

DIGITAL ADDENDA 7A – 7B

Digital Addendum 7A: Species of special concern in the study area

Table 7.1: Animal species of special concern in the study area (i.e. animal species that have more than 60% of their distribution in the study area, or that occur in the study area and are Threatened according to IUCN Red List criteria)

Group	Scientific name	Common name	Distribution	Habitat	Endemism	IUCN Red List status
Mammalia	<i>Bunolagus monticularis</i>	Riverine Rabbit	Northern and Western Cape: only distributed in Central and south Karoo	Riparian bush on the narrow alluvial fringe of seasonally dry watercourses in the central Karoo.	SA Endemic and largely endemic to study area	<b>Critically Endangered</b> (global assessment: IUCN, 2008)
Mammalia	<i>Chlorotalpa sclateri shortridgei</i>	Sclater's Golden Mole	South Africa and Lesotho. Subspecies known only from Sutherland, but may range eastwards to Beaufort West.	Escarpment Mountain Renosterveld.	SA and Lesotho endemic, <b>subspecies a SA endemic and endemic to study area.</b>	<b>Least Concern</b> (global assessment: IUCN, 2015 )
Mammalia	<i>Elephantulus pilicaudus</i>	Karoo Rock Sengi	Endemic to the Upper and Lower Karoo Bioregions of the Nama-Karoo, including Williston, Karoo National Park, Carnarvon, Calvinia, Loxton. Distribution not well understood.	Rocky habitat with an elevation of $\geq 1,300$ m above sea level.	SA endemic, <b>may be a narrow endemic</b>	<b>Data Deficient</b> (global assessment: IUCN, 2013) <b>Least Concern</b> (national assessment, 2016)
Mammalia	<i>Felis nigripes</i>	Black-footed Cat	Found mainly in the Nama- and Succulent Karoo biomes but also in southern North West and Gauteng, marginally in Mpumalanga and KwaZulu-Natal, Free State, Northern Cape, Western Cape and Eastern Cape	Open habitat that provides some cover in the form of stands of tall grass or scrub bush. Use disused springhare or aardvark burrows or dens under calcrete slabs, or hollowed out termite mounds in which to lie up during the day.	Southern African endemic, in Botswana, Namibia and SA.	<b>Vulnerable</b> (global assessment: IUCN, 2016 and national assessment, 2016)

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Group	Scientific name	Common name	Distribution	Habitat	Endemism	IUCN Red List status
Mammalia	<i>Mystromys albicaudatus</i>	White-tailed Mouse	Relatively widespread in South Africa: eastern North West, Gauteng, southern Mpumalanga, western high-lying KwaZulu-Natal, Free State, Eastern Cape and Western Cape.	They are generally, but not always, associated with grasslands, occurring in the fynbos and the Karoo and rocky areas	South African endemic	<b>Endangered</b> (global assessment, IUCN, 2008); <b>Vulnerable</b> (national assessment, 2016)
Mammalia	<i>Otomys unisulcatus</i>	Karoo Bush Rat	South Africa, with small intrusion into southern Namibia. Distributed widely from the Western Cape eastwards to western Eastern Cape and north through the Northern Cape.	Shrub and fynbos in areas with rocky outcrops and high plant cover and foliage density.	Near SA endemic, with approx. <b>60% of distribution in study area</b>	<b>Least Concern</b> (IUCN, 2008 assessment)
Mammalia	<i>Panthera pardus</i>	Leopard	Africa and Asia (may be different subspecies)	In a wide range of habitats but mainly associated with rocky outcrops and hills, mountain ranges.		<b>Vulnerable</b> (global assessment: IUCN, 2016 and national assessment, 2016)
Aves (Birds)	<i>Afrotis afra</i>	Southern Black Korhaan	South Africa, Swaziland and Lesotho. In Albany Thicket, Fynbos and Succulent Karoo biomes and the southern extreme of the Nama Karoo.	Fynbos, mainly Renosterveld and Strandveld. Prefers undisturbed habitat.	Southern African endemic	<b>Vulnerable</b> (2015 regional assessment)
Aves (Birds)	<i>Aquila rapax</i>	Tawny Eagle	Widespread throughout sub-Saharan Africa, with a small population in the grassy Karoo.	Lightly wooded savanna and thornveld and semi-desert. Mostly in protected areas.	African endemic.	<b>Endangered</b> (2015 regional assessment)
Aves (Birds)	<i>Aquila verreauxii</i>	Verreauxs' Eagle	Wide distribution throughout Africa; in South Africa across 5 biomes, but restricted to mountainous habitat; large areas of high density in study area.	Mainly restricted to mountainous terrain. May use pylons in Karoo for nesting.	African endemic.	<b>Vulnerable</b> (2015 regional assessment)
Aves (Birds)	<i>Ciconia nigra</i>	Black stork	Breeds widely in Palaearctic region and is a partial migrant in sub-Saharan Africa. In South Africa mostly in southern and eastern provinces, avoiding the dry interior and west.	Dams and shallow waterbodies with fish.		<b>Vulnerable</b> (2015 regional assessment)

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Aves (Birds)	<i>Circus maurus</i>	Black Harrier	South Africa. Core of range in Fynbos, but does extend to the southern reaches of the Karoo.	Mostly fynbos. In fragmented Renosterveld prefers high quality patches. Forages in high altitude grasslands, down to Karoo scrub.	SA endemic	<b>Endangered</b> (2015 regional assessment)
Aves (Birds)	<i>Cursorius rufus</i>	Burchell's Courser	Southern Africa, present in the Karoo.	Open desert and semi-desert areas. Habitats include grazed or burnt grassland, stony or gravel plains, dry river beds and edges of salt pans.	Near endemic to southern Africa.	<b>Vulnerable</b> (2015 regional assessment)
Aves (Birds)	<i>Gyps coprotheres</i>	Cape Vulture	Southern Africa, predominantly South Africa and Lesotho. Breeding colonies in Limpopo, North West and Gauteng, KwaZulu-Natal and Eastern Cape.		Southern African endemic.	<b>Endangered</b> (global assessment, IUCN, 2015, and 2015 regional assessment)
Aves (Birds)	<i>Neotis denhami</i>	Denham's Bustard	Wide but fragmented Afrotropical distribution. In the study area mostly in Eastern Cape grassland and lowland fynbos.	Generally avoid drier areas, but do occasionally occur marginally in Nama Karoo. Often in rocky areas and on plateaus. Occasionally use cultivated fields.	African endemic.	<b>Vulnerable</b> (2015 regional assessment)
Aves (Birds)	<i>Phragmacia substriata</i>	Namaqua warbler	South Africa and Namibia. Lower and mid Orange River, south to karroid regions of Western Cape, and central Free State and Eastern Cape.	Very specific habitat requirements - seldom more than 50 m from streams and rivers.	SA endemic with small intrusion in extreme southern Namibia. More than 60% of distribution in study area.	<b>Least Concern</b> (2014 SARC assessment)
Aves (Birds)	<i>Podica senegalensis</i>	African Finfoot	Throughout central and western Africa; mostly in Limpopo and Mpumalanga and KwaZulu-Natal, but are populations recorded in the Eastern Cape in the study area.	Perennial rivers or streams lined by thick riparian bush.	African endemic.	<b>Vulnerable</b> (2015 regional assessment)

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Group	Scientific name	Common name	Distribution	Habitat	Endemism	IUCN Red List status
Aves (Birds)	<i>Sagittarius serpentarius</i>	Secretary Bird	Widespread throughout sub-Saharan Africa, mostly in open grassland and scrub.	Open grassland and scrub, with short ground cover and scattered trees for nesting.	African endemic.	<b>Vulnerable</b> (2015 regional assessment)
Aves (Birds)	<i>Stephanoaetus coronatus</i>	Crowned Eagle	Widespread throughout sub-Saharan Africa with high densities observed in the Somerset East area.	Mostly forest, including riverine forest but also woodlands and forested gorge sin savanna and grassland.	African endemic.	<b>Vulnerable</b> (2015 regional assessment)
Reptilia	<i>Afroedura karroica</i>	Karoo Flat Gecko	Central-western Eastern Cape and adjacent regions of the southern Northern Cape and north-eastern Western Cape in grassland and Nama-Karoo.	Between 1300 2200 m in dolerite outcrops in grasslands	Endemic (90%) in study area	<b>Least Concern</b> (2014 SARC assessment)
Reptilia	<i>Bitis inornata</i>	Plain Mountain Adder	Eastern Cape. Sneeuberg.	Above 1500 m in grassy habitats	Endemic to Karoo	<b>Endangered</b> (2014 SARC assessment)
Reptilia	<i>Cordylus cloetei</i>	Cloete's Girdled Lizard	Western Cape. Nuweveldberg: area of occurrence = 338 km <sup>2</sup> .	Sandstone rocky habitats on Nuweveldberg	Endemic to Karoo	<b>Least Concern</b> (2014 SARC assessment)
Reptilia	<i>Cordylus minor</i>	Western Dwarf Girdled Lizard	South Africa. Western Karoo in Western and Northern Cape, from Komsberg range in the north to Majiesfontein in the south.	Rocky areas of mudstone shale lowlands	SA endemic, with about 70% distribution in study area.	<b>Least Concern</b> (2014 SARC assessment)
Reptilia	<i>Goggia braacki</i>	Braack's Pygmy Gecko	Western Cape. Nuweveldberg: 75 km <sup>2</sup> area of occurrence.	Dolerite outcrops in montane grasslands on Nuweveldberg	Endemic to Karoo	<b>Near Threatened</b> (2014 SARC assessment)
Reptilia	<i>Homopus boulengeri</i>	Karoo Dwarf Tortoise / Karoo Padloper	South Africa. From Pearston in the Eastern Cape to Touwsrivier in the Western Cape. In Northern Cape to Calvinia in the northwest and Carnavon in the northeast.	Dolerite outcrops 800 - 1500 m	SA endemic	<b>Near Threatened</b> (2014 SARC assessment)
Reptilia	<i>Pachydactylus kladaroderma</i>	Thin-Skinned Gecko	South Africa. Eastern Cape Fold Mountains and southern escarpment mountains of the Westen Cape and adjacent N Cape.	Large rock outcrops in mesic habitats from 750 – 1700 m, in both shale and in sandstone	SA endemic, with about 50% distribution in study area.	<b>Least Concern</b> (2014 SARC assessment)

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Group	Scientific name	Common name	Distribution	Habitat	Endemism	IUCN Red List status
Reptilia	<i>Pseudocordylus microlepidotus namaquensis</i>		Western Cape. Nuweveldberg & Komsberg.	1500 – 1800 m	Endemic to Karoo	<b>Least Concern</b> (2014 SARC assessment)
Amphibia	<i>Cacosternum karroicum</i>	Karoo Caco	South Africa. Western and Northern Cape.	Rainwater pools in rocky areas of mountains	Endemic to Karoo. 60% in study area. Northern population is likely a separate species.	<b>Least Concern</b> (2011 assessment)
Actinopterygii (fin-ray fish)	<i>Barbus amatolicus</i>	Amatola Barb	Eastern Cape: Kabusi, Slang, Kubowa, Nqancule, possibly upper reaches of Buffalo Rivers.	No information	Endemic to Eastern Cape	<b>Vulnerable</b> (IUCN Red List, 2007 assessment)
Actinopterygii (fin-ray fish)	<i>Barbus trevelyani</i>		Eastern Cape: four or five locations at Tyume, main stream (Keiskama), Yellowwoods, Mggawabe, Cwengqwe Rivers.	No information	Endemic to Eastern Cape	<b>Endangered</b> (IUCN Red List, 2007 assessment)
Actinopterygii (fin-ray fish)	<i>Pseudobarbus afer</i>	Eastern Cape Redfin	Eastern Cape: Swartkops and Sundays River systems.	No information	Endemic to Eastern Cape	<b>Endangered</b> (IUCN Red List, 2007 assessment)
Actinopterygii (fin-ray fish)	<i>Pseudobarbus asper</i>		Eastern Cape: Gamtoos and Gourits Rivers (Groot).	No information	Endemic to Eastern Cape	<b>Endangered</b> (IUCN Red List, 2007 assessment)
Actinopterygii (fin-ray fish)	<i>Sandelia bainsii</i>	Cape Rocky	Eastern Cape: Nahoon, Buffalo, Ingoda, Gula, Keiskamma, Great Fish, Kowie Rivers.	No information	Endemic to Eastern Cape	<b>Endangered</b> (IUCN Red List, 2007 assessment)
Mollusca (terrestrial snails)	<i>Cochlitoma crawfordi</i>	<i>Crawford's Agate Snail</i>	Eastern and Northern Cape. Bedford, Cathcart, Toise River, Cookhouse, Douglas, Jansenville, NW Uitenhage, Middleton, Queenstown, Somerset East, SW Cradock, Zuurberg.	Grassy slope with rocks and scrubby forest; grassy hillside with rocks and stunted bushes; indigenous forest	South Africa endemic. 90% of distribution in study area.	Not evaluated
Mollusca (terrestrial snails)	<i>Gulella rogersi</i>	<i>Roger's Hunter Snail</i>	Eastern Cape. Alice, Cathcart, Cradock, Graaff-Reinet, Jansenville, Kei River Valley, Kuzuko GR, Penhoekberg, Queenstown, Riebeeck East, Sterkstroom, Stormberg.	Various habitats: S facing slope of watercourse, riverine forest; grassy slope with rocks; open thicket in calcrete area; gully between dolorite cliffs; rocky N facing hillside with aloes, noors and	Eastern Cape endemic. 90% of distribution in study area.	Not evaluated

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Group	Scientific name	Common name	Distribution	Habitat	Endemism	IUCN Red List status
				bush clump; grassy hillside with aloes and bush clumps; rocky veld with aloes; kloof with rock outcrops and cave.		
Mollusca (terrestrial snails)	<i>Prestonella bowkeri</i>	<i>Bowker's Karoo Rock Snail</i>	Eastern and Western Cape. Karoo National Park, Graaff-Reinet, Murraysburg, Nieu Bethesda area, Nuweveldberge, Sneeuweberg, Somerset East.	Crevice in rocky areas, usually near waterfall or in indigenous forest; SE bank of river; S facing dolerite cliffs in wooded kloof, under overhangs and in crevices on shaded (northern) cliffs beside river.	South Africa Endemic, with >90% of distribution in study area	Not evaluated
Mollusca (terrestrial snails)	<i>Prestonella nuptialis</i>		Eastern and Western Cape. Adelaide, Beaufort West, Cradock, Fort Beaufort, Graaff-Reinet, Somerset East.	Indigenous forest, along water courses, waterfalls, S facing rocky ridges, in crevices in rocks.	South Africa Endemic. >90% distribution in study area.	Not evaluated
Mollusca (terrestrial snails)	<i>Sheldonia arnotti</i>	<i>Arnot's Tailwagger</i>	Eastern, Northern and Western Cape. Colesburg, Graaff-Reinet, Middleton, Nieu Bethesda, Wapadsberg Pass.	Grassy fynbos, bush, rocky grasslands, rocky riverine scrub.	South Africa Endemic. 90% of distribution in study area.	Not evaluated
Mollusca (terrestrial snails)	<i>Sheldonia asthenes</i>		Eastern and Western Cape. Cradock, Prince Albert, Somerset East, Graaff-Reinet, Queenstown, Sterkstroom.	S facing slope with Acacia and Rhus, in leaf-litter beneath bushes and under rock walls, in gullies between dolerite cliffs; rocky outcrop on hilltop ridge.	South Africa Endemic. 90% of distribution in study area.	Not evaluated
Crustacea, Anostraca (fairy shrimp)	<i>Branchipodopsis browni</i>		Southern Namibia, SA: Williston, Loxton, Fraserburg, Richmond.	Temporary waterbodies such as shallow, inundated areas.	Most records from Karoo, 80% in study area	Not evaluated
Crustacea, Anostraca (fairy shrimp)	<i>Branchipodopsis hutchinsoni</i>		Northern Cape: 30 km along dirt road from Hutchinson to Richmond –only one locality.	Temporary waterbodies, collected from inundated ditch along the side of road.	Endemic to Karoo - based on only one known locality	Not evaluated
Lepidoptera (butterflies)	<i>Aloeides dicksoni</i>	Dickson's Copper	Eastern Cape, Cradock in west to Seymour in east.	Grassland and Karoo. Montane >1000 m.	78% endemic to study area	<b>Least Concern</b> (SABCA 2013)

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Group	Scientific name	Common name	Distribution	Habitat	Endemism	IUCN Red List status
						assessment)
Lepidoptera (butterflies)	<i>Aloeides kaplani</i>	Kaplan's Copper	Eastern and Northern Cape, from Patensie in south-east to Springbok in north	Mountain peaks and adjacent slopes. >1000 m.	69% endemic to study area	<b>Least Concern</b> (SABCA 2013 assessment)
Lepidoptera (butterflies)	<i>Aloeides pringlei</i>	Pringle's Copper	Eastern Cape. Winterberg, near Bedford.	Montane grassland, >1000 m; rocky places.	100% endemic to study area	<b>Least Concern</b> (SABCA 2013 assessment)
Lepidoptera (butterflies)	<i>Cassionympha camdeboo</i>	Camdeboo Brown	Eastern Cape. Aberdeen area.	Relatively moist woodland and scrub. >1000 m.	99% endemic to study area	<b>Least Concern</b> (SABCA 2013 assessment)
Lepidoptera (butterflies)	<i>Chrysoritis beaufortia beaufortia</i>	Beaufort Opal	Eastern Cape. From Nieuweveld mountains at Beaufort West in west and Kompassberg near Nieu Bethesda in east.	Mountain slopes. >1000 m.	92% endemic to study area	<b>Least Concern</b> (SABCA 2013 assessment)
Lepidoptera (butterflies)	<i>Chrysoritis beaufortia sutherlandensis</i>	Beaufort's Opal	Northern Cape, Roggeveld escarpment at and near Sutherland.	Rocky ridges. Montane >1000 m	63% endemic to study area	<b>Least Concern</b> (SABCA 2013 assessment)
Lepidoptera (butterflies)	<i>Chrysoritis midas</i>	Midas Opal	Northern and Western Cape, from Roggeveld escarpment in west near Sutherland to Nuweveldberge in east near Beaufort West	Top of cliffs or rocky ridges at high altitudes (above 1500 m).	71% endemic to study area	<b>Least Concern</b> (SABCA 2013 assessment)
Lepidoptera (butterflies)	<i>Chrysoritis violescens</i>	Violet Opal	Northern Cape. Roggeveld escarpment around Sutherland.	Rocky ridges on the slopes of hills and mountains. >1000 m.	81% endemic to study area	<b>Least Concern (Rare-Habitat Specialist)</b> (SABCA 2013 assessment)
Lepidoptera (butterflies)	<i>Durbaniella clarki belladonna</i>	Clark's Rocksitter	Eastern Cape, approx. 30 km north-east of Jansenville.	Low hills in Sundays Thicket; south facing slopes. Microhabitat consists of dolerite rocks. <1000 m.	59% endemic to study area	<b>Vulnerable</b> (SABCA 2013 assessment)
Lepidoptera (butterflies)	<i>Kedestes barberae bonsa</i>	Barber's Ranger	Eastern and Northern Cape, from Aberdeen in the south to Colesberg in the north.	Lowland <1000 m; grassy; watercourses	67% endemic to study area	<b>Least Concern</b> (SABCA 2013 assessment)
Lepidoptera (butterflies)	<i>Lepidochrysops victori</i>	Victor's Blue	Eastern Cape. Near Bedford.	Karoo Escarpment Grassland, Amatole Montane Grassland. >1000 m.	100% endemic to study area	<b>Vulnerable</b> (SABCA 2013 assessment)

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Lepidoptera (butterflies)	<i>Phasis clavum erythema</i>	Namaqua Arrowhead	Northern Cape, Roggeveld escarpment in region of Sutherland.	Gullies at high altitude on Roggeveld escarpment and lower slopes below peaks. Montane >1000 m.	64% endemic to study area	<b>Least Concern</b> (SABCA 2013 assessment)
Lepidoptera (butterflies)	<i>Phasis pringlei</i>	Pribgle's Arrowhead	Northern Cape, from Roggeberg escarpment near Sutherland.	Mainly riverine areas, also in rocky habitats where host plant occurs.	61% endemic to study area	<b>Least Concern</b> (SABCA 2013 assessment)
Lepidoptera (butterflies)	<i>Pseudonympha trimenii ruthae</i>	Trimen's Brown	Eastern Cape, near Steytlerville in south to Noupoot in north-west and Lady Grey in north-east.	Various biomes, at high altitudes on mountains and hillsides. >1000 m	61% endemic to study area	<b>Least Concern</b> (SABCA 2013 assessment)
Lepidoptera (butterflies)	<i>Tarsocera southeyae</i>	Southey's Widow	Eastern and Northern Cape. Calvinia in west and Jansenville in in east; used to occur near Willowmore.	Hillsides, gullies and ridges, around rocky places up to 1000 m.	86% endemic to study area	<b>Least Concern</b> (SABCA 2013 assessment)
Lepidoptera (butterflies)	<i>Thestor camdeboo</i>	Camdeboo Skolly	Eastern Cape. Mountains inland of Graaff-Reinet and Aberdeen.	Upper slopes of high mountains. >1000 m; Merxmuellera grass.	100% endemic to study area	<b>Least Concern (Rare-Restricted Range)</b> (SABCA 2013 assessment)
Lepidoptera (butterflies)	<i>Thestor compassbergae</i>	Compassberg Skolly	Eastern Cape. Compassberg around Nieu Bethesda.	Sparsely vegetated grassy areas or areas of open shale. High altitudes on mountain slopes. >1000 m; Merxmuellera grass; rocky places.	100% endemic to study area	<b>Least Concern (Rare-Restricted Range)</b> (SABCA 2013 assessment)
Lepidoptera (butterflies)	<i>Thestor pringlei</i>	Pringle's Skolly	Northern and Western Cape. Roggeveld escarpment around Sutherland, outlier population at Matoosberg Station.	Rocky slopes and low ridges in mountain Renosterveld. >1000 m.	77% endemic to study area	<b>Least Concern</b> (SABCA 2013 assessment)
Lepidoptera (butterflies)	<i>Torynesis magna</i>	Large Widow	Western and Eastern Cape, from Swartberg near Oudtshoorn in west to Barkly East in east.	Grasslands in mountainous terrain. Slopes and hillsides. >1000 m; Merxmuellera grass.	67% endemic to study area	<b>Least Concern</b> (SABCA 2013 assessment)
Lepidoptera (butterflies)	<i>Trimenia wykehami</i>	Wykham's Silver-Spotted Copper	Northern and Western Cape, Roggeveld escarpment near Sutherland in west to Nuweveldberge near Beaufort	Rocky hillsides and slopes in dry karroid country. >1000 m.	79% endemic to study area	<b>Least Concern</b> (SABCA 2013 assessment)



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Group	Scientific name	Common name	Distribution	Habitat	Endemism	IUCN Red List status
			West in east.			
Orthoptera (grasshopper)	<i>Batrachotetrix stollii</i>	Toad Grasshopper	Western, Eastern and Northern Cape. Aberdeen, Beaufort West, Graaff-Reinet, Jansenville, Kenhardt, Middleburg, Nelspoort, Prince Albert, Sutherland, Willowmore, Worcester, Bedford, De Aar.	Unknown	South Africa Endemic, with probably about 60% restricted to study area	Not evaluated
Orthoptera (katydid)	<i>Griffiniana capensis</i>	Cape Agile Katydid	Eastern and Northern Cape, 20 km S Aberdeen, vicinity of Teekloof Pass, 30 km south Fraserburg, Tankwa Karoo National Park.	Unknown	South Africa Endemic, with >60% of distribution likely to be in study area	<b>Least Concern (IUCN, 2014)</b>
Orthoptera (grasshopper)	<i>Plegmpaterus irisus</i>		Northern and Western Cape. Sutherland area, Ruiterskop Sta. 30 km NNE Laingsburg, Prince Albert area, 2 mi S Middelpos nr. Tankwa Karoo NP 3 mi SW Seekoegat, 4 mi N Merweville, 16 mi SE Loxton.	Unknown	South Africa Endemic, with >60% of distribution likely to be in study area	Not evaluated

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Table 7.2: Plant species of special concern in the study area (i.e. plant species that have more than 80% of their distribution within the study area).

Family	Scientific name	Common name	Distribution	Habitat	Habitat type	IUCN Red List Status (2015 South African Plant Assessment)
Crassulaceae	<i>Adromischus cooperi</i>	Bontplakkie (Afrikaans)	Somerset East to Graaff-Reinet, Middelburg and Queenstown.	Rock crevices, usually on slopes or in the shade of other vegetation.	Kopies	Least Concern
Crassulaceae	<i>Adromischus fallax</i>	Graaff-Reinet Plakkie (Afrikaans)	Graaff-Reinet district.	Rock faces at high altitude.	Mountains	Rare
Crassulaceae	<i>Adromischus humilis</i>	Karooberg Plakkie (Afrikaans)	Nuweveld Mountains near Beaufort West, north of Laingsburg at Klipfontein, and at Oukloof Pass near Fraserburg.	Rock crevices.	Mountains	Least Concern
Rutaceae	<i>Agathosma sp nov. (Nick Helmeii)</i>		Roggeveld mountains.	Growing amongst boulders in dolerite outcrops.	Mountains	Rare
Aizoaceae	<i>Aloinopsis acuta</i>		Roggeveld to Nieuweveld.	Arid rocky escarpments.	Mountains	Data Deficient
Malvaceae	<i>Anisodonteia capensis</i>	Wildestokroos (Afrikaans)	Victoria West to near Prince Albert.	Most often occurs near rivers.	Floodplains	Least Concern
Malvaceae	<i>Anisodonteia malvastroides</i>	Wildestokroos (Afrikaans)	Escarpment ranges of Graaff-Reinet and Middelburg.	Arid escarpments.	Mountains	Least Concern
Aizoaceae	<i>Antimima dekenahi</i>		Williston to Sutherland and Fraserburg.	In crevices in shale.	Rocky / hilly lowlands	Least Concern
Aizoaceae	<i>Antimima emarcescens</i>		Sutherland.	In mountain renosterveld, scrambling in other bushes	Mountains	Rare
Aizoaceae	<i>Antimima ivori</i>		Sutherland to Fraserburg.	In crevices in exposed sandstone.	Rocky / hilly lowlands	Least Concern
Aizoaceae	<i>Antimima loganii</i>		Roggeveld	In crevices of sandstone rocks	Rocky / hilly lowlands	Data Deficient

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Family	Scientific name	Common name	Distribution	Habitat	Habitat type	IUCN Red List Status (2015 South African Plant Assessment)
Amaryllidaceae	<i>Apodolirion bolusii</i>	Maagbitterwortel (Afrikaans)	Valley of Desolation, Graaff-Reinet.	Karroid shrubland or in subtropical thicket on shale-derived soils.	Lowland flats	Data Deficient
Asparagaceae	<i>Asparagus mollis</i>	Wag-'n-bietjie (Afrikaans)	Jagerskraal, Verlatekloof Pass	On Dwyka tillite	Lowland flats	Least Concern
Asphodelaceae	<i>Astroloba congesta</i>	Katdoring (Afrikaans)	Cradock to Grahamstown.	Karroid flats.	Lowland flats	Least Concern
Iridaceae	<i>Babiana virginea</i>		Roggeveld Escarpment, Middelpso to Verlate Kloof.	Shale outcrops amongst the clumps of Merxmullera.	Mountains	Least Concern
Aizoaceae	<i>Bergeranthus nanus</i>		Graaff-Reinet to the area between Somerset East and Cradock.	Exposed intrusive dolerite sills.	Lowland flats	Vulnerable
Asteraceae	<i>Berkheya cardopatifolia</i>		Roggeveld foothills and Laingsburg to Upper Karoo.	Dry hillsides and cliffs.	Mountains	Least Concern
Apocynaceae	<i>Brachystelma theronii</i>	Mohata-o-mosoeu (Southern Sotho)	Laingsburg to Williston.	Dolerite-capped shale hills.	Kopies	Least Concern
Apocynaceae	<i>Ceropegia filiformis</i>	Rankkambroo (Afrikaans)	Beaufort West to Luckhoff and east to Middleburg.	Growing in karroid scrub amongst low shrubs.	Lowland flats	Least Concern
Scrophulariaceae	<i>Chaenostoma rotundifolium</i>	Necklace vine (English)	Victoria West to Sneeuberg north to Griekwastad.	Cliff faces and rock outcrops.	Mountains	Least Concern
Aizoaceae	<i>Chasmatophyllum braunsii</i>	Bohlanya-ba-pere (Southern Sotho)	Laingsburg and Victoria West.	Nama Karoo.	Lowland flats	Data Deficient
Aizoaceae	<i>Chasmatophyllum nelii</i>		Prince Albert to Kliplaat to Cradock.	Rocky flats and hills of sandstone and dolerite origin.	Rocky/hilly lowlands	Least Concern
Aizoaceae	<i>Chasmatophyllum stanleyi</i>		Beaufort West, Aberdeen, Willowmore, Laingsburg to Prince Albert.	On stony to shaley slopes.	Rocky/hilly lowlands	Least Concern
Rosaceae	<i>Cliffortia arborea</i>	Anysberg star tree (English)	Hantamsberg Mountain to Nuweveld Mountains.	Cliffs and ledges of dolerite, sandstone, and shale escarpment.	Mountains	Vulnerable

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Family	Scientific name	Common name	Distribution	Habitat	Habitat type	IUCN Red List Status (2015 South African Plant Assessment)
Colchicaceae	<i>Colchicum karooparkense</i>		Beaufort West within the Karoo National Park.	Stony flats.	Lowland flats	Least Concern
Crassulaceae	<i>Crassula vestita</i>	Cape May (English)	Roggeveld Mountains.	Amongst low shrublets, associated with rock outcrops.	Lowland flats	Least Concern
Scrophulariaceae	<i>Cromidon decumbens</i>	Smooth Hawk's Beard (English)	Hantamsberg and Roggeveld to near Graaff-Reinet.	Sheltering under rocks.	Kopies	Least Concern
Asteraceae	<i>Curio hallianus</i>	Suuroogblom (Afrikaans)	Central Karoo, between Prince Albert, Loxton and Merweville.	Sheltered among the roots of shrubs and in rocky crevices.	Kopies	Least Concern
Aizoaceae	<i>Cylindrophyllum calamiforme</i>		Graaff-Reinet to Somerset East S, from Willowmore to Jansenville.	Stony slopes and flats of karoo sediments.	Lowland flats	Least Concern
Boraginaceae	<i>Cynoglossum obtusicalyx</i>		Hantamsberg and Ceres and Beaufort West.	Often on screes below cliffs.	Mountains	Least Concern
Hyacinthaceae	<i>Daubinya aurea</i>	Swan Orchid (English)	Roggeveld Escarpment between Sutherland and Middelpos.	Arid shrubland, on seasonally damp, red clay flats along the base of dolerite ridges.	Mountains	Endangered
Aizoaceae	<i>Delosperma aberdeenense</i>	Abredeeen Volstruislaai (Afrikaans)	Aberdeen to Cradock and Somerset East.	Flats or hills of karoo sediments.	Lowland flats	Least Concern
Aizoaceae	<i>Delosperma aereum</i>	Prins Albert Volstruislaai (Afrikaans)	Prince Albert to Klipplaat.	Occurs in lower karoo bioregion.	Lowland flats	Least Concern
Aizoaceae	<i>Delosperma concavum</i>	Sneeuberg Volstruislaai (Afrikaans)	Sneeuberg mountains above Graaff Reinet.	Flats and hills of karoo sediments.	Mountains	Least Concern
Aizoaceae	<i>Delosperma karrooicum</i>	Graaff-Reinet Volstruislaai (Afrikaans)	Queenstown to Graaff-Reinet District the Sneeu berg mountain range.	Slopes of karoo shales or siltstones.	Rocky/hilly lowlands	Least Concern
Aizoaceae	<i>Delosperma lootsbergense</i>	Karoo Volstruislaai (Afrikaans)	Middelburg and Graaff-Reinet Districts.	Flats and hills of karoo sediments.	Lowland flats	Least Concern

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Family	Scientific name	Common name	Distribution	Habitat	Habitat type	IUCN Red List Status (2015 South African Plant Assessment)
Aizoaceae	<i>Delosperma sphalmanthoides</i>	Sutherland Volstruislaai (Afrikaans)	Sutherland.	In shallow soils over sandstone rocks, 1500 – 1600 m.	Mountains	Rare
Scrophulariaceae	<i>Diascia alonsooides</i>		Sutherland to Murraysburg and Graaff-Reinet.	South facing slopes in loamy soil.	Kopies	Least Concern
Scrophulariaceae	<i>Diascia ramosa</i>	Pensies (Afrikaans)	Somerset East, Boschberg.	Mountain slopes in Amathole Montane Grassland.	Mountains	Vulnerable
Iridaceae	<i>Dierama grandiflorum</i>	Devil Thorn (English)	Graaff-Reinet and Somerset East.	Grass slopes among rock outcrops.	Mountains	Vulnerable
Hyacinthaceae	<i>Drimia karoovica</i>	Maerman (Afrikaans)	Roggeveld to Great Karoo.	Stony flats and slopes.	Lowland flats	Least Concern
Aizoaceae	<i>Drosanthemum lique</i>	Doublem (Afrikaans)	Karoo to Eastern Cape.	In loamy soils, often in disturbed areas.	Lowland flats	Least Concern
Apocynaceae	<i>Duvalia angustiloba</i>	Hotnotstoontjie (Afrikaans)	Great Karoo between Beaufort West, Rietbron, Aberdeen, Victoria West and Loxton.	Grows under shrubs in dry, flat areas or among dolerite outcrops.	Lowland flats	Least Concern
Ericaceae	<i>Erica passerinoides</i>	Sticky white heath (English)	Sneeuberg in the Koudeveld Mountains, Katberg Pass and Cata Forest Reserve.	Karoo-fynbos ecotone, on south-facing slopes.	Mountains	Vulnerable
Asteraceae	<i>Eumorphia corymbosa</i>		Nuweveld Mountains.	Seasonal wet soils along rivers and in marshy habitats.	Floodplains	Least Concern
Asteraceae	<i>Eumorphia dregeana</i>		Hanover to Graaff- Reinet.	Karoo Escarpment Grassland.	Mountains	Least Concern
Euphorbiaceae	<i>Euphorbia hypogaea</i>	Underground Spurge (English)	Sutherland to Great Karoo.	Karroid scrub, usually on flats under or alongside bushes.	Lowland flats	Least Concern

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Family	Scientific name	Common name	Distribution	Habitat	Habitat type	IUCN Red List Status (2015 South African Plant Assessment)
Euphorbiaceae	<i>Euphorbia jansenvillensis</i>		Steytlerville to Klipplaat and Jansenville.	Open karroid shrubland, stony slopes and flats, in loose sandy soils under small shrubs, or wedged among stones.	Lowland flats	Vulnerable
Euphorbiaceae	<i>Euphorbia obesa</i>	Vetmense (Afrikaans)	Graaff-Reinet to Rietbron.	Open karroid shrubland, stony slopes and flats, in loose sandy soils under small shrubs, or wedged among stones.	Lowland flats	Endangered
Euphorbiaceae	<i>Euphorbia polycephala</i>		Between Pearson, Cradock and Somerset East.	Karroid shrubland and thicket, on rocky hills and flats.	Lowland flats	Vulnerable
Euphorbiaceae	<i>Euphorbia stellispina</i>	Karoo Noorsdoring (Afrikaans)	North east of Calvinia to north of Laingsburg, widespread in Great Karoo.	Karroid scrub on stony slopes with scattered dolerite rocks.	Kopies	Least Concern
Euphorbiaceae	<i>Euphorbia suffulta</i>	Bosmelkbos (Afrikaans)	Merweville to Klaarstroom.	Stony gentle slopes, often inside other bushes.	Lowland flats	Least Concern
Asteraceae	<i>Euryops dentatus</i>		Bankberg, Toorberg and Sneeuweberg in the Graaff-Reinet district.	Arid mountain slopes.	Mountains	Vulnerable
Asteraceae	<i>Euryops exudans</i>	Graaff-Reinet Harpuis (Afrikaans)	Sneeuweberg between Graaff-Reinet and Cradock.	Karoo Escarpment Grassland.	Mountains	Least Concern
Asteraceae	<i>Euryops nodosus</i>	Nuweveld Harpuis (Afrikaans)	Nuweveld Escarpment.	Stony flats and hillsides, often dolerite, in renosterveld.	Mountains	Least Concern
Asteraceae	<i>Euryops petraeus</i>	Sneeuweberg Harpuis (Afrikaans)	Sneeuweberge and Winterhoek Mountains in the Graaff-Reinet district, and Nuweveld Mountains south of Fraserburg.	Rocky mountain summits, 1650 - 2450 m.	Mountains	Least Concern

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Family	Scientific name	Common name	Distribution	Habitat	Habitat type	IUCN Red List Status (2015 South African Plant Assessment)
Asteraceae	<i>Euryops proteoides</i>	Proteaharpuis (Arikaans)	Southern Sneeu-berg between Graaff-Reinet and Pearston.	Moist, south-facing escarpment slopes and below cliff-lines and along drainage lines, 1200 - 2000 m.	Mountains	Least Concern
Asteraceae	<i>Euryops sulcatus</i>	Waterharpuis (Afrikaans)	Roggeveld and Nieuweveld escarpment.	Rocky slopes. 1500 - 1860 m.	Mountains	Least Concern
Proteaceae	<i>Faurea recondita</i>	Kamdeboo Beechwood (English)	Kamdeboo Mountains north of Aberdeen.	South-eastern slopes in dense mountain fynbos, specifically Drakensberg-Amathole Afromontane Fynbos forest margins.	Mountains	Least Concern
Cyperaceae	<i>Ficinia compasbergensis</i>	Compasberg Ystervarkgras (Afrikaans)	Calvinia and Sutherland Districts to the Eastern Cape.	Mountain peaks and slopes.	Mountains	Least Concern
Aizoaceae	<i>Galenia glandulifera</i>	Bloubrakbossie (Afrikaans)	Great Karoo, Whitehill to Prince Albert.	Stony soil.	Lowland flats	Least Concern
Asteraceae	<i>Gazania caespitosa</i>	Botterblom (Afrikaans)	Graaff-Reinet district, Sneeu-berge.	Unknown.	Mountains	Data Deficient
Iridaceae	<i>Geissorhiza cantharophila</i>	Syblom (Afrikaans)	Klein Roggeveld.	Clay and gravel slopes in renosterveld, WM	Mountains	Least Concern
Geraniaceae	<i>Geranium harveyi</i>		Nuweveld Moutains southwestwards to the mountains near Cala and southwards to Boschberg, Somerset East.	In sheltered areas on outcrops or grassy slopes in sand, loam or clay.	Mountains	Least Concern
Amaryllidaceae	<i>Gethyllis longistyla</i>	Koekoemakranka (Afrikaans)	Sneeu-berg, Agter Sneeu-berg and Nuweveld Mountains.	Tops of rocky, dolerite ridges.	Mountains	Least Concern
Iridaceae	<i>Gladiolus marlothii</i>	Roggeveld Gladiolus (English)	Roggeveld Escarpment and Komsberg	Stony slopes in clay, WM	Mountains	Least Concern

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Family	Scientific name	Common name	Distribution	Habitat	Habitat type	IUCN Red List Status (2015 South African Plant Assessment)
Asteraceae	<i>Gnaphalium simii</i>		Hanover.	Calcareous vleis.	Floodplains	Data Deficient
Scrophulariaceae	<i>Gomphostigma incomptum</i>	Besembossie (Afrikaans)	Roggeveld through Upper Karoo to near Colesberg.	Riverbanks.	Floodplains	Least Concern
Malvaceae	<i>Grewia robusta</i>	Kruisbessiebos (Afrikaans)	Beaufort West area southwards to George and Oudtshoorn.	Restricted to the arid areas of the Karoo and the arid parts of Eastern Cape. It generally favours dry scrub, often on stony hill slopes and in valley bushveld.	Lowland flats	Least Concern
Asphodelaceae	<i>Haworthia semiviva</i>	Baakhout (Afrikaans)	Roggeveld and Nuweveld mountains.	Shaded places under shrubs.	Lowland flats	Least Concern
Asphodelaceae	<i>Haworthiopsis nigra</i>		Widespread across the Great Karoo, extending southwards to Grahamstown and East London and eastwards to Queenstown.	Sheltered among the base of shrubs on karoo plains, as well as rocky ridges, outcrops and cliffs.	Lowland flats	Least Concern
Asteraceae	<i>Helichrysum albertense</i>	Sewejaartjie (Afrikaans)	Laingsburg to Leeu Gamka, eastwards to Klipplaat and southwards to Prince Albert.	Karroid shrubland, on low ridges and flats.	Lowland flats	Data Deficient
Asteraceae	<i>Helichrysum scitulum</i>		Nuweveld Mountains near Beaufort West to Witteberg near Lady Grey.	Rocky mountain summits, forming loose mats in rock crevices or cascading down steep cliffs and slopes, growing intertwined with grasses and other vegetation.	Mountains	Least Concern
Asteraceae	<i>Helichrysum tysonii</i>		Mountains between Murraysburg, Graaff-Reinet and Middelburg.	Bare, rocky areas, will colonise eroded places and hard, gravelly road verges.	Mountains	Least Concern



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Family	Scientific name	Common name	Distribution	Habitat	Habitat type	IUCN Red List Status (2015 South African Plant Assessment)
Aizoaceae	<i>Hereroa concava</i>		Beaufort West.	Unknown.	unknown	Data Deficient
Aizoaceae	<i>Hereroa crassa</i>		Laingsburg to Prince Albert, Beaufort West.	On slopes with quartzite rock.	Mountains	Least Concern
Aizoaceae	<i>Hereroa herrei</i>		Graaff- Reinet.	Unknown.	unknown	Data Deficient
Aizoaceae	<i>Hereroa willowmorensis</i>	Sheeps ear (English)	Beaufort West to Willowmore and Aberdeen.	In shaley or gravelly soils.	Lowland flats	Least Concern
Malvaceae	<i>Hermannia grandiflora</i>	Ouma-se-kappie (Afrikaans)	Great Karoo to the Roggeveld, Tanqua Karoo.	In dry seasonal washes.	Floodplains	Least Concern
Malvaceae	<i>Hermannia linnaeoides</i>	Klokkiebos (Afrikaans)	Central Karoo to near Prince Albert.	In seasonally wet depressions.	Pans	Least Concern
Malvaceae	<i>Hermannia nana</i>	Klokkiebos (Afrikaans)	Matjiesfontein to Koup Karoo.	Stony slopes.	Kopies	Least Concern
Asteraceae	<i>Hertia cluytūfolia</i>	Goewernementsbossie (Afrikaans)	Carnavon to Sneeuberg.	Karroid plains.	Lowland flats	Least Concern
Iridaceae	<i>Hesperantha helmei</i>	Graaff-Reinet Aandblom (Afrikaans)	Graaff-Reinet, Nardousberg.	High elevations in regularly burned, rocky grassland, covered in snow during winter.	Mountains	Least Concern
Iridaceae	<i>Hesperantha teretifolia</i>	Aandblom (Afrikaans)	Roggeveld Escarpment.	Stony slopes, often growing in rock crevices.	Mountains	Least Concern
Apocynaceae	<i>Hoodia dregei</i>	Wolweghaap (Afrikaans)	Merweville, Beaufort West and Prince Albert.	Stony slopes of hills or stony flat areas.	Lowland flats	Vulnerable
Apocynaceae	<i>Hoodia grandis</i>	Grootghaap (Afrikaans)	Great and Little Karoo between Matjiesfontein, Merweville, Leeu-Gamka and Calitzdorp.	Among bushes on stony slopes.	Lowland flats	Least Concern

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Family	Scientific name	Common name	Distribution	Habitat	Habitat type	IUCN Red List Status (2015 South African Plant Assessment)
Apocynaceae	<i>Hoodia pilifera subsp. annulata</i>	Stinkbos (Afrikaans)	Great Karoo from Aberdeen and Graaff-Reinet southwards to Rietbron and eastwards to Willowmore, Klipplaat and Steytlerville.	Flat areas between low hills on slightly gravelly ground, rarely on hill slopes.	Lowland flats	Least Concern
Apocynaceae	<i>Huernia humilis</i>	Karoo Toad Plant (English)	Widespread across the Great Karoo between Middelpos, Beaufort West, Willowmore, Richmond and De Aar.	Karroid shrubland, this species occurs wedged among rocks under small bushes.	Lowland flats	Least Concern
Apocynaceae	<i>Huernia kennedyana</i>	Cradock Toad Plant (English)	Cradock and Somerset East.	Occasionally on flat areas, more usually associated with slightly raised gravelly spots, on low doleritic ridges, also on shale ridges in crevices among rocks.	Kopies	Least Concern
Fabaceae	<i>Indigofera asantasanensis</i>	Sneeuberg Lusernbo (Afrikaans)	Confined to the summit plateau of the Toorberg–Koudeveld–Meelberg in the western Sneeu berg, between 1700 – 2150 m.	Found exclusively on the dolerite-derived loamy-clays and black turf soils typical of this plateau. The vegetation type is Karoo Escarpment Grassland.	Mountains	Vulnerable
Fabaceae	<i>Indigofera magnifica</i>	Toorberg Lusernbo (Afrikaans)	Summit plateau of the Toorberg–Koudeveld–Meelberg in the western Sneeu berg, between 1700 – 2150 m.	Found exclusively on the dolerite-derived loamy-clays and black turf soils typical of this plateau. The vegetation type is Karoo Escarpment Grassland, typical of high altitudes in the Sneeu berg mountain complex.	Mountains	Vulnerable
Cyperaceae	<i>Isolepis expallescens</i>	Waterbiesie (Afrikaans)	Central Karoo, Fraserburg and Victoria West districts.	River Beds.	Floodplains	Least Concern

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Family	Scientific name	Common name	Distribution	Habitat	Habitat type	IUCN Red List Status (2015 South African Plant Assessment)
Iridaceae	<i>Ixia brevituba</i>	Roggeveld Kalossie (Afrikaans)	Roggeveld Escarpment southwest of Middelpos.	Stony, light clay in renosterveld.	Mountains	Least Concern
Iridaceae	<i>Ixia marginifolia</i>	Kalossie (Afrikaans)	Loeriesfontein to Fraserburg, Beaufort West and Matjiesfontein.	Clay or loamy ground in renosterveld or karroid scrub.	Lowland flats	Least Concern
Iridaceae	<i>Ixia pavonia</i>	Kalossie (Afrikaans)	Roggeveld Escarpment.	Shallow, rocky clay soils on steep slopes.	Mountains	Least Concern
Iridaceae	<i>Ixia rigida</i>	Witkalossie (Afrikaans)	Roggeveld Escarpment.	Rocky red clay soils on dolerite outcrops.	Mountains	Vulnerable
Iridaceae	<i>Ixia sobolifera subsp. sobolifera</i>	Bluebells (English)	Klein Roggeveld between Sutherland and Matjiesfontein.	Well-drained, rocky loam or clay soils in succulent shrubland.	Mountains	Least Concern
Scrophulariaceae	<i>Jamesbrittenia crassicaulis</i>		Middelburg east to Queenstown, and south from Graaff-Reinet to Cradock.	In montane cliffs and other rocky places.	Mountains	Least Concern
Scrophulariaceae	<i>Jamesbrittenia incisa</i>		Calvinia to Swartputs and Breekbeenkolk, and Sutherland to Fraserburg.	Among boulders in karroid vegetation.	Kopies	Vulnerable
Asphodelaceae	<i>Kniphofia acraea</i>	Wild Jessamine (English)	Cradock and Mountain Zebra National Park.	Grows in small seepage areas among rocks in grassy montane fynbos.	Mountains	Least Concern
Hyacinthaceae	<i>Lachenalia comptonii</i>	Violtjie (Afrikaans)	Roggeveld Escarpment and Little Karoo.	Sandy Flats.	Lowland flats	Least Concern
Hyacinthaceae	<i>Lachenalia congesta</i>	Violtjie (Afrikaans)	Sutherland and Calvinia.	Shale in karroid scrub.	Lowland flats	Least Concern
Hyacinthaceae	<i>Lachenalia isopetala</i>	Violtjie (Afrikaans)	Bokkeveld Plateau, Roggeveld to Komsberg.	In stony doleritic clay.	Mountains	Least Concern
Hyacinthaceae	<i>Lachenalia longituba</i>	Violtjie (Afrikaans)	Roggeveld Plateau and Escarpment	In small groups on moist, loam flats, WM	Lowland flats	Least Concern

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Family	Scientific name	Common name	Distribution	Habitat	Habitat type	IUCN Red List Status (2015 South African Plant Assessment)
Hyacinthaceae	<i>Lachenalia whitehillensis</i>	Graceful Poker (English)	Komsberg to near Laingsburg.	Deep sand.	Lowland flats	Least Concern v
Iridaceae	<i>Lapeirousia montana</i>	Rooinaeltjies (Afrikaans)	Komsberg Pass area to Middelpas.	Clay soils in renosterveld.	Lowland flats	Least Concern
Asteraceae	<i>Lasiospermum poterioides</i>	Gansgras (Afrikaans)	Roggeveld to Williston.	Beaufort clay series.	Floodplains	Least Concern
Brassicaceae	<i>Lepidium bipinnatum</i>	Indiese platertjie (Afrikaans)	Fraserberg.	Unknown habitat.	unknown	Least Concern
Fabaceae	<i>Lessertia inflata</i>	Seeroogbossie (Afrikaans)	Calvinia to Upper Karoo.	In shaley soils.	Lowland flats	Least Concern
Fabaceae	<i>Lotononis azureoides</i>		Nuweveld Mountains.	Steep, rocky sandstone slopes at 1600 m.	Mountains	Least Concern
Fabaceae	<i>Lotononis venosa</i>	Silwerboom (Afrikaans); Molomo-monate (South Sotho)	Klein Roggeveld Mountains.	Open karroid scrub on sandy clay alluvium.	Mountains	Vulnerable
Scrophulariaceae	<i>Manulea chrysantha</i>	Egossa-rooipeer (Afrikaans)	Nuweveld Mountains through Great Karoo to Little Karoo.	Riverbeds and gravel patches.	Floodplains	Least Concern
Scrophulariaceae	<i>Manulea deserticola</i>		Fauresmith and Modder River.	Sandy soils.	Lowland flats	Data Deficient
Aizoaceae	<i>Mesembryanthemum excavatum</i>	Olifantslaai (Afrikaans)	Tanqua Karoo, Laingsburg, Fraserburg, Beaufort West.	Prefers disturbed areas.	Lowland flats	Least Concern
Geraniaceae	<i>Monsonia camdeboensis</i>	Karoo Bushman Candle (English)	Great Karoo between Beaufort West, Sterkstroom and Willowmore.	Rocky dolerite ridges, or rocky outcrops on shale plains.	Kopies	Least Concern
Iridaceae	<i>Moraea crispa</i>		Cederberg Mountains to Baviaanskloof, southern and western Karoo.	Clay slopes.	Mountains	Least Concern
Amaryllidaceae	<i>Nerine huttoniae</i>	Berg Lily (Afrikaans)	Great Fish River Floodplain.	Floodplains, in sandy alluvial flats.	Floodplains	Vulnerable

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Family	Scientific name	Common name	Distribution	Habitat	Habitat type	IUCN Red List Status (2015 South African Plant Assessment)
Apocynaceae	<i>Ophionella arcuata</i> <i>subsp. Arcuata</i>		East of Willowmore through Steytlerville and Pearston to west of Somerset East.	Flats	Lowland flats	Least Concern
Apocynaceae	<i>Orbea miscella</i>	Engelseturksvy (Afrikaans)	Widely distributed in the Great Karoo, from Fraserburg north-eastwards to Richmond, Hanover and Cradock and south-eastwards to Willowmore and Steytlerville.	Occurs in flattish areas on low stony ridges where they grow among stones and small karroid bushes usually not taller than 30 cm.	Lowland flats	Least Concern
Hyacinthaceae	<i>Ornithogalum corticatum</i>	Roggeveld Chincherinchee	Roggeveld Escarpment.	Heavy clay soils derived from dolerite.	Mountains	Least Concern
Hyacinthaceae	<i>Ornithogalum verae</i>	Slang-gwaap (Afrikaans)	Roggeveld	Dolerite flats, WM	Lowland flats	Least v
Asteraceae	<i>Osteospermum thymelaeoides</i>	Onkruidbietou (Afrikaans)	Laingsburg, Roggeveld Escarpment and Nuweveld Mountains, as far as Molteno Pass.	Upper south-facing slopes, 1036-1676 m.	Mountains	Least Concern
Asteraceae	<i>Othonna pavonia</i>		De Aar to Beaufort West and east to Cradock.	Karoid plains and slopes.	Lowland flats	Least v
Asteraceae	<i>Othonna rhamnoides</i>	Slangblom (Afrikaans)	Roggeveld to Sneeuberg.	Stony calcrete flats.	unknown	Data Deficient
Oxalidaceae	<i>Oxalis pocockiae</i>		Tanqua-Karoo, to Prince Albert and Carnarvon.	Unknown.	unknown	Least Concern
Apocynaceae	<i>Pectinaria longipes</i> <i>subsp. longipes</i>	Joemapitsuring (Afrikaans)	Kleinrogeveld Mountains, Roggeveld plateau to Fraserberg	Flat gravelly areas under low growing Asteraceous shrubs	Mountains	Least Concern
Aizoaceae	<i>Peersia frithii</i>		Laingsburg to Aberdeen.	Slopes or flats of finely weathered Ecce shales.	Lowland flats	Least Concern

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Family	Scientific name	Common name	Distribution	Habitat	Habitat type	IUCN Red List Status (2015 South African Plant Assessment)
Geraniaceae	<i>Pelargonium aestivale</i>	Malva (Afrikaans)	Widespread in the summer rainfall areas of the central Karoo, from Murraysburg to Fraserburg.	Grassy karroid shrubland wedged between rocks on hillsides or flats.	Lowland flats	Least Concern
Geraniaceae	<i>Pelargonium griseum</i>	Dassie Buchu (Afrikaans)	Lady Grey from Joubert's Pass eastwards to the Oudeberg near Graaff-Reinet.	Mountainous areas with hot summer and cold winter conditions and an annual precipitation of 200 – 300 mm.	Mountains	Least Concern
Pteridaceae	<i>Pellaea rufa</i>	Hard fern (English); Maagpynbossie (Afrikaans)	Ladismith to Willowmore.	Rock outcrops.	Kopies	Least Concern
Aizoaceae	<i>Phyllobolus rabiei</i>		Fauresmith to Victoria West and Cradock.	Karroid scrub on floodplains.	Floodplains	Least Concern
Asteraceae	<i>Phymaspermum scoparium</i>	Geelblombos	A poorly collected species from near Graaff-Reinet in the Eastern Cape to Hanover in the Northern Cape.	Floodplains.	Floodplains	Least Concern
Apocynaceae	<i>Piarranthus comptus</i>	Gooseberry (English)	Beaufort West to Laingsburg and Willowmore.	Gravelly flats under bushes.	Lowland flats	Least Concern
Aizoaceae	<i>Pleiospilos bolusii</i>	Quagga Kos (Afrikaans)	Willowmore to Beaufort West and Aberdeen.	Quartz flats in karroid shrubland.	Quartz patches	Vulnerable
Aizoaceae	<i>Pleiospilos nelii</i>	Kwaggavygie (Afrikaans)	Willowmore Karoo.	Quartz covered flats in sparse karoo vegetation.	Quartz patches	Near Threatened
Fabaceae	<i>Polhillia involucrata</i>		Roggeveld Escarpment.	Mountain renosterveld on well-drained, sandy loams.	Mountains	Endangered

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Family	Scientific name	Common name	Distribution	Habitat	Habitat type	IUCN Red List Status (2015 South African Plant Assessment)
Fabaceae	<i>Psoralea margaretiflora</i>	Sneeuberg Fountain-bush (English)	Kamdeboo, Toorberg, Koudeveld and Coetzeesberg mountains in the Sneeuwberg Mountain Complex, Graaff-Reinet and Pearston districts.	Rich turf soils and colluvium associated with dolerite on lower and middle slopes at Karoo Escarpment Grassland-Mountain Fynbos ecotones, as well as closed Otholobium macradenium shrubland.	Mountains	Least Concern
Asteraceae	<i>Pteronia erythrochaeta</i>	Boegoekaroo (Afrikaans)	Upper Karoo (extends up to Carnavon) and Great Karoo and into Western Free State		unknown	Least Concern
Asteraceae	<i>Pteronia tricephala</i>	Bloukeur (Afrikaans)	Roggeveld Escarpment to Upper Karoo.	Habitat unknown.	unknown	Least Concern
Apocynaceae	<i>Quaqua arenicola</i> <i>subsp. pilifera</i>		Roggeveld plateau, south of Middelpoos to Fraserburg	Stony dolerite slopes, usually at the base of bushes	Mountains	Least Concern
Aizoaceae	<i>Rabiea difformis</i>	Cradock Clock Plant (English)	Middelburg and Cradock Districts.	Rocky outcrops of karoo sediments.	Kopies	Least Concern
Scrophulariaceae	<i>Reyemia chasmanthiflora</i>		Between Calvinia and Middelpoos.	In karroid vegetation on very dry stony flats.	Lowland flats	Least Concern
Scrophulariaceae	<i>Reyemia nemesioides</i>		Hantamsberg to Roggeveld to Nuweveld Mountains.	Dolerite hills.	Kopies	Least Concern
Aizoaceae	<i>Rhinephyllum broomii</i>		Carnarvon to Fraserburg Road and Beaufort West.	On bare stony, gentle slopes, in shale.	Lowland flats	Least Concern
Aizoaceae	<i>Rhinephyllum graniforme</i>		Fraserburg, frequent in patches between Laingsburg and Prince Albert.	On shaley flats.	Lowland flats	Least Concern
Aizoaceae	<i>Rhinephyllum obliquum</i>		Fraserburg, near Luttig.	Ecology unknown.	unknown	Least Concern

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**DIGITAL ADDENDA 7A – 7B**

Family	Scientific name	Common name	Distribution	Habitat	Habitat type	IUCN Red List Status (2015 South African Plant Assessment)
Iridaceae	<i>Romulea albiflora</i>	Wit Froetang (Afrikaans)	Roggeveld Escarpment.	Shale flats on escarpment edge.	Mountains	Critically Endangered
Iridaceae	<i>Romulea eburnea</i>	Klein Roggeveld Froetang (Afrikaans)	Klein Roggeveld.	Shale soils.	Mountains	Vulnerable
Iridaceae	<i>Romulea hallii</i>	Froetang (Afrikaans)	Roggeveld Plateau southwest of Sutherland.	Shale soils, 1500 m.	Mountains	Vulnerable
Iridaceae	<i>Romulea komsbergensis</i>	Komsberg Froetang (Afrikaans)	Komsberg Pass to Middelpas.	Seasonally damp clay flats, 1400 m.	Mountains	Near Threatened
Iridaceae	<i>Romulea syringodeoflora</i>	Roggeveld Froetang (Afrikaans)	Roggeveld Plateau.	Stony shale flats and slopes.	Mountains	Vulnerable
Asteraceae	<i>Rosenia glandulosa</i>	Klierbos (Afrikaans)	Calvinia to Stettynsburg.	Arid shrubland.	Lowland flats	Least Concern
Asteraceae	<i>Rosenia spinescens</i>		Whitehill to Murraysburg.	Stony clay flats.	Lowland flats	Least Concern
Aizoaceae	<i>Ruschia acocksii</i>		Roggeveld Mountain slopes	Mudstone soils	Lowland flats	Least Concern
Aizoaceae	<i>Ruschia beaufortensis</i>		Beaufort West.	In arid nama karoo mountains.	Mountains	Least Concern
Aizoaceae	<i>Ruschia campestris</i>		Besemgoedberg	On shale in renosterveld	Lowland flats	Least Concern
Aizoaceae	<i>Ruschia dejagerae</i>		Fraserburg to Beaufort West.	In shallow soil, among rocks, covered in snow during winter.	Mountains	Least Concern
Aizoaceae	<i>Ruschia indurata</i>		Beaufort West and Great Karoo to Steynsburg and Steytlerville, Eastern Cape.	On dolerite rock sheets.	Kopies	Least Concern
Aizoaceae	<i>Ruschia mariae</i>		Eastern Cape: Steytlerville.	Unknown.	Unknown	Data Deficient



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Family	Scientific name	Common name	Distribution	Habitat	Habitat type	IUCN Red List Status (2015 South African Plant Assessment)
Aizoaceae	<i>Ruschia parviflora</i>		Beaufort West to Eastern Cape.	On stony hills.	Kopies	Least Concern
Aizoaceae	<i>Sceletium emarcidum</i>	Kougoed (Afrikaans)	Prieska, Beaufort West, Cradock and Calvinia.	Karroid areas, climbing in other bushes.	Generalist includes flats	Least Concern
Poaceae	<i>Secale strictum subsp africanum</i>	Rog (Afrikaans)	Roggeveld.	River banks.	Floodplains	Critically Endangered
Scrophulariaceae	<i>Selago bolusii</i>		Graaff-Reinet, Sneeuberg mountain range.	Rocky areas on cliffs or mountain summits, among boulders.	Mountains	Least Concern
Scrophulariaceae	<i>Selago centralis</i>		Graaff-Reinet, Aberdeen-, Jansenville- and Cradock Districts.	With grass and shrubs in open areas.	Lowland flats	Least Concern
Scrophulariaceae	<i>Selago crassifolia</i>		Victoria West to Murraysburg.	Sandstone outcrops.	Kopies	Least Concern
Scrophulariaceae	<i>Selago magnakarooica</i>		Fraserburg to Middelburg.	Sandstone outcrops.	Mountains	Least Concern
Scrophulariaceae	<i>Selago persimilis</i>	Amandelaarbossie (Afrikaans)	Burgersdorp S to Middelburg and Cradock.	Unknown.	Unknown	Least Concern v
Scrophulariaceae	<i>Selago rigida</i>		Bokkeveld Plateau and Roggeveld Escarpment to Nuweveld Mountains.	Shaley slopes.	Mountains	Least Concern
Asteraceae	<i>Senecio acutifolius</i>		Widespread in the central Karoo from Beaufort West to Cradock and south to Steytlerville.	Stony hills and flats.	Lowland flats	Least Concern
Asteraceae	<i>Senecio cotyledonis</i>		Roggeveld and Upper Karoo to Little Karoo.	Stony karroid slopes.	Kopies	Least Concern
Lamiaceae	<i>Stachys cuneata</i>	Vaaltee (Afrikaans)	Upper, central and western Karoo.	Found in dry watercourses on dolorite hills.	Floodplains	Least Concern

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**DIGITAL ADDENDA 7A – 7B**

Family	Scientific name	Common name	Distribution	Habitat	Habitat type	IUCN Red List Status (2015 South African Plant Assessment)
Apocynaceae	<i>Stapeliopsis pillansii</i>		Great Karoo, from west of Rietbron sporadically eastwards to near Somerset East, Pearston and Jansenville.	Low stony ridges or flat gravelly areas under small shrubs.	Kopies	Least Concern
Aizoaceae	<i>Stomatium difforme</i>	Karoo Tierbekvygie (Afrikaans)	Sutherland to Laingsburg	In pockets of shallow gravel on bare dolerite sheets	Kopies	Least Concern
Aizoaceae	<i>Stomatium loganii</i>	Klein Roggeveld Tierbekvygie (Afrikaans)	Laingsburg: Klein Roggeveld	Unknown	Unknown	Least Concern
Aizoaceae	<i>Stomatium suaveolens</i>	Fraserberg Tierbekvygie (Afrikaans)	Williston, Sutherland, Fraserburg.	In shallow pans.	Pans	Least Concern
Aizoaceae	<i>Stomatium viride</i>		Beaufort West.	Ecology unknown.	Unknown	Least Concern
Iridaceae	<i>Syringodea pulchella</i>	Crane Flower's Bill (English)	Sneeuberg Mountains.	Karoo Escarpment Grassland.	Mountains	Least Concern
Aizoaceae	<i>Tetragonia acanthocarpa</i>	Waterslaaibos (Afrikaans); umSwi (Xhosa)	Karoo to Free State and the Eastern Cape.	In open ground often found near brak pans.	Pans	Least Concern
Asphodelaceae	<i>Trachyandra thyrsoidea</i>	Veld Cabbage (English); Watertoue (Afrikaans)	Matjiesfontein and Laingsburg to Oudtshoorn.	Rocky, well-drained slopes.	Mountains	Least Concern
Aizoaceae	<i>Trichodiadema obliquum</i>	Hairy Nipple Vygie (English)	Beaufort West.	Ecology unknown.	Unknown	Data Deficient
Aizoaceae	<i>Trichodiadema olivaceum</i>	Stervygie (Afrikaans)	Somerset East to Steynsberg.	Slopes and flats of weathered karoo sediments.	Lowland flats	Least Concern
Iridaceae	<i>Tritonia tugwelliae</i>	Karoo Kalkoentjie	Prince Albert, Leeu-Gamka and Laingsburg.	Deep loamy-sand in Nama Karoo shrubland.	Lowland flats	Least Concern
Crassulaceae	<i>Tylecodon faucium</i>	Klipnenta-cotyledon (Afrikaans)	Mountains south of Sutherland.	Shaded rock crevices, often on south-facing slopes, 1100 - 1400 m.	Mountains	Least Concern

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<b>Family</b>	<b>Scientific name</b>	<b>Common name</b>	<b>Distribution</b>	<b>Habitat</b>	<b>Habitat type</b>	<b>IUCN Red List Status (2015 South African Plant Assessment)</b>
Apocynaceae	<i>Xysmalobium gomphocarpoides var. parvilobum</i>		Karoo basin around Beaufort West.	Dry sandy river beds.	Floodplains	Least Concern
Scrophulariaceae	<i>Zaluzianskya marlothii</i>	Roggeveld Drumsticks (English)	Uitkyk and Sneeukrans in the Roggeveld.	Arid slopes, 1500 - 1700 m.	Mountains	Data Deficient
Scrophulariaceae	<i>Zaluzianskya pilosissima</i>	Carnarvon Drumsticks (English)	Roggeveld to Carnarvon.	Sandy and gravelly flats and streambeds.	Lowland flats	Least Concern

**Digital Addendum 7B: Methodology used to identify areas of Ecological and Biodiversity Importance and Sensitivity (EBIS)**

As explained in Section 3.1, a hybrid approach was taken to identifying EBIS'. This approach combines multi-criteria analysis with systematic biodiversity planning (also known as systematic conservation planning). The multi-criteria part of the analysis allows for identification of the ecologically important and sensitive areas features in the landscape where the whole feature falls within a specific level of sensitivity or importance (e.g. a riparian area or a buffer around a protected area). However, in landscapes where there is a great deal of choice of location for meeting targets for biodiversity features such as the Karoo, it is usually not necessary to secure the whole ecosystem or habitat to ensure the ongoing integrity of the area, but nevertheless it is necessary to ensure that enough area of each feature is left intact. A multi-criteria approach does not allow for the identification of a set of areas, which if secured, would allow Karoo ecosystems, their key ecological processes and important species to persist. Hence, a systematic biodiversity planning approach was also applied to the spatial mapping of EBIS'. This approach, which is widely accepted in South Africa as best practice for the identification of spatial biodiversity priorities, aims to identify a set of areas which meets targets for all biodiversity features in a way that is ecologically sustainable, efficient and least conflicting with other activities and land uses. Details of the methodology are described below.

***Features included in the analysis***

Areas which are currently legal protected, including five National Parks (Karoo, Tankwa Karoo, Mountain Zebra, Camdeboo and Addo Elephant National Parks), 17 Nature Reserves (Commandodrift, Oviston, Somerset East and Tsolwana) and 3 Protected Environments (Compassberg, Noorsveld, and the newly declared Mountain Zebra-Camdeboo Protected Environment) were fully included into the planning process. Buffers corresponding to NEMA EIA requirements of 10 km around the national parks and 5 km around nature reserves were also built in to avoid impacts on these key sites, but no buffers were included around the Protected Environments as this is not provided for under NEMA regulations. All reserves that are included in the current and developing World Heritage Site designations for Fynbos and Succulent Karoo were included. The UNESCO designated Gouritz Cluster Biosphere Reserve was included.

Critical Biodiversity Areas (CBAs) from the existing systematic biodiversity plans which cover the area were strongly included in the analysis, with full inclusion where possible and a strong weighting where the areas were too broad. These included the very high value landscapes of the Bokkeveld-Hantam-Roggeveld captured in the Namakwa District Biodiversity Sector Plan (Desmet & Marsh, 2008), the highest priority areas from the Central Karoo District Biodiversity Sector Plan (Skowno et

al., 2009), the irreplaceable areas from the Eastern Cape biodiversity plan (Berliner & Desmet, 2007) and CBAs from the new Northern Cape biodiversity plan (Oosthuysen & Holness, in prep.). All of these spatial plans include comprehensive assessment of areas required to meet targets for ecosystems (especially threatened and endemic ecosystems), key species and ecological process areas (including key corridors and linkages for climate change adaptation).

Although the CBAs from the existing systematic biodiversity plans which cover the area provided a robust starting point for the identification of priority areas in the study area, they were not sufficient or at a fine enough scale that all key ecosystems were fully incorporated. As the available habitat maps for the area were not sufficiently refined to support the detail of planning required, a proxy habitat map was developed by combining the existing national vegetation map, the land type map (which identifies different areas based on soils, topography and other environmental variables) and catchment boundaries. The map includes 350 distinctive habitat units and 7047 separate mapped units. The analysis ensured that sufficient representative areas of each of these 350 habitat types were secured.

A set of hydrological process areas were identified based on all rivers, wetlands and springs. Features were buffered based on an expert assessment of the area required to secure water related processes (Table 7.3 and Table 7.4).

Table 7.3: Rivers were buffered based on their designation with the NFEPA project (Nel et al., 2011) and their ecosystem threat status. Values are in meters.

River priority from the FEPA project and Ecosystem Threat Status	River or Fish FEPA, Fish Support Area, Fish Corridor			Phase 2 FEPA, Upstream Management Area			Other Non-FEPA prioritised rivers		
	Critically Endangered and Endangered	Vulnerable	Least Threatened	Critically Endangered and Endangered	Vulnerable	Least Threatened	Critically Endangered and Endangered	Vulnerable	Least Threatened
<b>Mountain &amp; Upper Foothill</b>	100	100	100	100	100	50	100	50	50
<b>Lower foothill</b>	200	200	200	200	200	50	100	50	50
<b>Lowland river</b>	200	200	200	200	200	100	200	100	100

Table 7.4: Wetlands and related features were buffered based on their type and ecosystem threat status. Values are in meters.

Wetland type	Critically Endangered and Endangered	Vulnerable	Least Threatened and unclassified systems
<b>Priority wetlands (FEPA)</b>	200	200	100
<b>Channelled and un-channelled valley bottom wetlands, floodplain wetlands, seeps.</b>	200	200	100
<b>Depressions and Flats</b>	100	100	50
<b>Dry watercourses</b>	50	50	50
<b>Springs</b>			500

Threatened, endemic and near-endemic plants were carefully prioritised. Endemic and near-endemic plants were identified by checking all plants listed in the three regional floras that cover this region (Snijman, 2013; Maggee & Boatwright, in prep; Bredenkamp, in prep). Plant species that have either 80% of their entire global range (near endemic) or that occur entirely within the area demarcated for SGD (endemics) were selected. In total 193 priority plant species occur within the SGD area. Of these 20 are too poorly known and 57 are locally common and widespread within this area and not likely to lose a significant proportion of their population to SGD, even under the Big Gas scenario. The remaining 119 plant species were included in the analysis (see Digital Addendum 7A). These species are of conservation concern and the areas where they are concentrated need to be avoided during the roll out of SGD. The majority of the restricted species (75 or 63%) occur in the mountains and are concentrated in the botanical centres of endemism, the Roggeveld Escarpment around Sutherland (46), the Cape Midlands Escarpment that includes the Sneeu Berg Massif that surrounds Graaff-Reinet (23) and the Nuweveldberge (12) just west of Beaufort West. The 44 restricted endemic species that occur on the flat plains of the Karoo are mainly succulent plants from the families Aizoaceae (the Vygies); Euphorbiaceae (Euphorbias) and Apocynaceae (Stapeliads). Many of these occur in dolerite outcrops; however 25 species are restricted to the clay and gravel flat areas and would be highly vulnerable to the impacts of SGD. All known locations for the 119 priority species were buffered by 1 km and these areas were fully included in the plan. In addition, the habitat requirements for each species were identified and these areas were included based on a sliding scale with species with small known ranges having high proportional targets and ones with larger ranges being allocated lower proportional targets. Finally, the specific ecosystem units associated with high numbers of special species were separately identified, and these landscapes were included as features in their own right.

Animals of concern (Digital Addendum 7A) were considered to be those whose threat status could decline (i.e. their assessed risk of extinction increase) if habitat were to be lost in the exploration area. This means that species with 60% or more of their distribution within the shale gas exploration area, or those that are threatened at a global scale that occur in the focus area were considered to be species

of concern. There are 11 species that are threatened at a global scale that occur in the exploration area, including one that is Critically Endangered (Riverine Rabbit); eight that are Endangered (the Cape Vulture; two damselfly species, the Kubusi Stream-damsel and the Basking Malachite; the Plain Mountain Adder and four freshwater fish species, the Eastern Cape Redfin, Cape Rocky, and two fish species without common names, *Barbus trevelyani* and *Pseudobarbus asper*); and three that are Vulnerable (Black-footed Cat, Victor's Blue Butterfly, and one freshwater fish species, the Amatola Barb). There are also two reptile species that are Near Threatened, the Karoo Padloper and Braack's Pygmy Gecko. The levels of endemism for vertebrates in the study area are relatively low, with most of the species occurring in the area having wide distributions. The Riverine Rabbit and the Karoo Rock Sengi, *Elephantulus pilicaudus*, are exceptions, and are near endemic to the study area. No bird species were considered to be endemic or near endemic to the area. Five species or subspecies of reptile are endemic or near endemic to the exploration area (Cloete's Girdled Lizard, *Pseudocordylus microlepidotus namaquensis* (no common name), Karoo Flat Gecko, Western Dwarf Girdled Lizard and the Thin-skinned Gecko. The five threatened fish species are all near endemics. There is one frog species, the Karoo Dainty Frog, *Cacosternum karroicum*, that is near endemic. Habitat requirements for all these species were built into the spatial analysis. Several terrestrial invertebrate groups include species with narrow ranges, but in many cases there is insufficient data to be able to identify endemics with any certainty. Butterflies are relatively well surveyed (Mecenero et al., 2013) and 19 species or subspecies have more than 60% of their range in the study area, and 4 of these are only known from the study area (Pringle's Copper, Victor's Blue, Compassberg Skolly, and the Camdeboo Skolly). Terrestrial molluscs often have narrow distributions, and seven species appear to be largely restricted to the study area. Threatened animal species were prioritised in a similar way to the plants, and both the known distribution points and priority mapped occupied range were incorporated into the planning process.

Special habitats (e.g. rocky outcrops, koppies, dolerite dykes, boulder fields, woody vegetation on outwash plains) which are critical for many threatened species and often support key local ecological processes were identified using backscatter from synthetic aperture radar (SAR) data (See Thenkabail, 2016 for background on this method).

#### ***Targets for biodiversity pattern and ecological process features***

Targets for features were set as follows:

- Ecosystem targets were linked to national targets set by the National Biodiversity Assessment (NBA) 2011 (Driver et al., 2012). These targets ranged from 16% to 28% of their original extent.
- Threatened, and endemic and range restricted plants: Firstly, a 100% target was used for the immediate 1 km buffer around threatened species locations. Secondly, targets for special species

habitat requirements were scaled against habitat extent, with the smallest required areas having a target set at 100% ranging down to a 20% target for the species with the broadest range. Finally, targets of 100% of the highest value landscapes with multiple threatened species were set.

- Threatened species habitat (animals): Targets were scaled as for the threatened, endemic and range restricted plants.
- Hydrological process areas: As these areas are highly sensitive to impacts, support many processes and species in the Karoo, and form a potential conduit through which contaminants could be transferred through to the rest of the landscape, rivers, wetlands, springs and their buffers were included with a 100% target.
- Special habitats: Special habitats (e.g. rocky outcrops, koppies, dolerite dykes, boulder fields, woody vegetation on outwash plains etc.) were included with a 100% target.
- Designated protected areas and their buffers: An effective 100% target was used for Protected Areas (National Parks, Nature Reserves and Protected Environments) and buffers around these features (10 km around National Parks and 5 km around Nature Reserves).
- Known priority areas: Irreplaceable CBAs covering the region were included with a 100% target.

### ***Spatial analysis process***

The analysis process was undertaken as follows: Irreplaceable features were identified and fixed into the spatial analysis using a multi-criteria approach. Individual distributions of biodiversity features were then analysed using the conservation planning software MARXAN. The analysis identified the best portfolio of sites which meets all the targets in a configuration that is most efficient, least cost and least conflicting with other activities. The approach identifies all the sites which are either always required (i.e. irreplaceable) or near-irreplaceable (Very High ecological importance), and an additional set of areas which represents a best possible configuration of areas to meet the remaining targets (i.e. the set of optimal sites) (High Ecological importance). Finally, there are a set of sites which are in a natural or near-natural condition but are not required to meet targets, as long as the irreplaceable and optimal sites are secured (Medium to Low ecological importance). The features included in each category are summarised in Table 7.5 in the body of the assessment.