Botanical Report for Proposed Agricultural Activities on Farm Portions 420 and 373, Outeniqua Game Farm

Prepared For: Ecoroute

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Reviewer: Dr. James Dabrowski

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confluent

DECLARATION OF SPECIALIST INDEPENDENCE

- I consider myself bound to the rules and ethics of the South African Council for Natural Scientific Professions (SACNASP);
- At the time of conducting the study and compiling this report I did not have any interest, hidden or otherwise, in the proposed development that this study has reference to, except for financial compensation for work done in a professional capacity;
- Work performed for this study was done in an objective manner. Even if this study results in views and findings that are not favourable to the client/applicant, I will not be affected in any manner by the outcome of any environmental process of which this report may form a part, other than being members of the general public;
- I declare that there are no circumstances that may compromise my objectivity in performing this specialist investigation. I do not necessarily object to or endorse any proposed developments, but aim to present facts, findings and recommendations based on relevant professional experience and scientific data;
- I do not have any influence over decisions made by the governing authorities;
- I undertake to disclose all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by a competent authority to such a relevant authority and the applicant;
- I have the necessary qualifications and guidance from professional experts in conducting specialist reports relevant to this application, including knowledge of the relevant Act, regulations and any guidelines that have relevance to the proposed activity;
- This document and all information contained herein is and will remain the intellectual property of Confluent Environmental. This document, in its entirety or any portion thereof, may not be altered in any manner or form, for any purpose without the specific and written consent of the specialist investigators.
- All the particulars furnished by me in this document are true and correct.

Bianke Fouche (MSc Conservation Biology)

21 February 2025

BIANKE FOUCHE ABRIDGED CV

Qualifications

- B.Sc. Environmental Sciences (Nelson Mandela University),
- B.Sc. Honours in Botany (Nelson Mandela University),
- M.Sc. Conservation Biology (University of Cape Town)

SACNASP Registration No: 141757 (Professional Botanical; Candidate Ecological)

Skills and Core Competencies

- My MSc research will add to our understanding of plant community niche construction and Alternative Stable State (ASS) theory. The knowledge gained will be used to advise landscape stewardship practices, especially regarding reforestation initiatives in the Overstrand.
- I have worked closely with the conservation team of the Grootbos Foundation, where I assisted with vegetation surveys, mounting voucher specimens in the Grootbos herbarium, and taken part in controlled fynbos fires in the Overberg.
- Postgraduate studies of mine included assessing the allelopathic effects of *Eucalyptus* leaves on garden peas and leeks and assessing the accuracy of the climate leaf analysis multivariate programme (CLAMP) in predicting the climate of fynbos vegetation.
- In Cape Town I regularly took part in alien clearing activities and helped to identify relevant listed invasive plants.
- I am currently a member of SACNASP, the International Association for Impact Assessment (IAIA) in South Africa, Botanical Society of South Africa, and the custodians for rare and endangered wildflowers (CREW-Outramps) in George.

References

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ABBREVIATIONS

BPA	Biodiversity Priority Area
WC BSP	Western Cape Biodiversity Spatial Plan
CBA	Critical Biodiversity Area
CD:NGI	Chief Directorate: National Geo-spatial Information
DFFE	Department of Forestry, Fisheries, and the Environment
EIA	Environmental Impact Assessment
EN	Endangered
ESA	Ecological Support Area
NEM:BA	National Environmental Management: Biodiversity Act
OGF	Outeniqua Game Farm (Portions 373 and 420)
SACNASP	South African Council for Natural Science Professionals
SCC	Species of Conservation Concern
SEI	Site Ecological Importance
VAST	Vegetation Assets, States, and Transitions

1. INTRODUCTION

1.1 Background

Confluent Environmental was appointed by Ecoroute to conduct a specialist botanical and terrestrial sensitivity assessment for the agricultural areas on Portions 420 and 373 of Outeniqua Game Farm (OGF). This study is part of OGF's proposal to expand agricultural production on these two farm portions.

The planned expansion will be supported by a proposed dam on the Ruiterbos River, which is intended to irrigate approximately 80 hectares (ha) of agricultural land, allowing for crop rotation. In order to ensure that this expansion does not result in further transformation of critically endangered (CR) Garden Route Granite Fynbos, especially within the designated Critical Biodiversity Areas (CBA 1), it is necessary to verify that sufficient land is available for the proposed irrigation areas without encroaching on these sensitive ecosystems.

This report follows the initial Section 24G (S24G) retrospective botanical assessment of listed activities that commenced without prior approval, subject to an assessment of their environmental impact and potential penalties (Fouche, 2024). The focus of this current study is on the planned and existing agricultural activities on OGF. Fig. 1 illustrates the location of endangered (EN) and critically endangered (CR) ecosystem remnants in relation to Portions 420 and 373. The majority of OGF is mapped as remaining CR Garden Route Granite Fynbos. The goal is to identify and assess existing transformed areas that can accommodate the proposed 80 ha of agricultural expansion, thereby minimizing further impacts on Garden Route Granite Fynbos.

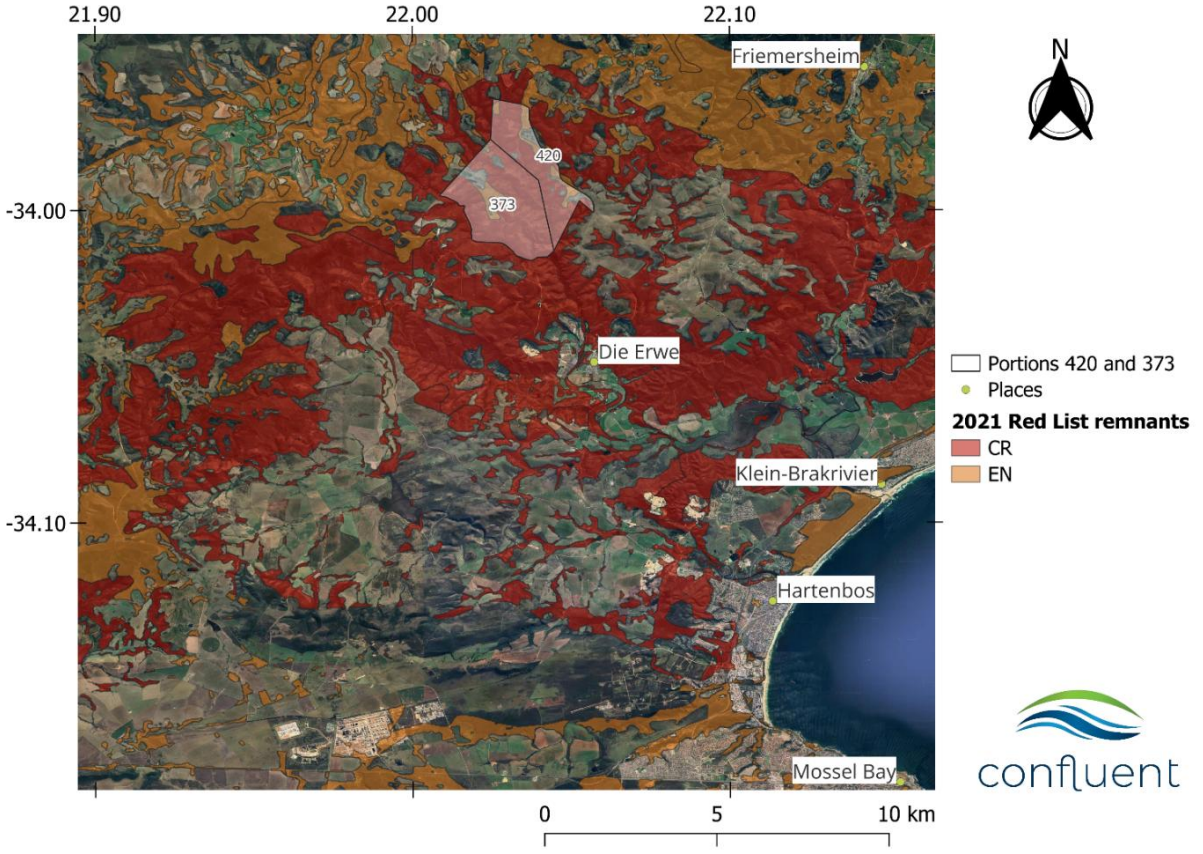


Figure 1: The general location of Portions 420 and 373, illustrated with the 2021 mapped remnants of Red Listed Ecosystem fragments.

1.2 Agricultural areas assessed

The agricultural areas on Outeniqua Game Farm (OGF) were initially mapped using census data from Cape Farm Mapper (left map in Fig. 2). This data provided a baseline for identifying areas suitable for agricultural expansion. Following the site assessment conducted in January 2025, these mapped areas were refined to provide a more accurate representation of the land available for irrigation and farming (right map in Fig. 2 – presented again later in this report).

The primary objective of this assessment is to confirm that ca. 80 ha of land can be utilized for irrigation from the proposed dam on the Ruiterbos River. It is also essential that this 80 ha consists of existing transformed agricultural land, rather than natural Garden Route Granite Fynbos, which is critically endangered. By focusing on these transformed areas, the aim is to limit the impact on the remaining fynbos and preserve the highly biodiverse ecosystems found on OGF.

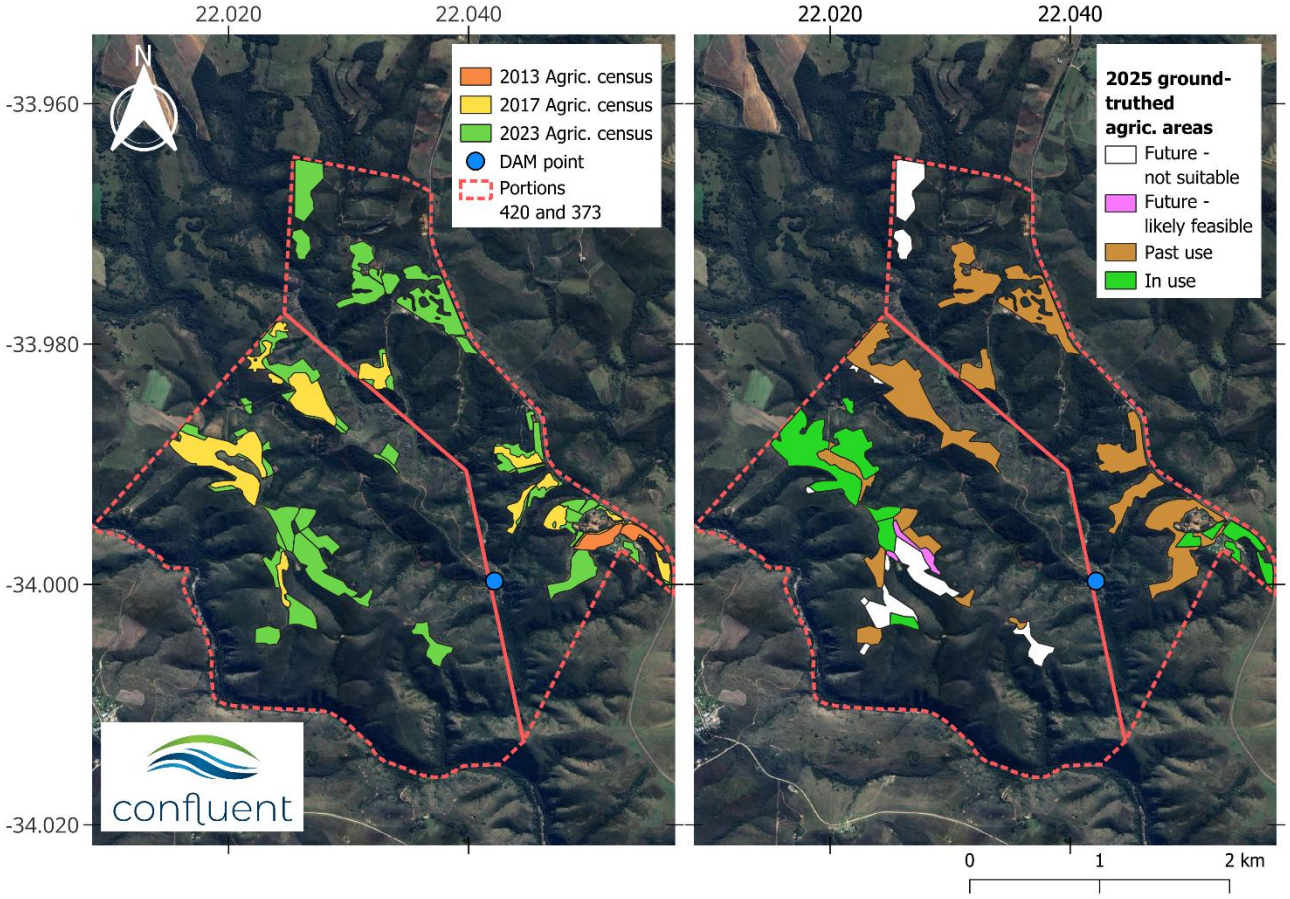


Figure 2: The census agricultural areas as presented in Cape Farm Mapper on OGF are presented in the map on the left, while the map on the right indicates refined areas that were mapped following the site assessment in January 2025. The position of the proposed dam is indicated by a blue point on the boundary between Portions 420 & 373.

2. TERMS OF REFERENCE

This report provides information on Terrestrial and Botanical diversity and sensitivity of the proposed agricultural expansion on OGF. The primary objectives of this report are:

- To identify areas within OGF that are suitable for the proposed 80 ha of agricultural expansion, including irrigation from the proposed dam on the Ruiterbos River.
- To verify that the identified 80 ha consist of transformed agricultural land and do not impact natural or critically endangered ecosystems, particularly Garden Route Granite Fynbos.
- To minimize potential environmental impacts and preserve biodiversity, particularly by preventing further loss of sensitive fynbos ecosystems.

The scope of this sensitivity verification report includes:

- Desktop Assessment: Review of available data, including Cape Farm Mapper agricultural census data and historical photographic records, to map existing agricultural areas on OGF.
- Field Assessment: Site visit conducted in January 2025 to refine and verify mapped agricultural areas and assess terrestrial and botanical sensitivity in relation to the proposed dam and irrigation areas.
- Assessing the terrestrial and botanical biodiversity of the identified agricultural areas, ensuring that no critically endangered (CR) or endangered (EN) ecosystems, including Garden Route Granite Fynbos, are affected by the proposed expansion.
- Ensuring that the assessment complies with relevant environmental regulations and guidelines, such as the Environmental Impact Assessment Regulations, as promulgated in terms of Section 24 (5) of the National Environmental Management Act, 1998 (Act No. 107 of 1998), which includes:
    - The protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial plant species (28 July 2023).
    - The protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial biodiversity (20 March 2020).
- Additional guidelines for the terrestrial biodiversity theme includes:
    - Ecosystem Guidelines for Environmental Assessment in the Western Cape (de Villiers et al., 2016).
    - The Western Cape Biodiversity Spatial Plan Handbook for 2023 (Cape Nature, 2023; CapeNature, 2017; Pool-Sandvliet et al., 2017).
- Additional guidelines for the terrestrial plant species theme includes:
    - Species Environmental Assessment Guideline: Guidelines for the implementation of the Terrestrial Flora (3c) & Terrestrial Fauna (3d) Species Protocols for environmental impact assessments in South Africa (Verburgt et al., 2020).

The assessment was undertaken by a specialist registered with the South African Council for Natural Scientific Professionals (SACNASP) with relevant expertise in the field of Botanical and/or Ecological science.

2.1 Online Screening Tool

The Department of Forestry, Fisheries, and the Environment (DFFE) screening tool report for the development footprint has identified the **Terrestrial Plant Species Theme as having a Medium sensitivity (some small fragments have a Low sensitivity; see Fig. 3)**, and the **Terrestrial Biodiversity Theme as having a Very High sensitivity** (Fig. 3). Note that the Screening Tool plant species theme does not take Near Threatened plant populations into account. The Medium screening tool sensitivity for plant species is detailed in the Environmental Impact Assessment (EIA) Regulations, 2014 (as amended), and associated guidelines. The best description is provided in the Species Environmental Assessment Guideline (Verburgt et al., 2020):

"*Model-derived suitable habitat areas for threatened and/or rare species are included in the medium sensitivity level … The models provide a probability-based distribution indicating a continuous range of habitat suitability across areas that have not been previously surveyed. A probability threshold of 75% for suitable habitat has been used to convert the modelled probability surface and reduce it into a single spatial area which defines areas that fall within the medium sensitivity level*."

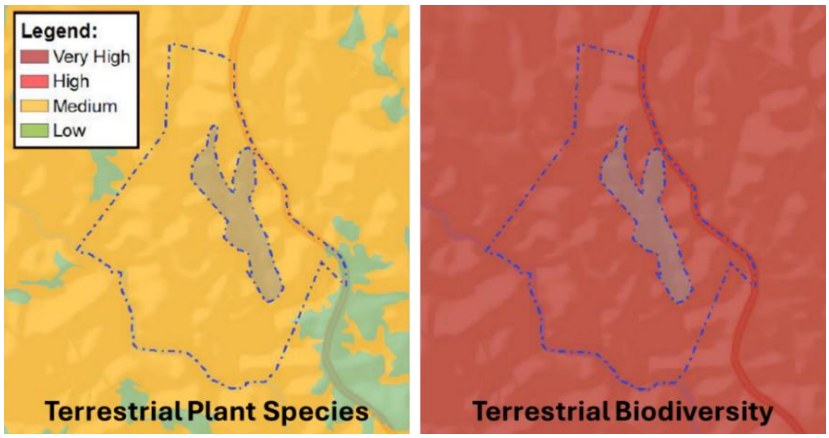


Figure 3: The screening tool sensitivities of OGF, as generated for the S24G report (Fouche, 2024).

A Very High sensitivity rating for terrestrial biodiversity is triggered for all Biodiversity Priority Areas (BPAs) and other sensitive features (Stewart et al., 2021). BPAs include the various management layers of the Western Cape Biodiversity Spatial Plan (WC BSP), as well as the other sensitive features in Table 1 below.

Table 1: Sources of BPA data for the Terrestrial Biodiversity Theme sensitivity (Stewart et al., 2021). Only BPAs that have been triggered for Portions 420 and 373 by the screening tool are listed.

Sensitivity layer	Data included and source
Critical Biodiversity Areas (CBAs)	CBA spatial footprint for metros, provinces, or bioregional plans, combined to create a national data set. Both CBA 1 and 2 areas have been triggered in the Screening Tool report
Ecological Support Areas (ESAs)	Most recent ESA spatial footprint for metros, provinces, or bioregional plans, combined to create a national data set. ESA 2 areas have been triggered in the Screening Tool Report.
Red Listed Ecosystems	Any ecosystem listed as Vulnerable (VU), Endangered (EN), or Critically Endangered (CR) according to the "Revised National List of Ecosystems that are Threatened and in Need of Protection (NEM:BA Act no.10 of 2004, as amended in November 2022).

3. METHODOLOGY

The main aim of the methodology followed during the preparation of this report was to show that there are agricultural fields on OGF that will be irrigated from the proposed new dam in the Ruiterbos River.

3.1 Assumptions & Limitations

This assessment is subject to a few assumptions, uncertainties, and limitations that are distinct from those listed in the S24G report for OGF (Fouche, 2024). These include

- Limitations related to spatial and temporal scales. The field assessment in January of 2025 provided a snapshot of conditions at that time. It is assumed that the agricultural areas and biodiversity have not significantly changed since the survey date.
- There is a limitation on the accuracy of the mapping of the agricultural areas on PGF, as the mapping relies on the quality of the available data. In the case of this report, the data available was from Cape Farm Mapper and historical records of the site, which may not fully capture all the site-specific conditions.
- The area on Portions 373 and 420 also represents diverse and dynamic ecosystems. Even within Garden Route Granite Fynbos there can be a great deal of species turnover depending on the microclimate of different areas of OGF. The results may vary depending on local conditions or irreplaceable taxa that were not fully captured during the field assessment.

3.2 Desktop Assessment

The desktop assessment was performed using Cape Farm Mapper (CFM) and QGIS version 3.36.0 “Maidenhead”. This assessment did not involve a detailed plant species survey, but rather an assessment of the state of transformation of the vegetation observed in areas flagged by CFM as agricultural areas (see the agricultural census data). The existing transformed agricultural fields were categorised into two main groups:

- **In-use areas**: These areas are actively used for agricultural purposes, either irrigated, recently ploughed, or currently planted with crops.
- **Past-use areas**: These areas are visibly transformed, but are currently either dry land pastures or are heavily invaded by black wattles (*Acacia mearnsii*) and Rooikrans (*A. cyclops*)

It should be noted that while invasion by non-native species is not a sole criterion for determining whether an area is transformed, some transformed areas are indeed heavily invaded by these species. Therefore, invasion is considered a sub-category within the “Past-use Areas,” but not all invaded areas are classified as such on OGF.

Following this categorization, additional areas on OGF were assessed to explore the potential for expanding agricultural production. This evaluation was based on the agricultural census data from Cape Farm Mapper, supplemented by an analysis of historical imagery of the site, which helped to identify any potential areas for expansion that could be incorporated into the proposed irrigation scheme.

3.3 Field Assessment

The field assessment for the agricultural areas was completed on the 24th of January 2025. The main objective of the field assessment in addition to the desktop analysis was to validate all the identified areas and to ensure that the mapping is as refined as possible. The following two key factors were considered during the field assessment:

- **Native or Non-native vegetation cover**: The degree of land transformation from natural to non-natural cover (i.e., degree of transformation) was assessed by distinguishing between areas suitable for agriculture (non-native cover areas) and those that remain ecologically intact or require protection. Special attention was given to areas containing sensitive or protected vegetation, such as critically endangered Garden Route Granite Fynbos. In the VAST model (Lesslie et al., 2010; Thackway & Lesslie, 2006) natural / native vegetation retains its original species and ecological processes with minimal human impact, supporting high biodiversity and natural transitions. In contrast, non-native vegetation results from human activities like agriculture or urbanization, leading to altered species composition, disrupted ecological functions, and often reduced biodiversity. While natural / native areas evolve through natural processes, transformed areas require restoration or continue to degrade. This assessment is focussed on identifying transformed areas that can be classified into non-native cover VAST classes IV, V, or VI (see Table 2 for a tabular representation of the meaning of these three classes of these transformation categories.
- **Invasive Species**: Areas with significant invasion, most notably by black wattle (*Acacia mearnsii*) and Rooikrans (*A. cyclops*) were noted, especially those that could be considered for inclusion in the agricultural expansion but are not actively being farmed.

The results from the field assessment allowed for the refinement of identified agricultural areas, which provides a more accurate representation of the land that is available for irrigation and agricultural use. This validation is also essential in order to ensure that the proposed agricultural expansion will not encroach on sensitive ecosystems.

Table 2: Vegetation Assets, States, and Transitions (VAST) framework with columns representing states. Shifts between states are defined as transitions, as laid out in (Lesslie et al., 2010; Thackway & Lesslie, 2006).

Increasing modification

		Native vegetation cover Dominant plant species indigenous to the locality and spontaneous in occurrence, i.e. a vegetation community described using definitive vegetation types relative to estimated pre 1750 types				**Non-native vegetation cover** Dominant structuring plant species indigenous to the locality but cultivated; alien to the locality and cultivated; or alien to the locality and spontaneous		
Vegetation cover classes		**Class 0:** **RESIDUAL BARE**	**Class I:** **RESIDUAL**	**Class II:** **MODIFIED**	**Class III:** **TRANSFORMED**	**Class IV:** **REPLACED -ADVENTIVE**	**Class V:** **REPLACED -MANAGED**	**Class VI:** **REMOVED**
		Areas where native vegetation does not naturally persist	Native vegetation community structure, composition, and regenerative capacity intact —no significant perturbation from land use or land management practice. Class I forms the benchmark for classes II to VI	Native vegetation community structure, composition and regenerative capacity intact—perturbed by land use or land management practice	Native vegetation community structure, composition and regenerative capacity significantly altered by land use or land management practice	Native vegetation replacement—species alien to the locality and spontaneous in occurrence	Native vegetation replacement with cultivated vegetation	Vegetation removed
Diagnostic criteria	Current regenerative capacity	Natural regenerative capacity unmodified—ephemerals and lower plants	Natural regenerative capacity unmodified	Natural regeneration tolerates or endures under past and or current land management practices	Natural regenerative capacity limited or at risk under past and or current land use or land management practices. Rehabilitation and restoration possible through modified land management practice	Regeneration of native vegetation community has been suppressed by ongoing disturbances of the natural regenerative capacity; limited potential for restoration	Regeneration of native vegetation community lost or suppressed by intensive land management; limited potential for restoration	Nil or minimal
	Vegetation structure	Nil or minimal	Structural integrity of native vegetation community is very high	Structure is predominantly altered but intact, e.g. a layer or strata and or growth forms and or age classes removed	Dominant structuring species of native vegetation community significantly altered, e.g. a layer or strata frequently removed	Dominant structuring species of native vegetation community removed or predominantly cleared or extremely degraded	Dominant structuring species of native vegetation community removed	Vegetation absent or ornamental
	Vegetation composition	Nil or minimal	Compositional integrity of native vegetation community is very high	Composition of native vegetation community is altered but intact	Dominant structuring species present—species dominance significantly altered	Dominant structuring species of native vegetation community removed	Dominant structuring species of native vegetation community removed	Vegetation absent or ornamental

4. RESULTS: DESKTOP ASSESSMENT

4.1 Terrestrial Biodiversity

4.1.1 Climate, Geology, and Soil

The climate of OGF is considered semi-arid. Winters are usually mildly cold and wet, while summers are hotter and drier. The average temperature during summer months (November to March) is usually between 20 and 30˚C. Winter temperatures usually remain moderate, usually ranging between 5 and 15˚C. The mean annual precipitation (MAP) is low, at around 454mm.

4.1.2 Vegetation Type(s)

The 2024 National Vegetation Map (NVM) provides the primary classification for the vegetation types present on OGF. The mapped vegetation according to the 2024 NVM (Mucina & Rutherford, 2006) predominantly consists of critically endangered (CR) Garden Route Granite Fynbos, which is an important biodiversity hotspot characterized by a high diversity of endemic species. In addition, areas within the valley systems are classified as endangered (EN) Swellendam Silcrete Fynbos, another threatened vegetation type of significant ecological value (Fig. 4). Some of the valley vegetation in the area is more representative of thicket communities, which align most closely with the critically endangered (CR) Gouritz Valley Thicket vegetation type. These areas support distinct plant species and contribute to the overall ecological complexity of the site.

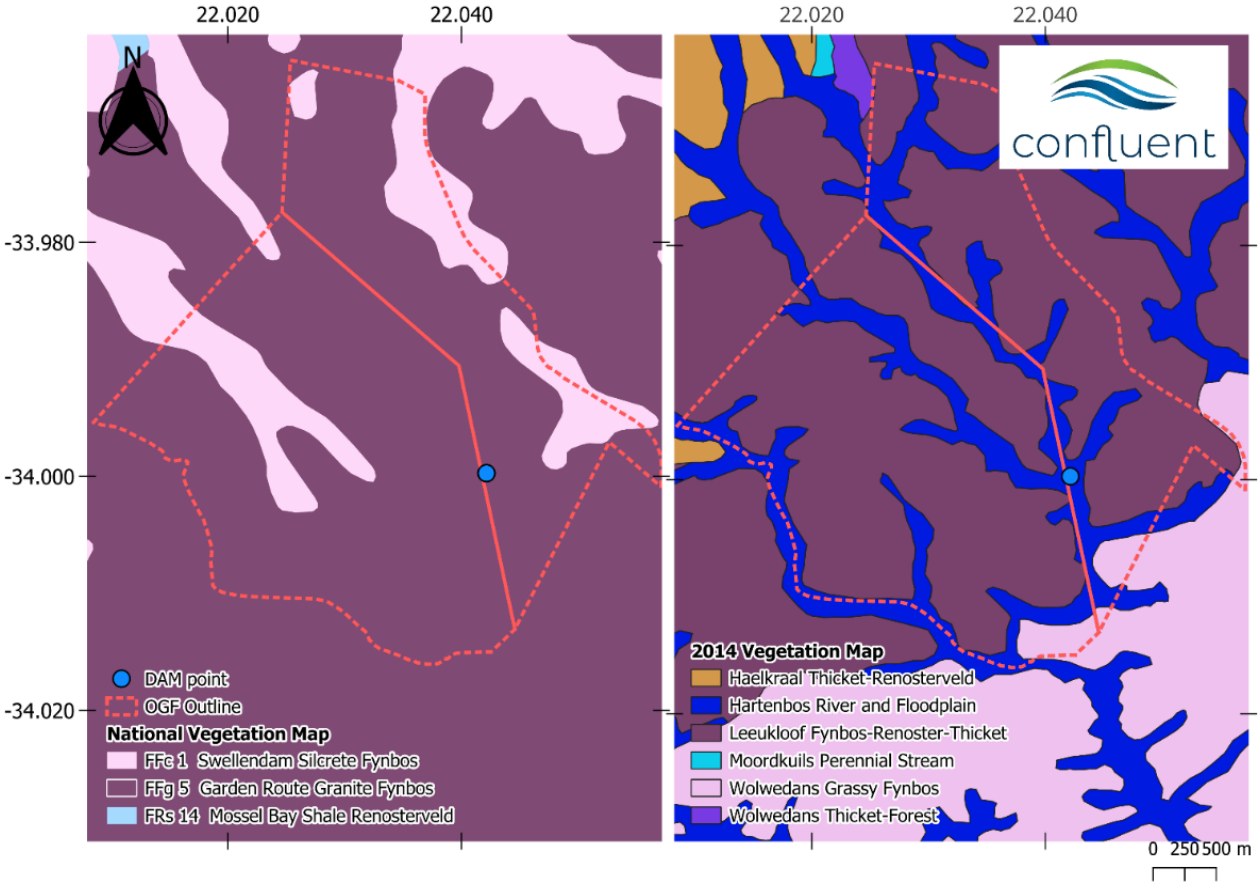


Figure 4: The 2024 National Vegetation Map (NVM) and the Vlok vegetation map illustrated alongside each other. The outline of Portions 420 and 373 are in red.

The Vlok vegetation map (Vlok et al., 2008; Vlok & de Villiers, 2007) is also illustrated in Fig. 4 alongside the 2024 NVM for more clarity. While the Vlok map does not include conservation Red List statuses for the vegetation communities, it offers a more granular understanding of the local vegetation structure, which complements the broader classifications from the NVM.

4.1.3 Western Cape Biodiversity Spatial Plan

The Biodiversity Spatial Plan for the Western Cape (WC BSP) for the approximate area included in this assessment is presented in Fig. 5. Explanations of the BSP categories in Fig. 5 are in Box 1. BSP layers are also associated with recommended land-uses, which is presented in Appendix 9.1. The BSP presented in this report is the 2023 version, which represents the updated version after the 2017 BSP. I this version of the BSP, the majority of OGF is still considered a Critical Biodiversity Area (CBA). As described in Box 1, this means that the vegetation on Portions 420 and 373 have a high conservation value and are regarded as areas essential to meeting biodiversity targets in the Western Cape.

Figure 5: The mapped 2023 Western Cape Biodiversity Spatial Plan (WC BSP) categories for OGF (Portions 420 and 373).

BOX 1: The Biodiversity Spatial Plan

Critical Biodiversity Area 1

Definition: Areas in a natural condition. Required to meet biodiversity targets for species, ecosystems or ecological processes and infrastructure.

Objective: Maintain in a natural or near-natural state, with no further loss of habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land uses are appropriate.

Critical Biodiversity Area 2

Definition: Areas in a degraded or secondary condition. Required to meet biodiversity targets for species, ecosystems or ecological processes and infrastructure.

Objective: Maintain in a functional, natural or near-natural state, with no further loss of habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land uses are

4.2 Plant Species

The plant species that were listed in the Screening Tool report under the Medium plant species sensitivity were *Agathosma microcarpa, Diosma passerinoides, Elegia squamosa, Erica unicolor* subsp. *Mutica*, *Euchaetis albertiniana*, *Freesia fergusoniae, Lampranthus pauciflorus, Lidbeckia pinnata, Romulea jugicola,* and Sensitive species 153, 268, 500, 516, 633, 700, 763, 800, 980, and 1024. Additional potential species of conservation concern (SCC) and protected species may also occur, as the screening tool report does not take Near Threatened (NT) or Rare plant species into consideration. A detailed assessment of the SCC found on OGF is presented in the S24G report (Fouche, 2024), as detailed species surveys fell outside of the scope of this assessment.

5. HISTORICAL ANALYSIS & OBSERVATIONS

The historical imagery presented in this section was sourced from Google Earth and the CD NGI Geospatial Portal. Farms 373 (789 ha) and 420 (489 ha), which together cover an area of ca. 1278 ha are included in this historical analysis. Because of this, Fig. 6 below is expanded upon in Appendix 9.2, should more detailed analysis on the imagery provided be required. The 1939 imagery clearly illustrates that some sections of OGF have been farmed and transformed from a natural state for at least the last century. The area of farmed land has increased since 1939, as is seen most evidently in the most recent imagery from May of 2024. The majority of the increase in farmed area on OGF does seem to have occurred within the past five years. A quick discussion of the 10 areas highlighted in Fig. 6 is provided below.

1. The north-western corner of OGF on Portion 420 seems to have been transformed to some extent in the 1939 imagery and was still transformed as a dryland pasture in 2005. Technically, this area can be identified as a Past-use area, but instead it was classified as an unsuitable area for agricultural expansion as irrigation from the proposed dam is likely not feasible here, and there may be good rehabilitation potential for this land, given the extent of transformation elsewhere on OGF.
2. The polygon labelled 2 (on Portion 420) indicates a quarry area on OGF, which is clearly visible in the 2005 and 2024 imagery. In the 1939 imagery, it is only visible as a small clearing.
3. The area indicated as number 3 in Fig. 6 was untransformed in 1939, however over at least the last two decades (i.e., since 2005), this area has been utilised largely as a dryland pasture on Portion 420.
4. Just west of area 3 there is another area which seemed to have some kind of cleared vegetation in the 1939 image. In 2005, the vegetation seems to have recovered, with the beginning of wattle invasion visible in the valley. The 2024 imagery indicates that some vegetation clearing has likely taken place, with additional roads made and a proliferation of invasive wattle. However, the vegetation can likely still recover to fynbos if alien clearing is done here.

5. Area five has been farmed and maintained as a transformed dryland field since at least 1939. This is likely the largest historical farmed piece of land on OGF, and presents an excellent opportunity for agricultural expansion. This area is currently classified as a Past-use area, as no irrigation or active crop planting is occurring here, and it is a good option for the future given its transformed status (i.e., it does not represent natural fynbos vegetation). Although a lot of this agricultural area is further than 1km away from the proposed dam, it is relatively straightforward to lead water to here compared to other areas that are a similar distance away (because only one “ridge” need be followed, and multiple valleys and hills need not be traversed to get to this area).
6. Area 6 just south of area five is also an agricultural area that is visible in all the historical images going back to 1939. The majority of this area is active agriculture, with a large portion being planted with maize, and smaller areas planted with avocados. Currently this area is being irrigated from the Palmiet River. It is assumed that irrigation from the proposed dam in the Ruiterbos River might therefore not be required for these lands. Furthermore, although it is a similar distance away from the transformed fields of the area labelled 5, the path water would need to follow to arrive here from the Ruiterbos River seems potentially more convoluted.
7. An old dam near the Palmiet River (still in use) and some transformed areas are visible since the 1939 imagery in area 7. The transformed areas visible have mostly recovered, apart from two remaining agricultural fields that are still visibly transformed in 2025 (pers. obs. During the January site assessment).
8. This area is simply highlighted as it is the proposed location of the dam in the Ruiterbos River.
9. Currently this area contains several dryland fields, which are not visible in earlier imagery from 2005 and 1939. These areas are considered trandformed Past-use agricultural fields, given that they are transformed, but not irrigated.
10. The last area highlighted in the historical imagery is where the current OGF lodge is located, as well as the surrounding transformed gardens. An increase in the amount of built area and surrounding agricultural fields is visible from 1039 to 2024.

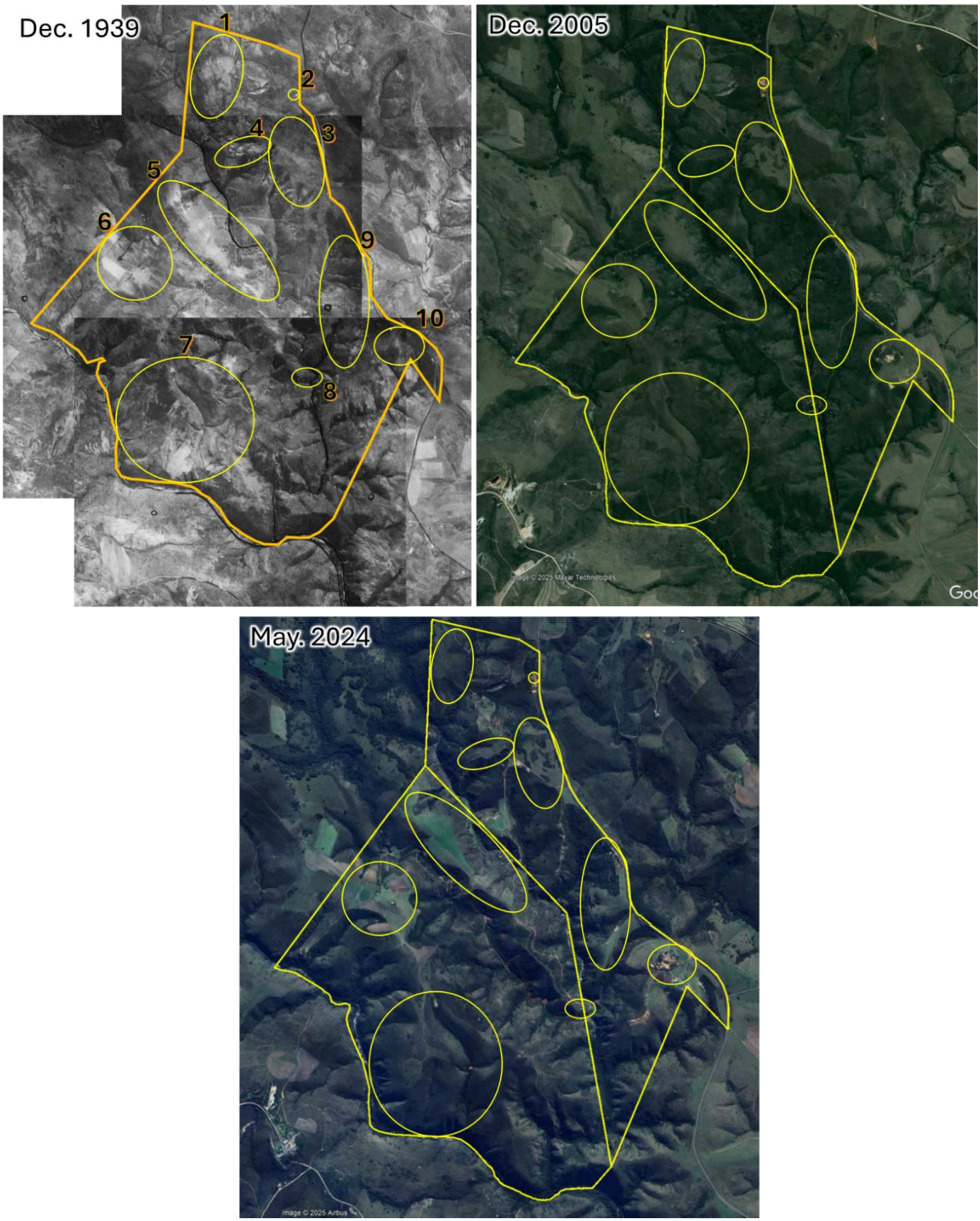


Figure 6: A stitched historical image of OGF (Portions 373 and 420) in December of 1939. See Appendix 9.2 for a detailed illustration of the numbered areas 1 through 10 on the images.

6. RESULTS: FIELD ASSESSMENT

The main aim of this assessment was to understand which pieces of land are transformed due to agriculture, and to help identify any additional agriculturally transformed areas that may contribute towards the existing agricultural areas on OGF. The map below (Fig. 7) illustrates the ground-truthed agricultural areas that were observed.

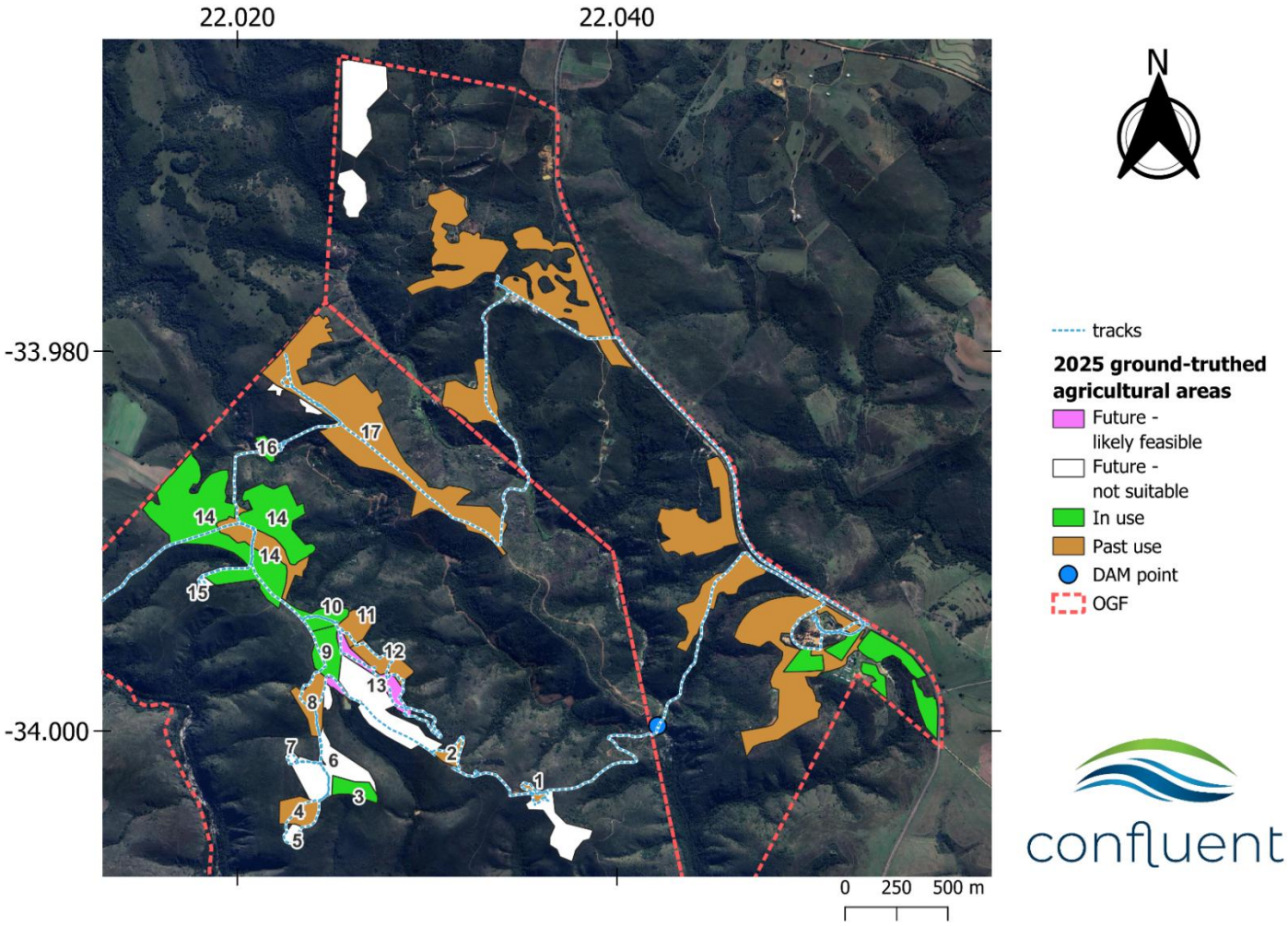


Figure 7: A view of all the Agricultural land mapped for OGF. In-use fields are mapped in bright green, and Past-use areas are mapped in brown. Two pink polygons indicate the only areas that are deemed as suitable for future agricultural expansion from a botanical & terrestrial ecology perspective. White areas were either highlighted in the CFM census, or by the owner, however they are not suitable for future transformation to agriculture and must instead be protected.

Table 3 outlines the area calculation for identified agricultural areas mapped in Fig. 7, confirming that there is more than 80 ha available for irrigation farming on OGF. Despite this finding, it is important to consider the practicality of pumping water to some of these areas, particularly those situated on steep slopes or located far from the proposed instream dam along the Ruiterbos River. It is generally recognized that pumping water over significant distances and elevation changes requires substantial infrastructure, including high-capacity pumps, energy sources, and potentially reinforced pipelines to manage pressure fluctuations. The feasibility of such an endeavour will depend on factors such as elevation gain, energy costs, and water demand. Careful planning and technical consultation would be necessary to determine whether the cost and technical challenges do not outweigh agricultural benefits.

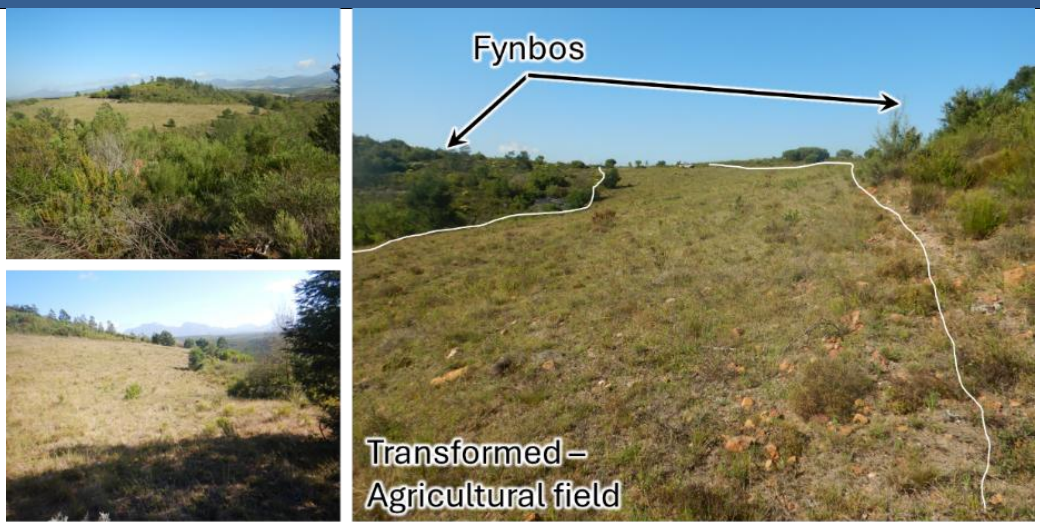
Table 3: A calculation of areas as presented in Figure 7.

Area	Currently in use (ha)	Transformed dryland - past use (ha)	Potential for agriculture - not suitable (ha)	Potential for agriculture - likely feasible (ha)
OGF (Portions 420 & 373)	48.75	119.09	34.71	3.33

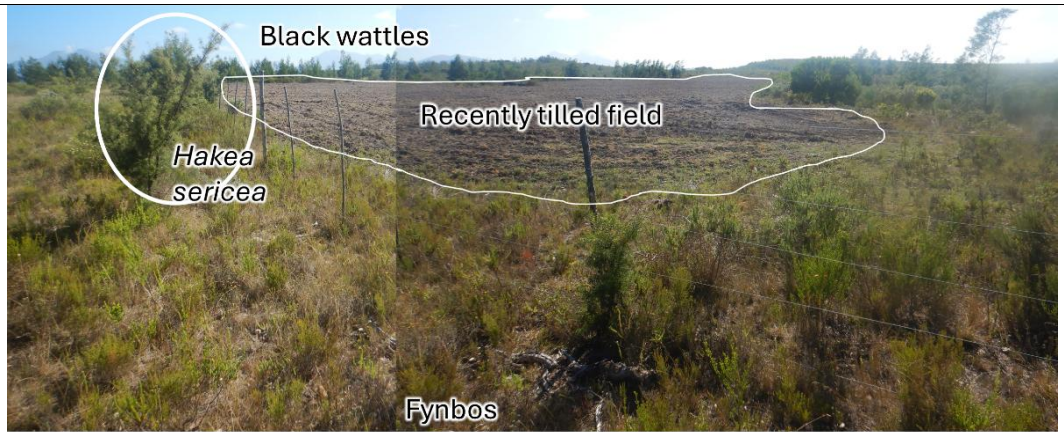
The numbers on the map of Fig. 7 correspond to the Table 4 discussion map number. If any additional areas beyond the identified In-use and Past-use areas of Fig. 7 are considered for agricultural transformation, biodiversity offsets would need to be considered to mitigate the loss of critically endangered (CR) and endangered (EN) vegetation. Given the high and very high site ecological importance (SEI) and irreplaceability of the ecosystems identified on OGF (Fouche, 2024), offsetting may only be approached as a last resort (it is also the last step of the mitigation hierarchy). It is important to note that adherence to the mitigation hierarchy will be difficult to justify if further transformation occurs. This report has demonstrated that ample already-transformed land is available for agricultural use on OGF, and that remaining natural vegetation is mapped as CBA 1. Given these factors, any proposal for offsetting due to continued habitat loss will face significant challenges, as the conservation value of CBA 1 areas in CR vegetation makes justification for further transformation problematic.

Table 4: Images of agricultural areas and landscapes observed during the field assessment in January of 2025. The majority of the areas assessed were on Portion 373, as transformed areas on Portion 420 are mostly Past-use dryland fields.

Map	Photo
1	  This section represents a very small past-use field that is still in a transformed state. Beyond the small area surveyed, there is a greater area that was flagged as agricultural in the 2023 census map on CFM; however, this section was confirmed to be Gardern Route Granite Fynbos during the site assessment and is not suitable for agriculture. The transformed area here accounts for ca. **0.71 ha** of transformed agricultural past-use area. The unsuitable fynbos area here, as mapped in the agricultural map is ca. 4.27 ha.

Map	Photo
2	

Another transformed agricultural past-use field that covers ca. **1.25 ha**. Surrounding this dryland field is Rooikrans (*Acacia cyclops*) invaded fynbos.

3	

An annotated image of an In-use agricultural field observed on OGF Portion 373. This field is considered In-use because it had recently been tilled at the time of the site assessment in January of 2025. This field covered an area of ca. **2.01 ha**.

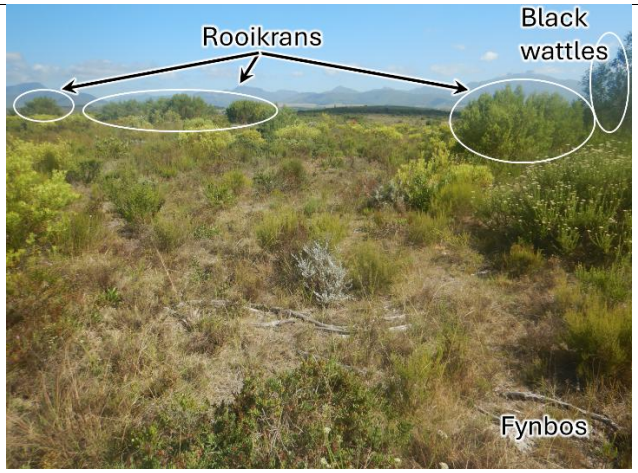
4	

Another field nearby the one in point 3 above is considered as a Past-use field as it is visibly transformed, however there are no signs of irrigation. This field is currently just a dryland pasture and is surrounded by pristine fynbos that contains some stands of invasive wattles in places. The area of the Past-use field is ca. **2.87 ha**.

Map	Photo
5	

The following fynbos patch was included in this analysis of agricultural areas on OGF, as it was pointed out as an area that would be considered favourable for further agricultural expansion. The images above clearly show that the vegetation in this area is still fynbos, consistent with Garden Route Granite Fynbos. The southernmost point of this proposed future area is defined by a stand of black wattles. However, fynbos persists in this stand of wattles. Dure to the sensitive nature of the fynbos, and the fact that OGF is essentially considered as a CBA 1, this section covering ca. **0.54 ha** may not be transformed for agriculture.

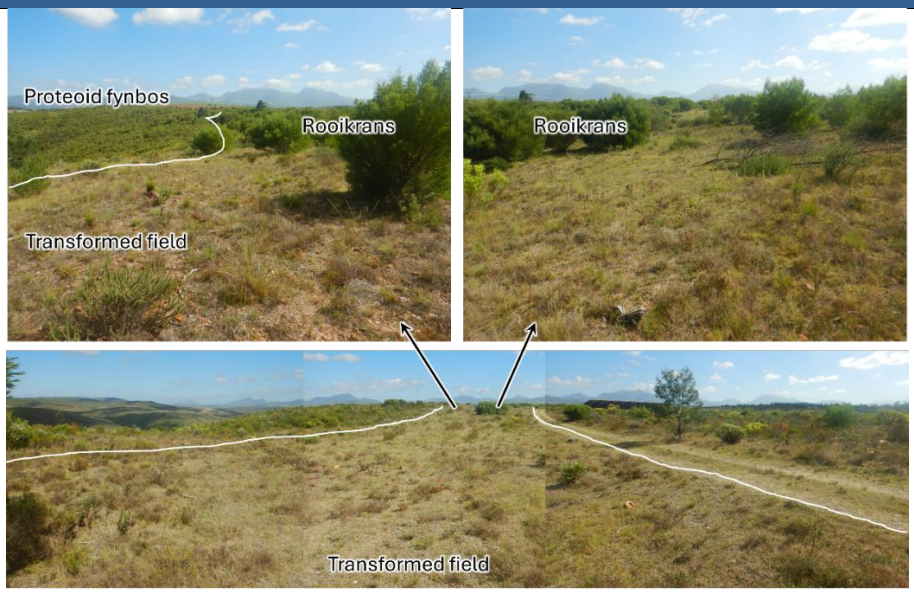
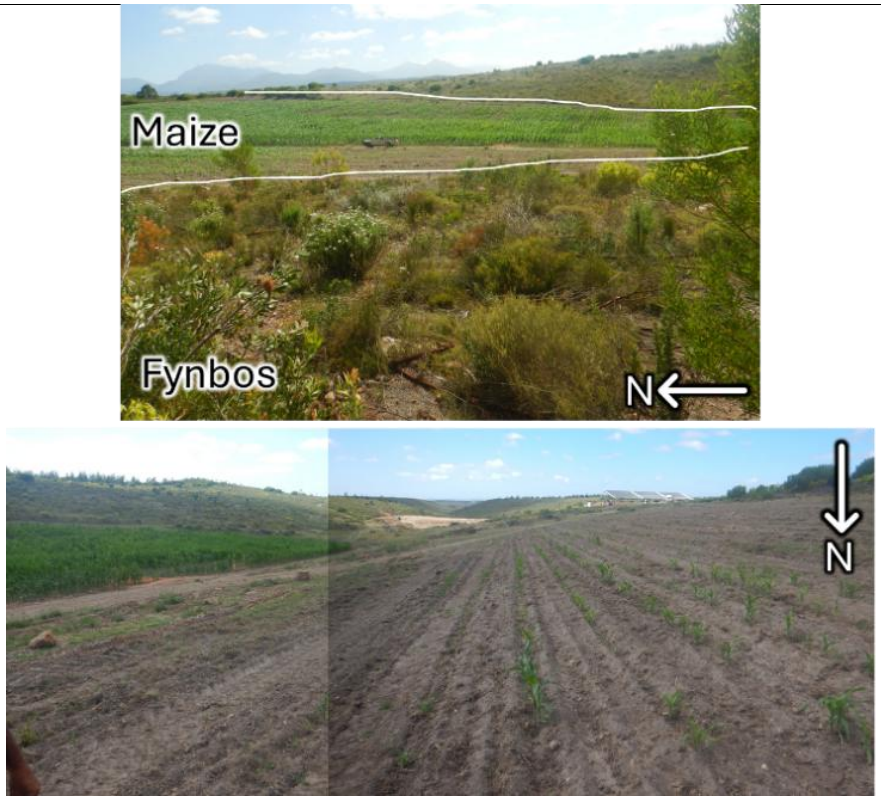
6



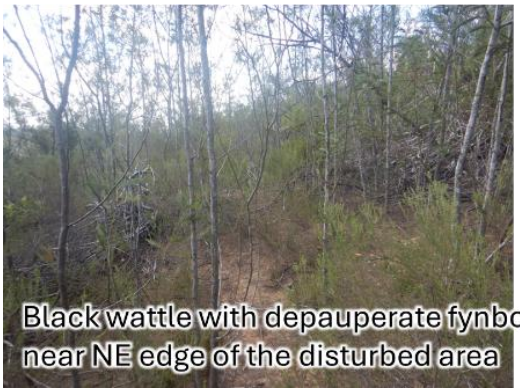
This section represents another area that seems to have been cleared in the past, but that has been left to recover for long enough for fynbos to recover. This area may also not be transformed for agricultural use. Although this area is part of a wider fynbos ecosystem, the mapped area in Fig. 7 amounts to ca. 6.79 ha.

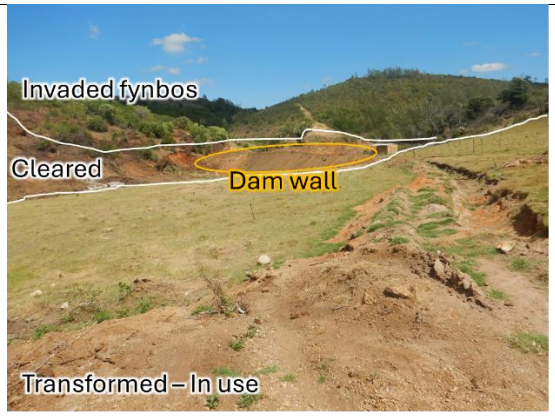
7

Another small area (**ca. 0.34 ha**) was flagged as there seemed to have been some past disturbance here. Despite being heavily invaded by both Rooikrans and black wattle, this section has excellent rehabilitation potential, and may not be transformed for agricultural use.

Map	Photo
8	
	Another example of a dryland pasture adjacent to proteoid fynbos (**ca. 3.38 ha**). Some rooikrans invasion was also observed in a section of this Past-use field, and these must be cleared both in the field an in the surrounding fynbos to prevent biodiversity loss in the adjacent CR Garden Route Granite Fynbos.
9	
	An in use agricultural field planted with Maize (**ca. 3.56 ha**). This field is surrounded by pristine fynbos that may not be further impacted.

Map	Photo
10	  A recently ploughed area adjacent to the fields planted with Maize, accounting for **ca. 2.5 ha**.
11	  Next to the ploughed field there is a transformed dryland Past-use field (covering ca. **2.48 ha**). This field is bounded along the south by a long stretch of area that is heavily invaded by black wattle.

Map	Photo
12	    The heavily invaded black wattle area mentioned above represents an area that was transformed historically. The mapped area here is **ca. 3.14 ha**. Because of this, it is also considered a Past-use area. Most of the wattle invaded area contains no, or minimal understorey coverage. The edges of the wattle invasion still hosts some fynbos elements.
13	 The narrow strip of land between the wattle-invaded area and the maize fields is covered in fynbos, which spans **ca. 2.85 ha**. However, due to its limited width, significant invasion by both Rooikrans and black wattle, and its lack of importance for landscape connectivity, this area is considered a potential site for agricultural expansion. This would only be considered if the currently designated In-use and Past-use agricultural areas do not provide sufficient space for the proposed irrigation zones to be supplied by the planned dam.

Map	Photo
14	   This area represents a large section of transformed land on Portion 373 of OGF (**ca. 35.27 ha**). Most of this area is considered as In-use agricultural areas, with the section containing infrastructure and other materials mapped as a Past-use transformed area.
15	 A small section of fynbos was flagged to be included under a pivot irrigation system (**ca. 0.33 ha**). Currently the maize pivot irrigation cannot complete a full circle of irrigation. Despite the limitation of the pivot, the identified fynbos area for potential agricultural expansion is not appropriate, as it represents pristine CR Garden Route Granite Fynbos.
16	  A section of transformed lawn / fields exists adjacent to a small dam north of the large agricultural area in the previous images (areas 14). While some clearing was also visible adjacent to the dam, this can be rehabilitated, and therefore only the lawn areas are included as In-use agricultural areas here (ca. 0.89 ha).

Map	Photo
17	 A view looking eastwards over the Past-use dryland pastures. In total, the polygon labelled 17 in the map in Fig. 7 covers ca. 30.73 ha. The majority of the Past-use areas mapped on Portion 420 of OGF look very similar to this image.

7. RESIDUAL IMPACTS AND OFFSET REQUIREMENTS

This assessment also highlights several key ecological risks associated with agricultural expansion on OGF which is a CBA 1 area and home to threatened ecosystems. Some of the risks and existing impacts on OGF include habitat fragmentation, proliferation of invasive species, and loss of biodiverse habitat. The analysis of historical imagery illustrates that agricultural expansion has occurred most rapidly within the past five years on OGF, in addition to increased construction of roads and built environments (assessed in the S24G botanical report). This observation on OGF further highlights the need to preserve the fynbos and thicket habitat, and to conduct invasive alien clearing in a sustainable manner.

A residual impact assessment for OGF has not been conducted, as there is sufficient transformed land available to accommodate agricultural expansion without further impacting intact-remaining ecosystems. A residual impact is defined as the impact – direct, indirect, and cumulative – of any activity(ies) on biodiversity after all effort to avoid and minimise the impact has been made (Brownlie et al., 2015; Department of Forestry Fisheries and the Environment, 2023). This is in line with the requirements of the mitigation hierarchy (Brownlie et al., 2023; Ekstrom et al., 2015). Residual impact assessments help determine if a biodiversity offset is required to compensate for the impacts of loss of natural flora and biodiversity, as illustrated in the decision tree of Fig. 8. A biodiversity offset is defined according to the National Biodiversity Offset Guideline (Department of Forestry Fisheries and the Environment, 2023) as the measurable outcome of compliance with a formal requirement contained in Environmental Authorisations to implement an intervention that has the purpose of counterbalancing the residual negative impacts of an activity, or activities, on biodiversity, through increased protection and appropriate management after every effort has been made to avoid and minimise impacts and rehabilitate affected areas.

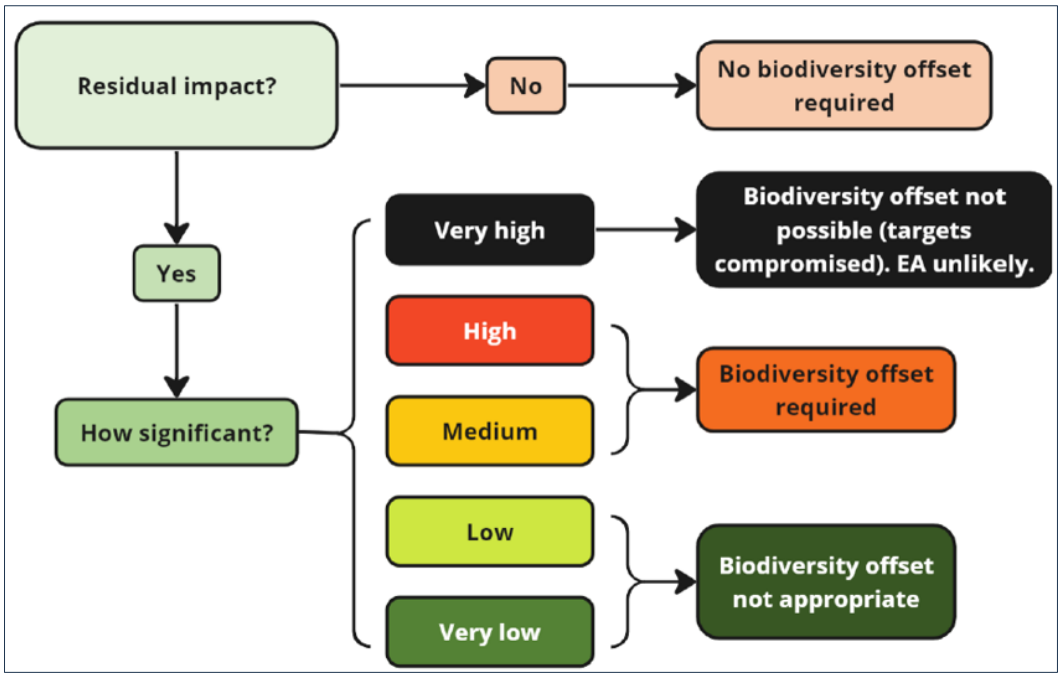


Figure 8. Biodiversity offset decision tree adapted from the National Biodiversity Offset Guideline (NBOG; 2023).

As also mentioned earlier, offsetting potentially irreplaceable vegetation also means that offsetting might not be allowed, and it will be difficult to demonstrate that the mitigation hierarchy was followed if further transformation occurs given the scope and needs of this project as it is currently understood (Fig. 8). However, should further transformation be deemed necessary within substantiated reasoning that follows the mitigation hierarchy, offset requirements should follow established guidelines, ensuring that for every hectare of CR or EN vegetation lost, a minimum offset ratio of 30:1 is applied for CR ecosystems and 15:1 for EN ecosystems (Brownlie et al., 2015; Department of Forestry Fisheries and the Environment, 2023). These ratios align with best-practice conservation principles to ensure no net loss of biodiversity.

8. CONCLUSION & RECOMMENDATIONS

The assessment of the ecosystems and transformed fields on OGF (Portions 420 and 373) has allowed for an inventory of land that is available for agriculture to be drawn up. A large proportion of the agricultural areas assessed could conceivably be irrigated from the proposed dam with minimal to no impact on CR Garden Route Granite Fynbos or EN Swellendam Silcrete Fynbos. The site is mapped as a Critical Biodiversity Area (CBA 1), signifying its high conservation value – CBA 1 areas are required to meet the Western Cape's conservation goals. While the majority of OGF is natural Garden Route Granite Fynbos (CR), with some EN Swellendam Silcrete Fynbos, there are some transformed agricultural areas that do not represent natural vegetation on OGF. Based on the findings of this report, the following recommendations are made:

- Maintain strict protection of natural / invaded-natural (untransformed) CBAs, particularly areas containing CR Garden Route Granite Fynbos, EN Swellendam Silcrete Fynbos, and CR Gouritz Valley Thicket.

- Implement an alien invasive species management plan to curb the spread and monoculture stands of black wattle (*Acacia mearnsii*) and Rooikrans (*Acacia cyclops*). See the S24G impact assessment report for more detail (Fouche, 2024).
- Following a recent article published on 24 February (Nsikane, 2025; Nsikani et al., 2025), it became clear that a recommendation to reduce invasive plant burning on OGF must be made (Box 2).

BOX 2: Burning invasive wattles on site is not the best conservation strategy

In South Africa, the fynbos ecosystem faces significant threats from invasive plants, like black wattles (*Acacia mearnsii*). Invasive alien plants consume excessive water and fuel fires, severely impacting water security and grazing lands. One common method of clearing invasive plants is "stack burning," where invasive species are cut, stacked, and burned on-site. This approach, however, has negative consequences for the fynbos ecosystem, as it leaves burn scars on the land that hinder natural regeneration. According to Nsikane (2025) and Nsikani et al. (2025), the following Do's and don'ts are identified for landscape level management:

Do's

1. Alternative alien clearing should be done instead of burning, such as cut down and removal, or biomass must be burned on roads or existing transformed areas to prevent ecological damage to the fynbos.
2. Understand the role of fire in fynbos ecosystems, which are naturally fire-adapted. While stack burning may not be ideal, controlled burns in certain areas, under the right conditions, can help maintain the biodiversity of fynbos.
3. Manual removal is often the most effective and least disruptive method. Use tools like hand saws, axes, or chainsaws to cut down black wattle and rooikrans trees. This method avoids soil disturbance and maintains the integrity of the fynbos ecosystem.
4. Cut and remove rather than burning on-site. If invasive plants are cut and left in place, they can decompose and return nutrients to the soil. Avoid leaving the slash where it could damage surrounding native vegetation or watercourses.
5. Timing is crucial. Cutting down invasive plants, like black wattle and rooikrans, before they flower or seed reduces the risk of spreading. This means clearing areas of low to moderate invasion first and then moving on to areas of more severe invasion.
6. If feasible, transport the slash to a central collection point for disposal, composting, or controlled burning away from sensitive areas. Make sure that slash disposal adheres to local waste management guidelines.
7. Where appropriate, consider chipping the invasive plants to create mulch or compost. This can only be done if there are no seeds in the cleared material. This material can be used for other restoration projects or as a mulch in non-sensitive areas.
8. After clearing invasive plants, especially on slopes, implement erosion control measures to prevent soil degradation. Techniques like mulching or planting ground cover species can stabilize the soil and prevent erosion, particularly in areas adjacent to watercourses.

BOX 2: Burning invasive wattles on site is not the best conservation strategy

Don'ts

1. Never dump cut invasive plants into streams, rivers, or wetlands. Slash that ends up in watercourses can obstruct flow, degrade water quality, or introduce non-native plant material to the ecosystem. Don't use stack burning as the first choice for clearing invasive plants. While it may offer immediate results, it causes significant damage to soil health, plant biodiversity, and ecosystem structure in the long term.
2. Don't ignore the fact that certain areas, especially those at the center of stack burn scars, may require significant intervention, such as reseeding or soil restoration and long-term alien management (the invasives are likely to return fast)
3. Don't ignore the importance of monitoring the areas post-clearing for the emergence of new invasive plant species. Ongoing management is essential to prevent reinvasion.

    - Prioritize restoration initiatives in degraded areas to support ecological connectivity. Start with restoration in less impacted areas and move gradually towards more impacted areas.
    - Limit agricultural expansion strictly to transformed areas (both in-use and past-use) as mapped in the report. The potentially feasible agricultural expansion areas identified may only be considered if evidence of well-managed clearing and restoration of invaded areas is ongoing on OGF.
    - Conduct annual ecological assessments (springtime might be the best) to track changes in habitat quality and biodiversity.

- Implement sustainable farming practices that align with ecological conservation principles
    - Try to utilise land close together first, in order to minimise the effect of landscape fragmentation.
    - Apply buffer zones along riparian areas and create field boundaries and zones within fields that are attractive to beneficial insects. Plant perimeter (trap) crops that are more attractive to a particular pest and that reduces the likelihood of spreading invasive plants.
    - Use contour farming to reduce soil erosion,
    - Use appropriate planting densities, and companion crops (Magdoff, 2007)
    - Use rotations that are complex, involve plants of different families and, if at all possible, include sod crops such as grass/clover hay that remain without soil disturbance for a number of years.
- Build soil strength
    - Add large quantities of organic materials on a regular basis—animal manures, composts, tree leaves, cover crops, rotation crops
    - Use cover crops routinely to provide multiple benefits such as habitat for beneficial insects, adding N and organic matter to soil, reducing erosion and enhancing water infiltration into the soil, retaining nutrients in soil. Cover crops also improve soil moisture retention. It is possible to supply all of the nitrogen

to succeeding crops by growing a vigorous winter legume cover crop (Magdoff, 2007).

- Reducing tillage is an important part of an ecological approach to agriculture. Tilling soil leaves it more susceptible to erosion and also breaks natural soil aggregates that are important for the infiltration of water into the soil.
- Apply additional erosion control to that mentioned above and soil conservation techniques during the preparation of lands for agriculture. E.g., terracing, grassed waterways (where there are waterways), etc.

- Ensure all future developments, including road construction, adhere to environmental regulations to prevent unauthorized habitat destruction. Engage with relevant environmental authorities to ensure compliance with Section 24G regulations and the Environmental Impact Assessment (EIA) process.
- Monitor water usage from the proposed dam to minimize adverse impacts on downstream aquatic ecosystems.
    - Slash from alien clearing efforts may not be dumped into the Ruiterbos River.
    - Reintroduction of dredged / excavated material.
    - Improve the habitat within the dam. Think about introducing a gravel bar or island in the dam, and if *Typha capensis* becomes dominant, undertake periodic cutting to encourage a wider variety of aquatic plants to grow in the dam.
    - Implement fish passes to enable the upstream passage of fish (Schmutz & Moog, 2018)
    - Implement appropriate sediment management techniques. Examples of techniques include sediment flushing, sediment bypass, and augmentation of sediment downstream (Schmutz & Moog, 2018). The aquatic specialist or dam engineer can provide further insight here.

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10. APPENDIX

10.1 Land-Use Recommendations According to the WC BSP

Recommended acceptable land-uses for each BSP layer is outlined and summarised in Table 5 below.

Table 5: The land-use planning proposed by the Western Cape Biodiversity Spatial Plan.

Yes Permissible land uses that are unlikely to compromise the biodiversity objective	Restricted Land-uses that may compromise the biodiversity objective and are only permissible under certain conditions	No Land-uses that will compromise the biodiversity objective and are not permissible

	Map and Land use Categories	Protected Area	Critical Biodiversity Area 1	Critical Biodiversity Area 2	Ecological Support Area 1: Terrestrial	Ecological Support Area 1: Aquatic	Ecological Support Area 2	Ecological Support Area: Species Specific Overlay	ONA: Natural to Near Natural	ONA: Degraded	No Natural Remaining
Conservation	Proclaimed Protected Areas	Land use within proclaimed protected areas is subject to a management plan drawn up for that specific protected area.	Yes	Yes	Yes	Yes	Yes	Restricted	Yes	Restricted	Restricted
Conservation	Conservation Areas		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Restricted	Restricted
Agriculture	Intensive Agriculture		No	No	No	No	No	Restricted	Restricted	Restricted	Yes
Agriculture	Extensive Agriculture		Restricted	Restricted	Restricted	Restricted	Restricted	Restricted	Yes	Yes	Yes
Tourism and Recreational	Low Impact Facilities		No	Restricted	Restricted	Restricted	Restricted	Restricted	Restricted	Yes	Yes
Tourism and Recreational	High Impact Facilities		No	No	No	No	No	No	Restricted	Restricted	Yes
Rural Accommodation	Agri-worker Accommodation		No	No	No	No	No	Restricted	Restricted	Restricted	Yes
Rural Accommodation	Smallholdings		No	No	No	No	Restricted	Restricted	Restricted	Yes	Yes
Urban	Existing settlements and urban expansion		No	No	No	No	No	Restricted	Restricted	Restricted	Yes
Urban	Community Facilities and Institutions		No	No	No	No	No	Restricted	Restricted	Restricted	Yes

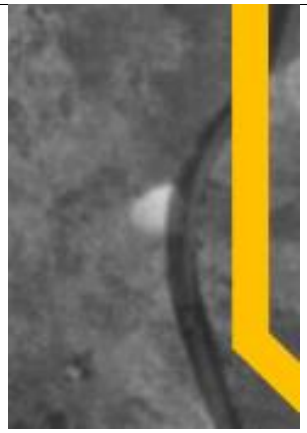
Yes Permissible land uses that are unlikely to compromise the biodiversity objective	Restricted Land-uses that may compromise the biodiversity objective and are only permissible under certain conditions	No Land-uses that will compromise the biodiversity objective and are not permissible

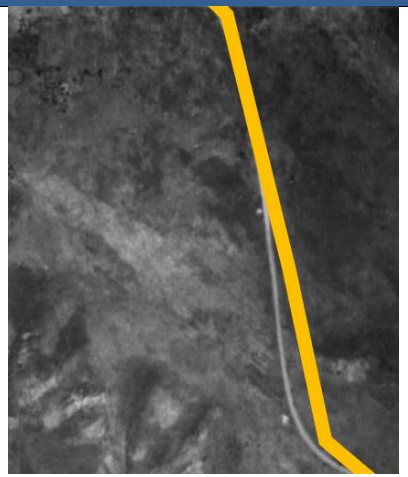
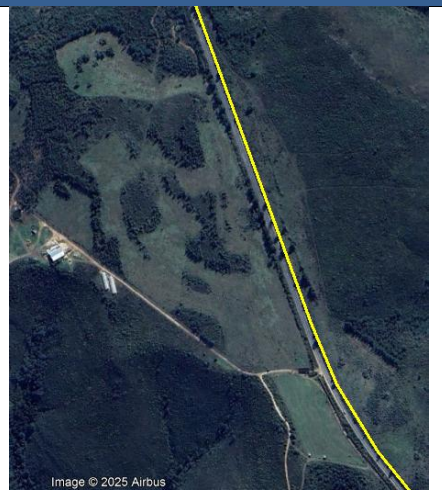
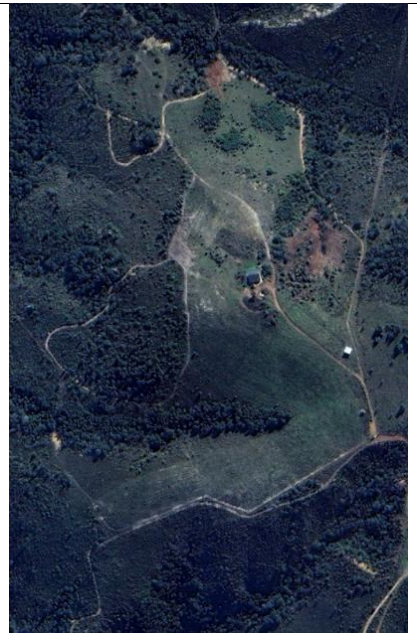
Map and Land use Categories		Protected Area	Critical Biodiversity Area 1	Critical Biodiversity Area 2	Ecological Support Area 1: Terrestrial	Ecological Support Area 1: Aquatic	Ecological Support Area 2	Ecological Support Area: Species Specific Overlay	ONA: Natural to Near Natural	ONA: Degraded	No Natural Remaining
Business & Industrial	Rural Business	Land use within proclaimed protected areas is subject to a management plan drawn up for that specific protected area.	No	No	Restricted	No	No	No	Restricted	Restricted	Yes
	Non-place-bound Industry (low-moderate impact)		No	No	Restricted	No	No	Restricted	Restricted	Restricted	Yes
	Non-place-bound Industry (high impact)		No	No	No	No	No	Restricted	Restricted	Restricted	Yes
	Renewable Energy		No	No	Restricted	No	Restricted	No	Restricted	Restricted	Yes
	Extractive Industry (incl. Prospecting)		No	No	No	No	No	Restricted	Restricted	Restricted	Yes
Infrastructure Installations	Linear - roads and rail		No	Restricted	Restricted	Restricted	Restricted	No	Restricted	Yes	Yes
	Linear - pipelines & canals		No	Restricted	Restricted	Restricted	Restricted	Restricted	Restricted	Yes	Yes
	Linear - powerlines		Restricted	Restricted	Restricted	Restricted	Restricted	Restricted	Restricted	Yes	Yes
	Other Utilities		No	No	Restricted	No	Restricted	Restricted	Restricted	Yes	Yes

10.2 Historical imagery expanded version

The imagery in Table 6 is the zoomed in version of the images presented earlier in this report. This appendix serves the function of providing further clarity for the short description of the historical imagery in the main text of this report. These zoomed in images may aid the competent authorities in reviewing this report.

Table 6: Extracted zoomed in imagery of Portions 373 and 420 of Outeniqua Game Farm.

No.	1939	2005	2024
1			
2			

No.	1939	2005	2024
3			
4			

confluent

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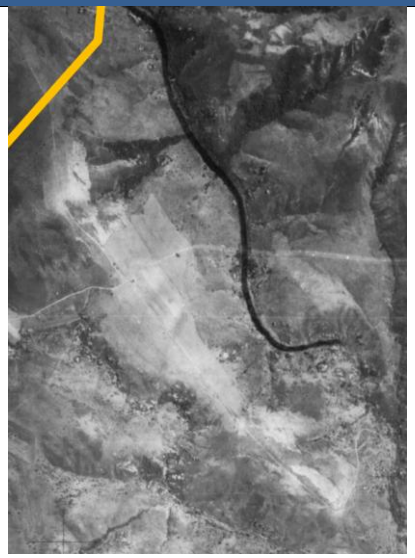
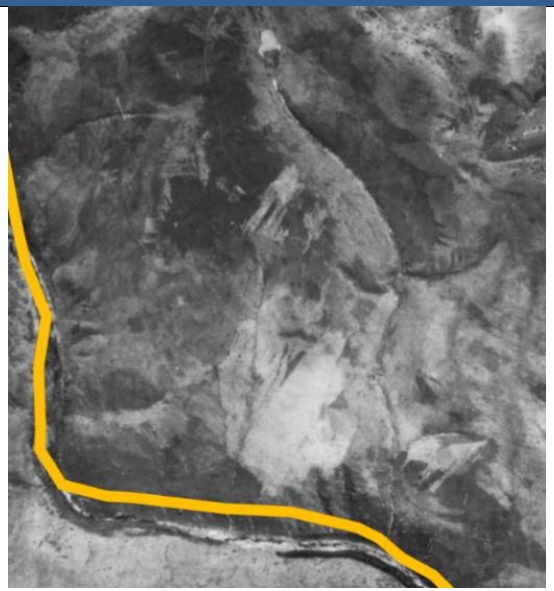
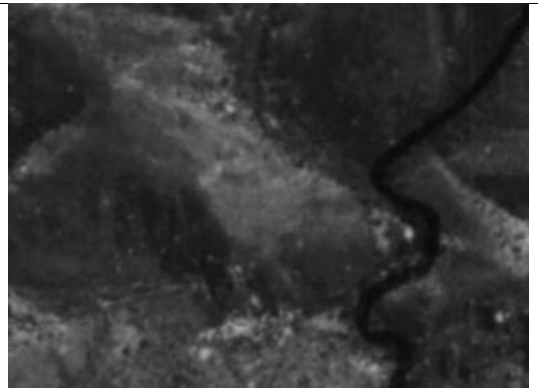
5			
6			

confluent

No.	1939	2005	2024
7			
8			

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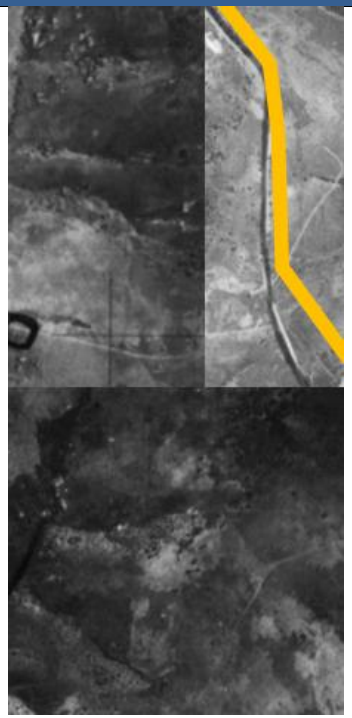
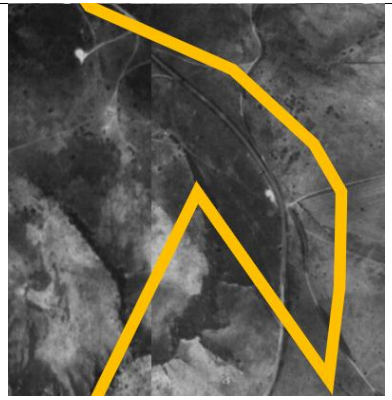
9			
10			

confluent