AVIFAUNA SURVEY

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I. Introduction

The Square Kilometre Array (SKA) is situated in the Nama Karoo, so only those bird species that occur in the Nama Karoo will be discussed here. The study area of the strategic environmental assessment (SEA) for the first phase of the SKA project (SKA1_MID) covers 153 Quarter Degree Grid Cells (QDGC)[1], fairly well covered by participants in the Bird Atlas project in the late 1980s and early 1990s with lists of bird species for all 153 QDGC. Data for the 153 QDGC are a combination of the South African Bird Atlas Project data, museum specimen data and sight data (WRJD pers. obs.) and includes a recent bird list compiled by Etienne Marais. The avifauna of the Nama Karoo is not distinctive, and there are no families of birds endemic to the Karoo, but there are 25 species that are near-endemic to the region (Table 1). Only two species, Red Lark *Calendulauda burra* and Sclater's Lark *Spizocorys sclateri*, whose distribution ranges are almost entirely within the Nama Karoo, can be considered true endemics to the Nama Karoo. Species richness tends to be highest in the eastern Nama-Karoo, and along transition zones with savanna and grasslands, and is significantly correlated with rainfall. The avifauna in the drier areas is thus less species rich than the edge avifauna. The "edge" species are mostly resident, whereas species of the more central parts tend to be nomadic at both a landscape scale and at a local scale. At least 368 species of birds have been recorded over the whole of the Nama Karoo. This number, however, includes vagrant species that are not of conservation concern or indeed of any concern in the present report.

II. Survey results

The number of species recorded within the Karoo Central Astronomy Advantage Area 1 (KCAAA1) is 215, of which only 134 species can be considered resident, and the remainder made up of breeding migrants (16 species), non-breeding migrants (27 species), nomads (27 species) and vagrants (10 species). All the species of aquatic habitats, or associated with aquatic habitats, have been considered nomads. The coverage is not even for the avifauna – for only 37 QDGC (24%) are there more than 10 field cards for the bird atlas. The following endemic and near endemic species have been recorded in KCAAA1 and are considered to be priorities for protection in the Nama-Karoo (listed with the associated conservation status according to BirdLife South Africa 2015 checklist of threatened species. All species not on the BirdLife list or the IUCN Red List are of Least Concern):

- Karoo Korhaan Heterotetrax [Eupodotis] vigorsii (Dryland species - conservation status: Least Concern (LC))
- Ludwig's Bustard Neotis ludwigii* (Dryland species - IUCN Red List species status – Endangered)
- Black Harrier Circus maurus (Dryland species - IUCN Red List species status – Endangered)
- Pririt Batis Batis pririt (Dryland species - conservation status: LC)
- Dusky Sunbird Cinnyris fuscus* (Dryland species - conservation status: LC)
- Scaly-feathered Finch Sporopipes squamifrons (Dryland species - conservation status: LC)
- White-throated Canary Crithagra albogularis (Dryland species - conservation status: LC)
- Black-headed Canary Serinus alario* (Dryland species - conservation status: LC)
- Lark-like Bunting Emberiza impetuani*(Dryland species - conservation status: LC)
- Fairy Flycatcher Stenostira scita (Dryland species - conservation status: LC)

[1] The Quarter Degree grid cell (QDGC) is a 15 minute x 15 minute coordinate grid super-imposed over the continent for spatial reference. One QDGC comprises of 9 pentads. More info on the Southern African Bird Atlas Project 2 at http://sabap2.adu.org.za/index.php

- Grey Tit Melaniparus [Parus] afer[2] (Dryland species - conservation status: LC)
- Ashy Tit Melaniparus [Parus] cinerascens[2] (Dryland species - conservation status: LC)
- Black-eared Sparrowlark Eremopterix australis*(Dryland species - conservation status: LC)
- Grey-backed Sparrowlark Eremopterix verticalis* (Dryland species - conservation status: LC)
- Karoo Lark Calendulauda albescens (Dryland species - conservation status: LC)
- Red Lark Calendulauda burra (Dryland species - conservation status: Vulnerable)
- Sclater's Lark Spizocorys sclateri* (Dryland species - conservation status: Near threatened (NT))
- Stark's Lark Spizocorys starki* (Dryland species - conservation status: LC)
- Large-billed Lark Galerida magnirostris (Dryland species - conservation status: LC)
- Karoo Eremomela Eremomela gregalis (Dryland species - conservation status: LC)
- Cinnamon-breasted Warbler Euryptila subcinnamomea (Dryland species - conservation status: LC)
- Rufous-eared Warbler Malcorus pectoralis (Dryland species - conservation status: LC)
- Layard's Tit-Babbler Curruca [Sylvia] layardi (Dryland species - conservation status: LC)
- Wattled Starling Creatophora cinerea* (Dryland species - conservation status: LC)
- Pale-winged Starling Onychognathus nabouroup(Dryland species - conservation status: LC)
- Karoo Scrub-Robin Cercotrichas coryphaeus (Dryland species - conservation status: LC)
- Sickle-winged Chat Emarginata [Cercomela] sinuate (Dryland species - conservation status: LC)
- Karoo Chat Emarginata [Cercomela] schlegelii (Dryland species - conservation status: LC)
- Tractrac Chat Emarginata [Cercomela] tractrac (Dryland species - conservation status: LC)
- Greater Flamingo Phoenicopterus ruber (Species associated with water - conservation status: NT)
- Lesser Flamingo Phoeniconaiais [Phoenicopterus] minor (Species associated with water - conservation status: NT)
- Pied Avocet Recurvirostra avosetta (Species associated with water - conservation status: LC)
- Black-winged Stilt Himantopus himantopus (Species associated with water - conservation status: LC)
- Chestnut-banded Plover Charadrius pallidus (Species associated with water - conservation status: NT)
- Whiskered Tern Chlidonias hybrid (Species associated with water - conservation status: LC)
- Namaqua Warbler Phragmacia substriata (Species associated with water - conservation status: LC)

The number of species recorded within the SKA1_MID SEA study area is 264 (see section V), of which only 152 species can be considered resident, and the remainder made up of breeding migrants (19 species), non-breeding migrants (32 species), nomads (37 species) and vagrants (15 species). The latter includes species recorded two or three times, but are clearly not part of the local avifauna. Some species (17) have been recorded only once, and for the purposes of this report, once again are not considered to be part of the local avifauna. The vagrant species include, *inter alia*, such species as Cape Vulture *Gyps coprotheres* (two records of birds that could have been from the Magaliesberg colonies, the nearest to the SKA) and Red-billed Hornbill *Tockus erythrorhyncha*, a specimen collected near Williston, at least 200 km south of its distribution range. Vagrant species are not listed in section V, but are in the database for the SKA1_MID SEA study area. All the species of aquatic habitats, or associated with aquatic habitats, have been considered nomads. Most nomadic species associated

[2] Ashy Tit Melaniparus [Parus] cinerascens and Grey Tit Melaniparus [Parus] afer overlap in distribution in KCAAA1, and both are near endemic (Ashy Tit) and endemic (Southern Grey Tit) to southern Africa. The SABAP data were collected prior to the split that separated Ashy, Southern Grey, and Miombo Tit Melaniparus [Parus] griseiventris and at that time all "grey" tits were considered to be one species, the "Grey Tit". The Grey Tit is the more widespread species in the southern parts of KCAAA1, and is likely to be the species of grey tit most frequently recorded in KCAAA1. It is, in fact, the only "grey tit" that has been collected in the SKA1_MID SEA study area (specimens in Durban Natural Science Museum and Ditsong National Museum of Natural History). Nonetheless there is still uncertainty about correct identity of the grey tits in the early sight records. Both species have been lumped for the purposes of this report.

with water may be resident for a time when the ephemeral water bodies (vleis and pans) are flooded, and would remain until the area dried out.

Most bird species in the Nama Karoo are not rare, and with the exception of the restricted range endemics, are common in substantial parts of their geographic ranges elsewhere. The Chestnut-banded Plover Charadrius pallidus that occurs on salt pans in the Karoo is fairly widespread, but generally rare throughout its range. It has been recorded in KCAAA1 fairly frequently on the edges of pans, and is highly likely to be common, given the number and area of ephemeral saline pans. The arms of the SKA1_MID SEA study area that have been mapped, has relatively few areas of suitable habitat for Chestnut-banded Plovers. The Red Lark (Figure 1, sight and specimen records) is virtually confined to the coarse red sands of relic dune systems, but has been collected in red sand plains. Dune fields occur north of Van Wyksvlei and activities on these dune systems should be minimal. Red Lark Calendulauda burra is a resident, endemic species categorised as "Vulnerable". Red Larks will benefit from the removal of livestock and reduced disturbance on red dunes within the protected area. The Sclater's Lark (Figure 2) occurs on arid to semi-arid stony plains with scattered shrubs, grasses and bare patches (Hockey et al. 2005). Sclater's Lark, *Spizocorys sclateri,* is a nomadic, endemic species categorised as "Near threatened" by BirdLife South Africa. The birds occur at a fairly low density mainly on gravel plains with very little vegetation. Depending on rainfall both locally and more widespread in the Bushamanland area, the occurrence of the birds in the protected area will be patchy in time and space, but will nevertheless benefit the population over the longer term. The Cinnamon-breasted Warbler, *Euryptila subcinnamomea,* is confined to inselbergs and rocky ridges in the Succulent and Nama Karoo. Sight records of its occurrence in the SKA1_MID SEA study area are shown in Figure 3. Other species of interest for this survey include:

- Struthionidae - Ostrich *Struthio camelus, t*he "Southern" Ostrich, with the exception of a small remnant population at Kleinzee, no longer exists as a wild, genetically uncontaminated species in the Karoo, and all records of its occurrence in KCAAA1 are of domesticated birds. The species is not a conservation issue in the central Karoo.
- Gruidae - Blue Crane *Grus [Anthropoides] paradiseus*, recorded infrequently at a low density and towards the east of KCAAA1. Unlikely to be threatened by activities connected with the dish-antennas, but collisions with power lines have been recorded elsewhere in South Africa (Shaw *et al.* 2010). Collisions with powerlines are of conservation concern in this species, and flappers or other markers may not be effective (Shaw 2013). However, the species is not common in the SKA area, and might not be adversely affected by powerlines.
- Otididae - Kori Bustard *Ardeotis kori,* recorded frequently at a moderate density at scattered sites throughout KCAAA1. It is thought unlikely that the dish-antenna structures will be a hazard for this species, nor will the construction phase be any threat to the species in the area, but power lines are extremely hazardous to this species and all efforts should be made to ensure that all lines are marked. It is unlikely that Kori Bustards will have set flight paths, so all that can be done is to mark the cables with markers at fairly close intervals to increase visibility.
- Ludwig's Bustard *Neotis ludwigii,* recorded about 3x as frequently and at a higher density as Kori Bustard, almost throughout KCAAA1. It is unlikely that the dish-antenna structures will be a hazard for this species, nor will the construction phase be any threat to the species in the area, but power lines are extremely hazardous to this species and all efforts should be made to ensure that all above ground lines are marked. Ludwig's Bustards fly long distances, often in the dawn or dusk in low light conditions (Shaw 2013) and consequently have a high susceptability to collisions with power lines. As in the Kori Bustard, it is unlikely that Ludwig's Bustards will have set flight paths, but there is a possibility that the birds occur more frequently in transformed lands and along roads.
- Blue Korhaan Eupodotis caerulescens, recorded twice from QDGC on the eastern edge of KCAAA1. This species is, in any case, on the extreme western edge of its distribution range in this area. It is unlikely to be threatened by any activities connected with the dish-antennas.

Recorded instances of powerline collisions are infrequent, and only recorded in the area where Blue Korhaans are relatively more common.

- Accipitridae - Black Harrier Circus maurus, recorded intermittently and infrequently at scattered sites throughout KCAAA1. The removal of livestock and the subsequent growth of the shrublands and wetland edges will benefit the species. Black Harriers forage by coursing over shrublands at a fairly low height above the vegetation, so are unlikely to be impacted by powerlines.
- Falconidae - Lesser Kestrel *Falco naumanni* is a non-breeding migrant from the Palaearctic that is considered "Vulnerable" by BirdLife International (2004), partly because of threats to the species in its wintering range, but is now categorised as "Least Concern" by BirdLife South Africa (2015). Lesser Kestrels were infrequently recorded at a few scattered sites in KCAAA1. The species is mainly insectivorous and will benefit from increases in the (eg) grasshopper populations when livestock are removed from the area. Lesser Kestrels need large trees in which to roost at night, and there is a possibility (dependent on local grasshopper populations and lack of large trees) that the kestrels may attempt to roost on the dish-antennas.

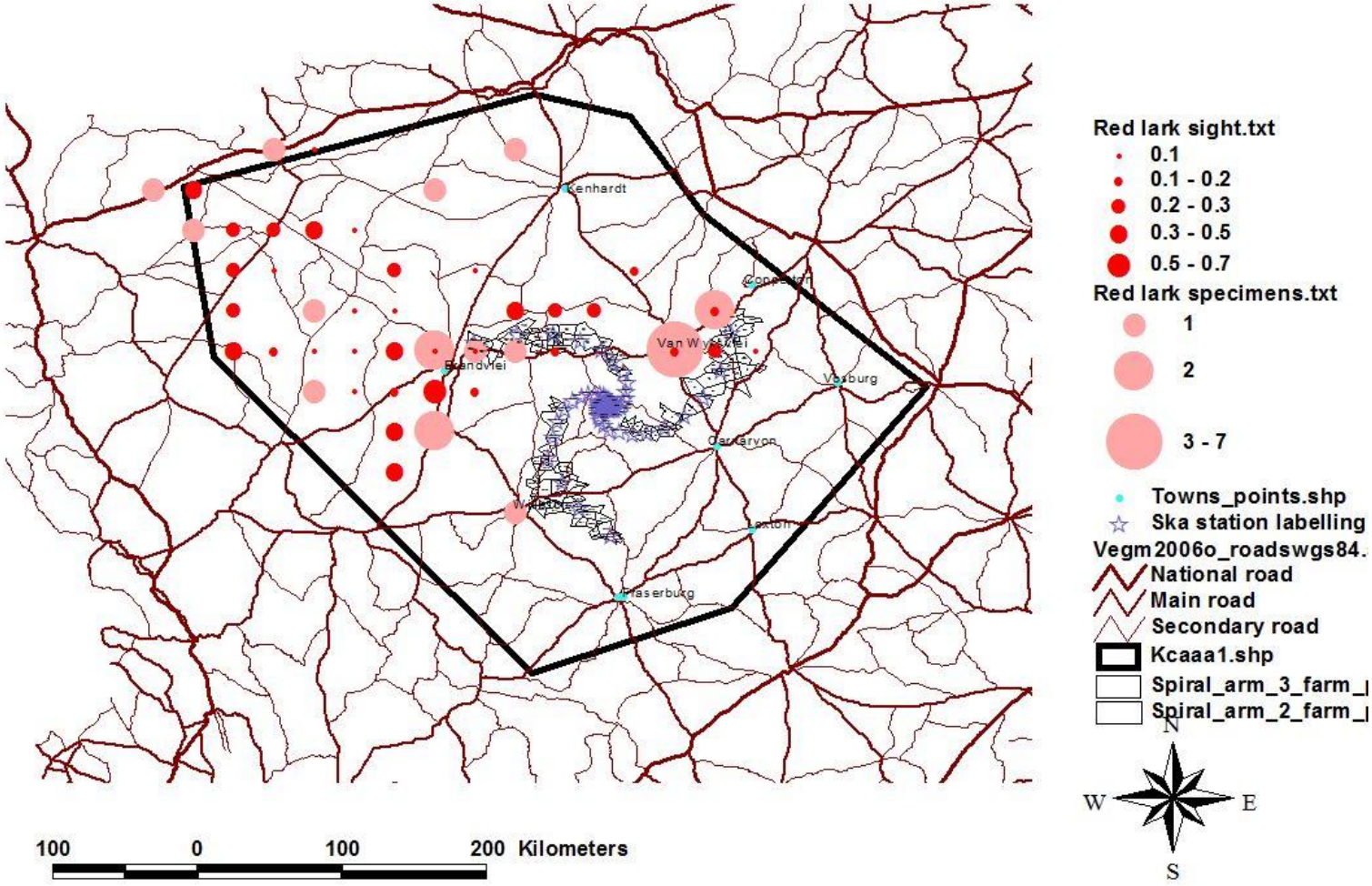

Figure 1: Sight (in red) and specimen (in pink) records of Red Larks within and marginal to KCAAA1. Sight records are an index calculated by dividing the number of records of the species by the number of field cards on which the species was recorded.

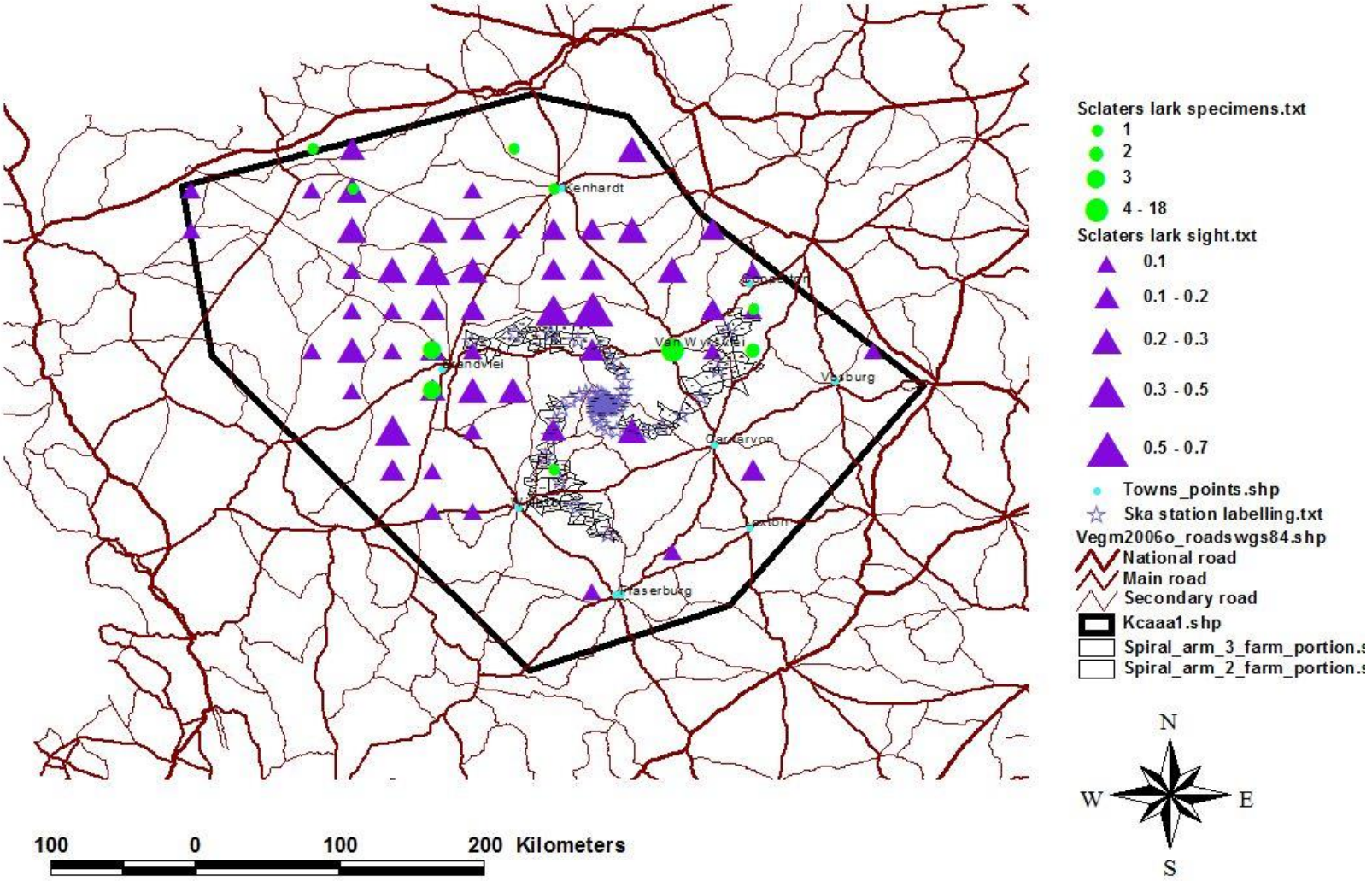

Figure 2: Sight (purple triangles) and specimen (green dots) of Sclater's Lark in KCAAA1.

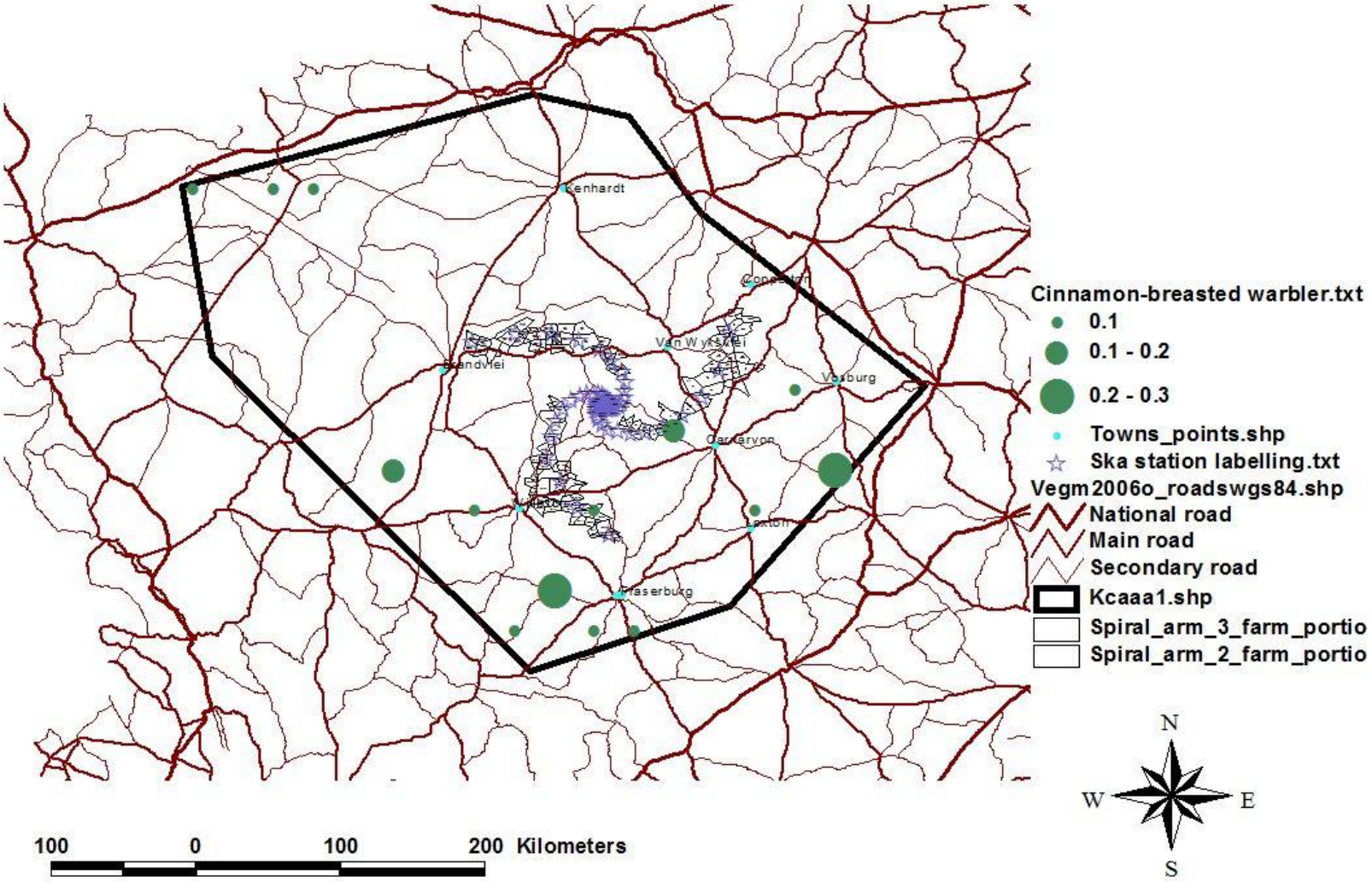

Figure 3: Cinnamon-breasted Warbler sightings (green dots) within KCAAA1.

III. Infrastructure and potential impacts on birds

In general, and due to the low density of birds in the area, impacts on birds are likely to be low. Some potential impacts of the SKA1_MID on birds include:

- sheer size and visibility (largely white) of the overall dish-antennas structure is unlikely to be a hazard to birds, and more likely to be a benefit and used as nest sites by some species; and
- cables on power lines, and to some extent pylons, are hazardous for large flying birds, particularly those that are blind in the direction of travel (Martin & Shaw 2010).

Recommended mitigation measures and monitoring activities include:

- Regular inspections of the dish-antenna structures to remove nests of birds such as Little Swift, crows, Cape Sparrow and White-browed Sparrow-weaver. Any direct use of the dish-antennas by birds, whether nesting or roosting, should be noted and discouraged. The complex of struts and stays around the dish would be attractive to birds that build nests supported by a surrounding structure.
- Avoid the construction of above-ground overhead cables as far as possible, and install markers on all overhead cables, particularly on those power lines adjacent to seasonally flooded areas (pans) since several "water birds" travel at night.

Collision risk can be reduced after cables have been marked. Studies (mostly in the Northern Hemisphere) have found that increasing the visibility of power lines results in a statistically significant reduction of bird collisions. Birds can avoid powerlines if they see the line early enough. Given the high mortality of Kori and Ludwig's Bustards, both common powerline casualties (Shaw 2013) it is essential that powerline cables be marked from the beginning of the construction phase throughout and beyond the life of the project, and cables must be marked all along their length and not only in places adjacent to potential high risk areas, such as wetlands (Shaw 2013). Suggested markers are Bird Flight Diverters (BFDs, brightly coloured plastic spirals 1m long, 30 cm in diameter), placed (attached) every 5 m, static fibreglass plates such as yellow, spiral vibration dampers, 112 -125 cm long, placed at 3.3 m intervals, or plates of yellow fibreglass 30.5 x 30.5 cm with a 5 cm diagonal black strip, placed at 23-32 m intervals, and moving markers (flappers), such as the "Firefly bird flapper" (Figure 4). See APLIC (2012), pp. 75-102 for a range of markers and applications, and Jenkins et al. (2010) for the most effective mitigation of bird-powerline collisions risk in South Africa. Markers should also be spaced closer near pylons, since there are indications that Ludwig's Bustards, for one, collide more frequently with pylons (Shaw 2013). Note that stay wires are also a potential hazard for bird collisions, so these should also carry markers. Suggested markers are listed by Jenkins *et al.* (2010) and include brightly coloured "aviation" balls, thickened wire coils, shiny and hinged flapping devices, the same as those used on the main power lines. Jenkins *et al.* (2010) conclude that there are uncertainties about the best-performing marking devices because of variations in local performance and species at risk, further note that an all-purpose device that is effective at all times has yet to be developed.

Figure 4: A "Firefly" bird flapper, a fairly effective device for marking powerlines.

The construction of underground cables is costly but would eliminate the current situation where significant numbers of the large bustards and cranes are killed (Shaw 2013). It has been noted that power to the antennas in the field will be provided by a combination of medium voltage and low voltage underground cabling and 22kV overhead power lines, and that overhead power lines will only be considered at a distance greater than 5km radius from the centre of the core area. This will remove parts of the hazards for birds but there will still be cables beyond the 5 km area.

The design of the poles and insulators (Figure 5, Figure 6, Figure 7, and Figure 8) does not offer any suitable sites for nests of large raptors, but it is likely that crows (both Cape and Pied) will nest on the insulator carriers. Similarly, Sociable Weavers are highly likely to build nests on the poles, using the insulator carriers as a starting (foundation) point (Figure 9). The crow nests are unlikely to cause any shorting-out problems, but the weaver nests could cover two or more cables and have a high probability of shorting-out if the nest becomes wet during rain.

Figure 5: Two different designs of powerline poles in the SKA area.

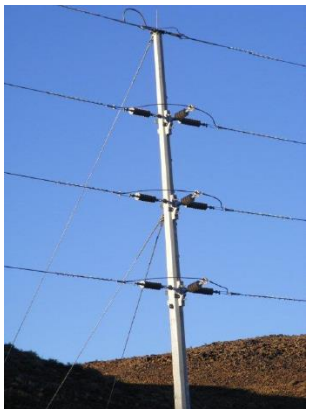

Figure 6: Detail at the top of the transmission pole showing minimal purchase for crow nests, but nevertheless nests are likely to be built.

Figure 7: Another pole design, a single 22kV post insulator mounted on the top of a wood pole with suspended insulators. The structure does not offer much in the way of potential nest sites.

Figure 8: Cable termination on an overhead line. The structure offers several possibilities for places for nests to be built, either by crows or by Sociable Weavers.

Figure 9: A Sociable Weaver nest on a pole in the SKA area.

Residual effects of the construction and the potential effects of the operation of the dish-antennas should be measured. To this end, it would be extremely useful for a monitoring programme to be set up to gather data on the priority conservation bird species, as well as any other bird species that occur in the area. Simple bird counts along transects of one kilometre or more and at least 100 m wide in which all bird species are counted either side of the line can provide useful data on the density and movement of species within the area, and will provide some indication of local population sizes. Such counts should, ideally, be repeated along the same transect line about once monthly at best, once every two months or even once every six months. Bird counts should begin as soon as possible, so as to get some base line density and movement data as a benchmark for the residual effects of the construction on birds. It is important that any monitoring of birds should be carried out by a reasonably competent "bird watcher" who does know, or has experience of the birds in that part of the Karoo. The species observed and counted should be identified correctly, otherwise the data will be less valuable than it could have been.

Regular patrols under the power lines must also be done at least once every month, and all casualties recorded. Data that should be included in such surveys are species, the GPS points at which the casualties are found, the place where the bird was found relative to pylons and stay wires, and the condition of the dead bird – whether partially eaten or only feather remains and so on.

IV. Conservation recommendations for further long-term monitoring and research programme within the SKA core area and KCAAA1

There is currently no formal conservation area within KCAAA1. Dean (1995) identified 15 QDGC in the Nama Karoo that, on the basis of bird species richness, suitable for conservation areas. Among these 15 QDGC, the following seven QDGC were identified as high priority areas on the basis of several categories of bird species that should be included in formal conservation areas:

- QDGC 3020AA contains 23 priority species (total of 66 species with 14 Karoo endemic species and 24 south African endemic species);
- QDGC 3020DB contains 25 priority species (total of 79 species with 13 Karoo endemic species and 22 south African endemic species);
- QDGC 3022AC contains 27 priority species (total of 81 species with 12 Karoo endemic species and 28 south African endemic species);
- QDGC 2920DC contains 28 priority species (total of 73 species with 15 Karoo endemic species and 30 south African endemic species);
- QDGC 2921AC contains 32 priority species (total of 162 species with 12 Karoo endemic species and 36 south African endemic species);

The location of these seven QDGCs is illustrated on Figure 10.

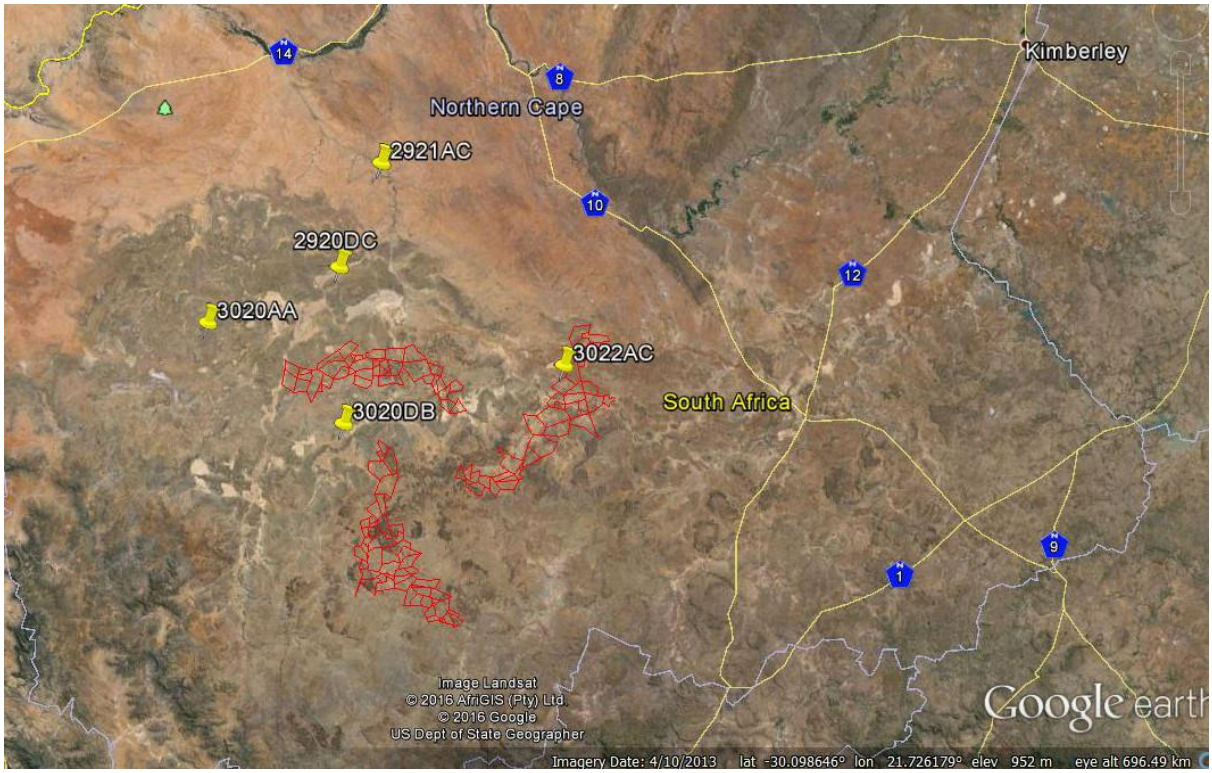

Figure 10: QDGC identified as priority places (yellow markers) for protected areas within the KCAAA1. The spiral arms are shown in red.

In the context of the SKA, the initial construction phase through to the operational stage of the dish-antennas will have some disturbance effects on the avifauna and some territorial bird species (Karoo Long-billed Lark, Karoo Chat) will be displaced. However, the area is large and should be able to absorb individual birds that have been displaced from their territories by the construction work. The bird density in the Nama Karoo is low, probably around 35 birds/km^2 (calculated in the southern parts of the Nama Karoo – Dean & Milton 2001). Apart from attempting to minimise potential dangers to birds through power lines and associated infrastructure, no mitigation measures and management actions to enhance benefits and avoid negative impacts on birds can be formally proposed. The low populations of all bird species in the area, and the size of the protected area, should benefit birds if disturbance is minimal, and negative impacts, as noted above, are limited to birds displaced from territories through construction work. Although a size for the protected area has not been defined, even if it includes only the area covered by the spiral arms, the core area will be at least 10 000 km^2, large by any standards and more than large enough to protect all local populations of all bird species occurring in the area. All the ecosystem processes that favour birds, with the exception of food benefits from the prey of large mammalian predators, will almost certainly be included in such a large area.

The highest priority *resident* species among the endemic birds is the Red Lark. For this species, protection of the remaining habitat is especially urgent. Populations of the Red Lark are fragmented within the present distribution range of the species. Almost the entire distribution range of the Red Lark lies within KCAAA1. There is some evidence to show that the Red Lark is threatened by domestic livestock in its optimal habitat and that numbers have been reduced by overgrazing (Dean *et al*. 1991). The removal of livestock and usual farming activities in the SKA core area can thus only benefit Red Lark populations.

The highest priority Karoo *endemic and nomadic* species is Sclater's Lark, and a substantial part of this species' north central distribution range is within KCAAA1. As in the Red Lark, the removal of livestock and usual farming activities in the core area will benefit some of the Sclater's Lark population, but being to some extent nomadic will also be using the areas outside the core.

A third priority species, the endemic and resident Cinnamon-breasted Warbler occurs within KCAAA1 only in a few sites. The entire population is fragmented into metapopulations throughout its distribution range, so would probably benefit from the "reserve" status that the SKA will have – no threats to its continued existence anywhere in its distribution range have been identified except that it inhabits inselbergs and rocky ridges that are essentially islands in a sea of unsuitable habitat.

In ecosystems such as in the Nama-Karoo, where there is both spatial and temporal heterogeneity in bird habitats, "larger" protected areas may be more effective than "smaller" protected areas in sustaining avian diversity. The core SKA area is large, and should function very effectively as a protected area for most of the avifauna.

V. List of all bird species recorded within KCAAA1

Relative abundance is a measure of frequency of sightings, calculated by the number of sightings of a species divided by the number of field cards for the core area. Red Data is the BirdLife South Africa conservation category: LC = Least concern, NT = Near threatened, VU = Vulnerable, EN = Endangered. Status abbreviations are: BM = breeding migrant, M = non-breeding migrant from the Palaearctic, N = nomad, R = resident, V = vagrant. Habitats are: A = aquatic, NS = aerial forager over all habitat types, R = rocky ridges, S = shrubland or grassland, W = woodland (in this area, drainage-line woodland).

Order follows Hockey et al. (2005), and nomenclature follows Dickinson & Remsen (2013) and Dickinson & Christidis (2014).

Family	Common name	Species	Relative abundance	Red Data	Status	Habitat
Phasianidae	Grey-winged Francolin	*Scleroptila afra [africanus]*	0.3	LC	R	R
Phasianidae	Cape Spurfowl	*Pternistis capensis*	0.1	LC	R	W
Phasianidae	Common Quail	*Coturnix coturnix*	0.1	LC	BM	S
Numididae	Helmeted Guineafowl	*Numida meleagris*	0.2	LC	R	W
Anatidae	Egyptian Goose	*Alopochen aegyptiaca*	0.3	LC	R	A
Anatidae	South African Shelduck	*Tadorna cana*	0.4	LC	R	A
Anatidae	Spur-winged Goose	*Plectropterus gambensis*	0.1	LC	N	A
Anatidae	Cape Teal	*Anas capensis*	0.2	LC	R	A
Anatidae	African Black Duck	*Anas sparsa*	0.1	LC	R	A
Anatidae	Yellow-billed Duck	*Anas undulata*	0.2	LC	R	A
Anatidae	Cape Shoveler	*Spatula [Anas] smithii*	0.1	LC	R	A
Anatidae	Red-billed Teal	*Anas erythrorhyncha*	0.2	LC	N	A
Anatidae	Hottentot Teal	*Spatula [Anas] hottentota*	0.3	LC	N	A
Anatidae	Southern Pochard	*Netta erythrophthalma*	0.1	LC	N	A
Picidae	Ground Woodpecker	*Geocolaptes olivaceus*	0.2	LC	R	R
Ramphastidae	Acacia Pied Barbet	*Tricholaema leucomelas*	0.4	LC	R	W
Upupidae	African Hoopoe	*Upupa africana*	0.2	LC	V	W
Phoeniculidae	Common Scimitarbill	*Rhinopomastus cyanomelas*	0.2	LC	R	W
Alcedinidae	Malachite Kingfisher	*Corythornis [Alcedo] cristata*	0.1	LC	V	A
Alcedinidae	Pied Kingfisher	*Ceryle rudis*	0.2	LC	V	A
Meropidae	Swallow-tailed Bee-eater	*Merops hirundineus*	0.1	LC	BM	W-S
Meropidae	European Bee-eater	*Merops apiaster*	0.2	LC	BM	W-S
Coliidae	White-backed Mousebird	*Colius colius*	0.4	LC	R	W
Coliidae	Red-faced Mousebird	*Urocolius indicus*	0.2	LC	R	W
Cuculidae	Diderick Cuckoo	*Chrysococcyx caprius*	0.1	LC	V	W

Apodidae	Alpine Swift	*Tachymarptis melba*	0.1	LC	R	NS
Apodidae	Common Swift	*Apus apus*	0.1	LC	M	NS
Apodidae	African Black Swift	*Apus barbatus*	0.2	LC	R	NS
Apodidae	Little Swift	*Apus affinis*	0.4	LC	R	NS
Apodidae	White-rumped Swift	*Apus caffer*	0.2	LC	BM	NS
Tytonidae	African Grass-Owl	*Tyto capensis*	0.2	VU	V	S
Strigidae	Cape Eagle-Owl	*Bubo capensis*	0.2	LC	R	R
Strigidae	Spotted Eagle-Owl	*Bubo africanus*	0.2	LC	R	R
Caprimulgidae	Freckled Nightjar	*Caprimulgus tristigma*	0.2	LC	R	R
Caprimulgidae	Rufous-cheeked Nightjar	*Caprimulgus rufigena*	0.2	LC	BM	S
Caprimulgidae	European Roller	*Coracias garrulus*	0.2	NT	M	W
Caprimulgidae	European Nightjar	*Caprimulgus europaeus*	0.1	LC	M	W
Columbidae	Speckled Pigeon	*Columba guinea*	0.5	LC	R	R
Columbidae	Laughing Dove	*Streptopelia senegalensis*	0.6	LC	R	W
Columbidae	Cape Turtle-Dove	*Streptopelia capicola*	0.6	LC	R	W
Columbidae	Red-eyed Dove	*Streptopelia semitorquata*	0.2	LC	R	W
Columbidae	Namaqua Dove	*Oena capensis*	0.5	LC	N	W-S
Otididae	Ludwig's Bustard	*Neotis ludwigii*	0.3	NT	BM	S
Otididae	Kori Bustard	*Ardeotis kori*	0.2	EN	R	S
Otididae	Northern Black Korhaan	*Afrotis afraoides*	0.6	LC	R	S
Otididae	Karoo Korhaan	*Heterotetrax [Eupodotis] vigorsii*	0.5	NT	R	S
Otididae	Blue Korhaan	*Eupodotis caerulescens*	0.1	LC	R	S
Gruidae	Blue Crane	*Grus [Anthropoides] paradiseus*	0.2	LC	R	S
Rallidae	African Rail	*Rallus caerulescens*	0.1	LC	N	A
Rallidae	Common Moorhen	*Gallinula chloropus*	0.1	LC	N	A
Rallidae	Red-knobbed Coot	*Fulica cristata*	0.2	LC	R	A
Pteroclidae	Namaqua Sandgrouse	*Pterocles namaqua*	0.5	LC	N	S
Scolopacidae	African Snipe	*Gallinago nigripennis*	0.1	LC	V	A
Scolopacidae	Common Whimbrel	*Numenius phaeopus*	0.1	LC	M	A
Scolopacidae	Eurasian Curlew	*Numenius arquata*	0.1	NT	M	A
Scolopacidae	Marsh Sandpiper	*Tringa stagnatilis*	0.1	LC	M	A
Scolopacidae	Common	*Tringa nebularia*	0.2	LC	M	A

	Greenshank					
Scolopacidae	Wood Sandpiper	*Tringa glareola*	0.1	LC	M	A
Scolopacidae	Common Sandpiper	*Actitis hypoleucos*	0.1	LC	M	A
Scolopacidae	Ruddy Turnstone	*Arenaria interpres*	0.1	LC	M	A
Scolopacidae	Sanderling	*Calidris alba*	0.1	LC	M	A
Scolopacidae	Little Stint	*Calidris minuta*	0.2	LC	M	A
Scolopacidae	Curlew Sandpiper	*Calidris ferruginea*	0.1	LC	M	A
Scolopacidae	Ruff	*Calidris [Philomachus] pugnax*	0.1	LC	M	A
Burhinidae	Spotted Thick-knee	*Burhinus capensis*	0.2	LC	R	S
Recurvirostridae	Black-winged Stilt	*Himantopus himantopus*	0.2	LC	N	A
Recurvirostridae	Pied Avocet	*Recurvirostra avosetta*	0.2	LC	N	A
Charadriidae	Grey Plover	*Pluvialis squatarola*	0.1	LC	M	A
Charadriidae	Common Ringed Plover	*Charadrius hiaticula*	0.1	LC	M	A
Charadriidae	Kittlitz's Plover	*Charadrius pecuarius*	0.2	LC	BM	A
Charadriidae	Three-banded Plover	*Charadrius tricollaris*	0.3	LC	BM	A
Charadriidae	Chestnut-banded Plover	*Charadrius pallidus*	0.1	NT	V	A
Charadriidae	Blacksmith Lapwing	*Vanellus armatus*	0.5	LC	R	A
Charadriidae	Crowned Lapwing	*Vanellus coronatus*	0.2	LC	R	S
Glareolidae	Double-banded Courser	*Rhinoptilus africanus*	0.3	NT	R	S
Glareolidae	Burchell's Courser	*Cursorius rufus*	0.2	VU	R	S
Laridae	Grey-headed Gull	*Chroicephalus [Larus] cirrocephalus*	0.2	LC	R	A
Laridae	White-winged Tern	*Chlidonias leucopterus*	0.2	LC	M	A
Accipitridae	Black-shouldered Kite	*Elanus caeruleus*	0.1	LC	R	W
Accipitridae	Black Kite	*Milvus [migrans] migrans*	0.1	LC	M	W
Accipitridae	African Fish-Eagle	*Haliaeetus vocifer*	0.3	LC	R	A
Accipitridae	Black-chested Snake-Eagle	*Circaetus pectoralis*	0.1	LC	BM	W
Accipitridae	Black Harrier	*Circus maurus*	0.1	EN	R	S
Accipitridae	Southern Pale Chanting Goshawk	*Melierax canorus*	0.6	LC	R	W
Accipitridae	Steppe Buzzard	*Buteo buteo [vulpinus]*	0.1	LC	M	W

Accipitridae	Jackal Buzzard	*Buteo rufofuscus*	0.3	LC	R	R
Accipitridae	Verreaux's Eagle	*Aquila verreauxii*	0.2	VU	R	R
Accipitridae	Booted Eagle	*Hieraaetus [Aquila] pennatus*	0.2	LC	BM	R
Accipitridae	Martial Eagle	*Polemaetus bellicosus*	0.2	EN	R	W
Sagittaridae	Secretarybird	*Sagittarius serpentarius*	0.2	VU	R	S
Falconidae	Lesser Kestrel	*Falco naumanni*	0.1	LC	M	W
Falconidae	Rock Kestrel	*Falco tinnunculus [rupicolus]*	0.4	LC	R	S
Falconidae	Greater Kestrel	*Falco rupicoloides*	0.1	LC	R	W
Falconidae	Lanner Falcon	*Falco biarmicus*	0.2	VU	R	W
Podicepedidae	Little Grebe	*Tachybaptus ruficollis*	0.2	LC	R	A
Podicepedidae	Black-necked Grebe	*Podiceps nigricollis*	0.1	LC	N	A
Phalacrocoracidae	Reed Cormorant	*Microcarbo [Phalacrocorax] africanus*	0.2	LC	R	A
Ardeidae	Little Egret	*Egretta garzetta*	0.1	LC	N	A
Ardeidae	Grey Heron	*Ardea cinerea*	0.3	LC	R	A
Ardeidae	Black-headed Heron	*Ardea melanocephala*	0.2	LC	R	S
Ardeidae	Goliath Heron	*Ardea goliath*	0.2	LC	N	A
Ardeidae	Cattle Egret	*Bubulcus ibis*	0.2	LC	R	S
Scopidae	Hamerkop	*Scopus umbretta*	0.1	LC	N	A
Phoenicopteridae	Greater Flamingo	*Phoenicopterus ruber*	0.2	NT	N	A
Phoenicopteridae	Lesser Flamingo	*Phoeniconaias [Phoenicopterus] minor*	0.3	NT	N	A
Threskiornithidae	Glossy Ibis	*Plegadis falcinellus*	0.1	LC	N	A
Threskiornithidae	Hadeda Ibis	*Bostrychia hagedash*	0.1	LC	R	W
Threskiornithidae	African Sacred Ibis	*Threskiornis aethiopicus*	0.1	LC	R	A
Threskiornithidae	African Spoonbill	*Platalea alba*	0.2	LC	R	A
Ciconiidae	Black Stork	*Ciconia nigra*	0.1	VU	N	A
Ciconiidae	White Stork	*Ciconia ciconia*	0.2	LC	M	S
Dicruridae	Fork-tailed Drongo	*Dicrurus adsimilis*	0.2	LC	V	W
Monarchidae	African Paradise-Flycatcher	*Terpsiphone viridis*	0.2	LC	BM	W
Malaconotidae	Brubru	*Nilaus afer*	0.3	LC	R	W
Malaconotidae	Bokmakierie	*Telophorus zeylonus*	0.5	LC	R	S
Platysteiridae	Pririt Batis	*Batis pririt*	0.1	LC	R	W
Corvidae	Cape Crow	*Corvus capensis*	0.2	LC	R	W
Corvidae	Pied Crow	*Corvus albus*	0.1	LC	R	W

Corvidae	White-necked Raven	*Corvus albicollis*	0.1	LC	R	R
Laniidae	Red-backed Shrike	*Lanius collurio*	0.1	LC	M	W
Laniidae	Common Fiscal	*Lanius collaris*	0.5	LC	R	W
Remizidae	Cape Penduline-Tit	*Anthoscopus minutus*	0.2	LC	R	S
Paridae	"Grey" tits	*Melaniparus [Parus] sp.*	0.3	LC	R	W
Hirundinidae	Brown-throated Martin	*Riparia paludicola*	0.1	LC	R	S
Hirundinidae	Barn Swallow	*Hirundo rustica*	0.1	LC	M	NS
Hirundinidae	White-throated Swallow	*Hirundo albigularis*	0.2	LC	BM	A
Hirundinidae	Pearl-breasted Swallow	*Hirundo dimidiata*	0.2	LC	BM	S
Hirundinidae	Greater Striped Swallow	*Cecropis [Hirundo] cucullata*	0.3	LC	BM	A
Hirundinidae	South African Cliff-Swallow	*Petrochelidon [Hirundo] spilodera*	0.1	LC	BM	S
Hirundinidae	Rock Martin	*Ptyonoprocne fuligula*	0.4	LC	R	NS
Pycnonotidae	African Red-eyed Bulbul	*Pycnonotus nigricans*	0.3	LC	R	W
Stenostiridae	Fairy Flycatcher	*Stenostira scita*	0.2	LC	R	W
Macrosphenidae	Long-billed Crombec	*Sylvietta rufescens*	0.3	LC	R	W
Cisticolidae	Yellow-bellied Eremomela	*Eremomela icteropygialis*	0.3	LC	R	S
Cisticolidae	Karoo Eremomela	*Eremomela gregalis*	0.3	LC	R	S
Acrocephalidae	African Reed-Warbler	*Acrocephalus scirpaceus [baeticatus]*	0.2	LC	BM	A
Acrocephalidae	Lesser Swamp-Warbler	*Acrocephalus gracilirostris*	0.2	LC	R	A
Phylloscopidae	Willow Warbler	*Phylloscopus trochilus*	0.1	LC	M	W
Sylviidae	Layard's Tit-Babbler	*Curruca [Sylvia] layardi*	0.2	LC	R	R
Sylviidae	Chestnut-vented Tit-Babbler	*Curruca [Sylvia] subcaeruleum*	0.3	LC	R	W
Sylviidae	Garden Warbler	*Sylvia borin*	0.1	LC	M	W
Zosteropidae	Orange River White-eye	*Zosterops pallidus*	0.2	LC	R	W
Cisticolidae	Grey-backed Cisticola	*Cisticola subruficapilla*	0.3	LC	R	S
Cisticolidae	Levaillant's Cisticola	*Cisticola tinniens*	0.1	LC	R	A
Cisticolidae	Desert Cisticola	*Cisticola aridulus*	0.2	LC	R	S
Cisticolidae	Black-chested	*Prinia flavicans*	0.4	LC	R	S

	Prinia					
Cisticolidae	Karoo Prinia	*Prinia maculosa*	0.4	LC	R	S
Cisticolidae	Namaqua Warbler	*Phragmacia substriata*	0.2	LC	R	A
Cisticolidae	Rufous-eared Warbler	*Malcorus pectoralis*	0.6	LC	R	S
Cisticolidae	Cinnamon-breasted Warbler	*Euryptila subcinnamomea*	0.1	LC	R	R
Alaudidae	Cape Clapper Lark	*Mirafra apiata*	0.2	LC	R	S
Alaudidae	Sabota Lark	*Calendulauda sabota*	0.4	LC	R	S
Alaudidae	Fawn-coloured Lark	*Calendulauda africanoides*	0.3	LC	R	S
Alaudidae	Red Lark	*Calendulauda burra*	0.2	VU	R	S
Alaudidae	Karoo Lark	*Calendulauda albescens*	0.3	LC	R	S
Alaudidae	Spike-heeled Lark	*Chersomanes albofasciata*	0.7	LC	R	S
Alaudidae	Karoo Long-billed Lark	*Certhilauda subcoronata*	0.5	LC	R	S
Alaudidae	Black-eared Sparrowlark	*Eremopterix australis*	0.4	LC	N	S
Alaudidae	Grey-backed Sparrowlark	*Eremopterix verticalis*	0.4	LC	N	S
Alaudidae	Red-capped Lark	*Calandrella cinerea*	0.4	LC	R	S
Alaudidae	Stark's Lark	*Spizocorys starki*	0.2	LC	N	S
Alaudidae	Pink-billed Lark	*Spizocorys conirostris*	0.2	LC	V	S
Alaudidae	Sclater's Lark	*Spizocorys sclateri*	0.2	NT	N	S
Alaudidae	Large-billed Lark	*Galerida magnirostris*	0.4	LC	R	S
Turdidae	Karoo Thrush	*Turdus smithi*	0.2	LC	R	W
Muscicapidae	Chat Flycatcher	*Bradornis infuscatus*	0.6	LC	R	S
Muscicapidae	Fiscal Flycatcher	*Sigelus silens*	0.2	LC	R	W
Muscicapidae	Spotted Flycatcher	*Muscicapa striata*	0.1	LC	M	W
Muscicapidae	Cape Robin-Chat	*Cossypha caffra*	0.2	LC	R	W
Muscicapidae	Kalahari Scrub-Robin	*Cercotrichas paena*	0.2	LC	R	S
Muscicapidae	Karoo Scrub-Robin	*Cercotrichas coryphaeus*	0.6	LC	R	S
Muscicapidae	Whinchat	*Saxicola rubetra*	0.2	LC	M	S
Muscicapidae	African Stonechat	*Saxicola torquatus*	0.2	LC	R	S
Muscicapidae	Mountain Wheatear	*Myrmecocichla [Oenanthe] monticola*	0.5	LC	R	R
Muscicapidae	Capped Wheatear	*Oenanthe pileata*	0.2	LC	R	S
Muscicapidae	Sickle-winged	*Emarginata*	0.2	LC	R	S

	Chat	*[Cercomela] sinuata*				
Muscicapidae	Karoo Chat	*Emarginata [Cercomela] schlegelii*	0.5	LC	R	S
Muscicapidae	Tractrac Chat	*Emarginata [Cercomela] tractrac*	0.4	LC	R	S
Muscicapidae	Familiar Chat	*Oenanthe [Cercomela] familiaris*	0.5	LC	R	S
Muscicapidae	Anteating Chat	*Myrmecocichla formicivora*	0.6	LC	R	S
Sturnidae	Pale-winged Starling	*Onychognathus nabouroup*	0.2	LC	R	R
Sturnidae	Red-winged Starling	*Onychognathus morio*	0.1	LC	R	W
Sturnidae	Cape Glossy Starling	*Lamprotornis nitens*	0.2	LC	R	W
Sturnidae	Pied Starling	*Lamprotornis [Spreo] bicolor*	0.4	LC	R	S
Sturnidae	Wattled Starling	*Creatophora cinerea*	0.2	LC	N	W
Sturnidae	Common Starling	*Sturnus vulgaris*	0.1	LC	R	W
Nectariniidae	Southern Double-collared Sunbird	*Cinnyris chalybeus*	0.1	LC	LN	S
Nectariniidae	Dusky Sunbird	*Cinnyris fuscus*	0.3	LC	N	S
Ploceidae	Scaly-feathered Finch	*Sporopipes squamifrons*	0.2	LC	R	S
Ploceidae	White-browed Sparrow-Weaver	*Plocepasser mahali*	0.4	LC	R	W
Ploceidae	Sociable Weaver	*Philetairus socius*	0.3	LC	R	W
Ploceidae	Cape Weaver	*Ploceus capensis*	0.1	LC	R	A
Ploceidae	Southern Masked-Weaver	*Ploceus velatus*	0.6	LC	R	A
Ploceidae	Red-billed Quelea	*Quelea quelea*	0.2	LC	N	W
Ploceidae	Yellow-crowned Bishop	*Euplectes afer*	0.1	LC	R	A
Ploceidae	Southern Red Bishop	*Euplectes orix*	0.2	LC	R	A
Estrildidae	African Quailfinch	*Ortygospiza atricollis*	0.3	LC	R	S
Estrildidae	Red-headed Finch	*Amadina erythrocephala*	0.2	LC	R	S
Estrildidae	Common Waxbill	*Estrilda astrild*	0.2	LC	R	S
Viduidae	Pin-tailed Whydah	*Vidua macroura*	0.1	LC	R	S
Passeridae	House Sparrow	*Passer domesticus*	0.4	LC	R	NS
Passeridae	Cape Sparrow	*Passer melanurus*	0.8	LC	R	W
Passeridae	Southern Grey-headed Sparrow	*Passer diffusus*	0.1	LC	R	W
Motacillidae	Cape Wagtail	*Motacilla capensis*	0.5	LC	R	A

Motacillidae	African Pipit	*Anthus cinnamomeus*	0.2	LC	R	S
Motacillidae	Plain-backed Pipit	*Anthus leucophrys*	0.1	LC	R	S
Motacillidae	Long-billed Pipit	*Anthus similis*	0.1	LC	R	R
Fringillidae	Cape Canary	*Serinus canicollis*	0.1	LC	R	W
Fringillidae	Black-headed Canary	*Serinus alario*	0.3	LC	N	S
Fringillidae	Black-throated Canary	*Crithagra atrogularis*	0.2	LC	R	S
Fringillidae	Yellow Canary	*Crithagra flaviventris*	0.5	LC	R	S
Fringillidae	White-throated Canary	*Crithagra albogularis*	0.5	LC	R	S
Emberizidae	Lark-like Bunting	*Emberiza impetuani*	0.7	LC	N	S
Emberizidae	Cinnamon-breasted Bunting	*Emberiza tahapisi*	0.2	LC	V	R
Emberizidae	Cape Bunting	*Emberiza capensis*	0.4	LC	R	S

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