TERRESTRIAL ANIMAL (AMPHIBIAN) SPECIES COMPLIANCE STATEMENT

Wetton, Western Cape

June 2021

CLIENT

Prepared by:

The Biodiversity Company

Cell: +27 81 319 1225

Fax: +27 86 527 1965

info@thebiodiversitycompany.com

www.thebiodiversitycompany.com

Table of Contents

Tables

Figures

1 Introduction

The Biodiversity Company (TBC) was commissioned by Sillito Environmental Consulting to conduct a terrestrial species assessment, with a focus on amphibian species of conservation concern (SCC). The assessment was undertaken for the proposed construction of a housing development on ERF 511 Wetton, Ottery, Western Cape, South Africa. The applicant proposes development will include the following:

- Construction of 19 group housing units; and
- Associated infrastructure, access roads and various paved surfaces.

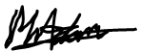
The approach adopted for the assessment has taken cognisance of the recently published Government Notice 320 in terms of NEMA dated 20 March 2020: “Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National 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”, the aquatic biodiversity sensitivity theme as “very high” and the plant species sensitivity theme as “medium” and “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 SCC which may occur within the development (or project) area. A site inspection was carried out on the 1st and 2nd June 2021 to confirm the presence, likely presence or confirmed absence of amphibian SCC.

Although the overall relative animal species sensitivity is considered “high” for the project area (including a 500 m radius from the site), the sensitivity feature rating for the three amphibian SCC that may occur on site is considered to be “medium” based on the data from the National Environmental Screening Tool. The three amphibian SCC that may occur on the site are the Micro Frog (*Microbatrachella capensis*) (Critically Endangered), the Western Leopard Toad (*Sclerophrys pantherina*) (Endangered) and the Cape Platanna (*Xenopus gilli*) (Endangered).

2 Specialist Details

Report Name	**TERRESTRIAL ANIMAL (AMPHIBIAN) SPECIES COMPLIANCE STATEMENT**
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.

3 Terms of Reference

The Terms of Reference (ToR) included the following:

- Specialist amphibian survey for the presence, likely presence or confirmed absence of amphibian 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) 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 amphibians in the project area;
- Assessing the likelihood that any amphibian 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 amphibian 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 amphibian-specific outcomes, suggestions and mitigations to be included in the Management plan.

4 Project Area Description

The project area (Figure 1), is situated on ERF 511 in Wetton, which is a suburb of Ottery in the City of Cape Town Metropolitan Municipal Area, Western Cape Province, South Africa. The project area is considered undeveloped, vacant land and is 4362 m² in extent.

The land use surrounding the project area consists predominantly of residential housing and small-scale industry, with associated secondary infrastructure such as roads, schools and shops. A vacant plot, ERF 509, exists on the eastern boundary of the project area and the two portions form a continuous unit with no boundary wall (Figure 2). All other boundaries are adjoined by residential properties with pre-cast concrete walls.

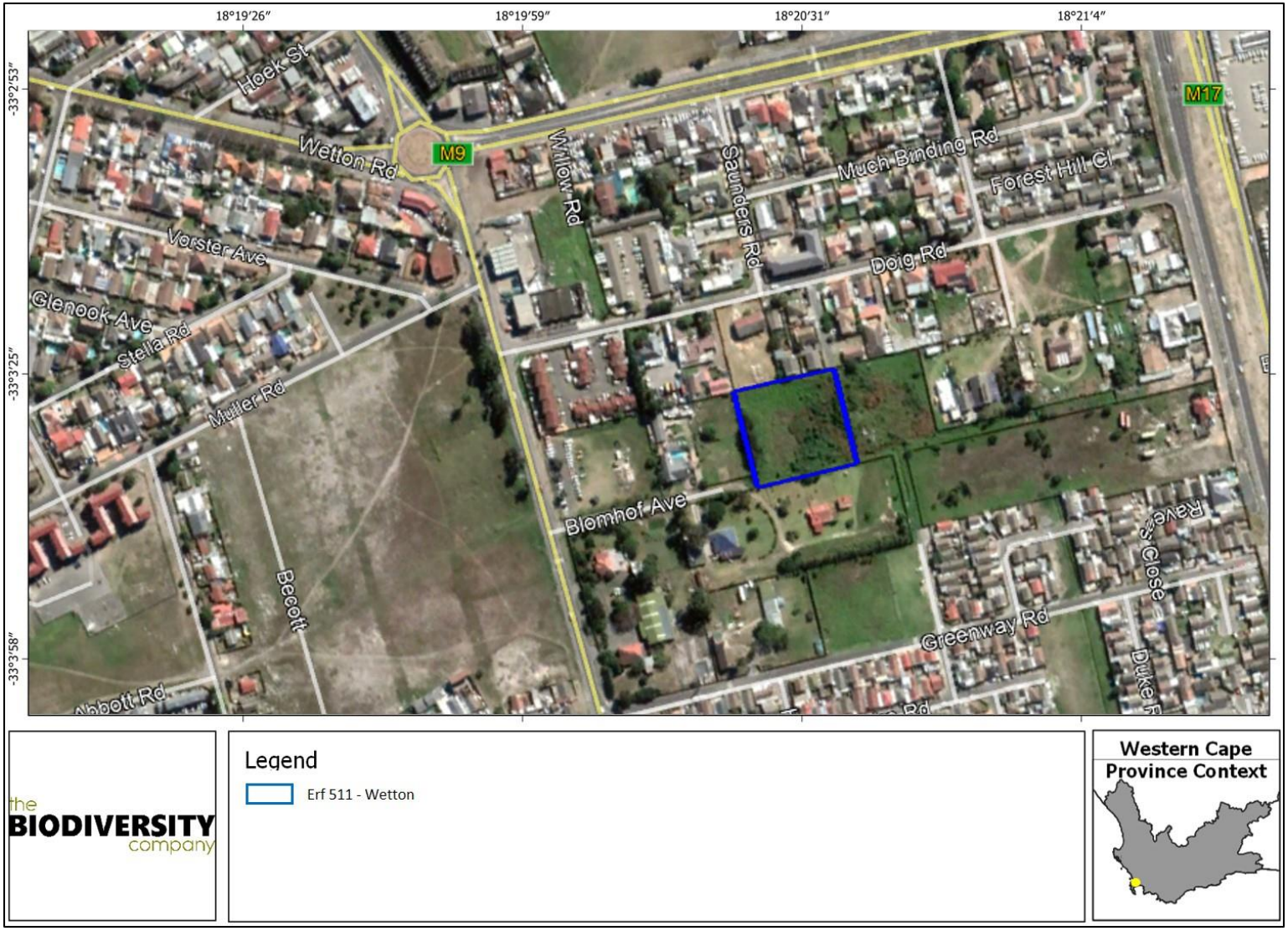


Figure 1: Location of the project area, ERF 511, in Wetton, City of Cape Town Metropolitan Municipal Area

Figure 2: Overview of ERF 511, Wetton: A) Wetland in the north-eastern corner of ERF 511 looking east across ERF 509; B) Entrance to the project area from Blomhof Avenue; and C) Central wetland on ERF 511

5 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

5.1 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.

6 Methodologies

6.1 Herpetology (Reptiles & Amphibians)

A herpetofauna desktop assessment was undertaken, with a primary focus on amphibian 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);
- 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).

6.2 Field Survey

Following the desktop analysis, a field survey was conducted by a herpetologist on the 1st and 2nd of June 2021. Due to the relatively small size of the proposed development, all areas of the project area were surveyed as well as the wetland to the east of the project area (ERF 509).

The herpetological field survey comprised the following techniques:

- Visual surveys and hand searching for amphibian species that shelter in particular habitats and/or under debris such as rocks, logs, bark etc, was undertaken;

- Identification of species by vocalisation: All frog 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 1st June 2021. Headlamps and torches were used to locate individual frogs; and
- Local information: Information was gathered from people in the surrounding community as well as people living in the wetland adjacent to the project area about any potential frog species that they had encountered.

7 Limitations

The following limitations should be noted for the assessment:

- Only a single season survey was conducted for the respective study. This constitutes an early wet season or 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; and
    - 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, such as those in the project area, from their foraging grounds after sufficient rainfall which usually commences from late July onwards;
- Ideally, an amphibian 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 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 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 amphibians 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.

8 Expected Amphibian Species

Based on the available literature and the various other sources analysed, there are nineteen (19) species of amphibians that could be expected to occur within the project area (QDS: 3418BA) and/or were historically recorded in this area (Table 2).

Three of these species are listed as species of conservation concern, namely:

- Micro Frog (*Microbatrachella capensis*) - Critically Endangered
- Western Leopard Toad (*Sclerophrys pantherina*) - Endangered
- Cape Platanna (*Xenopus gilli*) – Endangered

A fourth amphibian SCC, the Cape Sand Frog (*Breviceps gibbosus*), does occur in several adjacent QDS's, however it has not been recorded in the project area QDS and has therefore been omitted from this assessment.

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

Scientific Name	Common Name	Conservation Status
Amietia fuscigula	Cape River Frog	Least Concern
Breviceps montanus	Cape Mountain Rain Frog	Least Concern
Breviceps rosei	Sand Rain Frog	Least Concern
Cacosternum boettgeri	Common Caco	Least Concern
Cacosternum platys	Flat Caco	Least Concern
Hyperolius horstockii	Arum Lily Frog	Least Concern
Hyperolius marmoratus	Painted Reed Frog	Least Concern
Microbatrachella capensis	Micro Frog	Critically Endangered
Sclerophrys capensis	Raucous Toad	Least Concern
Sclerophrys pantherina	Western Leopard Toad	Endangered
Semnodactylus wealii	Rattling Frog	Least Concern
Strongylopus bonaespei	Banded Stream Frog	Least Concern
Strongylopus grayii	Clicking Stream Frog	Least Concern
Tomopterna delalandii	Cape Sand Toad	Least Concern
Vandijkophrynus angusticeps	Sand Toad	Least Concern
Xenopus gilli	Cape Platanna	Endangered
Xenopus laevis	Common Platanna	Least Concern
Tomopterna delalandii	Cape Sand Frog	Least Concern

9 Results & Discussion

The project area (ERF 511) is a vacant piece of land that is in a residential area and is enclosed on three sides (northern, western and southern boundaries) by pre-cast concrete walls of the surrounding properties. Based on the field survey the project area is predominantly flat, with minor depressions in the centre and eastern portions where the wetland is situated (as identified in the freshwater assessment that was conducted, Blue Science (2016)).

9.1 Existing Impacts

The project area was found to be heavily transformed from its original condition due to the following impacts (Figure 3):

- The surrounding land-use which consists of suburban houses 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;
- Litter, dumping of building rubble and the presence of people living within the project area;
- Evidence of heavy vehicles driving through the wetland in the central portion of the project area;
- Artificial drainage of the site along the southern boundary, leading to two canals that drain from the south-eastern corner of ERF 509;
- Stormwater (and possibly ground water) enters the site along the northern boundary and, in particular, the north-western corner where permanent water accumulates and then drains across the north-eastern portion of the property and into the larger wetland on the adjacent property (ERF 509); and
- Artificial water source: water is also entering the wetland on ERF 511 via an exposed municipal water pipe near the western boundary (Figure 3). In discussion with local residents, this water has been continuously entering the site via this pipe since 2018.

Figure 3: Impacts identified in the project area: A) Artificial water source entering the project area; B) & E) Litter, dumping of rubble and people living in the project area; C) Severe encroachment of alien invasive plant species; and D) Vehicles driven through the wetland in the project area

9.2 Amphibian Survey Results

Although the project area is considered to be heavily transformed and very little, if any, indigenous vegetation remains, various amphibian species 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 wetland (Erf 509) during the field survey undertaken in early June 2021.

The following amphibian and reptile species were recorded in the project area during the June 2021 survey (Table 3 and Figure 4):

Table 3: List of amphibian and reptile species recorded in the project area

Scientific Name	Common Name	Conservation Status
Amietia fuscigula	Cape River Frog	Least Concern
Strongylopus grayii	Clicking Stream Frog	Least Concern
Bradypodion pumilum	Cape Dwarf Chameleon	Least Concern

Figure 4: Two of the species recorded in the project area: A) Clicking Stream Frog (Strongylopus grayii), and B) Cape Dwarf Chameleon (Bradypodion pumilum)

The Clicking Stream Frogs were found in abundance across the project area and could be heard calling throughout the day. Four (4) adult Cape Dwarf Chameleons were recorded in different locations across the project area. No tadpoles were recorded in any of the water bodies present in the project area.

9.2.1 Amphibian SCC Commentary

There was no evidence of amphibian SCC occurring in the project area (Erf 511), and due to the poor environmental condition of the site and extensive impacts, it is not anticipated that any such species occur. However, due to the cryptic nature of amphibians, the single season survey, the seasonal timing of the survey and historic records of amphibian SCC in the wider project area, it is plausible that such species may nonetheless be present and/or may utilise the site for brief periods during the year. Commentary on the likelihood of occurrence of the amphibian SCC is provided below.

- Micro Frog (*Microbatrachella capensis*): this species of frog was originally only known from one location near Kenilworth racecourse (which is approximately 2.8 km's from the project area).
    - This species requires undisturbed, seasonal seepage pools and vleis in natural or near-natural fynbos (Du Preez, 2009). None of these conditions are present within the project area and based on previous surveys (Blue Science, 2016) the pools present on site are perennial and therefore not conducive to providing habitat for *Microbatrachella capensis*.
    - This species begins breeding during May, and as such the field survey was conducted at the ideal time to encounter this species should it have occurred in the project area.
    - 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 'very unlikely' that this species exists in the project area, nor would it utilise the site in the foreseeable future.
- Cape Platanna (*Xenopus gilli*): this species 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).
    - The project area is located approximately 9.8 kms from the nearest coastline.
    - This species is entirely aquatic and is only capable of moving relatively short distances during heavy rainfall periods. This species is known to occur in the Zeekoei Vlei which falls in the same catchment as the project area (the Zeekoei/Lotus River & Zeekoei Vlei System), but it is considered unlikely that this species could migrate from these systems to the project area given the anthropogenic barriers that exist.
    - *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).
    - Based on the above, and the results of the field survey, it is considered 'very unlikely' that this species is, or could be, present in the project area.
- Western Leopard Toad (*Sclerophrys pantherina*): this large toad inhabits pans, vleis and dams in and around the Cape Peninsula and the Cape Flats.
    - Unlike the Micro Frog and Cape Platanna, 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).
    - Although *Sclerophrys pantherina* spends most of its time away from water, it is typically still found in the general vicinity of wetland habitats.
    - 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).

- There is almost no suitable breeding habitat in the project area for this species, besides a very small patch of open water in the north-eastern corner. However, it is unlikely that this small water body truly meets the breeding requirements for this species.
- Based on the above, the likelihood of occurrence of this species in the project area, permanently or seasonally, is considered to be low or 'unlikely'.

9.2.2 Sensitivity and Habitat Summary

Based on the results of the field survey, the project area has been heavily transformed due to extensive anthropogenic impacts as well as the impact of alien invasive plant species and has been assigned a **low sensitivity**, and does not represent the "high" relative animal species theme sensitivity (as it relates to amphibian SCC) as per the screening tool (Figure 5).

Furthermore, there appears to be very little, if any, remnants of the Cape Flats Sand Fynbos vegetation type which is thought to have occurred in the project area historically and on which certain amphibian SCC would rely.

The freshwater assessment that was conducted at the project area (Blue Science, 2016) concluded that "*none of this vegetation type is still intact within the study area*" and that "*due to the amount of high density residential development in the upper to middle reaches of the catchment, the water quality as well as ecosystem health of this system is* ***poor to very poor***". Water quality of this status would have an undesirable affect on amphibian populations in the area, especially sensitive species or species with very specific water quality requirements such as the Micro Frog and the Cape Platanna.

Furthermore, the wetland areas are not considered of ecological importance and have a low sensitivity (Blue Science, 2016).

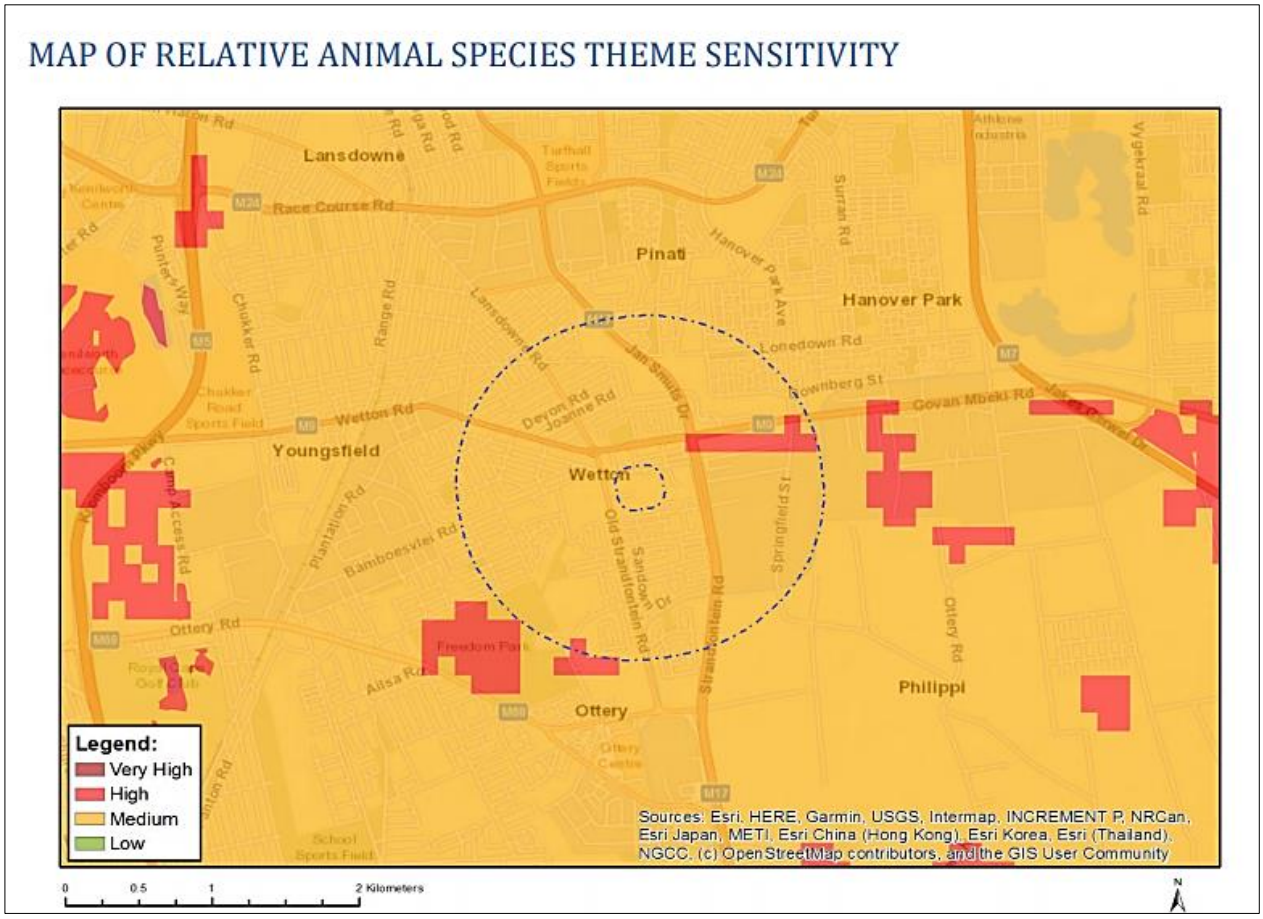


Figure 5: Map depicting the relative animal species sensitivity of the project area and surrounds (50 0m buffer) (National Environmental Screening Tool)

10 Conclusion & Recommendations

No amphibian SCC, or evidence thereof, were recorded within the project area (Erf 511). The site is considered to have been extensively altered from its natural state due to a range of anthropogenic impacts and the presence of dense stands of alien invasive plant species. According to previous studies, the ecosystem health of the project area and water quality is poor to very poor and the wetland areas are not considered of ecological importance and have a low sensitivity.

Based on the above, and the results of the field survey, the likelihood of occurrence of any amphibian SCC occurring within the project area is considered 'unlikely' to 'very unlikely'. The presence of the Micro Frog *Microbatrachella capensis*) and the Cape Platanna (*Xenopus gilli*), both of which have very specific habitat requirements, is considered 'very unlikely' and the presence of the Western Leopard Toad is considered 'unlikely'.

Nonetheless, the remaining wetland in the project area is still host to several amphibian and reptile species, in particular Clicking Stream Frogs (*Strongylopus grayii*) and Cape Dwarf Chameleons (*Bradypodion pumilum*), both of which occur in healthy densities at the site.

10.1 Recommendations & Mitigation Measures

The proposed development will affect a small portion of the central wetland in the project area. The impact of the original proposed development on this wetland has already been significantly reduced due to changes in the layout of the development. These changes, and various mitigation measures, are detailed in the February 2020 Addendum to the Freshwater Assessment. Amphibian-specific recommendations are provided below. It is critically important that these be read in conjunction with the recommendations and mitigation measures as described in the Freshwater Assessment (2016) and the Freshwater Assessment Addendum (2020).

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

- An Environmental Control Officer (ECO) should be present during initial site clearing activities, in the unlikely event that any amphibian SCC are encountered. Any other amphibians that are encountered can be relocated to the wetland in the north-eastern corner of the project area or the wetland on Erf 509;
- The portion of the wetland in project area which is to remain undeveloped, should be cordoned off during construction to prevent further anthropogenic impacts to the system;
- All stormwater drains should be covered by a mesh cover with a diameter of less than 3 cms in order to prevent frogs from falling in to these drains;
- If a new wall is to be constructed on the eastern boundary of the project area, it 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 to the adjacent wetland;
- All alien invasive plant species should be removed from the project area and the wetland 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;

- Indigenous plant species (and preferably locally indigenous plant species) should be used for all landscaping;
- 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 wetland on Erf 509;
- 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
- Ensure that no pollutants enter the stormwater system or the wetland areas.

11 Specialist Opinion

The project area has been extensively transformed from its original state. Based on this and the results of the amphibian field survey, it is considered ‘unlikely’ to ‘very unlikely’ that any amphibian SCC occur within the proposed development area. Due to these factors, the relative animal species sensitivity at the project area is ‘low’ and does not represent the sensitivity as identified in the National Environmental Screening Tool.

Nonetheless, the project area is still host to several amphibian species, as well as a population of Cape Dwarf Chameleons. Therefore, it is important that the management outcomes and mitigation measures be adhered to in order to mitigate an impact that might stem from the development.

Considering the above-mentioned information, it is the opinion of the specialist that the project may be considered, should all mitigation measures be adhered to, and recommendations considered by the issuing authority.

12 Reference

ADU (Animal Demography Unit). (2020). Virtual Museum. (Accessed: July 2020).

Alexander, G. & Marais, J. (2007). A guide to the Reptiles of Southern Africa. Struik, Cape Town.

Bates, M.F., Branch, W.R., Bauer, A.M., Burger, M., Marais, J., Alexander, G.J & de Villiers, M.S. (Eds). (2014). Atlas and Red List of Reptiles of South Africa, Lesotho and Swaziland. Suricata 1. South African Biodiversity Institute, Pretoria.

Branch, W.R. (1998). Field Guide to Snakes and Other Reptiles of Southern Africa. Struik, Cape Town.

Du Preez, L. & Carruthers, V. (2009) A Complete Guide to the Frogs of Southern Africa. Struik Nature, Cape Town.

EWT (Endangered Wildlife Trust). (2017). Threatened Amphibian Programme. (2015). The Southern African Frog Atlas Project https://www.ewt.org.za/TAP/refrence.html (SAFAP, now FrogMAP). http://vmus.adu.org.za (Accessed: July 2020).

FrogMap. (2017). The Southern African Frog Atlas Project (SAFAP, now FrogMAP). http://vmus.adu.org.za (Accessed: August 2020).

IUCN. (2017). The IUCN Red List of Threatened Species. www.iucnredlist.org (Accessed: July 2020).

Measey, G.J. (2011). Ensuring a Future for South Africa's Frogs: A Strategy for Conservation Research. South African National Biodiversity Institute, Pretoria.

Minter, L., Burger, M., Harrison, J.A. & Kloepfer, D. (2004). Atlas and Red Data Book of the Frogs of South Africa, Lesotho and Swaziland. Smithsonian Institute Avian Demography Unit, Washington; Cape Town.

National Environmental Management Act. 1998. National Environmental Management Act (act no. 107 of 1998)- Environmental management framework regulations.

National Environmental Screening Tool 2017.Available from Department of Environmental Affairs website (https://screening.environment.gov.za/screeningtool/index.html#/pages/welcome),downloade downloaded

Skowno, A.L., Raimondo, D.C., Poole, C.J., Fizzotti, B. & Slingsby, J.A. (eds.). (2019). South African National Biodiversity Assessment 2018 Technical Report Volume 1: Terrestrial Realm. South African National Biodiversity Institute, Pretoria.

13 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

June 2021

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

June 2021

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

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

Infrastructure Development, Sustainability and Conservation.

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'Iviore. 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).