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Herpetofauna Habitat Assessment

of

MOKOLO AND CROCODILE WATER AUGMENTATION PROJECT (MCWAP): 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 phase 1 MCWAP pipeline is to be constructed, from the Mokolo Dam to near Lephalale and then to Steenbokpan.

The objective was to determine which species might still occur on the site. Special attention had to be given to the habitat requirements of all the protected species which may occur in the area. This survey focuses on the current status of threatened herpetofaunal 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 ecologically 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 Mokolo 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.

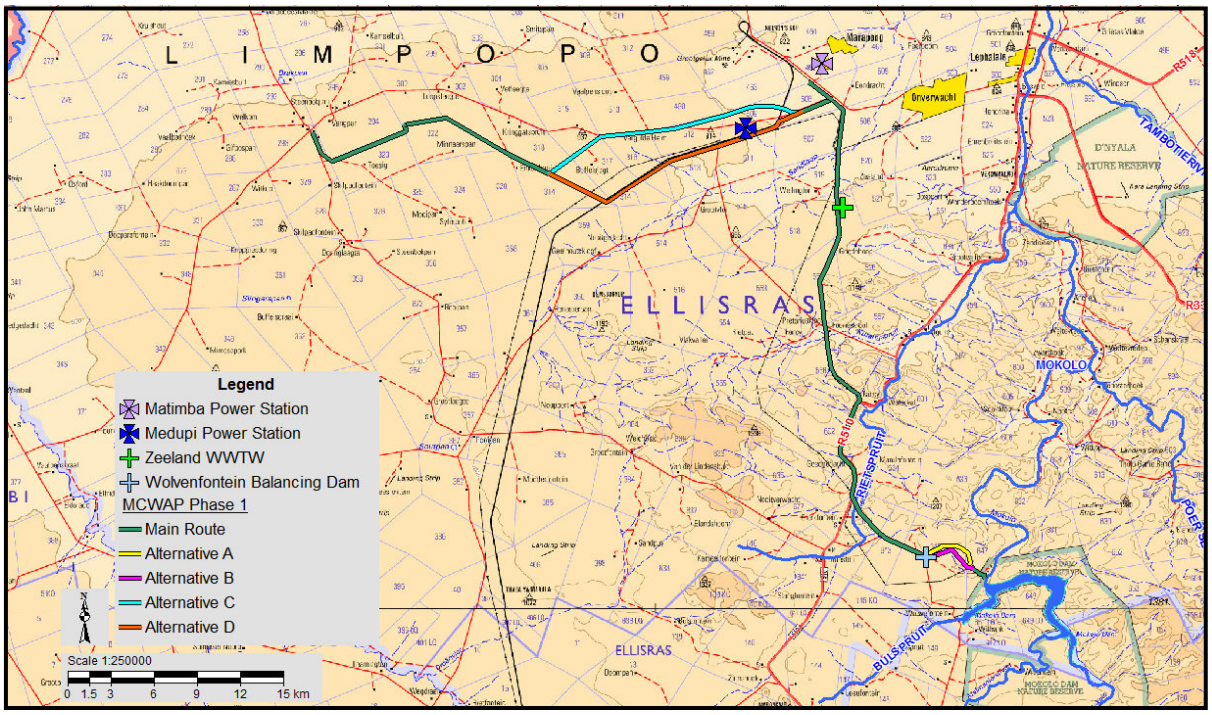

Figure 1: Locality map of the study site.

After the initial inspection during 2009, certain additional alternatives were identified and investigated. These follow below:

Alternative C Route around Madupi: It was found that the terrain south of the Alternative C Route is extremely disturbed and still exposed to road building activities and other construction works associated with the construction of the Madupi power station. North of the road is a cleared section (road reserve) with very dense stands of Limpopo Sweet Bushveld (Figure 15) along this line. The ground cover is very dense, probably inhibiting terrestrial species. As no aquatic habitat appears to be available, even the dry-land amphibian component will be poorly represented. Arboreal species are favoured in this environment.

BP Reservoir at Rietspruit, Farm Fancy 556 LQ and Wider Environmental Corridor on Farm Waterval 601 LQ: The route past this site leads across a rocky pass and it is not considered possible to suggest an alternative route. The existing pipeline from the Mokolo dam runs along the R510 road and then turns in a north-westerly direction up and over the pass on farm Fancy past the BP Reservoir. Just south of this bend in the pipeline the R510 joins the track and servitude along the pipeline and continues in a straight line in a south-westerly direction. The block allocated for a wider environmental survey lies in the bottom of a relatively narrow ravine in hilly terrain. It does not appear to be advantageous to consider the second pipeline to lie at a distance from the existing line, as it would increase the environmental damage in the valley unnecessarily.

Alternative B on the farm Wolvenfontein: The proposal suggested that the second pipeline follows the existing route for a few hundred meters from the Mokolo dam, then swings westwards for a short distance to an altitude of about 1020 m, then ascends the next slope in a straight line via an 'Environmental Corridor' to an altitude of about 1050 m avoiding a deep gorge to the west and then swinging sharply westwards above that ravine towards the gravity storage dam. This route is the shortest line causing the least environmental damage. This cuts across stony to rocky terrain and in which rupicolous lizards such as the Giant Plated Lizard (*Gerrhosaurus v. validus*), the Dwarf Flat Lizard (*Platysaurus minor)* and the Rainbow Skink (*Trachylepis quinquetaeniata*) occur. Enough of this habitat type is available that small populations may reestablish themselves in the 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.

A second visit was made to the site in the company of other Galago Environmental Specialists from the 30th January to the 2nd of February 2010 to consider some potential alternative routes and examine some special localities.

5.1.1 Field Surveys

During the site visit reptiles and amphibians were identified by sightings during random transect walks. Possible burrows or other reptile retreats (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), the recent SARCA reptile survey (2009) 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 Protected Species such as the:

- Giant Bullfrog (*Pyxicephalus adspersus*);
- African Bullfrog (*Pyxicephalus edulis*);
- Southern Rock Python (*Python natalensis*);
- Nile Crocodile (*Crocodylus niloticus*).

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**	
Poyntonophrynus fenoulheti	Northern Pygmy Toad	Low
Amietophrynus gutturalis	Guttural Toad	Medium
Amietophrynus poweri	Western Olive Toad	Medium
Amietophrynus rangeri	Raucus Toad	Low
Amietophrynus maculatus	Flat-backed Toad	Medium
Schismaderma carens	Red Toad	Medium
Family: Hyperoliidae	**Tree Frogs**	
Kassina senegalensis	**Bubbling Kassina**	**High**
Family: Brevicepitidae	**Rain Frogs**	
Breviceps adspersus	Bushveld Rain Frog	Low
Family: Microhylidae	**Rubber Frogs**	
Phrynomantis bifasciatus	Banded Rubber Frog	Medium
Family: Pipidae	**Platannas**	
Xenopus laevis	**Common Platanna**	**Low**
Family: Phrynobatrachidae	**Puddle Frogs**	
Phrynobatrachus natalensis	Snoring Puddle Frog	Medium
Family: Ptychadenidae	**Grass Frogs**	
Hildebrantia ornata	Southern Ornate Frog	Low
Ptychadena anchietae	Plain Grass Frog	High
Ptychadena mossambica	Broad-banded Grass Frog	Low
Family: Pyxicephalidae	**Common Frogs**	
Cacosternum boettgeri	Common Caco	Medium
Amieta angolensis	Common River Frog	Low
Pyxicephalus edulis	African or Edible Bullfrog	Low ?
Pyxicephalus adspersus	Giant Bullfrog	Low ?
Tomopterna cryptotis	Tremolo Sand Frog	Medium
Tomopterna krugerensis	Knocking Sand Frog	Low
Family: Rhacophoridae	**Foam-nest Frogs**	
Chiromantis xerampelina	Southern Foam-nest Frog	Low
CLASS: REPTILIA	**REPTILES**	
Order: TESTUDINES	**TORTOISES**	
Suborder: Cryptodira	**Modern Chelonians**	
Family: Testudinidae	**Land Tortoises**	
Stigmochelys pardalis	Leopard Tortoise	High
Psammobates oculifer	Kalahari Tent Tortoise	Low
Kinixys spekii	Speke's Hinged Tortoise	Medium
Kinixys lobatsiana	Lobatse Hinged Tortoise	Low
Suborder: Pleurodira	**Side-necked Terrapins**	
Family: Pelomedusidae	**Side-necked Terrapins**	
Pelomedusa subrufa	Marsh or Helmeted Terrapin	Low
Order: SQUAMATA	**SCALE-BEARING REPTILES**	
Suborder: Sauria	**Lizards**	
Family: Scincidae	**Skinks**	

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

Dispholidus typus	Boomslang	Medium
Thelotornis capensis	Twig or Vine Snake	Low
Family: Elapidae	**Cobras,Mambas / Elapids**	
Aspidelaps scutatus scutatus	Shield-nose Cobra	Low
Elapsoidea boulengeri	Boulenger's Garter Snake	Low
Naja annulifera	Snouted Cobra	Medium
Naja mossambica	Mozambique Spitting Cobra	Medium
Dendroaspis polylepis	Black Mamba	Medium
Family: Viperidae	**Adders**	
Bitis arietans	Puff Adder	Medium
Bitis caudalis	Common Horned Adder	Low
Order: CROCODYLIA	**CROCODILIANS**	
Family: Crocodylidae	**Crocodiles**	
Crocodylus niloticus	Nile Crocodile	Low ?

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

Scientific name	Common name	Observation	Habitat
Dispholidus typus	Boomslang	Dead on road	Bushveld
Thelotornis capensis	Vine Snake	Dead on road	Bushveld
Dendroaspis polylepis	Black Mamba	Dead on road	Bushveld
Lygodactylus capensis	Cape Dwarf Gecko	Common	Trees, gates, walls
Pedioplanis lineoocellata	Spotted Sand Lizard	Diurnal	Rocky ridge
Pedioplanis pulchella	Common Sand Liz.	Diurnal	Rocky ridge
Varanus niloticus (juv)	Nile monitor	Basking afternoon	Overflow of dam
Platysaurus guttatus	Dwarf Flat Lizard	Basking afternoon	Rocks on pipeline
Agama atra (juv)	Rock Agama	Basking afternoon	Rocks on pipeline
Stigmochelis pardalis	Leopard Tortoise	Common	Bushveld
Kinyxis spekii	Speke's Hinge-backed Tortoise	Alive on road	Bushveld
Poyntonophrynus (Bufo) fenoulheti	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 and Spotted Bush Snake. Pythons have very suitable habitat, in particular in the mountainous areas, preferably within reach of water and 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 in sandy terrain in the vicinity of pans.

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

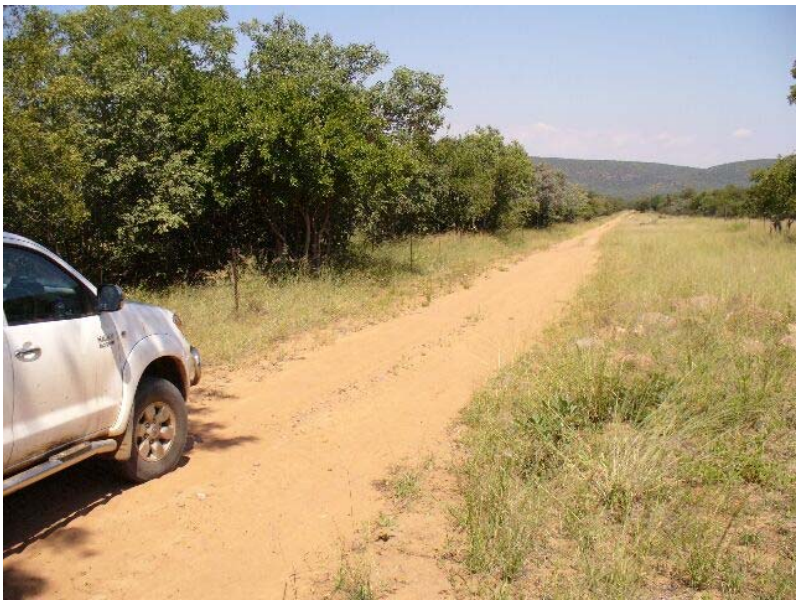

Figure 5: Sandy track in Limpopo Sweet Bushveld on farm Zwartwater 507 LO heading towards more hilly terrain in the south.

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 with slight variation due to the presence of sandy substrate, stony to rocky terrain, water, bush and trees. However, since these lines are proposed to run parallel to existing power and pipelines, 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.

Sensitive species such as Pythons have very suitable habitat along the pipeline route, in particular in the mountainous areas, but will not be impacted outside the construction phase if the area is properly rehabilitated (topsoil placement and grassing to provide food for small mammals which becomes their food source). Bullfrogs could still occur in sandy terrain in the vicinity of pans and could be impacted by construction activities near wetlands.

Staff of the Sable Hills Game Ranch reported the presence of crocodiles in the Mokolo Dam as well as the river below the dam wall. Each larger pool is reported to have a large, resident, territorial individual. Crocodiles are a protected species and the abstraction of water from the dam and river must therefore ensure that enough water is released for the ecological reserve to ensure the continued existence of the crocodiles. That study is however outside the scope of this report and will be dealt with in the reserve determination (in terms of the National Water Act, No. 36 of 1998) of the Mokolo River.

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