APPENDIX I
SPECIALIST AVIFAUNAL REPORT

CAPE STRENGTHENING SCOPING PHASE

Bird Impact Assessment Study

Proposed Omega Substation and associated powerlines on the farm Groot Oliphantskop

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Executive Summary

The study deals with the expected impacts on avifauna of a proposed transmission substation and associated transmission lines on the farm Groot Oliphantskop (the farm) near Koeberg in the Western Cape Province. Three potential impacts are envisaged (1) habitat destruction, (2) disturbance of breeding and roosting birds and (3) collisions with the existing and proposed transmission lines.

Alternative A is the preferred alternative. The destruction of habitat and disturbance of birds using this location for foraging is inevitable. However, due to ample alternative habitat being available it is likely that birds using this area for will find alternative habitat to use. No mitigation measures are therefore recommended as far as habitat destruction and disturbance is concerned except to restrict all movement to the site and immediate surroundings. Both the new 765kV lines and 400kV transmission line turn-in will pose a collision risk to birds utilizing the two wetland areas on the farm, as well as the remaining crops. There is also a chance of pelicans (and to a lesser degree flamingos) flying in to the lines. The earthwires of these lines should therefore be marked with anti-collision devices.

Alternative B is not is not a preferred alternative. The small seasonal wetland in close proximity to the site is an important site for waterbirds and specifically Blue Cranes. Damage to the wetland either through construction activities or the construction of access roads should be avoided. Ideally all construction activities should take place outside the breeding season i.e. between September and March. If this can not happen, the potential for the cranes to desert the site is very high. As far as collisions are concerned, the same recommendations are valid here as for alternative A.

Alternative C is the least preferred alternative. The seasonal wetland in close proximity to the site is the most important site for waterbirds and specifically Blue Cranes on the farm. Damage to the wetland either through construction activities or the construction of access roads should be avoided. Ideally all construction activities should take place outside the breeding season i.e. between September and March. If this can not happen, the potential for the cranes to desert the site is very high. This will have an impact on the local population as wetlands (and therefore suitable breeding sites) are not common in the Swartland.

1 Methodology and brief

1.1 Project brief

The study deals with the expected impacts on avifauna of a proposed transmission substation and associated transmission lines on the farm Groot Oliphantskop (the farm) near Koeberg in the Western Cape Province. The brief received from Eyethu Engineering for the avifaunal study was as follows:

- Prepare a background statement, including particulars of the study area from previous experience or desk top studies.
- Undertake a site visit to verify the above information and determine if there are gaps in the baseline data and to identify any areas of potential sensitivity that may require a more detailed study
- Prepare a brief report on the study methodology, findings, conclusions and recommendations that will include, inter alia, a list of species lily to be encountered their locations, expected impacts and mitigation and monitoring requirements.
- Mapping of sensitive areas on maps provided by Eyethu
- Assess and evaluate potential impacts to the magnitude, spatial scale, timing, duration, reversibility, probability, significance and acceptability.

1.2 Methodology

- Maps of the study area were provided showing existing infrastructure, land cover and the proposed substation sites. These were used in order to identify potential avian “hot-spots” based on the expected use of the habitat by birds.
- Atlas of southern African Birds (ASAB) (Harrison *et.al.* 1997) species lists of the quarter degree square 3318CB (or 1: 50 000 map unit), within which the sites are located were obtained from the Avian Demography Unit at University of Cape Town. These were used to determine what powerline sensitive species could potentially occur at the sites.
- The area was visited for a half a day to obtain a first-hand perspective of the proposed sites and bird habitat on the farm.
- Information on bird species and behaviour in the Swartland in general was gathered from the ornithologists Mr. Koos de Goede of the Endangered Wildlife Trust’s Birds of Prey Working Group, Ms. Vicki Hudson of the Overberg Crane Group, Mr. Kevin Shaw of Cape Nature Conservation and the Avian Demography Unit’s Co-ordinated Avian Roadcount (CAR) project.
- Site specific information on bird species and behaviour was obtained from Mr. Hermann Stoffberg, who has farmed on the farm since 1962.
- The impacts were predicted on the basis of full-time gathering and analysis of data by the author on wildlife impacts with electricity infrastructure throughout southern Africa since 1996, supplemented with published accounts from elsewhere in the world.

2 Assumptions and Limitations

Due to time constraints, no primary data on species composition and numbers could be gathered at the three proposed substation sites on the farm over a long period of time. The assessment therefore relies heavily on secondary sources, such as scientific publications on the habitat use of birds in the Swartland, personal observations from the author during visits to the general area, personal observations of experienced amateur and professional ornithologists and specifically the observations of Mr. Hermann Stoffberg, the current occupier of the farm. To some extent, the findings of the previous EIA study conducted in 1998 were also used.

3 General Description of Environment

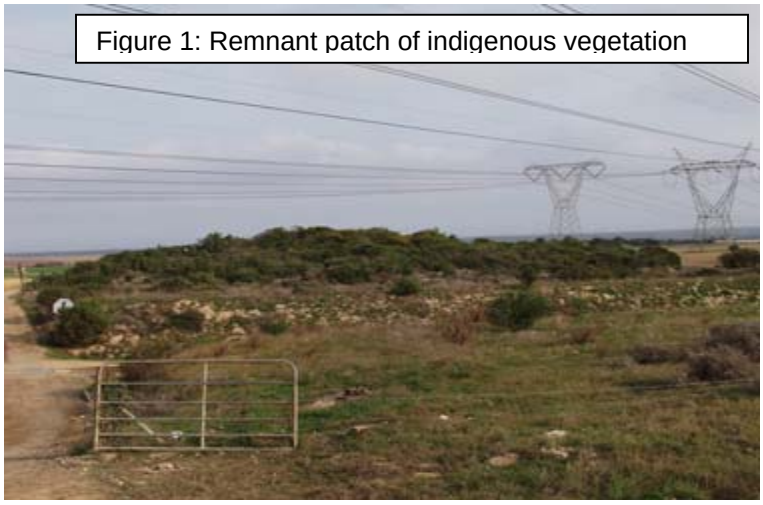
The farm Groot Oliphantskop is situated in Swartland, which is situated in the Fynbos biome. Within the Swartland, the most prominent indigenous vegetation types are West Coast Renosterveld, Sand Plain Fynbos and Mountain Fynbos. Very little remains of the indigenous vegetation in the Swartland. Of the three vegetation types, Mountain Fynbos has been the least impacted by agriculture while the other two have suffered badly: it is estimated that only 3% of the West Coast Renosterveld survives (Young et.al. 1993). Wheat cultivation is the predominant form of dry-land cultivation (36%), followed by old lands (i.e. lands left after the last harvest and not cultivated for several seasons-24%). Pastures make up about 8% of the land use. Since 1988, there has been a diversification of farming in the region (Young *et.al*. 2003), with many farmers switching from a wheat/wheat system to a wheat/pasture system. This is also the case with the farm Groot Oliphantskop which comprises a total area of 600 hectares. The farm is primarily used for wheat cultivation and milk production (H. Stoffberg pers. comm). The vegetation on the farm consists mainly of pastures, wheat lands, a few strips of indigenous fynbos and a few pockets of exotic trees (Australian *Eucalyptus* and *Acacia* species). The farm also contains two wetland areas which is quite rare for the Swartland (V. Hudson, K Shaw pers.comm).

The different habitats and the birds likely to be encountered in them will know be discussed in more detail (see also appendix A1 and A2).

3.1 Indigenous vegetation

The Fynbos biome is characterized by a high level of botanical diversity and endemism in its botanical composition (Harrison *et.al*. 1997), a fact which is not paralleled in its terrestrial avifauna. Very few patches undisturbed indigenous vegetation remains on the farm, and most of it is infested with exotics (see appendix A3). None of the few fynbos avifaunal

Figure 1: Remnant patch of indigenous vegetation



endemics were recorded in the relevant quarter degree square during the atlas period (Harrison *et.al*. 1997), although the Black Harrier, a southern African endemic closely associated with fynbos were recorded. This species is more likely to occur in the nearby Koeberg Nature Reserve, which is an important refuge for the remaining indigenous vegetation. The remnant patches of the indigenous vegetation on the farm are so small and fragmented that it can not be considered important refuges for birds.

3.2 Wheat/Pasture

Figure 2: Ploughed and planted wheat fields on the farm

The diversity of birds, especially large terrestrial species are generally low in this habitat. However, large numbers of certain species, for example Spurwinged Geese and Helmeted Guineafowl can occur in this habitat in large numbers. This habitat is of particular importance for the Blue Crane which is the process of establishing itself in the Swartland. It would seem that the switch from a wheat/wheat system to a wheat/pasture system has favoured the species (Young *et.al.* 2003). The colonization of the Swartland by Blue Cranes are likely to be the result of three factors (1) changes in land use (2) an influx from birds from the nearby Overberg and (3) successful breeding by birds in the Swartland (Young *et.al*. 2003). Cranes use agricultural landscapes extensively (fallow, pasture, stubble, crops, bare lands) which provide the birds with a choice of habitats for foraging and nesting as the seasons change. The future of the species has become intimately linked to the farmer and his lands. The farm provides ample habitat for cranes as the majority of the farm consists of lands and pastures. Mr. Stoffberg, who has farmed the property since 1962, reported regular occurrence of Blue Cranes on the farm, both breeding and roosting, as well as one collision mortality of this species on the existing 400kV lines that cross the farm.

Other species that utilizes this habitat (and are therefore likely to occur on the farm) are Steppe Buzzard and White Stork, palearctic migrants that can occur in high numbers in summer. Flocks of White Storks may forage in pastures and fallow fields for insects, while Steppe Buzzards hunt rodents in the fields. Nocturnal predators include Spotted Eagle Owl and Barn Owl. Lanner Falcons hunt Speckled Pigeons, which occur abundantly in summer in the fields. Secretarybirds have occasionally been recorded (H. Stoffberg pers.comm).

3.3 Wetlands

Figure 3: Seasonal wetland on the farm

The most important aspect of the farm habitat from an avifaunal perspective is the two seasonal wetlands (see appendix A3). Wetlands are crucial for Blue Cranes that use them as roosts. According to Mr. Stoffberg, flocks of up to 50 Blue Cranes roost on the two wetlands in winter and in summer the wetlands are used by several pairs of Blue Cranes for breeding. Wetlands and farm dams are relatively scarce in the Swartland (compared to the Overberg) and therefore their presence is likely to attract cranes (V. Hudson; K. Shaw pers. comm.).

Other species will also use the wetlands extensively, particularly Spurwinged Geese and various species of waterfowl. The wetlands are likely to attract Blackheaded Heron as well.

3.4 Exotic trees

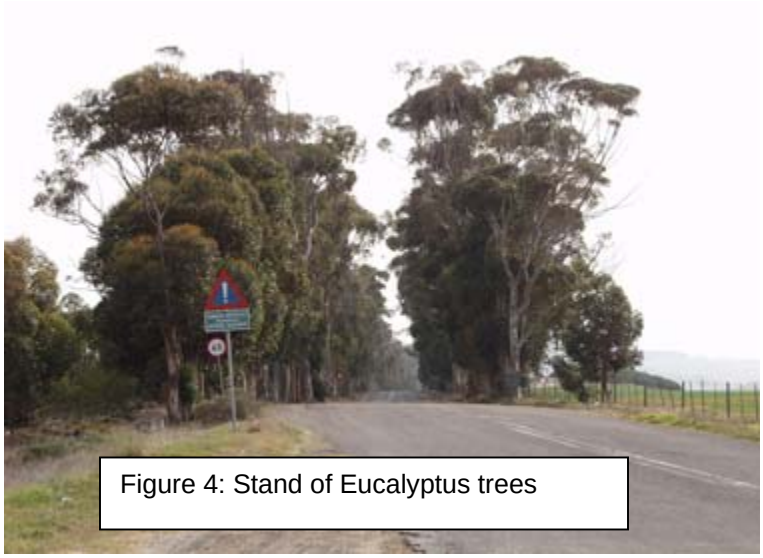


Figure 4: Stand of Eucalyptus trees

The farm contains several stands of exotic trees (see appendix A3). These may be utilized by forest species that do not normally occur in the indigenous vegetation, such as Black Sparrowhawk and African Goshawk. Both these species have established themselves in exotic vegetation in the Western Cape (pers. obs.). These species are likely to be attracted by the large numbers of pigeons in the fields.

3.5 Man-made infrastructure

The man-made infrastructure on the farm has modified the habitat to such an extent that it will definitely influence both the numbers and species of birds occurring there. Apart from the home-stead, there are also several cow-sheds and other farm buildings (see appendix A3). This has created habitat for several species, including Barn Owl and

Spotted Eagle Owl that hunt rodents around the buildings (H. Stoffberg pers.comm). The kraals are frequented by Cattle Egret, Sacred Ibis, Blacksmith Plover and Speckled Pigeon (pers. obs).

The farm also has four parallel sets of 400kV transmission lines cutting across it (see appendix A3). Raptors that utilize the towers to hunt from include Brown Snake Eagle, Blackbreasted Snake Eagle, Martial Eagle (rarely), Steppe Buzzard, Jackal Buzzard, Blackshouldered Kite, Rock Kestrel, Lesser Kestrel and Lanner Falcon. Pied Crows also spend a lot of time on the towers, and presumably breed in the vicinity. These birds (presumably) occur at higher densities than usual due to the presence of the powerlines which offers ideal hunting perches.

Figure 5: Home-stead and farm buildings

3.7 Other bird species

White Pelicans breed on Dassen Island. When breeding, these birds commute from the breeding island to feed at wetlands primarily between the Cape Flats and the Berg River. To do this, they typically fly direct from Dassen Island to the coast, and then go inland to the hills around Darling to search for thermals. They soar up in the thermals to gain elevation, and then glide towards their intended destination, slowly losing altitude. However, when conditions are unsuitable for thermal formation, they use a combination of ground effect and ridge soaring to save energy. The farm lies close to the direct north-south flight path from the breeding site and the main feeding sites on the Cape Flats (Rietvlei, Strandfontein, Zeekoeivlei, Muldersvlei).

Flamingos migrate at night, and flight altitudes may drop, especially when they encounter a strong headwind. The farm lies fairly close to flight paths to Rietvlei Wetland Reserve, and they have been observed flying over the farm (H. Stoffberg pers. comm.).

4 Project Overview

The requirement is for Transmission to construct a 765kV substation called Omega on the farm Groot Oliphantskop approximately 5km north of Koeberg Power Station. The size of the substation area is approximately 150 hectares. The substation will be 1.5km x 1km and will consist of three layers in an open air structure. Eskom Transmission owns the farm and it was rezoned for general industrial to accommodate the construction of the proposed substation. Four 400kV lines that currently cross the farm will turn in and leave the substation again. Additionally, two 765kV lines will enter the substation from the north-east (see appendix A3).

5 Potential Impacts and Issues

Three potential impacts are envisaged (1) habitat destruction, (2) disturbance of breeding and roosting birds and (3) collisions with the existing and proposed transmission lines. A comprehensive analysis of the impacts is provided in appendix B and C. A short summary of the impacts and the criteria used to assess them are provided below.

5.1 Criteria against which impacts are evaluated

Nature of impact
- Type of effect the activity would have on the affected environment

Probability
- Improbable, where the possibility of the impact to materialise is very low
- Probable, where there is a distinct possibility that the impact will occur
- Highly probable, where it is most likely that the impact will occur
- Definite, where the impact will definitely occur

Spatial scale
- Local (the site and immediate surroundings)
- Regional (provincial scale)
- National
- International

Duration
- Short term (0-5 years)
- Medium term (5-15 years)
- Long term (for the life-time of the activity)

Significance
- Low, where it will not have an impact on the decision to go ahead with the development
- Medium, where it should have an impact on the decision to go ahead with the development unless mitigated
- High, where it will influence the decision to go ahead with the development regardless of possible mitigation

(Adapted from Guideline Document, EIA Regulations, Implementation of sections 21, 22 and 26 of the Environment Conservation Act, April 1998, DEAT)

5.2 Habitat destruction

It is planned for an area of 150 hectares to be cleared of vegetation. The severity of this impact will vary between the different alternatives. This impact will be most severe at alternative C, as it would almost definitely impact on the wetland, either through direct destruction of sensitive wetland vegetation, or through impact on the drainage line that feeds the wetland which will in turn affect the sensitive wetland system. The construction of roads to accommodate heavy construction equipment could also damage the wetland. It goes without saying that these impacts will detrimentally affect waterbirds and cranes currently using this habitat this area for roosting and breeding. Alternative B also contains a small wetland with breeding cranes (H. Stoffberg pers.comm), which will likewise be affected by the construction of the substation in a similar way as alternative C. Given the relative rarity of wetlands in the Swartland, this could have quite serious

implications for the local population of waterbirds and cranes. Alternative A will affect pastures and wheat lands, and although this habitat is extensively used by cranes, it occurs in abundance in the Swartland and should therefore not be a major loss for the birds.

5.2 Disturbance

Construction activates at all three sites will disturb birds in the vicinity, but the most serious impacts will be at alternative C, followed by alternative B, due to the presence of breeding cranes. This impact is likely to continue, (albeit to a much lesser degree) after the construction phase, due to vehicle and other traffic around the substation. Again, due to the relative rarity of wetlands in the Swartland, this could have serious implications for the local population of waterbirds and cranes. For the same reasons as above (abundance of alternative habitat) the impact of disturbance is likely to be less at alternative A than at the other two alternatives.

5.3 Collisions

The potential of collisions with the transmission lines will always be present, regardless of which alternative is chosen. The birds of special concern most likely to be affected are Blue Cranes, White Pelicans, White Storks and (possibly) flamingos. In the case of the White Pelicans, White Storks, flamingos (and the Blue Crane in winter), flocking behaviour could result in several individuals being killed in one incident. Raptors chasing prey might also blunder into the lines.

6 “No Go” Areas

As discussed above, the most sensitive areas on the farm are the two wetlands, particularly the one at alternative C. Due to the presence of several waterbird species, and most importantly breeding and flocking Blue Cranes, alternative C should be regarded as a “No Go” area.

7 Conclusions

The development of the Omega substation and associated powerlines will have a limited impact on the birds occurring at the proposed sites. The impacts will vary greatly depending on the site that is chosen. The least attractive alternative is alternative C, closely followed by alternative B, due to the potential impact on the sensitive, relatively rare wetland habitat at these two sites. Site A is the best alternative as it will not impact on sensitive habitat (crops and pastures), and that habitat is available in abundance in the Swartland.

8 Suggested Mitigation Measures

8.1 Alternative A

This is the preferred alternative.

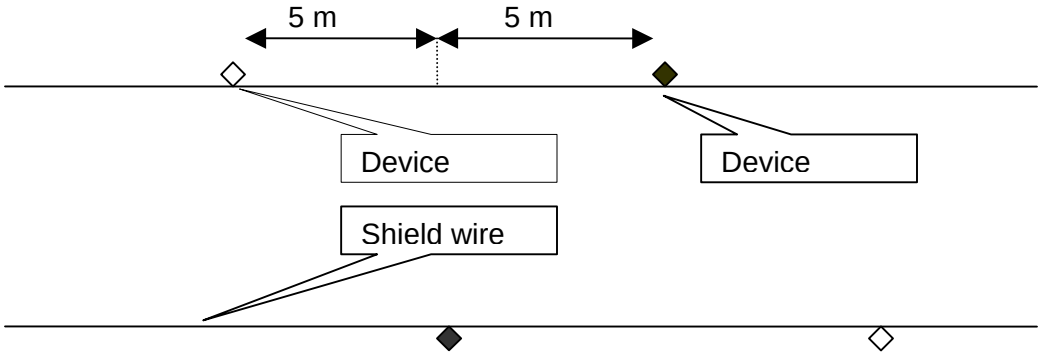
Habitat destruction and disturbance: The destruction of habitat and disturbance of birds using that location for foraging is inevitable. However, due to ample alternative habitat being available it is likely that birds using this area for will find alternative habitat to use.

No mitigation measures are therefore recommended, except to restrict all movement to the site and immediate surroundings.

Collisions: Both the new 765kV lines and 400kV transmission line turn-in will pose a collision risk to birds utilizing the two wetland areas on the farm, as well as the remaining crops. There is also a chance of pelicans (and to a lesser degree flamingos) flying in to the lines. The earthwires of these lines should therefore be marked with anti-collision devices.

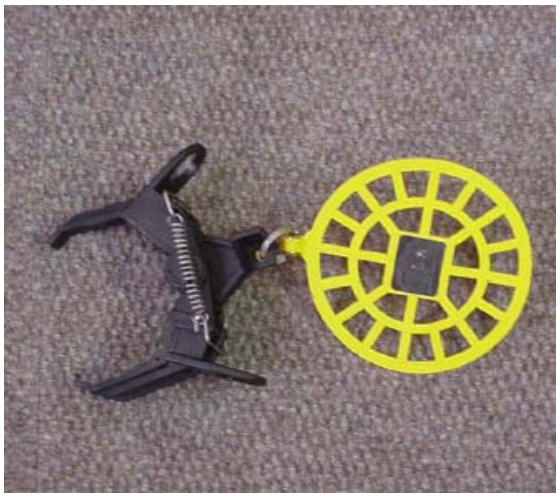
Research in the Netherlands has shown that spacing intervals have a major influence on the effectiveness of anti-collision devices (Koops & de Jong 1982, as cited in APLIC 1994). In South Africa, the same has been found (Anderson 2001). See figure 6 below for a suggested marking method with devices.

Figure 6**:** Marking method with anti-collision devices on overhead ground wires (viewed from above). Note that both the wires shown above are the shield or ground wires (devices are staggered).



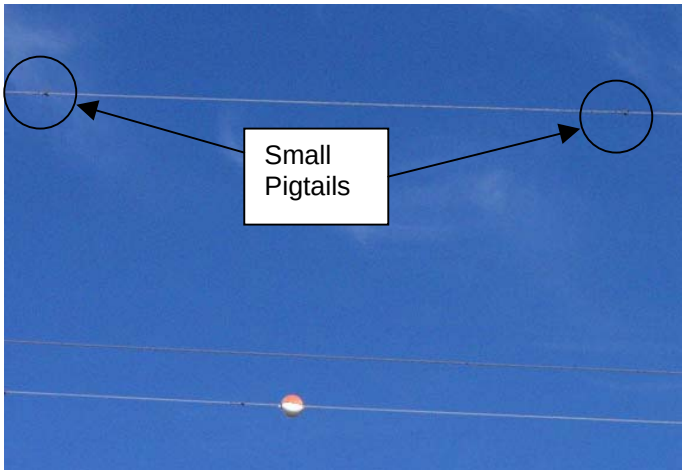
There are several devices available in southern Africa for the marking of powerlines. Some are dynamic devices (usually called bird flappers), and some are static. Both have advantages and disadvantages. Dynamic devices are very effective in reducing collisions as the birds seem to see them very well (van Rooyen unp. data), probably because of the movement that attracts attention. The disadvantage of dynamic devices is that they are subject to extensive wear and tear, inevitably limiting the lifespan of the device. This has obvious cost implications if a line needs to be re-marked at intervals of a few years. No solution to that problem has been found to date and it must be accepted as a constraint. Figure 7 show examples of bird flappers currently available on the market.

Figure 7: Examples of bird flappers



Static devices are mechanically more durable because they lack the element of wear and tear that moving parts inevitably have. However, in South Africa, static devices, particularly the so called Bird Flight Diverter (also known as the pigtail) has had limited success (Anderson 2001). The most obvious reason seems to be that they are simply less visible, especially the small ones (see figure 8). A better option would be to use the bigger pigtail (see figure 8, right), although it is still not the preferred option.

Figure 8: The overhead shield wires of a 66kV line marked with small pigtails.



Research to find a compromise between durability and visibility is ongoing in South Africa. **It is therefore recommended that the Endangered Wildlife Trust is consulted before a final decision is taken on the type of device to be used in this instance, as new products might be available by the time the line is constructed**.

8.2 Alternative B

This is not a preferred alternative.

Habitat destruction and disturbance: The small seasonal wetland in close proximity to the site is an important site for waterbirds and specifically Blue Cranes. Damage to the wetland either through construction activities or the construction of access roads should be avoided. Ideally all construction activities should take place outside the breeding season i.e. between September and March. If this can not happen, the potential for the cranes to desert the site is very high.

Collisions: See alternative A, the same recommendations are valid here

8.3 Alternative C

This is the least preferred alternative.

Habitat destruction and disturbance: The seasonal wetland in close proximity to the site is the most important site for waterbirds and specifically Blue Cranes on the farm. Damage to the wetland either through construction activities or the construction of access roads should be avoided. Ideally all construction activities should take place outside the breeding season i.e. between September and March. If this can not happen, the potential for the cranes to desert the site is very high. This will have an impact on the local population as wetlands (and therefore suitable breeding sites) are not common in the Swartland.

9 References

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