

# DESKTOP ECOLOGICAL SCAN FOR THE PROPOSED RENEWABLE ENERGY SITES; ILEMBE DISTRICT MUNICIPALITY, KWAZULU-NATAL



---

Compiled for **Tripto 4 Environmental Solutions** by:

Mr. C. L. Cook Ecological Consultant (*Pr. Sci. Nat.* 400084/08)

082 688 9585

[Giant.bullfrog@gmail.com](mailto:Giant.bullfrog@gmail.com)

---

REPORT SUBMITTED 3<sup>rd</sup> SEPTEMBER 2013

## 1. INTRODUCTION

Triplo 4 Sustainable Solutions as an Independent Environmental Practitioner appointed Mr. C.L. Cook to provide an ecological scan for the proposed three agricultural sites situated within the Mandeni and KwaDukuza areas in Northern Kwazulu-Natal. The subject properties / areas have been historically utilised for agricultural activities with small-scale agricultural lands on the mid and upper slopes.

**The assignment is interpreted as follows:** A brief environmental scan to determine the current ecological status of the three potential renewable energy sites and determine if any sensitive habitats occur on the site. In order to compile the report the following had to be done:

### **Initial preparations:**

- Obtain all relevant maps including aerial photographs (Google images) of the renewable energy sites and information on the natural environment upstream and downstream of the area concerned (approximately 500m).
- A brief desktop survey of the proposed site using published literature as well as data accessed from electronic data from the internet (POSA, SABAP2, SAFAP, SARCA).

### **1.1 Objectives of the Preliminary Ecological Survey Scan**

- To provide a basic description of the vegetation on the proposed three alternative energy sites.
- To describe the available habitats on site including areas of important conservation value or areas most likely to form important habitat for remaining threatened plant and animal species.

### **1.2 Scope of the Study**

- An initial ecological scan documenting the dominant vegetation on the site as well as published literature on threatened or red listed plant and animal species likely to occur on the sites.
- Documentation of the findings of the study in a brief report.

### **1.3 Constraints and Limitations of Short Duration Ecological Scans**

- Limitation to a base-line ecological scan or desktop analysis.
- No actual site visitation or vegetation and faunal surveys, no soil augering / ground-truthing of potential hillslope and drainage line wetland habitats have been undertaken.

## 2. METHODOLOGY

A brief desktop survey was undertaken by Mr CL Cook on 3<sup>rd</sup> September 2013.

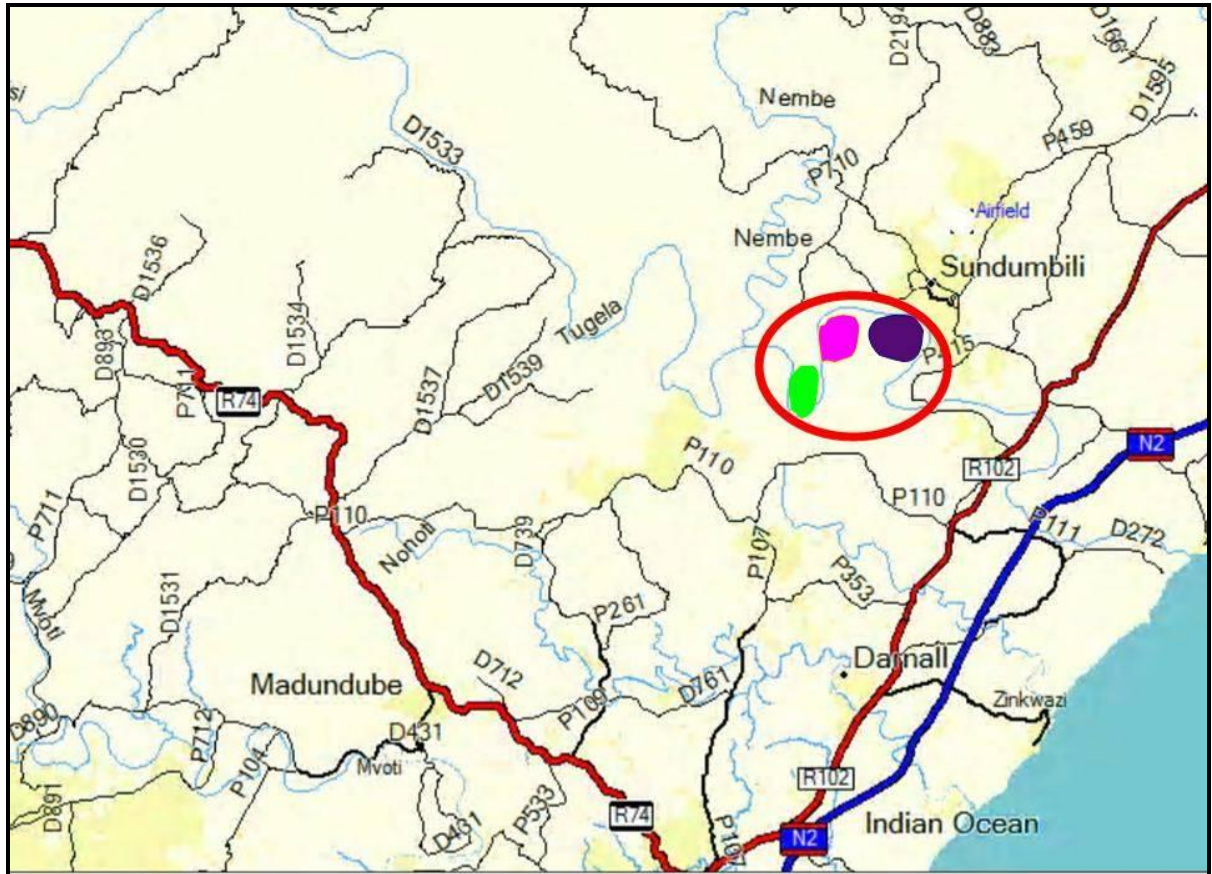
### 2.1 Predictive Methods

A 1:50 000 map of the study area was provided showing existing infrastructure and the three proposed / potential Mandeni alternative energy sites. The map was used as far as possible in order to identify potential “hot-spots” along the proposed three alternative energy sites, e.g. Patches of undisturbed grassland vegetation, rivers, hillslope seepage wetlands, drainage lines as well as historic agricultural areas. Satellite imagery of the area was obtained from Google Earth and was studied in order to get a three dimensional impression of the topography and land use.

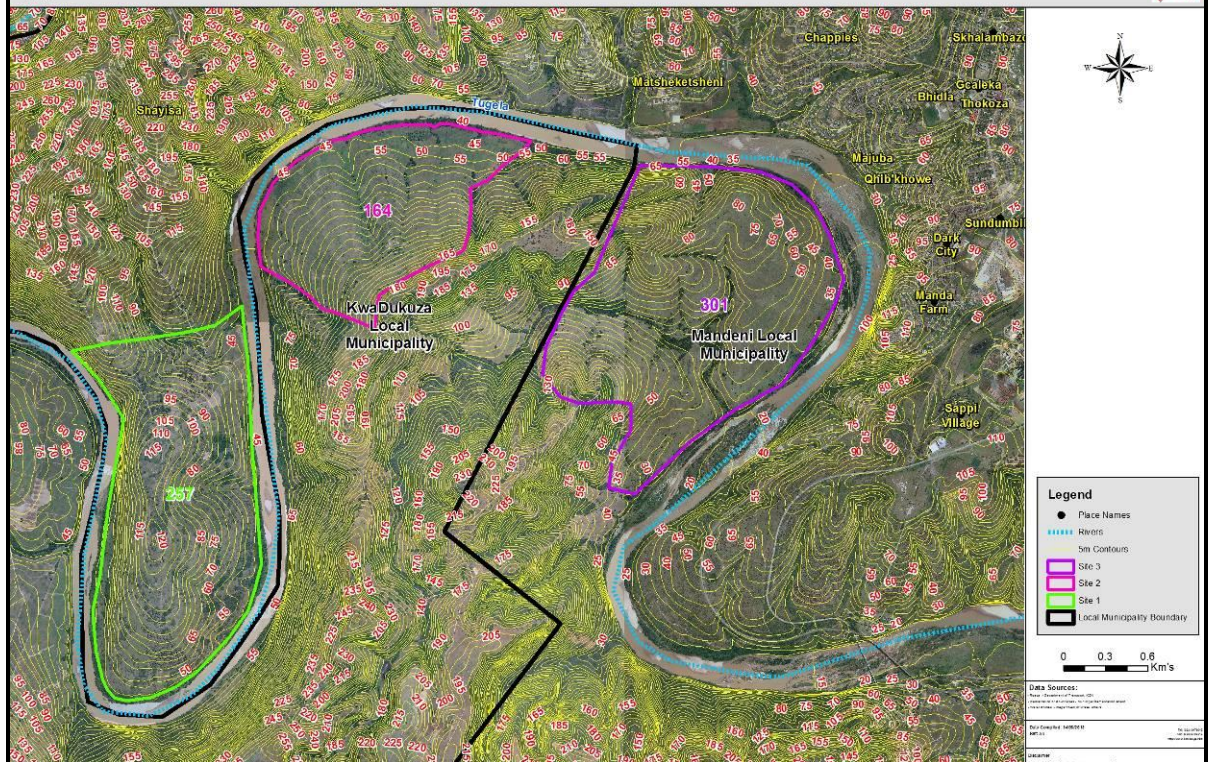
### 2.2 Literature Survey

A detailed literature search was undertaken to assess the current status of threatened plants as well as faunal species that have been historically known to occur in the Mandeni 2931 AB quarter degree grid cell (QDGC) as well as 2905\_3120 and 2910\_3120 pentads for avifauna/birds (SABAP2). The literature search was undertaken utilising:

- *The Vegetation of South Africa, Lesotho and Swaziland* (Mucina & Rutherford 2006) for the vegetation description;
- *The National Red List of Threatened Plants of South Africa* (Raimondo *et al*, 2009);
- Internet using POSA (<http://posa.sanbi.org>);
- *The Mammals of the Southern African Subregion* (Skinner & Chimimba 2005);
- *The Red Data Book of the Mammals of South Africa: A Conservation Assessment* (Friedmann and Daly (editors) 2004);
- ADU's MammalMap ([http://vmus.adu.org.za/vm\\_sp\\_list.php](http://vmus.adu.org.za/vm_sp_list.php)) accessed on the 3<sup>rd</sup> of September 2013) for mammals. Hockey, P.A.R., Dean, W.R.J., Ryan, P.G. (eds). 2005;
- *Roberts- Birds of Southern Africa VII<sup>th</sup> ed.* And BARNES, K.N. (ed.) (2000);
- *The Escom Red Data Book of Birds of South Africa, Lesotho and Swaziland* for avifauna (birds);
- Internet SABAP2 (<http://sabap2.adu.org.za>) accessed on the 3<sup>rd</sup> of September 2013);
- *The Atlas and Red Data Book of the Frogs of South Africa, Lesotho and Swaziland* (Minter *et al*. 2004) for amphibians;
- SAFAP (*The Field Guide to the Snakes and other Reptiles of Southern Africa* (Branch 2001);
- *South African Red Data Book-Reptiles and Amphibians* (Branch 1988); and
- SARCA (<http://sarca.adu.org.za> accessed on the 3<sup>rd</sup> of September 2013) for reptiles.



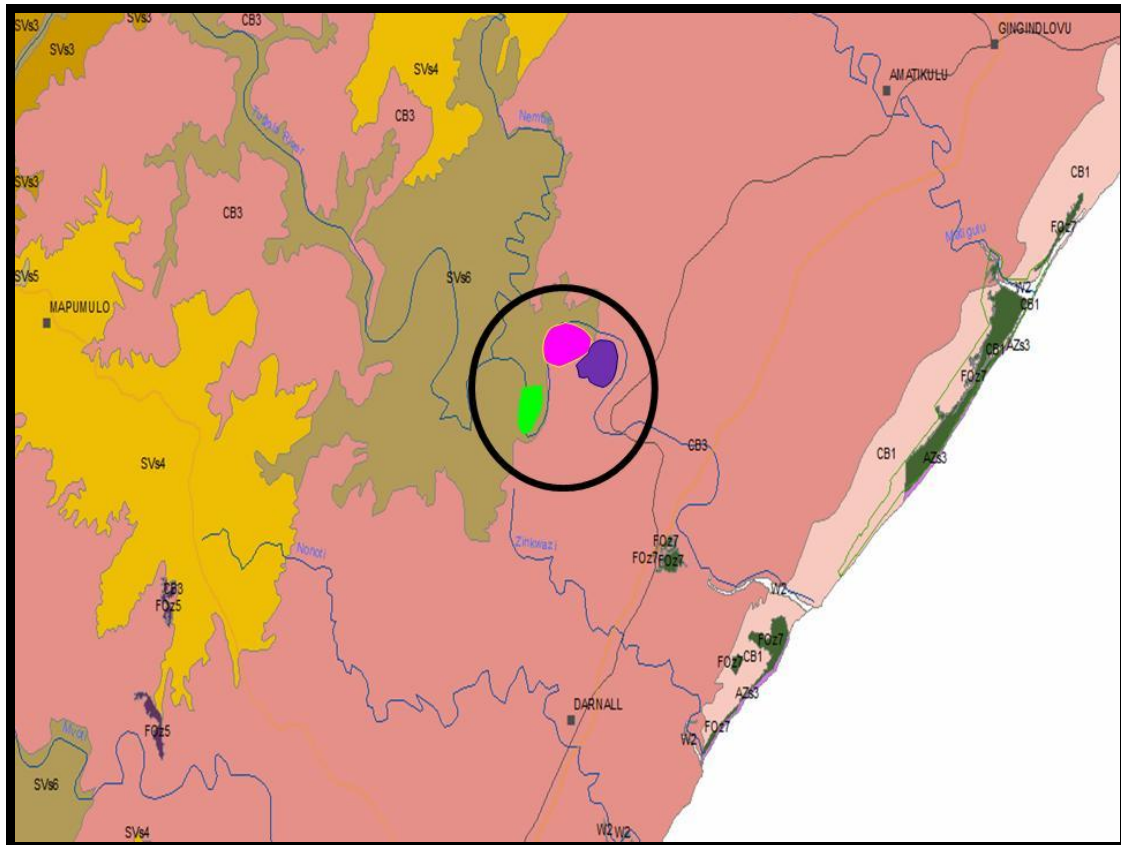
**ilembe District Municipality: Proposed Renewable Energy Sites**



**Figure1:** A locality map of the proposed three alternative energy sites. The green Circle = Site 1; the Pink Circle = Site 2 and the Purple Circle= Site 3.

### 3. THE STUDY AREA

The proposed three alternative energy sites are situated approximately 85km north of Durban within the Kwadukuza and Mandeni Local Municipalities which is located within the Ilembe District Municipality. The proposed sites are situated to the north-west of Mandeni adjacent to the Tugela River.



**Figure2.** Vegetation map of the proposed three alternative energy sites. Site 1 and 2 are situated within **Eastern Valley Bushveld (SVs 6)** and site 3 is situated within the **Kwazulu-Natal Coastal Belt (CB 3)** vegetation unit (Mucina & Rutherford 2006).

### 3.1 Eastern Valley Bushveld (SVs 6)



The proposed renewable energy sites 1 and 2 are situated within **Eastern Valley Bushveld (SVs 6)** (Mucina & Rutherford 2006). Acocks (1988) called this vegetation type **Valley Bushveld** whereas Low & Rebelo (1996) called it **Valley Thicket**.

#### **Distribution**

It occurs in KwaZulu-Natal and Eastern Cape Provinces, in deeply incised valleys of rivers including the lower reaches of the Thukela, Mvoti, Mgeni, Mlazi, Mkhomazi, Mzimkulu, Mzimkulwana, Mtamvuna, Mtentu, Msikaba, Mzimvubu (and its several tributaries), Mthatha, Mbhashe, Shixini, Qhorha and Great Kei.

#### **Vegetation and Landscape Features**

Eastern Valley Bushveld is described by Mucina & Rutherford (2006) as being semi-deciduous savanna woodlands with pockets of thickets in a mosaic pattern, often succulent and dominated by *Euphorbia* and *Aloes*. Most of the river valleys run along a northwest-southeast axis which results in unequal distribution of rainfall on respective north-facing and south-facing slopes since the rain bearing winds blow from the south. The steep north-facing slopes are sheltered from the rain and also receive greater amounts of insolation adding to xerophilous\*. The Endemic taxa include the tall shrub *Bauhinia natalensis* and the succulent herb *Huernia pendula* (Mucina and Rutherford 2006).

---

\* thriving in or adapted for a hot dry habitat

Existing impacts occurring / potentially occurring within the proposed renewable energy sites and surrounding area include:

- Extensive vegetation transformation occurring around the homesteads, livestock enclosures, grazing pastures and small-scale agricultural lands;
- Extensive vegetation degradation due to overgrazing by cattle and goats with the grasses grazed to the ground;
- Extensive soil erosion (surface, rill and gully) especially along the non-perennial drainage lines as well as macro-channel banks of the Tugela River. This is due to poor stormwater management, uncontrolled livestock drinking activities along the river as well as removal of the riparian vegetation during wood harvesting activities;
- Alteration of the natural fire regime: frequent fires at the incorrect time of year;
- Wood harvesting and tree clear-felling;
- Thicket formation and severe bush encroachment occurs in the old agricultural lands as well as livestock enclosures as in the lower lying areas of the site by *Acacia spp.* and *Dichrostachys cinera*;
- Numerous human and livestock pathways bisecting the site;
- Illegal poaching and hunting (dogs, catapults and snares);
- Riparian zone degradation due to removal of majority of tree species for wood harvesting;
- Reed invasion in certain sections of the Tugela River resulting from increased phosphates levels due to washing activities as well as siltation and sedimentation due to poor vegetation and soil conservation around the site;
- Bank erosion from vegetation removal, overgrazing and trampling from cattle;
- Massive siltation and sedimentation accumulates in the perennial and non-perennial (seasonal) rivers and drainage lines/streams;
- Extensive dumping and littering especially adjacent to homesteads;
- Deterioration in water quality due to presence of pit-latrines as well as washing and bathing activities within the Tugela River.

### **Geology and Soils**

The area is underlain by the sediments of the Karoo Supergroup with the mudstones and lesser sandstones of the Adelaide and Tarkastad Subgroups (Beaufort Group) dominant and some Ecca Group Shale. Dominant land type Fa (Mucina and Rutherford 2006). The site is underlain by colluvial and residual soils that overlie weathered bedrock of the Natal Metamorphic Province.

### **Climate**

Summer rainfall area but with some rain during winter. Mean Annual Precipitation (MAP) is between 550-1 000mm. Frost is infrequent.

### **Conservation Status**

The Eastern Valley Bush currently has the conservation status of being **Least Threatened**. Of the National Conservation Target of 25% only 0.8 % is statutorily conserved in the Luchaba Wildlife Reserve and small patches within the Oribi Gorge Nature Reserve. Approximately 15% has been transformed through cultivation. *Chromolaena odorata*, *Lantana camara* and *Caesalpinia decapetala* are the most problematic alien invader plants threatening this vegetation type (Mucina and Rutherford 2006).

As the proposed sites are situated around rural homesteads and agricultural areas the majority of natural vegetation consisting of Eastern Valley Bushveld (SVs6) has been transformed due to:

- existing rural houses, livestock kraals and (small scale) agricultural lands;
- Severe degradation of the remaining vegetation due to surrounding anthropogenic activities including wood harvesting, collection of medicinal plants as well as extensive overgrazing by cattle and goats;
- Extensive bush encroachment by *Acacia nilotica* subsp. *kraussiana*, *Acacia tortilis* subsp. *heteracantha* and *Dichrostachys cinerea* within old agricultural lands as well as adjacent to the lower lying around the Tugela River and the non-perennial drainage lines;
- Remnant patches of indigenous riparian vegetation remains along the Tugela River as well as northern non-perennial drainage line. Large areas of the riparian vegetation have been removed during wood harvesting activities.



### 3.2 Kwazulu-Natal Coastal Belt (CB 3)



The proposed renewable energy site 3 falls within the **Kwazulu-Natal Coastal Belt (CB 3)** vegetation unit (Mucina & Rutherford 2006). The Kwazulu-Natal Coastal Belt vegetation unit is distributed along the coastal strip of Kwazulu-Natal from near Mtunzini in the north, via Durban to Margate and just short of Port Edward in the south. The Pondoland-Ugu Sandstone Sourveld vegetation unit is distributed along the coastal strip of Eastern Cape and Kwazulu-Natal provinces. Elevated coastal sandstone plateaus from Port St Johns on the Pondoland Coast to the vicinity of Port Shepstone including the sourveld of the well known Oribi Gorge. Altitude ranges from 0-600 m, with the altitude at the sites ranging from 174- 234 m.

#### **Vegetation and Landscape Features**

Highly dissected undulating coastal plains which presumably used to be covered to a great extent with various types of subtropical coastal forests (Northern Coastal Forest). Some primary grassland dominated by Red Grass (*Themeda triandra*) still occurs in hilly, high-rainfall areas where pressure from natural fire and grazing regimes prevailed. At present the Kwazulu-Natal Coastal Belt is affected by an intricate mosaic of very extensive sugar cane fields, banana plantations, timber plantations and coastal holiday resorts, with interspersed secondary *Aristida* grasslands, thickets and pockets of coastal thornveld (Mucina *et al.* 2006).

### **Geology and Soils**

Ordovician Natal Group sandstone, Dwyka tillite, Ecca shale and Mapumulo gneiss dominate the landscapes of the Kwazulu-Natal Coastal Belt. Weathering of the old dunes has produced the red sand, called the Berea Red Sand in places. The soils supported by the above-mentioned rocks are shallow over hard sandstones and deeper over younger, softer rocks.

### **Climate**

Summer rainfall area but with some rain during winter. High air humidity and with no incidence of frost. Mean Annual Precipitation (MAP) is 989 mm.

### **Conservation**

**Kwazulu-Natal Coastal Belt (CB 3)** is an **Endangered** vegetation unit with only a small part statutorily conserve in Ngoye, Mbumazi and Vernon Crookes Nature Reserves. About 50% is transformed for cultivation, urban sprawl and road-building. Conservation target is 25% conserved.

The vegetation on the site has been heavily degraded due to continual anthropogenic activities including wood harvesting, collection of medicinal plants, frequent fires, overgrazing by cattle and goats. Dense, short grassland overwhelmingly dominated by unpalatable, wiry Ngongoni Grass (*Aristida junciformis*), with this monodominance associated with low species diversity. Wooded areas (thornveld) are found in the fire-protected valleys as well as along the perennial and non-perennial drainage lines.

#### 4 RED LISTED PLANT SPECIES

According to the Plants of South Africa (POSA) online checklist two threatened species have been recorded from the 2931 AB QDGC. These include the Large-leaf Onionwood *Cassipourea gummiflua* var. *verticillata* which is listed as Vulnerable and *Kniphofia littoralis* listed as Near-Threatened. The Large-leaf Onionwood *Cassipourea gummiflua* var. *verticillata* occurs in evergreen forest, riverine and swamp forest as well as Moist scarp forest and coastal lowland forest. Marginally suitable habitat occurs along the riparian zone of the Tugela River and within the fire-protected forest pockets around the proposed sites. *Kniphofia littoralis* is usually found in the seasonal and temporary wet zones of hillslope seepage wetlands and valley bottom wetlands. They seldom occur within the permanently inundated zone. Suitable habitat occurs along the non-perennial drainage lines and moist hillslope seepage grasslands for this species.



**Figure3.** *Kniphofia littoralis*

More intensive surveys are required during the wet summer months in order to ascertain the current status of these species on the proposed renewable energy sites.

#### **4. THREATENED OR RED LISTED FAUNA**

The literature search was undertaken utilising *The Vegetation of South Africa, Lesotho and Swaziland* (Mucina & Rutherford 2006) for the vegetation description. *The Mammals of the Southern African Subregion* (Skinner & Chimiba 2005) and *The Red Data Book of the Mammals of South Africa: A Conservation Assessment* (Friedmann and Daly (editors) 2004) for mammals. *Roberts-Birds of Southern Africa VII<sup>th</sup> ed.* (Hockey, Dean and Ryan (editors) 2005) and *The Escom Red Data Book of Birds of South Africa* (Barnes 2000) for avifauna (birds). *A Complete Guide to the Frogs of Southern Africa* (du Preez & Carruthers 2009) and the *The Atlas and Red Data Book of the frogs of South Africa, Lesotho and Swaziland* (Minter et al. 2004) for amphibians. *The Field Guide to the Snakes and other Reptiles of Southern Africa* (Branch 2001) and *South African Red Data Book- Reptiles and Amphibians* (Branch 1988) for reptiles.

##### **4.1 Amphibians**

Amphibians are an important component of South Africa's exceptional biodiversity (Siegfried 1989) and are such worthy of both research and conservation effort. This is made additionally relevant by international concern over globally declining amphibian populations, a phenomenon currently undergoing intensive investigation but as yet is poorly understood (Wyman 1990; Wake 1991). Amphibians have declined dramatically in many areas of the world. These declines seem to have worsened over the past 25 years and amphibians are now more threatened than either mammals or birds, though comparisons with other taxa are confounded by a shortage of reliable data.

Most frogs have a biphasic life cycle, where eggs laid in water develop into tadpoles and these live in the water until they metamorphose into juvenile frogs living on the land. This fact, coupled with being covered by a semi-permeable skin makes frogs particularly vulnerable to pollutants and other environmental stresses. Consequently frogs are useful environmental bio-monitors (bio-indicators) and may acts as an early warning system for the quality of the environment.

Breeding in African frogs is strongly dependent on rain, especially in the drier parts of the country where surface water only remains for a short duration. The majority of frog species in the Kwazulu-Natal Province can be classified as explosive breeders. Explosive breeding frogs utilise ephemeral pans or inundated grasslands for their short duration reproductive cycles.

Ideally, a herpetological survey should be undertaken throughout the duration of the wet season (November-Mach). It is only during this period that accurate frog species lists can be compiled. During this survey; fieldwork was augmented with species lists compiled from personal records; data from the South African Frog Atlas Project

(SAFAP)(1999-2003) and published data, and the list provided below is therefore regarded as likely to be fairly comprehensive.

**Table1.** Frog species recorded from locus = 2931AB during Southern African Frog Atlas Project (SAFAP).

Family	Genus	Species	Common name	Red list category	Atlas region endemic
Arthroleptidae	<i>Arthroleptis</i>	<i>wahlbergi</i>	Bush Squeaker	Least Concern	0
Arthroleptidae	<i>Leptopelis</i>	<i>natalensis</i>	Forest Tree Frog	Least Concern	0
Brevicipitidae	<i>Breviceps</i>	<i>adpersus</i>	Bushveld Rain Frog	Least Concern	0
Brevicipitidae	<i>Breviceps</i>	<i>mossambicus</i>	Mozambique Rain Frog	Least Concern	0
Bufonidae	<i>Amietophrynus</i>	<i>gutturalis</i>	Guttural Toad	Least Concern	0
Bufonidae	<i>Schismaderma</i>	<i>carens</i>	Red Toad	Least Concern	0
Hyperoliidae	<i>Afrivalus</i>	<i>delicatus</i>	Delicate Leaf-folding Frog	Least Concern	0
Hyperoliidae	<i>Afrivalus</i>	<i>fornasinii</i>	Greater Leaf-folding Frog	Least Concern	0
Hyperoliidae	<i>Hyperolius</i>	<i>marmoratus</i>	Painted Reed Frog	Least Concern	0
Hyperoliidae	<i>Hyperolius</i>	<i>pickersgilli</i>	Pickersgill's Reed Frog	Endangered	1
Hyperoliidae	<i>Hyperolius</i>	<i>pusillus</i>	Water Lily Frog	Least Concern	0
Hyperoliidae	<i>Hyperolius</i>	<i>tuberilinguis</i>	Tinker Reed Frog	Least Concern	0
Hyperoliidae	<i>Kassina</i>	<i>senegalensis</i>	Bubbling Kassina	Least Concern	0
Phrynobatrachidae	<i>Phrynobatrachus</i>	<i>mababiensis</i>	Dwarf Puddle Frog	Least Concern	0
Phrynobatrachidae	<i>Phrynobatrachus</i>	<i>natalensis</i>	Snoring Puddle Frog	Least Concern	0
Pipidae	<i>Xenopus</i>	<i>laevis</i>	Common Platanna	Least Concern	0
Ptychadenidae	<i>Ptychadena</i>	<i>anchietae</i>	Plain Grass Frog	Least Concern	0
Ptychadenidae	<i>Ptychadena</i>	<i>mascareniensis</i>	Mascarene Grass Frog	Least Concern	0
Ptychadenidae	<i>Ptychadena</i>	<i>oxyrhynchus</i>	Sharpnosed Grass Frog	Least Concern	0
Pyxicephalidae	<i>Amietia</i>	<i>angolensis</i>	Common or	Least	0

Family	Genus	Species	Common name	Red list category	Atlas region endemic
			Angola River Frog	Concern	
Pyxicephalidae	<i>Cacosternum</i>	<i>nanum</i>	Bronze Caco	Least Concern	0
Pyxicephalidae	<i>Strongylopus</i>	<i>fasciatus</i>	Striped Stream Frog	Least Concern	0
Pyxicephalidae	<i>Tomopterna</i>	<i>natalensis</i>	Natal Sand Frog	Least Concern	0

**No suitable habitat occurs on the proposed sites for the Endangered Pickersgill's Reed Frog (*Hyperolius pickersgilli*).**

## 4.2 Reptiles

Reptile lists require intensive surveys conducted for several years. Reptiles are extremely secretive and difficult to observe during field surveys. The majority reptile species are sensitive to severe habitat alteration and fragmentation. Due to the high levels of habitat destruction and degradation within the study area due to agricultural, residential and commercial activities coupled with increased levels of disturbances around the agricultural areas are all causal factors in the alteration of reptile species occurring on the site and surrounding areas. As a result of human presence in the area as well as on the site; coupled with extensive habitat destruction from agricultural activities and high levels of disturbances, alterations to the original reptilian fauna are expected to have already occurred. Removal of large tree species during the clearing of lands for plantations and dead trunks for firewood collection destroys numerous habitats for many arboreal reptile species. Clearing of rock material from agricultural lands and for building materials destroys vital habitat for numerous rupicolous reptile species including the Agamids, Cordylids, Geckonids and Skinks. The majority of snake species hibernate in old tree trunks, termite mounds or under suitable rocks.

**Table2.** Reptile species found for locus = 2931AB during South African Reptile Conservation Assessment (SARCA).

Family	Genus	Species	Sub-species	Common name	Red list category	Atlas region endemic
Agamidae	<i>Acanthocercus</i>	<i>atricollis</i>	<i>atricollis</i>	Southern Tree Agama	Not Evaluated	0
Atractaspidae	<i>Amblyodipsas</i>	<i>concolor</i>		Natal Purple-glossed Snake	Not Evaluated	1
Atractaspidae	<i>Aparallactus</i>	<i>capensis</i>		Black-headed	Not Evaluated	0

Family	Genus	Species	Sub-species	Common name	Red list category	Atlas region endemic
				Centipede-eater		
Atractaspidae	<i>Atractaspis</i>	<i>bibronii</i>		Bibron's Stiletto Snake	Not Evaluated	0
Boidae	<i>Python</i>	<i>natalensis</i>		Southern African Python	Not Evaluated	0
Chamaeleonidae	<i>Bradypodion</i>	<i>melanocephalum</i>		KwaZulu Dwarf Chameleon	Not Evaluated	1
Chamaeleonidae	<i>Chamaeleo</i>	<i>dilepis</i>	<i>dilepis</i>	Common Flap-neck Chameleon	Not Evaluated	0
Colubridae	<i>Boaedon</i>	<i>capensis</i>		Brown House Snake	Not Evaluated	0
Colubridae	<i>Crotaphopeltis</i>	<i>hotamboeia</i>		Red-lipped Snake	Not Evaluated	0
Colubridae	<i>Dasypeltis</i>	<i>inornata</i>		Southern Brown Egg-eater	Not Evaluated	1
Colubridae	<i>Dispholidus</i>	<i>typus</i>	<i>typus</i>	Boomslang	Not Evaluated	0
Colubridae	<i>Duberria</i>	<i>lutrix</i>	<i>lutrix</i>	South African Slug-eater	Not Evaluated	1
Colubridae	<i>Gonionotophis</i>	<i>capensis</i>	<i>capensis</i>	Common File Snake	Not Evaluated	0
Colubridae	<i>Gonionotophis</i>	<i>nyassae</i>		Black File Snake	Not Evaluated	0
Colubridae	<i>Lycodonomorphus</i>	<i>inornatus</i>		Olive House Snake	Not Evaluated	1
Colubridae	<i>Lycodonomorphus</i>	<i>rufulus</i>		Brown Water Snake	Not Evaluated	0
Colubridae	<i>Lycophidion</i>	<i>capense</i>	<i>capense</i>	Cape Wolf Snake	Not Evaluated	0
Colubridae	<i>Philothamnus</i>	<i>hoplogaster</i>		South Eastern Green Snake	Not Evaluated	0
Colubridae	<i>Philothamnus</i>	<i>natalensis</i>	<i>natalensis</i>	Eastern Natal Green Snake	Not Evaluated	0
Colubridae	<i>Philothamnus</i>	<i>semivariatus</i>		Spotted Bush Snake	Not Evaluated	0
Colubridae	<i>Psammophis</i>	<i>brevirostris</i>		Short-	Not	0

Family	Genus	Species	Sub-species	Common name	Red list category	Atlas region endemic
				snouted Grass Snake	Evaluated	
Colubridae	<i>Psammophis</i>	<i>mossambicus</i>		Olive Grass Snake	Not Evaluated	0
Colubridae	<i>Pseudaspis</i>	<i>cana</i>		Mole Snake	Not Evaluated	0
Colubridae	<i>Thelotornis</i>	<i>capensis</i>	<i>capensis</i>	Southern Twig Snake	Not Evaluated	0
Cordylidae	<i>Cordylus</i>	<i>vittifer</i>		Common Girdled Lizard	Not Evaluated	0
Elapidae	<i>Dendroaspis</i>	<i>polylepis</i>		Black Mamba	Not Evaluated	0
Elapidae	<i>Naja</i>	<i>melanoleuca</i>		Forest Cobra	Not Evaluated	0
Elapidae	<i>Naja</i>	<i>mossambica</i>		Mozambique Spitting Cobra	Not Evaluated	0
Gekkonidae	<i>Afroedura</i>	<i>pondolia</i>		Pondo Flat Gecko	Not Evaluated	1
Gekkonidae	<i>Hemidactylus</i>	<i>mabouia</i>		Common Tropical House Gecko	Not Evaluated	0
Gekkonidae	<i>Lygodactylus</i>	<i>capensis</i>	<i>capensis</i>	Common Dwarf Gecko	Not Evaluated	0
Gerrhosauridae	<i>Gerrhosaurus</i>	<i>flavigularis</i>		Yellow-throated Plated Lizard	Not Evaluated	0
Leptotyphlopidae	<i>Leptotyphlops</i>	<i>scutifrons</i>	<i>scutifrons</i>	Peters' Thread Snake	Not listed	0
Leptotyphlopidae	<i>Leptotyphlops</i>	<i>sylvicolus</i>		Forest Thread Snake	Not Evaluated	1
Scincidae	<i>Acontias</i>	<i>plumbeus</i>		Giant Legless Skink	Not Evaluated	0
Scincidae	<i>Afroablepharus</i>	<i>wahlbergii</i>		Wahlberg's Snake-eyed Skink	Not Evaluated	0
Scincidae	<i>Trachylepis</i>	<i>striata</i>		Striped Skink	Not Evaluated	0
Scincidae	<i>Trachylepis</i>	<i>varia</i>		Variable Skink	Not Evaluated	0
Typhlopidae	<i>Afrotyphlops</i>	<i>bibronii</i>		Bibron's Blind Snake	Not Evaluated	0



Family	Genus	Species	Sub-species	Common name	Red list category	Atlas region endemic
Varanidae	<i>Varanus</i>	<i>niloticus</i>		Water Monitor	Not Evaluated	0
Viperidae	<i>Bitis</i>	<i>arietans</i>	<i>arietans</i>	Puff Adder	Not Evaluated	0
Viperidae	<i>Causus</i>	<i>defilippii</i>		Snouted Night Adder	Not Evaluated	0
Viperidae	<i>Causus</i>	<i>rhombeatus</i>		Rhombic Night Adder	Not Evaluated	0

**Red listing source:** 1996 IUCN global listing

***No threatened reptile species have been recorded or are likely to occur on the proposed renewable energy sites.***

### 4.3 Avifauna

One hundred and sixty (160) bird species have been recorded for the 2905\_3120 Pentad in which sites 2 and 3 are situated and one hundred and sixty five (165) from Pentad 2910\_3120 in which site 1 is situated.

***No red listed or threatened bird species have been recorded from the area.***

### 4.4 Mammals

The majority of larger mammal species are likely to have been eradicated or have moved away from the area during the previous agricultural, residential and commercial developments. This is mainly a result of increased development pressure and human disturbances such as hunting and poaching (wire snares), as well as habitat alteration and degradation by vegetation clearance and frequent fires. Smaller mammal species are extremely vulnerable to snares and poaching activities as well as feral cats and dogs. It is highly unlikely that the proposed renewable energy sites constitutes significant habitat for any species of threatened mammal species.

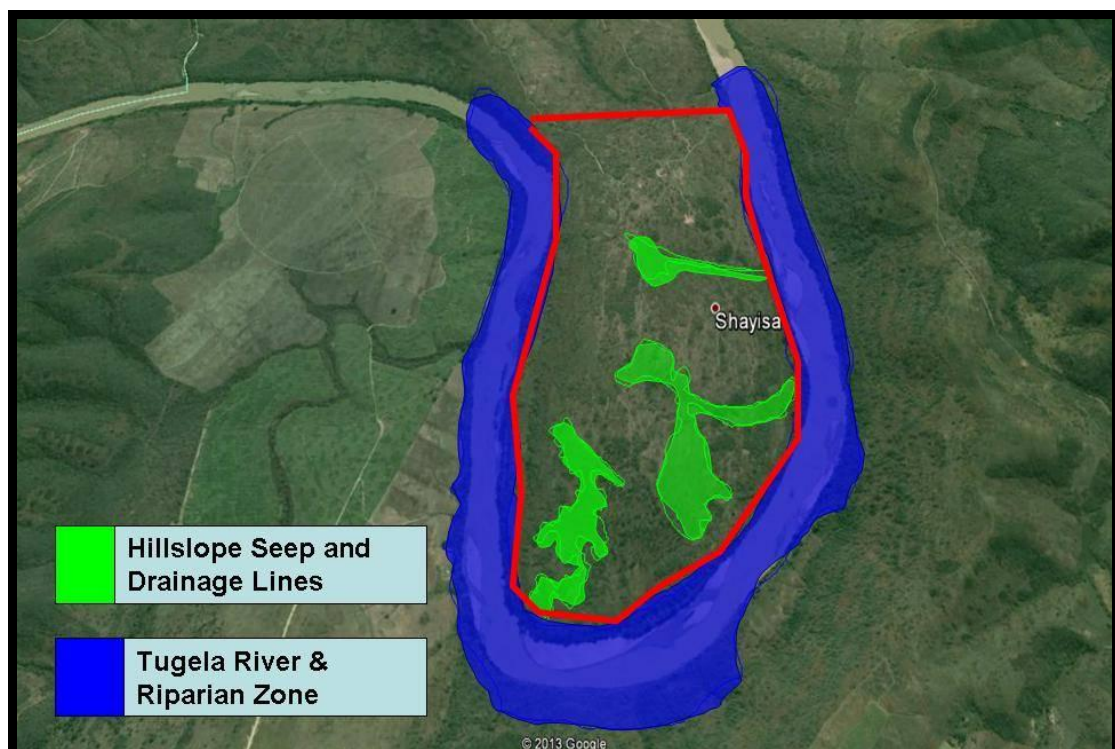
***No sensitive or endangered mammals were recorded within the study area.***

## 5. CONCLUSION

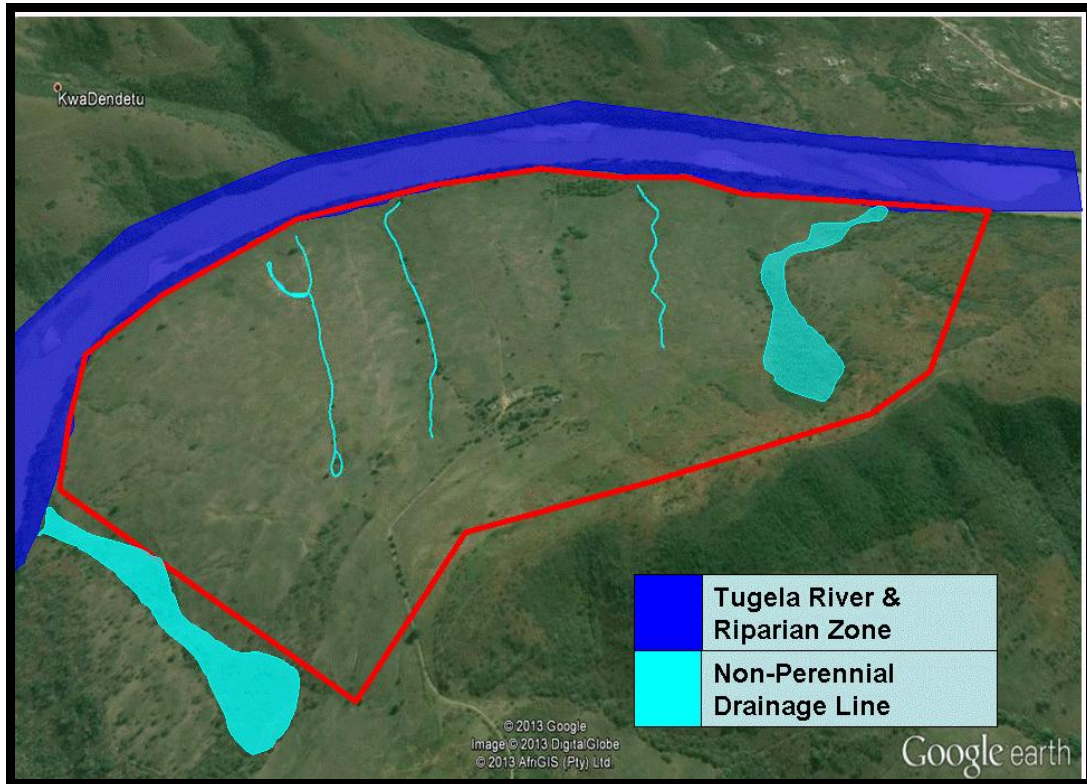
Due to increasing pressure put on local councils to make more land available for development purposes, it is important that the vegetation and fauna of the natural areas be properly assessed in order to identify and indicate areas of ecological and environmental importance. The scan provided preliminary indications of the potential sensitivities, environmental constraints and / or potential for the proposed project to be established at the three identified sites from an ecological and enviro-legal perspective. This level of assessment should facilitate the identification of environmental triggers and the need for environmental authorisations and assist with scoping of the project and funding applications.

More intensive surveys will be required during the further site specific planning and development stages in order to ascertain the vegetation communities on the site as well as the delineation of wetland resources around and within the proposed renewable energy sites. This will allow the optimal establishing of the plantation within the enviro-legal framework, whilst minimising environmental negative impacts and optimising positive aspects of the proposed project

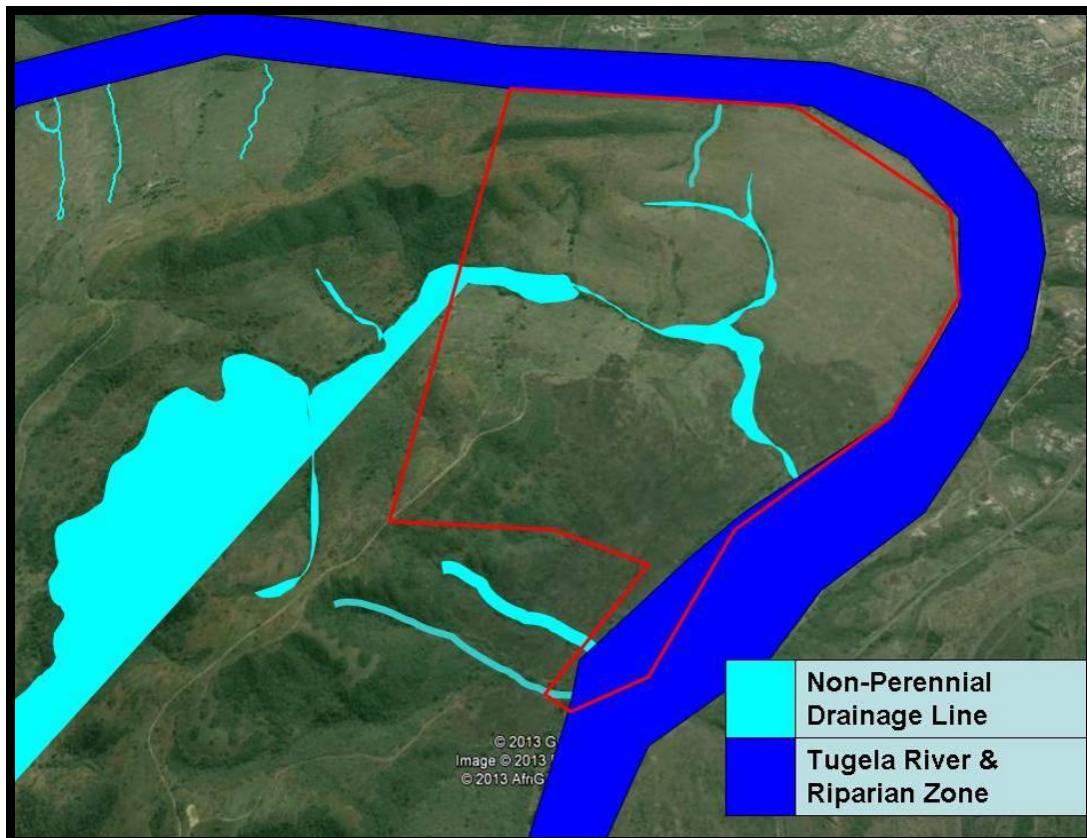
**Development (agricultural activities) within the wetland habitats on the site may require authorisation in terms of a Water Use Licence applied for under Section 21 of the National Water Act (Act 36, 1998) – Activities (c) and (i).**



**Site1: Green areas potentially depicting Hillslope Seep and Drainage Lines**



**Site2**



**Site3**

**Figure 4.** Preliminary sensitivity maps for the proposed renewable energy sites. More detailed surveys are required in order to ascertain the current ecological status of the vegetation as well as delineation of wetland habitats within the proposed sites.

## 5. REFERENCES

- ACOCKS, J.P.H. (1988).** *Veld Types of South Africa*. Memoirs of the Botanical Survey of South Africa, No.57: 1-146. Botanical Research Institute, Pretoria.
- BARNES, K.N. (ed.) (2000).** *The Escom Red Data Book of Birds of South Africa, Lesotho and Swaziland*. Birdlife South Africa, Johannesburg.
- BOON, R. (2010).** *Pooley's Trees of Eastern South Africa: A complete guide*. Flora and Fauna Publications Trust.
- BRANCH, W.R. (1988).** *Field Guide to the Snakes and other Reptiles of Southern Africa*. Struik Publishers, Cape Town.
- BROMILOW, C. (2001).** *Problem Plants of South Africa*. Briza Publications, Pretoria South Africa.
- CARRUTHERS, V.C. (2001).** *Frogs and Frogging in South Africa*. Struik Publishers, Cape Town.
- DE GRAAF, G. (1981).** *The rodents of southern Africa*. Butterworth Press, Pretoria.
- LOW, A.B. and REBELO, A.G. (1998).** *Vegetation of South Africa, Lesotho and Swaziland*. D.E.A.&T., Pretoria.
- MINTER, L.R., BURGER, M., HARRISON, J.A., BRAAK, H.H, BISHOP, P.J, AND KLOEPFER, D. 2004.** *Atlas and Red Data Book of the frogs of South Africa, Lesotho and Swaziland*. SI/MAB Series 9. Smithsonian Institution, Washington, DC.
- MUCINA, L AND RUTHERFORD, M.C. (eds) 2006.** *The vegetation of South Africa, Lesotho and Swaziland*. Strelitzia 19. SANBI, Pretoria.
- PASSMORE, N.I. and CARRUTHERS, V.C. (1995).** *Frogs of South Africa. A Complete Guide*. Wits University Press, Witwatersrand.
- ROBERTS, A. (1951).** *The mammals of South Africa*. Central News Agency, Cape Town.
- SKINNER, J.D. and SMITHERS, R.H.N. (1990).** *The Mammals of the Southern African Subregion*. University of Pretoria, Pretoria.

**SKINNER, J.D., and CHIMIMBA, C.T. (2005).** *The Mammals of the Southern African Subregion* 3<sup>rd</sup> ed. Cambridge University Press.

**SKINNER, J.D. and SMITHERS, R.H.N. (1990).** *The Mammals of the Southern African Subregion*. University of Pretoria, Pretoria.

**SMITHERS, R.H.N. (1986).** *South African Red Data Book-Terrestrial Mammals*. South African National Scientific Programmes Report No.125: 1-214.

**WESSA-KZN. (2008).** *Invasive Alien Plants in Kwazulu-Natal: Management and Control*.