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Flora and Fauna Habitat Assessment

of

MOKOLO – CROCODILE RIVER WATER PIPELINE PHASE 1

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TABLE OF CONTENTS

EXECUTIVE SUMMARY

1. Introduction:

Galago Environmental CC was appointed to undertake a botanical study along the proposed route for the Mokolo-Crocodile river pipeline phase 1.

The 80km pipeline route is located in several quarter degree grid squares ranging from Steenbokpan in the west to Lephalale in the east and then south to Mokolo dam. It extends from west to east over the Limpopo Sweet Bushveld and Waterberg Mountain Bushveld to the south. There are also some elements of Central Sandy Bushveld such as *Acacia burkei, Combretum zeyheri* and *Terminalia sericea that* occur but the vegetation still closely resembles Waterberg Mountain Bushveld. (Mucina & Rutherford, 2006).

2. Requirements:

During the site visit the site was surveyed and assessed for the potential occurrence of Red Data or wetland-associated fauna species such as:

- Juliana's golden mole (*Neamblosomus juliana*)
- Rough-haired golden mole (*Chrysospalax villosus*)
- African marsh rat (*Dasymys incomtus*)
- Angoni vlei rat (*Otomys angoniensis*)
- Vlei rat (*Otomys irroratus*)
- African clawless otter (*Aonyx capensis*)
- Spotted-necked otter (*Lutra maculicollis*)
- Marsh mongoose (*Atilax paludinosus*)
- Forest shrew (*Myosorox varius*)
- White tailed rat (*Mystromys albicaudatus*)
- Highveld golden mole (*Amblysomus septentrionalis*)
- Giant Bullfrogs (*Pyxicephalus adspersus*);
- Cape Vulture (*Gyps coprotheres*)
- Blue Crane (*Anthropoides paradiseus*)
- Lesser Kestrel (*Falco naumanni*)
- African Grass-Owl (*Tyto capensis*)
- African Marsh-Harrier (*Circus ranivorus*)
- White-backed Night-Heron (*Gorsachius leuconotus*)
- White-bellied Korhaan (*Eupodotis senegalensis*)
- Martial Eagle (*Polemaetus bellicosus*)
- African Finfoot (*Podica senegalensis*)
- Lesser Flamingo (*Phoenicopterus minor*)
- Secretarybird (*Sagittarius serpentarius*)
- Black Stork (*Ciconia nigra*)
- Half-collared Kingfisher (*Alcedo semitorquata*)
- Greater Flamingo (*Phoenicopterus ruber*)

3. Specialist studies:

This investigation was conducted by the following specialists:

Specialists	Aspect Investigated	Qualifications	Prof. Registration	Date of Field Survey
Rautenbach, I.L.	Mammalogy and zoological review	Ph.D., T.H.E.D.	Pr. Nat. Sci.	25-26 March 2009
Haacke, W.D.	Herpetology	M.Sc. (Zoology)	Pr. Nat. Sci.	25-26 March 2009
Geyser, R.	Avifauna		Pending	25-26 March 2009
Coetzer, J.V.	Botany	D.Sc.	Pr. Nat. Sci.	25-26 March 2009
Marais, V.	Environmental Impacts and maps	BL Landscape Architecture		25-26 March 2009

4. Findings:

Three vegetation units were identified (See Annexure A in the Flora report):

- Limpopo Sweet Bushveld
- Waterberg Mountain Bushveld
- Disturbed areas

From the **vegetation** study it was found that the vegetation on the pipeline route is considered sensitive and precautions should be taken to inflict as little damage as possible during the construction phase. (See Appendix A for the flora report).

The **mammal** study found that the proposed pipeline route will traverse along an existing pipeline servitude and is not anticipated to directly result in a significant loss of ecological sensitive and important habitat units, ecosystem function (e.g. reduction in water quality, soil pollution), loss of faunal habitat, nor of loss/displacement of threatened or protected fauna. It is most likely that an additional narrow strip of pristine veld will be used for the pipeline route and converted to barren ground eventually supporting pioneer vegetation.

A large ecological concern is the potential deleterious effect that the volume of water to be extracted may have on the welfare of the Mokolo River system downstream of the Dam. The river system provides a unique habitat to a plethora of narrowly specialized species, and furthermore acts as a dispersal corridor. Even a temporary and partial desiccation exacerbated by water extracted for the development during a drought will have far-reaching ecological consequences. The welfare of the river system should therefore supersede that of economic interests. (See Appendix B for the mammal report).

The **avifauna** study found that three Red Data bird species will be impacted directly by the availability of water downstream from the Mokolo River pumpstation. These species are the Half-collared Kingfisher, African Finfoot and White-backed Night-Heron. The habitat in the Mokolo River and Rietspruit are ideal for these species. The pipeline will only have a negative impact during the construction phase of the proposed pipeline through the wooded areas, where after the birds will return to the area if rehabilitation are carried out correctly. (See Appendix C for the avifauna report).

The **herpetological** study found that the proposed pipeline of Phase 1 either runs on or along servitudes of tar roads, railway lines, power lines or the existing pipeline. 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.

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 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. (See Appendix D for the herpetofauna report).

5. Mitigation:

Mitigation measures proposed by the specialists:

- The topsoil must be kept separate during excavation, and correctly replaced when filling the ditch.
- Reasonable care must be taken to limit erosion, inter alia by sowing indigenous grass species.
- It is recommended that the developer appoint a specialist registered in terms of the Natural Scientific Professions Act (No. 27 of 2003) to advice on the seeding of indigenous grasses.
- No plants not indigenous to the area, or exotic plant species, especially grasses such as Kikuyu and other ground-covering plants, should be introduced in the rehabilitation of the line, as they might spread into the areas of natural vegetation.
- Where possible work should be restricted to one area at a time. This will give the smaller birds, mammals and reptiles a chance to weather the disturbance in an undisturbed zone close to their natural territories.
- Prior to construction, fences (*game fences*) should be erected in such a manner to prevent access and damage to any sensitive areas identified.
- The contractor must ensure that no fauna species are disturbed, trapped, hunted or killed during the construction phase. Conservation-orientated clauses should be built into contracts for construction personnel, complete with penalty clauses for non-compliance.
- Where the pipeline will cross the Rietspruit and other drainage lines, the pipeline should be build over these wetland systems high enough to allow free movement of birds underneath the pipeline.

- Measures should be taken to prevent erosion in areas where the pipeline will cross hilly areas.
- **No vehicles must be allowed to move in or across the wet areas or drainage lines and possibly get stuck.** This leaves visible scars and destroys habitat. It is important to conserve areas where there are tall reeds or grass and areas were there are short grass and mud.
- It is suggested that where work is to be done close to the drainage lines, these areas **be fenced off during construction** to prevent heavy machines and trucks from trampling the plants, compacting the soil and dumping in the system.
- During the construction phase noise must be kept to a minimum to reduce the impact of the development on the fauna residing on the site.
- Alien and invasive plants must be removed during the construction and operation phase of the project.

- 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.

Mitigation measures developed by GDACE which is also appropriate for the Limpop Province:

- An Ecological Management Plan (to be included in the Environmental Management Plan (EMP) must be developed for the construction and operational phase of the development and should:
    - include an ongoing monitoring and eradication programme for all non-indigenous species, with specific emphasis on invasive and weedy species
    - ensure the persistence of all Red and Orange List species
    - minimize artificial edge effects (e.g. water runoff from developed areas and application of chemicals)
    - result in a report back to the Directorate of Nature Conservation on an annual basis.

- Where possible, trees naturally growing on the site should be retained as part of the landscaping, with specific emphasis on the following species: *Acacia erioloba*, *Boscia albitrunca*, *Combretum imberbe*, *Sclerocarya birrea* subsp. *caffra*. Measures to ensure that these trees survive the physical disturbance from the development should be implemented. A tree surgeon should be consulted in this regard. A qualified botanist must mark trees when the route is pegged and permits obtained from DWAF before any protected trees are removed.
- The crossing of natural drainage systems should be minimized and only constructed at the shortest possible route, perpendicular to the natural drainage system. Where possible, bridge crossings should span the entire stretch of the buffer zone.

Pipelines

- The appropriate agency should implement an ongoing monitoring and eradication program for all invasive and weedy plant species growing within the servitude.
- Rehabilitation of natural vegetation should proceed in accordance with a rehabilitation plan compiled by a specialist registered in terms of the Natural Scientific Professions Act (No. 27 of 2003) in the field of Ecological Science.
- Any post-development re-vegetation should use species indigenous to South Africa. Plant species locally indigenous to the area are preferred. As far as possible, indigenous plants naturally growing along the route, but would otherwise be destroyed during construction, should be used for re-vegetation.
- Where a pipeline is to traverse a wetland, measures are required to ensure that the pipeline has minimal effect on the flow of water through the wetland, e.g. by using a high level clear span bridge or box culverts rather than pipes.
- Disturbance to any wetlands during construction should be minimized. A plan for the immediate rehabilitation of damage caused to wetlands should be compiled by a specialist registered in accordance with the Natural Scientific Professions Act (No. 27 of 2003) in the field of Ecological Science. This rehabilitation plan should form part of the EMP and a record book should be maintained on site to monitor and report on the implementation of the plan.

6. Environmental Sensitivity and Conclusion:

From the surveys it was determined that the proposed pipeline routes of Phase 1 either runs on or along servitudes of tar roads, railway lines, power lines or the existing pipeline. Although the vegetation in the vicinity of the proposed pipeline route is sensitive, most of the areas directly linked to these servitudes are disturbed to a certain degree. It was therefore found that the proposed pipeline will not have a significant impact on the fauna and flora in the area, given that the servitude width be kept to a minimum and that the mitigation measures proposed above be implemented.

APPENDIX A: Flora assessment

APPENDIX B: Mammal scan

APPENDIX C: Avifauna scan

APPENDIX E: Herpetofauna scan