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Ngwedi Substation

Ground Truthing for Environmental Management Plan

by

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EXECUTIVE SUMMARY

- An Environmental Management Program (EMPR) was carried out between the proposed Ngwedi (Mogwase) Substation and associated transmission power line turn-ins in August 2012. The focus of the study was on-site substation specific verification as well as overall habitat assessment
- On site mitigation measures were provided..
- Identified protected trees for the area include Maroela, Tamboti, Baobab, Leadwood, Camel Thorn and Sheppard Bush. No protected species were found within the substation footprint.
- The substation footprint is situated on an area of low sensitivity. However, peripheral activities such as road construction need to take into account surrounding sensitive habitats.

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INTRODUCTION

Enviro-Insight CC was appointed by Baagi on a sub-contractual agreement, headed by Eskom (herewith known as the client), to conduct a ground truthing walkdown verification, forming part of the Environmental Management Plan (herewith referred to as EMP) for the proposed Ngwedi (Mogwase) Substation in the North-West Province, South Africa.

The scope of the agreement was to conduct a general Ecological (flora and fauna) EMP assessment focusing on the establishment of the substation footprint. The focus of the study was to conduct an onsite sensitivity verification of the ecological habitat, within the overall demarcated substation area. The substation area was situated at the begining of the two transmission lines of approximately 25 km each. The fieldwork for the study took place in August 2012, representing late winter dry-season conditions. The fieldwork was carried out by the author (Samuel Laurence) and associates.

The purpose of an Ecological EMP is designed as a framework for the implementation of management recommendations for all parties involved in the construction of the Eskom substations. All parties must be made fully aware of the potential impacts (derived from both the EIA and EMP) and subsequent mitigation measures for said negative impacts. Finally, all parties must be made aware as to the penalties of non-compliance with the stipulations of the EIA and EMP. The interested parties include:

- Construction engineers
- Contract managers
- Contractor construction teams

In addition, a number of other interested parties must be involved on a more peripheral level, yet are equally important in ensuring compliance with the overall process and the Record of Decision (ROD). These include:

- The client, namely Eskom Transmission division
- The Environmental Audit Team
- Environmental Control Officers
- Project Managers from all groups
- Landowners
- Environmental specialists
- Other Interested and Affected Parties (IAPs)

TERMS OF REFERENCE

- A literature review of the floral and faunal communities within the study site.
- Conduct an on site verification for the proposed line substation, focusing on the proposed project footprint.
- Identify mitigation measures (including pylon relocations) regarding the negative impacts on the ecological community.
- Prepare the ecological Environmental Management Plan (EMP).

BACKGROUND INFORMATION

1.1 LOCATION AND LAND USE

The study was carried out on the Ngwedi (Mogwase) Substation and associated transmission power line turn-ins, 10 km from the Sun City complex, adjacent to the Pilanesberg National Park, North-West Province. The proposed lines traverse a variety of habitats, including open thornveld, open to closed ridge habitat, open grassland on vertic soils and rocky drainage line. The land use varies between cattle farms, municipal/tribal lands and unaffiliated ridges, with the line running adjacent to an existing mine. Various farm infrastructures such as cattle kraals, irrigation systems, housing structures and artificial waterholes are also represented within the line corridor. Figure 1 shows the footprint of the proposed substation as well as the full extent of the associated transmission line on a regional and national scale.

1.2 FLORAL COMMUNITIES

The majority of the habitat consists of thornveld, varying structurally between closed and open. Some stretches of broadleaf ridge habitat and drainage line associated vegetation were also present. Mucina and Rutherford (2006) list the vegetation types as;

- Goldreef Mountain Bushveld (surrounding habitat)
- Zeerust Thornveld (on site vegetation type)

The transmission line overlaid with the regional vegetation types have been mapped as Figure 2.

Goldreef Mountain Bushveld

This vegetation type occurs on the ridge habitats within the servitude area. Structure is variable but tall semi-closed stands of protected trees are strongly associated with significant heritage sites within the line servitude. Dominant species include *Combretum sp's Spirostachys africana, Sclerocarrya birrea*, *Gymnosporia sp's* and *Acacia sp's*. The conservation status is listed as Least Threatened. However, the prevalence of protected trees and sensitive faunal habitat as well as significant heritage sites under the servitude has increased the overall sensitivity of this habitat.

Zeerust Thornveld

The Zeerust thornveld represents the primary vegetation type along the line. Structure varies from open vertic grasslands to *Acacia* dominated thornveld. Vertic soils predominated with infusions of sandy loams and intermittent drainage line associated rock structures. Herbaceous layer is prevalent, with grass quality dependent on grazing pressure. The conservation status is listed as Least Threatened.

In addition to the vegetation types listed by Mucina and Rutherford (2006), three primary structural sub-vegetation type have been identified for the substation footprint and immediately surrounding areas. These include:

- Open grasslands on vertic soil
- Open grasslands
- Open-semi closed thornveld

1.3 FAUNAL COMMUNITIES

For the purpose of this document, the faunal communities are represented by all taxa, excluding avifauna (birds), which are addressed separately. The faunal species are mostly free roaming bushveld associates, with an expected representation of lagomorphs; mesopredators, small to medium sized ungulates as well as smaller faunal taxa such as herpetofauna (reptiles and amphibians) as well as invertebrates, naturally occurring and are not subject to management practices.

General Impacts

The impacts on flora and faunal communities by the creation of the substation are represented in a number of ways, namely;

- Vegetation clearing for line servitude and for line stringing
- Substation footprint specific impacts such as clearing and land scarring of vertic soils
- Establishment of maintenance infrastructure such as road servitudes

Sensitivity

The sensitivity scale as shown in subsequent sensitivity mapping is described as follows:

High – RED

- Low levels of disturbance/transformation
- High forage potential
- Strong connectivity with other important habitats
- High refugia potential
- Relatively high vegetative and physical structural diversity
- Relatively low resilience to environmental impacts
- Relatively high ecosystem uniqueness

Low – GREEN

- Relatively high levels of disturbance/transformation
- Low to moderate forage potential
- Low to moderate connectivity with other important habitats
- Low to moderate refugia potential
- Low to medium levels of vegetative and physical structural diversity
- Relatively high to moderate resilience to environmental impacts
- Low levels of regional uniqueness.

Floristically Sensitive Habitats

The overall habitat within the substation footprint is not regionally or nationally threatened. Therefore, sensitivity must be assessed on a site specific basis. For the purposes of the study, sensitivity ratings were based on the presence and relative density of protected tree species and presence of associated sensitive habitat types such as drainage lines/rock ridges. The relevance of this floristic aspect is described in further detail under the impacts section.

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Faunally Sensitive Habitats

From an overall faunal perspective, the habitat types within the corridor are not considered to be sensitive on a large scale, but rather on a site specific basis. Immediate impacts include trampling and overgrazing effects from livestock and wildlife mismanagement. Although a number of red data species in the area are considered to be red-data, the nature of the power line and a small scale substation development are relatively LOW impact on most of the larger, more mobile species. It is the more sedentary species, or those species relying upon sensitive habitats that may be at risk from the development process. Overall, from a terrestrial fauna perspective, the proposed substation development represents a relatively low impact development type. However, from a faunal perspective, the potential sensitive habitat types are described below.

Seasonal pans and drainage lines

Seasonal pans are extremely important faunal habitats due to the limited surface area they encompass and the highly specific set of ecological conditions that they represent. There are a number of important taxa to consider in association with the pan and drainage systems.

Amphibians and reptiles (herpetofauna): The seasonal pan systems provide breeding habitat amphibians, including the highly specialised protected (NEEMA) African bullfrog *Pyxicephalus edulis.* Du Preez & Carruthers (2009) list the African Bullfrog species *(Pyxicephalus edulis)* as protected. Drainage line systems provide movement corridors for herpetofaunal species.

Terrestrial vertebrates: The seasonal pans provide drinking water for terrestrial species, whilst drainage line systems provide movement corridors for such species. Pan systems on area near the Ngwedi transmission line are high in mineral salts, which meet the requirements for ungulate species.

Termitaria, artificial rock refugia and drainage line associated rock ridges

The above listed habitats are extremely important for a number of reasons. Firstly, they represent highly specific micro habitats which provide both forage and refuge for many species of reptiles and small mammals. Termitaria are strongly linked with the aardvark *Orycteropus afer*, a highly important keystone species which create vital breeding and refugia habitat for a variety of species which are addressed below. The same can be said for artificial rock habitats which have been created by human settlements but have become an important part of the ecology of the system over many hundreds of years. Information on specific taxa dependent on these habitat types are provided below.

Small mammals: Small mammals are associated with all of the above habitats, especially drainage line ridges and artificial rock refugia habitats. Larger carnivores: large carnivores such as leopard *Panthera pardus* (IUCN Near Threatened), brown hyaena *Parahyaena brunnea* (IUCN Near Threatened), *Mellivora capensis* (IUCN Near Threatened).Smaller carnivores: similar to larger carnivores, small carnivores also make extensive use of termitaria for breeding and diurnal refugia. Relevant

species include black-backed jackal, African wildcat, honey badger (IUCN listed Near Threatened) and caracal. Ungulates and small herbivores: Suids (warthogs and bushpigs) readily take refuge in Aardvark holes found within termitaria. Small herbivores such as porcupines and lagomorphs (rabbits) also reside during daylight hours within these habitats and although they are not listed as red-data, these species are vital in terms of their role in the trophic food chain.

Reptiles: Many reptile species reside in termitaria/rock refugia (both natural and artificial) due to the fact that the internal cavities maintain a consistent temperature as well as providing refugia from predators. Some reptile species are termitaria obligates, including the plated lizard *Gerrhosaurus major*. Other species depend heavily on aardvark excavations, including the African python *Python natalensis* (IUCN Near Threatened) which has previously been recorded in the area by the author in an area adjacent to the study area. The presence is supported by distribution data from SARCA.

In regards to the study, the primary faunal groups of concern are herpetofauna. The reasons for this are three-fold:

- Many herpetofaunal species exhibit low mobility and are associated with suitable habitats.
- Some herpetofaunal species exhibit highly specific breeding preferences and depend on suitable habitat types in order to reproduce. Relevant examples for the study area include African bullfrog (seasonal pans) and South African python.(rock outcrops and associated drainage lines).
- Most herpetofaunal species exhibit some degree of hibernation, in which appropriate habitats such as rock refugia are extremely important on a local scale.

The Southern African Reptile Conservation Assessment (SARCA; http://vmus.adu.org.za/) and the Southern African Frog Atlas Project (SAFAP; http://vmus.adu.org.za/) provide distribution data at the quarter degree square (QDS) resolution. Expected species lists may therefore represent an overestimation of the diversity expected as very specific habitat types may be required by a species which may be present in a QDS but not necessarily on the study site within the QDS. Conversely, many large areas in South Africa are poorly sampled for herpetofauna and expected species lists may therefore underestimate the species diversity. For this reason, the expected species list was drawn not only from the QDS's on which the proposed power lines are situated (2526BD and 2527AC) but also from all of the 10 surrounding QDS's (2526BA, 2526BB, 2526BC, 2526DA, 2526DB, 2527AA, 2527AB, 2527AD, 2527CA, 2527CB). This increase the likelihood of obtaining a species list that suffers less from poor sampling in the area. However, it also artificially inflates the expected number of species because many different habitats in the surrounding QDS's may not be present on the study site. The full list of the herpetofaunal species that may occur on site are shown in Appendix 1.

The sections of line identified as sensitive are shown in Figure 3 shows the sensitivity of the substation in context of the area. Figure 4 shows photographic examples of the vegetation types within the footprint area. Figure 5 shows photographic

examples of the sensitive habitat types located on site. Figure 6 shows photographic examples of some of the current impacts occurring on the line.

METHODS

The methods were split into two sections, namely desktop and the on site verification. The desktop component primarily involved overlaying the sub station footprint and pylon positions onto Google images and examining the area for sensitive vegetation types. The focus of the fieldwork centred on a verification approach, where, basic habitat conditions were noted (soils, dominant vegetation, presence of ridges or wetlands) and the project footprint given clearance. Once the data was collected, it was fed into an unspecified format (as no official template or have terms of reference have been provided) for impact analysis and mitigation/recommendation.

1.4 ENVIRONMENTAL MANAGEMENT PLAN

The environmental management plan was formulated based on a number of aspects,

- Explanation of the specific floral or faunal impact
- Understanding the magnitude of the impact in relation to the specific taxa
- Provision of general recommendations to all relevant parties.

Table 1: The significance of the impact was calculated using the following definitions.

Impact magnitude – the degree of change brought about in the environment	
Spatial Scale	**On-site** – impacts that are limited to the project site.
	Project area (local) – impacts that are limited to the project site and adjacent areas.
	Regional – impacts that are experienced at a regional scale e.g. North-West Province
	National – impacts that are experienced at a national scale
	Tran boundary/International – impacts that are experienced at

	an international scale i.e. affecting another country or international waters.
Temporal Scale	**Short-term** – impacts that are predicted to last only for the duration exploration activities (i.e. 2 years). **Long-term** – impacts that will continue for the life of the project, but ceases when the project stops operating (i.e. 30 years). **Temporary** – impacts are predicted to be reversible and will return to a previous state when the impact ceases or after a period of recovery. **Permanent** – impacts that cause a permanent change in the affected receptor or resource that endures substantially beyond the project lifetime. **Long term** – impacts that occur continuously or frequently. **Intermittent –** impacts that are occasional or occur only under specific circumstances

Magnitude therefore describes the actual change that is predicted to occur in the resource or receptor (e.g. the degree of impact on the livelihoods of a local community; the probability (likelihood) and consequences in terms of accidental events).

An assessment of the overall magnitude of an impact is therefore provided taking into account all the dimensions of the impact above presented in order to determine whether an impact is of low, medium or high magnitude. For impacts on ecological resources, the criteria used to assess the magnitude of impacts are

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BOX 1 MAGNITUDE CRITERIA FOR ECOLOGICAL IMPACTS

A **High Magnitude Impact** affects an entire population or species at sufficient magnitude to cause a decline in abundance and/or change in distribution beyond which natural recruitment (reproduction, immigration from unaffected areas) would not return that population or species, or any population or species dependent upon it, to its former level within several generations*. A high magnitude impact may also adversely affect the integrity of a site, habitat or ecosystem.

A **Moderate Magnitude Impact** affects a portion of a population and may bring about a change in abundance and/or distribution over one or more generations*, but does not threaten the integrity of that population or any population dependent on it. A moderate magnitude impact may also affect the ecological functioning of a site, habitat or ecosystem but without adversely affecting its overall integrity. The area affected is also important.

A **Low Magnitude Impact** affects a specific group of localized individuals within a population over a short time period (one generation* or less) but does not affect other trophic levels or the population itself.

* These are generations of animal / plant species under consideration not human generations. It should be noted that the restoration potential of an affected habitat also needs to be considered in applying the above criteria.

Sensitivity of Resources and Receptors

The significance of an impact of a given magnitude will depend on the sensitivity of resources and receptors to that impact. For ecological impacts sensitivity can be assigned as low, medium or high based on the conservation importance of habitats and species. For habitats, these are based on naturalness, extent, rarity, fragility, diversity and importance as a community resource.

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RESULTS AND DISCUSSION (RECOMMENDATIONS)

1.5 SUB-STATION SPECIFIC INFORMATION

The substation is situated on "old fields" which are equated to highly disturbed agricultural lands. The areas show mainly vertic soils and no trees of protected status. The grass basal layer varies between medium grazing potential to low grazing potential based on a brief assessment of the INDICATOR value of the species, with the sub-optimal season limiting the ability to carry out an acurate quantification. The faunal potential of the sub-station site is low, due to a lack of suitable refugia and forage potential. Any resident species will be displaced from the area, limiting the direct disturbance on faunal species.

It must be stated that although the substation footprint is situated upon an area of LOW sensitivity, associated construction impacts may impinge upon sensitive habitats. For example, access roads that serve the sub station infrastructure have NOT been demarcated and it is imperative that on site ECO's monitor peripheral impacts as well as the on site construction activities, so as surrounding sensitive habitats are not affected.

All recommendations, designed to mitigate the impacts of the construction process should be documented by the ECO and relayed to the constructor for implementation.

1.6 FAUNAL ANALYSIS

There are a number of significant impacts which may directly influence faunal assemblages within the sub station footprint. The impacts, in context to the impact analysis are described below.

Impact: Destruction of sensitive faunal habitats.

Activities: Permanent placement of infrastructure and servitude roads on identified sensitive areas, mechanical destruction due to machinery.

Phases: Construction and operation

Description: The use of machinery such as bulldozers and large transport vehicles can often be highly detrimental to sensitive habitats such as wetlands. The mechanical action of construction machinery can cause indiscriminate vegetation destruction, soil trampling and compaction effects and localised erosion. In addition, the actual establishment of the infrastructure and servitude roads can be hazardous to these habitats, as the base areas require extensive excavation of the foundations.

Nature of Impact	negative
Probability	probable
Extent	project area
Duration	long term
Type	direct
Magnitude	low
Significance	low

Recommendations

- Drainage lines and pans must be excluded from all heavy construction activities.
- Termitaria should be excluded from all heavy construction activities where possible.
- The ECO should be present in an advisory role during clearing activities.
- Regular monitoring of the construction process, especially in identified sensitive habitats should be carried out by the ECO all through the construction phase.

Impact: Displacement of faunal species due to noise effects.

Activities: Clearing of vegetation, pylon construction, line stringing

Phases: Primarily construction phase.

Description: All phases of the operation will have certain negative noise effects. The primary sources of the noise will be diesel engines, generators and workers. Noise influences can be divided into two types, i.e. constant noise effects (engines, generators) and sporadic noise effects (explosives). Although no quantitative data is available on the issue, it is highly likely that many faunal species will be (albeit temporarily) displaced by construction activities.

Nature of Impact	negative
Probability	probable
Extent	project area
Duration	intermittent events with potential long term displacement effects

Type	direct
Magnitude	low
Significance	low

Recommendations

- The effects of noise are in all likelihood, unavoidable. The effects can be monitored carefully by the ECO and adaptive management applied where necessary.
- Due to the low sensitivity of the sub station footprint, construction can take place at any time.

Impact: Interruption of animal breeding due to inappropriate timing of construction activities

Activities: Construction, vegetation clearing, strong influx of machinery and associated disturbance factors during spring

Phases: Primarily construction phase.

Description: Construction activities during spring months may cause large scale disruptions to breeding activities of resident ungulates. Low scale disturbance may involve disruption of normal rutting and mating behaviour will large scale, continuous disruption may cause extremely high stress conditions and associated abortions of young by females.

Nature of Impact	negative
Probability	moderate
Extent	project area
Duration	intermittent events with potential long term effects/long term
Type	direct
Magnitude	low
Significance	low

Recommendations

- The end goal is for an absolute minimum interference with both free roaming and "farmed" wildlife.
- Due to the low sensitivity of the sub station footprint, intensive mitigation is not deemed to be necessary.

Impact: Increased unsustainable utilisation of faunal species due to increased access of humans to the area.

Activities: Clearing of vegetation, establishment of towers, and maintenance of towers.

Phases: Construction and operation

Description: Increased access to faunal habitats may increase the incidence of unsustainable poaching practices. During both the walk down and tree marking operation, a number of snares were located and subsequently dismantled. Snares are non-specific and may be as likely to cause the death of highly important, red-data species such as cheetahs as less sensitive free roaming ungulates such as warthogs. Photographic evidence of snares on site is shown in Figure 6.

Nature of Impact	negative
Probability	probable
Extent	project area
Duration	intermittent events
Type	direct
Magnitude	low
Significance	low

Recommendations

- Establishment of a "Zero Tolerance" approach to poaching
- Strict monitoring of construction and maintenance crew activities by the ECO

Impact: Establishment of refugia habitat (the substation) resulting in on-site killing of large or venomous snakes (including red-data pythons), giving rise to health and safety issues

Activities: Construction activities

Phases: Construction and operation

Description: It is axiomatic to bushveld environments that large snakes will be frequently encountered. Attempts to kill such animals can either lead to the loss of a red-listed species such as the African python *Python* natalensis (Near Threatened) or alternatively, to a snake bite from a potentially dangerous species.

Nature of Impact	negative
Probability	probable
Extent	project area
Duration	short term
Type	direct
Magnitude	low
Significance	low

Recommendations

- Appropriate inductions should take place for all construction and maintenance staff. This service is offered by bodies such as Enviro-Insight CC.
- No attempt should ever be made to remove or kill large snakes. A local specialist should be called in the event of any encounters.
- Snake safety inductions should be carried out for staff working on the lines and the sub station.

1.7 FLORAL ANALYSIS

Impact: Clearing of protected tree species.

Activities: General clearing of vegetation for sub station footprint creation.

Phases: Primarily construction but to a lesser extent operation (maintenance).

Description: There are six species of protected tree species that are found within the region, namely tambotie *Spirostachys* africana, maroela *Sclerocarrya birrea* caffra, Sheppard's tree *Boscia albitrunca*, Baobab *Adansonia* digitata, camel thorn *Acacia erioloba* and leadwood *Combretum imberbe.* During the construction phase, the project footprint will not impinge upon senstive vegetation types as NO PROTECTED TREES are located within the substation footprint. However, road servitudes leading to the substation may impinge upon, all vegetation, including protected trees.

Nature of Impact	**negative**
Probability	**definite**
Extent	**project area**
Duration	**intermittent events with potential long term effects/long term**
Type	**direct**
Magnitude	**moderate**
Significance	**moderate**

Recommendations

- The ECO should be present in an advisory capacity during road creation and tree removal.
- All protected trees, in accordance to legislation and common practice, are marked.
- Firewood is not to be removed from the line corridor.

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FIGURES

Figure 1: The extent of the Ngwedi line in a regional context.

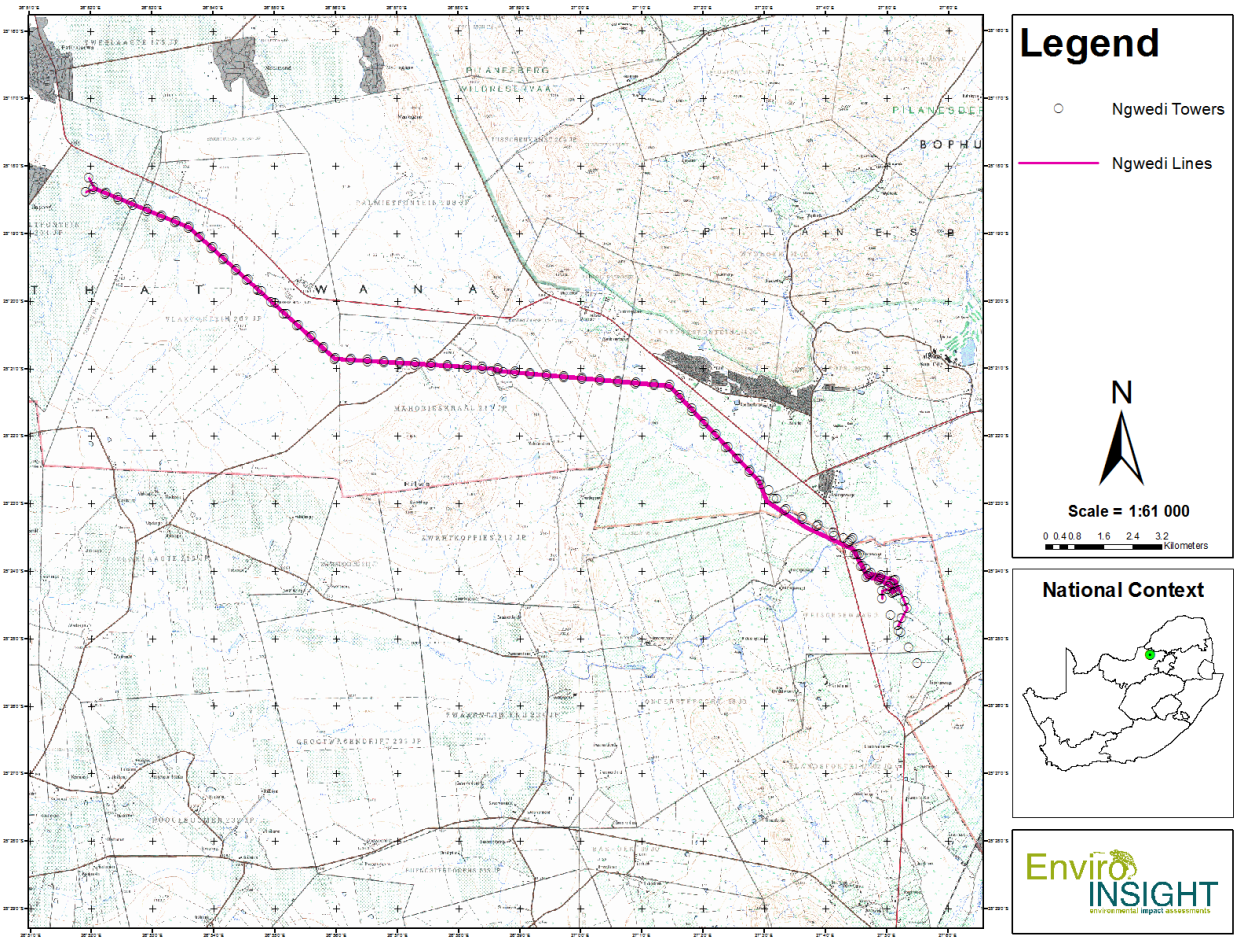

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Figure 2: Vegetation types associated with the Ngwedi powerline and substation.

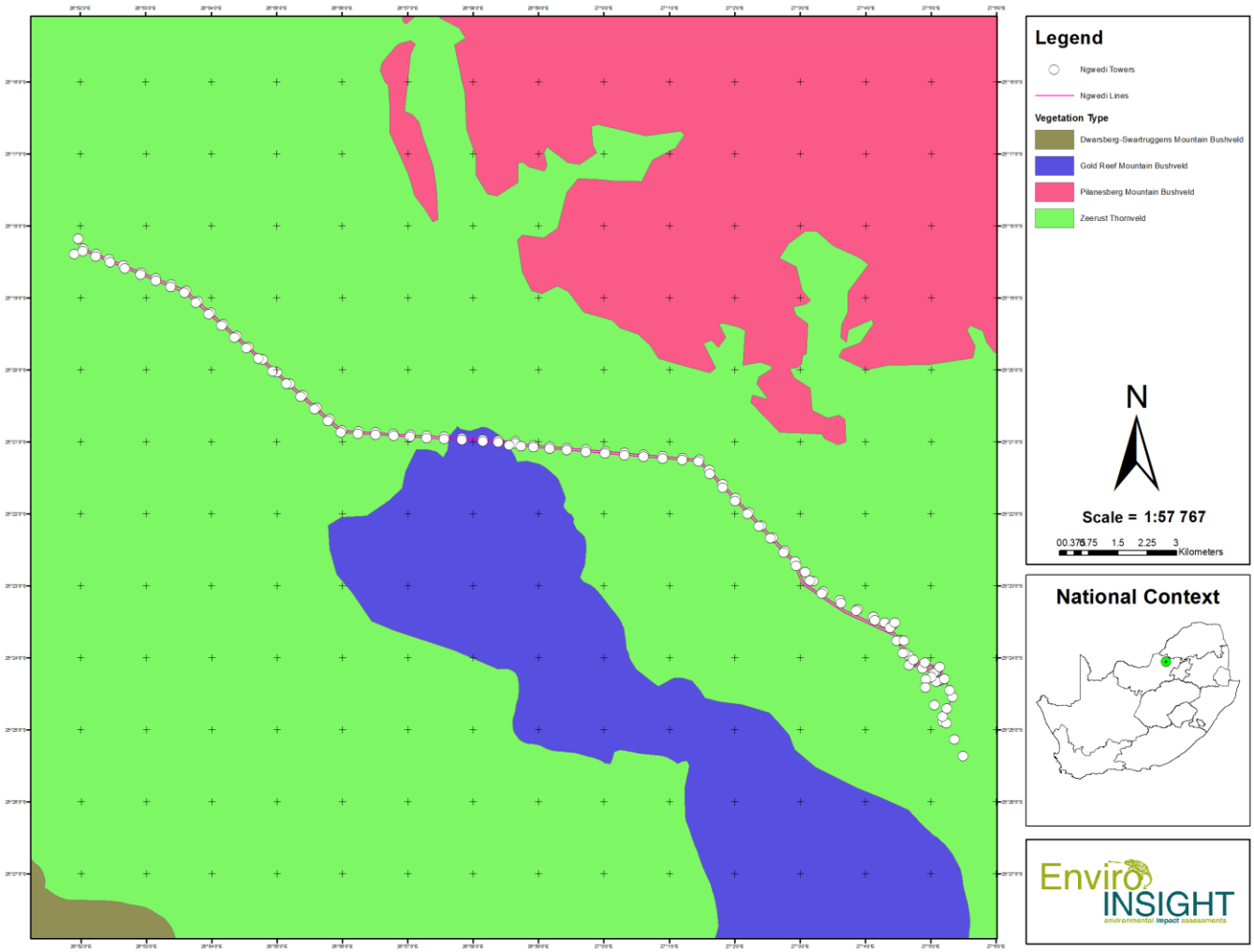

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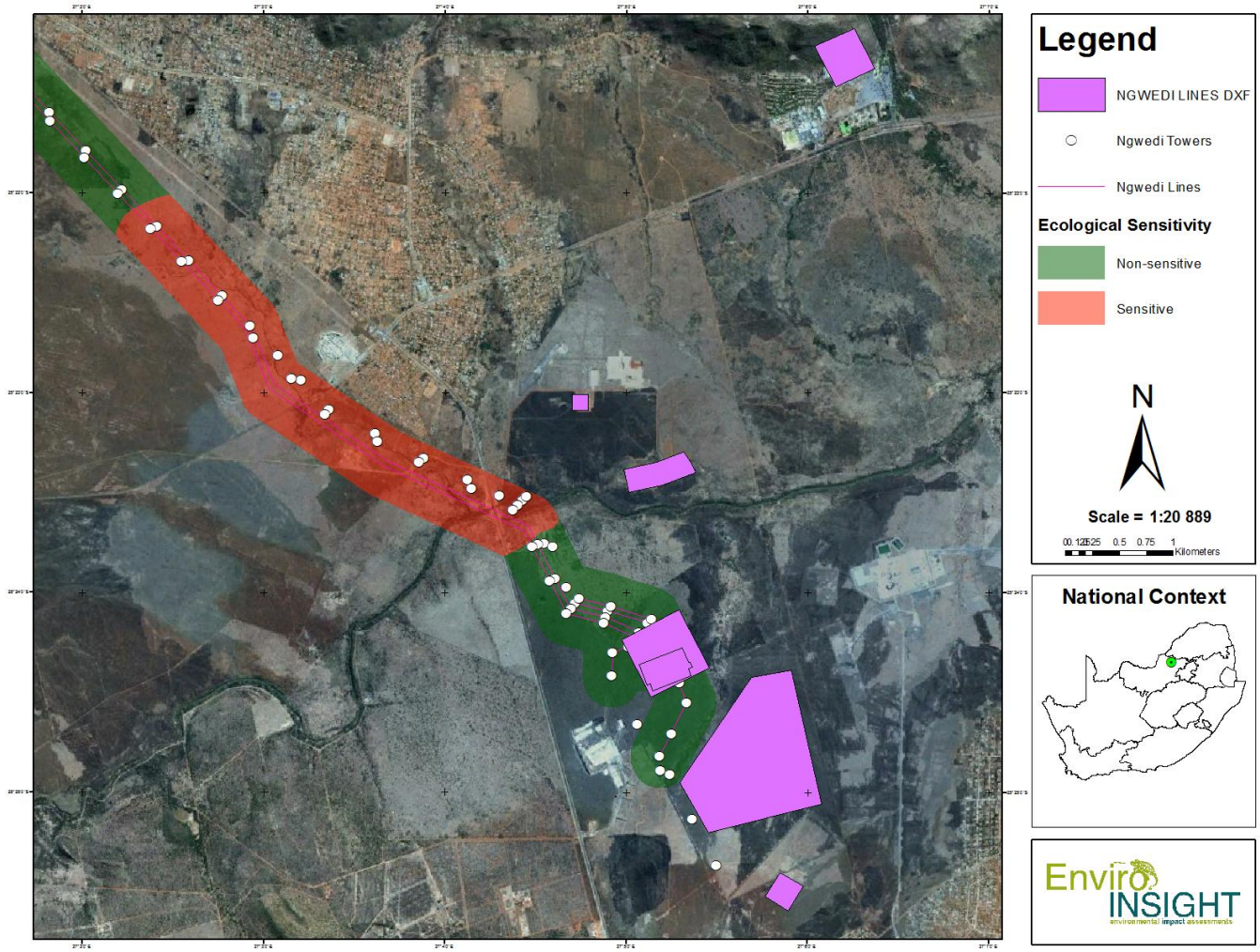
Figure 3: Substation footprint overlayed with local habitat sensitivity. The substation is situated on a non-sensitive area at the beginning at of the line corridor.



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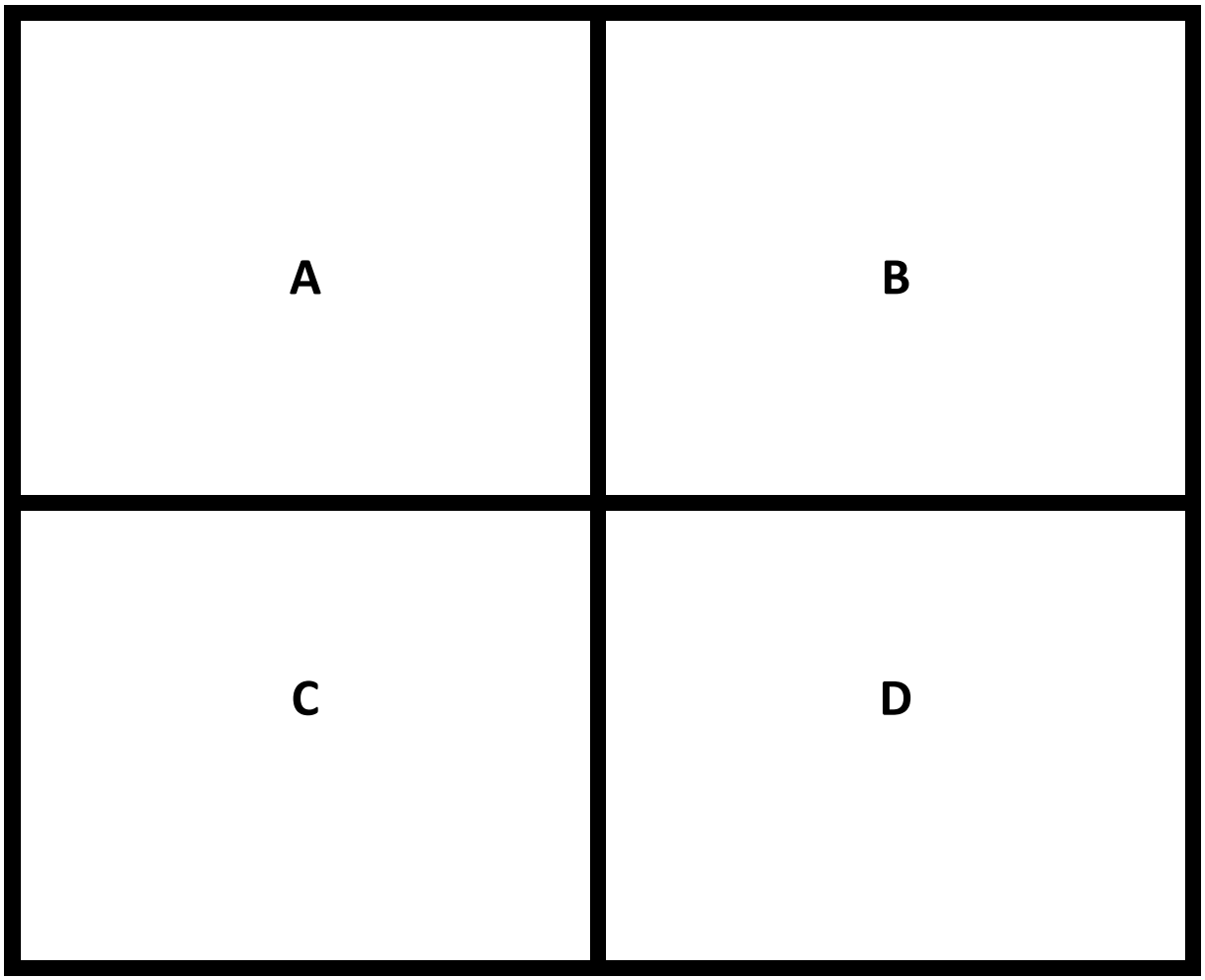
Ordering of collage presented for photographic evidence.



The photographic evidence is presented in a quadrant, divided into A, B, C and D in the exact order as shown above. Summaries of each Quadrant are presented below each collage.

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Figure 4: Photographic examples of habitat types found within the substation footprint

A) Open grassland

B) Open grassland on vertic soils

Figure 5: Photographic examples of sensitive habitats found within the region

A) Rock refugia habitat adjacent to drainage systems

B) Aardvark/termitaria refugia

Figure 6: Photographic examples of current impacts found within the region

A) Uncontrolled burning

B) Invasive species

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Appendix 1: SARCA reptile herpetofaunal data showing likelihood of occurrences for species found within the region.

Family	Genus	Species	Subspecies	Common name	Red list category
Agamidae	*Acanthocercus*	*atricollis*	*atricollis*	Southern Tree Agama	Not Evaluated
Agamidae	*Agama*	*aculeata*	*distanti*	Distant's Ground Agama	Not Evaluated
Agamidae	*Agama*	*atra*		Southern Rock Agama	Not Evaluated
Atractaspididae	*Aparallactus*	*capensis*		Black-headed Centipede-eater	Not Evaluated
Atractaspididae	*Atractaspis*	*bibronii*		Bibron's Stiletto Snake	Not Evaluated
Boidae	*Python*	*natalensis*		Southern African Python	Not Evaluated
Chamaeleonidae	*Chamaeleo*	*dilepis*	*dilepis*	Common Flap-neck Chameleon	Not Evaluated
Colubridae	*Boaedon*	*capensis*		Brown House Snake	Not Evaluated
Colubridae	*Crotaphopeltis*	*hotamboeia*		Red-lipped Snake	Not Evaluated
Colubridae	*Dasypeltis*	*scabra*		Rhombic Egg-eater	Not Evaluated
Colubridae	*Dispholidus*	*typus*	*typus*	Boomslang	Not Evaluated
Colubridae	*Gonionotophis*	*capensis*	*capensis*	Common File Snake	Not Evaluated
Colubridae	*Lycodonomorphus*	*rufulus*		Brown Water Snake	Not Evaluated
Colubridae	*Lycophidion*	*capense*	*capense*	Cape Wolf Snake	Not Evaluated
Colubridae	*Philothamnus*	*hoplogaster*		South Eastern Green Snake	Not Evaluated
Colubridae	*Philothamnus*	*semivariegatus*		Spotted Bush Snake	Not Evaluated
Colubridae	*Prosymna*	*bivittata*		Two-striped Shovel-snout	Not Evaluated
Colubridae	*Prosymna*	*sundevallii*		Sundevall's Shovel-snout	Not Evaluated
Colubridae	*Psammophis*	*angolensis*		Dwarf Sand Snake	Not Evaluated
Colubridae	*Psammophis*	*brevirostris*		Short-snouted Grass Snake	Not Evaluated
Colubridae	*Psammophis*	*subtaeniatus*		Western Yellow-bellied Sand Snake	Not Evaluated
Colubridae	*Psammophylax*	*tritaeniatus*		Striped Grass Snake	Not Evaluated
Colubridae	*Telescopus*	*semiannulatus*	*semiannulatus*	Eastern Tiger Snake	Not Evaluated
Colubridae	*Thelotornis*	*capensis*	*capensis*	Southern Twig Snake	Not Evaluated
Cordylidae	*Cordylus*	*jonesii*		Jones' Girdled Lizard	Not Evaluated
Cordylidae	*Cordylus*	*vittifer*		Common Girdled Lizard	Not Evaluated
Elapidae	*Dendroaspis*	*polylepis*		Black Mamba	Not Evaluated
Elapidae	*Naja*	*annulifera*		Snouted Cobra	Not Evaluated
Elapidae	*Naja*	*mossambica*		Mozambique Spitting Cobra	Not Evaluated
Gekkonidae	*Chondrodactylus*	*turneri*		Turner's Gecko	Not Evaluated
Gekkonidae	*Homopholis*	*walbergii*		Wahlberg's Velvet Gecko	Not Evaluated
Gekkonidae	*Lygodactylus*	*capensis*	*capensis*	Common Dwarf Gecko	Not Evaluated
Gekkonidae	*Pachydactylus*	*affinis*		Transvaal Gecko	Not Evaluated
Gekkonidae	*Pachydactylus*	*capensis*		Cape Gecko	Not Evaluated
Gerrhosauridae	*Gerrhosaurus*	*flavigularis*		Yellow-throated Plated Lizard	Not Evaluated
Lacertidae	*Ichnotropis*	*squamulosa*		Common Rough-scaled Lizard	Not Evaluated
Lacertidae	*Nucras*	*holubi*		Holub's Sandveld Lizard	Not Evaluated
Lacertidae	*Nucras*	*intertexta*		Spotted Sandveld Lizard	Not Evaluated
Leptotyphlopidae	*Leptotyphlops*	*distanti*		Distant's Thread Snake	Not Evaluated
Leptotyphlopidae	*Leptotyphlops*	*scutifrons*	*scutifrons*	Peters' Thread Snake	Not listed
Pelomedusidae	*Pelomedusa*	*subrufa*		Marsh Terrapin	Not Evaluated

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Pelomedusidae	*Pelusios*	*sinuatus*		Serrated Hinged Terrapin	Not Evaluated
Scincidae	*Acontias*	*occidentalis*		Western Legless Skink	Not Evaluated
Scincidae	*Afroablepharus*	*walbergii*		Wahlberg's Snake-eyed Skink	Not Evaluated
Scincidae	*Mochlus*	*sundevallii*	*sundevallii*	Sundevall's Writhing Skink	Not Evaluated
Scincidae	*Trachylepis*	*capensis*		Cape Skink	Not Evaluated
Scincidae	*Trachylepis*	*punctatissima*		Speckled Rock Skink	Not Evaluated
Scincidae	*Trachylepis*	*sp. (Transvaal varia)*		Skink sp. 1	Not listed
Scincidae	*Trachylepis*	*varia*		Variable Skink	Not Evaluated
Testudinidae	*Kinixys*	*lobatsiana*		Lobatse Hinged Tortoise	Not Evaluated
Testudinidae	*Kinixys*	*spekii*		Speke's Hinged Tortoise	Not Evaluated
Testudinidae	*Stigmochelys*	*pardalis*		Leopard Tortoise	Not Evaluated
Typhlopidae	*Afrotyphlops*	*bibronii*		Bibron's Blind Snake	Not Evaluated
Typhlopidae	*Rhinotyphlops*	*lalandei*		Delalande's Beaked Blind Snake	Not Evaluated
Varanidae	*Varanus*	*albigularis*	*albigularis*	Rock Monitor	Not Evaluated
Varanidae	*Varanus*	*niloticus*		Water Monitor	Not Evaluated
Viperidae	*Bitis*	*arietans*	*arietans*	Puff Adder	Not Evaluated
Viperidae	*Bitis*	*caudalis*		Horned Adder	Not Evaluated
Viperidae	*Causus*	*rhombeatus*		Rhombic Night Adder	Not Evaluated

Family	Genus	Species	Subspecies	Common name	Red list category
Brevicepitidae	*Breviceps*	*adspersus*			Least Concern
Bufonidae	*Amietophrynus*	*garmani*			Least Concern
Bufonidae	*Amietophrynus*	*gutturalis*			Least Concern
Bufonidae	*Amietophrynus*	*poweri*			Least Concern
Bufonidae	*Amietophrynus*	*rangeri*			Least Concern
Bufonidae	*Poyntonophrynus*	*fenoulheti*			Least Concern
Bufonidae	*Poyntonophrynus*	*vertebralis*			Least Concern
Bufonidae	*Schismaderma*	*carens*			Least Concern
Hyperoliidae	*Kassina*	*senegalensis*			Least Concern
Microhylidae	*Phrynomantis*	*bifasciatus*			Least Concern
Phrynobatrachidae	*Phrynobatrachus*	*natalensis*			Least Concern
Pipidae	*Xenopus*	*laevis*			Least Concern
Ptychadenidae	*Ptychadena*	*anchietae*			Least Concern
Ptychadenidae	*Ptychadena*	*mossambica*			Least Concern
Pyxicephalidae	*Amietia*	*angolensis*		Common or Angola River Frog	Least Concern
Pyxicephalidae	*Cacosternum*	*boettgeri*			Least Concern
Pyxicephalidae	*Pyxicephalus*	*adspersus*			Least Concern
Pyxicephalidae	*Pyxicephalus*	*edulis*			Least Concern
Pyxicephalidae	*Strongylopus*	*fasciatus*			Least Concern
Pyxicephalidae	*Tomopterna*	*cryptotis*			Least Concern
Pyxicephalidae	*Tomopterna*	*krugerensis*			Least Concern
Pyxicephalidae	*Tomopterna*	*natalensis*			Least Concern
Rhacophoridae	*Chiromantis*	*xerampelina*			Least Concern