
ROMANSRIVIER (ESKOM) POWERLINE ROUTE: Baseline assessment of mammals, amphibians and reptiles

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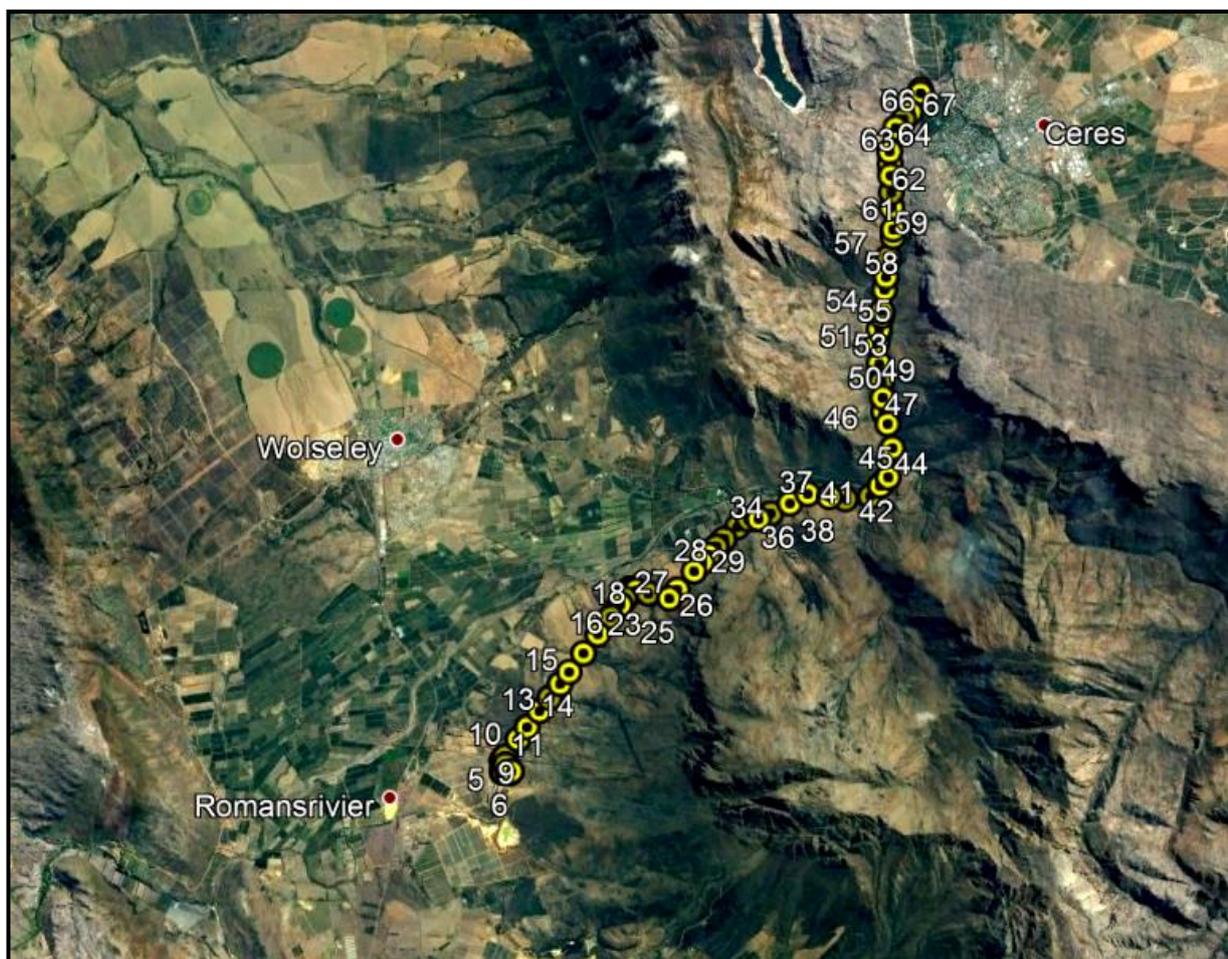


Figure 1: The proposed route for the Romansrivier powerline, with the black-centered yellow circles (1-67) indicating the pylon positions.

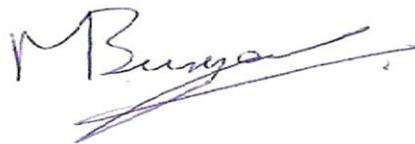
DECLARATION OF INDEPENDENCE

I hereby declare that I have no conflicts of interest related to the work of this report. Specifically, I declare that I have no personal financial interests in the property and/or development being assessed in this report, and that I have no personal or financial connections to the relevant property owners, developers, planners, financiers or consultants of the development. I declare that the opinions expressed in this report are my own and a true reflection of my professional expertise.

CV OF SPECIALIST CONSULTANT (abridged)

Mr **Marius Burger** holds a National Diploma in Nature Conservation with Cape Technicon, and worked as a research assistant with Eastern Cape Nature Conservation (1987-1997). Subsequently he took up employment with the Animal Demography Unit (ADU, University of Cape Town) as National Coordinator of the Southern African Frog Atlas Project (1997-2003) and as Project Herpetologist of the Southern African Reptile Conservation Assessment (2005-2009). Burger's EIA activities as a faunal specialist started in 1996, and since then he has participated in about 85 different projects in collaboration with a variety of EIA consultancies. In 1998, he established a sole-proprietor business *Sungazer*. His achievements as a faunal specialist are summarised below:

- Research collaborator with FLORA FAUNA & MAN, Ecological Services Ltd.: 2011 – present.
- Research Collaborator with the Smithsonian Institute: 2002 – 2004.
- Research Collaborator with the South African Museum: 2000 – 2002.
- Member of IUCN SSC Snake and Lizard Red List Authority 2017-2020: 2017 – present.
- Member of South African Frog Re-assessment Group (SA-FRoG): 2013 – present.
- Extraordinary Lecturer with the Unit for Environmental Sciences and Management, North-West University: 2015 – present.
- Country liaison for the journal *Amphibian and Reptile Conservation*: 2000 – 2004.
- Chairman of the Port Elizabeth Herpetological Club: 1992 – 1996.
- Compiled about 100 specialist and EIA reports for various consultancies.
- Published about 105 scientific, semi-scientific and popular articles, and authored/edited three books and 34 chapters/accounts in books.
- Presented 41 papers/posters at national/international symposia.
- Directed/presented in about 100 natural history television documentaries for *National Geographic*, *BBC World*, *SABC*, *Kyknet* and others.



M. Burger – trading as *Sungazer* – September 2017

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Abbreviations

ADU	Animal Demography Unit
CR	Critically Endangered
EN	Endangered
FIA	Faunal importance assessment
IUCN	International Union for Conservation of Nature
LC	Least Concern
NE	Not Evaluated
NT	Near Threatened
SA	South Africa, Lesotho and Swaziland
SCC	Species of conservation concern
VU	Vulnerable
WC	Western Cape

1 SUMMARY

Introduction: A baseline study was conducted for the mammal, amphibian and reptile faunas of the proposed Romansrivier powerline route. The main aims were to assess the area in terms of the local species richness of these various faunal groups, to highlight species of conservation concern (SCC), to highlight environmental issues relevant to this project, and to provide management and mitigation guidelines accordingly. A one-day site visit was conducted during August 2017. Various data sources were consulted to gain insight on the faunal assemblages that may potentially occur in the general region. A faunal impact assessment (FIA) score was calculated for each of the three faunal groups, to obtain an approximate impression of the site's importance for each respective group at regional (Witzenberg Municipality) and national (South African; SA) scales.

MAMMALS

The potential mammal species richness total along the proposed powerline route and immediate regions may be as much as 61, but more realistically only about 40 (or less). Of these, the following are SCC:

- **Leopard:** Regionally listed as Vulnerable. The disturbance impact during the construction and operational phases is likely to be insignificant for this large predator.
- **White-tailed Mouse:** Regionally listed as Vulnerable. This species may potentially occur in this area, but the habitat is generally unfavourable. The type of impacts associated with the construction and operational phases of a powerline along this route are generally of low significance to small rodents.
- **Spectacled Dormouse:** Regionally listed as Near Threatened. It is a rock-dwelling species, occurring in mountainous terrain along the proposed route. The type of impacts associated with the construction and operational phases of a powerline along this route are generally of low significance to small rodents.
- **African Clawless Otter:** Globally listed as NT, but regionally (SA) considered to be of LC. Construction of new vehicle bridges may cause temporary disturbances for some otter individuals, but the overall impact is deemed to be low to neutral.
- **Honey Badger:** Regionally listed as Near Threatened. The projected impacts of the proposed powerline are of low significance for this species, both in terms of habitat transformation and disturbances during the construction and operational phases.
- **African Striped Weasel:** Regionally listed as Near Threatened. The projected impacts of the proposed powerline are of low significance for this species, both in terms of habitat transformation and disturbances during the construction and operational phases.
- **Grey Rhebok:** Globally listed as Near Threatened. The overall impacts in terms of disturbance and habitat transformation during the construction and operational phases are deemed insignificant for this species.

Although several mammal SCC occur in the general area, none are likely to be impacted to any significant degree by the construction and maintenance of the proposed powerline. The FIA rating for mammals in the context of this powerline route is MODERATE at regional and LOW to MODERATE at national scales. From a mammal perspective there is thus no significant cause for concern in respect of the proposed powerline project.

AMPHIBIANS

The potential amphibian species richness total along the proposed powerline route and immediate regions may be as much as 15, but more realistically only about eight species. Of these, the following are SCC:

- **Cape Rain Frog:** Globally listed as Near Threatened. Although the species occurs nearby to the west, it is unlikely to occur within this route due to a lack of suitable habitat.
- **Cape Caco:** Globally listed as Near Threatened. Although the species occurs nearby to the west, it is unlikely to occur within this route due to a lack of suitable habitat.

Zero amphibian SCC are likely to occur within the area of the proposed powerline route. The FIA rating for amphibians in the context of the powerline route is MODERATE at regional and LOW to MODERATE at national scales. From an amphibian perspective there is thus no significant cause for concern in respect of the proposed powerline.

REPTILES

Potential reptile species richness may be as much as 54, but more realistically only about 45 species. Of these, the following are SCC:

- **Geometric Tortoise:** Globally listed as Critically Endangered. This species has a patchy distribution, and a few scattered records are known from the general region on the western (Romansrivier) side of the proposed powerline route. Only the western-most section of the proposed powerline route may potentially be inhabited by a few Geometric Tortoise individuals, but more probably none are likely to be present there.
- **Oelofsen's Girdled Lizard:** Globally listed as Near Threatened. Known from the general region to the west, but unlikely to occur along the proposed powerline route.

Zero reptile SCC are likely to occur within the area of the proposed Romansrivier powerline route. However, as a precautionary approach, consideration must be given for the event that Geometric Tortoises may indeed be present in some of the remnant renosterveld patches. The FIA for reptiles in the context of the powerline route is MODERATE at regional and LOW to MODERATE at national scales. From a reptile perspective there is thus no significant cause for concern in respect of the proposed powerline, other than to limit habitat loss in the western-most sections.

GEOMETRIC TORTOISES

A critically Endangered species that have experienced a significant population decline (i.e. >90% in 100 years) as a result of large-scale anthropogenic land transformation. Extensive habitat fragmentation has aggravated this situation, and most of the remaining population is currently scattered as isolated subpopulations with little genetic flow. It is a habitat specialist, restricted to the Fynbos Biome of the south-western Cape, predominantly in the Renosterveld Bioregion. In the case of the proposed Romansrivier powerline project, the relevant two vegetation types are Breede Shale Fynbos and Breede Alluvium Fynbos. Although some of the Breede Shale Fynbos sections on the flatter western-most regions appears to be at least partially suited for Geometric Tortoises, it is however not optimal habitat

for this species. The likelihood of tortoises inhabiting any of these sections are probably <30%, and probably in very low numbers if any occur at all.

FAUNAL IMPACTS AND IMPACT RECOMMENDATIONS

- **Reduction of faunal abundance due to habitat loss (including transformation and fragmentation of natural habitat):** Due to the general lack of SCC, the reduction of faunal abundance as a result of natural habitat loss, transformation and fragmentation associated with this particular project is deemed to be of **Low** significance without and with mitigation.
- **Reduction of faunal abundance due to disturbances:** Due to the general lack of SCC and the temporary nature of the disturbance, this impact is deemed to be **Insignificant**.
- **Faunal mortalities by vehicular traffic:** Due to the general lack of SCC and the very low volumes of slow-moving traffic, this impact is deemed to be **Insignificant**.

The following mitigation measures are relevant to faunal and general terrestrial ecology components:

- Apply site-specific mitigation specified in the EMP.
- Apply a strict no-fire on site policy, with a protocol in place to control/extinguish veld fires should any accidentally break out during the construction phase.
- Apply a strict no-poaching on site policy.
- Appoint an ECO to monitor construction activities and compliance with the EMP.
- Locate site camps in transformed areas.
- Limit the footprint area of the construction activity to what is absolutely essential.
- Define all areas outside of the planned project and construction footprint as no-go areas.
- Demarcate no-go areas.
- Restrict access to no-go areas by construction personal.
- Avoid the piling of excavated rock on natural vegetation.
- Restrict the movement of construction vehicles to new and existing access roads only.

A search and rescue initiative for faunal SCC is not a specific requirement prior to the construction phase. However, in the unlikely event that Geometric Tortoise specimens (live or dead) are coincidentally encountered on site during the construction phase, the ECO should report this finding to herpetologists at CapeNature.

1 INTRODUCTION AND TERMS OF REFERENCE

The following report is a baseline assessment of mammals, amphibians and reptiles in relation to the proposed Romansrivier powerline route. Details of the project are outlined in several of the *SRK Consulting* reports, but in summary it constitutes the construction of a double circuit powerline between Romansrivier and Ceres substations along a route of about 15 km (see Figure 1). The overall aim of this faunal baseline report is to highlight faunal Species of Conservation Concern (SCC), and to provide guidelines for the management and impact mitigation of such species. More specifically, conservation considerations for the Geometric Tortoise (Critically Endangered) are discussed. The terms of reference for this study are:

- Consolidate the relevant literature, data sources and specialists' reports to gain a general impression of the faunal assemblages that are likely to occur in this area (including checklists of each of the three faunal groups).
- Highlight the faunal SCC, and elaborate on their respective environmental requirements and the potential impacts relating to this project.
- Provide management measures to prevent/mitigate impacts on these species during construction and afterwards.

2 STUDY APPROACH

2.1 Site survey

A one-day site survey was conducted on 27 August 2017, to obtain a general impression of the habitat diversity and quality of the proposed Romansrivier powerline route. This is useful for compiling checklists of the faunal species that are likely to occur in the general region.

2.2 Distributional data sources

Other than the short site visit, this report was primarily compiled as a desktop study. The assessment drew from relevant literature and database sources, and from data/information supplied by an expert on Geometric Tortoise conservation:

- Animal Demography Unit (ADU) Virtual Museum: <http://vmus.adu.org.za/>
- Dr Margaretha D. Hofmeyr: Biodiversity and Conservation Biology, University of the Western Cape.

2.3 Faunal importance assessments (FIA)

The purpose of assessing the faunal importance of the site for each of the three vertebrate faunal groups, i.e. mammals, amphibians and reptiles, is to obtain an approximate impression of the site's value for each of the faunal groups at regional (Witzenberg Municipality) and national (South African; SA) scales. This assessment incorporates a variety of components, i.e. the presence/absence of threatened species, the levels of conservation status of the threatened species, overall species richness, levels of endemism, ecological functioning potential of the site, the size and habitat quality of the site, habitat heterogeneity or homogeneity, and the site's value as an ecological corridor, a green zone, or source or sink for genetic exchange in respect of peripheral natural areas. The IUCN Red List of threatened species (IUCN 2017), together with the respective SA assessments of the three faunal groups, i.e. mammals (Child et al. 2016), reptiles (Bates et al. 2014) and amphibians (Minter et al. 2004; Measey 2011), served

as the sources for the conservation status for fauna of the proposed Romansrivier powerline route. The following criteria were used to determine the relative importance of this route in respect of these faunal groups, in the context of the Witzenberg Municipality (regional) and SA (national). A score of one point is given for each YES answer, excepting for Red List species where as many as two points can be awarded. A score of 0.5 is awarded if the answer is disputably YES or NO for questions 1 to 5. A score of 0.25, 0.5, 0.75 or 1 may be awarded for questions 6 to 12, depending on the subjective assessments of these questions. Thus a maximum possible score is 12 points.

- Score total 0 - 4 = LOW at regional and national scales.
- Score total 4.25 - 8 = MODERATE at regional and LOW to MODERATE at national scale.
- Score total 8.25 - 12 = HIGH at regional and MODERATE to HIGH at national scale.

Questions:

1. Are any threatened (Red List) species known to occur within the proposed Romansrivier powerline route? For the purpose of this evaluation, threatened species constitute those listed as **Critically Endangered** (2 points), **Endangered** (1.5 points), **Vulnerable** (1 point) and *Near Threatened* (0.5). If several threatened species are present, only the most threatened status of them all is applicable, thus a maximum of 2 points can be scored in this section. Note also that if a score is of YES (1) is made here, then no score can be presented in the next category (i.e. potential occurrence of threatened species). Thus the maximum total possible score for a particular faunal evaluation is 12.
2. If not, are any threatened species likely to occur within the proposed Romansrivier powerline route?
3. Are any localised (Witzenberg Municipality) endemics known or likely to occur within the proposed Romansrivier powerline route?
4. Are any provincial (WC) endemics known or likely to occur within the proposed Romansrivier powerline route?
5. Are any national (SA) endemics known or likely to occur within the proposed Romansrivier powerline route?
6. Is the site likely to support high species richness relative to the Witzenberg Municipality?
7. Are the existing faunal communities thought to be of importance in respect of the local ecological functioning of systems within the proposed Romansrivier powerline route?
8. Is the total extent of the proposed Romansrivier powerline route large enough to support the existing faunal communities in the long-term?
9. Is the habitat quality of the proposed Romansrivier powerline route such that it is suitable for the long-term support of faunal communities?
10. Does the proposed Romansrivier powerline route have great habitat heterogeneity that would favour overall high species richness?
11. Is the proposed Romansrivier powerline route important in respect of peripheral natural areas, either as an ecological corridor or a significant suburban green zone?
12. Is the proposed Romansrivier powerline route important in respect of peripheral natural areas as a source or sink for genetic exchange?

3 RESULTS AND DISCUSSION

3.1 Habitat description

A brief summary of habitat diversity of the proposed Romansrivier powerline route is provided here, in reference to the faunal communities that are likely to occur in this region. Refer to the botanical report (Emms 2017) for a vegetation map and a conservation planning map with details of Protected Areas, Critical Biodiversity Areas and Ecological Support Areas. Most of this vegetation is relatively pristine in the mountainous regions, but much of the flatter terrain have been transformed by agricultural activities. Six vegetation types occur in the study area: (1) Winterhoek Sandstone Fynbos, (2) Ceres Shale Renosterveld, (3) North Hex Sandstone Fynbos, (4) Breede Shale Fynbos, (5) Breede Alluvium Fynbos, and (6) Northern Inland Shale Band Vegetation. Two of these are threatened vegetation types, i.e. Breede Alluvium Fynbos (Endangered) and Ceres Shale Renosterveld (Vulnerable). Generalist faunal species (e.g. Chacma Baboons) may frequent most or all of these vegetation types, whereas some of the specialist faunal species (e.g. Geometric Tortoise) would be restricted to one or two specific vegetation type.

In addition to vegetation type, faunal assemblages are also influenced by substrate type and various other physical features. The most prominent of these are summarised below:

- **Hard compacted substrates vs soft sandy substrates:** A range of substrate types are present within the proposed powerline route. Fossorial species like legless skinks, golden moles and mole rats favour soft substrates over hard compacted substrates.
- **Flat terrain vs moderate to steep slopes:** Certain species (e.g. Leopard and Chacma Baboons) regularly move between flat and sloped terrain, whereas some like the Geometric Tortoise never occur on moderate to steep-sloped terrain.
- **Rocky terrain:** Several species have a close association with rocky terrain, e.g. Klipspringer, Hewitt's Red Rock Hare and various rupicolous lizard species like some agamid, cordylid and gekkonid lizards.
- **Watercourses (streams and rivers):** A small subset of the amphibians occurring in the area are associated with streams or rivers, e.g. Cape River Frog and Cape Ghost Frog. A few mammal species, e.g. African Clawless Otter and Water Mongoose, also frequent water courses.
- **Seepage areas:** Certain terrestrial breeding frogs (e.g. moss frogs) are associated with seepage areas in mountainous terrain.
- **Artificial dams:** A few artificial dams (e.g. near pylons 11 and 25) are present along the proposed powerline route, and these are typically inhabited or visited by common generalist species like the South African Helmeted Terrapin, Common Platanna and Water Mongoose.

From west (Romansrivier) to east (Ceres), the proposed powerline route transects a variety of habitat types which can briefly be summarised as follow:

- Altitude ranges from about 330 to 450 m along the route, with some of the adjacent peaks near Ceres reaching 1200+ m.
- The western-most section is mostly flattish terrain, changing into slight to moderate slopes along the way and culminating in some steep mountainous sections with rocky terrain (Figure 5) towards Ceres.
- The western half of the proposed route has some artificial dams, whereas the latter half is characterised by prominent watercourses (Figures 6 and 7), e.g. Dwars and Breede rivers.



Figure 2: Relatively young (recently burnt) Breede Shale Fynbos near pylon 3.



Figure 3: Breede Alluvium Fynbos near pylon 10.



Figure 4: Recently burnt Breede Shale Fynbos on a moderate slope (Mostertshoekberg) in region of pylon 26.



Figure 5: Steep slopes and mountainous terrain with North Hex Sandstone Fynbos in region of pylon 39.



Figure 6: A section of the Dwarsrivier in the Michell's Pass region.



Figure 7: Zoomed in on rapids and pools along the Dwarsrivier in the Michell's Pass region.

3.2 Mammals

Several mammal species that historically occurred in this region, e.g. ungulates like Eland, Bontebok and Cape Mountain Zebra, have become locally extinct. Currently, the potential mammal species richness total along the proposed Romansrivier powerline route and immediate regions may be as much as 61 (see checklist: Appendix 1, Table 4), but more realistically only about 40 (or less) mammal species are likely to inhabit or occasionally utilise the site. Of these, the following are SCC:

- **Leopard** (*Panthera pardus*): The global (IUCN 2017) conservation status of this species is LC, but the regional SA assessment (Child et al. 2016) lists it as being VU. Although low numbers of Leopards do occur in the general region, they are generally solitary with wide home ranges. The proposed powerline route is likely to traverse some of the Leopard home range terrain, but utilisation of these areas is likely to be intermittent and infrequent. The disturbance impact of a powerline is considered to be insignificant to the general wellbeing of this large predator. Likewise, the disturbance impact during the construction phase would be short in duration and insignificant in overall extent.
- **White-tailed Mouse** (*Mystromys albicaudatus*): The unrevised conservation status of this species according to IUCN (2017) is EN, but the most recent assessment (Child et al. 2016) lists it as being VU. Although this species is known from the general region, it is unlikely (but not completely impossible) that it occurs along the proposed powerline route due to unfavourable habitat. The proposed powerline is thus of very little consideration for this species. Likewise, even if this species does actually occur here, the type of impacts associated with the construction and operational phases of a powerline along this route are generally of low significance to small rodents.
- **Spectacled Dormouse** (*Graphiurus ocularis*): Listed as being of LC by the IUCN (2017), but NT according to the regional SA assessment (Child et al. 2016). It is a rock-dwelling species that is likely to utilise some of the more mountainous terrain along the proposed route. The type of impacts associated with the construction and operational phases of a powerline along this route are generally of low significance to small rodents.
- **African Clawless Otter** (*Aonyx capensis*): Globally (IUCN 2017) listed as NT, but regionally (Child et al. 2016) considered to be of LC. This species is likely to utilise some of the main water courses along the proposed powerline route. The construction of new vehicle bridges may likely cause temporary disturbances for some otter individuals, but this impact is overall deemed to be low and likely to be neutral after the construction has been completed.
- **Honey Badger** (*Mellivora capensis*): Globally (IUCN 2017) of LC, but regionally (Child et al. 2016) regarded as NT. The projected impacts of the proposed powerline are of low significance for this species, both in terms of habitat transformation and disturbances during the construction and operational phases. This species is likely to occur in low numbers in this region.
- **African Striped Weasel** (*Poecilogale albinucha*): Similar to the Honey Badger, the conservation status of this species is globally (IUCN 2017) regarded to be of LC, but regionally (Child et al. 2016) it is considered to be NT. The projected impacts of the proposed powerline are of low significance for this species, both in terms of habitat transformation and disturbances during the construction and operational phases. This species is likely to occur in low numbers in this region.

- **Grey Rhebok** (*Pelea capreolus*): Globally (IUCN 2017; Child et al. 2016) listed as NT. Although this species occurs in mountainous and fynbos terrain in some of the larger protected areas in the general region, it is possible that they may occasionally utilise sections of the proposed powerline route. If so, then the disturbance during the construction phase may temporarily spook those individuals. However, the overall impacts in terms of disturbance and habitat transformation during the construction and operational phases are locally deemed insignificant for this species.

In summary, even though several mammal SCC occur in the general area, none are likely to be impacted in any significant way by the construction and maintenance of the proposed Romansrivier powerline.

The FIA rating for mammals (Table 1; score = 5.5) in the context of the Romansrivier powerline route is MODERATE at regional and LOW to MODERATE at national scales. From a mammal perspective there is thus no significant cause for concern in respect of the proposed powerline, but the overall impact can be reduced by implementing a variety of mitigation measures (details elsewhere in report).

Table 1: Mammal FIA of the Romansrivier powerline route at regional and national scales.

Criterion	FIA score
Known presence of threatened species	0
Probable presence of threatened species	1
Presence of Witzenberg Municipality endemics	0
Presence of WC endemics	1
Presence of SA endemics	1
High species richness relative to the Witzenberg Municipality	0.5
Important ecological functioning	0.25
Size of the site	0.25
Habitat quality of the site	0.5
Extent of habitat heterogeneity	0.5
Importance as an ecological corridor or an urban green zone	0.25
Importance for genetic exchange	0.25
TOTAL	5.5

3.3 Amphibians

The potential amphibian species richness total along the proposed Romansrivier powerline route and immediate regions may be as much as 15 (see checklist: Appendix 1, Table 5), but more realistically only about eight amphibian species are likely to inhabit or occasionally utilise the site. Of these, the following are SCC:

- **Cape Rain Frog** (*Breviceps gibbosus*): The current global (IUCN 2017; Measey 2011) listing for this is NT. Although this frog has been recorded from 3319AC to the west of the proposed powerline route, it is unlikely to occur within this route due to a lack of suitable habitat.

- **Cape Caco** (*Cacosternum capense*): The current global (IUCN 2017; Measey 2011) listing for this is NT. Although this frog has been recorded from 3319AC to the west of the proposed powerline route, it is unlikely to occur within this route due to a lack of suitable habitat.

In summary, zero amphibian SCC are likely to occur within the area of the proposed Romansrivier powerline route.

The FIA rating for amphibians (Table 2; score = 4.5) in the context of the Romansrivier powerline route is MODERATE at regional and LOW to MODERATE at national scales. From an amphibian perspective there is thus no significant cause for concern in respect of the proposed powerline, but the overall impact can be reduced by implementing a variety of mitigation measures (details elsewhere in report).

Table 2: Amphibian FIA of the Romansrivier powerline route at regional and national scales.

Criterion	FIA score
Known presence of threatened species	0
Probable presence of threatened species	0
Presence of Witzenberg Municipality endemics	0
Presence of WC endemics	1
Presence of SA endemics	1
High species richness relative to the Witzenberg Municipality	0.5
Important ecological functioning	0.25
Size of the site	0.25
Habitat quality of the site	0.5
Extent of habitat heterogeneity	0.5
Importance as an ecological corridor or an urban green zone	0.25
Importance for genetic exchange	0.25
TOTAL	4.5

3.4 Reptiles

The potential reptile species richness total along the proposed Romansrivier powerline route and immediate regions may be as much as 54 (see checklist: Appendix 1, Table 6), but more realistically only about 45 reptile species are likely to inhabit or occasionally utilise the site. Of these, the following are SCC:

- **Geometric Tortoise** (*Psammobates geometricus*): The current global (IUCN 2017; Bates *et al.* 2014) listing for this is CR. The proposed Romansrivier powerline route passes through an area that may potentially be occupied by Geometric Tortoises (Figure 10), and these areas were therefore investigated during the field survey. Only the western-most section of the propose powerline route may potentially be inhabited by a few Geometric Tortoise individuals. However, the vegetation here are suboptimal Geometric Tortoise habitat, and it is doubtful that any specimens occur there.

- **Oelofsen’s Girdled Lizard** (*Cordylus oelofseni*): The current global (IUCN 2017; Bates *et al.* 2014) listing for this is NT. Although this lizard has been recorded from 3319AC to the west of the proposed powerline route, it is not specifically known from proposed route. It is unlikely to occur here.

In summary, zero reptile SCC are likely to occur within the area of the proposed Romansrivier powerline route. However, as a precautionary approach, consideration is given in the event that Geometric Tortoises may be present in some of the remnant renosterveld patches.

The FIA rating for reptiles (Table 3; score = 4.5) in the context of the Romansrivier powerline route is MODERATE at regional and LOW to MODERATE at national scales. From a reptile perspective there is thus no significant cause for concern in respect of the proposed powerline, but the overall impact can be reduced by implementing a variety of mitigation measures (details elsewhere in report).

Table 3: Reptile FIA of the Romansrivier powerline route at regional and national scales.

Criterion	FIA score
Known presence of threatened species	0
Probable presence of threatened species	0
Presence of Witzenberg Municipality endemics	0
Presence of WC endemics	1
Presence of SA endemics	1
High species richness relative to the Witzenberg Municipality	0.5
Important ecological functioning	0.25
Size of the site	0.25
Habitat quality of the site	0.5
Extent of habitat heterogeneity	0.5
Importance as an ecological corridor or an urban green zone	0.25
Importance for genetic exchange	0.25
TOTAL	4.5

3.5 Geometric Tortoise considerations

Substantial anthropogenic land transformation has resulted in a Geometric Tortoise population size reduction of more than 90% over the past 100 years. Extensive habitat fragmentation contributes to the vulnerability of this species, with most of the remaining population occurring as scattered isolated subpopulations with little to no genetic flow. Today, even small remnant populations are of conservation importance. It is a habitat specialist, occurring within the following habitat parameters of the south-western Cape (modified from Bates *et al.* 2014): *Fynbos Biome, predominantly in the Renosterveld Bioregion, which is comprised of a number of threatened vegetation types including Alluvium Fynbos, Sand Fynbos, Shale Fynbos, Shale Renosterveld, Granite Renosterveld and Silcrete Renosterveld. The general habitat comprises low-lying, undulating plains (seldom rocky terrain, but never koppies) with a dominant low to medium-high shrub layer, a strong restiod and ericoid presence and an essentially annual, herbaceous under-storey with perennial grasses.*

In the case of the proposed Romansrivier powerline project, the relevant two vegetation types are Breede Shale Fynbos and Breede Alluvium Fynbos (see Figure 9). Some of the Breede Shale Fynbos sections on the flatter western-most regions seem to be at least partially suited for Geometric Tortoises, but it is not optimal habitat for this species. The likelihood of tortoises inhabiting any of these sections are probably <30%, and probably in very low numbers if any occur at all. Further east along the proposed route, much of the Breede Shale Fynbos is on moderately sloped terrain which is generally not favoured by Geometric Tortoises. These areas most likely do not harbour any Geometric Tortoises. As for the Breede Alluvium Fynbos section, only a very small polyp of this vegetation type is traversed by the proposed powerline route. Currently, the vegetation of this small section seems rather overgrown and generally not suitable for Geometric Tortoises. In summary, only the western-most section of the proposed powerline route may potentially be inhabited by a few Geometric Tortoise individuals, but more probably none are likely to be present there.



Figure 8: A map of vegetation types (SANBI 2012) and the proposed Romansrivier powerline route (string of black circles). Red circles denote the nearest known Geometric Tortoise records.

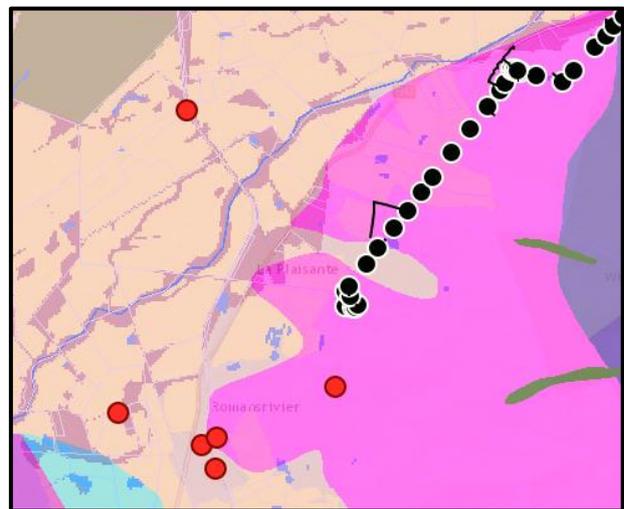


Figure 9: Zoomed in on Figure 8, the Geometric Tortoise records occur in Breede Shale Fynbos (bright pink polygon) and Breede Alluvium Fynbos (light pink polygon).

Prior to conducting the faunal site visit, a map (Figure 10) was prepared to highlight the areas where Geometric Tortoises may potentially occur. Confirmed records of Geometric Tortoises in the Romansrivier region towards Wolseley were plotted on this map, in relation to the proposed powerline route. Due to the close proximity of these records, there exists a reasonable chance that Geometric Tortoises may occur in patches within the southern reaches of the proposed powerline route. The section highlighted as a red polygon (structures 1-13) was predicted as being a high probability zone for the potential occurrence of Geometric Tortoises here, and the faunal site survey was focused in this area. The orange polygon (Figure 10; structures 14-24) was regarded as being a medium probability zone in this regard, and was also investigated during this site visit.



Figure 10: A section of the Romansrivier proposed powerline route indicated with black-centred white circles (= pylon positions). The section of the powerline within the red polygon is ranked as a high probability zone for the occurrence of Geometric Tortoises. The section of the powerline within the orange polygon is ranked as a medium probability zone for the occurrence of Geometric Tortoises. The blue circles denote sites with known Geometric Tortoise records.

3.6 Faunal impacts and general recommendations

The following types of impacts associated with the construction and maintenance of the proposed Romansrivier powerline have faunal considerations:

- Reduction of faunal abundance due to habitat loss (including habitat transformation and fragmentation of natural habitat):** For the proposed Romansrivier powerline project, the type of habitat loss is mostly in the form of access roads for the construction and maintenance of pylon structures. Some of the existing roads will need to be upgraded, and new roads will have to be constructed to reach specific pylon positions. Vegetation clearing at pylon footprints and laydown areas will also contribute to habitat loss. The extent of habitat loss/transformation projected for the proposed Romansrivier powerline route is nearly 50 000 m² (~5 ha). More than half (~3.6 ha) of this clearing will be for access roads. Only 800 m² will take place in endangered (400 m²) or vulnerable (400 m²) vegetation types. In response to the loss of natural vegetated patches, it is typical that the abundance of certain faunal species will be reduced accordingly. Habitat transformation has already occurred in several areas, mostly as a result of historic and current agricultural activities. The proposed Romansrivier powerline project is not likely to add significantly to this type of impact, other than perhaps some temporary habitat transformation of the pylon laydown areas. The fragmentation of natural habitat at a landscape level has shown to be a substantial negative impact for certain species like Geometric Tortoises, but less so for birds and most generalist faunal species. However, the scale

of habitat fragmentation associated with the proposed Romansrivier powerline, i.e. road construction and upgrades, does not constitute a significant impact in this regard. For SCC like the Geometric Tortoise, it is the historic loss, transformation and fragmentation of natural habitat that has caused its current dire conservation status listing of being Critically Endangered. It is presumed with moderate certainty that this species does not occur within the project study site. In summary, due to the general lack of SCC, the reduction of faunal abundance as a result of natural habitat loss, transformation and fragmentation associated with this particular project is deemed to be of **Low** significance without and with mitigation.

- **Reduction of faunal abundance due to disturbances:** The presence of people, vehicles and machinery is likely to cause temporary disturbances to certain faunal species, especially for medium to large sized mammals. Likewise, blasting activities will cause certain species to temporarily leave the general area. Due to the general lack of SCC and the temporary nature of the disturbance, this impact is deemed to be **Insignificant**.
- **Faunal mortalities by vehicular traffic:** During the construction and maintenance of pylon structures, faunal mortalities may occur on the roads. Due to the general lack of SCC and the very low volumes of slow-moving traffic, this impact is deemed to be **Insignificant**.

The following mitigation measures are proposed to reduce some of the negative impacts described above. Most of these mitigation measures are also applicable to other components of the terrestrial ecology impact assessment. Additionally, the mitigations for freshwater ecology impacts (not listed here) are also relevant to some of the faunal communities:

- Apply site-specific mitigation specified in the EMP.
- Apply a strict no-fire on site policy, with a protocol in place to control/extinguish veld fires should any accidentally break out during the construction phase.
- Apply a strict no-poaching on site policy.
- Appoint an ECO to monitor construction activities and compliance with the EMP.
- Locate site camps in transformed areas.
- Limit the footprint area of the construction activity to what is absolutely essential.
- Define all areas outside of the planned project and construction footprint as no-go areas.
- Demarcate no-go areas.
- Restrict access to no-go areas by construction personal.
- Avoid the piling of excavated rock on natural vegetation.
- Restrict the movement of construction vehicles to new and existing access roads only.

A search and rescue initiative for faunal SCC prior to the construction phase is not a deemed necessary. However, in the unlikely event that Geometric Tortoise specimens (live or dead) are coincidentally encountered on site during the construction phase, the ECO should report this (with photographic evidence) to the herpetologists at CapeNature. The precise locality information (preferably coordinates) must be noted, and such specimens must be released in the immediate vicinity of where they were found. If found in a high-risk area, such specimens can be moved to the nearest safe area of natural habitat, preferably not more than 50 m away.

4 REFERENCES

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5 APPENDIX 1: Species checklists

Table 4: A checklist of mammals that are known from or may potentially occur along the proposed Romansrivier powerline route. Conservation status according to IUCN and local (SA) listings include the following categories: Least Concern (LC), Near Threatened (NT), Vulnerable (VU) and Endangered (EN). Endemism is as follow: Endemic to South Africa, Lesotho and Swaziland (SA), endemic to Western Cape (WC). Scoring for likelihood of occurrence: possible occurrence (1), probable occurrence (2) and confirmed occurrence (3).

Scientific name	English name	IUCN/SA	Endemism	Occur	Notes
Bathyergidae		African mole-rats			
<i>Bathyergus suillus</i>	Cape Dune Mole-rat	LC/LC	WC	1	
<i>Cryptomys hottentotus</i>	Common Mole-rat	LC/LC	0	2	
<i>Georychus capensis</i>	Cape Mole-rat	LC/LC	SA	1	
Gliridae		Dormice			
<i>Graphiurus ocellatus</i>	Spectacled Dormouse	LC/NT	SA	2	
Muridae		Old World rats and mice & gerbils			
<i>Acomys subspinosus</i>	Cape Spiny Mouse	LC/LC	SA	2	
<i>Dendromus melanotus</i>	Grey Climbing Mouse	LC/LC	0	2	
<i>Dendromus mesomelas</i>	Brant's Climbing Mouse	LC/LC	0	1	
<i>Desmodillus auricularis</i>	Short-tailed Gerbil	LC/LC	0	1	
<i>Gerbilliscus afra</i>	Cape Gerbil	LC/LC	near WC	2	
<i>Gerbilliscus paeba</i>	Hairy-footed Gerbil	NE/LC	0	1	
<i>Micaelamys namaquensis</i>	Namaqua Rock Mouse	LC/LC	0	2	
<i>Mus minutoides</i>	Pygmy Mouse	LC/LC	0	2	
<i>Myomyscus verreauxii</i>	Verreaux's Mouse	LC/LC	SA	1	
<i>Mystromys albicaudatus</i>	White-tailed Mouse	EN/VU	SA	1	
<i>Otomys irroratus</i>	Southern African Vlei Rat	LC/LC	SA	2	
<i>Rhabdomys pumilio</i>	Xeric Four-striped Mouse	LC/LC	SA	3	Recorded during site visit (Burger 2017)

Table 4 (continued)

Scientific name	English name	IUCN/SA	Endemism	Occur	Notes
Nesomyidae	Nesomyid rodents				
<i>Dendromus melanotis</i>	Grey African Climbing Mouse	LC/LC	0	1	
Hystricidae	Old World porcupines				
<i>Hystrix africaeaustralis</i>	Cape Porcupine	LC/LC	0	3	Recorded during site visit (Burger 2017)
Leporidae	Hares & rabbits				
<i>Lepus capensis</i>	Cape Hare	LC/LC	0	2	
<i>Lepus saxatilis</i>	Scrub Hare	LC/LC	0	1	
<i>Pronolagus saundersiae</i>	Hewitt's Red Rock Hare	LC/LC	SA	2	
Orycteropodidae	Aardvark				
<i>Orycteropus afer</i>	Aardvark	LC/LC	0	1	
Procaviidae	Hyraxes				
<i>Procavia capensis</i>	Rock Hyrax	LC/LC	0	2	
Chrysochloridae	Golden moles				
<i>Chrysochloris asiatica</i>	Cape Golden Mole	LC/LC	SA	2	
Macroscelidae	Sengis				
<i>Elephantulus edwardii</i>	Cape Rock Sengi	LC/LC	SA	2	
<i>Macroscelides proboscideus</i>	Karoo Round-eared Sengi	LC/LC	0	2	
Soricidae	Shrews				
<i>Crocidura cyanea</i>	Reddish-Grey Musk Shrew	LC/LC	0	2	
<i>Myosorex varius</i>	Forest Shrew	LC/LC	SA	2	
<i>Suncus varilla</i>	Lesser Dwarf Shrew	LC/LC	0	2	
Rhinolophidae	Old World horseshoe & leaf-nosed bats				
<i>Rhinolophus capensis</i>	Cape Horseshoe Bat	LC/LC	near SA	2	
<i>Rhinolophus clivosus</i>	Geoffroy's Horseshoe Bat	LC/LC	0	1	

Table 4 (continued)

Scientific name	English name	IUCN/SA	Endemism	Occur	Notes
Nycteridae	Slit-faced bats				
<i>Nycteris thebaica</i>	Egyptian Slit-faced Bat	LC/LC	0	2	
Molossidae	Free-tailed bats				
<i>Tadarida aegyptiaca</i>	Egyptian Free-Tailed Bat	LC/LC	0	2	
Molossidae	Free-tailed bats				
<i>Tadarida aegyptiaca</i>	Egyptian Free-Tailed Bat	LC/LC	0	2	
Miniopteridae	Long-fingered bats				
<i>Miniopterus natalensis</i>	Natal Long-Fingered Bat	LC/LC	0	1	
Vespertilionidae	Plain-faced bats				
<i>Eptesicus hottentotus</i>	Long-Tailed Serotine Bat	LC/LC	0	2	
<i>Myotis tricolor</i>	Temmink's Hairy Bat	LC/LC	0	1	
<i>Neoromicia capensis</i>	Cape Serotine Bat	LC/LC	0	2	
Canidae	Jackals, foxes and relatives				
<i>Canis mesomelas</i>	Black-backed Jackal	LC/LC	0	1	
<i>Otocyon megalotis</i>	Bat-eared Fox	LC/LC	0	2	
<i>Vulpes chama</i>	Cape Fox	LC/LC	0	2	
Felidae	Cats				
<i>Caracal caracal</i>	Caracal	LC/LC	0	2	
<i>Felis silvestris</i>	African Wild Cat	LC/LC	0	2	
<i>Panthera pardus</i>	Leopard	LC/VU	0	1	
Hyaenidae	Hyenas				
<i>Proteles cristata</i>	Aardwolf	LC/LC	0	1	

Table 4 (continued)

Scientific name	English name	IUCN/SA	Endemism	Occur	Notes
Herpestidae		Mongoose			
<i>Cynictis penicillata</i>	Yellow Mongoose	LC/LC	0	2	
<i>Herpestes ichneumon</i>	Large Grey Mongoose	LC/LC	0	1	
<i>Herpestes pulverulentus</i>	Cape Grey Mongoose	LC/LC	0	3	Recorded during site visit (Burger 2017)
<i>Atilax paludinosus</i>	Water Mongoose	LC/LC	0	2	
Mustelidae		Weasels, badgers, otters & relatives			
<i>Aonyx capensis</i>	African Clawless Otter	NT/LC	0	2	
<i>Ictonyx striatus</i>	Striped Polecat	LC/LC	0	1	
<i>Mellivora capensis</i>	Honey Badger	LC/NT	0	2	
<i>Poecilogale albinucha</i>	African Striped Weasel	LC/NT	0	2	
Viverridae		Genets & civets			
<i>Genetta genetta</i>	Small-spotted Genet	LC/LC	0	2	
<i>Genetta tigrina</i>	Cape Genet	LC/LC	SA	2	
Cercopithecidae		Old World Monkeys			
<i>Papio ursinus</i>	Chacma Baboon	LC/LC	0	2	
Bovidae		Antelope and relatives			
<i>Oreotragus oreotragus</i>	Klipspringer	LC/LC	0	1	
<i>Pelea capreolus</i>	Grey Rhebok	LC/NT	SA	1	
<i>Raphicerus campestris</i>	Steenbok	LC/LC	0	2	
<i>Raphicerus melanotis</i>	Cape Grysbok	LC/LC	SA	1	
<i>Sylvicapra grimmia</i>	Common Duiker	LC/LC	0	2	

Table 5: A checklist of amphibians that are known from or may potentially occur along the proposed Romansrivier powerline route. Conservation status according to IUCN and local (SA) listings include the following categories: Least Concern (LC) and Near Threatened (NT). Endemism is as follow: Endemic to South Africa, Lesotho and Swaziland (SA), endemic to Western Cape (WC). Scoring for likelihood of occurrence: known from the general region, but not likely to occur within the study area (0), possible occurrence (1) and probable occurrence (2). The respective SAFAP (Minter *et al.* 2004) records for each species and QDS are indicated.

Scientific name	English name	IUCN/SA	Endemism	Occur	Notes
Brevicipitidae		Rain frogs and relatives			
<i>Breviceps gibbosus</i>	Cape Rain Frog	NT/NT	WC	0	3319AC
<i>Breviceps montanus</i>	Mountain Rain Frog	LC/LC	WC	2	3319AC, AD
Bufonidae		Toads			
<i>Capensibufo tradouwi</i>	Tradouw Mountain Toadlet	LC/LC	WC	0	No SAFAP records, but known from this region
<i>Sclerophrys capensis</i>	Raucous Toad	LC/LC	SA	2	3319AC, AD
<i>Vandijkophrynus anguiceps</i>	Cape Sand Toad	LC/LC	SA	1	3319AC
<i>Vandijkophrynus gariensis</i>	Karoo Toad	LC/LC	SA	2	3319AD
Heleophryinidae		Ghost frogs			
<i>Heleophryne purcelli</i>	Cape Ghost Frog	LC/LC	WC	1	3319AD
Pyxicephalidae		Pyxicephalid frogs			
<i>Amietia fuscigula</i>	Cape River Frog	LC/LC	SA	2	3319AC, AD
<i>Arthroleptella bicolor</i>	Bainskloof Moss Frog	LC/LC	WC	0	3319AC; recorded from Waterfall Nature Reserve
<i>Cacosternum boettgeri</i>	Boettger's Caco	LC/LC	0	2	3319AC
<i>Cacosternum capense</i>	Cape Caco	NT/NT	WC	0	3319AC
<i>Strongylopus bonaespei</i>	Banded Stream Frog	LC/LC	WC	1	3319AC, AD
<i>Strongylopus grayii</i>	Clicking Stream Frog	LC/LC	0	2	3319AC, AD
<i>Tomopterna delalandii</i>	Cape Sand Frog	LC/LC	SA	2	3319AC, AD
Pipidae		Pipid frogs			
<i>Xenopus laevis</i>	Common Platanna	LC/LC	0	2	No SAFAP records, but known from this region

Table 6: A checklist of reptiles that are known from or may potentially occur along the proposed Romansrivier powerline route. Conservation status according to IUCN and local (SA) listings include the following categories: Not Evaluated (NE), Least Concern (LC), Near Threatened (NT) and Critically Endangered (CR). Endemism is as follow: Endemic to South Africa, Lesotho and Swaziland (SA), endemic to Western Cape (WC). Scoring for likelihood of occurrence: known from the general region, but not likely to occur within the study area (0), possible occurrence (1), probable occurrence (2) and confirmed occurrence (3). The respective SARCA (Bates *et al.* 2014) records for each species and QDS are indicated.

Scientific name	English name	IUCN/SA	Endemism	Occur	Notes
Pelomedusidae		Side-necked terrapins			
<i>Pelomedusa galeata</i>	South African Helmeted Terrapin	NE/LC	SA	2	No SARCA records, but known from this region
Testudinidae		Tortoises			
<i>Chersina angulata</i>	Angulate Tortoise	LC/LC	near SA	2	3319AC
<i>Homopus areolatus</i>	Parrot-beaked Tortoise	LC/LC	SA	2	3319AC
<i>Psammobates geometricus</i>	Geometric Tortoise	CR/CR	WC	1	3319AC, AD
Gekkonidae		Geckos			
<i>Afrogecko porphyreus</i>	Marbled Leaf-toed Gecko	LC/LC	SA	2	3319AC, AD
<i>Chondrodactylus bibronii</i>	Bibron's Gecko	NE/LC	0	2	3319AD
<i>Goggia hexapora</i>	Cederberg Pygmy Gecko	LC/LC	WC	2	3319AC, AD
<i>Goggia microlepidota</i>	Small-scaled Gecko	LC/LC	WC	0	3319AD
<i>Pachydactylus formosus</i>	Southern Rough Gecko	LC/LC	WC	2	3319AC, AD
<i>Pachydactylus geitje</i>	Ocellated Gecko	LC/LC	SA	2	3319AC, AD
Lacertidae		Lacertid lizards			
<i>Australolacerta australis</i>	Southern Rock Lizard	LC/LC	WC	1	3319AD
<i>Nucras tessellata</i>	Western Sandveld Lizard	NE/LC	0	1	No SARCA records, but known from this region
<i>Pedioplanis burchelli</i>	Burchell's Sand Lizard	LC/LC	SA	2	3319AC, AD
<i>Pedioplanis l. pulchella</i>	Common Sand Lizard	NE/LC	Near SA	2	3319AC
<i>Tropidosaura gularis</i>	Cape Mountain Lizard	LC/LC	SA	1	No SARCA records, but known from this region
<i>Tropidosaura m. montana</i>	Common Mountain Lizard	LC/LC	WC	2	3319AC

Table 6 (continued)

Scientific name	English name	IUCN/SA	Endemism	Occur	Notes
Cordylidae	Cordylid lizards				
<i>Chamaesaura anguina</i>	Cape Grass Lizard	NE/LC	0	2	3319AD
<i>Cordylus cordylus</i>	Cape Girdled Lizard	LC/LC	1	2	3319AC, AD
<i>Cordylus oelofseni</i>	Oelofsen's Girdled Lizard	NT/NT	WC	0	3319AC
<i>Hemicordylus capensis</i>	Cape Cliff Lizard	LC/LC	Near WC	1	No SARCA records, but known from this region
<i>Karusasaurus polyzonus</i>	Southern Karusa Lizard	LC/LC	0	2	3319AC, AD
<i>Pseudocordylus microlepidotus</i>	Cape Crag Lizard	LC/LC	0	2	3319AC, AD
Gerrhosauridae	Plated lizards				
<i>Tetradactylus seps</i>	Short-legged Seps	LC/LC	SA	2	No SARCA records, but known from this region
<i>Tetradactylus tetradactylus</i>	Cape Long-tailed Seps	LC/LC	SA	2	3319AC, AD
Scincidae	Skinks				
<i>Acontias meleagris</i>	Cape Legless Skink	LC/LC	SA	2	No SARCA records, but known from this region
<i>Trachylepis capensis</i>	Cape Skink	LC/LC	0	2	3319AC, AD
<i>Trachylepis homalocephala</i>	Red-Sided Skink	NE/LC	SA	2	3319AC, AD
<i>Trachylepis variegata</i>	Variegated Skink	NE/LC	0	2	3319AC
Agamidae	Agamid lizards				
<i>Agama atra</i>	Southern Rock Agama	LC/LC	0	2	3319AC, AD
<i>Agama hispida</i>	Spiny Ground Agama	LC/LC	0	2	3319AC
Chamaeleonidae	Chameleons				
<i>Bradypodion gutturale</i>	Little Karoo Dwarf Chameleon	LC/LC	WC	2	3319AC, AD

Table 6 (continued)

Scientific name	English name	IUCN/SA	Endemism	Occur	Notes
Typhlopidae	Blind snakes				
<i>Rhinotyphlops lalandei</i>	Delalande's Beaked Blind Snake	NE/LC	0	2	3319AC
Leptotyphlopidae	Thread snakes				
<i>Leptotyphlops nigricans</i>	Black Thread Snake	LC/LC	SA	2	3319AC
Lamprophiidae	Lamprophid snakes				
<i>Amplorhinus multimaculatus</i>	Cape Many-spotted Snake	LC/LC	0	2	3319AC
<i>Boaedon capensis</i>	Brown House Snake	NE/LC	0	2	No SARCA records, but known from this region
<i>Duberria lutrix</i>	Common Slug Eater	LC/LC	SA	2	3319AC, AD
<i>Homoroselaps lacteus</i>	Spotted Harlequin Snake	LC/LC	SA	2	3319AC
<i>Lamprophis guttatus</i>	Spotted Rock Snake	LC/LC	Near SA	2	3319AD
<i>Lycodonomorphus inornatus</i>	Olive Ground Snake	LC/LC	SA	2	No SARCA records, but known from this region
<i>Lycodonomorphus rufulus</i>	Brown Water Snake	NE/LC	0	2	No SARCA records, but known from this region
<i>Prosymna sundevallii</i>	Sundevall's Shovel-snout	LC/LC	0	2	3319AC, AD
<i>Psammophis crucifer</i>	Montane Grass Snake	LC/LC	0	2	3319AC, AD
<i>Psammophis notostictus</i>	Karoo Whip Snake	NE/LC	0	2	3319AC, AD
<i>Psammophylax rhombeatus</i>	Spotted Skaapsteker	NE/LC	0	2	3319AC, AD
<i>Pseudaspis cana</i>	Mole Snake	NE/LC	0	2	3319AC, AD
Colubridae	Colubrid snakes				
<i>Crotaphopeltis hotamboeia</i>	Herald Snake	NE/LC	0	2	No SARCA records, but known from this region
<i>Dasyplectis scabra</i>	Rhombic Egg Eater	LC/LC	0	2	3319AD
<i>Dispholidus typus</i>	Boomslang	NE/LC	0	2	No SARCA records, but known from this region

Table 6 (continued)

Scientific name	English name	IUCN/SA	Endemism	Occur	Notes
Elapidae	Cobras, mambas & relatives				
<i>Aspidelaps l. lubricus</i>	Coral Shield Cobra	NE/LC	0	2	3319AC
<i>Naja nigricincta woodi</i>	Black Spitting Cobra	NE/LC	0	1	3319AC
<i>Naja nivea</i>	Cape Cobra	NE/LC	0	2	3319AC, AD
Viperidae	Adders & vipers				
<i>Bitis arietans</i>	Puff Adder	NE/LC	0	2	3319AC
<i>Bitis rubida</i>	Red Adder	LC/LC	Near WC	1	No SARCA records, but known from this region
<i>Bitis atropos</i>	Berg Adder	LC/LC	0	2	3319AC