
ECOLOGICAL WALKTHROUGH FOR THE DOORNHOEK SOLAR PV FACILITY NEAR KLERKSDORP, NORTH WEST PROVINCE

Prepared for:

Doornhoek PV (Pty) Ltd

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February 2023

Details of Company

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Author and Botanist

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Tarryn has over ten years of experience working as a botanist, nine of which are in the environmental sector. She has worked as a specialist and project manager on projects within South Africa, Mozambique, Lesotho, Zambia, Tanzania, Cameroon, Swaziland and Malawi. The majority of these projects required lender finance and consequently met both in-country and lender requirements.

Tarryn has extensive experience writing botanical impact assessments, critical habitat assessments, biodiversity management plans, biodiversity monitoring plans and Environmental Impact Assessments to International Standards, especially to those of the International Finance Corporation (IFC). Her experience includes working on large mining projects such as the Kenmare Heavy Minerals Mine, where she monitored forest health, undertook botanical impact assessments for their expansion projects and designed biodiversity management and monitoring plans. She has also project managed Environmental Impact Assessments for graphite mines in northern Mozambique and has a good understanding of the Mozambique Environmental legislation and processes.

Tarryn holds a BSc (Botany and Zoology), a BSc (Hons) in African Vertebrate Biodiversity and an MSc with distinction in Botany from Rhodes University. Tarryn's Master's thesis examined the impact of fire on the recovery of C3 and C4 Panicoid and non-Panicoid grasses within the context of climate change for which she won the Junior Captain Scott-Medal (Plant Science) for producing the top MSc of 2010 from the South African Academy of Science and Art as well as an Award for Outstanding Academic Achievement in Range and Forage Science from the Grassland Society of Southern Africa.

Tarryn is a professional member of the South African Council for Natural Scientific Professionals (since 2014).

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1. INTRODUCTION

1.1. Introduction and Purpose of this report

The Applicant, Doornhoek PV (Pty) Ltd, has received Environmental Authorisation to construct a photovoltaic (PV) solar energy facility located on a site approximately 11km north of Klerksdorp in the North West Province (Figure 1.1). The Doornhoek PV solar facility is fully authorised by two adjacent Environmental Authorisations. The solar PV facility will comprise several arrays of PV panels and associated infrastructure and will have a contracted capacity of up to 165MW. The development area is situated within the City of Matlosana Local Municipality within the Dr Kenneth Kaunda District Municipality. The site is accessible via an existing district road located adjacent to the east of the development area.

The proposed Doornhoek PV Facility will cover up to approximately 280ha and will include the following infrastructure (Figure 1.2):

- PV modules and mounting structures
- Inverters and transformers
- Battery Energy Storage System (BESS)
- Site and internal access roads (up to 8m wide)
- Operation and Maintenance buildings including a gate house and security building, control centre, offices, warehouses and workshops for storage and maintenance.
- Temporary and permanent laydown area
- Grid connection infrastructure, including:
 - 33kV cabling between the project components and the facility substation
 - A 132kV facility substation
 - A 132kV Eskom switching station
 - A Loop-in-Loop out (LILo) overhead 132kV power line between the Eskom switching station and the existing Watershed–Klerksdorp 1 132kV power line.

In line with the recommendations specified in the specialist study, as well as the conditions outlined in the Environmental Authorisations (EAs) associated with the development of the project and associated infrastructure, an ecological walkthrough of the development footprint must be undertaken prior to the commencement of vegetation clearance and construction. The following report outlines the findings of the ecological walkthrough undertaken for the proposed project and associated infrastructure.

1.2. Terms of Reference

The Terms of Reference (ToR) for this report include the following:

- Undertake an ecological walkthrough of the project infrastructure footprint, visiting as much of the accessible infrastructure as feasible;
- Compile a report based on the findings of the ecological walkthrough that includes:
 - Identification of ecological constraints for the planned infrastructure;
 - Identification and quantification of Species of Conservation Concern that will require permits for their removal; and
 - Where appropriate, recommendations and mitigation measures to reduce the impact of infrastructure on the ecological environment.

1.3. Assumptions and Limitations

- The assessment is based on the project infrastructure layout provided by the client on the 13th of December 2023. Changes to the boundaries of the site may affect the results contained in this report.
- The field survey was undertaken from the 9-11 January 2023 during the flowering season for this area, and as such, the majority of species could be identified.
- Descriptions of the vegetation types, floristics and biodiversity spatial plans have been included in the original ecological report and have therefore not been repeated here. The focus of this document is on the findings from the ecological walkthrough.
- The information, as presented in this document, only has reference to the study site as indicated on the project maps. Therefore, this information cannot be applied to any other area without a detailed investigation being undertaken.
- The ecological walkthrough excludes birds.

2. APPROACH

A list of plant Species of Conservation Concern¹ likely to occur within the development footprint (Table 2.1) was compiled based on those recorded in the Ecological Impact Assessment conducted by Biodiversity Africa (2021) as well as the South African National Biodiversity Institute (SANBI) Plants of Southern Africa (POSA) plant database (<http://posa.sanbi.org>).

The site survey was undertaken over the course of two (2) days, from the 9th to the 10th of January 2023. As much of the infrastructure layout (roads, powerline corridors, substations, laydown areas, solar PV arrays) was assessed on foot and by car. Areas of near natural habitat that have not been previously transformed were prioritised. These areas are typically those mapped as having medium

¹ Species of Conservation Concern are species that have a high conservation importance in terms of preserving South Africa's high floristic diversity and include not only threatened species, but also those classified in the categories *Extinct in the Wild* (EW), *Regionally Extinct* (RE), *Near Threatened* (NT), *Critically Rare*, *Rare*, *Declining* and *Data Deficient – Insufficient Information* (DDD) (SANBI Red List of South African Plants).

sensitivity (Figure 2.1). Within these areas there are slight variations in vegetation communities that range from open grassland to small bushclumps. The ecological walkthrough included sample points within both of these communities.

Identified SCC were GPS tagged using OruxMaps and the number of individuals within an 10 x 10m plot recorded to enable the density of species to be calculated. Species density was then used to calculate the number of individuals likely to be impacted by project infrastructure as this is required for the permit application. Figure 2.1 provides a map indicating tracks and sample points that were visited and evaluated.

If species were recorded within the Project Area of Influence but not within the infrastructure footprint, which is likely for early flowering geophytes, an estimated number of individuals for these species was calculated for the entire PAOI that was sampled and estimated numbers provided for the permit application should these species be encountered during the clearing of vegetation.

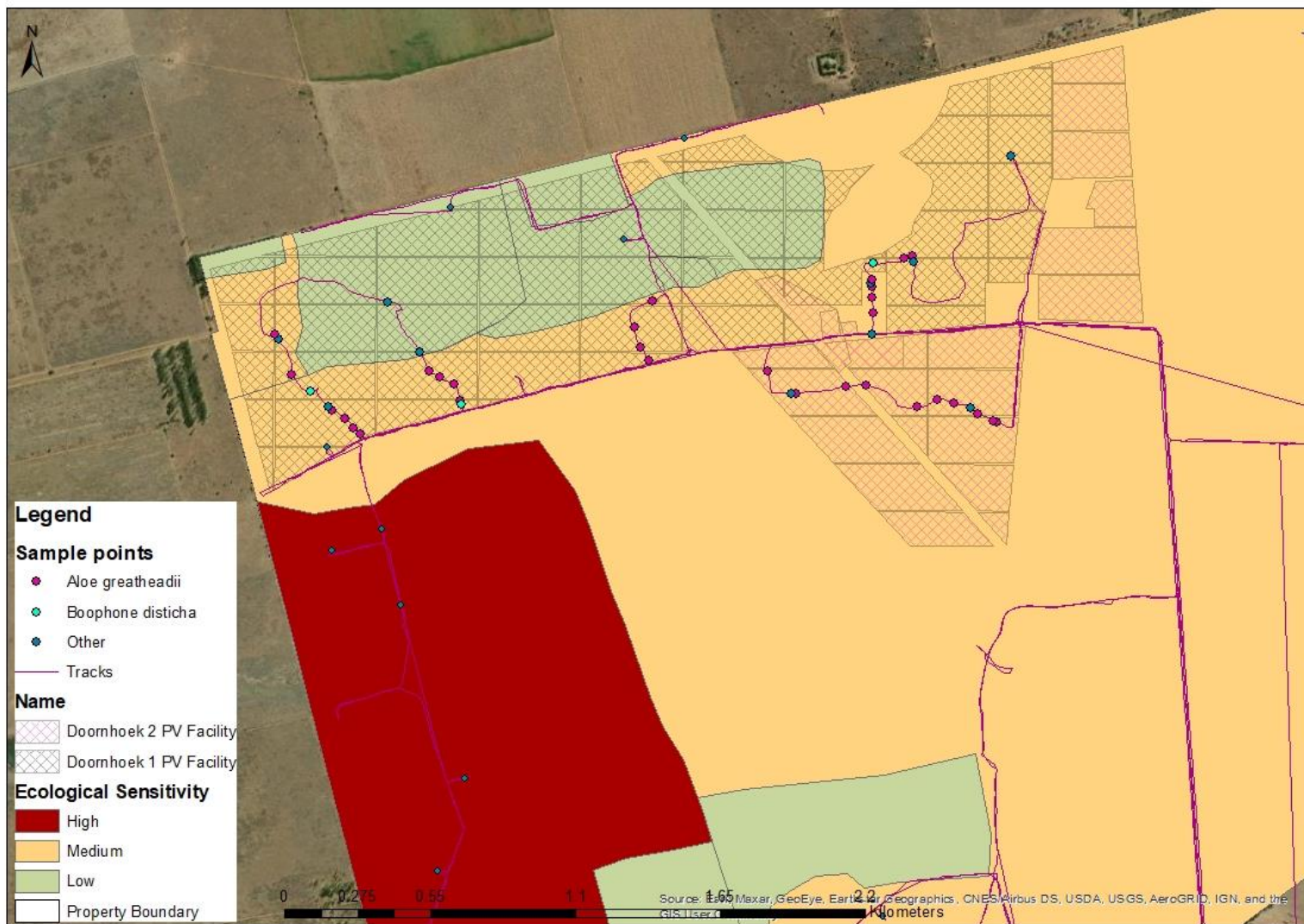


Figure 2.1: Map indicating the sample tracks and points taken during the ecological walkthrough

3. ECOLOGICAL OVERVIEW OF THE PROJECT SITE

The ecological assessment identified the project site as occurring within Klerksdorp Thornveld based on species assemblages recorded during the field survey. This vegetation type is characterised by open to dense *Vachellia karroo* bush clumps in dry grassland (Mucina *et al.*, 2006) although other common trees present include *Senegalia caffra*, *Celtis africana*, *Searsia lancea*, *Ziziphus mucronata* and low shrubs such as *Asparagus species*, *Helichrysum dregeanum*, *Felicia muricata*, *Gomphocarpus fruticosus*. The grass layer is dominated by *Themeda triandra* although in areas that are overgrazed, *T. triandra* is typically replaced by *Elionurus muticus*, *Cymbopogon pospischelli* and *Aristida congesta*.

Within the site itself, this vegetation type is comprised of scattered clumps of *Vachellia karroo* with patches of *Searsia lancea* occurring within disturbed sites. There is a well grazed grass understory (*Setaria sphacelata*, *Eragrostis superba*, *Aristida sp.* and some *Themeda triandra*) interspersed with species such as *Senecio inaequidens* and patches of *Aloe greatheadii*. The habitat is characterised by a relatively low diversity throughout most of the site.

Klerksdorp Thornveld is listed as Least Concern and has a conservation target of 24%. Only about 2.5% is statutorily conserved and it is therefore listed as poorly protected (RLE, 2021).

The Ecological Impact Report undertaken in 2021 identified two Species of Conservation Concern that have a moderate likelihood of occurrence within the project (Table 3.1). Active searches for these two species and associated habitat were undertaken during the ecological walkthrough. Neither suitable habitat, nor evidence of either of these species, were recorded within the project site.

Table 3.1: Species of Conservation Concern with a moderate likelihood of occurrence within the project site.

Species	Conservation Status	Likelihood of Occurrence	Comment
<i>Pearsonia bracteata</i>	Near Threatened	Moderate	This species is known from 8-14 locations between Wolkberg and Pretoria to Klerksdorp and is associated with plateau grassland (von Staden, 2011). Available habitat on site is degraded and heavily grazed and as such the likelihood of occurrence of this species is moderate.
Sensitive species 1261	Vulnerable	Moderate	This species occurs from Lichtenberg to Wolmaransstad and Sasolburg and is associated with sandy loam soils in thornveld and Themeda grassland. Available habitat on site is degraded and heavily grazed and as such the likelihood of occurrence of this species is moderate.

4. FINDINGS

4.1. Observations

No sensitive ecological features (for faunal species or plant species) that need to be avoided, were identified within the project infrastructure footprint during the ecological walkthrough (Figure 4.1 and 4.2).

No threatened species (Critically Endangered, Endangered or Vulnerable), TOPS species or protected tree species were recorded during the ecological walkthrough. However, two schedule 4 plant species were recorded within the project footprint and one was recorded within the PAOI. All three will require permits for their removal. Calculated densities and recommendations for each species are listed below under section 4.1.1 and 4.1.2 respectively. Table 4.1 provides the estimated quantities of individuals likely to be impacted by project infrastructure.

4.1.1. Density calculations

Data collected from the field survey indicates that the density for *Aloe greatheadii* is estimated to be 0.17 plants per square meter. Based on field observations, suitable habitat for this species is present in 95 ha (or 95,000m²) of the area that will be impacted. Based on this, it has been calculated that approximately 166,600 individuals will be affected. Although the field survey and ecological walk through indicate that there are a high number of this species present within the project area and PAOI, the specialist is of the opinion that this is an overestimation of numbers and that the likely number of individuals that will be impacted will be between 60,000 and 80,000.

Only three *Boophone disticha* individuals were recorded within the project footprint. As with *Aloe greatheadii* these will be restricted to areas of habitat that were not previously transformed i.e. 195 ha. It is estimated that there are 0.000625 plants per square meter and therefore 1218 individuals that will be affected.

Only one *Ammocharis coranica* was recorded within the project area of influence (i.e. within the surveyed 1800ha). This species was not recorded within the project footprint during the ecological walkthrough despite active searches for this species being undertaken. Based on this, density calculations indicate that there is likely less than one individual that will occur within the impacted site, if at all. It is therefore recommended that permits for the loss of up to 30 individuals of this species (an overestimate) are applied for in the unlikely event that they are encountered during the construction phase.

4.1.2. *Recommended Management Actions for each species.*

***Aloe greatheadii* (Least Concern)**

Aloe greatheadii is widespread and prolific within the Project Area of Influence (PAOI). Rather than translocating this species into adjacent habitat, where they are already prolific, it is recommended that the permit for the removal and destruction of individuals is applied for. Alternatively, these individuals can be offered to a local nursery who can remove them.


***Boophone disticha* (Least Concern) and *Ammocharis coranica* (Least Concern)**



Since both these species are bulbs, translocation of individuals is likely to be successful. It is therefore recommended that individuals of these species are carefully dug up and moved to a suitable habitat adjacent to the project site but outside of the area of impact. The receiving environment must be within the PAOI and must be of similar habitat to the area where the species were dug up from. Permits for the translocation of these two species must be applied for.



Figure 4.1: Typical vegetation recorded on site.

Table 4.1: Species recorded within the project site that will require permits for their removal

FAMILY	SCIENTIFIC NAME	RED LIST STATUS	PNCO STATUS	Estimated Quantity	Photograph
ASPHODELACEAE	<i>Aloe greatheadii</i>	Least Concern	Schedule 4	166,600 individuals	

FAMILY	SCIENTIFIC NAME	RED LIST STATUS	PNCO STATUS	Estimated Quantity	Photograph
AMARYLLIDACEAE	<i>Ammocharis coranica</i>	Least Concern	Schedule 4	30 individuals	
AMARYLLIDACEAE	<i>Boophone disticha</i>	Least Concern	Schedule 4	1218 individuals	

4.2. Conclusions and Recommendations

All mitigation measures outlined in the Terrestrial Ecological Impact Assessment (Biodiversity Africa, 2022) must be implemented during the construction and operational phases.

Mitigation measures specific to this study include:

- A permit must be obtained from the relevant competent authority prior to the damage, destruction, removal or translocation of *Aloe greatheadii*, *Boophone disticha* and *Ammocharis coranica*.
- A Search and Rescue operation must be undertaken for *Boophone disticha* and *Ammocharis coranica* prior to clearing of vegetation commencing. These species must be moved to a suitable site adjacent to the project area.

No Threatened Species, TOPS or Protected Tree species were recorded during the ecological walk through, and it is therefore the opinion of the specialist that the project can proceed from a terrestrial biodiversity perspective.

5. REFERENCES

Biodiversity Africa. 2022. Ecological Impact Assessment for the Proposed Doornhoek 1 Solar PV Facility, Klerksdorp, North West Province. Cape Town, South Africa.

Mucina, L.; Hoare, D.B.; Lotter, M.C.; du Preez, P.J.; Rutherford, M.C; Scott-Shaw, C.R.; Bredenkamp, G.J.; Powrie, L.W.; Scott, L.; Camp, K.G.T.; Cilliers, S.S.; Bezuidenhout, H.; Mostert, T.H.; Siebert, S.J.; Winter, P.J.D.; Burrows, J.E.; Dobson, L.; Ward, R.A.; Stalmans, M.; Oliver, E.G.H.; Siebert, F.; Schmidt, E.; Kobisi, K and Kose, L. Grassland Biome IN: Mucina, L. and Rutherford, M.C. (eds) 2011. The Vegetation of South Africa, Lesotho and Swaziland. *Strelitzia* 19. South African National Biodiversity Institute, Pretoria.

Red List of terrestrial Ecosystems of South Africa. (2021). SANBI and DFFE.



RHODES UNIVERSITY

THIS IS TO CERTIFY THAT

TARRYN BARBARA LEE MARTIN

WAS THIS DAY AT A CONGREGATION OF THE UNIVERSITY
ADMITTED TO THE DEGREE OF


MASTER OF SCIENCE

IN

BOTANY

WITH DISTINCTION

GRAHAMSTOWN
10 APRIL 2010



M. S. Hat

VICE CHANCELLOR

R. Bennett

DEAN OF THE FACULTY OF SCIENCE

Stephen L. ...

REGISTRAR

APPENDIX 2: CV

CONTACT DETAILS

Name	Tarryn Martin
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Designation	Director
Profession	Botanical Specialist and Environmental Manager
E-mail	tarryn@biodiversityafrica.com
Office number	+27 (0)71 332 3994
Education	2010: Master of Science with distinction (Botany) 2004: Bachelor of Science (Hons) in African Terrestrial Vertebrate Biodiversity 2003: Bachelor of Science
Nationality	South African
Professional Body	SACNASP: South African Council for Natural Scientific Profession: Professional Natural Scientist (400018/14) SAAB: Member of the South African Association of Botanists IAIASa: Member of the International Association for Impact Assessments South Africa Member of Golden Key International Honour Society
Key areas of expertise	<ul style="list-style-type: none">• Biodiversity Surveys and Impact Assessments• Environmental Impact Assessments• Critical Habitat Assessments• Biodiversity Management and Monitoring Plans

PROFILE

Tarryn has over ten years of experience working as a botanist, nine of which are in the environmental sector. She has worked as a specialist and project manager on projects within South Africa, Mozambique, Lesotho, Zambia, Tanzania, Cameroon and Malawi.

She has extensive experience writing botanical impact assessments, critical habitat assessments, biodiversity management plans, biodiversity monitoring plans and Environmental Impact Assessments to International Standards, especially to those of the International Finance Corporation (IFC). Her experience includes working on large mining projects such as the Kenmare Heavy Minerals Mine, where she monitored forest health, undertook botanical impact assessments for their expansion projects and designed biodiversity management and monitoring plans. She has also project managed Environmental Impact Assessments for graphite mines in northern Mozambique and has a good understanding of the Mozambique Environmental legislation and processes.

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**EMPLOYMENT
EXPERIENCE**

Director and Botanical Specialist, Biodiversity Africa

July 2021 - present

- Botanical and ecological assessments for local and international EIAs in Southern Africa
- Identifying and mapping vegetation communities and sensitive areas
- Designing and implementing biodiversity management and monitoring plans
- Designing rehabilitation plans
- Designing alien management plans
- Critical Habitat Assessments
- Large ESIA studies
- Managing budgets

Principal Environmental Consultant, Branch Manager and Botanical Specialist, Coastal and Environmental Services

May 2012-June 2021

- Botanical and ecological assessments for local and international EIAs in Southern Africa
- Identifying and mapping vegetation communities and sensitive areas
- Designing and implementing biodiversity management and monitoring plans
- Designing rehabilitation and biodiversity offset plans
- Designing alien management plans
- Critical Habitat Assessments
- Large ESIA studies
- Managing budgets
- Cape Town branch manager
- Coordinating specialists and site visits

Accounts Manager, Green Route DMC

October 2011- January 2012

- Project and staff co-ordination
- Managing large budgets for incentive and conference groups travelling to southern Africa
- Creating tailor-made programs for clients

- Negotiating rates with vendors and assisting with the ground management of inbound groups to ensure client satisfaction.

Camp Administrator and Project Co-ordinator, Windsor Mountain International Summer Camp, USA

April 2011 - September 2012

- Co-ordinated staff and camper travel arrangements, main camp events and assisted with marketing the camp to prospective families.

Freelance Project Manager, Green Route DMC

November 2010 - April 2011

- Project and staff co-ordination
- Managing large budgets for incentive and conference groups travelling to southern Africa
- Creating tailor-made programs for clients
- Negotiating rates with vendors and assisting with the ground management of inbound groups to ensure client satisfaction.

Camp Counsellor, Windsor Mountain Summer Camp, USA

June 2010 - October 2010

NERC Research Assistant, Botany Department, Rhodes University, Grahamstown in collaboration with Sheffield University, Sheffield, England

April 2009 - May 2010

- Set up and maintained experiments within a common garden plot experiment
- collected, collated and entered data
- Assisted with the analysis of the data and writing of journal articles

Head Demonstrator, Botany Department, Rhodes University

March 2007 - October 2008

Operations Assistant, Green Route DMC

September 2005 - February 2007

- Project and staff co-ordination
- Managing large budgets for incentive and conference groups travelling to southern Africa
- Creating tailor-made programs for clients
- Negotiating rates with vendors and assisting with the ground management of inbound groups to ensure client satisfaction

PUBLICATIONS

- Ripley, B.; Visser, V.; Christin, P.A.; Archibald, S.; Martin, T and Osborne, C. Fire ecology of C₃ and C₄ grasses depends on

evolutionary history and frequency of burning but not photosynthetic type. *Ecology*. 96 (10): 2679-2691. 2015

- Taylor, S.; Ripley, B.S.; Martin, T.; De Wet, L-A.; Woodward, F.I.; Osborne, C.P. Physiological advantages of C₄ grasses in the field: a comparative experiment demonstrating the importance of drought. *Global Change Biology*. 20 (6): 1992-2003. 2014
- Ripley, B; Donald, G; Osborne, C; Abraham, T and Martin, T. Experimental investigation of fire ecology in the C₃ and C₄ subspecies of *Alloteropsis semialata*. *Journal of Ecology*. 98 (5): 1196 - 1203. 2010
- South African Association of Botanists (SAAB) conference, Grahamstown. Title: Responses of C₃ and C₄ Panicoid and non-Panicoid grasses to fire. January 2010
- South African Association of Botanists (SAAB) conference, Drakensberg. Title: Photosynthetic and Evolutionary determinants of the response of selected C₃ and C₄ (NADP-ME) grasses to fire. January 2008

COURSES

- Rhodes University and CES, Grahamstown
- EIA Short Course 2012
- Fynbos identification course, Kirstenbosch, 2015.
- Photography Short Course, Cape Town School of Photography, 2015.
- Using Organized Reasoning to Improve Environmental Impact Assessment, 2018, International IAIA conference, Durban

CONSULTING EXPERIENCE

International Projects

- 2020 – 2021: Project manager for the 2Africa subsea cable ESIA in Mozambique.
- 2020 – 2021: Project manager for the Category B EIA for the Wihinana Graphite Mine, Cabo delgado, Mozambique
- 2020 – 2021: Project manager for the category B exploration ESIA for Sofala Heavy Minerals Mine, Inhambane, Mozambique
- 2020: Critical Habitat Assessment for a graphite mine in Cabo Delgado, Mozambique. This assessment was to IFC standards.
- 2020: Analysed the botanical dataset for Lurio Green Resources and provided comment on the findings and gaps.
- 2020: Biodiversity Management Plan and Monitoring Plan for mine at Pilivilli in Nampula Province, Mozambique. This assessment was to IFC standards.
- 2019: Botanical Assessment for a cocoa plantation, Tanzania. This assessment was to IFC standards.
- 2019: Critical Habitat Assessment, Biodiversity Management Plan and Ecosystem Services Assessment for JCM Solar Farm in Cameroon. This assessment was to IFC standards.

- 2019: Undertook the Kenmare Road and Infrastructure Botanical Baseline Survey and Impact Assessment for an infrastructure corridor that will link the existing mine at Moma to the new proposed mine at Pillivilli in Nampula Province, Mozambique. This assessment was to IFC standards.
- 2012 – Present: Kenmare Terrestrial Monitoring Program Project Manager and Specialist Survey, Nampula Province, Mozambique.
- 2018: Conducted a field survey and wrote a botanical report to IFC standards for the proposed Balama Graphite Mine Environmental and Social Impact Assessment (ESIA) in Cabo Delgado Province, Mozambique.
- 2018: Co-authored the critical habitat assessment chapter for the proposed Kenmare Pilivilli Heavy Minerals Mine.
- 2018: Authored the Conservation Efforts chapter for the Kenmare Pilivilli Heavy Minerals Mine.
- 2017-2018: Co-authored and analysed data for the Kenmare Bioregional Survey of *Icuria dunensis* (species trigger for critical habitat) in Nampula Province, Mozambique. This was for a mining project that needed to be IFC compliant.
- 2017: Conducted a field survey and wrote a botanical report to IFC standards for the proposed Ancuabe Graphite Mine Environmental and Social Impact Assessment (ESIA) in Cabo Delgado Province, Mozambique.
- 2017-2018: Managed the Suni Resources Montepuez Graphite Mine Environmental Impact Assessment. This included the management of ten specialists, the co-ordination of their field surveys, regular client liaison and the writing of the Environmental Impact Assessment Report which summarised the specialists findings, assessed the impacts of the proposed mine on the environment and provided mitigation measures to reduce the impact.
I was also the lead botanist for this baseline survey and impact assessment and undertook the required field work and analysed the data and wrote the report.
- 2017: Undertook the botanical baseline survey and impact assessment for the proposed Kenmare Pilivilli Heavy Mineral Mine in Nampula Province, Mozambique. This was to IFC Standards.
- 2017: Ecological Survey for the Megaruma Mining Limitada Ruby Mine Exploration License, Cabo Delgado, Mozambique.
- 2016: Undertook the botanical baseline survey and impact assessment, wrote an alien invasive management plan and co-authored the biodeiversity monitoring plan for this farm. The project was located in Zambezia Province, Mozambique.
- 2015-2016: Conducted the Triton Minerals Nicanda Hills Graphite Mine Botanical Survey and Impact Assessment. Was also the project manager and specialist co-ordinator for this project. The project was located in Cabo Delgado Province, Mozambique.
- 2015: Was part of the team that undertook a Critical Habitat Assessment for the Nhangonzo Coastal Stream site at Inhassora in

Mozambique that Sasol intend to establish drill pads at. This project needed to meet the IFC standards.

- 2014: Lurio Green Resources Wood Chip Mill and Medium Density Fibre-board Plant, Project Manager and Ecological Specialist, Nampula Province, Mozambique. 2014-2015.
- 2013-2014: LHDA Botanical Survey, Baseline and Impact assessment, Lesotho.
- 2014: Biotherm Solar Voltaic Ecological Assessment, Zambia.
- 2013-2014: Lurio Green Resources Plantation Botanical Assessment, Vegetation and Sensitivity Mapping, Specialist Co-ordination, Nampula Province, Mozambique.
- 2013: Syrah Resources Botanical Baseline Survey and Ecological Assessment., Cabo Delgado Mozambique.
- 2013-2014: Baobab Mining Ecological Baseline Survey and Impact Assessment, Tete, Mozambique.

South African Projects

- 2021 - Present: Project Manager for the Sturdee Energy Solar PV facility, Western Cape
- 2021: Ecological Assessment for the Sturdee Energy Solar PV facility, Western Cape
- 2021: Rehabilitation plan for a housing development (Hope Village)
- 2020: Ecological Assessment for the Eskom Juno-Gromis Powerline deviation, Western Cape
- 2020: Project Manager for the Basic Assessment for SANSA development at Matjiesfontein (Western Cape). Project received authorization in 2021.
- 2020: Ecological Assessment for construction of satellite antennae, Matjiesfontein, Western Cape
- 2019: Ecological Assessment for a wind farm EIA, Kleinzee, Northern Cape
- 2019: Ecological Assessment for two housing developments in Zeerust, North West Province
- 2019: Botanical Assessment in Retreat, Cape Town for the DRDLR land claim.
- 2019: Cape Agulhas Municipality Botanical Assessment for the expansion of industrial zone, Western Cape, South Africa, 2019.
- 2018: Ecological Assessment for the construction of a farm dam in Greyton, Western Cape.
- 2018: Conducted the Ecological Survey for a housing development in Noordhoek, Cape Town
- 2018: Conducted the field survey and developed an alien invasive management plan for the Swartland Municipality, Western Cape.
- 2017: Undertook the field survey and co-authored a coastal dune study that assesses the impacts associated with the proposed rezoning and subdivision of Farm Bookram No. 30 to develop a resort.
- 2017: Project managed and co-authored a risk assessment for the use of Marram Grass to stabilise dunes in the City of Cape Town.

- 2015-2016: iGas Saldanha to Ankerlig Biodiversity Assessment Project Manager, Saldanha.
- 2015: Innowind Ukomoleza Wind Energy Facility Alien Invasive Management Plan, Eastern Cape Province, South Africa.
- 2015: Savannah Nxuba Wind Energy Facility Powerline Ecological Assessment, ground truthing and permit applications, Eastern Cape South Africa.
- 2014: Cob Bay botanical groundtruthing assessment, Eastern Cape, South Africa.
- 2013-2016: Dassiesridge Wind Energy Facility Project Manager, Eastern Cape, South Africa.
- 2013: Harvestvale botanical groundtruthing assessment, Eastern Cape, South Africa.
- 2012: Tsitsikamma Wind Energy Facility Community Power Line Ecological Assessment, Eastern Cape, South Africa.
- 2012: Golden Valley Wind Energy Facility Power Line Ecological Assessment, Eastern Cape, South Africa.
- 2012: Middleton Wind Energy Facility Ecological Assessment and Project Management, Eastern Cape, South Africa.
- 2012: Mossel Bay Power Line Ecological Assessment, Western Cape, South Africa.
- 2012: Groundtruthing the turbine sites for the Waainek Wind Energy Facility, Eastern Cape, South Africa.
- 2012: Toliara Mineral Sands Rehabilitation and Offset Strategy Report, Madagascar.