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Herpetofauna Habitat Assessment

of

MOKOLO – CROCODILE RIVER WATER PIPELINE PHASE 1

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1. INTRODUCTION

Galago Environmental CC was appointed to undertake a reptile and amphibian habitat survey of the proposed route along which the Mokolo – Crocodile River water pipeline is to be constructed, from the Mokolo Dam to near Lephale and then to Steenbokpan

The objective was to determine which species might still reside on the site. Special attention had to be given to the habitat requirements of all the Red Data species, which may occur in the area. This survey focuses on the current status of threatened herpetofauna species occurring, or which are likely to occur on the proposed development site, and a description of the available and sensitive habitats on the site.

2. OBJECTIVES OF THE HABITAT STUDY

- To assess the current status of the habitat component and current general conservation status of the property;
- To provide lists of reptiles and amphibians which occur or might occur, and to identify species of conservation importance;
- To highlight potential impacts of the development on the herpetofauna of the study site; and
- To provide management recommendations to mitigate negative and enhance positive impacts should the proposed development be approved.

3. SCOPE OF STUDY

This report:

- Is a reptile and amphibian survey based on sightings and literature, with comments on preferred habitats;
- Comments on ecological sensitive areas;
- Evaluates the conservation importance and significance of the site with special emphasis on the current status of resident threatened species;
- Offers recommendations to reduce or minimise impacts, should the proposed development be approved.

4. STUDY AREA

The Makolo Dam lies in the deep valleys of the densely wooded Waterberg system (Waterberg Mountain Bushveld [Mucina et al, 2006]) and the initial terrain through which the existing pipeline has been constructed is steep and rocky and the proposed pipeline route is referred to as a '4x4 Track'. The terrain levels out on farm Sterkfontein 542 LO, where the track passes a wetland and small dam before it joins the E 510 tar road. The existing, as well as the proposed parallel, pipeline runs beside the tar road until it turns northwesterly onto the farm Fancy 566 LO. Initially a steep, rocky pass is traversed, after which the service track turns straight north, over some ridges until it swings further east

on farm Goedgenoeg 539 LO. After crossing a drainage line on farm Zeeland 526 LO, the vegetation type changes to Limpopo Sweet Bushveld (Mucina et al, 2006). The proposed route then turns north to a filtering station with some reservoirs on this farm and continues northwards until it passes the railway line on farm Zwartwater 507 LO, where the pipeline and track turn northwestwards as far as the road between Lephalale and Steenbokpan. There the existing pipeline and the route of the proposed pipeline run parallel to the tar road towards Steenbokpan until they swing in a southwesterly direction and carry on running roughly parallel but at a distance from the tar road until they meet the tar road from the south and then turn north to the village of Steenbokpan.

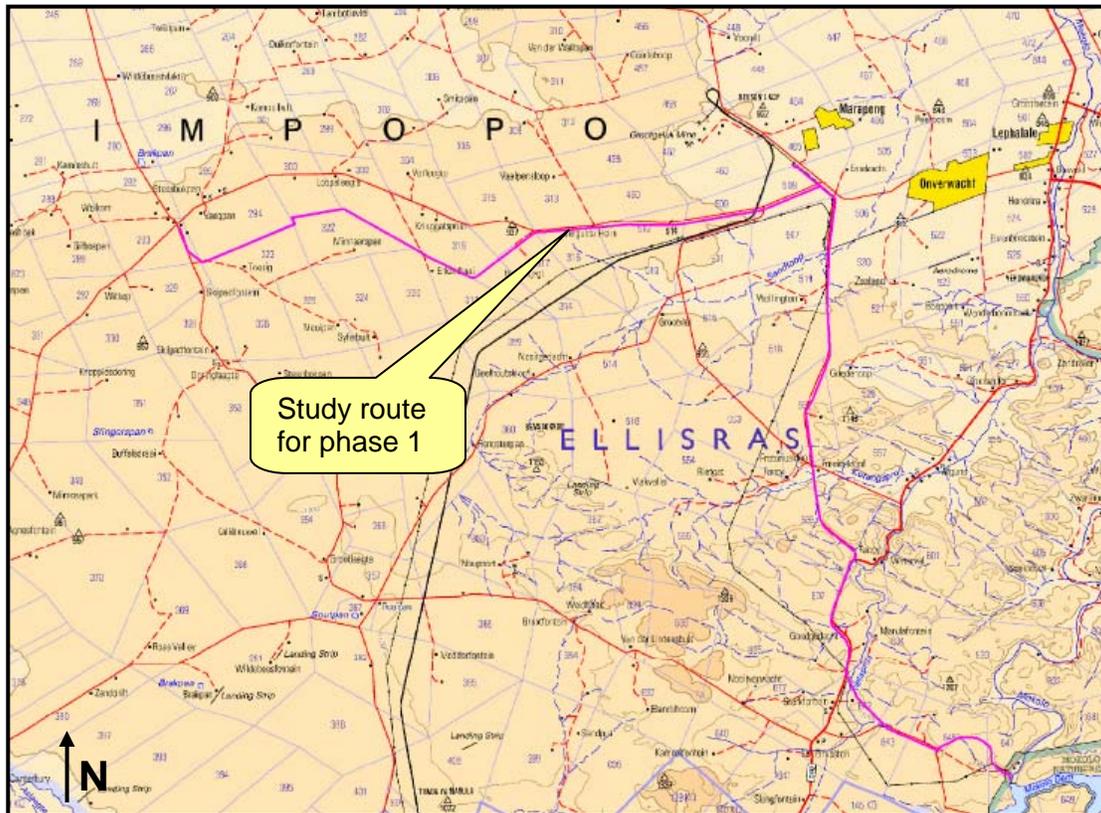


Figure 1: Locality map of the study area

5. METHOD

A five day site visit was conducted between 23 and 27 March 2009. During the visit the observed and derived presence of herpetofauna associated with the recognised habitat types of the study site, were recorded. This was done with due regard to the known distributions of Southern African herpetofauna.

The adjoining properties were scanned for important fauna habitats.

5.1.1 Field Surveys

During the site visit reptiles amphibians were identified by visual sightings through random transect walks. Possible burrows or reptile habitats (stumps or rocks) were inspected for any inhabitants. Amphibians were also identified by their vocalisations.

5.1.2 Desktop Surveys

As the majority of reptiles and amphibians are secretive, nocturnal and/or poikilothermic or seasonal, distributional ranges and the presence of suitable habitats were used to deduce the presence or absence of these species based on authoritative tomes, scientific literature, field guides, atlases and databases. This can be done irrespective of season.

The probability of occurrences of herpetofauna species was based on their respective geographical distributional ranges and the suitability of on-site habitat. In other words, *high* probability would be applicable to a species with a distributional range overlying the study site as well as the presence of prime habitat occurring on the study site. Another consideration for inclusion in this category is the inclination of a species to be common, i.e. normally occurring at high population densities.

Medium probability pertains to a herpetofaunal species with its distributional range peripherally overlapping the study site, or required habitat on the site being sub-optimal. The size of the site as it relates to its likelihood to sustain a viable breeding population, as well as its geographical isolation is also taken into consideration. Species categorised as *medium* normally do not occur at high population numbers, but cannot be deemed as rare. A *low* probability of occurrence will mean that the species' distributional range is peripheral to the study site and habitat is sub-optimal. Furthermore, some herpetofauna categorised as *low* are generally deemed rare.

Based on the impressions gathered during this visit and records in the Transvaal Museum, as well as the documentation of the herpetofauna of the then Transvaal by Dr N. H. G. Jacobsen (Unpublished Ph.D. thesis, University of Pretoria, 1989) and his internal report for the Gauteng Province (1995), as well as the "Atlas and Red Data Book of the Frogs of South Africa, Lesotho and Swaziland" (Minter, et al, 2004) the following list of species which may occur on this site was compiled. The vegetation type was analysed according to the standard handbook by Mucina and Rutherford (eds) (2006).

5.1.3 Specific Requirements

During the visit the site was surveyed and assessed for the potential occurrence of Red Data species such as:

- Giant Bullfrogs (*Pyxicephalus adspersus*);
- African Bullfrogs; and
- Southern Rock Python

6. RESULTS

Table 1: The Reptiles and Amphibians that could occur on the site

| SCIENTIFIC NAME | ENGLISH NAME | PROBABILITY OF OCCURRENCE |
|-----------------------------------|------------------------------------|---------------------------|
| CLASS: AMPHIBIA | AMPHIBIANS | |
| Order: ANURA | FROGS | |
| Family: Bufonidae | Toads | |
| <i>Bufo fenoulheti</i> | Northern Pygmy Toad | Low |
| <i>Bufo gutturalis</i> | Guttural Toad | Medium |
| <i>Bufo poweri</i> | Western Olive Toad | Medium |
| <i>Bufo rangeri</i> | Raucus Toad | Low |
| <i>Bufo maculatus</i> | Flat-backed Toad | Medium |
| <i>Schismaderma carens</i> | Red Toad | Medium |
| Family: Hyperoliidae | Tree Frogs | |
| <i>Kassina senegalensis</i> | Bubbling Kassina | High |
| Family: Microhylidae | Rain Frogs and Rubber Frogs | |
| <i>Breviceps adspersus</i> | Bushveld Rain Frog | Low |
| <i>Phrynomantis bifasciatus</i> | Banded Rubber Frog | Medium |
| Pipidae | Platannas | |
| <i>Xenopus laevis</i> | Common Platanna or Clawed Frog | Low |
| Family: Ranidae | Common Frogs | |
| <i>Cacosternum boettgeri</i> | Common Caco | Medium |
| <i>Afrana angolensis</i> | Common River Frog | Low |
| <i>Hildebrandtia ornata</i> | Southern Ornate Frog | Low |
| <i>Phrynobatrachus natalensis</i> | Snoring Puddle Frog | Medium |
| <i>Ptychadena anchietae</i> | Plain Grass Frog | High |
| <i>Ptychadena mossambica</i> | Broad-banded Grass Frog | Low |
| <i>Pyxicephalus edulis</i> | African or Edible Bullfrog | Low ? |
| <i>Pyxicephalus adspersus</i> | Giant Bullfrog | Low ? |
| <i>Tomopterna cryptotis</i> | Tremolo Sand Frog | Medium |
| <i>Tomopterna krugerensis</i> | Knocking Sand Frog | Low |
| Family: Rhacophoridae | Foam-nest Frogs | |
| <i>Chiromantis xerampelina</i> | Southern Foam-nest Frog | Low |
| | | |
| CLASS: REPTILIA | REPTILES | |
| Order: TESTUDINES | TORTOISES | |
| Suborder: Cryptodira | Modern Chelonians | |
| Family: Testudinidae | Land Tortoises | |
| <i>Stigmochelys pardalis</i> | Leopard Tortoise | High |
| <i>Psammobates oculifer</i> | Serrated or Kalahari Tent Tortoise | Low |
| <i>Kinixys spekii</i> | Speke's Hinged Tortoise | Low |
| <i>Kinixys lobatsiana</i> | Lobatse Hinged Tortoise | Low |
| Suborder: Pleurodira | Side-necked Terrapins | |
| Family: Pelomedusidae | Side-necked Terrapins | |
| <i>Pelomedusa subrufa</i> | Marsh or Helmeted Terrapin | Low |
| | | |
| Order: SQUAMATA | SCALE-BEARING REPTILES | |
| Suborder: Sauria | Lizards | |
| Family: Scincidae | Skinks | |
| <i>Mochlus s. sundevallii</i> | Sundevall's Writhing Skink | Medium |
| <i>Trachylepis capensis</i> | Cape Skink | Low |

| SCIENTIFIC NAME | ENGLISH NAME | PROBABILITY OF OCCURRENCE |
|------------------------------------|-----------------------------------|---------------------------|
| <i>Trachylepis punctatissima</i> | Speckled Skink | Medium |
| <i>Trachylepis varia</i> | Variable Skink | Medium |
| <i>Panaspis walbergii</i> | Wahlberg's Snake-eyed Skink | Low |
| Family: Lacertidae | Lacertids | |
| <i>Ichnotropis capensis</i> | Cape Rough-scaled Lizard | Low |
| <i>Pedioplanis lineocellata</i> | Common Sand Lizard | Low |
| <i>Pedioplanis pulchella</i> | Common Sand Lizard | Low |
| Family: Gerrhosauridae | Plated Lizards | |
| <i>Gerrhosaurus flavigularis</i> | Yellow-throated Plated Lizard | Low |
| <i>Gerrhosaurus validus</i> | Giant Plated Lizard | Low |
| Family: Cordylidae | Girdled Lizards | |
| <i>Cordylus jonesii</i> | Tropical Girdled Lizard | Low |
| Family: Varanidae | Monitor Lizards | |
| <i>Varanus albigularis</i> | White-throated Monitor | Low |
| <i>Varanus niloticus</i> | Nile or Water Monitor | Low |
| Family: Agamidae | Agamas | |
| <i>Agama aculeata distanti</i> | Distant's Ground Agama | Low |
| <i>Acanthocercus atricollis</i> | Tree Agama | Medium |
| Family: Chamaeleonidae | Chameleons | |
| <i>Chamaeleo dilepis</i> | Flap-necked Chameleon | Medium |
| Family: Gekkonidae | Geckos | |
| <i>Hemidactylus mabouia</i> | Tropical House Gecko | Medium |
| <i>Homopholis wahlbergii</i> | Wahlberg's Velvet Gecko | Low |
| <i>Lygodactylus capensis</i> | Cape Dwarf Gecko | High |
| <i>Pachydactylus affinis</i> | Transvaal Thick-toed Gecko | Low |
| <i>Pachydactylus capensis</i> | Cape Thick-toed Gecko | Low |
| <i>Chondrodactylus turneri</i> | Turner's Gecko | Medium |
| | | |
| Suborder: AMPHISBAENIA | Worm Lizards | |
| <i>Zygaspis quadrifrons</i> | Kalahari Round-headed Worm Lizard | Medium |
| | | |
| Suborder: SERPENTES | SNAKES | |
| Family: Leptotyphlopidae | Thread Snakes | |
| <i>Leptotyphlops scutifrons</i> | Peters' Thread Snake | Medium |
| Family: Boidae | Boas and Pythons | |
| <i>Python natalensis</i> | Southern African Python | Medium |
| Family: Atractaspididae | African Burrowing Snakes | |
| <i>Atractaspis bibronii</i> | Bibron's Stiletto Snake | Low |
| <i>Aparallactus capensis</i> | Cape Centipede-eater | Medium |
| <i>Amblyodipsas polylepis</i> | Common Purple-glossed Snake | Low |
| Family: Colubridae | Typical Snakes | |
| <i>Lamprophis capensis</i> | Brown House Snake | Low |
| <i>Lycophidion capense</i> | Cape Wolf Snake | Medium |
| <i>Psammophylax tritaeniatus</i> | Striped Skaapsteker | Low |
| <i>Psammophis subtaeniatus</i> | Stripe-bellied Sand Snake | Medium |
| <i>Psammophis brevirostris</i> | Short-snouted Sand Snake | Low |
| <i>Philothamnus semivariegatus</i> | Spotted Bush Snake | Medium |
| <i>Dasypeltis scabra</i> | Rhombic Egg-eater | Medium |
| <i>Crotaphopeltis hotamboeia</i> | Red-Lipped or Herald Snake | Low |
| <i>Telescopus semivariegatus</i> | Eastern Tiger Snake | Medium |
| <i>Dispholidus typus</i> | Boomslang | Medium |

| SCIENTIFIC NAME | ENGLISH NAME | PROBABILITY OF OCCURRENCE |
|-------------------------------------|--------------------------------------|---------------------------|
| <i>Thelotornis capensis</i> | Twig or Vine Snake | Low |
| Family: Elapidae | Cobras, Mambas, other Elapids | |
| <i>Aspidelaps scutatus scutatus</i> | Shield-nose Snake | Low |
| <i>Elapsoidea boulengeri</i> | Boulenger's Garter Snake | Low |
| <i>Naja annulifera</i> | Snouted Cobra | Medium |
| <i>Naja mossambica</i> | Mozambique Spitting Cobra | Medium |
| <i>Dendroaspis polylepis</i> | Black Mamba | Medium |
| Family: Viperidae | Adders | |
| <i>Bitis arietans</i> | Puff Adder | Medium |
| <i>Bitis caudalis</i> | Common Horned Adder | Low |
| | | |
| Order: CROCODYLIA | CROCODILIANS | |
| Family: Crocodylidae | Crocodies | |
| <i>Crocodylus niloticus</i> | Nile Crocodile | Medium |

Table 2: The Reptiles and Amphibians that are positively confirmed on the study site

| Scientific name | Common name | Observation | Habitat |
|----------------------------------|-------------------|---------------------|---------------------|
| <i>Dispholidus typus</i> | Boomslang | DOR (2327CB) | Bushveld |
| <i>Dendroaspis polylepis</i> | Black Mamba | DOR (2327CB) | Bushveld |
| <i>Lygodactylus capensis</i> | Cape Dwarf Gecko | Common | Trees, gates, walls |
| <i>Pedioplanis lineoocellata</i> | Common Sand Liz. | Active in afternoon | Rocky ridge |
| <i>Varanus niloticus (juv)</i> | Nile monitor | Basking afternoon | Overflow of dam |
| <i>Platysaurus guttatus</i> | Dwarf Flat Lizard | Basking afternoon | Rocks on pipeline |
| <i>Agama atra (juv)</i> | Rock Agama | Basking afternoon | Rocks on pipeline |
| <i>Stigmochelis pardalis</i> | Leopard Tortoise | Common | Bushveld |
| <i>Bufo fenoulheti</i> | North. Pigmy Toad | Under stone | Bushveld |

7. FINDINGS AND POTENTIAL IMPLICATIONS

The proposed new or additional pipeline of Phase 1 either runs on or along servitudes of tar roads, railway lines, power lines or the existing pipeline. The vegetation type in the southern part, north of the Mokolo Dam, is dense Waterberg Mountain Bushveld (Mucina et al, 2006), which changes to Limpopo Sweet Bushveld (Mucina et al, 2006) further north. The latter is not always as dense as the former but in general is also very substantial. To establish the servitudes, the bush has been cleared and grassveld tends to have covered these bare strips. In addition, trenches will be dug to accommodate the actual pipes and after completion of the construction the surface area will become covered by grasses and in time shrubs and young trees will start growing on these strips. The growth of woody plants will be controlled to allow access to the structures.



Figure 2: Waterberg Mountain Bushveld along track leading towards the Mokolo dam.

The general habitat type surrounding the proposed route consists of open to very dense bushveld, with limited available habitat for diurnally active and sit-and-wait predators, such as terrestrial skinks, lacertids and other reptiles. Arboreal species are the more prominent components of the local herpetofauna. Typical examples are the Tree Agama, Chameleon, Boomslang, Black Mamba, Spotted Bush Snake and others. Pythons have very suitable habitat, in particular in the mountainous areas, depending on the availability of warm-blooded prey. A limited selection of terrestrial reptiles may be expected to occur on the proposed pipeline route.



Figure 3: '4x4 track' across rocky substrate leading towards the Mokolo dam

Although Bullfrogs are known from the general area, neither of the two species have been confirmed from the quarter degree grid cells involved in Phase 1 of this project but they could occur here.



Figure 4: View of service road on top of Phase 1 pipeline on farm Fancy 566 LO north of Mokolo dam.



Figure 5: Sandy track in Limpopo Sweet Bushveld on farm Zwartwater 507 LO heading towards more hilly terrain in the south.

8. LIMITATIONS, ASSUMPTIONS AND GAPS IN KNOWLEDGE

None

9. RECOMMENDED MITIGATION MEASURES

- It is recommended that, while trenches are open during the construction phase, a sloping section of the side-wall is made available for the escape of any trapped animals. Tortoises and pythons, if encountered during construction, should be removed and placed into suitable habitat away from the construction area. Due to the probable presence of low densities of relatively common species on the existing servitudes and the narrow width of the proposed servitudes, no further mitigating measures are being proposed as the expected effect on the local herpetofauna is limited.

10. CONCLUSION

In general, the habitat types through which the proposed pipelines are to be constructed are very suitable for a relatively high species diversity. The herpetofauna mainly consists of widespread, common Bushveld species. However, since these lines are proposed to run parallel to existing power lines and pipeline or road servitudes along which the natural vegetation and fauna has been altered, the potential damage to the current herpetofauna is considered to be relatively low. As these strips are narrow, re-colonisation by suitable species will take place in the altered habitat.

11. LITERATURE SOURCES

- Branch, W.R. (Editor), August 1988. 'South African Red Data Book – Reptiles and Amphibians'. S.A.National Scientific Programmes, Report No. 151, 244 pp.
- Branch, W.R. 1998. 'Field Guide to the Snakes and other Reptiles of Southern Africa'. 3rd edition. Struik Publishers, Cape Town. 399 pp., maps, 112 plates.
- Branch, W.R. 2002. 'The Conservation Status of South Africa's threatened Reptiles': 89 – 103. In:- G.H.Verdoorn & J. le Roux (editors), 'The State of Southern Africa's Species', Proceedings of a conference held at the Rosebank Hotel, 4 – 7 September 2001. World Wildlife Fund.
- Jacobsen, N.H.G. Dec.1989. A herpetological survey of the Transvaal. 3 Vols, 1621 pp., 266maps. (Unpublished Ph.D. Thesis).
- Minter, L.R., M.Burger, J.A.Harrison, H.H.Braack, P.J.Bishop and D.Kloepfer, eds. 2004. 'Atlas and Red Data Book of the Frogs of South Africa, Lesotho and Swaziland'. SI/MAB Series #9. Smithsonian Institution, Washington, DC.
- Mucina, L. & Rutherford, M.C. 2006. The vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. South African National Biodiversity Institute, Pretoria.
- SARCA reptile survey 2006 – 2009. Virtual Museum. Animal Demography Unit 2009 Department of Zoology - University of Cape Town.