



Animal Species Specialist Assessment Report

Proposed Diepwalle Tented Camp, Knysna, Western Cape



Prepared for:

Cape EAPrac



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Prepared by:



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076 227 5056

April 2023



Executive summary

Biodiversity Management Services was appointed by Cape EAPrac to conduct an Animal Species Specialist Report for the proposed tented camp to be situated in the Diepwalle section of the Garden Route National Park outside Knysna. The proposed site is situated in a small forest clearing (approximately 0.5 ha) with a small artificial pond and associated Southern Afrotemperate Forest. The proposed tented camp development is around the edge of the clearing and into the fringes of the Southern Afrotemperate Forest. The animal sensitivity theme identified by the Department of Forestry, Fisheries and the Environment environmental screening tool was “High”, necessitating the completion of this report. The area has undergone transformation in the past, and the clearing of alien invasive plants is evident, yet it remains in a relatively natural state. In this report, we identify three distinct habitat types important for animals and these are listed throughout the report as Mature Southern Afrotemperate Forest, Densely Vegetated Clearing and Woody Pond. Descriptions of habitat types are based on visual assessment of the study site and knowledge of animal habitat requirements, especially those identified by the screening tool.

The screening tool identified seven species of concern (one with a sensitivity score of ‘high’ and six with a sensitivity score of ‘medium’). These species were three aves, two mammals, one amphibian and one insect. Each species was then evaluated in terms of their occurrence on the study site based on occurrence and suitability of the habitat. Of the species identified by the screening tool it is likely that two of the possible species are highly likely to occur in the study area and three species will possibly occur at the study site. These species are *Bradypterus sylvaticus* (highly likely), *Stephanoaetus coronatus* (highly likely), *Africalus knysnae* (possible), *Chlorotapla duthieae* (possible) and sensitive species 8 (possible). The other two species identified by the screening tool are unlikely to occur in the study area as a result of unfavourable habitat. In addition to the species identified by the screening tool we also identified three additional species listed as near threatened or higher by the IUCN that may occur at the study site and these are *Amblysomus corriae*, *Miniopterus schreibersii* and *Panthera pardus*.

Although there are a number of sensitive species that are likely to occur at the site of the proposed tented camp, the nature of the development is likely to be of low risk to animal species. Furthermore, we suggest several mitigation measures that are strongly advised to be included in the development to mitigate impacts on animal species, these include; the use of raised boardwalks with removable sections, downlighting, minimizing disturbance outside of the development footprint, eliminating the need for a generator, implementing an Environmental Control Officer during the initial setup and development and ensuring facilities and rubbish bins are animal proof.



List of Acronyms

| | |
|----------|-------------------------------------------------------|
| ADU | Animal Demography Unit |
| AIP | Alien Invasive Plants |
| DFFE | Department of Forestry, Fisheries and the Environment |
| ECO | Environmental Control Officer |
| EIA | Environmental Impact Assessment |
| EWT | Endangered Wildlife Trust |
| GRNP | Garden Route National Park |
| IBA | Important Bird and Biodiversity Area |
| IAS | Invasive Alien Species |
| IUCN | International Union for the Conservation of Nature |
| SABAP | Southern African Bird Atlas Project |
| SANParks | South African National Parks |
| SANBI | South African National Biodiversity Institute |
| SDP | Site Development Plan |



Contents of this specialist report

Contents of this specialist report that complies with the legislated requirements as described in the protocol for the specialist assessment and minimum report content requirements for environmental impacts on animal species, published in government notice No. 320 of 2020.

| PROTOCOL FOR THE SPECIALIST ASSESSMENT AND MINIMUM REPORT CONTENT REQUIREMENTS FOR ENVIRONMENTAL IMPACTS ON TERRESTRIAL ANIMAL SPECIES | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| 3. | Terrestrial Animal Species Specialist Assessment Report | Report section |
| 3.1 | This report must include as a minimum the following information: | |
| 3.1.1 | contact details and relevant experience as well as the SACNASP registration number of the specialist preparing the assessment including a curriculum vitae; | Page 3 |
| 3.1.2 | a signed statement of independence by the specialist; | Page 9 |
| 3.1.3 | a statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment; | Page 15 |
| 3.1.4 | a description of the methodology used to undertake the site sensitivity verification, impact assessment and site inspection, including equipment and modelling used where relevant; | Page 14 |
| 3.1.5 | a description of the mean density of observations/number of sample sites per unit area and the site inspection observations; | Page 15 and Appendices |
| 3.1.6 | a description of the assumptions made and any uncertainties or gaps in knowledge or data; | Page 10 |
| 3.1.7 | details of all SCC found or suspected to occur on site, ensuring sensitive species are appropriately reported; | Page 20 |
| 3.1.8 | the online database name, hyperlink and record accession numbers for disseminated evidence of SCC found within the study area; | Page 15 and Appendices |
| 3.1.9 | the location of areas not suitable for development and to be avoided during construction where relevant; | NA |
| 3.1.10 | a discussion on the cumulative impacts; | Page 30 |
| 3.1.11 | impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr); | Page 30 |
| 3.1.12 | a reasoned opinion, based on the findings of the specialist assessment, regarding the acceptability or not of the development and if the development should receive approval or not, related to the specific theme being considered, and any conditions to | Page 34 |



| | | |
|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| | which the opinion is subjected if relevant; and | |
| 3.1.13 | a motivation must be provided if there were any development footprints identified as per paragraph 2.2.12 above that were identified as having “low” or “medium” terrestrial animal species sensitivity and were not considered appropriate. | NA |
| 3.2 | A signed copy of the assessment must be appended to the Basic Assessment Report or Environmental Impact Assessment Report. | |



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1. Specialist contact details and *Curriculum vitae*

Contact Details: Biodiversity specialist

Specialist Dr Christopher Brooke
 Qualifications PhD Nature Conservation
 Company Biodiversity Management Services
 SACNASP Pr.Sci.Nat: 148392
 Email chris@managebiodiv.com
 Address 43 Mosel Road, Mosel, Kariega, Eastern Cape
 Contact +27 (60) 674 0388

Contact Details: Biodiversity specialist, Report review and Quality Control

Name Ken Coetzee
 Company Conservation Management Services
 Email consken@mweb.co.za
 Address 4 Chestnut Street, Heather Park, George
 Contact +27 (76) 227 5056

Curriculum vitae – Dr C Brooke

1. Tertiary qualifications

| Degree | Institution | Research theme or modules | Time period |
|-------------------------------------------------------------|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| Doctor of Philosophy, Nature Conservation | Nelson Mandela University | Medium to large mammalian fauna of the Palaeo-Agulhas Plain: Predicting habitat use and range distribution | 2018-2021 |
| Master of Science, Nature Conservation (<i>cum laude</i>) | Nelson Mandela University | Energy maximisation strategies of different African herbivores in a fire dominated and nutrient poor grassland ecosystem | 2016-2017 |
| Baccalaureus of Technology, Nature Conservation | Nelson Mandela Metropolitan University | Plant studies IV; Research methodology; Fresh water management IV; Conservation management I; Principles of management I; Resource management IV | 2015 |
| National Diploma, Nature Conservation | Nelson Mandela Metropolitan University | Plant studies I, II and III; Animal studies I, II and III; Conservation Ecology I, II and III; Resource Management I, II and III; Soil science; Conservation communication I and II; Conservation development; Conservation administration; Computer usage | 2012-2014 |



2. Work experience

| Company | Company details | Job description | Time period |
|--------------------------------------------|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| Full time positions: | | | |
| Biodiversity Management Services (Pty) Ltd | 43 Mosel Road, Mosel, Kariega, 6229 | <i>Company director</i> | 16 August 2022 – Current |
| Fathala Nature Reserve | Fathala Nature Reserve, Region de Fatick, Senegal, West Africa | <i>Conservation student:</i> Worked with all aspects of reserve management, including maintenance of infrastructure, monitoring of mammals, administration, guiding and planning of reserve activities. | 01 December 2013 – 01 December 2014 |
| Raptors View Wildlife Estate | Raptors View Home Owners Association Office, 14 Safari Junction, Hoedspruit, 1380 | <i>Management assistant:</i> Worked with reserve management maintaining infrastructure and the wildlife estate. Duties included maintaining infrastructure, erosion control, animal management and culling, monitoring, problem animal control and security. | 01 December 2010 – 31 January 2012 |

| Non-permanent positions: | | | |
|---------------------------------|-------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| Nelson Mandela University | School of Natural Resource Management, Nelson Mandela University, George Campus, Madiba Drive, George, 6530 | <i>Supplemental instruction</i> Offered SI for ecology I and ecology III Part-time lecturer (Animal Studies 3) Part-time lecturer (Natural Resource management II and Game Ranch Management II) | January 2016 - November 2018 January 2019- July 2019 February 2021- July 2022 |

3. Scientific output

| Book Chapters |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1) Venter, J.A., Vermeulen, M.M & Brooke, C.F. (2019). Feeding ecology of large browsing and grazing herbivores. In Gordon, I.J. & Prins, H.T., editors. Ecology of Ungulate Browsing and Grazing II, Springer International Publishing. |
| Peer reviewed Journal Publications |
| 1) Bugir, C.K., Brooke, C.F., Hayward, M.W., (submitted). Prey preferences of Anatomically Modern Humans (<i>Homo sapiens sapiens</i>). Submitted to the Journal of Human Evolution. |
| 2) Lardo, L.E., Sutherland, C., Brooke, C.F., Tenan, S., Keith, M., Somers, M.J., Peel, M., Huebner, S., Romero, L., Swanepoel, L., Frits, H., Venter, J.A., (submitted). Regional variation in mammalian species richness and occupancy across South Africa's protected areas. Submitted to Ecological Applications. |
| 3) Martens-Brooke, F.R., Brooke, C.F., Prima, M-C., Schabo, D.G., Farwig, N., Rösner, S., Pheiffer, M.B., Downs, C.T., Venter, J.A., (submitted). Connectivity of priority areas of Cape Vultures (<i>Gyps coprotheres</i>) from the south-east population of South Africa Submitted to Emu - Austral Ornithology. |
| 4) Reeves, B., Brooke, C.F., Venter, J.A., Conradie, W. (2022) The reptiles and amphibians of the Mpofu-Fort Fordyce Nature Reserve complex in the Winterberg Mountains, Eastern Cape Province, South Africa. South African Journal of Wildlife |



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| Research, 52: 143-145 doi:10.3957/056.052.0134 |
| 5) Brooke, C.F., Marean, C.W., Wren, C.D., Fritz, H., Venter, J.A. (2022). Using functional groups to predict the spatial distribution of large herbivores on the Paleo-Agulhas Plain, South Africa during the last glacial maximum. <i>Journal of Quaternary Science</i> . DOI: 10.1002/jqs.3430 |
| 6) Brooke, C.F., Marean, C.W., Wren, C.D., Fritz, H., Venter, J.A. (2021). Predicting large herbivore biomass for the last glacial maximum on the extinct Palaeo-Agulhas Plain (South Africa) using modern ecological knowledge of African herbivore assemblages and rainfall. <i>Quaternary Research</i> 1-14. doi:10.1017/qua.2021.23 |
| 7) Fortin, D., Brooke, C.F., Lamirande, P., Frits, F., McLoughlin, P.D., Pays, O. 2020. Quantitative spatial ecology to promote human-wildlife coexistence: a tool for integrated management of anthropogenic landscapes. Submitted to <i>Frontiers in Sustainable Food Systems</i> , section Agroecology and Ecosystem Services, 4:230 |
| 8) Brooke, C.F., Fortin, D., Kraaij, T., Fritz, H., Kalule-Sabiti, M.J., Venter, J.A. 2020. Poaching impedes the selection of optimal post-fire forage in three large grazing herbivores. <i>Biological Conservation</i> , 241: 108393. doi.org/10.1016/j.biocon.2019.108393 |
| 9) Venter, J.A., Brooke, C.F., Marean, C.W., Fritz, H., Helm, C.W. 2019. Large mammals of the Palaeo-Agulhas Plain showed resilience to extreme climate change but vulnerability to modern human impacts, <i>Quaternary Science Reviews</i> . doi: 10.1016/j.quascirev.2019.106050 |
| 10) Brooke, C.F., Kraaij, T & Venter, J.A. 2018. Characterizing a poacher-driven fire regime in low-nutrient coastal grasslands of Pondoland, South Africa. <i>Fire Ecology</i> , 14(1):1-16. doi: 10.4996/fireecology.140101016 |
| Presentations at conferences and symposia |
| 1) Martens-Brooke, F.R., Brooke, C.F., Prima, M-C., Schabo, D.G., Farwig, N., Rösner, S., Pfeiffer, M.B., Downs, C.T & Venter, J.A., 2021., Connectivity of priority areas of Cape Vultures (<i>Gyps coprotheres</i>) from the south-east population of South Africa. South African Wildlife Management Association Symposium. Wildlife management in the 21st century: Adapt or die? Berg-en-Dal Camp Rest Camp, Kruger National Park, Mpumalanga. |
| 2) Brooke, C.F., 2021. Large herbivore populations and densities on the Palaeo-Agulhas Plain: understanding an extinct southern Cape ecosystem. South African Wildlife Management Symposium: Wildlife management in the 21 st century: Adapt or die? Berg-en-Dal Rest Camp, Kruger National Park, Mpumalanga. |
| 3) Brooke, C.F., 2021. Large herbivore populations and densities on the Palaeo-Agulhas Plain: understanding an extinct southern Cape ecosystem. SASQUA online series 2021, session 5: Southern South African palaeoecology and climate models. |
| 4) Venter, J.A., Brooke, C.F., Marean, C.W., Fritz, H., Helm, C.W. 2019. Large mammals of the Palaeo-Agulhas Plain: Conceptual reconstruction of large mammal communities and their habitats, 41 st Fynbos Forum: Eliminating barriers to conservation, Baardskeedersbos, Western Cape, South Africa. |
| 5) Brooke, C.F., Marean, C.W., Harris, J.A., Venter, J.A. 2019. Using the present to uncover the past: Reconstructing the ecology and behaviour of extinct large mammals on the Palaeo-Agulhas Plain (south coast, South Africa). South African Wildlife Management Symposium: Sustainable landscapes for wildlife conservation, Wilderness Hotel, Western Cape, South Africa. |
| 6) Venter, J.A., Brooke, C.F., Marean, C.W., Fritz, H. & Helm, C.W 2019. Conceptual reconstruction of large mammal assemblages of the Palaeo-Agulhas Plain reveals resilience to climate change but vulnerability to modern humans. 29th International Congress for Conservation Biology (ICCB 2019), Kuala Lumpur, Malaysia. |
| 7) Venter, J.A., Brooke, C.F., Marean, C., Fritz, H. & Helm, C. 2019. Conceptual reconstruction of large mammal communities on the Palaeo-Agulhas Plain. Annual Meeting & Centennial celebration of the American Society of Mammalogists, Hyatt Regency Washington on Capitol Hill, Washington DC, United States of America |
| 8) Brooke, C.F., Marean, C., Harris, J.A. & Venter, J.A. 2019. Using the present to uncover the past: Reconstructing the ecology and behaviour of extinct large mammals on the Palaeo-Agulhas Plain (south coast, South Africa). Society for American Archaeology 51 st Annual meeting, Albuquerque Convention Centre, New Mexico, United States of America. |
| 9) Brooke, C.F., Marean, C. & Venter, J.A. 2019. Large mammals of the Palaeo-Agulhas Plain: predicting habitat use and population densities. SASQUA XXII Biennial Congress, Point Hotel, Mossel Bay, South Africa |
| 10) Venter, J.A., Brooke, C.F. & Marean, C. 2018. Large mammals of the Palaeo-Agulhas Plain: Conceptual reconstruction of assemblages and habitats. Southern African Wildlife Management Symposium: Managing small and fragmented populations, Klein Kariba, Limpopo Province, South Africa. |
| 11) Brooke, C.F., Fortin, D., Kraaij, T. & Venter, J.A. 2018. Niche separation of large ungulates: foraging to maximise instantaneous or daily digestible energy. Savanna Science Network Meeting, Skukuza, Mpumalanga, South Africa. |
| 12) Brooke, C.F., Fortin, D., Kraaij, T., Kalule-Sabiti, M.J. & Venter, J.A. 2017. Foraging ecology of large ungulates in a vegetation mosaic affected by anthropogenic fire and poaching on Mkambati Nature Reserve, Eastern Cape, South Africa. Southern African Wildlife Management Association Symposium: Wildlife management in the face of global change, Goudini, Western Cape Province, South Africa. |
| Poster presentations |
| 1) Brooke, C.F., Kraaij, T. & Venter, J.A. 2016. Fire and herbivory dynamics in the low nutrient coastal grasslands of Mkambati Nature Reserve, Eastern Cape South Africa, 51st Annual Congress of the Grassland Society of Southern Africa, Wilderness, Western Cape Province, South Africa. |



| Grant funding | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| <p>Brooke, C.F 2021-2022. Late Pleistocene large mammal use of the Palaeo-Agulhas plain: The facilitation role of mega-herbivores and the implications for modern rewilding of landscapes.</p> <p><i>Position:</i> Principle investigator</p> <p><i>Project funder:</i> NRF</p> <p><i>Project Funding:</i> R610 000</p> | | | |
| <p>Brooke, C.F., Marean, C.W., Wren, C.D., Venter, J.A. 2019. Large mammals of the Palaeo-Agulhas Plain: Predicting habitat use and range distribution.</p> <p><i>Position:</i> Principle investigator</p> <p><i>Project funder:</i> Past Africa</p> <p><i>Project Funding:</i> R28 550</p> | | | |
| <p>Brooke, C.F., Kraaij, T. & Venter J.A. 2016-2017. Energy maximisation strategies of different African herbivores in a fire dominated and nutrient poor grassland ecosystem.</p> <p><i>Position:</i> Principle investigator</p> <p><i>Project funder:</i> Dormehl-Cuninham Scholarship</p> <p><i>Project funding:</i> R 21 298</p> | | | |
| Teaching experience | | | |
| 2021-2022 | Nelson Mandela University | Taught Natural Resource Management (second year students) for Nature Conservation students and Game Range Management II (second year students) to Game Ranch Management Students. | |
| 2019 | Nelson Mandela University | Taught Animals III/Game Health III (second year students) for Nature Conservation and Game Ranch Management Students. | |
| 2016-2017 | Nelson Mandela University | Taught Supplemental instruction to undergraduate students for ecology I (one semester) and ecology III (three semesters). | |
| Student supervision | | | |
| Nkosi, N | BTech (Nature Conservation) Nelson Mandela University, co-supervisor | Ungulate responses to old agricultural fields in Gondwana Game Reserve | Completed 2019 |
| Mieny, K | Honours (Wildlife Management) University of Pretoria, co-supervisor | A preliminary assessment of the seasonal difference and influence of megaherbivores on the diets of large herbivores in Sanbona Wildlife Reserve | To be completed November 2022 |
| Moderation | | | |
| 2019 | Nelson Mandela University | Moderated final examinations for Animals I/Game Health I (first year students) for Nature Conservation and Game Ranch Management. Nelson Mandela University | |

4. Professional membership and service

| Association | Details | Time period |
|-------------|--------------------------------|--------------|
| SACNASP | Professional Natural Scientist | 2022-Current |



| | | |
|-----------------------------------------------|----------------|--------------|
| South African Wildlife Management Association | Student member | 2018-current |
| Society for American Archaeology | Student member | 2019 |

5. Other courses

List of courses completed

Snake ID & snakebite treatment; Advanced snake handling; Basic ArcGIS; Hidden Markov Models; Agent based models using the MARS platform; Agent based models in social ecological systems, Introduction to data analysis in R, data collection and management; Introduction to multivariate statistics.

6. Projects undertaken

| Projects | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| Soil Erosion control – planning working with and training local communities to tackle soil erosion resulting from overgrazing and deforestation in northern Malawi | 2023 |
| Terrestrial Biodiversity Specialist Report – Proposed Western Bypass, George | 2023 |
| Animal Species Specialist Report – Proposed Western Bypass, George | 2023 |
| Research assistance – Cape Parrot Project population counts and nest monitoring | 2022 |
| Herpetofauna surveys – Karoo National Park and Mpofu and Fort Fordyce Nature Reserves (conducted annually) | 2017-2019 |



2. Details and Expertise of the specialist

Dr Christopher Brooke is an environmental consultant and director of Biodiversity Management Services (Pty) Ltd. Christopher obtained his MSc (*Cum Laude*) from Nelson Mandela University with a project focussed on how large herbivores respond to frequent fires (maximising highly nutritious forage) and the threat of poaching in Mkambati Nature Reserve, Eastern Cape, South Africa. Thereafter, Christopher completed his PhD at Nelson Mandela University with a thesis modelling the population dynamics and drivers of large mammals on the Palaeo-Agulhas Plain (now submerged off the coast of South Africa). Christopher has since undertaken a postdoc where he is working to understand the effects of Megaherbivores in the Fynbos and Karoo biomes and how this facilitates habitat for other species. Christopher has also been involved in various other projects dealing with terrestrial vertebrates (herpetofauna, avifauna, large carnivores etc.) and the introduction and management thereof. In addition, Christopher has also undertaken various short courses (through Nelson Mandela University) pertaining to GIS and statistical analysis of ecological data. Since the conception of Biodiversity Management Services Christopher has partaken in several Terrestrial Biodiversity and Animal Species Specialist assessments and is involved in habitat management in areas across Africa.



3. Declaration by the specialist

I Dr Christopher Brooke declare that -

- I act as the independent specialist in this application;
- I am aware of the procedures and requirements 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 (NEMA), 1998, as amended, when applying for environmental authorisation which were promulgated in Government Notice No. 320 of 20 March 2020 (i.e. “the Protocols”) and in Government Notice No. 1150 of 30 October 2020.
- 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 –
 - o any decision to be taken with respect to the application by the competent authority; and;
 - o 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 48 and is punishable in terms of section 24F of the NEMA Act.



Signature of the specialist

Biodiversity Management Services

Company Name

Date: 14/08/2023



4. Introduction

4.1. Background

Cape EAPrac has been appointed by South African Trading Enterprises (Pty) Ltd. to conduct an EIA for the proposed construction of a seasonal tented camp in the Diepwalle forest (outside Knysna) in SANParks GRNP. The site was selected as it has been previously disturbed, and historically used as a sawmill site and movie set. The proposed development footprint covers an area of approximately 0.59 ha and encompasses a forest clearing, forest fringe, mature growth Southern Afrotropical Forest and a small artificial dam. The area falls within the Knysna municipality and Garden Route district municipality of the Western Cape. Biodiversity Management Services has been appointed by Cape EAPrac to conduct a terrestrial animal species specialist assessment for the proposed site. The terrestrial animal species specialist report is necessary as the DFFE screening tool identified the area as a 'high priority' for animal species under the animal sensitivity theme. The screening tool further identified seven species and forest invertebrates as either 'medium' or 'high' sensitivity. To this end a terrestrial animal species specialist assessment was conducted to determine the feasibility of the project, the best placement of infrastructure to minimize impact on animals, as well as suggest monitoring and mitigation measures that need to be implemented should the applicant (South African Trading Enterprises) be successful with their application for environmental authorisation.

4.2. Conditions relating to this report

The findings, observations, results and recommendations are based on the authors best scientific and professional knowledge. The conditions and limitations relating to this report were subject to the availability of suitable up to date literature regarding species distribution and occurrence. The likely occurrence of a species within the footprint of the proposed tented camp was based on habitat assessments, expert knowledge on the species identified by the screening tool, published literature and observations of species occurrence in the area. Fieldwork did draw some uncertainties leading to possible assumptions of species occurrence, in particular surrounding *Chlorotapla duthieae*. Fieldwork was conducted in February 2023 (see Approach and Methodology) as this was considered an appropriate time with the high likelihood of finding species and suitable habitats. It is a time when migratory species would have been present, temperatures were warm and water was readily available (although several days without rain prior to the survey meant the litter surface was relatively dry), providing suitable habitat for species. It is however possible that some species may have been absent during the sampling period. Importantly due to limited time in field a detailed faunal survey was not conducted, and likely occurrence of species was based on direct observation, known occurrence, habitat suitability, published literature or a combination thereof.



The author (Dr Christopher Brooke) reserves the right to modify aspects of the report, including the recommendations when and if new information may become available within reason of the proposed scope of the development. Although open to comment from Cape EAPrac this report may not be altered or added to without prior written consent of the author.

4.3. Scope of this report

The scope of this report was to conduct a terrestrial animal species specialist report for the proposed tented camp in a clearing in the Diepwalle forest, SANParks, Knysna municipality. This report deals with the potential impact of development on the animal species found in the study area. Specific focus is given to species identified through the DFFE screening tool, as a 'high' sensitivity animal species theme was identified. The impacts on these species and potential mitigating measures that can be implemented to avoid negative impacts are also discussed.

4.4. Description of study area

The mission of the GRNP is *"An innovative and accessible national park, spanning mountains to marine, conserving the natural and cultural heritage of the Garden Route collaboratively for the benefit of people and the environment"*. The study area is situated within SANParks GRNP in the Diepwalle (deep walls) forest. The site is located approximately 15 km from Knysna off the R399. The site falls within the Southern Afrotropical Forest vegetation type of the forest biome, a biome that covers only approximately 0.5 % of South Africa's Land surface area (Mucina and Geldenhuys, 2006). The study site is situated in a small forest clearing that has historically been subject to various levels of disturbance. This disturbance includes being used as a forestry station in the 1800s, the scene of various film sets more recently and elephant bomas. Although the area falls within the GRNP and is listed as an IBA, it is not listed as a sensitive (no-go area) by the EWT threatened species no-go mapping tool (Endangered Wildlife Trust, 2023). The road running past the study site is not public access and subject to little traffic. Aside from access to the site the road only serves as an access road to one of SANParks research sites. Importantly, this road is currently a jeep track (twee-spoor road) and with the exception of additional drainage to prevent further degradation, should be kept in as natural state as possible. The Outeniqua hiking trail also runs close to the proposed site (approximately 100 m to the south), it is of little consequence as it is planned to be moved and will not contribute any further disturbance to the area.

Although listed by Mucina and Geldenhuys (2006) as Southern Afrotropical Forest, the area is representative of several different fine scale habitats. For the benefit of understanding animal species habitat requirements, these habitats have been described as Mature Southern Afrotropical Forest, densely vegetated clearing and woody pond (Table



1 and Figure 1). Bordering the Mature Southern Afrotropical Forest and densely vegetated clearing there is little signs of ecotonal vegetation, however AIP's have been removed historically and may have been acting in this regard.

Table 1:Description of habitat types within the study area.

| Habitat type | Transformation | Invaded by IAP |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Mature Southern Afrotropical Forest | Very light transformation around the forest fringe. This includes remains of cut AIP and signs of old infrastructure | Little to none. <i>Acacia stricta</i> (hop wattle) seedling were noted on the forest fringe at the location to tent 8 and could signify the potential for reinvasion. |
| Densely vegetated clearing | Heavily transformed. The clearing is now densely vegetated. Many of the species are associated with disturbed areas (<i>Helichrysum</i> sp.) | Several invasive and non-indigenous species were noted at the site. These included garden roses and bramble (<i>Robus</i> sp.) |
| Woody pond | Transformed. Although the pond is man-made it has become a naturalised feature of the landscape and important for many species. | Little to none. No noticeable IAP's in this habitat, however there is evidence that AIP have previously been removed. |



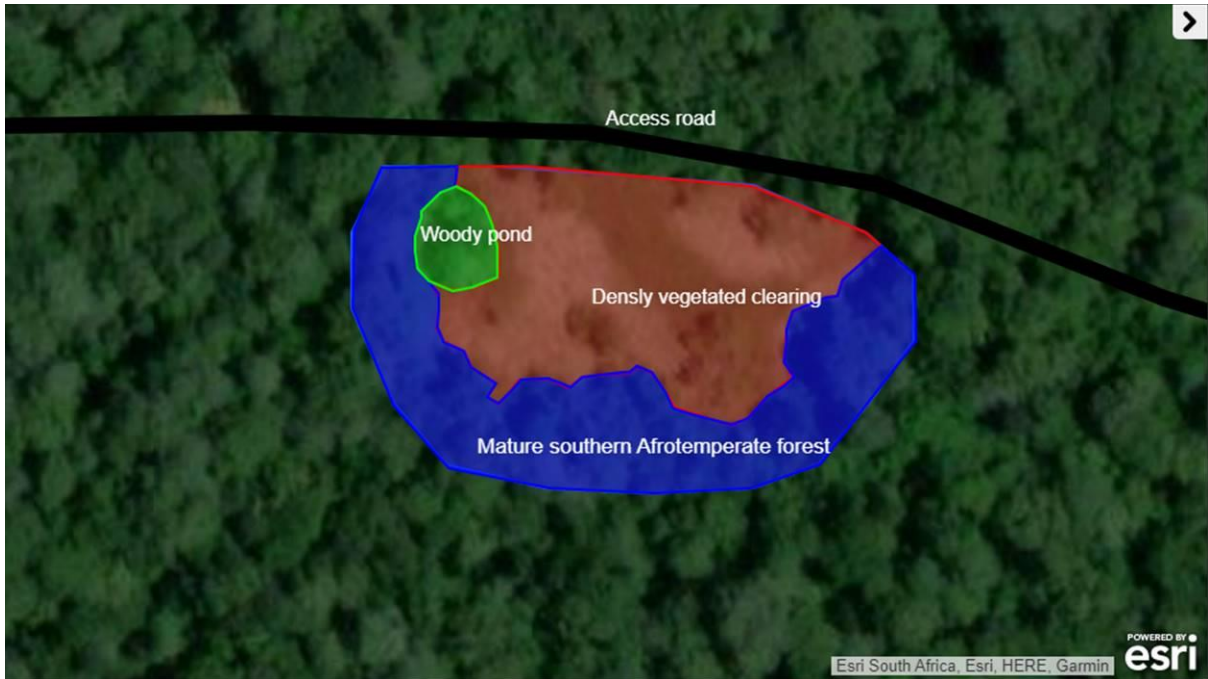


Figure 1:Satellite image of the proposed study area (plate 1) and description of the habitats (based on habitat characteristics) of the study site (plate 2) (“CapeFarmMapper,” 2016).

There is very little topographic variation on the study site. The site is characterised by a gentle slope with the highest point of the study site at the western edge (Figure 2). As a result there are no areas with steep slopes or areas that create unique habitats for animal specialists.



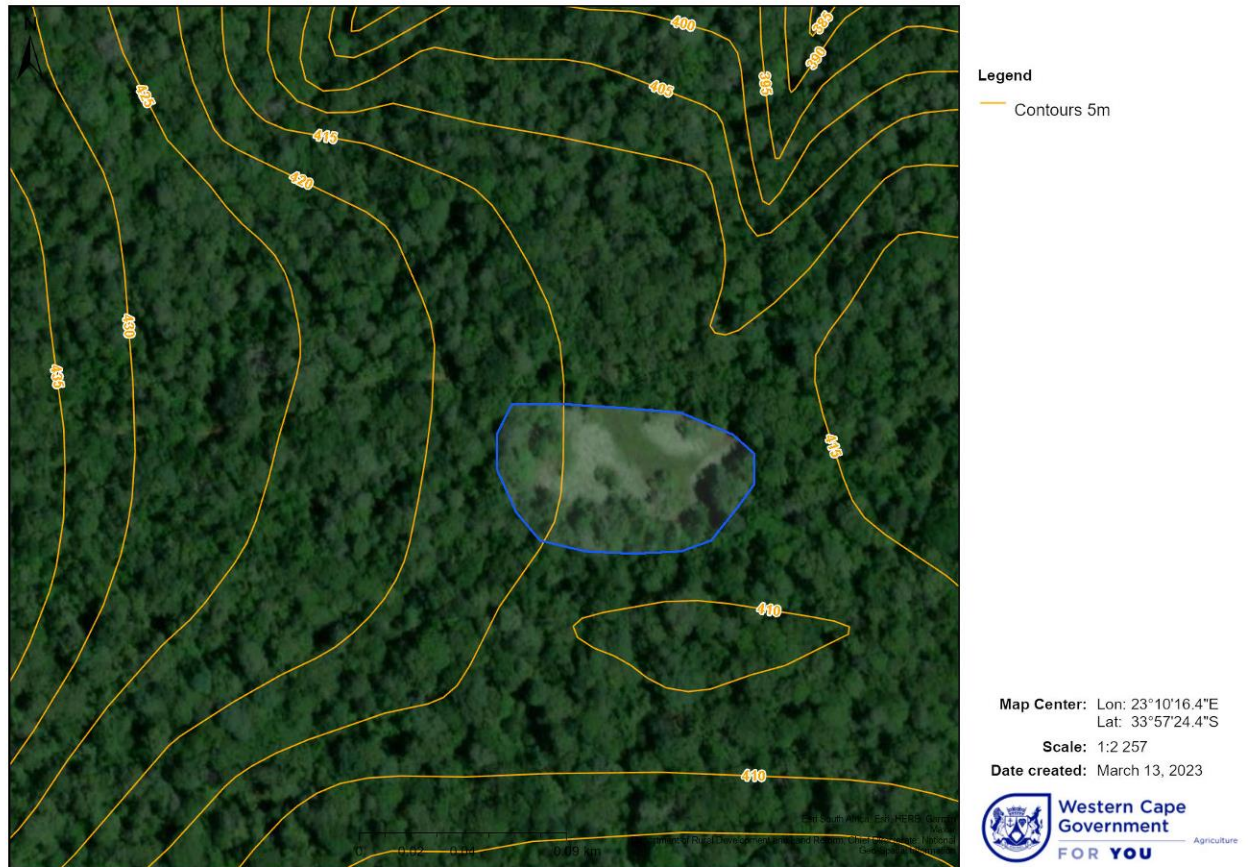


Figure 2: Topography of the proposed study site.

The proposed camp will consist of 15 guest tents, one large dining area, a kitchen area, several staff tents and a turning area for vehicles (Figure 3). Each guest tent will be on a wooden platform of 5 x 10m. All structures will be constructed on wooden platforms and be completely removable out of season and at the camp decommission. The main decks, pool area and yoga deck will be joined by a raised wooden walkway and the paths leading to each tent will remain gravel forest paths. Included in the proposed design are also forest library and quiet zones and areas that need to be set aside for water storage, and power (solar) generation and staff accommodation. The proposed dining and drop-off/pick-up areas are situated alongside an existing wetland (see freshwater specialist report for details) and is an area that is currently used for parking and turning vehicles. Based on the uniqueness of the area and the current queries around the current SDP the area has been assessed in terms of suitable habitat and presence of animal species. Importantly, and alterations to the SDP need to provide the same level of uniqueness and seclusion of the site but takes into account the environmental considerations that should be worked around. Thus a manual mapping of each tent position is proposed.



Water supply has been suggested wither through a gravity fed pipe from the Diepwalle camp or having water shipped in by tank. On the site water will be stored in wither 5000 or 10 000l tanks. Disposal of water from toilets and septic systems will be trucked out is self-contained sewage systems from chemical toilets. Grey water from showers, cooking facilities and pools will be disposed of by means of a slip path and soakaways outside of and not flowing toward the wetland area.

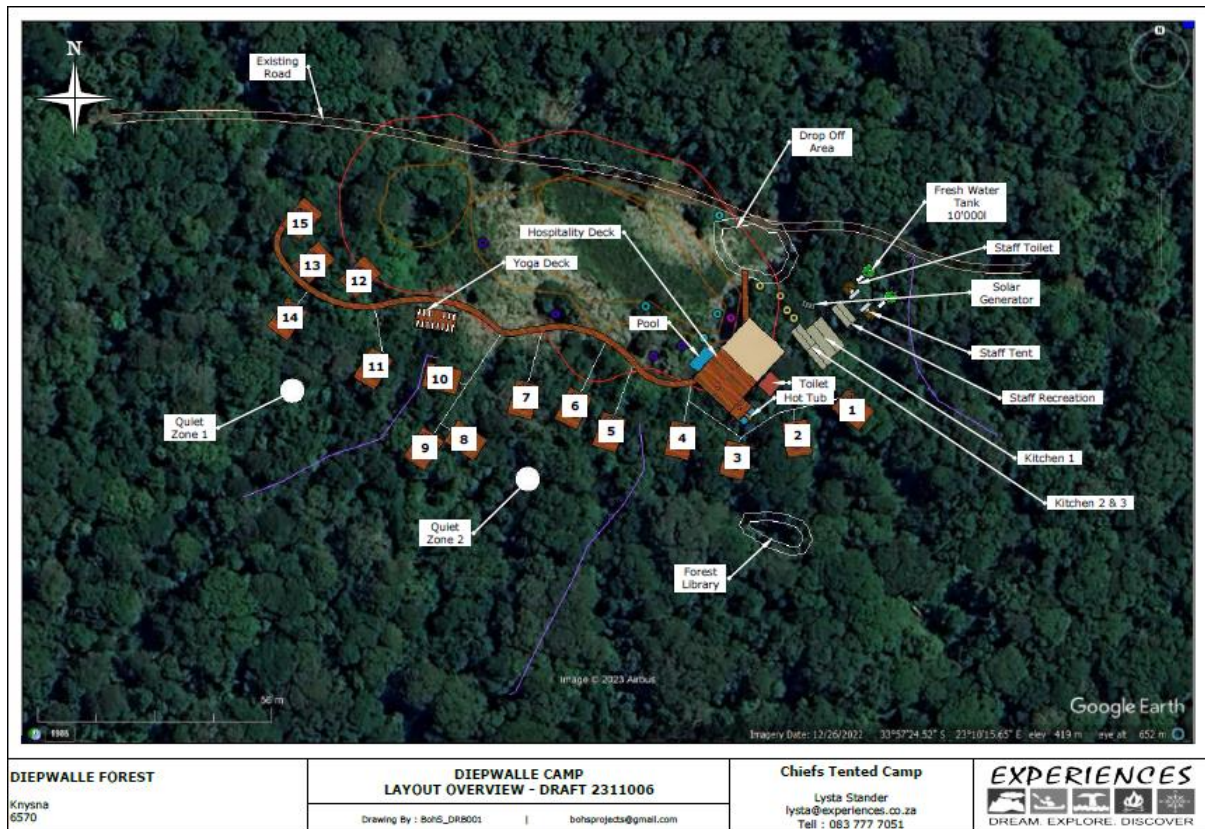


Figure 3: SDP for the Diepwalle tented camp.

5. Approach and Methodology

Prior to a field site visit a literature review and desktop study was conducted. This investigation made use of several available online resources to determine presence or absence of species at the proposed site of the tented camp. Resources included species specific research for those species identified by the scoping tool, available species distribution and red list data from SANBI. Recent satellite imagery for the site was gathered from Google Earth and the proposed layout of the camp overlaid to determine the areas where the highest impact would be likely. The Endangered Wildlife Trust No-Go mapping tool (Endangered Wildlife Trust, 2023) was used to determine if the area was highly sensitive in terms of the environment or key species in the study area. Importantly, the study area did not fall within any no-go areas.



A site visit was conducted on Thursday 16th February 2023 throughout the course of the day. Only a single survey was conducted at this site as it was relatively small and the majority of species identified by the screening tool were cryptic and would not be easy to find. This resulted in using known distributions (identified through the literature studies and communication with SANParks staff) to determine habitat suitability and likelihood of species occurrence at the study site. The survey took place in summer when temperatures were warm. Warm temperatures were hoped to coincide with increased activity of invertebrates, reptiles and amphibians. However, during our site visit the proposed site was relatively dry and species activity was low.

During the survey all species were noted if they were present at the site. These species observations included direct observations, auditory observations and species specific habitat modifications (nests and underground tunnels used by moles). For forest invertebrates several small sites were identified and at each of these sites, inspections were conducted in rotten and fallen debris, soil and leaf litter was moved around in an attempt to find and identify species. However, the dry conditions at the time of the survey were not ideal and few forest invertebrates were found. Several species of *Peripatopsis* (velvet worms; listed as vulnerable or higher by the IUCN) were indicated as likely to occur by SANParks staff, however, none were found during our surveys. IAP's, areas that were degraded and old infrastructure that could provide habitat for species was also noted. Habitat information gathered during the site visit was compared to the preferred habitat and habitat requirements of the species identified by the screening tool and used as a proxy for likely occurrence in the event that species were not seen during the site visit. For each species suitability of habitat was graded as suitable, marginal or unsuitable and the presence of the species of concern was graded as likely to occur, possibly can occur or unlikely to occur.

5.1. Faunal inventories

Faunal inventories were collated from the most recent published literature and online resources. The occurrence of mammals, reptiles, frogs and insects (where available) was compiled using QDS records for 3323cc. QDS record data was collected from the Animal Demography Unit MammalMAP, reptile data from the ReptileMAP and amphibian data from the FrogMAP. Complete inventories of mammals and reptiles and amphibians can be found in Appendices 1-3 (<https://vmus.adu.org.za>). Complete inventories of Insecta are rare and often not reliable for determining distribution and species traits. However, using the Animal Demography Unit's LepiMAP, OrdonataMAP, ScorpionMAP, LacewingMap, DungbeetleMap and SpiderMAP we have compiled a list of invertebrates where possible (Appendix 4) (<https://vmus.adu.org.za>). Data on avifauna for the site was generated using SAPAB2 using the pentads 3355-2310. Data on complete avifauna occurrence for the pentads can be found in Appendix 5. Data on avifauna includes a list of species that were seen at the site during the site survey (Appendix 6). Finally, focus was given to species that were identified as sensitive by the screening tool (Table 2).



Table 2: The seven species of concern listed by the screening tool, the scoping report sensitivity score, SANBI red list category following the IUCN guidelines (SANBI, 2023) and Appendix 7, predicted occurrence at the site and basic habitat requirements.

| Species | Taxonomic family | Common name | Scoping report sensitivity score | IUCN Red list category | Predicted occurrence in the study site | Habitat requirements | Justification for predicted occurrence |
|--------------------------------|------------------|--------------------------|----------------------------------|------------------------|----------------------------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| <i>Bradypterus sylvaticus</i> | Locustellidae | Knysna warbler | High | Vulnerable | High | Afromontane forest fringes | Well suited to habitat and known to occur |
| <i>Circus maurus</i> | Accipitridae | Black harrier | Medium | Endangered | Low | Fynbos and mountain fynbos, high altitude grasslands and into the semi-desert of the karoo | Unsuitable habitat |
| <i>Afrivalus knysnae</i> | Hyperoliidae | Knysna leaf-folding frog | Medium | Endangered | Medium/low | Wetlands and dams including suitable artificial habitat | Could potentially occur, however has not been previously recorded and habitat not optimal |
| <i>Stephanoaetus coronatus</i> | Accipitridae | Crowned eagle | Medium | Vulnerable | High | Mature Forest | Habitat suitable and known to occur |
| <i>Chlorotapla duthieae</i> | Chrysochloridae | Duthie's golden mole | Medium | Vulnerable | Medium | Coastal forest, suburban gardens and pasture lands on alluvial sands and sandy loams | Habitat suitable and signs of moles found. However, these cannot be attributed to <i>C duthieae</i> with certainty |



| | | | | | | | |
|------------------------------|-----------|---------------------------------|--------|------------|--------|-----------------------------------|-------------------------------------------------------------------------------------------------------|
| <i>Sensitive species 8</i> | N/A | N/A | Medium | Vulnerable | Medium | Mature Forest/Dense vegetation | Known to occur in the area, however recent anthropogenic pressure appears to be affecting the species |
| <i>Aneuryphymus montanus</i> | Acrididae | Yellow-winged agile grasshopper | Medium | Vulnerable | Low | Montane fynbos in rocky hillsides | Habitat unsuitable and not found within the study area |



5.2. Faunal occurrence

The study area is situated within one of the largest unfragmented piece of Southern Afrotemperate Forest in South Africa. The area is managed by SANParks for the preservation of biodiversity, heritage and ecosystem processes. GRNP represents one of the few National Parks in South Africa that is not fenced and movement of species between the GRNP and surrounding landscape is not inhibited. Although fragmented the GRNP currently covers 165 899 ha, including cultural areas that have not officially been declared as part of the park. This large area provides habitat and sanctuary for many species, however research is ongoing to better understand the species and biodiversity within the GRNP.

Progress has been made and continues to understand the indigenous fauna of the area but focuses primarily on selected species. These include *Philantomba monticola* (blue duiker), *Loxodonta africana* (African elephant), *Stephanoaetus coronatus* (crowned eagle) as well as terrestrial invertebrates, small mammals, medium to large mammals and terrestrial birds (SANParks, 2020). Furthermore, several species that likely occurred historically in the GRNP include *Diceros bicornis* (black rhinoceros), *Hippopotamus amphibius* (hippopotamus), *Syncerus caffer* (cape buffalo), *Tuarotragus oryx* (eland), *Alcelaphus buselaphus* (red hartebeest), *Equus zebra zebra* (Cape mountain zebra) and *Panthera leo* (lion) (Lloyd, 2007; Skead et al., 2007). However, it is unlikely that any of these species would have occurred at the study site. Of the approximately 1000 elephants thought to have occurred in the area only one known female remains (SANParks, 2020). Although historically disturbed, it is thought the area still contains a near complete suite of fauna and is thus crucial for species protection.

For the purpose of this study, the likely presence of species is determined through the species strong associations with particular habitats. Due to the short time-period and when single field surveys were conducted, it was unlikely that we would physically find any of the species identified by the screening tool. As a result we followed the method of (Cooperrider et al., 1986) to determine the likely presence or absence of species based on the suitability and availability of habitat (Figure 4).

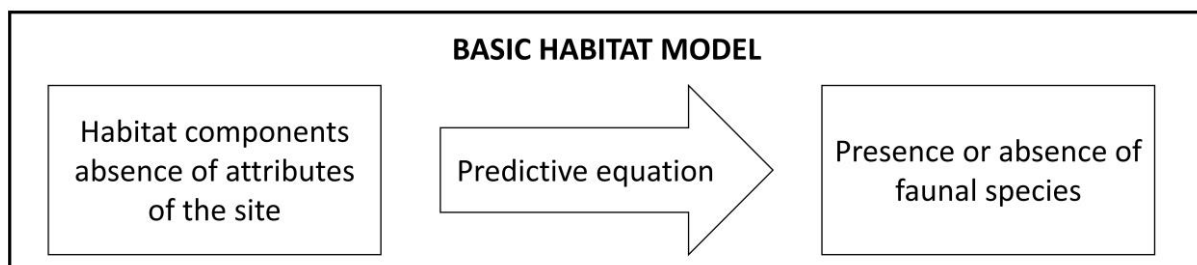


Figure 4: Basic illustration of the habitat model developed by (Cooperrider et al., 1986).



6. Description of the affected species

The relative animal species sensitivity theme was identified as 'High Sensitivity' noting seven species of concern and forest invertebrates. Of these species only one (*Bradypterus sylvaticus*) was listed as high sensitivity. All other key species identified by the screening tool were listed as 'Medium Sensitivity' (Table 2). Important characteristics of each species and their likely occurrence in the study area are highlighted below. Last observation of each species (where available) given in this description is specially for 3323cc (i.e., the QDS intersected by the study area). The screening tool does not detect species that are listed by the IUCN criteria as being near threatened, or data deficient. However, these are also potentially important species of conservation concern. A list of species for the study area that meet these criteria are given below along with their likelihood of occurring in the study area. In the event they are likely to occur in the study area a brief description accompanies each species.

6.1. *Bradypterus sylvaticus* (Sundevall, 1860)

Bradypterus sylvaticus (Knysna warbler) is secretive and listed as an uncommon to rare, localised endemic. *B. sylvaticus* occurs in tangled vegetation along the fringes of Afromontane forests and along drainage lines in the Fynbos Biome. However, in George, birds have been noted abandoning these habitats in preference for densely wooded suburban gardens that provide ample nesting habitat (Taylor, 2015a). It has been known to use bramble thickets and these habitat modifications are common within the study area. *B. sylvaticus* feeds primarily on insects, slugs and worms where it forages mostly on the ground moving through dense low matted vegetation. The main threats to this species are habitat destruction due to the construction of fire breaks (reduced fire frequency resulting in habitat modifications) and heavy invasions of AIP's in green belts (Chittenden et al., 2016). SABAP2 (<https://sabap2.birdmap.africa/>) records show *B. sylvaticus* at the study site, but the last recorded observation was on the 16th of September 2016. Furthermore, communication with SANParks staff indicates the species is present and has been seen at the study site. The vegetation at the study site is well suited to *B. sylvaticus*. The large forest fringe and densely tangled wooded habitat surrounding the small artificial dam provide good habitat. Furthermore, the dense vegetation within the clearing (dominated by *Helichrysum* sp.) is well suited to the species for both feeding and breeding. If this habitat in the clearing is lost due to clearing for aesthetic purposes around the proposed tented camp it may be detrimental for *B. sylvaticus*.

6.2. *Afrivalus knysnae* (Loveridge and Shreve, 1954)

Listed as Endangered by SANBI all individuals of *Afrivalus knysnae* (Knysna leaf-folding frog) are found within five distinct populations in their range. *A. knysnae* are found in a mosaic of coastal vegetation types where they occur in ponds and dams with shallow semi-permanent water and emergent vegetation (Rebelo et al., 2022) found along the fringes of Afromontane forest where water is present (du Preez and Carruthers, 2009). Although the



habitat appears suitable in the small pond at the western edge of the clearing and there is adequate aquatic vegetation to provide habitat and nest material, no *A knysnae* were found during the field visit. Importantly, it was noted during the Aquatic Biodiversity Specialist Assessment the water was relatively turbid, although this might not be the case throughout the year. During our survey period the pond was relatively empty, with only a small portion of water at the roadside wall. Unfortunately, the last observation of *A knysnae* on the ADU FrogMAP for the study area was recorded on the 2nd of December 1940. Additionally, the sides of the pond were steep, and this does not provide suitable habitat for *A knysnae* (De Lange, 2019). Based on the assessment of the habitat available at the site, the proximity to other water sources and the requirements of *A knysnae* it is unlikely that it will occur at the proposed site, however they are known from the broader area and cannot be ruled out of the study area completely.

6.3. *Circus Maurus* (Temminck, 1828)

Circus maurus (Black harrier) is a species associated with open habitats in Fynbos and mountain fynbos, high altitude grasslands and into the semi-desert of the karoo. Listed as an uncommon endemic who feed primarily on rodents, small birds and to a lesser extent reptiles, frogs and insects (Chittenden et al., 2016). Hunting is typically done in the open where prey is located (visually or auditory) and ambushed from flight. Nesting of *C maurus* occurs in marshy habitat close to the ground (Chittenden et al., 2016). Based on the characteristics and habitat requirements of this species it will almost certainly not occur at the study site as it is not adapted to densely forested environments and the relatively small clearing will not provide suitable habitat. Furthermore, there are no records for the study site from SABAP2.

6.4. *Stephanoaetus coronatus* (Linnaeus, 1766)

Stephanoaetus coronatus (Crowned eagle) are found predominantly in forest, including riverine and gallery forest as well as densely wooded savannas and plantation forests (Taylor, 2015b). Importantly, Southern Afrotemperate Forest was abundant in the study area. *S coronatus* are known to feed on small rock mammals, and domestic animals, showing an ability to adapt to losses in habitat (Taylor, 2015b). Communication with SANParks indicated that *S coronatus* is present in the area, but not often seen around the study site. The only two known nests surrounding the study site are in Gouna and Bergplaas sections of the Garden Route National Park. The Gouna nest is approximately 13.5 km from the study site (Figure 5) whereas the Bergplaas nest is approximately 50 km from the study site. Although it is likely that *S coronatus* will occur within the study site there are no records available for this species on SABAP2 (<https://sabap2.birdmap.africa/>) indicating a possible low density in the area. Understanding the species and local demographics in the area surrounding the proposed tented camp site it is unlikely that the development of the site will have any negative effects on *S coronatus*.





Figure 5: Location of the nearest crowned eagle nest in relation to the proposed site for the tented camp in the Diepwalle section of the Garden Route National Park.

6.5. *Chlorotapla duthideae* (Broom 1907)

Chlorotapla duthideae (Duthie's golden mole) is known from only two distinct sub-populations in the Eastern and Western Cape Provinces where it occurs between George and Gqeberha (formally Port Elizabeth). *C. duthideae* inhabits coastal forests, suburban gardens and pasturelands where habitat is within alluvial sands and sandy loams. *C. duthideae* is nocturnal and predominantly uses tunnels and leaf litter close to the surface where it feeds primarily on earth worms (Mittermeier and Wilson, 2018). Although known to make nests at the base of trees, this was not noted at the study site where the majority of tunnels close to the surface were found in more open areas among young vegetation (Figure 6). Coincidentally, this was where the location for the staff tents, main catering deck and a small portion of the back of house and kitchen.

The only other species that could potentially have made these subsurface tunnels (Figure 6) is *Amblysomus corriae* (Fynbos golden mole). *A. corriae* exists in similar areas and similar habitats as *C. duthideae* but the two species appear to select for different microhabitats. *A. corriae* preferring forest fringes and associated fynbos whereas *C. duthideae* prefers deeper forests (Bronner and Mynhardt, 2015). Based on the location of the site (deep in the forest), even though it exhibits characteristics of forest fringe, it is more likely that *C. duthideae* is the species responsible for the subsurface tunnels although any confirmation can only be done through trapping and identifying individuals.





Figure 6: Subsurface tunnels created by moles at the sites for staff tents, main catering deck and a small portion of the back of house and kitchen in the proposed SDP. It is difficult to say with certainty that the species responsible for these subsurface tunnels is *C duthideae* but it is a likely possibility. Subsurface tunnels were opened to determine the diameter of the tunnel.

6.6. Sensitive Species 8

Sensitive species 8 is a forest specialist with a known declining population due to habitat loss and ever-increasing development along the coastline. Sensitive species 8 is associated with a narrow strip of evergreen coastal and scarp forest. The species is secretive and not often seen (Venter et al., 2016). A diurnal species it is often targeted by poachers for meat (Estes, 2012). Based on the available information and field surveys it is likely that sensitive species 8 will occur within the study area. Camera trap images have been captured not far from the proposed site in the same section of forest. However, after communication with SANParks staff it appears that the noise caused by domestic dogs at the Diepwalle camp has drastically decreased the number of observations of sensitive species 8 in the region of the study site. Although thought to be moderately tolerant to anthropogenic disturbance (Venter et al., 2016), indications at the Diepwalle forest camp suggest a high sensitivity to disturbance sensitive species 8 has likely been pushed deeper into the forest and away from



humans. Based on this information it remains likely that sensitive species 8 will still occur in the study area, even if it is at lower densities. During the field surveys, habitat was determined to be well suited to sensitive species 8, even though no direct signs of the species were found during the survey. A week after our field survey there was a recorded sighting by one of the other specialists of sensitive species 8 on the access road to the proposed site. However, there are no recorded sightings for the study area of the ADU MammalMAP.

6.7. Forest invertebrate

SANParks staff made note of four species of *Peripatopsis* that were all listed by the IUCN as being threatened or higher (Table 3). Although it is possible that all of these species could occur at the study site, none were found during the survey. During the survey for forest invertebrates several invertebrate families were found and identified, however none were collected and sent for identification. Furthermore, a lower than expected diversity of invertebrates was found during the survey and it is likely that this is a direct result of the dry conditions (resulting in low soil moisture) leading up to the field survey. Invertebrate families that were found during the survey include earthworms, millipede, harvestman, centipedes, spiders, scorpions, butterflies, carpenter bees, damsel flies, cicadas and mosquitos. A complete list (including IUCN red list status where available) of available invertebrate data for the site can be found in appendix 4 from the ADU LepiMAP, OrdonataMAP, ScorpionMAP, LacewingMAP, DungbeetleMAP and SpiderMAP. As a result of the high invertebrate diversity in the area it is likely that development will impact a number of invertebrate species. Importantly, development should cause the least disturbance possible, raised decks and walkways can be implemented to minimise the footprint traversed by people and minimise disturbance to the forest floor and leaf litter layer. Examples of important invertebrate habitat that where disturbance needs to be avoided as far as possible is depicted in Figures 7 and 8.

Table 3: *Peripatopsis* (velvet worm) species likely to occur at the study site.

| Species | IUCN Red list category |
|-------------------------------|------------------------|
| <i>Peripatopsis mellaria</i> | Vulnerable |
| <i>Peripatopsis forex</i> | Threatened |
| <i>Peripatopsis edenensis</i> | Endangered |
| <i>Peripatopsis clavigera</i> | Critically endangered |





Figure 7: Well suited habitat for forest invertebrates. However, the dry conditions during our site visit were not ideal for finding these species.





Figure 8: View of the clearing that the proposed tented camp will be situated around and the habitat it entails. The drop-off/pick-up point kitchen and central walkways will all be situated in this clearing.

6.8. *Aneuryphymus montanus* (Brown, 1960)

Aneuryphymus montanus (Yellow-winged agile grasshopper) is associated with fynbos vegetation where it is associated with rocky hillsides and has been collected amongst recently burnt *sclerophorus* vegetation and is thought to prefer south facing slopes. There is no such habitat within the immediate surrounds of the study site.



7. Species not included by the screening tool where environmental consideration is important

Several other species were recorded during the site survey and these included *Potamochoerus larvatus* (bushpig), *Hadogenes capensis* (cape rock scorpion), *Lycodonomorphus inornatus* (olive ground snake), *Strongylopus grayii* (clicking stream frog), *Amietia fuscigula* (cape river frog) and *Cassionympha cassius* (rainforest brown) (Figure 9). However, no species identified at the site were of environmental concern.

Species that were identified by ADU virtual museum records of having an IUCN red list rating of Near Threatened or higher but were not considered by the screening tool are also important to consider for the proposed development. ADU virtual museum records are listed below (Table 4) but only species considered important for the proposed tented camp footprint are discussed any further. A complete list of mammals, reptiles, amphibians, invertebrates from the ADU virtual museum for the study site is prepared in appendices 1-4 and a complete list of birds for the study site from SABAP2 in appendix 5.

Table 4: Potential vertebrate species of conservation concern identified as occurring in the region (QDS) of the study site. Species are listed with their IUCN category and habitat requirements.

| Species | Common name | IUCN red list category | Habitat requirements | Predicted occurrence in the study site |
|-------------------------------|--------------------------|------------------------|--------------------------------------------------------------------------------|----------------------------------------|
| <i>Amblysomus corriae</i> | Fynbos golden mole | Near threatened | Sandy and sandy loam soils in fynbos and forest (particularly forest fringes). | Medium |
| <i>Dasymys capensis</i> | Water rat | Vulnerable | Intact rivers and wetland ecosystems | Low |
| <i>Dasymys incomtus</i> | Common dasymys | Near threatened | Intact rivers and wetland ecosystems | Low |
| <i>Myosorex longicaudatus</i> | Long-tailed Forest Shrew | Endangered | Primary forest, forest ecotones, fynbos and boggy grasslands | High |
| <i>Miniopterus</i> | Schreibers's | Near | Does not appear to | Low |



| | | | | |
|------------------------|-------------------|------------|------------------------------------------------------------------------------------------------------------------------|------|
| <i>schreibersii</i> | Long-fingered Bat | threatened | be from southern Africa, ADU distribution records in question. ADU could be referring to <i>Miniopterus natelensis</i> | |
| <i>Panthera pardus</i> | Leopard | Vulnerable | Wide variety of habitat including forest, fynbos, coastal shrubland and savanna | high |

7.1. *Amblysomus corriae*

A corriae are listed as Near Threatened by the IUCN and this provides information as to why they were not detected by the screening tool (only detects vulnerable or higher). As discussed in Section 6.5, *A corriae* occurs in similar habitat to *C duthideae*, however they are known to prefer the forest fringes. *A corriae* are insectivorous and feed mainly on insects and earthworms (Bronner and Mynhardt, 2015). Based on knowledge of this species, it is likely that either *A corriae* or *C duthideae* will occur at the study site, but not both. It is possible that the species responsible for the diggings and sub-surface tunnels at the sites of tents 2 and 3 are *A corriae*, but as discussed in Section 6.5 it is more likely they belong to *C duthideae*.

7.2. *Myosorex longicaudatus*

Recorded in primary forest, forest ecotone, fynbos and boggy grassland *M longicaudatus* (long-tailed forest shrew) are listed as vulnerable by the IUCN. *M longicaudatus* are threatened by habitat loss through deforestation, but still appear relatively common in its distribution range. Collections that have been analysed were collected at the Diepwalle forest station, approximately 1.5 km from the proposed site (BGIF, 2022). This species represents good climbers and are insectivorous. Based on species knowledge it is likely that *M longicaudatus* will occur at the site and possibly in relatively high densities. Further evidence to support this is the availability of suitable food and habitat that is well suited to *M longicaudatus*. It is likely that the proposed tented camp will affect populations of *M longicaudatus* in the area, however with the correct implementation of mitigatory measures (Section 8), I cannot see these impacts being detrimental to *M longicaudatus*.

7.3. *Panthera pardus*

Although widespread *P pardus* (leopard) faces widespread threat outside of protected areas. Loss of suitable habitat and habitat fragmentation are posing threats to the species.



Despite this *P. pardus* are highly adaptable and able to survive in a wide array of environments. In the Eastern and Western Cape provinces *P. pardus* tend to occur at low densities and are often prosecuted by humans (McManus et al., 2022). These threats highlight the importance of protecting large forest fragments such as the Diepwalle forests where species risk from humans are lower. Based on this information it is very likely that *P. pardus* will occur at the study site. However, their low density in the area and sensitivity to humans means they will likely avoid the study area if the camp is created. They will likely move further into the forest where risk of encountering humans is lower. As a results, I suggest that the construction of the proposed tented camp will pose minimal threat to *P. pardus* within the area. The small scale of the development footprint will also cause minimal negative impact on the habitat and presence of *P. pardus* in the area.

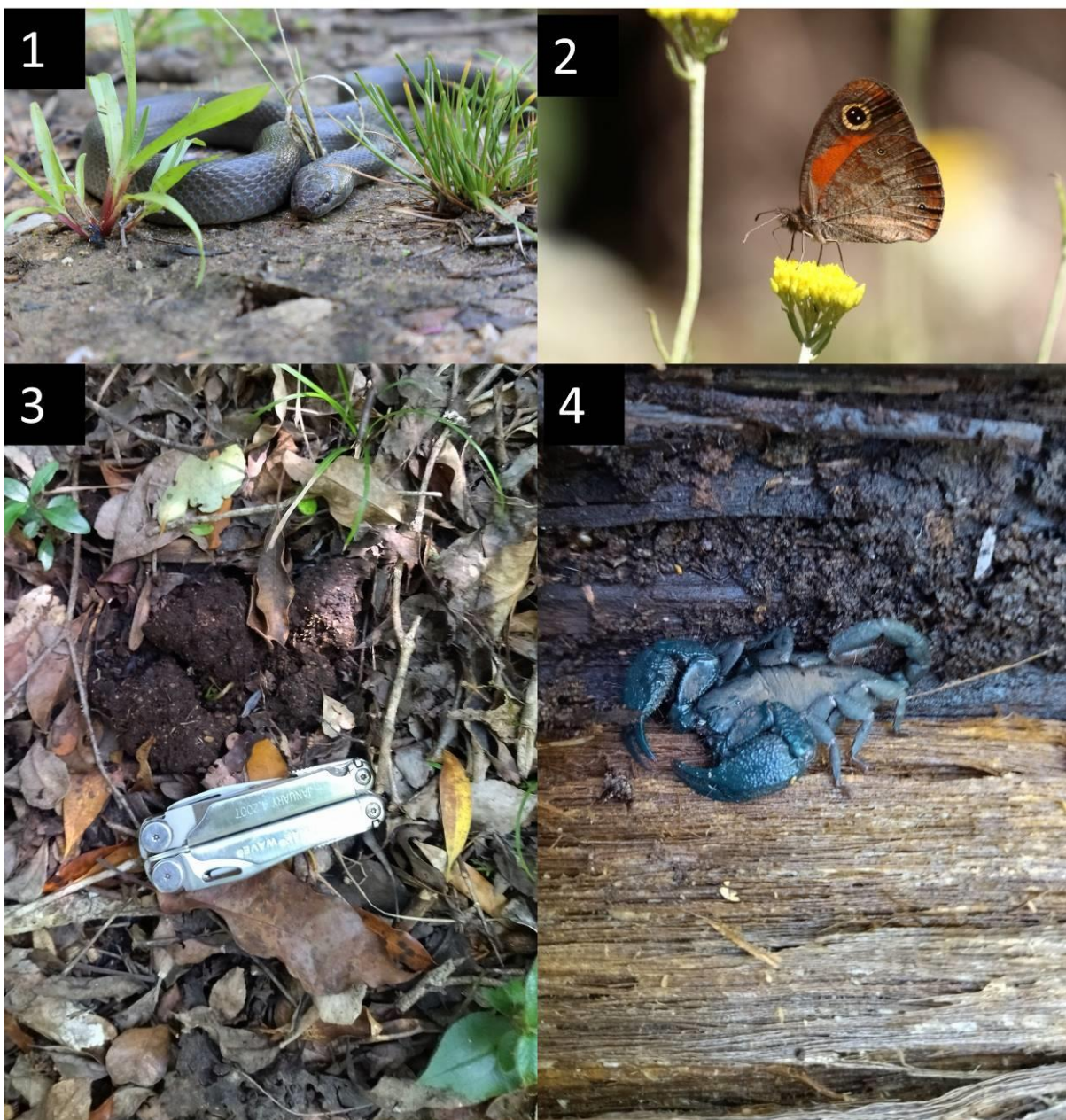


Figure 9: Some of the species found during our field survey. Plates (1) *Lycodonomorphus inornatus*, (2) *Cassionympha cassius*, (3) *Potamochoerus larvatus* droppings and (4) *Hadogenes capensis*.

8. Assessment of impacts and mitigation measures

Although several of the species identified by the screening tool may occur at the study site, none were found during our field visit and sensitive species 8 was seen nearby the following week. Our findings have indicated that this area is a key area for protected and endangered animal species and any proposed developments in the area need to be cognisant of this. Although the construction of the proposed tented camp is unlikely to have any detrimental effects of any of the species identified by the scoping tool, it will no doubt have an effect on other (non-threatened species) that were not identified as being at risk by the screening tool. It is important that the proposed development does not cause any unnecessary disturbance to species. Disturbance that needs to be avoided includes the area of the woody pond where species rely on permanent water for habitat (invertebrates, amphibians etc.) and water sources (mammals) It is crucial that the woody pond not be closed off and made inaccessible by the boardwalks.

Below are a list of mitigatory measures that should be implemented to minimize the impact of development on animals in the area directly surrounding the proposed development.

- Raised boardwalks – Boardwalks should be constructed with divisions that can be removed when the camp is not in use, unless the boardwalks are removed entirely out of season. Raised boardwalks may have a negative impact on large mammals trying to pass through the camp, however the negative impacts are far outweighed by the fact that there is no continual disturbance on the forest floor. Leaf litter will build up underneath the walkways providing habitat and food for many invertebrates and small mammals. Furthermore, raised walkways will not negatively affect the movement of smaller species on the forest floor. Species such as *C duthideae* (highlighted by the screening tool) will only be negatively affected during the initial construction of walkways where wither holes are dug or stabilising blocks are places on the ground. However, in order for this to be realised, once walkways have been constructed no person should be walking next to or through the natural vegetation where they can disturb the environment and associates species.
- Down lighting – Environmental consideration needs to be taken into account with lighting and care must be taken to place lights only in areas where they are essential (light walkways and inside tents/enclosed areas). No artificial lighting should be used for aesthetic purposes such as to light the clearing or artificial dam. Unnecessary lighting will negatively affect wildlife, can disorientate species and cause considerable invertebrate mortalities (insects get disorientated and attracted to lights where they eventually die). Some solutions to this are to use downlighting and



motion activated lights. Downlights should be fitted as low as feasibly possible and should produce light on the areas needed. This includes shielding the light so that no light is emitted at an angle greater than 90° (or as near to that is safely possible). Additionally, the lowest lumen lights possible for the desired effect are advised.

- Use of lighting – Ideally there should be a threshold after which all external lighting is switched off. Lighting inside the individual tents, cooking area (when in use) and dining area (when in use) should pose little problem. However, outdoor lighting (i.e. downlighting) that can interfere with and disorientate species should be switched off after a certain time or when the specific area is not in use.
- Minimizing the environmental footprint – Minimize any unnatural disturbance outside of the demarcated areas for infrastructure and boardwalks. This includes the area surrounding the woody pond. Although the pond is not a natural feature, it has over time become naturalised in the landscape and provides crucial habitat and resources for a variety of species. In this regard it is recommended that boardwalks obscure the pond as little as possible. The original layout would prevent approximately 70% of movement around the pond (Figure 2) and this will drastically inhibit species trying to use the habitat. It is recommended instead that boardwalks skirt only the western edge of the woody pond taking guests through the forest to access their tents rather than through the clearing (Figure 3). The dense natural vegetation in the clearing will also provide habitat for *Bradypterus sylvaticus* and the tangled vegetation will provide important habitat for them to feed close to the ground. As a result, the disturbance to this vegetation needs to be minimized. Some clearing may be possible and necessary, especially around the kitchen and dining areas, however clearing should only be carried out with the approval of the ECO in demarcated areas.
- Eliminate the need for a generator – using solar is an alternative. If cooking is done at the Diepwalle camp there should be no huge demand for electricity. The use of a generator will cause disturbance to both guests and the environment. Furthermore, placing the generator away from guests in an area where it is thought to cause little disturbance is highly discouraged. Vibrations from the engine negatively affect organisms on or in the ground and noise disturbs numerous species that use auditory cues for feeding and communicating. Important species to consider in this regard are amphibians (frogs), Chiroptera (bats) and many invertebrates. Engine vibrations are well known as a deterrent for moles and other burrowing mammals. Importantly, vibrations and noise from generators can inhibit communication, predator prey interactions and habitat use in many invertebrate species. Specific to this study will be the effect of the generator on the communication of *A knysnae*, habitat use and disturbance to *C duthideae* and all-round disturbance to forest invertebrates. As an additional measure, in the event there is not enough solar, batteries could be charged and brought into the camp with the multitude of vehicles bringing food, guests and resources into the camp. A proposed mobile generator (mounted on a trailer) as suggested by the developer is a suitable workaround and back-up power source. In a situation where a generator is needed to charge



batteries (i.e. in overcast conditions where solar is not feasible), the trailer can be moved to the Diepwalle SANParks camps and batteries can be charged where there will be little disturbance.

- ECO – Appoint and use an environmental control officer. This is especially important during the original layout and construction of the camp to ensure that minimal disturbance possible is caused. This can include having the ECO make minor changes to the camp layout and positioning of any infrastructure where deemed necessary. Importantly, the ECO should ensure the smallest footprint is disturbed as possible and only clearly marked paths are used where areas of low impact have been identified. Additionally, the ECO needs to be cognisant of the sensitive species in the area (especially those living on or under the soil surface) and special attention needs to be given not to disturb these species wherever possible.
- Road management – To minimize disturbance along the road, I suggest the road is not graded (as mentioned by SANParks staff it should be), rather manual repairs be done where needed and the ‘two-track road’ is maintained. Keeping the road in as natural state as possible is important as it limits the effects of linear infrastructure on animal species in the area, and although only a small road it may form a near impenetrable barrier for small species who are unable to cross safely. There will be a risk of vehicle collisions to species (especially smaller species drivers do not see). Additionally, species may also put themselves at risk by traversing onto the road (outside of their natural habitat) to cross between fragmented patches of forest. Risks include vehicle collisions, predation where there is little or no cover and desiccation in the event species are forced into direct sunlight for long periods. Much of this maintenance and alterations that need to be conducted on the existing road will be incorporating drainage into the road to divert water into areas that is safe to do so. This will limit the formation of dongas and gullies in the road surface considerably, while limiting the disturbance to animals in the area. Roadside drainage needs to consider where the water is being released from the road as to prevent further damage in natural areas. Advice would be to make small bolster humps and associated drains on the downward slope of the road verge wherever deemed necessary. Furthermore, it is important to make sure these drains flow into well vegetated and stable areas where water will easily be able to infiltrate the ground and there is little risk of further runoff.
- Removable walkways – Removable sections in the raised deck walkways. The raised boardwalks are preferable as they will impact fewer species at the proposed study site. Small animals and invertebrates will be able to pass underneath uninhibited. However, when the site is decommissioned outside of season these walkways will still form a barrier to the movement of larger species in the area, some of which are listed as sensitive. It is thus suggested that the boardwalks be constructed with sections that are easy to remove (possibly a two-meter section every 10 meters of



boardwalk). This will limit the negative impacts of linear infrastructure on species and lessen the environmental footprint of the proposed site outside of the tourist season and ensure the boardwalks will not inhibit the movement of large species when the camp is decommissioned.

- Animal proof refuse facilities – both baboons (*Papio ursinus*) and vervet monkeys (*Chlorocebus pygerythrus*) are known to be in the area and can easily become a pest if they identify the camp as an easy food source. Care needs to be taken to ensure that all refuse facilities are animal proof and rubbish bins have lockable lids. Caution also needs to be taken around the kitchen and dining areas to ensure that no food or food waste is left lying around as this can become an easy meal for animals (especially primates). Unfortunately, once behaviours are learnt (i.e. raiding and stealing food) it becomes very difficult to stop these behaviours and it is often to the detriment of the animal species.

8.1. Site decommission

As with the construction of the site and seasonal setup at the site, decommission is also crucial to minimize any negative impacts of the environment and species therein. I therefore advise the following guidelines for the decommission of the site to minimize effects of species and the environments. After the initial construction there should be no need for an ECO to be onsite during the decommission. However, it is advised that SANParks provide a final sign off and site inspection at the end of each decommission to ensure the site is left in as natural state as possible.

- All tents and equipment be removed from the site. Importantly, during deconstruction care should be taken to use the walkways and not extend the footprint of the proposed camp outside what has been authorised by the ECO.
- Final sweeps should be carried out to ensure that there is no litter remaining on the site. This includes anything that may have fallen through cracks in the decks or walkways.
- All materials that can harm wildlife should be removed from the site. This includes liquids such as fuels and oils, wires and lighting.
- If water tanks are left on the site it is imperative that they are sealed or closed properly. We do not want wildlife to be able to get trapped and die in open tanks. Furthermore, if animals and vegetation gets trapped in water tanks, they would need to be cleaned and sanitized prior to opening the camp again.
- All pools and hot tubs need to be removed out of season to ensure they cannot trap any animals or biodiversity. Care needs to be taken that any water drained from the pool and hot tubs is not drained into an area where it can filter or run into the wetland. Care needs to be taken that the slip paths suggested for water disposal slope away from the wetland.



- Any damage caused to the environment that could affect animal species should be rehabilitated before the camp is closed. This includes repairs to road verges and parking areas where there is heavy vehicle traffic as well as any necessary repairs to the access roads to ensure there is no further degradation when the camp is closed.

Overall, it is my expert opinion that the site is suitable for the proposed development and the development will cause minimal disturbance to the animal species within the area. To make this feasible the development should be undertaken responsibly and incorporate the findings of this study to ensure there will be very few long-term negative impacts. However, even with a low impact I highly recommend (although it is not a pre-requisite) that a monitoring plan is implemented. A baseline monitoring assessment should be implemented prior to the project start so as to understand how species occurrence changes during- and post development. Although, this may not be of direct significance to the proposed project it will hugely assist other projects of a similar nature going forward. The plan should include the implementation of camera traps and possible recording devices for species detection. Invertebrate mortalities should also be recorded periodically around the camp as a direct result of lighting in the evenings and at night. Collaborations between SANParks and local research institutions may be one way to approach this. Finally, it would be beneficial to keep a record of interesting and unexpected animal species that are seen in and around the camp. One possible record keeping that is recommended is that of iNaturalist (<https://www.inaturalist.org/>) as this makes records available and contributes to our knowledge of species through citizen science.

9. Conclusion and recommendations

The proposed Diepwalle tented camp is situated within the Diepwalle Section of the GRNP within the Knysna municipality. The selected site is a small area of approximately 0.59 ha and is made up of a densely vegetated clearing, wooded pond and surrounding mature Southern Afrotemperate Forest. As part of the EIA compliance process a terrestrial animal species specialist assessment was undertaken in February 2023 to identify key habitats and species that may be negatively affected by the proposed development. Together with a field survey, an inventory of terrestrial fauna and important habitats, data were drawn from literature and up to date online resources. Each species identified by the screening tool was evaluated in terms of occurrence and habitat to determine if a species was likely at the site. A total of seven species and forest invertebrates were identified by the screening tool as being found at the site, however our research and site visit identified that only two species had a high probability of occurring at the site and three species had a medium priority of occurring at the site. It is highly unlikely that the other three species would occur at the study site. A high diversity of forest invertebrates is thought to occur at the site, but due to the environmental conditions at the time of sampling very few forest invertebrates were found.



Based on the findings of this report it is my expert opinion that should development at the proposed site go ahead there will be very little disturbance to animals should the above mentioned recommendation be incorporated. I can therefore suggest that the project can go ahead with minimal effect to the animals in the study area and surrounding lands. I suggest numerous environmental measures that can be put in place to limit the negative effects on animal species and these should be incorporated into any further design and construction at the site. Understanding these mitigatory measures is crucial and if there are questions regarding the recommendations the specialists should be contacted for clarification.

During the surveys we did not determine any other possible sites for development, however the proposed site is suitable and there is no need to alternate site selection. Furthermore, previous degradation and use of the area resulted in the site not being in a completely natural state.



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Appendix 1: Mammal records for QDS 3323cc from the ADU MammalMAP

| Species code | Family | Scientific name | Common name | Red list category | Last recorded |
|--------------|-----------------|----------------------------------------|------------------------------|------------------------|---------------|
| 151470 | Bathyergidae | <i>Cryptomys hottentotus</i> | Southern African Mole-rat | Least Concern (2016) | |
| 151590 | Bathyergidae | <i>Georchus capensis</i> | Cape Mole-rat | Least Concern (2016) | |
| 213970 | Bovidae | <i>Tragelaphus scriptus</i> | Bushbuck | Least Concern | 2022/10/07 |
| 113300 | Cercopithecidae | <i>Chlorocebus pygerythrus</i> | Vervet Monkey | Least Concern (2016) | 1905/02/05 |
| 114040 | Cercopithecidae | <i>Papio ursinus</i> | Chacma Baboon | LC (IUCN, 2016) | 2022/12/07 |
| 106140 | Chrysochloridae | <i>Amblysomus corriae</i> | Fynbos Golden Mole | Near Threatened (2016) | 1976/11/06 |
| 105890 | Chrysochloridae | <i>Chlorotalpa duthieae</i> | Duthie's Golden Mole | Vulnerable (2016) | 1909/01/28 |
| 191660 | Felidae | <i>Caracal caracal</i> | Caracal | Least Concern (2016) | 2014/07/15 |
| 193900 | Felidae | <i>Panthera pardus</i> | Leopard | Vulnerable (2016) | 2014/06/25 |
| 127730 | Gliridae | <i>Graphiurus (Graphiurus) murinus</i> | Forest African Dormouse | Least Concern | 1976/12/06 |
| 196940 | Herpestidae | <i>Herpestes ichneumon</i> | Egyptian Mongoose | Least Concern (2016) | 1980/01/01 |
| 196300 | Herpestidae | <i>Herpestes pulverulentus</i> | Cape Gray Mongoose | Least Concern (2016) | 1978/03/02 |
| 151730 | Hystriidae | <i>Hystrix africaeaustralis</i> | Cape Porcupine | Least Concern | 1976/12/01 |
| 182640 | Molossidae | <i>Tadarida aegyptiaca</i> | Egyptian Free-tailed Bat | Least Concern (2016) | 2003/09/28 |
| 144050 | Muridae | <i>Acomys (Subacomys) subspinosus</i> | Cape Spiny Mouse | Least Concern | 1980/01/01 |
| 146472 | Muridae | <i>Dasymys capensis</i> | Water Rat | Vulnerable (2016) | 1976/06/13 |
| 146420 | Muridae | <i>Dasymys incommisus</i> | Common Dasymys | Near Threatened (2016) | 1976/09/06 |
| 146620 | Muridae | <i>Grammomys dolichurus</i> | Common Grammomys | Least Concern (2016) | 1964/01/19 |
| | | | Southern African Pygmy | | |
| 148270 | Muridae | <i>Mus (Nannomys) minutoides</i> | Mouse | Least Concern | 1980/05/14 |
| 217980 | Muridae | <i>Myomyscus verreauxi</i> | Verreaux's Mouse | Least Concern | 1983/04/14 |
| | | | Southern African Vlei Rat | | |
| 151100 | Muridae | <i>Otomys irroratus</i> | (Fynbos type) | Least Concern (2016) | 1980/04/27 |
| 150360 | Muridae | <i>Rhabdomys pumilio</i> | Xeric Four-striped Grass Rat | Least Concern (2016) | 1980/04/25 |
| | | | Brants's African Climbing | | |
| 136600 | Nesomyidae | <i>Dendromus mesomelas</i> | Mouse | Least Concern (2016) | 1980/04/26 |



| | | | | | |
|--------|------------------|----------------------------------------|--------------------------------|----------------------|------------|
| 170760 | Pteropodidae | Rousettus (Rousettus) aegyptiacus | Egyptian Rousette | Least Concern | 1979/08/25 |
| 171179 | Rhinolophidae | Rhinolophus sp. | Horseshoe Bats | | 2004/03/18 |
| 171650 | Rhinolophidae | Rhinolophus clivus | Geoffroy's Horseshoe Bat | Least Concern (2016) | 2003/10/05 |
| 160860 | Soricidae | Crocidura flavescens | Greater Red Musk Shrew | Least Concern (2016) | 1980/04/25 |
| 163270 | Soricidae | Myosorex longicaudatus | Long-tailed Forest Shrew | Endangered (2016) | 1980/04/29 |
| 163350 | Soricidae | Myosorex varius | Forest Shrew | Least Concern (2016) | 1980/04/29 |
| 162890 | Soricidae | Suncus infinitesimus | Least Dwarf Shrew | Least Concern (2016) | 1980/04/28 |
| | | Potamochoerus larvatus | Bush-pig (subspecies | | |
| 207780 | Suidae | koiropotamus | koiropotamus) | Least Concern (2016) | 2012/02/29 |
| 191200 | Vespertilionidae | Kerivoula lanosa | Lesser Woolly Bat | Least Concern (2016) | 1909/02/18 |
| 190220 | Vespertilionidae | Miniopterus fraterculus | Lesser Long-fingered Bat | Least Concern (2016) | 2004/03/19 |
| 190500 | Vespertilionidae | Miniopterus schreibersii | Schreibers's Long-fingered Bat | Near Threatened | 2004/03/18 |
| 187040 | Vespertilionidae | Neoromicia capensis | Cape Serotine | Least Concern (2016) | 2004/03/24 |
| 185360 | Vespertilionidae | Pipistrellus (Pipistrellus) hesperidus | Dusky Pipistrelle | Least Concern | 2004/03/17 |
| | | | Cape Genet (Cape Large- | | |
| 195300 | Viverridae | Genetta tigrina | spotted Genet) | Least Concern (2016) | 1980/04/28 |



Appendix 2: Frog records for QDS 3323cc from the ADU FrogMAP

| Species code | Family | Scientific name | Common name | Red list category | Last recorded |
|--------------|----------------|-----------------------------------------|--------------------------------------------|--------------------------------------------------------------|---------------|
| 170 | Brevicipitidae | Breviceps fuscus | Plain Rain Frog Cape Mountain Rain | Least Concern | 1999/07/07 |
| 210 | Brevicipitidae | Breviceps montanus | Frog | Least Concern | 2001/11/14 |
| 370 | Bufonidae | Sclerophrys capensis Vandijkophrynus | Raucous Toad | Least Concern | 2022/10/04 |
| 310 | Bufonidae | gariensis gariensis | Karoo Toad (subsp. gariensis) | | 2001/10/02 |
| 510 | Heleophrynidae | Heleophryne regis | Southern Ghost Frog Knysna Leaf-folding | Least Concern Endangered B1ab(i,ii,iii,v)+2ab(i,ii,iii,v) | 1992/03/28 |
| 40 | Hyperoliidae | Afrixalus knysnae | Frog | (2016) | 1940/12/02 |
| 580 | Hyperoliidae | Hyperolius horstockii | Arum Lily Frog | Least Concern | 1940/11/30 |
| 590 | Hyperoliidae | Hyperolius marmoratus | Painted Reed Frog | Least Concern (IUCN ver 3.1, 2013) | 2022/12/13 |
| 920 | Hyperoliidae | Semnodactylus wealii | Rattling Frog | Least Concern | 2001/11/11 |
| 1050 | Pipidae | Xenopus laevis | Common Platanna | Least Concern | 2020/01/12 |
| 880 | Pyxicephalidae | Amietia delalandii | Delalande's River Frog | Least Concern (2017) | 2022/12/07 |
| 890 | Pyxicephalidae | Amietia fuscigula | Cape River Frog | Least Concern (2017) | 2022/12/07 |
| 895 | Pyxicephalidae | Amietia vandijki | Van Dijk's River Frog | Least Concern (2013) | 2018/01/04 |
| 400 | Pyxicephalidae | Cacosternum boettgeri | Common Caco | Least Concern (2013) | 2015/07/24 |
| 430 | Pyxicephalidae | Cacosternum nanum | Bronze Caco | Least Concern (2013) | 2022/10/04 |
| 930 | Pyxicephalidae | Strongylopus bonaespei | Banded Stream Frog | Least Concern | 2000/12/22 |
| 940 | Pyxicephalidae | Strongylopus fasciatus | Striped Stream Frog | Least Concern | 2018/10/18 |
| 950 | Pyxicephalidae | Strongylopus grayii | Clicking Stream Frog | Least Concern | 2002/06/21 |
| 1000 | Pyxicephalidae | Tomopterna delalandii | Cape Sand Frog | Least Concern | 2001/11/11 |



Appendix 3: Reptile records for QDS 3322cc from the ADU ReptileMAP

| Species code | Family | Scientific name | Common name | Red list category | Last recorded |
|--------------|----------------|--------------------------------------|-----------------------------|----------------------------|---------------|
| 1490 | Agamidae | <i>Agama atra</i> | Southern Rock Agama | Least Concern (SARCA 2014) | 2009/01/24 |
| 1260 | Chamaeleonidae | <i>Bradypodion damaranum</i> | Knysna Dwarf Chameleon | Least Concern (SARCA 2014) | 2016/09/19 |
| 4560 | Colubridae | <i>Crotaphopeltis hotamboeia</i> | Red-lipped Snake | Least Concern (SARCA 2014) | 1940/11/30 |
| 4750 | Colubridae | <i>Dasypeltis scabra</i> | Rhombic Egg-eater | Least Concern (SARCA 2014) | 2013/12/07 |
| 4690 | Colubridae | <i>Dispholidus typus typus</i> | Boomslang | Least Concern (SARCA 2014) | 2007/09/19 |
| 4620 | Colubridae | <i>Philothamnus occidentalis</i> | Western Natal Green Snake | Least Concern (SARCA 2014) | 2021/01/06 |
| 2910 | Cordylidae | <i>Cordylus cordylus</i> | Cape Girdled Lizard | Least Concern (SARCA 2014) | 2007/09/19 |
| 2900 | Cordylidae | <i>Ninurta coeruleopunctatus</i> | Blue-spotted Girdled Lizard | Least Concern (SARCA 2014) | 2022/10/16 |
| | | <i>Pseudocordylus microlepidotus</i> | | | |
| 3210 | Cordylidae | <i>microlepidotus</i> | Cape Crag Lizard | Least Concern (SARCA 2014) | 1980/04/25 |
| 1100 | Gekkonidae | <i>Afrogecko porphyreus</i> | Marbled Leaf-toed Gecko | Least Concern (SARCA 2014) | 2021/02/11 |
| 480 | Gekkonidae | <i>Chondrodactylus bibronii</i> | Bibron's Gecko | Least Concern (SARCA 2014) | 1900/06/15 |
| 3600 | Gerrhosauridae | <i>Tetradactylus seps</i> | Short-legged Seps | Least Concern (SARCA 2014) | 2007/09/19 |
| 1750 | Lacertidae | <i>Nucras lalandii</i> | Delalande's Sandveld Lizard | Least Concern (SARCA 2014) | 1980/11/19 |
| 1950 | Lacertidae | <i>Tropidosaura gularis</i> | Cape Mountain Lizard | Least Concern (SARCA 2014) | 2006/10/21 |
| | | <i>Tropidosaura montana</i> | | | |
| 1960 | Lacertidae | <i>montana</i> | Common Mountain Lizard | | 1979/10/05 |
| 5090 | Lamprophiidae | <i>Amplorhinus multimaculatus</i> | Many-spotted Snake | Least Concern (SARCA 2014) | 1980/04/09 |
| 4320 | Lamprophiidae | <i>Boaedon capensis</i> | Brown House Snake | Least Concern (SARCA 2014) | 1979/06/17 |
| 4510 | Lamprophiidae | <i>Duberria lutrix lutrix</i> | South African Slug-eater | Least Concern (SARCA 2014) | 2015/09/04 |
| 5130 | Lamprophiidae | <i>Homoroselaps lacteus</i> | Spotted Harlequin Snake | Least Concern (SARCA 2014) | 1900/06/15 |
| 4380 | Lamprophiidae | <i>Lycodonomorphus rufulus</i> | Brown Water Snake | Least Concern (SARCA 2014) | 1980/02/13 |
| 4840 | Lamprophiidae | <i>Psammophis crucifer</i> | Cross-marked Grass Snake | Least Concern (SARCA 2014) | 2017/10/29 |
| 4960 | Lamprophiidae | <i>Psammophylax rhombeatus</i> | Spotted Grass Snake | Least Concern (SARCA 2014) | 2015/06/16 |
| 2060 | Scincidae | <i>Acontias meleagris</i> | Cape Legless Skink | Least Concern (SARCA 2014) | 1967/08/08 |
| 2310 | Scincidae | <i>Trachylepis capensis</i> | Cape Skink | Least Concern (SARCA 2014) | 2007/09/19 |



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|------|--------------|---------------------------|------------------------|----------------------------|------------|
| 2340 | Scincidae | Trachylepis homalocephala | Red-sided Skink | Least Concern (SARCA 2014) | 2022/01/11 |
| 2490 | Scincidae | Trachylepis variegata | Variegated Skink | Least Concern (SARCA 2014) | 1980/11/19 |
| 5550 | Testudinidae | Homopus areolatus | Parrot-beaked Tortoise | Least Concern (SARCA 2014) | 1900/06/15 |
| 5390 | Viperidae | Causus rhombeatus | Rhombic Night Adder | Least Concern (SARCA 2014) | 2007/01/10 |



Appendix 4: Invertebrate records for QDS 3322cc from the ADU LepiMAP, OrdonataMAP, ScorpionMAP and SpiderMAP

| Species code | Family | Scientific name | Common name | Red list category | Last recorded |
|--------------|----------------|---------------------------------|----------------------------------|-------------------------------|----------------|
| 304100 | HORMURIDAE | Opisthacanthus capensis | | | 2015/07/2 4 |
| 320300 | Corydalidae | Taeniochauliodes ochraceopennis | | | 1931/01/1 5 |
| 322400 | Chrysopidae | Apochrysa leptalea | | | 1998/02/2 3 |
| 323680 | Chrysopidae | Italochrysa amplipennis | | | 1998/02/2 3 |
| 325840 | Hemerobiidae | Hemerobius nairobicus | | | 2013/02/1 9 |
| 326000 | Hemerobiidae | Micromus oblongus | | | 1972/11/0 7 |
| 329560 | Myrmeleontidae | Palpares speciosus | | | 1998/02/2 3 |
| 400410 | PAPILIONIDAE | Papilio dardanus cenea | Mocker swallowtail | Least Concern (SABCA 2013) | 2021/01/0 9 |
| 400530 | PAPILIONIDAE | Papilio demodocus | Citrus swallowtail | Least Concern (SABCA 2013) | 2021/01/0 9 |
| 401360 | PAPILIONIDAE | Papilio nireus lyaeus | Narrow green-banded swallowtail | Least Concern (SABCA 2013) | 2023/02/1 9 |
| 403120 | PIERIDAE | Catopsilia florella | African migrant | Least Concern (SABCA 2013) | 2008/03/1 7 |
| 403160 | PIERIDAE | Colias electo electo | African clouded yellow | Least Concern (SABCA 2013) | 2007/12/1 9 |
| 404180 | PIERIDAE | Colotis euipe omphale | Southern round-winged orange tip | Least Concern (Least concern) | 2021/01/0 7 |



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|--------|-------------|--------------------------------------------|-------------------------|----------------------------|----------------|
| 405610 | PIERIDAE | Pontia helice helice Mylothris agathina | Southern meadow white | Least Concern (SABCA 2013) | 2022/10/0 5 |
| 405670 | PIERIDAE | agathina | Eastern dotted border | Least Concern (SABCA 2013) | 2022/12/0 7 |
| 407190 | PIERIDAE | Dixeia charina charina | African ant-heap white | Least Concern (SABCA 2013) | 2007/12/1 9 |
| 407450 | PIERIDAE | Belenois aurota | Pioneer caper white | Least Concern (SABCA 2013) | 2008/03/1 7 |
| 407630 | PIERIDAE | Belenois gidica abyssinica | African veined white | Least Concern (SABCA 2013) | 2007/12/1 9 |
| 409280 | NYMPHALIDAE | Danaus chrysippus orientis | African plain tiger | Least Concern (SABCA 2013) | 2007/12/1 9 |
| 410580 | NYMPHALIDAE | Acraea horta | Garden acraea | Least Concern (SABCA 2013) | 2015/09/0 3 |
| 410760 | NYMPHALIDAE | Acraea neobule neobule | Wandering donkey acraea | Least Concern (SABCA 2013) | 2020/11/1 2 |
| 415230 | NYMPHALIDAE | Aeropetes tulbaghia | Table mountain beauty | Least Concern (SABCA 2013) | 2021/02/1 3 |
| 415440 | NYMPHALIDAE | Dira clytus clytus | Cape autumn widow | Least Concern (SABCA 2013) | 2008/03/1 7 |
| 416120 | NYMPHALIDAE | Bicyclus safitza safitza | Black-haired bush brown | Least Concern (SABCA 2013) | 2022/01/1 1 |
| 419750 | NYMPHALIDAE | Cassionympha cassius | Rainforest dull brown | Least Concern (SABCA 2013) | 2022/01/1 1 |
| 419810 | NYMPHALIDAE | Pseudonympha hippia | Table mountain brown | Least Concern (SABCA 2013) | 1990/12/0 6 |
| 419840 | NYMPHALIDAE | Pseudonympha magus | Silver-bottom brown | Least Concern (SABCA 2013) | 2009/12/0 3 |
| 420130 | NYMPHALIDAE | Stygionympha vigilans | Western hillside brown | Least Concern (SABCA 2013) | 2021/11/2 1 |



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|--------|-------------|-----------------------------------|----------------------|----------------------------|----------------|
| 420240 | NYMPHALIDAE | Cymothoe alcimeda alcimeda | Battling glider | Least Concern (SABCA 2013) | 2009/03/1 4 |
| 433670 | NYMPHALIDAE | Charaxes karkloof trimeni | Karkloof charaxes | Least Concern (SABCA 2013) | 2010/03/0 7 |
| 436520 | NYMPHALIDAE | Charaxes pelias | Protea charaxes | Least Concern (SABCA 2013) | 2020/11/1 2 |
| 437080 | NYMPHALIDAE | Charaxes varanes varanes | Pearl charaxes | Least Concern (SABCA 2013) | 1994/01/1 2 |
| 437190 | NYMPHALIDAE | Charaxes xiphares xiphares | Forest-king charaxes | Least Concern (SABCA 2013) | 2010/03/0 7 |
| 438050 | NYMPHALIDAE | Vanessa cardui | Painted lady | Least Concern (SABCA 2013) | 2022/10/0 4 |
| 438280 | NYMPHALIDAE | Junonia hierta cebrene | Yellow pansy | Least Concern (SABCA 2013) | 2022/01/1 1 |
| 438810 | NYMPHALIDAE | Precis archesia archesia | Garden inspector | Least Concern (SABCA 2013) | 2020/11/1 2 |
| 439440 | NYMPHALIDAE | Catacroptera cloanthe cloanthe | Pirate | Least Concern (SABCA 2013) | 2007/12/1 9 |
| 440650 | LYCAENIDAE | Thestor braunsi | Braun's skolly | Least Concern (SABCA 2013) | 1985/12/0 1 |
| 440780 | LYCAENIDAE | Thestor murrayi | Garden route skolly | Least Concern (SABCA 2013) | 2009/09/2 5 |
| 443870 | LYCAENIDAE | Durbaniella clarki jenniferae | Little rocksitter | Least Concern (SABCA 2013) | 1997/11/1 2 |
| 454410 | LYCAENIDAE | Leptomyrina lara | Cape black-eye | Least Concern (SABCA 2013) | 2009/09/2 5 |
| 455930 | LYCAENIDAE | Capys alpheus alpheus | Orange banded protea | Least Concern (SABCA 2013) | 2009/09/2 5 |
| 457090 | LYCAENIDAE | Chrysoritis chrysaor | Burnished opal | Least Concern (SABCA 2013) | 2009/09/2 5 |



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|--------|------------|---------------------------------------|-----------------------------|------------------------------------------|----------------|
| 457300 | LYCAENIDAE | <i>Chrysoritis palmus margueritae</i> | Water opal | Least Concern (SABCA 2013) | 1995/11/0 5 |
| 457710 | LYCAENIDAE | <i>Chrysoritis zeuxo cottrelli</i> | Cottrell's daisy copper | Least Concern (SABCA 2013) | 1996/11/1 5 |
| 457770 | LYCAENIDAE | <i>Trimenia argyropлага</i> | Large silver-spotted copper | Least Concern (SABCA 2013) | 1971/12/1 5 |
| 457800 | LYCAENIDAE | <i>Trimenia macmasteri</i> | Karoo silver-spotted copper | Least Concern (SABCA 2013) | 2007/12/1 9 |
| 458840 | LYCAENIDAE | <i>Aloeides almeida</i> | Plain russet | Least Concern (SABCA 2013) | 2007/12/1 9 |
| 458870 | LYCAENIDAE | <i>Aloeides aranda</i> | Yellow russet | Least Concern (SABCA 2013) | 2009/12/0 3 |
| 459180 | LYCAENIDAE | <i>Aloeides juana</i> | Black-bordered russet | Least Concern (SABCA 2013) | 1989/12/2 6 |
| 459420 | LYCAENIDAE | <i>Aloeides pallida jonathani</i> | Giant russet | Least Concern (SABCA 2013) | 2020/11/1 2 |
| 459440 | LYCAENIDAE | <i>Aloeides pallida littoralis</i> | Giant russet | Data DeficieNear threatened (SABCA 2013) | 1970/11/2 0 |
| 459500 | LYCAENIDAE | <i>Aloeides quickelbergei</i> | Outeniqua russet | Least Concern (SABCA 2013) | 2008/07/2 1 |
| 460620 | LYCAENIDAE | <i>Anthene definita definita</i> | Steel-blue-ciliate blue | Least Concern (SABCA 2013) | 1940/11/1 5 |
| 463230 | LYCAENIDAE | <i>Lampides boeticus</i> | Pea blue | Least Concern (SABCA 2013) | 2020/11/1 2 |
| 463670 | LYCAENIDAE | <i>Cacyreus lingeus</i> | Bush bronze | Least Concern (SABCA 2013) | 1940/11/1 5 |
| 463680 | LYCAENIDAE | <i>Cacyreus marshalli</i> | Common geranium bronze | Least Concern (SABCA 2013) | 2013/12/0 6 |
| 463710 | LYCAENIDAE | <i>Cacyreus fracta fracta</i> | Water geranium bronze | Least Concern (SABCA 2013) | 2013/12/0 6 |



| | | | | | |
|--------|-------------|------------------------------|-------------------------|----------------------------|-----------|
| 463950 | LYCAENIDAE | Leptotes sp. | | | 2022/10/1 |
| | | | | | 6 |
| | | | | | 2008/03/1 |
| 464050 | LYCAENIDAE | Leptotes pirithous pirithous | Common zebra blue | Least Concern (SABCA 2013) | 7 |
| | | | | | 2013/12/0 |
| 464520 | LYCAENIDAE | Tarucus thespis | Vivid pierrot | Least Concern (SABCA 2013) | 6 |
| | | | | | 2020/07/2 |
| 464605 | LYCAENIDAE | Zizeeria knysna knysna | African grass blue | Least Concern (SABCA 2013) | 3 |
| | | | | | 1993/02/1 |
| 464650 | LYCAENIDAE | Zizina otis antanossa | African clover blue | Least Concern (SABCA 2013) | 9 |
| | | | | | 1974/12/3 |
| 464770 | LYCAENIDAE | Oraidium barberae | Dwarf blue | Least Concern (SABCA 2013) | 1 |
| | | Eicochrysops messapus | | | 2021/02/1 |
| 465000 | LYCAENIDAE | messapus | Cupreous ash blue | Least Concern (SABCA 2013) | 3 |
| | | | | | 2013/12/0 |
| 466180 | LYCAENIDAE | Lepidochrysops asteris | Brilliant giant cupid | Least Concern (SABCA 2013) | 6 |
| | | | | | 2003/01/1 |
| 466260 | LYCAENIDAE | Lepidochrysops braueri | Ice-blue giant cupid | Least Concern (SABCA 2013) | 6 |
| | | | | | 2003/01/1 |
| 466780 | LYCAENIDAE | Lepidochrysops ketsi ketsi | Ketsi giant cupid | Least Concern (SABCA 2013) | 6 |
| | | | | | 1994/11/3 |
| 467200 | LYCAENIDAE | Lepidochrysops outeniqua | Outeniqua giant cupid | Least Concern (SABCA 2013) | 0 |
| | | | | | 2007/12/1 |
| 467520 | LYCAENIDAE | Lepidochrysops robertsoni | Robertson's giant cupid | Least Concern (SABCA 2013) | 9 |
| | | | | | 2009/03/1 |
| 468730 | HESPERIIDAE | Eagris nottoana knysna | Rufous-winged elfin | Least Concern (SABCA 2013) | 4 |
| | | | | | 2022/10/0 |
| 471670 | HESPERIIDAE | Metisella metis paris | Gold-spotted sylph | Least Concern (SABCA 2013) | 4 |
| | | | | | 1974/11/0 |
| 471710 | HESPERIIDAE | Metisella orientalis | Eastern sylph | | 8 |



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|--------|-------------|--------------------------|-----------------------|----------------------------|-----------|
| 472101 | HESPERIIDAE | Afrogegenes sp. | | | 2008/03/1 |
| | | | | | 7 |
| 472120 | HESPERIIDAE | Afrogegenes letterstedti | Brown dodger | Least Concern (SABCA 2013) | 2023/02/1 |
| | | | | | 9 |
| 517150 | EREBIDAE | Siccia caffra | | | 2021/02/1 |
| | | | | | 1 |
| 539270 | EREBIDAE | Amata kuhlweini | | | 2022/01/1 |
| | | | | | 1 |
| 551000 | GEOMETRIDAE | Oedicentra albipennis | | Least Concern (SABCA 2013) | 2020/03/1 |
| | | | | | 8 |
| 553260 | GEOMETRIDAE | Xenimpia erosa | | Least Concern (SABCA 2013) | 2021/02/1 |
| | | | | | 3 |
| 553390 | GEOMETRIDAE | Xylopteryx arcuata | | Least Concern (SABCA 2013) | 2021/02/1 |
| | | | | | 1 |
| 587500 | EREBIDAE | SUBFAMILY LITHOSIINAE | | | 2021/02/1 |
| | | | | | 1 |
| 591240 | EREBIDAE | Rhyopteryx sp. | | | 2021/02/1 |
| | | | | | 1 |
| 631790 | CRAMBIDAE | Notarcha quaternalis | | | 2021/02/1 |
| | | | | | 1 |
| 651080 | CRAMBIDAE | Palpita vitrealis | | | 2021/02/1 |
| | | | | | 3 |
| 660040 | Synlestidae | Chlorolestes sp. | true malachites | | 2017/11/0 |
| | | | | | 2 |
| 660070 | Synlestidae | Chlorolestes conspicuus | Conspicuous Malachite | Least concern | 2021/09/1 |
| | | | | | 2 |
| 660080 | Synlestidae | Chlorolestes umbratus | White Malachite | Least concern | 2022/12/1 |
| | | | | | 3 |
| 660130 | Synlestidae | Chlorolestes tessellatus | Forest Malachite | Least concern | 2022/12/1 |
| | | | | | 3 |



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|--------|-----------------|--------------------------|---------------------|-----------------|----------------|
| 660150 | Synlestidae | Ecchlorolestes nylephtha | Queen Malachite | Near threatened | 2021/02/1 3 |
| 660300 | Lestidae | Lestes virgatus | Smoky Spreadwing | Least concern | 2022/02/2 5 |
| 660360 | Lestidae | Lestes plagiatus | Highland Spreadwing | Least concern | 2019/04/1 9 |
| 661180 | Chlorocyphidae | Platycypha caligata | Dancing Jewel | Least concern | 2018/03/1 2 |
| 661480 | Platycnemididae | Allocnemis leucosticta | Goldtail | Least concern | 2022/12/1 3 |
| 661710 | Platycnemididae | Elattoneura sp. | African threadtails | | 2019/12/0 5 |
| 661790 | Platycnemididae | Elattoneura frenulata | Sooty Threadtail | Least concern | 2023/02/1 9 |
| 661810 | Platycnemididae | Elattoneura glauca | Common Threadtail | Least concern | 2021/11/2 1 |
| 662140 | Platycnemididae | Spesbona angusta | Ceres Streamjack | Endangered | 2022/10/1 6 |
| 662150 | Coenagrionidae | FAMILY Coenagrionidae | | | 2017/10/2 9 |
| 662290 | Coenagrionidae | Africallagma sp. | African bluets | | 2017/11/3 0 |
| 662330 | Coenagrionidae | Africallagma glaucum | Swamp Bluet | Least concern | 2018/10/2 3 |
| 662630 | Coenagrionidae | Azuragrion nigradorsum | Sailing Bluet | Least concern | 2018/02/2 6 |
| 662720 | Coenagrionidae | Ceriagrion glabrum | Common Citril | Least concern | 2023/02/1 9 |
| 663100 | Coenagrionidae | Ischnura senegalensis | Tropical Bluetail | Least concern | 2022/10/1 6 |



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|--------|----------------|--------------------------|--------------------------|-----------------|--|-----------|
| 663195 | Coenagrionidae | Pseudagrion sp. | | | | 2021/02/1 |
| | | | | | | 5 |
| 663300 | Coenagrionidae | Pseudagrion draconis | Mountain Sprite | Least concern | | 2023/02/1 |
| | | | | | | 9 |
| 663350 | Coenagrionidae | Pseudagrion furcigerum | Palmiet Sprite | Near threatened | | 2022/01/1 |
| | | | | | | 7 |
| 663410 | Coenagrionidae | Pseudagrion hageni | Painted Sprite | Least concern | | 2022/02/2 |
| | | | | | | 5 |
| 663460 | Coenagrionidae | Pseudagrion kersteni | Powder-faced Sprite | Least concern | | 2022/01/1 |
| | | | | | | 1 |
| 663820 | Coenagrionidae | Pseudagrion massaicum | Masai Sprite | Least concern | | 2018/04/1 |
| | | | | | | 6 |
| 664140 | Aeshnidae | Anax imperator | Blue Emperor | Least concern | | 2022/12/1 |
| | | | | | | 3 |
| 664170 | Aeshnidae | Anax speratus | (Eastern) Orange Emperor | Least concern | | 2023/02/1 |
| | | | | | | 9 |
| 664470 | Aeshnidae | Pinheyschna subpupillata | Stream Hawker | Least concern | | 2017/10/2 |
| | | | | | | 9 |
| 664550 | Gomphidae | Ceratogomphus pictus | Common Thorntail | Least concern | | 2022/01/1 |
| | | Ceratogomphus | | | | 1 |
| 664560 | Gomphidae | triceraticus | Cape Thorntail | Near threatened | | 2022/12/1 |
| | | | | | | 3 |
| 665740 | Gomphidae | Paragomphus cognatus | Rock Hooktail | Least concern | | 2022/01/1 |
| | | | | | | 1 |
| 665790 | Gomphidae | Paragomphus genei | Common Hooktail | Least concern | | 2021/03/0 |
| | Libelluloidea | | | | | 7 |
| 666300 | incertae | Syncordulia venator | Mahogany Presba | Vulnerable | | 2017/11/2 |
| | | | | | | 5 |
| 667130 | Libellulidae | Crocothemis erythraea | Broad Scarlet | Least concern | | 2023/02/1 |
| | | | | | | 9 |



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|--------|--------------|----------------------------------|-------------------------------|---------------|----------------|
| 667140 | Libellulidae | <i>Crocothemis sanguinolenta</i> | Little Scarlet | Least concern | 2022/01/1 1 |
| 667690 | Libellulidae | <i>Nesciothemis farinosa</i> | Eastern Blacktail | Least concern | 2022/12/1 3 |
| 667770 | Libellulidae | <i>Orthetrum</i> sp. | | | 2022/01/1 1 |
| 667860 | Libellulidae | <i>Orthetrum caffrum</i> | Two-striped Skimmer | Least concern | 2012/03/1 7 |
| 667890 | Libellulidae | <i>Orthetrum capicola</i> | Cape Skimmer | Least concern | 2023/02/1 9 |
| 667950 | Libellulidae | <i>Orthetrum julia</i> | Julia Skimmer | Least concern | 2018/03/1 2 |
| 668120 | Libellulidae | <i>Orthetrum trinacria</i> | Long Skimmer | Least concern | 2019/03/0 4 |
| 668190 | Libellulidae | <i>Palpopleura jucunda</i> | Yellow-veined Widow | Least concern | 2018/03/1 2 |
| 668230 | Libellulidae | <i>Pantala flavescens</i> | Wandering Glider | Least concern | 2021/03/0 7 |
| 668420 | Libellulidae | <i>Sympetrum fonscolombii</i> | Red-veined Darter or Nomad | Least concern | 2022/01/1 1 |
| 668630 | Libellulidae | <i>Tamea limbata</i> | Ferruginous Glider | Least concern | 2021/02/0 8 |
| 668640 | Libellulidae | <i>Trithemis</i> sp. | | | 2022/01/1 1 |
| 668670 | Libellulidae | <i>Trithemis arteriosa</i> | Red-veined Dropwing | Least concern | 2023/02/1 9 |
| 668870 | Libellulidae | <i>Trithemis dorsalis</i> | Highland Dropwing | Least concern | 2022/01/1 1 |
| 668890 | Libellulidae | <i>Trithemis furva</i> | Navy Dropwing | Least concern | 2022/01/1 1 |



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|---------|----------------|-------------------------|----------------------------------|---------------|----------------|
| 669080 | Libellulidae | Trithemis stictica | Jaunty Dropwing | Least concern | 2023/02/1 9 |
| 669120 | Libellulidae | Trithemis kirbyi | Orange-winged Dropwing | Least concern | 2020/03/0 7 |
| 669390 | Libellulidae | Zygonyx natalensis | Blue Cascader | Least concern | 2022/02/2 5 |
| 673940 | EREBIDAE | Polypogon melanommoides | | | 2021/02/1 1 |
| 701920 | Araneidae | Gea sp. | araneid orb-web spiders | | 2015/07/2 4 |
| 702330 | Araneidae | Neoscona sp. | Neoscona hairy field spiders | | 2015/05/0 4 |
| 713000 | Pisauridae | Nilus sp. | Fish-eating or fishing spiders | | 2017/11/1 0 |
| 720190 | Tetragnathidae | Tetragnatha sp. | Long-jawed water orb-web spiders | | 2017/11/1 0 |
| 720950 | Theridiidae | Latrodectus geometricus | Common brown button spiders | | 2015/05/1 7 |
| 721780 | Thomisidae | Thomisus sp. | Flower crab spiders | | 2015/05/0 4 |
| 7700320 | Scarabaeidae | Bohepilissus subtilis | | | 1988/01/1 5 |
| 7700480 | Scarabaeidae | Caccobius obtusus | | | 1977/12/1 3 |
| 7701140 | Scarabaeidae | Circellium bacchus | | | 1975/09/0 9 |
| 7701400 | Scarabaeidae | Copris crassus | | | 1977/09/0 2 |
| 7701490 | Scarabaeidae | Copris fidius | | | 1977/12/1 3 |



| | | | |
|---------|--------------|----------------------------|----------------|
| 7702070 | Scarabaeidae | Cyptochirus ambiguus | 1977/12/1 3 |
| 7702280 | Scarabaeidae | Digitonthophagus gazella | 1977/02/0 2 |
| 7702290 | Scarabaeidae | Drepanocerus kirbyi | 1977/09/0 2 |
| 7702450 | Scarabaeidae | Epirinus flagellatus | 1977/12/1 3 |
| 7702480 | Scarabaeidae | Epirinus hilaris | 1978/11/2 3 |
| 7702630 | Scarabaeidae | Epirinus silvestris | 1992/03/0 8 |
| 7702670 | Scarabaeidae | Euoniticellus africanus | 1977/02/0 2 |
| 7702700 | Scarabaeidae | Euoniticellus intermedius | 1977/02/0 2 |
| 7702750 | Scarabaeidae | Euoniticellus triangulatus | 1980/03/1 3 |
| 7703780 | Scarabaeidae | Liatongus militaris | 1977/12/1 3 |
| 7703840 | Scarabaeidae | Litocopris simplex | 1977/09/0 2 |
| 7704690 | Scarabaeidae | Neosisyphus spinipes | 1977/12/1 3 |
| 7704890 | Scarabaeidae | Oniticellus pictus | 1977/12/1 3 |
| 7705080 | Scarabaeidae | Onitis curvipes | 1977/02/0 2 |
| 7705270 | Scarabaeidae | Onitis minutus | 1976/05/0 4 |



| | | | |
|---------|--------------|---------------------------|-----------|
| 7705390 | Scarabaeidae | Onitis pecuarius | 1977/02/0 |
| | | | 2 |
| 7705930 | Scarabaeidae | Onthophagus binodis | 1977/12/1 |
| | | | 3 |
| 7706690 | Scarabaeidae | Onthophagus giraffa | 1977/09/0 |
| | | | 2 |
| 7709530 | Scarabaeidae | Sarophorus tuberculatus | 1977/09/0 |
| | | | 2 |
| 7710660 | Scarabaeidae | Sisyphus caffer | 1977/12/1 |
| | | | 3 |
| 7710710 | Scarabaeidae | Sisyphus gazanus | 1977/02/0 |
| | | | 2 |
| 7710760 | Scarabaeidae | Sisyphus muricatus | |
| | | | 1977/09/0 |
| 7710870 | Scarabaeidae | Tibiodrepanus sulcicollis | 2 |



Appendix 5: Avifauna records for SABAP pentad 3355-2310

| Common group | Common species | Scientific name | Last observation |
|--------------|----------------------|----------------------------------|------------------|
| | Neddicky | <i>Cisticola fulvicapilla</i> | 2013/06/22 |
| Apalis | Bar-throated | <i>Apalis thoracica</i> | 2014/04/28 |
| Batis | Cape | <i>Batis capensis</i> | 2015/07/19 |
| Boubou | Southern | <i>Laniarius ferrugineus</i> | 2015/07/19 |
| Brownbul | Terrestrial | <i>Phyllastrephus terrestris</i> | 2013/06/22 |
| Bunting | Cinnamon-breasted | <i>Emberiza tahapisi</i> | 2013/06/22 |
| Buzzard | Forest | <i>Buteo trizonatus</i> | 2013/06/22 |
| Camaroptera | Green-backed | <i>Camaroptera brachyura</i> | 2010/06/12 |
| Canary | Brimstone | <i>Crithagra sulphurata</i> | 2013/06/22 |
| Canary | Cape | <i>Serinus canicollis</i> | 2013/06/22 |
| Canary | Forest | <i>Crithagra scotops</i> | 2015/07/19 |
| Crow | Cape | <i>Corvus capensis</i> | - |
| Cuckooshrike | Black | <i>Campephaga flava</i> | 2010/02/27 |
| Cuckooshrike | Grey | <i>Cebilepyris caesius</i> | 2013/06/22 |
| Dove | Cape Turtle | <i>Streptopelia capicola</i> | 2014/04/28 |
| Dove | Lemon | <i>Columba larvata</i> | 2010/02/27 |
| Dove | Red-eyed | <i>Streptopelia semitorquata</i> | 2015/07/19 |
| Dove | Rock | <i>Columba livia</i> | 2013/06/22 |
| Dove | Tambourine | <i>Turtur tympanistria</i> | 2010/06/12 |
| Drongo | Fork-tailed | <i>Dicrurus adsimilis</i> | 2015/07/19 |
| Fiscal | Southern | <i>Lanius collaris</i> | 2013/06/22 |
| Flycatcher | African Dusky | <i>Muscicapa adusta</i> | 2015/07/19 |
| Flycatcher | African Paradise | <i>Terpsiphone viridis</i> | 2010/02/27 |
| Flycatcher | Blue-mantled Crested | <i>Trochocercus cyanomelas</i> | 2010/06/12 |
| Flycatcher | Fiscal | <i>Melaenornis silens</i> | 2013/06/22 |
| Goshawk | African | <i>Accipiter tachiro</i> | 2013/06/22 |
| Grassbird | Cape | <i>Sphenoeacus afer</i> | 2015/07/19 |
| Greenbul | Sombre | <i>Andropadus importunus</i> | 2015/07/19 |
| Ibis | African Sacred | <i>Threskiornis aethiopicus</i> | - |
| Lapwing | Crowned | <i>Vanellus coronatus</i> | 2010/02/27 |
| Martin | Rock | <i>Ptyonoprogne fuligula</i> | 2011/04/30 |
| Mousebird | Speckled | <i>Colius striatus</i> | 2013/06/22 |
| Oriole | Black-headed | <i>Oriolus larvatus</i> | 2015/07/19 |
| Pigeon | African Olive | <i>Columba arquatrix</i> | 2013/06/22 |
| Pipit | African | <i>Anthus cinnamomeus</i> | 2014/04/28 |
| Prinia | Karoo | <i>Prinia maculosa</i> | 2011/04/30 |
| Puffback | Black-backed | <i>Dryoscopus cubla</i> | 2013/06/22 |
| Raven | White-necked | <i>Corvus albicollis</i> | 2015/07/19 |
| Robin-Chat | Cape | <i>Cossypha caffra</i> | 2015/07/19 |
| Robin-Chat | Chorister Robin-Chat | <i>Cossypha dichroa</i> | 2010/02/27 |
| Spurfowl | Red-necked | <i>Pternistis afer</i> | 2010/06/12 |



| | | | |
|------------|-------------------------|---------------------------------|------------|
| Starling | Red-winged | <i>Onychognathus morio</i> | 2013/06/22 |
| Stonechat | African | <i>Saxicola torquatus</i> | 2015/07/19 |
| Sunbird | Amethyst | <i>Chalcomitra amethystina</i> | 2015/07/19 |
| Sunbird | Greater Double-collared | <i>Cinnyris afer</i> | 2015/07/19 |
| Sunbird | Malachite | <i>Nectarinia famosa</i> | 2015/07/19 |
| Sunbird | Orange-breasted | <i>Anthobaphes violacea</i> | 2016/09/10 |
| | Southern Double- | | |
| Sunbird | collared | <i>Cinnyris chalybeus</i> | 2016/09/10 |
| Thrush | Olive | <i>Turdus olivaceus</i> | 2011/04/30 |
| Trogon | Narina | <i>Apaloderma narina</i> | 2016/09/10 |
| Turaco | Knysna | <i>Tauraco corythaix</i> | 2016/09/10 |
| Wagtail | Cape | <i>Motacilla capensis</i> | 2013/06/22 |
| Warbler | Knysna | <i>Bradypterus sylvaticus</i> | 2016/09/10 |
| Warbler | Victorin's | <i>Cryptillas victorini</i> | 2014/04/28 |
| | Yellow-throated | | |
| Warbler | Woodland | <i>Phylloscopus ruficapilla</i> | 2011/04/30 |
| Waxbill | Swee | <i>Coccygia melanotis</i> | 2011/04/30 |
| White-eye | Cape | <i>Zosterops virens</i> | 2016/09/10 |
| Wood | | | |
| Hoopoe | Green | <i>Phoeniculus purpureus</i> | 2011/04/30 |
| Woodpecker | Knysna | <i>Campethera notata</i> | 2010/02/27 |
| | | <i>Dendropicos</i> | |
| Woodpecker | Olive | <i>griseocephalus</i> | 2013/06/22 |



Appendix 6: Avifaunal observations during the site visit in March 2023

| Common group | Common species | Scientific name |
|--------------|-------------------------|----------------------------------|
| Greenbul | Sombre | <i>Andropadus importunus</i> |
| Apalis | Bar-throated | <i>Apalis thoracica</i> |
| Flycatcher | African Dusky | <i>Muscicapa adusta</i> |
| Flycatcher | African Paradise | <i>Terpsiphone viridis</i> |
| Robin-Chat | Chorister Robin-Chat | <i>Cossypha dichroa</i> |
| Turaco | Knysna | <i>Tauraco corythaix</i> |
| Thrush | Olive | <i>Turdus olivaceus</i> |
| White-eye | Cape | <i>Zosterops virens</i> |
| Buzzard | Forest | <i>Buteo trizonatus</i> |
| Oriole | Black-headed | <i>Oriolus larvatus</i> |
| Brownbul | Terrestrial | <i>Phyllastrephus terrestris</i> |
| Sunbird | Amethyst | <i>Chalcomitra amethystina</i> |
| Sunbird | Greater Double-collared | <i>Cinnyris afer</i> |



Appendix 7: National Red List Categories

Definitions of the national Red List categories

Categories marked with ^N are non-IUCN, national Red List categories for species not in danger of extinction, but considered of conservation concern. The IUCN equivalent of these categories is Least Concern (LC).

Extinct (EX) A species is Extinct when there is no reasonable doubt that the last individual has died. Species should be classified as Extinct only once exhaustive surveys throughout the species' known range have failed to record an individual.

Extinct in the Wild (EW) A species is Extinct in the Wild when it is known to survive only in cultivation or as a naturalized population (or populations) well outside the past range.

Regionally Extinct (RE) A species is Regionally Extinct when it is extinct within the region assessed (in this case South Africa), but wild populations can still be found in areas outside the region.

Critically Endangered, Possibly Extinct (CR PE) Possibly Extinct is a special tag associated with the category Critically Endangered, indicating species that are highly likely to be extinct, but the exhaustive surveys required for classifying the species as Extinct has not yet been completed. A small chance remains that such species may still be rediscovered.

Critically Endangered (CR) A species is Critically Endangered when the best available evidence indicates that it meets at least one of the five IUCN criteria for Critically Endangered, indicating that the species is facing an extremely high risk of extinction.

Endangered (EN) A species is Endangered when the best available evidence indicates that it meets at least one of the five IUCN criteria for Endangered, indicating that the species is facing a very high risk of extinction.

Vulnerable (VU) A species is Vulnerable when the best available evidence indicates that it meets at least one of the five IUCN criteria for Vulnerable, indicating that the species is facing a high risk of extinction.



Near Threatened (NT) A species is Near Threatened when available evidence indicates that it nearly meets any of the IUCN criteria for Vulnerable, and is therefore likely to become at risk of extinction in the near future.

Critically Rare (plants) - Extremely Rare (butterflies) A species is Critically / Extremely Rare when it is known to occur at a single site, but is not exposed to any direct or plausible potential threat and does not otherwise qualify for a category of threat according to one of the five IUCN criteria.

Rare A species is Rare when it meets at least one of four South African criteria for rarity, but is not exposed to any direct or plausible potential threat and does not qualify for a category of threat according to one of the five IUCN criteria. The four criteria are as follows:

- Restricted range: Extent of Occurrence (EOO) <500 km², OR
- Habitat specialist: Species is restricted to a specialized microhabitat so that it has a very small Area of Occupancy (AOO), typically smaller than 20 km², OR
- Low densities of individuals: Species always occurs as single individuals or very small subpopulations (typically fewer than 50 mature individuals) scattered over a wide area, OR
- Small global population: Less than 10 000 mature individuals.

Least Concern A species is Least Concern when it has been evaluated against the IUCN criteria and does not qualify for any of the above categories. Species classified as Least Concern are considered at low risk of extinction. Widespread and abundant species are typically classified in this category.

Data Deficient - Insufficient Information (DDD) A species is DDD when there is inadequate information to make an assessment of its risk of extinction, but the species is well defined. Listing of species in this category indicates that more information is required and that future research could show that a threatened classification is appropriate.

Data Deficient - Taxonomically Problematic (DDT) A species is DDT when taxonomic problems hinder the distribution range and habitat from being well defined, so that an assessment of risk of extinction is not possible.

Not Evaluated (NE) A species is Not Evaluated when it has not been evaluated against the criteria. Certain species do not qualify for national listing because they are naturalized



exotics, hybrids (natural or cultivated), or synonyms. In certain cases species have not been assessed nationally as taxon specialists prefer to use only the Global Red List status.

