

IMPERATA CONSULTING Wetlands • Ecology • Responsibility Physical Address: 69 Chateaux de Grace, 71 Hardekool Avenue, Val de Grace, Pretoria

Postal Address: P.O. Box 72914, Lynnwood Ridge, 0040 Contact Details: Email: retief@imperata.co.za Cell: 082 606 7770 Fax: 012 365 3217

29 October 2020

Mr Mark Custers Director Eco Assessments PO Box 441037 Linden, 2014

RIPARIAN HABITAT DELINEATION STUDY FOR MAGALIES RIVER LODGE, PORTION 77 OF THE FARM KRUITFONTEIN 511-JQ, GAUTENG PROVINCE

Dear Mr Custers

1. INTRODUCTION

Imperata Consulting was appointed by Eco Assessments to undertake a survey on 2 October 2020 to delineate riparian habitat and other watercourses on Portion 77 of the Farm Kruitfontein 511-JQ.

The study area of approximately 8.75 ha has been developed into a recreational facility more than15 years ago. Emphasis was placed on the identification and delineation of riparian and/or wetland habitat along the Magalies River that borders the study area along its south-western boundary (Figure 1), but the rest of the study area (henceforth also referred to as the site or property) was also considered.

The property is located in the Mogale City Municipality. It is located approximately 1.1 km north of Magaliesburg, while its surroundings include cultivated lands and other recreational facilities, such as Mount Grace Country House Hotel and De Hoek Country Hotel. The site itself is largely undeveloped, with the hotel building being the largest prominent feature in the western side of the site, while smaller structures, including a tented camp are present further to the east along the foot slope of a ridge. The location of the hotel building and other structures are visible as black dots on the 1:50000 topographical map (Figure 1).

A retrospective and detailed impact assessment of the existing development, as well as Present Ecological State (PES) and Ecological Importance and Sensitivity (EIS) assessments of delineated watercourses using site conditions, extend beyond the scope of this report.

> Imperata Consulting CC Reg No.: 2007/043725/23 Owner: LER Grobler (Pr. Sci. Nat.) SACNASP Reg. No.: 400097/09



Figure 1: Location map of the Magalies River Lodge study area with river lines from the 1:50000 topographical map 2527DC and the most recent national wetland layer (National Wetland Map version 5) that forms part of the National Biodiversity Assessment (NBA) of 2018.

2. METHODS

Watercourse identification was based on definitions specified in the National Water Act (Act No. 36 of 1998) (NWA).

- A river or spring.
- A natural channel in which water flows regularly or intermittently.
- A wetland, lake or dam into which, or from which, water flows.
- Any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks.

The NWA defines riparian habitat as:

...include the physical structure and associated vegetation of the areas associated with a watercourse which are commonly characterised by alluvial soils, and which are inundated or flooded to an extent and with a frequency sufficient to support vegetation of species with a composition and physical structure distinct from those of adjacent land areas.

Prior to the site survey, a desktop assessment of the study area and its surroundings was undertaken. The following existing spatial datasets that pertain to river, wetlands and other watercourses were used:

- The 1:50000 topographic map 2527DC.
- The NFEPA River spatial dataset (Net *et al.*, 2011).
- The 2013-2014 South African National Land Cover dataset, which indicates wetlands, permanent water and seasonal water based on the globally available Landsat 8 imagery was used to further help identify the presence of wetlands and other watercourses (GTI, 2015).
- The latest National Wetland Layer (Map version 5) from the 2018 National Biodiversity Assessment (NBA) (Van Deventer *et al.*, 2018).
- Available aerial imagery of the study area in Google Earth Pro.

A site survey was undertaken on 2 October 2020 by Mr Retief Grobler (Pr.Sc.Nat. registered in Ecological Science and Botanical Science). Sample points were investigated within the study area with the use of a handheld GPS to verify the presence or absence of riparian habitat, wetland or other indicators. These indicators were based on the procedure provided by the Department of Water and Sanitation (DWS; previously also known as DWAF and DWA) for the identification and delineation of wetland and riparian habitat (DWAF 2005 & DWAF, 2008). They include the presence of macro channel features around rivers and riparian plant species, as well as the presence of hydromorphic (wetland soil) features, wetland plant species (facultative and obligate hydrophytes) and terrain unit indicators.

These indicators were used to map identified watercourses within the property. Buffer zones around delineated watercourses were also considered based on requirements provided by regulatory authorities, such as the Gauteng Department of Agriculture and Rural Development (GDARD) and guidelines for the recommendation of site specific buffer zones around aquatic system (Macfarlane *et al.*, 2014).

3. RESULTS

The study area is located in Quaternary Catchment A21F within the Limpopo Water Management Area (WMA), previously known as the Crocodile (west) and Marico WMA. Quaternary Catchment A21F has a moderately modified Present Ecological State (PES) and a moderate Ecological Importance and Sensitivity (EIS) based on the work by Middleton and Bailey (2008).

Information from the Sub-Quaternary Reach (SQR) A21F-01168 from the Department of Water and Sanitation (DWS) indicate that the SQR fall within an overall C (Moderately Modified) PES category. SQR information in Tables 1 and 2 are based on the Magalies River, which borders the site to the southwest (Figure 1). There is a range of driving variables responsible for the changes observed in ecological integrity in the reach of the Magalies River, as indicated in Table 1. General information including river characterization, overall PES and EIS categories and conservation status are provided in Table 2. The SQR (A21F-01168) reflected an overall Moderate Ecological Importance (EI) with a Very High Ecological Sensitivity (ES) score (Desktop).

One of the reasons for the high Ecological Sensitivity (ES) of the river reach is that it is regarded as a Fish Support Area in the NFEPA river assessment (Nel *et al.*, 2011; Table 2). The SQR dataset also indicate that the IUCN listed Near Threatened (NT) *Enteromius motebensis* (Marico Barb) fish species can also occur within the river reach (DWS, 2014).

Sub-Quaternary Reach	A21F-01168	
System:	Magalies River	
Instream Habitat Continuity Modification	Moderate	
Riparian/Wetland Zone Continuity Modification	Moderate	
Potential Instream Habitat Modifying Activities	Moderate	
Riparian-Wetland Zone Modification	Large	
Potential Flow Modifying Activities	Serious	
Potential Physico-Chemical Modifying Activities	Moderate	

	DDQ	6 J 60 0			
Table 1:	PES categories	for the SOR	associated with) the study area	(DWS. 2014).
			abboolatea miter		(2

Information summary for SQR A21D-01185 (DWS, 2014)	Descriptor
Present Ecological State (PES)	Class C (Moderately Modified)
Ecological Integrity (EI)	Moderate
Ecological Sensitivity (ES)	High
Default Ecological Category (EC)	A
Conservation Significance	Descriptor
NFEPA Areas (Nel <i>et al.,</i> 2011)	Study area overlaps with a NFEPA river that is a Fish Support Area

Table 2: Summary of the desktop study for aquatic systems located within the SQR that overlapswith the study area

Woodward (2017), states the following justification for the inclusion of *Enteromius motebensis* as a listed Near Threatened species following IUCN criteria:

The Marico Barb (*Barbus motebensis*) occurs in small streams and has a restricted distribution range with an extent of occurrence (EOO) of 12,552 km2 and very small area of occupancy (AOO) of 132 km2. It is known from approximately 20 locations, most of which are threatened by water abstraction associated with agriculture, with some also affected by urban water pollution. Other streams are impacted by seepage from mines via the dolomitic groundwater flow and also by competition from invasive alien fish. These impacts have been exacerbated by the severe recent droughts. The species qualifies as Near Threatened under criterion B1b(ii,iii,iv)+2b(ii,iii,iv).

The National Wetland Map Version 5 indicates that a channelled valley bottom wetland is located adjacent to the Magalies River, which extends into the property (Figure 1). No wetland habitat was identified during the site visit within the study area or in its immediate surroundings (Figure 2). Wetland habitat was also absent from a drainage line from a tributary of the Magalies River, located approximately 145 m south of the site (Figures 1 and 2). No other watercourse was identified away from the Magalies River. The majority of the site consists of a rocky ridge that lacks wetland features. A man-made furrow is present that is not regarded to be consistent with the NWA definition of a watercourse due to its anthropogenic origin and location in terrestrial habitat.

The reach of the Magalies River along the study area only contains riparian vegetation and soils that lack hydromorphic features along is right-hand (eastern) channel bank. Indigenous riparian woody species have been largely replaced by the alien tree *Populus xcanescens*, while other exotic plant species are also present, such as *Solanum mauritianum* and *Ligustrum* cf. *japonicum*. A few individuals of the indigenous riparian tree *Salix mucronata* are present in localised areas.

Riparian habitat within the study area was delineated primarily by demarcating the edge of the macro channel with limited reliance on indigenous riparian species that have been largely replaced by exotic vegetation (Figures 2 and 3). The right-hand bank of the active channel was also recorded and used to demarcate the active channel separately (Figure 4), as it has bearing on the recommendation of a site specific buffer zone discussed in Section 4.



Figure 2: Sample points visited during the site survey with the delineated riparian habitat and 1:100 year floodlines obtained from AED (2020).



Figure 3: Illustrates the edge of riparian habitat that is bordered by bare areas and lawns along the right-hand macro channel bank of the Magalies River. Hard surface infrastructure features associated with the Magalies River Lodge are located outside of the watercourse (outside of riparian habitat).



Figure 4: Illustrates the active channel for the reach of the Magalies River that overlaps with the study area looking upstream (top panel) and downstream (bottom panel).

The delineated riparian habitat is more accurate along the right-hand bank of the macro channel of the river, as the left-hand bank is located outside of the study area and was only demarcated through a desktop approach. The 1:100 year floodlines, determined by African Environmental Development (AED, 2020), extends beyond the riparian area on the left-hand bank as the left-hand channel bank has a lower gradient, while floodlines are contained within the riparian along the right-hand bank of the channel due to its steeper gradient.

Hard surface infrastructure features, such as buildings, are located outside of riparian habitat, but two wooden decks are located within the macro channel and associated riparian habitat. An upper deck is located at the outer margin of the riparian area and overlaps entirely with the watercourse, while a lower deck is located immediately above the active channel (Figure 5). Natural habitat upslope of the riparian area has been transformed into lawns and incorporated as part of open space between the lodge and the watercourse (Figure 3).



Figure 5: Illustrates the upper and lower decks that are both entirely located within delineated riparian habitat (top panel), while the lower deck is located immediately upslope of the active channel (top and bottom panels).

4. **DISCUSSION**

From a riparian habitat consideration, the impact of the two decks on the watercourse is not regarded as high as the structures have had a similar effect as alien trees in the area due to their construction on poles. No impact is expected on instream habitat as the poles are located outside of the active channel. Similarly the water quality-related impact of the decks, which have been built with chemically treated wood, is expected to be negligible as the combined surface area of the poles are low and contact only occurs when bankfull flow is exceeded. The decks have a higher magnitude shading impact for their surface area compared to exotic trees, resulting in a very low (<2%) plant cover underneath them. No signs of erosion were recorded below the decks or either immediately upstream or downstream of the poles that support the deck. Flow events that extend beyond the active channel therefore do not appear to result in any visible impact in terms of scour damage around decks for the last 15 years. Natural riparian vegetation will not become reestablished underneath the decks, while the decks remain in place, but their reestablishment is also dependent on the control of alien trees, specifically dense stands of Populus xcanescens that dominates the macro channel bank. The combine surface area of the two decks are small with an approximate size of 125 m^2 or 0.01 ha (Figure 5). The overall impact of the decks on the watercourse is regarded as low mainly due to their small size, lack of erosion around them and the existing shading impact caused by tall alien trees.

Management priorities for the Magalies River channel and its riparian habitat should be to improve their ecological condition due to the High Ecological Sensitivity of the river reach (DWS, 2014). Alien control measures to improve riparian habitat is therefore worthy of consideration, but in order to be effective improvement plans should incorporate the entire reach and not only focus on riparian habitat within the property. This would also require a strategy where the channel bank stability provided by alien trees are considered so that replacement by indigenous species is achieved in phases over time.

The swimming pool and a portion of the lodge building is present within 32 m of the watercourse edge as measured from the upper margin of the riparian habitat that is currently regulated by the NEMA, but have been constructed approximately 20years ago and may predate environmental legislation, such as NEMA and the NWA (Figure 6).

A recently published preliminary guideline document for the determination of buffers around rivers, wetlands and estuaries recommends that a modified fixed-width approach is regarded as most appropriate for the South African context (Macfarlane *et al.*, 2014). The document states the following as part of their proposed modified fixed-width approach:

"...proposes highly conservative buffer widths based on generic relationships for broadscale assessments, but allows these to be modified based on more detailed site-level information. Resultant buffers therefore range from highly conservative, fixed widths for different land uses at a desktop level to buffers that are modified based on a more thorough understanding of the water resource and specific site characteristics".

The application of this method to the site on the assumption that no development is yet in place, results in a recommended buffer zone, or setback distance, of 33 m, which is defined from the edge of the active channel, and not the riparian edge, for river watercourses (Figure 6; Macfarlane *et al.*, 2014). Based on this advocated approach from 2014, the setback area from where development can start should include the riparian habitat and the recommended buffer from the edge of the active channel, meaning that development within the riparian habitat should not occur if the recommended buffer does not extend beyond the edge of the active channel extends beyond the riparian habitat and includes the swimming pool and a small residential structure, but excludes the main lodge building (Figures 3 and 6).

Importantly, this retrospective buffer calculation does not consider sensitive biodiversity, but is expected to be sufficient for species, such as the Near Threatened *Enteromius motebensis*, due to the lack of signs of erosion observed at existing infrastructure features that have been present for 15 years and more. However, it is essential that septic tanks and French drains systems present are regularly maintained to prevent spillage and seepage that can lower water quality in the river channel. The location of these features are currently uncertain, but are expected to be of a similar age as the building (approximately 20 years).



Figure 6: Illustrates the active channel and riparian habitat along the macro channel of the Magalies River within the study areas, as well as a 32 m buffer zone from the edge of the riparian area and a 33 m buffer zone from the edge of the active channel.

No wetlands were identified within the study area and its immediate surroundings. Areas that extend approximately 60 m downstream and 180 m upstream of the property, along the right-hand bank of the river and upslope of riparian habitat, appeared to have wetland habitat based on an interpretation of aerial imagery. No wetland conditions or indicators were recorded in any of these areas, with the majority of them being terrestrial habitat with well drained or shallow rock soils. A small tributary of the Magalies River that exists as riparian habitat with a swale like-channel with no wetland conditions, was verified approximately 170 m upstream of the property and is also indicated on the 1:50000 topographical map (Figure 1).

The existing development footprint within the property is located in a catchment that is largely localised to the property and drains directly into the Magalies River without any distinct evidence of overlapping with wetland areas. An estimation of the potential impact of the existing development on wetlands within the regulated 500 m regulated area for Section 21 (c) and (i) water use activities is therefore regarded as negligible based on available information.

A separate legal opinion will be obtained for the existing development. A discussion of how relevant environmental legislation related to watercourses affect the property is therefore not included in this letter.

Sincerely

Retief Grobler *Owner and Wetland Ecologist* Imperata Consulting

5. REFERENCES AND FURTHER READING

Department of Water Affairs and Forestry (DWAF). 1999. Resource Directed Measures for Protection of Water Resources. Wetland Ecosystems. Version 1.0, September 1999.

Department of Water Affairs and Forestry. 2005. A practical field procedure for identification and delineation of wetlands and riparian areas. Edition 1. Department of Water Affairs and Forestry, Pretoria.

Department of Water Affairs and Forestry (DWAF). 2008. Updated Manual for the Identification and Delineation of Wetlands and Riparian Areas, prepared by M. Rountree, A. L. Batchelor, J. MacKenzie and D. Hoare. Report no. XXXXXXXXX. Stream Flow Reduction Activities, Department of Water Affairs and Forestry, Pretoria, South Africa.

Department of Water Affairs and Forestry. 2007. Manual for the assessment of a Wetland Index of Habitat Integrity for South African floodplain and channelled valley bottom wetland types by M. Rountree (ed); C.P. Todd, C. J. Kleynhans, A. L. Batchelor, M. D. Louw, D. Kotze, D. Walters, S. Schroeder, P. Illgner, M. Uys. and G.C. Marneweck. Report no. N/0000/00/WEI/0407. Resource Quality Services, Department of Water Affairs and Forestry, Pretoria, South Africa.

Department of Water Affairs and Forestry. 2009. Government Gazette No. 32805. Impeding or Diverting the Flow of Water in a Watercourse [Section 21(c)] and Altering the Bed, Banks, Course or Characteristics of a Watercourse [Section 21(i)]. Pp66-71, Pretoria.

Department of Water and Sanitation (DWS). 2014. A Desktop Assessment of the Present Ecological State, Ecological Importance and Ecological Sensitivity per Sub Quaternary Reaches for Secondary Catchments in South Africa. Compiled by RQIS-RDM: https://www.dwa.gov.za/iwqs/rhp/eco/peseismodel.aspx accessed on [May 2015].

GDARD. 2014. Requirements for Biodiversity Assessments. Directorate of Nature Conservation: Technological Services. Gauteng Department of Agriculture and Rural Development (GDARD), Johannesburg.

Macfarlane D.M, Kotze D, Walters D, Ellery W, Koopman V, Goodman P, and Goge C. 2008. WET-Health: A Technique for Rapidly Assessing Wetland Health. WRC Report TT 340/08. Water Research Commission, Pretoria.

Macfarlane, D.M., Bredin, I.P., Adams, J.B., Zungu, M.M., Bate, G.C. and Dickens, C.W.S. 2014. Preliminary guideline for the determination of buffer zones for rivers, wetlands and estuaries. Final Consolidated Report. WRC Report No TT 610/14, Water Research Commission, Pretoria.

Middleton B.J. & Bailey A.K. 2008. Water Resources of South Africa, 2005 Study (WR2005). Water Research Commission (WRC) Report TT380/08, Pretoria.

Nel, J.L., Driver, A., Strydom, W.F., Maherry, A., Petersen, C., Hill, L., Roux, D.J., Nienaber, S., van Deventer, H., Swartz, E., & Smith-Adao, L.B. 2011. Atlas of Freshwater Ecosystem Priority Areas in South Africa: Maps to support sustainable development of water resources. WRC Report No. TT 500/11.

Ollis, D.J., Snaddon, C.D., Job, N.M. & Mboma, N. 2013. Classification System for Wetlands and other Aquatic Ecosystems in South Africa. User Manual: Inland Systems. SANBI Biodiversity Series 22. South African National Biodiversity Institute, Pretoria.

Rountree, M.W., Malan, H. and Weston, B. (Editors) 2013. Manual for the Rapid Ecological Reserve Determination of inland wetlands (Version 2.0). Joint Department of Water Affairs/Water Research Commission study. Pretoria.

Van Deventer, H., Smith-Adao, L., Mbona, N., Petersen, C., Skowno, A., Collins, N., Grenfell, M., Job, N., Lötter, M., Ollis, D., Scherman, P., Sieben, E. and Snaddon, K. 2018. South African Inventory of Inland Aquatic Ecosystems. South African National Bio diversity Institute, Pretoria. CSIR Report number CSIR/NRE/ECOS/IR/2018/0001/A; SANBI report number http://hdl.handle.net/20.500.12143/5847

Van Deventer, H., Van Niekerk, L. Adams, J., Ketelo, M., Gangat, R., Lamberth, S., Lötter, M., Namhla, M., MacKay, F., Nel, J., Ramjukadh, C., Skowno, A., Weert, S. 2020. National Wetland Map 5: An improved spatial extent and representation of inland aquatic and estuarine ecosystems in South Africa. Water SA 46(1) 66–79 / Jan 2020 https://doi.org/10.17159/wsa/2020.v46.i1.788

Woodford, D. 2017. *Enteromius motebensis*. The IUCN Red List of Threatened Species 2017: e.T2581A100145924. https://dx.doi.org/10.2305/IUCN.UK.2017-3.RLTS.T2581A100145924.en. Downloaded on 22 October 2020.

APPENDIX: CURRICULUM VITAE

Name:	Lourens Erasmus Retief Grobler
Name of Firm:	Imperata Consulting CC
Position:	Wetland Ecologist
Nationality:	South African
Languages:	Afrikaans (mother tongue), English

EDUCATIONAL QUALIFICATIONS

BSc (Botany), University of Pretoria (1999–2001)

BSc Hons (Botany) (cum laude), University of Pretoria (2004)

Title of Thesis: "The Impact of subsistence banana (Musa x paradisiaca) farming on the vegetation of peat swamp forest surrounding the Kosi Bay Lake System."

MSc Botany (cum laude), University of Pretoria (2009)

Title of Thesis: "Phytosociology of Peat Swamp Forests of the Kosi Bay Lake System."

KEY QUALIFICATIONS

Watercourse Investigations, Including Wetland and Riparian Habitat Delineation (Mapping), Assessments, Management & Rehabilitation:

Involved in wetland inventories, classification and description of watercourses, mapping of drainage lines (e.g. wetlands, rivers and ephemeral headwaters), ecological assessments, and wetland rehabilitation studies. A selection of projects demonstrating relevant experience, include:

Wetland rehabilitation

- Wetland rehabilitation assessment plans for the South African National Biodiversity Institute (SANBI) for several wetlands in the Eastern Free State. 2005.
- Wetland health and rehabilitation assessments for the Gauteng Province, as part of the Working for Wetlands Project under the auspices of the South African National Biodiversity Institute (SANBI). Wetland Ecologist and sub-consultant to Land Resources International (Pty) Ltd. 2007-2009.

- Wetland health and rehabilitation assessments for the Gauteng Province, as part of the Working for Wetlands Project under the auspices of the South African National Biodiversity Institute (SANBI). Wetland Ecologist sub-consultant to Aurecon South Africa (Pty) Ltd. 2010-2011
- Wetland health and rehabilitation assessments for two wetland rehabilitation projects, upstream of Boksburg Lake, Ekurhuleni Metropolitan Municipality, Gauteng. Wetland Ecologist and sub-consultant to Land Resources International (Pty) Ltd. 2011
- Wetland rehabilitation and assessment report for the Hogsback area (Eastern Cape Province), as part of the Working for Wetlands Project under the auspices of the South African National Biodiversity Institute (SANBI). Wetland Ecologist sub-consultant to Aurecon South Africa (Pty) Ltd. 2011
- Wetland & river reinstatement and monitoring guideline report for the New Multi Product Pipeline (NMPP) Project, Trunkline Section (Jameson Park, Gauteng to Durban, KwaZulu-Natal). Transnet Capital Projects. 2010
- Alien plant control in watercourse crossings (wetlands & rivers) report for the New Multi Product Pipeline (NMPP) Project, Trunkline Section (Jameson Park, Gauteng to Durban, KwaZulu-Natal). Transnet Capital Projects. 2012

Wetland studies for a variety of strategic planning, residential, commercial and industrial projects

- Ecological functional assessment of wetland areas surrounding the Orlando Power Station for the proposed Ekhaya development, Soweto, Gauteng. Strategic Environmental Focus (SEF), (Pty) Ltd 2005.
- Wetland Audit for the City of Johannesburg. Reviewer and sub-consultant for Strategic Environmental Focus (SEF), (Pty) Ltd. 2008
- Elsburgspruit wetland and habitat assessment, Ekurhuleni Metropolitan Municipality, Gauteng Province. Sub-consultant for Van Riet & Louw Landscape Architects (Pty) Ltd. 2008
- Wetland and watercourse delineation and assessment for the proposed Sun City Vacation Club and Golf Course Phase 3 Development, North West Province. EkoInfo CC. 2008
- Wetland delineation & assessment study for the proposed construction and operation of an aluminum fluoride production facility and associated infrastructure on the farm Jobarne 489 JR, Ekandustria, Gauteng Province. African Geo-Environmental Services (AGES). 2010
- Development of a prioritisation framework for wetland rehabilitation in Ekurhuleni Metropolitan Municipality. Land Resources International (Pty) Ltd. 2011
- Surface watercourse and wetland desktop investigation for the Ivory Park Urban Development Framework, City of Johannesburg, Gauteng Province. Aurecon Group. 2011

• Wetland Study (Delineation & Assessment) for the proposed Witfontein Commercial & Residential Development, Ekurhuleni Metropolitan Municipality, Gauteng Province. Aurecon Group. 2011

Wetland & watercourse assessments in linear developments (power lines, roads, railway. and pipeline projects) and other projects in the energy sector (e.g. solar electricity installations):

- Wetland investigation for The Hills road alternatives, Pretoria-East, Gauteng. African-EPA. 2007
- Wetland and river bio-monitoring assessments for the New Multi Product Pipeline (NMPP) Project, Trunkline Section (Jameson Park, Gauteng to Durban, KwaZulu-Natal). Transnet Capital Projects. 2009-2013
- Wetland and surface watercourse study for the proposed Ariadne-Venus 475 kV transmission line, Kwa-Zulu Natal. Baagi Environmental Consultancy. 2010
- Surface watercourse assessment study for the proposed R5 Rand Water pipeline between Rietvlei N.R. and Mamelodi, Gauteng. Aurecon Group. 2010
- Wetland and surface watercourse study for the proposed Paulputs-Aggeneys 220kV transmission line, Northern Cape. SSI Engineers and Environmental Consultants. 2011
- Surface watercourse investigation for a proposed 20MW solar electricity installation at Kalgold Mine, North West Province. Mark Wood Consultants. 2011
- Wetland and surface watercourse study for the proposed Arnot-Ginaledi 475 kV transmission line, Mpumalanga Province. Baagi Environmental Consultancy. 2012
- Watercourse investigation for the proposed upgrade of a section of the N4 Platinum Highway, Rustenburg, North West Province. Environamic. 2012.
- Wetland delineation review for the proposed 80 MW photovoltaic solar electricity installation, Grootvlei, Mpumalanga Province. Mark Wood Consultants. 2012
- Wetland and watercourse assessment study for a proposed 75MW Photovoltiac (PV) plant and associated infrastructure on a portion of the remaining extent of Erf 1, Prieska Northern Cape Province. Enviro Insight. 2012
- Water Use License application & watercourse assessment for permanent access roads on Section PL1-PL4 (Durban to Kendal) of Transnet's New Multi Product Pipeline (NMPP) Project. Transnet Capital Projects. 2012-2014
- Watercourse assessments for the Ngqura 16 MTPA manganese ore rail expansion: Area 1 & 3 (Coega – De Aar; Eastern & Northern Cape). Hatch South Africa. 2013
- Watercourse assessment for the Douglas-Hopetown road upgrade project, Northern Cape. EIMS. 2013.
- Specialist Wetland & Drainage Line Investigation for the Proposed Hermes 132 kV Distribution Line and Substation, Klerksdorp, North West Province. Envirolution Consulting. 2013

- Specialist Medupi-Borutho 400 kV Power Line Environmental Management Plan (EMP) Watercourses & Drainage Lines. North West Province. Baagi Environmental Consultancy. 2013.
- Specialist Gromis-Orangemund 400 kV Power Line Environmental Management Plan (EMP) – Watercourses & Drainage Systems, Northern Cape Province. Baagi Environmental Consultancy. 2013
- Watercourse delineation, PES & EIS assessment specialist study for a Water Use License Application for 8 proposed distribution lines around Ngwedi MTS, SA Chrome, Boschkoppie, Impofu Substation, Styldrift, Bakubung, Ledig, Sun City, Mokwase Industries, and Manyane Substations, North West Province. Baagi Environmental Consultancy. 2014
- Environmental Impact Assessment for the Sasol PSA and LPG Project: Botanical Biodiversity and Terrestrial and Wetland Habitat. Specialist Report, Inhassoro, Mozambique. In collaboration with De Castro & Brits C.C. for Mark Wood Consultants on behalf of SASOL. 2014.
- Specialist Watercourse and Wetland Study For the Proposed 500kV Nzhelele to Triangle Eskom Powerline Project (RSA Section Only) EIA Project, Limpopo Province. Baagi Environmental Consultancy. 2014

Green Star eco-conditional office development assessments:

- Green Star eco-conditional office assessment for the Lynnwood Bridge retail phase 2 development, Gauteng. Aurecon Group. 2011
- Green Star eco-conditional office assessment for the GCIS Hatfield head office development, Gauteng. Aurecon Group. 2012
- Green Star eco-conditional office assessment for the USAID expansion development, Gauteng. Aurecon Group. 2012
- Green Star eco-conditional office assessment for the Atrium on 5th development, Gauteng. Aurecon Group. 2012
- Green Star eco-conditional office assessment for the Lynnwood Bridge retail phase 3 development, Gauteng. Aurecon Group. 2013
- Green Star eco-conditional office assessment for the Athol Towers development, Gauteng. Aurecon Group. 2013

Wetlands and surface watercourse assessments for mining-related developments:

- Wetland and drainage line watercourse study for a proposed Fluorspar Mine in Dinokeng, Gauteng Province. African Geo-Environmental Services (AGES), (Pty) Ltd. 2009.
- Wetland assessment study for the proposed Northern Coal Colliery near Breyton, Mpumalanga Province. Terra Soil Science. 2010.

- Desktop wetland & watercourse assessment for Harmony Gold's Kusasalethu Mine as part of their ISO 14000 environmental management certification, North West Province. DD Science. 2012.
- Watercourse assessment for a water re-use and reclamation project at Mponeng Mine, North West Province, De Castro & Brits Ecological Consultants. 2013

Additional Wetland Related Training:

• Attended a two-day DWAF (DWA) facilitated wetland training course on the Wetland Index of Habitat Integrity assessment technique (Wetland IHI methodology) presented by Mark Rountree, June 2009.

Training - Course Lecturer:

• Co-lecturer and founding member of an Introductory Wetland Training Course, presented by the Department of Botany (University of Pretoria) through the University's Continued Education at UP (CE@UP) program, and the Gauteng Department of Agriculture, Conservation and Environment (GDACE). Aspects focused on include the legislation, delineation, drivers and ecology, assessments, management and rehabilitation of wetlands. This course was started in November 2004 and presented since then on September 2005, November 2005, May 2006, July 2007, May 2008, May 2010, and May 2012.

Publications:

- 1. Grobler, R., Bredenkamp, G. & Grundling, P-L. 2004. Subsistence farming and conservation constrains in coastal peat swamp forests of the Kosi Bay Lake System, Maputaland, South Africa. Géocarrefour 79: 4.
- 2. Grundling, P-L. & Grobler, R. 2005. Peatlands and mires of South Africa. In: Steiner, G.M. (ed.) Mires from Siberia to Tierra Del Fuego. Stapfia 85, Landesmuseen Neue Serie 35, pp. 379-396.
- **3.** Sliva J., Grundling P-L., Kotze D., Ellery F., Moning C., Grobler R., Taylor P.B. (2005). *MAPUTALAND Wise Use Management in Coastal Peatland Swamp Forests in Maputaland, Mozambique / South Africa.* Wetlands International, Project No: WGP2 36 GPI 56.

MEMBERSHIPS IN PROFESSIONAL AND GENERAL SOCIETY

Professional Society

- Pr. Sci. Nat (Professional Natural Scientist) in the fields of Botanical and Ecological Science (Registration No. 400097/09).
- Please refer to the SACNASP website to undertake a search of their registered scientists in order to authenticate that Mr. LER Grobler is registered SACNASP

member and is registered for the two fields indicated. Searches can be done according to employer (Imperata Consulting) or other criteria provided in this document.

http://www.sacnaspregister.co.za/search/

General Society

- International Mire Conservation Group (IMCG), since 2003.
- Gauteng Wetland Forum (GWF), since 2006.
- South African Wetland Society (SAWS), since 2007.

EMPLOYMENT EXPERIENCE

Wetland Ecologist and Project Manager: Imperata Consulting (March 2007 – Present) Tasks include:

- Wetland and riparian habitat delineation according to the DWAF (2005) prescribed delineation guideline, as well as the demarcation of other drainage line types (e.g. headwater streams or A Section Channels)
- Wetland Present Ecological State (PES) and Ecological Importance and Sensitivity (EIS) assessments.
- Ecosystem assessments based on phytosociological investigations (vegetation unit identification, description, and assessment), as well as associated mapping and sensitivity rating of vegetation assemblages.
- Inventory, classification and mapping of wetland ecosystems.
- Wetland rehabilitation and monitoring.
- Wetland management and recommendation of impact mitigation measures.
- Environmental risk assessments related to the presence of wetland and riparian ecosystems.
- Project management related to specialist wetland, riparian and headwater ecosystem investigations.

Wetland Ecologist: SEF (January 2006 – February 2007) Tasks included:

- Wetland and riparian habitat delineation and wetland ecosystem functional assessments.
- Strategic wetland assessments and mapping.
- Vegetation analysis and description, including mapping of sensitive vegetation assemblages.

Nature Conservator: Tshwane Nature Conservation (July 2005 – December 2005) Tasks included:

• General management of the ecological integrity of greenbelt areas in the eastern section of the City of Tshwane Metropolitan Municipality, including the Colbyn Valley Peatland, Faerie Glen Nature Reserve, Moreletakloof Nature Reserve, Meyerspark Bird Sanctuary, and Murrayfield Koppie.

REFERRALS

Mr. Tim Liversage: Previously worked as the NMPP Pipeline Environmental Manager at Transnet Capital Projects

Email: tmliversage@gmail.com

Mr. Piet-Louis Grundling: Independent Wetland Consultant and Researcher, as well as Chair of the South African Wetland Society (SAWS) and the International Mire Conservation Group (IMCG).

Email: peatland@mweb.co.za