

Pietersrivier Nature Reserve

Management authority: Antonie Michaél (Katot) Meyer



Western Cape South Africa Management Plan

Prepared by

CapeNature Biodiversity Stewardship Programme

Citation: *Pietersrivier Nature Reserve – Management Plan. Version 1.1, (12 August 2020) Carlo van Tonder.
(Updated dated by Wayne Meyer & Carlo van Tonder - January 2025)*

STATUS

The Pietersrivier Protected Environment has been declared as a Section 23 Nature Reserve.

Declaration Date:	Government Gazette Notice:
2025-11-14	REF NO. P.N. 127/2025

AUTHORISATION

Protected Management Plan for the Pietersrivier Nature Reserve was drafted and recommended by Antonie Michaél (Katot) Meyer, who is the management authority of Pietersrivier Nature Reserve.

Recommended and adopted by:

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Name and Title	Signature and Date
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Review Date: 2035-01-30

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ACRONYMS AND ABBREVIATIONS

CEO	Chief Executive Officer
DEA&DP	Department of Environmental Affairs and Development Planning
DEA	National Department of Environmental Affairs
DAFF	Department of Agriculture, Forestry and Fisheries
DWA	National Department of Water Affairs
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
EMP	Environmental Management Plan
FPA	Fire Protection Association in terms of the National Veld and Forest Fire Act (No.1 of 1998)
GIS	Geographical Information System
IDP	Municipal Integrated Development Plan
IUCN	International Union for the Conservation of Nature
MEC	Member of the Executive Council
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
NEMA	National Environmental Management Act
NEM:PAA	National Environmental Management: Protected Areas Act no 57 of 2003
NPAES	National Protected Area Expansion Strategy
NSBA	National Spatial Biodiversity Assessment
PA	Protected Area
PNR	Pietersrivier Nature Reserve
SAHRA	South African Heritage Resources Agency
SDF	Municipal Spatial Development Framework
SMME	Small, Micro and Medium Enterprises
SMP	Strategic Management Plan
SWOT	Strengths, weaknesses, opportunities and threats analysis
UNESCO	United Nations Educational, Scientific and Cultural Organisation

WWF	World Wildlife Fund
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1. BACKGROUND

1.1 Introduction

The Pietersrivier Contract Nature Reserve (PNR) is located in the southeastern extremity of the Western Cape Province, within the George Local Municipal Area south of Uniondale. The R339 that connects Avontuur to Knysna cuts across the Outeniqua Mountains just east of the property (Figure 1). This area forms part of the Klein Langkloof Mountains located in the northeastern extremity of the Outeniqua Mountain range. Sections of the Garden Route National Park (GRNP) flank PNR and are located approximately 8 km west and approximately 6 km east of PNR respectively (Figure 2). The remainder of farm 257 Annex De Vlucht, which is state land and managed by CapeNature, lies in close proximity of PNR's northern boundary (Figure 2). PNR is approximately 1150 ha in extent.

The current owner of PNR, Mr. Antonie Michaél (Katot) Meyer was born on the Oakdale Agricultural School farm in Riversdale, Western Cape. He attended the Langenhoven High School in Riversdale before which he served in the National Defence Force and studied. From 1972 – 1996 he worked as an engineer for the Department of Agriculture, Division Agricultural Engineering at the University of Stellenbosch, Middelburg (Eastern Cape) and Oudtshoorn districts. The property has been in the Meyer family from the late 1800's and first belonged to Mr. Antonie Michaél (Gal) Meyer. Mr. Gal Meyer built special ox wagons that were used to transport the metal beams for the construction of the railway bridge across the Gouritz River. With his revenue he bought the properties currently comprising the PNR as well as properties to the west of the Langkloof. The PNR properties were used as a livestock station when it was too cold in the Langkloof.

In 2004, Mr. Katot Meyer contacted CapeNature to find out about forming a Conservancy in the De Vlucht area. A conservancy was formed and registered with CapeNature in June of 2006. Mr. Meyer continued to investigate the possibility of securing his property for perpetuity and liaised with CapeNature, Garden Route Conservation Services to conduct a Biodiversity Assessment with Regional Ecologist, Dr. Annelise-Schutte Vlok. The property was assessed in January 2008 and in May 2008 was identified as a possible Contract Nature reserve during review.

Owner	Antonie Michaél (Katot) Meyer
Contact Person	Antonie Michaél (Katot) Meyer
Contact Details – Tel.	082 083 9967/044 272 5114
Contact Details – Email	attakwas@cybersmart.co.za
Management Authority	Antonie Michaél (Katot) Meyer

Property Descriptions	<ol style="list-style-type: none"> 1. Portion 9 (a portion of Portion 8) of the farm Smaldeel No. 265, situated in the George Municipality, Division Uniondale, Western Cape Province 2. Remainder of Portion 2 of the Farm Smaldeel No. 265, situated in the George Municipality, Division Uniondale, Western Cape Province 3. Remainder of Portion 3 of the Farm Smaldeel No. 265, situated in the George Municipality, Division Uniondale, Western Cape Province 4. Remainder of the Farm Pieters Rivier No. 258, situated in the George Municipality, Division Uniondale, Western Cape Province 5. Remainder of the Farm No. 256, situated in the George Municipality, Division Uniondale, Western Cape Province
Title Deed Number	T20545/1972
Total Property Area	1 151.2769 ha

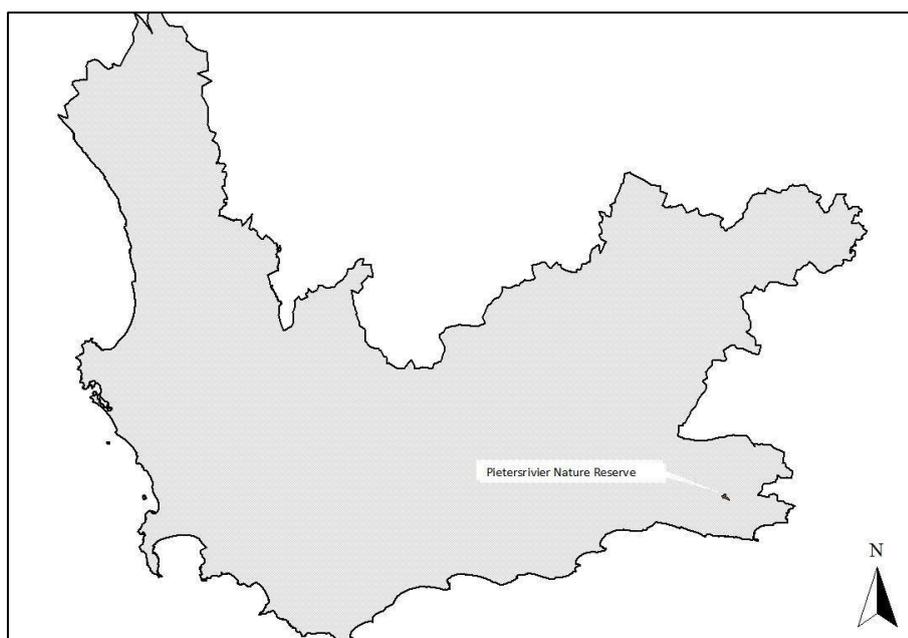


Figure 1. The location of Pietersrivier Nature Reserve in relation to the Western Cape Province.

1.2 The values of the site

- a) According to Rutherford and Mucina (2006) the property contains Langkloof Shale Renosterveld that is classified as Critically Endangered with no formal conservation elsewhere.
- b) According to Rutherford and Mucina (2006) the property contains South Outeniqua Sandstone Fynbos classified as Vulnerable.
- c) Good representation of endemic, rare and threatened plant species.
- d) The property forms part of an important ecological east-west corridor for Outeniqua and Tsitsikamma Mountains.
- e) The property forms part of an important corridor and catchment area of the Keurbooms River that is classified as Endangered according to the "South African National Spatial Biodiversity Assessment" (Nel et al., 2004).
- f) It forms part of an important upland-lowland gradient.
- g) It is a transition zone between different Fynbos vegetation units.
- h) The property is located within the Gouritz Landscape Initiative's Eastern Coastal management sector.
- i) Predator-prey interactions are intact with the top predator in the Cape Floristic Region namely Leopard (*Panthera pardus*) that is present.
- j) Important cultural-historic aspects are present on the property namely San rock art and the original ox wagon route of William John Burchell.

1.3 The purpose of the plan

With section 17 of the National Environmental Management: Protected Areas Act no. 57 of 2003 (hereafter NEM:PAA) in context PNR contains features that makes it worthy of declaration as a Contract Nature Reserve in that it provides essential ecosystem services and makes a significant contribution to:

- protecting ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes in a system of protected areas
- preserve the ecological integrity of such areas
- protect South Africa's threatened or rare species
- assist in ensuring the sustained supply of environmental goods and services
- provide for the sustainable use of natural biological resources
- create or augment destinations for nature-based tourism

The Management plan for the PNR provides the guidelines and framework within which the Contract Nature Reserve will be managed. The management plan intends to add value and continuity by clearly stating management objectives, scheduling action and providing guidelines on the correct

management approach. Where possible, emphasis has been placed on assigning responsibility for management interventions, scheduling said management interventions and quantifying management costs. This approach has the specific intention of creating a mechanism whereby management intervention can be monitored and audited on an annual basis. In context, this management plan is a dynamic document that should be updated on an annual basis or as soon as new information becomes available that may better inform decisions on responsible land management.

A memorandum of understanding has been signed between the owner and CapeNature whereby, pending the declaration of the Property or a portion thereof as a Nature Reserve in terms of the NEM:PAA, the owner undertakes to manage the Property, from the date of signature hereof, in accordance with the provisions of the Management Agreement concluded with the Western Cape Nature Conservation Board.

1.4 Planning approach

In 2004, Mr. Katot Meyer contacted CapeNature to find out about the possibility of forming a Conservancy in the De Vlugt area. A conservancy was formed with Mr. Meyer as one of the members and registered with CapeNature in June of 2006. Subsequently Mr. Meyer wanted to secure his property for perpetuity and liaised with CapeNature, Garden Route Conservation Services about incorporating his property into the conservation estate of the Western Cape Province by means of CapeNature's Stewardship Programme. Garden Route Conservation Services and Gouritz Regional Ecologist, Dr. Annelise Schutte-Vlok, conducted a Biodiversity Assessment in January 2008 and in May 2008 the Pietersrivier properties were recommended as a Contract Nature Reserve during review.

This management plan has been drafted by the CapeNature's Conservation Services component, Garden Route area, in collaboration with the management authority. Several contact sessions with the management authority was held during 2012 and 2013 in order to conceptualise the vision, objectives and management actions for PNR. A draft management plan was completed and provided to the management authority and to CapeNature's Stewardship Programme and Regional Ecologist for comments. After comments were received from the afore-mentioned parties these were incorporated into the management plan after which it was presented to the management authority who undertook to implement the management actions set out by this plan by signing a memorandum of understanding.

Parallel to the formulation of the management plan for PNR, CapeNature's Conservation Services drafted the legal documents required in terms of NEM:PAA (refer to section 2.2) and provided these to the management authority for approval.

2. DESCRIPTION OF THE PROTECTED AREA AND ITS CONTEXT

2.1 Property details and title deed information

1. Portion 9 (a portion of Portion 8) of the farm Smaldeel No. 265, situated in the George Municipality, Division Uniondale, Western Cape Province, measuring 98,3200 (Ninety Eight comma Three Two Zero Zero) hectares in extent;
2. Remainder of Portion 2 of the Farm Smaldeel No. 265, situated in the George Municipality, Division Uniondale, Western Cape Province, measuring 675,5639 (Six Hundred and Seventy Five comma Five Six Three Nine) hectares in extent;
3. Remainder of Portion 3 of the Farm Smaldeel No. 265, situated in the George Municipality, Division Uniondale, Western Cape Province, measuring 73,6968 (Seventy Three comma Six Nine Six Eight) hectares in extent;
4. Remainder of the Farm Pieters Rivier No. 258, situated in the George Municipality, Division Uniondale, Western Cape Province, measuring 282,6198 (Two Hundred and Eighty Two comma Six One Nine Eight) hectares in extent;
5. Remainder of the Farm No. 256, situated in the George Municipality, Division Uniondale, Western Cape Province, measuring 21,0764 (Twenty One comma Zero Seven Six Four) hectares in extent.

The properties are held by Deed of Transfer No T20545/1972. The properties are situated north and south of the Kliprivier/Joncksrus divisional road 1660, approximately 45.5 kilometers west of Uniondale, the nearest town.

2.2 Legal framework

The NEM:PAA commenced on 1 November 2004 and makes provision for the declaration of various types of protected areas, one of which is a Nature Reserve. This Act aims for the protection of conservation and ecologically viable areas, representative of South Africa's biological diversity and its natural landscapes and seascapes. The MEC is empowered under section 23(1) of NEM:PAA to declare, by notice in the Provincial Gazette, an area in respect of private land as specified in the notice as a Nature Reserve if the owner has consented to the declaration by way of a written agreement with the MEC. Section 38(2) of NEM:PAA stipulates that the MEC, in writing, must assign the management of a Nature Reserve to a suitable person, organisation or organ of state. This

person, organisation or organ of state will function as the management authority for the purposes of NEM:PAA. In the case of PNR the management authority will be the landowner Mr. Antonie Michaél (Katot) Meyer which according to section 39 of NEM:PAA is also responsible for providing a management plan within 12 months of the assignment.

According to section 31 of NEM:PAA the Minister must follow a consultation process with interested and affected parties before a notice under section 23(1) is issued. A consultation process will be followed in terms of section 32, 33 and 34 of NEM:PAA. Therefore copies of the agreement to declare the PNR and consent to the assignment of the management authority between the PNR and the Minister (still to be signed) will be sent to the Department of Water and Environmental Affairs, the Department of Agriculture, the Local Municipality concerned, the Department of Environmental Affairs and Development Planning, the South African National Biodiversity Institute, and the South African Heritage Resources Agency. The notice of intention to declare the PNR as indicated will also be sent per registered mail to all adjoining landowners concerned. The public participation process must entail the publication of the intention to declare a Nature Reserve in the area and an invitation for representations and objections from the public and the above mentioned organs of state within 60 (sixty) days of such publication. The MEC must give due consideration to such objections and representations before declaring the Nature Reserve.

The notice of intention to declare the PNR will be advertised in English, Afrikaans and Xhosa in the Western Cape Province Provincial Gazette in terms of Provincial Notice No. 44436. A notice of the same nature will also be published in English/Afrikaans in a national newspaper as well as in the City Press in Xhosa as soon as the Minister has approved the process as recommended in paragraph above.

Besides the legal framework for proclaiming a Nature Reserve under NEM:PAA given above the following legislation could be applicable to activities on and regarding the PNR:

- Constitution of the Republic of South Africa Act; No 108 of 1996
- National Environmental Management Act; No 107 of 1998
- National Environmental Management: Protected Areas Act; No 57 of 2003
- National Environmental Management: Biodiversity Act; No 10 of 2004
- National Forest Act; No 84 of 1998
- National Veld and Forest Fire Act; No 101 of 1998

- National Water Act, No 36 of 1998
- Conservation of Agricultural Resource Act; No 43 of 1983
- Environment Conservation Act; No 73 of 1989
- Game Theft Act ; No105 of 1991
- National Heritage Resources Act; No 25 of 1999
- Mineral and Petroleum Resources Development Act; No 28 of 2002
- Fencing Act; No 31 of 1963
- The Nature and Environmental Conservation Ordinance; No 19 of 1974

2.3 Landscape perspective

PNR is located in south of the Uniondale area and west of the R339 that connects Avontuur to Knysna. This area forms part of the Klein Langkloof Mountains located in the eastern extremity of the Outeniqua Mountain range. Sections of the Garden Route National Park flank PNR and are located approximately 8 km west and approximately 6 km east of PNR respectively (Figure 2). The remainder of farm 257 Annex De Vlugt, which is state land and managed by CapeNature, lies in close proximity of PNR's northern boundary (Figure 2). The majority of PNR consists of Critical Biodiversity Areas (CBA) and Ecological Support Areas (ESA). PNR is largely undeveloped and largely intact containing pristine vegetation types.

The Rapid Biodiversity Conservation Assessment and Framework for a Conservation Plan for the Plettenberg Bay municipality (Lombard *et al.* 2004) by the Biodiversity Conservation Unit of the Wildlife and Environment Society of South Africa (WESSA) have identified areas in the Keurbooms River catchment as a corridor that will provide a North-South upland-lowland gradient. This will provide linkage between the mountains and the sea as well as between statutory conservation areas i.e Annex 0/257 de Vlugt (Kammanassie Nature Reserve) and the Soetkraal area of the Garden Route National Park. The corridor could be important for the movement of some of the remaining large predators (e.g. Crowned Eagles, Black Eagles, Leopards), as well as herbivores such as Bushbuck. It is also important for the protection of water catchments of the Keurbooms and Palmiet Rivers, which would help to maintain a healthy estuary as well as water security for the Plettenberg Bay area. From a terrestrial point Lombard *et al.* (2004) also consider the area where PNR is located to be part of an important corridor for nectarivores and a biogeographical east-west corridor for the Outeniqua-Tsitsikamma-Fynbos units.

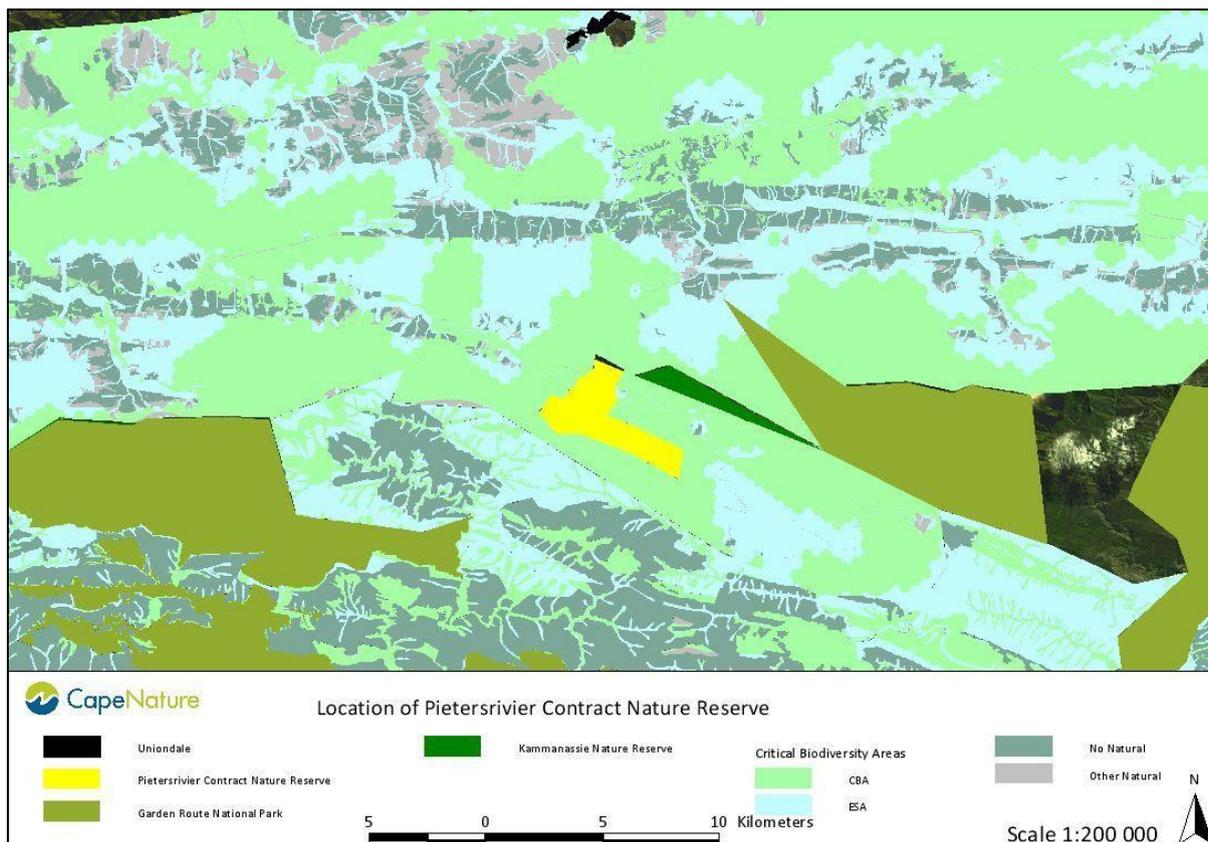


Figure 2. Location of Pietersrivier Nature Reserve in relation to formal protected areas and Critical Biodiversity Areas (CBA) and Ecological Support Areas (ESA).

2.3.1 Protected Area Expansion Strategy and Implementation Plan

CapeNature’s Protected Area Expansion Strategy and Implementation Plan 2015 – 2020 address the formal proclamation of protected areas in priority natural habitats to conserve biodiversity and ecosystem services for future generations (Western Cape Protected Area Expansion Strategy: 2015 – 2020, Maree *et al.* 2015). Currently, the formal protected area network does not adequately protect the majority of ecosystems and biodiversity in the Western Cape and the establishment of protected areas in the most threatened and under-conserved habitats are critical. This strategy is aligned to the concepts and goals of the 2008 National Protected Area Expansion Strategy (NPAES), but does identify some different spatial priorities. Although the PNR is not yet included with the CapeNature Protected Area Expansion Strategy and Implementation Plan this area has been identified as a priority at local level.

2.3.2 Integrated Development Plan and Spatial Development Framework

The Garden Route District Municipality, that includes the Kannaland, Hessequa, Mossel Bay, George, Oudtshoorn, Bitou and Knysna Local Municipalities, has published an Integrated Development Plan (IDP) for 2022-2027 as well as a Spatial Development Framework (SDF) for 2017-2022. It should be noted that the PNR now falls within the jurisdiction of the George Municipality that now also includes the Uniondale district. No mention is made of the PNR or the greater area where it is located, from a conservation point of view, in the IDP nor SDF.

The George Local Municipality, that includes Pietersrivier Nature Reserve, has published an IDP for 2022-2027 as well as an SDF for 2023-2027. No mention is made of the PNR or the greater area where it is located, from a conservation point of view, in the IDP nor SDF. See Figure 3.

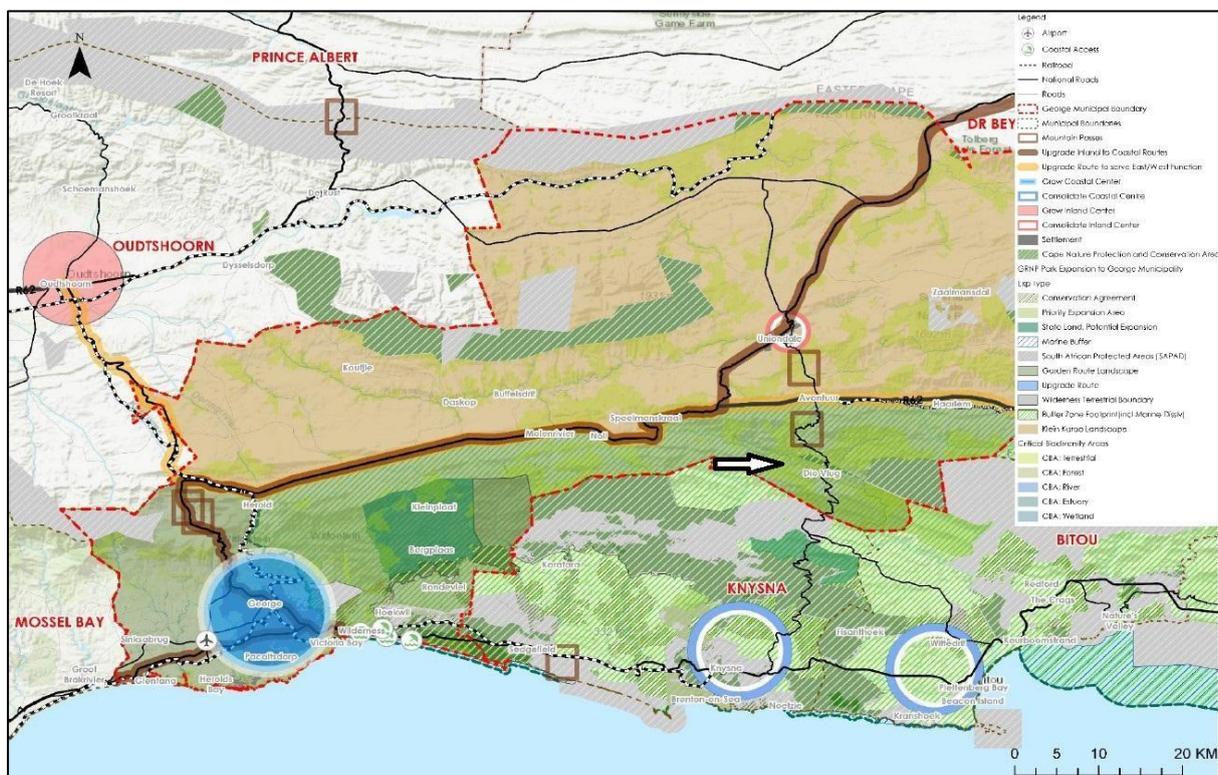


Figure 3. Location of Pietersrivier Nature Reserve indicated with black arrow on George Local Municipality SDF for 2023-2027 (George Municipal Spatial Development Framework 2023/27).

2.4 Physical environment

2.4.1 Climate

The PNR is located in an area that receives rainfall throughout the year (Schulze, 1997) with an average annual rainfall of approximately 450 mm. Summer months are hot with daily maximum

temperatures sometimes exceeding 35°C. Daily minimum temperatures during winter sometimes drops to below 0°C.

2.4.2 Topography and terrain morphology

PNR is located within the northeastern extremity of the Outeniqua Mountain range that is part of the Cape Fold Mountains that formed approximately 265 million years ago (Rust, 1998). The topography of PNR is characterized by a small valley of the Keurbooms River course (approximately 340 m.a.s.l.) in a more or less east-west direction that is flanked by anticlinal ridges that reaches a height of approximately 900 m.a.s.l. The anticlinal ridges are characterized by relatively deep drainage lines that cut in diagonally into the Keurbooms River.

2.4.3 Geology, geomorphology, soils and land types

Pietersrivier is mostly underlain by the Table Mountain Group that is part of the greater Cape Supergroup. Quartz sandstone that has been metamorphosed to quartz arenite is characteristic of the Prince Alfred's Pass that lies just south of PNR (Rust, 1998). Table Mountain Quartzite is a well-known aquifer yielding large supplies of good quality groundwater. A lesser geological feature of PNR is the narrow band of shale approximately 0.5 km wide (Figure 4) that dissects the property. This shale belongs to the Bokkeveld Group and mostly consists of black shale, compact siltstone and olive-grey sandstone and is typical of the valleys and low rolling hills (Rust, 1998).

2.4.4 Hydrology and aquatic systems

PNR is located within the catchment area for the Keurbooms River. The South African National Biodiversity Assessment (Nel *et al.* 2004) has assigned a conservation status of "endangered" to this river. The Keurbooms River and its sub catchments fall within the Ecosystem Priority Areas (FEPAs) as identified by the National Freshwater Ecosystem Priority Area (NFEPAs) project (Nel 2011a, 2011b). According to the NFEPAs the condition of the Keurbooms River is described as "Largely natural with few modifications". The results of a River Health Programme (RHP 2009) survey from 2007 indicated that the middle section of the Keurbooms River was considered to be in a fair condition. According to this survey this River is also home to the endangered Keurbooms Redfin (*Pseudobarbus tenius*) that is threatened by the presence of alien invasive fish species and habitat destruction. River FEPA status have been assigned to rivers that are currently in good condition and indicate that these should remain so in order to achieve biodiversity targets for river ecosystems and fish species.

At present there are nine earth dams on PNR that are fed from a pipeline that originates from the Pietersrivier. The water is extracted from a small weir and gravity fed to the various dams through a 80 mm and 100 mm diameter polyethylene pipe. PNR is registered with the Department of Water

Affairs as a water user for the irrigation of 5 ha of which approximately only 10% is used annually.
There are no servitudes or sharing agreements with neighbours regarding water use.

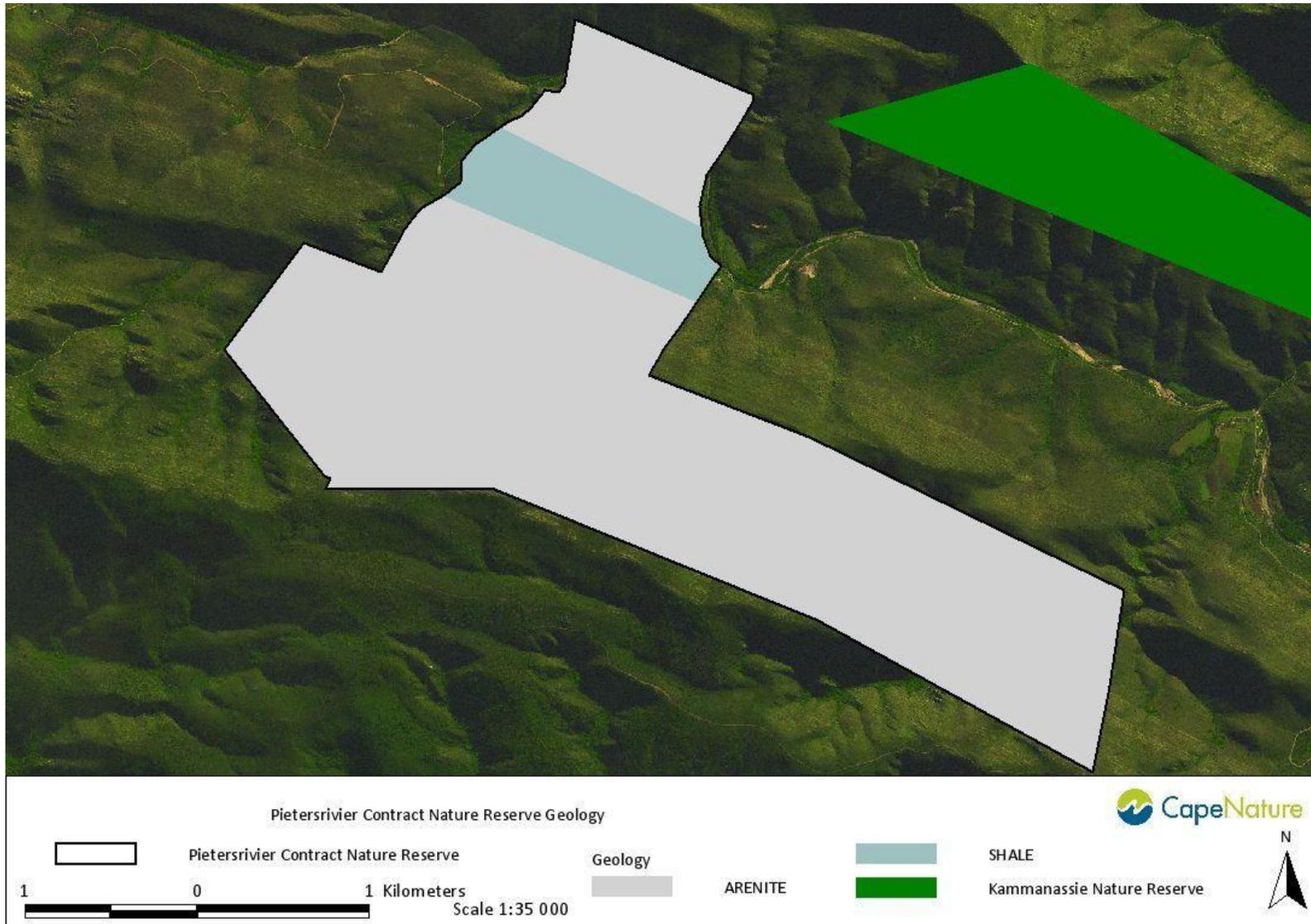


Figure 4. Geological features of Pietersrivier Nature Reserve.

2.5 Biological environment

2.5.1 Vegetation

The vegetation of the PNR is characterised by Fynbos with thicket and forest patches. Forest patches are prevalent in the kloofs that cut through the gentle to steep Fynbos covered slopes of PNR. According to the identification of Vegetation of South Africa by Mucina and Rutherford (2006), four vegetation units are found in the area (Figure 5). They are briefly described below.

2.5.1.1 Langkloof Shale Renosterveld

According to Rebelo *et al.* (2006a) this vegetation unit is poorly known. It is dominated by Renosterbos (*Elytropappus rhinocerotis*) shrubland/Fynbos mosaic and classified as **Critically Endangered**. Currently none of this vegetation unit is formally conserved (Rebelo *et al.* 2006a). The PNR contains ± 47 ha of this vegetation unit that contributes 1.08 % to the Biodiversity Threshold target for this vegetation unit.

2.5.1.2 North Outeniqua Sandstone Fynbos

Proteoid and Restoid Fynbos dominate this vegetation unit with Ericaceous and Asteraceous elements widespread on higher and lower altitudes respectively (Rebelo *et al.* 2006c). The conservation status of this vegetation unit is **Least Threatened** and currently 11 % is conserved. The PNR contains ± 433 ha of this vegetation unit that contributes 0.50 % to the conservation target for this vegetation unit.

2.5.1.3 South Outeniqua Sandstone Fynbos

This **Vulnerable** vegetation unit is dominated by Proteoid and Restoid elements with Ericaceous Fynbos prevalent on the upper slopes and grassy components present on lower slopes (Rebelo *et al.* 2006b). Currently 24 % of this vegetation unit is conserved. The PNR contains ± 472 ha of this vegetation unit that contributes 0.30 % to its conservation target.

2.5.1.4 Tsitsikamma Sandstone Fynbos

Rebelo *et al.* (2006d) describes this vegetation unit to be dominated by tall Proteoid shrubland over Ericoid shrubland with Fynbos thicket in moister areas. It is classified as **Least Threatened**. Currently 44 % of this vegetation unit is conserved. The PNR contains ± 137 ha of this vegetation unit that contributes 0.18 % to its conservation target.

2.5.1.5 Fine-scale Habitat variants on PNR

According to the fine-scale vegetation map for the Garden Route Initiative compiled by Vlok *et al.* (2008), PNR contains six habitat variants (Figure 6) and described in Table 1. From a management point of view, this map is very useful.

Table 1. Description of the fine-scale vegetation on Pietersrivier Nature Reserve as described by Vlok *et al.* (2008).

Eco	Biome	Habitat	Variant	Description
Aquatic	Fynbos	Stream	Keurbooms River & Perennial Streams	The Keurbooms River & Perennial Stream unit is easily identified in having Keurbooms (<i>Virgilia divaricata</i>) abundant along the main drainage channel as well as small patches of Afromontane forest, often with <i>Afrocarpus falcatus</i> and <i>Searsia chirendensis</i> present. <i>Berzelia intermedia</i> , <i>Cannomois virgata</i> , <i>Leucadendron conicum</i> , <i>Leucadendron eucalyptifolium</i> and <i>Protea mundii</i> are abundant and prominent along the upper streams. The upper seepage areas often have grasses such as <i>Ehrharta dura</i> abundant after fire. The rare orchid <i>Acrolophia barbata</i> and the uncommon localized endemic shrubs <i>Erica inconstans</i> and <i>Psoralea keetii</i> also occur in these upper seepage areas. This unit is most similar to the Outeniqua Perennial Stream unit, but can be easily recognized by the presence of <i>Protea mundii</i> and the absence of <i>Protea aurea</i> .
Terrestrial	Fynbos	Grassy	Kouga Grassy Fynbos	The Kouga Grassy Fynbos is also characterised by having <i>Capeochloa arundinacea</i> dominant on north-facing slopes with few Proteas and Ericas on these north-facing slopes, in this unit <i>Protea nitida</i> and shrubs such as <i>Erica cerinthoides</i> , <i>Erica simulans</i> , <i>Leucadendron salignum</i> and <i>Leucospermum cuneiforme</i> are occasionally prominent in small patches on south facing slopes. It shares most of its common species with the Grassy Fynbos of the more western areas (e.g. <i>Heliophila glauca</i> , <i>Osteospermum imbricatum</i> , etc.), but some of the species present in the Kouga Grassy Fynbos (e.g. <i>Agathosma puberula</i> and <i>Muraltia juniperifolia</i> , etc.) are absent from all the other Grassy Fynbos units of the Klein Karoo domain. It also differs from most of the other Grassy Fynbos units in often having sweet grasses (C4 species such as <i>Themeda triandra</i>) quite abundant after fire.
Terrestrial	Fynbos	Mesic Proteoid	Tsitsikamma Mesic Proteoid Fynbos	The Tsitsikamma Mesic Proteoid Fynbos unit is mostly dominated by <i>Leucadendron eucalyptifolium</i> and <i>Protea mundii</i> , with <i>Protea neriifolia</i> and <i>Leucadendron uliginosum ssp. glabratum</i> more common on north facing slopes. It is thus most easily recognised from the more western Mesic Proteoid Fynbos units by the presence of <i>Protea mundii</i> in wet sites and <i>Leucadendron uliginosum ssp. glabratum</i> in more arid sites. Another feature is the often super-abundance of <i>Cannamois virgata</i> on south facing slopes. Small forest patches often occur in fire protected ravines, usually with <i>Laurophyllus capensis</i> and <i>Virgilia divaricata</i> abundant on the ecotone. A number of fynbos species, such as <i>Gladiolus carneus</i> , reach their easternmost distribution in this unit. Rare and localised endemics present include <i>Acrolophia barbata</i> , <i>Erica trachysantha</i> , <i>Gladiolus sempervirens</i> and <i>Protea vogtsiae</i> .
Terrestrial	Fynbos	Waboomveld	Outeniqua Waboomveld	The Outeniqua Waboomveld is most similar to the Fouriesberg Waboomveld, but differs in often having <i>Protea neriifolia</i> prominent, lacking species such as <i>Leucadendron teretifolium</i> and having a different component of small shrubs, such as <i>Erica solandri</i> . It is very often densely invaded by <i>Hakea sericea</i> , which threatens the uncommon and rare species present in this unit, such as <i>Aspalathus glabrescens</i> , <i>Erica ingeana</i> , <i>Erica sp. nov. (cf. alfredii)</i> and <i>Lotononis elongata</i> .
Terrestrial	Fynbos	Waboomveld Mos Forest	De Vlugt Forest-Waboomveld	The De Vlugt Forest-Waboomveld is a very distinctive unit as small patches of forest (with species such as <i>Buddleja salviifolia</i> , <i>Diospyros dichrophylla</i> , <i>Pittosporum viridiflorum</i> , <i>Pterocelastrus tricuspidatus</i> , <i>Searsia chirendensis</i> , <i>Virgilia divaricata</i> , etc.) are often present on steep south facing slopes. Waboom (<i>Protea nitida</i>) remain prominent in the matrix fynbos, along with <i>Leucadendron salignum</i> , <i>Protea neriifolia</i> and occasionally <i>Leucadendron eucalyptifolium</i> . Other shrubs are also abundant, with <i>Erica copiosa</i> , <i>Erica sparsa</i> and <i>Printzia polifolia</i> abundant. Succulents (e.g. <i>Aloe arborescens</i> , <i>Bulbine latifolia</i> , <i>Crassula rupestris</i> , <i>Haworthia cymbiformis</i> , etc.) are abundant on rocky outcrops, despite the fact that this unit occurs in a fairly high rainfall area.
Terrestrial	Renosterveld	Mos Sandolienveld	De Vlugt Sandolien-Renosterveld	The De Vlugt Sandolien-Renosterveld unit is similar to the Hartbeesvlakte Sandolien-Renosterveld in having Renosterbos (<i>Elytropappus rhinocerotis</i>) dominant on the north facing slopes and Sandolien (<i>Dodonaea angustifolia</i>) more prominent on the south facing slopes of the silcrete hills that occur here, but it differs in having Subtropical Thicket and Forest elements (e.g. <i>Buddleja saligna</i> , <i>Carissa bispinosa</i> , <i>Diospyros dichrophylla</i> , <i>Grewia occidentalis</i> , <i>Pittosporum viridiflorum</i> , <i>Rhus lucida</i> , etc.) more prominent on the lower slopes and in the valleys. The grass component is also better developed here, often with <i>Themeda triandra</i> and occasionally <i>Tristachya leucothrix</i> prominent. Succulents (e.g. <i>Aloe ferox</i> , <i>Glottiphyllum depressum</i> , <i>Haworthia cymbiformis</i> , <i>Haworthia scabra</i> , etc.) are abundant on rocky outcrops and in the Renosterveld. One of these, an unusual white-flowered <i>Trichodiadema</i> (<i>T. mirabile-orientale</i> complex) may be endemic here.

Very small percentages of Kouga Grassy Fynbos and Outeniqua Waboomveld are protected within statutory conservation areas (Table 2). De Vlucht Sandolien-Renosterveld is not formally protected but the inclusion of this endangered vegetation unit within PNR will make a significant contribution towards its conservation (Table 2).

Main threats to the vegetation in the greater area include alien invasive vegetation and too frequent fires. Alien infestations within the property and greater area will negatively influence the hydrological processes in the area if not managed correctly. Too frequent fires will negatively impact on the current vegetation as listed as well as the invasive alien plants on the property and greater area. To date 180 plant species have been identified on PNR of which 7 are listed on the Red Data List according to Raimondo *et al.* (2009) (Appendix II).

Table 2. Habitat variants identified by Vlok *et al.* (2008) and the contribution of formally protected areas and towards their conservation.

Habitat variant	Conservation status	Original extent (ha) of habitat variant	Area (ha) of habitat variant protected by SANParks	Area (ha) of habitat variant protected by CapeNature	Total area (ha) under formal protection	Percentage (%) of habitat variant under formal protection	Area (ha) of habitat variant contained in the PNR	Percentage (%) that protection of habitat variant will be expanded by inclusion of the PNR
De Vlucht Forest Waboomveld	Least Threatened	861.45	0.00	199.64	199.64	23.18	26.13	3.03
De Vlucht Sandolien Renosterveld	Endangered	1197.46	0.00	0.00	0.00	0.00	116.65	9.74
Keurbooms River & Perennial stream	Least Threatened	6989.16	1130.17	58.22	1188.38	17.00	235.66	3.37
Kouga Grassy Fynbos	Vulnerable	19494.75	944.83	50.88	995.71	5.11	98.52	0.51
Outeniqua Waboomveld	Least Threatened	7916.70	0.00	106.81	106.81	1.35	99.49	1.26
Tsitsikamma Mesic Proteoid Fynbos	Least Threatened	25604.25	6749.43	111.45	6860.88	26.80	513.13	2.00

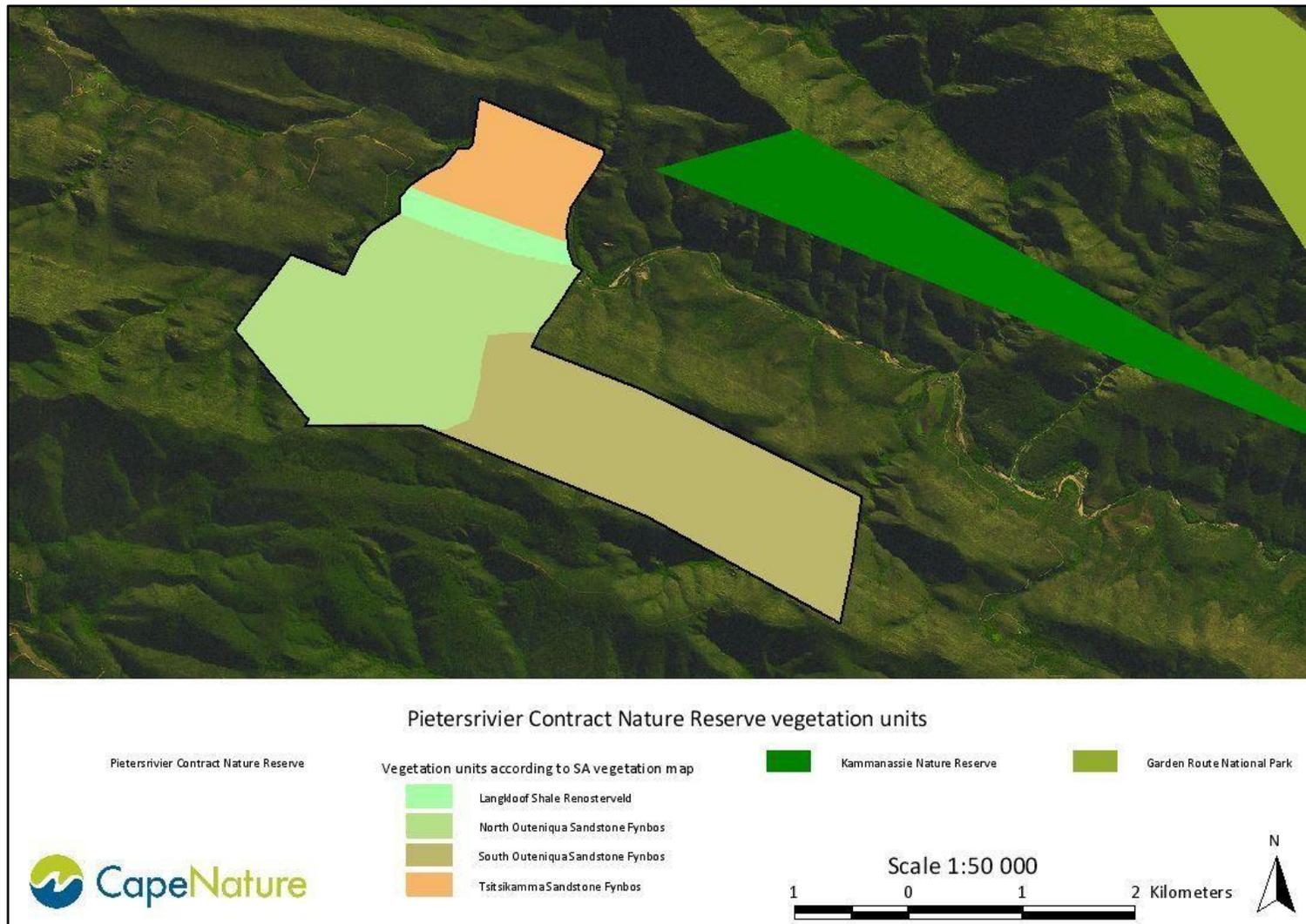


Figure 5. Vegetation units on Pietersrivier Nature Reserve according to the identification in *The vegetation of South Africa, Lesotho and Swaziland* by Mucina and Rutherford (2006).

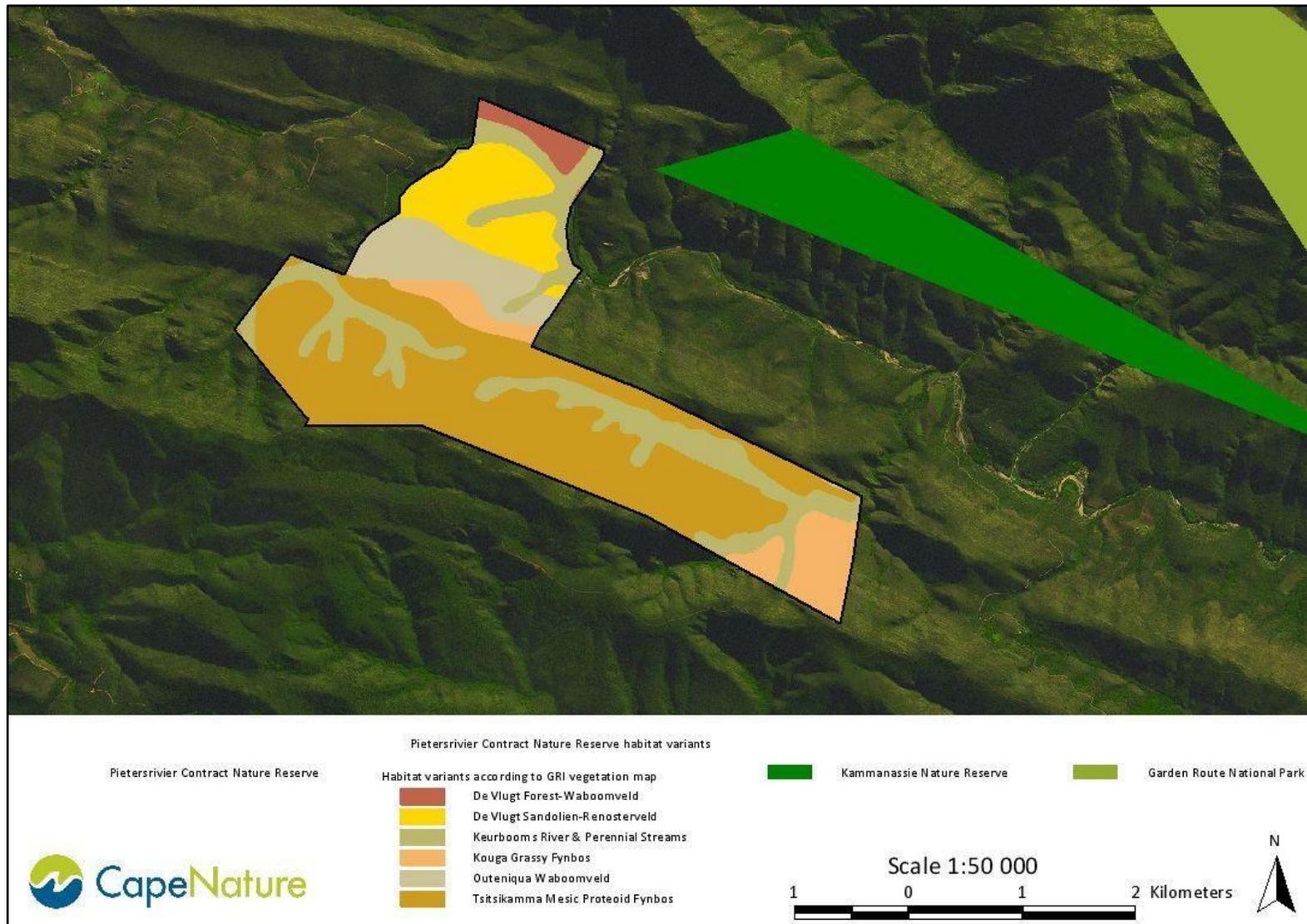


Figure 6. Habitat variants on Pietersrivier Nature Reserve as identified by Vlok *et al.* (2008) in *A vegetation map for the Garden Route Initiative*.

2.5.2 Mammals

There are few transformed areas on the property and as a result the ecological processes are largely intact providing habitat for a wide variety of mammalian species. Apex predators such as the Leopard (*Panthera pardus*) and Caracal (*Caracal caracal*) have been observed. Small to medium sized antelope species occur naturally in this area. These include Bushbuck (*Tragelaphus scriptus*), Grey rhebuck (*Pelea capreolus*), Common duiker (*Sylvicapra grimmia*) and Cape grysbok (*Raphicerus melanotis*) are known to occur in the area. Bushpig (*Potamochoerus larvatus*) and Cape clawless otter (*Aonyx capensis*) are also present.

2.5.3 Birds

Provisional distribution data from the current South African Bird Atlas Project 2 administered by the Animal Demography Unit at the University of Cape Town has shown that 114 bird species have been identified in the 5 x 5 minute pentad (3345_2305) that covers PNR and the surrounding area (Appendix III). A bird list can be viewed at the Middle Keurbooms Conservancy's Information Centre in De Vlugt. Mr. Meyer has created a short bird walk with signage that includes a list of bird species which birders would be able to observe during their walk.

2.5.4 Amphibians and reptiles

Currently a complete list of the amphibian and reptile species occurring in the area is not available. However, snakes such as Puffadders (*Bitis arietans*) and Boomslang (*Dispholidus typus*) have been encountered by the management authority, as well as various species of frogs.

2.5.5 Invertebrates

It is currently unknown what invertebrates species occur in the area and more information is required.

2.5.6 Aquatic organisms

Limited information on aquatic organisms is available at present for this area.

2.6 Socio-political context

The PNR is located in an isolated community with little agricultural potential considering the present day economic climate and compared to the past. Some of the surrounding properties are used for farming with livestock, of which some are economic units. Due to the scarcity of water a few farms are able to produce crops such as potatoes and fruit orchards that need irrigation. Given the above factors the area is lightly populated and most people poor. However, some properties are owned by absentee landowners who are more affluent.

The Kliprivier NGK Primary school is located approximately 20km from PNR and houses 36 learners from the farming community. The school is well-supported by the local farm owners but the parent body is in no position to support the school financially.

Excluding the Burchell route on PNR there are at least three tourist attractions/facilities in the area that offer visitors accommodation. These are Outeniqua Trout Lodge, Keurbooms River Game Trails and Cloud Cottage. In addition, the scenic Prince Alfred's pass between Knysna and Avontuur is very popular amongst tourists with a small shop and tea garden providing some economic benefit for the settlement of De Vlugt.

2.7 Past landuse history

The properties of PNR was mainly used to farm with cattle and peaches, however various other crops were also grown from time to time. Table 2 gives a summary of the landuse on PNR from 1955 – 1985. In 1971 Mr. Katot Meyer's father passed away after which his uncle leased the farm to keep cattle until he also passed away in 1976. After this Mr. Meyer managed the farm from Stellenbosch and Middelburg which, due to the distance, turned out to be impractical. A farm labourer and his family lived on the property during this time until 1996. Amongst other things his main priority was to clear alien invasive vegetation during his tenure. Mr. Meyer enjoyed his work as an extension officer at the Department of Agriculture and retired during 1996. He settled on Oudtshoorn and established a guest house by using low cost building methods. He was now in a better position to manage Pietersrivier and established 5 ha of Avocado trees. Due to the cooler climate it was hoped to provide the market at a later stage (about two months) compared to the main Avocado producing areas of the old Transvaal Province. Mr. Meyer seized the Avocado cultivation after four years as browsing by game such as bushbuck made it impossible to establish young Avocado trees without erecting electrical fencing around the orchards which proved too expensive to implement.

After the failed Avocado cultivation Mr. Meyer decided to focus on conservation and ecotourism by developing the "Burchell Route" along the historical track that the naturalist and explorer William John Burchell followed across Pietersrivier during 1814. The historical significance of the property has been used as a selling point that focuses on a specific tourist market ensuring a unique experience for the explorer of today that makes use of a modern "wagon" (4 x 4 vehicle). The idea was to give visitors a pioneer feeling by having them experience the daily livelihoods and history of the earlier inhabitants of the De Vlugt area and more in particular the route Burchell followed in 1814. Mr. Meyer did a lot of work himself to maintain the various tracks and establish pioneer camps and shelters. The other main infrastructure on the property such as the laying of the waterpipe from the Pietersrivier, construction of dams and building of sheds was done by Mr. Meyer and his sons and at times with

labour from other areas such as Middelburg. Mr. Meyer enjoys the physical labour as it also keeps him fit and also means that the costs of maintaining the property is relatively low.

From photos, previous experience and comparing PNR with neighbouring properties Mr. Meyer is of the opinion that sheep farming was intensively practised in the past that caused some deterioration of the natural veld and influenced natural game populations. Indiscriminate fires to stimulate the growth of grasses for grazing were actively practised until at least 1970. However, Mr. Meyer has experienced that since 1970 the natural veld on Pietersrivier has improved as his father and he practised sensible veld management by rotational grazing and sustainable stocking rates during the period when they kept cattle. The opposite is true regarding alien invasive vegetation that has increased dramatically during the last 40 years which amongst other things has seriously invaded the Keurbooms River. According to Mr. Meyer the Keurbooms River used to be in a pristine state with an abundance of Keurboom (*Virgilia divaricata*) along the section that runs through PNR. Past agricultural landuse practices are summarized in Table 2 and the location indicated in Figure 7.

Table 3. Summary of past agricultural landuse practices on PNR from 1955 – 1985.

Period	Activity/Land use
1955 -1977	Cattle farming. Property divided into 12 camps with natural water sources used as water pints. Additional feeding was produced by irrigating Kikuyu grass patches from small dams
1971 - 1980	Dryland cultivation of wheat produced on shale soils with contour mounds maintained. The winter rains became less and the wheat production was seized. The old lands were taken over by Renosterbos after which it was mowed and were pioneer grasses established
1955 - 1985	A peach orchard was located along the banks of the Keurbooms River and was flood-irrigated. At a later stage water was relayed from the Pietersrivier into holding dams that could supply lower lying irrigation systems with enough pressure.
1960	The Department of Forestry established a Pine plantation as part of a strategy to ensure long term wood supplies. These trees were never harvested and with time spread into the adjacent area. From approximately 1980 a labourer was tasked to eradicate Hakea and Pine trees.
± 1950	Black wattle trees were established to supply firewood. As the population grew fewer firewood was available.
± 1960	Apples, Apricots and Potatoes was produced during this time

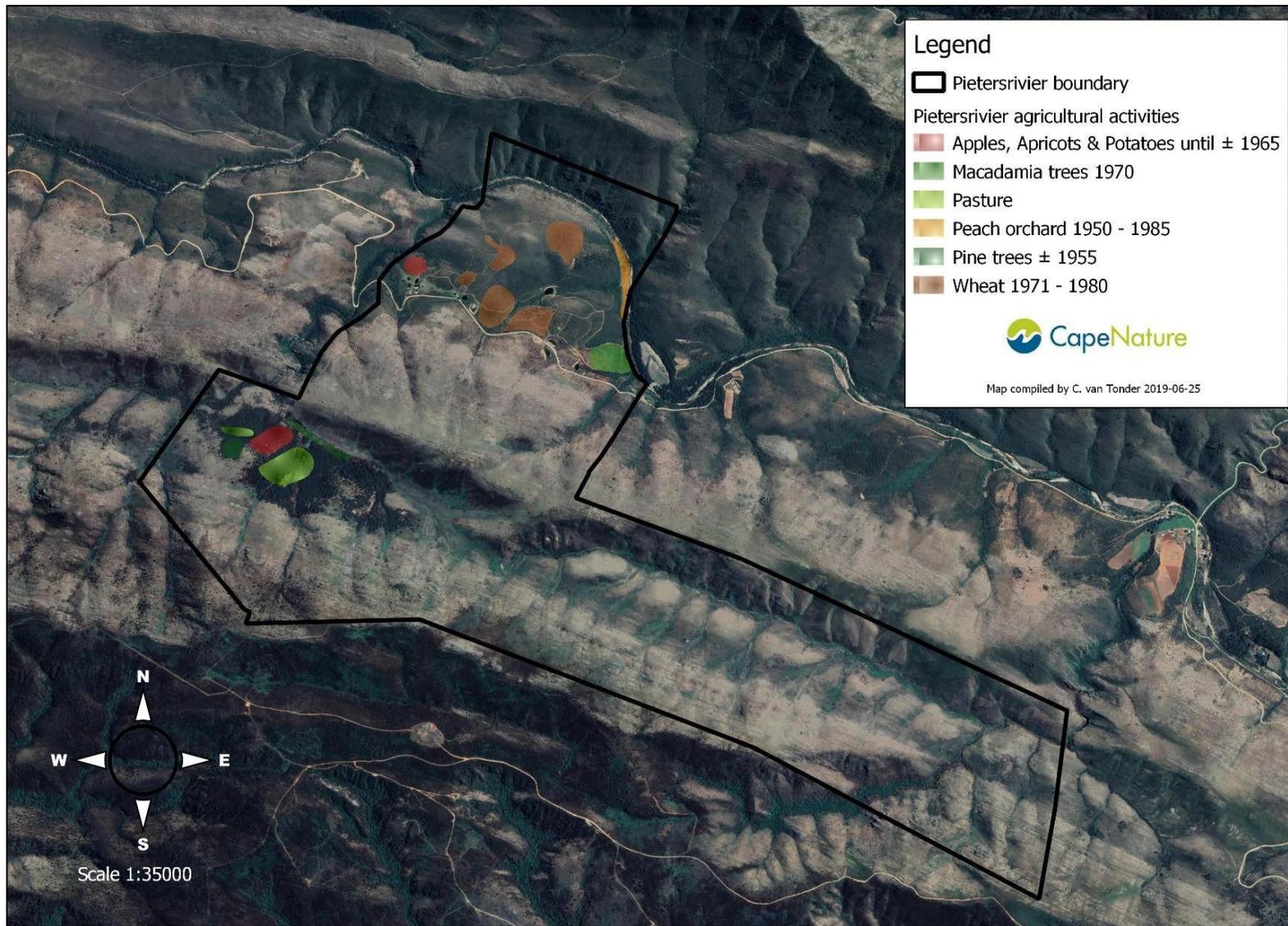


Figure 7. Locations of past agricultural landuse practices on Pietersrivier Nature Reserve.

2.8 Facilities and infrastructure

2.8.1 Roads, tracks and trails

Figure 8 shows the location of roads, tracks and trails on Pietersrivier Nature Reserve. Approximately 2.3 km of PNR is dissected by a district road DR01660 that intersects the R339 connecting Avontuur with Knysna over the Prince Alfred's pass (Figure 8). Mr. Meyer does maintenance on this part of the road himself and mainly focus on drainage. Garden Route District Municipality's Technical Services: Roads Division has cleared alien invasive vegetation along this road and follow up work is done by Mr. Meyer.

A 4 x 4 route follows Burchell's original ox wagon track of 1814 and is approximately 20 km in length that takes about 5 hours to complete. It links to a historic sled track was established by hunters and farmers approximately 20 years before Burchell's visit to the area and connects various livestock posts (shelters). Around 1920 various tracks were established for accessing the different parts of the property. This was after "Gal se pas" was constructed by Mr. Katot Meyer's grandfather in approximately 1905. A small network of paths exists around the homestead, dams and old lands near the Rondekop camp that were re-opened during 1980.

Three circular hiking trails mostly follow existing roads and tracks and are located around the Rondekop camp, Gal se pas and Boegoeskraal respectively. The Boegoeskraal route is designed with bird watching in mind and goes through a patch of indigenous forest. A technical mountain bike trail of approximately 25 km is laid out from the Rondekop campsite and follows the various jeeptracks and a section of the Burchell route. Fire access paths are kept open but are seldom used requiring little maintenance.

No new tracks are planned and maintenance is done by Mr. Meyer himself. In areas where the tracks traverse fine-textured soil water relay contours are established and holes are filled with rocks. Tracks located on Sandstone derived soils are brushpacked with vegetation obtained from the opening of existing paths and holes are filled with rock. The section of the track that goes up Gal se pas is maintained by constructing water relay humps with shale. Seepage areas are avoided and certain sections of tracks are not used when heavy rains occur.

2.8.2 Campsites and shelters

PNR contains three campsites located at Rondekop, Boegoeskraal and Jaggakamma indigenous forest respectively (Figure 9). None of the campsites have electricity. The Rondekop campsite is located in a

small kloof with water being supplied from one of the nearby dams. It contains two showers that have a unique paraffin water heating system that has been invented by the owner. The campsite also has

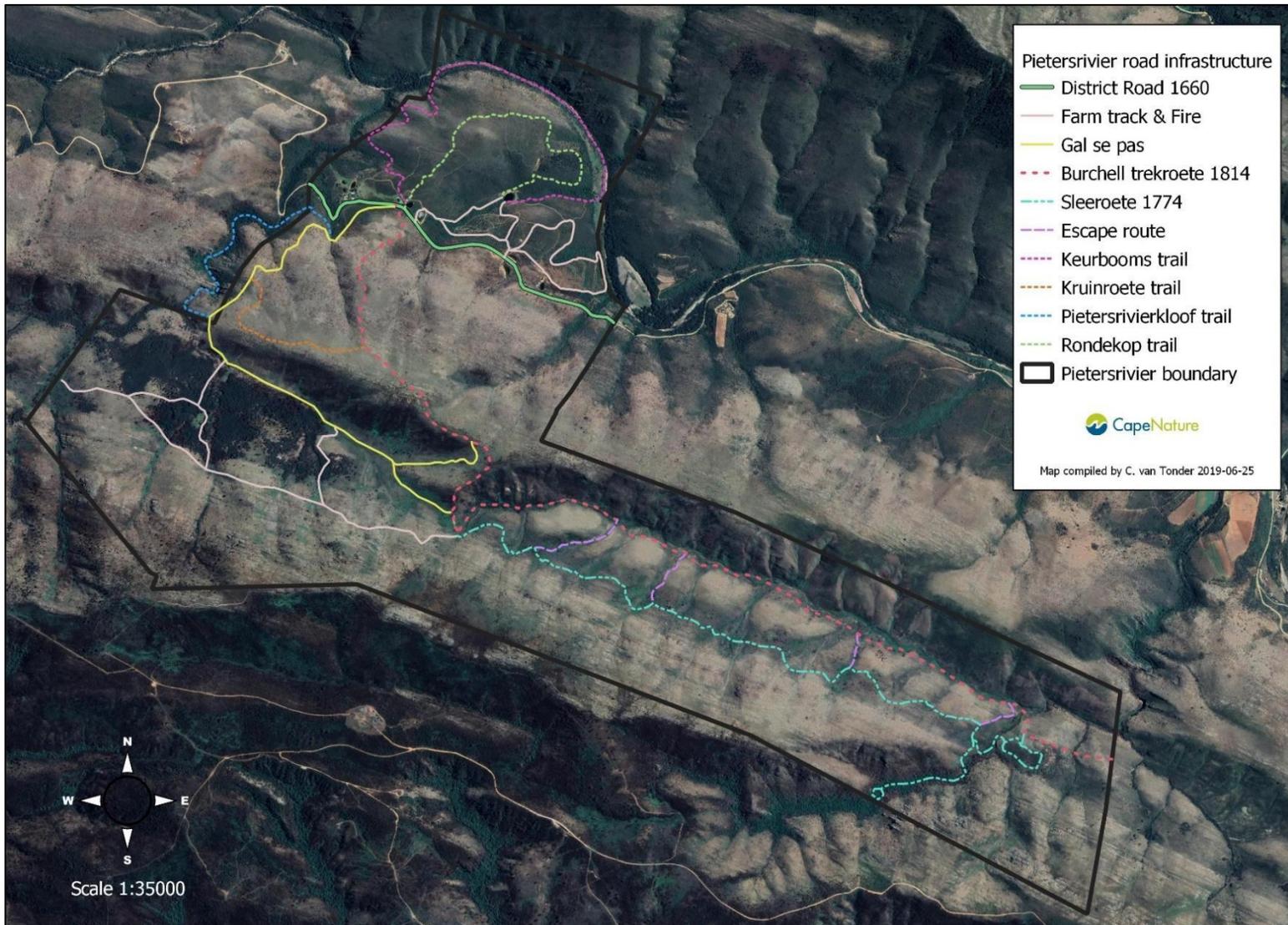


Figure 8. Road infrastructure on Pietersrivier Nature Reserve.

two flush toilets with a french drain sewage disposal system. The Boegoeskraal and Jaggakamma campsites are smaller than the Rondekop camp. The owner visits PNR approximately 20 times a year staying on PNR for a maximum of 6 days per visit. During these visits the owner does maintenance of the campsites, roads, water supply, tracks and trails while visiting tourists are also given a guided experience (Refer to section 7). The owner is considering establishing another campsite along the bank of the Keurbooms River in close proximity to the Rondekop camp.

There are at least six old ruins that served as livestock posts in the past. The management authority intends to restore these shelters by reconstructing the roof, build a sand floor, build a small dam and install a toilet and shower at each. Most of the shelters will serve as overnight accommodation for hikers with one shelter intended for accommodation by users of the 4 x 4 Burchell pioneer route.

2.8.4 Old homestead

The original homestead is still used by the management authority but is not utilized by tourists (Figure 9). Three sheds surround the homestead where old vehicles and equipment are stored.

2.8.5 Water supply

There are nine earth dams on PNR that are fed from a pipeline that originates from the Pietersrivier. The water is extracted from a small weir and gravity fed to the various dams through a 80 mm diameter polyethylene pipe. PNR is registered with the Department of Water Affairs as a water user for the irrigation of 5 ha of which approximately only 10% is used annually. There are no servitudes or sharing agreements with neighbours regarding water use.

2.8.6 Signage

As PNR will focus on ecotourism with associated camp sites, trails and tracks as and has a public road dissecting the property, various signage will be erected. These will include the following:

- Marking of the different veld types along the Burchell Route
- Marking of the trees in the Jaggakamma forest which were used for constructing ox wagons
- Marking of the Kloof Route
- Marking of the Sled Route
- PNR signage along public road on both side of PNR
- Information board displaying names and logos involved in the catchment area of the PNR

2.8.7 Fencing

Fencing around PNR is not maintained except where neighbours are keeping livestock, e.g. the eastern boundary of the property with Mr. C. van Rooyen (Farm 0/267).

2.8.8 Macadamia nut orchard

An irrigated Macadamia nut orchard consisting of approximately 70 trees was established in 1987 and is located near the Rondekop camp (Figure 9). The owner intends to keep and maintain the orchard but is not planning to expand it. It is currently not fenced and has no invasive potential.

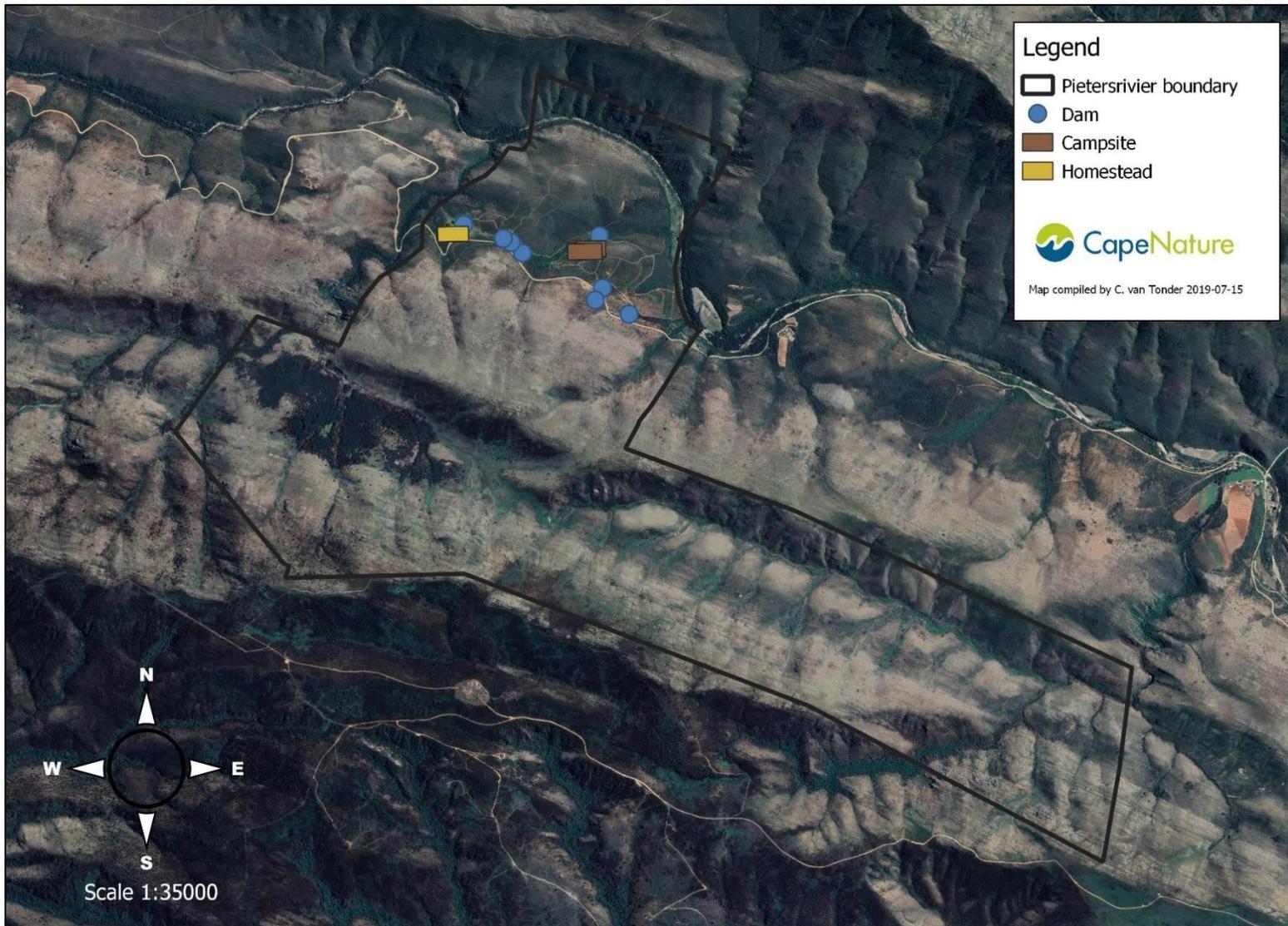


Figure 9. Building and dam infrastructure on Pietersrivier Contract Nature Reserve.

2.9 Summary of management issues, opportunities and challenges

2.9.1 Fire management

Fynbos is a fire-prone ecosystem with fire having played a major role in its plant reproductive evolution (Le Maitre and Midgley, 1991). Fynbos plants are adapted to survive fires in various ways which mainly include plants resprouting from a woody rootstock after fire; those that can reproduce only from seed after fire (non-sprouters or often also called reseeder); those that occur in fire-exclusion areas by growing in areas that do not experience regular fires such as on rocky outcrops (Esler *et al.* 2014). Reseeding Fynbos species need fire to stimulate germination through exposure to smoke and heat as well as to clear areas to facilitate the process of establishing suitable germination sites (Le Maitre and Midgley, 1991). Fire is also essential for resprouters and geophytes (commonly known as bulbs) in order to stimulate fresh sprouting and in some cases flowering. Fynbos plants relying on reseeding survival strategies may be lost from the ecosystem if the fire return period is too short resulting in reproductively immature species not having a chance to reproduce (Van Wilgen *et al.* 1991). Similarly, fire return periods that exceed the lifespan of reseeding species, that typically have short-lived seed reserves, could also result in their local extinction. Fire frequency, season and intensity all thus have an influence on the survival of Fynbos plants with their different life histories which have implications for using fire as a management tool for biodiversity conservation outcomes.

As PNR is relatively small fire events through natural fire ignitions (e.g. lightning strikes) are basically precluded from entering due to the fragmentation of the landscape as a result of agricultural lands. Prescribed burning is widely recognized as the fire management option used for establishing a mosaic of vegetation ages and to spread the work load in Fynbos ecosystems (Van Wilgen *et al.* 1994). The ideal size for prescribed burns in a Fynbos ecosystem is 300 – 500 ha (Esler *et al.* 2014) which can normally be completed within a day. Important to remember however is that implementing any prescribed burning will be determined by a combination of ecological, practical and monetary considerations.

It is suggested that prescribed burns must exceed 50 ha for it to have any positive outcome for plant diversity. Burning a vegetation unit smaller than this would enable seed-eating rodents to cover most of the burnt area in search of nutritious seeds and in the process decimate seed reserves (Esler *et al.* 2014). As most Fynbos species cannot survive without establishing within the first year after fire (Esler *et al.* 2014), it is essential to burn as large an area as possible to prevent mortality of seedlings as a

result of grazing by large herbivores such as antelope and domestic stock. For these reasons properties that also contain CBA's and that are currently outside the PNR will be taken into consideration when planning prescribed burns.

Prescribed burning will be integrated with fire risk management in the PNR. Infrastructure such as houses and fire risk management features (e.g. firebreaks) that are present and will have to be protected or maintained in order to address both objectives. Prescribed burning would need to be planned in collaboration with neighbours and the Fire Protection Association and Municipality.

See Figure 10 for a map of the fire history of the area. A very large section of the property burnt in Oct 2018, leaving only the section north of the Joncksrus road unburnt.

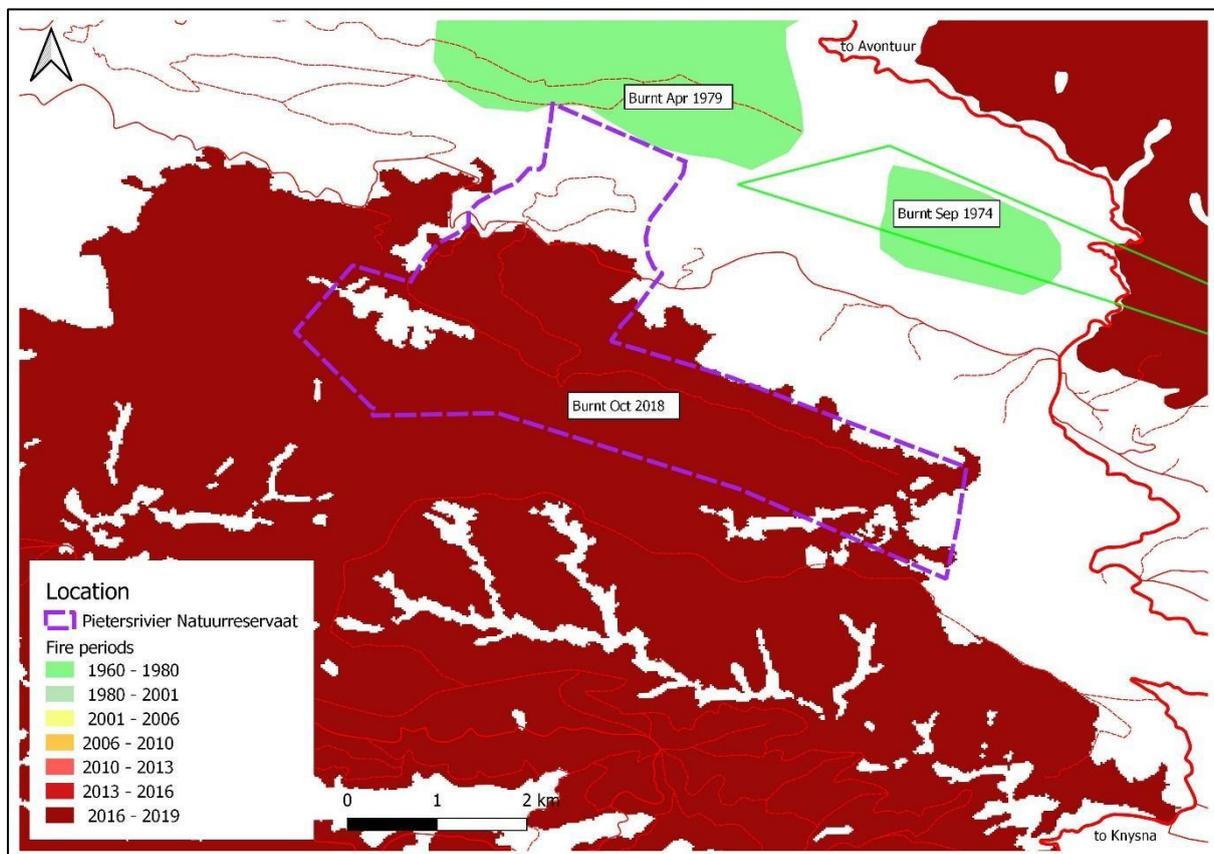


Figure 10. Fire history of Pietersrivier Nature Reserve and its surrounds.

2.9.2 Invasive alien vegetation eradication

The spread of alien invasive plant species have had a massive impact on native ecosystems on a global scale (Mack et al. 2000) with the Fynbos Biome not being an exception. Over the last 200 years alien invasive vegetation have proliferated to such an extent in the Fynbos Biome that in many instances it

had caused the reduction of streamflow, changes in fire intensity and changes to the species composition of fauna and flora (Richardson et al. 1991, Richardson and Van Wilgen, 2004). Infestations of alien vegetation lead to increased fuel loads that in the event of a fire, results in higher intensity fires that can destroy even flora with special adaptations such as underground lignotubers and thick bark. Furthermore, it is known that native Fynbos regenerates poorly after fire in areas with dense *Acacia saligna* infestations (Musil, 1993) and that dense alien infestation reduces cover and species diversity of Fynbos (Richardson et al. 1989, Holmes and Cowling, 1997). Likewise, fauna are also negatively affected by these hotter fires that could enter rock crevices and burrows used for shelter by animals such as reptiles and small mammals (Coetzee, 2005).

The eradication of alien invasive vegetation in the PNR is seen as one of the major management interventions that are required. CapeNature completed a clearing plan for PNR that is included under section 5.2.1.2 - Invasive vegetation management of this management plan. Each year areas are prioritized for clearing in relation with available funding. The invasive alien vegetation clearing plan will be integrated with the fire management plan. Therefore, areas identified for prescribed burns will be cleared of alien vegetation at least 18 months before. This would ensure that fire is used as a tool to destroy alien vegetation that is regenerated from the seed bed. However, when a wildfire occurs and alien vegetation have not been cleared then the fire would act as a 'clearing event' and then follow up clearing work should be planned based on the invasive alien species that have been recorded on the property, taking into consideration the pre-fire densities and ages. For example, *Acacia mearnsii* and other *Acacia* species should be prioritised for clearing within 6 months and a year after the fire – ideally twice in the first year after the fire, as they are very aggressive. Clearing of *Hakea* and *Pinus* species could be planned for 3 years after fire. They should be cleared before they start flowering or producing cones for the first time. Where possible, local labour will be used for the clearing operations and work will be done according to Working for Water standards.

2.9.3 Game management

No game introductions are intended. The naturally occurring game listed in section 2.5.2 are classified as *res nullius* (belong to nobody) will remain as is on PNR. No hunting will be allowed.

2.9.4 Tourism

Ecotourism is a key activity that will take place on PNR. PNR will focus on a specific tourist market by providing a unique pioneer experience by using 4 x 4 vehicles. The "Burchell Route" follows the

historical ox wagon track that Burchell traversed across Pietersrivier during 1814. A plaque commemorating W.J. Burchell is situated 50 m from the main road at the twin dams. The site is developed into an interpretative display showing the route W.J. Burchell followed, indigenous trees used for the construction of ox wagons and information brochures on W.J. Burchell. are available to tourists. A bust of W.J. Burchell is situated along the Burchell Route. What sets the Burchell Route apart from other similar ox wagon routes across the Cape Fold Mountains is the fact that it has remained intact. It is also one of the few remaining ox wagon routes that can be followed on the original tracks the other being near Graaff-Reinett and Alicedale. Burchell was the only explorer/naturalist that passed through the area. Each visiting group will be educated regarding the history, culture and conservation of the area. A demonstration of what an ox wagon looked like and consisted of is given by showing a smaller built-to-scale ox wagon replica. The different wood types are pointed out and the trees of which each was sourced marked along the route. After leaving PNR Mr. Meyer hopes that each visiting group would leave with the following:

- How to operate a 4 x 4 vehicle in a sensitive area
- How to tread lightly and leave as little as possible after visiting natural areas
- An understanding of the significance of managing water catchment areas
- A sense of where we come from and how the country was explored two centuries ago
- Ideas on how each person can contribute towards conserving water and energy

Associated activities include hiking, birding and mountain-biking. Accommodation is provided in the form of campsites at Rondekop, Boegoeskraal and the Jaggakamma indigenous forest. It is planned to construct six rustic shelters at the old ruins to which visitors can hike to overnight and in the process experience the existence of the livestock herders of the past. In addition, Mr. Meyer has an informal agreement to cooperate with four other landowners in the area that are able to provide luxury accommodation to PNR visitors thereby contributing towards tourism in the greater area. The scenic Prince Alfred pass constructed by the famous Thomas Bain in 1865 is a very popular activity that is within easy reach from PNR. Booklet on history of the Prince Alfred's Pass by Ilse Meyer is available for sale at the Rondekop camp's information centre.

2.9.5 Cultural, historical and archaeological management

At least three sites with San rock art occur on PNR. As a rule these are not indicated to visitors as Mr. Meyer is concerned about its preservation. Not much information is available as to the age of the paintings and which clan inhabited the area.

Six ruins are scattered across the PNR landscape where livestock farmers were settled in the past. At some of the ruins remains of old lands, threshing floors and water-furrows are still noticeable. Mr. Meyer wants to reconstruct some of the ruins to provide basic shelters for visitors that want to overnight. The historic track followed by Burchell per ox wagon is one of the main historic features of PNR and along the route old sled paths can be noticed. This is the only section of Burchell's wagon trail that is open to the public. In addition a small mountain pass named Gal se pas after Mr. Meyer's grandfather, is located on the eastern side of the Pietersrivier and can also be accessed by hikers and 4 x 4 vehicle. All the afore-mentioned structures and tracks have historic importance and are very much part of the pioneer theme of PNR.

2.9.6 Security and safety

Although farm attacks has increased percentage wise in South Africa, the permanent residents in the Middle Keurbooms Conservancy assist each other by keeping a watchful eye on infrastructure and suspicious people that enter the area. Access to PNR will be granted to family, friends and visiting tourists as per the Protected Area Management Agreement. This will be by appointment only with the management authority.

2.9.7 Community participation

Due to the low population, a fair degree of absentee land ownership and the current day marginal agricultural potential of the area an intensive labour force is absent. The property forms part of the Middle Keurbooms Conservancy and contributes to community involvement by raising awareness of the conservation projects taking place. Visitors to PNR are encouraged to contribute towards the "Pietersrivier Water Neutral Project" by clearing a demarcated area of alien invasive vegetation in order to reduce their "water footprint".

3. Strategic management framework

3.1 Vision

To manage and protect the natural ecosystems and rich biodiversity that are entrusted to the care of Pietersrivier Nature Reserve and to re-establish the atmosphere and feeling of the times when the pioneers such as the first inhabitants, naturalists and hunters lived in the area allowing the people of South Africa to re-experience this bygone era.

3.2 Management Objectives

Objective 1. Conserve biodiversity and allow natural processes to take place on PNR

Objective 2. Conserve historical and cultural heritage of PNR

Objective 3. Manage sustainable ecotourism

3.3 Spin-offs

- Contribute towards providing a sustainable yield of freshwater for the Bitou community from the Jaggakamma, Pietersrivier and Keurbooms River systems
- Conservation of veld types and species unique to the De Vlucht area and Keurbooms River system
- Provide job opportunities – contractors that remove alien invasive vegetation
- Contribute towards tourism in the De Vlucht area
- Could form core for expansion of other conservation initiatives
- Focus on the mind change of the visitor to leave the natural environment untouched.

4. Zonation plan

4.1 Zonation for the protected area

The purpose of the zonation of Pietersrivier Nature Reserve is to control the intensity and type of land use within the reserve in efforts to ensure the main goal of biodiversity conservation is met. On this basis, within some zones, the permissible intensity of use will be relatively higher than in others. Two zonation categories are demarcated, namely: 1) Development – Management and 2) Primitive. The zonations and infrastructure are shown in Figure 11.

4.1.1 Development – Management zone

This zonation is limited to the area around the homestead that consists of several stores and two uninhabited farmhouses. This zone is mainly used for storing maintenance materials and vehicles. This area is used by the management authority to camp when performing work on the property or during times when visitors are present at the campsite. It is off limits to visitors. Appendix IV details general principles applicable to this zone.

4.1.2 Primitive zone

The rest of Pietersrivier Nature Reserve is zoned as Primitive. This zone is the best fit due to limited visitor use and infrastructure development and the management of the property for biodiversity conservation. Primary uses of this zone include a campsite, hiking trails and a 4x4 route. Appendix IV details general principles applicable to this zone.

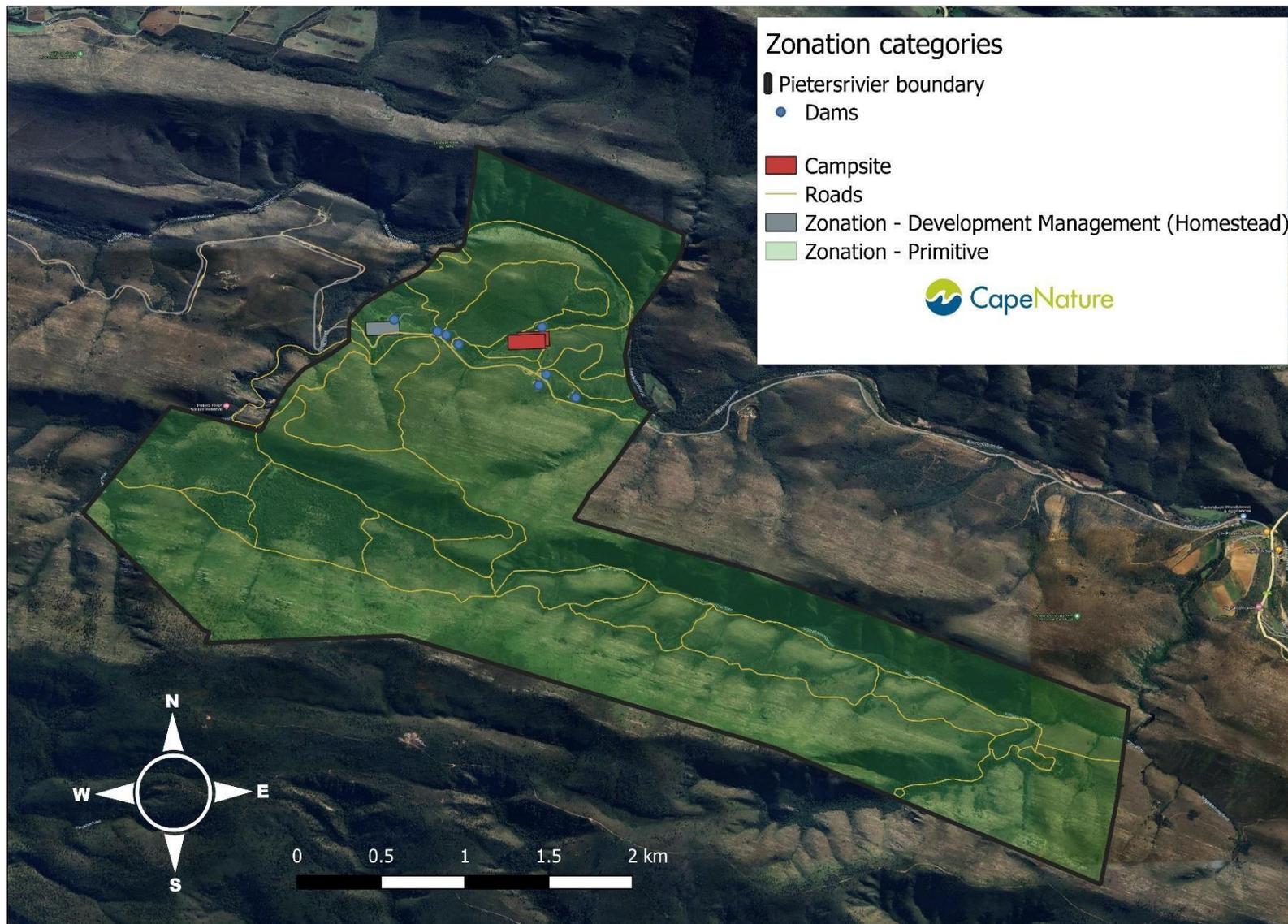


Figure 11. Zonation categories and infrastructure for Pietersrivier Nature Reserve.

4.2 Conceptual development guidelines

Development will be restricted as per the provisions set out in the Protected Area Management Agreement.

5. Operational management framework

5.1 Administrative framework

The owner, Antonie Michaél (Katot) Meyer, will be party to a signed memorandum of agreement with the Provincial MEC and CapeNature CEO in terms of section 23 of NEMPAA to declare the PNR and give consent to be assigned as the management authority for the PNR. Furthermore, the owner has signed a Protected Area Management Agreement with CapeNature on 24 March 2015 that, amongst other things, agree to the objectives of PNR and gives an undertaking by the owner to manage the property exclusively for the purpose for which it was declared and in accordance with the Management Plan. The agreement further specifies that CapeNature shall convene a meeting with the owner on an annual basis to formally review the annual progress towards achieving the management objectives. The agreement also specifies the rights and obligations by the owner in terms of the property.

5.2 Management Programmes

5.2.1 Biodiversity management

5.2.1.1 Fire management

Fire is the critical driver of ecological processes in fynbos. Without fire, fynbos would not be able to persist. The way in which fynbos species regenerate after fire, determines the composition of fynbos vegetation after a fire. By controlling fire rotation, season of burn and/or the intensity of fires, the composition of fynbos vegetation after a fire can be changed. In developing a fire management strategy for the site, the following guiding principles as given by (Esler *et al.* 2014) should be adhered to:

- The location of the property in relation to the neighbouring properties and landscape must be considered, especially in terms of burnable vegetation, veld age, fire return interval, fire history, and causes of ignition; as well as existing infrastructure and current landuse practices.
- Since this property is a protected area, the protection of biodiversity and ecological processes need to be key factors informing fire management. Ask the question if 50% of the individuals of the slowest maturing non-sprouting species (e.g. *Protea neriifolia*) in a population have flowered 3 times and set adequate seed. See Figure 12 & 13 for veld age map.
- Plan the blocks to be burnt – keep these blocks as large as possible, preferably 300-500 ha. Ideally a patch mosaic of burnt and un-burnt areas should be maintained.
- Consider working with neighbouring landowner(s) in planning fire management blocks and make sure to involve the FPA, District Municipality, Local Municipality, CapeNature, Dept of Agriculture, etc. for their inputs.
- Burning and fire management must be undertaken in a safe manner that is legally compliant with the National Veld and Forest Fire Act (No.101 of 1998).
- Ensure that firebreaks are in place and maintained, that fire fighting equipment (bakkie-sakkie, fire beaters, hoses, water, etc.) is available and in working order and people are trained.
- Be mindful that if part of the veld is infested with invasive alien plants follow up eradication work will have to be planned within six months after the fire for blackwattle (*Acacia mearnsii*), rooikrans (*Acacia cyclops*) and Port Jackson (*Acacia saligna*), and three years for hakea (Hakea species) or pines (*Pinus* species).

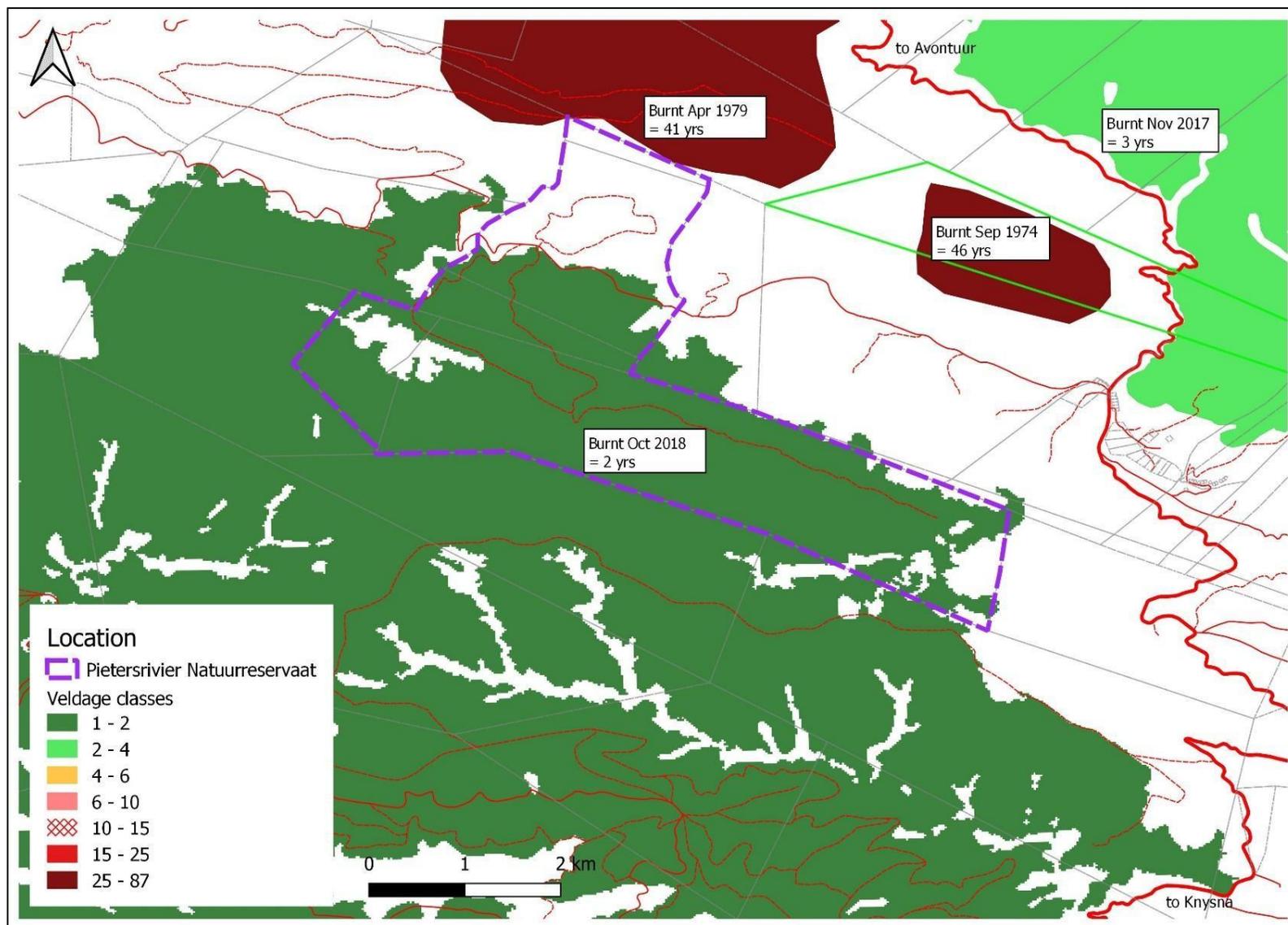


Figure 12. The 2019 veld age map with veld age classes for Pietersrivier Nature Reserve and neighbouring properties.

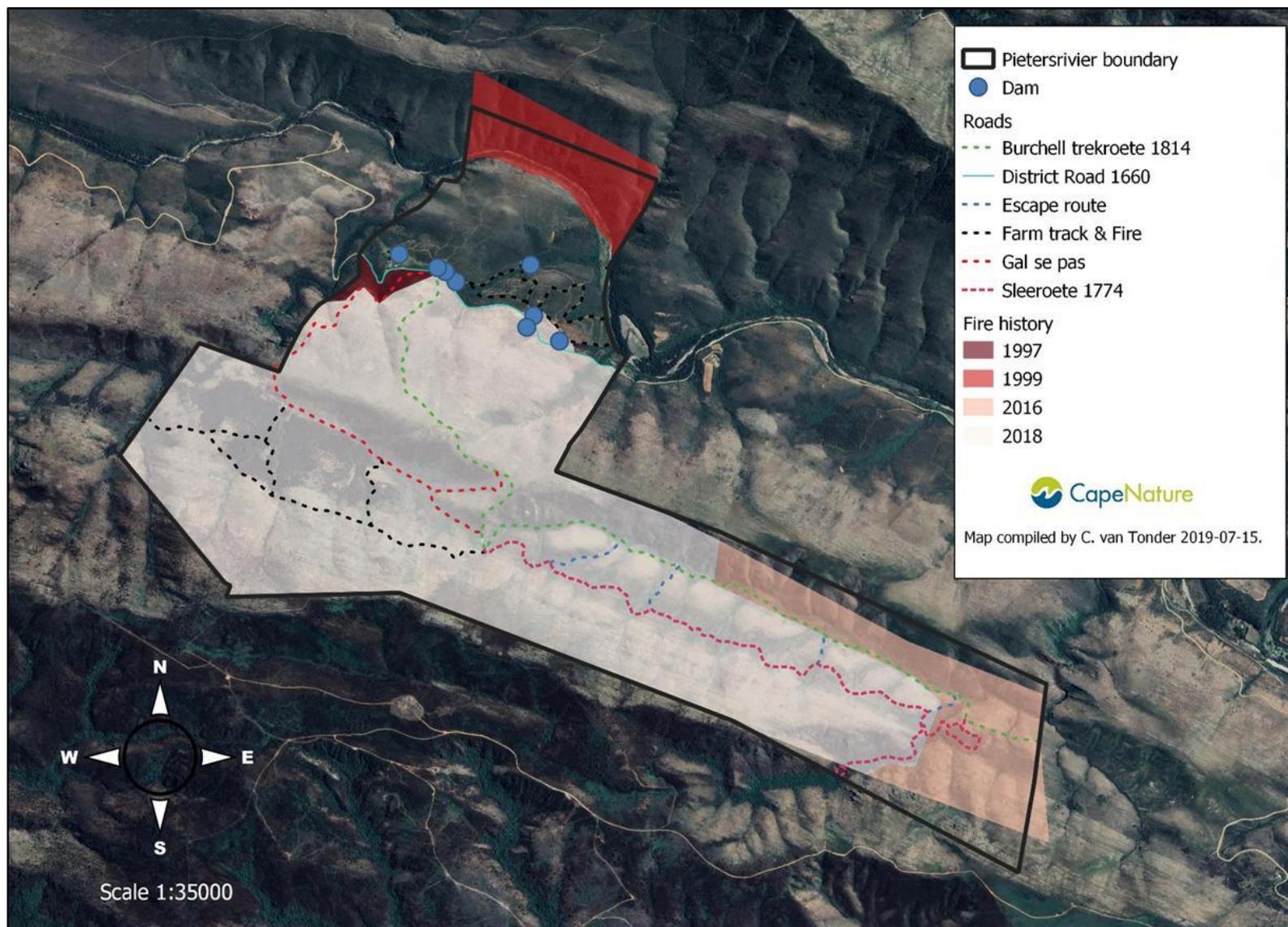


Figure 13. Fire management map for Pietersrivier Nature Reserve showing veld age and locations of dams roads.

5.2.1.1 FIRE MANAGEMENT

<p>Objectives</p> <ul style="list-style-type: none"> · To ensure conservation of species and processes by maintaining and improving ecosystem functioning. · To implement effective Integrated Catchment Management. · To allow for natural fire processes to occur without impacting on safety and infrastructure. 			
Key Deliverables	Management Activities	Responsibility	Timeframe
Reduce/Prevent the Spread of Fires.	<p>Construct Priority Firebreaks according to Schedule.</p> <p>Negotiate Firebreak Agreement with Neighbours.</p> <p>Fuel Reduction around Infrastructure to Minimise Risk.</p> <p>Conduct Pre-Fire Season Fire Audit.</p> <p>Mapping of all Fires and Capture on GIS.</p>	Management Authority	Annually
Maintain Partnerships to Improve Fire Management.	<p>Attend Local FPA Meetings.</p> <p>Maintain Firebreak Agreements with Neighbours.</p> <p>Attend Pre-Fire Season meetings with local Fire & Rescue Service.</p>	Management Authority	Annually

<p>Determine and Implement Thresholds of Potential Concern.</p>	<p>Conduct Permanent <i>Protea</i> Plot Monitoring if possible.</p> <p>Conduct Post-Fire <i>Protea</i> Regeneration Monitoring within 18 months after a fire.</p> <p>Set and Monitor Thresholds of Potential Concern.</p>	<p>CapeNature</p>	<p>Annually</p>
<p>Reduce Wildfires due to Human Negligence.</p>	<p>Create Fire Awareness Programme for Members and Staff.</p>	<p>Management Authority</p>	<p>Annually</p>

5.2.1.2 Invasive vegetation management

A listed invasive species means any species, which is listed in terms of section 70 of the Biodiversity Act, whose establishment and spread occurs outside of its natural distribution range. In undertaking invasive plant control, the following guiding principles will be adhered to:

Invasive plant control will require an ongoing programme that prioritises key infestations along water courses, drainage lines and upper catchment areas.

Initial clearing efforts should focus on containing infestations that are most likely to spread into new areas.

All follow-up requirements must be strictly adhered to otherwise the problem will be exacerbated.

Strategic partnerships and poverty relief programmes such as the Working for Water programme should be utilised.

Figure 14 shows the alien invasive vegetation management map including management units. Table 4 gives species and density per management unit.

5.2.1.2 INVASIVE VEGETATION MANAGEMENT

<p>Objectives</p>	<ul style="list-style-type: none"> · To enhance biodiversity protection and conservation. · To ensure conservation of species and processes by maintaining and improving ecosystem functioning. · To implement effective Integrated Catchment Management. 		
<p>Key Deliverables</p>	<p>Management Activities</p>	<p>Responsibility</p>	<p>Timeframe</p>
<p>Eradicate Alien and Invasive Species</p>	<p>Identify and Map all Alien Invasive Flora Within or Threatening the Reserve.</p> <p>Compile a Management Unit Clearing Plan.</p> <p>Identify Areas in Maintenance Phase.</p> <p>Eradication and Control of Infestations where necessary</p>	<p>Management Authority</p>	<p>Annually</p>
<p>Implement Biological Control</p>	<p>Identify Potential Biological Control Sites and Prioritise Accordingly.</p> <p>Map and Update Biological Control Sites.</p> <p>Implement New and Supplement Existing Biological Control.</p>	<p>CapeNature</p>	<p>Ongoing</p>

	<p>Monitor Success of Biological Control.</p> <p>Ensure Accurate Record keeping of Biological Control Data.</p> <p>Ensure Biological Control Site Security.</p>		
<p>Prevent Further Introduction of Aliens</p>	<p>Ensure Surrounding Landowners are aware of Relevant Legislation.</p>	<p>Management Authority</p>	<p>Ongoing</p>

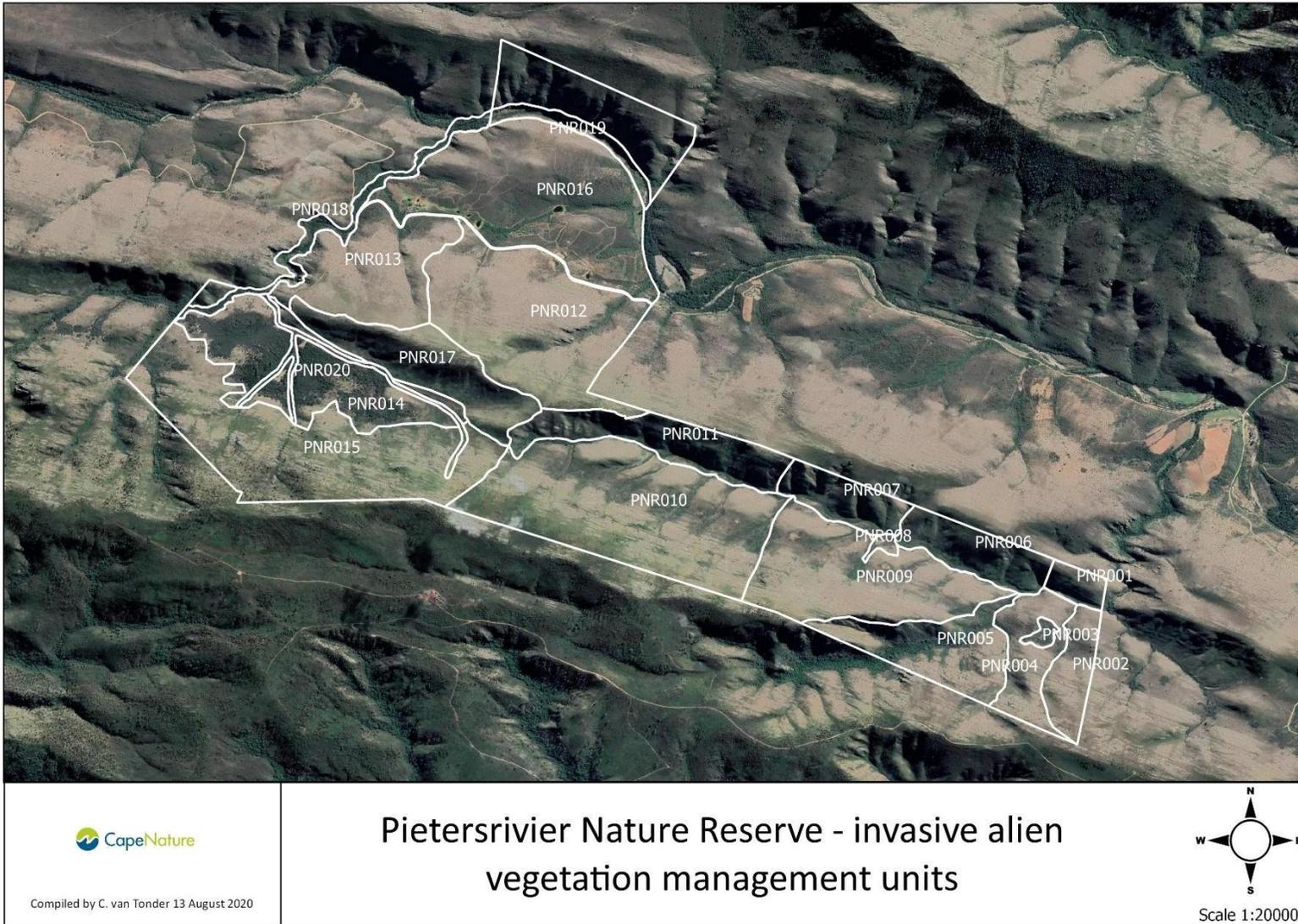


Figure 14: Invasive alien vegetation management map showing management units on Pietersrivier Contract Nature Reserve.

Table 4. Alien species, density and clearing history per management unit on PNR.

Compartment no.	Hectares	Species 1 Name	Species 1 Age/Size	Species 1 Density (actual %)	Species 1 Clearing Method	Species 2 Name	Species 2 Age/Size	Species 2 Density (actual %)	Species 2 Clearing Method	Total Density (Average %)	Clearing Stage	Date of clearing
PNR003	2.879	<i>Acacia mearnsii</i>	Adult	40	cut-stump treatment					40	3rd Follow up	12/2019
PNR004	30.643	<i>Acacia mearnsii</i>	Young	15	cut-stump treatment					15	2nd Follow up	09/2017
PNR001	9.237	<i>Pinus pinaster</i>	Young	2	cutting or slashing					2	1st Follow up	03/2012
PNR005	48.290	<i>Acacia mearnsii</i>	Young	2	cut-stump treatment	<i>Pinus pinaster</i>	Adult	2	felling	4	1st Follow up	03/2012
PNR008	2.205	<i>Acacia mearnsii</i>	Young	30	cut-stump treatment	<i>Acacia cyclops</i>	Young	50	cutting or slashing	80	Initial	04/2015
PNR006	31.709	<i>Hakea sericea</i>	Seedling	10	cutting or slashing	<i>Acacia cyclops</i>	Young	50	cutting or slashing	60	Initial	04/2015
PNR009	89.025	<i>Pinus pinaster</i>	Adult	20	felling					20	Initial	04/2015
PNR007	24.910	<i>Hakea sericea</i>	Seedling	15	cutting or slashing					15	Initial	04/2015
PNR011	47.268	<i>Pinus pinaster</i>	Young	10	felling	<i>Hakea sericea</i>	Seedling	30	cutting or slashing	40	Initial	04/2015
PNR010	146.413	<i>Pinus pinaster</i>	Adult	20	felling					20	Initial	04/2015
PNR012	117.644	<i>Hakea sericea</i>	Seedling	30	cutting or slashing	<i>Pinus pinaster</i>	Young	1	cutting or slashing	31		No clearing history
PNR014	93.837	<i>Acacia mearnsii</i>	Adult	70	cut-stump treatment	<i>Pinus pinaster</i>	Adult	20	felling	90		No clearing history
PNR015	140.904	<i>Pinus pinaster</i>	Adult	70	felling					70	Initial	04/2015
PNR013	64.465	<i>Acacia mearnsii</i>	Young	1	cut-stump treatment					1		No clearing history
PNR016	200.000	<i>Pinus pinaster</i>	Young	1	cutting or slashing	<i>Acacia mearnsii</i>	Adult	3	cut-stump treatment	4	2nd Follow up	Approx. 2009
PNR002	22.400	<i>Hakea sericea</i>	Seedling	2	cutting or slashing					2	Initial	03/2012
PNR019	4.500	<i>Acacia mearnsii</i>	Adult	20	cut-stump treatment					20	4th Follow up	03/2020
PNR018	7.500	<i>Acacia mearnsii</i>	Adult	80	cut-stump treatment					80	Initial	03/2020
PNR017	53.900	<i>Acacia mearnsii</i>	Young	20	cut-stump treatment					20		No clearing history
PNR020	6.000	<i>Acacia mearnsii</i>	Young	30	cut-stump treatment					30	Initial	03/2015

5.1.2.3 Wildlife Management

To promote the conservation of indigenous fauna as an important component contributing to and maintaining ecosystem functioning.

Small antelope (Cape Grysbok, Common (Grey) Duiker, Bushbuck and Vaal (Grey) Rhebok) occur naturally in the area, and move freely between farms. There is currently no need to manage these populations.

No game introductions are intended. The naturally occurring game listed in section 2.5.2 are classified as *res nullius* (belong to nobody) will remain as is on PNR. No hunting will be allowed.

5.1.2.3 WILDLIFE MANAGEMENT			
Objectives	<ul style="list-style-type: none"> · To enhance biodiversity protection and conservation. · To ensure conservation of species and processes by maintaining and improving ecosystem functioning. · To implement effective Integrated Catchment Management. 		
Key Deliverables	Management Activities	Responsibility	Timeframe
Prevent the Introduction of Alien Species	Formulate Policy regarding Domestic Animals in the Reserve. No Introduction of Alien Fish Species into River Systems.	Management Authority	Ongoing
Control Alien and Invasive Species	Identify the Occurrence of Alien Fauna on PNR. Monitor Populations of Alien Fauna on the Reserve.	Management Authority	Ongoing

	<p>Implement Control Measures where appropriate.</p> <p>Measure Success of Control Methods utilised.</p>		
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5.2.1.4 Erosion Prevention and Control

In addressing soil erosion, the following guiding principles should be adhered to:

- Areas impacted by soil erosion should be stabilised and re-vegetated with indigenous plant species to prevent the spread of listed invasive plant species.
- Areas susceptible to soil erosion, or showing early signs of soil erosion such as loss of vegetation cover, must be managed to prevent soil erosion.

5.2.1.4 EROSION PREVENTION AND CONTROL			
Objectives	<ul style="list-style-type: none"> · To identify areas where soil erosion occurs · To prioritize and plan for erosion control/mitigation measures · To implement erosion/mitigation control measures and evaluated its effectiveness. 		
Key Deliverables	Management Activities	Responsibility	Timeframe
Prevent and Mitigate Soil Erosion	Conduct a Soil Erosion Assessment Map Erosion Sites and Ensure Photographs are available. Compile an Erosion Maintenance Plan. Monitor the effectivity of the Erosion Control Mitigation. Monitor Cost Effectiveness of Maintenance. Monitor Site Recovery	Management Authority	Annually

	Conduct a Roads and Footpath Assessment.		
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5.1.2.5 Monitoring and Baseline Data Collection

Information on the locality of Rare, Endangered and Endemic species is necessary to ensure effective management and monitoring of populations. This objective aims to improve the biological knowledge base through the implementation and promotion of effective baseline data collection and research opportunities.

5.1.2.5 MONITORING AND BASELINE DATA COLLECTION

<p>Objectives</p>	<ul style="list-style-type: none"> · To manage biodiversity knowledge to ensure effective conservation management. · To implement measures to ensure resilience and persistence of biodiversity in light of climate change. · To ensure the implementation of effective conservation management interventions. · To ensure conservation of species and processes by maintaining and improving ecosystem functioning. 		
<p>Key Deliverables</p>	<p>Management Activities</p>	<p>Responsibility</p>	<p>Timeframe</p>
<p>Compile Ecological Plan of Operations and Ecological Matrix</p>	<p>Compile and Ecological Plan of Operations.</p> <p>Collate all relevant Monitoring and Research Protocols and Data Sheets.</p> <p>Develop and Implement an Approved Ecological Matrix.</p>	<p>CapeNature</p>	<p>Annually</p>
<p>Create a Biodiversity Resource Inventory</p>	<p>Prioritise Species for inclusion on the Ecological Matrix.</p> <p>Compile and Implement the Ecological Matrix.</p> <p>Collect Specimens and Submit to CapeNature Scientific Services.</p>	<p>CapeNature</p>	<p>Annually</p>

	Analyse data, re-assess and implement Adaptive Management Strategies.		
Implement Monitoring Programme	<p>Review Monitoring Protocols.</p> <p>Identify Monitoring Needs of PNR in consultation with CapeNature.</p> <p>Establish Indicators for Monitoring.</p> <p>Implement Monitoring Activities as per Ecological Matrix.</p> <p>Report on Monitoring Activities as per Ecological Matrix.</p> <p>Analyse data, re-assess and implement Adaptive Management Strategies.</p> <p>Implement Monitoring Programmes as per Ecological matrix.</p>	CapeNature	Annually

5.2.1.6 Biodiversity and security

Develop an integrated security strategy for the Nature Reserve. Access to the Nature Reserve needs to be controlled and conditions of entry for visitors into the Nature Reserve should be clearly stipulated on signboards at access points.

5.2.1.6 BIODIVERSITY SECURITY			
Objectives	<ul style="list-style-type: none"> · To enhance biodiversity protection and conservation. · To ensure conservation of species and processes by maintaining and improving ecosystem functioning. 		
Key Deliverables	Management Activities	Responsibility	Timeframe
Improved security and safety of the biodiversity assets on the Nature Reserve	<p>Ensure Notarial Deed with surveyor diagram and title deed restrictions are registered with the Notary and Surveyor General against the property</p> <p>Ensure Conservation Area is rezoned to appropriate conservation zoning, e.g. Open Space III</p> <p>Ensure appropriate signage at access points.</p>	CapeNature	Once off

5.2.2 Tourism development

In developing tourism within the biodiversity stewardship site, the following guiding principles should be adhered to:

- Tourism products must be appropriate to the site’s values and must not threaten its biodiversity or ecological function.
- In developing tourism products, requirements for environmental authorisation must be considered and adhered to.
- Tourism products should be designed to capitalise on the unique beauty and biodiversity features of the site.
- Tourism products should be developed in response to tourism market demands and opportunities within the site and should be carefully assessed to determine their viability.

5.2.2 DEVELOPMENT OF TOURISM OPPORTUNITIES			
Objectives	<ul style="list-style-type: none"> · To evaluate potential tourism opportunities. · To implement effective management systems. · To ensure legal compliance and implementation of authorised development plans. 		
Key Deliverables	Management Activities	Responsibility	Timeframe
Development of tourism opportunities that generate revenue for the Nature Reserve	<p>Planning and development of hiking routes, mountain bike trails, and basic facilities to cater for visitors to the nature Reserve.</p> <p>Trail running tracks with 10 km and 30 km options.</p> <p>Development of a business plan for tourism accommodation facilities.</p>	Management Authority	As required

5.2.3 Operational Management

5.2.3.1 Legal Compliance

Through the management authority of the biodiversity stewardship site, the management authority has been mandated to enforce laws related to the conservation of the site, which prohibit particular activities. In fulfilling this role, the managers of PNR will adhere to the following guiding principles:

- Law enforcement efforts should be coordinated with the relevant authorities including CapeNature and the South African Police Service in addressing offences and breaches of the law.
- Law enforcement at the site will be undertaken through surveillance, monitoring and appropriate reaction in the event of an offence.

5.2.3.1 LEGAL COMPLIANCE			
Objectives	· To ensure legal compliance to all relevant legislation and policies.		
Strategic Outcome	Management Activities	Responsibility	Timeframe
Ensure that all legal requirements are met.	<p>All development needs to be done according to the NEMA principles and follow the applicable legislation and procedures of all relevant stakeholders.</p> <p>All water management within the Reserve must comply with the National Water Act (No 36 of 1998).</p> <p>Abstraction of water from water sources originating in the Reserve</p>	Management Authority	Ongoing

	must not affect the biodiversity of the Reserve		
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5.2.3.2 Management Effectiveness

5.2.3.2 MANAGEMENT EFFECTIVENESS			
Objectives	· To implement effective management systems.		
Strategic Outcome	Management Activities	Responsibility	Timeframe
Annual audit completed. Auditing systems inform management	Conduct annual audits. Implementation, annual review and update of management plan Compile detailed workplan identifying specific targets for achieving management	CapeNature	May

5.2.3.3 Infrastructure development and management

In order for PNR to operate appropriately, adequate infrastructure need to be developed and maintained both for management and tourism purposes. In addressing infrastructure needs at the site, the following guiding principles will be adhered to:

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

5.2.3.3 INFRASTRUCTURE			
Objectives	<ul style="list-style-type: none"> · To ensure the implementation of effective conservation management interventions. · To enhance biodiversity protection and conservation. · To ensure conservation of species and processes by maintaining and improving ecosystem functioning. 		
Strategic Outcome	Management Activities	Responsibility	Timeframe
All infrastructures on the Reserve is adequately maintained.	Develop and implement a scheduled maintenance programme to maintain facilities and infrastructure in a condition that meet relevant environmental, health and safety requirements.	Management Authority	Ongoing

5.2.3.4 Management of cultural, historical and archaeological assets

Entrance to the reserve is regulated to bookings only, and the reserve does not have exceedingly high visitor numbers. Thus no major management actions are currently deemed necessary to preserve cultural, historical and archaeological assets. The management authority has had experts in cave art document the paintings.

- Invite experts to document the rock art at any new sites observed.
- Monitor all cultural, historical and archaeological assets to ensure no vandalization and/or unnatural degradation of the sites.

5.2.3.4 MANAGEMENT OF CULTURAL, HISTORICAL AND ARCHEOLOGICAL ASSETS			
Objectives	· Preservation of cultural, historical and archaeological assets		
Strategic Outcome	Management Activities	Responsibility	Timeframe
Preservation of cultural, historical and archaeological assets	Catalogue rock art sites and monitor all cultural, historical and archaeological assets.	Management Authority	Ongoing

6. Monitoring and reporting

Monitoring and reporting is a critical component of the adaptive management cycle. It enables the effective assessment of management interventions and, if necessary, can be used to direct modifications of management in an effort to achieve the outcomes required.

6.1 Annual monitoring

The annual monitoring schedule should be designed to monitor the implementation of aspects of the management plan. It should be designed to be straightforward and relatively easy to implement by on-site staff.

Records should be maintained of key management interventions and of problem events or incidents such as uncontrolled access, poaching, illegal plant collection or uncontrolled/arson fires.

Scientific monitoring programmes may be established to monitor specific management interventions such as measures for the protection of flagship species. Most of the outcomes of the monitoring process will be captured in an annual report, which will be used to inform the following year's annual plan of operation.

6.2 Annual protected area management plan implementation review

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

- Determine how effectively the management plan has been implemented.
- Assist in determining the focus for the annual plan of operation and the setting of appropriate time frames and budgets.
- Enable effective adaptive management by identifying changes and modifying management interventions.
- The audit will form the basis of the management plan review. This should include records of recommendations for update/changes to the annual revision of the management schedules as well as the five-year plan.

6.3 Management plan review

On a 5-yearly basis, this Management Plan should be reviewed and adjusted where necessary. To achieve this, the following questions (and others as needed) should be addressed:

1. Did this Management Plan make a meaningful contribution to management of the PNR?
2. Were individual management prescriptions realistic and achievable? Were they written unambiguously or was there room for misunderstanding?
3. Were budgets for each management activity realistic? Were the allocated budgets too much or too little?
4. Were sufficient staff members of the right qualifications allocated to each management activity?

There will be some overlap between the review and the audit and they should therefore be done on the same day, by the same team

7. Costing plan

The costing plan relates management actions to budget requirements that are ultimately needed to implement the management plan. The costing plan shown in Table 3 has been extrapolated from information obtained from the management authority regarding detailed management activities over a one year period. The information is based on work done during 20 visits per year with each visit lasting approximately 6 days. This excludes funding used from external sources.

Table 5. Cost per management action and person days for Pietersrivier Nature Reserve over a one year period.

Management action	Person days (12 hour day at R150 per day)	Total (R)
1. Clearing of alien invasive vegetation		
Follow up in road reserve. ± 2.3 km	5	750
Follow up in nbals after initial clearing by contractors	15	2250
Initial clearing in low density nbals	10	1500
Buffer strip around boundaries. ± 22 km	15	2250
Subtotal	45	6750
2. Tourism		
Maintenance of Burchell route and camp sites (brushcutting and erosion control)	10	1500
Improvements (signage)	3	450
Reception of visitors (campfire stories, briefing at start of route, assistance en route, guided walks)	20	3000
Maintenance of old ruins (Cleaning and opening access roads)	15	2250
Restoration of old ruins (fit roof, fireplace, toilet and shower)	20	3000
Subtotal	68	10200
3. Fire management		
Maintenance of firebreaks and access paths	10	1500
Subtotal	10	1500
4. Infrastructure management		
Maintenance of waterpipe from Pietersrivier	5	750
Subtotal	5	750
5. Maintenance of equipment	10	1500
1 x Massey Ferguson tractor 165, blade & brushcutter (1980)		
1x Massey Ferguson tractor 135, blade and scrub (1966)		
1 x Land Rover 109 4 x 4		
1 x Land Rover Defender		
1 x Hook plough		
1 x Lister generator with alternator and electrical appliances		
2 x trailers		
4 x Chainsaws		
1 x Brushcutter		

Saws, Spades and handsaws		
Subtotal	10	1500
6. Running costs		
20 x trips to PNR per year (last about 6 days per trip) @ 300 km per round trip		
R1 per km for fuel (300 x 1 x 20)		6000
R2 per km for maintenance (300 x 2 x 20)		12000
Food and protective clothing (20 x R600)		12000
Maintenance and repair		2000
Massey Ferguson 165 tractor		1500
Chainsaws and brushcutter		2000
Pipeline		
Subtotal		35500
TOTAL	138	56200

8. References

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9. Appendices

Appendix I – Proclamation Gazette Notice

Appendix II

Plant species list for Pietersrivier Contract Nature Reserve (Nomenclature follows that of Germishuizen and Meyer, 2003).

Family	Scientific name	Common name	Common name Afrikaans	Red data status
AIZOACEAE	<i>Carpobrotus deliciosus</i>	Sour fig	Suurvy	Least Concern
AIZOACEAE	<i>Carpobrotus edulis</i>	Sour fig	Suurvy	Least Concern
AIZOACEAE	<i>Erepsia aristata</i>			Rare
AMARYLLIDACEAE	<i>Boophone disticha</i>	Bushman Poison Bulb	Boesmangifbol	Declining
ANACARDIACEAE	<i>Harpephyllum caffrum</i>	Sour Plum	Wilde Pruim	Least Concern
ANACARDIACEAE	<i>Laurophyllus capensis</i>	Iron Martin	Ystermartiens	Least Concern
ANACARDIACEAE	<i>Searsia laevigata</i>			Least Concern
ANACARDIACEAE	<i>Searsia lucida</i>			Least Concern
ANACARDIACEAE	<i>Searsia rosmarinifolia</i>			Least Concern
	<i>Notobubon laevigatum</i>			Least Concern
APIACEAE	<i>Carissa bispinosa</i>		Noem-noembessie	Least Concern
APOCYNACEAE	<i>Carissa bispinosa</i>	Num-num	Noem-noem	Least Concern
APOCYNACEAE	<i>Gonioma kamassi</i>	Kamassi	Kamassie	Least Concern
AQUIFOLIACEAE	<i>Ilex mitis</i>	Cape Holly	Without	Declining
ARALIACEAE	<i>Cussonia species</i>		Kiepersol	
ASPARAGACEAE	<i>Asparagus capensis</i>	Wild asparagus	Wag-'n'bietjie	Least Concern
ASPARAGACEAE	<i>Asparagus plumosus</i>	Feathery Asparagus	Katstert	Least Concern
ASPARAGACEAE	<i>Asparagus rubicundus</i>			Least Concern
ASPARAGACEAE	<i>Asparagus striatus</i>		Bergappel	Least Concern
ASPHODELACEAE	<i>Aloe arborescens</i>		Kransaalwyn	Least Concern
ASPHODELACEAE	<i>Aloe ferox</i>	Bitter aloe	Bitteraalwyn	Least Concern
ASPHODELACEAE	<i>Bulbine latifolia</i>		Waterglas	Least Concern
ASTERACEAE	<i>Athanasia dentata</i>			Least Concern
ASTERACEAE	<i>Athanasia trifurcata</i>		Klaaslouwbossie	Least Concern
ASTERACEAE	<i>Berkeya sp</i>	N/A	N/A	
	<i>Chrysanthemoides monilifera</i>		Bietou	Not evaluated
ASTERACEAE	<i>Conyza scabrida</i>		Bakbos	Least Concern
ASTERACEAE	<i>Corymbium species</i>			
ASTERACEAE	<i>Cullumia bisulca</i>			Least Concern
ASTERACEAE	<i>Cullumia decurrens</i>	N/A	N/A	Least Concern
	<i>Elytropappus rhinocerotis</i>		Renosterbos	Least Concern
ASTERACEAE	<i>Eriocephalus africanus</i>		Wilde Roosmaryn	Least Concern
ASTERACEAE	<i>Felicia spp</i>			
ASTERACEAE	<i>Gazania krebsiana</i>	Common Gazania	Botterblom	Least Concern
ASTERACEAE	<i>Helichrysum cymosum</i>			Least Concern
ASTERACEAE	<i>Helichrysum felinum</i>			Least Concern
ASTERACEAE	<i>Helichrysum foetidum</i>			Least Concern
	<i>Helichrysum nudifolium var. nudifolium</i>	Hottentot's Tea	Hottentotstee	Least Concern
ASTERACEAE	<i>Helichrysum petiolare</i>		Hottentotskooigoed	Least Concern
ASTERACEAE	<i>Metalasia densa</i>		Blombos	Least Concern
ASTERACEAE	<i>Metalasia massonii</i>			Least Concern
ASTERACEAE	<i>Metalasia pungens</i>			Least Concern
ASTERACEAE	<i>Metalasia species</i>	N/A	N/A	
ASTERACEAE	<i>Othonna parviflora</i>		Bobbejaankool	Least Concern

ASTERACEAE	<i>Pentzia dentata</i>	N/A	Grootskaapkaroo	Least Concern
ASTERACEAE	<i>Senecio burchellii</i>	Burchell-senecio	Geelgibbossie	Least Concern
ASTERACEAE	<i>Senecio crenatus</i>			Least Concern
	<i>Senecio pauciflosculosus/lineatus/hirtifolius?</i>			
ASTERACEAE	<i>Senecio rigidus</i>	Poisonous Ragwort		Least Concern
ASTERACEAE	<i>Seriphium plumosum</i>			Not evaluated
ASTERACEAE	<i>Stoebe capitata</i>		Bergslangbos	Least Concern
	<i>Tarchoanthus littoralis</i>	Camphor bush	Kanferbos	Least Concern
ASTERACEAE	<i>Ursinia trifida</i>	N/A	N/A	Not evaluated
BLECHNACEAE	<i>Blechnum capense</i>			Least Concern
BRASSICACEAE	<i>Heliophila suavissima</i>		Ruikpeperbossie	Least Concern
BRUNIACEAE	<i>Berzelia intermedia</i>		Kolkol	Least Concern
BRUNIACEAE	<i>Brunia noduliflora</i>	Stompiebos	Stompiebos	Least Concern
BUDDLEJACEAE	<i>Buddleja salviifolia</i>	Wild sage	Bergsalie	Least Concern
BUDDLEJACEAE	<i>Nuxia floribunda</i>	Forest Elder	Bosvlier	Least Concern
CAMPANULACEAE	<i>Theilera guthriei</i>			Least Concern
CELASTRACEAE	<i>Cassine peragua</i>	Bastard Saffron	Bastersaffraan	Least Concern
CELASTRACEAE	<i>Cassine peragua</i>	Forest Spoonwood	Bastersaffraan	Least Concern
CELASTRACEAE	<i>Gymnosporia buxifolia</i>	Common Spike-thorn	Gewone Pendoring	Least Concern
	<i>Pterocelastrus tricuspidatus</i>			
CELASTRACEAE	<i>tricuspidatus</i>	Candel wood	Kershout	Least Concern
CONVOLVULACEAE	<i>Cuscuta campestris</i>		Dodder	Not evaluated
				Near
CORNACEAE	<i>Curtisia dentata</i>	Assegai	Assegai	Threatened
CRASSULACEAE	<i>Cotyledon orbiculata</i>	Pig's Ears	Plakkie	Least Concern
	<i>Crassula perforata subsp. kougaensis</i>			Least Concern
CRASSULACEAE	<i>Crassula species</i>			
CRASSULACEAE	<i>Crassula tetragona</i>			Least Concern
CUNONIACEAE	<i>Platylophus trifoliatus</i>	White Alder	Witels	Least Concern
	<i>Widdringtonia nodiflora</i>			Least Concern
CUPRESSACEAE	<i>Cyperus congestus</i>			Least Concern
CYPERACEAE	<i>Tetraria involucrata</i>			Least Concern
DENNSTAEDTIACEAE	<i>Pteridium aquilinum</i>	Bracken fern	Adelaarsvaring	Least Concern
DIPSACACEAE	<i>Scabiosa anthemifolia</i>	Wild Scabiosa	Bitterbos	Least Concern
EBENACEAE	<i>Diospyros dichrophylla</i>		Bloukoolhout/Jakkalstolbos	Least Concern
EBENACEAE	<i>Euclea polyandra</i>		Bobbejaanbessiebos	Least Concern
ERICACEAE	<i>Erica cerinthoides</i>	Fire heath	Rooihaartjie	Least Concern
ERICACEAE	<i>Erica discolor</i>			Least Concern
ERICACEAE	<i>Erica glandulosa</i>			Least Concern
ERICACEAE	<i>Erica leucopelta</i>			Least Concern
ERICACEAE	<i>Erica peltata</i>	Raasheath	Raasheide	Least Concern
ERICACEAE	<i>Erica sessiliflora</i>	Green Heath	Groen heide	Least Concern
ERICACEAE	<i>Erica sparsa</i>			Least Concern
ERICACEAE	<i>Erica uberiflora</i>			Least Concern
EUPHORBIACEAE	<i>Clutia pulchella</i>			Least Concern
EUPHORBIACEAE	<i>Clutia species</i>			
Euphorbiaceae	<i>Rucinus communis</i>	Castor oil plant	Kasterolie	
FABACEAE	<i>Argyrolobium</i>			
FABACEAE	<i>Aspalathus rubens</i>			Least Concern
FABACEAE	<i>Aspalathus species</i>			

FABACEAE	<i>Cyclopia species</i>	Honeybush tea	Heuningbostee	
FABACEAE	<i>Indigofera flabellata</i>			Least Concern
FABACEAE	<i>Otholobium spp.</i>	N/A	N/A	
FABACEAE	<i>Podalyria buxifolia</i>			Least Concern
FABACEAE	<i>Psoralea sp. Nov.</i>			
FABACEAE	<i>Psoralea trullata</i>			Rare
FABACEAE	<i>Tephrosia capensis</i>			
FABACEAE	<i>Virgilia oroboides</i>		Keurboom	Least Concern
GENTIANACEAE	<i>Chironia baccifera</i>		Aambeibos	Least Concern
	<i>Pelargonium</i>			
GERANIACEAE	<i>alchemilloides</i>		Wilde malva	Least Concern
	<i>Pelargonium</i>			
GERANIACEAE	<i>pulverulentum</i>			Least Concern
GERANIACEAE	<i>Pelargonium scabrum</i>		Hoenderspoorbos	Least Concern
	<i>Pelargonium</i>			
GERANIACEAE	<i>schizopetalum</i>		Muishondbos	Least Concern
HAMAMELIDACEAE	<i>Trichocladus crinitus</i>	Black Witch-hazel	Onderbos	Least Concern
ICACINACEAE	<i>Apodytes dimidiata</i>	Bird's-eye Tree	Witpeer	Least Concern
ICACINACEAE	<i>Cassinopsis ilicifolia</i>	Lemon Thorn	Lemoentjedorng	Least Concern
IRIDACEAE	<i>Bobartia aphylla</i>		Biesie	Least Concern
IRIDACEAE	<i>Dietes iridioides</i>	Wild iris	Wilde-iris	Least Concern
IRIDACEAE	<i>Tritoniopsis ramosa</i>			Least Concern
IRIDACEAE	<i>Watsonia fourcadei</i>			Least Concern
LAMIACEAE	<i>Leonotis leonurus</i>	Wild dagga	Wilde dagga	Least Concern
LAMIACEAE	<i>Mentha longifolia</i>	Wild mint	Wildekruisement	Least Concern
LANARIACEAE	<i>Lanaria lanata</i>	Cape Edelweiss	Perdekapok	Least Concern
LAURACEAE	<i>Cassytha ciliolata</i>		Bobbejaantou	Least Concern
LAURACEAE	<i>Ocotea bullata</i>	Black Stinkwood	Swartstinkhout	Endangered
LOBELIACEAE	<i>Cyphia spp.</i>	N/A	N/A	
LOBELIACEAE	<i>Lobelia tomentosa</i>			Least Concern
LOGANIACEAE	<i>Nuxia floribunda</i>	Forest Elder	Bosvlier	Least Concern
MALVACEAE	<i>Grewia occidentalis</i>		Kruisbessie	Least Concern
MALVACEAE	<i>Hermannia species</i>			
MALVACEAE	<i>Sparrmannia africana</i>		Stokroos	Least Concern
MELIACEAE	<i>Ekebergia capensis</i>	Cape Ash	Essenhout	Least Concern
	<i>Montinia</i>			
MONTINIACEAE	<i>caryophyllacea</i>	Wild Clove-bush	Bergklapper	Least Concern
MYRICACEAE	<i>Morella humilis</i>			Least Concern
MYRICACEAE	<i>Morella serrata</i>	Mountain wax berry	Berg-wasbessie	Least Concern
	<i>Rapanea</i>			
MYRSINACEAE	<i>melanophloeos</i>	Cape Beech	Boekenhout	Declining
OROBANCHACEAE	<i>Alectra sessiliflora</i>		Verfblommetjie	Least Concern
				Near Threatened
OXALIDACEAE	<i>Oxalis pendulifolia</i>			
OXALIDACEAE	<i>Oxalis purpurea</i>		Bobbejaansuring	Least Concern
	<i>Pittosporum</i>			
PITTIOSPORACEAE	<i>viridiflorum</i>	Cheesewood	Kasuur	Least Concern
POACEAE	<i>Arundo donax</i>	Spanish Reed	Spaanse riet	Not evaluated
POACEAE	<i>Cynodon dactylon</i>		Kweek	Least Concern
POACEAE	<i>Eragrostis capensis</i>	Cape Love Grass	Hartjiegras	Least Concern
POACEAE	<i>Eragrostis curvula</i>	African Love Grass	Bergsoetgras	Least Concern
	<i>Pennisetum</i>			
POACEAE	<i>clandestinum</i>	Kikuyu	Kikuju	Not evaluated
POACEAE	<i>Themeda triandra</i>		Rooigras	Least Concern
PODOCARPACEAE	<i>Podocarpus latifolius</i>	Real Yellowwood	Opregte Geelhout	Least Concern

POLYGALACEAE	<i>Muraltia spinosa</i>	N/A	N/A	Least Concern
POLYGALACEAE	<i>Polygala fruticosa</i>	Featherdusters		Least Concern
POLYGONACEAE	<i>Persicaria attenuata</i>			Least Concern
PROTEACEAE	<i>Aulax cancellata</i>			Least Concern
PROTEACEAE	<i>Hakea sericea</i>	Silky Hakea	Hakea	
	<i>Leucadendron eucalyptifolium</i>		Geelbos	Least Concern
PROTEACEAE	<i>Leucadendron salignum</i>	N/A	Geelbos	Least Concern
	<i>Leucospermum cuneiforme</i>	Wart-stemmed Pincushion		
PROTEACEAE	<i>Leucospermum royenifolium</i>		Gewone Luisiesbos	Least Concern
PROTEACEAE	<i>Protea cynaroides</i>	King Protea	Koningprotea	Least Concern
PROTEACEAE	<i>Protea lanceolata</i>	Lance-leaved Protea	Smalblaar suikerbos	Least Concern
		Narrow-leaved Sugarbush		
PROTEACEAE	<i>Protea neriifolia</i>		Baardsuikerbos	Least Concern
PROTEACEAE	<i>Protea nitida</i>		Waboom	Least Concern
PROTEACEAE	<i>Protea repens</i>	Common Sugarbush	Suikerbos	Least Concern
PROTEACEAE	<i>Protea vogtsiae</i>			Least Concern
	<i>Knowltonia vesicatoria</i>			
RANUNCULACEAE	<i>Thamnochortus cinereus</i>			Not evaluated
RESTIONACEAE	<i>Phyllica axillaris</i>	None	Geen	Least Concern
RHAMNACEAE	<i>Phyllica burchellii</i>			Least Concern
RHAMNACEAE	<i>Phyllica paniculata</i>		Luisbos	Data deficient
ROSACEAE	<i>Cliffortia cordifolia</i>			Least Concern
ROSACEAE	<i>Cliffortia ruscifolia</i>	Climber's Friend	Doringbossie	Least Concern
ROSACEAE	<i>Cliffortia sp</i>			
ROSACEAE	<i>Cliffortia strobilifera</i>		Kammiebos	Least Concern
ROSACEAE	<i>Rubus species</i>	Bramble	Braam	
	<i>Anthospermum aethiopicum</i>		Katstert	Least Concern
RUBIACEAE	<i>Agathosma capensis</i>		Anysboegoe	Least Concern
RUTACEAE	<i>Agathosma ovata</i>	False Buchu	Bosboegoe	Least Concern
	<i>Coleonema pulchellum</i>			
RUTACEAE	<i>Colpoon compressum</i>	Cape Sumach	Pruimbas	Least Concern
SANTALACEAE	<i>Thesium strictum</i>		Bokbos	Least Concern
SAPINDACEAE	<i>Dodonaea viscosa</i>	Olive	Bosysterhout	Least Concern
SCROPHULARIACEAE	<i>Halleria lucida</i>	Tree Fuchsia	Notsung	Least Concern
SCROPHULARIACEAE	<i>Selago corymbosa</i>	Poverty bush	Bitterblombossie	Least Concern
SCROPHULARIACEAE	<i>Selago species</i>			
THYMELAEACEAE	<i>Gnidia juniperifolia</i>			Least Concern
THYMELAEACEAE	<i>Passerina species</i>			
THYMELAEACEAE	<i>Struthiola argentea</i>	Aandgonna		Least Concern
TYPHACEAE	<i>Typha capensis</i>	Bulrush	Papkuil	Least Concern
VISCACEAE	<i>Viscum capense</i>		Voëlent	Least Concern
VITACEAE	<i>Rhoicissus tomentosa</i>	Common Forest Grape	Gewone Bosdruif	Least Concern

Appendix III

Bird species identified through the South African Bird Atlas Project 2 in 5 x 5 minute pentads 3345_2305 that covers the area in and around Pietersrivier Contract Nature Reserve.

English common name	Afrikaans common name	Scientific name
Apalis, Bar-throated	Bandkeelkleinjantjie	<i>Apalis thoracica</i>
Batis, Cape	Kaapse Bosbontrokkie	<i>Batis capensis</i>
Bishop, Southern Red	Rooivink	<i>Euplectes</i>
Bishop, Yellow	Kaapse Flap	<i>Euplectes capensis</i>
Bokmakierie	Bokmakierie	<i>Telophorus zeylonus</i>
Boubou, Southern	Suidelike Waterfiskaal	<i>Laniarius ferrugineus</i>
Bulbul, Cape	Kaapse Tiptol	<i>Pycnonotus capensis</i>
Bunting, Cape	Rooivlerkstreepkoppie	<i>Emberiza capensis</i>
Buzzard, Jackal	Rooiborsjakkalsvoel	<i>Buteo rufofuscus</i>
Buzzard, Steppe	Bruinjakkalsvoel	<i>Buteo vulpinus</i>
Canary, Brimstone	Dikbekkanarie	<i>Crithagra sulphuratus</i>
Canary, Cape	Kaapse Kanarie	<i>Serinus canicollis</i>
Canary, Forest	Gestreepte Kanarie	<i>Crithagra scotops</i>
Canary, White-throated	Witkeelkanarie	<i>Crithagra albogularis</i>
Chat, Familiar	Gewone Spekvreter	<i>Cercomela familiaris</i>
Cisticola, Grey-backed	Grysrugtinktinkie	<i>Cisticola subruficapilla</i>
Cisticola, Lazy	Luitinktinkie	<i>Cisticola aberrans</i>
Cisticola, Levaillant's	Vleitinktinkie	<i>Cisticola tinniens</i>
Cisticola, Wailing	Huiltinktinkie	<i>Cisticola lais</i>
Coot, Red-knobbed	Bleshoender	<i>Fulica cristata</i>
Cormorant, Reed	Rietduiker	<i>Phalacrocorax africanus</i>
Cormorant, White-breasted	Witborsduiker	<i>Phalacrocorax carbo</i>
Crake, Black	Swartriethaan	<i>Amaurornis flavirostris</i>
Crested-Flycatcher, Blue-mantled	Bloukuifvlieëvanger	<i>Trochocercus cyanomelas</i>
Crombec, Long-billed	Bosveldstompstert	<i>Sylvietta rufescens</i>
Crow, Cape	Swartkraai	<i>Corvus capensis</i>
Cuckoo, Red-chested	Piet-my-vrou	<i>Cuculus solitarius</i>
Dove, Namaqua	Namakwaduifie	<i>Oena capensis</i>
Dove, Red-eyed	Grootringduif	<i>Streptopelia semitorquata</i>
Drongo, Fork-tailed	Mikstertbyvanger	<i>Dicrurus adsimilis</i>
Eagle, Martial	Breekoparend	<i>Polemaetus bellicosus</i>
Eagle, Verreaux's	Witkruisarend	<i>Aquila verreauxii</i>

Eagle-Owl, Cape	Kaapse Ooruil	<i>Bubo capensis</i>
Eagle-Owl, Spotted	Gevlekte Ooruil	<i>Bubo africanus</i>
Fiscal, Common	Fiskaallaksman	<i>Lanius collaris</i>
Fish-Eagle, African	Visarend	<i>Haliaeetus vocifer</i>
Flycatcher, African Dusky	Donkervlieevanger	<i>Muscicapa adusta</i>
Flycatcher, Fiscal	Fiskaalvlieivanger	<i>Sigelus silens</i>
Flycatcher, Spotted	Europese Vlieievanger	<i>Muscicapa striata</i>
Goose, Egyptian	Kolgans	<i>Alopochen aegyptiacus</i>
Grassbird, Cape	Grasvoel	<i>Sphenoeacus afer</i>
Grebe, Little	Kleindobbertjie	<i>Tachybaptus ruficollis</i>
Greenbul, Sombre	Gewone Willie	<i>Andropadus importunus</i>
Guineafowl, Helmeted	Gewone Tarentaal	<i>Numida meleagris</i>
Harrier, Black	Witkruisvleivalk	<i>Circus maurus</i>
Harrier-Hawk, African	Kaalwangvalk	<i>Polyboroides typus</i>
Heron, Black-headed	Swartkopreier	<i>Ardea melanocephala</i>
Honeyguide, Lesser	Kleinheuningwyser	<i>Indicator minor</i>
Hoopoe, African	Hoephoep	<i>Upupa africana</i>
Ibis, Hadeda	Hadeda	<i>Bostrychia hagedash</i>
Kestrel, Rock	Kransvalk	<i>Falco rupicolus</i>
Kingfisher, Brown-hooded	Bruinkopvisvanger	<i>Halcyon albiventris</i>
Kite, Black-shouldered	Blouvalk	<i>Elanus caeruleus</i>
Lapwing, Crowned	Kroonkiewiet	<i>Vanellus coronatus</i>
Lark, Cape Clapper	Kaapse Klappertjie	<i>Mirafra apiata</i>
Longclaw, Cape	Oranjekeelkalkoentjie	<i>Macronyx capensis</i>
Martin, Rock	Kransswael	<i>Hirundo fuligula</i>
Moorhen, Common	Grootwaterhoender	<i>Gallinula chloropus</i>
Mousebird, Red-faced	Rooiwangmuisvoel	<i>Urocolius indicus</i>
Mousebird, Speckled	Gevlekte Muisvoel	<i>Colius striatus</i>
Neddicky	Neddikkie	<i>Cisticola fulvicapilla</i>
Nightjar, Fiery-necked	Afrikaanse Naguil	<i>Caprimulgus pectoralis</i>
Olive-Pigeon, African	Geelbekbosduif	<i>Columba arquatrix</i>
Oriole, Black-headed	Swartkopwielewaal	<i>Oriolus larvatus</i>
Owl, Barn	Nonnetjie-uil	<i>Tyto alba</i>
Paradise-Flycatcher, African	Paradysvlieevanger	<i>Terpsiphone viridis</i>
Pigeon, Speckled	Kransduif	<i>Columba guinea</i>
Pipit, African	Gewone Koester	<i>Anthus cinnamomeus</i>
Pipit, Long-billed	Nicholsonse Koester	<i>Anthus similis</i>
Pipit, Plain-backed	Donkerkoester	<i>Anthus leucophrys</i>

Prinia, Karoo	Karoolangstertjie	<i>Prinia maculosa</i>
Puffback, Black-backed	Sneeubal	<i>Dryoscopus cubla</i>
Quail, Common	Afrikaanse Kwartel	<i>Coturnix coturnix</i>
Raven, White-necked	Withalskraai	<i>Corvus albicollis</i>
Robin-Chat, Cape	Gewone Janfrederik	<i>Cossypha caffra</i>
Rock-jumper, Cape	Kaapse Berglyster	<i>Chaetops frenatus</i>
Rock-Thrush, Cape	Kaapse Kliplyster	<i>Monticola rupestris</i>
Rush-Warbler, Little	Kaapse Vleisanger	<i>Bradypterus baboecala</i>
Saw-wing, Black	Swartsaagvlerkswael	<i>Psalidoprocne holomelaena</i>
Scrub-Robin, Karoo	Slangverklikker	<i>Cercotrichas coryphoeus</i>
Seedeater, Protea	Witvlerkkanarie	<i>Crithagra leucopterus</i>
Seedeater, Streaky-headed	Streepkopkanarie	<i>Crithagra gularis</i>
Siskin, Cape	Kaapse Pietjekanarie	<i>Crithagra totta</i>
Sparrow, Southern Grey-headed	Gryskopmossie	<i>Passer diffusus</i>
Sparrowhawk, Black	Swartsperwer	<i>Accipiter melanoleucus</i>
Sparrowhawk, Little	Kleinsperwer	<i>Accipiter minullus</i>
Sparrowhawk, Rufous-chested	Rooiborssperwer	<i>Accipiter rufiventris</i>
Spurfowl, Cape	Kaapse Fisant	<i>Pternistis capensis</i>
Spurfowl, Red-necked	Rooikeelfisant	<i>Pternistis afer</i>
Starling, Common	Europese Spreeu	<i>Sturnus vulgaris</i>
Starling, Red-winged	Rooivlerkspreeu	<i>Onychognathus morio</i>
Stonechat, African	Gewone Bontrokkie	<i>Saxicola torquatus</i>
Sugarbird, Cape	Kaapse Suikervoel	<i>Promerops cafer</i>
Sunbird, Amethyst	Swartsuikerbekkie	<i>Chalcomitra amethystina</i>
Sunbird, Greater Double-collared	Groot-rooibandsuikerbekkie	<i>Cinnyris afer</i>
Sunbird, Malachite	Jangroentjie	<i>Nectarinia famosa</i>
Sunbird, Orange-breasted	Oranjeborssuikerbekkie	<i>Anthobaphes violacea</i>
Sunbird, Southern Double-collared	Klein-rooibandsuikerbekkie	<i>Cinnyris chalybeus</i>
Swallow, Barn	Europese Swael	<i>Hirundo rustica</i>
Swallow, Greater Striped	Grootstreepswael	<i>Hirundo cucullata</i>
Swamp-Warbler, Lesser	Kaapse Rietsanger	<i>Acrocephalus gracilirostris</i>
Swift, African Black	Swartwindswael	<i>Apus barbatus</i>
Swift, White-rumped	Witkruiswindswael	<i>Apus caffer</i>
Tchagra, Southern	Grysborstjagra	<i>Tchagra tchagra</i>
Thrush, Olive	Olyflyster	<i>Turdus olivaceus</i>
Turaco, Knysna	Knysnaloerie	<i>Tauraco corythaix</i>
Turtle-Dove, Cape	Gewone Tortelduif	<i>Streptopelia capicola</i>
Wagtail, Cape	Gewone Kwikkie	<i>Motacilla capensis</i>

Warbler, Victorin's	Rooiborsruigtesanger	<i>Cryptillas victorini</i>
Waxbill, Common	Rooibeksysie	<i>Rooiborsruigtesanger</i>
Waxbill, Swee	Suidelike Swie	<i>Coccopygia melanotis</i>
Weaver, Cape	Kaapse Wewer	<i>Ploceus capensis</i>
White-eye, Cape	Kaapse Glasogie	<i>Zosterops virens</i>
Wood-Owl, African	Bosuil	<i>Strix woodfordii</i>
Woodpecker, Cardinal	Kardinaalspeg	<i>Dendropicos fuscescens</i>
Woodpecker, Ground	Grondspeg	<i>Geocolaptes olivaceus</i>
Woodpecker, Knysna	Knysnaspeg	<i>Campethera notata</i>
Woodpecker, Olive	Gryskopspeg	<i>Dendropicos griseocephalus</i>

Appendix IV – Zonation categories

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

Zone	Zone Objective	Characteristics	Visitor Activities	Facilities / Infrastructure	Visitor Access	Management Guidelines
Primitive	<p><i>Conservation:</i> To limit visitor use, numbers and infrastructure to minimise impact in sensitive environments.</p> <p>To reduce need for management of users and visitor impacts.</p> <p>Allows for minimal or more intensive biodiversity management intervention.</p> <p>Include extensive areas of sensitive or threatened habitats & species in this low use zone when sites do not meet the criteria for wilderness</p> <p><i>Users:</i> To provide an experience of solitude in natural landscapes with little nearby evidence of human presence.</p> <p>Can provide access to and buffer Wilderness Zones</p>	<p>Intrinsically wild appearance & character.</p> <p>Areas where users will seldom encounter other human groups or presence.</p> <p>Any visible human impact or infrastructure inside the zone is unobtrusive.</p> <p>Human activities outside zone may be audible or visible in places.</p> <p>Areas remote from management centres, or otherwise difficult or expensive to access for management.</p> <p>Areas that might not meet the criteria for Wilderness but can serve as undeveloped visual buffers for Wilderness.</p> <p>Areas that may have natural burning regimes, with no active fire management and road/firebreak infrastructure OR areas that require active fire management to stay within thresholds of concern.</p>	<p>Guided or unguided nature observation</p> <p>Primarily intended for hiking or walking access.</p> <p>Only allows for 4x4 routes and if specifically considered and noted.</p> <p>Only allows for non-hiking accommodation node if specifically considered and noted.</p>	<p>Deviation from the natural and/or pristine state to be minimised¹</p> <p>No visible infrastructure in Wilderness viewsheds.</p> <p>May provide isolated, small, unobtrusive accommodation facilities for up to 16 guests on restricted footprints, particularly for overnight hiking trails.</p> <p>May have defined or beacons hiking routes, management access roads, tracks and firebreaks.</p> <p>Roads for visitor use may only be existing roads or new routes that also allow access for essential management needs.</p> <p>All roads, tracks or trails should be located and constructed to reduce maintenance, visibility and erosion. Where unsurfaced tracks will result in erosion, use double concrete strip or interlocking pavers to stabilise. Re-route unstable or erosion-prone road sections if this will lower long-term visual and environmental impact.</p> <p>Avoid full width tarred or surfaced roads or roads and tracks wider than required for a single vehicle.²</p>	<p>Visitor access only by permit.</p> <p>Control of visitor numbers, frequency and group sizes to meet zone objectives.</p> <p>Only users of facilities/activities will access to this zone.</p> <p>Defined or non-defined hiking and day trail routes</p> <p>On foot always, or by bicycle, 2x4 or 4x4 vehicle on designated routes.</p> <p>No access without zone permit</p>	<p>Visitor Management:</p> <p>Manage to conserve natural and cultural resources, ecological processes and wild appearance & character.</p> <p>Restrict numbers of visitors and allow for no-use rest periods if required.</p> <p>All facilities will be small, very basic, self-catering and distributed to avoid contact between users</p> <p>There should be limited if any interaction between groups</p> <p>Since visitor use usually cannot be intensively managed, re-route trails away from any areas with sensitive local habitats or plant and animal species.</p> <p>Trail layout, design and construction must reduce maintenance requirements.</p> <p>Visible & audible human impacts from adjacent zones should be mitigated</p> <p>Conservation Management:</p> <p>Habitats with lower or higher management requirements. May be natural burning zones.</p> <p>Prevent or restore visible trampling or any other visitor impact.</p> <p>Rehabilitate non-useful roads to natural vegetation.</p> <p>Consumptive Use:</p> <p>Sustainable use can be appropriate under controlled circumstances subject to a formal assessment and application in accordance with CapeNature policies.</p>

¹ CapeNature should embark on a work shopping exercise to determine more explicit thresholds for development, including road infrastructure in this and other zones. Until this time, take a precautionary approach to maintain the zone objective and characteristics.

² But do consider the safety requirements for access of more than one vehicle at a time for fire-fighting or rescue operations. Where a dedicated escape route might be required for tourism infrastructure, consider whether the additional road impact now or in the future is warranted.

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

Zone	Zone Objective	Characteristics	Visitor Activities	Facilities / Infrastructure	Visitor Access	Management Guidelines
Development – Low Intensity	<p><i>Conservation:</i> To locate the zone and infrastructure to minimise impact on sensitive environments.</p> <p>To actively manage users and visitor impacts on adjacent sensitive areas.</p> <p>Provide additional protection to sensitive or threatened habitats, species or other features by Special Management Overlays</p> <p><i>Users:</i> To provide access to adjacent natural landscapes with little expectation of solitude.</p> <p>To provide primarily self-catering accommodation or camping.</p> <p>Can provide for Environmental Education accommodation and access into surrounding landscapes.</p>	<p>Areas with extensive degraded or transformed footprints.</p> <p>Natural or semi-natural habitats only when use of these areas is essential to minimise infrastructure/use impacts over whole reserve.</p> <p>Areas able to accommodate high numbers of visitors regularly, with no identified sensitive or regionally rare biodiversity.</p> <p>Areas able to accommodate roads, trails and accommodation infrastructure without risk of erosion or degradation.</p> <p>Areas easily accessible from reserve management centre.</p> <p>Areas where risk of fire damage to infrastructure is low or can be mitigated without unacceptable impacts on surrounding environment.</p> <p>Areas not visible from Primitive or Wilderness Zones.</p> <p>Areas where new infrastructure can be located with low visibility from the surrounding landscape.</p> <p>Areas with available potable water, and not sensitive to disposal of treated wastewater via soak away.</p>	<p>Picnicking.</p> <p>Walking or bicycle access into adjacent areas.</p> <p>Self-catering accommodation and camping.</p> <p>Meeting, workshops or mini-conference activities for no more than the number of people that can be accommodated overnight in the zone.</p> <p>Can provide for Environmental Education accommodation and access into surrounding landscapes, but this must be carefully planned not to conflict with visitor use.</p>	<p>Reception offices.</p> <p>Self-catering accommodation and camping for up to 100 guests in total at any time³</p> <p>No more than 6-8 beds per unit.</p> <p>Single small lodges for up to 30 guests are permissible if all facilities are contained in a compact footprint, this represents the total accommodation for the zone, and any restaurant or catering facilities are for overnight guests only.</p> <p>If possible roads should be narrow with separate incoming and outgoing routes, otherwise double vehicle width roads are strongly advisable for safety and usability.</p> <p>Roads in this zone should be surfaced wherever possible to reduce management cost and environmental impacts.</p> <p>Development and infrastructure may take up a significant proportion of the zone, but planning should ensure that area still provides relatively natural outdoor experience.</p>	<p>Motorised self-drive 2x4 sedan car access.</p> <p>Tour bus access</p> <p>Parking areas</p> <p>This zone should be used to provide parking and walk-in access for day visitors to adjacent Nature Access zone if possible.</p>	<p>Visitor Management:</p> <p>Use built and infrastructure solutions to such as railings, hard surfacing and boardwalks to manage undesirable visitor impacts.</p> <p>Accept some impact on natural habitats in this zone unless these are specifically addressed in a Special Management Overlay.</p> <p>Frequent footpath and road maintenance must be scheduled for high impact routes.</p> <p>Visible impacts to adjacent Zones should be mitigated</p> <p>Conservation Management:</p> <p>Provide access and generate revenue.</p> <p>Management should aim to mitigate the impacts of the high number of visitors.</p> <p>L largely transformed habitats with lower management requirements. Usually fire exclusion areas.</p> <p>Prevent or restore visible trampling or any other visitor impact.</p> <p>Plan for a compact overall development footprint, avoiding dispersed infrastructure that will increase fire risk and/or environmental footprint. This is most critical in fire-prone environments.</p> <p>Consumptive Use:</p> <p>Sustainable use may be appropriate subject to a formal assessment and application in accordance with CapeNature policies.</p>

¹ Although this sounds high this is still in line with many CapeNature sites that would fall within this zone definition and E.g. configured as 10 x 4-sleeper self-catering units and 15 campsites this seems completely reasonable.

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

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

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

