



Dave Edge & Associates

Biodiversity Surveys

Environmental Consulting

BUTTERFLY SENSITIVITY STUDY
AMENDMENT APPLICATION
PARADISE COAST
MOSSEL BAY
WESTERN CAPE PROVINCE

Prepared for:

HillLand Environmental
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Attention: Cathy Avierinos

David A Edge

Date of issue: 25th December 2023

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CREDENTIALS OF THE CONSULTING PERSONNEL

Dr David A Edge

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Expertise:

- Qualifications: BSc (Zoology & Botany) UNISA; BSc (Hons) (Environmental Science) North-West University; MSc (Environmental Science) North-West University; PhD (Environmental Science) North-West University. Pr Nat Sc reg. no. 129735.
- Experience: Lepidopterist and ecologist with over 60 years' experience collecting and studying butterflies. Has conducted numerous specialist butterfly surveys in terms of NEMA.
- Publications/ conferences: 41 scientific papers published in peer reviewed journals, and has presented papers at a number of national and international conferences.

A more detailed CV is attached as Appendix 1.

Conditions pertaining to this report

The content of this report is based on the authors' best scientific and professional knowledge as well as available information. Dave Edge & Associates reserve the right to modify the report in any way deemed fit should new, relevant or previously unavailable or undisclosed information become known to the author from on-going research or further work in this field, or pertaining to this investigation, and will inform Jeffery Environmental Consultants accordingly.

This report must not be altered or added to without the prior written consent of the primary author. This also refers to electronic copies of the report, which are supplied for the purposes of inclusion as part of other reports, including main reports. Similarly, any recommendations, statements or conclusions drawn from or based on this report must make reference to this report. If these form part of a main report relating to this investigation or report, this report must be included in its entirety as an appendix or separate section to the main report.

NATIONAL LEGISLATION AND REGULATIONS GOVERNING THIS REPORT

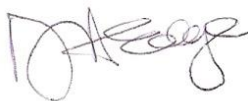
This is a 'specialist report' compiled in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended, and the Environmental Impact Assessment Regulations, 2014.

DECLARATION BY THE INDEPENDENT PERSON WHO COMPILED THIS REPORT

I, **David Alan Edge**, as the appointed independent specialist hereby declare that I:

- act as an independent specialist in this application;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- have and will not have any vested interest in the proposed activity proceeding;
- have disclosed, to the applicant, EAP and competent authority, any material information that have or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- am fully aware of and meet the responsibilities in terms of NEMA, the Environmental Impact Assessment Regulations, 2014 (specifically in terms of Regulation 13 and Appendix 2 of GN No. R. 982) and any specific environmental management Act, and that failure to comply with these requirements may constitute and result in disqualification;
- have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;
- have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application; have ensured that the names of all interested and affected parties that participated in terms of the specialist input/study were recorded in the register of interested and affected parties who participated in the public participation process;
- have provided the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not; and am aware that a false declaration is an offence in terms of regulation 48 of GN No. R.982.

Signature of the Specialist:



David Alan Edge

Representing:

Dave Edge & Associates

1. Introduction

HillLand Environmental has been engaged by Similan to prepare an Amendment Application for the Paradise Coast development, Mossel Bay, Western Cape Province (location in Figure 1).

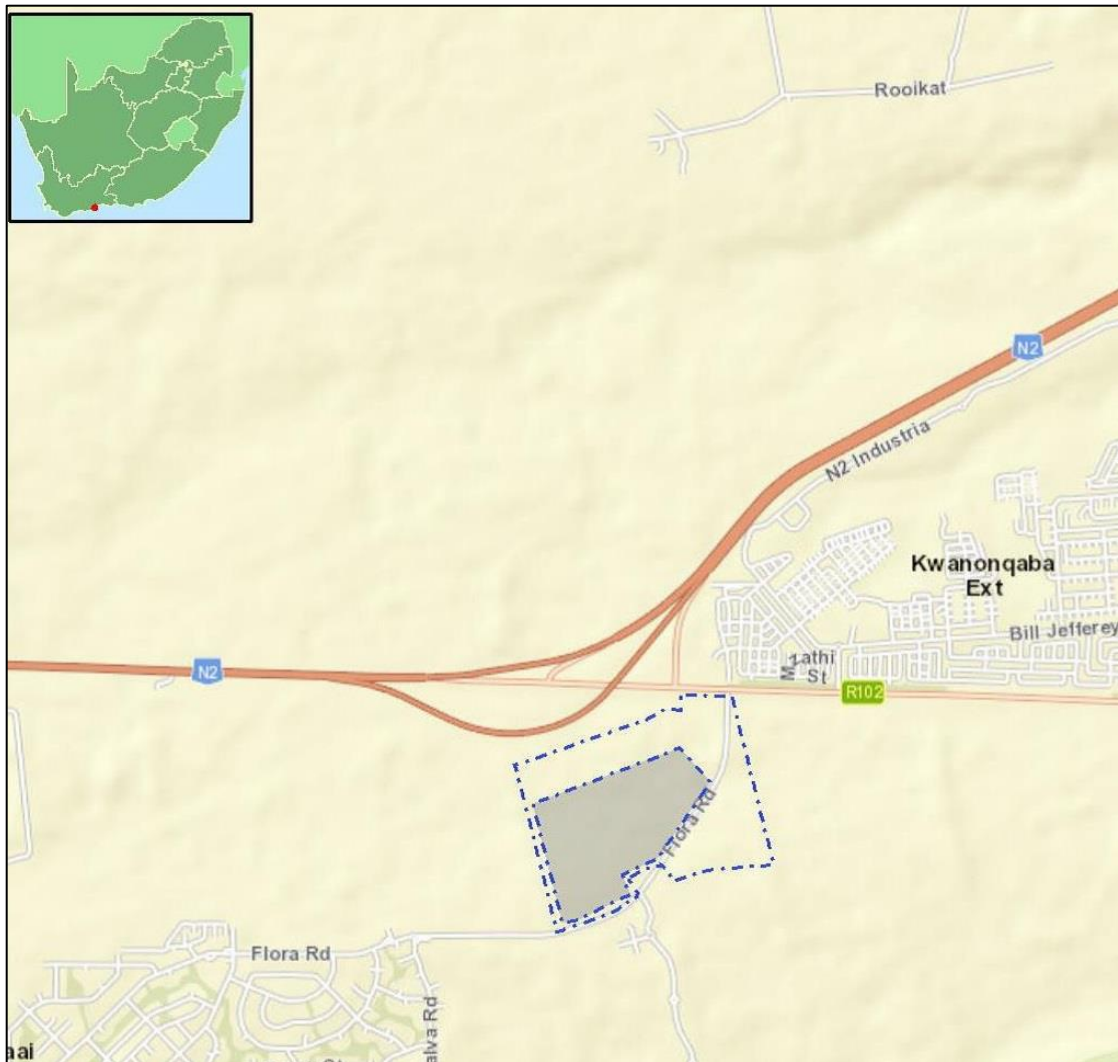


Figure 1 – Location of the proposed Amendment Application for Paradise Coast

2. Terms of reference of the Consultant

Dave Edge & Associates was appointed on 13th October 2022 by Cathy Avierinos of HillLand Environmental, to determine whether any butterfly species of conservation concern (SCC) could occur in the footprint of the Amendment Application, with a scope as follows:

- 1) Carry out a desktop study to determine if the following butterfly SCCs picked up by the Screening Tool report (ST) or any other SCC butterflies known to occur in the vicinity have been recorded at or near the site, or whether it is feasible, given the physical and biological characteristics of the site (including vegetation types and butterfly host plants) for any of the SCCs to occur at the expansion site:

Aloeides thyra orientis
Lepidochrysops littoralis

- 2) Carry out butterfly surveys, as required, to ascertain whether these SCC butterflies occur in the amended footprint of the development site, and also whether they occur on other adjacent areas which are owned by the developer, which could make an offset a viable option.
- 3) Possible issue of a Terrestrial Biodiversity Compliance Statement in respect of the development.

3. Methodology

3.1 Desktop study

Butterfly SCC records from the quarter degree grid square (QDGS) in which the proposed project is sited were extracted from the LepiMap Virtual Museum database <https://vmus.adu.org.za/>.

Published data on the two butterfly SCCs picked up by the ST report, as well as any other SCC butterfly taxa potentially occurring on the site were studied, principally Mecenero *et al.* (2013) and Mecenero *et al.* (2020), to determine the vegetation types in which the SCCs occur, and Williams (2020) to determine the recorded larval host plants.

3.2 Butterfly surveys

The Paradise Coast Amendment Application (PCAA) site and the adjacent areas owned by the developer were surveyed on foot, focusing on vegetation types where the SCC butterflies have been recorded, and habitats where they are likely to occur. In the case of *A. t. orientis* this would be on higher lying ground where flat sandy patches, often resulting from human disturbance, are found. For *L. littoralis* this would be at the top of west–east trending ridges or near the top of the north facing slope below such ridges, where large shrubs are found over 3 m in height. Tracks and waypoints were recorded by use of a handheld Garmin Etrex 10 GPS. Photographs of any SCC or other interesting butterflies were taken. Because of the size of the areas to be surveyed, three days were needed to do the survey thoroughly.

4. Results

4.1 Desktop study

The Paradise Coast Amendment Application (PCAA) is situated in the QDGS 3422AA (Mossel Bay). A list of the threatened butterflies recorded in this QDGS appears in Table 1 below. The predominant vegetation type occurring around the PCAA is FFI3 Canca Limestone Fynbos (Mucina & Rutherford, 2006) – see Figure 2. The altitude at the PCAA is c. 190–200m and the ground is level to gently sloping southwards.



Figure 2 – Vegetation types in the vicinity of the Paradise Coast Amendment Application PCAA (red outlined area), as mapped by Mucina & Rutherford (2006), showing that the site is in vegetation type FFI3 = Canca Limestone Fynbos

The butterfly SCCs from Table 1 picked up by the Screening Tool and occurring in vegetation type Canca Limestone Fynbos (FFI3) were:

Aloeides thyra orientis Pringle, 1994 (EN)

This butterfly is endemic to the southern coastal regions of the Western Cape Province, from Witsand to Gouritsmond in the west to the Brenton peninsula near Knysna in the east,

and it was assessed in 2018 as Endangered (Mecenero *et al.*, 2020). It has been recorded in the vegetation type FFI3 Canca Limestone Fynbos (Mucina & Rutherford, 2006), which covers the entire development site. *A. t. orientis* prefers flat sandy ground near the summit of ridges, but can also be found closer to the coast

The closest known occurrences to the development site are at Gouritsmond about 40 km away. This butterfly's host plant is unknown, and its flight period is from October to March. It is possible that *A. t. orientis* could occur at the development site.

Lepidochrysops littoralis Swanepoel & Vári, 1983 (EN)

This butterfly is endemic to the Western Cape Province, occurring from De Hoop Nature Reserve in the west to Mossel Bay in the east, and it was assessed in 2020 as Endangered (Mecenero *et al.*, 2020). It has been recorded in FFI3 Canca Limestone Fynbos and FFs15 (Mucina & Rutherford, 2006), with the former occurring at the development site.

L. littoralis generally inhabits the higher ground, being over 190m at the closest known occurrence to the development site, on the most eastern part of the property less than 1 km away. Its host plants is are *Selago* species (Williams, 2020), and its flight period is from September to February.

The other two SCCs recorded in the QDGS 3422AA, *Aloeides pallida littoralis* (NT) and *Aloeides trimeni southeyae* (EN) have never been recorded from the vegetation type FFI3 found at Paradise Coast, and are very unlikely to occur there.

Table 1 – Threatened butterflies recorded in the LepiMap database from the QDGS 3422AA

FAMILY	SCIENTIFIC NAME	COMMON NAME	RED LIST CATEGORY (SALCA 2020)	Vegetation types in Fig. 2
LYCAENIDAE	<i>Aloeides pallida littoralis</i>	Knysna Russet	Near Threatened	
LYCAENIDAE	<i>Aloeides thyra orientis</i>	Brenton Russet	Endangered	FFI3
LYCAENIDAE	<i>Aloeides trimeni southeyae</i>	Mossel Bay Russet	Endangered	
LYCAENIDAE	<i>Lepidochrysops littoralis</i>	Coastal Blue	Endangered	FFI3



Figure 3 – Tracks (blue lines) and waypoints (white numbers) from site visits to Paradise Coast on 17th October, 9th November and 16th December.

4.2 Butterfly surveys

Surveys were conducted on 17th October, 9th November and 16th December, with perfect weather conditions for observing butterflies. . Refer to Fig. 3 above for details.

The first survey began at waypoint (WP)748 and followed the track shown in blue up to WP751 (see Figure 3) on the Paradise Coast property, and included a visit to waypoint WP752 where *L. littoralis* had previously been recorded. The second survey north of Paradise Coast began at WP783 and continued until WP791, following the blue track. The third survey, on the extension area which is the subject of the application, included waypoints from WP853 to WP862, and also followed a blue track

Significant butterfly or host plant records are listed in Table 2.

Table 2 – Significant butterfly or host plant records at the places shown in Figure 3

Waypoint no.	Butterfly observed	Common name	Host plants recorded
WP749	<i>Spialia spio</i>	Mountain Sandman	<i>Hermannia</i> species
WP750	<i>Catopsilia florella</i>	African Migrant	
WP751	<i>Chrysoritis pyroeis</i>	Sand-dune Opal	<i>Osteospermum moniliferum</i>
WP751	<i>Tarucus thespis</i>	Fynbos Blue	
WP752	<i>Chrysoritis palmus</i>	Water Opal	<i>Osteospermum moniliferum</i>
WP784-5, 788	<i>Pseudonympha magus</i>	Silver-bottom Brown	Grass species
Common	<i>Vanessa cardui</i>	Painted Lady	Various
WP784	<i>Lepidochrysops littoralis</i> *	Coastal Blue	<i>Selago</i> species 1
Common	<i>Pontia helice</i>	Meadow White	
WP785	<i>Afrogegenes letterstedti</i>	Brown Dodger	Grasses
WP785	<i>Lepidochrysops littoralis</i> *	Coastal Blue	<i>Selago</i> species 2
WP786	<i>Cacyreus fracta</i>	Water Bronze	<i>Pelargonium</i> species
WP786-791	<i>Chrysoritis thysbe</i>	Thysbe Opal	<i>Osteospermum moniliferum</i>
WP853-856	<i>Pseudonympha magus</i>	Silver-bottom Brown	Grass species
WP858	<i>Catacroptera cloanthe</i>	Pirate	
WP860	<i>Cacyreus fracta</i>	Water Bronze	<i>Pelargonium</i> species
WP861	<i>Pseudonympha trimenii</i>	White-netted Brown	
WP862	<i>Chrysoritis chrysaor</i>	Burnished Opal	

* Not seen but lots of host plants

WP751 (*Chrysoritis pyroeis*) is the first record of this species from the Mossel Bay area. There is a significant population of *Chrysoritis thysbe* in the area north-east of Paradise Coast, and *Lepidochrysops littoralis* has been recorded there in the past. Either or both the *Selago* species recorded could be used by *L. littoralis*.

Neither of the two SCC species (*Aloeides t. orientis* and *L. littoralis*) were recorded in the area where the PCAA is being applied for (WP856 to 862), and the absence of suitable habitat for *A. t. orientis* and the host plants of *L. littoralis* make it very unlikely that either of them occurs in the PCAA.

4.3 Terrestrial Biodiversity Compliance Statement

From the desktop study and the three site visits it is highly unlikely that either of the SCCs listed in Table 3 could occur within the PCAA are of the Paradise Coast development site (the area searched on the 16th December in Figure 3). However, it would be most desirable from a butterfly conservation point of view if the area that was searched on the 9th November was set aside as a butterfly reserve.

Table 3 – Estimate of probability of occurrence of SCC butterflies in the amended application footprint

SCC no.	1	2
Family	Lycaenidae	Lycaenidae
Common name	Brenton Red Russet	Coastal giant Cupid
Scientific name	<i>Aloeides thyra orientis</i>	<i>Lepidochrysops littoralis</i>
IUCN Red List category	EN	EN
Habitat requirements	Flat sandy open ground in sandy fynbos or limestone fynbos, up to 250m altitude.	Rocky ridges or high ground in limestone fynbos, dune strandveld or dune thicket, up to 400m altitude.
Vegetation types in the vicinity.	FFI3 Canca Limestone Fynbos	FFI3 Canca Limestone Fynbos.
Known larval host plants.	Larvae are reared by ants in underground nests.	<i>Selago</i> species for first two instars. Later instars fed by ants in underground nests.
Probability of occurrence within the amended application footprint	Zero	Zero
Justification	The Amendment Application area is quite small and already degraded, and this butterfly does not occur in the vicinity.	The Amendment Application area is quite small and already degraded, and this butterfly does not occur in the vicinity.

5. References

- Mecenero, S., Ball, J.B., Edge, D.A., Hamer, M.L., Henning, G.A., Krüger, M., Pringle, E.L., Terblanche, R.F., Williams, M.C. 2013. *Conservation Assessment of butterflies of South Africa, Lesotho and Swaziland – Red List and atlas*. Safronics (Pty.) Ltd, Johannesburg & Animal Demography Unit, University of Cape Town.
- Mecenero, S., Edge, D.A., *et al.* 2020. Outcomes of the Southern African Lepidoptera Conservation Assessment (SALCA). *Metamorphosis* **31(4)**: 54–55 and 99–100.
- Mucina, L. & Rutherford, M.C. (eds). 2006. The vegetation of South Africa, Lesotho and Swaziland. *Strelitzia* **19**. South African National Biodiversity Institution, Pretoria.
- Williams, M.C. 2020. Afrotropical Butterflies. <https://www.metamorphosis.org.za/?p=articles&s=atb>



D.A. Edge

For: Dave Edge & Associates

25th December 2023

APPENDIX 1

CURRICULUM VITAE

DAVID ALAN EDGE

Date of birth: 22nd August 1943
Place of birth: Ormskirk, Lancs., UK
Residence: Brenton-on-Sea, Knysna, Western Cape

QUALIFICATIONS

1965 MA (Cantab) – Mechanical Engineering
2001 BSc (cum laude) – Zoology & Botany (UNISA)
2002 BSc (Hons) (cum laude) – Environmental Science (Potchefstroom University)
Specialising in Biodiversity and Conservation biology
2006 PhD in Environmental Sciences – North-West University. Thesis entitled “The ecology and conservation of the Brenton Blue”
2020 Registered Professional Natural Scientist – reg. no. 129735.

LEPIDOPTERISTS’ SOCIETY OF AFRICA (LEPSOC AFRICA)

1983 Founder member
1984–1986 Council member
1993–2016 Representative – Southern Cape
2008–2011 Treasurer
2011–2020 Editor – *Metamorphosis*, a scientific journal dedicated to the study of African Lepidoptera

CONSERVATION ACTIVITIES

1993–1996 Leading role-player in the campaign to save Brenton Blue
1995–2018 Brenton Blue Management Committee - member and leader of research programme
1999–2019 Knysna Environmental Forum - Co-chairman
2005–2020 Brenton Blue Trust – Trustee
2008–2013 South African Butterfly Conservation Assessment (SABCA)
Digitised own collection of over 8000 specimens of South African butterflies. Project leader for the southern Cape – an area of 60 000 sq. km, supervising three other field workers. Field surveys yielded over 2500 new species–QDGS records. Editor of South African Butterfly Atlas, lead author for Chapters 3 and 4 (see publications below). Authored over 100 species accounts (out of 800)
2011–2019 Leader of the Conservation of Rare and Endangered Lepidoptera (COREL) programme for South Africa, including being “Custodian” for six species.
2015–2019 Project Director for the South African Lepidoptera Conservation Assessment (SALCA) project carried out for the South African Biodiversity Institute (SANBI)
2015–2019 Taxon Lead – Butterflies for the BioGaps project to establish the biological diversity of the ‘Shale Gas Fracking’ area of the Karoo
2020 Appointed chairperson of the Western Heads-Goukamma Conservancy

ENVIRONMENTAL CONSULTING

Dave Edge & Associates Environmental Consulting

1997 – 2001	Sparrebosch, Knysna	Detailed butterfly surveys for EIA and monitoring
2000 – 2004	Roodefontein, Plettenberg Bay	Butterfly surveys for scoping report and EIA
2001	Pezula Estate, Knysna	Preliminary assessment of butterfly potential
2001	The Cove, Knysna	Preliminary assessment of butterfly potential
2001 – 2003	Fernwood, Knysna	Butterfly surveys for scoping report and EIA
2003 – 2004	The Lakes, Sedgefield	Butterfly survey for scoping report and EIA
2004 – 2005	Lagoon Bay, Glentana	Butterfly survey for scoping report and EIA
2004 – 2006	Paradise Coast, Mossel Bay	Butterfly survey for scoping report and EIA
2004 – 2005	Pezula@Hunters, Knysna	Butterfly survey for scoping report and EIA
2004 – 2006	Uitzicht 216-176, Knysna	Butterfly survey for scoping report and EIA
2004 – 2008	Pierpoint Nature Estate, Knysna	Butterfly survey for scoping report and EIA
2005 – 2006	Erf 4016 Eastford, Knysna	Butterfly survey for scoping report
2006 – 2007	Stilbaai Farm 485/51	Butterfly survey for scoping report
2006 – 2008	Destiny Africa, George	Butterfly survey for scoping report
2008	Escom, Nuclear Power Stations	Preliminary assessment of butterfly potential
2009	Pierpoint Nature Estate, Knysna	Research programme to establish ecology of <i>A. almeida</i>
2009 – 2010	Escom, Nuclear Power Stations	Detailed butterfly surveys (3 power station sites)
2011 – 2012	Uitzicht 216-77, Brenton	Biodiversity survey for scoping report
2012	Green View Estate, Mossel Bay	Butterfly survey for scoping report

2015	Zeelandsnek, Oudtshoorn	Butterfly survey for scoping report
2015 – 2018	Mossel Bay Cemetery project	Butterfly survey for scoping report; monitoring programme
2016 – 2019	Entabeni Estate, Knysna	Management plan for butterfly reserve
2016 – 2019	Uitzicht 216-71 & 72, Brenton	EIA for development proposal
2017 – 2019	Hartenbosheuwels	Butterfly scoping study
2019	Abalone Hatchery, Gouritsmond	Desk top study – butterflies
2019	Lamloch Safari Park, Kleinmond	Butterfly survey
2019	Village-on-Sea, Mossel Bay	Butterfly survey
2019	Mossel Bay Golf Estate	Butterfly survey
2020	Rouen Farm	Butterfly survey and issue of Terrestrial Biodiversity Compliance Statement (TBCS)
2020	Drakenzicht	Butterfly survey and issue of TBCS
2020	Still Bay Cemetery	Desktop study and issue of TBCS
2020	Butterfly Blue, Stellenbosch	Desktop study and issue of TBCS
2020	Erf 4016, Knysna	Butterfly survey and comments on Basic Assessment Report
2020	Nuweveld Wind Farms	Desktop study; butterfly survey; and issue of TBCS
2020	Gletwyn Gardens	Desktop study and issue of TBCS
2020	Rouen Farm, Gordon's Bay	Desktop study and issue of TBCS – butterflies
2020	Still Bay Cemetery	Terrestrial biodiversity sensitivity – butterflies
2020-2021	Nuweveld Wind Farm, W Cape	Desk top study of potential impact on butterflies
2020-2021	Nuweveld Wind Farm, W Cape	Butterfly survey to determine occurrence of ERT butterflies
2020-2021	Kokerboom Wind Farm, N Cape	Desk top study of potential impact on butterflies
2020–2021	Villa Billion Project, Kuils River	Terrestrial biodiversity compliance statement – butterflies
2021	Erf 4016, Knysna	Environmental impact assessment – butterflies
2021	Impofu Grid Extension, E Cape	Butterfly sensitivity study; habitat modelling
2021	Belhar Project, Cape Town	Terrestrial biodiversity sensitivity – butterflies
2021	Hoogland Wind Farm, W. Cape	Desk top study of potential impact on butterflies
2021	Still Bay West Erf 485-82 & 92	
2021	Aalwyndal Erf 21275, Mossel Bay	Desk top study, site survey and TBCS – butterflies
2021	Still Bay East Erf 1692	Desk top study and site survey – butterflies
2021	Hoogland Wind Farm, W. Cape	Butterfly survey to determine occurrence of ERT butterflies
2021	Zandberg Sand Mine Expansion	Desk top study and site survey and EIA – butterflies
2021	Aalwyndal Erven 21238 & 9	Desk top study, site survey and TBCS – butterflies
2022	Still Bay West Erf 591	Desk top study, site survey and TBCS – butterflies
2022	Knysna Uitzicht 216-111	Desk top study, site survey and TBCS – butterflies
2022	Mfuleni Project	Desk top study and preliminary site survey – butterflies
2022	Jongensfontein Erf 187	Desk top study, site survey and recommendations for a butterfly reserve
2022	Kleingeluk Quarries, Mossel Bay	Desk top study, site survey and TBCS – butterflies
2022	Ezelsjacht Wind & Solar, W Cape	Desk top study, site survey and TBCS – butterflies
2022	Klein Brak Hotel, Mossel Bay	Desk top study and TBCS – butterflies
2022	Vrygrond/ Retreat Housing, Cape Town	Desk top study, site surveys and TBCS – butterflies
2022	Dubula Solar Energy project	Desk top study, site survey and TBCS – butterflies
2023	Wittedrif Road upgrade	Desk top study and TBCS – butterflies
2023	Mossel Bay Sand Mine extension	Desk top study, site survey and TBCS – butterflies
2023	Nekkies bypass, Knysna	Desk top study and TBCS – butterflies
2023	Knysna Uitzicht 216-78 project	Desk top study and site survey. TBCS denied – butterflies

ACADEMIC CAREER

2009–2014 North-West University (Potchefstroom) Senior Lecturer

Developed new post graduate teaching module for “Conservation Ecology”

Lectured to postgraduate (honours and masters) students on Conservation Ecology; including setting and marking assignments and examination papers.

AWARDS

1998 The Habitat Council "for outstanding achievements in the field of environmental conservation and management – for his role in helping to secure the habitat of the endangered Brenton Blue butterfly"

2003 LepSoc Africa – June 2003 – Chairman's Award “for the most significant contribution to African Lepidoptera conservation for the period July 2002 – June 2003”

2013 LepSoc Africa – October 2013 – President's Award “for his passion and commitment leading the development and completion of the new e-*Metamorphosis* web journal.

2015 LepSoc Africa – August 2015 – Honorary Life Membership.

2018 LepSoc Africa – September 2018 – President's Award “in acknowledgement of his tireless work and commitment to the Lepidopterists' Society of Africa”.

PUBLICATIONS IN SCIENTIFIC JOURNALS (40)

EDGE, D.A. 1982. Re-discovery of *Erikssonia acraeina* Trimen. *Rostrum*, **1**(2): 2

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- EDGE, D.A.** & PRINGLE, E.L. 1996. Notes on the natural history of the Brenton Blue *Orachrysops niobe* (Trimen) (Lepidoptera: Lycaenidae). *Metamorphosis* **7**(3): 109–120
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- EDGE, D.A.** & VAN HAMBURG, H. 2009. Larval feeding behaviour and myrmecophily of the Brenton Blue butterfly *Orachrysops niobe* (Trimen). *Journal of Research on the Lepidoptera* **42**: 21–33.
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