HERPETOFAUNA ASSESSMENT FOR PROPOSED DEVELOPMENT OF ERF 2224

Hout Bay, Western Cape

May 2022

CLIENT

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1 Introduction

The Biodiversity Company (TBC) was commissioned by Sillito Environmental Consulting to conduct a herpetofaunal assessment, with a focus on amphibian and reptile species of conservation concern (SCC). The assessment was undertaken for the proposed construction of a residential housing development ('Oakhurst Lifestyle Estate') on ERF 2224, Hout Bay, Western Cape, South Africa. The applicant's proposed development will include the following:

- Construction of 83 residential housing units;
- Clubhouse, bowling green and swimming pool;
- Care facility;
- Retention pond;
- Bridge upgrade; and
- Associated infrastructure, access roads, various paved surfaces and walkways.

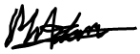
Although not the focus of this study, the approach adopted for the assessment has taken cognisance of the recently published Government Notice 320 in terms of NEMA dated 20 March 2020: "Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation".

The National Web-based Environmental Screening Tool has characterised the animal species sensitivity theme for the project area as "high" and "medium", the aquatic biodiversity sensitivity theme as "very high" and the plant species sensitivity theme as "low". According to the screening tool, the relative terrestrial biodiversity theme is rated as having a "very high sensitivity".

This purpose of this report and assessment is to determine the presence or the likely presence of amphibian and/or reptile SCC which may occur within the development area. A site inspection was carried out on the 28th and 29th April 2022 to confirm the presence, likely presence or confirmed absence of amphibian and/or reptile SCC. A night survey was conducted during the evening of the 28th April 2022.

Although the overall relative animal species sensitivity is considered "high" for the project area, the sensitivity feature rating for the one amphibian SCC (the Western Leopard Toad (*Sclerophrys pantherina*)) that may occur on site is considered to be "medium" based on the data from the National Environmental Screening Tool. The presence of this species within the project area has already been confirmed during a previous study conducted by NCC Environmental Services in 2014, and there have been a minimum of 8 additional records of this site within 100m of the project area according to records submitted to iNaturalist. In addition to this, there are a further six (6) amphibian SCC and one reptile SCC that may occur within the project area. The likelihood of occurrence for each of these species is discussed in this report based on available scientific resources, previous studies and the results of the field assessment.

1.1 Specialist Details

Report Name	**HERPETOFAUNA ASSESSMENT FOR PROPOSED DEVELOPMENT OF ERF 2224**
Submitted to	sillitò ENVIRONMENTAL CONSULTING
Report Writer/Fieldwork	**Michael Adams**  Michael Adams is a registered professional natural scientist (Pr Sci Nat: 118544) with extensive experience in terrestrial biodiversity assessments and has worked as a specialist herpetologist on a wide range of projects throughout Africa. He holds an MBA (WITS), a BSc (Hons) in Wildlife Management (TUKS) and a BSc in Environmental Science (UCT).
Report Reviewer	**Andrew Husted**  Andrew Husted is Pr Sci Nat registered (400213/11) in the following fields of practice: Ecological Science, Environmental Science and Aquatic Science. Andrew is an Aquatic, Wetland and Biodiversity Specialist with more than 12 years' experience in the environmental consulting field. Andrew has completed numerous wetland training courses, and is an accredited wetland practitioner, recognised by the DWS, and also the Mondi Wetlands programme as a competent wetland consultant.
Declaration	The Biodiversity Company and its associates operate as independent consultants under the auspice of the South African Council for Natural Scientific Professions. We declare that we have no affiliation with or vested financial interests in the proponent, other than for work performed under the Environmental Impact Assessment Regulations, 2017. 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. We have no vested interest in the project, other than to provide a professional service within the constraints of the project (timing, time and budget) based on the principals of science.

1.2 Terms of Reference

The Terms of Reference (ToR) included the following:

- Specialist amphibian and reptile survey for the presence, likely presence or confirmed absence of amphibian and reptile SCC;
- Description of the baseline receiving environment specific to the field of expertise (general surrounding area as well as site specific environment);
- Identification and description of any sensitive receptors in terms of relevant specialist discipline (amphibians/reptiles) that occur in the project area, and the manner in which these sensitive receptors may be affected by the proposed development;
- Identify 'significant' ecological or wetland features as they relate to the possible presence of amphibian SCC within the proposed project area;
- Assessing the potential impacts that the development could have on herpetofauna in the project area;
- Assessing the likelihood that any herpetofaunal species may be breeding within the proposed project area;
- Identification of conservation significant habitats around the project area which might be impacted or where known populations of herpetofauna SCC may occur;
- Screening to identify any critical issues (potential fatal flaws) that may result in project delays or rejection of the application; and
- Provide herpetofauna-specific outcomes, suggestions and mitigations to be included in the Management plan.

2 Project Area Description

The project area (Figure 1), is situated on ERF 2224 within the suburb of Hout Bay in the City of Cape Town Metropolitan Municipal Area, Western Cape Province, South Africa. The project area is considered predominantly undeveloped (but disturbed), vacant land and is approximately 7,50 hectares (ha) in extent.

The land use surrounding the project area consists predominantly of residential housing (to the east and west of the project area) and small-scale industry, with associated secondary infrastructure such as roads, restaurants and shops (Figure 2). On the southern boundary is Bay Road which backs on to predominantly natural vegetation which forms part of the Table Mountain National Park. The Bokkemanskloof River bisects a portion of the southern and western portions of the project area.

Figure 1: Location of the project area, ERF 2224, in Hout Bay, City of Cape Town Metropolitan Municipal Area

Figure 2: Overview of ERF 2224, Hout Bay: A) Bokkemanskloof River which bisects a portion of the project area; B) Old bridge in the south-eastern portion of the project area; and C) North-facing view, with existing infrastructure visible bottom-right of the photo

3 Key Legislative Requirements

The legislation, policies and guidelines listed below are applicable to the current project in terms of biodiversity and ecological support systems. The list below, although extensive, is not exhaustive and other legislation, policies and guidelines may apply in addition to those listed below (*Table 1*).

Table 1: A list of key legislative requirements relevant to these studies in the Western Cape

Region	Legislation
International	Convention on Biological Diversity (CBD, 1993)
	The Convention on Wetlands (RAMSAR Convention, 1971)
	The United Nations Framework Convention on Climate Change (UNFCC,1994)
	The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES 1973)
	The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention, 1979)
National	Constitution of the Republic of South Africa (Act No. 108 of 2006)
	The National Environmental Management Act (NEMA) (Act No. 107 of 1998)
	The National Environmental Management Act (NEMA) (Act No. 107 of 1998) Section 24 , No 42946 (January 2020)
	The National Environmental Management Act (NEMA) (Act No. 107 of 1998) Section 24 , No 43110 (March 2020)
	The National Environmental Management Protected Areas Act (Act No. 57 of 2003)
	The National Environmental Management Biodiversity Act (Act No. 10 of 2004)
	The National Environmental Management: Waste Act, 2008 (Act 59 of 2008);
	The Environment Conservation Act (Act No. 73 of 1989) and associated EIA Regulations
	National Environmental Management Air Quality Act (No. 39 of 2004)
	National Protected Areas Expansion Strategy (NPAES)
	Environmental Conservation Act (Act No. 73 of 1983)
	Natural Scientific Professions Act (Act No. 27 of 2003)
	National Biodiversity Framework (NBF, 2009)
	National Forest Act (Act No. 84 of 1998)
	National Veld and Forest Fire Act (101 of 1998)
	National Spatial Biodiversity Assessment (NSBA)
	World Heritage Convention Act (Act No. 49 of 1999)
	National Heritage Resources Act, 1999 (Act 25 of 1999)
	Municipal Systems Act (Act No. 32 of 2000)
	Alien and Invasive Species Regulations, 2014
	South Africa's National Biodiversity Strategy and Action Plan (NBSAP)
	Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983)
	Sustainable Utilisation of Agricultural Resources (Draft Legislation).
	White Paper on Biodiversity
	National Water Act (NWA, 1998)
Provincial	Western Cape Land Use Planning Act, 2015

	Nature and environmental conservation ordinance no. 19 of 1974
	Provincial notice no. 955 of 1975 (dated: 29 august 1975)
	Draft Western Cape Biodiversity Bill, 2019
	Western Cape Biodiversity Sector Plan 2017

3.1 National Environmental Management Act (NEMA, 1998)

The National Environmental Management Act (NEMA) (Act 107 of 1998) and the associated Regulations as amended in April 2017, states that prior to any development taking place within a wetland or riparian area, an environmental authorisation process needs to be followed.

4 Methodologies

4.1 Herpetology (Reptiles & Amphibians)

A herpetofauna desktop assessment was undertaken, with a primary focus on species of conservation concern that may occur within, or adjacent to, the project area. Herpetofauna distributional data was obtained and amalgamated from the following sources in order to generate expected species lists and identify amphibian SCC:

- South African Reptile Conservation Assessment (SARCA) (sarca.adu.org);
- A Guide to the Reptiles of Southern Africa (Alexander & Marais, 2007);
- Field guide to Snakes and other Reptiles of Southern Africa (Branch, 1998);
- Atlas and Red list of Reptiles of South Africa, Lesotho and Swaziland (Bates *et al.,* 2014);
- A Complete Guide to the Frogs of Southern Africa (du Preez & Carruthers, 2009);
- iNaturalist (iNaturalist.org);
- Animal Demography Unit (ADU) - FrogMAP (frogmap.adu.org.za);
- Atlas and Red Data Book of Frogs of South Africa, Lesotho and Swaziland (Mintner *et al.,* 2004); and
- Ensuring a future for South Africa's frogs (Measey, 2011).

4.2 Field Survey

Following the desktop analysis, a field survey was conducted by a herpetologist on the 28th and 29th of April 2022. Due to the relatively small size of the proposed development, all areas of the project area were surveyed, including stretches of the Bokkemanskloof River as well as the wetlands to the south of the project area (as marked during previous surveys (NCC, 2014)). The herpetological field survey comprised the following techniques:

- Visual surveys and hand searching for herpetofauna species that shelter in particular habitats and/or under debris such as rocks, logs, bark etc;
- Identification of species by vocalisation: Almost all amphibian species in South Africa have unique and identifiable vocalisations which can be used to identify individuals to

a species level. Vocalisations that were heard at the project site were recorded and identified;

- Nocturnal survey: Most South African amphibians are nocturnal and/or are more vocal at night and are usually less concealed than during the day. For this reason, a nocturnal survey of the project area was conducted for several hours on the night of the 28th April 2022. Headlamps and torches were used to locate individual frogs and reptiles; and
- Local information: Information was gathered from people in the surrounding community as well as people working near the wetlands and dams within the project area about any potential herpetofauna species that they had encountered.

4.3 Limitations

The following limitations should be noted for the assessment:

- Only a single season survey was conducted for the respective study. This constitutes a late dry season survey for the winter rainfall region of the Western Cape Province. This is a major limitation for a survey that is primarily focused on determine the presence or absence of amphibian species;
    - This is particularly true for the Western Leopard Toad, as they are not completely reliant on being near wetlands or water bodies for most of the year. They are considered explosive breeders and are very mobile, and would typically only migrate back to wetlands or dams, such as those in the project area, from their foraging grounds after sufficient rainfall which usually commences from late July onwards;
- Ideally, a herpetofaunal assessment should be conducted over a long timeframe and be replicated over several seasons. Therefore, this assessment should be regarded as a snapshot of the receiving environment and associated amphibian and reptile communities;
- The desktop and field assessments were conducted on those portions of the project area as originally defined by the client. Any changes in the project boundary subsequent to this may negatively affect the robustness of this report;
- By their nature, amphibian and reptile species are cryptic and difficult to detect in a given environment, and although a thorough survey was completed, it is highly likely that certain species of herpetofauna that occur on site, or that only occur on site during particular times of the year, were not recorded; and
- This assessment has not assessed any temporal trends for the project.

5 Expected Herpetofauna Species

Based on the available literature and the various other sources analysed, there are nineteen (19) species of amphibians and forty-six (46) species of reptile that could be expected to occur in the vicinity of the project area (i.e. QDS: 3418AB) and/or were historically recorded in this area (Table 2 and Table 3). Species that are listed as ‘Near Threatened’, ‘Endangered’ or ‘Critically Endangered’ are highlighted in red.

5.1 Amphibians

As can be seen in Table 2, seven (7) of the amphibian species are listed as species of conservation concern, namely:

- Cape Peninsula Moss Frog (*Arthroleptella lightfooti*) - Near Threatened
- Cape Rain Frog (*Breviceps gibbosus*) – Near Threatened
- Flat Caco (*Cacosternum platys*) – Near Threatened
- Rose's Mountain Toadlet (*Capensibufo rosei*) – Critically Endangered
- Micro Frog (*Microbatrachella capensis*) - Critically Endangered
- Western Leopard Toad (*Sclerophrys pantherina*) - Endangered
- Cape Platanna (*Xenopus gilli*) – Endangered

It is important to note that much of this data is derived from a relatively large spatial scale (using the QDS 3418AB) and on a finer scale it may be highly improbable for many of these species to occur in the project area itself. Each amphibian SCC as listed above will be discussed on a species by species basis and given a 'likelihood of occurrence' ranking under Section 9 of this report.

Table 2: List of amphibian species that are expected to occur in the project area

Common Name	Scientific Name	Threat Status
Amietia fuscigula	Cape River Frog	Least Concern (IUCN 2017)
Arthroleptella lightfooti	Cape Peninsula Moss Frog	Near Threatened (IUCN 2017)
Breviceps gibbosus	Cape Rain Frog	Near Threatened (IUCN 2017)
Breviceps montanus	Cape Mountain Rain Frog	Least Concern (IUCN 2017)
Breviceps rosei	Sand Rain Frog	Least Concern (IUCN 2017)
Cacosternum platys	Flat Caco	Near Threatened (IUCN 2017)
Capensibufo rosei	Rose's Mountain Toadlet	Critically Endangered (IUCN, 2017)
Hyperolius horstockii	Arum Lily Frog	Least Concern (IUCN 2017)
Hyperolius marmoratus	Painted Reed Frog	Least Concern (IUCN, 2013)
Microbatrachella capensis	Micro Frog	Critically Endangered (IUCN, 2017)
Sclerophrys gutturalis	Guttural Toad	Least Concern (IUCN, 2016)
Sclerophrys pantherina	Western Leopard Toad	Endangered (IUCN, 2017)
Semnodactylus wealii	Rattling Frog	Least Concern (IUCN 2017)
Strongylopus bonaespei	Banded Stream Frog	Least Concern (IUCN 2017)
Strongylopus grayii	Clicking Stream Frog	Least Concern (IUCN 2017)
Tomopterna delalandii	Cape Sand Frog	Least Concern (IUCN 2017)
Vandijkophrynus angusticeps	Cape Sand Toad	Least Concern (IUCN 2017)
Xenopus gilli	Cape Platanna	Endangered (IUCN, 2017)
Xenopus laevis	Common Platanna	Least Concern (IUCN 2017)

5.2 Reptiles

As can be seen in Table 3, only one (1) of the expected reptile's species is listed as a species of conservation concern, namely:

- Cape Dwarf Chameleon (*Bradypodion pumilum*) - Near Threatened

The habitat requirements of this reptile SCC as listed above will be discussed and the species will be given a 'likelihood of occurrence' ranking under Section 9 of this report.

Table 3: List of reptile species that are expected to occur within the project area

Common Name	Scientific Name	Threat Status
Acontias meleagris	Cape Legless Skink	Least Concern (SARCA 2014)
Afrogecko porphyreus	Marbled Leaf-toed Gecko	Least Concern (SARCA 2014)
Agama atra	Southern Rock Agama	Least Concern (SARCA 2014)
Amplorhinus multimaculatus	Many-spotted Snake	Least Concern (SARCA 2014)
Bitis arietans arietans	Puff Adder	Least Concern (SARCA 2014)
Bradypodion pumilum	Cape Dwarf Chameleon	Near Threatened (IUCN 2017)
Bradypodion ventrale	Southern Dwarf Chameleon	Least Concern (IUCN 2017)
Chamaesaura anguina anguina	Cape Grass Lizard	Least Concern (SARCA 2014)
Chersina angulata	Angulate Tortoise	Least Concern (SARCA 2014)
Cordylus cordylus	Cape Girdled Lizard	Least Concern (SARCA 2014)
Cordylus niger	Black Girdled Lizard	Least Concern (IUCN 2017)
Crotaphopeltis hotamboeia	Red-lipped Snake	Least Concern (SARCA 2014)
Dasypeltis scabra	Rhombic Egg-eater	Least Concern (SARCA 2014)
Dispholidus typus typus	Boomslang	Least Concern (SARCA 2014)
Duberria lutrix lutrix	South African Slug-eater	Least Concern (SARCA 2014)
Gerrhosaurus flavigularis	Yellow-throated Plated Lizard	Least Concern (SARCA 2014)
Goggia incognita	Cryptic Pygmy Gecko	Least Concern (IUCN 2017)
Hemachatus haemachatus	Rinkhals	Least Concern (SARCA 2014)
Homopus areolatus	Parrot-beaked Tortoise	Least Concern (SARCA 2014)
Homoroselaps lacteus	Spotted Harlequin Snake	Least Concern (SARCA 2014)
Indotyphlops braminus	Brahminy Blind Snake	Introduced Species
Lamprophis aurora	Aurora House Snake	Least Concern (SARCA 2014)
Lamprophis fuscus	Yellow-bellied House Snake	Least Concern (SARCA 2014)
Leptotyphlops nigricans	Black Thread Snake	Least Concern (SARCA 2014)
Lycodonomorphus inornatus	Olive House Snake	Least Concern (SARCA 2014)
Lycodonomorphus rufulus	Brown Water Snake	Least Concern (SARCA 2014)
Lygodactylus capensis	Common Dwarf Gecko	Least Concern (SARCA 2014)
Meroles knoxii	Knox's Desert Lizard	Least Concern (SARCA 2014)
Naja nivea	Cape Cobra	Least Concern (SARCA 2014)
Pachydactylus geitje	Ocellated Gecko	Least Concern (SARCA 2014)
Pelomedusa galeata	South African Marsh Terrapin	Least Concern (IUCN 2017)
Psammophis crucifer	Cross-marked Grass Snake	Least Concern (SARCA 2014)
Psammophis leightoni	Cape Sand Snake	Least Concern (IUCN 2017)
Psammophis notostictus	Karoo Sand Snake	Least Concern (SARCA 2014)

Psammophylax rhombeatus	Spotted Grass Snake	Least Concern (SARCA 2014)
Pseudaspis cana	Mole Snake	Least Concern (SARCA 2014)
Pseudocordylus microlepidotus	Cape Crag Lizard	Least Concern (SARCA 2014)
Rhinotyphlops lalandei	Delalande's Beaked Blind Snake	Least Concern (SARCA 2014)
Scelotes bipes	Silvery Dwarf Burrowing Skink	Least Concern (SARCA 2014)
Tetradactylus seps	Short-legged Seps	Least Concern (SARCA 2014)
Tetradactylus tetradactylus	Cape Long-tailed Seps	Least Concern (SARCA 2014)
Trachylepis capensis	Cape Skink	Least Concern (SARCA 2014)
Trachylepis homalocephala	Red-sided Skink	Least Concern (SARCA 2014)
Trachylepis variegata	Variegated Skink	Least Concern (SARCA 2014)
Tropidosaura gularis	Cape Mountain Lizard	Least Concern (SARCA 2014)
Typhlosaurus caecus	Southern Blind Legless Skink	Least Concern (SARCA 2014)

6 Results & Discussion

The project area (ERF 2224) is a predominantly vacant piece of land that is situated in a residential area and is effectively enclosed on three sides (northern, western and eastern boundaries) by surrounding private residential properties, residential estates, business properties (restaurant) and/or roads. The southern boundary of the property is intersected by Bay Road. Beyond this portion of the project area is a portion of the greater Table Mountain National Park.

Based on the field survey the project area is predominantly sloping in a north-westerly direction across the Disa River Valley, underlain by shale and granite. The middle reaches of the Bokkemanskloof River bisect a portion of the project area and there are dams situated in the north-eastern and central portion of the site. The river continues in a northerly direction away from the project area from where it crosses under a main road (M63) before entering the Disa River.

6.1 Existing Impacts

The project area was found to be moderately to heavily transformed from its original condition but nonetheless still maintains basic ecological functionality and habitats which can support various herpetofauna and includes wetlands and ponds which are used as breeding grounds for amphibians (including Western Leopard Toads, as reported in the NCC report (2014)).

The following anthropogenic impacts/disturbances which may impact herpetofauna species and diversity were noted during the field survey (Figure 3):

- The surrounding land-use which consists of suburban houses, residential estates and small-scale industries, as well as associated infrastructure such as roads;
- Increased stormwater run-off into the project area due to the surrounding land-use;
- Severe encroachment by alien invasive plant species, mostly significantly Kikuyu grass (*Pennisetum clandestinum*) which dominates much of the project area. The Bokkemanskloof River is heavily infested with Eucalyptus spp. and Poplar (Populus spp.) trees. This infestation will negatively influence the quality and volume of water

which is moving in to the lower reaches of the river and will affect amphibian species within the project area;

- Moderate levels of litter, dumping of building rubble and the presence of footpaths within the project area;
- Various access roads, both current and historic, that exists across most of the project area (including an old bridge which crosses the Bokkemanskloof River); and
- Existing residential dwelling in the northern portion of the project area.

Figure 3: Some of the impacts identified in the project area: A) Footpaths and fencing; B) Severe encroachment of alien invasive plant species in wetland areas in the southern portion of the project area; and C) Old infrastructure adjacent to the Bokkemanskloof River.

6.2 Herpetofauna Survey Results

Although the project area is considered to be relatively transformed and little indigenous vegetation remains, various herpetofauna are evidently utilising the remaining habitat in the project area and certain species appear to be present in high densities.

No amphibian SCC, or evidence of such, were recorded in the project area or in the adjacent wetlands (as identified by NCC (2014)) during the field survey undertaken in late April 2022.

The following amphibian and reptile species were recorded in the project area during the April 2022 survey (Table 4 and Figure 4):

Table 4: List of amphibian and reptile species recorded in the project area

Common Name	Scientific Name	Threat Status
Amphibians		
Amietia fuscigula	Cape River Frog	Least Concern (IUCN, 2017)
Strongylopus grayii	Clicking Stream Frog	Least Concern (IUCN, 2017)
Reptiles		
Afrogecko porphyreus	Marbled Leaf-toed Gecko	Least Concern (SARCA 2014)
Lygodactylus capensis	Common Dwarf Gecko	Least Concern (SARCA 2014)
Naja nivea	Cape Cobra	Least Concern (SARCA 2014)

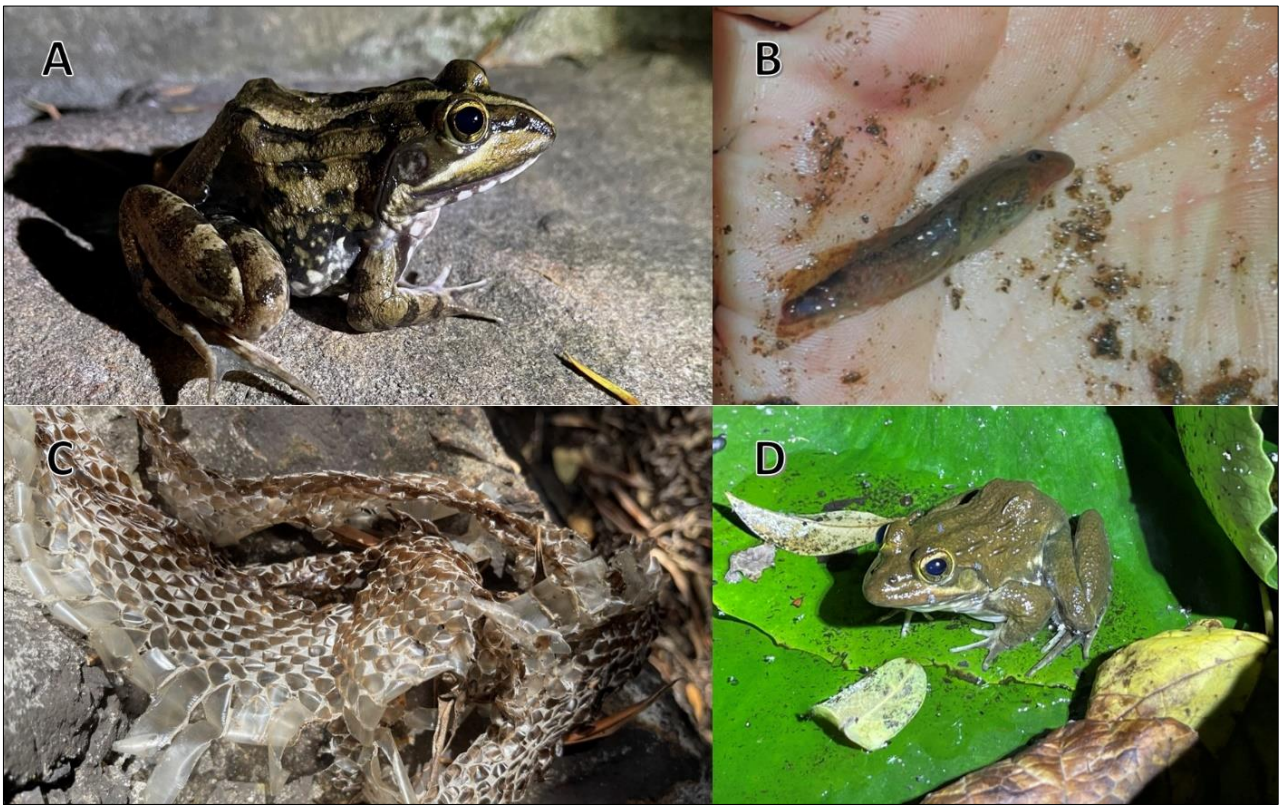


Figure 4: Some of the herpetofauna species recorded in the project area: A) and D) Cape River Frog (Amietia fuscigula); B) Tadpole of a Cape River Frog (Amietia fuscigula); and C) Skin of a Cape Cobra (Naja nivea).

The Cape River Frogs were found in abundance across the project area, predominantly close to the Bokkemanskloof River and Clicking Stream Frogs were recorded calling infrequently during the

evening. Large numbers of tadpoles were recorded the water bodies present in the project area, as well as in the Bokkemanskloof River itself. This indicates that the water quality is of an acceptable standard, for at least certain amphibian species, to breed. Evidence of Western Leopard Toad breeding within the project area has already been confirmed (NCC, 2014).

6.2.1 Herpetofauna SCC Commentary

There was no evidence of amphibian SCC occurring in the project area during the April 2022 survey. However, due to the cryptic nature of amphibians, the single season survey, the seasonal timing of the survey and historic records of amphibian SCC within, and adjacent to, the project area, it is plausible that such species may nonetheless be present and/or may utilise the site for brief periods during the year. This is especially true for the Western Leopard Toad, a species which is known to migrate and forage far from existing water bodies or breeding sites.

Based on the results of the April 2022 survey and the NCC (2014) survey, and the environmental condition of the project area, each herpetofauna SCC was given a "likelihood of occurrence" rating. The ratings were ranked in the following probability order: "Highly Unlikely", "Low", "Moderate", "High" and "Confirmed" (if the species was recorded). The table below shows the probability ratings assigned to each of the identified SCC.

Table 5: Likelihood of occurrence rankings for possible herpetofauna species

Common Name	Scientific Name	Likelihood of Occurrence
Amphibians		
Arthroleptella lightfooti	Cape Peninsula Moss Frog	**Low - Moderate**
Breviceps gibbosus	Cape Rain Frog	**Low**
Cacosternum platys	Flat Caco	**Low**
Capensibufo rosei	Rose's Mountain Toadlet	**Low**
Microbatrachella capensis	Micro Frog	**Highly Unlikely**
Sclerophrys pantherina	Western Leopard Toad	**Confirmed**
Xenopus gilli	Cape Platanna	**Low**
Reptiles		
Bradypodion pumilum	Cape Dwarf Chameleon	**Moderate**

The Cape Peninsula Moss Frog (*Arthroleptella lightfooti*) is a diminutive frog species and is typically found near streams in pristine riverine forests and on very steep seepages. The habitats present in the project area do not provide ideal habitat for this species. There are however a few records of this species occurring within 5 km's of the project area and therefore the likelihood of occurrence is rated as low to moderate.

The Cape Rain Frog (*Breviceps gibbosus*), the Flat Caco (*Cacosternum platys*) and the Rose's Mountain Toadlet (*Capensibufo rosei*) are all considered to have a low likelihood of occurrence within the project area. There are no records for any of these species within 4 km's of the project area.

The Micro Frog (*Microbatrachella capensis*) was originally only known from one location near Kenilworth racecourse (which is more than 10 km's from the project area). This species also requires undisturbed, seasonal seepage pools and vleis in natural or near-natural fynbos (Du Preez, 2009). Furthermore, this diminutive species of frog is considered incapable of migrating from surrounding areas where it occurs (such as the Kenilworth racecourse) to the project area due to extensive

anthropogenic barriers. It is therefore considered 'highly unlikely' that this species exists in the project area, nor would it utilise the site in the foreseeable future.

The Western Leopard Toad (*Sclerophrys pantherina*) is a large toad which inhabits pans, vleis and dams in and around the Cape Peninsula and the Cape Flats. Unlike many of the threatened amphibian species in the Western Cape, the Western Leopard Toad is not restricted to pristine natural habitats and often colonises dams in farmlands and suburbs where breeding sites exist (Du Preez, 2009). This species typically breeds in relatively large, permanent, water bodies that have standing open water which is greater than 50cm deep with scattered patches of aquatic vegetation (Minter *et al.,* 2004). The presence of this species has been confirmed on within the project area and is known to breed in the project area (NCC, 2014).

The Cape Platanna (*Xenopus gilli*) is almost exclusively aquatic and inhabits permanent and seasonal blackwater sponges and lakelets in low-lying coastal areas, usually within 10 kms of the coastline (Minter *et al.,* 2004). This species is entirely aquatic and is only capable of moving relatively short distances during heavy rainfall periods. *Xenopus gilli* does not typically occur in habitats that have that have been disturbed by agriculture or urban development, or that contain invasive plants and animals (Picker, 1985; Picker and De Villiers, 1989). There are also no records of this species occurring within 5 km's of the project area and it is considered unlikely that this species could migrate to the project area given the anthropogenic barriers that exist.

The Cape Dwarf Chameleon (*Bradypodion pumilum*) inhabits a wide range of habitats, including fynbos, renosterveld, riparian thicket and even exotic or alien vegetation. It also occurs in urban habitats and it is for this reason that this species is given a moderate likelihood of occurrence.

6.2.2 Sensitivity and Habitat Summary

Based on the results of the field survey, the project area has been somewhat transformed from its natural state due to historic and on-going anthropogenic impacts as well as the impact of alien invasive plant species and has been assigned **a moderate to low sensitivity**. Furthermore, there appears to be very little, if any, remnants of the Peninsula Granite Fynbos vegetation type which is thought to have occurred in the project area historically and on which certain amphibian SCC would rely.

Nonetheless, the presence of an endangered amphibian species, the Western Leopard Toad has been confirmed within the project area. Portions of the project area also have a "High" sensitivity rating according to the National Environmental Screening Tool (Figure 5). This species has also been confirmed to breed in the project area which significantly increases the sensitivity of the site and the importance of stringent mitigation measures should the development proceed.

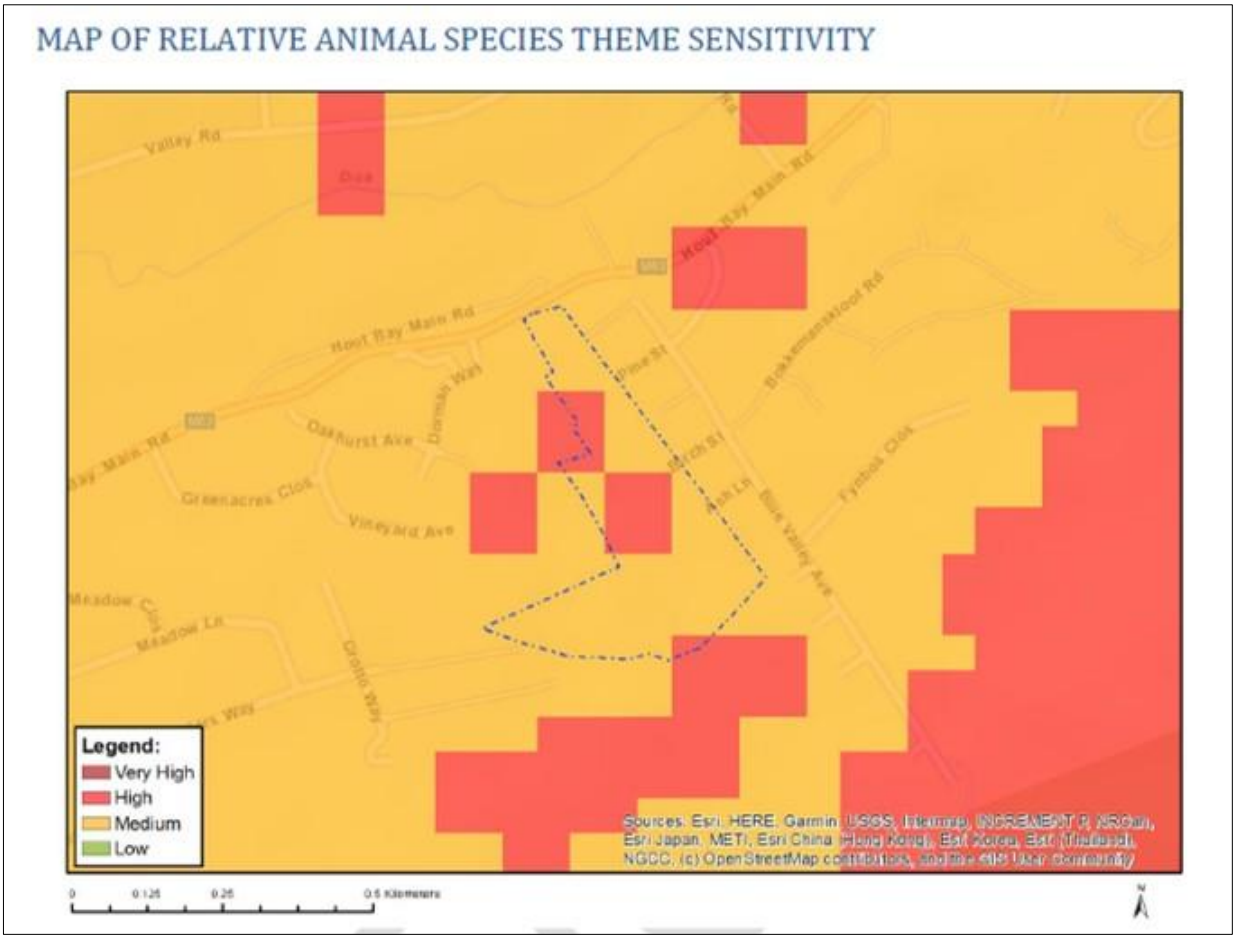


Figure 5: Map depicting the relative animal species sensitivity of the project area and surrounds (National Environmental Screening Tool, 2022)

7 Conclusion & Recommendations

No amphibian SCC, or evidence thereof, were recorded within the project area during the April 2022 survey, but previous studies (NCC, 2014) and records from iNaturalist, show that the endangered Western Leopard Toad is present, and breeds, within, and adjacent to, the project area. The site is considered to have been altered from its natural state due to a range of anthropogenic impacts and the presence of dense stands of alien invasive plant species. Nonetheless, portions of natural vegetation and habitat remain (including three wetlands, two dams and the Bokkemanskloof River), all of which provide potential habitat for amphibian and reptile SCC to occur.

Two species of amphibian and three species of reptiles were recorded during the April 2022 field survey. Although none of these are considered to be SCC, it does show that there is habitat present for herpetofauna to exist within the project area.

7.1 Recommendations & Mitigation Measures

It is the specialist's opinion that the proposed development will affect possible migration routes and foraging habitats of the endangered Western Leopard Toad (WLT), but that there is a low probability of other species of conservation concern occurring on the site. Previous studies have confirmed the presence of WLT's breeding in the wetlands in the southern portion of the project area. The integrity of these wetlands, along with the existing dams, the proposed attenuation pond and the Bokkemanskloof River are considered to be of primary importance in terms of preservation of amphibian and reptile populations within the development area and are the focus of the majority of the mitigation measures listed below.

It is critically important that these recommendations and mitigation measures be read in conjunction with the recommendations and mitigation measures as described in the 'Western Leopard Toad Habitat Assessment for the Proposed Development of Erf 2224, Hout Bay (NCC, 2014)' report as well as in conjunction with the guidelines developed by the Biodiversity Management Plan of the WLT, namely:

- The Construction Phase Environmental Management Guideline and Construction Checklist.
- The Western Leopard Toad Development Design Guidelines.

Both of the above guidelines and checklist are available in the NCC (2014) report.

Furthermore, the recommendations and mitigations in the 'Review of Freshwater Assessment - Upper Bokkemanskloof River on Erf 2224, Hout Bay' must be reviewed, and adhered to, in conjunction with the below.

The following additional recommendations are made to reduce the extent on the development on the remaining amphibian and reptile species:

- An Environmental Control Officer (ECO) with appropriate herpetofauna experience should be present during initial site clearing activities, in the event that any amphibian or reptile SCC are encountered. Any other herpetofauna encountered can be relocated either to the wetlands in the southern portion of the project area or (preferably) into the Table Mountain National Park adjacent;
- The wetlands (as defined by the NCC (2014) report) in project area are to remain undeveloped and must be cordoned off during construction to prevent further anthropogenic

impacts to the system. A buffer of 15 m from the periphery of all wetlands is supported, as motivated by BlueScience (9/11/2021);

- All stormwater drains should be covered by a mesh cover with a diameter of less than 3 cm's in order to prevent frogs from falling in to these drains;
- Any new fences / walls to be constructed within the project area, should be constructed in such a way as to be as 'frog-friendly' as possible. Ideally the fence / wall should be made of palisade fencing. If this is not possible, then rectangular holes of approximately 10 cm (high) by 15 cm (length) should be made at ground level in the wall / fence, in order to facilitate the movement of amphibians across the project area. This is especially important to allow movement of amphibians in and east-west direction, as many of the existing WLT records are from the adjacent Bokkemanskloof Estate;
- All alien invasive plant species should be removed from the project area and the wetlands during the wetland rehabilitation process, in accordance with advice from a horticulturist / rehabilitation expert. Such rehabilitation should ideally be conducted from January to June, to avoid the primary breeding season of most amphibian species. The removal of alien tree species from the Bokkemanskloof River should be a priority;
- Appropriate traffic calming measures need to be put in place and signage warning road-users of the possible presence of WLT's;
- The feasibility of installing wildlife corridors or tunnels under access roads should be considered;
- The proposed attenuation pond will become habitat for amphibian species and may well become an area where the WLT's will breed. As such, it is recommended that only indigenous vegetation be used in this pond;
- Indigenous plant species (and preferably locally indigenous plant species) should be used for all landscaping. All land-owners should be encouraged to plant such species in their gardens;
- Construction personnel must be educated on the possible presence of endangered species of amphibians and chameleons, and the intentional killing of any amphibians or reptiles must be prohibited;
- The use of poisons, such as pesticides, should be avoided as far as possible;
- A nocturnal search and rescue mission should be conducted in order to capture and relocate any Cape Dwarf Chameleons in the project area. This should be done before construction begins. It is recommended that these animals be relocated to suitable habitat in the adjacent Table Mountain National Park (but not further than 2 km's from the project area);
- Ensure that no structures are built, during and after construction that could act as potential pit-fall traps for amphibian species. Any trenches that are necessary during construction should be checked every morning for the presence of amphibians and reptiles; and
- Ensure that no pollutants enter the stormwater system or the wetland areas.

7.2 Specialist Opinion

Although the project area has been somewhat transformed from its original state it is still host to several amphibian and reptile species, most notably a population of Western Leopard Toads. Therefore, it is important that the management outcomes and mitigation measures be adhered to in order to mitigate any impact that might stem from the development.

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9 Appendix

Appendix A Specialist declarations

DECLARATION

I, Michael Adams, declare that:

- I act as the independent specialist in this application;
- I 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 applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant 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; and the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of Section 24F of the Act.

Michael Adams

Terrestrial Ecologist

The Biodiversity Company

May 2022

DECLARATION

I, Andrew Husted, declare that:

- I act as the independent specialist in this application;
- I 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 applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant 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; and the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of Section 24F of the Act.

Andrew Husted

Terrestrial Ecologist

The Biodiversity Company

May 2022

Appendix B Specialists CVs

Michael Adams

MBA, BSc (Hons)

Cell: +27 83 680 7619

Email: mikeadams_13@yahoo.com

Identity Number: 8405245292084

Date of birth: 24th May 1984

Profile Summary

Extensive experience with many mining projects in South Africa, parts of Africa, providing specialist input into ESHIAs and EMPs.

Specialist herpetologist with over ten years of working experience in this field.

Experience with the project management of impact assessments and conservation projects.

Specialist guidance, support and facilitation for the compliance with legislative processes, in South Africa as well as with IFC and the Equator principles.

Provide specialist and technical input for various faunal and ecological studies.

Areas of Interest

Renewable Energy & Sustainability

Reptile awareness and conservation

Publication of scientific journals and articles

Photography & Scuba Diving

Key Experience

- Familiar with World Bank, Equator Principles and the International Finance Corporation requirements
- Specialist Herpetological Surveys and Assessments
- Advanced Venomous Reptile Handling Trainer
- Game Reserve and Nature Reserve Management Plans
- Conservation Management Plans
- Endangered Species Conservation Projects
- Amphibian ex-situ Conservation Rescue
- Environmental Impact Assessments (EIA)
- Reptile Husbandry Expert & Trainer
- Terrestrial Ecological Assessments

Countries worked in

Botswana	Malawi
Guinea	South Africa
Swaziland	Lesotho
Cameroon	Mozambique

Nationality

South African

Languages

English – Proficient

Afrikaans – Proficient

Qualifications

- Masters Business Administration (MBA) – University of Witwatersrand
- BSc Honours (University of Pretoria) – Wildlife Management
- BSc Environmental Science (University of Cape Town)
- Certified Natural Scientist (SACNASP)

Certificates

- Advanced Snake Handling – African Reptiles & Venom (2006, 2009, 2010)
- Class IV Commercial Scuba Diving (2012)
- First Aid Level 1 (2006, 2012)
- Rifle & Shotgun Proficiency – SASSETA (2006)

SELECTED RECENT PROJECT EXPERIENCE

Project Name: A biodiversity baseline and impact assessment for the proposed Umsimbithi Emakhazeni Coal Mining Project, in Mpumalanga Province, South Africa.

Client: Kongiwe

Personal position / role on project: Project Manager & Terrestrial Ecologist.

Location: Mpumalanga Province, South Africa (2017).

Main project features: To conduct a dual season terrestrial ecology baseline and impact assessment for the expected impact footprint area including various open cast and underground coal mining activities which encompassed an area of over 15 000ha.

Project Name: Environmental Impact Assessment for the Manungu Colliery Expansion, Delmas, Mpumalanga, South Africa.

Client: Manungu / EIMS

Personal position / role on project: Project Manager

&Terrestrial Ecologist Location: South Africa (2017 / 2018).

Main project features: Conduct a detailed survey and terrestrial ecology impact assessment for the expected impact footprint area.

OVERVIEW

An overview of the specialist technical expertise includes the following:

- Terrestrial Ecological Assessments with a specialization in herpetology.
- The design, compilation and implementation of Biodiversity and Land Management Plans and strategies.
- Faunal surveys which includes mammals, birds, amphibians and reptiles.
- Specialist herpetological survey techniques including trapping and acoustic sampling.
- Rehabilitation Plans and Monitoring for the terrestrial component.
- Veld management.
- Advanced reptile handling training provider and snakebite first aid.
- Experience in Natural Capital and valuing environmental services.
- Environmental Control Officer (ECO) experience.

EMPLOYMENT EXPERIENCE

CURRENT EMPLOYMENT: Icon Corporation Pty Ltd (December 2019 – present)

POSITION: Consultant

Part-time environmental consultant and specialist wildlife training provider.

Roles include:

- Lecturer and presenter for advanced snake handling, snake identification and snakebite first aid.
- Training provider for reptile capture and relocation.
- Expert herpetological advisor for international filming and documentaries.
- Training of staff in reptile husbandry and handling.
- Financial and marketing consultant for a Reptile Centre in Limpopo.
- Consultant: expert herpetological input for impact assessments.

PAST EMPLOYMENT: The Biodiversity Company (August 2017 – August

2019)

POSITION: Manager: Terrestrial Ecology Unit & Principle Herpetologist

The team at The Biodiversity Company have conducted stand-alone specialist studies and provided overall guidance of studies with a pragmatic approach for the management of biodiversity that takes into account all the relevant stakeholders, most importantly the environment that is potentially affected.

Roles include:

- Manager of Faunal and Floral surveys for baseline, basic or impact assessments.
- Advanced snake handling, identification and snakebite first aid training provider.
- GIS map work and report writing.
- Project Management.
- Specialist herpetologist training.
- Specialist assistant for fieldwork for the terrestrial ecology unit.
- Specialist inputs to the above mention services.

PAST EMPLOYMENT: The Endangered Wildlife Trust

POSITION: Acting Manager – National Business & Biodiversity Network

Period of work November 2015 to August 2016 (Assistant Manager September 2016 to

July 2017) Key Roles & Accountabilities:

- Acting Manager for the National Business and Biodiversity Network (NBBN).
- Management of reptile-related conservation plans of the EWT, including development of Albany Adder Conservation Project.
- Presenter for Amphibian Conservation Unit and specialist reptile input.
- Responsible for managing the network and a number of corporate partners (including partners from the mining, merchandise and financial sectors). Assisting clients with implementation of biodiversity strategies and supervision of BAP's etc.
- Manages all fundraising activities for the network and in charge of networking with various corporate clients to bring in funding for the network.
- Organisation of biodiversity and business-related events and courses across South Africa.
- Part-time work for mining companies, reviewing impacts assessment documents as well as environmental management plans.

PAST EMPLOYMENT: Icon Corporation (Pty Ltd)

POSITION: Divisional Representative (Part-time) Period of work: January 2014 to January 2015

Key Roles & Accountabilities:

- Part-time work for a small environmental division within a larger consulting firm.
- Responsible for client interaction, sales and marketing.
- In charge of all administrative duties for the division include budgetary requirements.
- Research and report writing for clients and consulting advice depending on client specifications.

PAST EMPLOYMENT: National Zoological Gardens of South Africa (NZG)

POSITION: Conservator of Reptiles

Period of work: November 2009 to

November 2013 Key Roles &

Accountabilities:

- Responsible for the overall management and up keep of the Reptile Park, including budgets.
- Directed and supervised staff in various daily tasks, conducting all necessary performance management activities.
- Conducted various talks and lectures for school groups, as well as more in-depth lectures and training talks for vets, doctors, paramedics, the military, field guides and veterinary students.
- Lead all husbandry and healthcare requirements of numerous animals including; various snakes and other reptiles (over 180 animals) - such as Komodo dragons, crocodilians, amphibians and various invertebrates.
- Developed and implemented a new Komodo dragon training regime and spent three weeks working at the ZSL London Zoo, UK.
- Developed and maintained a bio-secure frog room for the critically endangered Pickersgill reed frog as part of the national Pickersgill Reed Frog Project and worked on projects with the vulnerable Sungazer lizard.
- Implemented staff training initiatives including training in; reptile handling, public speaking.

PAST EMPLOYMENT: Kinyonga Reptile Centre

POSITION: Curator of Reptiles

Period of work: February 2008 to

November 2009

Key Roles & Accountabilities:

- Responsible for the overall management and welfare of animals at the Centre.
- Lecturer and presenter for various reptile courses, including advanced reptile handling, snake identification and snakebite first aid.
- Directed and supervised staff in various daily tasks, conducting all necessary performance management activities.
- Husbandry, welfare and handling of all animals at the Centre, including all venomous reptiles as well as various lizards and crocodilians.

ACADEMIC QUALIFICATIONS

MBA (Master of Business Administration) - University of the Witwatersrand, 2014 - 2015

Subjects: Leadership | Management Consulting | Advanced Information Systems | Business Start-ups | Micro and Macroeconomic | Accounting | Organisational Behaviour | Human Resources | Corporate Finance and Statement Analysis | Operations and Decisions Science | Information Systems Management | Marketing | Strategy | Leadership Development | Social Responsibility | Corporate Governance | Ethics and Governance

Bachelor of Science [Honours] Wildlife Management - University of Pretoria, 2006 - 2006

Subjects: Wildlife Nutrition | Wildlife Management & Research Techniques | Taxonomy | Vegetation of South Africa | Land Evaluation and Farm Management | Parasites, Diseases &

Capture of Wild Animals | Animal Population Dynamics | Man & Natural Resources | Applied Veld Management | Soil Science | Hunting & Ethics

Bachelor of Science in Environmental & Geographic Science - University of Cape Town, 2002 - 2005

Subjects: Cell Biology | Biological Diversity | Mathematics | Environmental Science | Chemistry | Mammalian Zoology | Entomology | Freshwater Ecosystems | Ecosystem Physiology | Statistics | Zoology | Plant Diversity | Archaeology | Environmental Impact Assessments | Inland Water Ecosystems | Geographic Information Systems | Environmental Management

Appendix C Specialists CVs

Andrew Husted

M.Sc Aquatic Health (*Pr Sci Nat*)

Cell: +27 81 319 1225

Email: andrew@thebiodiversitycompany.com

Identity Number: 7904195054081

Date of birth: 19 April 1979

Profile Summary

Working experience throughout South Africa, West and Central Africa and also Armenia.

Specialist experience with on-shore drilling, mining, engineering, hydropower and renewable energy.

Experience with project management of national and international multi-disciplinary projects. Including managing and compiling ESHIAs and EMPs

Specialist guidance, support and facilitation for the compliance with legislative processes, for in-country requirements, and international lenders.

Specialist expertise include Instream Flow and Ecological Water Requirements, aquatic ecology and wetlands resources.

Areas of Interest

Mining, Oil & Gas, Renewable Energy & Bulk Services Infrastructure Development, Sustainability and Conservation.

Key Experience

- Familiar with World Bank, Equator Principles and the International Finance Corporation requirements
- Environmental, Social and Health Impact Assessments (ESHIA)
- Environmental Management Programmes (EMP)
- Ecological Water Requirement determination experience
- Wetland delineations and ecological assessments
- Terrestrial Ecological Assessments
- Aquatic Ecological Assessments
- Rehabilitation Plans and Monitoring
- Aquaculture

Country Experience

Botswana, Cameroon

Democratic Republic of Congo

Ghana, Ivory Coast, Lesotho

Liberia, Mali, Mozambique

Nigeria, Republic of Armenia, Senegal

Sierra Leone, South Africa

Swaziland, Tanzania

Nationality

South African

Languages

English – Proficient

Afrikaans – Conversational

German - Basic

Qualifications

- MSc (University of Johannesburg) – Aquatic Health.
- BSc Honours (Rand Afrikaans University) – Aquatic Health
- BSc Natural Science
- Pr Sci Nat (400213/11)
- Certificate of Competence: Mondi Wetland Assessments
- Certificate of Competence: Wetland WET-Management
- SASS 5 (Expired) – Department of Water Affairs and Forestry for the River Health Programme
- EcoStatus application for rivers and streams

Publication of scientific journals and articles.

SELECTED PROJECT EXPERIENCE

Project Name: The Environmental and Social Impact Assessment (ESIA) the proposed Nondvo Dam

Client: WSP

Personal position / role on project: Project Manager.

Location: Swaziland

Main project features: To conduct a dual season terrestrial and aquatic ecological baseline and impact assessment for the proposed dam. The study was required to meet national and IFC requirements, including a Critical Habitat assessment.

Project Name: The environmental flow assessment for the Mara River system

Client: IHE Delft Institute for Water Education

Personal position / role on project: Project Manager / Freshwater Ecologist

Location: Tanzania

Main project features: To conduct a dual season campaign to the Lower Mara River Basin in Tanzania to collect hydrological and ecological information as part of an environmental flow assessment on the Tanzanian side of the Mara River in collaboration with GIZ and NBI-NELSAP.

Project Name: The Environmental and Social Impact Assessment (ESIA) the proposed solar photovoltaic facility and transmission in Cuamba

Client: WSP

Personal position / role on project: Project Manager.

Location: Mozambique

Main project features: To conduct a single season terrestrial and aquatic ecological baseline and impact assessment for the proposed dam. The study was required to meet national and IFC requirements, including a Critical Habitat assessment.

Project Name: A biodiversity baseline assessment for the proposed Siguiri Gold Mine Project, in Kankan Province, Guinea.

Client: SRK Consulting.

Personal position / role on project: Project Manager.

Location: Siguiri, Guinea, West-Africa (2018).

Main project features: To conduct a dual season ecological baseline assessment for the expected impact footprint area. The study was required to meet national and IFC requirements, including a Critical Habitat assessment.

Project Name: A biodiversity baseline and impact assessment for the proposed Lesotho Bulk Water Supply Scheme, Lesotho.

Client: WSP.

Personal position / role on project: Wetland & Aquatic Ecologist, PROBFLO and Project Manager.

Location: Mohale's Hoek, Lesotho (2018).

Main project features: To conduct a dual season terrestrial and aquatic ecological baseline and impact assessment for the pipeline route and proposed weir. The study was required to meet national and IFC requirements, including a Critical Habitat assessment. The study also contributed to prescribing Instream Flow Requirements using PROBFLO for the system.

Project Name: A biodiversity baseline and impact assessment for the proposed Pavua Hydropower Project, in Sofala Province, Central Mozambique.

Client: Mott MacDonald.

Personal position / role on project: Project Manager.

Location: Sofala Province, Mozambique (2017).

Main project features: To conduct a dual season terrestrial and aquatic ecological baseline and impact assessment for the expected impact footprint area, including Gorongosa National. The study was required to meet national and IFC requirements, including a Critical Habitat assessment. The study also contributed to prescribing Instream Flow Requirements for the system.

EMPLOYMENT EXPERIENCE

CURRENT EMPLOYMENT: The Biodiversity Company (January 2015 – Present)

I founded The Biodiversity Company in 2015, now consisting of experienced ecologists who provide technical expertise and policy advice to numerous sectors, such as mining, agriculture, construction and natural resources. The team at The Biodiversity Company have conducted stand-alone specialist studies and provided overall guidance of studies with a pragmatic approach for the management of biodiversity that takes into account all the relevant stakeholders, most importantly the environment that is potentially affected. We manage risks to the environment to reduce impacts with practical, relevant and measurable methods.

EMPLOYMENT: Digby Wells Environmental (October 2013 – December 2014)

Digby Wells assigned me to the role of Country Manager for the United Kingdom. This was a new endeavour for the company as the company's global footprint continues to increase. The primary responsibilities for the role included the following:

- **Client liaison** to be able to interact more efficiently and personally with current mining clients, mining industry service providers, legal firms and banking institutions in order to introduce Digby Wells as a services provider with the aim of securing work.
- **Project management** for international projects which may require a presence in the United Kingdom, this was dependent on the location and needs of the client. These projects would mostly be based on the Equator Principles (EP) and International Finance Corporation (IFC) Performance Standards.
- **Technical input** to provide specialist technical expertise for projects, this included fauna, aquatic ecology, wetlands and rehabilitation. Continued with the design and implementation of Biodiversity and Land Management Plans to assist clients with managing the natural

resources. Responsibilities also included the mentorship and management (including reviewing and guiding) other expertise such as flora, fauna and pedology.

EMPLOYMENT: Digby Wells Environmental (March 2012 – September 2013)

Manager of a multi-disciplinary department of scientists providing specialist services in support of national and international requirements as well as best practice guidelines, primarily focussing on the mining sector. In addition to managing the department, I was also expected to contribute specialist services, most notably focusing on water resources. Further responsibilities also included the management of numerous projects on a national or international scale. A general overview of the required responsibilities are as follows:

- **Project management** for single as well as multi-disciplinary studies on a national and international scale. This included legislation and commitments for the respective country being operated in, as well as included the World Bank (WB), EP and IFC requirements.
- **Individual and/or team management** in order to provide mentoring and supportive structures for development and growth in support of the company's strategic objectives.
- **Scientific report writing** to ensure that the relevant standards and requirements have been attained, namely local country legislation, as well as WB, EP and IFC requirements.
- **Report reviewing** in order to ensure compliance and consideration of relevant legislation and guidelines and also quality control.
- **Specialist management** to facilitate the collaboration and integration of specialist skills for the respective projects. This also included the development of Biodiversity and Land Management Plan for clients.
- **Client Resource Manager** for numerous clients in order to establish as well as maintain working relationships.

An overview of the tenure working with the company is provided below**:**

- **October 2013 – December 2014: London Operations Manager** – Deployed to establish a presence for the company (remote office) in the United Kingdom by means of generating project work to support the employment of staff and operation of a business structure.
- **March 2012 – September 2013: Biophysical Department Manager** – Responsible for the development and growth of the department to consist of four specialist units. This included the development of a new specialist unit, namely Rehabilitation.
- **January 2011 - February 2012: Ecological Unit Manager** – In addition to implementing aquatic and wetland specialist services, the role required the overall management of additional specialist services which included fauna & flora.
- **June 2010 - December 2010: Aquatic Services Manager** – This required the marketing and implementation of specialist programmes for the client base such as biomonitoring and wetland off-set strategies. In addition to this, this also included expanding on the existing skill set to include services such as toxicity, bioaccumulation and ecological flow assessments.
- **August 2008: Aquatic ecologist** – Employed as a specialist to establish the aquatic services within the company. In addition to this, wetland specialist services were added to the existing portfolio.

PREVIOUS EMPLOYMENT: Econ@UJ (University of Johannesburg)

- June 2007 – July 2008: Junior aquatic ecologist
    - Researcher
    - Technical assistant for fieldwork
    - Reporting writing
    - Project management

ADDITIONAL EXPERIENCE

Compliance audits	Conducting site investigations in order to determine the level of compliance attained, ensuring that the client maintains an appropriate measure of compliance with environmental regulations by means of a legislative approach
Control officer	Acting as an independent Environmental Control Officer (ECO), acting as a quality controller and monitoring agent regarding all environmental concerns and associated environmental impacts
Screening studies	Project investigations in order to determine the level of complexity for the environmental and social studies required for a project. This is a form of risk assessment to guide the advancement of the project.
Public consultation	The provision of specialist input in order to communicate project findings as well as assist with providing feedback if and when required.
Water use licenses	Consultation with the relevant authorities in order to establish the project requirements, as well as provide specialist (aquatics/wetland) input for the application in order to achieve authorisation.
Closure	Primarily the review of closure projects, with emphasis on the closure cost calculations. Support was also provided by assisting with the measurements of structures during fieldwork.
Visual	The review of visual studies as well as the collation of field data to be considered for the visual interpretation for the project.

ACADEMIC QUALIFICATIONS

University of Johannesburg, Johannesburg, South Africa (2009): MAGISTER SCIENTIAE (MSc) - Aquatic Health:

Title: *Aspects of the biology of the Bushveld Smallscale Yellowfish (Labeobarbus polylepis): Feeding biology and metal bioaccumulation in five populations.*

Rand Afrikaans University (RAU), Johannesburg, South Africa (2004): BACCALAUREUS SCIENTIAE CUM HONORIBUS (Hons) – Zoology

Rand Afrikaans University (RAU), Johannesburg, South Africa (2001 - 2004): BACCALAUREUS SCIENTIAE IN NATURAL AND ENVIRONMENTAL SCIENCES. Majors: Zoology and Botany.

PUBLICATIONS

Mahomed D, Husted A, Fry C, Downsa CT and O'Brien GC. 2019. Spatial shifts and habitat partitioning of ichthyofauna within the middle-lower region of the Pungwe Basin, Mozambique, Journal of Freshwater Ecology, 34:1, 685-702, DOI: 10.1080/02705060.2019.1673221

Tate RB and Husted, A. 2015. Aquatic Biomonitoring in the upper reaches of the Boesmanspruit, Carolina, Mpumalanga, South Africa. African Journal of Aquatic Science.

Tate RB and Husted A. 2013. Bioaccumulation of metals in *Tilapia zillii* (Gervai, 1848) from an impoundment on the Badeni River, Cote D'Ivoire. African Journal of Aquatic Science.

O'Brien GC, Bulfin JB, Husted A. and Smit NJ. 2012. Comparative behavioural assessment of an established and new Tigerfish (*Hydrocynus vittatus*) population in two manmade lakes in the Limpopo catchment, Southern Africa. African Journal of Aquatic Science.

Tomschi, H, Husted, A, O'Brien, GC, Cloete, Y, Van Dyk C, Pieterse GM, Wepener V, Nel A and Reisinger U. 2009. Environmental study to establish the baseline biological and physical conditions of the Letsibogo Dam near Selebi Phikwe, Botswana. EC Multiple Framework Contract Beneficiaries.8 ACP BT 13 – Mining Sector (EDMS). Specific Contract N° 2008/166788. Beneficiary Country: Botswana. By: HPC HARRESS PICKEL CONSULT AG

Husted A. 2009. Aspects of the biology of the Bushveld Smallscale Yellowfish (*Labeobarbus polylepis*): Feeding biology and metal bioaccumulation in five populations. The University of Johannesburg (Thesis).