaries first moved through the region during the late 18th century (Cadman, 2007). As these missionaries moved northward, they established mission stations at various locales, two relevant examples being Amandelboom from which Williston was founded, and Schietfontein (Carnarvon). The Rhenish Missionary society initially established the Amandelboom mission station in the Zak River area, after which the “Schietfontein” Xhosa petitioned for a mission station of their own. The Reverend C.W. Alheit was dispatched to the area. Many groups who did not agree with the mission stations authority or religion, migrated elsewhere. Rev. Alheit played a dominant role in Carnarvon (*Schietfontein*). His presence influenced the perceptions of colonial officials and the increasing number of white stock farmers (Anderson, 1985).

Many white farmers considered stock farming as a viable alternative to grain and vineyards. Migrants initially moved into the Karoo area with wagons, tents and *matjieshuise*, adopting a transhumance farming economy (Walton, 1989; Kramer, 2011). The influx of more people into the area led to land shortages and consequently tensions among the different groups. It is believed that many /Xam Bushmen perished at the hands of commandos organised by frontier farmers and a number of women and children were forced to into slavery (De Prada-Samper, 2012). During this period, the first permanent structures were constructed using the available material. The result was a vernacular architecture known as corbelled buildings (Kramer, 2011). The remains of a few of the corbelled buildings can still be found in the SKA area. The corbelled buildings vary in style, size and function and no two are alike. Some scholars refer to them as true forms of vernacular architecture (Digby Wells Environmental; 2018). In general, the buildings were constructed from stone and are circular, with few square or rectangular exceptions.



These buildings are commonly associated with the permanent settlement of white stock farmers and later Trekboers in the Carnarvon (*Schietfontein*), Loxton and Fraserburg area (Kramer, 2011). It has been suggested that these structures may have been influenced by the Xhosa residing in the region and the Sotho-Tswana from further north, groups that came from a “stone building” culture (Frescura, 1981; Kramer, 2011). Walton (1989) postulates that stock farmers opted to construct structures in conventional rectangular forms with flat *brakdak*, and later with corrugated iron roofs. This form of construction provided for larger living areas and required less maintenance. Within the site-specific study area, the evolution from corbelled buildings, to rectangular flatroofed dwellings, and finally corrugated pitch roof structures can be observed (Digby Wells Environmental, 2018).

The different groups that lived in the area left a number of graves and graveyards. Unfortunately, the graves for the /Xam are mostly unidentified because of the burial methods. These are mainly from the LSA period. There are also burial grounds and graves affiliated with historic farmsteads and associated labourer homesteads - *i.e.* Xhosa, Korana and Griqua, which occurred during the British Colony- and First Boer Republic periods (Digby Wells Environmental, 2018).

2.14 Socio-economic context

The park is situated in the Northern Cape within the NDM, PKSDM, KLM and KHLM with the closest towns being Brandvlei, Carnarvon, Van Wyksvlei and Williston. The Northern Cape Province had the lowest number of inhabitants in 2016, with a total of 1,193,780 persons, which constituted only 2.1 % of the total South African population (Stats SA, 2016). It is estimated that about 11,673 and 13,069 people reside in the KLM and KHLM respectively (Kareeberg Local Municipality, 2017; Karoo Hoogland Local Municipality, 2017).

These Karoo towns have typical rural problems of poverty, unemployment and social inequality. However, they are not as poor and undeveloped as “deep rural” areas elsewhere in the country. Family incomes are relatively low, with around 70 % of households receiving grants from government, as a main or supplementary income. The unemployment rate in the KLM and KHLM is moderately high around 19 % and 12 % respectively (Kareeberg Local Municipality, 2017; Karoo Hoogland Local Municipality, 2017). In 2014 about 25.8 % of the people living in the KHLM were living in poverty (Namaqua District Municipality, 2017). The three main challenges for local residents in the KLM and KHLM are the availability of job opportunities, relatively poor condition of the road network and the quality and availability of drinking water. Both the local and district municipalities have Integrated Development Plans (IDPs) and Spatial Development Frameworks (SDFs) that incorporate the park. SARAO commissioned an impact assessment of SKA and SKA-related projects on the socio-economic conditions in the Northern Cape Province in 2015 (SKA, 2015). In addition to the above a socio-economic assessment was also commissioned by the Council for Scientific and Industrial Research (CSIR) as part of the Strategic Environmental Assessment for Phase 1 of the SKA radio telescope (Atkinson *et al.*, 2017).

The park itself is mainly surrounded by private livestock farms (mostly goats and sheep) that focus on meat production. The three main economic sectors are agriculture, trade and community services.

The area has the potential to become a unique destination for astronomy tourism in the Northern Cape and South Africa. The tourism sector in the KLM and KHLM currently contributes a small percentage to the economy of the area.

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Section 3: Policy framework

3.1 Introduction

SANParks, like all protected area management authorities, is subject to the Constitution, international agreements, legislation, national policies and government priorities. Section 41 of the NEM: PAA requires that management plans be nested within the context of a Co-ordinated Policy Framework (CPF). The CPF can be downloaded from the SANParks website using the following link http://www.sanparks.org/conservation/park_man/.

The CPF provides the organisational guidance required by the DEA guideline for management plans (Cowan and Mpongoma 2010). This document will summarise the institutional, ecological, economic and social environment for park management and includes:

- An introduction to the management plan requirements of the NEM: PAA, what it means for stakeholders, and the corporate provisions SANParks has made to comply with NEM: PAA;
- SANParks as an organisation: including its organisational structure, vision, mission, biodiversity values and performance management system (by means of the balanced scorecard), and its approach to strategic adaptive management; and
- Policies and guiding principles:
 - Finances and commercialisation;
 - Tourism;
 - Zoning system in parks;
 - Stakeholder relationships;
 - Management to maintain biodiversity and ecosystem processes;
 - Risk management;
 - Safety and security;
 - Cultural heritage resources;
 - Resource use; and
 - Research.

SANParks policies are guided by its vision and mission statements. As a public entity, SANParks is committed to act in pursuit of transformation of South Africa's society in support of entrenching South Africa's democracy. As such, this policy framework is available to stakeholders.

The relationship between the park-specific adaptive management planning cycles and the SANParks CPF is outlined in Figure 1, where the planning cycle for management plans in SANParks is 10 years. The programmes and costing could be revised at shorter time intervals, as required.

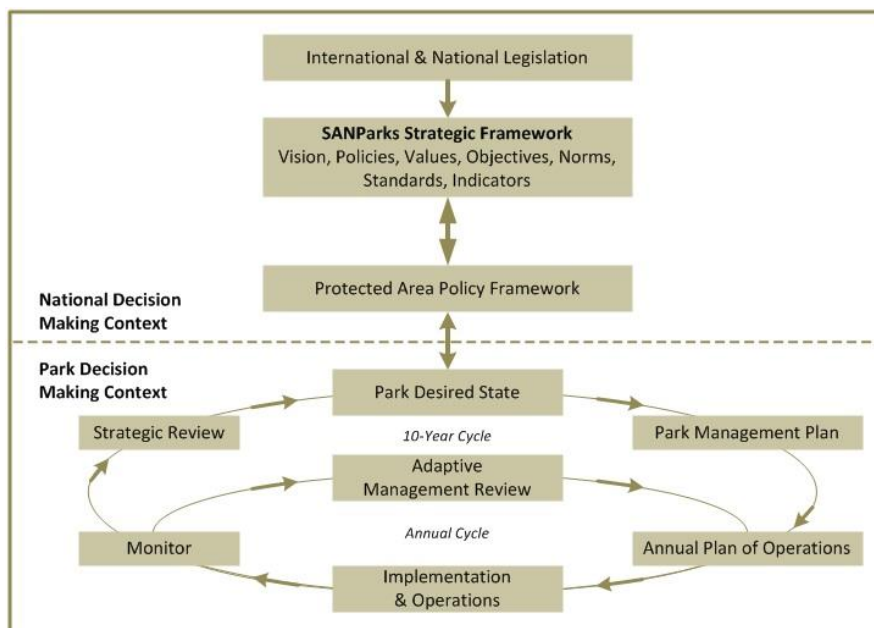


Figure 1. SANParks protected area planning framework.

3.2 Strategic adaptive management

Protected areas are increasingly viewed as complex social-ecological systems. The social-ecological coupling acknowledges multiple interactions that take place between people and natural landscapes – even fenced-off protected areas are influenced by external social issues. These systems are regarded as complex because the results of interactions between the social and ecological components, as well as between components within each of these sub-systems, are often unpredictable. A further challenge in the management of protected areas is that the suite of stakeholders may have widely varying or even conflicting expectations, based on different worldviews and values. Under these conditions of divergent stakeholder interests and limited predictability, it might be impossible to agree on an optimal approach and similarly it may be unrealistic to expect certainty in terms of management outcomes. Strategic Adaptive Management (SAM) has emerged as the SANParks approach of choice to deal with the complexity and multi-stakeholder tensions that characterise park management decisions (Figure 2). SAM is designed to be strategic (facilitate action with foresight and purpose), adaptive (facilitate learning whilst we are doing) and participatory (facilitate engagement and co-learning with stakeholders) (Grant *et al.*, 2008).

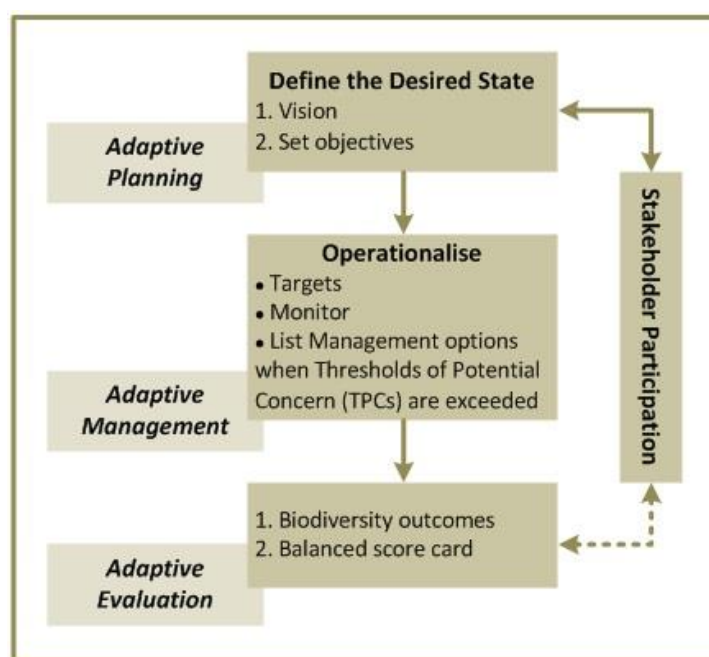


Figure 2. Steps in the adaptive management cycle as used by SANParks.



SAM begins with determining the desired future state of a particular social-ecological system (Figure 3). The aim of this step is to build a sense of common purpose among all relevant stakeholders and to develop a collective roadmap for moving from a current reality to a more desirable social-ecological system. This desired state or vision needs to be described within the context of associated stakeholders and their respective values, as well as social, technological, environmental, economic and political (V-STEEP) influences. Description of the future state is further enriched by deliberating the distinctive and special features (called vital attributes) of the park.

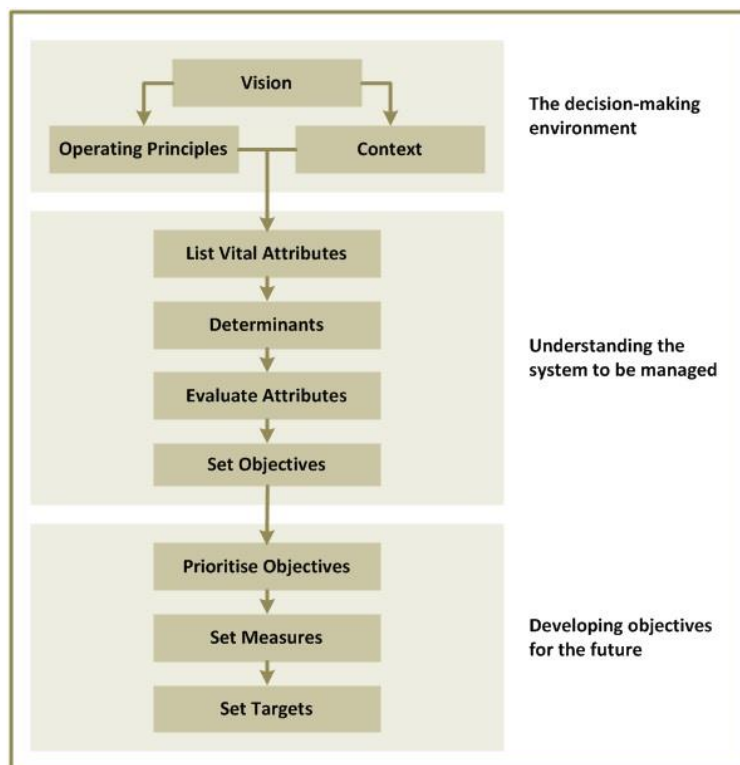


Figure 3. The adaptive planning process as used by SANParks.

The mission, together with the vital attributes of the system to be managed, informs the setting of objectives. A nested hierarchy of objectives starts with high-level objectives that are deconstructed into a series of lower-level objectives and, ultimately, management approaches for achieving those objectives. Alternative management options are considered by looking at resources, constraints, potential threats and risks associated with a particular management option, while anticipating likely results. From these options, the most appropriate is selected, followed by a planning stage and implementation.

A critical component of SAM is to monitor and evaluate the consequences of management decisions. Constant scrutiny of emerging results and evaluation against objectives is essential to allow strategy and methodology to be adjusted as new understanding and knowledge emerges (see section 10.7). Of critical importance is the participation and engagement of all relevant stakeholders.

3.3 Park-specific framework

All park managers (except for Kruger National Park) report to the Managing Executive: Parks through a Regional General Manager. In the case of Meerkat NP, reporting is done via the

Regional General Manager for the Arid Cluster. The park's future organogram (Figure 4) sets out the reporting structure in the park.

3.4 Park regulations and internal rules

In addition to the regulations for the proper administration of special nature reserves, national parks and world heritage sites, as gazetted on 28 October 2005 in GG 28181, the park has also drafted applicable internal rules in terms of Section 52 of the NEM: PAA, (Appendix 4).

3.5 Support to the park

Park management is primarily supported by head office, providing human resource, financial, marketing, review and auditing services. The regional operations office assists the park with line management support. The park also receives support from functions such as park planning and development, veterinary wildlife service, scientific services etc.

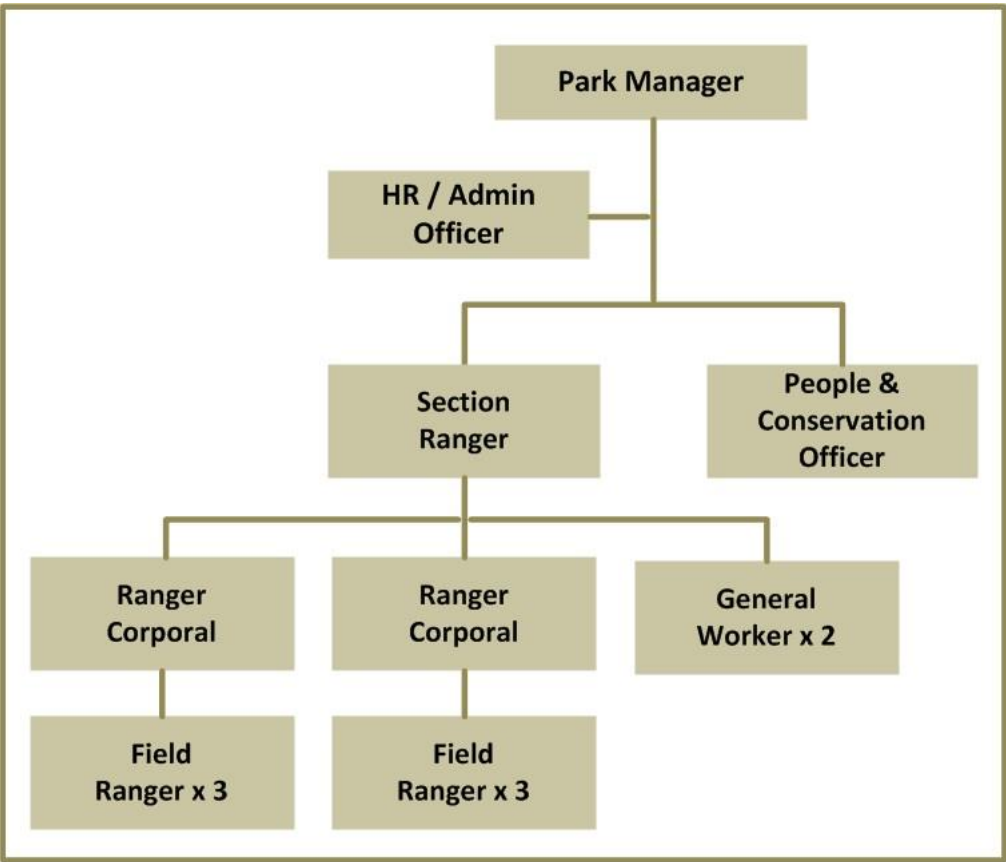


Figure 4. Meerkat National Park organogram.



Section 4: Consultation

SANParks recognises that parks must serve societal values and that parks need to be part of and interrelate with the broader landscape and socio-economic context within which they are situated. The goal of the park within the public participation process is to work directly with stakeholders to ensure that the stakeholder concerns and aspirations are consistently understood and considered (Spies & Symonds, 2011). Therefore, stakeholders both interested and affected, were included in the revision process of the PMP by notifying them of participation processes through mechanisms suitable for the different stakeholder groups. These processes provided the opportunity for input from all stakeholders within reasonable timeframes, with the emphasis on sharing of information and joint learning. Processes also aim to recognise all knowledge, indigenous, ordinary and expert, as well as the diversity of values and opinions that exist between stakeholders. The commitment to the incorporation of public opinion into this plan is rooted in the park's management activities and is therefore geared towards promoting conservation values (and society's connection with those values, as also outlined in the NEM: PAA) and promoting this goal in part, by engaging the broader context in which the park is situated. The adaptive planning process that was followed was designed to (i) help stakeholders express opinions and values in a structured way, (ii) to use the opinions and expressed values to formulate a vision for the park, (iii) to translate the vision into management objectives that reflect the values as expressed by stakeholders and (iv) comment on the draft PMP.

The objectives of the stakeholder participation process are to:

- Create a channel for the accurate and timely dissemination of information to interested and affected stakeholders;
- Create the opportunity for communication between SANParks and the public;
- Promote opportunities for the building of understanding between parties;
- Provide the opportunity for stakeholders to give meaningful input into the decision-making processes that drive the development of the PMP.

The approach to the stakeholder participation process is based on the principles embodied in the following legal framework, namely:

- The Constitution of the Republic of South Africa Act No. 108 of 1996;
- The National Environmental Management Act No. 107 of 1998 (NEMA); and
- The National Environmental Management: Protected Areas Act No. 57 of 2003 as amended by the National Environmental Management: Protected Areas Act No. 21 of 2014.

In addition to the above legal framework, the stakeholder process was developed with the guiding principles for SANParks stakeholder participation in mind. SANParks thus undertakes to:

- Seek to notify stakeholders of participation processes through appropriate mechanisms;
- Ensure that the process provides the opportunity for input from all stakeholders within reasonable timeframes, emphasising the sharing of information, joint-learning and capacity building;
- Promote participation by stakeholders through timeous and full disclosure of all relevant and appropriate information;
- Provide feedback on the outcome of the process to stakeholders and demonstrate how their inputs have been considered in the decision-making process;
- Ensure that methodologies accommodate the context of the issue at hand and the availability of resources (people, time, money) and do not conflict with these guiding principles; and
- Give particular attention to ensuring participation by marginalised communities, communities with specific concerns, or communities that have contractual rights in the national park.

The stakeholder participation process followed during the revision process of this management plan is depicted in Figure 5 below.

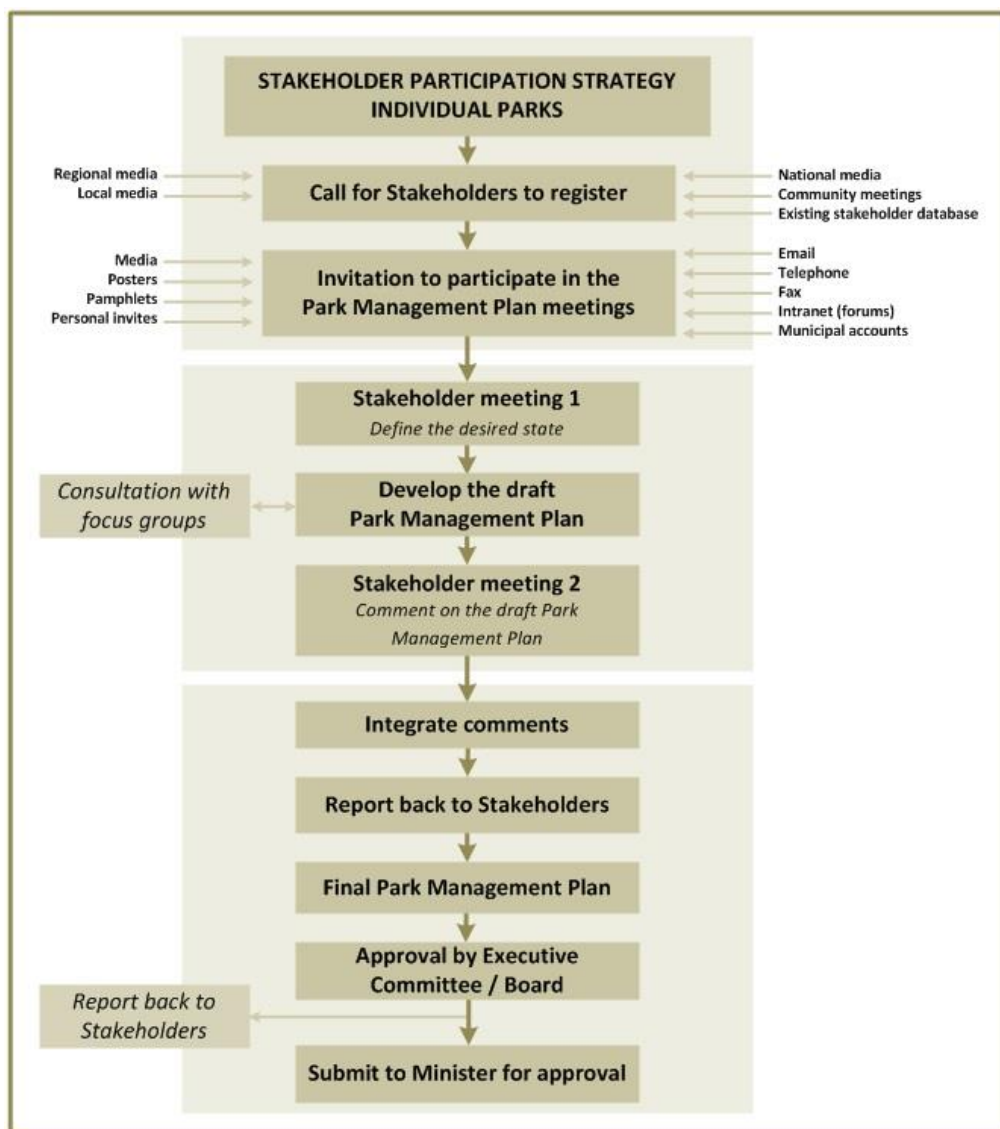


Figure 5. SANParks stakeholder participation process.

Details regarding the stakeholder process that was followed are outlined in Appendix 2.



Section 5: Purpose and vision

5.1 Purpose of the park

The NEM: PAA requires that the park be managed in accordance with the purpose for which it was declared. SANParks will manage the park firstly in accordance with its organisational vision and secondly in accordance with the mission and objectives hierarchy that were derived through consultation with stakeholders, as set out in this section.

5.2 Desired state for the park

Reconciling the need for participatory planning and governance and enabling ongoing adaptation, the Adaptive Planning Process is an essential early component of strategic adaptive management. It is an easy and effective tool for enabling real stakeholder participation in producing an effective shared rationale or overall big picture 'desired state' for a national park. It requires expression of the various stakeholders' value systems and then builds on the shared values to consider all possible system drivers (social, technological, economic, environmental and political). The process enables stakeholders to consider opportunities to strengthen the vital attributes of the park and to counter and constrain threats to these. These opportunities are formulated as the high-level objectives of the PMP. In this way the desired state of the park, its vision and mission, and high-level objectives are co-constructed with stakeholders. This strategic-level guidance obtained through stakeholder consultation is then unpacked into further detail and articulated as sub-objectives, either in-house or with relevant experts.

For more than a decade SANParks has been using the adaptive planning process with stakeholders. This often requires dealing with individual and / or group values, prejudices and sensitivities. Nevertheless, the process provides all participants with a space to express their own views and understand other's views. This ensures mutual understanding and commitment to both the process and the end product, namely the PMP.

The purpose of the adaptive planning process is to source and incorporate stakeholder input into a more technical planning process. However, this purpose is embedded within a broader context of forming and sustaining relationships with the public to secure mutual understanding and ongoing support and legitimacy. The desired state process reported on here, is therefore an event in an ongoing, dynamic public engagement process.

5.2.1 Vision and mission

SANParks' corporate vision for all national parks including Meerkat National Park, revised in 2019, is as follows:

VISION

"A world class system of national parks re-connecting and inspiring society".

The mission defines the fundamental purpose of the park, succinctly describing why it exists and what it does to achieve its vision. The following mission was developed after consultation with stakeholders at workshops held on 24, 25, 26 April 2018 and 05 June 2018:

MISSION

"In partnership with astronomy and earth system sciences, SANParks will ensure the conservation of Meerkat National Park through integrated and adaptive management of ecological systems and cultural heritage".

"As a regional partner, we develop and promote community participation, empowerment and socio-economic opportunities".

5.2.2 SANParks strategic plan

The SANParks' Strategic Plan is focused on all aspects of management of the organisation from the core areas of the mandate to corporate governance and business operational support management. The Balanced Scorecard performance (BSC) management approach has been followed to ensure consistent, effective and efficient execution of the organisational strategy and performance management regime. The strategic plan sets out the organisation's key strategic objectives necessary for the effective and efficient delivery of the organisation's mandate along the BSC perspectives. Park management must ensure an integrated approach is followed regarding the implementation of the SANParks Strategic Plan and the Management Plan.

5.2.3 Operating principles or values

SANParks has adopted eleven corporate values that serve as guiding principles around which all employee behaviour and actions are governed and shaped. Stakeholders recognised and endorsed the SANParks corporate and conservation values as outlined in the CPF. These principles or values are:

Corporate values:

1. Show **leadership** in all we do.
2. Be guided by **environmental ethics** in all we do.
3. Promote **transformation** within, and outside of the organisation.
4. Strive for **scientific** and **service excellence** at all times.
5. Act with **professionalism** at all times.
6. Adopt, and encourage **initiative** and innovation by all.
7. Treat all our stakeholders with equity and **justice**
8. Exercise **discipline** at all times.
9. Show **respect** to all.
10. Act with **honesty** and **integrity**.
11. Strive for **transparency** and open **communication** at all times.

In addition to the above, SANParks has also adopted Biodiversity values as set out below:

1. We adopt a **complex systems view** of the world while striving to ensure the **natural functioning** and **long-term persistence** of the **ecosystems** under our care.
2. We aim at persistent achievement of **biodiversity representivity** and **complementarity** to promote **resilience** and ensure **ecosystem integrity**.
3. We can **intervene in ecosystems responsibly and sustainably**, but we focus management on **complementing natural processes** under a "**minimum interference**" philosophy.
4. We accept with humility the **mandate of custodianship** of biodiversity **for future generations** while recognising that both natural and social systems change over time.

At the workshop that took place on 09 May 2017, the participants suggested adding additional values. SANParks agreed to adopt the following:

1. The business unusual approach requires an adaptive response;
2. Respecting societal value and recognising techno-ecosystems are a modern approach to existing agro-ecosystem theory; and
3. Acknowledging the complex nature of techno-ecosystems, we will strongly rely on the values of transparency, accountability, inclusivity, capacity, mutual respect, co-learning.

5.2.4 Park context

The context refers to the current circumstances and the conditions that determine these circumstances. The context is therefore important as a set of agreed-upon realities that will influence the setting of management objectives. The context is summarised under sections 2.1 to 2.15.



5.2.5 Vital attributes

The vital attributes of the park are the important characteristics and / or properties of the park that concisely describe the key features of the park. The park identified 13 attributes that are vital to the approach by which it is managed. The key attributes are:

1. The park has a unique and long historic timeline and is home to a rich cultural heritage;
2. A unique astronomical sense of place and sense of self, in relation to the universe and the open karoo land and skylscapes;
3. Fertile ground for research opportunities, science education and communication;
4. The Bushmanland-pan system and with their associated salt pans are host to unique ecosystems in an arid region;
5. Ecotonal landscapes and a diversity of fauna and flora including iconic species; and
6. Largest radio astronomy telescope and data science project in the world.

5.2.6 Determinants and risks to the vital attributes

A major component of management's responsibility is to ensure the maintenance of the determinants or strengths of the vital attributes and to limit the influence of threats to the system.

The boxes below reflect the vital attributes, determinants and threats.

1. The park has a unique and long historic timeline and is home to a rich cultural heritage.	
Determinants: Riel dans, rock art, prehistoric fossils, corbelled buildings, stone kraals, grave sites, artefacts and historic buildings, oral and written history (pre-colonial to present).	
Threats	
• Loss of historic memory • Misinterpretations of oral tradition • Lack of research and documentation • Destruction of tangible heritage resources	• Animal damage to assets • Vandalism and theft • Lack of capacity to manage and protect • Natural weathering and degradation
2. A unique astronomical sense of place and sense of self, in relation to the universe and the open karoo land and skylscapes.	
Determinants: No light / air pollution, silence, limited man-made interferences, telescopes, park size, remoteness.	
Threats	
• Pollution (light, air, noise) • Inappropriate development	• Increased visitation
3. Fertile ground for research opportunities, science education and communication.	
Determinants: Radio Frequency Interference (RFI) restriction could lead to new methods, techniques and technologies to be developed for and by research, research not affected by recreational activities and development of a research hub in the area.	
Threats	
• Lack of funding • Restricting research protocols	• Remoteness from research hubs

4. Bushmanland-pan system and with their associated salt pans are host to unique ecosystems in an arid region.

Determinants: Catchment system for pans, temporary stream erosion basins, brackish soils, aquatic organisms in pans.

Threats

- | | |
|--|--|
| <ul style="list-style-type: none"> • Invasive species • Lack of restoration • Driving on the pans • Climate change | <ul style="list-style-type: none"> • Upstream interference of flow regime • Fragmentation of pans • Erosion and sand movement |
|--|--|

5. Ecotonal landscapes and a diversity of fauna and flora including iconic species e.g. the quiver tree.

Determinants: Black eagle, Quiver tree forest, and endemics, southern most extent of Kalahari red dunes, climate, geomorphology, soils, elevation, dolerite Koppies, Bushmanland, Bushmanland floor, Upper Karoo Hardeveld, Western Karoo shrubveld.

Threats

- | | |
|---|---|
| <ul style="list-style-type: none"> • Lack of recruitment (quiver trees) • Illegal harvesting • Damaged caused by animals • Inappropriate development • Historic and future mismanagement of land and herbivory | <ul style="list-style-type: none"> • Invasive species • Treatment of invasive species • Lack of restoration • Climate Change • Disease |
|---|---|

6. Largest radio astronomy telescope and data science project in the world.

Determinants: Hydrogen intensity and Real-time Analysis eXperiment (HIRAX), Hydrogen Epoch of Reionisation Array (HERA), KAT7, MEERKAT, SKA radio telescope, signatories to the international treaty organisation, hosting agreement between South Africa and the International Treaty Organisation.

Threats

- | | |
|--|---|
| <ul style="list-style-type: none"> • Inadequate funding • Vandalism • Sabotage • RFI | <ul style="list-style-type: none"> • Inappropriate development • Political interference (local, national and international) |
|--|---|

5.2.7 High-level objectives

While the Mission sets out the “Where do we want to go”, high-level objectives act as the roadmap to achieve the Mission. These high-level objectives tend to flow naturally from the vital attributes. The desired state is achieved by means of a hierarchy of objectives (Figure 6), starting with an overall objective aligned with SANParks’ organisational structure and the park’s Vision and Mission statements, then broad, high-level objectives (this Section) and then to more detailed levels, ending with specific operational or management actions (Section 10). Discussions at the stakeholder meeting gave rise to an initial set of high-level objectives. These were refined to reflect the following:

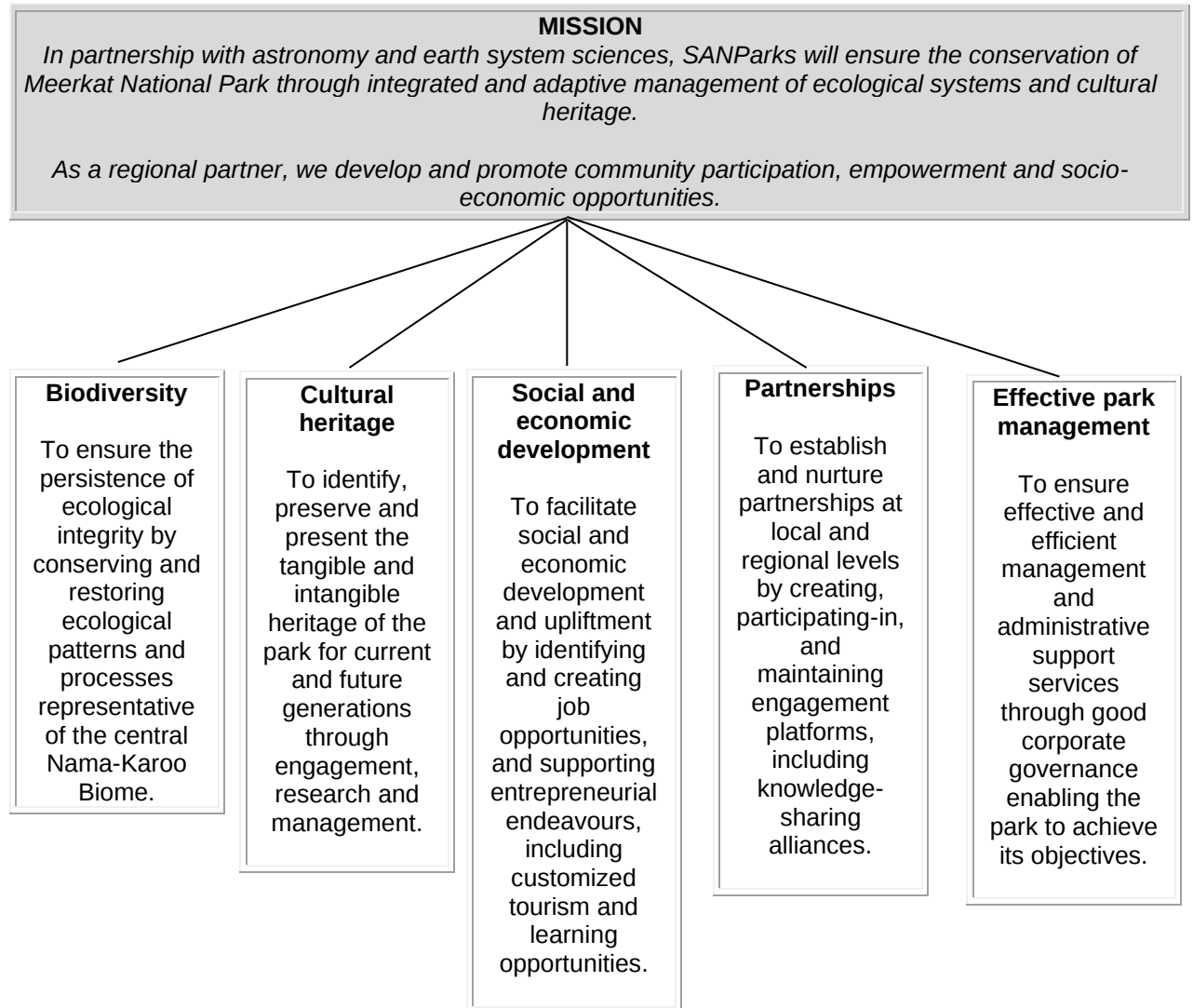


Figure 6. Park high-level objectives.

5.2.8 Unpacking the high-level objectives

The high-level objectives listed above are progressively being disaggregated through a series of "objectives" of increasing focus. These are set out in Figures 7 – 11 below.

1. Biodiversity high-level objective: To ensure the persistence of ecological integrity by conserving and restoring ecological patterns and processes representative of the central Nama-Karoo Biome.

1.1 Habitat and vegetation objective: To determine potential change of plant species composition, vegetation structure and function, and its consequences to ecological processes by monitoring, data analysis and evaluating results.

1.2 Wildlife management objective: To understand and manage wildlife dynamics, maintain integrity and vegetation, by reintroducing species that historically occurred in the area and regulating wildlife populations as a modifier of biodiversity at various temporal and spatial scales.

1.3 Degradation objective: To restore ecological patterns and processes by re-establishing the structure, function and composition of degraded land.

1.4 Invasive and alien species objective: To facilitate the re-establishment of natural biodiversity by identifying, controlling and where possible, eradicating alien biota.

1.5 Species of special concern objective: To ensure the persistence of species and plant communities of special concern by identifying threatened and rare species, plant communities and threats, and where applicable develop and implement management responses.

1.6 Freshwater ecosystem objective: To ensure the functionality of the fresh water systems (rivers, drainage lines, pans, subterranean water and boreholes) by maintaining and restoring hydrological processes and the variety of aquatic habitats.

1.7 Climate change objective: To mitigate potential impacts of climate change on park biodiversity by actively participating in national climate initiatives.

Figure 7. Biodiversity high-level objective and supporting objectives.

2. Cultural heritage high-level objective: To identify, preserve and present the tangible and intangible heritage of the park for current and future generations through engagement, research and management.

2.1 Inventorisation objective: To improve and diversify the cultural heritage resources, inclusive of oral history, by updating and maintaining a comprehensive inventory.

2.2 Conservation objective: To conserve the tangible and intangible cultural heritage assets through effective management and where relevant sustainable utilisation (e.g. site visitation).

2.3 Interpretation and awareness objective: To enable the interpretation and awareness of park and regional cultural heritage resources, and oral history, through research and knowledge management.

2.4 Capacity building objective: To support the recording and enable effective management of all cultural heritage resources, inclusive of oral history, by developing appropriate skills and partnerships.

Figure 8. Cultural heritage high-level objective and supporting objectives.



3. Social and economic development high-level objective: To facilitate social and economic development and upliftment by identifying and creating job opportunities, and supporting entrepreneurial endeavours, including customized tourism and learning opportunities.

3.1 Techno-ecotourism objective: To identify and develop an exclusive techno-eco tourism experience by developing sustainable opportunities within the restrictions of the park.

3.2 Learning and development objective: To facilitate skills and knowledge transfer opportunities through the implementation, development and identification of a range of teaching and learning programmes.

3.3 Socio-economic development objective: To contribute to local economic development by identifying, creating and maintaining employment opportunities.

Figure 9. Social and economic development high-level objective and supporting objectives.

4. Partnerships high-level objective: To establish and nurture partnerships at local and regional levels by creating, participating in, and maintaining engagement platforms, including knowledge-sharing alliances.

4.1 Stakeholder objective: To establish and promote the efficient functioning of techno-ecosystems by engaging and partnering with multiple interested stakeholders and organisations.

4.2 Communication objective: To build, maintain and constantly improve relations between the park and all its relevant stakeholders, both internally and externally through various mediums.

Figure 10. Social high-level objective and supporting objectives.

5. Effective park management high-level objective: To strive for effective management and administrative support services through good corporate governance enabling the park to achieve its objectives.

5.1 Environmental management objective: To strive for best practise and ensure compliance with environmental legislation through improved governance and environmental risk management.

5.2 Risk management objective: To establish and maintain effective, efficient and transparent risk management systems by creating an enabling environment for the management of risk.

5.3 Financial management and administration objective: To ensure sound financial management and administration through proficient budget management, effective internal controls and compliance to corporate governance prescripts.

5.4 Human capital development objective: To ensure sufficient and effective staff capacity to achieve management objectives by adhering to legislation, corporate human resource policies and guidelines.

5.5 Information and records management objective: To achieve best practice in the field of information and records management by complying with the Records Management Legislative framework and policies, thereby ensuring care of all vital records in SANParks.

5. Effective park management high-level objective: To strive for effective management and administrative support services through good corporate governance enabling the park to achieve its objectives.

5.6 Infrastructure objective: To maintain, upgrade and develop, where appropriate, new infrastructure through proper planning and efficient management.

5.7 Safety and security objective: To provide a safe and secure environment for both visitors and SANParks employees and to ensure that the integrity of the natural and cultural resources and assets are secured.

5.8 Safety health, environment and quality objective: To continuously reduce the disabling injury frequency rate through the implementation of an efficient and effective Occupational Health and Safety management system.

5.9 Research, monitoring and co-learning objective: To provide the opportunity to undertake broad-based scientific research and co-learning opportunities that furthers scientific inquiry, as well as providing support to management, decision making and communication through co-operative and relevant research and monitoring programmes.

5.10 Disaster management objective: To ensure that all disaster situations that may occur in the park is addressed and managed through pre-determined contingency plans and pre-planned actions.

5.11 Outcomes objective: To evaluate outcomes of management interventions related to protected area management through regularly assessment.

Figure 11. Effective park management high-level objective and supporting objectives.



Section 6: Zoning

6.1 Introduction

The primary objective of a park zonation plan is to establish a coherent spatial framework in and around a park to guide and co-ordinate conservation, tourism and visitor experience initiatives, and minimise conflict between these sometimes, differing activities. A zoning plan is also a legislated requirement of the NEM: PAA, which stipulates that the management plan, which is to be approved by the Minister, must contain “a zoning of the area indicating what activities may take place in different sections of the park and the conservation objectives of those sections”.

The zoning of the park is largely determined by the SKA radio telescope and required supporting infrastructure. Outside of the Astronomy Infrastructure Zone the zoning for the park was underpinned by an analysis and mapping of the sensitivity and value of a park’s biophysical, heritage and scenic resources. This was informed by the impact assessment studies undertaken for the Integrated Environmental Management Plan for the Square Kilometre Array. The zoning of the park was based on the requirements of the SKA radio telescope and on an analysis and mapping of the sensitivity and value of the park’s biophysical, heritage and scenic resources (SANParks, 2005a).

Given that the park has only recently been established, that the MeerKAT radio telescope is operational and the SKA radio telescope is under development (and that further stages are envisaged), and that the potential for tourism is largely unknown, the zoning process for the park should be seen as an interim process that is likely to be revised over time as the full extent of the radio astronomy infrastructure becomes clear.

Tourism potential and sites need to be carefully examined and responsibly expanded over time, and only if this is possible within the limits of the operation of the radio astronomy facility, the viability of tourism facilities in this remote location, and the conservation objectives of the park (particularly avoiding impacts to sensitive ecological, environmental and heritage features).

This section – which is guided by the Conservation Development Framework (CDF) planning manual (SANParks, 2005b) – sets out the rationale for use zones, describes the zones, and provides management guidelines for each of the zones. The use zoning of the park is shown in Appendix 5, Map 4, and summarised in Table 1 below.

6.2 Guiding principles underpinning the zonation

The park is unlike other National Parks in that it must operate in a way that does not impact on the SKA radio telescope and required supporting infrastructure. This is established in terms of the Park Management Agreement, where the primary requirement of operating within very specific requirements of securing the SKA radio telescope and its operation. All activities (tourism and park management) need to be in compliance with SARAO policies and the Astronomy Management Authority Act to protect the radio telescope.

In addition to the specific requirements of the radio telescope, the principles underpinning park zonation, as listed below, were informed by the SANParks CDF planning manual, the Guidelines for Strategic Environmental Assessment in South Africa, Integrated Environmental Management and the NEMA. Accordingly, the zonation:

- Is the foundation of all planning and development within a park, with the aim of ensuring its long-term sustainability;
- Accommodates strategic, flexible and iterative planning procedures;
- Is a “framework for planning” not a “plan for implementation” (*i.e.* implementation is dealt with through lower level plans and programmes);
- Is risk-averse and promotes a cautious approach, which considers the limits of current knowledge about the consequences of decisions and actions;

- Recognises that the mandate of SANParks is to conserve biodiversity and heritage resources of national and international significance, in terms of both the NEM: PAA and the National Heritage Resources Act;
- Ensures the integrity of the park's scenic quality by limiting human intrusions into the landscape;
- Accommodates a wide range of unique opportunities for experiences of solitude and nature-based recreation which do not conflict with the desired social and environmental states;
- Confines development within the park to areas that are robust enough to tolerate transformation and without detracting from the "sense of place";
- Rationalises and channels access into the park and internal movement through it;
- Sets the limits of acceptable change; to minimise the loss of biodiversity and to reduce conflict between different park uses;
- Recognises that park boundaries are not static in time and that there are factors beyond the current or future boundaries that can positively or negatively influence the park; and
- Recognises that the park cannot exist in isolation and that planning needs to ensure that the park is integrated into the surrounding landscapes as well as the economic and social structures at local and regional scales.

6.3 Rationale for use zones

The primary function of a protected area is to conserve biodiversity. However, the park also has a specific role to accommodate the SKA radio telescope and required supporting infrastructure. To a large extent, the zoning and use of the park is constrained by the SKA radio telescope and Guest Instruments on site. Other functions such as the need to ensure that visitors have access to the park, that research can take place, and that adjoining communities and local economies derive benefits from the park, could potentially conflict with and compromise the primary functions of the park (i.e. to secure the operation of the radio telescope and secure biodiversity). Use zoning is the primary tool to ensure that all users could have a wide range of quality experiences without compromising the integrity of the environment or the requirements of the SKA radio telescope.

Appropriate use zoning serves to minimise conflicts between different users of a park by separating potentially conflicting activities whilst ensuring that activities which do not negatively impact on the park's vital attributes and objectives (especially the conservation of the protected area's natural systems and its biodiversity) can continue in appropriate areas. Use zones serve to ensure that high intensity facilities and activities are placed in areas that are robust enough to tolerate intensive use, as well as to protect more sensitive areas of the park from over-utilisation.

6.4 The zoning system

SANParks has adopted a multiple zoning system for its parks. The system consists of:

- Use zones covering the entire park;
- Special management overlays; and
- A buffer zone surrounding the park.

6.4.1 The zoning process and its linkage to the underlying environmental analysis

The zoning of the park is largely determined by the SKA radio telescope and required supporting infrastructure. Outside of the Astronomy Infrastructure Zone the zoning for the park was underpinned by an analysis and mapping of the sensitivity and value of a park's biophysical, heritage and scenic resources. This was largely informed by the impact assessment studies undertaken for the Integrated Environmental Management Plan for the Square Kilometre Array. This analysis examined the parks' biophysical characteristics including: vegetation value (in particular the contribution to national conservation objectives) and vegetation resilience to physical disturbance; hydrological sensitivity (areas vulnerable to disruption of hydrological processes such as floodplains and wetlands); topographic sensitivity (steep slopes); soil sensitivity (soils that are vulnerable to erosion) and geology sensitivity. In addition, the heritage value and sensitivity of the sites were examined (mostly archaeological and cultural aspects). The visual sensitivity of the landscape was also surveyed to identify sites where visual, scenic, aesthetic and amenity values that contribute to the area's overall 'sense of place', and which encompass both natural and cultural landscape characteristics. This analysis was used to inform users of the appropriate use of the different areas of the park and in specifying areas for additional conservation protection (See Special Conservation Overlay). The Special Conservation Overlay shows the relationship between the use zoning and the areas of specific high value from the biodiversity and landscape sensitivity-value analysis.



Table 3. Use zones and use zone characteristics for the park.

	Remote	Primitive	Astronomy Infrastructure Zone
General characteristics	Retains an intrinsically wild appearance and character (essentially no infrastructure) or capable of being restored to such.	Generally, retains wilderness qualities but with basic self-catering facilities. Access is controlled or limited to 4x4 diesel vehicles. Provided access to Remote and Wilderness Zones and can serve as a buffer to them.	This zone is primarily designated to accommodate the SKA radio telescope and required supporting infrastructure.
Experiential qualities	Wildness, remoteness, solitude and awe-inspiring natural characteristics.	Relaxing, serenity with minimal impact to experience wilderness qualities.	This zone is dominated by the SKA radio telescope, Guest Instruments and required supporting infrastructure.
Interaction between user groups	None to very low.	Low.	Low
Types of access	Controlled access, guided non-motorised.	Controlled access. Unaccompanied motorised and guided non-motorised. Foot and 4x4 diesel vehicles.	Access is specified by the management of the SKA radio telescope. Certain roads may be designated to allow tourist vehicles to access to SANParks facilities. Access to designated provincial roads would be retained as required.
Type of activities	Hiking in small guided groups, possibly other guided non-motorised activities.	Hiking, 4x4 drives, game viewing possibly other guided non-motorised activities.	This zone is dominated by the SKA radio telescope and required supporting infrastructure and activities. Tourism access is largely limited to viewpoints over the SKA radio telescope and Guest Instruments.
Type of facilities	Essentially undeveloped and roadless.	Small, basic self-catering. Distributed to avoid contact between users or limited concessions with limited numbers. 4x4 routes & guided hiking trails.	This zone is dominated by the SKA radio telescope and required supporting infrastructure. Tourist facilities are largely limited to viewpoints and specified access to other zones. It is possible that some small-scale accommodation could be developed subject to the limitations imposed by the SKA radio telescope and Guest Instruments.
Limits of acceptable change: Biophysical	Deviation from a natural / pristine state should be minimized and existing impacts should be reduced.	Deviation from a natural / pristine state should be small and limited to restricted impact footprints. Existing impacts should be reduced.	The SKA radio telescope and its associated infrastructure will have a significant impact within the local development footprints. Sites and activities need to be managed to avoid impacts on designated sensitive areas and adjacent zones.
Limits of acceptable change: Aesthetics and recreational	Activities which impact on the intrinsically wild appearance and character of the area will not be tolerated.	Activities which impact on the intrinsically wild appearance and character of the area should be restricted and impacts limited to the site of the facility. Noise and light pollution should be kept to a minimum.	This zone is dominated by the SKA radio telescope and required supporting infrastructure. It is anticipated that the facility will unavoidably have a significant aesthetic impact on the zone.
Guidelines for management infrastructure	Ideally there should be no management infrastructure, but low impact temporary infrastructure may be present only to limit biodiversity loss. Low spec strategic management roads are allowed.	Small, isolated, permanent but low spec infrastructure (such as dirt roads & low spec airstrips making use of existing road footprints) may be present. This may be to help manage biodiversity or service tourist facilities.	This zone is primarily designated to accommodate the SKA radio telescope and required supporting infrastructure. Management infrastructure is largely specified by the requirements of this facility.

The sensitivity map (Appendix 5, Map 5) shows the relationship between the use zoning and the summary of the biodiversity and landscape sensitivity-value analysis. Although, to a large extent, the zoning of the park has been pre-determined by the requirements of the Meerkat radio telescope and its supporting infrastructure, it was nevertheless possible include a relatively high percentage of the most of the environmentally sensitive and valuable areas into zones that are strongly orientated towards conservation. Table 2 summarises the percentage area of the park covered by each zone, as well as the percentage of the highly environmentally sensitive and valuable areas (defined as areas with values in the top quartile of the sensitivity-value analysis) that are within each zone. Over half (53.7 %) of the park is covered by zones that are primarily conservation focussed in terms of their objectives (*i.e.* Remote and Primitive). These include 64.2 % of the most sensitive areas. Notably, the Remote Zone covers around 14 % of the park yet includes over 34 % of the most sensitive areas. Further, almost all (98 %) of the most sensitive areas are included in the Special Conservation Overlays.

Table 2. Park percentage area summary covered by each zone, as well as the percentages of the highly environmentally sensitive and valuable areas (defined as areas with values in the top quartile of the sensitivity value-analysis) that are within each zone.

Zone emphasis	Use zone	Zone as a % of park area	% of highly sensitive areas that are in a zone
Conservation orientated	Remote	14.2	34.1
	Primitive	39.5	30.1
Astronomy	Astronomy infrastructure	46.3	35.8

6.5 Overview of the use zones

6.5.1 Remote zone

Objective

The objective of this conservation-orientated zone is to protect sensitive environments from almost all development impacts and tourism pressures.

Characteristics

This is an area retaining an intrinsically wild appearance and character, or capable of being restored to such and which is essentially undeveloped and road less. There are no permanent improvements or any form of human habitation. The remote zone provides outstanding opportunities for solitude with awe inspiring natural characteristics. Ideally, sight and sound of human habitation and activities are barely discernible and at a far distance.

Visitor activities and experience

Activities: Access is strictly controlled and non-motorised. Groups must be small and will be guided. Several groups may be in an area at the same time, but if necessary, densities and routes must be defined so that groups are unaware of each other. The principle of “Pack it in Pack it out” must be applied.

Interaction with other users: There is no interaction between groups. The number of groups within the area will be determined by the ability to ensure that there is no interaction between groups.

Limits of acceptable change

Biophysical environment: Deviation from a natural / pristine state should be avoided, else minimised and where unavoidable, existing impacts must be reduced.

Aesthetics and recreational environment: This zone is dominated by the SKA radio telescope and required supporting infrastructure. It is anticipated that the facility will unavoidably have a significant aesthetic impact on the zone.



Facilities

Type and size: No facilities are provided. Should overnight facilities be required to serve this zone, these must be placed in the adjoining zones.

Sophistication of facilities: Except for self-carried portable tents, no other facilities are permitted. Guidelines for washing, ablution and cooking must be defined according to the “Pack it in Pack it out” principles. Camping is allowed only at designated sites and within the restrictions placed on the park.

Audible equipment and communication structures: None.

Access and roads: Public access is non-motorised. Vehicular access and parking are provided in the adjoining zones. Established footpaths may be provided where erosion risks occur. Limited low specification management tracks (*i.e.* not built up roads) are acceptable within this zone, though these tracks should be rationalised, and eventually removed.

Location in park

Remote areas were designated in the sensitive pan and plains areas. It is anticipated that once the park is fully established, that additional mid-altitude plateau and mountainous areas will be included into this zone to ensure that most landscapes with high environmental sensitivity and value are specified as Remote.

Guidelines on management infrastructure and utilisation

Ideally, there should be no management infrastructure, and natural processes must be allowed to function without management intervention. However, most parks are too small to allow ecological processes (fire, fecundity – particularly of large predators) to continue without management intervention, which would eventually impact biodiversity negatively. Furthermore, in new or expanding parks, farm management infrastructure might still be apparent. For this reason, concessions are made on management infrastructure in this zone, principally to prevent loss of biodiversity or restoration. Infrastructure might include footpaths where erosion might be a problem or identified (barely) traversable management 4x4 routes for fire management or ensuring area integrity. Temporary management infrastructure, as might be used for game capture or anti-poaching activities, such as temporary bomas or helicopter landing sites would be permissible, as would vehicular access by staff for specific management interventions, although this must be exercised circumspectly.

6.5.2 Primitive zone

Objective

The objective of this conservation-orientated zone is to protect sensitive environments from development impacts by limiting the size, number and sophistication of infrastructure, and by reducing tourism pressure through controlled access and visitor numbers.

Characteristics

The primary characteristic of this zone is the experience of wilderness qualities with the emphasis on controlled access. Access is controlled in terms of numbers, frequency and group sizes. The zone shares the wilderness qualities of wilderness areas and the remote zone, but with the provision of small basic self-catering facilities with controlled access. It also provides access to areas zoned as remote or wilderness. Views of human activities and development outside of the park may be visible from this zone.

All activities, vehicles and equipment shall be in compliance with SARAO policies and the Astronomy Management Authority Act to protect the radio telescope.

This zone serves to protect sensitive environments from high levels of development. The primitive zone may contain concession sites and other facilities where impacts are managed through strict control of the movement and numbers of tourists, for example if all tourists are in concession safari vehicles.

Visitor activities and experience

Activities: Access is controlled in terms of the number, frequency and group sizes. Activities could be guided or unguided and include hiking, 4x4 drives and game viewing. In the park, access control is mostly passive, with 4x4 trails marked as restricted to 4x4 (diesel vehicles only, bluetooth removed and with RFI permits), thus limiting visitor numbers on these routes. Access may also be controlled either through only allowing access to those with bookings for specific facilities, or alternatively through a specific booking or permit for a particular hiking trail or 4x4 route in more sensitive areas. Several groups may be in the area at the same time, but access should be managed to minimise interaction between groups if necessary.

Interaction with other users: Interaction between groups of users is low, and care must be taken in determining the number and nature of facilities located in the area to minimise these interactions.

Limits of acceptable change

Biophysical environment: Deviation from a natural / pristine state must be small and limited to restricted impact footprints. Existing impacts must be reduced. Any facilities constructed in these areas, and activities undertaken here, should be done in a way that limits environmental impacts. Road and infrastructure specifications must be designed to limit impacts.

Aesthetics and recreational environment: Activities which impact on the intrinsically wild appearance and character of the area, or which impact on the wilderness characteristics of the area (solitude, remoteness, wildness, serenity, peace, *etc.*) must be restricted and impacts limited to the site of the facility. Ideally, visitors must only be aware of the facility or infrastructure that they are utilising, and this infrastructure / facility must be designed to fit in with the environment within which it is located, in order to avoid aesthetic impacts.

Facilities

Type and size: Facilities are small, often basic and are distributed to avoid contact between users. To achieve this, camp development must be limited to 25 beds, alternatively facilities can be designed for high levels of luxury, but with limited visitor numbers (*e.g.* controlled access camps or concession sites).

Sophistication of facilities: Generally, facilities are small, basic and self-catering, though concession facilities may be significantly more sophisticated.

Audible equipment and communication structures: None.

Access and roads: Vehicular accesses to facilities are mostly limited to low-spec roads, a combination of 4x4, gravel and twee spoor. Established footpaths are provided to avoid erosion and braiding.

Location in park

Primitive areas were designated in the southern and central parts of the park outside of the Astronomy Infrastructure Zone.

Guidelines on management infrastructure and utilisation

Permanent management infrastructure is permissible in this zone, but these should be relatively small and isolated. Park operations staff may need to service tourist facilities in this zone. Small, isolated, permanent but low specification infrastructure (such as dirt roads) may be present. This may be to help manage biodiversity or service tourist facilities.



6.5.3 Astronomy infrastructure zone

Objective

The objective of this zone is primarily to accommodate the SKA radio telescope (and Guest Instruments) and required supporting infrastructure. Any other activities in this zone are subject to the operational requirements of the SKA radio telescope. All activities (tourism and park management) need to be in compliance with SARAO policies and the Astronomy Management Authority Act to protect the radio telescope.

Characteristics

This zone is dominated by the SKA radio telescope and required supporting infrastructure and activities. Tourism access is largely limited to viewpoints over the SKA radio telescope. Access is specified by the management of the SKA radio telescope. Certain roads may be designated to allow tourist vehicles to access to SANParks facilities. Access to designated provincial roads would be retained as required. It is possible that some small-scale accommodation could be developed subject to the limitations imposed by the SKA radio telescope.

Visitor activities and experience

Activities: This zone is dominated by the SKA radio telescope and required supporting infrastructure and activities. Tourism access is largely limited to viewpoints over the SKA radio telescope, and activities would largely be limited to viewing the SKA radio telescope from these sites. Some limited activities such as bird-watching may be practiced along roads where access is allowed (e.g. designated public roads and access roads to SANParks facilities. It is possible that some small-scale accommodation could be developed subject to the limitations imposed by the SKA radio telescope.

Interaction with other users: Interaction between groups of users is low.

Limits of acceptable change

Biophysical environment: The SKA radio telescope and its associated infrastructure will have a significant impact within the local development footprints. Sites and activities need to be managed to avoid impacts on designated sensitive areas and adjacent zones.

Aesthetics and recreational environment: This zone is dominated by the SKA radio telescope and required supporting infrastructure. It is anticipated that the facility will unavoidably have a significant aesthetic impact on the zone.

Facilities

Type and size: This zone is dominated by the SKA radio telescope and required supporting infrastructure. Tourist facilities are largely limited to viewpoints and specified access to other zones. It is possible that some very small-scale accommodation could be developed subject to the limitations imposed by the SKA radio telescope.

Sophistication of tourism facilities: If allowed, generally, facilities are small, basic and self-catering.

Audible equipment and communication structures: None.

Access and roads: Road access will be specifically controlled to meet the requirement of the radio astronomy infrastructure. Certain roads may be designated to allow tourist vehicles to

access to SANParks facilities. Access to designated provincial roads would be retained as required.

Location in park

The zone is largely influenced by the pre-determined requirements of the radio astronomy infrastructure. In particular, the MeerKat, SKA-1 and SKA-2 facilities, supporting infrastructure (e.g. fibre, PV sites, access roads, control facilities) and construction infrastructure are included in the zone. The zone includes a broad central band of the park, as well as areas required for the spiral areas of SKA-1 and SKA-2.

6.6 Special conservation overlays

Two special management overlays, representing sensitive heritage areas and sensitive aquatic, soils and vegetation were identified for special protection in order to reduce any potential loss and to prioritize rehabilitation work in these areas (Appendix 5, Map 4). The areas were based on the detailed biodiversity and heritage impact assessment work for the Square Kilometre Array Integrated Environmental Management Plan (NRF, 2018).

The Special Conservation Overlay for heritage focusses on two areas:

- Built heritage sites and their 1km buffer: These are the main heritage precincts of at Groot Paardekloof Farmstead and the Corbelled houses and farmsteads.
- The sites with high potential for palaeo-environmental artefacts, particularly fossils.

The Special Conservation Overlay for aquatic, soils and vegetation focusses on areas:

- Sensitive pans, wetlands and river lines.
- Erodible slopes and pan features (e.g. dolerite and shale slopes).
- Sensitive and valuable vegetation types (e.g. dolerite hills, inselbergs and pediments with *Aloe dichotoma* forests).

6.7 Buffer zone

The Buffer Zone shows areas outside the park within which land use changes can affect the park. The Buffer Zone in combination with guidelines will serve as a basis for: (i) identifying focus areas in which park management and scientists must respond to Environmental Impacts Assessment's (EIAs), (ii) helping to identify types of impacts that will be important at a particular site, and most importantly (iii) integrating long term protection of the park into the SDFs of municipalities and other local authorities. The park will interact with all spheres of government, whether local, provincial, or national, as required, to achieve a positive conservation outcome in the buffer zone. In terms of EIA responses, the Buffer Zone serves largely to raise red flags and does not remove the need for carefully considering the exact impact of a proposed development. In particular, it does not address activities with broad regional aesthetic or biodiversity impacts e.g. renewable energy development projects. The Buffer Zone are aligned with the most applicable fine-scale systematic conservation plan in the area. In the case of Meerkat NP, this is the Critical Biodiversity Area Map from the Northern Cape Spatial Biodiversity Plan (Holness & Oosthuysen, 2016). From an aquatic perspective, the Buffer Zone are aligned with freshwater priority catchments, rivers and wetlands from the National Freshwater Ecosystem Priority Areas project (Nel *et al.*, 2011a; 2011b). The buffer zones also align with initial Key Biodiversity Areas that are being identified through an ongoing SANBI process.

There are two categories within the park Buffer Zone for Meerkat NP, namely Priority Natural Areas and View Shed Protection Areas.

6.7.1 Priority natural areas

This zone aims to ensure the long-term persistence of biodiversity, within and around the park, by identifying the key areas on which the long-term survival of the park depends. This includes areas important to both biodiversity patterns (especially reasonably intact high priority natural habitats) and processes (ecological linkages, catchments, intact hydrological systems, etc.). This does not imply any loss of existing rights (e.g. current agricultural activities or legal extractive biodiversity use such as fishing), but rather aims to ensure the park's survival in a living landscape.

Priority Natural Areas include areas identified for future park expansion as well as reasonably natural areas of high biodiversity value, which are critical for the long-term persistence of biodiversity within the park. These include adjacent natural areas (especially high priority habitats), which function as an ecologically



integrated unit with the park, as well as areas critical for maintaining ecological links and connectivity with the broader landscape.

Development guidelines: Inappropriate developments and negative land use changes (such as additional ploughing permits for natural veld, development beyond existing transformation footprints, urban expansion, intensification of land use through golf estates, etc.) must be opposed within this area. Developments with site-specific impacts (e.g. a lodge on a game farm) must be favourably viewed if they contribute to ensuring conservation friendly land use within a broader area. Within these areas, inappropriate development such as dam construction, loss of riparian vegetation and excessive aquifer exploitation must be opposed. In addition, the control of alien vegetation, control of soil erosion, and appropriate land care (e.g. appropriate stocking rates) must be promoted.

Response to development should be aligned with the guidelines for the spatial category in the appropriate conservation plan i.e. the Northern Cape Biodiversity Plan (Holness and Oosthuysen, 2016). Park management should ideally coordinate responses to development in consultation with the appropriate provincial authorities to ensure consistency in response to developments from different agencies.

Offsets: These areas should be considered as offset receiving areas where possible, especially in identified park expansion areas.

6.7.2 View shed protection

These are areas where developments can impact on the aesthetic quality of a visitor's experience in a park. This zone is particularly concerned with visual impacts (both day and night) but can also include sound pollution.

Development guidelines: Within these areas, any development proposals must be carefully screened to ensure that they do not impact excessively on the aesthetics of the park. The areas identified are only broadly indicative of sensitive areas, as at a fine scale many areas within this zone will be perfectly suited for development. Further, invasive developments outside this zone will also have to be considered.

6.8 Future improvements

As Meerkat NP is at an early stage in its development, it is anticipated that the park zoning will be significantly updated in future iterations

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Section 7: Access and facilities

7.1 Public access and control

The National Park is located approximately 728 km from Cape Town, 960 km from Johannesburg and 85 km from the town of Carnarvon in the Northern Cape Province of South Africa.

Access to the park from Cape Town is via the N7 (National tarred road); R364 (regional tarred road); R27 (regional tarred road) and R63 (regional tarred road). Approximately 120km from Williston to Carnarvon, the Van Wyksvlei turn-off (sign-boarded) will be on the left.

Access to the park from Johannesburg is via Kimberley via the N12 (national tarred road) from Johannesburg via Potchefstroom, Wolmaransstad, Bloemhof, Christiana, Warrenton, Kimberley, Hope Town, Strydenburg, Britstown, R384 (regional tarred road) from Britstown via Vosburg to Carnarvon and R63 (regional tarred road) from Carnarvon for 10km, turn-off to Van Wyksvlei approximately 10km from Carnarvon on the right.

7.2 Areas with restricted access

Access to the park is restricted due to the sensitive nature of research undertaken on site. SARAO provides 24/7 security access control through an outsourced security contract. There are three boom gates, one on the Provincial road at the Meys Dam boundary, one at the SKA Site Complex and one on the Provincial road at the Losberg farm boundary.

7.3 Airfields and flight corridors

The existing landing strip site is located at 30°41'27.16"S; 21°27'20.80"E. The elevation is 1,048 m AMSL and the length of the runway is 1,300 m with a width of 18 m. The landing strip is designed to accommodate a Pilatus PC-12 (design aircraft) or similar. The maximum take-off weight restriction of 5,700kg has to be respected by all pilots flying into the airfield. The landing strip is registered with the Civil Aviation Authority.

For the PC-12 aircraft, the Rescue and Firefighting category is 3, although with minimal air traffic movements (less than 700 movements in the busiest consecutive three months) - this could be reduced to category 2. A foam extinguishing vehicle has also been provided by SARAO.

An apron of 35 m x 60 m is located at the south-eastern threshold of the runway. This position allows for the shortest access road to the main road. There is no airfield ground lighting or fuel storage on site.

There is a Standard Operating Procedure in place for all aircraft landing as this poses a serious RFI risk to the MeerKAT and SKA radio telescope. No private charters will be allowed to land on the landing strip without prior approval from SARAO.

7.4 Administration and other facilities

The establishment of the park is a 'business unusual' case for SANParks as SARAO will be in charge of all infrastructure management that pertains to the functioning of SARAO instruments (including SKA Phase 1) including roads, power, fibre, buildings etc. In addition to the SKA radio telescope, there are other international and local guest instruments located in the Karoo Radio Astronomy Observatory which include, the HERA and HIRAX radio telescopes in the park. There is existing infrastructure that is used mainly by the SKA Radio Astronomy Observatory while SANParks will make use of some of the infrastructure to achieve its mandate. This comprises existing access roads, grid and back-up power, data connectivity and security. The facilities and

infrastructure listed in Table 5 below are utilised for operational purposes enabling the park to fulfil its legal mandate. Map 7 in Appendix 5 shows all the infrastructure in the park.

Table 5: Existing Infrastructure.

Existing Infrastructure	Main user	Current status	Zone
All-weather landing strip	SARAO & SANParks	Operational	Primitive
Boundary fence ~200 km			Various
Data connectivity (drop off to SANParks office)	SANParks		Primitive
Existing roads on site (35 km)	SARAO & SANParks		Various
Grid Power (drop off to SANParks office)	SANParks		Primitive
Other farmhouses / stores to be utilised by SANParks (TBC)			Various
Security access control points	SARAO & SANParks		Primitive
Swartfontein farmhouse / outbuildings			

7.5 Visitor facilities

There are no visitor facilities in the park.

7.6 Commercial activities

For the purposes of this management plan, commercial activities include all income-generating facilities, products and services offered, and are divided into those operated by the park and those operated by third parties, for example concession lodges.

7.6.1 Accommodation

There is no accommodation available in the park.

7.6.2 Public private partnerships

There are no public private partnerships (concessions) in the park.

7.6.3 Retail and other facilities

There are no retail facilities in the park.

7.6.4 Activities

There are no activities available to visitors in the park.

7.7 Cultural heritage sites

A number of sites have been identified but none are accessible to visitors.

7.8 Community use

There is no community resource utilisation taking place in the park.

Community members wishing to visit gravesites should contact the Park Manager to make the necessary arrangements regarding access and be briefed on the general rules applicable.

7.9 Mining

There are currently no other mineral / prospecting rights registered against the properties other than those registered in the name of the NRF. These mineral permits are for four existing borrow-pits which are being used to source material for road maintenance on the SKA site.



7.10 Servitudes

Servitudes allow land owners or representatives of organisation access to the park to perform certain duties. There is currently only one servitude owner that require access through the park, namely the Northern Cape Department of Roads and Public Works. The sealed provincial road (PO2996 and PO2337) providing access to the park (Provincial responsibility)

A wind pump and dam servitude provided access to water for previous neighbouring land owners on remaining extent of the farm Poffadderfontein No 495. This servitude is still registered against the property, but no longer in use, as SARAO is also the owner of the neighbouring farms Portions 2 and 3 of the farm Poffadderfontein No 495.

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Section 8: Expansion / Consolidation

The potential expansion of the park remains an option, however, a detail expansion plan must first be developed. This expansion plan will be developed within the first three years after the approval of this document. The process will be based on a systematic conservation approach taking into account the National Protected Area Expansion Strategy for South Africa developed in 2018 as well as other biodiversity and cultural information layers.

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Section 9: Concept development plan

9.1 Long term development plan

Development is not considered lightly and is only embarked on to fulfil a real operational need or tourism opportunity. The RFI restrictions applicable to the SKA Observatory will guide any future development and limit the possible products and activities *i.e.* tourism opportunities, visitation to the site, equipment usage and research methodology, and will require SANParks to consult and communicate all undertakings and operations on site with SARAO.

It is envisaged that a SKA Exploratorium will be built in Carnarvon for members of the public and school groups to undertake a 3D virtual visit to the SKA site without causing interference to the SKA radio telescope during operations. An opportunity also exists to undertake both astronomy and environmental outreach programmes in the SKA Exploratorium. Possibilities exist for SANParks to establish a local environmental presence in the Exploratorium where cultural heritage / ecological walking tours of the park could be arranged whilst adhering to the RFI restrictions in the Observatory.

Caution will be exercised when considering any park development. The zonation of the park will dictate the placement of any development and the implementation of identified projects will be dependent on the availability of funds.

9.2 Development nodes

The primary development node will be the footprint of the SKA radio telescope. For SKA Phase 1, there will be a total of 197 antennas, which comprises of the 64-dish MeerKAT radio telescope and 133 SKA1_MID antennas owned by the international SKA Treaty Organisation. The remaining antennas and associated infrastructure will be distributed along three spiral arms with baselines up to 150 km each. In addition to the antennas, supporting infrastructure will include access roads, offices & workshops, a high-performance computing and power facility, power and fibre network, and security facilities. SKA Phase 2 will likely consist of up to 2,500 antennas in the SKA core area and will extend out to the eight African partner countries.

In total the development footprint is likely to be less than 5,000 ha (less than 4 % of the park).

9.3 Communication routes

There is no cellular phone coverage within the park (currently or in the future) as cell phones cause RFI and the SKA site is protected by the AGA Act and its Regulations.

The SKA operational activities in the SKA Observatory and within the park require the availability of an efficient Digital Mobile Radio System which will be used both by SARAO and SANParks. Such a system is required for reasons of safety (including electrical switching), maintenance, infrastructure operations and logistics. This network will be deployed during the commencement of SKA1 construction (2020).

The existing MeerKAT communication system operates in the 70/75 MHz midband VHF frequency domain and consists of two sets of repeaters.

SARAO will provide data connectivity to the SANParks office located at Swartfontein by creating a fibre drop-off point. Back-up connectivity can be provided through a very-small-aperture terminal.

SARAO is busy with the deployment of a trunked communication network operating at 137MHz frequency range which could also be used by SANParks. This network will consist of hand-held devices which link into a trunked network enabling both landline and cell phone calls.

9.4 Service supply routes

The main service route to the park is along the Provincial tarred road (PO 2996 & PO 2337) providing access to the National Park.

9.5 Infrastructure development proposals

All infrastructure development proposals for SANParks, including activity development, are presented in Tables 6 - 8 below. No target dates for the completion of the projects in this section are available at this stage (2019), because the allocation of funding has not been finalised.

9.5.1 Administration and other facilities

The identified facilities set out in Table 6 below will be utilised for operational purposes.

Table 6. Proposed administrative infrastructure development in the park.

Infrastructure	Current status	Zone	Probability
SANParks administrative office at Swartfontein upgrade	Existing	Primitive	High
Additional staff housing	New	Various	

9.5.2 Visitor facilities

Proposed visitor facilities include all non-commercial facilities and points of interest available to visitors and are set out in Table 7 below.

Table 7. Proposed non-commercial facilities and points of interest development in the park.

Infrastructure / visitor sites	Current status	Zone	Probability
Lookout point	New	Primitive	Medium

9.5.3 Commercial facilities and activities

Due to the RFI restrictions, there are limited opportunities for commercial activities and / or products that could be developed in the park to provide a tourism experience. All proposed opportunities will be individually investigated and their priority determined based on feasibility and income potential. There may be opportunities for development that will be excluded, as they are considered unlikely to be developed within the term of this plan. However, should the market change or a third party present an opportunity, products may be considered based on the agreed terms and locations, as per the park product development framework (Appendix 3).

9.5.3.1 Activities

Leisure activities provide a mechanism for visitors to experience the unique infrastructure and surrounding environment, with the potential for community development and without the high capital investment required for accommodation. Key challenges regarding provision of leisure activities in future will be the RFI restriction, diversity of offering and customer demand. Activities identified for possible development are outlined in Table 8.

Table 8. Proposed activity development in the park.

Activities	Current status	Zone	Probability
Guided tours (multiple sites)	New	Various	High



Section 10: Strategic plan

10.1 Introduction

Sections 3, 4 and 5 of this plan outlined the policy framework, the consultation process and vision, mission and high-level objectives for the park. In this section the high-level objectives of the park are unpacked into lower level objectives and sub-objectives and finally into operational actions. In this way, decision-making, even at the operational level, can be linked back with the core values and inputs from stakeholders on which they have been based. This approach conforms to the requirements of the NEM: PAA and the NEM: BA, SANParks policy and ratified international conventions.

Programmes of implementation, developed as outlined above, form the strategic plan for this planning cycle, and are arranged under the following headings:

- Biodiversity;
- Cultural heritage;
- Socio-economic development;
- Partnerships; and
- Effective park management.

Each programme is structured as follows:

- **Programme name:** A name describing the programme.
- **Background:** Overview of intent, guiding principles, description, outcome, research and monitoring and risk (all where applicable);
- **Tables:** Outline of objectives, initiatives and management actions within the scope of the objective with an indication if the programme is once-off, continuing or conditional on the availability of resources. These tables have the following headings:
 - **Objectives** The various objectives derived from the hierarchy of objectives, which make up each programme;
 - **Actions:** The actions necessary to achieve the objective;
 - **Responsibility:** The SANParks person, section, department, division or unit responsible for implementing the action;
 - **Portfolio of evidence (POE):** Proof whereby the achievement of the objective can be evaluated;
 - **Timeframe:** An indication of when the action is likely to be completed (indicated by year in the planning cycle); and
 - **References:** References to relevant programmes, lower level plans (LLPs) or other documents.

In most cases a detailed LLP supports the individual programmes. These LLPs could be reviewed on a frequent basis depending on the changing circumstances and requirements of the park.

The commitments outlined in the various programmes under section 10 are aligned with the performance management system of the operational staff. Progress and impact will be tracked, and the work plan will be reviewed annually to prioritise implementation activities, to be responsive to emerging matters and to inform the risk response strategy.

10.2 Biodiversity conservation

SANParks subscribe to the broad definition of biodiversity as described by Noss (1990) which includes structural, functional and compositional diversity at all scales. In managing the heterogeneity and diversity in the park it is emphasised that ecological systems function across a

full hierarchy of physical and biological components, processes, and scales in a dynamic space-time mosaic (Pickett *et al.*, 1997). Park management therefore attempts to identify key agents, drivers and controllers of change that can be manipulated if the need to influence the nature and direction of heterogeneity change arises as Biggs & Rogers (2003) suggests. As such, a number of biodiversity management programmes have been developed to effectively manage the diversity and patterns and processes of this landscape.

10.2.1 Habitat and vegetation programme

The purpose of this programme is to determine potential change of key habitats and plant communities and the consequences for the faunal component and aesthetic values.

Event driven dynamic behaviour, unpredictable and low rainfall and complicated interactions between plant species make it difficult to gather sufficient understanding of vegetation dynamics to be able to develop guidelines for sustainable management. Long-term vegetation change in semi-arid to arid areas is usually allogenic (*i.e.* abiotic driven, including disturbance) in response to geomorphological processes, and overgrazing and trampling may induce successional or degradational trends in arid plant communities (Van Rooyen *et al.*, 1984).

Effective conservation cannot be achieved without a thorough knowledge of the plant communities present in an area. Consistent scientific vegetation classification and description form the basis of conservation and monitoring exercises to maintain biodiversity (Brown *et al.*, 2013). The necessity for an ecologically sound plant community's identification and classification, which describes and maps a conservation area, has been established (Bezuidenhout *et al.*, 2015). However, a sound understanding of the ecology, summarised in a vegetation map, will contribute considerably to the compilation of an effective wildlife management programme and conservation policy. Habitat data, including geology, soil texture, soil depth, slope, aspect and the percentage rockiness of the soil surface, will all be collected and used in the description of the different plant communities.

Protected areas are under increasing threat from a range of external and internal factors. Monitoring is an essential component of measuring the performance of protected areas, in order to conserve biodiversity. The requirement for biodiversity monitoring in national parks is an important component of the SANParks adaptive management philosophy. SANParks' Framework for Biodiversity Monitoring guides the structure and development of the Biodiversity Monitoring System for SANParks (McGeoch *et al.*, 2011).

A detailed lower level plan outlining the rationale and operational approach supports this programme. This programme links with high-level objective 1 and objective 1.1 on page 37. To achieve the purpose of this programme, the actions listed in the table below will be implemented.

HABITAT AND VEGETATION PROGRAMME				
High-level objective: To ensure the persistence of ecological integrity by conserving and restoring ecological patterns and processes representative of the central Nama-Karoo Biome.				
Objective: To determine potential change of plant species composition, vegetation structure and function, and its consequences to ecological processes by monitoring, data analysis and evaluating results.				
Actions	Responsibility	POE	Timeframe	Reference
Identify, classify and map the plant communities.	CSD	Map	Year 3	Degradation LLP, Fresh water LLP, Species of special concern LLP, Wildlife Management LLP
Implement research projects to assess understanding of the functioning of the different landscape units and assessing the veld condition of the landscape units.	CSD, PM	Registered research projects, reports	As required	
Objective: To ensure monitoring and evaluation of programme implementation and effectiveness.				
Monitor, evaluate and review the programme, and inform relevant risk responses and adaptive management.	PM	Documentation	Annually	

10.2.2 Wildlife management programme

The purpose of this programme is to ensure that the monitoring of wildlife (occurrence, populations and distribution), vegetation (cover, composition and condition) and rainfall is conducted and subsequently integrated to inform wildlife management responses.



The historical mammal biodiversity in the SKA site was dominated by small mammals, including common duiker *Sylvicapra grimmia*, Cape grysbok *Raphicerus melanotis* and grey rhebok *Pelea capreolus*, as well as eland *Tragelaphus oryx*, African buffalo *Syncerus caffer* and gemsbok *Oryx gazelle*. In addition, herbivores that have been documented through camera trapping in the area include springbok *Antidorcas marsupialis*, kudu *Tragelaphus strepsiceros* and steenbok *Raphicerus campestris* (Blanckenberg, 2018). Current species recorded also included meso-predators.

As the current database is inadequate for the management of wildlife resources in the park, the priority is to collect the relevant information on wildlife, vegetation and rainfall to develop a benchmark of understanding. The SKA site was previously used for small livestock farming, mainly sheep farming, which resulted in land degradation, indiscriminate provision of water points, over grazing and soil erosion. Surrounding farms continue this practice, which could have implications on carnivore management, particularly for meso-predators such as jackals. Until an appropriate veld assessment can be conducted and adequate data provided, the land will likely need to rest and be rehabilitated. Following an assessment, systematic reintroductions can be initiated.

The ideal wildlife management plan requires minimum intervention, especially in the context of the non-equilibrium paradigm, where the emphasis is on rehabilitation from prior land use impacts on biodiversity rather than managing animal numbers. The aim is to re-establish viable populations of wildlife species that historically occurred in the area. Management action would therefore primarily involve reducing the extent of domesticated herbivore impact (for example through the manipulation of artificial water where this is possible), and thereafter manipulating the population dynamics of species. Recovery thus depends on whether resources are available, whether species can be nourished in degraded areas, whether suitable habitat is available once a degraded area has been rehabilitated, and whether sufficient resources are available at the reintroduction site to establish and sustain a breeding population. This implies that animal impact would be distributed unevenly across the landscape with areas of high and low impact in accordance with variability of vegetation species composition.

The restoration of predation processes is a key objective for SANParks in achieving ecosystem objectives. Predators, particularly meso-predators, are seen as damage-causing and contentious by farmers surrounding the SKA site. To date the surrounding farmers have applied active control of the meso-predators, mainly jackal and caracal. Large predators such as leopards would ideally regulate the meso-predator populations, and although not documented, there are speculations that leopard occur in the surrounding SKA area. Carnivore reintroduction, which mimicks a colonisation sequence, has a higher feasibility rate in establishing stable predator-prey relations. The challenges of maintaining ecological processes that involve carnivores are offset against expectations of stakeholders. Although the presence of carnivores can have impacts on the neighbouring communities, predation is part of a natural process in the ecosystem. Therefore, part of the focus would be to monitor the jackal populations and verify if brown hyena and leopard occur in the area.

A detailed lower level plan outlining the rationale and operational approach supports this programme. This programme links with high-level objective 1 and objective 1.2 on page 37. To achieve the purpose of this programme, the actions listed in the table below will be implemented.

WILDLIFE MANAGEMENT PROGRAMME					
High-level objective: To ensure the persistence of ecological integrity by conserving and restoring ecological patterns and processes representative of the central Nama-Karoo Biome.					
Objective: To understand and manage wildlife dynamics, maintain integrity and vegetation, by reintroducing species that historically occurred in the area and regulating wildlife populations as a modifier of biodiversity at various temporal and spatial scales.					
Sub-objective	Actions	Responsibility	POE	Timeframe	Reference
To ensure that informed wildlife management decisions and actions are taken that ultimately restore and maintain wildlife and habitat interactions and feedbacks.	Compile area-wide wildlife diversity data using historical records.	CSD	Database	1 year	
	Compile historical rainfall data for the area (to contextualise prevailing rainfall conditions)	CSD		Ongoing	
	Conduct area-wide animal census and if possible compile distribution maps.	CSD, external researcher collaborations	Registered research projects	Year 3	
To minimise the effects of extensive or insufficient surface water provision.	Create surface water database for each water source.	CSD, BSP	Database	Ongoing	Linked to Water Resources Management LLP
	Create surface water map indicating water availability (and distribution).	CSD	Map	Ongoing	Linked to Water Resources Management LLP
	Consider surface water map to evaluate artificial water provision implementation.	CSD and external research collaborations	Registered research projects, reports	Ongoing	Linked to Water Resources Management LLP
To supplement populations of species that currently occur in small numbers.	Identification of species for reintroductions	CSD and PM	Reports	Year 3, ongoing	
	Submit proposal to the Wildlife Management Committee to source required species.	CSD	Proposal	Year 3	
	Establish a monitoring protocol for detecting population trends.	CSD	Rreport	Year 4, ongoing	
	Supplement populations as per Wildlife Management Committee recommendations.	CSD, PM	Reports	As needed	
To reintroduce species that previously occurred in the area covered by the park.	Identify which species no longer occur in the park.	CSD and PM	Reports	Year 4	
	Submit proposals to the Wildlife Management Committee to source required species.	CSD	Proposal	As required	
	Introduce populations as per Wildlife Management Committee recommendations.	CSD, PM	Reports	As required	
	Monitor outcomes of the reintroduction.	PM, CSD	Report	As required	
To ensure monitoring and evaluation of programme implementation and effectiveness.	Monitor, evaluate and review the programme, and inform relevant risk responses and adaptive management.	PM	Documentation	Annually	

10.2.3 Degradation programme

The purpose of this programme is to assess the habitat degradation status and implement mitigating measures to improve ecological processes and enhance ecosystem functioning in affected areas.

The national policy on the conservation and sustainable use of South Africa's biodiversity as compiled by the DEA, calls for the identification of key sites for rehabilitation, based on biological and socio-economic criteria, and the development and implementation of rehabilitation plans for identified sites. In addition, the



Convention on Biological Diversity lists rehabilitation as an important tool for promoting the conservation of biodiversity. Former human activity, such as indigenous tree clearing for farming purposes or the aftermath of long periods of intensive grazing (Daemane *et al.*, 2011), has a long-term negative impact on biodiversity. Environmental disturbances that hinder ecosystem stability and function, threaten the various benefits derived from national parks, as they result in decreased species diversity and subsequent decline in ecological function and resilience (Tilman *et al.*, 1997; Evans *et al.*, 2001). Therefore, these anthropogenic disturbances should be mitigated and ecological processes restored to reduce the undesirable impact on the biological integrity of ecosystems.

SANParks considers degradation as the deterioration of the environment through depletion of resources such as air, water and soil; the destruction of ecosystems and the extinction of wildlife – the enervated change or disturbance to the environment is perceived to be undesirable. In some cases, the disturbed or damaged ecosystem cannot re-establish itself without human facilitation (SER, 2004; Forsythe, 2013). This is because the environment has been exposed to frequent or intense disturbances that hinder or delay ecosystem repair (Pullin, 2002). These disturbances can be man-made or natural and still need human interventions to recover even in natural ecosystems such as national parks (Daemane *et al.*, 2013). Most degradation in the park result from human-induced practices such as past agricultural activity, invasive alien species (although relatively small scale), past and present herbivory, old infrastructure, erosion and soil degradation and the presence of extra-limital species. Invasive alien plants have allelopathic effects that completely exclude and hinder native vegetation presence (Sean *et al.*, 2008; Gerber *et al.*, 2008) by modifying nutrient formation and hydrology (Higgins *et al.*, 1999; Zachariades & Goodall, 2002). This restructures resource availability and modifies ecosystem processes. In general, degrading agents in the system lead to species loss (Oldeman *et al.*, 1991; Nachtergaele *et al.*, 2010). However, not all disturbances and associated change are toxic for ecosystems. The impact depends on the type and intensity of disturbance. For example, moderate grazing benefits biodiversity as it removes senescent vegetation (Read & Andersen, 2000; Littlewood, 2008). Generally, the highest diversity and conservation value is found at intermediate levels of disturbance (Barnosky *et al.*, 2012; Chesson and Huntly, 1997; Roxburgh *et al.*, 2004). Apart from human-induced activities, degradation can be caused by natural disturbances (*i.e.* floods, droughts) that are too frequent or severe to allow natural ecosystem recovery in a reasonable period. Degradation resulting from various factors, including climate perturbations and extreme events, inappropriate fire or herbivory regimes, alien species invasion, as well as human activities, generally reduces flows of ecosystem goods and services. Although some of these are natural processes, intervention may be required in protected areas where natural recovery processes are retarded or prohibited because of fragmented habitat surrounded by alternative land use. Except for some chaotic or gradual natural events leading to land degradation, the phenomenon is mainly due to the interaction of the users with the land. Water runoff is accelerated by road infrastructure in areas with high tourism intensities. Degradation therefore affects the capacity of the habitat to support life, thereby contributing to an unsustainable ecological system. The sensitive nature of soils in the park permits easy erosion during rainfall seasons and floods. Infestation by alien invasive plants also cause vegetation community degradation as species richness, composition and diversity decline. In areas affected by past or current herbivore management practices, removal of basal vegetation cover and associated soil capping are evident, leading to soil degradation such as sheet, rill and gully erosion.

The Landscape Function Analysis technique (Tongway and Hindley, 2004) is undertaken at selected sites to assess soil stability, infiltration / runoff and nutrient cycling as indicators to measure soil degradation. Rehabilitation in areas affected by soil degradation includes gully control methods such as resloping, silt fencing, brush packing and gabion construction (Coetzee, 2005). For bigger interventions such as gullies, fixed photos are taken before and after intervention. Where sheet erosion was identified as a major degradation concern, a combination

of soil ponding and brush packing is undertaken to break capped soils and facilitate the capture of sediment and seeds. Vegetation is then monitored in selected sites to assess the success of intervention measures in areas affected by sheet erosion.

Initial assessments indicate that the focus of the rehabilitation should be linked to the removal of redundant structures, small-scale erosion control and rehabilitation of cultivated land and disturbed areas around homesteads. A full assessment of the area needs to be completed to determine long-term needs for a rehabilitation project. Based on current assessment the project could start in 2020 / 2021 cycle.

This programme links with high-level objective 1 and objective 1.2 on page 37. To achieve the purpose of this programme, the actions listed in the table below will be implemented.

DEGRADATION PROGRAMME					
High-level objective: To ensure the persistence of ecological integrity by conserving and restoring ecological patterns and processes representative of the central Nama-Karoo Biome.					
Objective: To restore ecological patterns and processes by re-establishing the structure, function and composition of degraded land.					
Sub-objective	Actions	Responsibility	POE	Timeframe	Reference
To restore the soil functioning and associated vegetation patterns of land degraded by erosion.	Identify and map prioritised sites requiring rehabilitation.	BSP	Document	Year 1	
	Rehabilitation of old cultivated lands / homesteads and areas affected by soil erosion.	BSP	Report	Year2, ongoing	Annual plan of operations
	Monitoring recovery in areas undergoing rehabilitation.	BSP, CSD	Report	Ongoing	
To ensure monitoring and evaluation of programme implementation and effectiveness.	Monitor, evaluate and review the programme, and inform relevant risk responses and adaptive management.	PM	Documentation	Annually	

10.2.4 Invasive and alien species programme

The purpose of this programme is to protect the biodiversity and infrastructural assets within the park through suppressing and where possible, eradicating and preventing the re-infestation of invasive and alien species (IAS) within the park and to protect the park from new and emergent species.

Many international conventions call for the management of invasive alien species among others the Convention on Biodiversity. In South Africa, the management of IAS is mandatory under the NEM: BA. There are sixteen legislative statutes (national acts, provincial ordinances and municipal by-laws) that govern the management of IAS. Of these, the most relevant are the NEM: BA and the Conservation of Agricultural Resources Act (Act No. 43 of 1983) [CARA] and regulations emanating from these acts. The CARA provides additional guidance for the management of IAS plants.

The IAS management framework for SANParks (Hendricks and Symonds, 2009) provides the context within which all management of IAS is implemented.

CARA requires the management of listed alien invasive plants. There are three categories of plants covered within CARA, each with its own management and control regulations. NEM: BA provides for the protection of South Africa's biodiversity within the framework of the National Environmental Management Act (Act No. 107 of 1998) [NEMA]. This Act puts in place a framework for the management of IAS. Regulations governing the management of IAS and was published in July 2013 (Government Gazette No. R. 506).

Climate change, invasive alien species, pollution and mining are amongst some of the key threats to protected areas (Alers *et al.*, 2007). Invasive and alien species are considered to be one of the largest and fastest growing threats to biodiversity. These species can transform the structure and species composition of ecosystems by replacing indigenous species, either directly by out-competing them for resources or by changing the way nutrients are cycled through the ecosystem. They also increase biomass which impact on fire regimes and fire intensity (McNeely *et al.*, 2001). Foxcroft *et al.* (2013) identified biological invasions as one of the greatest threats to protected areas. The development of robust decision-making tools that are based on both invasive species traits as well as ecological principles, along with effective implementation, is key to the success of invasive species management programmes. The likelihood of protecting the park from



the threats of IAS is dependent on sound management strategies, adequate resources and effective engagement with key stakeholders, effective legislation and policing of legislation. The likelihood of eradication or maintenance control varies considerably with species and terrain invaded. Rapid response is required to remove species before it they are allowed to build up large populations.

List of invasive species occurring in the park

Six alien plant species have been recorded in the park and are listed in Table 9 below.

Table 9. List of alien and invasive species recorded in the park.

Taxonomic classification	Scientific name	Common name	NEM: BA category	Current perceived level of threat
Plants	<i>Atriplex nummularia</i>	Old man saltbush	2	Low
	<i>Eucalyptus globulus</i>	Blue gum	Undetermined	Low
	<i>Prosopis glandulosa</i>	Honey mesquite	1b	High
	<i>Argemone Mexicana</i>	Yellow-flowered Mexican poppy	1b	Low
	<i>Nicotiana glauca</i>	Wild tobacco	1b	Medium
	<i>Populus canescens</i>	Grey poplar	2	Medium
Birds	<i>Passer domesticus</i>	House sparrow	3	Medium
Mammals	<i>Mus musculus</i>	House mouse	1b	Undetermined
	<i>Rattus rattus</i>	Black (house) rat	1b	Undetermined

Description of the land infested and assessment of the extent of infestation

The park is infested by various IAS plants, which occur at different densities of infestation. Mitigation measures will be implemented to facilitate the improvement of ecological patterns and processes by the enhancement of ecosystem functioning in affected areas through passive control and aggressive eradication of IAS in the park and the park buffer zone. Within these management areas, various units have been identified.

These are:

- **Park.**
The main IAS in the park is *Prosopis glandulosa*, this species is concentrated around natural drainage lines, pans and homesteads in the park. A full assessment is required to determine the extent and spread of all species in the park. The bird and mammal invasive alien species are currently not perceived as a threat, however, a full assessment will also be required.
- **Buffer zone.**
A full assessment of the park buffer zone needs to be undertaken to identify the potential threat of invasion or infestation by IAS from private property.

Status report on the efficacy of past control measures

Prior to the park being established, informal clearing took place by previous landowners. An update on the status of IAS will be given in the next review of the management plan earmarked to be completed in 2024 / 2025.

Current measures to monitor, control and eradicate invasive and alien species

SANParks' IAS framework provides an integrated approach to IAS management, with the primary objective of meeting the biodiversity objectives of the park's management plan. The framework includes five vital components:

- Assessment and risk analysis;
- Priority setting;
- Early detection and rapid response;
- Control; and
- Restoration.

The spread of IAS into the park from the broader alien plant footprint and cadastral areas has been identified as a high risk. These areas will be monitored and assessed for risk of pathway movement into the park, prioritised in terms of eradication and treated accordingly. A full assessment and risk analysis of IAS in the park will enable priority setting. Prioritisation will then allow resources to be directed into ecologically sensitive and economically feasible areas. A generic set of criteria has been developed to prioritise areas and species. Once species and associated areas have been prioritised for treatment, this information will be fed into an Annual Plan of Operations (APO), which will form the basis of the motivation for annual funding. The APO will set out clearing schedules for each site, personnel requirements and costing. A long-term strategy will be developed for the areas within the park and adjacent buffers, which will assist in compiling an inventory, priority listing and allocation of resources over a five to ten-year time-frame. This long-term strategy will inform funding motivation and operations on an annual basis. Working with the South African National Biodiversity Institute (SANBI) Early Detection and Rapid Response Programme, the park will aim to identify pathways into the park, so that new IAS introductions may be prevented, and to enable a rapid response plan to eradicate or contain infestation. Even though a new invasion may seem insignificant, it must be evaluated for risk and prioritised for treatment, to ensure the potential threat does not spread, which could require exponentially more effort and resources to clear at a later stage.

Control methods, or an integrated combination thereof, are designed to suit the target species and environment in which they occur. The following methods could be used within the park, cadastral and broad alien plant footprint boundaries:

1. Initial treatment (mechanical, chemical and biological).
 - Chainsaw – fell, debranch and stack;
 - Foliar spray – application of herbicide; and
 - Biocontrol release - collection of clean cladodes, propagation of biocontrol and deployment of agent.
2. Follow-up treatment (manual, chemical and biological).
 - Loppers and hand saws;
 - Foliar spray – application of herbicide; and
 - Biocontrol release - collection of clean cladodes, propagation of biocontrol and deployment of agent.
3. Integrated combination of methods.

The following species have been identified as a priority for control:

- *Prosopis glandulosa*
- *Nicotiana glauca*

Ongoing monitoring of potential habitats of all listed plant species is critical.

Indicators of progress and success, indications of when the programme is to be completed

The success of the control programme will be determined by the results gathered from the monitoring programme. These results will highlight the status of IAS infestation, densities and rate of spread. These in



turn, will direct operational investment and the longevity of the programme in the park. An update on progress will be given in the next review of the management plan earmarked to be completed in 2024 / 2025.

A detailed lower level plan outlining the rationale and operational approach supports this programme. This programme links with high-level objective 1 and objective 1.4 on page 37. To achieve the purpose of this programme, the actions listed in the table below will be implemented.

INVASIVE AND ALIEN SPECIES PROGRAMME					
High-level objective: To ensure the persistence of ecological integrity by conserving and restoring ecological patterns and processes representative of the central Nama-Karoo Biome.					
Objective: To facilitate the re-establishment of natural biodiversity by identifying, controlling and where possible, eradicating alien biota.					
Sub-objective	Actions	Responsibility	POE	Timeframe	Reference
To systematically survey and list alien species in and around the park.	Survey the park and neighbouring farms to determine IAS (fauna and flora) abundance and distribution, and maintain updated species lists.	BSP, PM, CSD	Reports	Annually, year 2 for neighbouring farms	
	Secure funding to evaluate the broader alien plant footprint to determine IAS (flora) abundance and distribution.	BSP	Funding allocated	Annually	
	Monitor, and / or where necessary, manage previously degraded areas within the park and adjacent to the park to reduce the risk of invasion or post clearing reinvasion.	PM, BSP	Results	Ongoing	
To ensure the effective and timely development and implementation of integrated control strategies, in such a manner that rapid response and long-term maintenance goals are met.	Maintain control of species and areas according to the current management programmes' APO.	BSP, PM	APO	Annually	
	Introduce biological control agents and / or other appropriate and innovative methods (subject to risk-benefit evaluation) where appropriate and necessary.	BSP, PM	APO	Annually	
	Eradicate, where possible, all new incursions of alien species (fauna and flora) and monitor the efficiency of the eradication programme.	BSP, PM	Monthly reports	Ongoing	
	Monitor the efficacy of the clearing programmes.	PM, BSP, CSD	Monthly reports	Ongoing	
To ensure monitoring and evaluation of programme implementation and effectiveness.	Monitor, evaluate and review the programme, and inform relevant risk responses and adaptive management.	PM	Documentation	Annually	

10.2.5 Species of special concern

The purpose of this programme is to ensure the persistence and viability of key species by contributing to national initiatives and implementing species-specific management approaches.

SANParks' biodiversity values stipulate that, except in crucial instances for the survival of globally critically endangered species, management for system integrity and biodiversity must take precedence over species management. However, SANParks will strive to prevent extinction, within national parks, of species on the IUCN global critically endangered or endangered lists, and will work with other conservation initiatives to secure and strengthen the future of such species over their historic distribution ranges. Global environmental change drivers are the primary cause of species becoming threatened and then listed as a species of special concern. Emergence of illegal resource use has been identified as a key element. Emerging diseases may also pose new challenges. Invasive species, such as alien plants, and pollution are perhaps lower level threats, while climate change impacts focus mostly on unpredictable weather patterns. Species of Special Concern is largely an administrative designation or grouping. These include (i) red list taxa from local to regional scales; (ii) taxa without a formal conservation status assessment or with insufficient data; (iii) species/taxa listed in the NEM: BA, Threatened or Protected species Regulations, Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) appendices; (iv) species which is subject to a Biodiversity Management Plan as per NEM: BA and NEM: PAA; (v) endemic taxa that has >80% of range confined to a park; (vi) reintroduced taxa that were extinct or threatened or indigenous species recently introduced and (vii) locally threatened populations. These categories also include species with a data deficient status especially invertebrates. Apart from these principal definitions, species may also be of special concern if (i) threatened taxa were monitored in the past, but its conservation status have improved; (ii) taxa are functionally important or key species; (iii) taxa are selected or common species; (iv) species with social or cultural value; (v) taxa that are subject to resource use and legitimate sustainable harvesting; (vi) species listed under relevant international conventions other than CITES. These designations that can make-up species of special concern, pose some key challenges in defining a list for the park largely because species of special concern can nearly be any kind of species and are context- person- and park specific. Within this context, there are 49 species currently found in the park that can be classified as threatened. The Red Data List of species with distribution ranges in the park is listed in Table 10 below.

Ninety species of mammals' historical distribution ranges fall within the park. Of these mammals, most species of special concern are small mammals. Only the Natal-long-fingered bat *Minipoterus natalensis* and black-footed cat *Felis nigripes* have been surveyed and documented on the site, thus providing baseline studies that verify the occurrence of these species. More baseline studies are needed to gather data to determine the presence and potential population size of other small mammal species of special concern.

Of the 215 bird species recorded within the park, 135 species are considered resident, 16 breeding migrant species, 27 non-breeding species, 27 nomadic species and 10 vagrant species. Species of special concern listed as vulnerable include the black harrier *Circus maurus*, lanner falcon *Falco biarmicus* and secretary bird *Sagittarius serpentarius*. Species listed as endangered include Ludwig's bustard *Neotis ludwigii* and the kori bustard *Ardeotis kori*. Some species listed as Near-Threatened include Sclater's lark *Spizocorys sclateri*, lesser flamingo *Phoeniconaias minor* and blue korhaan *Eupodotis caerulescens*.

Further studies are needed to gather more data to understand the diversity and distribution of reptile and amphibious species on this site.

The plant families with the most species of conservation concern are *Iridaceae*, *Amaryllidaceae* and *Apocynaceae*. These three plant families are geophytes or small shade succulents and difficult to detect in field surveys during dry periods. Three plant species of conservation concern occur within the study area, namely quiver tree *Aloidendron dichotomum*, ghaap *Hoodia gordonii* and camel thorn *Vachellia erioloba*. The park has experienced vegetation pressure due to the historic small stock farming, leading to over utilisation of the habitat. Inclusive of this land use, unpredictable low rainfall and complicated interactions between plant species make it difficult to gather sufficient understanding of vegetation dynamics to be able to develop guidelines for sustainable management. Habitats management would therefore need thorough veld assessments.

Table 10. List of species of special concern that occur in the park.

Taxonomic group	Scientific name	Common name	IUCN category – global
Birds	<i>Aquila verreauxii</i>	Verreaux's eagle	VU
	<i>Ardeotis kori</i>	Kori bustard	EN
	<i>Calendulauda burra</i>	Red lark	VU
	<i>Charadrius pallidus</i>	Chestnut-banded plover	NT
	<i>Ciconia nigra</i>	Black stork	VU



Taxonomic group	Scientific name	Common name	IUCN category – global
Birds	<i>Circus maurus</i>	Black harrier	VU
	<i>Cursorius rufus</i>	Burchell's courser	VU
	<i>Eupodotis caerulescens</i>	Blue korhaan	NT
	<i>Falco biarmicus</i>	Lanner falcon	VU
	<i>Falco naumanni</i>	Lesser kestrel	VU
	<i>Grus paradiseus</i>	Blue crane	VU
	<i>Gyps coprotheres</i>	Cape vulture	VU
	<i>Heterotetrax vigorsii</i>	Karoo korhaan	NT
	<i>Neotis ludwigii</i>	Ludwig's bustard	EN
	<i>Phoeniconaias minor</i>	Lesser flamingo	NT
	<i>Polemaetus bellicosus</i>	Martial eagle	EN
	<i>Rhinoptilus africanus</i>	Double-banded courser	NT
	<i>Sagittarius serpentarius</i>	Secretary bird	VU
	<i>Spizocorys sclateri</i>	Sclater's lark	NT
	<i>Tyto capensis</i>	African grass-owl	VU
Mammals	<i>Felis nigripes</i>	Black-footed cat	VU
	<i>Miniopterus natalensis</i>	Natal Long-fingered bat	NT
Plants	<i>Asclepias monticola</i>		CR
	<i>Anginon jaarsveldii</i>		EN
	<i>Aloe chlorantha</i>		VU
	<i>Avonia herreana</i>		VU
	<i>Aloe dichotoma</i>		VU
	<i>Brunsvigia josephinae</i>		VU
	<i>Bulbine melanovaginata</i>		VU
	<i>Conophytum achabense</i>		VU
	<i>Cylindrophylloids hallii</i>		VU
	<i>Dinteranthus wilmotianus</i>		NT
	<i>Ectadium virgatum</i>		NT
	<i>Gladiolus lapeirousioides</i>		VU
	<i>Haworthia venosa</i>		VU
	<i>Hoodia officinalis</i>		NT
	<i>Ixia thomasiae</i>		EN
	<i>Jamesbrittenia incisa</i>		VU
	<i>Lachenalia barkeriana</i>		NT
	<i>Lithops dinteri</i>		VU
	<i>Lithops olivacea</i>		VU
	<i>Moraea fistulosa</i>		CR
	<i>Polhillia involucreata</i>		EN
	<i>Romulea albiflora</i>		CR
	<i>Romulea komsbergensis</i>		NT
	<i>Romulea membranacea</i>		VU
	<i>Romulea unifolia</i>		NT
	<i>Strumaria aestivalis</i>		VU

Taxonomic group	Scientific name	Common name	IUCN category – global
Plants	<i>Strumaria massoniella</i>		VU

Critically Endangered – CR, Endangered – EN, Vulnerable – VU, Near Threatened – NT, Least Concern – LC, Data Deficient – DD.

A detailed lower level plan outlining the rationale and operational approach supports this programme. This programme links with high-level objective 1 and objective 1.5 on page 37. To achieve the purpose of this programme, the actions listed in the table below will be implemented.

SPECIES OF SPECIAL CONCERN PROGRAMME					
High-level objective: To ensure the persistence of ecological integrity by conserving and restoring ecological patterns and processes representative of the central Nama-Karoo Biome.					
Objective: To ensure the persistence of species and plant communities of special concern by identifying threatened and rare species, plant communities and threats, and where applicable develop and implement management responses.					
Sub-objective	Actions	Responsibility	POE	Timeframe	Reference
To identify the current threats facing species of special concern and prioritise for action where appropriate.	Identify species and collect baseline information on species and habitats of concern.	CSD, External Researchers	Reports	Year 3	Wildlife management LLP, habitat and vegetation LLP
	Develop monitoring programmes for identified species.	CSD	Documentation	Year 4	
To understand the distribution and population status of prioritised species of special concern.	Develop partnerships to assist with implementation and monitoring.	CSD, External Researchers/ Organisations	Monitoring programme	Year 3, ongoing	
To ensure monitoring and evaluation of programme implementation and effectiveness.	Monitor, evaluate and review the programme, and inform relevant risk responses and adaptive management.	PM	Documentation	Annually	

10.2.6 Fresh water programme

The purpose of the freshwater ecosystem programme will be to ensure the functionality of the fresh water systems (rivers, drainage lines, wetlands/pans and subterranean water) by restoring/rehabilitating and maintaining the hydrological processes and the variety of aquatic habitats.

South Africa is a signatory to the Convention on Biological Diversity (CBD). Therefore, SANParks' strategic plan, management plans and conservation policies are informed by the CBD's Programme of Action for Protected Areas. In 2010, CBD member nations agreed to 20 Aichi Targets to stop loss of biodiversity by 2020. Target 11 states that, "by 2020, at least 17 % of terrestrial and inland water areas and 10 % of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascape".

South Africa was pro-active in adopting a freshwater conservation target. This target emerged from a series of participative workshops involving several government departments and national agencies [SANParks, CSIR and SANBI], and stated that at least 20 % of each inland water ecosystem type should be conserved (Roux *et al.*, 2006). The endorsement of a quantitative target was followed by a national planning exercise to identify strategic spatial priority areas for satisfying the 20 % target. The resulting conservation priorities, known as Freshwater Ecosystem Priority Areas (FEPAs), comprise 22 % of South Africa's river length and 38 % of wetland area (Nel *et al.*, 2011).

The aquatic system of the park is dominated by ephemeral systems, which are influenced by changes in hydrology and water quality, and which are mostly endorheic and discharge into the pans / wetlands (CSIR, 2016; Snaddon *et al.*). There are two perennial rivers (viz. the Sak River (in the south) that originates from



the Nuweveld Mountains outside the park and flows into the Grootvloer-Verneukpan wetland system, and its tributary Riet-Vis River (in the west). The park has numerous ephemeral rivers (CSIR, 2016; Snaddon *et al.*) including the Carnavonleegte River that flows into the endorheic Grootvloer-Verneukpan wetland system. The river system (about 10,000 km) is largely natural and fall within the AB category of the FEPA (Nel *et al.*, 2011) with the remaining river length (1,000 km) falling within the C category.

There are 11 types of wetlands including highly sensitive ones such as the digressional, seep and flat wetland, and the riverine wetlands such as floodplain and valley-bottom wetlands that form part of the Bushmanland Vloere wetland system (CSIR, 2016; Snaddon *et al.*), of which some are FEPA wetlands. During the high flows this wetland system flows into the Hartbees River and ultimately connects the Sak and Orange Rivers and thus forms an important migratory route for fish and aquatic organisms between the associated river ecosystems (CSIR, 2016; Snaddon *et al.*).

Groundwater is the most important source of water in the park (Kruger & Beranek, 2018) that is mostly obtained from 83 boreholes (CSIR, 2016; Snaddon *et al.*) accessing fractured aquifers underneath the park. The park also has about 130 dams (CSIR, 2016) that are mostly located in the river causeways. The mean groundwater levels in the park, range from three metres (in the south-east) to 25 metres (in the north-west), with the mean groundwater depths ranging from 11 to 25 metres. (Bosch & Cronwright, 2005).

Since this is a newly proclaimed National Park that is located in an area of the country that has not been well researched, additional information will be required regarding the freshwater ecosystems and its status. Further inventorisations, mapping and verification of these ecosystems will have to be done to contribute to the information currently available. The importance to these freshwater ecosystems need to be determined as well as its intactness and inter-relationship.

The previous land use in the park would have degraded the freshwater ecosystems notably through infrastructures such as earth dams and boreholes. The dams would have hindered normal river flow and impeded the migratory routes of freshwater organisms. It could also have altered the watercourse of the rivers that would have negatively impacted the river dynamics. The abstraction of water through boreholes would have impacted both the terrestrial and freshwater ecosystems as it unnaturally transfers water from one point of the ecosystem to another. Therefore, there is a need to investigate the roles (either positive or negative) that the boreholes played in both freshwater and terrestrial ecosystems. All the boreholes in the park should be mapped and the impact thereof on the environment be assessed. Ultimately, park management will decide which boreholes should be utilised for water provision (human consumption and wildlife) and those which should be closed to allow the areas that were adversely affected to rehabilitate.

A detailed lower level plan outlining the rationale and operational approach supports this programme. This programme links with high-level objective 1 and objective 1.6 on page 37. To achieve the purpose of this programme, the actions listed in the table below will be implemented.

FRESHWATER ECOSYSTEM ROGRAMME					
High-level objective: To ensure the persistence of ecological integrity by conserving and restoring ecological patterns and processes representative of the central Nama-Karoo Biome.					
Objective: To ensure the functionality of the fresh water systems (rivers, drainage lines, pans, subterranean water and boreholes) by maintaining and restoring hydrological processes and the variety of aquatic habitats.					
Sub-objective	Actions	Responsibility	POE	Timeframe	Reference
To determine the intactness of the vital components (biological, geochemical, physical, etc.) that sustain the freshwater ecosystems.	Verify, update and map all freshwater ecosystems.	CSD, PM	Documentation	Year 5	
	Consolidate and verify all freshwater ecosystems and FEPA status.				
	Investigate the conditions of the vital variables that sustain the functionality of the freshwater ecosystems.	CSD, BSP			
	Determine the impact of the removal of alien plant species on the water table.				
To assess the role that boreholes will fulfil in the landscape for both anthropological and wildlife purposes.	Determine if boreholes can be used to simulate and sustain the functionality and biodiversity of the degraded freshwater systems.	CSD	Documentation	Year 5	
	Determine if the presence of the boreholes is contributing to degradation of the ecosystem.	CSD	Documentation	Year 5	
	Determine, list and maintain boreholes that are important for human and wildlife consumption.			Year 2	
To ensure monitoring and evaluation of programme implementation and effectiveness.	Monitor, evaluate and review the programme, and inform relevant risk responses and adaptive management.	PM	Documentation	Annually	

10.2.7 Climate change programme

The purpose of this programme is to document the nature and magnitude of changing climate in the region of the park and to understand and record the impact of these changes on the ecology of indigenous plants and animals, as well as the impact it has on SANParks' ability to carry out management actions and to meet its mandates.

Climate change refers to a significant and long-lasting shift in normal weather conditions that affects average conditions as well as the occurrence of extremes. Current climate change is thought to result from increased earth surface temperatures, often referred to as global warming, that is accelerated as a result of human-induced or anthropogenic activities which release greenhouse gases.

The Nama Karoo area is characterised by an arid climate with very little summer rainfall. Annual rainfall totals are generally less than 200 mm, with peak rainfall in March (CSIR, 2016). Evaporation rates are typically much higher than annual rainfall and summers are hot and dry, while it becomes very cold and dry in winter with overnight frost and dew (CSIR, 2016). Increased temperatures will shift hot extremes to uncomfortable levels significantly more frequently, reducing the ability of people to work outdoors. Most likely scenarios of change predict reduced rainfall regionally which will be further exacerbated by higher temperatures. In certain areas, the climate variations may move outside of conditions previously recorded in the Nama Karoo, and more closely resemble climates associated with desert conditions. The impact of reduced water and increased temperatures on plants and animals remain uncertain, but biodiversity loss and species turnover are likely.

Historical weather data is available from the South African Weather Service and Agricultural Research Council (ARC) stations at Vanwyksvlei and Carnarvon and trends in the data from Vanwyksvlei have been analysed between 1960 and 2003 (Kruger & Shongwe, 2004). Data obtained from various South African Weather Service and Agricultural Research weather stations (<300 km from the core site at Losberg) for the period 1994 - 2005 was analysed in a 2005 report used to provide information for the SKA site. The SKA weather station established at Losberg produced data between 2005 and 2011.



An important component of assessing biological and ecological responses of species to changing climate is to document the nature of local climatic changes and extreme weather events. In this regard, it is necessary to cooperate with researchers from the SARAO and the South African Environmental Observation Network (SAEON), and other relevant agencies to ensure the collection and archiving of biologically important climate data and meta-data. Meta-data should include comments that verify extreme events and where possible, document any relevant responses.

A detailed lower level plan outlining the rationale and operational approach supports this programme. This programme links with high-level objective 1 and objective 1.7 on page 37. To achieve the purpose of this programme, the actions listed in the table below will be implemented.

CLIMATE CHANGE PROGRAMME					
High-level objective: To ensure the persistence of ecosystem integrity by conserving and restoring ecological patterns and processes representative of the central Nama-Karoo Biome					
Climate Change Objective: To mitigate potential impacts of climate change on park biodiversity by actively participating in national climate initiatives.					
Sub-objectives	Actions	Responsibility	Indicators	Timeframe	Reference
To assess, monitor, understand and adapt to the variation in climate and weather extremes that impact on biodiversity, and other SANParks mandates	Liaise with SARAO and SAEON to collect, analyse and archive climatic data.	CSD, PM	Updated databases	Annually	SANParks Global Environmental Change Assessment (van Wilgen and Herbst (Eds), National Strategies and Policies, Namakwa Biodiversity Sector Plan
	Document impacts of climate change and / or extreme weather events on species of special concern, threatened ecosystems and processes, partner stakeholders' livelihoods, wildlife resource use, park infrastructure and cultural heritage.	PM, CSD, SAEON, external researchers	Reports, publications	As required	Northern Cape Biodiversity Sector Plan, South African National Climate Change Response White Paper (2011)
	Conduct park-level vulnerability assessment.	CSD, PM	Report; updated Green Power and Energy Plans; updated Risk Management Plans	Year 2	Namakwa District Biodiversity Sector Plan, Vulnerability Index, South African National Climate Change Response White Paper (2011)
	Develop and implement an Adaption Response Plan as appropriate, based on vulnerability assessment.	PM, CSD	Document	Year 3. ongoing	GEC Report (2016), South African National Climate Change Response White Paper (2011)

CLIMATE CHANGE PROGRAMME					
High-level objective: To ensure the persistence of ecosystem integrity by conserving and restoring ecological patterns and processes representative of the central Nama-Karoo Biome					
Climate Change Objective: To mitigate potential impacts of climate change on park biodiversity by actively participating in national climate initiatives.					
Sub-objectives	Actions	Responsibility	Indicators	Timeframe	Reference
To assess, monitor, understand and adapt to the variation in climate and weather extremes that impact on biodiversity, and other SANParks mandates.	Keep abreast with evolving knowledge on global climate change and feedback information.	CSD, PM	Minutes of meetings	Biennially	
To ensure monitoring and evaluation of programme implementation and effectiveness.	Monitor, evaluate and review the programme, and inform relevant risk responses and adaptive management.	PM	Documentation	Annually	

10.3 Cultural heritage management programme

The purpose of the programme is to record, research, present, and conserve the tangible and intangible cultural heritage resources of the park.

The management of the cultural heritage resources is guided by national legislation, policies and procedures within SANParks. The National Heritage Resources Act (NHRA) No. 25 of 1999 provides the framework for the maintenance and conservation of heritage resources in accordance with the standards and procedures set out by the South African Heritage Resources Agency (SAHRA). SANParks policies such as the Cultural Heritage Policy (2011), the Heritage Objects Collections Management Policy (2011), the Guidelines for Burials and Scattering of Ashes (2010) and the Development and Maintenance of Heritage Sites (2011) provide further guidance. An expert study of the park was conducted in 2018. This resulted in two reports, namely the Heritage Impact Assessment (HIA) and the Conservation Management Plan (CMP). The studies included a strategic level assessment of the heritage resources within the area under consideration to determine potential impacts (Digby Wells Environmental, 2018). This will guide the management of cultural heritage in the park.

The archaeological surveys were not exhaustive, and more surveys are needed to record new sites. The expert report identified 30 archaeological sites that should remain *in situ*. The recorded new sites should be added to South African Heritage Resources Information System (SAHRIS). The HIA also recommends that there should be signage to indicate the presence of heritage resources. There will be sites that will be affected by the new structures (*i.e.* antennas) and these must be recorded in detail prior to the construction phase. This may include inter alia, distribution and density mapping, surface collection and test excavations subject to the approval of a Section 35 Permit. Heritage resources that are situated within the development footprint of antennas need to be recorded in detail and a qualified archaeologist should be on site during earth moving activities (Digby Wells, 2018).

The HIA recommends that all historic buildings that qualify to be grade 2 sites according to the NHRA be formally registered on SAHRIS. Sites to be assessed for Grade 2 listing should include among others those that are older than 60 years and that possess cultural significance as per Section 2 (vi) and Section 3 of the NHRA. All grade 2 sites will need a permit issued by the South African Heritage Resources Agency (SAHRA) or the Provincial Heritage Resources Authority (as per competence assessment) if any alteration is to be done. The historic buildings should remain *in situ* and a buffer zone of 1 km should be created around them. These buildings should be managed as no go areas and thorough documentation of the sites should be done. Several buildings have been recommended for demolition. Subject to the requirements of NHRA section 27 and 34, these buildings should be thoroughly documented before demolition and the demolition should only be to floor level to retain the footprint or the original building (Digby Wells Environmental, 2018).



All sites cannot be treated the same even if they are in the same grade. Accordingly, sites should be graded according to threats and conservation needs. Sites that will be opened to the public or sites that are under threat, should have Site Specific Management Plans. This will in turn determine the inspection schedule. Any new sites should be added on SAHRIS.

The region is rich in oral history and there is an urgent need to record the oral history of the area. This might require training of a P&C officer as well as identification and training of local people (especially unemployed matriculants and graduates) to work as field workers in collecting oral history.

A detailed lower level plan outlining the rationale and operational approach is available. This programme links with high-level objective 2 and objective 2.1 – 2.4 on page 37. To achieve the purpose of this programme, the actions listed in the table below will be implemented.

CULTURAL HERITAGE PROGRAMME					
High-level objective: To identify, preserve and present the tangible and intangible heritage of the park for current and future generations through engagement, research and management.					
Objective	Action	Responsibility	POE	Timeframe	Reference
To improve and diversify the cultural heritage resources, inclusive of oral history, by updating and maintaining a comprehensive inventory.	Update the inventory when new sites are discovered.	PM	Inventory	Ongoing	
	Train the P&C officer and volunteers in oral history recording.	GM: Cultural Heritage	Training manual	Year 1	
	Record oral history.	PM	Audio and transcripts	Year 3	
	Grade sites for inspection purposes.	GM: Cultural Heritage	Grading list	Year 1, as required	
	Make detailed recordings of sites.	Service provider	Records	Year 1	
	Implement recommendations of the CMP.	PM	CMP	Ongoing	
To conserve the tangible and intangible cultural heritage assets through effective management and where relevant sustainable utilisation.	Develop a site inspection schedule.	PM	Inspection schedule	Year 1	
	Inspect sites as per schedule.	PM	Inspection reports	As required	
	Maintain sites as per inspection recommendation.	PM	Maintenance reports	As required	
	Demolish identified buildings.	Service provider	Reports	Year 1	
	Develop Site Specific Management Plans.	Service provider	Plans	Year 1	
To enable the interpretation and awareness of park and regional cultural heritage resources and oral history, through research and knowledge management.	Conduct feasibility studies of sites with tourism potential.	GM: Cultural Heritage, PM	Report	Year 1	
	Develop a presentation plan for sites that will be open to the public.	PM	Document	Year 2	
	Open sites for visitation.	PM	Report	Year 3	
	Explore and establish research partnerships.	PM	MOU	Year 2	

CULTURAL HERITAGE PROGRAMME					
High-level objective: To identify, preserve and present the tangible and intangible heritage of the park for current and future generations through engagement, research and management.					
Objective	Action	Responsibility	POE	Timeframe	Reference
To support the recording and enable effective management of all cultural heritage resources, inclusive of oral history, by developing appropriate skills and partnerships.	Identify skills gaps.	GM: Cultural Heritage	Report	Year 1	
	Identify partners to assist with training.	GM: Cultural Heritage	Report	Year 1	
	Train P&C officer according to training needs.	Service provider	Report	Year 2	
To ensure monitoring and evaluation of programme implementation and effectiveness.	Monitor, evaluate and review the programme, and inform relevant risk responses and adaptive management.	PM	Documentation	Annually	

10.4 Socio and economic development

Park management wishes to establish and maintain meaningful and beneficial relationships with a wide range of stakeholders, which will ultimately result in support to the park values, objectives and various programmes related to the different core functions. Park management will strive to implement new opportunities for enhancing relationships with surrounding communities and other stakeholders to ensure that local and regional initiatives and developments contribute positively to the attainment of the overall desired state of the park and the social ecological system within which it is embedded.

10.4.1 Techno-eco programme

The purpose of the techno-eco programme is to provide opportunities, albeit limited, for visitors to experience the combination of the unique astronomy and related technology as well as the natural and cultural heritage within the landscape.

The following strategic principles act as a guide for all decision-making processes:

- Recognise that apart from limitations of the biophysical environment and the park's desired state; Tourism activities undertaken by SANParks and tourist density will be constrained by the limitations as agreed to in the Contract Park Agreement reached between the NRF and SANParks;
- Promote mutual benefits with our key stakeholders and partners, as well as opportunities for growth and development of neighbouring communities, bearing in mind that SANParks is not a development agency;
- Strategic tourism planning and sustainable product development, using zonation and appropriate style (such as "limits of sophistication", "touch the earth lightly" and "sense of place" architectural themes) to achieve the desired state in the park and regional context; and
- Tourism activities in the park should not negatively affect the financial position of the park.

An agro-ecosystem refers to a landscape crossing agriculture and natural ecosystems, where all subsequent, and often multifaceted interactions need to be managed to sustain the needs of its stakeholders. A techno-ecosystem refers to landscape interfacing technological developments and natural ecosystems. However, techno-ecosystems have, for the most part, referred to growing urban-industrial ecosystems, e.g. cities that rely largely on non-renewable resources to advance technologically (Haber, 1990; Naveh and Lieberman, 1994; Odum, 2001).

The SKA Radio Astronomy Observatory will be within the national park and will increasingly interact on the social, economic, and ecological facades in the local landscape. At the SKA, stable and long-term data collection is a key prerequisite, and priority in the landscape. Following agro-ecosystem theory, it becomes clear that one only needs to replace stable commodity production with stable data collection, but biodiversity conservation and social equitability must be maintained as unchanged challenges in the landscape (Conway, 1987), for the SKA to be a techno-ecosystems, articulated through agro-ecosystem principles. In other words, while the SKA can sustainably produce their astronomy deliverables both spatially and temporally, biodiversity conservation (SANParks) and social equitability (social needs) are more likely to be



harmonised and maintained in this new landscape.

SANParks, as a major provider of tourism and natural experiences in the country, recognises that this park is not the “business as usual” tourism orientated park. The focus will not be on income generation but rather the offering of limited unique experiences.

The Northern Cape Department of Economic Development and Tourism has undertaken a feasibility study to establish a SKA Exploratorium in Carnarvon. Funding was recently received from the National Department of Tourism to continue with the detailed design of the SKA Exploratorium while capital funding will be secured through the Department to construct the facility in Carnarvon. This multi-purpose centre will enhance astronomy tourism and environmental outreach, act as an information centre for the SKA project and market and sell crafts, amongst others. The Exploratorium will be used as the “launch pad” for members of the public visiting the site (all tours will operate from there). This would allow members of the public and school groups to undertake a 3D virtual visit to the SKA site without causing radio frequency interference (RFI) to the SKA radio telescope during operations. The SANParks People and Conservation (P&C) Officer will also be based at the SKA Exploratorium.

An opportunity exists to undertake both astronomy and environmental outreach tourism in the SKA Exploratorium. Possibilities exist for SANParks to establish a local environmental presence in the Exploratorium where cultural heritage and biodiversity walking tours of the National Park could be arranged whilst adhering to the RFI restrictions in the Observatory.

Unique selling features of the park include, but are not limited to, viewing of the SKA telescopes, remoteness, silence, dark skies with associated starry skies and celestial objects, quiver tree forests, natural pan systems and rock art. It is envisaged that site tours will be launched within the first two years after the establishment of the park. These tours will be a joint effort between SKA and SANParks and will be limited in frequency and duration to ensure that RFI is minimised. The main aim would be to allow visitors to experience the astronomy and related technology, while also having the opportunity to experience local cultural heritage such as rock art and the corbelled houses and possibly fossil sites. From a biodiversity perspective the visitors would be able to see the quiver tree forests and the pan system in the north of the park.

As part of the development of the SKA Exploratorium, it will be important to include the development of a lookout point where visitors could get a panoramic view of the main site. The park may also provide limited opportunities for events such as birding weekends or mountain bike events. An opportunity also exists to develop a SKA – Southern African Large Telescope (SALT) Observatory route that would allow the tourists to experience both the optical and radio research fields. This will require an integrated approach with the support of the national and provincial departments responsible for Tourism, Roads and Public Works to develop a strategy for such a route. Currently the road between Sutherland and Williston is a gravel road; a tarred road would improve accessibility to the area and support the route concept. These options will be further investigated and could be accommodated on a request basis with the support from SARAO.

Whilst there is not an immediate need for a range of tourism facilities in the park, this might change and could be considered in future. In addition to guided tours, tourism in future could be expanded to allow for some form of overnight accommodation at a suitable location, hiking trails, astronomy talks, sightseeing (inclusive of a self-drive route up to a view point where the SKA telescopes could be seen), *etc.* It should be noted that all tourism facilities and or products will be decided on within the parameters of stringent rules which apply and contribute to the successful operation of the SKA telescope and associated research.

A detailed lower level plan outlining the rationale and operational approach is available. This programme links with high-level objective 3 and objective 3.1 on page 38. To achieve the purpose of this programme, the actions listed in the table below will be implemented.

TECHNO-ECO PROGRAMME					
High-level objective: To facilitate social and economic development and upliftment by identifying and creating job opportunities, and supporting entrepreneurial endeavours, including customised tourism and learning opportunities.					
Objective	Action	Responsibility	POE	Timeframe	Reference
To identify and develop an exclusive techno-eco tourism experience by developing sustainable opportunities within the restrictions of the park.	Develop a lookout point as part of SKA Exploratorium development.	SARAO	Product	Year 2	
	Participate in hosting joint tours.	SARAO, PM	Report	Year 2, ongoing	
	Identify events, activities and products that may be considered for development within the park.	PM, SARAO	List	Ongoing	
	Present the identified events, activities and products to the NRF / SANParks Steering Committee for approval.	PM, SARAO	Document	As required	
To ensure monitoring and evaluation of programme implementation and effectiveness.	Monitor, evaluate and review the programme, and inform relevant risk responses and adaptive management.	PM	Documentation	Annually	

10.4.2 Learning and development programme

The purpose of this programme is to build constituencies in support of the park's conservation endeavours by playing a significant, targeted and effective role in promoting a variety of educational opportunities and initiatives.

Because this is a new park, the Environmental Education (EE) programme will have to be developed based on the needs of the surrounding communities. As the demand for educational experiences grow, the programmes could be expanded to accommodate more participants. An integrated approach to EE and interpretation has been adopted by SANParks. A broad stakeholder base is targeted and relevant programmes addressing a variety of issues are planned. The potential beneficiaries of this programme are mainly school and youth groups and special interest groups. The approach to environmental education within SANParks generally takes the form of organised and interactive activities which include:

- **Formal EE Programmes:** Target the formal education sector, directed at school groups that may benefit from the park and learners in schools adjacent to the park. The programme enhances awareness and education among learners through the development of up-to-date materials on environmental conservation for incorporation into the school curriculum; and
- **Non-formal EE Programmes:** Implement community-oriented initiatives addressing relevant socio-ecological challenges and targeting appropriate stakeholders including farmers, traditional leaders, landowners, women and youth. This programme has the primary objective to raise awareness of and share information with communities about conservation issues which will promote the conservation mandate of the park.

Interpretation is a communication process designed to reveal meaning and relationships of our cultural and natural heritage through involvement with objects, artefacts, landscapes and sites. The SKA Exploratorium will play a significant role in the advancement of outreach programmes.

The Expanded Public Works Programme (EPWP) is a nationwide programme and covers all spheres of government and state-owned enterprises. This programme provides an important avenue for labour absorption and income transfer to poor households in the short to medium-term. One of the aims of the EPWP is the transfer of skills through the identification of skills shortages and offering of accredited training interventions. Accredited training opportunities can be both in the form of functional and operational training interventions. The goal of offering a range of training interventions will be to capacitate both the contractors and their staff to seek opportunities outside of SANParks and thus exit the EPWP successfully.

A detailed lower level plan outlining the rationale and operational approach supports this programme. This programme links with high-level objective 3 and objective 3.2 on page 38. To achieve the purpose of this programme, the actions listed in the table below will be implemented.



LEARNING AND DEVELOPMENT PROGRAMME					
High-level objective: To facilitate social and economic development and upliftment by identifying and creating job opportunities, and supporting entrepreneurial endeavours, including customised tourism and learning opportunities.					
Objective: To facilitate skills and knowledge transfer opportunities through the implementation, development and identification of a range of teaching and learning opportunities.					
Sub-objectives	Actions	Responsibility	PoE	Timeframe	Reference
To plan, develop and present formal and informal education programmes for organised school and other youth groups and special interest groups.	Develop an environmental education schedule and update annually.	PM	Document	Year 1, annually	
	Organise and conduct environmental education programmes for schools e.g. environmental and social calendar days.		Reports	Ongoing	
	Organise and conduct applicable youth development programmes.		Reports	Ongoing	
	Organise and conduct outreach programmes in the identified communities.		Reports	Ongoing	
	Develop new and update existing programme information.		Material	Ongoing	
	Facilitate presentations and talks for special interest groups.		Reports	As required	
To facilitate skills transfer as part of the job creation in local communities through the implementation of EPWP and other initiatives.	Identify the skills development needs as part of the EPWP programmes.	PM	Reports	Ongoing	SED strategy, EPWP Strategy
	Develop and implement programmes to improve skills development and continuously review.		Reports	Year 1, ongoing	
To ensure monitoring and evaluation of programme implementation and effectiveness.	Monitor, evaluate and review the programme, and inform relevant risk responses and adaptive management.	PM	Documentation	Annually	

10.4.3 Socio-economic development programme

The purpose of this programme is to contribute to local economic development, economic empowerment and social development in communities and areas adjacent to the park.

Government has promised socio-economic transformation and stated that it is committed to eradicating poverty by creating opportunities where the poor become involved in productive activities (Department of Planning, Monitoring and Evaluation, 2012). This applies especially to those residing in rural areas. The promotion of Broad Based Black Economic Empowerment in various sectors is part of government's vision for the upliftment of the previously disadvantaged. The focus will be in integrating these people into viable sectors which should hopefully boost communities economically. Socio-economic empowerment is critical to meeting government development goals and will help to establish shared vision partnerships in the communities. With the right opportunities and essential business skills training, the communities will be empowered to understand mutually beneficial practises and to safeguard the sectors they are involved in.

In general, SANParks is committed to ensure that a broad base of South Africans participate in biodiversity initiatives, and that all SANParks operations have a synergistic existence with neighbouring communities for their educational and socio-economic benefit, hence enabling the broader society to be connected to National Parks. This will be achieved by partnering with national and local government through participating in government programmes such as the EPWP, participating in existing and contributing to the municipal IDPs, benefitting local communities and procuring from local suppliers as far as possible. Several programmes are being implemented throughout SANParks to contribute to the development of local communities, including waste management, social legacy, EPWP, Environmental Protection, the wildlife economy and green and blue economy (e.g. bio prospecting). The green and blue economy programmes contribute to the development of green sector industries in local communities by providing access to and use of wildlife and marine resources in national parks. The sourcing of goods and services from local communities is also promoted through the identification and ring fencing of opportunities for the benefit of local enterprises. By partnering with neighbouring district and local municipalities and neighbouring communities, the park could enable better access to park-related opportunities ranging from biodiversity conservation, alien species eradication (e.g. WfW) and arts and crafts concession programmes (outsourcing catering and transport services to neighbouring communities), thereby assisting in the upliftment of previously disadvantaged individuals and growth of small micro-medium enterprises (SMMEs). SMMEs are critical drivers of job creation and, more broadly, economic growth in South Africa. Government has prioritised SMME development as one of the strategies for economic development and job creation. Empowering young people through skills development is a national priority. The SANParks Enterprise Development Strategy will take a long-term view and place its primary emphasis on facilitating youth access to the benefits that national parks present.

The EPWP remains a significant focus area of SANParks to effectively contribute to local socio-economic development while achieving biodiversity outcomes. It is envisaged that various programmes namely WfW, Working for Ecosystem and environmental monitors, could ultimately be hosted in the park. These programmes focus on poverty alleviation and are labour intensive projects that create temporary jobs in the short term while simultaneously achieving biodiversity objectives. It is foreseen that 45 temporary jobs will be created and R 3,500,000 spent on operations and the management of these programmes over the next five years. Skills development and capacity building is regarded as a cornerstone to enable economic activity. When the park is established, opportunities for skills development through learnership and internship programmes in a broad range of fields (i.e. reception, experiential training for conservation students) would be possible. Park management will endeavour to support and develop local initiatives or small businesses that provide services that are required during specific events or functions. Where possible, local SMMEs, and especially previously disadvantaged individuals are favoured when sourcing contractors, provided that all procurement conditions as stated in the SANParks procurement policy are adhered to. Legacy projects could also be considered in the form of 'mobile' or permanent infrastructure servicing healthcare and educational needs.

Within the regional context SANParks could investigate and support (where possible) the establishment of viable eco and cultural tourism routes and associated enterprises for the economic benefit of local communities. Opportunities exist in the area for tiger's eye mining and jewellery production and for cave art and other walking trails (Pixley ka Seme District Municipality IDP 2017-2022) and SANParks can assist with capacity building and providing support to SMME's in this regard.

This programme links with high-level objective 3 and objective 3.3 on page 38. To achieve the purpose of this programme, the actions listed in the table below will be implemented.

SOCIO-ECONOMIC DEVELOPMENT PROGRAMME					
High level objective: To facilitate social and economic development and upliftment by identifying and creating job opportunities, and supporting entrepreneurial endeavours, including customised tourism and learning opportunities.					
Objective: To contribute to local economic development by identifying, creating and maintaining employment opportunities.					
Sub-objective	Actions	Responsibility	POE	Timeframe	Reference
To maintain and strengthen relationships with local government.	Ensure that all projects and plans are incorporated into the local municipal IDPs.	PM	Reports	Year 2	
	Collaborate with local government departments on socio economic programmes.	PM	Reports	Annually	Municipal IDPs



SOCIO-ECONOMIC DEVELOPMENT PROGRAMME					
High level objective: To facilitate social and economic development and upliftment by identifying and creating job opportunities, and supporting entrepreneurial endeavours, including customised tourism and learning opportunities.					
Objective: To contribute to local economic development by identifying, creating and maintaining employment opportunities.					
Sub-objective	Actions	Responsibility	POE	Timeframe	Reference
To provide social upliftment, employment, skills development, and business opportunities to local residents, entrepreneurs and businesses.	Identify new SED opportunities and assist with the implementation of the approved programmes.	PM, BSP	Reports	Annually	SANParks HCM Policies
	Investigate the co-hosting of a predator control training course.	PM	Report	Year 3	
	Identify and implement skills development opportunities for permanent and temporary staff.	PM, BSP	Reports	Ongoing	
	Ensure local procurement of goods and services.	PM	SCM data, reports	Ongoing	SANParks SED Policies
To monitor and evaluate the impact of the implementation programmes and adapt as required.	Determine the impact of the socio-economic park-based programmes on local socio-economic upliftment	CSD, PM, SED	Research documents	Year 3	SANParks HCM Policies
	Monitor and evaluate progress and impact against annual work plan targets and programme objectives.	CM, relevant Departments	Reports	Annually	
	Adapt program approach and feedback and inform risk response strategy.	CM	Document	Annually	

10.5 Partnerships

The park wishes to establish and maintain meaningful and mutually beneficial relationships with a wide range of stakeholders, in support of the park's values, objectives and various programmes related to the different core functions. The park will strive to identify and implement new opportunities for enhancing relationships with surrounding communities, all spheres of government and other stakeholders to ensure that local and regional initiatives and developments contribute positively to the attainment of the overall desired state of the park and the social ecological system within which it is embedded.

10.5.1 Stakeholder engagement programme

The purpose of this programme is to establish and maintain meaningful and beneficial relationships with a wide range of stakeholders.

Stakeholder engagement between SANParks and society covers a range of different objectives at various scales, ranging from local to global. The NEM: PAA promotes the participation of local communities in the management of protected areas. It further contributes towards strengthening stakeholder-park relations by empowering stakeholders and local communities to participate in decision-making processes related to management and development issues in parks. SANParks has adopted an overarching park management approach to strengthen relationships with stakeholders in pursuit of the long-term "desired state" of the park. This requires continuous engagement with a range of stakeholders and sectors through various mechanisms. The park's engagement with external stakeholders needs to be responsive to deal with issues beyond internal park operations, including the broader economic and integrated land use role of the park. The commitment to the incorporation of public opinion into park management is rooted in the

recognition that the park must serve a conservation-oriented subset of societal values and that it is inevitably situated within a broader landscape and context.

SANParks has a mandate to conserve biodiversity and to promote the associated conservation values. Stakeholders also have an interest in the park and its effect on the surrounding and interested communities and their activities. For this reason, the park management must engage stakeholders in an ongoing way. This is also the motivation for establishing a SANParks mandate and thereby investing in stakeholder engagement and public participation processes.

Both formal and informal partnerships will be initiated, maintained and nurtured with Government, conservation entities, business partners, communities, various non-governmental organisations, community-based organisations, the media, customers and employees. The park will work closely with the communities of Brandvlei, Carnarvon, Vanwyksvlei and Williston to promote mutually beneficial community relations through various programmes and initiatives.

The NRF / SARAO as the landowner is a key stakeholder and a Steering Committee has been established between the NRF / SARAO and SANParks to discuss matters relevant to the management of the park.

A detailed lower level plan outlining the rationale and operational approach supports this programme. This programme links with high-level objective 4 and objective 4.1 on page 38. To achieve the purpose of this programme, the actions listed in the table below will be implemented.

STAKEHOLDER PROGRAMME					
High-level objective: To establish and nurture partnerships at local and regional levels by creating, participating in, and maintaining engagement platforms, including knowledge-sharing alliances.					
Objective: To establish and promote the efficient functioning of techno-ecosystems by engaging and partnering with multiple interested stakeholders and organisations.					
Sub-objectives	Actions	Responsibility	PoE	Timeframe	Reference
To improve co-operation and build sound stakeholder relationships.	Identify strategic platforms for engagement and strengthening capacity and participate in these platforms.	PM	Minutes of meetings	Year 1, ongoing	
	Develop a stakeholder and sector analysis / profile and overarching stakeholder engagement plan.		Document	Year 2	
	Participate in the Meerkat National Park Steering Committee meetings.		Minutes of meetings	Biannually or as required	
	Conduct annual roadshows in partnership with SARAO to inform targeted stakeholder groups of progress made.		Report	Annually	
To ensure monitoring and evaluation of programme implementation and effectiveness.	Monitor, evaluate and review the programme, and inform relevant risk responses and adaptive management.	PM	Documentation	Annually	

10.5.2 Communication programme

The purpose of this programme is to develop, strengthen and maintain stakeholder relations through information sharing and participation and thereby strengthening the SANParks brand.

This programme will be aligned to the stakeholder framework of the NRF / SARAO / SKA and will be guided by the Integrated Environmental Management Plan for SKA phase 1 as promulgated by the Minister of Environmental Affairs. This will include:

- Effectively communicate and increase public access to park management related information in an accurate, responsible, reliable and end-user focused manner;
- Ensure a customised and coherent approach to stakeholder engagement across SKA / park stakeholders;
- Enable better planned and more informed engagement activities;



- Position stakeholder engagement as a key park management activity;
- Facilitate effective collaboration and knowledge sharing with communities and identified stakeholders;
- Communicate SANParks' commitment to and principles of stakeholder engagement to its stakeholders; and
- Maintain SANParks' reputation and stakeholder relations while supporting the realisation of the park's vision and that of the SKA.

The programme also aims to provide the main stakeholders, public and staff with relevant and accurate information pertaining to the park's operations, special projects and achievements through events, initiatives, social and print media and public relations. This will be achieved through:

- **External communications**
Media and public relation interactions should ensure that the park is adequately and well represented to create and maintain a positive image for the organisation. This will be achieved by managing and monitoring media coverage of contentious issues, educating the public about the park and emerging conservation issues, information sharing pertaining to the development and growth of the park and keeping conservation debates at the forefront of media coverage.
- **Internal communications**
Internal communication is important to facilitate an effective two-way communication process within the park. It is critical that the employees, who are vital in contributing towards the achievement of the programmes, get the correct information at the right time. Therefore, internal communications should ensure that staff members are always well informed about the business activities, processes and new developments in the park.

This programme links with high-level objective 4 and objective 4.2 on page 38. To achieve the purpose of this programme, the actions listed in the table below will be implemented.

COMMUNICATION PROGRAMME					
High-level objective: To establish and nurture partnerships at local and regional levels by creating, participating in, and maintaining engagement platforms, including knowledge-sharing alliances.					
Objective: To build, maintain and constantly improve relations between the park and all its relevant stakeholders, both internally and externally through various mediums.					
Sub-objective	Actions	Responsibility	PoE	Timeframe	Reference
To build and strengthen stakeholder relationships through the involvement in various fora.	Develop a stakeholder engagement plan.	PM, Regional Communications Manager	Document	Year 1	
	Develop strategic partnerships in support of the core functions and associated programmes.		Minutes of meetings	Ongoing	
	Develop a Communication Plan.		Document	Year 1	
	Continuously update the Communication Plan and develop a range of communication media to ensure effective knowledge transfer.		Document	Ongoing	

COMMUNICATION PROGRAMME					
High-level objective: To establish and nurture partnerships at local and regional levels by creating, participating in, and maintaining engagement platforms, including knowledge-sharing alliances.					
Objective: To build, maintain and constantly improve relations between the park and all its relevant stakeholders, both internally and externally through various mediums.					
Sub-objective	Actions	Responsibility	PoE	Timeframe	Reference
To inform the public of achievements, developments or incidents that take place in the park using mass media.	Conduct annual roadshows with targeted stakeholder groups.	Regional Communications Manager, PM	Events	Annually	
	Issue relevant media releases and alerts and ensure timeous response to media queries.	Regional Communication, Manager PM	Media statements and alerts	Ongoing	
	Write feature articles / opinion pieces on topical issues.		Articles	Ongoing	
	Build and maintain relations with media houses across various platforms.	Regional Communications Manager, PM	Updated media database	Year 1 and ongoing	
	Engage on social media platforms.		Online interactions	Ongoing	
	Ensure up to date online content on the relevant SANParks platforms.		Number of updates	Ongoing	
To facilitate a speedy flow of information between park management and staff using bulletins and internal newsletters, as well as to respond to general customer queries.	Timeously issue internal bulletins and information broadcast.	Regional Communication Manager	Number of internal bulletins and information broadcasts	Ongoing	Communications and Marketing Annual Plan
	To encourage line management to share information.		Information submitted	Ongoing	
	Timeously respond accurately to queries both internally and externally.		Number of complaints and queries	Ongoing	Communications and Marketing Annual Plan
To improve the park's image amongst its stakeholders through the provision of well planned, managed and coordinated events.	Promote environmental calendar days, corporate and brand awareness events.	PM, Regional Communications Manager	Number of events	Annually	Communications and Marketing Annual Plan
	Develop and maintain stakeholder engagement plan in line with SANParks protocol for stakeholder participation.		Number of stakeholder engagements	Year 1 and ongoing	
	Develop a stakeholder database.		Document	Year 1	
	Update existing Stakeholder Database.		Document	Quarterly	
To monitor, evaluate, and review the communication programme.	Continuously monitor and evaluate the impact of the Communication Plan, the support to various programmes and adapt the Communication Plan as required.	Regional Communications Manager	Report	Annually	Communications Plan
	Revise the Stakeholder Engagement Plan.		Document	Annually	

10.6 Effective park management

Effective park management programmes (including daily, weekly, monthly quarterly and annual actions, reports and reviews) ensure that the values and objectives of the park are maintained. These programmes put in place the systems and processes that enable proactive management of the park's objectives. This section outlines the management programmes, objectives and actions that assist in effective park management such as environmental management, financial management (e.g. procurement, reporting), budgeting, maintenance planning, and monitoring compliance.



10.6.1 Environmental management programme

The purpose of this programme is to mitigate potentially negative environmental impacts of park related development and operational activities through effective risk management and assessment, legislative compliance and the implementation of environmental management tools.

As part of the SKA1 development, a Strategic Environmental Assessment has been undertaken by the CSIR. The outcome of this work is an Integrated Environmental Management Plan (IEMP), which defines specific management outcomes to be implemented by the project prior to and during construction and operations. The IEMP is the overarching document which all parties need to comply with on site and in the National Park.

Park staff are required to practice sound environmental management in accordance with required standards of environmental best practice and compliance with legislation. A number of management tools will be developed to manage the environmental impact of park operations.

In terms of section 24(2) of the NEMA, the Minister of the DFFE has identified activities that may not commence unless authorised by the competent authority, the NEMA: Environmental Impact Assessment (EIA) Regulations (2014). Further to the provisions of NEMA, the park will assess risk and implement Environmental Management Plans (EMPs) and Environmental Management Programmes to guide all park related operational activities that are not listed under NEMA as an activity requiring an EIA process. The precautionary approach will be applied, as well as NEMA Section 28 (2) Duty of Care, which imposes a general duty and obligation to avoid pollution and environmental degradation. The DFFE has indicated that should there be new development in relation to the national park, SANParks can apply for an exemption from environmental authorisation (same process that has been followed for the SKA1 development).

This programme links with high-level objective 5 and objective 5.1 on page 38. To achieve the purpose of this programme, the actions listed in the table below will be implemented.

ENVIRONMENTAL MANAGEMENT PROGRAMME					
High-level objective: To ensure effective and efficient management and administrative support services through good corporate governance, enabling the park to achieve its objectives.					
Objective: To strive for best practise and ensure compliance with environmental legislation through improved governance and environmental risk management.					
Sub-objectives	Actions	Responsibility	POE	Timeframe	Reference
To manage and reduce the impacts of park activities on the environment.	Make all environmental legislation and the SKA IEMP available to relevant staff.	PM	Documentation	Ongoing	
	Ensure that EIAs and heritage impact assessments are completed for all park related listed activities or alternatively, SANParks to explore obtaining an exemption from environmental authorisation	PM	Documents, reports	As required	
	Conduct internal scoping for all park related activities / developments that may potentially impact on the environment.	SGM: SP, PM	Documents	As required	
	Provide an environmental management plan (EMP) to contractors / service providers when operating in the park.	SGM: SP, PM	Document	As required	

ENVIRONMENTAL MANAGEMENT PROGRAMME					
High-level objective: To ensure effective and efficient management and administrative support services through good corporate governance, enabling the park to achieve its objectives.					
Objective: To strive for best practise and ensure compliance with environmental legislation through improved governance and environmental risk management.					
Sub-objectives	Actions	Responsibility	POE	Timeframe	Reference
To manage and reduce the impacts of park activities on the environment.	Enforce the requirements as set out in the IEMP and EMP.	PM	Inspection checklist, report	As required	
	Develop and implement a set of best practice procedures for identified park related activities.	PM	Standard operating procedures	Year 2	
To ensure monitoring and evaluation of programme implementation and effectiveness.	Monitor, evaluate and review the programme, and inform relevant risk responses and adaptive management.	PM	Documentation	Annually	

10.6.2 Risk management programme

The purpose of this programme is to update and maintain the park's risk profile and to manage risks accordingly. The management of business risks is regarded by SANParks as an integral part of management across all operations whilst taking into consideration the AGA Act, its regulations and SARAO Policies applicable within the SKA Observatory / National Park.

In line with corporate governance best practices and as per the Public Finance Management Act, (Act No. 01 of 1999) (PFMA) requirements, the Board of SANParks has formalised the risk management processes by adopting a Corporate Risk Management Framework (CRMF). As its foundation, the risk management framework follows an enterprise-wide risk assessment process, based on thorough understanding of the environment in which the organisation operates and the strategic corporate objectives it intends to deliver on.

The main aim of the CRMF is to instil a culture of corporate risk management awareness and risk ownership, which is practised as the responsibility of all. This will provide SANParks with a comprehensive understanding of all identified risks and their potential impact on the achievement of objectives, thereby creating a good basis for the effective management of all risks to remain within the risk appetite of the organisation.

Acknowledging that all activities are exposed to various types of risks, the focus of this framework is on the optimisation of the balance between potential risks and the potential rewards that may emanate from both pro-active and conscious risk-oriented actions. As such, SANParks maintains a corporate profile of the identified key strategic challenges the organisation faces. This profile is communicated to the Board and is reviewed on an on-going basis. The risk profile reflects, among others, the risks identified, as well as how each risk is addressed and/or monitored. At park level, the General Managers are responsible for risk management. As the link between the operational activities and its environment on the one hand, and the corporate support and management structure on the other, the General Managers are in many instances responsible for implementation of corporate initiatives, programmes, management plans and other projects that form part of the SANParks strategy to address or mitigate issues of risk. Similarly, the SANParks Strategic Plan and Annual Performance Plan must also be incorporated to ensure that strategic initiatives are achieved. Examples are the implementation and roll-out of a safety and security plan, the implementation and maintenance of ecological monitoring systems to identify and assess the impact of environmental change, and compliance with financial and cash-flow directives. The park may also experience, from time to time, extreme environmental/weather conditions (*i.e.* droughts, floods and runaway fires) as part of the normal cycle. An appropriate response to each of these events will be addressed in the disaster management plan.

Similarly, the General Managers need to ensure that emerging issues of risk, that can jeopardise achievement of the park's (and SANPark's corporate) objectives, are timely identified and assessed in terms of possible severity. In consultation with the corporate support structure, such issues are either assessed to be within the management capacity of the park and its existing resources, or the matter is elevated to a corporate level, where a specific risk management strategy is agreed upon, resources allocated where applicable, and a risk management or monitoring plan is implemented.



This programme links with high-level objective 5 and objective 5.2 on page 38. To achieve the purpose of this programme, the actions listed in the table below will be implemented.

RISK MANAGEMENT PROGRAMME					
High-level objective: To ensure effective and efficient management and administrative support services through good corporate governance, enabling the park to achieve its objectives.					
Objective	Actions	Responsibility	POE	Timeframe	Reference
To establish and maintain effective, efficient and transparent systems of risk management.	Draft a risk assessment and Response Strategy for the park.	PM	Document	Year 1	
	Draft and implement a comprehensive Risk Implementation Plan for the park, and review and update this plan on a quarterly basis.		Document	Quarterly	CRMF
	Quarterly review and update the park's Risk Response Strategy.		Report	Quarterly	

10.6.3 Financial management and administration programme

The purpose of this programme is to ensure sound financial management and administration. As a public entity, SANParks manages the public funds entrusted to the organisation in accordance with the PFMA (as amended by Act 29 of 1999), and is listed as Schedule 3 Part A: 25 Other Public Entity.

The SARAO will fully fund the management of this park for the duration of the contract. The park will provide SARAO with a budget on a five-yearly basis for consideration and approval for the park management to implement the management plan.

The finance division supports the park's operations and projects are supported and conducted in an efficient, cost-effective and responsible manner. The finance division also ensures that the financial accounting and administration activities are in compliance with the PFMA, Generally Recognised Accounting Practise, Preferential Procurement Policy Framework, National Treasury Regulations and organisational policies and procedures. All procurement for goods and services is done in accordance with the National Treasury guidelines as per the PFMA and Preferential Procurement Policy Framework Act (Act 5 of 2000).

The financial management and administration support function entails the following activities:

- Budgeting management;
- Financial accounting;
- Financial administration;
- Asset management; and
- Supply Chain Management (SCM)

The financial division manages the consolidation of the annual budget for the park. The budgeting process includes both the operational budgeting for the park as well as the capital expenditure budget. Furthermore, monthly reporting on the actual budget performance against the allocated budget for the period will be provided to the NRF, on request. It is also responsible to guide and provide the necessary assistance with the budget process to all cost centre managers in the park. The SANParks annual budget guideline informs a zero-based approach, which implies that every category must be critically assessed and evaluated before the budget is captured.

Financial administration entails the day-to-day processing of financial transactions such as processing and payment of invoices, account reconciliations, processing of debtors invoices, *etc.* It will be critical that all the assets of the park are correctly accounted for. It is also important that these assets are managed effectively according to the asset management policy and procedure.

This programme links with high-level objective 5 and objective 5.3 on page 38. To achieve the purpose of this programme, the actions listed in the table below will be implemented.

FINANCIAL MANAGEMENT AND ADMINISTRATION PROGRAMME					
High-level objective: To ensure effective and efficient management and administrative support services through good corporate governance, enabling the park to achieve its objectives.					
Objective: To ensure sound financial management and administration.					
Sub-objective	Actions	Responsibility	POE	Timeframe	Reference
To attain effective financial management.	Ensure less than 1% variance on cost of operations.	PM	Statements with <1% variance	Ongoing	
	Ensure sound financial management of special projects – BSP.	BSP	Budget targets achieved	Ongoing	
	Participate in the independent audit of financial records.	PM	Report	As required	
	Address audit findings.	PM	Report	As required	
To improve the management of financial resources.	Prepare accurate and realistic annual budgets in consultation with management team that are in line with the sound management plan objectives.	PM	Annual budgets prepared	Annually	
	Provide monthly financial reports timeously by cost centre.	PM	Reports	Monthly	
	Review the insurance schedule and submit to corporate.	PM	Documents submitted	Annually	
	Submit insurance claims as and when required	PM	Claims	As required	
To ensure proper asset and SCM.	Verify and manage assets registers.	PM	Register	Bi-annually	
	Assist with the procurement of goods and services.	PM	Reports	Ongoing	
	Manage and maintain existing contracts for the supply of goods and services.	PM	Register	Ongoing	
	Ensure sound management of vehicle fleet (<i>i.e.</i> logbooks, services, licencing and fuel management).	PM	Logbooks, service records, fuel card statements	Monthly	

10.6.4 Human capital development programme

The purpose of the human capital development programme is to ensure that the park has an adequate human capital function to render effective conservation, visitor and supporting services, whilst also ensuring that it provides human capital development support to surrounding communities as per SANParks policy framework.

SANParks has developed corporate human capital policies, guidelines and procedures to guide the park and its workforce in an effectively organised structure while delivering the outputs of the management plan. The park views itself as an equal opportunity employer. This is achieved through non-discriminatory practices in the work environment, availability of equal opportunities for employees and prospective employees, respect for diversity and gender differences, and commitment to uphold and implement the Employment Equity Act (Act No. 55 of 1998).



By adhering to corporate policies, guidelines and procedures, the park will ensure that competent staff are appointed and that current staff are managed in an effective manner to keep them positive, proactive and committed to their tasks and responsibilities. This will also ensure that human capital management complies with the relevant national legislation. Park human resource capacity is not only defined by the development of current staff, but requires the holistic management of the appropriate human capital. This includes the creation of a learning environment, developing leadership skills, sharing of knowledge and experiences and making staff wellness programmes available to employees and their families. This will assist staff in dealing with the negative effects of lifestyle diseases and other lifestyle challenges (*i.e.* financial planning). The Human Capital and Administration Officer must report on new appointments, resignations, attendance registers, overtime claims, leave *etc.* This report serves as the basis for the salary instruction to prepare and process the payment of monthly salaries. The park reviews training needs on an annual basis and submits the training need analysis and requirements for approval to Head Office. Compilation of training needs starts off with the Individual Development Plans for each staff member and is then followed by training, skills development and performance appraisals. Park management encourages all staff to improve their levels of skills and qualifications in their relevant field of expertise through study bursaries and training on an on-going basis.

The park currently (2020) has 14 permanent employees.

This programme links with high-level objective 5 and objective 5.4 on page 38. To achieve the purpose of this programme, the actions listed in the table below will be implemented.

HUMAN CAPITAL DEVELOPMENT PROGRAMME					
High-level objective: To ensure effective and efficient management and administrative support services through good corporate governance, enabling the park to achieve its objectives.					
Objective: To ensure sufficient and effective staff capacity to achieve management objectives by adhering to corporate human resource policies and guidelines.					
Sub-objectives	Actions	Responsibility	POE	Timeframe	Reference
To ensure the park attracts and retains the most suitable human capital.	Implement staff mentoring and coaching programme.	PM	Reports	Ongoing	
	Develop human capital in the fields of conservation and administration through the internship programme.		Contracts	Annually	
To implement plans and skills development strategies to meet the strategic goals of the organisation.	Identify training needs and conduct training interventions within budget allocation.	PM	Document, reports	Annually	
	Assist employees with applications with regard to study bursaries, staff accommodation bookings, changes in medical status, banking changes and assist with queries to medical aid regarding unpaid medical accounts.	PM	Documents	Ongoing	
	Conduct workshops and Imbizos to ensure that staff is familiar with SANParks Policies including the SKA Code of Conduct and Policies.	PM	Training schedule / register	Ongoing	SANParks Policies

HUMAN CAPITAL DEVELOPMENT PROGRAMME					
High-level objective: To ensure effective and efficient management and administrative support services through good corporate governance, enabling the park to achieve its objectives.					
Objective: To ensure sufficient and effective staff capacity to achieve management objectives by adhering to corporate human resource policies and guidelines.					
Sub-objectives	Actions	Responsibility	POE	Timeframe	Reference
To implement plans and skills development strategies to meet the strategic goals of the organisation.	Participate in the internal and independent audit of human capital documentation.	PM	Report	As required	
	Address audit findings.	PM	Report	When required	
To implement workplace wellness programmes.	Conduct wellness awareness workshops.	PM	Workshops	Annually	Wellness policy
	Provide private facilities within the park to enable employee's access to the wellness programme.	PM	Facility	Ongoing	Wellness policy
To implement workplace wellness programmes.	Identify and refer employees that require assistance through the employee wellness programme.	PM	Number of referrals	As required	Wellness policy
	Invite professionals to the park to promote awareness on OHS and health issues.	PM	Attendance registers	Ongoing	OHS Act
	Commemorate events related to wellness (e.g. AIDS day, world blood donor day, days of activism on non-violence against women).	PM	Attendance registers	Annually	Wellness policy
	Administer injury on duty cases.		Report	As required	OHS Act, Housing policy, Wellness policy
	Administer staff housing.		Document	Quarterly	
	Promote access to clinics through external mobile clinics support to assist with primary health care.		Reports	Ongoing	

10.6.5 Information and records management programme

The purpose of this programme is to preserve SANParks' institutional memory by establishing a database of park information. Information and records management systems are applied to promote accountability, transparency and good corporate governance.

Management of parks requires that appropriate information is collected, preserved and made accessible to a range of internal and external stakeholders for the smooth running of operations at SANParks. The programme also seeks to manage knowledge generated so that it is used for the benefit of the organisation.

Information is not only essential to formulate effective long-term management objectives, plans, programmes and systems, but also for educating and informing residents, associations, user groups, local authorities, provincial and national decision- and policy-makers, international organisations and aid / donor agencies. SANParks however holds the intellectual property rights of all such information that is generated by any of its employees in their official capacities.

This programme links with high-level objective 5 and objective 5.5 on page 38. To achieve the purpose of this programme, the actions listed in the table below will be implemented.



INFORMATION AND RECORDS MANAGEMENT PROGRAMME					
High-level objective: To ensure effective and efficient management and administrative support services through good corporate governance, enabling the park to achieve its objectives.					
Objective: To achieve best practice in the field of information and records management by complying to the Records Management Legislative framework and policies and thereby ensuring care of all vital records in SANParks.					
Sub-objectives	Actions	Responsibility	POE	Timeframe	Reference
To develop and implement a records management and file plan for the park in accordance with SANParks policies and procedures.	Establish the records management and file plan of the park.	PM , HOD's	File plan	Year 1	National Archives and Records Services of SA Act
	Implement the records management and file plan.		Records and documents filed	Year 1, ongoing	Corporate file plan and policy
	Ensure appropriate access to park files and records in accordance to corporate records management policy and guidelines.		Access procedures	Ongoing	Corporate file plan and Records Management Policy
	Provide access to interpretation centre.		Statistics	Ongoing	

10.6.6 Infrastructure programme

The purpose of this programme is to provide guidance for the upgrading and maintenance of SANParks related infrastructure. It is important to note that all the existing infrastructure belongs to SARAO. SANParks will be allocated certain infrastructure *i.e.* farm buildings to be used as offices and or staff accommodation however, the ownership will still reside with SARAO. SARAO will therefore also be responsible for the maintenance of the infrastructure utilised by SANParks.

Infrastructure in the park consists mainly of facilities in support of the research that SARAO will be conducting (high-performance computing complex, bulk services, airstrip, workshops and stores, management roads, fence, power, fibre networks *etc.*) The total infrastructure footprint covers about 4 % of the total area of the park.

All equipment and vehicles that will be used by park staff, must first be tested by SARAO to ensure they comply with the RFI restrictions. SARAO will issue a permit to allow the use of equipment in the park.

This programme links with high-level objective 5 and objective 5.6 on page 39. To achieve the purpose of this programme, the actions listed in the table below will be implemented.

INFRASTRUCTURE PROGRAMME					
High-level objective: To ensure effective and efficient management and administrative support services through good corporate governance, enabling the park to achieve its objectives.					
Objective: To maintain, upgrade infrastructure and where appropriate, develop new infrastructure through proper planning and efficient management.					
Sub-objectives	Actions	Responsibility	POE	Timeframe	Reference
To assist with planning and provide support to developmental infrastructure projects.	Identify possible development of infrastructure that can enhance operational efficiency and visitor experience.	PM	Minutes of meeting, monthly reports	As required	

INFRASTRUCTURE PROGRAMME					
High-level objective: To ensure effective and efficient management and administrative support services through good corporate governance, enabling the park to achieve its objectives.					
Objective: To maintain, upgrade infrastructure and where appropriate, develop new infrastructure through proper planning and efficient management.					
Sub-objectives	Actions	Responsibility	POE	Timeframe	Reference
To ensure that all mechanical and electrical equipment is maintained to a desirable state.	Compile an inventory of all SANParks mechanical and electrical equipment in the park and update as required.	PM	Inventory	Year 1, as required	
	Develop and implement an annual maintenance schedule for all SANParks equipment.	PM	Maintenance plan	Annually	OHS Act, electrical regulations, fire equipment, pressure vessels and lifting gear
To ensure monitoring and evaluation of programme implementation and effectiveness.	Monitor, evaluate and review the programme, and inform relevant risk responses and adaptive management.	PM	Documentation	Annually	

10.6.7 Safety and security programme

The purpose of this programme is to provide a safe and secure environment for SANParks employees and to ensure area integrity and environmental asset protection.

This programme is aligned to the overarching SANParks Safety and Security Strategy. It outlines the safety and security principles applicable to SANParks' environmental assets and staff. Crime generally constitutes significant risk and as such, poses a major threat to an organisation such as SANParks' ability to deliver on its mandate. This requires the successful protection of all assets (including natural, cultural and physical) under its custodianship.

SANParks implements and enforces the requirements contained in legislation and organisational policies. The primary legislation and organisational policies include, amongst other:

- NEMA;
- NEM: PAA and Regulations;
- Internal Park Rules;
- Safety and Security Strategy & Procedures;
- Criminal Procedures Act;
- National Key Points Act; and
- Firearms Control Act.

Upon taking management control of the park one of the priorities would be to develop a Safety and Security Plan that comprehensively addresses both the strategic and operational aspects of staff safety as well as environmental asset protection and area integrity. Park management must take cognisance of the SARAO safety and security plan to ensure an integrated approach. SARAO must likewise take cognisance of the park safety and security plan to ensure a strategic and integrated approach. An analysis of the strengths, weaknesses, opportunities and threats which affect the safety and security of the park need to be conducted and converted into achievable objectives and actions. Proactive consideration will be given to issues such as working hours, law and order, high-risk areas, personnel, resources, equipment, staff training, reporting, data capture, record keeping, and monitoring. The SKA site complex is a National Key Point and SANParks staff will need to comply with the requirements of the National Key Points Act.

A detailed lower level plan outlining the rationale and operational approach supports this programme. This programme links with high-level objective 5 and objective 5.7 on page 39. To achieve the purpose of this programme, the actions listed in the table below will be implemented.



SAFETY AND SECURITY PROGRAMME					
High-level objective: To strive for effective and efficient management and administrative support services through good corporate governance, enabling the park to achieve its objectives.					
Objective: To provide a safe and secure environment for both visitors and SANParks employees and to ensure that the integrity of the natural and cultural resources and assets is secured.					
Sub-objectives	Actions	Responsibility	POE	Timeframe	Reference
To provide a high level of safety and security for visitors, SANParks employees, natural and cultural resources and assets.	Develop a safety and security plan and relevant emergency action drills.	PM	Updated documents	Year 1	Safety and Security Plan
	Conduct regular interventions i.e. patrols to ensure that area integrity is maintained.	PM	Reports	Ongoing	
	Train staff in area integrity management, conservation guardianship and readiness to react to emergency situations.	PM	Training needs analysis	Annually	
	Develop and implement “a stage of readiness” for emergencies to ensure staff safety.	PM	Documents	As required	
	Assess readiness of staff and functionality of equipment.	PM	Reports	Annually	
	Properly equip staff to effectively carry out their safety and security functions.	PM	New equipment purchased	As required	
To improve overall park safety through interactions with external role players.	Align safety and security activities to accommodate collaborative operations with external partners, e.g. SAPS, DENC, SARAO and neighbouring landowners.	PM	Document, report	Ongoing	
	To participate in external safety and security forums.	PM	Minutes of meetings	Quarterly	
To ensure monitoring and evaluation of programme implementation and effectiveness.	Monitor, evaluate and review the programme, and inform relevant risk responses and adaptive management.	PM	Documentation	Annually	

10.6.8 Safety, health, environment and quality programme

The purpose of this programme is to prevent, minimise and manage occupational accidents and occupational illnesses and diseases. This programme is required by the Occupational Health and Safety Act (Act No. 85 of 1993), to ensure that workplace hazards are managed and controlled to ensure a safe working environment at all times, including contractor activities on site. The programme is guided by the SANParks SHEQ (Safety, Health, Environment and Quality) policy and framework and includes the elements required by the occupational health and safety legislation as a minimum, but is also based on the ISO 45001 Occupational Health and Safety management system standard.

SANParks has made the decision to move away from the generic OHS management model to an internationally recognised and best practice system called the ISO 45001 standard. Under this standard, the park is expected to align with and implement best practice processes and norms.

The ISO 45001 standard consists of six elements namely:

- Identifying hazards and risks;
- Identifying legal and other requirements;
- Establishing objectives and programmes;
- Operational control;
- Emergency preparedness and response; and
- Internal audit.

This programme links with high-level objective 5 and objective 5.8 on page 39. To achieve the purpose of this programme, the actions listed in the table below will be implemented.

SAFETY, HEALTH, ENVIRONMENT AND QUALITY PROGRAMME					
High-level objective: To strive for effective and efficient management and administrative support services through good corporate governance, enabling the park to achieve its objectives.					
Objective: To continuously reduce the disabling injury frequency rate through the implementation of an efficient and effective Occupational Health and Safety management programme.					
Sub-objective	Actions	Responsibility	POE	Timeframe	Reference
To implement the ISO 45001 standard.	Identify hazards and risks.	HCM, all Departments	Register	Year 1, ongoing	
	Identify legal and other requirements.		Register		
	Establish, implement and maintain programmes to mitigate identified hazards and risks.		Documents		
	Develop and implement standard operating procedures to manage identified hazards and risks.		Documents		
	Develop and implement emergency preparedness and response plans.		Documents		
	Conduct regular self-audits.		Reports	Year 2, annually	
	Support internal audits.				
	Support external audits.				

10.6.9 Research, monitoring and co-learning programme

The purpose of this programme is to contribute towards providing relevant and rigorous scientific evidence, enabling critical thinking and facilitating co-learning in support of increasingly difficult management and policy challenges facing sustainable conservation in the Nama-Karoo region.

SANParks relies on credible science and research to contribute to the knowledge required to responsibly manage and conserve biodiversity. The current research has an emphasis on the biophysical and ecological attributes and environmental processes in the area. Moving forward, this programme will focus predominantly on the biophysical, ecological, social and tourism environments.

Because of the human-induced impact on the ecosystem due to agricultural practises such as sheep farming, the viability of the restoration of biodiversity could affect the achievement of some conservation objectives. Therefore, collaboration through the research that has been done and still needs to be conducted, will inform the monitoring process where selected indicators will be evaluated to test the achievement of the PMP objectives. Given the difficulty in monitoring all facets of biodiversity, biophysical properties and ecological elements, selected indicators will be used as surrogates for broad ecosystem monitoring.

The research that will be emanating from the park will be used to inform decision-making, challenge, adapt and reflect on management actions, influence policy (at multiple layers from park to organisational and to national level) and highlight potential risks and identify opportunities as the park develops. A well-functioning interface between scientists / researchers, Park Managers and policy developers will ensure a two-way knowledge transfer. These management–science–academic partnerships strongly support an adaptive management framework where the best available knowledge is used to make decisions or implement actions that are continuously evaluated, refined and modified, facilitating a learning-by-doing approach and co-learning attitude. The bulk of research in SANParks is conducted (and funded) by non-SANParks scientists, academics and students, with SANParks scientists acting as research coordinators, facilitators and integrators of the vast body of knowledge generated.



For the next five-year management cycle, the park should focus on conducting benchmark research to gather baseline data and assessing the trends based on the drivers and outcomes identified through monitoring, which will inform management recommendations. This will stimulate the identification of research and monitoring needs. Monitoring will primarily focus on the biophysical, ecological, social and tourism elements. Existing and future data gathered by external researchers will need to be regularly stored on the SANParks Meta-data Repository. Biodiversity monitoring of SKA will be valuable to conduct quantitative assessments of the status and projected future trends and impacts of change.

Co-learning will be in its infancy but will be strengthened through engaging with schools and communities on education platforms and thereby encouraging mutually beneficial relationships. The dissemination of information and knowledge has been part of SANParks mandate for several years, and in part has been geared towards facilitating positive relationships with local people living adjacent to National Parks. Relationship building through education and co-learning are aimed at enhancing understanding, communication, support and participation from neighbouring communities. This is done through science engagement, events and excursions into National Parks.

This programme links with high-level objective 5 and objective 5.9 on page 39. To achieve the purpose of this programme, the actions listed in the table below will be implemented.

RESEARCH, MONITORING AND CO-LEARNING PROGRAMME					
High-level objective: To ensure effective and efficient management and administrative support services through good corporate governance, enabling the park to achieve its objectives.					
Objective: To provide the opportunity to undertake broad-based scientific research and co-learning opportunities that furthers scientific inquiry, as well as providing support to management, decision making and communication through co-operative and relevant research and monitoring programmes.					
Sub-objective	Actions	Responsibility	POE	Timeframe	Reference
To identify research and monitoring needs.	Conduct benchmark research and gather baseline data.	CSD, external researchers	Report, databases	1 year	Individual biodiversity programmes
To conduct and facilitate relevant socio-ecological research and monitoring to support the core pillars of SANParks and the adaptive management philosophy.	Develop monitoring protocols and identify sites.	CSD, PM	Reports	1 year	
	Implement a biodiversity monitoring programme.	CSD, external researchers / organisations	Reports	Ongoing	
	Conduct and facilitate / support research & monitoring for internal and external researchers.	CSD	Database	Ongoing	
To establish and maintain meaningful and beneficial relationships by supporting research, storing, sharing and reporting on data.	Register research projects	CSD	Database	Ongoing	
	Secure partnerships and funding to implement monitoring	CSD, PM	Reports	Ongoing	

RESEARCH, MONITORING AND CO-LEARNING PROGRAMME					
High-level objective: To ensure effective and efficient management and administrative support services through good corporate governance, enabling the park to achieve its objectives.					
Objective: To provide the opportunity to undertake broad-based scientific research and co-learning opportunities that furthers scientific inquiry, as well as providing support to management, decision making and communication through co-operative and relevant research and monitoring programmes.					
Sub-objective	Actions	Responsibility	POE	Timeframe	Reference
To ensure that science supports management actions, decision-making and contributes towards effective park management and policy development through continuous communication and co-learning at the science-management interface.	Contribute towards SANParks Research Report	CSD, PM	Report	Annually	
	Participate in advisory groups and working groups.	CSD, PM	Minutes of meetings / workshops	Annually	

10.6.10 Disaster management programme

The purpose of this programme is to identify and develop procedures for both pro-active disaster management and reactive disaster response and to develop mitigation measures that will facilitate multi-agency and multi-jurisdictional co-ordination in both pro-active and reactive programmes.

The NRF is currently the overarching legal entity and is responsible for the collation and management of a Disaster Management Plan for national radio astronomy telescopes and programmes in South Africa. The SARAO Disaster Management Plan is designed to establish a framework for implementation of the provisions of the Disaster Management Act (Act No 57 of 2002) as amended and the National Disaster Management Framework of 2005, as well as the related provisions of the National Key Points Act (Act No. 102 of 1980) as amended.

Park management will adopt the Disaster Management Plan and disaster response and mitigation measures as developed by SKA. This will ensure an integrated approach towards disaster management. Protocols and procedures will be established for the safe and effective management of an emergency event that could occur at the SKA site. The plan prepares for the response to priority risks (as identified in the disaster risk assessment) that could not be eliminated through preventative or mitigation measures. The plan will ensure that employees, contractors, visitors and critical infrastructure are protected from any harm during an emergency situation.

A detailed lower level plan outlining the rationale and operational approach supports this programme. This programme links with high-level objective 5 and objective 5.10 on page 39. To achieve the purpose of this programme, the actions listed in the table below will be implemented.

DISASTER MANAGEMENT PROGRAMME					
High-level objective: To ensure effective and efficient management and administrative support services through good corporate governance, enabling the park to achieve its objectives.					
Objective: To ensure that all disaster situations that may occur in the park is addressed and managed through pre-determined contingency plans and pre-planned actions.					
Sub-objective	Actions	Responsibility	POE	Timeframe	Reference
To ensure appropriate preparedness.	Participate in disaster meetings, planning and liaison with Provincial structures.	All departments	Documentation	Quarterly, annually	

10.6.11 Outcomes programme

The purpose of this programme is to evaluate outcomes of management interventions related to protected area management.



Protected areas are under increasing threat from a range of external and internal pressures. Monitoring is an essential component of measuring the outcomes of management interventions. Various tools and processes have been adopted to track progress.

The Management Effectiveness Tracking Tool (METT) provides an over-arching framework for assessing the management effectiveness of protected areas world-wide. The assessment provides guidance for protected area managers and tracks progress towards the effective management of protected areas. Assessment are conducted biennially to measure strategic achievements. An agreement was reached with the DFFE regarding the assessment intervals. Parks that score below 67 % will perform annual assessments while those that score above 67 % will perform biennial assessments.

The State of Biodiversity (SoB) assessment is aimed at assessing the effectiveness of SANParks' management of its biodiversity. It will form a component of the organisation's assessment tool aimed at measuring SANParks management effectiveness. The information gained through this assessment can also be used in the biennial METT assessment. Given the fact that limited changes occur from one year to the next, the assessment will be repeated every five years.

The State of Area Integrity Management (SoAIM) assessment, evaluates the operational ability of a park to perform its required function effectively and efficiently with strong focus on safety, security and biodiversity issues related to law enforcement and compliance. This assessment ensures that people, systems, processes, and resources are in place and in use to ensure integrity to achieve the desired ecological and security status of a park.

All the programmes in the management plan are expected to be implemented to achieve the park's desired state. It is therefore vital that park management track progress towards achieving these outcomes. SANParks has designed a PMP implementation assessment tool, adopted from the METT scoring model. The total score of 67 % and above is used as a guideline to determine sound management. Lessons learnt should be fed back into the adaptive management planning cycle (see Section 10.7). These evaluation criteria are also complemented by engagements at science-management forums where progress on implementation of biodiversity programmes is continuously assessed and adaptive management is applied to achieve the expected outcomes.

This programme links with high-level objective 5 and objective 5.11 on page 39. To achieve the purpose of this programme, the actions listed in the table below will be implemented.

OUTCOMES PROGRAMME				
High-level objective: To ensure effective and efficient management and administrative support services through good corporate governance, enabling the park to achieve its objectives.				
Objective: To evaluate outcomes of management interventions related to protected area management.				
Actions	Responsibility	PoE	Timeframe	Reference
Participate in the METT assessment.	PM, CSD	Report	Year 1, 3, 5, 7, 9	
Participate in the SoB assessment.	PM, CSD	Report	Year 5, 10	
Assess the implementation of the PMP.	PM	Tool	Annually	
Participate in the SoAIM assessment.	PM	Report	Annually	

10.7 Evaluation and learning

10.7.1 Introduction

Section 5 has dealt with the jointly agreed desired state, and section 10 with all the specific programmes, which are necessary to achieve this. However, the desired state cannot be

effectively maintained without explicit attention to prioritisation, integration, operationalisation, and above all, reflection and adaptation according to the principles in the SANParks biodiversity custodianship framework (Rogers, 2003).

The need for reflection and adaptation (*i.e.* adaptive learning) comes from acknowledging that the world of conservation is complex and that the existing knowledge base is imperfect. Complexity implies that feedbacks between components of the conservation system are likely to change in unpredictable ways and the only way to stay abreast of such changes is through ongoing learning and adaptation. Lack of effective feedback and reflection is the predominant underlying cause of failure of strategic adaptive management, and hence failure to realise the desired outcomes of the park. Evaluation should furthermore test the appropriateness of an intervention and monitor the predictive capacity, societal acceptability and accomplishment of broad goals (Kingsford & Biggs, 2012; Figure 12).

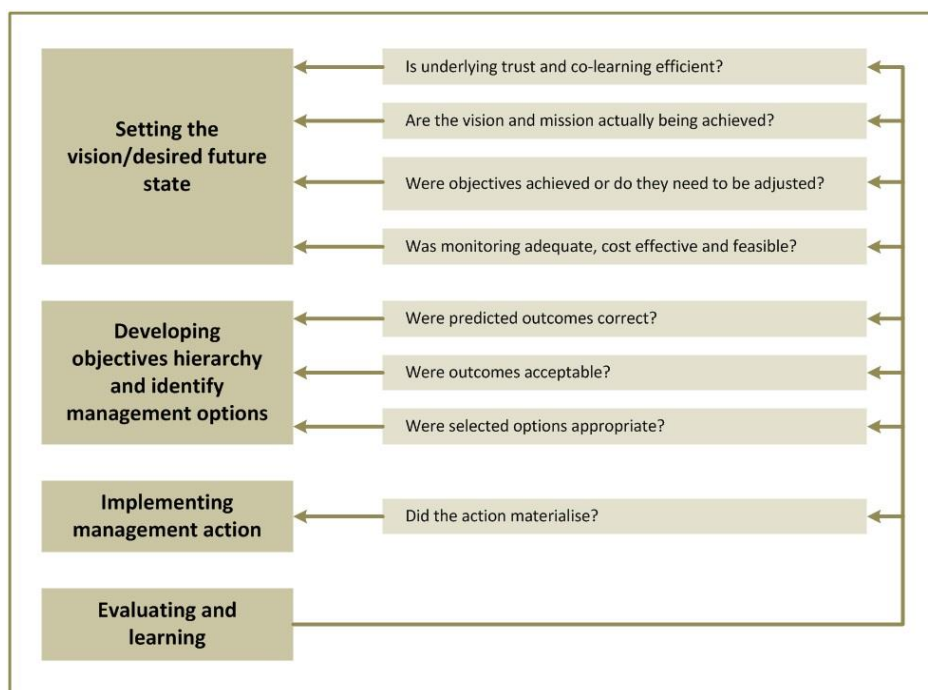


Figure 12. Feedback questions essential for adaptive learning (from Kingsford and Biggs, 2012).

10.7.2 Operationalisation

Given the desired state, and the programmes outlined in Section 10, specific action and annual operational plans need to inform the Key Performance Areas (KPAs) of staff members (applicable personnel working in the Parks, CSD and Tourism Divisions) to ensure that the outcomes are achieved. In addition, explicit reflection and co-learning opportunities need to be maintained and honoured to facilitate an adaptable, learning approach that can cope with unexpected events or surprises. An example is those opportunities provided by the science-management forum engagements at park or regional level.

A critical component of strategic adaptive management is to monitor and evaluate the consequences of management decisions, actions, and other associated external programmes. This involves assessment of the outcome of management interventions, but also frequent evaluation of early warning signals (referred to by SANParks as Thresholds of Potential Concern, or TPCs) of whether the intervention is on an appropriate trajectory for achieving the particular objective. Ongoing evaluation of emerging results against objectives is essential to allow strategy and methodology to be adjusted as new understanding and knowledge emerge. Continuous evaluation and learning are facilitated by making time for reflecting on the following questions (Roux and Foxcroft, 2011):

- Has the intended plan of operation materialised?;
- Were the selected options appropriate?;
- Were the predicted consequences correct and, if not, why?;
- Is the monitoring adequate, cost effective and feasible?;
- Were the consequences actually acceptable?; and



- Even if the predicted consequences were correct and are acceptable, are the objectives and vision being met?

Science-Management Forum discussions are aimed at ensuring that feedback take place, best available knowledge and understanding are incorporated into decision-making and TPCs are flagged and considered timely. In addition, annual reflection workshops involving managers and scientists will evaluate what has been learnt in each programme, and what should be adjusted.

If this process is effectively honoured, it is believed that the park will be practicing strategic adaptive management, and in accordance with our overarching values around complex systems, will have the best chance of achieving the desired state in a sustainable way.

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Section 11: Costing

11.1 Introduction

In line with section 41 2 (d) of NEM: PAA, the programmes of implementation to achieve this desired state, stated in section 5, is costing below.

The park will adhere to the following guiding principles:

- Responsibly manage the allocation of budget, revenue raising activities and expenditure;
- Ensure that solid financial management supports the achievement of the objectives in this plan;
- Comply with the Public Finance Management Act as well as SANParks' financial policy and procedures.

A funding estimate of the activities in this management plan was derived using the zero-based budgeting approach. When estimating the costing the following items were considered:

- Those costs and associated resources which could be allocated to specific activities and which are of a recurring nature;
- Those costs and associated resources which could be allocated to specific activities, but which are of a once-off nature;
- Unallocated fixed costs (water, electricity, phones, bank fees *etc.*);
- Maintenance of infrastructure;
- Provision for replacement of minor assets, (furniture, electronic equipment, vehicles, *etc.*).

Based on the agreement between the NRF and SANParks, the NRF will fund the management of this park. The programmes and actions in the PMP are dependant upon the allocation of funds, both in terms of operational and capital requirements, as per the agreement.

It must be stressed that the costing, (see below), is an indication of the resources required to implement this PMP. The budget that is annually allocated to the park might not be adequate to fully implement the identified programmes and actions. Future budgets are reliant on the Medium Term Expenditure Framework allocations and any adjustments to this allocation, could ultimately impact the implementation of this PMP. This costing and future budget allocations does not take into account any emergency or disaster which could also impact the implementation of this PMP.

11.2 Income

No income is budgeted for the period 2022 / 2023 – 2030 / 2031.

11.3 Expenditure

11.3.1 Once-off costs

It is estimated that the park would require R 3,050,000 for once-off / developmental projects over the period 2022 / 2023 – 2031 / 2032 as can be seen in Table 11 below.

Table 11. The estimated once-off cost of the various programmes.

Programme	Estimated budget
Wildlife management	R 1,500,000
Cultural heritage	R 1,200,000
Management plan revision	R 350,000
Total	R 3,050,000

11.3.2 Recurring costs

The annual directly allocated cost (including staff salaries, travel, supplies and tools) is estimated at R 7,719,420 for 2022 / 2023. These ongoing costs are split according to the programmes listed in Table 12 below.

Table 12. The estimated annual operational costs for the park for 2022 / 2023.

Programme	Amount	Percentage of total
Invasive and alien species	R 4,658,859	60.35%
Safety and security	R 782,178	10.13%
Human capital development	R 353,840	4.58%
Learning and development	R 300,317	3.89%
Financial management and administration	R 272,920	3.54%
Rehabilitation	R 224,505	2.91%
Wildlife management	R 203,083	2.63%
Freshwater ecosystem	R 172,484	2.23%
Infrastructure	R 168,713	2.19%
Stakeholder	R 120,620	1.56%
Cultural heritage	R 89,684	1.16%
Habitat and vegetation	R 77,136	1.00%
Species of special concern	R 76,456	0.99%
Techno-eco tourism	R 47,667	0.62%
Research, monitoring and co-learning	R 32,067	0.42%
Disaster management	R 27,620	0.36%
SHEQ	R 27,169	0.35%
Climate change	R 20,817	0.27%
Environmental management	R 15,000	0.19%
Information and record management	R 11,300	0.15%
Risk management	R 11,185	0.14%
Outcomes	R 10,452	0.14%
Socio-economic development	R 8,650	0.11%
Communication	R 6,700	0.09%
Total	R 7,719,420	100 %

11.3.3 Unallocated fixed costs

The unallocated fixed costs required but not allocated in Table 8 above for 2022 / 2023 amounts to R 1,012,974.

11.3.4 Capital expenditure

The park will require a further R 307,282 in 2022 / 2023 for small renovations and to acquire the necessary equipment and tools.



11.3.5 Replacement of minor assets

To calculate the replacement provision, the cost price of the assets is divided by the estimated useful life. The estimated asset value for various categories is based on their original purchase price and the estimated budget required annually making provision for their replacement. Management should thus make provision for about R 51,571 in 2022 / 2023, and this figure is presented in Table 13.

Table 13. The total value various categories of minor assets and replacement thereof (based on the original purchase price).

Asset type	Asset value	Provision for replacement
Computer equipment	R 30,000	R 6,000
Firearms	R 40,000	R 4,000
Furniture	R 130,000	R 18,571
Mechanical equipment	R 35,000	R 5,000
Office equipment	R 50,000	R 10,000
White goods	R 40,000	R 8,000
Total	R 325,000	R 51,571

11.4 Summary

It is estimated that the park will require an annual operating budget of R 9,091,248 for 2022 / 2023, increasing to R 11,477,491 in 2026 / 2027. In addition to this amount, the park will also require R 3,050,000 over the next five-year period for once-off costs. A summary is presented in Table 14.

Table 14. A summary of the annual and once-off costs that are required to fully implement the activities in the management plan over the next five years.

	2022 / 2023	2023 / 2024	2024 / 2025	2025 / 2026	2026 / 2027
Once-off costs over five years	R 3,050,000				
Annual cost	R 9,091,248	R 9,636,722	R 10,214,926	R 10,827,821	R 11,477,491
SANParks expenditure budget	R 6,944,545	R 7,361,218	R 7,802,891	R 8,271,064	R 8,767,328
Shortfall	R 2,146,703	R 2,275,505	R 2,412,035	R 2,556,757	R 2,710,163

The shortfall can be broken down as follows:

- An additional amount of R 1,992,317 is required for the invasive alien species programme; and
- An additional amount of R 154,386 is required to ensure scientific staff can contribute towards achieving the identified actions in the various biodiversity programmes.

11.5 Implications

Should the park be unsuccessful in securing the shortfall amount of R 2,146,703 then the following programmes will be affected:

- The invasive alien species programme will have to be scaled back which will ultimately affect the efficiency of the programme. The degraded areas will thus stay degraded for longer and cleared areas could ultimately be recolonised. The SKA project will thus also be negatively affected. In addition, the socio-economic development programme will be negatively affected in various ways;
- Various actions in the biodiversity programmes will not be achieved.

11.6 Future

There are various ways in which the shortfall could be covered, options include:

- To request additional funding from SKA;
- To approach donors; or
- To except the shortfall and rationalise the programmes.

Depending on the priority and urgency of the various requirements, management will make a decision regarding the most appropriate action to take.



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Appendix 1: Declarations

1. Land declared

Proclamation no. 15 in Government Gazette 43145 of 27 March 2020 declared the following land to be part of the Meerkat National Park in terms of the National Environmental: Protected Areas Act (Act No. 57 of 2003)

1. Remaining extent of the Farm Dubbelde Vlei no. 63, situated in the Carnarvon Registration, measuring 3,443.1526 ha, according to SG diagram no. F196/1873, held by the Deed of Transfer T1292/2017;
2. Remaining extent of the Farm Schiet Poort no. 64, situated in the Carnarvon Registration, measuring 3,165.0657 ha, according to SG diagram no. F76/1870, held by the Deed of Transfer T4271/2017;
3. Portion 1 of the Farm Schiet Poort No.64, situated in the Carnarvon Registration, measuring 1,571.9601 ha, according to SG diagram no. F5094/1945, held by the Deed of Transfer T63456/2016;
4. Portion 2 of the Farm Schiet Poort no. 64, situated in the Carnarvon Registration, measuring 1,571.9748 ha, according to SG diagram no. F5095/1945, held by the Deed of Transfer T70250/2016;
5. Remaining extent of the Farm Boter Leegte no. 65, situated in the Carnarvon Registration, measuring 5,494.0743 ha, according to SG diagram no. F77/1870, held by the Deed of Transfer T1117/2018;
6. Portion 1 of the Farm Boter Leegte no. 65, situated in the Carnarvon Registration, measuring 289.9760 ha, according to SG diagram no. F1910/1880, held by the Deed of Transfer T987/2018;
7. Portion 2 of the Farm Boter Leegte no. 65, situated in the Carnarvon Registration, measuring 5,382.0434 ha, according to SG diagram no. F1724/1936, held by the Deed of Transfer T74872/2016;
8. Remaining extent of the Farm Brak Puts no. 66, situated in the Carnarvon Registration, measuring 7,996.1359 ha, according to SG diagram no. F25/1870, held by the Deed of Transfer T987/2018;
9. Portion 1 of the Farm Brak Puts no. 66, situated in the Carnarvon Registration, measuring 263.6305 ha, according to SG diagram no. F1909/1880, held by the Deed of Transfer T1117/2018;
10. Remaining extent of Portion 1 of the Farm Swart Fontein no. 67, situated in the Carnarvon Registration, measuring 2,080.7051 ha, according to SG diagram no. F2365/1899, held by the Deed of Transfer T1117/2018;
11. Portion 2 of the Farm Swart Fontein no. 67, situated in the Carnarvon Registration, measuring 3,368.7442 ha, according to SG diagram no. F9558/1955, held by the Deed of Transfer T988/2018;
12. Farm Meys Dam no. 68, situated in the Carnarvon Registration, measuring 7,046.0464 ha, according to SG diagram no. F68/1870, held by the Deeds of Transfer T47450/2008;
13. Portion 1 of the Farm Vissers Kloof no. 69, situated in the Carnarvon Registration, measuring 8,730.1999 ha, according to SG diagram no. F10067/1951, held by the Deed of Transfer T2838/2017;
14. Portion 2 of the Farm Vissers Kloof no. 69, situated in the Carnarvon Registration, measuring 4,364.4744 ha, according to SG diagram no. F9559/1953, held by the Deed of Transfer T1292/2017;
15. Portion 3 of the Farm Vissers Kloof no. 69, situated in the Carnarvon Registration, measuring 4,355.4745 ha, according to SG diagram no. F9560/1953, held by the Deed of Transfer T882/2017;
16. Portion 2 of the Farm Blaauwpoort no. 71, situated in the Carnarvon Registration, measuring 2,753.9231 ha, according to SG diagram no. FA2211/1925, held by the Deeds of Transfer T882/2017;

17. Portion 1 of the Farm Pofadderfontein no. 494, situated in the Carnarvon Registration, measuring 2,220.2675 ha, according to SG diagram no. F646/1938, held by the Deed of Transfer T2921/2017;
18. Portion 2 of the Farm Pofadderfontein no. 494, situated in the Carnarvon Registration, measuring 2,220.2628 ha, according to SG diagram no. F645/1938, held by the Deed of Transfer T2921/2017;
19. Remaining extent of the Farm Pofadderfontein no. 495, situated in the Carnarvon Registration, measuring 1,522.9723 ha, according to SG diagram no. F11054/1947, held by the Deed of Transfer T5584/2017;
20. Portion 2 of the Farm Pofadderfontein no. 495, situated in the Carnarvon Registration, measuring 1,882.1315 ha, according to SG diagram no. F11052/1947, held by the Deed of Transfer T2132/2017;
21. Portion 3 of the Farm Pofadderfontein no. 495, situated in the Carnarvon Registration, measuring 1,756.9467 ha, according to SG diagram no. F11053/1947, held by the Deed of Transfer T2132/2017;
22. Remaining extent of the Farm Swartfontein no. 496, situated in the Carnarvon Registration, measuring 2,288.3240 ha, according to SG diagram no. F9557/1953, held by the Deed of Transfer T1117/2018;
23. Portion 1 of the Farm Swartfontein no. 496, situated in the Carnarvon Registration, measuring 2,288.8077 ha, according to SG diagram no. F9558/1953, held by the Deed of Transfer T3318/2017;
24. Portion 2 of the Farm Swartfontein no. 496, situated in the Carnarvon Registration, measuring 945.8000 ha, according to SG diagram no. F888/1958, held by the Deed of Transfer T1117/2018;
25. Remaining extent of Lot No. 4 Van Wyks Vlei Settlement, situated in the Carnarvon Registration, measuring 1,827.867 ha, according to SG diagram no. F437/1934, held by the Deed of Transfer T882/2017; and
26. Lot No. 149 Van Wyks Vlei Settlement, situated in the Carnarvon Registration, measuring 913.9345 ha, according to SG diagram no. F1562/1943, held by the Deed of Transfer T882/2017.
27. Farm Water Kloof no. 69, situated in the Fraserburg Registration, measuring 6,494.0400 ha, according to SG diagram no. F429/1807, held by the Deed of Transfer T67474/2016;
28. Farm De Hoek no. 70, situated in the Fraserburg Registration, measuring 4,667.1001 ha, according to SG diagram no. F73/1870, held by the Deed of Transfer T67474/2016;
29. Remaining extent of the Farm Zout Rivier no. 71, situated in the Fraserburg Registration, measuring 1,487.3191 ha, according to SG diagram no. F70/1870, held by the Deed of Transfer T1381/2017;
30. Portion 1 of the Farm Zout Rivier no. 71, situated in the Fraserburg Registration, measuring 4,386.0966 ha, according to SG diagram no. FA1905/1930, held by the Deed of Transfer T2915/2017;
31. Portion 2 of the Farm Zout Rivier no. 71, situated in the Fraserburg Registration, measuring 1,462.0489 ha, according to SG diagram no. F3723/1959, held by the Deed of Transfer T1381/2017;
32. Portion 3 of the Farm Zout Rivier no. 71, situated in the Fraserburg Registration, measuring 1,462.0469 ha, according to SG diagram no. F3724/1959, held by the Deed of Transfer T3702/2017;
33. Remaining extent of the Farm Rooi Zand no. 72, situated in the Fraserburg Registration, measuring 3,809.9210 ha, according to SG diagram no. F69/1870, held by the Deed of Transfer T793/2017;
34. Portion 1 of the Farm Rooi Zand no. 72, measuring 3,809.8590 hectares, according to SG diagram no. F1725/1936, held by the Deed of Transfer T3495/2017;
35. Farm Los Berg no. 73, situated in the Fraserburg Registration, measuring 6,534.9700 ha, according to SG No. F4069/1935, held by the Deeds of Transfer T745934/2008;
36. Farm Groot Paarde Kloof no. 74, situated in the Fraserburg Registration, measuring 7,779.9230 ha, according to SG diagram no. F489/1870, held by the Deed of Transfer T46437/2016;
37. Remaining extent of the Farm Jas Kloof no. 76, situated in the Fraserburg Registration, measuring 3,681.6733 ha, according to SG diagram no. F71/1870, held by the Deed of Transfer T2916/2017;
38. Portion 1 of the Farm Jas Kloof no. 76, situated in the Fraserburg Registration, measuring 3,660.8330 ha, according to SG diagram no. F5685/1937, held by the Deed of Transfer T2916/2017;
39. Farm Blaauw Heuvel no. 96, situated in the Fraserburg Registration, measuring 5,465.0025 ha, according to SG diagram no. FB74/1870, held by the Deed of Transfer T49289/2016;



Correction notice no. 1923 in Government Gazette 46088 of 25 March 2022 correct the inaccurate property descriptions and sizes of the following properties:

1. Remaining extent of the Farm Swartfontein no. 496, situated in the Carnarvon Registration, measuring 2,288.3240 ha, according to SG diagram no. F9557/1953, held by the Deed of Transfer T1117/2018, as it appears in the schedule, is substituted with Remaining extent of the Farm Swartfontein no. 496, situated in the Carnarvon Registration, measuring 3,234.1240 ha, according to SG diagram no. F9557/1953, held by the Deed of Transfer T1117/2018;
2. Portion 1 of the Farm Swartfontein no. 496, situated in the Carnarvon Registration, measuring 2,288.8077 ha, according to SG diagram no. F9558/1953, held by the Deed of Transfer T3318/2017, as it appears in the schedule, is substituted with Remaining extent of Portion 1 of the Farm Swartfontein no. 496, situated in the Carnarvon Registration, measuring 2,288.8077 ha, according to SG diagram no. F9558/1953, held by the Deed of Transfer T3318/2017; and
3. Farm Los Berg no. 73, situated in the Fraserburg Registration, measuring 6,534.9700 ha, according to SG diagram no. F4069/1935, held by the Deeds of Transfer T745934/2008, as it appears in the schedule, is substituted with Portion 1 of the Farm Los Berg no. 73, situated in the Fraserburg Registration, measuring 1,813.5806 ha, according to SG diagram no. F4069/1935, held by the Deeds of Transfer T745934/2008 and Remaining extent of the Farm Los Berg no. 73, situated in the Fraserburg Registration, measuring 4,703.3903 ha, according to SG diagram no. F67/1870, held by the Deeds of Transfer T745934/2008.

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Appendix 2: Stakeholder participation report

STAKEHOLDER EVENTS AND ACTIVITIES

Stakeholder consultation

This table reflects the various organisations that were identified to participate in the Management Plan process. The government departments are at national, provincial and local level. The intention is to show that, in terms of the spirit of co-operative governance SANParks has approached these parties.

International	Square Kilometer Array Organisation
National Government	Environment, Forestry and Fisheries, Science and Technology
Provincial government	Office of the Northern Cape Premier, Northern Cape Working Group
Local government	Karoo-Hoogland Local Municipality, Kareeberg Local Municipality, Pixley Ka Seme District Municipality and Namaqua District Municipality.
Local Resident / Neighbours	SARAO data base
Community organisations	Land Action Group, AGRI Northern Cape, Save the Karoo
Research	NRF, HSRC, SAEON

Desired state workshop

A range of key stakeholders and SANParks specialists participated in the development of the desired state, which entails developing a vision for the park supported by higher level objectives which forms the basis of the management plan.

Activities	Description
Invitations	SANParks specialists, key stakeholders and the general public were invited.
Desired State workshops	Workshops were held on 24, 25 and 26 April 2018 as well as 06 and 07 June 2018 in Williston, Brandvlei and Carnarvon respectively.
Attendance	73 Participants partook in the workshops representing the following constituencies: • Aero Club South Africa; • Hantam Local Municipality; • Kareeberg Local Municipality; • Local businesses; • Local farmers; • Local residents; • Namakwa District Municipality; • National Wool Growers Association; • Pixley Ka Seme District Municipality; • SANParks; • SARAO; • South African Social Security Agency; • Stellenbosch University; • Vroue Landbouvereniging; • Williston Farmers Union.

Media platforms used to invite stakeholders to register and participate

A variety of media platforms were used to engage stakeholders in an effort to inform them of the revision of the Integrated Management Plan and invite stakeholders to participate

Mechanism to register	Description
Print media advertisements	Advertisements to inform interested and affected parties of the information sessions were placed in the following national newspapers on: • Sunday Times (22 August 2021); • Rapport (22 August 2021); and • Noordwester (26 August 2021).
Registration at meetings	Participants were also able to register at the following meetings: Desired state workshops held on 24, 25 and 26 April 2018 in Williston, Brandvlei and Carnarvon respectively.
Internet	Stakeholders were asked to register via the SANParks website from 01 April 2018.
Public information boards	Official notices were placed at seven public venues in the region, namely: • Spar - Carnarvon; • Karoo Vleisboere Koöperasie - Carnarvon; • Kaap Agri – Brandvlei; • Die Winkel – Brandvlei; • Die Handelshuis – Williston; and • Williston Vleis Koöperasie.

Public information sessions to allow comment on the draft management plan

Six public information sessions were held.

Venue	Meeting type	Date	Number of stakeholders that attended
NG Church Hall, 39 Voortrekker St, Brandvlei	In-person and virtual	07 September 2021 at 16:30	0
Amandelboom Community Development Centre, Scholtz St, Williston	In-person only	08 September 2021 at 10:00	24
Amandelboom Community Development Centre, Scholtz St, Williston	In-person and virtual	08 September 2021 at 16:30	11
SASSA Hall, Lang St, Carnarvon	In-person only	09 September 2021 at 10:00	3
SASSA Hall, Lang St, Carnarvon	In-person and virtual	09 September 2021 at 16:30	0
No venue	Virtual only	10 September 2021 at 10:00	0

Dissemination of documentation and feedback to stakeholders

Item	Action	Date
Draft Management Plan for comment placed in public venues.	• Public library, No 342 Hoof St, Brandvlei; • Kareeberg Local Municipal library, No 5 Lang St, Carnarvon; and • Karoo Hoogland Municipality library, Herb St, Williston	23 August 2021
Draft Management Plan for comment placed on SANParks website.	https://www.sanparks.org/conservation/park_man/	23 August 2021
Dissemination of comment and response document	The document will be available on the SANParks website, or emailed, mailed, faxed or delivered by hand where no contact details were supplied.	N/A
Dissemination of approved Integrated Management Plan	The plan will be available on the SANParks website once approved by the Minister.	N/A

Appendix 3: Tourism product development framework

The product development framework provides park management with a guideline in order to inform the development potential of the park. Identified opportunities remain subject to comprehensive feasibility study prior to implementation, thus listing an activity does not automatically result in development.

Similarly, whilst specific products or activities may be developed within the park, they will be restricted to specific areas within the park or on the periphery (adjoining buffer zone, with land use activities determined by the municipal LUMS). The park is zoned into various visitor use zones, based on its environmental sensitivity, as described in the legend below, and products are applicable to the various use zones accordingly.

For any development to be supported within the delineated buffer zone, the permissible land use schemes as per SPLUMA, and relevant development application processes must be adhered to.

LEGEND		
No.	Visitor use zones	Description
1	Wilderness / remote	Wilderness conforms to the legal definition. Pristine natural environment, essentially undeveloped and roadless. Controlled non-motorised access - usually on foot. Could have paths where erosion is a problem or for safety.
2	Primitive	Almost completely natural state to be maintained. Development footprints absolute minimum. Controlled access - 4x4s, horse-riding. Small basic overnight facilities.
3	Quiet	General natural state to be maintained. Only non-motorised access. Access not specifically controlled. Ablution facilities can be allowed.
4	Low intensity leisure	Motorised self-drive with basic facilities. Small - medium sized camps. Infrastructure should be minimised in order to maintain natural state.
5	High intensity leisure	High density tourism development node with concentrated human activities. High volume roads, high density camps with modern amenities.
6	Buffer / adjoining	Land in the delineated buffer zone or adjacent to national parks. Products indicated are those with which SANParks is comfortable to be associated with as long as it does not conflict with the LUMS.

For the purposes of this management plan, the focus of the framework listed in Table 15 is to indicate which products already exist, which new products may be allowed, and in which visitor use zones these may occur.

Table 15: Tourism product development framework for the park.

PRODUCT CATEGORY		PRODUCT OR SERVICE	Is Product currently AVAILABLE or under develop-ment?		Is Product APPROPRIATE for the applicable National Park?		ZONING FOR WHICH PRODUCT IS APPROPRIATE					
							Within boundaries of national- / contractual park					Buffer / adjoining
							1	2	3	4	5	6
Over-night facilities	Self-catering - limited service (serviced prior to arrival and after departure only)	Accommodation (budget)		✓	✓					✓	✓	✓
		Accommodation (economy)		✓	✓			✓		✓	✓	✓
		Accommodation (premium) / guest house		✓		✓						✓
		Accommodation backpacking / youth hostels		✓		✓						✓
		Dormitories / school groups / educational facilities		✓		✓						✓
		Game / bird hide		✓	✓			✓		✓	✓	✓
		Military bunker / fort / gun sites		✓		✓						✓
		Tree houses / platforms		✓		✓						✓
		Fly camp / platform / sleep out		✓		✓						✓
	Self-catering - serviced (serviced daily)	Accommodation (budget)		✓	✓					✓	✓	✓
		Accommodation (economy)		✓	✓			✓		✓	✓	✓
		Accommodation (premium) / guest house		✓		✓						✓
		Accommodation backpacking / youth hostels		✓		✓						✓
		Dormitories / school groups / educational facilities		✓		✓						✓
		Houseboat (economy)		✓		✓						✓
		Houseboat (premium)		✓		✓						✓
	Camping	Camping (budget facilities) (power / no power)		✓	✓			✓		✓	✓	✓
		Camping (premium facilities) (power / no power)		✓		✓						✓

PRODUCT CATEGORY		PRODUCT OR SERVICE	Is Product currently AVAILABLE or under develop-ment?		Is Product APPROPRIAT E for the applicable National Park?		ZONING FOR WHICH PRODUCT IS APPROPRIATE					
							Within boundaries of national-/ contractual park					Buffer / adjoining
			YES	NO	YES	NO	1	2	3	4	5	6
Over-nigh facilities	Camping	Camping bush rustic (protected) (budget facilities)		✓	✓			✓		✓	✓	✓
		Camping bush rustic (protected) (premium facilities / self-sufficient)		✓		✓						✓
		Camping bush rustic (unprotected) (self-sufficient)		✓	✓			✓		✓	✓	✓
	Full service (generally some/all meals and activities included)	Game / bush / safari / boutique lodge - under 20 beds		✓		✓						✓
		Game / bush / safari / boutique lodge - 20 beds plus		✓		✓						✓
		Conference lodge / hotel - 21 - 50 beds		✓		✓						✓
		Conference lodge / hotel - 50 beds plus		✓		✓						✓
		Houseboat		✓		✓						✓
		Luxury tented safaris		✓		✓						✓
		Remote camp / fly camp / platform / sleep Out		✓		✓						✓
		Overnight train rides		✓		✓						✓
	Additional services	Cook and guide provided		✓		✓						✓
		Cook, guide and OSV provided		✓		✓						✓
		Meal packages e.g. breakfast, half board or full board		✓		✓						✓
Leisure / recreational		4x4 Eco-trails (multi-day, self-drive, basic facilities)		✓		✓						✓
		4x4 Eco-trails (multi-day, self-drive, no facilities)		✓		✓						✓
		4x4 trails (full-day / half-day / guided or unguided)		✓	✓			✓		✓	✓	✓
		Abseiling / rappelling		✓		✓						✓
		Animal interaction activities (limited)		✓		✓						✓
		Animal tracking activities		✓		✓						✓
		Archery		✓		✓						✓
		Base jumping		✓		✓						✓
		Bird watching	✓		✓		✓	✓	✓	✓	✓	✓
		Boat cruises		✓		✓						✓
		Boat cruise - birding		✓		✓						✓
		Boat cruises - sunset		✓		✓						✓
		Botanical sightseeing	✓		✓		✓	✓	✓	✓	✓	✓
		Bouldering		✓		✓						✓
		Bungee / bungee jumping		✓		✓						✓
		Cableway		✓		✓						✓
		Canoe trails (Varying facilities)		✓		✓						✓
		Canoeing		✓		✓						✓
		Canopy tour (acrobranch)		✓		✓						✓
		Canopy tour (boardwalk)		✓		✓						✓
		Canopy tour / flying fox (tree top / cliff to cliff)		✓		✓						✓
		Caving / spelunking/ potholing		✓		✓						✓
		Clay-pigeon / clay target shooting		✓		✓						✓
		Coasteering		✓		✓						✓
		Cruise - birding		✓		✓						✓
		Cycling		✓	✓			✓		✓	✓	✓
		Cycling (downhill cycling)		✓		✓						✓
		Cycling (BMX track area)		✓		✓						✓
		Diving (scuba)		✓		✓						✓
		Dog walking		✓		✓						✓
		Elephant backed rides / safaris		✓		✓						✓

PRODUCT CATEGORY	PRODUCT OR SERVICE	Is Product currently AVAILABLE or under develop-ment?		Is Product APPROPRIATE for the applicable National Park?		ZONING FOR WHICH PRODUCT IS APPROPRIATE					
						Within boundaries of national-/ contractual park					Buffer / adjoining
		YES	NO	YES	NO	1	2	3	4	5	6
Leisure / recreational	Fishing (catch and release)		✓		✓						✓
	Funicular		✓		✓						✓
	Game drives - night drive		✓		✓						✓
	Game drives - night drive (Night Vision aided)		✓		✓						✓
	Game drives - premium		✓		✓						✓
	Game drives - standard		✓		✓						✓
	Game drives - UA		✓		✓						✓
	Games facilities (e.g. table tennis, pool, etc.)		✓		✓						✓
	Geocaching		✓		✓						✓
	Golf		✓		✓						✓
	Golf club membership		✓		✓						✓
	Green hunting / darting safaris		✓		✓						✓
	Hang gliding		✓		✓						✓
	Hiking		✓	✓		✓	✓	✓	✓	✓	✓
	Hiking trails - Wilderness (full service)		✓		✓						✓
	Hiking trails - Wilderness (no facilities) (backpack)		✓		✓						✓
	Hiking trails (budget)		✓	✓		✓	✓	✓	✓	✓	✓
	Hiking trails (premium)		✓		✓						✓
	Horse riding		✓		✓						✓
	Horse riding trails (varying facilities)		✓		✓						✓
	Jet skiing		✓		✓						✓
	Jogging / running		✓		✓						✓
	Kayaking / paddling		✓		✓						✓
	Kayaking / paddling trails		✓		✓						✓
	Kitesurfing / kiteboarding / fly surfing		✓		✓						✓
	Kloofing (guided)		✓		✓						✓
	Mini golf / putt-putt		✓		✓						✓
	Model aircraft flying		✓		✓						✓
	Motorcycle trails (varying facilities)		✓		✓						✓
	Motorcycling		✓		✓						✓
	Motorcycling - off-road		✓		✓						✓
	Motorised boating		✓		✓						✓
	Mountain bike trails (varying facilities)		✓		✓						✓
	Mountain biking		✓		✓						✓
	Mountain biking - unicycling		✓		✓						✓
	Mountaineering		✓		✓						✓
	Paddle boards		✓		✓						✓
	Paddle boats		✓		✓						✓
	Paddle skiing		✓		✓						✓
	Paragliding		✓		✓						✓
	Parasailing		✓		✓						✓
	Park and ride		✓	✓			✓		✓	✓	✓
	Photography	✓		✓		✓	✓	✓	✓	✓	✓
	Picnicking (basic facilities)		✓	✓			✓		✓	✓	✓
	Picnicking (full facilities)		✓		✓						✓

PRODUCT CATEGORY	PRODUCT OR SERVICE	Is Product currently AVAILABLE or under develop-ment?		Is Product APPROPRIATE for the applicable National Park?		ZONING FOR WHICH PRODUCT IS APPROPRIATE					
						Within boundaries of national-/ contractual park					Buffer / adjoining
		YES	NO	YES	NO	1	2	3	4	5	6
Leisure / recreational	Picnicking (no facilities)		✓		✓						✓
	Quad biking		✓		✓						✓
	Railway		✓		✓						✓
	Rap jumping (deepelling)		✓		✓						✓
	River rafting		✓		✓						✓
	Rock climbing		✓		✓						✓
	Sailing		✓		✓						✓
	Sandboarding		✓		✓						✓
	Self-drive night drives		✓		✓						✓
	Skate boarding / roller blading		✓		✓						✓
	Skate boarding / roller blading (downhill)		✓		✓						✓
	Skydiving		✓		✓						✓
	Snorkelling		✓		✓						✓
	Spear fishing		✓		✓						✓
	Speed gliding		✓		✓						✓
	Sports facilities (e.g. tennis, squash, bowls, etc.)		✓		✓						✓
	Stairway (via ferrata / ironway)		✓		✓						✓
	Stargazing		✓	✓		✓	✓	✓	✓	✓	✓
	Surf Skiing		✓		✓						✓
	Surfing		✓		✓						✓
	Swimming		✓		✓						✓
	Trail running		✓	✓							✓
	Trail running (night time)		✓	✓							✓
	Tubing		✓		✓						✓
	Vessels (cruise boats, yachts, river/paddle boats)		✓		✓						✓
	Walking		✓	✓		✓	✓	✓	✓	✓	✓
	Walks - day		✓	✓		✓	✓	✓	✓	✓	✓
	Walks - night		✓		✓						✓
	Wildlife / game viewing	✓		✓			✓	✓	✓	✓	✓
	Wingsuit flying / wingsuiting		✓		✓						✓
Airborne (Implications of CAA)	Drones over national parks		✓		✓						✓
	Flights over national parks		✓		✓						✓
	Helicopter flips		✓		✓						✓
	Hot-air ballooning		✓		✓						✓
	Microlight flying / ultra-light aviation		✓		✓						✓
Interpretive	Archaeology		✓		✓						✓
	Endangered species breeding centre		✓		✓						✓
	Films - amphitheatre		✓		✓						✓
	Films - auditorium		✓		✓						✓
	Interpretive centres		✓		✓						✓
	Palaeontology		✓	✓		✓	✓	✓	✓	✓	✓
	Theatre		✓		✓					✓	✓
	Tours - astronomy		✓	✓		✓	✓	✓	✓	✓	✓
	Tours - birding		✓	✓		✓	✓	✓	✓	✓	✓
	Tours - botanical		✓	✓		✓	✓	✓	✓	✓	✓

PRODUCT CATEGORY	PRODUCT OR SERVICE	Is Product currently AVAILABLE or under develop-ment?		Is Product APPROPRIATE for the applicable National Park?		ZONING FOR WHICH PRODUCT IS APPROPRIATE					
						Within boundaries of national-/ contractual park					Buffer / adjoining
		YES	NO	YES	NO	1	2	3	4	5	6
Interpretive	Tours - specialist (fauna and flora)		✓	✓		✓	✓	✓	✓	✓	✓
	Tours - tree (dendrology)		✓	✓		✓	✓	✓	✓	✓	✓
	Trail - mobility impaired		✓		✓	✓					✓
	Trails - brail		✓		✓	✓					✓
	Trails - sensory		✓		✓	✓					✓
Cultural / historical	Cleansing ceremonies (including baptism)		✓		✓	✓					✓
	Cultural dances		✓		✓	✓					✓
	Cultural points of interest	✓		✓		✓	✓	✓	✓	✓	✓
	Cultural village		✓		✓	✓					✓
	Gold panning (recreational)		✓		✓	✓					✓
	Historical points of interest	✓		✓		✓	✓		✓	✓	✓
	Mountain worship		✓		✓	✓					✓
	Museums		✓		✓	✓					✓
	Religious facilities (prayer or otherwise)		✓		✓	✓					✓
	Storytelling		✓		✓	✓					✓
	Tours - battlefield / military		✓		✓	✓					✓
	Tours - cultural		✓	✓		✓	✓	✓	✓	✓	✓
	Tours - historical		✓	✓		✓	✓	✓	✓	✓	✓
	Tours - medicinal plants		✓	✓		✓	✓	✓	✓	✓	✓
	Tours - rock art	✓		✓		✓	✓	✓	✓	✓	✓
	Tours - South African struggle		✓		✓	✓					✓
Medical / health	Health spa		✓		✓	✓					✓
	Gymnasium		✓		✓	✓					✓
	Wellness centres		✓		✓	✓					✓
Developmental	Astronomy training		✓		✓	✓					✓
	Birding course		✓		✓	✓					✓
	Botany course		✓		✓	✓					✓
	Bush homeopathy		✓		✓	✓					✓
	Bush skills		✓		✓	✓					✓
	Field guide training		✓		✓	✓					✓
	Firearm skills		✓		✓	✓					✓
	First aid		✓		✓	✓					✓
	Game capture training		✓		✓	✓					✓
	Nature / wildlife photography course		✓		✓	✓					✓
	Nature based hospitality training		✓		✓	✓					✓
	Off-road driving skills training		✓		✓	✓					✓
	Orienteering		✓		✓	✓					✓
	Rope skills course		✓		✓	✓					✓
	Scuba diving Skills		✓		✓	✓					✓
	Specialised training / courses		✓		✓	✓					✓
	Survey and mapping skills		✓		✓	✓					✓
	Survival skills		✓		✓	✓					✓
	Tracking skills		✓		✓	✓					✓
	Training - ranger		✓		✓	✓					✓
	Volunteering		✓		✓	✓					✓

PRODUCT CATEGORY	PRODUCT OR SERVICE	Is Product currently AVAILABLE or under develop-ment?		Is Product APPROPRIATE for the applicable National Park?		ZONING FOR WHICH PRODUCT IS APPROPRIATE					
						Within boundaries of national-/ contractual park					Buffer / adjoining
		YES	NO	YES	NO	1	2	3	4	5	6
Developmental	Wilderness search and rescue		✓		✓						✓
Children / youth	Babysitting		✓		✓						✓
	Child care centres in camps		✓		✓						✓
	Children activity centres (jungle gym)		✓		✓						✓
	Children encounter zone		✓		✓						✓
	Children game drives		✓		✓						✓
	Children holiday programmes in camps		✓		✓						✓
	Children trails		✓		✓						✓
	Learner programmes		✓		✓						✓
	Paint ball		✓		✓						✓
	Youth camps (KampKwena, "summer" camps)		✓		✓						✓
Business tourism and events	Events - any		✓	✓			✓		✓	✓	✓
	Events - adventure		✓	✓			✓		✓	✓	✓
	Festivals		✓		✓						✓
	Fundraising events e.g. WWF Swim for Nature		✓	✓			✓		✓	✓	✓
	Lapas / bomas (to rent)		✓		✓						✓
	MICE (Meetings, Incentives, Conventions and Exhibitions)		✓		✓						✓
	Musical concerts		✓	✓			✓		✓	✓	✓
	Photographic shoots and filming		✓		✓						✓
	Product launches		✓		✓						✓
	Races / competitions - marathons / trail running		✓		✓						✓
	Races / competitions - mountain-biking		✓		✓						✓
	Races / competitions - other		✓		✓						✓
	Races / competitions - adventure / expedition racing		✓		✓						✓
	Scientific conferences		✓		✓						✓
	Team building		✓		✓						✓
	Weddings		✓		✓						✓
Retail / services	Apparel outlets		✓		✓						✓
	Airport / aerodrome / airstrip		✓		✓						✓
	Banking - Bank or ATM		✓		✓						✓
	Rental - bicycle		✓		✓						✓
	Camping equipment rental		✓		✓						✓
	Rental - car		✓		✓						✓
	Car wash		✓		✓						✓
	Casinos		✓		✓						✓
	Clinics / Doctor/ first aid		✓		✓						✓
	Outlets - community curios		✓		✓						✓
	Outlets - curios		✓		✓						✓
	Essential commodities in camps (ice, wood, etc.)		✓		✓						✓
	Fast moving consumer goods (FMCG) outlets		✓		✓						✓
	Fuel stations		✓		✓						✓
	Gas equipment hire		✓		✓						✓
	Hop-on guides		✓		✓						✓
	Internet café / Wi-Fi hotspot		✓		✓						✓
PRODUCT CATEGORY	PRODUCT OR SERVICE	Is Product currently		Is Product APPROPRIATE for		ZONING FOR WHICH PRODUCT IS APPROPRIATE					

		AVAILABLE or under develop-ment?		the applicable National Park?		Within boundaries of national-/ contractual park					Buffer / adjoining
		YES	NO	YES	NO	1	2	3	4	5	6
Retail / services	Laundromats and laundry service		√		√						√
	Pharmacies		√		√						√
	Photo booth		√		√						√
	Pop-up retail		√		√						√
	Postal services		√		√						√
	Proshop		√		√						√
	Road emergency services		√		√						√
	Shuttle services		√		√						√
	Vending machines		√		√						√
	Vendors		√		√						√
	Wi-Fi facilities (free service)		√		√						√
Food and beverage	Bars		√		√						√
	Boma / lapa meals		√		√						√
	Bush meals		√		√						√
	Coffee shops / tea rooms		√		√						√
	Fast-food outlets		√		√						√
	Game drives picnic baskets		√		√						√
	Local cuisine		√		√						√
	MICE catering		√		√						√
	Picnic baskets		√		√						√
	Pop-up food, retail		√		√						√
	Restaurants		√		√						√
	Room service		√		√						√
	Sports bar		√		√						√
Non tourism related activities											
Mining/ Exploratory	Prospecting		√		√						√
	Mining		√		√						√
Consumptive / Subsistence	Fishing (non-release)		√		√						√
	Hunting (lethal)		√		√						√
	Sustainable harvesting of resources	√		√			√		√	√	√



Appendix 4: Internal rules

All persons entering the park and all employees (NRF/SARAO/SKA/SANParks) residing or working in the park are subject to the NEM: PAA as amended, together with any Regulations in terms of the NEM: PAA and the following specific internal rules:

- Strict adherence to the rules and regulations of the SKA project at all times;
- Adhere to the speed limit of 80 km/h on the main tarred road and 40 km/h on gravel roads;
- No livestock is allowed inside the park or staff living quarters;
- A total of two pets (excluding cats) per household are allowed with prior permission from Park Management;
- No littering is allowed;
- Staff residing in the park are responsible for the cleanliness and basic upkeep of their house and the immediate surroundings of their house;
- Staff are responsible for their guests and are to ensure that all rules and regulations are adhered to at all times.
- Staff / visitors who fail to comply with lawful instructions issued by park officials will be dealt with accordingly;
- Any SANParks staff member who contravenes or fails to comply with the park rules is liable to disciplinary action as per SANPark's disciplinary policy and procedures;
- Should any NRF / SARAO / SKA staff member contravene or fail to comply with the park's internal rules, these infringements will be dealt with as agreed by the Joint Management Committee; and
- Any specific instruction issued by Park Management for environmental conservation is binding on any employee residing or working within the park.

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Appendix 5: Maps

Map 1: Regional context

Map 2: Physical features

Map 3: Land tenure and park expansion

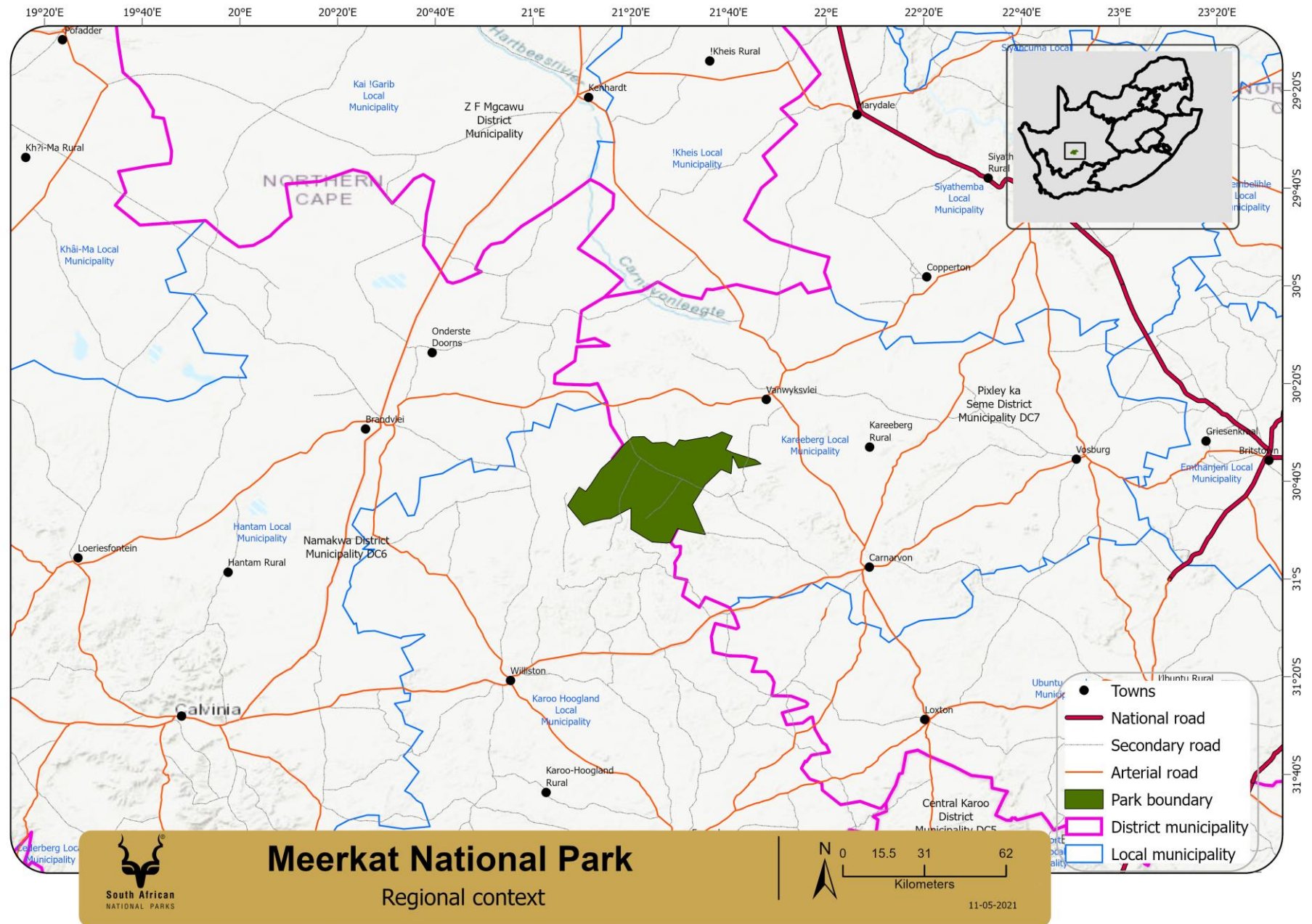
Map 4: Zoning

Map 5: Zoning with sensitivity value

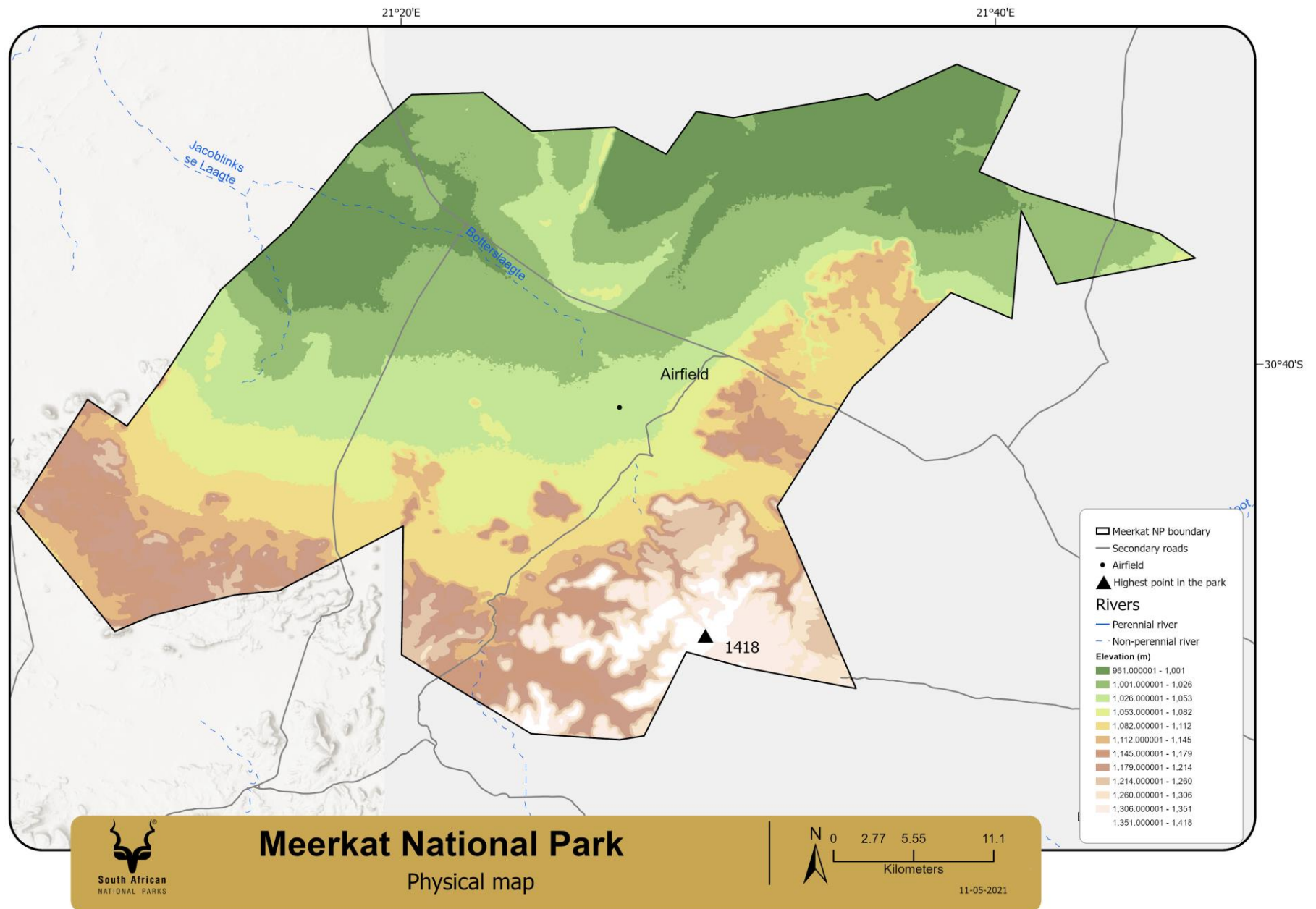
Map 6: Buffer zone

Map 7: Infrastructure

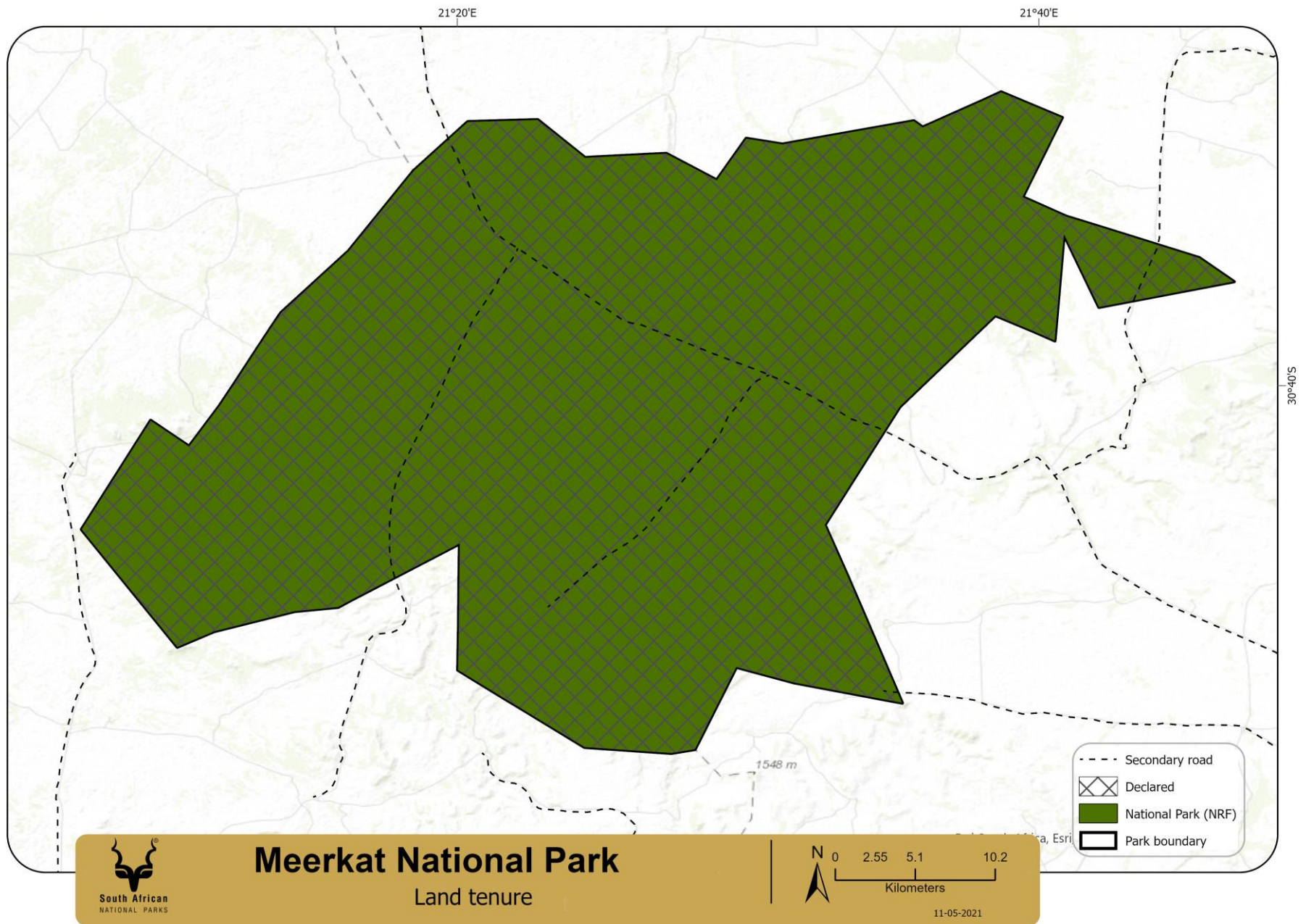
Map 8: Vegetation



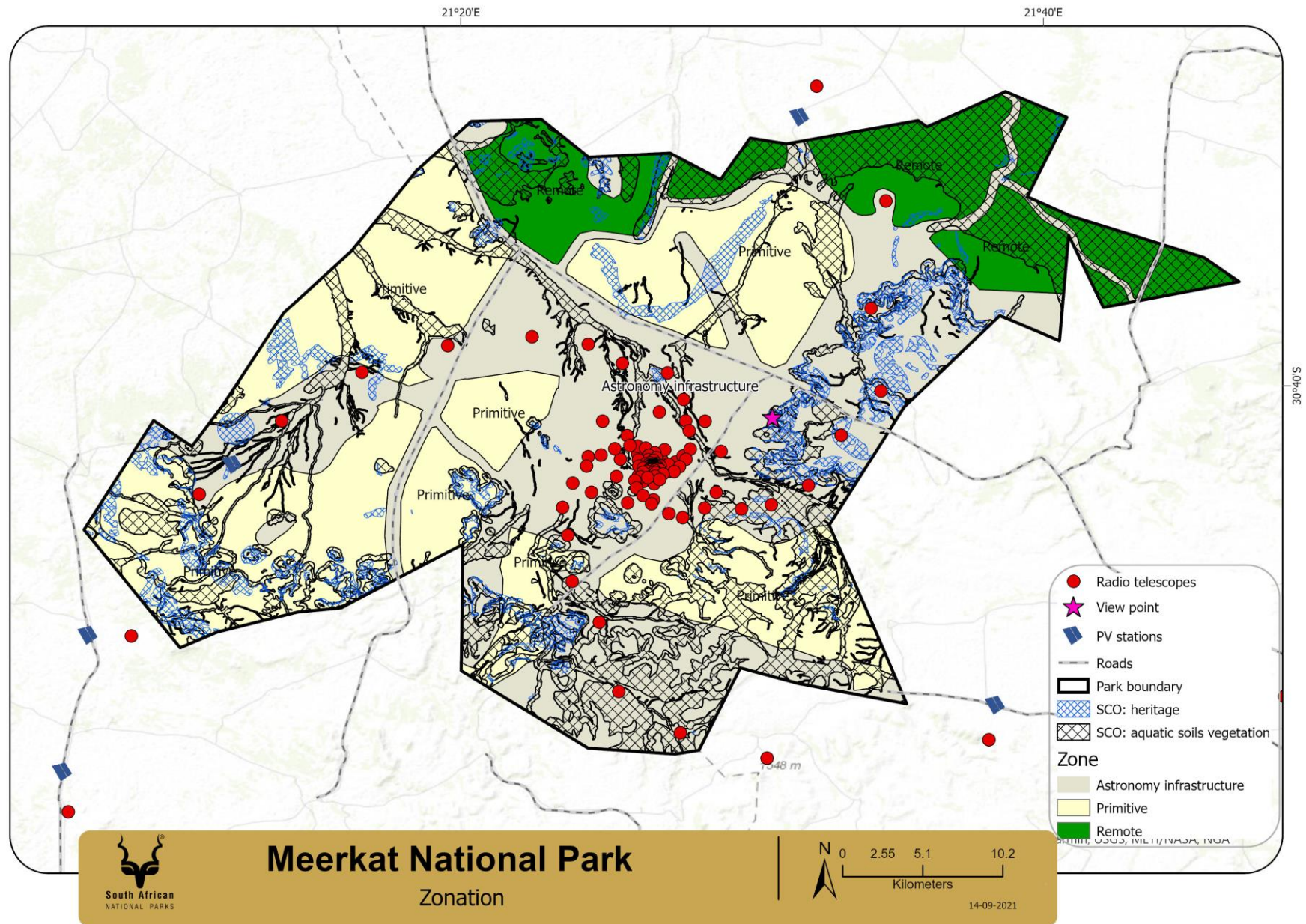
Map 1: Regional context



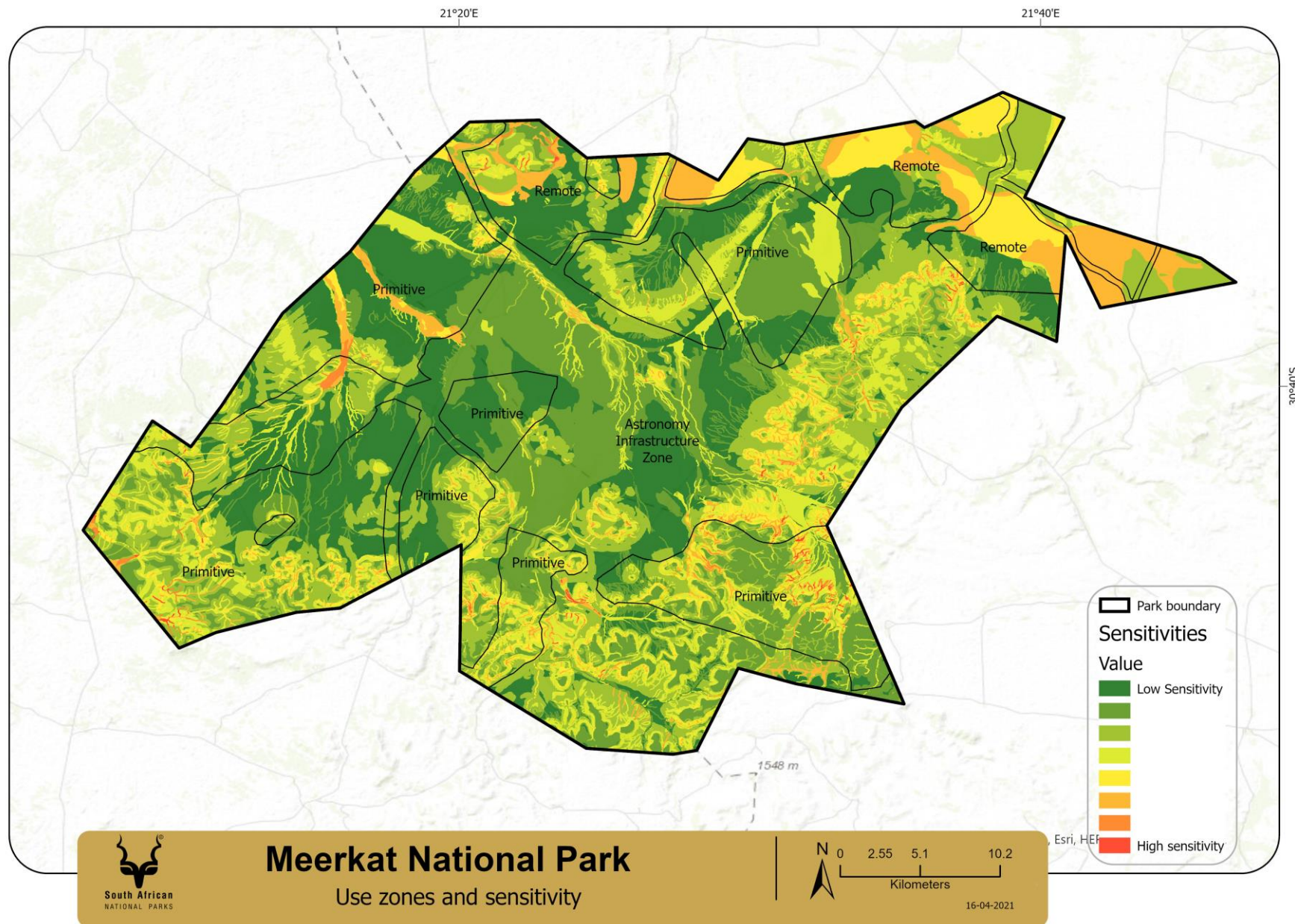
Map 2: Physical features



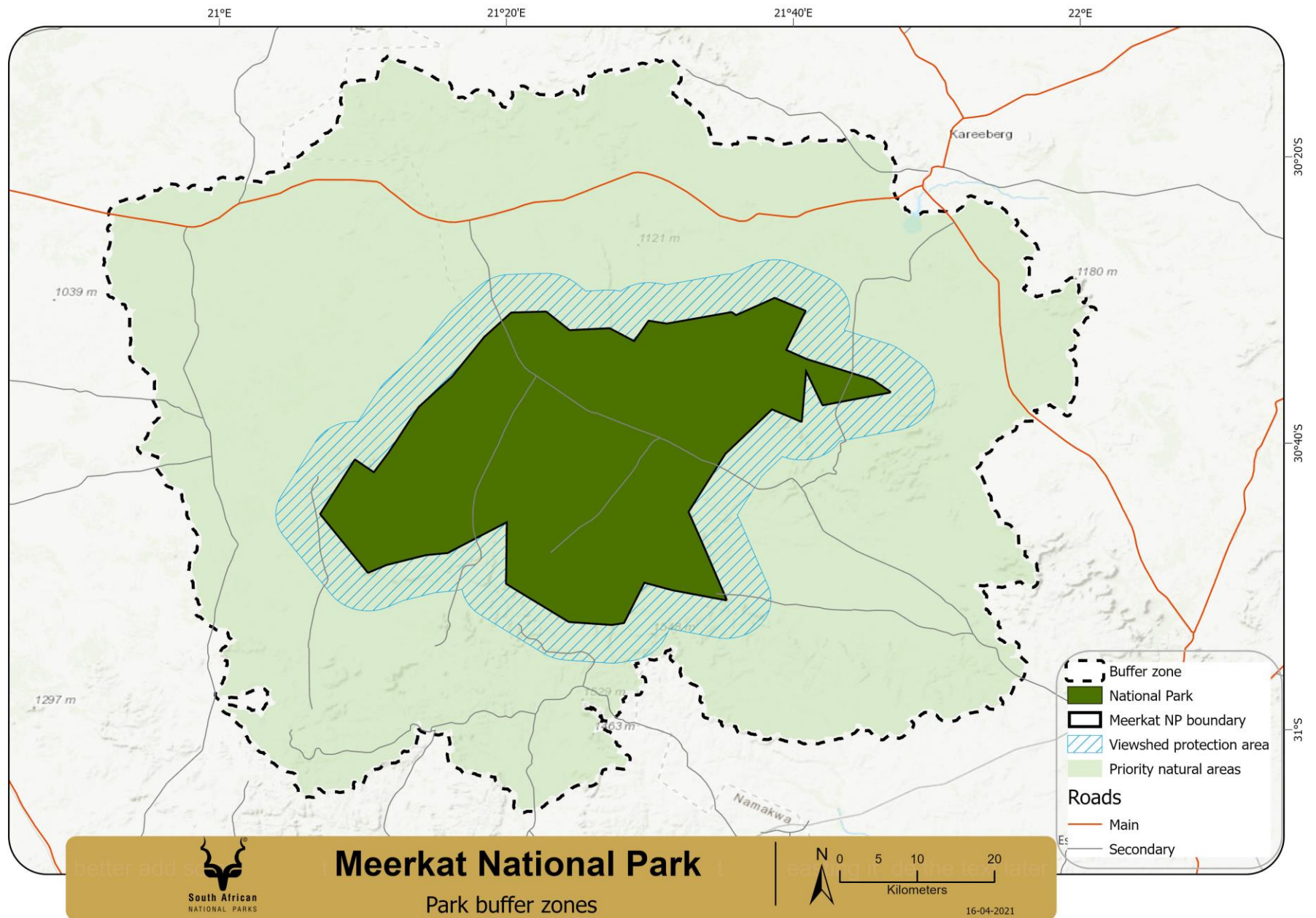
Map 3: Land tenure



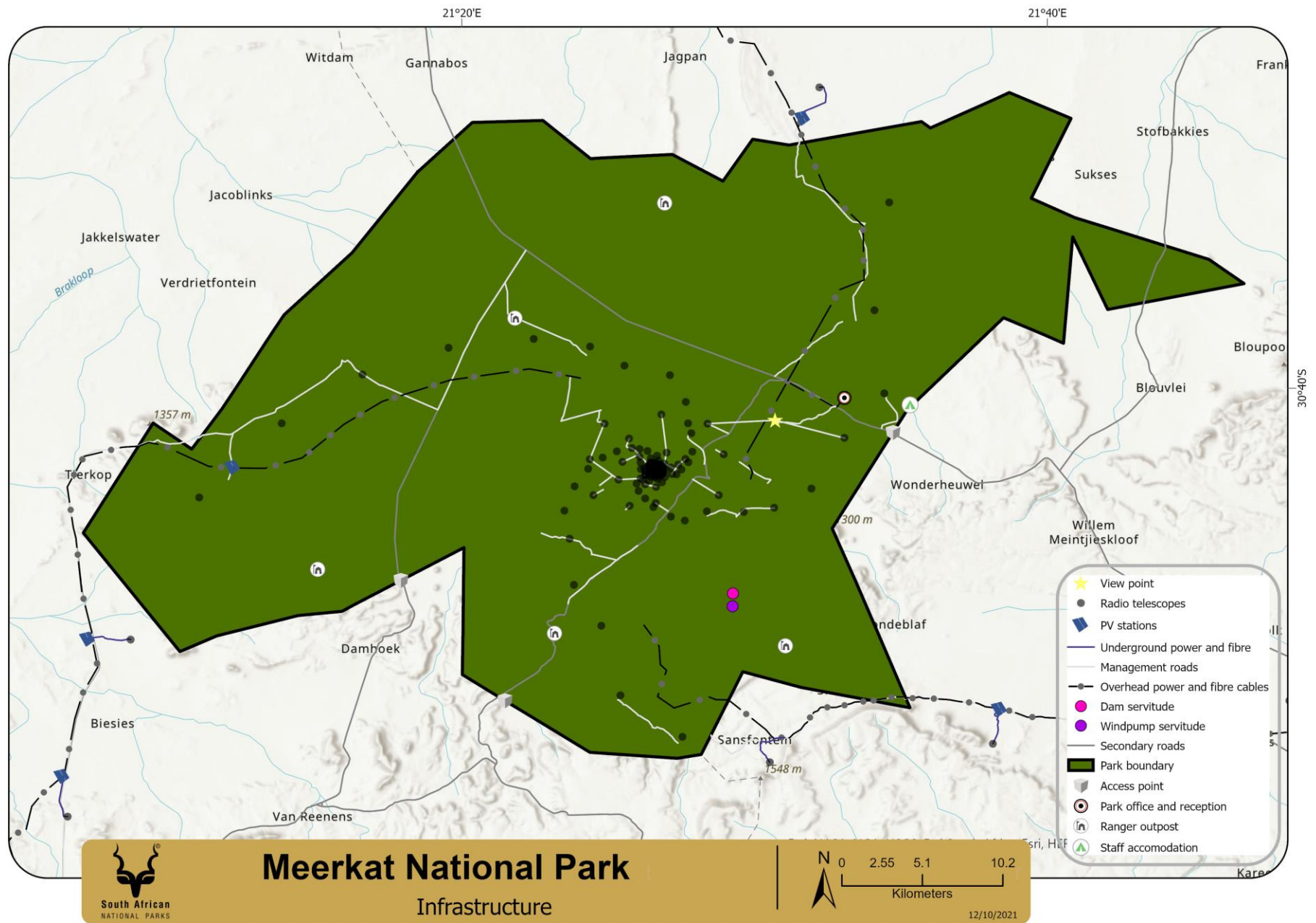
Map 4: Zoning



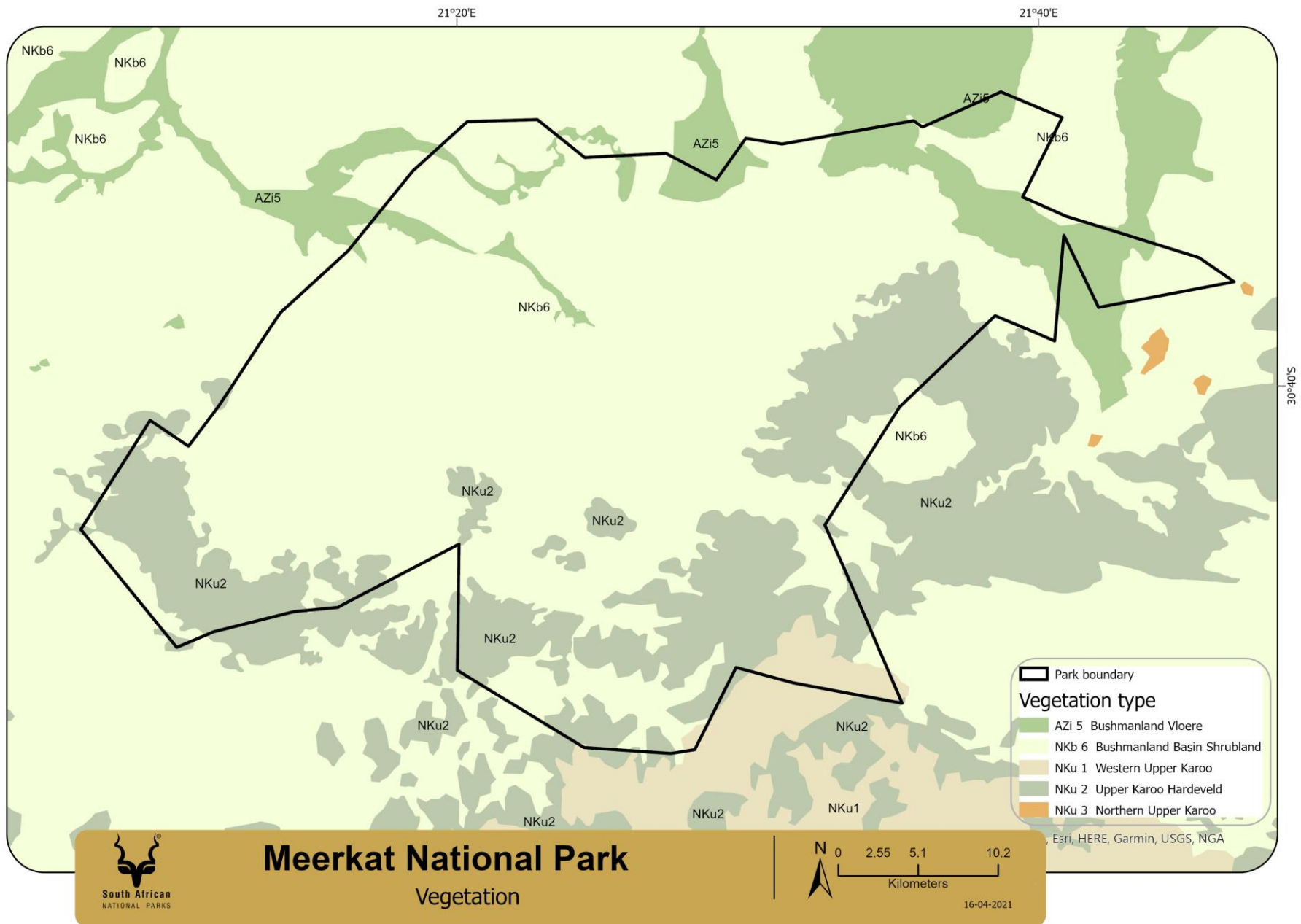
Map 5: Zoning and sensitivity



Map 6: Buffer zone



Map 7: Park infrastructure



Map 8: Vegetation