

KAPAMA LODGE

BASELINE TERRESTRIAL ECOLOGY STUDY & BIODIVERSITY VALUE ASSESSMENT



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Prepared for: Peter Velcich
NuLeaf Planning and Environmental
PostNet Suite 168
Private Bag X 844
Silverton 0127

Prepared by: ECOREX Consulting Ecologists CC
Postnet Suite #192,
Private Bag X2
Raslouw 0109

Author: Duncan McKenzie

Reviewer: Warren McClelland (ECOREX)



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EIA REGULATIONS SPECIALISTS REPORT CHECKLIST

(1) A specialist report prepared in terms of the 2014 Environmental Impact Assessment Regulations must contain-

	(a) details of-	
✓	(i) the specialist who prepared the report; and	page 07
✓	(ii) the expertise of that specialist to compile a specialist report including a curriculum vitae;	page 60
✓	(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	page 61
✓	(c) an indication of the scope of, and the purpose for which, the report was prepared;	page 07
✓	(d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	page 11
✓	(e) a description of the methodology adopted in preparing the report or carrying out the specialised process;	page 11
✓	(f) the specific identified sensitivity of the site related to the activity and its associated structures and infrastructure;	page 33
✓	(g) an identification of any areas to be avoided, including buffers;	page 37
✓	(h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	page 35
✓	(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	page 15
✓	(j) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment;	page 33
✓	(k) any mitigation measures for inclusion in the EMPr;	page 37
✓	(l) any conditions for inclusion in the environmental authorisation;	page 37
✓	(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	page 37
	(n) a reasoned opinion-	
✓	(i) as to whether the proposed activity or portions thereof should be authorised; and	page 38
✓	(ii) if the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	page 38
X	(o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	n/a
X	(p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	n/a
✓	(q) any other information requested by the competent authority.	none

Abbreviations

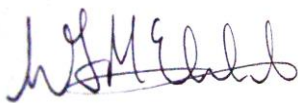
GKNP	Greater Kruger National Park
IBA	Important Bird Area
IUCN	International Union for Conservation of Nature
LEMA	Limpopo Environmental Management Act (No. 7 of 2003)
LPBCA	Limpopo Province Biodiversity Conservation Assessment
mamsl	Metres Above Mean Sea Level
NEMBA ToPS	National Environmental Management: Biodiversity Act Threatened or Protected Species (No. 10 of 2004)
NFA	National Forest Act (No. 30 of 1998)
PRECIS	National Herbarium Pretoria (PRE) Computerised Information System
QDS	Quarter Degree Square, for example 2431 AB
SABAP2	Southern African Bird Atlas Project 2
SANBI	South African National Biodiversity Institute

Terminology

Alien	Introduced from elsewhere: neither endemic nor indigenous.
Biodiversity	The structural, functional and compositional attributes of an area, ranging from genes to landscapes.
Degraded	An ecosystem that is a poor ecological state, usually through impacts such as invasion by alien plants, severe overgrazing, poor burning regimes, etc. These systems still contain a moderate proportion of indigenous flora.
Geophyte	Plants that produce their growth points from organs stored below the ground, an adaptation to survive frost, drought and / or fire.
Palearctic	Ecozone consisting of North Africa, Europe and Asia north of the Himalayan foothills.
Transformed	Transformed ecosystems are no longer natural and contain little or no indigenous flora. Examples include agricultural lands, plantations, urban areas, etc.
Ungulate	Hoofed animal.

Declaration of Independence

We declare that we have been appointed as independent consulting ecologists with no affiliation with or vested financial interests in the proponent, other than for work performed under the Environmental Impact Assessment Regulations, 2010. We have no conflicting interests in the undertaking of this activity and have no interests in secondary developments resulting from the authorisation of this project. Remuneration for our services by the proponent is not linked to approval by any decision-making authority responsible for authorising this development.



W.L. McClelland

15 August 2018



D.R. McKenzie

15 August 2018

1. INTRODUCTION

ECOREX Consulting Ecologists CC was appointed by Peter Velcich of NuLeaf Planning & Environmental to conduct the terrestrial ecology study for a Basic Assessment Report (BAR) for a proposed lodge expansion project in the Kapama Private Game Reserve, Limpopo Province, which would provide a basis for assessing potential impacts of the project on terrestrial ecology and guide the design and location of additional planned infrastructure. The study comprised flora and vertebrate fauna (mammals, birds, reptiles, frogs). The two key deliverables were a baseline terrestrial ecology survey and an integrated Biodiversity Value Assessment.

The study team was as follows:

Duncan McKenzie – Terrestrial Ecologist. He has been involved in biodiversity assessments for ECOREX for ten years and countries of work experience include Lesotho, Swaziland, Mali, Mozambique, Guinea, Sierra Leone, South Africa, Tanzania and Democratic Republic of the Congo. Duncan has previously worked as a Regional Coordinator for the Mondi Wetlands Project and lectures on many aspects of conservation in Nelspruit and the Kruger National Park. He is currently the Regional Co-ordinator for the South African Bird Atlas Project, a position he has held for eight years, formerly sat on the KZN Bird Rarities Committee and is a co-author on the Wildflowers of the Kruger National Park project. A more detailed CV is presented in Appendix 6.

Linda McKenzie (GIS Specialist). Linda is a GIS Specialist/GIS Analyst with over 13 years' experience in the industry. For the last four years she has operated her own GIS Consultancy called Digital Earth. She has extensive experience in both the private and public sector, as has worked on a wide variety of projects and GIS applications. These include, most recently, vegetation and sensitivity mapping, landcover data capture, municipal roads master planning, hydroelectric scheme and wind farm feasibility mapping and town planning, land surveyor and engineering support services. Linda currently serves as Vice Chairperson and Treasurer for GISSA Mpumalanga and is a registered Professional GISc Practitioner (PGP0170).

2. TERMS OF REFERENCE

The objectives of the Ecology Survey will be to:

- Provide a brief baseline ecological assessment of the terrestrial ecosystems that are likely to be impacted by the proposed development;
- Provide an assessment of the biodiversity value of potentially affected ecosystems; this would incorporate an assessment of the conservation value of the ecosystems;
- Make recommendations regarding infrastructure layout, where appropriate.

The primary deliverable will be a report on Terrestrial Ecosystems, including:

- Biodiversity baseline description;
- Biodiversity Value Assessment;
- Broad-scale Vegetation Map;
- Biodiversity Value Map;
- Recommendations regarding infrastructure layout, where relevant.

3. STUDY AREA

The proposed development is situated on the farm Hoedspruit 82-KU within the west-central part of the Kapama Private Game Reserve, approximately 10 km south of the town of Hoedspruit, Mopani District, Limpopo Province (Figure 1). The Kapama Private Game Reserve is approximately 13 000 ha in size¹ and lies adjacent to the Greater Kruger National Park. Two small footprints were surveyed, together covering an area of approximately 500 m² ha. The project involves the addition of one block of 20 rooms to the west of River Lodge as well as the construction of an additional dining deck in the northern part of the camp. These are situated within the existing River Lodge which has been constructed at the confluence of two episodic drainage lines. An earth dam of approximately 1.5 ha in size is situated immediately downstream of the camp with the current dining decks situated over the top end of the dam. The study area is situated within the quarter-degree grid 2431 AC at an altitude of approximately 540 mamsl. The topography of the general area is flat to undulating with shallowly incised drainage lines. Most of the study area contains untransformed vegetation, but existing infrastructure is present within the adjacent 62-bed River Lodge.

¹ <https://www.kapama.com/about/>

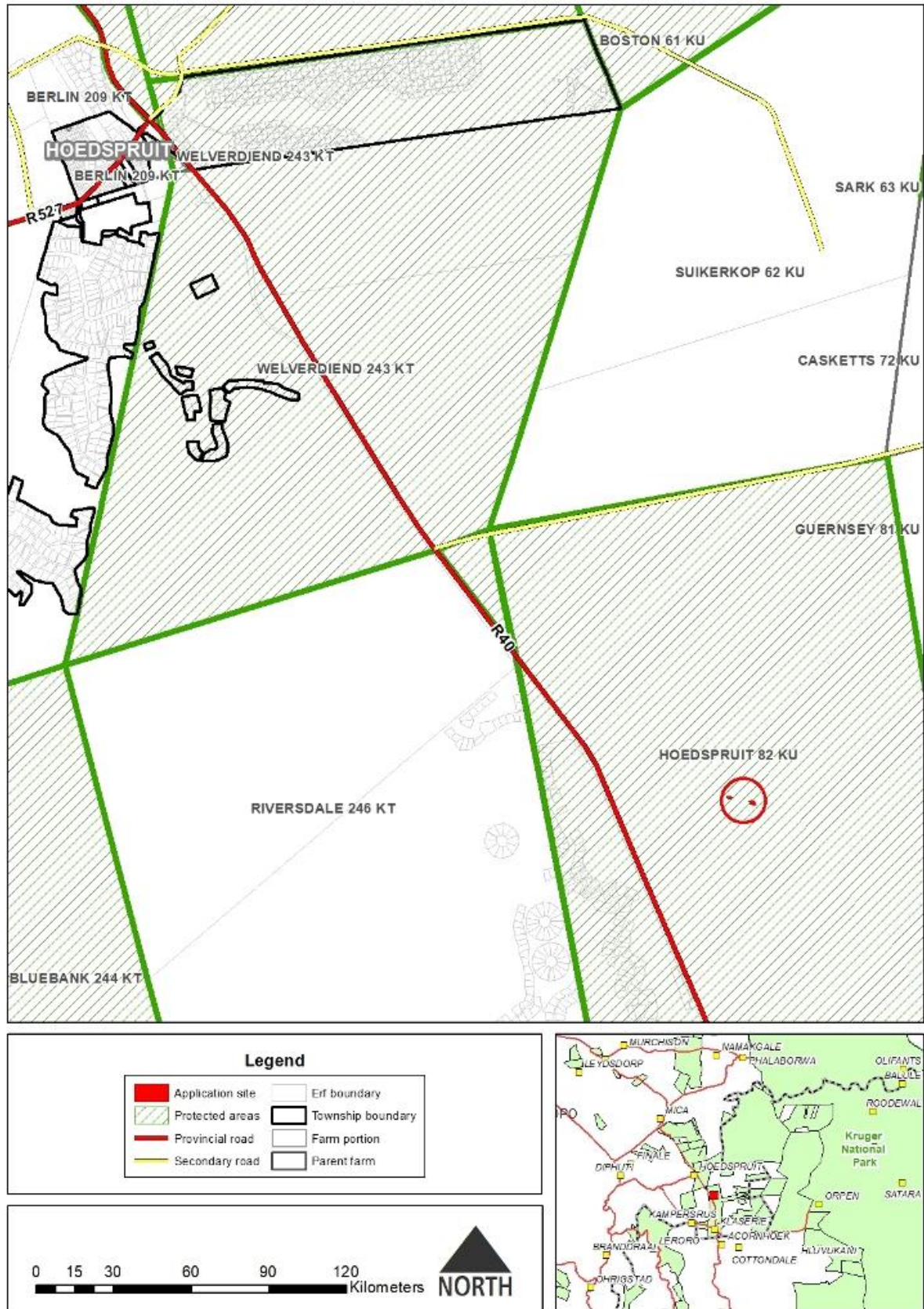


Figure 1. Location of Study Area

4. METHODS

4.1 Flora

Desktop

Vegetation communities were identified prior to fieldwork using satellite imagery supplied by Digital Earth. Red Data plant species listed for the quarter-degree grid 2431 AC in the PRECIS data from the South African National Biodiversity Institute (SANBI) was used to produce a list of the most likely threatened species, which were searched for during fieldwork.

Fieldwork

Fieldwork was conducted over one day on the 24th May 2018. The boundary of the proposed footprint was supplied by NuLeaf and was pre-loaded onto a Samsung S7 phone using LocusMap Pro™ software. Representative meandering transects were surveyed on foot in each vegetation community and species lists compiled for each community. Plants were listed according to each of the vegetation communities identified during the desktop phase. Plants not identified to species level were collected and dried in a plant press for identification at a later stage. Specific attention was paid to search for any conservation-important species of flora and fauna as listed under the Limpopo Environmental Management Act (No. 7 of 2003), National Forests Act (No. 30 of 1998), National Environmental Management: Biodiversity Act (No. 10 of 2004) Threatened and Protected Species Lists (GG Notice 256, 2015) and the various national Red Data Lists. The location of any conservation-important species found was recorded using the GPS. Plants were listed according to each of the vegetation communities identified during the desktop phase

4.2 Fauna

Desktop

Lists of conservation-important mammals, birds, reptiles and frogs potentially occurring within the proposed agricultural development were prepared using data from the MTPA's threatened species database, Swanepoel *et al.* (2016), the Southern African Bird Atlas Project 2 <http://sabap2.adu.org.za/>, Taylor *et al.* (2016), Minter *et al.* (2004) and Bates *et al.* (2014). The above data were captured mostly at a quarter-degree spatial resolution, but were refined by excluding species unlikely to occur within the study area, due to unsuitable

habitat characteristics (e.g. altitude and land-use). Bat species thought to only forage over the study area (i.e. mostly cave-roosting species) were not included in the assessment due to the lack of suitable caves within the study area. Potential occurrence of fauna in the study area was predicted based on knowledge of known habitat requirements of local fauna species.

Fieldwork

Birds were identified audially and visually using Bushnell 10x42 binoculars. Observations were made incidentally during the time that the vegetation survey was conducted, and limited to birds seen and heard within the study area and immediate surrounds. Mammals, reptiles and frogs were recorded incidentally as they were encountered during the survey through direct evidence (sightings) and indirect evidence (spoor, dung).

4.3 Biodiversity Value Assessment

The biodiversity value of each vegetation community was based on a combination of Conservation Importance and Functional Importance, each of which were rated on a five-point scale, from Very Low to Very High, as indicated in Table 1. This method was based on Biodiversity Action Plan guidelines developed by Anglo American (Coombes, 2004).

Conservation Importance

The method of calculating conservation importance was based on six key parameters, which were each allocated a score that ranged between zero (Not Important) and twenty (Very Important) (Table 2). The overall conservation importance was based on the median value of the six parameters, namely:

1. *Protection Status*. The extent to which the vegetation community is currently formally protected (e.g. World Heritage Site; RAMSAR, National Park; Provincial Game Reserve; Private Conservancy etc.);
2. *Size*. The extent to which the larger vegetation type of which the defined area is a representative sample, still exists; this incorporates the conservation status of threatened vegetation types in that vegetation types with the highest threat status are assumed to have the lowest extent of habitat remaining;
3. *Species Diversity*. The extent to which the vegetation community supports a high diversity of plants or animals;

4. *Species of Conservation Concern.* The extent to which the vegetation community supports threatened species and other species of conservation concern;
5. *Unique Habitat or Taxa.* Presence of range-restricted plants or animals or unusual natural feature;
6. *Present Ecological State.* The extent to which the vegetation community is modified from natural conditions.

Functional Importance

The method of calculating functional importance was based on four ecosystem service categories, which were each allocated a score that ranged between zero (Not Important) and twenty (Very Important) (Table 3). The overall functional importance was based on the median value of the four ecosystem service categories, namely:

1. *Provisioning Services.* The extent and frequency that the vegetation community provides consumable goods (e.g. food, freshwater, timber, fibre, medicinal plants, etc.);
2. *Regulating Services.* The extent to which the vegetation community provides regulating services (e.g. flood attenuation, water purification, storage, climate regulation, carbon sequestration, etc.);
3. *Cultural Services.* The extent to which the vegetation community provides cultural services (e.g. tourism attraction, spiritual attraction, aesthetic value, etc.), and;
4. *Supporting Services.* The extent to which the vegetation community provides supporting ecological services, either positive (e.g. migration corridor, refuge area, primary production, pollination, pest control, nutrient cycling, soil formation), or negative (e.g. disease sources, pest outbreaks).

By integrating assessments of the conservation importance and functional importance of the different vegetation communities, an assessment of Biodiversity Value was made. This is indicated spatially in Figure 6.

Table 1. Method of calculating Biodiversity Value of vegetation communities

Conservation Importance	Functional Importance				
	Very High	High	Moderate	Low	Very Low
Very High	Very High	Very High	High	High	Moderate
High	Very High	High	High	Moderate	Moderate
Moderate	High	High	Moderate	Moderate	Low
Low	High	Moderate	Moderate	Low	Low
Very Low	Moderate	Moderate	Low	Low	Very Low

Table 2. Method of calculating Conservation Importance of vegetation communities

Parameter	Very High	High	Moderate	Low	Very Low
Protection Status	International	National	Regional	Local	None
	20 19 18 17	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1 0
Size / Length	Very small	Small	Moderate	Large	Very Large
	(<500km ²)	(500 to 1,000km ²)	(1,000 to 20,000km ²)	(20,000 to 50,000km ²)	(> 50,000km ²)
	20 19 18 17	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1 0
Species Diversity	Noticeably High		Moderate		Noticeably Low
	20 19 18 17	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1 0
Species of Conservation Concern	Noticeably High		Moderate		Noticeably Low
	20 19 18 17	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1 0
Unique Habitat or Taxa	Noticeably High		Moderate		Noticeably Low
	20 19 18 17	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1 0
Present Ecological State	Natural, largely Unmodified	Slightly modified	Moderately Modified	Considerably Modified	Severely Modified
	20 19 18 17	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1 0

Table 3. Method of calculating Functional Importance of vegetation communities

Parameter	Very High	High	Moderate	Low	Very Low
Provisioning Services	Constant	Regular	Frequent	Occasional	Intermittent
	20 19 18 17	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1 0
Regulating Services	Very High	High	Moderate	Low	Very Low
	20 19 18 17	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1 0
Cultural Services	Very High	High	Moderate	Low	Very Low
	20 19 18 17	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1 0
Supporting Services	Very High	High	Moderate	Low	Very Low
	20 19 18 17	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1 0

4.4 Assumptions, Limitations And Knowledge Gaps

4.4.1 Seasonality

The assessment was based on a single field survey at the start of the dry season only. It is possible that plants which flower at other times of the year are underrepresented, including most of the potentially occurring threatened plants such as *Adenium swazicum* (CR). However, this is not seen as a limitation that could affect the Record of Decision as the habitat is unsuitable for any Threatened plant species.

4.4.2 Overlooked Species

Certain plant species, particularly geophytes, will only flower in seasons when conditions are optimal and may thus remain undetected, even over a survey that encompasses several seasons. Other plant species may be overlooked because of very small size and / or extreme rarity. A sampling strategy will always represent merely a subset of the true diversity of the study area. However, the level of sampling effort for this study was appropriate for the objectives of the study.

5. BIODIVERSITY BASELINE DESCRIPTION

5.1 Flora

5.1.1 National Vegetation Types

According to Mucina & Rutherford (2006), the study area is situated within Granite Lowveld in the Lowveld Savannah Bioregion in the Savanna Biome. Granite Lowveld occurs in a narrow strip from Phongola in northern KwaZulu-Natal in the south, through central Swaziland, and to Giyani in Limpopo Province in the north. Granite Lowveld originally covered about 19 838 km², of which 21% has been transformed, mostly through agriculture and urbanisation. Due to large tracts of this vegetation type occurring in public and private nature reserves in South Africa, including the Kruger National Park, it is considered **Well Protected** and has a national and provincial ecosystem status of **Least Concern**¹. The study area is not situated within any Threatened Ecosystems as listed in Government Gazette No. 34809 of 9 December 2011 (DEAT, 2011).

Typical Granite Lowveld is dominated by tall trees such as *Acacia nigrescens* and *Sclerocarya birrea* subsp. *caffra*, as well as a variety of smaller trees and shrubs such as *Combretum zeyheri* and *C. apiculatum*, *Terminalia sericea*, *Euclea divinorum* and *Peltophorum africanum*. Common herbaceous plants include *Waltheria indica*, *Aspilia mossambicensis*, *Commelina* species and *Kohautia virgata*. Dominant grasses are *Digitaria eriantha*, *Panicum maximum* and *Pogonarthria squarrosa* (Mucina & Rutherford, 2006).

The study area is not situated in any of southern Africa's floristic centres of endemism, which are areas that have an unusually high number of plants unique to that area (Van Wyk & Smith, 2001).

5.1.2 Limpopo Province Biodiversity Conservation Assessment

The Limpopo Province Biodiversity Conservation Assessment (LPBCA) classifies the study area and general surroundings as a **Critical Biodiversity Area 1** (CBA1) (Desmet *et al.*, 2013). CBA1's are described as **Irreplaceable** Sites that are required to meet biodiversity pattern and/or ecological processes targets. The primary land management objective for CBA1's is to maintain them in a natural state with limited or no biodiversity loss and to rehabilitate degraded areas to a natural or near natural state. Compatible land uses for these

¹ Lötter *et al.*, 2014

areas include conservation activities such as eco-tourism and extensive game farming (Desmet *et al.*, 2013).

5.1.3 Local Vegetation Communities

Two untransformed vegetation communities were identified within the study area on the basis of distinctive vegetation structure (grassland, woodland, thicket, etc.), floristic composition (dominant and diagnostic species) and position in the landscape (mid-slopes, terrace, crest, etc.). The untransformed vegetation communities are described in detail below (alien plant species are indicated by an asterisk):

5.1.3.1 *Schotia brachypetala* – *Euclea divinorum* Riparian Thicket

Riparian Thicket occurs along the banks of the seasonal drainage lines which run through the camp (Figure 5). It is characterised by moderately tall riparian trees with a clumped, often dense understory layer. Vegetation structure is mostly Short Thicket and Bushland Woodland (*sensu* Edwards, 1983; Figure 2). Existing infrastructure occurs in the central portions where wooden decks span the drainage line. This area is used as a dining area for lodge guests. Riparian Thicket covers approximately 1500 m² or 33 % of the area surveyed.

The tree *Schotia brachypetala* dominates the canopy of this community with a lower abundance of additional trees such as *Spirostachys africana*, *Acacia robusta* subsp. *clavigera*, *Combretum hereroense*, *Elaeodendron transvaalense* and *Terminalia sericea*. Smaller trees and shrubs found include *Euclea natalensis* subsp. *angustifolia* and *E. divinorum*, *Mystroxydon aethiopicum* subsp. *schlechteri*, *Gymnosporia senegalensis*, *Pappea capensis*, *Searsia gueinzii*, *Grewia flavescens*, *Dalbergia melanoxylon* and *Phyllanthus reticulatus* var. *reticulatus*. Dwarf shrubs and herbs found include *Hypoestes forskalii*, *Barleria elegans*, *B. obtusa* and **Ageratum conyzoides*. Grasses dominate the ground layer, especially *Panicum maximum* and *Eragrostis trichophora*.

A total of 72 species (65 % of the entire list) was recorded from Riparian Thicket (Appendix 1). This is the highest species list of the two vegetation communities present. Species fidelity, which is closely linked to community uniqueness, is very high, with 60 species (83 % of the community list) occurring nowhere else in the study area.

Four conservation-important species were recorded (Table 4) with two considered to be of conservation concern as defined by Raimondo *et al.* (2009)¹. *Elaeodendron transvaalense* and *Dalbergia melanoxylon* are both assessed as Near Threatened. *Sclerocarya birrea* subsp. *caffra* and *Elaeodendron transvaalense* are protected under the National Forests Act (No. 30 of 1998) and *Spirostachys africana* is protected under the Limpopo Environmental Management Act (No. 7 of 2003).



Figure 2. Photographs of Riparian Thicket

Riparian Thicket was assessed as having **Moderate Biodiversity Value** through integration of Moderate Conservation Importance and Moderate Functional Importance scores (Table 5). It was rated as having Moderate Conservation Importance (Appendix 5) despite high ratings for Protected Status and Threatened Species due to the current disturbance levels within the community. These include the earth dam inundating parts of the community, as well as tourist dining decks within the camp.

5.1.3.2 *Combretum zeyheri* – *Eragrostis rigidior* Plains Woodland

This vegetation community occurs to the east of the River Lodge, in the area designated for the construction of additional guest rooms (Figure 5). Vegetation structure can best be described as Short to Tall Mid-dense Woodland (Figure 3) (Edwards, 1983). Plains Woodland covers approximately 3800 m², or 84 % of the area surveyed.

A moderate variety of trees dominate the canopy with the most dominant including *Combretum zeyheri*, *C. hereroense*, *Peltophorum africanum*, *Acacia nigrescens*, *Sclerocarya birrea* subsp. *caffra*, *Strychnos madagascariensis* and *Terminalia sericea*. Common shrubs found include *Euclea divinorum*, *Acacia gerrardii* subsp. *gerrardii* var. *gerrardii*,

¹ Species of conservation concern include those with a status of Declining, Near Threatened, Data Deficient, Vulnerable, Endangered and Critically Endangered)

Dichrostachys cinerea subsp. *africana* and *Mundulea sericea*. Dominant forbs, bulbs and herbs found include *Ocimum americanum* var. *americanum*, *Waltheria indica*, *Kyphocarpa angustifolia* and *Agathisanthemum bojeri* subsp. *bojeri*. The dominant grasses found include *Eragrostis rigidior*, *Urochloa mosambicensis*, *Sporobolus pyramidalis*, *Eragrostis superba* and *Heteropogon contortus*.

A total of 50 species (45 % of the entire list) was recorded in *Combretum zeyheri* – *Eragrostis rigidior* Plains Woodland (Appendix 1). Three conservation-important species were recorded. One of these is listed by the IUCN as Near Threatened, namely *Dalbergia melanoxylon*, although this species has a national status of Least Concern. Two species are protected under the National Forests Act (No. 30 of 1998): *Sclerocarya birrea* subsp. *caffra* and *Balanites maughamii* subsp. *maughamii* (Table 4).



Figure 3. Photographs of Plains Woodland

Plains Woodland was assessed as having **Moderate** Biodiversity Value through integration of Moderate Conservation Importance and Moderate Functional Importance scores (Table 5). Despite the confirmation of a number of threatened mammals, this area is situated adjacent to existing infrastructure and construction activities are taking place immediately to the north west of the site.

Open water covers approximately 330 m² or 7 % of the study area.

5.1.4 Conservation-Important Flora

A total of 111 plant species in 37 families was recorded during fieldwork (Appendix 1). Two of these are listed as Near Threatened (*Elaeodendron transvaalense* and *Dalbergia melanoxylon*). Three of these are protected under the National Forests Act (No. 30 of 1998), namely *Elaeodendron transvaalense*, *Sclerocarya birrea* subsp. *caffra* and *Balanites maughamii* subsp. *maughamii*. One species is protected by the Limpopo Environmental Management Act (No. 7 of 2003), namely *Spirostachys africana*. The Near Threatened species are discussed below and displayed in Figure 4 below.

***Elaeodendron transvaalense* (Burt Davy) R.H.Archer** Bushveld Saffron

This is a small to medium-sized evergreen tree occurring in northern and eastern South Africa, and further afield through Namibia, Botswana, Zimbabwe, Mozambique and Zambia. The species is heavily harvested in South Africa for traditional medicine and some sub-populations have declined as a result; as such it has been assessed as Near Threatened (Williams *et al.*, 2008a). A moderate number of plants were located within the Riparian Thicket community.

***Dalbergia melanoxylon* Guill. & Perr.** Zebra Wood

This species usually grows as a small to medium-sized tree and is found throughout the Lowveld and as far north and west as Senegal. Although not locally listed, it is assessed by the International Union for the Conservation of Nature (IUCN) as Near Threatened due to over-collection for the wood carving industry and in the manufacturing of musical instruments¹. This species is, however, still common in South Africa (*pers.obs.*). Low numbers were located within both vegetation communities.

¹ World Conservation Monitoring Centre. 1998. *Dalbergia melanoxylon*. The IUCN Red List of Threatened Species 1998: e.T32504A9710439. <http://dx.doi.org/10.2305/IUCN.UK.1998.RLTS.T32504A9710439.en>. Downloaded on 27 May 2016.

*Elaeodendron transvaalense**Dalbergia melanoxylon* (from file)

Figure 4. Representative photograph of Near Threatened plants confirmed during fieldwork

Three additional plant species with conservation concern¹ potentially occur within the study area (Appendix 2). These plants have either been recorded from similar habitat within the quarter-degree grid 2431 AC and surrounding grids or are widespread in Granite Lowveld and are likely to occur within the study area. Only one of these species has a moderate chance of occurring (Appendix 2), namely *Drimia sanguinea*, which is listed as Near Threatened and is discussed below:

***Drimia sanguinea* (Schinz) Jessop Red Drimia**

This small bulb is invisible for most of the year either through dormancy or being inconspicuous due to its grass-like leaves. It is only in the flowering season that they are visible. This takes place in early spring and it is therefore likely that this bulb was not located during fieldwork due to the timing of the survey. This plant is listed as Near Threatened due to over-collection for the medicinal plant trade².

¹ Raimondo et al. (2009) has been followed here regarding species of conservation concern (i.e. those with a status of Declining, Near Threatened and Data Deficient) and threatened species (Vulnerable, Endangered and Critically Endangered)

² Williams et al, 2008

Table 4. Conservation-important plant species confirmed during fieldwork

Taxa	Growth Form	Red Data	Protected	LIM Endemic	Vegetation Communities	
					Riparian Thicket	Plains Woodland
Family Anacardiaceae <i>Sclerocarya birrea</i> (A.Rich.) Hochst. subsp. <i>caffra</i> (Sond.) Kokwaro	tree		NFA		r	r
Family Balanitaceae <i>Balanites maughamii</i> Sprague subsp. <i>maughamii</i>	tree		NFA			r
Family Celastraceae <i>Elaeodendron transvaalense</i> (Burt Davy) R.H.Archer	tree	NT	NFA		u	
Family Euphorbiaceae <i>Spirostachys africana</i> Sond.	tree		LEMA		f	
Family Fabaceae <i>Dalbergia melanoxylon</i> Guill. & Perr.	tree	NT‡			r	r
TOTAL	5	2	4	0	4	3

NFA = National Forests Act

LEMA = Limpopo Environmental Management Act

NT = Near Threatened

‡ = IUCN assessment

d = dominant

f = frequent

u = uncommon

r = rare



Figure 5. Vegetation communities identified within the Study Area

5.2 Terrestrial Fauna

5.2.1 Mammals

5.2.1.1 Regional Overview

The Kapama Private Game Reserve is situated in the savanna biome adjacent to the Greater Kruger National Park (GKNP) and therefore has very high mammal diversity, relatively low numbers of endemics and a relatively high number of Red Data species¹. The surrounding area around proposed footprint is formally conserved with roads and lodges the primary types of development. Mammal populations, therefore, are protected and reasonably secure. Fifty-seven mammal species are confirmed for the QDS 2431 AC in the Animal Demography Unit's Virtual Museum's database².

5.2.1.2 Conservation-Important Species

An estimated 26 conservation-important mammals potentially occur within the project area (Appendix 4), which is an extremely high total but this is due to the study area being situated within a large, formally protected conservation area. Several cave-roosting bat species of conservation concern are likely to occur overhead, but these species are only likely to feed over the site because of the shortage of suitable roosting sites and have been excluded from this assessment.

Of the 26 potentially occurring species, 17 are considered to be of conservation concern³ with only nine considered threatened (Appendix 4). Of these, three were **confirmed** during fieldwork and are discussed in more detail below:

African Elephant (*Loxodonta africana*)

Despite South Africa only having 4 % of Africa's elephant population, they are the best protected and most intensely managed⁴. Elephants are now mostly restricted to conservation areas in South Africa and the adjacent GKNP area supports an estimated 13 750 animals⁵. The world's largest land mammal is threatened due to poaching for ivory

¹ Child *et al.*, 2016

² http://vmus.adu.org.za/vm_sp_list.php accessed 26/05/2018

³ The same approach as Raimondo *et al.* (2009) has been followed here regarding species of conservation concern (i.e. those with a status of Declining, Near Threatened and Data Deficient) and threatened species (Vulnerable, Endangered and Critically Endangered)

⁴ Blanc *et al.*, 2007

⁵ Ferreira *et al.*, 2012

and meat, loss and fragmentation of habitat and conflict with humans in agricultural areas¹. Evidence of the presence of these animals was observed at both footprints, where they probably forage and drink regularly.

Leopard (*Panthera pardus*)

Upgraded to Vulnerable in the latest Red Data assessment², leopard are severely threatened outside protected areas mainly due to habitat loss, direct and indirect persecution including hunting and extermination from wildlife ranchers and for traditional attire (Swanepoel *et al*, 2016). The adjacent GKNP supports the largest population of these large cats in South Africa³. Tracks were observed in the proposed lodge site and they probably regularly forage around River Lodge.

Hippopotamus (*Hippopotamus amphibius*)

This large even-toed ungulate is listed as Vulnerable due to habitat loss, range contraction, conflict from farmers and a decline in water quality⁴. It probably forages regularly within the study area as a few individuals are present in the small dam immediately north of camp.

One species assessed as Vulnerable has a high likelihood of occurrence, and is discussed below.

Lion (*Panthera leo*)

Africa's largest member of the cat family is listed as Vulnerable due to indiscriminate killing in defense of human life and livestock, habitat loss, and prey base depletion⁵. This species is resident in Kapama and probably regularly forages around River Lodge as prey is attracted to the water in the small dam but would not remain for extended periods of time.

The remaining potentially occurring threatened species have a Low likelihood of occurrence due to either a lack of suitable habitat or general scarcity.

Eight potentially occurring species are assessed as Near Threatened, which are species close to or likely to soon qualify for the status of Vulnerable. One species was located during fieldwork, namely Spotted Hyaena (*Crocuta crocuta*), and this species is described below.

¹ Blanc, J. 2008

² Swanepoel *et al*, 2016

³ Swanepoel *et al*, 2016

⁴ Swanepoel *et al.*, 2016

⁵ Bauer *et al.*, 2016

Spotted Hyaena (*Crocuta crocuta*)

This large carnivore is dependent on conservation areas in South Africa as it is frequently persecuted by stock farmers outside¹. An estimated 2000-5340 animals reside within the adjacent GKNP (SANParks, 2011). Tracks were located at both proposed footprints and they are likely to regularly forage around the camp.

One additional Near Threatened mammal has a moderate likelihood of occurring within the study area and is described below.

Honey Badger (*Mellivora capensis*)

This is a small carnivore in the Mustelidae family which includes otters, badgers and weasels. It is assessed as Near Threatened due to direct persecution from farmers and for the muthi trade, indirect poisoning, poor recruitment and habitat loss². Animals could regularly forage anywhere in natural habitat in the study area but are unlikely to be resident.

Twenty-three potentially occurring species are protected under either the Limpopo Environmental Management Act (No. 7 of 2003) or the National Environmental Management: Biodiversity Act Threatened or Protected Species (No. 10 of 2004) (Appendix 4).

Thirteen mammal species were confirmed to occur during (Appendix 3). Additional fieldwork, including small mammal trapping and camera traps, would result in a few additions.

¹ Child *et al.*, 2016

² Child *et al.*, 2016

5.2.2 Birds

5.2.2.1 Regional Overview

The savanna biome supports the highest diversity of bird species within the Southern African sub-region and the GKNP supports the largest birdlist of all conservation areas in South Africa with an estimated 57 % of the birds found within the entire southern African sub-region recorded¹. The study area, situated within the quarter degree square (QDS) 2431 AC, is especially diverse with a total of 335 species recorded during the second Southern African Bird Atlas Project (SABAP2)², which is currently in progress. At a finer scale, data from SABAP2 indicate that 194 bird species from 17 full protocol lists³ have already been recorded from the pentad (mapping unit) in which the study area is situated (2425_3100)⁴. A pentad covers an area of approximately 77 km², which is considerably smaller than a quarter-degree grid and thus a better indication of which species occur in the study area.

The study area falls within the Kruger National Park and Adjacent Areas Important Bird Area (IBA) and qualifies as a Global IBA under criteria A1, A2, A3 and A4i. Eleven globally threatened species are resident within the GKNP, in addition to fourteen resident regionally threatened birds. A number of migratory and vagrant threatened species also occur⁵.

5.2.2.2 Conservation-Important Species

An estimated 32 conservation-important birds potentially occur within the project area (Appendix 4). Twenty-four of these are considered threatened, none of which were confirmed to occur during fieldwork.

Of the 32 potentially occurring threatened bird species, nine have a moderate or high likelihood of occurrence. These species are discussed below with the vultures grouped as they have similar threats and likelihood of occurrence:

¹ Taylor *et. al.*, 2015

² http://sabap2.adu.org.za/pentad_info.php?group=&qdgc=&iba=&area=&pentad=2425_3100§ion=observers#pent_info_tabs accessed 26/05/2018

³ Full protocol lists require at least two hours of coverage per list

⁴ Data accessed from http://sabap2.adu.org.za/pentad_info.php?pentad=2425_3100#menu_top on 26/05/2018

⁵ Taylor *et. al.*, 2015

Bateleur (*Terathopius ecaudatus*)

The Bateleur is listed as Endangered in South Africa primarily due to habitat loss and is now mostly restricted to larger conservation areas, at least as a breeding species¹. An estimated 550 – 650 breeding pairs are found within the GKNP² and this species would certainly utilise the habitat within the study area to forage over. Suitable nesting sites (tall trees such as *Acacia nigrescens*) are present but no nests were located during fieldwork.

Tawny Eagle (*Aquila rapax*)

This large eagle is listed as Endangered due to continuing decline in the local population through habitat transformation, direct persecution, indirect poisoning and drowning in concrete reservoirs³. It is largely restricted to conservation areas in South Africa and the GKNP area supports an estimated 500 – 700 pairs (Barnes, 1998). Birds will probably regularly utilise the study area to forage in and although limited suitable breeding habitat is present, no nests were located.

Southern Ground-Hornbill (*Bucorvus leadbeateri*)

This large, mostly terrestrial bird is listed as Endangered due to habitat loss, direct persecution, bush encroachment and collisions with windows⁴. They are mostly restricted to large conservation areas in South Africa and their slow reproduction rate of one chick / 9.3 years per family group means they have a very slow recovery rate if birds are lost⁵. Birds are likely to forage occasionally within the study area and no suitable nesting sites were observed.

White-backed Vulture (*Gyps africanus*) – Critically Endangered, Hooded Vulture (*Necrosyrtes monachus*) – Critically Endangered, Lappet-faced Vulture (*Torgos tracheliotos*) – Endangered, Cape Vulture (*Gyps coprotheres* – Endangered) and White-headed Vulture (*Trigonoceps occipitalis*) – Critically Endangered

These five vultures are all threatened due to similar anthropogenic impacts such as habitat loss, poisoning, electrocution and collision with powerlines, drowning in concrete farm reservoirs and collection for the medicinal trade⁶. All could potentially forage within the study area and despite suitable breeding trees being present for all but the Cape Vulture, are

¹ Taylor *et. al.*, 2015

² Barnes, 1998

³ Taylor *et. al.*, 2015

⁴ Taylor *et. al.*, 2015

⁵ Hockey *et al.*, 2005

⁶ Taylor *et. al.*, 2015

unlikely to do so due to the close proximity of the River Lodge and associated human disturbance.

Martial Eagle (*Polemaetus bellicosus*)

Africa's largest eagle is listed as Endangered due to many factors including habitat loss, direct persecution from small-stock farmers and indirect persecution from electrocution and reservoir drownings¹. This species occupies very large territories (up to 150 km² in the Lowveld²) but probably regularly forages over the study area. An estimated 250 birds occur within the GKNP (Hockey *et al.*, 2005).

Eight Near Threatened species potentially occur within the study area with only one confirmed during fieldwork and is discussed below.

Marabou Stork (*Leptoptilos crumeniferus*)

The largest of all Africa's storks, the Marabou favours a wide diversity of habitats and will readily scavenge around humans. A flock was recorded roosting at the dam adjacent to the lodge and it is likely to regularly forage within the study area. This species does not regularly breed in South Africa but a few pairs breed in central Swaziland³.

One additional Near Threatened species has a moderate likelihood of occurring within the study area (Appendix 4). This species is discussed below:

European Roller (*Coracias garrulous*)

This Palearctic migrant prefers open, grassy areas within savanna. It is listed as Near Threatened due to habitat loss over some of its breeding grounds, particularly in Europe⁴. Suitable foraging habitat is present in the eastern footprint.

The remaining species of conservation-concern⁵ have a low likelihood of occurring within the study area (Appendix 4). This is primarily due to a lack of suitable habitat or regional scarcity. Ten potentially occurring species are protected under the National Environmental Management: Biodiversity Act (No.10 of 2004, Appendix 3).

¹ Taylor *et al.*, 2015

² Hockey *et al.*, 2005

³ Taylor *et al.*, 2015

⁴ Taylor *et al.*, 2015

⁵ The same approach as Raimondo *et al.* (2009) has been followed here regarding species of conservation concern (i.e. those with a status of Declining, Near Threatened and Data Deficient) and threatened species (Vulnerable, Endangered and Critically Endangered)

5.2.2.3 Local Avifaunal Assemblages

Seventy-one bird species were confirmed to occur within or immediately around the actual habitats represented in the study area during fieldwork, all of which are listed in Appendix 3. Sufficient sampling was undertaken for assessing habitat suitability for potentially occurring threatened species, the primary objective of the ornithological component of this study, and to describe broad bird assemblages. Further fieldwork is likely to increase the species richness of each assemblage but is unlikely to identify additional assemblages. Three assemblages were present and are dealt with below.

Woodland Assemblage

This is by far the largest and most diverse bird assemblage in the general Kapama area. Common bird species found include Grey Go-away-bird (*Corythaixoides concolor*), Marico Sunbird (*Cinnyris mariquensis*), Burchell's Starling (*Lamprotornis australis*), White-browed Scrub Robin (*Erythropygia leucophrys*), Blue Waxbill (*Uraeginthus angolensis*) and Arrow-marked Babbler (*Turdoides jardineii*). Forty species (56 % of the total list) were recorded from this assemblage, the highest of the three assemblages (Appendix 4).

Thicket Assemblage

Thicket vegetation occurring along the drainage lines within the River Lodge provides refuge for a number of bird species such as White-throated Robin-Chat (*Cossypha humeralis*), Purple-crested Turaco (*Tauraco porphyreolophus*), Yellow-bellied Greenbul (*Chlorocichla flaviventris*), Green-backed Camaroptera (*Camaroptera brachyura*) and Spectacled Weaver (*Ploceus ocularis*). Twenty-eight species (39 % of the total list) were recorded from this assemblage, the second highest of the three assemblages (Appendix 4).

Open Water Assemblage

A low diversity of birds associated with open water habitats was present in the small dam adjacent to the northern footprint. These included Egyptian Goose (*Alopochen aegyptiaca*), Green-backed Heron (*Butorides striata*), Wire-tailed Swallow (*Hirundo smithii*), Blacksmith Lapwing (*Vanellus armatus*) and African Pied Wagtail (*Motacilla aguimp*). Six species were recorded from Open Water, or 8 % of the entire list, the lowest of the three assemblages (Appendix 3).

5.2.3 Reptiles

5.2.3.1 Regional Overview

The Lowveld of eastern Limpopo supports a high diversity of reptile species with 102 species already recorded from the degree grid 2431¹. Fifty species of reptiles have been recorded from the QDS 2431 AC, in which Kapama is situated, as listed on the Reptile Atlas of Southern Africa website (<http://vmus.adu.org.za/>) and in Bates *et al.* (2014), indicating that reptile diversity in the area is high. Bates *et al.* (2014) classifies the grid in which Kapama is located as having high reptile diversity. Reptile endemism, however, is low which is to be expected as the area lies in close proximity to Mozambique within the widespread savannah biome (Bates *et al.*, 2014).

5.2.3.2 Conservation-Important Species

Of the potentially occurring species, only two conservation-important reptiles potentially occur (Appendix 4). One of these has been assessed as Vulnerable, namely Nile Crocodile (*Crocodylus niloticus*), which is also protected under NEMBA ToPS. This species has a moderate likelihood of occurrence within the small dam in front of River Lodge and is discussed below.

Nile Crocodile

Africa's largest reptile is listed as Vulnerable due to degradation of aquatic environments, persecution and water pollution². The population in the GKNP is considered the largest in South Africa (Bates *et al.*, 2014) and individuals may reside in the small dam in front of River Lodge.

Southern African Python (*Python natalensis*) is protected under the National Environmental Management: Biodiversity Act (No.10 of 2004) and is likely to occasionally forage within the study area. Three reptiles were recorded during fieldwork (Appendix 3), all common and widespread species³. A dedicated reptile survey during the wet season would no doubt have produced more species but is unlikely to have produced data that would change the recommendations in this report.

¹ http://vmus.adu.org.za/vm_sp_list.php accessed 26/05/2018

² Bates *et al.*, 2014

³ Bates *et al.*, 2014

5.2.4 Frogs

5.2.4.1 Regional Overview

The Lowveld of Limpopo and Mpumalanga supports one of the richest areas in South Africa for frog diversity (Minter *et al.* 2004). Twenty-six species of frogs have been recorded in 2431 AC, as listed on the Frogs of Southern Africa website (<http://vmus.adu.org.za/>) as well as in the frog atlas project (Minter *et al.*, 2004). Frog endemism, however, is very low with no potentially occurring endemic species present in the Kapama area (Minter *et al.*, 2004).

5.2.4.2 Conservation-Important Species

None of the potentially occurring frog species have Red Data or protected status. No frogs were recorded during the assessment although summer fieldwork with nocturnal surveys would result in a few species.

6. BIODIVERSITY VALUE ASSESSMENT

A qualitative integration of conservation importance and functional importance values for the two vegetation communities represented in the study area provides an indication of the biodiversity values of these communities. The data sheets for conservation importance and functional importance calculations for each community are presented in Appendix 5, and are dealt with in more detail under each vegetation community description. The integrated biodiversity values are summarised in Table 5 and presented spatially in Figure 6.

Riparian Thicket was assessed as having **Moderate** Biodiversity Value through integration of Moderate Conservation Importance and Moderate Functional Importance scores (Appendix 5). High scores were obtained for Protection status and Threatened species, but ultimately the inundation of some of this community by water from the earth dam downstream, as well as existing lodge developments resulted in lower scores for other assessment parameters. Four conservation-important species were recorded, with two considered to be of conservation concern as defined by Raimondo *et al.* (2009)¹. *Elaeodendron transvaalense* and *Dalbergia melanoxylon* are both assessed as Near Threatened. *Sclerocarya birrea* subsp. *caffra* and *Elaeodendron transvaalense* are protected under the National Forests Act (No. 30 of 1998) and *Spirostachys africana* is protected under the Limpopo Environmental Management Act (No. 7 of 2003). No Threatened or Near Threatened plant species potentially occur. Two Threatened or Near Threatened mammal species were confirmed, namely Hippopotamus and African Elephant (both Vulnerable) and two Vulnerable species (Lion and Leopard) and two Near Threatened species (Spotted Hyaena and Honey Badger) have a moderate or higher likelihood of occurring. Marabou Stork (Near Threatened) was confirmed from the area adjacent to this community. Nile Crocodile (Vulnerable) potentially occurs within the adjacent dam.

Plains Woodland was assessed as having **Moderate** Biodiversity Value through integration of Moderate Conservation Importance and Moderate Functional Importance (Appendix 5). The proposed footprint is situated immediately adjacent to existing lodge facilities, as well as a large construction site, so disturbance levels are very high. Three conservation-important species were recorded. One of these is listed as Near Threatened, namely *Dalbergia melanoxylon*. Two species are protected under the National Forests Act (No. 30 of 1998): *Sclerocarya birrea* subsp. *caffra* and *Balanites maughamii* subsp. *maughamii*. One plant species of conservation concern potentially occurs, namely *Drimia sanguinea* (Near

¹ Species of conservation concern include those with a status of Declining, Near Threatened, Data Deficient, Vulnerable, Endangered and Critically Endangered)

Threatened). Three Threatened or Near Threatened mammal species were confirmed during fieldwork, namely African Elephant, Leopard (both Vulnerable) and Spotted Hyaena (Near Threatened). Two Threatened mammals potentially occur, namely Hippopotamus and Lion (both Vulnerable), and one additional Near Threatened mammal has a moderate likelihood of occurring, namely Honey Badger. White-backed, White-headed and Hooded Vultures (Critically Endangered), Cape Vulture, Lappet-faced Vulture, Tawny Eagle, Martial Eagle, Bateleur and Southern Ground Hornbill (Endangered) and Marabou Stork (Near Threatened) potentially occur.

Table 5. Conservation Importance, Functional Importance and Biodiversity Values for the vegetation community in the Study Area

Vegetation Community	Conservation Importance	Functional Importance	Biodiversity Value
Riparian Thicket	Moderate	Moderate	Moderate
Plains Woodland	Moderate	Moderate	Moderate



Figure 6. Biodiversity Values of Vegetation Communities in the Study Area

7. KEY POTENTIAL IMPACTS

While a detailed impact assessment was not part of the terms of reference for this report, key potential impacts associated with the proposed development can be described. The following are potentially significant impacts on untransformed vegetation within the study area:

- **Loss of a portion of Critical Biodiversity Area 1** – The proposed housing site has been assessed as a Critical Biodiversity Area 1 by the LPBCA; however, the area to be impacted is very small;
- **Loss of plant species of conservation importance** – five species could be impacted during the construction phase. The trees *Elaeodendron transvaalense* and *Dalbergia melanoxylon* are listed as Near Threatened and the trees *Elaeodendron transvaalense*, *Sclerocarya birrea* subsp. *caffra* and *Balanites maughamii* subsp. *maughamii* are nationally protected and the tree *Spirostachys africana* is protected under provincial legislation;
- **Degradation of watercourses** – despite the habitat transformation that has occurred through the construction of an earth dam downstream of the camp, additional construction in the small watercourses entering the dam could be sensitive to degradation through construction, road building and dumping of building rubble and topsoil. Long-term changes in surface and subsurface runoff could negatively affect the riparian structure and function, particularly with respect to channel erosion caused by increased stormwater runoff;
- **Invasion of natural habitat by alien plants** – although only four alien plant species was located during fieldwork, invasion from others is possible as construction activities introduce seeds which may thrive in bare soil resulting from building activities;
- **Loss of habitat for conservation-important fauna** – the vegetation community present potentially provides key habitat for fauna that would be sensitive to impacts, although most fauna species would only occasionally utilise the very small proposed development areas;
- **Increase in poaching activities** – construction workers, if left unsupervised, may participate in small-scale poaching through setting snares or traps for bushmeat. Medicinal plants may also be harvested for muthi (for example *Elaeodendron transvaalense*).

8. RECOMMENDATIONS

While this is not a detailed impact assessment, some preliminary recommendations and mitigation measures are listed below.

Table 6 summarises the potential Biodiversity / Development Conflict within the identified vegetation communities.

- Wherever possible, trees taller than 5 m or with a diameter at breast height of 30 cm should be left unharmed, whether protected by law or not.
- The trees *Elaeodendron transvaalense*, *Sclerocarya birrea* subsp. *caffra* and *Balanites maughamii* subsp. *maughamii* are nationally protected and *Spirostachys africana* is protected under provincial legislation. It is recommended that all development take place around these trees and that they be left untouched. If this is unavoidable then destruction permits from the relevant authorities will have to be applied for.
- Prior to any construction at any of the sites, an experienced botanist should conduct a walk-through, marking each plant species of conservation concern to be avoided or that may need to be relocated prior to any site clearance activity taking place.
- All existing and proposed roads to contain adequate stormwater drainage and erosion control measures.
- Poaching could be a significant threat. If any external labour teams are used during construction, then these teams should preferably be accommodated off site; if this is not possible then teams should be carefully monitored to ensure that no unsupervised access to plant and animal resources takes place.

Table 6. Potential Biodiversity / Development Conflict within the identified vegetation communities

Vegetation Communities	Biodiversity / Development Conflict	Development Recommendations
Riparian Thicket	Moderate	Develop with mitigation
Plains Woodland	Moderate	Develop with mitigation

Provided the recommendations suggested in this report are followed, there is no objection to the proposed developments on Kapama in terms of the terrestrial ecosystems of the study area. However, if construction was to proceed without the implementation of the mitigation measures given in Section 8 above and development recommendations in Table 6 then we would object to the development application.

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10. APPENDICES

Appendix 1. Checklist of Flora recorded during fieldwork

Taxa	Growth Form	Red Data	Protected	LIM Endemic	Vegetation Communities	
					Riparian Thicket	Plains Woodland
Family Acanthaceae <i>Barleria elegans</i> S.Moore ex C.B.Clarke <i>Barleria obtusa</i> Nees <i>Hypoestes forskalii</i> (Vahl) R.Br. <i>Justicia flava</i> (Vahl) Vahl	herb climber herb herb				r r d	f
Family Amaranthaceae <i>Kyphocarpa angustifolia</i> (Moq.) Lopr.	herb					f
Family Anacardiaceae <i>Lannea schweinfurthii</i> (Engl.) Engl. var. <i>stuhlmannii</i> (Engl.) Kokwaro <i>Ozoroa engleri</i> R.Fern. & A.Fern. <i>Sclerocarya birrea</i> (A.Rich.) Hochst. subsp. <i>caffra</i> (Sond.) Kokwaro <i>Searsia gueinzii</i> (Sond.) F.A.Barkley	tree tree tree tree		NFA		r r f	r r
Family Apocynaceae <i>Carissa bispinosa</i> (L.) Desf. ex Brenan <i>Cynanchum gerrardii</i> (Harv.) Liede <i>Cynanchum viminalis</i> (L.) L.	shrub succulent succulent				u r r	
Family Araceae <i>Stylochaeton natalensis</i> Schott	herb				r	
Family Asparagaceae <i>Asparagus falcatus</i> L. <i>Asparagus virgatus</i> Baker	climber shrub				r r	
Family Asteraceae * <i>Ageratum conyzoides</i> L.	herb				r	

<i>Gymnanthemum crataegifolium</i> (Hutch.) H.Rob.	dwarf shrub				r	
<i>Litogyne gariepina</i> (DC.) Anderb.	herb				r	
<i>Polydora steetziana</i> (Oliv. & Hiern) H.Rob.	herb				r	
* <i>Tagetes minuta</i> L.	herb				r	
* <i>Zinnia peruviana</i> (L.) L.	herb				r	
Family Balanitaceae						
<i>Balanites maughamii</i> Sprague subsp. <i>maughamii</i>	tree		NFA			r
Family Boraginaceae						
<i>Heliotropium strigosum</i> Willd.	herb				r	
Family Burseraceae						
<i>Commiphora schimperi</i> (O.Berg) Engl.	tree				u	r
Family Capparaceae						
<i>Capparis tomentosa</i> Lam.	climber				r	
Family Celastraceae						
<i>Elaeodendron transvaalense</i> (Burt Davy) R.H.Archer	tree	NT	NFA		u	
<i>Gymnosporia maranguensis</i> (Loes.) Loes.	shrub				r	
<i>Gymnosporia senegalensis</i> (Lam.) Loes.	shrub				u	
<i>Mystroxydon aethiopicum</i> (Thunb.) Loes. subsp. <i>schlechteri</i> (Loes.) R.H.Archer	tree				f	
Family Combretaceae						
<i>Combretum apiculatum</i> Sond. subsp. <i>apiculatum</i>	tree					u
<i>Combretum hereroense</i> Schinz	tree				f	u
<i>Combretum zeyheri</i> Sond.	tree				d	
<i>Terminalia sericea</i> Burch. ex DC.	tree				u	r
Family Commelinaceae						
<i>Commelina erecta</i> L.	herb					r
Family Convolvulaceae						
<i>Ipomoea</i> sp. (no flowers)	climber				r	
Family Crassulaceae						
<i>Cotyledon barbeyi</i> Schweinf. ex Baker	succulent				r	
<i>Kalanchoe rotundifolia</i> (Haw.) Haw.	succulent				r	
Family Cucurbitaceae						
<i>Cucumis zeyheri</i> Sond.	climber				r	
Family Cyperaceae						
<i>Cyperus</i> sp.	sedge				r	
Family Dioscoreaceae						

<i>Dioscorea cotinifolia</i> Kunth	climber				r	
Family Dracaenaceae						
<i>Sansevieria hyacinthoides</i> (L.) Druce	succulent				r	r
Family Ebenaceae						
<i>Euclea divinorum</i> Hiern	tree				d	f
<i>Euclea natalensis</i> A.DC. subsp. <i>angustifolia</i> F.White	tree				r	
Family Euphorbiaceae						
<i>Croton menyharthii</i> Pax	shrub				u	
<i>Euphorbia ingens</i> E.Mey. ex Boiss.	tree				r	
<i>Spirostachys africana</i> Sond.	tree		LEMA		f	
Family Fabaceae						
<i>Acacia burkei</i> Benth.	tree				u	
<i>Acacia exuvialis</i> I.Verd.	shrub				r	
<i>Acacia gerrardii</i> Benth. subsp. <i>gerrardii</i> var. <i>gerrardii</i>	tree					u
<i>Acacia nigrescens</i> Oliv.	tree					r
<i>Acacia nilotica</i> (L.) Willd. ex Delile subsp. <i>kraussiana</i> (Benth.) Brenan	tree					r
<i>Acacia robusta</i> Burch. subsp. <i>clavigera</i> (E.Mey.) Brenan	tree				f	
<i>Aeschynomene indica</i> L.	dwarf shrub				r	
<i>Bolusanthus speciosus</i> (Bolos) Harms	tree				r	
<i>Crotalaria</i> sp. (no flowers)	herb				r	
<i>Dalbergia melanoxylon</i> Guill. & Perr.	tree	NT*			r	r
<i>Dichrostachys cinerea</i> (L.) Wight & Arn. subsp. <i>africana</i> Brenan & Brummitt	tree					r
<i>Mundulea sericea</i> (Willd.) A.Chev. subsp. <i>sericea</i>	tree					r
<i>Ormocarpum trichocarpum</i> (Taub.) Engl.	tree					r
<i>Peltophorum africanum</i> Sond.	tree					u
<i>Rhynchosia caribaea</i> (Jacq.) DC.	climber				r	
<i>Schotia brachypetala</i> Sond.	tree				d	
<i>Senna petersiana</i> (Bolle) Lock	tree					r
Family Hyacinthaceae						
<i>Drimia</i> sp. (no flowers)	bulb					r
<i>Drimiopsis crenata</i> van der Merwe	bulb				r	
Family Lamiaceae						
<i>Leucas glabrata</i> (Vahl) Sm. var. <i>glabrata</i>	herb					r
<i>Ocimum americanum</i> L. var. <i>americanum</i>	herb					f
Family Loranthaceae						
<i>Oncocalyx bolusii</i> (Sprague) Wiens & Polhill	epiphyte				r	

Family Malvaceae						
<i>Abutilon austro-africanum</i> Hochr.	dwarf shrub					f
<i>Grewia bicolor</i> Juss. var. <i>bicolor</i>	shrub				u	
<i>Grewia flavescens</i> Juss.	shrub				f	r
<i>Grewia hexamita</i> Burret	tree				u	
<i>Grewia villosa</i> Willd. var. <i>villosa</i>	shrub					r
<i>Hibiscus micranthus</i> L.f. var. <i>micranthus</i>	dwarf shrub					r
<i>Hibiscus praeteritus</i> R.A.Dyer	herb				r	
<i>Waltheria indica</i> L.	herb				r	f
Family Oleaceae						
<i>Jasminum fluminense</i> Vell. subsp. <i>fluminense</i>	climber				r	
Family Pedaliaceae						
<i>Ceratotheca triloba</i> (Bernh.) Hook.f.	herb					r
Family Phyllanthaceae						
<i>Phyllanthus reticulatus</i> Poir. var. <i>reticulatus</i>	shrub				u	
Family Poaceae						
<i>Aristida adscensionis</i> L.	grass				r	
<i>Aristida congesta</i> Roem. & Schult. subsp. <i>barbicollis</i> (Trin. & Rupr.) De Winter	grass				u	
<i>Cymbopogon nardus</i> (L.) Rendle	grass				r	
<i>Cynodon dactylon</i> (L.) Pers.	grass					r
<i>Digitaria eriantha</i> Steud.	grass				u	
<i>Echinochloa colona</i> (L.) Link	grass					r
<i>Eragrostis curvula</i> (Schrad.) Nees	grass					r
<i>Eragrostis gummiflua</i> Nees	grass					u
<i>Eragrostis lehmanniana</i> Nees var. <i>lehmanniana</i>	grass					r
<i>Eragrostis rigidior</i> Pilg.	grass					d
<i>Eragrostis</i> sp.	grass					r
<i>Eragrostis superba</i> Peyr.	grass					u
<i>Eragrostis trichophora</i> Coss. & Durieu	grass					r
<i>Heteropogon contortus</i> (L.) Roem. & Schult.	grass					r
<i>Hyperthelia dissoluta</i> (Nees ex Steud.) Clayton	grass					r
<i>Melinis repens</i> (Willd.) Zizka subsp. <i>repens</i>	grass				r	u
<i>Panicum maximum</i> Jacq.	grass				u	
<i>Perotis patens</i> Gand.	grass					r
<i>Pogonarthria squarrosa</i> (Roem. & Schult.) Pilg.	grass					u
<i>Sporobolus pyramidalis</i> P.Beauv.	grass					u

<i>Urochloa mosambicensis</i> (Hack.) Dandy	grass					u
Family Rhamnaceae						
<i>Berchemia zeyheri</i> (Sond.) Grubov	tree				r	
<i>Ziziphus mucronata</i> Willd. subsp. <i>mucronata</i>	tree				r	
Family Rubiaceae						
<i>Agathisanthemum bojeri</i> Klotzsch subsp. <i>bojeri</i>	herb					u
<i>Coddia rudis</i> (E.Mey. ex Harv.) Verdc.	shrub				r	
<i>Pyrostria hystrix</i> (Bremek.) Bridson	shrub				r	
* <i>Richardia brasiliensis</i> Gomes	herb					r
Family Sapindaceae						
<i>Pappea capensis</i> Eckl. & Zeyh.	tree					u
Family Solanaceae						
<i>Solanum campylacanthum</i> A. Rich. subsp. <i>panduriforme</i>	dwarf shrub					u
Family Strychnaceae						
<i>Strychnos madagascariensis</i> Poir.	tree				r	u
Family Vitaceae						
<i>Cissus cornifolia</i> (Baker) Planch.	climber				r	
<i>Rhoicissus tridentata</i> (L.f.) Wild & R.B.Drumm. subsp. <i>tridentata</i>	climber				r	
TOTAL		111	2	4	0	72
						50

NFA = National Forests Act LEMA = Limpopo Environmental Management Act NT = Near Threatened ‡ = IUCN assessment * = exotic species	d = dominant f = frequent u = uncommon r = rare
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Appendix 2. Potentially occurring plant species of conservation concern

Species	Family	Red Data Status	Habitat	Likelihood	Reason
<i>Adenium swazicum</i>	Apocynaceae	CR	Lowveld savanna, often on sodic soils	Low	No suitable habitat present
<i>Elaeodendron transvaalense</i>	Celastraceae	NT	Savanna or bushveld, from open woodland to thickets, often on termite mounds.	Confirmed	
<i>Dalbergia melanoxylon</i>	Fabaceae	NT‡	Savanna	Confirmed	
<i>Bowiea volubilis</i> subsp. <i>volubilis</i>	Hyacinthaceae	VU	Thickly vegetated river valleys and in boulder screes	Very Low	No suitable habitat present
<i>Drimia sanguinea</i>	Hyacinthaceae	NT	Open veld and scrubby woodland in a variety of soil types.	Moderate	Suitable habitat present
<i>Ansellia africana</i>	Orchidaceae	VU‡	Savanna	Low	All suitable habitat searched, but is confirmed to occur within River Lodge grounds

NT = Near Threatened
 VU = Vulnerable
 CR = Critically Endangered
 ‡ = IUCN assessment

Appendix 3. Checklist of fauna recorded during fieldwork

Common Name	Scientific Name	Red Data	Endemic	Protected	Assemblage		
					Woodland	Riparian Thicket	Open Water
Mammals							
ORDER: PRIMATES Family Cercopithecidae (Old World monkeys) Vervet Monkey Chacma Baboon	<i>Chlorocebus pygerythrus</i> <i>Papio ursinus</i>					x	
ORDER: LAGOMORPHA Family Leporidae (rabbits and hares) African Savanna Hare	<i>Lepus victoriae</i>				x		
ORDER: RODENTIA Family Sciuridae (squirrels) Tree Squirrel	<i>Paraxerus cepapi</i>					x	
ORDER: CARNIVORA Family Hyaenidae (hyaenas) Spotted Hyaena Family Felidae (cats) Leopard	<i>Crocuta crocuta</i> <i>Panthera pardus</i>	NT VU		NEMBA (PR) NEMBA (PR)	x x		
ORDER: PROBOSCIDEA Family Elephantidae (elephants) African Elephant	<i>Loxodonta africana</i>	VU		NEMBA (PR)	x	x	
ORDER: CETARTIODACTYLA Family Hippopotamidae (hippopotamus) Hippopotamus Family Suidae (pigs) Common Warthog Family Bovidae (antelope, cattle) African Buffalo Greater Kudu	<i>Hippopotamus amphibius</i> <i>Phacochoerus africanus</i> <i>Syncerus caffer</i> <i>Tragelaphus strepsiceros</i>	VU‡		LEMA LEMA	 x x		x x

Common Duiker	<i>Sylvicapra grimmia</i>				x	x	
Impala	<i>Aepyceros melampus</i>				x	x	
Subtotal	13	4	1	5	9	7	1
Birds							
ORDER: ANSERIFORMES							
Family Anatidae (ducks, geese and swans)							
Egyptian Goose	<i>Alopochen aegyptiaca</i>						x
ORDER: GALLIFORMES							
Family Numididae (guineafowl)							
Helmeted Guineafowl	<i>Numida meleagris</i>				x		
Family Phasianidae (pheasants, fowl and allies)							
Crested Francolin	<i>Dendroperdix sephaena</i>					x	
Natal Spurfowl	<i>Pternistis natalensis</i>					x	
ORDER: CICONIIFORMES							
Family Ciconiidae (storks)							
Marabou Stork	<i>Leptoptilos crumenifer</i>	NT					x
ORDER: PELECANIFORMES							
Family Ardeidae (herons and bitterns)							
Green-backed Heron	<i>Butorides striata</i>						x
ORDER: ACCIPITRIFORMES							
Family Accipitridae (kites, hawks and eagles)							
Gabar Goshawk	<i>Micronisus gabar</i>				x		
ORDER: CHARADRIIFORMES							
Family Charadriidae (plovers)							
Blacksmith Lapwing	<i>Vanellus armatus</i>						x
ORDER: COLUMBIFORMES							
Family Columbidae (pigeons and doves)							
Cape Turtle Dove	<i>Streptopelia capicola</i>				x		
Laughing Dove	<i>Spilopelia senegalensis</i>				x		
Emerald-spotted Wood Dove	<i>Turtur chalcospilos</i>				x		
ORDER: MUSOPHAGIFORMES							
Family Musophagidae (turacos)							
Purple-crested Turaco	<i>Tauraco porphyreolophus</i>					x	
Grey Go-away-bird	<i>Corythaixoides concolor</i>				x		
ORDER: CORACIIFORMES							

Family Alcedinidae (kingfishers) Brown-hooded Kingfisher	<i>Halcyon albiventris</i>					x		
ORDER: BUCEROTIFORMES								
Family Upupidae (hoopoes) African Hoopoe	<i>Upupa africana</i>					x		
Family Phoeniculidae (wood-hoopoes) Green Wood-hoopoe	<i>Phoeniculus purpureus</i>						x	
Family Bucerotidae (hornbills) African Grey Hornbill	<i>Tockus nasutus</i>					x		
Southern Red-billed Hornbill	<i>Tockus rufirostris</i>					x		
Southern Yellow-billed Hornbill	<i>Tockus leucomelas</i>					x		
ORDER: COLIIFORMES								
Family Coliidae (mousebirds) Speckled Mousebird	<i>Colius striatus</i>							x
Red-faced Mousebird	<i>Urocolius indicus</i>					x		
ORDER: PICIFORMES								
Family Lybiidae (African barbets) Black-collared Barbet	<i>Lybius torquatus</i>							x
Yellow-fronted Tinkerbird	<i>Pogoniulus chrysoconus</i>					x		
Acacia Pied Barbet	<i>Tricholaema leucomelas</i>					x		
Family Picidae (woodpeckers) Golden-tailed Woodpecker	<i>Campethera abingoni</i>							x
ORDER: PSITTACIFORMES								
Family Psittacidae (parrots) Brown-headed Parrot	<i>Poicephalus cryptoxanthus</i>							x
ORDER: PASSERIFORMES								
Family Platysteiridae (wattle-eyes and batises) Chinspot Batis	<i>Batis molitor</i>					x		
Family Malaconotidae (bushshrikes) Orange-breasted Bushshrike	<i>Chlorophoneus sulfureopectus</i>					x		
Black-backed Puffback	<i>Dryoscopus cubla</i>							x
Brubru	<i>Nilaus afer</i>					x		
Southern Boubou	<i>Laniarius ferrugineus</i>							x
Family Laniidae (shrikes) Southern White-crowned Shrike	<i>Eurocephalus anguimans</i>					x		

Family Oriolidae (figbirds and orioles)								
Black-headed Oriole	<i>Oriolus larvatus</i>							x
Family Corvidae (crows and jays)								
Pied Crow	<i>Corvus albus</i>					x		
Family Paridae (tits and chickadees)								
Southern Black Tit	<i>Parus niger</i>					x		
Family Pycnonotidae (bulbuls)								
Dark-capped Bulbul	<i>Pycnonotus tricolor</i>							x
Sombre Greenbul	<i>Andropadus importunus</i>							x
Yellow-bellied Greenbul	<i>Chlorocichla flaviventris</i>							x
Terrestrial Brownbul	<i>Phyllastrephus terrestris</i>							x
Family Hirundinidae (swallows and martins)								
Wire-tailed Swallow	<i>Hirundo smithii</i>					over	over	over
Family Macrosphenidae (crombecs and African warblers)								
Long-billed Crombec	<i>Sylvietta rufescens</i>					x		
Family Cisticolidae (cisticolas and allies)								
Rattling Cisticola	<i>Cisticola chiniana</i>					x		
Tawny-flanked Prinia	<i>Prinia subflava</i>					x		
Yellow-breasted Apalis	<i>Apalis flavida</i>							x
Green-backed Camaroptera	<i>Camaroptera brachyura</i>							x
Family Leiothrichidae (laughingthrushes)								
Arrow-marked Babbler	<i>Turdoides jardineii</i>					x		
Family Sturnidae (starlings)								
Cape Glossy Starling	<i>Lamprotornis nitens</i>					x		
Burchell's Starling	<i>Lamprotornis australis</i>					x		
Violet-backed Starling	<i>Cinnyricinclus leucogaster</i>					x		
Family Buphagidae (oxpeckers)								
Red-billed Oxpecker	<i>Buphagus erythrorhynchus</i>					x		
Family Turdidae (thrushes)								
Kurrichane Thrush	<i>Turdus libonyanus</i>							x
Family Muscipidae (chats and Old World flycatchers)								
White-browed Scrub Robin	<i>Erythropygia leucophrys</i>					x	x	
White-throated Robin-Chat	<i>Cossypha humeralis</i>							x
White-browed Robin-Chat	<i>Cossypha heuglini</i>							x

Family Nectariniidae (sunbirds)							
Marico Sunbird	<i>Cinnyris mariquensis</i>				x		
White-bellied Sunbird	<i>Cinnyris talatala</i>					x	
Family Passeridae (Old World sparrows)							
Southern Grey-headed Sparrow	<i>Passer diffusus</i>				x		
Family Ploceidae (weavers and widowbirds)							
Spectacled Weaver	<i>Ploceus ocularis</i>						x
Village Weaver	<i>Ploceus cucullatus</i>						x
Lesser Masked Weaver	<i>Ploceus intermedius</i>						x
Red-billed Quelea	<i>Quelea quelea</i>				x		
White-winged Widowbird	<i>Euplectes albonotatus</i>				x		
Family Estrildidae (waxbills, munias and allies)							
Common Waxbill	<i>Estrilda astrild</i>						x
Blue Waxbill	<i>Uraeginthus angolensis</i>				x		
Red-billed Firefinch	<i>Lagonosticta senegala</i>				x		
Quail-Finch	<i>Ortygospiza fuscocrissa</i>				x		
Bronze Mannikin	<i>Lonchura cucullata</i>						x
Family Viduidae (indigobirds and whydahs)							
Village Indigobird	<i>Vidua chalybeata</i>				x		
Family Motacillidae (wagtails and pipits)							
African Pied Wagtail	<i>Motacilla aguimp</i>						x
Family Fringillidae (finches and canaries)							
Yellow-fronted Canary	<i>Crithagra mozambica</i>				x		
Family Emberizidae (buntings and New World sparrows)							
Cinnamon-breasted Bunting	<i>Emberiza tahapisi</i>				x		
Subtotal	71	1	0	0	40	28	6
Reptiles							
ORDER: TESTUDINES							
Family Pelomedusidae (freshwater turtles)							
Serrated Hinged Terrapin	<i>Pelusios sinuatus</i>						x
ORDER: SQUAMATA							
Family Scincidae (skinks)							
Variable Skink	<i>Trachylepis varia</i>				x	x	
Family Varanidae (monitor lizards)							
Water Monitor	<i>Varanus niloticus</i>						x

Subtotal	2	0	0	0	1	1	1
TOTAL	86	5	1	5	50	36	8

PR - Protected
 NT - Near Threatened
 VU - Vulnerable
 NEMBA - National Environmental Management: Biodiversity Act
 LEMA = Limpopo Environmental Management Act
 ‡ - IUCN assessment

Appendix 4. Potentially occurring fauna of conservation concern

Common Name	Scientific Name	Red Data	Protected	Habitat	SABAP2 Reporting Rate for 2431 AC	Likelihood	Reason
Mammals							
Cheetah	<i>Acinonyx jubatus</i>	VU	NEMBA (VU)	Savanna, semi desert		Low	Could occasionally pass through
African Clawless Otter	<i>Aonyx capensis</i>	NT	LEMA	Rivers and streams		Low	Water bodies too isolated from permanent water
White Rhinoceros	<i>Ceratotherium simum</i>	NT	NEMBA (PR)	Savanna, semi desert		Low	Scarce, human disturbance
Blue Wildebeest	<i>Connochaetes taurinus</i>		NEMBA (PR)	Savanna, grassland		High	Suitable habitat present
Swamp Musk Shrew	<i>Crocidura mariquensis</i>	NT		Wetlands in savanna		Low	Unsuitable habitat present
Spotted Hyaena	<i>Crocuta crocuta</i>	NT	NEMBA (PR)	Wide variety of habitats		Confirmed	
African Marsh Rat	<i>Dasymys incommutus</i>	NT		Wetlands		Low	Unsuitable habitat present
Black Rhinoceros	<i>Diceros bicornis minor</i>	EN	NEMBA (VU)	Thickets, dense woodland		Low	Unsuitable habitat present, very rare in the area
Burchell's Zebra	<i>Equus quagga burchelli</i>		NEMBA (PR)	Savanna, grassland		High	Suitable habitat present
Southern Lesser Galago	<i>Galago moholi</i>		LEMA	Savanna		High	Suitable habitat present
Giraffe	<i>Giraffa camelopardalis</i>		LEMA	Savanna		High	Suitable habitat present
Hippopotamus	<i>Hippopotamus amphibius</i>	VU‡	LEMA	Wetlands		Confirmed	
Sable	<i>Hippotragus niger</i>	VU	NEMBA (VU)			Low	Very rare in the area
Serval	<i>Leptailurus serval</i>	NT	NEMBA (PR)	Grassland, wetlands		Low	Very rare in the area
African Elephant	<i>Loxodonta africana</i>	VU	NEMBA (PR)	Wide variety of habitats		Confirmed	
African Wild Dog	<i>Lycaon pictus</i>	EN	NEMBA (EN)	Wide variety of habitats		Low	Could occasionally pass through
Honey Badger	<i>Mellivora capensis</i>	NT	LEMA	Wide variety of habitats		Moderate	Suitable habitat present

Aardvark	<i>Orycteropus afer</i>		NEMBA (PR)	Wide variety of habitats		Low	Rare in the Lowveld, may occasionally pass through
Thick-tailed Greater Galago	<i>Otolemur crassicaudatus</i>		LEMA	Moist woodland and forest		Moderate	Suitable habitat present
Lion	<i>Panthera leo</i>	VU‡	NEMBA (VU)	Wide variety of habitats		High	Suitable habitat present
Leopard	<i>Panthera pardus</i>	VU	NEMBA (VU)	Wide variety of habitats		Confirmed	
African Weasel	<i>Poecilogale albinucha</i>	NT		Wide variety of habitats		Low	Very rare in the Lowveld
Aardwolf	<i>Proteles cristatus</i>		LEMA	Wide variety of habitats		Low	Rare in the Lowveld, may occasionally pass through
Steenbok	<i>Raphicerus campestris</i>		LEMA	Wide variety of habitats		High	Suitable habitat present
Ground Pangolin	<i>Smutsia temminckii</i>	VU	NEMBA (VU)	Wide variety of habitats		Low	Could occasionally pass through
African Buffalo	<i>Syncerus caffer</i>		LEMA	Wide variety of habitats		Confirmed	
<i>Subtotal</i>	26	17	23				
Birds							
Half-collared Kingfisher	<i>Alcedo semitorquata</i>	NT		Streams with overhanging vegetation	-	Low	Rare in the Lowveld, dams too isolated
Tawny Eagle	<i>Aquila rapax</i>	EN	NEMBA (EN)	Savanna	32,9	Moderate	Suitable habitat present
Kori Bustard	<i>Ardeotis kori</i>	NT	NEMBA (PR)	Savanna	-	Low	Unsuitable habitat present
Southern Ground-Hornbill	<i>Bucorvus leadbeateri</i>	EN	NEMBA (EN)	Savanna	17,4	Moderate	Suitable habitat present
Abdim's Stork	<i>Ciconia abdimii</i>	NT		Wide variety of habitats	0,7	Low	Occasional influxes possible
Black Stork	<i>Ciconia nigra</i>	VU		Forages in wetlands and breeds on cliffs	2,9	Low	Suitable habitat only present along the small dam which is fairly isolated from permanent water
Pallid Harrier	<i>Circus macrourus</i>	NT		Open grassland and semi-desert	-	Low	No suitable habitat present
African Marsh Harrier	<i>Circus ranivorus</i>	EN		Moist grassland and wetland	-	Low	No suitable habitat present
European Roller	<i>Coracias garrulus</i>	NT		Savanna	25,7	Moderate	Suitable habitat present

Saddle-billed Stork	<i>Ephippiorhynchus senegalensis</i>	EN		Large rivers, dams and pans	4,2	Low	Suitable habitat only present along the small dam which is fairly isolated from permanent water
Lanner Falcon	<i>Falco biarmicus</i>	VU		Wide variety of habitats	0,7	Low	Limited suitable habitat present, rare in the Lowveld
White-backed Night-Heron	<i>Gorsachius leuconotus</i>	VU		Streams with overhanging vegetation	-	Low	Suitable habitat only present along the small dam which is fairly isolated from permanent water
White-backed Vulture	<i>Gyps africanus</i>	CR	NEMBA (EN)	Savanna	75	High	Suitable habitat present
Cape Vulture	<i>Gyps coprotheres</i>	EN	NEMBA (EN)	Wide variety of habitats	9,2	Moderate	May occasionally forage within study area
Marabou Stork	<i>Leptoptilos crumeniferus</i>	NT		Wide variety of habitats	15,1	Confirmed	
Bat Hawk	<i>Macheiramphus alcinus</i>	EN		Tall woodland along rivers	-	Low	Very rare in the Lowveld
Lesser Jacana	<i>Microparra capensis</i>	VU		Floating vegetation on tropical wetlands	-	Low	No suitable habitat present
Yellow-billed Stork	<i>Mycteria ibis</i>	EN		Wide variety of wetlands	2,6	Low	Suitable habitat only present along the small dam which is fairly isolated from permanent water
Hooded Vulture	<i>Necrosyrtes monachus</i>	CR	NEMBA (EN)	Wide variety of wetlands	21,7	Moderate	May occasionally forage within study area
African Pygmy Goose	<i>Nettapus auritus</i>	VU		Tropical wetlands with floating vegetation	-	Low	No suitable habitat present
Great White Pelican	<i>Pelecanus onocrotalus</i>	VU		Large pools, rivers and lakes	-	Low	No suitable habitat present
Pink-backed Pelican	<i>Pelecanus rufescens</i>	VU		Large pools, rivers and lakes	-	Low	No suitable habitat present
Greater Flamingo	<i>Phoenicopterus roseus</i>	NT		Saline wetlands	-	Low	No suitable habitat present
African Finfoot	<i>Podica senegalensis</i>	VU		Rivers and streams with overhanging vegetation	0,3	Low	Suitable habitat only present along the small dam which is fairly isolated from permanent water

Martial Eagle	<i>Polemaetus bellicosus</i>	EN	NEMBA (EN)	Wide variety of habitats	18,4	Moderate	May occasionally forage within study area
Greater Painted-snipe	<i>Rostratula benghalensis</i>	NT		Wetlands	-	Low	Suitable habitat only present along the small dam which is fairly isolated from permanent water
Secretarybird	<i>Sagittarius serpentarius</i>	VU		Open savanna and grassland	0,3	Low	No suitable habitat present
Pel's Fishing Owl	<i>Scotopelia peli</i>	EN		Rivers and streams with overhanging vegetation	-	Low	Suitable habitat only present along the small dam which is fairly isolated from permanent water
Crowned Eagle	<i>Stephanoaetus coronatus</i>	VU		Forest	-	Low	No suitable habitat present
Bateleur	<i>Terathopius ecaudatus</i>	EN	NEMBA (EN)	Savanna	56,3	High	May occasionally forage within study area
Lappet-faced Vulture	<i>Torgos tracheliotos</i>	EN	NEMBA (EN)	Savanna	9,5	Moderate	May occasionally forage within study area
White-headed Vulture	<i>Trigonoceps occipitalis</i>	CR	NEMBA (EN)	Savanna	8,2	Moderate	May occasionally forage within study area
<i>Subtotal</i>	32	32	10				
Reptiles							
Nile Crocodile	<i>Crocodylus niloticus</i>	VU	NEMBA (VU)	Wetlands		Moderate	Suitable habitat present
Southern African Python	<i>Python natalensis</i>		NEMBA (PR)	Wide variety of habitats, but usually near water or rocky outcrops		High	Suitable habitat present
<i>Subtotal</i>	2	1	2				
Frogs							
Giant Bullfrog	<i>Pyxicephalus adspersus</i>	NT	LEMA	Pans and associated grassland or savanna		Low	Very rare in the Lowveld
<i>Subtotal</i>	1	1	1				
TOTAL	61	51	36				

CR = Critically Endangered
EN = Endangered

VU = Vulnerable
NT = Near Threatened
NEMBA = National Environmental Management: Biodiversity Act
LEMA = Limpopo Environmental Management Act
‡ = IUCN assessment

Appendix 5. Biodiversity Values of Vegetation Communities

Riparian Thicket

Conservation Importance

Parameter	Score	Very High	High	Moderate	Low	Very Low
Protection Status		International	National	Regional	Local	None
	15	20 19 18 17	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1 0
Size / Length		Very small (<500km ²)	Small (500 to 1,000km ²)	Moderate (1,000 to 20,000km ²)	Large (20,000 to 50,000km ²)	Very Large (> 50,000km ²)
	12	20 19 18 17	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1 0
Species Diversity		Noticeably High		Moderate		Noticeably Low
	11	20 19 18 17	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1 0
Threatened Species		Noticeably High		Moderate		Noticeably Low
	14	20 19 18 17	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1 0
Unique Habitat or Taxa		Noticeably High		Moderate		Noticeably Low
	12	20 19 18 17	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1 0
Present Ecological State		Natural, largely Unmodified	Slightly modified	Moderately Modified	Considerably Modified	Severely Modified
	11	20 19 18 17	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1 0
MEDIAN Score	12,0	20 19 18 17	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1 0

Functional Importance

Parameter	Score	Very High	High	Moderate	Low	Very Low
Provisioning Services		Constant	Regular	Frequent	Occasional	Intermittent
	12	20 19 18 17	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1 0
Regulating Services		Very High	High	Moderate	Low	Very Low
	14	20 19 18 17	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1 0
Cultural Services		Very High	High	Moderate	Low	Very Low
	13	20 19 18 17	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1 0
Supporting Services		Very High	High	Moderate	Low	Very Low
	12	20 19 18 17	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1 0
MEDIAN Score	12,5	20 19 18 17	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1 0

Plains Woodland**Conservation Importance**

Parameter	Score	Very High	High	Moderate	Low	Very Low
Protection Status		International	National	Regional	Local	None
	15	20 19 18 17	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1 0
Size / Length		Very small (<500km ²)	Small (500 to 1,000km ²)	Moderate (1,000 to 20,000km ²)	Large (20,000 to 50,000km ²)	Very Large (> 50,000km ²)
	15	20 19 18 17	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1 0
Species Diversity		Noticeably High		Moderate		Noticeably Low
	10	20 19 18 17	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1 0
Threatened Species		Noticeably High		Moderate		Noticeably Low
	13	20 19 18 17	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1 0
Unique Habitat or Taxa		Noticeably High		Moderate		Noticeably Low
	6	20 19 18 17	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1 0
Present Ecological State		Natural, largely Unmodified	Slightly modified	Moderately Modified	Considerably Modified	Severely Modified
	11	20 19 18 17	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1 0
MEDIAN Score	12,0	20 19 18 17	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1 0

Functional Importance

Parameter	Score	Very High	High	Moderate	Low	Very Low
Provisioning Services		Constant	Regular	Frequent	Occassional	Intermittent
	12	20 19 18 17	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1 0
Regulating Services		Very High	High	Moderate	Low	Very Low
	11	20 19 18 17	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1 0
Cultural Services		Very High	High	Moderate	Low	Very Low
	15	20 19 18 17	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1 0
Supporting Services		Very High	High	Moderate	Low	Very Low
	12	20 19 18 17	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1 0
MEDIAN Score	12,0	20 19 18 17	16 15 14 13	12 11 10 9	8 7 6 5	4 3 2 1 0

Appendix 6. Curriculum Vitae of Duncan McKenzie

Name: Duncan Robert McKenzie
Profession: Terrestrial Ecologist
Date of Birth: 9 Nov 1977
Name of Firm: ECOREX Consulting Ecologists cc
Position in Firm: Ecologist
Years with firm: 9
Nationality: South African
Qualifications :



- N.Dip. [Nature Conservation] UNISA, RSA 2007
- N.Cert. [Nature Guiding] Drumbeat Academy, RSA 2004

Membership in Professional Societies:

- BirdLife South Africa
- Animal Demography Unit, University of Cape Town
- Botanical Society of South Africa

Languages :

	<u>Speaking</u>	<u>Reading</u>	<u>Writing</u>
English (home):	Excellent	Excellent	Excellent
Afrikaans:	Good	Good	Good
isiZulu:	Good	Fair	Fair
Spanish:	Fair	Fair	Fair

Countries of Work Experience : Botswana, Lesotho, Mozambique, Namibia, South Africa, Swaziland, Zimbabwe (Guiding). South Africa, Mozambique, DRC, Mali, Lesotho, Tanzania, Swaziland, Sierra Leone (Consulting Ecologist)

OVERVIEW OF EXPERIENCE

- 8 years' experience in specialist species identification, conducting baseline surveys, data analysis and report writing in various biomes in southern Africa, particularly savannah, forest and grassland biomes
- 2 years' experience game reserve management (KwaZulu-Natal)
- 5 years' experience (part time) of wetland delineation and management
- 2 years' experience of plant propagation and use for rehabilitation
- Specialist knowledge of identification of vascular plants
- Specialist knowledge of identification of mammals, birds, reptiles and amphibians
- SABAP2 Regional Co-ordinator: Mpumalanga
- Member of the Kwa-Zulu-Natal Bird Rarities Committee

Employment Record:

2007 - present	ECOREX	Ecologist
2005 - 2006	Iglu (London, UK)	Specialist Travel Agent
1997 - 2005	Duncan McKenzie Bird Tours	Owner, Specialist Guide
2001	KZN Wildlife	District Conservation Officer, Reserve Manager
1999 - 2001	Institute of Natural Resources	Part-time Horticulturalist and Rehabilitation Officer
1997-2001	Mondi Wetlands Project	Part-time Field Assistant and Regional Co-ordinator
1996-1997	Natal Parks Board	Ranger

Appendix 7. Specialists Declaration

10.4 The Specialist

Note: Duplicate this section where there is more than one specialist.

I ...Duncan McKenzie..., as the appointed specialist hereby declare/affirm the correctness of the information provided as part of the application, and that I:

- in terms of the general requirement to be independent (tick which is applicable):

X	other than fair remuneration for work performed/to be performed in terms of this application, have no business, financial, personal or other interest in the activity or application and that there are no circumstances that may compromise my objectivity; or
---	---

	am not independent, but another EAP that is independent and meets the general requirements set out in Regulation 13 has been appointed to review my work (Note: a declaration by the review specialist must be submitted);
--	--

- have expertise in conducting specialist work as required, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- will ensure compliance with the EIA Regulations 2014;
- will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the application;
- will take into account, to the extent possible, the matters listed in regulation 18 of the regulations when preparing the application and any report, plan or document relating to the application;
- will disclose to the proponent or applicant, registered interested and affected parties and the competent authority all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the competent authority or the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority (unless access to that information is protected by law, in which case I will indicate that such protected information exists and is only provided to the competent authority);
- declare that all the particulars furnished by me in this form are true and correct;
- am aware that it is an offence in terms of Regulation 48 to provide incorrect or misleading information and that a person convicted of such an offence is liable to the penalties as contemplated in section 49B(2) of the National Environmental Management Act, 1998 (Act 107 of 1998).



Signature of the specialist

ECOREX Consulting Ecologists CC

Name of company

15/08/2018

Date