



Dave Edge & Associates

Biodiversity Surveys

Environmental Consulting

BUTTERFLY SURVEY: SITE SENSITIVITY VERIFICATION REPORT
EZELSJACHT SOLAR ENERGY FACILITY PROJECT
WESTERN CAPE PROVINCE

Prepared for:

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Date of issue: 31st October 2022

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CREDENTIALS OF THE CONSULTANTS

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Qualifications and 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.
- Professional affiliation: SACNASP Professional Natural Scientist (Ecological Science) – registration no. 129735.
- Experience: Lepidopterist and ecologist with over 60 years' experience studying butterflies. Has conducted numerous specialist butterfly surveys in terms of NEMA.
- Publications/ conferences: 34 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.

Mr. Andrew S. Morton

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Expertise:

- Education: Matriculated in 1992 from Wynberg Boys High, Cape Town.
- Experience: Amateur lepidopterist with over 35 years' experience collecting and studying butterflies, who has made several important discoveries of rare and endangered butterflies. Has conducted butterfly surveys for eleven project EIAs.
- Publications:
 - 2016 Morton, A.S. Discovery of a new locality for the Endangered skipper butterfly *Kedestes niveostriga schloszi* Pringle & Schlosz, 1997. *Metamorphosis* **27**: 15–16.
 - 2020 De Freina, J., Mecenero, S. & Morton, A.S. Notes on the life history of *Epitoxis namaqua* de Freina & Mey, 2011 (Lepidoptera: Erebidae: Arctiinae: Syntomini). *Metamorphosis* **31**: 15–19.
 - 2020 Staude, H.S., Maclean, M., Mecenero, S., Pretorius, R.J., Oberprieler, R.G., Van Noort, S., Sharp, A., Sharp, I., Balona, J., Bradley, S., Brink, M., Morton, A.S., Botha, M.J., Collins, S.C., Grobler, Q., Edge, D.A., Williams, M.C. & Sihvonen, P. (2020). An overview of Lepidoptera-host-parasitoid associations for southern Africa, including an illustrated report on 2 370 African Lepidoptera-host and 119 parasitoid-Lepidoptera associations. *Metamorphosis* **31(3)**: 1–394.
 - 2020 Mecenero, S., Edge, D.A., Staude, H.S., Coetzer, B.H., Coetzer, A.J., Raimondo, D.C., Williams, M.C., Armstrong, A.J., Ball, J.B., Bode, J.D., Cockburn, K.N.A., Dobson, C.M., Dobson, J.C.h., Henning, G.A., Morton, A.S., Pringle, E.L. Rautenbach, F., Selb, H.E.T., Van Der Colff, D. & Woodhall, S.E. Outcomes of the Southern African Lepidoptera conservation Assessment (SALCA). *Metamorphosis* **31(4)**: 1–160.
 - 2021 Oberprieler, R.G., Morton, A.S. & van Noort, S. The life history of *Vegetia grimmia* (Geyer, 1832) (Saturniidae: Bunaeinae: Microgonini), with an account of its discovery, distribution and taxonomic distinction. *Metamorphosis* **32**: 74–92.

CONDITIONS PERTAINING TO THIS REPORT

The content of this report is based on the author's 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 Mainstream accordingly.

This report must not be altered or added to without the prior written consent of the 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

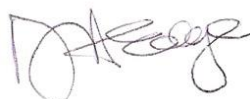
This 'specialist report' compiled will be added as an appendix to and will inform the terrestrial ecology impact assessment undertaken in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended, and the Environmental Impact Assessment Regulations, 2014 (as amended).

DECLARATION BY THE INDEPENDENT PERSON WHO COMPILED THIS REPORT

I, **David Alan Edge**, as the appointed independent specialist hereby declare/ affirm the correctness of the information provided or to be provided as part of the application and that I:

- act as an independent specialist in this application, and other than fair remuneration for work performed in connection with this application in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act, have no business, financial, personal or other interest in the development proposal or application and that there are no circumstances that may compromise my objectivity;
- have disclosed, to the applicant, EAP and the competent authority, any material information that have or may have the potential to influence the decision of the competent authority, 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 the EIA regulations, 2014 (as amended);
- am fully aware of and meet the responsibilities of a specialist 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 an offence in terms of Regulation 48 of the EIA regulations, 2014 (as amended).

Signature of the Specialist:



David Alan Edge

Representing:

Dave Edge & Associates

1. Introduction

South Africa Mainstream Renewable Power Developments (Pty) Ltd (“Mainstream”) is proposing to develop, own and operate one (1) Wind Energy Facility (WEF), Battery Energy Storage System (BESS), and associated infrastructure with a generation capacity of up to 140 megawatts (MW).

South Africa Mainstream Renewable Power Developments (Pty) Ltd (“Mainstream”) is proposing the construction and operation of one (1) Solar photovoltaic (PV) Energy Facility (SEF), Battery Energy Storage System (BESS), and associated infrastructure with a generation capacity of up to 110 megawatts.

In order to evacuate the energy generated by the SEF to supplement the national grid, Mainstream is also proposing an electrical grid infrastructure/ grid connection project which will be assessed in a separate Basic Assessment Processes (i.e. EGI for SEF).

The proposed SEF site is located approximately 13 km south-east of the town De Doorns, within the Cape Winelands District Municipality of the Western Cape Province. The site proposed for the SEF component falls entirely within the Breede Valley Local Municipality.

Applicant	Project Name	Capacity (MW)	Affected Property
South Africa Mainstream Renewable Power Developments (Pty) Ltd	Ezelsjacht Solar PV Energy Facility (SEF)	110 MW _{ac}	Portion 6 of the Farm Ratelbosch No. 149

The overall objective of the proposed development is to generate electricity by means of renewable energy technologies capturing solar energy to feed into the national grid.

The proposed SEF will consist of PV Panels, internal and access roads (with a width of up to 12 m during construction), a construction laydown area/camp, Operation and Maintenance (O&M) Building and the Independent Power Producer (IPP) 33/132kV portion of the onsite substation, amongst other associated infrastructure. The solar PV energy facility will have a generation capacity of up to 110 MW. In addition to the infrastructure mentioned above, the SEF will also potentially include energy storage infrastructure if it is deemed economically feasible to do so. This will consist of an area for a Battery Energy Storage System (BESS) covering an extent of up to approximately 5 hectares (ha). Currently, the battery technologies being considered are either Solid State Batteries or Redox Flow Batteries.

The findings of the respective specialist studies will be used to inform the location of the Solar PV arrays. All identified sensitive and/or no-go areas (including their respective buffers) will be avoided accordingly, as required. However, as part of the proposed application / Scoping & Environmental Impact Assessment (EIA) process for the SEF project, various site area / location alternatives may be assessed for the associated infrastructure such as the O&M Buildings, IPP Substations and BESS. This is however still to be confirmed and will be communicated to the specialists.

The site areas / location alternatives for the associated infrastructure such as the O&M Buildings, IPP Substations and BESS, will also need to be assessed against the ‘no-go’ alternative. The ‘no-go’ alternative is the option of not constructing the respective projects, where the status quo of the current status and/or activities on the site would prevail.

In terms of the EIA Regulations, 2014 (as amended), various aspects of the proposed development may have an impact on the environment and are considered to be listed activities. These activities require authorisation from the National Competent Authority (CA), namely the Department of Forestry, Fisheries and the Environment (DFFE), prior to the commencement thereof. One (1) application for EA for the proposed SEF development will be submitted to the DFFE, in terms of the EIA Regulations, 2014 (as amended).

To inform the assessment, specialist studies are required, including the appointment of a lepidopterist.

An overview map depicting the proposed SEF is given in Figure 1 below.

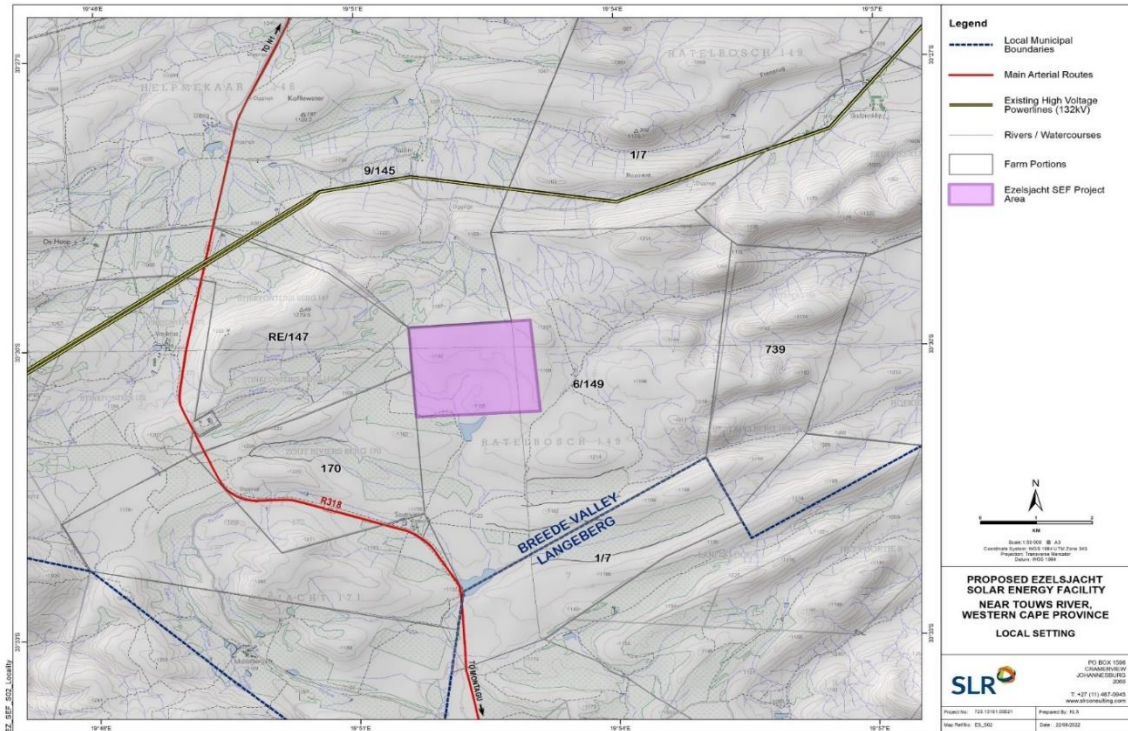


Figure 1 – Overview map of the proposed SEF near Touws River, Western Cape Province

2. Terms of reference of the Consultant

Dave Edge & Associates was appointed on 21 June 2022 by SLR Consulting (South Africa) Pty Ltd, to undertake a butterfly Impact assessment to assess impacts associated with the construction and operation of the SEF and associated infrastructure, covering the following scope:

1. Site Sensitivity Verification Report for the SEF,
2. Specialist Assessment Report / Compliance Statement (as applicable in terms of GN 320 of 20 March 2020 and GN 1150 of 30 October 2020); OR
3. Appendix 6 of the EIA Regulations, 2014 (as amended) (should no protocols apply to the discipline) for the SEF

Deliverables

- 1 x Site Sensitivity Verification Report (SSVR) (One for the SEF);
- 1 x Specialist Assessment Report / Compliance Statement (as applicable in terms of GN 320 of 20 March 2020 and GN 1150 of 30 October 2020); OR in terms of Appendix 6 of the EIA Regulations, 2014 (as amended) (should no protocols apply to the discipline) for the SEF.
- Data for the sensitivity layers for the SEF application; and
- Excel spreadsheet of impact ratings for the SEF application (should this be required)

Information provided by SLR:

1. Specialist Terms of Reference (ToR) document;
2. Screening tool reports from the DFFE;
3. Project layout maps showing the SEF, as a kmz files;and
4. Template to be used when compiling the SSVR.

3. Methodology

3.1 Butterfly occurrence records

Butterfly occurrence records from the quarter degree grid squares (QDGSs) 3319 BD and 3319DB were extracted from the LepiMap Virtual Museum (VM) database:

https://vmus.adu.org.za/vm_login.php?database=sabca&prj_acronym=LepiMAP&db=sabca&URL=http://lepimap.adu.org.za&Logo=images/lepimap_logo.png&Headline=Atlas%20of%20African%20Lepidoptera&Use_main_filter=1.

The data obtained were tabulated, with any butterfly species of conservation concern (SCC) identified, including those which had not been picked up by the ST, which only picked up one butterfly SCC (*Aloeides caledoni* – Medium sensitivity). The LepiMap VM database was searched for records of this species (and any other SCCs discovered), and these data were also tabulated.

3.2 Vegetation

The vegetation types at the site were investigated with reference to SANBI (2018).

The vegetation types in which the SCC butterflies had been recorded were obtained from Mecenero *et al.* (2020), and SCC butterfly host plants were obtained from various literature sources (if known).

3.3 SCC butterfly abiotic habitat requirements

For each SCC butterfly the known habitat requirements (topology, altitude, and substrate) were obtained from Mecenero *et al.* (2020). Topographic maps (1:50 000) of the SEF site were studied to detect whether and where similar habitat could exist within the SEF site.

3.4 Butterfly site surveys

The DFFE screening tool reports picked up only one butterfly SCC (*Aloeides caledoni* – Medium sensitivity). A butterfly sensitivity report was conducted to identify the parts of the site most likely to contain habitat for *A. caledoni* were delineated, and these areas were targeted to search for this butterfly.

Since good weather is critical for finding rare butterflies such as *A. caledoni* the 18th and 19th October were chosen, and because only these two days seemed suitable a second lepidopterist was brought to the site to enable the search to be completed in two days. The weather was perfect on the 18th, but on the 19th the wind was quite strong from midday onwards and this lessened the chance of finding *A. caledoni*. During the fine weather on the 18th we were able to cover all the high ground targeted in the four areas. In the afternoon of the 19th we had a look at the area for solar energy production to assess whether it was suitable habitat for *A. caledoni*.

4. Results

4.1 Butterfly occurrence records

Examination of LepiMap records did not reveal any other SCC butterfly (Table 1), and the known records of *Aloeides caledoni* extracted from the LepiMap database are listed in Table 2 (see page 11). The following information on this taxon was summarised from Pringle (2020):

Aloeides caledoni is a rare low density endemic confined to higher altitudes such as ridges and mountain tops. It is known to occur at Touws River, Matjiesfontein and Beaufort West at altitudes in excess of 1000 m. It has been recorded in vegetation types FFq3 Matjiesfontein Quartzite Fynbos, FFs12 Overberg Sandstone Fynbos, FFs23 North Swartberg Sandstone Fynbos, FRs6 Matjiesfontein Shale Renosterveld and Gh1 Karoo Escarpment Grassland (Mucina & Rutherford 2006). Host plant is unknown. Flight period is from October to mid-November.

Prior to the butterfly survey (see section 4.4 below) the probability of occurrence within the site of the proposed SEF (prior to the butterfly survey) was estimated to be well below 5%.

4.4 Butterfly site survey – Solar Energy Facility

The area where the Solar Energy Facility is planned was surveyed by vehicle and on foot and was found to be relatively flat and featureless, and being lower in altitude is not suitable terrain for *Aloeides caledoni* to occur. No butterflies other than common ones such as *Pontia helice helice* and *Vanessa cardui* were encountered. Refer to Figure 4 for details of the areas searched.

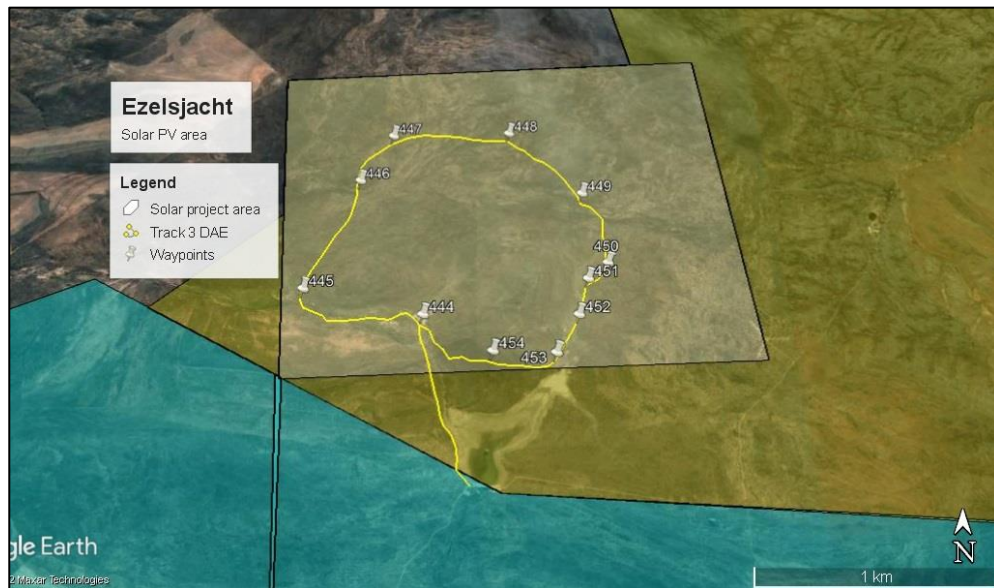


Figure 4 – Areas searched during butterfly survey of the Ezelsjacht SEF site, showing tracks and waypoints (kmz file also provided).

5. Conclusions

The proposed Ezelsjacht SEF does not pose any threat to any currently Red Listed threatened butterflies (in the categories Critically Endangered, Endangered, or Vulnerable). However, there is one Rare butterfly *Aloeides caledoni* which could occur at the site, and although this was identified by the ST as being of “Medium sensitivity”, a targeted butterfly survey did not reveal any occurrence of this taxon on the Ezelsjacht SEF site, which is not surprising since it is known to occur on high altitude ridges.

6. Acknowledgements

My colleague Mr Andrew S Morton is thanked for his contribution to the field surveys. The owners of the Ezelsjacht Guest Farm are thanked for their hospitality.

7. References

- Mecenero, S., Edge, D.A., Staude, H.S., Coetzer, B.H., Coetzer, A.J., Raimondo, D.C. & Williams, M.C. *et al.* 2020. Outcomes of the Southern African Lepidoptera 2016 Conservation Assessment (SALCA). *Metamorphosis* **31(4)**: 1–160.
- Mucina, L. & Rutherford, M.C. (eds). The vegetation of South Africa, Lesotho and Swaziland. 2006. *Strelitzia* 19. South African National Biodiversity Institution, Pretoria.
- Pringle, E.L. 2020. Conservation Assessment – *Aloeides caledoni* Tite & Dickson, 1973. *In*: Mecenero *et al.* 2020. Outcomes of the Southern African Lepidoptera Conservation Assessment (SALCA). *Metamorphosis* **31(4)**: 44–45.
- South African National Biodiversity Institute (2006-2018). The Vegetation Map of South Africa, Lesotho and Swaziland, Mucina, L., Rutherford, M.C. and Powrie, L.W. (Editors). Online: <http://bgis.sanbi.org/Projects/Detail/186, Version 2018>.

D.A. Edge

Dave Edge & Associates

31st October 2022

Table 1 – Butterfly taxa occurring in the same quarter degree grid squares (QDGS) as the EREF project, with IUCN threat categories. (If part of the scientific name is abbreviated to just the first letter it is a repeat of the word following)

QDGS ►		3119BD	3119DB	IUCN	ALL
Scientific name (families in bold)	Common name				
Hesperiidae					
<i>Spialia a. agylla</i>	Grassland sandman		1	LC	1
<i>Spialia ferax</i>	Striped sandman	1		LC	1
<i>Spialia spio</i>	Mountain sandman	1		LC	1
Lycaenidae					
<i>Aloeides caledoni</i>	Caledon russet	0	0	Rare	0
<i>Aloeides pierus</i>	Veined russet	1		LC	1
<i>Aloeides t. thyra</i>	Red russet	1		LC	1
<i>Cacyreus dicksoni</i>	Karoo geranium bronze	1	1	LC	1
<i>Capys a. alpheus</i>	Orange banded protea	1		LC	1
<i>Chrysoritis chrysantas</i>	Karoo daisy copper		1	LC	1
<i>Chrysoritis plutus</i>	Plutus opal	1		LC	1
<i>Chrysoritis u. uranus</i>	Uranus opal	1		LC	1
<i>Durbaniella clarki phaea</i>	Little rocksitter	1		LC	1
<i>Durbaniopsis saga</i>	Boland rocksitter	1		LC	1
<i>Lepidochrysops australis</i>	Southern giant cupid	1		LC	1
<i>Lepidochrysops bacchus</i>	Wineland giant cupid	1		LC	1
<i>Leptomyrina lara</i>	Cape black-eye		1	LC	1
<i>Leptotes pirithous</i>	Common zebra blue		1	LC	1
<i>Lycaena clarki</i>	Eastern sorrel copper	1		LC	1
<i>Oraidium barberae</i>	Dwarf blue		1	LC	1
<i>Tarucus thespis</i>	Vivid pierrot	1		LC	1
<i>Thestor brachycerus dukei</i>	Duke's skolly	1		LC	1
<i>Thestor penningtoni</i>	Swartberg skolly	1		LC	1
<i>Thestor stepheni</i>	Jonaskop skolly	1		LC	1
<i>Trimenia a. argyropilaga</i>	Large silver-spotted copper	1		LC	1
<i>Trimenia m. macmasteri</i>	Karoo silver-spotted copper		1	LC	1
<i>Zizeeria k. knysna</i>	African grass blue	1		LC	1
Nymphalidae					
<i>Charaxes pelias</i>	Protea charaxes	1		LC	1
<i>Danaus chrysippus orientis</i>	African plain tiger		1	LC	1
<i>Melampias h. huebneri</i>	Boland brown	1		LC	1
<i>Pseudonympha southei wykehami</i>	Black pepper brown	1		LC	1
<i>Pseudonympha t. trimenii</i>	White-netted brown	1		LC	1
<i>Stygionympha vigilans</i>	Western hillside brown	1		LC	1
<i>Tarsocera c. cassus</i>	Spring widow	1		LC	1
<i>Tarsocera dicksoni</i>	Boland spring widow	1		LC	1
<i>Torynesis hawequas</i>	Hawequas veined widow	1		LC	1
Pieridae					
<i>Belenois aurota</i>	Pioneer caper white	1	1	LC	1
<i>Pontia h. helice</i>	Southern meadow white	1	1	LC	1
TOTAL TAXA		29	10		36

Table 2 – Records of *Aloeides caledoni* obtained from LepiMap

Date	Locality	Observer	Coordinates (decimal minutes)		QDGS
1954.10.18	Matjiesfontein	G van Son	33.2167 S	20.5667 E	3320BA
1954.10.19	Matjiesfontein	R Badham	33.2167 S	20.5667 E	3320BA
1968.10.28	Caledon	CG Dickson	34.3000 S	19.3333 E	3419AD
1976.10.10	Caledon	R D Stephen	34.3167 S	19.4500 E	3419AD
1976.10.14	Touws River	E L Pringle	33.3333 S	20.0167 E	3320AC
1976.10.24	Caledon	R D Stephen	34.3000 S	19.4167 E	3419AD
1976.10.31	Caledon	R D Stephen	34.3000 S	19.4167 E	3419AD
1981.10.14	Touws River	E L Pringle	33.3000 S	20.0667 E	3320AC
1981.11.14	Touws River	I A Coetzer	33.3000 S	20.0667 E	3320AC
1990.10.31	Caledon	D A Edge	34.3139 S	19.4361 E	3419AD
1996.10.06	Lootsberg Pass	A I Curle	31.8369 S	24.8589 E	3124DD
1996.10.12	Lootsberg Pass	E L Pringle	31.8167 S	24.8500 E	3124DD
1997.09.28	Lootsberg Pass	S E Woodhall	31.8256 S	24.8650 E	3124DD
2007.11.13	Swartberg Mtn	D A Edge	33.3594 S	22.3839 E	3322AD
2007.12.12	Kruisrivier	H C Ficq	33.4391 S	21.8504 E	3321BD
2007.12.27	Kruisrivier	H C Ficq	33.4374 S	21.8348 E	3321BD
2008.11.02	Beaufort West	A Heath	32.3500 S	22.5833 E	3222BC
2009.10.22	Karoo Nat Park	A Heath	32.2719 S	22.4869 E	3222AD
2018.10.20	Molteno Pass	F Rautenbach	32.1766 S	22.5085 E	3222BA

Table 3 – List of butterfly families and species recorded in the WEF site, with sex, coordinates, altitude a.m.s.l. and host plants. Note that ♂ = male and ♀ = female.

WP no.	Family/ species	Sex	Coordinates		Alt. (m)	Host plants
			South	East		
	Lycaenidae					
425	<i>Aloeides</i> species (not <i>caledoni</i>)	♀	33° 31.710	19° 53.521	1166	None
434	<i>Aloeides</i> species (not <i>caledoni</i>)	♀	33° 31.645	19° 54.110	1187	None
435	<i>Aloeides</i> species (not <i>caledoni</i>)	♀	33° 31.646	19° 53.974	1177	None
440	<i>Aloeides</i> species (not <i>caledoni</i>)	♀	33° 31.250	19° 49.900	1219	None
AM5	<i>Aloeides</i> species (not <i>caledoni</i>)	♂	33° 31.224	19° 49.955	1220	None
AM11	<i>Aloeides</i> species (not <i>caledoni</i>)	♀	33° 31.964	19° 49.281	1250	None
441	<i>Aloeides aranda</i>	♀	33° 31.987	19° 50.308	1258	<i>Aspalathus</i> species
423	<i>Cacyreus dicksoni</i>	♂	33° 31.668	19° 53.176	1151	<i>Pelargonium</i> species
442	<i>Cacyreus dicksoni</i>	♂	33° 31.830	19° 50.287	1200	<i>Pelargonium</i> species
AM7	<i>Lepidochrysops australis</i>	♂	33° 31.977	19° 50.277	1250	<i>Selago</i> species
429	<i>Lepidochrysops oreas junae</i>	♂	33° 31.676	19° 53.590	1183	<i>Selago</i> species
437	<i>Lepidochrysops dukei</i> ssp	♂	33° 31.355	19° 49.720	1211	<i>Selago</i> species
439	<i>Lepidochrysops dukei</i> ssp	♀	33° 31.222	19° 49.968	1225	<i>Selago</i> species
AM1	<i>Lepidochrysops dukei</i> ssp	♂	33° 31.427	19° 49.654	1220	<i>Selago</i> species
AM2	<i>Lepidochrysops dukei</i> ssp	♂	33° 31.368	19° 49.671	1220	<i>Selago</i> species
AM3	<i>Lepidochrysops dukei</i> ssp	♀	33° 31.205	19° 49.812	1225	<i>Selago</i> species
AM14	<i>Lepidochrysops dukei</i> ssp	♂	33° 31.619	19° 50.198	1179	<i>Selago</i> species
AM15	<i>Lepidochrysops dukei</i> ssp	♀	33° 31.763	19° 50.165	1197	<i>Selago</i> species
AM16	<i>Lepidochrysops dukei</i> ssp	♂	33° 31.696	19° 53.260	1158	<i>Selago</i> species
AM17	<i>Lepidochrysops dukei</i> ssp	♀	33° 31.431	19° 53.229	1149	<i>Selago</i> species
AM4	<i>Leptomyrina lara</i>	♂	33° 31.222	19° 49.968	1225	Crassulaceae species
431	<i>Leptomyrina lara</i>	♂	33° 31.683	19° 53.579	1176	Crassulaceae species
426	<i>Phasis c. clavum</i>	♂	33° 31.678	19° 53.500	1183	<i>Searsia</i> species
427	<i>Phasis c. clavum</i>	♂	33° 31.675	19° 53.598	1183	<i>Searsia</i> species
AM12	<i>Phasis c. clavum</i>	♂	33° 31.730	19° 53.130	1170	<i>Searsia</i> species
	Nymphalidae					
AM13	<i>Pseudonympha southeyi wykehami</i>	♂	33° 31.695	19° 53.176	1150	Grasses
428	<i>Pseudonympha trimeni</i> ssp.	♀	33° 31.675	19° 53.588	1183	Grasses
432	<i>Pseudonympha trimeni</i> ssp.	♂	33° 31.676	19° 53.596	1179	Grasses
436	<i>Pseudonympha trimeni</i> ssp.	♀	33° 31.355	19° 49.720	1212	Grasses
AM6	<i>Pseudonympha trimeni</i> ssp.	♂	33° 31.358	19° 49.906	1215	Grasses
424	<i>Tarsocera cassus cassus</i>	♀	33° 31.725	19° 53.339	1164	Grasses
AM8	<i>Tarsocera cassus cassus</i>	♂	33° 31.971	19° 50.279	1250	Grasses
AM	<i>Vanessa cardui</i>	♂	Everywhere			Various
	Pieridae					
AM	<i>Pontia h. helice</i>	♂	Everywhere			Various
	Papilionidae					
AM10	<i>Papilio d. demodocus</i>	♂	33° 31.966	19° 50.280	1250	Various
	Hesperiidae					
AM9	<i>Spialia ferax</i>	♂	33° 31.968	19° 50.282	1250	<i>Hermannia</i> species

APPENDIX 1 – BUTTERFLY IMAGES



Figure 3 – *Tarsochera c. cassus* mating pair
Edge, J.M.

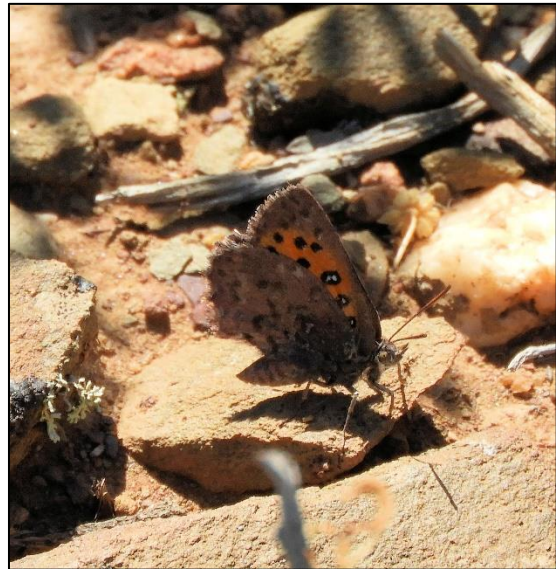


Figure 4 – *Aloeides* species female perching on stone
Edge, J.M.



Figure 5 – *Pseudonympha trimeni* ssp. nectaring
Edge, J.M.

APPENDIX 2 – 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 Professional Natural Scientist (Ecological Science) – SACNASP registration no. 129735.

ENGINEERING & MANAGEMENT CAREER

1965 – 1973 **Nchanga Consolidated Copper Mines, Zambia**
Assistant Divisional Engineer
Maintenance engineering and management
1973-1979 **Palabora Mining Company**
Assistant General Manager
Operations and maintenance management, mechanical engineering and extractive metallurgy, general management
1979-1993 **LTA Process Engineering**
Managing Director
General management, marketing, project engineering and management, design engineering, procurement and construction management.

LEPIDOPTERISTS’S SOCIETY OF AFRICA (LEPSOC AFRICA)

1983 Founder member
1984–2021 Council member
1993–2021 Representative – Southern Cape
2008–2019 Treasurer
2011–2021 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
1999–2018 Knysna Environmental Forum - Co-chairman
2005–2018 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)
2011–2021 Leader of the Conservation of Rare and Endangered Lepidoptera (COREL) programme for South Africa, including being “Custodian” for six species.
2015-2019 Taxon Lead – Butterflies for the BioGaps project to establish the biological diversity of the ‘Shale Gas Fracking’ area of the Karoo
2015-2020 Project Director for the South African Lepidoptera Conservation Assessment (SALCA) project carried out for the South African Biodiversity Institute (SANBI)

ENVIRONMENTAL CONSULTING

Dave Edge & Associates Environmental Consulting (57 projects)

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	Eskom, 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	Eskom, 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	Schaapkraal, Cape Town	Butterfly scoping and sensitivity report
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
2019	Lamloch Safari Park, Kleinmond	Preliminary butterfly survey for scoping report
2019	Garden Route Dam, George	Preliminary butterfly survey for scoping report
2020	Drakenzicht, Paarl	Terrestrial biodiversity compliance statement – butterflies
2020	Rouen Farm, Gordon's Bay	Terrestrial biodiversity compliance statement – butterflies
2020	Still Bay Cemetery	Terrestrial biodiversity sensitivity – butterflies
2020	Nuweveld Wind Farm, W Cape	Desk top study of potential impact on butterflies
2020	Nuweveld Wind Farm, W Cape	Butterfly survey to determine occurrence of ERT butterflies
2020	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	Desk top study, site survey and TBCS – butterflies
2021	Aalwyndal Erf 21275, Mossel Bay	Desk top study, site survey and TBCS – butterflies
2021	Still Bay East Erf 1692	Desk top study, site survey and TBCS – butterflies
2021	Hoogland Wind Farm, W. Cape	Butterfly survey to determine occurrence of ERT butterflies
2021	Zandberg Sand Mine Expansion	Desk top study, site survey and EIA – butterflies
2021	Aalwyndal Erven 21238 & 9	Desk top study, site survey and TBCS – butterflies
2022	Aalwyndal Erven 205 & 220	Butterfly site survey
2022	Still Bay West Erf 591	Desk top study, site survey and TBCS – butterflies
2022	Knysna Uitzicht 216-111	Desk top study and preliminary site survey – butterflies
2022	Mfuleni, Cape Town	Desk top study and site survey – butterflies
2022	Ezelsjacht Wind & Solar	Desk top study – butterflies
2022	Jongensfontein, Still Bay	Desk top study, site survey and EIA – butterflies
2022	Klein Brak Hotel	Desk top study and TBCS – butterflies
2022	Vrygrond, Cape Town	Desk top study and site survey – butterflies
2022	Retreat, Cape Town	Desk top study and site survey – 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 (39 Articles)

- EDGE, D.A.** 1982. Re-discovery of *Erikssonia acraeina* Trimen. *Rostrum*, **1**(2): 2
- EDGE, D.A.** 1985. Life history of *Iolous diametra natalica* Vári. *Metamorphosis*, **1**(13): 4–6
- EDGE, D.A.** 1987. Life history of *Iolous pallene* (Wallengren). *Metamorphosis*, **1**(19): 3–5
- EDGE, D.A.** 1990. Life history - *Aphnaeus hutchinsonii* Trimen 1887. *Metamorphosis*, **1**(27): 16–18
- 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
- EDGE, D.A.** 2002. Some ecological factors influencing the breeding success of the Brenton Blue *Orachrysops niobe* (Trimen) (Lepidoptera: Lycaenidae). *Koedoe* **45**(2): 19–34
- EDGE, D.A.** 2005a. Butterfly conservation in the southern Cape. *Metamorphosis* **16**(2): 28–46
- EDGE, D.A.** 2005b. Ecological factors influencing the survival of the Brenton Blue butterfly, *Orachrysops niobe* (Trimen) (Lepidoptera: Lycaenidae). Potchefstroom: North-West University. (Thesis–D.Phil.)
- EDGE, D.A.** 2005c. Life history and ecological observations on *Aloeides pallida*, undescribed subspecies (Lepidoptera: Lycaenidae). *Metamorphosis* **16**(4): 110–115
- EDGE, D.A.** & WILLIAMS, M.C. 2005. Observations on the life history of *Lepidochrysops balli* Dickson (Lepidoptera: Lycaenidae). *Metamorphosis* **16**(4): 106–109
- EDGE, D.A.** & PRINGLE, E.L. 2006. Observations on the life history of *Chrysoritis braueri* (Pennington) (Lepidoptera: Lycaenidae). *Metamorphosis* **17**(4): 134–139
- EDGE, D.A.** 2007. The Brenton Blue – tiny icon for biodiversity. *Vision – Endangered Wildlife Trust 15th Annual*. Future Publishing, Rivonia.
- TERBLANCHE, R.F. & **EDGE, D.A.** 2007. The first record of an *Orachrysops* in Gauteng. *Metamorphosis* **18**(4): 131–141
- EDGE, D.A.** 2008a. Adult behaviour of *Orachrysops niobe* (Trimen) (Lepidoptera: Lycaenidae). *Metamorphosis* **19**(3): 116–126.
- EDGE, D.A.** 2008b. Environmental management plan: Brenton Blue butterfly special nature reserve: Revision 2 (unpublished). CapeNature document. 43 pp.
- EDGE, D.A.**, CILLIERS, S.S. & TERBLANCHE, R.F. 2008. Vegetation associated with the Brenton Blue butterfly. *South African Journal of Science* **104**(11/12): 505–510.
- EDGE, D.A.**, ROBERTSON, H.G. & VAN HAMBURG, H. 2008. Ant assemblages at potential breeding sites for the Brenton Blue butterfly *Orachrysops niobe* (Trimen) (Lepidoptera: Lycaenidae). *African Entomology* **16**(2): 253–262.
- 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.
- EDGE, D.A.** 2011a. The Brenton Blue butterfly – twenty years of conservation. *Environment* **6**: 34–35.
- EDGE, D.A.** 2011b. Custodians of rare and endangered Lepidoptera (COREL). *Metamorphosis* **22**(3): 81–96.
- EDGE, D.A.** & TERBLANCHE, R.F. 2011. A rapid assessment protocol for surveying and monitoring diurnal Lepidoptera in Africa. *Metamorphosis* **22**(3): 75–80.
- EDGE, D.A.**, TERBLANCHE, R.F., HENNING, G.A., MECENERO, S. and NAVARRO, R. 2013. Butterfly conservation in South Africa: Analysis of the Red List and threats. In: *Conservation assessment of butterflies of South Africa, Lesotho and Swaziland: Red list and atlas*. Safronics (Pty) Ltd., Johannesburg and Animal Demography Unit, Cape Town. pp. 13–33.
- EDGE, D.A.**, WOODHALL, S.E., BALL, J.B., HENNING, G.A., ARMSTRONG, A.J. and MECENERO, S. 2013. Future priorities for butterfly conservation and research. In: *Conservation assessment of butterflies of South Africa, Lesotho and Swaziland: Red list and atlas*. Safronics (Pty) Ltd., Johannesburg and Animal Demography Unit, Cape Town. pp. 36–40.
- EDGE, D.A.** 2013. Family Lycaenidae Leach, 1815. In: *Conservation assessment of butterflies of South Africa, Lesotho and Swaziland: Red list and atlas*. Safronics (Pty) Ltd., Johannesburg and Animal Demography Unit, Cape Town. pp. 335–610.
- MECENERO, S., BALL, J.B., **EDGE, D.A.**, HAMER, M.L., HENNING, G.A., KRÜGER, M., PRINGLE, E.L., TERBLANCHE, R.F., and WILLIAMS M.C. (eds). 2013. *Conservation assessment of butterflies of South Africa, Lesotho and Swaziland: Red list and atlas*. Safronics (Pty) Ltd., Johannesburg and Animal Demography Unit, Cape Town.
- MECENERO, S., NAVARRO, R., COETZER, B. and **EDGE, D.A.** 2013. Description of data and methods. In: *Conservation assessment of butterflies of South Africa, Lesotho and Swaziland: Red list and atlas*. Safronics (Pty) Ltd., Johannesburg and Animal Demography Unit, Cape Town. pp. 3–11.
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- GARVIE, O.G., DOBSON, J., **EDGE, D.A.**, GARDINER, A.J., TERBLANCHE, R.F. & WILLIAMS, M.C. (2014). Research and conservation plan for the Waterberg Copper (*Erikssonia edgei* Gardiner & Terblanche, 2010) (Lepidoptera: Lycaenidae) at the Bateleur Nature Reserve. *Metamorphosis* **25**: 100–108
- BAZIN, E.A. & **EDGE, D.A.** 2015. The ecology and conservation of *Thestor brachycerus brachycerus* (Trimen, 1883) – an aphytophagous miletine butterfly from South Africa. *Journal of Insect Conservation* **19**(2): 349–357.
- EDGE, D.A.** & MECENERO, S. 2015. Butterfly conservation in southern Africa. *Journal of Insect Conservation* **19**(2): 325–339.
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- WILLIS, C.K. & **EDGE, D.A.** 2015. Oviposition and mating behaviour in *Orachrysops warreni* G.A. & S.F. Henning, 1994 (Lepidoptera: Lycaenidae: Polyommatainae), in Mpumalanga, South Africa. *Metamorphosis* **26**: 1–3.
- MECENERO, S. & **EDGE, D.A.** 2015. Southern African Lepidoptera Conservation Assessment (SALCA). *Metamorphosis* **26**: 116–122.

- EDGE, D.A.** 2016. Vegetation associated with the critically endangered butterfly *Chrysoritis dicksoni* (Gabriel, 1947) (Lepidoptera: Lycaenidae: Aphnaeinae) at Witsand, Western Cape Province. *Metamorphosis* **27**: 66–77.
- EDGE, D.A.** 2018. A new species of *Cooksonia* Druce, 1905 (Lepidoptera: Lycaenidae: Poritiinae) from Western Zambia. *Metamorphosis* **29(1)**: 51–55.
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- MECENERO, S., **EDGE, D.A.**, STAUDE, H.S., COETZER, B.H., COETZER, A.J., RAIMONDO, D.C. & WILLIAMS, M.C., *et al.* 2020. Outcomes of the Southern African Lepidoptera Conservation Assessment (SALCA). *Metamorphosis* **31(4)**: 1–160.