Terrestrial Biodiversity Site Sensitivity Verification Report

Proposed development of the residential housing on Erf 4439, Simon's Town, Western Cape

Compiled for: LORNAY ENVIRONMENTAL CONSULTING

September 2024

Report Information

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Authors involved in compiling this report:	Jonathan Colville (PhD) – Terrestrial Ecologist & Faunal Surveys Callan Cohen (PhD) – Birding Africa
Authors contact details:	**Email:** jonathan.colville@gmail.com | **Phone:** +27 83 564 5050 **Email:** callan@birdingafrica.com | **Phone:** +27 83 256 0491
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Specialist Details

Specialist Details | Jonathan Colville -- Terrestrial Ecologist & Faunal Surveys	
Company Name	Jonathan Colville -- Terrestrial Ecologist & Faunal Surveys
Email Address	jonathan.colville@gmail.com
Telephone	+27 (0) 83 564 5050
Highest Qualification	PhD Zoology | University of Cape Town | 2009
SACNASP Reg. No.	134759
Areas of Specialisation	Terrestrial faunal ecology and conservation

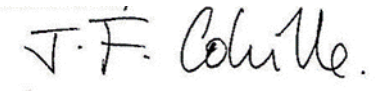
Jonathan Colville of Terrestrial Ecologist & Faunal Surveys has over fourteen years post-PhD experience in the fields of terrestrial ecology, including investigating the spatial patterns of South Africa's animal and plant diversity. Between 2009 and 2019, Jonathan was involved with the South African National Biodiversity Institute's (SANBI) Biodiversity, Research, Assessment and Monitoring Division (BRAM) undertaking ecological research on South Africa's animal and plant diversity. Since 2020 Jonathan has been operating as a specialist faunal consultant for EIAs and conservation projects. An abridged CV is provided below in Appendix 2.

Specialist Details | Callan Cohen -- Birding Africa	
Company Name	Birding Africa
Email Address	callan@birdingafrica.con
Telephone	+27 83 256 0491
Highest Qualification	PhD Ornithology | University of Cape Town | 2011
Areas of Specialisation	Ornithology, Ecology, Odonata, Lepidoptera

Callan Cohen (Director of Birding Africa) has extensive knowledge of Cape birds and is a recognised international expert on African birds. He has a PhD in Ornithology from the University of Cape Town where he is a Research Associate of the Fitzpatrick Institute of African Ornithology. He has co-authored two books on South African birds and contributed to five others, including the Red Data Book of Birds of South Africa, Lesotho, and Swaziland (Barnes, 2000). He has also published several books, articles, and reports on Odonata, Lepidoptera, Herpetology, and Botany. He has over 30 years of experience of bird field surveys. An abridged CV is provided below in Appendix 3.

Signed Statement of Independence:
In terms of Chapter 5 of the National Environmental Management Act of 1998 (Act No. 107 of 1998), as amended, and the Environmental Impact Assessment Regulations, 2014, specialists involved in Environment Assessment Processes must declare their independence and provide their contact details, relevant experience, and a curriculum vitae. I, Jonathan F. Colville, as the appointed independent specialists, do hereby declare that I am financially and otherwise independent of the client and their EAP, and that all opinions expressed

in this document are my own and based on my scientific and professional knowledge, and available information.



Jonathan F. Colville

Conditions Pertaining to this Report

The content of this report is based on my best scientific and professional knowledge, and available information. Jonathan Colville and Callan Cohen reserve the right to modify the report in any way deemed fit should new, relevant, or previously unavailable or undisclosed information becomes known to them from on-going research or further work in this field, or pertaining to this investigation, and they will inform Lornay Environmental Consulting accordingly. This report must not be altered or added to without the prior written consent of Jonathan Colville/Callan Cohen. 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 refer 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.

Introduction

EcoSense CC has been engaged by City of Cape Town to undertake a Basic Assessment for a Proposed mixed use housing development on Erf 4439, Annandale.

Lornay Environmental Consulting generated an online site sensitivity report using the National Web based Environmental Screening Tool (https://screening.environment.gov.za/screeningtool/). The screening tool uses spatial biodiversity priority and feature layers, including ecosystem and species level datasets for animal and plants provided by the South African National Biodiversity Institute (SANBI).

The Screening Tool rated the project site as overall **Medium** sensitivity for the animal species sensitivity theme. Two animal Species of Conservation Concern (SCC) were flagged, with possible suitable habitat for:

- Bird species:
    - Black Harrier (*Circus maurus*): Medium Sensitivity
    - Striped Flufftail (*Sarothrura affinis*): Medium Sensitivity

The Screening Tool rated the project site as overall **Medium** sensitivity for the plant species sensitivity theme, with 125 plant SCC flagged for the development area.

The Screening Tool rated the project site as "**Very High**" sensitivity for several terrestrial biodiversity features:

- Cape Floral Region Protected Areas: Very High
- Table Mountain National Park: Very High
- CBA 1: Terrestrial: Very High
- SWSA (SW) Table Mountain: Very High
- SANParks (Buffer) Table Mountain National Park: Very High
- Endangered Cape Flats Dune Strandveld vegetation: Very High

Jonathan Colville and Callan Cohen were appointed to assess the animal, plant, and terrestrial biodiversity sensitivity themes and provide a Site Sensitivity Verification Report (SSVR) in compliance with Government Notice (GN) 320 and 1150 of 2020 for the respective terrestrial themes.

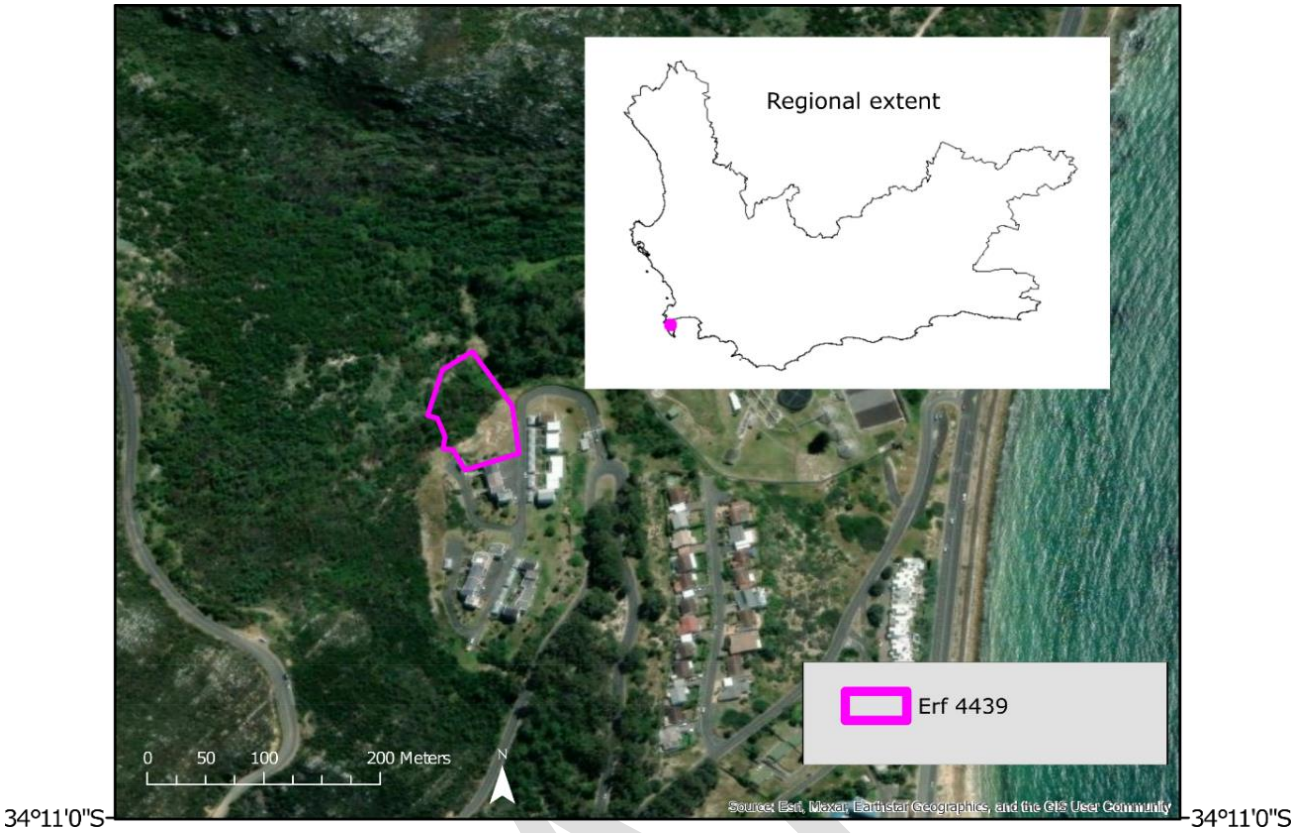


Figure 1: Location of the project site and its regional context in the Western Cape Province. The proposed development area is concentrated in the southern parts of the project site – see SDP in Appendix 1.

Terms of Reference

Jonathan Colville and Callan Cohen were appointed by Delta Ecology to conduct a Site Sensitivity Verification Report (SSVR), including a desktop study and a site visit to assess the site sensitivity and the possibility of suitable available habitat for any animal and plant SCC, and to assess the physical and biological characteristics of the site with regards to the terrestrial biodiversity sensitivity theme. Based on the information obtained from the site visit and desktop study, either a Terrestrial Animal/Plant Species Compliance Statement and/or a Terrestrial Biodiversity Compliance Statement would then be issued, or a Terrestrial Animal/Plant Species Specialist Assessment and/or a Terrestrial Biodiversity Specialist Assessment would subsequently be required, as stipulated in the Government Gazette No's. 43855 and 43110: Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Animal/Plant/ Species and Terrestrial Biodiversity.

1. Carry out a desktop study to determine if any animal/plant SCC have been recorded at or near the project area and to ascertain the habitat requirements of any animal/plant SCC.
2. Carry out a desktop study to provide a baseline description of the broad ecological characteristics of the site:
    a. Community and ecosystems:
        i. Vegetation type

ii. Threatened or vulnerable ecosystems

b. Other ecological patterns:

i. Significant landscape features or rare or important vegetation associations (e.g. seasonal wetlands, seeps, geological features, etc.).

ii. The extent of alien plant cover on the site.

iii. The condition of the site in terms of current or previous land uses.

3. Conduct a site visit of the project area to ground truth the desktop biodiversity data and to assess the physical and biological characteristics of the site and identify any sensitive areas, buffer zones, no-go areas, and possible alternatives. In addition, assess the physical and biological characteristics of the site with regards to habitat suitability and sensitivity for any animal/plant SCC flagged.

4. Prepare a report detailing the findings of the desktop study and site visit, confirming, or disputing the environmental sensitivity theme as identified by the screening tool, and the issuing of an Animal/Plant/Terrestrial Biodiversity Compliance Statement or a recommendation that an Animal/Plant/Terrestrial Biodiversity Specialist Assessment would be required.

Assumptions and Limitations

The following limitations and assumptions apply to this assessment:

- It is assumed that all third-party information used (e.g. GIS data and species historical records) was correct at the time of generating this report.
- The site was visited during winter (20 June 2024) and early spring (31 August 2024). Seasonality, however, is not considered as important as this site sensitivity assessment relied on surveying and assessing broad habitat features and utilising ecosystem-level data, such as intact vegetation type, and known habitat and distributional records for the animal/plant SCC.
- Parts of the project site were difficult to access on foot due the very steep topography and dense alien invasive plant growth.
- This scoping assessment was undertaken based on the information provided to date by Lornay Environmental Consulting for the proposed development.

Site Sensitivity Verification

The screening tool indicated "Medium" sensitivity for both the listed animal and plant SCC, and "Very High" for the Terrestrial Biodiversity theme. The site visit revealed that the project site, particularly the southern area earmarked for development (see Appendix 1), is in a highly disturbed ecological condition, with little remaining natural vegetation. The development area is therefore generally considered as Low sensitivity for all three themes. The nature of the site and its suitability as habitat for the listed animal/plant species is discussed in the remainder of the report.

Methodology

The methodology used in this report, including a background desktop study and site visit, is outlined in the subsections below.

Desktop Study

- Ecosystem-level data and broad-scale habitat was assessed using the following resources:
    - Vegetation Map of South Africa (SANBI, 2018; Skowno et al., 2019).
    - Land cover based habitat modification (Skowno, 2020).
    - Ecosystem Threat Status and Protection level of South Africa's ecosystems (Skowno *et al.*, 2019; Department of Forestry, Fisheries and the Environment, 2023).
    - Western Cape Biodiversity Spatial Plan (CapeNature, 2017; Pool-Stanvliet *et al.*, 2017).
    - City of Cape Town Biodiversity Network (Holmes and Pugnalin, 2016) and Bioregional Plans (City of Cape Town, 2015, 2018).
    - Maps generated by overlaying the project site onto GIS files were carefully examined to compare to what was observed in the field.
- Distributional records for insect SCC were extracted from digitized databases of several South African museums (e.g., Iziko Museum of South Africa, Ditsong National Museum of Natural History, South African National Collections of Insects).
- Online resources, such as the Orthoptera Species File Online (http://orthoptera.speciesfile.org/HomePage/Orthoptera/HomePage.aspx), the Atlas of African Lepidoptera (https://vmus.adu.org.za/), GBIF (https://www.gbif.org/), and iNaturalist (https://www.inaturalist.org/) were also consulted for information on geographic distributions of invertebrate and other faunal SCC.
- The Virtual Museum of Reptiles (https://vmus.adu.org.za/), GBIF (https://www.gbif.org/), and iNaturalist (https://www.inaturalist.org/) was consulted for distributional records for South Africa's reptiles.
- IUCN Red List of Threatened Species (https://www.iucnredlist.org/) was consulted for all animal SCC flagged for the project.
- SANBI's Red List of Plants (http://redlist.sanbi.org/) was was consulted for any potential plant SCC.
- Distributional records from the Southern African Bird Atlas Project (SABAP2 data (http://sabap2.birdmap.africa/)) for the bird SCC were examined.
- Taylor, Peacock and Wanless (2015) and online resources, such as BirdLife International (https://www.birdlife.org/projects/iucn-red-list/), were consulted for information on the conservation status of bird SCC.
- A map of South Africa's Important Bird Areas (IBA) (Marnewick *et al.*, 2015) was overlaid onto the project area. IBAs are selected using the presence of globally threatened species, groups of species with a restricted range (<50 000 km^2), species assemblages confined to a single biome, and congregations of one or more species.
- Published information on all animal/plant SCC were investigated to further assess their distribution range, ecology, habitat, and any life history requirements.

Site Visit

- The project site (Figure 1) was visited in June and early September 2024 to assess habitat quality, in terms of the type and amount of natural vegetation remaining. The extent of disturbance that the project area has experienced, in terms of changes to its vegetation and physical properties (e.g. soil) was also considered.
- Season: winter and early-spring.
- Areas at and around selected points were investigated by the specialists across the project area.
- At certain points the surrounding habitat was characterised and the likelihood of any animal/plant SCC being present was assessed.
- Seasonal Relevance:
    - It must be noted that this site sensitivity report focussed primarily on surveying the state of the habitat quality at the project area and its connectivity to surrounding natural vegetation and to areas of known biodiversity and conservation importance. Seasonality need only be considered for surveys of animal/plant SCC species should the required habitat be present.

Results

Desktop Study

The main vegetation types found at the project site (Figure 2) is:

- Cape Flats Dune Strandveld (Endangered; 56% natural extent remaining)
- The site also appeared to have some floristic elements of Peninsula Sandstone Fynbos (Critically Endangered), although dense alien plants have mostly replaced these.

Based on landcover models, the southern parts of Erf 4439 has lost its natural vegetation post-2014, with the northern areas retaining their natural vegetation (Skowno, 2020) (Figure 3). These remnant areas have a South African Red List of Ecosystems Status of Endangered (Figure 4) (South African National Biodiversity Institute and Department of Forestry, 2021). The site visit confirmed that the area earmarked for development has essentially lost all its original natural vegetation and that the northern remnant areas have also been heavily transformed by alien plants.

Cape Town's biodiversity network spatial plan highlights terrestrial and aquatic features that are critical for conserving biodiversity and maintaining ecosystem functioning (Holmes and Pugnalin, 2016). It has used a systematic conservation planning approach to identify CBA areas of high biodiversity value and that include Critically Endangered Ecosystems and critical linkages (ecological corridors). CBAs are required to meet biodiversity targets for species and ecosystems and ecological processes, and they should remain in a natural state that is maintained in good ecological condition. The area earmarked for development falls outside of any CBA (Figure 5), but the northern parts of Erf 4439 falls within a CBA (1b), mostly associated with the high threat status of the vegetation type found there.

The South African Protected Areas Database (SAPAD; Department of Forestry, 2023) indicates that the northern parts of Erf 4439 form part of a buffer area for protected and conservation areas (Figure 6).

The development area falls across an area identified as a Strategic Water Source Area (SWSA) for surface water (SW) (Figure 7). These areas are of high important as they contribute significantly to the water supply of South Africa. They are key ecological infrastructure assets for South Africa, supporting growth and development, and their protection is of high national priority (Le Maitre *et al.*, 2018b, 2018a; Lötter and Le Maitre, 2021).

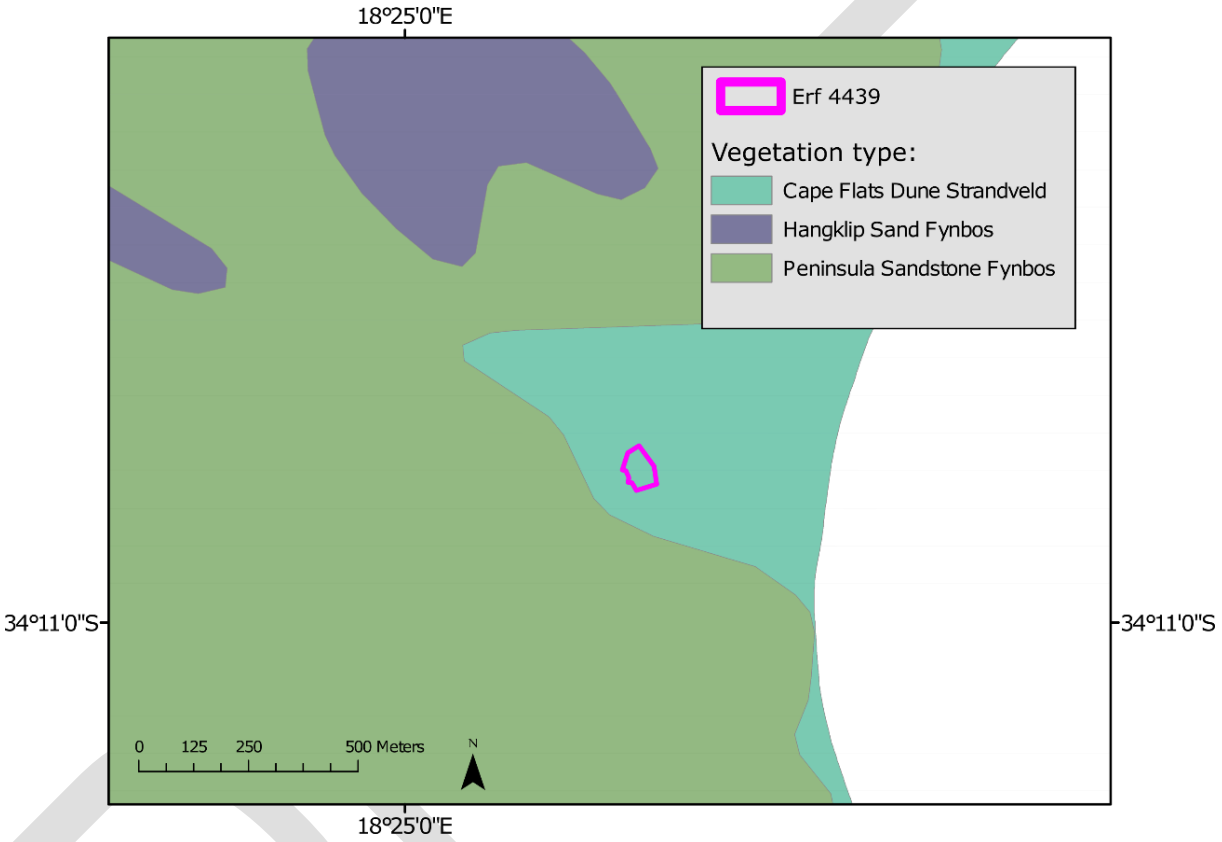


Figure 2. The vegetation types found at, and bordering, the project site (SANBI, 2018; Skowno et al., 2019)..

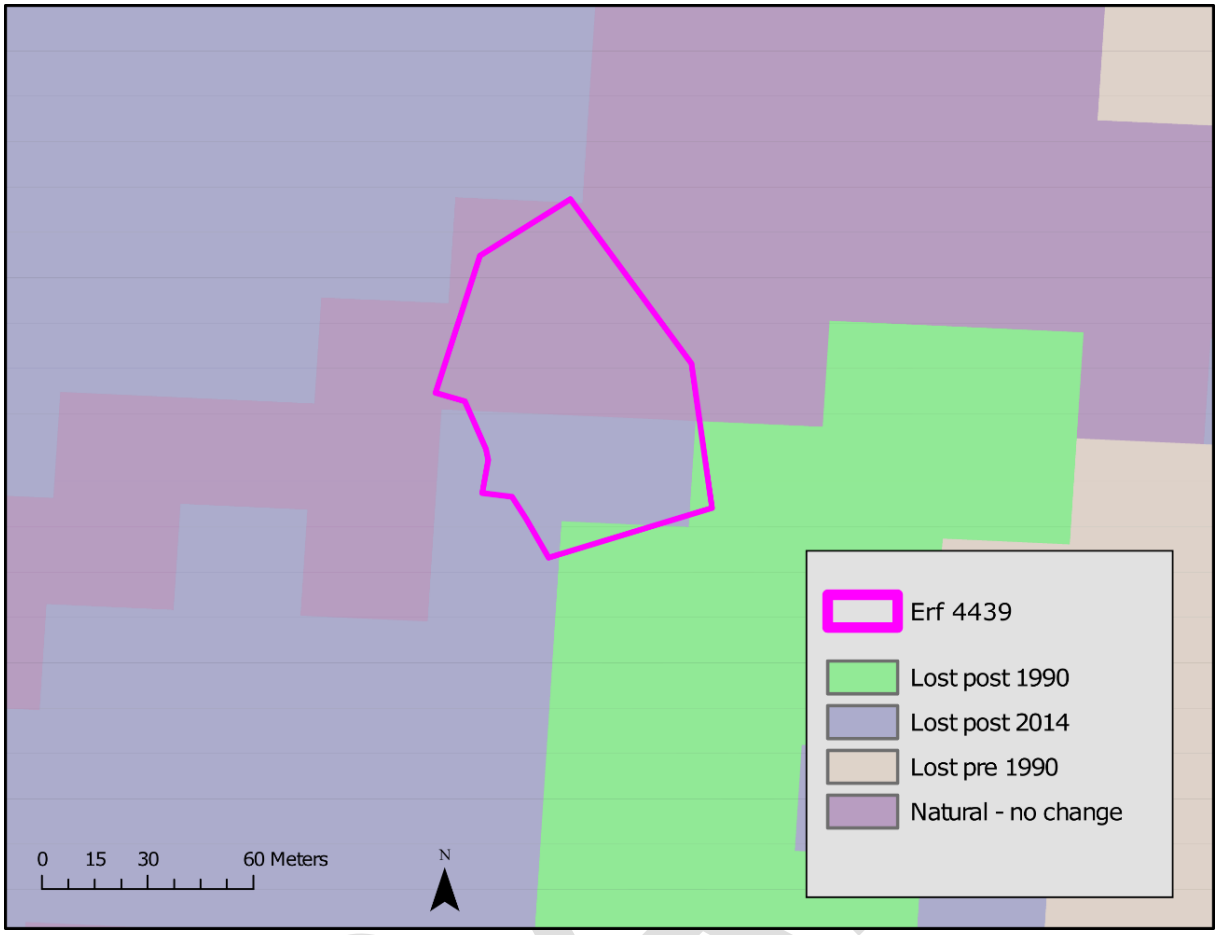


Figure 3. Land cover derived terrestrial habitat change layer showing that the southern parts of Erf 4439 have lost almost their natural vegetation (Skowno, 2020).

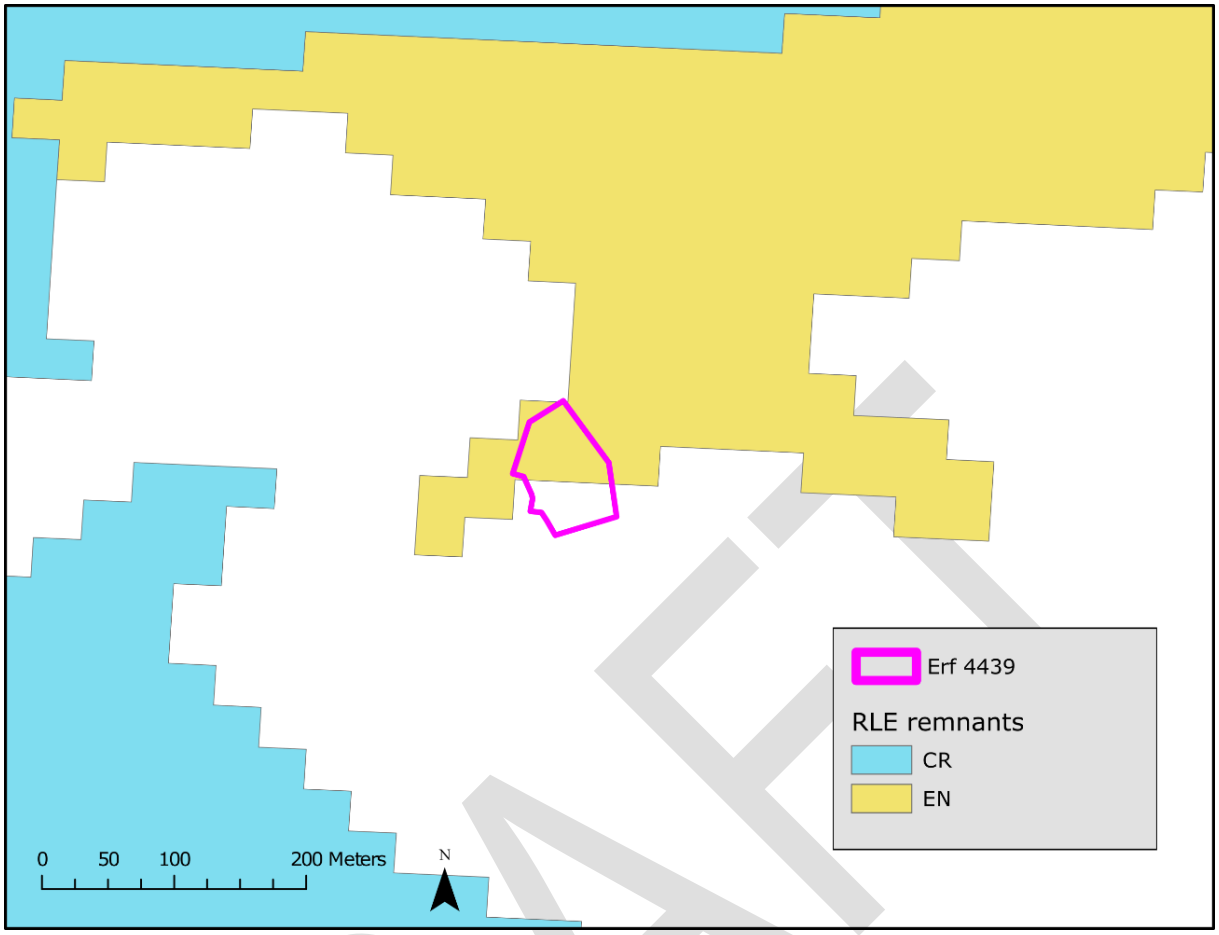


Figure 4. The northern area of Erf 4439 falls over an area that is considered as natural remnants of a Endangered (En) Red Listed Ecosystem type (South African National Biodiversity Institute and Department of Forestry, 2021).

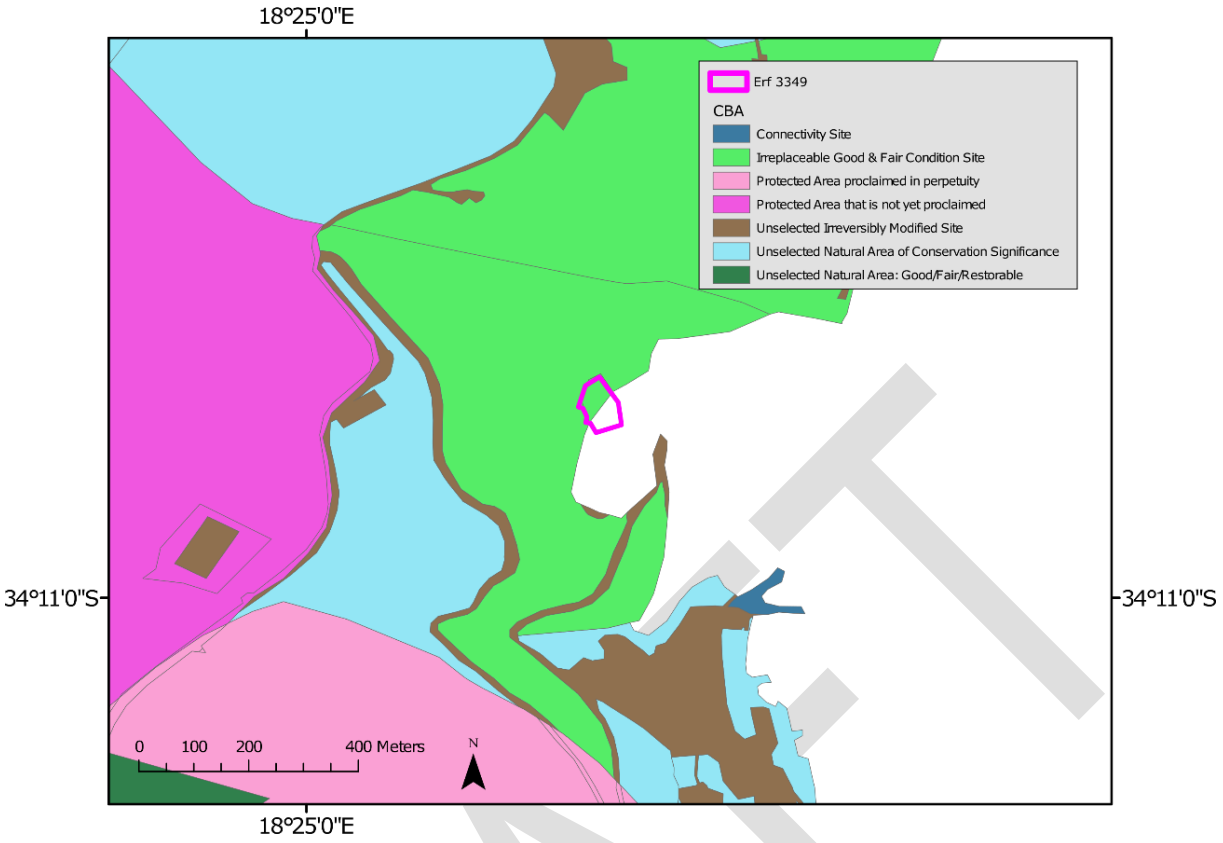


Figure 5. Critical Biodiversity Areas (CBA1b) of the City of Cape Town Biodiversity Network Plan in relation to Erf 4439.

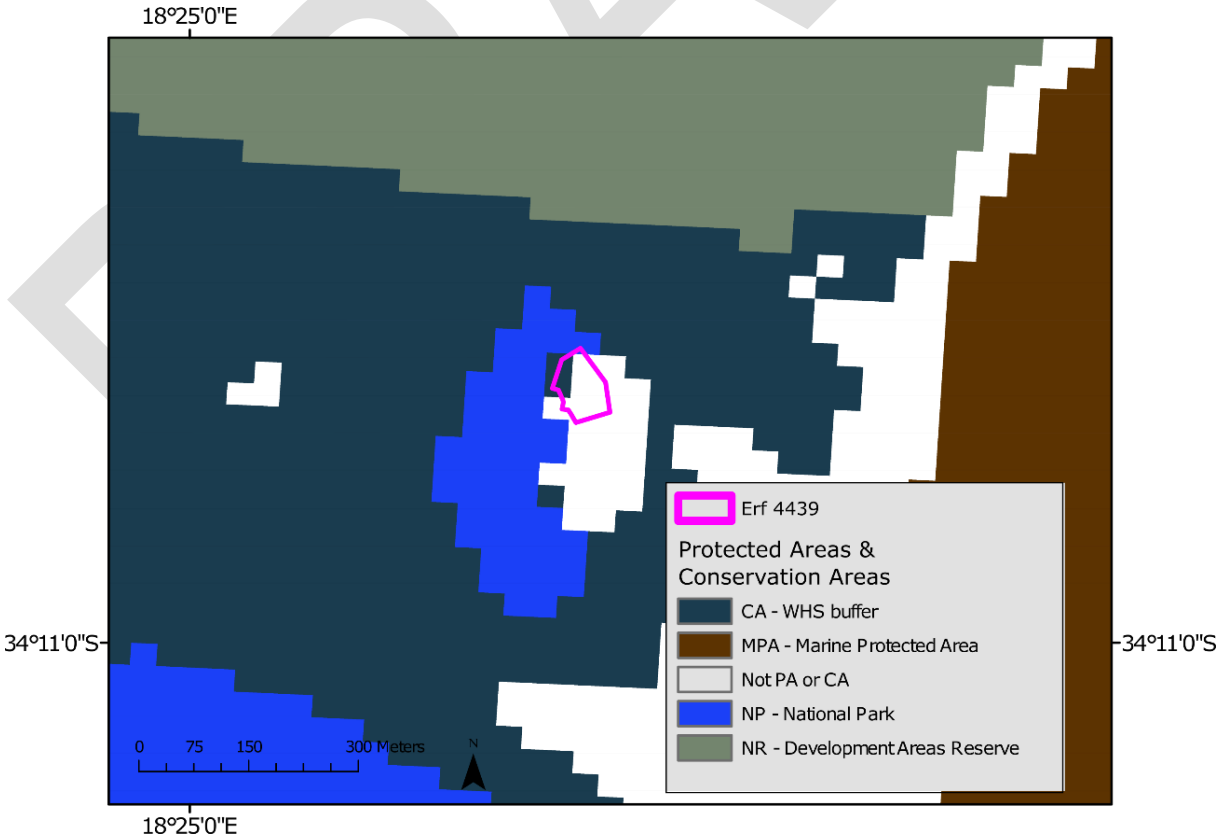


Figure 6. The north-western parts of the development area are considered as a buffer area for protected and conservation areas (Department of Forestry Fisheries and the Environment, 2023).

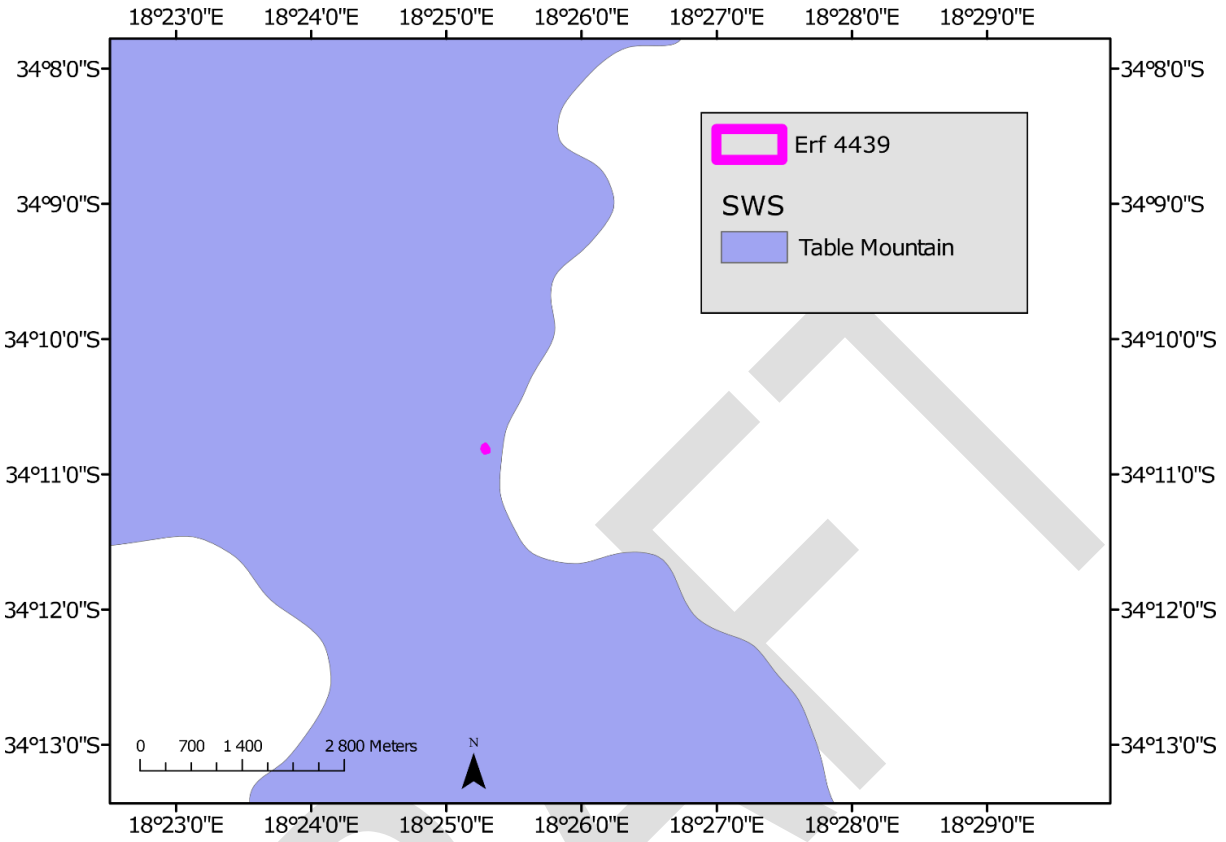


Figure 7. Strategic Water Source Areas (SWSA) in relation to Erf 4439.

Bird Species of Conservation Comcern

Circus maurus (Temminck 1828) Black Harrier

- This species of harrier is endemic to southern Africa and has an IUCN Red List Category and Criteria of **Endangered** C2a(ii) (Taylor, Peacock and Wanless, 2015; BirdLife International, 2017).
- This species occurs widely in South Africa, but fewer than 1000 birds are thought to occur, and habitat transformation is a major threat (Taylor et al. 2015).
- This species breeds on the ground in low, shrubby vegetation in spring, mainly in the Western Cape, before undertaking complex and variable post breeding movements that can take birds to the Drakensberg (Taylor et al. 2015).
- Prey is mainly rodents and birds.
- The overgrown nature of the site and steep slopes makes this site unsuitable for this species.

Sarothrura affinis (Smith 1828) Striped Flufftail

- This species of flufftail is endemic to the Afromontane areas of Africa, occurring in six isolated population between Sudan and South Africa. Globally, it has an IUCN Red List Category and Criteria Least Concern, but decreasing numbers (BirdLife International, 2016b). Taylor et al., (2015) listed the species as Vulnerable A2c; C1+2a(i) within South Africa, Lesotho and eSwatini.

The total South African population is estimated to be 1440-2150 mature birds (Taylor, Peacock and Wanless, 2015).

- The species has an estimated extent of occurrence of 4280000 km2 and its estimated geographic range overlaps the project area (BirdLife International, 2016b). Additionally, SABAP2 data shows high reporting rates for this species in the adjacent pentads covering the Jonkershoek and Hottentots-Holland Mountains.
- In the SW Cape it occupies the mesic Fynbos, requiring a combination of dense vegetation (for nesting/shelter) with bordering open areas for foraging. The species is sedentary, but will undertake some sporadic, usually resource driven altitudinal movements.
- Striped Flufftail was not detected during the site visit. Detection of this highly secretive species is known to be difficult. Detection is usually through the calls of territorial males, especially at night and late winter (Taylor, 1997). However, the low altitude and lack of dense montane vegetation at the site means that the site is not suitable for the species.

Site Visit

- Habitat characteristics and likelihood of any animal/plant SCC being found at the project site is given below.
- No suitable habitat for the animal SCC listed above was found at the development area; the faunal habitat of the development area is generally disturbed and transformed.
- No plant species of conservation concern were noted during the site visits; the plant habitat of the development area is highly disturbed and transformed.

Figure 8. The development area lies adjacent to a residential estate and tarred road.

Figure 9. The soils of the southern part adjacent to the development area are extremely disturbed and all natural vegetation has been removed. Note the dense alien trees on the right of the photo.

Figure 10. Most of the central part of the project area lies in a steep gully, choked with dense alien vegetation; all alien vegetation will need to be removed from the development area.

Figure 11. The sandy soils of the northern part have some indigenous vegetation; these areas are classed as a CBA for threatened vegetation and as a buffer for conservation areas.

Figure 12. Most of the development area is covered in a large diversity of alien plant species but alien clearing operations can be seen uphill of the site (piles of dry sticks).

Figure 13. Immediately to the north of the site, the old stone walls of Luyolo township can be seen. This community was removed last century but the area has been subject to much disturbance over a long time.

Figure 14. In this overview, the development area can be seen to the left of the bend in the road.

Figure 15. The dense alien vegetation and sandier northern slopes can be seen here.

Figure 16. *Solanum mauritanicum* is one of the many alien species found at the development area.

Figure 17. A number of *Searsia* species, such as *S. laevigata* and *S. glauca*, occur on the site. They are indigenous but often grow in disturbed areas.

Conclusions

- The information in this SSVR is applicable to the project area shown in Figure 1 and Appendix 1, and as described in the documentation provided to date to us by Lornay Environmental Consulting.
- Observations from the site visit indicated that Erf 4439 to be heavily disturbed and transformed, with only some small areas of natural vegetation remaining.
- Based on the available species-level information for the two bird SCC, their known habitat preferences, and the highly transformed habitat of parts of Erf 4439 it is considered that the development area is of **Low** sensitivity from a faunal perspective.
- Rose's Rain Frog (*Breviceps rosei*; Least Concern) was heard calling at the project site during the winter June survey. Rehabilitation of the site of alien invasive plants and the retention of the northern areas of the site as natural vegetation would ensure the future existence of this Western Cape endemic frog species at the project site.
- Similarly, from a botanical perspective, the sensitivity of the area to be developed is considered as **Low** with no plant species of conservation found.

- From a Terrestrial Biodiversity perspective, the area to be developed is considered as **Low** sensitivity. The site visit confirmed that the natural vegetation of Cape Flats Dune Strandveld, and potentially some pockets of Peninsula Sandstone Fynbos (Critically Endangered), has been essentially lost across Erf 4439 through disturbance and alien invasive plants.
- The northern parts of the project site that are classed as a CBA (1b), mostly related to the high threat status of the vegetation type. In addition, this area is also considered to form part of a large buffer area for conservation and protected areas. However, the area to be developed is focussed within the southern parts of the project site and falls outside of these biodiversity features (see SDP in Appendix 1). Sufficient space also appears to have been factored into the SDP to form an adequate buffer between the proposed development and these features, including the stream that occurs at the project site. Keeping the northern area as natural vegetation would ensure that the small area of Erf 4439 classed as a CBA is potentially retained.
- Of high concern is the high density of established alien invasive trees at the site. All alien plants need to be removed from Erf 4439, and the northern areas, including the riparian zone of the stream, need to be cleared and rehabilitated.
- Overall, it is the specialists' opinion the proposed development of the southern parts of Erf 4439 is unlikely to generate any significant negative impacts on any animal/plant SCC or any Terrestrial Biodiversity feature: largely on the condition that all alien plants are cleared from Erf 4439, and that the northern area is rehabilitated and left as natural vegetation.

Acknowledgments

CapeNature is thanked for collecting permits: CN44-87-20545 and CN44-59-13497.

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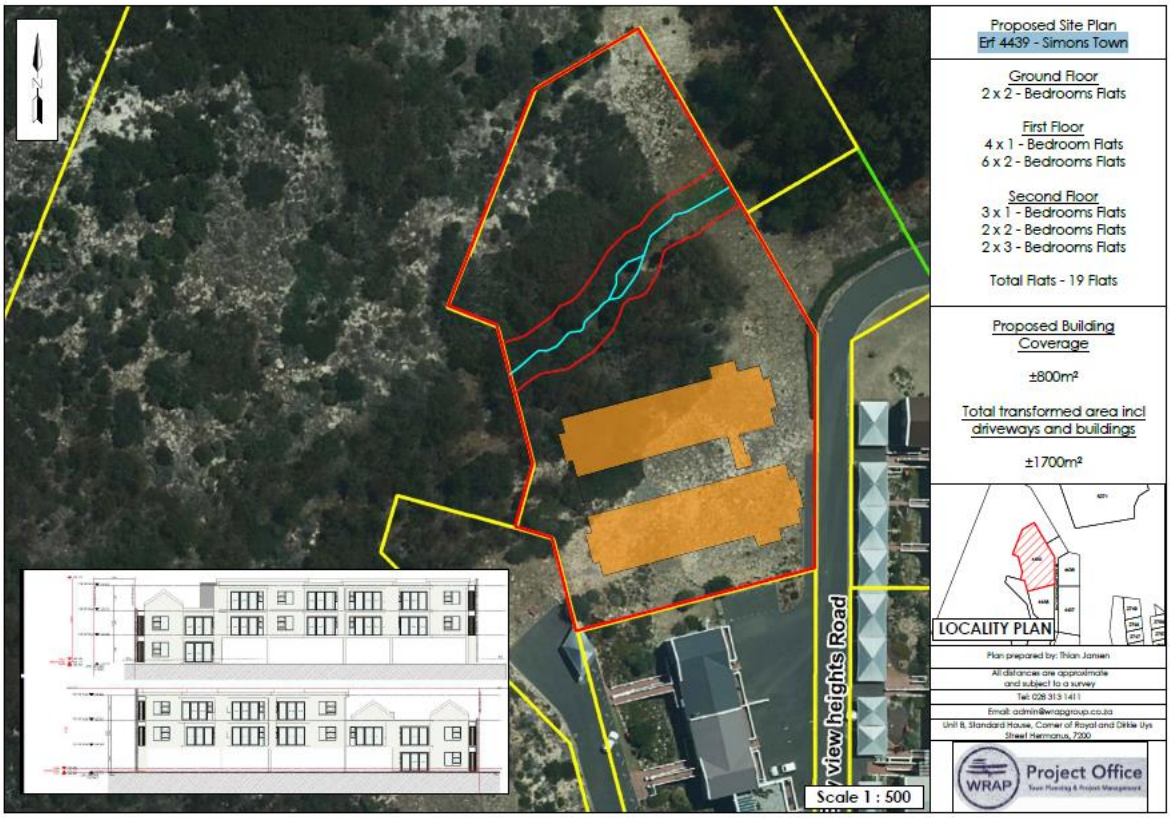
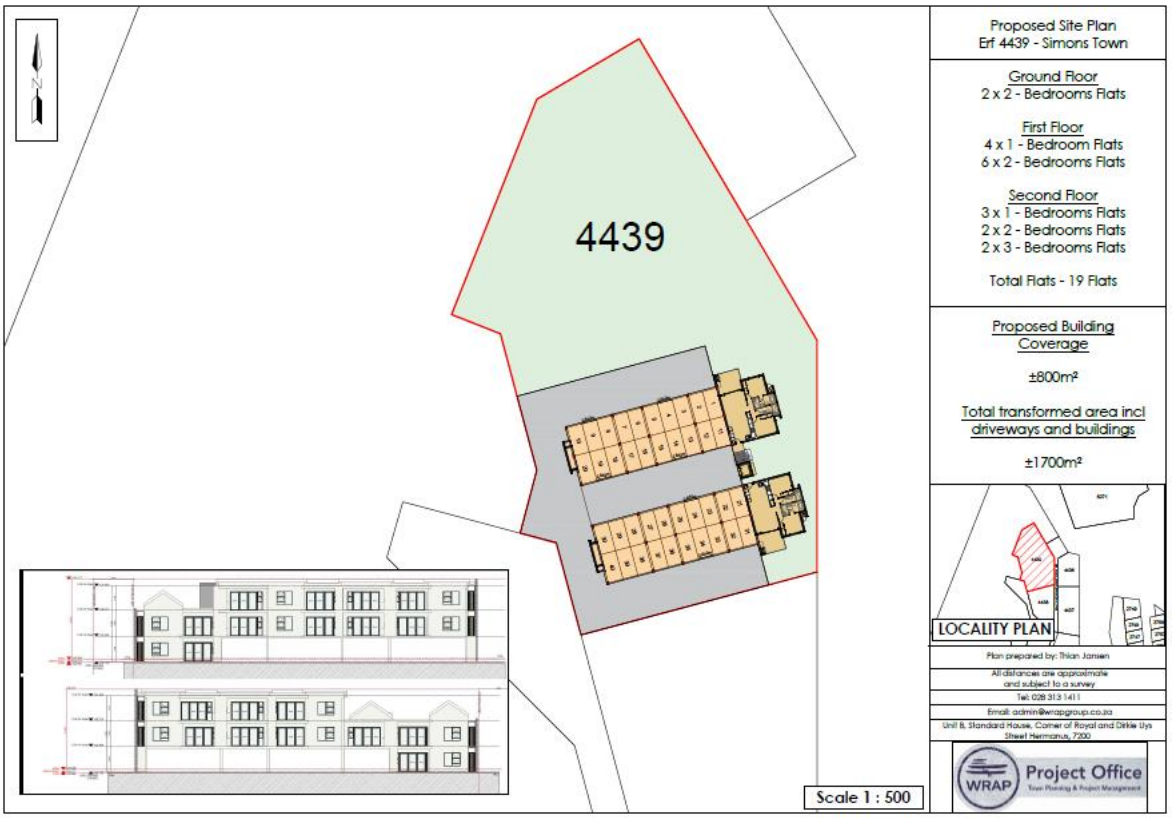
Appendix-1 – Spatial Development Plan for Erf 4439




4439
Scale 1 : 500
Proposed Site Plan
Erf 4439 - Simons Town
Ground Floor
2 x 2 - Bedrooms Flats
First Floor
4 x 1 - Bedroom Flats
6 x 2 - Bedrooms Flats
Second Floor
3 x 1 - Bedrooms Flats
2 x 2 - Bedrooms Flats
2 x 3 - Bedrooms Flats
Total Flats - 19 Flats
Proposed Building Coverage
±800m²
Total transformed area incl driveways and buildings
±1700m²
LOCALITY PLAN
Plan prepared by: Thian Jansen
All distances are approximate and subject to a survey
Tel: 028 313 1411
Email: admin@wrapgroup.co.za
Unit 8, Standard House, Corner of Royal and Dirkie Uys Street Hermanus, 7200
WRAP
Project Office

Appendix-2 – CV Jonathan Colville

CURRICULUM VITAE – JONATHAN F. COLVILLE

EDUCATION

PhD (Zoology): University of Cape Town, 2009. Thesis title: "*Understanding the evolutionary radiation of the megadiverse monkey beetle fauna (Scarabaeidae: Hopliini) of South Africa*".

Postdoctoral research fellowship: South African National Biodiversity Institute, 2009-2010.

PRIOR EMPLOYMENT

National Research Foundation Research Career Advancement Fellow: South African National Biodiversity Institute (2014-2019).

Researcher, South African National Biodiversity Institute, GEF/UNEP/FAO Global Pollination Project – South Africa (2010-2014).

PUBLICATIONS

Books edited:

- Allsopp, N., **Colville, J.F.**, Verboom, G.T. (2014). *Fynbos: Ecology, Evolution, and Conservation of a Megadiverse Region* (16 chapters; pp 1-377). Oxford University Press.

Book chapters:

- Forest F., **Colville J.F.**, Cowling R.M. (2018). Evolutionary diversity patterns in the Cape Flora of South Africa. In: *Phylogenetic Diversity: Applications and challenges in biodiversity science*. R. Scherson, D. Faith (Eds), Springer International Publishing.
- Lebuhn, G., Connor, E.F., Brand, M., **Colville, J.F.**, Keday, D., Resham, B.T., Muo, K., Ravindra, K.J. (2015). Monitoring pollinators around the world. In: *Pollination services to agriculture*. B. Gemmill-Herren (Ed), Routledge.
- **Colville, J.F.**, Potts, A.J., Bradshaw, P.L., Measey, G.J., Snijman, D., Picker, M.D., Procheş, Ş., Bowie, R.C.K., Manning, J.C. (2014). Floristic and faunal Cape biochoria: do they exist? In: *Fynbos: Ecology, Evolution, and Conservation of a Megadiverse Region*. N. Allsopp, J.F. Colville, G.A. Verboom (Eds), Oxford University Press.
- Lach, L., Picker, M.D., **Colville, J.F.**, Allsopp, M.H., and Griffiths, C.L. (2002). Alien invertebrate animals in South Africa. In: *Biological invasions: Economic and environmental costs of alien plant, animal, and microbe species*. D. Pimentel (Ed), CRC Press, London.

Journal articles:

- Barraclough, D.A., and **Colville, J.F**. (2022). The first species of Nemestrinidae (Diptera) endemic to Madagascar: A remarkable new species of *Atriadops* Wandolleck, 1897. *Zootaxa*. 5196 (1): 145–150.
- Dombrow, H., **Colville, J.F.**, Bowie, R.C.K. (2022). Review of the genus *Amblymelanoplia* Dombrow, 2002 (Coleoptera: Scarabaeidae: Melolonthinae: Hopliini) with the description of ninety-three new species from South Africa and observations on its biogeography and phylogeny. *Zootaxa*. 5163 (1): 1-278.
- Melin, A., and **Colville, J.F**. (2022). Description of the male of *Rediviva steineri* Kuhlmann 2012 (Hymenoptera: Melittidae), an endemic oil-collecting bee species from South Africa. *African Entomology*. 30: e11178.
- Allen-Perkins, A., Magrach, A., Dainese, M., Garibaldi, L., … **Colville, J.F.**, et al. (2022). CropPol: A dynamic, open, and global database on crop pollination. *Ecology*. 103, 3, e3614.

- Dorchin, N.; van Munster, S.; Klak, C.; Bowie, R.C.K.; **Colville, J.F**. (2022). Hidden diversity – A new speciose gall midge genus (Diptera: Cecidomyiidae) associated with succulent Aizoaceae in South Africa. *Insects*. 13, 75. https://doi.org/10.3390/insects13010075
- Cohen, C., Liltved, W.R., **Colville, J.F**., Shuttleworth, A., Weissflog, J., Svatos, A., Bytebier, B., Johnson, S.D. (2021). Sexual deception of a beetle pollinator through floral mimicry. *Current Biology*. 31: 1–8.
- Krenn, H.W., Karolyi, F., Lampert, P., Melin, A., **Colville, J.F**. (2021). Nectar uptake of a long-proboscid *Prosoeca* fly (Nemestrinidae) – Proboscis morphology and flower shape. *Insects*. 12(371): 1–13.
- McLeod, L., and **Colville, J.F.** (2021). Observations on unusual feeding and mating behaviour of a monkey beetle genus *Amblymelanoplia* Dombrow (Coleoptera: Scarabaeidae: Hopliini). *African Entomology*. 29(1): 301–306.
- **Colville, J.F**., Beale, C.M., Forest, F., Altwegg, R., Huntley, B., Cowling, R.M. (2020). Plant species richness, turnover and evolutionary diversity track gradients of stability and ecological opportunity in a megadiversity centre. *Proceedings of the National Academy of Sciences (PNAS)*. 117 (33): 20027–20037.
- Dombrow, H. & **Colville, J.F.** (2020). Review of the genus *Beckhoplia* Dombrow with the description of fifteen new species from South Africa and observations on its biogeography (Coleoptera: Scarabaeidae: Melolonthinae: Hopliini). *Zootaxa*. 4823(1): 1-64.
- Melin, A., Altwegg, R., Manning, J.C., and **Colville, J.F.** (2020). Allometric relationships shape foreleg evolution of long-legged oil bees (Melittidae: *Rediviva*). *Evolution*. https://doi.org/10.1111/evo.14144.
- Melin, A. & **Colville, J.F**. (2020). A nesting aggregation of *Rediviva intermixta* (Melittinae: Melittidae) with males sleeping together in nests (Namaqualand, South Africa). *The Journal of the Kansas Entomological Society*. 92 (3): 561–568.
- Melin, A., **Colville, J.F**., Duckworth, G.D.; Altwegg, R.; Slabbert, R.; Midgley, J.J.; Rouget, M.; Donaldson, J.S. (2020). Diversity of pollen sources used by managed honeybees in variegated landscapes. *Journal of Apicultural Research*. Doi10.1080\00218839.2020.1750757.
- Melin, A., Krenn, H.W., Manning, J.C., **Colville, J.F.** (2019). The allometry of proboscis length in Melittidae (Hymenoptera: Apoidae) and an estimate of their foraging distance using museum collections. *PLoS ONE*. 14(6): e0217839.
- Melin, A. & **Colville, J.F.** (2019). A review of 250 years of Southern African bee taxonomy and exploration (Hymenoptera: Apoidea: Anthophila). *Transactions of the Royal Society of South Africa*. 74:1, 86-96. [**Featured on Cover Page**]
- Rink, A.R., Altwegg, R., Edwards, S., Bowie, R.C.K., **Colville, J.F.** (2019). Contest dynamics and assessment strategies in combatant monkey beetles (Scarabaeidae: Hopliini). *Behavioural Ecology*. 40: 713–723.
- Barraclough, D., **Colville, J.F.**, Karolyi, F., Krenn, H.W. (2018). A striking new species of *Prosoeca* Schiner, 1867 (Diptera: Nemestrinidae): An important pollinator from the Bokkeveld Plateau, Northern Cape Province, South Africa. *Zootaxa* 4497: 411–421.
- **Colville, J.F.**, Picker, M.D., Cowling, R.M. (2018). Feeding ecology and sexual dimorphism in a speciose flower beetle clade (Hopliini: Scarabaeidae). *PeerJ*: 6:e4632.
- Melin, A., Mathieu, R., **Colville, J.F**., Midgley, J.J., Donaldson, J.S. (2018). Quantifying and evaluating distributed floral resources for managed honeybee pollination using an expanded concept of supporting ecosystem services. *PeerJ*: e5654.
- Cowling, R.M, Bradshaw, P.L., **Colville, J.F.**, Forest, F. (2017). Levyns' Law: Explaining the evolution of a remarkable longitudinal gradient in Cape plant diversity. *Transactions of the Royal Society of South Africa*. 72: 184-201.
- Treurnicht M., **Colville J.F.**, Joppa L.N., Huyser O., Manning J.C. (2017) Counting complete? Finalising the plant inventory of a global biodiversity hotspot. *PeerJ*: 5:e2984.

- Janion-Scheepers, C., Measey, G.J., Braschler, B., Chown, S.L., Coetzee, L., **Colville, J.F.**, Dames, J., Davies, A.B., *et al*. (2016). Soil biota in a megadiverse country: Current knowledge and future research directions in South Africa. *Pedobiologia*. 59: 129-174.
- Karolyi F., Hansal T., Krenn H.W., **Colville J.F.** (2016). Comparative morphology of the mouthparts of the megadiverse South African monkey beetles (Scarabaeidae: Hopliini): Feeding adaptations and guild structure. *PeerJ*: 4:e1597.
- Bradshaw, P.L., **Colville, J.F.**, Linder, H.P. (2015). Optimising regionalisation techniques: Identifying centres of endemism in the extraordinarily endemic-rich Cape Floristic Region. *PLoS ONE*. 10: e0132538.
- Cowling, R.M., Potts, A.J., Bradshaw, P.L., **Colville, J.F.**, Arianoutsou, M., Ferrier, S., Forest, F., Fyllas, N.M., Hopper, S.D., Ojeda, F., Procheş, Ş., Smith, R.J., Rundel, P.W., Vassilakis, E., Zutta, B.R. (2015). Variation in plant diversity in Mediterranean-climate ecosystems: The role of climatic and topographical stability. *Journal of Biogeography*. 42: 552-564.
- Kleijn, D., Winfree, R., Bartomeus, I., Carvalheiro, L.G., Henry, M., Isaacs, R., Klein, A-M., Kremen, C., M'Gonigle, L.K., Rader, R., Ricketts, T., Williams, N.M, Adamson, N-L., Ascher, J.S., Baldi, A., Batary, P., Benjamin, F., Biesmeijer, J.C., Blitzer, E.J., Bommarco, R., Brand, M.R., Bretagnolle, V., Button, L., Cariveau, D.P., Chifflet, R., **Colville, J.F.**, Danforth, B.N., Elle, E., Garratt, M.P.D., Herzog, F., Holzschuh, A., Howlett, B.G., Jauker, F., Jha, S., Knop, E., Krewenka, K.M., Le Feon, V., Mandelik, Y., May, E.M., Park, M.G., Pisanty, G., Reemer, M., Riedinger, V., Rollin, O., Rundlof, M., Sardinas, H.S., Scheper, J., Sciligo, A.R., Smith, H.G., Steffan-Dewenter, I., Thorp, R., Tscharntke, T., Verhulst, J., Viana, B.F., Vaissiere, B.E., Veldtman, R., Westphal, C., Potts, S.G. (2015). Delivery of crop pollination services is an insufficient argument for wild pollinator conservation. *Nature Communications*. 6: 7414**.**
- Manning, J.C., Goldblatt, P., **Colville, J.F.**, Cupidoa, C.N. (2015). Hopliine beetle pollination in annual *Wahlenbergia* species (Campanulaceae) from western South Africa, and the new species *W. melanops*. *South African Journal of Botany*. 100: 58-62.
- Mecenero, S., Altwegg, R., **Colville, J.F.**, Beale, C.M. (2015). Roles of spatial scale and rarity on the relationship between butterfly species richness and human density in South Africa. *PLoS ONE*. 10: e0124327.
- Forest, F., Goldblatt, P., Manning, J.C., Baker, D., **Colville, J.F.**, Devey, D.S., Jose, S., Kaye, M., Buerki, S. (2014). Pollinator shifts as trigger of speciation in painted petal irises (*Lapeirousia*: Iridaceae). *Annals of Botany*. 113: 357-71.
- Karolyi, F., **Colville, J.F.**, Handschuh, S., Metscher, B.D., Krenn, H.W. (2014). One proboscis, two tasks: Adaptations to blood-feeding and nectar-extracting in long-proboscid horse flies (Tabanidae, *Philoliche*). *Arthropod Structure & Development*. 43: 403-413.
- Karolyi, F., Morawetz, L., **Colville, J.F.**, Handschuh, S., Metscher, B.D., Krenn, H.D. (2013). Time management and nectar flow: Flower handling and suction feeding in long-proboscid flies (Nemestrinidae: *Prosoeca*). *Naturwissenschaften*. 100: 1083-1093. [**Featured on Cover Page**]
- Ryan, P.G., **Colville, J.F.**, Picker, M.D. (2013). Juvenile African Pipit feeding on monkey beetles. *Ornithological Observations*. 4: 6-8.
- Karolyi, F., Szucsich, N.U., **Colville, J.F.**, Krenn, H.W. (2012). Adaptations for nectar-feeding in the mouthparts of long-proboscid flies (Nemestrinidae: *Prosoeca*). *Biological Journal of the Linnean Society*. 107: 414-424.
- Picker, M.D., **Colville, J.F.**, Burrows, M. (2012). A cockroach that jumps. *Biology Letters*. 8: 390-392.
- **Colville, J.F.** (2009). Understanding the evolutionary radiation of the mega-diverse monkey beetle fauna (Scarabaeidae: Hopliini) of South Africa. *Frontiers in Biogeography*. 1: 24-29.
- Bohn, H., Picker, M.D., Klaus-Dieter, K. & **Colville, J.F.** (2010). A jumping cockroach from South Africa, *Saltoblattella montistabularis*, gen. nov., spec. nov. (Blattodea: Blattellidae). *Arthropod Systematics & Phylogeny*. 68: 53-69. **[Featured as a "Top 10 New Species discovery" by the International Institute for Species Exploration**].

- **Colville, J.F.**, Picker, M.D., Cowling, R.M. (2002). Species turnover of monkey-beetles (Scarabaeidae: Hopliini) along environmental and disturbance gradients in the Namaqualand region of the Succulent Karoo, South Africa. *Biodiversity and Conservation*. 11: 243–264.
- Picker, M.D., **Colville, J.F.**, van Noort, S. (2002). Mantophasmatodea now in South Africa. *Science*. 297: 1475.

Technical reports:

- **Colville, J.F.**, and Cohen, C. (2022). Terrestrial Animal Species Specialist Assessment. Grace Rock Equestrian Farm. Prepared for Delta Ecology and Legacy Environmental Management Consulting.
- **Colville, J.F.**, and Cohen, C. (2022). Terrestrial Animal Species Specialist Assessment. Dana Bay Access Road. Prepared for Sharples Environmental Services cc (SES).
- **Colville, J.F.**, and Cohen, C. (2022). Terrestrial Biodiversity Specialist Assessment. Duyker Eiland Prospecting Rights. Prepared for Elemental Sustainability (Pty) Ltd.
- **Colville, J.F.**, and Cohen, C. (2022). Terrestrial Animal Species Specialist Assessment. Proposed mixed use housing development. Prepared for EcoSense CC.
- **Colville, J.F.**, and Cohen, C. (2022). Terrestrial Animal Species Specialist Assessment. Proposed agricultural development. Prepared for McGregor Environmental Services.
- **Colville, J.F.**, and Cohen, C. (2022). Terrestrial Animal Species Specialist Assessment. Blue Sky's Project Prepared for Doug Jeffery – Environmental Consultants.
- **Colville, J.F.**, and Cohen, C. (2022). Terrestrial Animal Species Specialist Assessment. Proposed Expansion of Nature's View Dam near Citrusdal. Prepared for Earth Grace Environmental Consultancy.
- **Colville, J.F.** (2021). Terrestrial Animal Species Specialist Assessment. Proposed enlargement of existing Kleigat Dam. Prepared for Earth Grace Environmental Consultancy.
- **Colville, J.F.** (2021). Terrestrial Animal Species Specialist Assessment. Moorreesburg Wastewater Treatment Works Upgrade Project. Prepared for Zutari (Pty) Ltd.
- **Colville, J.F.** (2021). Terrestrial Animal Species Specialist Assessment. Maxnau Citrus Development. Prepared for Charl de Villiers Environmental Consulting.
- **Colville, J.F.** (2021). Terrestrial Animal Species Specialist Assessment. Gletwyn Estate Mixed Use Development. Prepared for Johan Neethling Environmental Services cc.
- **Colville, J.F.** (2021). Terrestrial Animal Species Specialist Assessment. Moorreesburg Wastewater Treatment Works Upgrade Project. Prepared for Zutari (Pty) Ltd.
- **Colville, J.F.** (2021). Terrestrial Animal Species Specialist Assessment. Proposed Development of Solar Photo-Voltaic Renewable Energy Power Station. Prepared for Resource Management Services (RMS).
- **Colville, J.F.** & Picker, M.D. (2009-2010). *Invertebrate impact assessment – Oudekraal, Table Mountain*. Prepared for Doug Jeffery Environmental Consultants.
- Picker, M.D. & **Colville, J.F.** (2007). *Invertebrate impact assessment: Worcester Island Development*. SRK Environmental impact report for Consulting Engineers and Scientists, Cape Town.
- Picker, M.D. & **Colville, J.F.** (2006). *Baseline faunal investigation for proposed development at Altona, Worcester, Western Cape Province*. Environmental impact report for SRK Consulting Engineers and Scientists, Cape Town.
- **Colville, J.F.** & Picker, M.D. (2005). *Scoping Phase II: The impact of development of Worcester on the insect and scorpion fauna*. Environmental impact report for Chand Environmental Consultants, Cape Town.
- **Colville, J.F.** (2001) *Scoping and faunal assessment for proposed housing development, Skapenberg, Somerset West*. Prepared for Design consultants CNdV Africa.

MEMBERSHIPS/RESEARCH ASSOCIATE

- Membership of Entomological Society of Southern Africa (2007-current).
- Membership of Lepidopterists Society of Southern Africa (2014-current).
- Honorary Research Associate (HRA), Statistics in Ecology, Environment and Conservation (SEEC), Department of Statistical Sciences, UCT (2014-current).
- SACNASP registration for Ecological Science (Professional Natural Scientist) (member#: 134759).

PROFESSIONAL SERVICES

- Editorial board *African Entomology* (2010-current).
- Editorial board *Metamorphosis* (2017-current).
- Editorial board *PeerJ* (2019-current).
- CAPE Invasive Alien Animal (IAA) Working Group (2016-2018).

Appendix-3 – CV Callan Cohen

ABRIDGED CURRICULUM VITAE DR CALLAN COHEN

Education

PhD in Ornithology (Zoology), University of Cape Town, 2011.

Positions held:

Director: Birding Africa. 1997 – present.

Research Associate: FitzPatrick Institute of African Ornithology, Department of Biological Sciences, University of Cape Town. 2012 – present.

Experience

Acknowledged expert on African birds, based on over 1000 field trips, research studies and surveys from 1990 to present, in over 25 African countries, but focused largely across South Africa. First author of 2 books on African birds, and contributor to almost 10 others. Also publications and reports on Odonata, Lepidoptera, Herpetology and Botany.

Selected Books

Cohen, C., Spottiswoode, C. & Rossouw, J. 2006. **Southern African Birdfinder: where to find 1400 species in southern Africa and Madagascar**. Cape Town: Struik New Holland Publishers, 456 pp. Reprinted 2007, 2012, 2022.

Cohen, C. & Spottiswoode, C. 2000. **Essential Birding in Western South Africa: Key routes from Cape Town to the Kalahari.** Cape Town: Struik New Holland Publishers, 136 pp. Reprinted 2001.

Klaas-Douwe B. Dijkstra & **Callan Cohen**. 2021. **Dragonflies and Damselflies of Madagascar and the western Indian Ocean Islands**. Association Vahatra Antananarivo, Madagascar. 198 pages.

Contributed 20 species accounts in: Harrison, J.A., Allan, D.G., Underhill, L.G., Herremans, M., Tree, A.J., Parker, V. & Brown, C.J. (Eds). 1997. **The Atlas of Southern African Birds**. Johannesburg: BirdLife South Africa.

Contributed 10 species accounts in: Hockey, P.A.R., Dean, W.R.J. & Ryan, P.G. (Eds). 2005. **Roberts' Birds of Southern Africa**. Seventh edition. Cape Town: John Voelcker Bird Book Fund.

Contributor to Red Data Book on Birds: BARNES, K.N. (ed.) 2000. **Threatened Birds of South Africa, Lesotho and Swaziland**. Johannesburg: BirdLife South Africa.

Species account written: African Marsh Harrier

Other Publications

About 100 journal articles and over 50 reports, e.g. most recent:

Cohen, C. 2021. **Deciphering South Africa's first Crested Honey Buzzard**. African Birdlife 9(4): 26-29.

Cohen, C., N. J. Collar, A. Dagnee, L. D. C. Fishpool, S. J. Marsden, C. N. Spottiswoode & S. R. Wotton. 2021. **Status of Taita Falcon Falco fasciinucha in Ethiopia and the identification problem posed by African Hobby F. cuvierii**. Bull ABC Vol 28 No 2: 225-233

Mills, Michael S. L., Julian Francis, Nik Borrow, Nigel Redman, Washington Wachira and **Callan Cohen**. 2021. **English bird names in common use: a framework to achieve a stable world list despite ongoing taxonomic changes, and a call to establish a broad-based African Bird Names Committee.** Bull ABC Vol 28 No 1: 93-98.