

Supplementary Information

Impacts of a concentrated solar power trough facility on birds and other wildlife in South Africa

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Appendix S1: Bird species used in the searcher efficiency trials along with the results recorded for each searcher (number of birds observed) during each trial and the observation probability (Obs. P) at the Bokpoort CSP facility, Northern Cape, South Africa. (S1 = searcher 1; S2 = searcher 2; S3 = searcher 3; S4 = searcher 4)

Species	Size	# Deployed	S1	S2	S3	S4	Total	Obs. P
African Pipit 1	S	3	2	3	3	2	10	0.83
African Pipit 2	S	3	0	1	3	1	5	0.42
African Pipit 3	S	3	1	2	1	3	7	0.58
House Sparrow	S	3	2	2	2	3	9	0.75
Rufous-eared Warbler	S	3	2	2	1	2	7	0.58
Cape Canary	S	3	1	1	1	0	3	0.25
Fiscal Flycatcher	S	3	3	2	3	3	11	0.92
Red-capped Lark	S	3	2	3	1	1	7	0.58
Lark-like Bunting	S	3	2	0	0	1	3	0.25
Subtotal		27	15	16	15	16	62	0.57
African Hoopoe	M	3	2	2	1	2	7	0.58
Rock Kestrel	M	3	3	3	3	3	12	1.00
South African Shelduck	M	3	2	3	1	3	9	0.75
Alpine Swift	M	3	2	3	2	3	10	0.83
Bokmakierie	M	3	3	3	1	2	9	0.75
Namaqua Sandgrouse	M	3	3	3	2	3	11	0.92
Subtotal		18	15	17	10	16	58	0.81
Helmeted Guineafowl	L	3	3	3	3	3	12	1.00
Red-knobbed Coot	L	3	3	3	3	3	12	1.00
Kelp Gull (juv.)	L	3	3	3	3	3	12	1.00
Subtotal		9	9	9	9	9	36	1.00
Total		54	39	42	34	41	156	0.72

Appendix S2: Results from the bird carcass persistence trials indicating the species used and the size and number of days it persisted in the field at the Bokpoort CSP facility (S = small; M = medium; L = Large; X = carcass present; R = carcass removed; F = feather spot; S = scavenged).

[illegible]

Helmeted Guineafowl 1 <i>Numida meleagris</i>	L	X	X	X	X	X	X	X	X	X	X	X	X	X
Helmeted Guineafowl 2 <i>Numida meleagris</i>	L	X	X	X	X	X	X	X	X	S	S	S	S	S
Kelp Gull 1 (juvenile) <i>Larus dominicanus</i>	L	X	X	S	S	S	S	S	S	S	S	S	S	S
Kelp Gull 2 <i>Larus dominicanus</i>	L	X	X	X	X	X	X	X	X	X	X	X	X	X
Kelp Gull 3 <i>Larus dominicanus</i> *	L	X ⁴	X ²	X	X	X	X ¹	X	X	X	X ^{1,2,1}	X2	X	X

*Carcass monitored with Ltl-5310 ACORN motion-triggered scouting cameras for scavenger activity: 1) Pied Crow, 2) Cape fox, 3) slender mongoose, 4) striped polecat.**
Camera malfunctioned during trial.

Appendix S3: Species list of birds at Bokpoort CSP facility grouped into areas recorded: 1) rangeland, solar field and ponds, 2) rangeland and solar field, 3) rangeland and ponds, 4) solar field and ponds, 5) unique to rangeland, 6) unique to solar field, 7) unique to ponds. Foraging guilds from Hockey et al. (2005) with primary foraging guild capitalized: A = aquatic invertebrates/plants; C = carnivorous; F = frugivorous; G = granivorous; I = insectivorous; N = nectivorous; O = omnivorous; P = piscivorous) and endemism status in southern Africa (NE = near-endemic; E = endemic).

Species		RL	SF	Ponds	Guild	Endemism
Rangeland, solar field and ponds						
Cape Sparrow	<i>Passer melanurus</i>	X	X	X	G, i	NE
Cape Turtle Dove	<i>Streptopelia capicola</i>	X	X	X	G, i	
Familiar Chat	<i>Cercomela familiaris</i>	X	X	X	I, g	
Lark-like Bunting	<i>Emberiza impetواني</i>	X	X	X	G, i	
Little Swift	<i>Apus affinis</i>	X	X	X	I	
Namaqua Dove	<i>Oena capensis</i>	X	X	X	G	
Rock Martin	<i>Hirundo fuligula</i>	X	X	X	I	
Speckled Pigeon	<i>Columba guinea</i>	X	X	X	G, i	
Rangeland and solar field						
Back-chested Prinia	<i>Prinia flavicans</i>	X	X		I	
Fawn-coloured Lark	<i>Calendulauda africanoides</i>	X	X		I, g	NE
Pied Crow	<i>Corvus albus</i>	X	X		O	
Rufous-eared Warbler	<i>Malcorus pectoralis</i>	X	X		I, f, g	E
Sociable Weaver	<i>Philetairus socius</i>	X	X		G, i	E
Spike-heeled Lark	<i>Chersomanes albofasciata</i>	X	X		I	NE
Yellow Canary	<i>Crithagra flaviventris</i>	X	X		G, f, i	NE
Rangeland and ponds						
Laughing Dove	<i>Spilopelia senegalensis</i>	X		X	G, f, i	
White-throated Swallow	<i>Hirundo albigularis</i>	X		X	I	
Only in rangeland						
Acacia Pied Barbet	<i>Tricholaema leucomelas</i>	X			F, i	
Ant-eating Chat	<i>Myrmecocichla formicivora</i>	X			I, f	E
Black-throated Canary	<i>Crithagra atrogularis</i>	X			G, i, f	
Brown-crowned Tchagra*	<i>Tchagra australis</i>	X			I, c	
Chat Flycatcher	<i>Bradornis infuscatus</i>	X			I	NE
Chestnut-vented						
Tit-Babbler	<i>Sylvia subcaerulea</i>	X			I, f, g	NE
Common Buttonquail	<i>Turnix sylvaticus</i>	X			I, g	
Common Scimitarbill	<i>Rhinopomastus cyanomelas</i>	X			I	
Desert Cisticola*	<i>Cisticola aridulus</i>	X			I	
Dusky Sunbird	<i>Cinnyris fuscus</i>	X			N	NE
Eastern Clapper Lark	<i>Mirafra fasciolata</i>	X			I, g	NE
Greater Kestrel	<i>Falco rupicoloides</i>	X			C, i	
Hadedda Ibis*	<i>Bostrychia hagedash</i>	X			I	
Kalahari Scrub Robin	<i>Erythropygia paena</i>	X			I	NE
Karoo Scrub Robin*	<i>Erythropygia coryphoeus</i>	X			I, f	E
Kori Bustard*	<i>Ardeotis kori</i>	X			C, i	
Long-billed Crombec*	<i>Sylvietta rufescens</i>	X			I, g, f	
Namaqua Sandgrouse	<i>Pterocles namaqua</i>	X			G	
Northern Black Korhaan*	<i>Afrotis afraoides</i>	X			I, c, g	E
Pale Chanting Goshawk*	<i>Melierax canorus</i>	X			C, i	
Pririt Batis	<i>Batis pririt</i>	X			I	
Pygmy Falcon	<i>Polihierax semitorquatus</i>	X			C	
Red-crested Korhaan*	<i>Lophotis ruficrista</i>	X			I, g	
Red-billed Quelea	<i>Quelea quelea</i>	X			G, i	
Sabota Lark	<i>Calendulauda sabota</i>	X			I, g	
Scaly-feathered Finch	<i>Sporopipes squamifrons</i>	X			G, i	
Short-toed Rock Thrush*	<i>Monticola brevipes</i>	X			I, f, g	
Southern Fiscal	<i>Lanius collaris</i>	X			C, i	
Southern Masked Weaver	<i>Ploceus velatus</i>	X			G, i	
Violet-eared Waxbill	<i>Uraeginthus granatinus</i>	X			G, i	

White-backed Mousebird	<i>Colius colius</i>	X		F	E
White-browed Sparrow-Weaver	<i>Plocepasser mahali</i>	X		I, g, f	
Yellow-bellied Eremomela	<i>Eremomela icteropygialis</i>	X		I, f, g	
Bokmakierie	<i>Telophorus zeylonus</i>	X		I, c, f	NE
Solar field and ponds					
African Red-eyed Bulbul	<i>Pycnonotus nigricans</i>	X	X	F, i	
Blacksmith Lapwing	<i>Vanellus armatus</i>	X	X	I, a	
Cape Wagtail	<i>Motacilla capensis</i>	X	X	I	
Red-headed Finch	<i>Amadina erythrocephala</i>	X	X	G, i	
Only in solar field					
House Sparrow	<i>Passer domesticus</i>	X		G, i	
Mountain Wheatear	<i>Oenanthe monticola</i>	X		I, g, f	
Western Barn Owl	<i>Tyto alba</i>	X		C	
Only at ponds					
African Fish Eagle	<i>Haliaeetus vocifer</i>		X	P, c	
Black-headed Heron	<i>Ardea melanocephala</i>		X	I, c	
Black-winged Stilt	<i>Himantopus himantopus</i>		X	A, p	
Brown-throated Martin	<i>Riparia paludicola</i>		X	I	
Cape Shoveler	<i>Spatula smithii</i>		X	A	
Cape Teal	<i>Anas capensis</i>		X	A	
Common Greenshank	<i>Tringa nebularia</i>		X	A	
Curlew Sandpiper	<i>Calidris ferruginea</i>		X	A	
Egyptian Goose	<i>Alopochen aegyptiaca</i>		X	G, a	
Grey Plover	<i>Pluvialis squatarola</i>		X	A	
Kittlitz's Plover	<i>Charadrius pecuarius</i>		X	A, i	
Little Grebe	<i>Tachybaptus ruficollis</i>		X	A, i, p	
Little Stint	<i>Calidris minuta</i>		X	I, a	
Malachite Kingfisher	<i>Alcedo cristata</i>		X	P, a	
Red-billed Teal	<i>Anas erythrorhyncha</i>		X	G, i, a	
Red-knobbed Coot	<i>Fulica cristata</i>		X	A	
Ruddy Turnstone	<i>Arenaria interpres</i>		X	A, i	
Ruff	<i>Philomachus pugnax</i>		X	A, i	
Sanderling	<i>Calidris alba</i>		X	A	
South African Shelduck	<i>Tadorna cana</i>		X	A	
Three-banded Plover	<i>Charadrius tricollaris</i>		X	A	
Whiskered Tern	<i>Chlidonias hybrida</i>		X	P, a	
White-breasted Cormorant	<i>Phalacrocorax lucidus</i>		X	P	

*species only recorded >50 from transect lines in rangeland

Appendix S4: Birds recorded within 50 m from the transect line (and the total number of times) during the rangeland surveys. These species were used in calculations to compare rangeland and solar field bird counts by accounting for the limited visibility in the solar field (<50 m).

Common name	Species name	Total count <50
Acacia Pied Barbet	<i>Tricholaema leucomelas</i>	1
Ant-eating Chat	<i>Myrmecocichla formicivora</i>	12
Back-chested Prinia	<i>Prinia flavicans</i>	60
Black-throated Canary	<i>Crithagra atrogularis</i>	2
Bokmakierie	<i>Telophorus zeylonus</i>	4
Cape Sparrow	<i>Passer melanurus</i>	4
Cape Turtle Dove	<i>Streptopelia capicola</i>	8
Chat Flycatcher	<i>Bradornis infuscatus</i>	4
Chestnut-vented Tit-Babbler	<i>Sylvia subcaerulea</i>	23
Common Buttonquail	<i>Turnix sylvaticus</i>	4
Common Scimitarbill	<i>Rhinopomastus cyanomelas</i>	2
Dusky Sunbird	<i>Cinnyris fuscus</i>	19
Eastern Clapper Lark	<i>Mirafra fasciolata</i>	14
Familiar Chat	<i>Cercomela familiaris</i>	1
Fawn-coloured Lark	<i>Calendulauda africanoides</i>	161
Greater Kestrel	<i>Falco rupicoloides</i>	2
Kalahari Scrub Robin	<i>Erythropygia paena</i>	24
Lark-like Bunting	<i>Emberiza impetواني</i>	104
Laughing Dove	<i>Streptopelia senegalensis</i>	2
Little Swift	<i>Apus affinis</i>	50
Namaqua Dove	<i>Oena capensis</i>	85
Namaqua Sandgrouse	<i>Pterocles namaqua</i>	151
Pied Crow	<i>Corvus albus</i>	3
Pirit Batis	<i>Batis pririt</i>	3
Pygmy Falcon	<i>Polihierax semitorquatus</i>	1
Red-billed Quelea	<i>Quelea quelea</i>	88
Rock Martin	<i>Hirundo fuligula</i>	12
Rufous-eared Warbler	<i>Malcorus pectoralis</i>	16
Sabota Lark	<i>Calendulauda sabota</i>	3
Scaly-feathered Finch	<i>Sporopipes squamifrons</i>	451
Sociable Weaver	<i>Philetairus socius</i>	883
Southern Fiscal	<i>Lanius collaris</i>	10
Spike-heeled Lark	<i>Chersomanes albofasciata</i>	2
Violet-eared Waxbill	<i>Uraeginthus granatinus</i>	1
White-backed Mousebird	<i>Colius colius</i>	7
White-browed Sparrow-Weaver	<i>Plocepasser mahali</i>	26
White-throated Swallow	<i>Hirundo albicularis</i>	9
White-backed Mousebird	<i>Colius colius</i>	10
Yellow-bellied Eremomela	<i>Eremomela icteropygialis</i>	11
Yellow Canary	<i>Crithagra flaviventris</i>	147
Total		242