

# SOUTH AFRICA

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Cape Sugarbird *Promerops cafer*. (ILLUSTRATION: MARK ANDREWS)

## GENERAL INTRODUCTION

The Republic of South Africa is located at the southern tip of the African continent; it landlocks the small Kingdom of Lesotho and is bordered by Namibia, Botswana and Zimbabwe to the north, Mozambique and Swaziland to the east, and by 2,954 km of coastline to the east, south and west. South Africa, its offshore islands and the subantarctic Prince Edward Islands cover an area of c.1,221,040 km<sup>2</sup>. South Africa consists of nine Provinces: Northern, Mpumalanga, Gauteng, North-west, Free State, KwaZulu-Natal, Northern Cape, Western Cape and Eastern Cape.

South Africa was estimated to have a population of c.39.6 million people at the end of 1998 (Central Statistical Service), with a growth-rate of 2.2% per year. At least five metropolitan districts hold more than a million people, with the major centres being Gauteng (more than 10 million), Cape Metropolitan District (more than 3 million), Durban (more than 2 million), Bloemfontein (more than 1 million) and Port Elizabeth (more than 1 million). All these areas have doubled in size in the last 20 years, and this rural emigration has left large tracts of the country experiencing localized population reduction, particularly in the Eastern Cape, Northern Cape, Mpumalanga and Northern Provinces.

South Africa consists of a high-altitude Central Plateau surrounded by a rim of steep-edged mountains (the Great Escarpment) which fall away steeply to a low-lying coastal margin. The plateau has an asymmetrical tilt, such that the edge in the east is higher than in the west, with the highlands ('highveld') associated with these edges being wider and higher in the east (the Drakensberg escarpment), reaching peaks of over 3,500 m in Lesotho. The width of the coastal margin varies from c.50 km to 200 km; it is widest in the south and narrowest in the east, but broadens out from north-eastern KwaZulu-Natal northwards to become the 'lowveld' of Mpumalanga and the Northern Province. The continuity of the Central Plateau is broken by a number of broad river valleys, principal amongst these being the Limpopo in the north-east. These low-lying areas introduce hot, dry, tropical conditions, similar to

those prevailing on the coastal plains, deep into the interior of the country. Other important river valleys are the Umfolozi and Tugela in the east, and the Orange in the west.

The ranges of the Cape Fold mountains occupy much of the coastal margin in the south. These extend from the Cedarberg Range (32°S 19°E) in the south-west, southward to the complex and extensive ranges in the extreme south-west between 33°S and 35°S, and from there eastwards, for the most part in three or four parallel ranges, to c.27°E. The rain shadows created by these mountains create parallel strips with dramatically different vegetation.

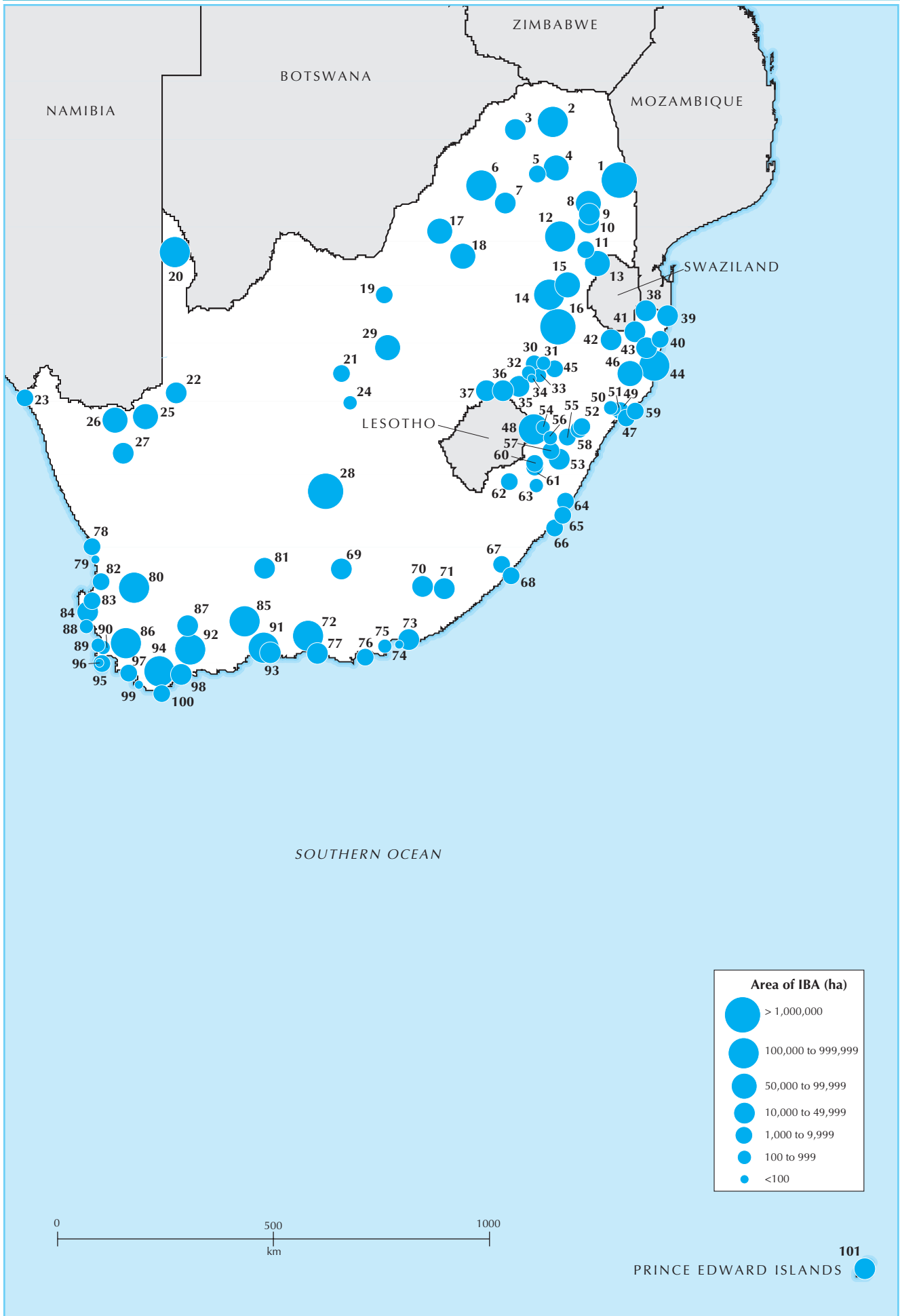
South Africa has three very distinct rainfall regions: the winter, the summer and the all-season regions. The south-western fringe of the country, in the Western Cape, has a Mediterranean climate with hot dry summers and cool rainy winters. Farther east, the coastal junction of the Western and Eastern Cape Provinces, which is located in the overlap zone of the winter and summer rainfall regions, has a temperate climate with all-year rain. The remainder of the country, comprising the eastern, central and north-west regions, receives summer rainfall. About 30% of South Africa receives less than 250 mm of rain per year, 34% receives between 250 and 500 mm, 25% receives between 500 and 750 mm and the remaining 11% more than 750 mm.

Temperatures in the region vary geographically, seasonally, and diurnally, and are strongly affected by altitude, latitude and ocean currents. The range of temperatures is least in the coastal lowlands, which are mostly frost-free. Coastal temperatures generally range from zero on a cold west-coast winter's morning to 35°C with near-100% humidity on the KwaZulu-Natal coast in midsummer.

On the Central Plateau, both seasonal and diurnal variation can be dramatic, with winter days being almost invariably cool to mild and winter nights cold with frequent frost, while summer days are invariably hot and nights mild. Temperature may range greatly in the interior and the highveld can experience overnight temperatures down to -10°C which soar to 45°C the next day.

Most inland areas south of the Tropic of Capricorn have two distinct seasons, summer and winter, with short transitional periods

Map 1. Location and size of Important Bird Areas in South Africa.



Important Bird Areas in Africa and associated islands – South Africa

Table 1. Summary of Important Bird Areas in South Africa.				101 IBAs covering 101,154 km <sup>2</sup>														
IBA code	National code <sup>1</sup>	Site name	Administrative region	Criteria (see p. 11; for A2/A3 codes, see Tables 2/3)														
				A1	A2					A3					A4i	A4ii	A4iii	
					088	089	090	091	092	s047	A07	A09	A11	A12	A13			
ZA001	SA002	Kruger National Park and adjacent areas	Northern, Mpumalanga	✓								✓				✓		
ZA002	SA003	Soutpansberg	Northern	✓	✓						✓						✓	
ZA003	SA004	Blouberg vulture colonies	Northern	✓													✓	
ZA004	SA005	Wolkberg forest belt	Northern	✓	✓						✓							
ZA005	SA006	Pietersburg Nature Reserve	Northern	✓														
ZA006	SA007	Waterberg system	Northern	✓													✓	
ZA007	SA008	Nyl river flood-plain	Northern	✓												✓		✓
ZA008	SA010	Blyde river canyon	Mpumalanga, Northern	✓	✓						✓						✓	
ZA009	SA011	Graskop grasslands	Mpumalanga	✓														
ZA010	SA012	Mac-Mac escarpment and forests	Mpumalanga	✓	✓						✓							
ZA011	SA014	Blue Swallow Natural Heritage Site	Mpumalanga	✓	✓						✓							
ZA012	SA016	Steenkampsberg	Mpumalanga	✓			✓				✓					✓	✓	
ZA013	SA017	Songimvelo Game Reserve	Mpumalanga	✓	✓						✓							
ZA014	SA018	Amersfoort–Bethal–Carolina District	Mpumalanga	✓	✓						✓					✓	✓	
ZA015	SA019	Chrissie Pans	Mpumalanga	✓												✓	✓	✓
ZA016	SA020	Grassland Biosphere Reserve (proposed)	Mpumalanga, Free State, KwaZulu-Natal	✓			✓				✓					✓	✓	✓
ZA017	SA023	Pilanesberg National Park	North-west	✓														
ZA018	SA025	Magaliesberg and Witwatersberg	North-west, Gauteng	✓												✓	✓	
ZA019	SA026	Barberspan and Leeupan	North-west	✓												✓	✓	✓
ZA020	SA027	Kalahari-Gemsbok National Park	Northern Cape										✓					
ZA021	SA028	Spitskop Dam	Northern Cape, North-west	✓												✓		
ZA022	SA029	Augrabies Falls National Park	Northern Cape											✓				
ZA023	SA030	Orange river mouth wetlands	Northern Cape	✓										✓		✓	✓	
ZA024	SA032	Kamfers Dam	Northern Cape													✓		
ZA025	SA034	Mattheus-Gat Conservation Area (proposed)	Northern Cape	✓						✓				✓				
ZA026	SA035	Haramoep and Black Mountain Mine Nature Reserve	Northern Cape	✓						✓				✓				
ZA027	SA036	Bitterputs Conservation Area (proposed)	Northern Cape	✓						✓				✓				
ZA028	SA037	Platberg-Karoo Conservancy	Northern Cape	✓										✓		✓	✓	
ZA029	SA039	Sandveld and Bloemhof Dam Nature Reserves	Free State, North-west	✓												✓		
ZA030	SA040	Sterkfontein/Merinodal	Free State	✓			✓				✓					✓		
ZA031	SA041	Voordeel Conservancy	Free State	✓			✓				✓							
ZA032	SA042	Alexpan	Free State	✓														
ZA033	SA043	Bedford/Chatsworth	Free State	✓												✓		
ZA034	SA045	Murphy's Rust	Free State	✓												✓		
ZA035	SA046	Sterkfontein Dam Nature Reserve	Free State, KwaZulu-Natal	✓	✓						✓							
ZA036	SA047	Golden Gate Highlands and Qwaqwa National Parks	Free State	✓			✓				✓					✓	✓	
ZA037	SA048	Fouriesburg–Bethlehem–Clarens	Free State	✓													✓	
ZA038	SA052	Ndumo Game Reserve	KwaZulu-Natal	✓				✓			✓							
ZA039	SA053	Kosi Bay system	KwaZulu-Natal	✓				✓			✓							
ZA040	SA054	Lake Sibaya	KwaZulu-Natal															✓
ZA041	SA055	Pongolapoort Nature Reserve	KwaZulu-Natal	✓				✓										
ZA042	SA056	Itala Game Reserve	KwaZulu-Natal	✓								✓				✓		
ZA043	SA057	Mkuzi Game Reserve	KwaZulu-Natal	✓				✓			✓					✓		
ZA044	SA058	Lake St Lucia and Mkuze swamps	KwaZulu-Natal	✓				✓			✓					✓	✓	
ZA045	SA059	Chelmsford Nature Reserve	KwaZulu-Natal	✓												✓		
ZA046	SA060	Hluhluwe-Umfolozi Park	KwaZulu-Natal	✓				✓			✓							
ZA047	SA063	Umlalazi Nature Reserve	KwaZulu-Natal	✓							✓							
ZA048	SA064	Natal Drakensberg Park	KwaZulu-Natal	✓			✓				✓					✓	✓	
ZA049	SA065	Ngoye Forest Reserve	KwaZulu-Natal	✓	✓						✓							
ZA050	SA066	Entumeni Nature Reserve	KwaZulu-Natal	✓	✓						✓							
ZA051	SA067	Dhlinza Forest Nature Reserve	KwaZulu-Natal	✓	✓						✓							
ZA052	SA069	Umvoti vlei	KwaZulu-Natal	✓														
ZA053	SA071	KwaZulu-Natal mistbelt forests	KwaZulu-Natal		✓						✓							
ZA054	SA072	Hlatikulu Nature Reserve	KwaZulu-Natal	✓														
ZA055	SA074	Karkloof Nature Reserve	KwaZulu-Natal	✓	✓						✓							
ZA056	SA075	Umgeni Vlei Nature Reserve	KwaZulu-Natal	✓														
ZA057	SA077	Impendle Nature Reserve	KwaZulu-Natal	✓														
ZA058	SA078	KwaZulu-Natal mistbelt grasslands	KwaZulu-Natal	✓												✓		
ZA059	SA079	Richards Bay Game Reserve	KwaZulu-Natal	✓												✓	✓	

**Table 1 ... continued.** Summary of Important Bird Areas in South Africa. 101 IBAs covering 101,154 km<sup>2</sup>

Criteria (see p. 11; for A2/A3 codes, see Tables 2/3)

IBA code	National code <sup>1</sup>	Site name	Administrative region	Criteria (see p. 11; for A2/A3 codes, see Tables 2/3)														
				A1	A2			A3					A4i	A4ii	A4iii			
				088	089	090	091	092	s047	A07	A09	A11	A12	A13				
ZA060	SA080	Greater Ingwangwana river	KwaZulu-Natal	✓														
ZA061	SA081	Franklin vlei	KwaZulu-Natal	✓													✓	
ZA062	SA082	Matatiele Commonage	KwaZulu-Natal	✓			✓			✓								
ZA063	SA083	Penny Park	KwaZulu-Natal	✓														
ZA064	SA085	Oribi Gorge Nature Reserve	KwaZulu-Natal	✓		✓				✓								
ZA065	SA086	Umtamvuna Nature Reserve	KwaZulu-Natal	✓		✓				✓							✓	
ZA066	SA087	Mkambati Nature Reserve	Eastern Cape	✓		✓				✓							✓	
ZA067	SA088	Collywobbles vulture colony	Eastern Cape	✓													✓	
ZA068	SA089	Dwesa and Cwebe Nature Reserves	Eastern Cape	✓		✓				✓								
ZA069	SA090	Karoo Nature Reserve	Eastern Cape	✓									✓				✓	
ZA070	SA091	Katberg–Readsdale forest complex	Eastern Cape	✓		✓				✓								
ZA071	SA092	Amatole forest complex	Eastern Cape	✓		✓				✓								
ZA072	SA093	Kouga–Baviaanskloof complex	Eastern Cape, Western Cape	✓	✓									✓				
ZA073	SA094	Alexandria coastal belt	Eastern Cape	✓		✓				✓								
ZA074	SA095	Algoa Bay Island Nature Reserve	Eastern Cape	✓												✓	✓	
ZA075	SA096	Swartkops estuary, Redhouse and Chatty salt pans	Eastern Cape	✓												✓	✓	
ZA076	SA097	Maitland–Gamtoos coast	Eastern Cape	✓													✓	
ZA077	SA098	Tsitsikamma National Park	Eastern Cape, Western Cape	✓		✓								✓				
ZA078	SA099	Olifants river estuary	Western Cape	✓									✓			✓		
ZA079	SA100	Bird Island	Western Cape	✓												✓	✓	
ZA080	SA101	Cedarberg–Koue Bokkeveld complex	Western Cape	✓	✓									✓				
ZA081	SA102	Karoo National Park	Western Cape	✓									✓				✓	
ZA082	SA103	Verlorenvlei	Western Cape	✓												✓		
ZA083	SA104	Lower Berg river wetlands	Western Cape	✓												✓	✓	
ZA084	SA105	West Coast National Park and Saldanha Bay islands	Western Cape	✓												✓	✓	
ZA085	SA106	Swartberg mountains	Western Cape	✓	✓									✓				
ZA086	SA107	Eastern False Bay mountains	Western Cape	✓	✓									✓				
ZA087	SA108	Anysberg Nature Reserve	Western Cape	✓	✓									✓				
ZA088	SA109	Dassen Island	Western Cape	✓												✓	✓	
ZA089	SA110	Robben Island National Historical Monument	Western Cape	✓												✓	✓	
ZA090	SA111	Rietvlei Wetland Reserve	Western Cape	✓												✓		
ZA091	SA112	Outeniqua mountains	Western Cape	✓	✓									✓				
ZA092	SA113	Southern Langeberg mountains	Western Cape	✓	✓									✓				
ZA093	SA114	Wilderness–Sedgefield Lakes complex	Western Cape	✓		✓								✓	✓		✓	
ZA094	SA115	Overberg wheatbelt	Western Cape	✓	✓									✓	✓			
ZA095	SA116	False Bay Park (proposed)	Western Cape	✓												✓	✓	
ZA096	SA117	Boulders Bay	Western Cape	✓												✓		
ZA097	SA118	Botrivierlei and Kleinmond estuary	Western Cape	✓												✓	✓	
ZA098	SA119	De Hoop Nature Reserve	Western Cape	✓	✓									✓	✓		✓	
ZA099	SA120	Dyer Island Nature Reserve	Western Cape	✓												✓	✓	
ZA100	SA121	Heuningnes river and estuary system	Western Cape	✓												✓		
ZA101	SA122	Prince Edward Islands Special Nature Reserve	Subantarctic Islands	✓												✓	✓	
Total number of IBAs qualifying:				91	9	22	3	4	6	3	27	8	1	9	11	45	25	21

1. Barnes (1998).

of about a month. North of the Tropic there are also two temperature seasons; however, rainfall peaks progressively later in the north and west of the subcontinent, resulting in three seasons: a cool dry winter (May to mid-August), a hot dry spring (mid-August to mid-October) and a hot moist summer (mid-October to April).

South Africa has a wide diversity of habitats. Six major terrestrial vegetation divisions are recognized and the country also holds a varied array of wetland and marine habitats.

The six primary terrestrial vegetation divisions within South Africa are: (1) fynbos; (2) succulent Karoo; (3) Nama-Karoo; (4) grassland; (5) savanna; (6) forest.

With the expansion of the circumpolar vortex in winter, cyclonic weather fronts from Antarctica bombard the south-western tip of Africa. Most of this moisture is shed orographically as the fronts hit the Cape Fold mountains. This Mediterranean climate has given rise to a rich (over 8,500 plant species) and distinctive type of vegetation, the fynbos, which is crammed into a minuscule 4.4% of

South Africa's land surface area and is the smallest of the world's floristic kingdoms. The climate, low-nutrient soils and periodic fires have all contributed to the type of diversity and dramatic levels of endemism found in this distinctive vegetation, which has adapted to survive the dry hot summers and strong winds. It is dominated by low, evergreen, sclerophyllous heathland and shrubland in which fine-leaved low shrubs and leafless tufted grass-like plants predominate. Trees and evergreen succulent shrubs are rare, while grasses form a negligible proportion of the biomass. The fynbos has two major vegetation divisions: fynbos proper, characterized by three main plant families, Restionaceae, Ericaceae and Proteaceae; and renosterveld, dominated by the family Compositae, specifically renosterbos *Elytropappus rhinocerotis*, with geophytes and some grasses. For the purpose of choosing Important Bird Areas (IBAs) under the A3 criterion (assemblages of biome-restricted bird species), the various types of fynbos were included within the Fynbos (A13) biome.

The semi-arid succulent Karoo falls within the winter-rainfall region in the far west, and is characterized by low to dwarf, open, succulent shrubland, typically including the families Mesembryanthemaceae and Crassulaceae. This shrubland is dominated by stem and leaf succulents and fine-leaved evergreen shrubs. Grasses are infrequent and mainly annuals. The mass flowering displays of annuals (mainly Compositae) and geophytes in spring, particularly in disturbed areas, are highly characteristic of the succulent Karoo. Low trees are common on rocky outcrops and along river courses where they form woodland corridors. For consideration under IBA category A3, this vegetation-type was included within the Namib–Karoo (A12) biome.

The Nama-Karoo largely comprises low shrubs and grasses; peak rainfall occurs in summer. Trees, e.g. *Acacia karroo*, are mainly restricted to watercourses where fairly luxuriant stands can develop, especially in the south-eastern Karoo (Eastern Cape) and along the Orange river. In comparison with the succulent Karoo, the Nama-Karoo has higher proportions of grass and tree cover. The grassy Karoo can be viewed as an ecological transition zone between the Nama-Karoo and grassland; although also primarily a dwarf-shrub habitat, it shows higher proportions of grass (from west to east) and, in places, tree cover. For consideration under IBA category A3, both of these vegetation-types were incorporated into the Namib–Karoo (A12) biome.

The grasslands encompass the open portions of the eastern interior plateau of South Africa. The dominant vegetation comprises grasses, with geophytes and herbs also well represented. These grasslands are maintained by a combination of relatively high summer rainfall, frequent fires, frost and grazing, which preclude the presence of shrubs and trees.

Sweet grasslands are found in low-rainfall areas; they are taller and have a low fibre content and retain nutrients in the leaves during the winter. Sour grasslands occur in regions of higher rainfall (more than 625 mm per year) on acidic, leached soils, and are characterized by being shorter and denser in structure, having a high fibre content and a tendency to withdraw nutrients from the leaves to the roots during the winter, rendering the grazing largely unpalatable to stock during this time. Mixed grasslands represent a transition between, or combination of, sour and sweet grassland. Alpine grasslands occur at altitudes above 1,850 m, and are sweet to mixed in nature. The low temperatures partially negate the effect of the relatively high rainfall and result in more arid vegetation than might be expected. Some scrubby, karroid botanical elements are present.

For consideration under IBA category A3, the sweet and mixed grasslands and low-altitude sour grasslands (below 1,100 m) were incorporated into the Kalahari–Highveld (A11) biome, and the high-altitude sour grasslands (above 1,100 m) and alpine grasslands were incorporated into the Afrotropical Highlands (A07) biome.

The savanna covers most of the northern and eastern parts of South Africa. Savanna is defined here as having a grassy understorey and a distinct woody upperstorey of trees and tall shrubs. Tree cover can range from sparse, in the southern Kalahari, to almost closed-canopy cover in well-developed mopane woodland. There is an important dichotomy in types of South African savanna, between the arid, fine-leaved, typically *Acacia*-dominated woodlands versus the mesic, predominantly broadleaved woodlands. The relatively arid woodland types, e.g. Kalahari, typically occur on nutrient-rich, often alluvial, soils in the drier (less than 650 mm per year) western regions. The relatively mesic woodlands, e.g. mopane woodland, typically occur on nutrient-poor (leached) soils in the wetter eastern regions. These two basic woodland types are, however, often closely interdigitated, with *Acacia* woodland on alluvial plains and broadleaved woodland on higher slopes. At a finer scale, five basic types of woodland can be recognized in the country: moist woodland, mopane woodland, arid woodland, southern Kalahari and valley bushveld.

Moist woodland comprises predominantly broadleaved, winter-deciduous woodland. A wide variety of plant species form diverse communities, including species such as *Combretum apiculatum*, *Acacia caffra* and *Faurea saligna*. Grass cover is determined by fire and grazing. Soil-types are varied but are generally nutrient-poor; average annual rainfall is 350–1,000 mm.

Mopane woodland is dominated by *Colophospermum mopane*, a broadleaved tree, generally winter-deciduous, but evergreen near permanent water. The growth habit varies from dense shrubland

to tall, open woodland with an open understorey and few grasses. Monospecific stands of mopane occur on seasonally waterlogged soils in tropical, poorly drained areas with average annual rainfall greater than 450 mm, but the mopane vegetation-type consists typically of a complex mosaic of monospecific mopane, elements of arid woodland and riparian vegetation. Summers are hot and wet, and winters cool.

Arid woodland comprises predominantly fine-leaved, semi-deciduous *Acacia*-dominated woodlands on rich soils. Arid woodland occurs where there is intermediate, though variable, rainfall (250–650 mm), with hot wet summers and cool dry winters.

The southern Kalahari is located on deep sands with rolling dunes, and consists of open shrubland with semi-deciduous *Acacia* and *Boscia* trees along intermittent fossil watercourses and in interdunal valleys. Grass cover is very variable dependent on rain and grazing. Summers are hot, winters cold; rainfall, averaging less than 250 mm per year, is very variable and mostly, but not exclusively, in summer.

Valley bushveld is a dense, closed shrubland with poorly developed grass cover, consisting of virtually impenetrable thickets of thorny shrubs, trees, succulents and creepers, mainly in hot, dry valleys along the east coast. Large euphorbias and aloes are conspicuous features.

For consideration under IBA category A3, the moist woodland and mopane woodland vegetation-types were included within the Zambezi (A10) biome, the arid woodland and southern Kalahari vegetation-types were included within the Kalahari–Highveld (A11) biome, and the valley bushveld was included within the East African Coast (A09) biome.

Two types of forest, Afromontane and coastal, are present in South Africa. All forest patches within c.40 km of the coast and located east of, and including, Alexandria Forest (IBA ZA073), were classified as coastal forests. Forest patches west of Alexandria Forest, irrespective of their distance from the coast, and those located farther inland than c.40 km, were classified as Afromontane forest. The tree canopy-cover in forests is continuous and mainly comprises evergreen tree species. Below the canopy, the vegetation is stratified into layers (subcanopy, shrub layer, ground layer, etc.). Epiphytes and lianas are common in both forest-types, but herbaceous vegetation, especially ferns, is only common in Afromontane forest. There are, however, few structural differences between the two forest-types. The tall, dense trees result in little ground vegetation and thick leaf-litter. Forests only occur in frost-free, fire-protected situations with relatively high rainfall.

Afromontane forest occurs at sea-level in the south, but at progressively higher altitudes farther north. It is often confined to moist valleys that are protected from fire, and surrounded by sour grasslands in the east and north, or by fynbos in the south. For consideration under IBA category A3, Afromontane forest was included within the Afrotropical Highlands (A07) biome. The coastal forest and sand forest, along with the mosaic of coastal thicket, coastal grasslands and mangroves, form the East African Coast (A09) biome. It is typically moist and tropical to subtropical.

Although the total area of wetlands in South Africa is small, there is a large variety of wetland habitats.

Along the moist southern and eastern coasts of South Africa there are numerous river courses draining south and east, usually with relatively small catchments owing to the close proximity of the Great Escarpment. The extensive Orange–Vaal system drains most of the western and central interior of South Africa to the west. Rivers in the Northern Province drain eastwards through the Limpopo–Shashi system into Mozambique. Most rivers are in the high-rainfall east and extreme south of South Africa and, not surprisingly, there is a gradient of increasingly intermittent river flow with increasing aridity farther west. Most rivers in areas that receive less than 500 mm of rainfall are seasonal or flow only for short periods after heavy rain. The Orange river, with a course of 1,950 km and a catchment area of 852,000 km<sup>2</sup> (covering 47% of the country), is the largest river in South Africa.

Vleis, marshes, sponges and flood-plains are characterized by static or slow-flowing water and are extensively covered with tall emergent wetland vegetation. Sponges are marshes associated with the upper catchments of watercourses at relatively high altitudes. Flood-plains are typically associated with the lower reaches of larger rivers, where these enter level terrain and water flow becomes slow,

and the rivers break their banks during flooding to inundate adjacent areas. Flood-plains are therefore most typical of coastal flats but can also arise under suitable conditions far inland, e.g. Nylsvlei.

Pans are wetlands with closed-drainage systems; water usually flows in from small catchments but with no outflow from the pan basins themselves. They are typical of poorly drained, relatively flat and dry regions. Water loss is mainly through evaporation, sometimes resulting in saline conditions, especially in the most arid regions. Water depth is shallow (less than 3 m), and flooding is characteristically ephemeral. They vary in diameter from a few metres to many kilometres.

The main 'panveld' of South Africa is situated on the Central Plateau, especially in the Nama-Karoo, in the southern Kalahari, and in the grasslands of the Free State and Mpumalanga. Pans, however, can also be found along the coastline, e.g. Yzerfontein Pan north of Cape Town. Innumerable tiny pans are found in woodland regions north of the Kalahari basin, particularly on poorly drained soils such as 'black cotton soils' in mopane veld.

Estuaries and lagoons are coastal wetlands typically associated with the mouths of rivers. South Africa is poorly endowed with coastal wetlands, particularly estuaries. Coastal wetlands are most abundant along the high-rainfall east and south coasts of southern Africa, although the west coast has several large estuaries, at the mouths of the Orange, Olifants and Berg rivers. Estuaries, e.g. Berg river estuary (IBA ZA083), are defined as being permanently subject to tidal influences, while lagoons typically have closed mouths that are intermittently, sometimes annually, breached by flooding, wave action or human activities, e.g. Botrivierlei (IBA ZA097) and Verlorenvlei (IBA ZA082).

The inland regions of South Africa are virtually devoid of true natural freshwater lakes. Therefore virtually all of the region's true freshwater lakes occur along the coastline, where they can be differentiated from estuaries and lagoons by being permanently isolated from any seawater influences, which is again important in determining their waterbird communities.

Two major currents, the Benguela and Agulhas, affect the waters of the South African coastline. The Benguela Current, usually nowadays referred to as the Benguela upwelling system, flows northwards along the Atlantic Ocean coast. It is a cold coastal current with an offshore flow component driven by persistent and strong south-easterly winds; these drive a nutrient-rich upwelling system, which supports a complex cold-water ecosystem. This cold current has a profound effect on the climate of the adjacent coastline. Air flowing from the cold ocean to the hot land does not yield precipitation; consequently the west coast of South Africa, from about St Helena Bay to the Orange river mouth, is semi-desert.

The Agulhas Current is a warm, fast-flowing current moving south-westwards along the Indian Ocean coast. It is part of a huge wind-driven gyre circulating anti-clockwise in the southern Indian Ocean, moving southwards along the east coast of Africa. The sector that moves along the east coast of Madagascar reunites with the Mozambique Current along the coast of KwaZulu-Natal, forming the Agulhas Current, which brings warm water from the tropics to the east coast of South Africa. Thus from the Kei mouth, westwards, cooler coastal waters support a set of marine plants and animals different to that which occurs in the warmer water along the KwaZulu-Natal coast. The Agulhas Current brings pockets of warm humid air inland along the eastern littoral belt; this profoundly affects the terrestrial vegetation, which is manifested as forest and moist woodland mosaic.

The sea/land coastal interface is characterized by exposed shorelines with strong wave-action. The mean tidal range is c.1 m, so the intertidal zone is narrow. There are few embayments that are sufficiently protected to provide totally sheltered shorelines; the largest are Langebaan Lagoon (IBA ZA084) and Richards Bay (IBA ZA059). These localities have, or had in their pristine state, the largest areas of intertidal sandflats in the country. The coastline consists mainly of alternating stretches of sandy beaches, rocky shorelines, cliffs and wave-cut platforms. Where exposure on the shoreline is reduced at low tide by the occurrence of offshore reefs or beds of kelp, mainly *Ecklonia*, the abundance of shorebirds increases. The rugged coastline has resulted in the formation of several offshore islands, stretching from Bird Island (IBA ZA079) to the islands in Algoa Bay (IBA ZA074) near Port Elizabeth.

South Africa shows very high levels of endemism in all taxa, and the remarkable richness of its biodiversity is largely a result of the juxtaposition of tropical and temperate climates and habitats. South Africa has recently been identified as one of a select group of 17 countries, so-called megadiversity countries, which collectively claim within their borders more than two-thirds of the world's biological resources (Mittermeier *et al.* 1997). South Africa is unique among these select nations in being the only one not to hold any tropical rainforest. Indeed, based on an index of species-richness and endemism for higher plants and vertebrates, some sources rank South Africa as the third most biologically diverse country in the world (World Conservation Monitoring Centre 1992). Although levels of diversity and endemism in insect fauna, and perhaps other invertebrate groups, have been shown to be extremely high in South Africa, knowledge of their taxonomy and distribution is poor and these taxa are not considered in this review.

South Africa is particularly rich from a floral perspective. The Cape Floristic Region (or fynbos) is one of the world's six floral kingdoms and, with over 8,500 flowering plant species in an area of 90,000 km<sup>2</sup>, it is believed to contain the richest concentration of plant species in the world. Perhaps more remarkable than the species-richness of the fynbos is the degree of endemism, including 4,970 (68%) endemic species and 210 (20%) endemic genera. Six families of plant are endemic to the fynbos and one is near-endemic, with only two species occurring elsewhere. In another seven families, more than 80% of the species present are endemic. High levels of endemism are also apparent in the Karoo (particularly the Succulent Karoo) region, where 35–50% of the 3,500–7,000 species are estimated to be endemic. The diversity of succulent species is unparalleled anywhere else in the world. The South African grasslands are also rich in endemics, with 28% of plant taxa restricted to this region, but levels of floral endemism are relatively low in the South African forests and savannas, largely because these vegetation-types are shared with countries farther north (e.g. Zimbabwe).

Among the vertebrates, most lineages display very high incidences of endemism. Some 20% of South Africa's mammal species are endemic, as were the famous and now extinct *Equus quagga* and *Hippotragus leucophaeus*. Although most of the endemic mammals are small, primarily among the rodents (Rodentia) and golden moles (Chrysochloridae), South Africa also has an impressive collection of endemic large ungulates, including *Equus zebra zebra*, *Connochaetes gnou*, *Damaliscus dorcas dorcas*, *Damaliscus dorcas phillipsi*, *Raphicerus melanotis* and *Pelea capreolus*.

The reptiles have extremely high levels of endemism and diversity, particularly among the geckos, skinks and girdled lizards. As of November 1997, southern Africa was known to hold 478 reptile species, of which 282 (59%) were endemic to the subregion. Similarly high levels of endemism are apparent in frogs, with over 50% of the c.98 South African frog species endemic to the country. Among freshwater fish species, diversity declines from the tropical lowveld, where 30 species per catchment is the norm, to the relatively species-poor rivers of the interior and Western Cape, where 10 species is the average complement for a river (but where endemism can be very high).

South Africa's marine life is particularly diverse, partly as a result of the extreme contrast between the cold Benguela and warm Agulhas currents on the west and east coasts respectively. This stark contrast makes the South African coast one of the most heterogeneous in the world. Over 10,000 plant and animal species, almost 15% of the coastal species known worldwide, are found in South Africa, and about 1,200 (or 12%) of these are endemic.

The underlying major cause of South Africa's environmental problems can be attributed to explosive population growth, which has still to manifest its full impact on our society and environment. The projected growth of the country's major urban centres does not bode well. The pressures of combating environmental problems such as water pollution, air pollution and soil erosion, and of handling increasing quantities of sewage and urban and toxic waste, are increasingly severe. Failure to take cognizance of these problems will result in the deterioration of the South African environment, which will be unable either to sustain a vigorous economy or to provide its population with any semblance of a quality lifestyle.

South Africa's major environmental problems are here treated in two sections. (1) Problems that are particularly prevalent in each biological system, focusing especially on South Africa's unique biomes—the fynbos, Karoo and grasslands—and (2) problems that transcend vegetation boundaries, but are particular to birds.

Large areas of fynbos are protected as water-catchment areas, and generally the avifauna of this biome is in a healthy state. The same, however, cannot be said for the system's flora, which is highly threatened by the invasion of alien plants and, in the fertile parts of the coastal lowlands, by habitat loss to agriculture, especially wheat cultivation. Agriculture and urbanization have destroyed over 47% of lowland fynbos, including over 85% of the coastal renosterveld. Other primary threats to fynbos include human expansion and consequent industrial/commercial development, uncontrolled veld fires (artificially induced fire frequencies and out-of-season burns eliminate plants regenerating from canopy-stored seeds, decimating valuable protea scrub) and flooding of valley bottoms by dams.

The once plentiful and diverse set of large nomadic ungulates on the Karoo has been replaced by intensively stocked monocultures of small livestock with specialist feeding habits, such that the region now holds some 10 million sheep *Ovis aries* and goats *Capra hircus*. Nearly 200 years of this treatment have had a devastating effect on the soils and vegetation. The Karoo holds 506 threatened plant species, some 21% of the threatened plants in southern Africa. Prolonged heavy grazing and trampling, especially around watering points, leads to compositional changes and depletion and thinning-out of the vegetation, which greatly accelerates rates of soil erosion. Such changes affect the avifauna, including several endemic species. Besides soil planning, management measures taken to curb this degradation have included rotational grazing, stock reduction, and stock diversification (using other types of livestock and/or game). Although conditions have improved since the 1950s, vegetation changes in the Karoo are now difficult or even impossible to reverse.

The South African grasslands have been so dramatically transformed by human activities that very little natural landscape remains. No fewer than 11 of the 14 globally threatened bird species present on the South African mainland (Collar *et al.* 1994) have major strongholds in grassland, and five of these are entirely grassland-restricted. Commercial afforestation is probably the most critical threat to the grasslands. There is conclusive evidence that it has already had a major cumulative impact on grassland birds, through habitat loss and fragmentation, changing land-uses and burning regimes, reduction of microhabitat variation and disruption of landscape processes (e.g. reduced run-off, altered drainage patterns). The potential for further negative impacts on wildlife, including endemic and threatened birds, is serious—timber has become one of South Africa's largest industries, a huge employer and earner of foreign exchange, and the intention is to increase non-native plantations by a further 1 million ha (from the existing c.1.4 million ha) within the next 25 years.

Although cultivated crops such as wheat and maize are also responsible for habitat destruction, they do not transform the grassland system in a comparable fashion. Many of the threatened grassland species are able to survive in crop-growing areas, especially where crops are grown in tandem with pastoral farming and where areas of natural veld are maintained for grazing. If biodiversity conservation in the grasslands is to be viable in the long term, large tracts of land suitable for afforestation must be sacrificed by the forest industry and be devoted to alternative forms of land-use, such as pastoral farming or ecotourism, which have fewer negative impacts on the threatened grassland biota.

Several other threats compound the conservation problems that the grasslands face. The grasslands hold over 75% of the country's coal-fired power stations, and several million tonnes of toxic sulphur dioxide are deposited on the surrounding crops, grasslands and wetlands each year as acid rain. Large portions of the grasslands are densely populated. Much of South Africa's crop farming occurs in these relatively high-rainfall areas and much grassland has been transformed by agriculture, principally maize farming. Many of the remaining grasslands are subject to overgrazing and uncontrolled burning, or are being destroyed by opencast coal mining.

Despite the severity and multiple sources of threat, it is unlikely that grassland reserves will be created in the short term, given the

current priorities for spending state money. However, much of South Africa's remaining natural grassland is farmland used for stock production, and so the provision of incentives for land-owners to manage parts of the grassland on their farms for particular species or communities of birds can be a very effective conservation strategy. Grassland birds can and do continue to survive and, in the case of many species, to thrive, where non-intensive stock-farming is practised. The mosaic created by varying burning regimes and stocking rates, and hence grazing pressure, can provide areas of suitable habitat for a wide spectrum of species.

In drought periods, overgrazing of the savanna leads to a virtual eradication of grasses, and damage to the structure of the soil through trampling, which in turn lead to increased soil erosion and encroachment by dense thicket. The loss of very large mammal species (e.g. *Loxodonta africana* and *Syncerus caffer*), that are capable of large-scale modification of vegetation structure, has also accelerated bush encroachment. Bush encroachment eventually leads to homogeneity in vegetation structure and species composition and losses of biodiversity, especially among the annual and ephemeral floral components. Grass burning is used by land-owners to control thicket, but too-frequent burning (followed by heavy grazing) can lead to soil impoverishment and to the dominance of unpalatable plant species. A potential threat is the collection of firewood, mainly by rural communities, which may lead to significant loss of dead and decaying branches and trunks, used by obligate tree-hole-nesting birds. This applies to primary hole-excavators, to secondary hole-users, and to species that make use of natural holes in decaying wood.

A large proportion of the indigenous forest, both coastal and Afromontane, has been cleared during the past 300 years to make way for plantations of non-native trees, subsistence and commercial agriculture, and urbanization. Although much of the remaining forest falls within protected areas, it is severely fragmented; further losses are likely to reduce the viability of the small populations in each forest 'island'. Most publicly and privately owned forests are in an advanced stage of recovery from timber exploitation in the 19th and early 20th centuries. In rural areas, forests have long been a source of material for subsistence. A recently recognized threat is an increase in use of traditional forest products; rural people have begun to gather food, medicinal plants and wood at increased rates, causing significant disturbances within forests. This has fuelled suspicions that levels of exploitation are unsustainable in the long term. Another threat has been mineral exploitation on the dune-forest outliers of northern KwaZulu-Natal, where titanium, zirconium, thorium and rare minerals are mined.

Adverse impacts on terrestrial wetlands are of critical concern given both the scarcity of and increased demand for water in the region. The flow of almost every river system has been regulated by storage dams, or by structures associated with inter-basin water transfer, resulting in reduced river flow, attenuated flood peaks, and altered sediment loads, channel morphology, water chemistry, and seasonality and temperature of flow. Salinization, inflows of water containing suspended sediments, and pollution by nutrients, heavy metals, mine-dump effluents, pesticides, insecticides and herbicides, have all considerably reduced both surface- and groundwater quality.

Catchment changes through afforestation, alien plant invasion, irrigation, over-abstraction and human settlement have reduced natural run-off and groundwater levels substantially. On the other hand, deforestation and overgrazing of catchments, and stormwater from adjoining built-up areas, can all produce increased run-off and violent flash floods. Moreover, wetlands such as marshes, bogs, flood-plains and vleis have undergone considerable alteration and degradation, through drainage for crop and timber cultivation, infilling for urban and industrial development and waste disposal, mining for the extraction of sand, clay and peat, and flooding for dams, among other activities. Estuaries are affected by all of these upstream developments, as well as by large-scale modifications for saltworks, harbours, bridges and marinas.

All of these factors have caused the degradation of most of South Africa's rivers and estuaries. The beleaguered position of river ecosystems is highlighted by the fact that nine of the 13 bird species that are more or less dependent on rivers are considered to be threatened with extinction in South Africa (Barnes 2000). It was estimated that by 1996 more than half of all of South Africa's

wetlands had already been destroyed or otherwise lost. Temporary wetlands, such as seasonal vleis and pans, especially those in and around towns and cities, are probably the most degraded, neglected and threatened of all of South Africa's ecosystems, terrestrial or aquatic. Most temporary wetlands in Gauteng and the Greater Cape Town Metropolitan Area have already been destroyed, developed or converted to permanent wetlands.

Threats to marine, and particularly coastal systems are similar in many respects to those facing terrestrial wetlands, with most threats originating from land-based activities. In South Africa, threats to the marine environment include marine pollution from domestic sewage, industrial waste, stormwater drains and oil spills; coastal zone degradation from rapid urbanization, tourism, recreation, infrastructure development, and mining on parts of the coast and in the ocean; the over-exploitation of marine resources, primarily by industrial fisheries, but also by recreational fishing, and in some intertidal areas by subsistence communities; and the introduction of alien species, either inadvertently through ballast water or on ships' hulls, or intentionally through activities such as mariculture.

Human activities, or 'anthropogenic factors', have had a dramatic impact on birds in South Africa. The main problems that affect birds, across vegetation-types, are as follows.

Deliberate poisoning of predators and scavengers by livestock farmers, since the nineteenth century, has had severe negative impacts on populations of vultures and large eagles—such as *Gyps coprotheres*, *Torgos tracheliotus*, *Terathopius ecaudatus* and *Aquila rapax*—among other target and non-target wildlife. On many commercial stock farms, the laying of poisoned carcasses or the random spreading of small poisoned baits still occurs, with the mammals *Canis mesomelas* and *Felis caracal* being the usual target species, and strychnine and benzene hexachloride (BHC) being the main poisons. Partly as a result, the present distributions of all the vultures in South Africa are mere relict fragments of their former ranges, confined to the larger protected areas, and to some rural areas where vulture-friendly subsistence farming continues. The poisoned baits prevent vultures recolonizing areas where they might well be able to survive on the natural mortality of domestic herds.

Accidental and deliberate poisoning of birds with poisoned crop seed is a frequent occurrence on cultivated lands, despite more bird-friendly options being available for combating farm pests. In particular, such poisoning is thought to be the greatest single threat to South Africa's cranes. *Grus carunculatus* and *Grus paradisea* are greatly attracted to maize-lands, both after harvesting when there is spilled grain to feed on and after planting when they dig up and eat the emerging maize plants. Sometimes farmers deal with them by putting out poisoned bait, and sometimes the cranes die from the seed dressing. Farmer awareness campaigns, such as the extremely successful campaign in the Overberg region of the Western Cape, are essential to address the problem of poisoning.

The effects of the use of DDT and other organo-chloride insecticides in the past have not been well documented in South Africa, but can be assumed to have been as serious as in the developed world. Of concern is that many of these chemicals, including DDT and Dieldrin, are still being used in South Africa, often illegally.

Most raptors, particularly the large eagles, have been perceived as threats to domestic stock and have been actively hunted by farmers. The taking of lambs has been exaggerated in the past and campaigns to make farmers aware are having positive results; more enlightened attitudes towards these birds have begun to take hold in recent years and it is possible that a reversal of population declines will occur in some areas.

Many ground-nesting species (e.g. *Grus paradisea* and *Neotis denhami*) have distinct distribution 'gaps' in Lesotho and former Transkei, both areas with dense human populations of rural people engaged in subsistence farming. It is not possible at present to know whether direct exploitation or incidental disturbance by people and livestock, or both, is the primary reason for this absence, but the effect is clearly anthropogenic.

The over-exploitation of marine fish resources affects seabirds. The fisheries based on the rich Benguela ecosystem off the west coast have already depleted stocks of some fish species, such as pilchard *Sardinops sagax*, and others may soon follow. This has

had an impact on *Morus capensis* and *Spheniscus demersus*, as pilchard forms a primary component of the diet of both species. *Spheniscus demersus* has suffered further from exploitation of its eggs, which continued up until 1968. To add to this direct exploitation, the practice of guano-scraping on offshore islands, which only ceased recently, not only disturbed seabirds, but also prevented *Spheniscus demersus* from burrowing into the guano to build their nests. Penguins breeding in surface nests are exposed both to the elements (sun, wind and rain) and to elevated predation of eggs and small chicks by *Larus dominicanus*.

Several pelagic seabird species, including albatrosses and petrels, are vulnerable to incidental mortality as a bycatch of longline fisheries. The birds are hooked and drowned as they take baits at the surface and are dragged underwater. The affected species are generally long-lived and reproduce slowly; hence the impact of the deaths of tens of thousands of birds per annum is likely to be severe. Another form of direct exploitation is the capture of wild birds for the cage-bird trade. The species probably needing the greatest protection from illegal trapping are the parrots and lovebirds, particularly the regionally threatened *Poicephalus robustus*.

The tilling of soil is one of the most drastic and irrevocable alterations wrought on natural systems. It completely destroys the structure and species composition of the natural vegetation, either temporarily or permanently, and thereby has a massive impact on the taxa that are dependent on that vegetation. This is equally true in grassland, fynbos, semi-arid scrub and savanna. On the other hand, species which are able to exploit monocultures of cultivated crops, or some by-product of cultivation (e.g. bare ground), can benefit temporarily. The vegetation-types most impacted by conversion to croplands are: renosterveld to wheatland in the Overberg and Swartland regions of the Western Cape; sweet grassland to maize and wheat in the central and northern Free State, Gauteng and Mpumalanga; grassland and thicket of the east coast littoral to sugar-cane; and riparian forest and woodland in many regions to vineyards, orchards and various irrigated crops. The birds most likely to show disrupted patterns of distribution are large species with large home ranges.

Pylons for high-tension cables are a major hazard for large birds (e.g. vultures, eagles, cranes and storks) that are attracted to them as perches and are electrocuted when they span the wires with their wings on take-off or landing. National declines of some species may be primarily due to this phenomenon. Progress has been made in improving designs to alleviate these effects, but many old-fashioned structures still exist. Large birds that are relatively unmanoeuvrable in flight (e.g. flamingos, cranes and bustards) are vulnerable to flying directly into utility wires and cables and breaking their necks or limbs, particularly if the cables are strung close to points of take-off and landing, such as near wetlands. On the other hand, some pylons have been designed specifically to offer birds nesting sites and such structures have the potential to boost populations (e.g. of *Polemaetus bellicosus* and *Gyps africanus*) in areas where suitable nest-sites are limited. Certain types of farm dam have been shown to be detrimental to large raptors (particularly vultures) which land on walls in an attempt to clean themselves, slip in and drown. This source of mortality could be quite significant for large raptors with small populations. Several simple structural modifications to prevent drowning have been shown to be effective and should be employed.

## ORNITHOLOGICAL IMPORTANCE

Because of the remarkable diversity of habitats present within South Africa, the region regularly hosts close to 800 bird species, equivalent to c.36% of Africa's and 7% of the world's avian species, despite the region accounting for only 4.2% of Africa's and 0.8% of the world's total land surface area. At least 600 terrestrial species breed within South Africa, of which 62 (more than 10%) are endemic or near-endemic.

South Africa supports 47 species of global conservation concern (Table 4), which is the second-largest total on the continent after Tanzania. This total comprises 18 globally threatened species—including *Heteromirafra ruddi* (Critically Endangered), *Sarothrura ayresi* (Endangered) and *Zoothera guttata* (Endangered)—as well as 30 near-threatened species.



**Table 2.** The occurrence of restricted-range species at Important Bird Areas in South Africa. Sites that meet the A2 criterion are highlighted in **bold**. Species of global conservation concern are highlighted in **bold blue**.

<b>088 – Cape fynbos Endemic Bird Area</b> (six species in South Africa; nine sites meet the A2 criterion)																																
IBA code:	071	072	077	080	082	085	086	087	091	092	093	094	096	097	098																	
<i>Chaetops frenatus</i>		✓		✓		✓	✓	✓	✓	✓																						
<i>Bradypterus victorini</i>		✓	✓	✓		✓	✓	✓	✓	✓	✓																					
<i>Promerops cafer</i>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓													
<i>Nectarinia violacea</i>		✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓													
<i>Serinus totta</i>		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						✓													
<i>Serinus leucopterus</i>		✓		✓		✓	✓	✓	✓	✓									✓													
Number of species recorded:	1	6	4	6	2	6	6	6	6	6	3	3	1	2	3																	
<b>089 – South African forests Endemic Bird Area</b> (seven species in South Africa; 22 sites meet the A2 criterion)																																
IBA code:	002	004	008	009	010	011	013	014	016	035	036	039	040	043	044	046	047	048	049	050	051											
<i>Tauraco corythaix</i>	✓	✓	✓		✓	✓	✓		✓												✓											
<i>Campephaga notata</i>					✓	✓	✓		✓	✓	✓										✓											
<i>Lioptilus nigricapillus</i>		✓	✓		✓	✓	✓		✓	✓	✓							✓		✓	✓											
<i>Cossypha dichroa</i>	✓	✓	✓		✓	✓	✓		✓			✓		✓	✓	✓	✓	✓	✓	✓	✓											
<i>Cercotrichas signata</i>		✓	✓		✓	✓	✓					✓	✓		✓	✓	✓		✓	✓	✓											
<i>Bradypterus sylvaticus</i>																																
<i>Serinus scotops</i>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓									✓													
Number of species recorded:	3	5	5	1	5	5	5	1	4	2	1	2	1	1	2	2	2	2	3	2	4	3										
IBA code:	053	055	057	060	064	065	066	068	070	071	072	073	075	076	077	086	091	092	093	094	098											
<i>Tauraco corythaix</i>	✓	✓	✓		✓	✓	✓	✓	✓	✓		✓			✓		✓		✓		✓											
<i>Campephaga notata</i>					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓											
<i>Lioptilus nigricapillus</i>	✓	✓	✓	✓				✓	✓																							
<i>Cossypha dichroa</i>	✓	✓			✓	✓	✓	✓	✓	✓		✓			✓		✓		✓		✓											
<i>Cercotrichas signata</i>					✓	✓	✓	✓	✓	✓		✓																				
<i>Bradypterus sylvaticus</i>												✓			✓		✓	✓														
<i>Serinus scotops</i>	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓											
Number of species recorded:	4	4	3	1	5	5	1	5	6	6	2	6	1	2	5	1	5	3	4	1	1											
<b>090 – Lesotho highlands Endemic Bird Area</b> (three species in South Africa; three sites meet the A2 criterion)																																
IBA code:																036	048	056	062	071												
<i>Chaetops aurantius</i>																✓	✓	✓	✓	✓												
<i>Anthus hoeschi</i>																✓	✓		✓													
<i>Serinus symonsi</i>																	✓		✓													
Number of species recorded:																2	3	1	3	1												
<b>091 – Southern African grasslands Endemic Bird Area</b> (three species in South Africa; four sites meet the A2 criterion)																																
IBA code:				012				016				030				031				036				048				056				062
<i>Heteromirafra ruddi</i>				✓				✓																								
<i>Spizocorys fringillaris</i>								✓				✓				✓																
<i>Anthus chloris</i>				✓				✓				✓				✓				✓				✓				✓				✓
Number of species recorded:				2				3				2				2				1				1				1				1
<b>092 – South-east African coast Endemic Bird Area</b> (four species in South Africa; six sites meet the A2 criterion)																																
IBA code:				001				038				039				040				041				043				044				046
<i>Apalis ruddi</i>								✓				✓				✓				✓				✓				✓				✓
<i>Nectarinia neergaardi</i>								✓												✓				✓				✓				
<i>Hypargos margaritatus</i>								✓				✓				✓				✓				✓				✓				✓
<i>Serinus citrinpectus</i>								✓												✓				✓				✓				✓
Number of species recorded:				2				3				2				1				4				4				3				3
<b>s047 – Karoo Secondary Area</b> (three sites meet the A2 criterion)																																
IBA code:																025	026	027														
<i>Certhilauda burra</i>																✓	✓	✓														

Most of the endemic and characteristic species of South Africa are, not surprisingly, confined to the country's unique biomes: grassland, fynbos and Karoo. Five Endemic Bird Areas (EBAs) occur in South Africa, a number equalled in Africa only by Madagascar. These EBAs, together with one Secondary Area, support a total of 25 restricted-range species (Table 2), of which four species are globally threatened and nine are near-threatened. Each EBA holds at least three restricted-range species.

The Cape fynbos EBA (EBA number 088) lies wholly within South Africa and holds six restricted-range species. Furthermore, *Fringilla capensis*, *Pycnonotus capensis* and *Circus maurus*, endemic or near-endemic to South Africa, have the majority of their

breeding ranges in the fynbos. Of the EBA's restricted-range species, *Chaetops frenatus* and *Serinus totta* have their sole congeners restricted to the highlands of the Drakensberg and Lesotho, and *Promerops cafer* has its sole congener, *P. gurneyi*, in the high-lying grasslands farther north in southern Africa. The fynbos also shares some endemic species with the Karoo (e.g. *Cisticola subruficapillus* and *Prinia maculosa*). These examples suggest a biogeographical connection between the avifaunas of the fynbos and Karoo and an ancient link between them, being quite distinct from the savanna and closed forest farther north and east in the region.

Nearly all of the South African forests EBA (089) lies within the country. Although these forests have floral affinities with many





Afromontane forest patches farther north in Africa, they are biogeographically unique and hold seven restricted-range species.

The Lesotho highlands EBA (090) holds three restricted-range species, as does the Southern African grasslands EBA (091), which covers a much larger area immediately to the north and east of the former EBA. These two EBAs comprise open landscapes dominated by grassland or dwarf-shrub vegetation. Many grassland birds, several of which are globally threatened and endemic to South Africa, show a clear preference for ‘sour’ grasslands (coarser, drier) over ‘sweet’ and mixed grasslands. Some of these species are essentially absent from the latter two grassland-types, e.g. *Geronticus calvus*, *Heteromirafra ruddi*, *Spizocorys fringillaris*, *Saxicola bifasciata* and *Anthus chloris*. Examples of endemic grassland species preferring sweet and mixed grasslands appear to be fewer, but include *Mirafra cheniana* and *Hirundo spilodera*.

The South-east African coast EBA (092) lies mainly outside South Africa, but all of its four restricted-range species occur within the country. Although this region supports the most species-rich

avifaunal communities in South Africa, most of the species present have a wide distribution in the Afrotropics, and there are relatively few endemics (whether restricted-range or not).

South Africa overlaps with no less than six major African biomes (Table 3). Of the 228 bird species that are globally restricted to the African Highlands biome (code A07), 23 occur in South Africa. Similarly, 12 of the 38 species characteristic of the East African Coast biome (code A09) occur in South Africa, as do nine of the 67 species of the Zambezi biome (A10), six of the 13 species of the Kalahari–Highveld biome (A11), 19 of the 23 species of the Namib–Karoo biome (A12), and all nine species of the Fynbos biome (A13).

The Karoo supports a particularly high diversity of bird species endemic to southern Africa. Its avifauna characteristically comprises ground-dwelling species of open habitats. Rainfall in the Nama-Karoo falls mainly during the austral summer, while the succulent Karoo lies within the winter-rainfall region. This provides opportunities for birds to migrate between the succulent Karoo and the Nama-Karoo, to exploit the enhanced conditions associated with rainfall. A high frequency of endemics and near-endemics with their ranges centred in the Karoo are in the lark family (Alaudidae), including *Certhilauda barlowi*, *C. albescens*, *C. subcoronata*, *C. curvirostris*, *C. burra*, *Spizocorys sclateri* and *Galerida magnirostris*, as well as *Eremopterix australis*. Many typical karroid species are nomads, able to use resources that are patchy in time and space.

To add to this remarkable terrestrial diversity, South Africa has a varied coastline holding a string of 17 offshore rocky islands, extending from Bird Island in Lambert’s Bay to the Algoa Bay islands. These provide platforms for breeding colonies of seabirds. For six seabird species—*Spheniscus demersus*, *Morus capensis*, *Phalacrocorax capensis*, *P. neglectus*, *P. coronatus* and *Larus hartlaubii*—and one shorebird (*Haematopus moquini*), the majority of their global populations breed on the offshore islands of the cold Antarctic-derived waters of the Benguela current (including those belonging to Namibia). There are also several embayments whose intertidal sandflats support large, internationally important concentrations of migrant waders. To add to this, the South African-owned subantarctic Prince Edward Islands support c.2.5 million pairs of breeding seabirds and could support up to 8 million seabirds in total. Important concentrations of several penguin, albatross and petrel species occur on the islands.

In these many regards, South Africa has one of the most diverse, complex and unique avifaunas of any country on the continent.

## CONSERVATION INFRASTRUCTURE AND PROTECTED-AREA SYSTEM

South Africa is the most economically developed country in the Afrotropics and its biological resources have been severely impacted by humans. Indeed, it is estimated that at least 25% of the land has been transformed, largely by agriculture, urban development, afforestation, mining and dams. In response to this biological impoverishment, South Africa has established numerous protected areas. In total, it has some 741 publicly owned protected areas, covering 74,956 km<sup>2</sup> and accounting for c.6% of the country’s land surface area. Most of these protected areas are concentrated in a relatively narrow strip of land between the Central Plateau and the coast. Most were established in the last 25 years, after a period in which the rate of proclamation was relatively slow.

These protected areas comprise 19 types, and are administered by many different bodies, including the National Parks Board, the Department of Water Affairs and Forestry (DWAF), the Department of Environmental Affairs and Tourism (DEAT), the South African National Defence Force (ZANDF), the National Botanical Institute (NBI), provincial conservation agencies, numerous local authorities, and an assortment of private and public land-owners who subscribe to various conservation schemes. Ten Acts of Parliament and 13 provincial Ordinances and Acts control protected areas in South Africa.

Legislation pertaining to the establishment of conservation areas includes the National Parks Act (for National Parks), the Financial Relations Consolidation and Amendment Act (for provincial game and nature reserves), the Forest Act and the Mountain Catchment

**Table 4.** The 47 species of global conservation concern that occur regularly in South Africa (Collar *et al.* 1994). The 18 globally threatened species are highlighted in **bold**.

Name	Global threat status
<b><i>Spheniscus demersus</i></b>	<b>Vulnerable</b>
<b><i>Diomedea exulans</i></b>	<b>Vulnerable</b>
<i>Diomedea chrysostoma</i>	Near Threatened
<i>Phoebastria fusca</i>	Near Threatened
<i>Macronectes halli</i>	Near Threatened
<i>Morus capensis</i>	Near Threatened
<i>Phalacrocorax coronatus</i>	Near Threatened
<i>Phalacrocorax neglectus</i>	Near Threatened
<b><i>Egretta vinaceigula</i></b>	<b>Vulnerable</b>
<b><i>Geronticus calvus</i></b>	<b>Vulnerable</b>
<i>Phoenicopterus minor</i>	Near Threatened
<b><i>Gyps coprotheres</i></b>	<b>Vulnerable</b>
<i>Circus fasciolatus</i>	Near Threatened
<i>Circus macrourus</i>	Near Threatened
<i>Circus maurus</i>	Near Threatened
<b><i>Falco naumanni</i></b>	<b>Vulnerable</b>
<b><i>Falco fasciinucha</i></b>	<b>Vulnerable</b>
<b><i>Grus paradisea</i></b>	<b>Vulnerable</b>
<b><i>Grus carunculatus</i></b>	<b>Vulnerable</b>
<b><i>Sarothrura ayresi</i></b>	<b>Endangered</b>
<b><i>Crex crex</i></b>	<b>Vulnerable</b>
<i>Eupodotis caerulescens</i>	Near Threatened
<i>Haematopus moquini</i>	Near Threatened
<i>Gallinago media</i>	Near Threatened
<i>Glareola nordmanni</i>	Near Threatened
<b><i>Sterna virgata</i></b>	<b>Vulnerable</b>
<i>Sterna balaenarum</i>	Near Threatened
<i>Geocolaptes olivaceus</i>	Near Threatened
<i>Campethera notata</i>	Near Threatened
<b><i>Heteromirafra ruddi</i></b>	<b>Critically Endangered</b>
<i>Certhilauda chuana</i>	Near Threatened
<b><i>Certhilauda burra</i></b>	<b>Vulnerable</b>
<i>Spizocorys sclateri</i>	Near Threatened
<b><i>Spizocorys fringillaris</i></b>	<b>Vulnerable</b>
<b><i>Hirundo atrocaerulea</i></b>	<b>Vulnerable</b>
<b><i>Anthus chloris</i></b>	<b>Vulnerable</b>
<i>Anthus hoeschi</i>	Near Threatened
<i>Chaetops irenatus</i>	Near Threatened
<i>Chaetops aurantius</i>	Near Threatened
<b><i>Zoothera guttata</i></b>	<b>Endangered</b>
<i>Saxicola bifasciata</i>	Near Threatened
<i>Lioptilus nigricapillus</i>	Near Threatened
<i>Anthreptes reichenowi</i>	Near Threatened
<i>Nectarinia neegaardi</i>	Near Threatened
<i>Serinus leucopterus</i>	Near Threatened
<i>Serinus totta</i>	Near Threatened
<i>Serinus symonsi</i>	Near Threatened

Areas Act (for Nature Reserves and Wilderness Areas administered by the directorate of forestry). The provisions of these acts relate to the acquisition of land and the establishment and administration of various management categories of conservation area, the provision of facilities and the control and prosecution of those not complying with specific regulations (Table 3).

Only six of the protected areas are larger than 100,000 ha, including two National Parks (Kruger and Kalahari Gemsbok, which together account for nearly 40% of the area under formal protection), and 73% are smaller than 5,000 ha. As such, South Africa's protected areas collectively form a widespread network of small and highly fragmented reserves. This network is augmented by 197 privately owned protected areas, covering c.9,330 km<sup>2</sup>, accounting for a further 0.76% of the national land surface area—the largest areas are conservancies and private lodges, mostly on the border of Kruger National Park. Some 42,189 km<sup>2</sup> of the protected-area system, a disproportionate 64% of the total, covers savanna vegetation. It is undoubted that the lowland fynbos (particularly renosterveld), succulent Karoo, Nama-Karoo and grassland vegetation-types are all inadequately protected in South Africa.

Several marine protected areas are located along South Africa's coastline. However, as is the case for terrestrial protected areas, there has been no overall planned development of marine reserves, a large number being either poorly positioned or inadequately policed. Furthermore, existing marine protected areas do not protect the full range of coastal and marine habitats. In most cases, marine protected areas have been established in order to rebuild fish stocks and improve fishery yield, rather than to conserve biodiversity.

Siegfried (1992) considered that most of South Africa's endemic birds were inadequately represented (populations smaller than 1,000 individuals) within the protected-area network, with most such poorly protected species being birds of the grassland and/or Karoo biomes. This emphasizes that the South African protected-area network is still poorly developed and there is room for considerable improvement. However, it is unlikely that new, large, state-owned protected areas will be established in future (Barnes 1998), and the survival of many species will depend on the land-use and management practices implemented by farmers and other land-owners. There is therefore an urgent need for implementation of conservation policies on privately owned land.

Conservation has had mainly positive impacts on bird populations, although many of these have been by-products rather than direct objectives of conservation planning. Perhaps the most significant achievement has been the continued existence of viable populations of some of the large raptors in South Africa. There are several species that have viable populations inside the large protected areas, namely Kruger and Kalahari Gemsbok National Parks, and the parks of northern KwaZulu-Natal (Ndumo, St Lucia, Umfolozi, Hluhluwe and Mkuzi), but have become almost extinct outside them. These large reserves have unequivocally demonstrated the importance of large protected areas as refugia for certain species (Liversidge 1984; Tarboton and Allan 1984).

Very few areas in South Africa are in a condition completely unaffected by human activity, even those thought of as 'unspoiled' or 'pristine'. Many important ecosystems have been degraded, and ecological processes impaired. Trends indicate that this situation is not improving. Unless there is fast and effective action, much biodiversity will soon be lost.

## INTERNATIONAL MEASURES RELEVANT TO THE CONSERVATION OF SITES

South Africa became the fifth contracting party to the Convention on Wetlands of International Importance, listing their first two sites in 1975. As of August 2001 South Africa had designated 16 Ramsar Sites. All the designated Ramsar Sites, except for one, Tongaland's turtle beaches and coral reefs, are important for birds and are included in this directory.

South Africa is party to the Convention on Biological Diversity (CBD), and became the 150th country to ratify UNESCO's Convention concerning the protection of the world cultural and natural heritage on 10 July 1997. Four sites have been designated

as World Heritage sites: the Sterkfontein Caves (where famous fossils of early hominids have been found), Natal-Drakensberg Park, Robben Island and the Greater St. Lucia Wetland Park (see also Davies and Day 1998). The three latter sites are important for birds and have been declared IBAs. Another 20 proposals are being planned, including one for Cape Town's world-famous Table Mountain. South Africa is also party to the Convention on Migratory Species (CMS), the African–Eurasian Waterbird Agreement, the Convention to Combat Desertification, the Convention on Climate Change and is active in the UNESCO Man and Biosphere programme; three Biosphere Reserves have been designated (Kogelberg, Cape West Coast, Waterberg).

## OVERVIEW OF THE INVENTORY

A total of 101 sites in South Africa were identified as globally Important Bird Areas (IBAs) in 1998, as well as a further 21 IBAs important at the sub-regional (southern African) level only (Barnes 1998). The global-level Important Bird Areas are listed and described in this inventory (Map 1, Table 1), and any reference to 'IBA' in this inventory concerns solely the globally important sites. The IBA network covers c.101,154 km<sup>2</sup>, equivalent to c.8.3% of the land surface area of South Africa. The final IBA tally covers diverse habitats and landscapes, ranging from unique mountain ranges to estuaries, stretches of dune-slacks, dams, lakes, vleis, and series of cliffs and offshore islands.

Site selection has centred on existing protected areas wherever these fulfil the IBA role. Surprisingly, the extensive protected-area network has been shown to be inadequate, in isolation, to protect the country's varied avifauna. About 25% of the IBAs are found on private and unzoned government land and receive no formal conservation or legislative protection. Most of the unprotected sites lie in the Provinces of Mpumalanga, Free State and the Northern Cape. Closer analysis of the physical nature of these unprotected IBAs shows that over 54% of these sites are in the grasslands, and half of the unprotected grassland sites hold high-altitude seeps, bogs, marshes or other wetlands (Barnes in press). This suggests that in South Africa the highest priority conservation areas for birds, and possibly other taxa, lie in the grasslands, particularly in the sensitive wetland systems. A further 35% of the unprotected IBAs are non-grassland natural wetlands, further emphasizing the importance of freshwater systems and highlighting their lack of formal protection.

A total of 91 sites meet the A1 criterion (Table 1), each holding significant populations of at least one species of global conservation concern. All but four of the 46 such species in South Africa occur at one or more IBAs in globally significant numbers—the four exceptions, *Falco fasciinucha*, *Circus macrourus*, *Gallinago media* and *Anthreptes reichenowii*, all occur at one or more IBAs in South Africa, but not in globally significant numbers.

All of the 25 restricted-range species in South Africa occur at one or more IBAs (Table 2). A total of 47 sites meet the A2 criterion (Tables 1 and 2), each site holding a good proportion of the species assemblage characteristic of a particular Endemic Bird Area (EBA) or Secondary Area (Table 2). No site qualifies for more than one EBA or Secondary Area. Some or all of the six restricted-range species of the Cape fynbos EBA (088) occur at 15 IBAs, of which a subset of nine sites meet the A2 criterion, together forming a comprehensive site-network for the conservation of these species (Table 2). Similarly, the seven species of the South African forests EBA (089) together occur at 42 IBAs, of which 22 meet the A2 criterion; the three species of the Lesotho highlands EBA (090) occur at five sites, of which three qualify; the three species of the Southern African grasslands EBA (091) occur at eight sites, of which six qualify; and the four species of the South-east African coast EBA (092) also occur at eight sites, of which six qualify (Table 2). *Certhilauda burra*, the restricted-range species whose distribution defines the Karoo Secondary Area (s047), occurs at three IBAs, all of which hold significant numbers of the species and therefore qualify under the A2 criterion. Two recently recognized larks, *Certhilauda barlowi* and *C. curvirostris*, occur in or near the Secondary Area, and have restricted ranges (covering less than 50,000 km<sup>2</sup> each) that overlap; thus it would appear that this part of the Karoo should be upgraded from 'Secondary Area' to the

status of EBA in any future revision of the global EBA classification.

All of the 78 biome-restricted species in South Africa occur at one or more IBAs (Table 3). A total of 56 sites meet the A3 criterion, each site holding a good proportion of the species assemblage characteristic of a particular biome (Table 3). No site qualifies for more than one biome. The 23 South African species that are restricted to the Afrotropical Highlands biome (code A07) occur at 53 IBAs, of which a subset of 27 sites meet the A3 criterion, together forming a comprehensive site network for the conservation of this species assemblage (Table 3). Similarly, the 12 species of the East African Coast biome (A09) occur at 32 IBAs, of which eight sites meet the A2 criterion; the nine species of the Zambezi biome (A10) occur at 33 sites, none of which qualify; the six species of the Kalahari–Highveld biome (A11) occur at 16 sites, only one of which qualifies; the 19 species of the Namib–Karoo biome (A12) occur at 25 sites, of which nine qualify; and the nine species of the Fynbos biome (A13) occur at 25 sites, of which 11 meet the A3 criterion (Table 3).

A total of 55 sites meet the A4 criteria, of which 45 support at least 1% of the relevant population of one or more waterbirds, thus meeting the A4i criterion. Twenty of these 45 sites regularly hold at least 20,000 waterbirds, thus meeting the A4iii criterion; one other site (ZA040) regularly holds more than 20,000 waterbirds, but does not hold 1% of any species's population. Twenty-five sites meet the A4ii criterion, of which seven sites qualify for supporting at least 1% of the world population of one or more seabird species, and the remaining 18 sites for holding at least 1% of the world population of one or more terrestrial congregatory species (mainly *Gyps coprotheres* and *Falco naumanni*).

## ACKNOWLEDGEMENTS

The South African IBA programme was supported financially by BirdLife International and WWF-South Africa. The staff at the BirdLife International Secretariat in Cambridge provided phenomenal support; financially, technically and logistically. In particular, thanks go to Lincoln Fishpool, Gary Allport, Nonie Coulthard and Trish Wilson. The staff at BirdLife South Africa were equally helpful, and Aldo Berruti and Steve Evans provided useful comments and insights.

The compilation of the IBA directory in South Africa was initiated and, in its early stages, coordinated by David Allan. Dave selflessly set the IBA ball rolling; for this we are deeply indebted. Foremost in providing information on sites, throughout the project, were Warwick Tarboton, B. D. Colahan, R. J. Nuttall and Onno Huyser. Steve Evans, Les Underhill and S. Kuyper made a major contribution towards the late-stage editing, commenting and updating of information.

Rob, Elsie, Alan and John Martin provided checklists for many of the Western Cape reserves, as well as information that would have been impossible to come by otherwise. Paul Martin, Justin Watson and Guy Castley provided information of the Eastern Cape's coastal areas and forests respectively. John Cooper, Onno Huyser, Bruce Dyer and Phil Whittington commented on and improved the island accounts. Deon Nel commented on the Prince Edward Islands account. Norbert Klages commented on the IBA account of the Algoa Bay islands. Steven Piper provided access to data on *Gyps coprotheres* that was imperative in the selection of certain IBAs, particularly in poorly known areas. Adam Riley provided very useful information on Matatiele. Lieutenant San Oosthuysen from the ZANDF provided information on the reserves owned by the Defence Force. Bozena Kalejta-Summers provided access to unpublished

data from Strandfontein Sewage Works. In the Northern Cape, Tania Anderson checked scientific plant names and Dr Mike Knight and Mr Francois Taljaard provided additional information on certain IBAs.

Mark Cooper checked the scientific names for all the plants and compiled most of the information for the 'Other threatened/endemic wildlife' sections. Keith Morgan made extremely valuable comments on the Barberspan account. John McAllister and Pat Benson commented on the Mpumalanga and Northern Province accounts. Callan Cohen and Phil Hockey commented on some accounts for the Western Cape. Malcolm Drummond read through and improved large portions of the text. Leon Bennun (National Museum of Kenya) and Neil Baker and Liz Baker in Tanzania commented on various aspects of IBA directories and, perhaps unknowingly, contributed to this one.

Alan Channing provided a list of South Africa's endemic frogs and Bill Branch provided access to data on endemic reptiles of southern Africa. Neil Grange, Iain Dee Campbell and Marcus Wishart were sources of fruitful conversation and Raff Furniss provided hours of entertainment after the incident in Etosha. Faansie Peacock, Mike Pope (for the Madikwe report) and additional titbits posted on the ZA BirdNet proved useful to various accounts.

Last but not least, many of the staff at the Avian Demography Unit (ADU) of the Department of Statistical Science, University of Cape Town, were instrumental in creating the inventory; Les Underhill, Marc Herremans and James Harrison volunteered to proof-read large chunks of text. Marja Wren-Sargent undertook all the bibliographic work and meticulously checked the references. Sue Kieswetter administered the finances of the programme. Marius Burger checked and corrected scientific names for frog and reptile taxa. To all those that have gone unmentioned but contributed nevertheless, many thanks.

## GLOSSARY

**ericoid** vegetation in which shrubs and/or dwarf-shrubs of the heath family (Ericaceae) are dominant.

**fynbos** the heathland vegetation of the wetter south-western parts of the winter-rainfall region of South Africa, extending eastwards into the Eastern Cape Province.

**highveld** high-lying regions (above 1,500 m) on the Great Plateau in the centre of the country.

**karroid** of the Karoo region; generally pertains to plants that are dwarf and succulent.

**kelp** large seaweeds which are a feature of the inshore marine environment on the south and west coasts.

**kloof** a deep gully or ravine.

**koppie** a small hill, particularly the mesas typical of the Karoo.

**krantz** a gully, ravine or small valley.

**lowveld** low-lying regions (below 1,000 m elevation) in the tropics and subtropics.

**mopane** broadleaved deciduous woodland dominated by the tree *Colophospermum mopane*.

**proteoid** describes vegetation in which shrubs of the family Proteaceae are dominant.

**renosterveld, renosterbos** a largely destroyed vegetation-type within the Fynbos biome. It occurs on nutrient-rich, shale-derived, lowland soils and is characterized by the shrub renosterbos *Elytropappus rhinocerotis*.

**restios, restionaceous, restioid** reedy tussock plants of the family Restionaceae, typical of the Fynbos biome.

**strandveld** the vegetation of the coastal strip, particularly the low scrub on the west coast.

**veld** vegetation.

**vlei** a wetland, particularly of a marshy nature.

## SITE ACCOUNTS

### Kruger National Park and adjacent areas ZA001

Admin region Northern, Mpumalanga

Coordinates 24°10'S 31°35'E

Area 2,142,528 ha Altitude 300–450 m

A1, A3 (A09), A4i

National Park

#### Site description

Kruger National Park (KNP) is situated on the southern portion of the Mozambique coastal plain in the lowveld of the Northern Province and Mpumalanga. The park is roughly rectangular in shape, stretching c.320 km from north to south and 65 km from east to west. The site

includes the important Banyani flood-plain, just outside the park's border, as well as several provincial and privately owned reserves that lie adjacent to the western border, and the large Onderberg area to the south of the park (managed by the Mpumalanga Parks Board). The area consists of flat, gently undulating plains that are occasionally broken by scattered inselbergs. The Lebombo mountains, a series of low hills, dominate the eastern border of the park. KNP is drained from west to east by two major river systems, the nKomati and the Limpopo, which form the southern and northern borders of the park respectively, and also by six other large rivers. Under natural conditions all of these rivers would be perennial, but owing to heavy

water abstraction within their catchments (west of the IBA), all but one now dry out seasonally.

The varied soils give rise to a plethora of different types of deciduous savanna and woodland, ranging from dense forest to open shrubby grassland. Savanna predominates overall, but there is dense broadleaved woodland in the south-west, dominated by *Dichrostachys*, *Combretum* and *Terminalia*, as well as mopane woodland in the central portion of the park, and more open woodland of *Burkea*, *Pseudolachmostylis*, *Kirkia* and baobab *Adansonia* in the drier, rugged northern region. Riverine forest and thicket occurs along all the major drainage lines.

### ■ Birds

See Box and Table 3 for key species. The park is known to support more than 490 bird species, about 55% of the species found in the southern African subregion. The diversity of birds can be attributed to the variety of habitats present and the ecotonal nature of the area. The park supports the healthiest populations of scavenging bird species in South Africa.

The Luvuvhu, Olifants and Sabie rivers, with their associated riverine forest, support several nationally threatened bird species that are secretive and river-dependent, such as *Scotopelia peli*, *Gorsachius leuconotus* and *Podica senegalensis*. The rivers, flood-plains, pans, dams and vleis are important for many wetland-dependent and associated birds, such as *Ciconia nigra*, which breed in the gorges of the nearby Lebombo mountains, *C. episcopus*, *Anastomus lamelligerus*, *Ephippiorhynchus senegalensis* and *Vanellus albiceps*. The Banyini flood-plain, which falls just outside the park's boundary near Pafuri, is of particular interest as in wet seasons it supports excellent pans and surrounding flooded grassy areas. The land is partially private and partially owned by the South African National Defence Force. The seasonally flooded grasslands lying to the north of Shingwedzi are also vital for wetland birds during years of heavy rain, particularly for *Crex crex*.

Several wide-ranging species, which are now rare outside South Africa's large national parks, are locally common in KNP, including the country's largest populations of *Leptoptilos crumeniferus*, *Necrosyrtes monachus*, *Gyps africanus*, *Torgos tracheliotus*, *Trigonoceps occipitalis*, *Polemaetus bellicosus*, *Terathopius ecaudatus*, *Aquila rapax*, *Ardeotis kori* and *Bucorvus cafer*. *Gyps coprotheres* regularly forage within the park. *Neotis denhami*, *Circus macrourus* and *Tyto capensis* occur in small numbers. The thicket and forest areas support the following species restricted to the East African Coast biome: *Poicephalus cryptoxanthus*, *Telophorus quadricolor*, *Lamprolornis corruscus*, *Hypargos margaritatus* and *Serinus citrinipectus* (the latter two in the north-east only).

#### Key species

A1	<i>Gyps coprotheres</i>	<i>Crex crex</i>
	<i>Falco naumanni</i>	
A3 (A09)	East African Coast biome: Five of the 12 species of this biome that occur in South Africa have been recorded at this site; see Table 3.	
A4i	Breeding (pairs)	Non-breeding
<i>Ciconia nigra</i>	10–20	40–60

### ■ Other threatened/endemic wildlife

KNP is one of the most important conservation areas in South Africa. Many threatened species occur throughout the park. Among mammals, there are important populations of *Ceratotherium simum* (LR/cd; more than 700 individuals), *Diceros bicornis* (CR), *Lycan pictus* (EN), *Loxodonta africana* (EN; more than 7,000 individuals) and *Acinonyx jubatus* (VU). The highly localized *Chrysospalax villosus* and *Amblysomus julianae* (CR) have been recorded in the park. The park also holds populations of the more localized *Chirindia langi*, *Zygaspis vandami* and *Afroedura langi*; the latter is restricted to the Olifants river valley. Among the frogs, southern African endemics include *Hemisus marmoratus*, *Hyperolius tuberilinguis*, *Africalus aureus*, *A. delicatus*, *Phrynobatrachus mababiensis*, *Hilderbrandtia ornata*, *Ptychadena mossambica*, *P. oxyrhynchus*, *Strongylopus grayii*, *Tomopterna krugerensis*, *T. marmorata* and *T. natalensis*. *Arthrolepis stenodactylus* is a rare resident.

### ■ Conservation issues

KNP was primarily created to protect the populations of large mammals, and has been administered by the National Parks Board

since 1926. Although the park continues to be managed primarily for its large mammals, several areas are of particular importance for birds, and should be managed accordingly.

The six major rivers that flow into the park have their catchments in the great South African escarpment in the west. The escarpment has suffered considerable environmental modification in the form of forestry, urbanization, agriculture and industrial development, which have led to an inevitable degradation in the quantity and quality of water. Impoundments and other developments are also being planned along the rivers, further threatening the remaining riverine habitat. Of the six (formerly) perennial rivers, only the Sabie still flows permanently, and declining flow volumes suggest that even this river will periodically dry up in future. All but three pairs of South Africa's remaining *Ephippiorhynchus senegalensis* breed along the threatened riverine habitat in the KNP.

Scavenging raptors have suffered severely from persecution and poisoning in South Africa's farming districts in the last 100 years. Raptor numbers have declined, even on properties directly adjacent to the KNP, which has acted as one of the last havens for these specialized and sensitive birds. The awareness programmes initiated during the 1980s have gone a long way towards changing farmers' attitudes to raptors. Some species are beginning to move out of the park and recolonize adjacent farmland. If these birds are ever going to recover their former distribution, the KNP will act as an essential source population for large parts of the country.

*Leptoptilos crumeniferus* is common in the KNP, almost exclusively because food is available at restcamps' rubbish tips. They were extremely rare in the park before the restcamps were developed. The rubbish tips are in the process of being upgraded to prevent access by wildlife (baboon, hyaena, warthog, etc.), and numbers of *Leptoptilos crumeniferus* are expected to decline accordingly.

### ■ Further reading

Benn *et al.* (1995), Braack (1983), Chittenden (1992), Fraser *et al.* (1987), Gertenbach (1983), Joubert (1984), Kemp (1974, 1980), Kemp *et al.* (1989), Newman (1987), Sinclair and Whyte (1991), Tarboton *et al.* (1987), Venter and Bristow (1984), Venter and Gertenbach (1984), Watson (1990a,b).

## Soutpansberg

**ZA002**

Admin region Northern

Coordinates 22°57'S 29°55'E

A1, A2 (089), A3 (A07), A4ii

Area c.260,000 ha

Forest Reserves,

Altitude 1,000–1,747 m

Natural Heritage Sites, State Forests

### ■ Site description

The Soutpansberg, an east–west trending mountain range, stretches some 130 km from 10 km west of Thohoyandou in the east to Vivo in the west. Louis Trichardt lies in the centre of the range, below its southern slopes. The range rises c.700 m from the surrounding plains to form spectacular peaks at Maditshwene (1,606 m) and Letjume (1,747 m) in the west and the lower-altitude Entabeni Peak (1,449 m) in the east. To the north, the plains drop into the lowveld of the Limpopo valley. The range holds the catchments of several important Northern Province rivers, including the Sand, Mutamba, Nzhelele, Nwanedzi, Mutale and Luvuvhu rivers. All of these flow north into the Province's most important river, the Limpopo.

The vegetation is primarily north-eastern mountain sourveld. Scrubby thornveld occurs on the mountain slopes. On the lower and middle slopes, sourish mixed bushveld dominates. The mountain peaks are covered with scattered clumps of *Protea* bushes. Patches of Afromontane forest, up to 30–40 m tall, are found in valleys and moist basins, especially where south-facing.

### ■ Birds

See Box and Tables 2 and 3 for key species. The Soutpansberg supports a colony of *Gyps coprotheres*, located on three separate adjacent cliffs. The thick forest vegetation in the valleys and basins supports a small population of *Poicephalus robustus robustus*, as well as *Stephanoaetus coronatus*, *Buteo oreophilus*, *Tauraco corythaix*, *Cossypha dichroa*, *Apaloderma narina*, *Coracina caesia*, *Telophorus olivaceus*, *T. multicolor*, *Mandingoa nitidula* and *Serinus scotops*. The bushveld on the slopes holds *Telophorus quadricolor*, *Cossypha humeralis* and *Eremomela usticollis*. The *Protea* woodland is suitable for *Promerops*

*gurneyi*. The rivers hold small numbers of *Podica senegalensis*, *Gorsachius leuconotus* and *Scotopelia peli*.

#### Key species

A1	<i>Gyps coprotheres</i>	
A2 (089)	South African forests EBA: Three of the seven species of this EBA that occur in South Africa have been recorded at this site; see Table 2.	
A3 (A07)	Afrotropical Highlands biome: 11 of the 23 species of this biome that occur in South Africa have been recorded at this site; see Table 3.	
A4ii	Breeding (pairs)	Non-breeding
	<i>Gyps coprotheres</i>	116–171      250–400

#### Other threatened/endemic wildlife

Flora: the stapeliads *Huernia nouhuysii*, *Stapelia clavicornona* and *Orbeanthus conjunctus* are rare and endemic to these mountains. Other spectacular endemics restricted to the Soutpansberg include *Aloe angelica*, *A. soutpansbergensis*, *Kalanchoe crundallii* and *Euphorbia soutpansbergensis*. The cycad *Encephalartos transvenosus*, endemic to the Soutpansberg and northern Drakensberg escarpment, is known from near the site's border. Amphibians: *Australolacerta rupicola*, and the subspecies *taeniatus* of the range-restricted *Breviceps sylvestris*, which may be a valid species, are endemic to the Soutpansberg. Two other species endemic to this range, *Bradypodion* sp. and *Afroedura* sp., are as yet undescribed. Reptiles: *Cordylus warreni* and *Lygodactylus ocellatus* (*L. o. soutpansbergensis* restricted to the Soutpansberg) are endemic to the Soutpansberg and Mpumalanga/Swaziland escarpment zone and occur in rocky montane grassland areas. *Platysaurus guttatus*, *P. relictus* (LR/nt) and *Lygodactylus nigropunctatus* have global ranges restricted to the Soutpansberg and nearby Waterberg (IBA ZA006), although the gecko also occurs patchily elsewhere in the central Northern Province.

#### Conservation issues

The eastern portion of the massif has been extensively afforested with commercial timber plantations. Parts of the range are also used for subtropical fruit farming, mainly avocados, mangos, nuts and citrus. The western portion of the massif, with its limited water resources, agriculturally marginal soils and poor industrial potential, has remained relatively pristine. The eastern portion holds various forest reserves, including Timbadola Forest Reserve, Entabeni State Forest, Klein Australië Forest Reserve, Goedehoop Forest Reserve, Roodewal Forest Reserve and Hanglip State Forest, and the private Buzzard Mountain Retreat, 20 km west of Louis Trichardt. Most of these protected areas are partly afforested and partly covered by indigenous vegetation. Salt is the only economically exploitable mineral deposit in the Soutpansberg. Various farms in the western portion, covering over 20,000 ha to date, have been registered as Natural Heritage Sites. Owing to the unique nature of these mountains, and the taxa restricted to them, it is recommended that additional land be considered for formal protection. The river catchments require particular conservation attention.

#### Further reading

Benson *et al.* (1990), Carr (1990), Clinning and Fourie (1990), Coetzee *et al.* (1981), Jacobsen (1990), Tarboton (1990), Tarboton and Allan (1984).

### Blouberg vulture colonies

Admin region Northern

Coordinates 23°07'S 28°58'E

Area c.30,000 ha Altitude 1,100–2,051 m

ZA003

A1, A4ii

Nature Reserves

#### Site description

Blouberg is an isolated inselberg that lies to the west of the Soutpansberg range, some 80 km west of Louis Trichardt. This small rugged pinnacle rises sharply from the surrounding plateau that lies, on average, at 1,000 m. Peaks such as Sesuane (1,552 m), Lenare (1,385 m) and the summit Gamonnaasenamoriri (2,051 m) dominate the massif. The site is defined as the portion of the inselberg lying above the 1,100 m contour line.

The mountain slopes are covered by north-eastern mountain sourveld. The scrubby thornveld of the mountain slopes includes woody species of *Phymaspermum*, *Lippia* and *Stoebe*. On the lower and mid-slopes, sourish mixed bushveld dominates, generally as an open savanna dominated by *Acacia* and *Dichrostachys* trees, with

*Combretum*, *Rhus*, *Grewia* and *Dombeya* less common. The mountain's higher slopes and plateau are covered in some areas by scattered *Protea* bushes. Small patches of Afromontane forest are found in valleys and moist basins throughout Blouberg, with forest trees of *Rapanea*, *Xymalos*, *Podocarpus* and *Trichocladus*.

#### Birds

See Box for key species. The cliffs at Blouberg regularly hold between 600 and 800 pairs of *Gyps coprotheres*, making it the world's second-largest colony. While most birds breed at the main colony, a few pairs breed elsewhere on the Blouberg, at satellite colonies such as Leipsig, Glenferness and Millbank. The satellite colonies are only occasionally active. The surrounding woodland holds *Bucorvus cafer*, *Eupodotis ruficrista*, *Mirafra passerina*, *Bradornis mariquensis*, *Turdoides bicolor*, *Cossypha humeralis*, *Cercotrichas paena*, *Calamonastes fasciolatus*, *Eremomela usticollis*, *Telophorus quadricolor*, *Eurocephalus anguitimens*, *Sporopipes squamifrons*, *Uraeginthus granatina* and *Estrilda erythronotos*.

#### Key species

A1	<i>Gyps coprotheres</i>	
A4ii	Breeding (pairs)	Non-breeding
	<i>Gyps coprotheres</i>	820–870      1,700–1,900

#### Other threatened/endemic wildlife

The Blouberg is the only home to the reptile *Platysaurus monotropis*, which is endemic to this set of inselbergs. *Platysaurus guttatus* and *Lygodactylus nigropunctatus* (endemic subspecies *L. n. montiscaeruli* is restricted to the Blouberg) have global ranges restricted to the Blouberg, Soutpansberg (IBA ZA002) and nearby Waterberg (IBA ZA006), although the latter species also occurs patchily elsewhere in the central Northern Province. The Blouberg foothills also hold *Platysaurus minor*.

#### Conservation issues

Both Blouberg East Nature Reserve (363 ha) and Blouberg West Nature Reserve (4,828 ha), which fall within the site, were declared in 1983. Poisonings of vultures, which are regularly recorded in the district, pose a potential threat to the colony. The bulk of farming in the district is for cattle, game and other large stock. Although farmers seldom set traps to combat mammalian predators such as jackal, caracal and domestic dogs, poison is still used indiscriminately. Vultures are used extensively for traditional, medicinal and ceremonial purposes and are targeted by rural residents who use poisoned carcasses to kill them.

Depleted food supply, with subsequent loss of vital nutrients in the diet, may result in increased mortalities as a consequence of metabolic bone disease, osteodystrophy, and other physiological abnormalities. Recreational mountaineering, collisions with man-made structures, human encroachment and environmental pollution all threaten the survival of this colony. Breeding success can fluctuate alarmingly in this species. The sudden loss of birds from the Karringmelkspruit colony in the Eastern Cape, where the colony collapsed from over 800 birds to none in approximately 25 years, serves as a warning that mismanagement of the larger colonies can result in dramatic population crashes over short periods of time. The Blouberg vultures forage quite widely, regularly travelling to the plains north of the Soutpansberg (IBA ZA002) and into Botswana's Tuli Block. An awareness programme for local farmers, land-users and residents should be initiated to promote the conservation of *Gyps coprotheres* in the area.

#### Further reading

Benson (1986), Benson and Dobbs (1984), Benson *et al.* (1990), Coetzee *et al.* (1981).

### Wolkberg forest belt

Admin region Northern

Coordinates 23°54'S 30°02'E

Area c.65,000 ha

Altitude 1,300–1,696 m

ZA004

A1, A2 (089), A3 (A07)

Nature Reserve, Forest Reserves, Wilderness Area, State Forests

#### Site description

This site consists of an arc of hills and a series of forests surrounding the western rim of Tzaneen. It includes New Agatha, Mamathhola



and Serala State Forests, Wolkberg Wilderness Area and Lekgalameetse Nature Reserve to the south of the town. Baccarat, De Hoek and Woodbush Forest Reserves lie to the west and Conningsby Plantation, Broederstroom, Grootbos Reserve, Westfalia Estates and Duiwelskloof Forest to the north of Tzaneen. Seshwene Peak (1,253 m) rises to the north of Tzaneen with Vaalkrans (1,607 m) and De Hoek (1,696 m), the region's highest peak, rising to the west of the town. The landscape consists of spectacular mountains with steep slopes, gorges and amphitheatres.

Despite the region being dominated by a matrix of *Eucalyptus* and pine *Pinus* plantations, large patches of good quality Afromontane forest and small grassland patches are found scattered throughout the valleys and moist basins of the Tzaneen mountains. Forest trees of general occurrence include species of *Rapanea*, *Xymalos*, *Podocarpus*, *Trichocladus*, *Rhus*, *Halleria*, *Ilex* and *Curtisia*. Ferns such as tree-fern *Cyathea*, shrubs and small trees are often abundant along the forest edges. The forest patches are interspersed with grassland, wooded savanna and scrub-forest dominated by *Trichilia*, *Combretum*, *Parinari*, *Acacia*, *Polystachya*, *Mystacidium*, *Protea*, *Faurea* and *Pterocarpus*.

### ■ Birds

See Box and Tables 2 and 3 for key species. The area holds *Macheiramphus alcinus*, which breeds in plantations and forest reserves, as do both *Polemaetus bellicosus* and *Stephanoaetus coronatus*. The mountain cliffs hold *Falco peregrinus*. This is one of very few areas in South Africa holding *Telophorus multicolor*, which inhabits forest and forest-edge habitats. The region's forests are also home to *Poicephalus robustus robustus*, *Zoothera gurneyi*, *Lioptilus nigricapillus*, *Buteo oreophilus*, *Tauraco corythaix*, *Cossypha dichroa*, *Cercotrichas signata*, *Coracina caesia*, *Telophorus olivaceus*, *Mandingoa nitidula* and *Serinus scotops*. Some of the region's rivers, particularly those at lower altitude, hold *Podica senegalensis* and *Gorsachius leuconotus*. Marshy and open climax grasslands hold *Schoenicola brevirostris* and *Sarothrura affinis*.

#### Key species

- A1 *Lioptilus nigricapillus*  
 A2 (089) South African forests EBA: Five of the seven species of this EBA that occur in South Africa have been recorded at this site; see Table 2.  
 A3 (A07) Afrotropical Highlands biome: 13 of the 23 species of this biome that occur in South Africa have been recorded at this site; see Table 3.

### Other endemic/threatened wildlife

The extremely rare and localized dolomite-restricted cycad *Encephalartos dolomiticus*, which occurs near Penge, almost certainly occurs within the site; its global range is restricted to the Wolkberg. A large population (1,000 individuals) of the slightly more widespread cycad *Encephalartos transvenosus* occurs in the Lekgalameetse Nature Reserve. Several other range-restricted plants occur within the site, including *Euphorbia stricta*, *Cyrtanthus thornicroftii*, *Kniphofia coralligemma*, *Encephalartos eugene-maraisii* and *E. inopus*, all of which are endemic to the Mpumalanga–Northern Province escarpment. The nominate subspecies of the range-restricted frog *Breviceps sylvestris* is endemic to the Wolkberg. Three reptile species have global ranges restricted to this IBA: *Afroedura multiporis* and the threatened *Lygodactylus methueni* (VU) are found in the forests, and *Acontophiops lineatus* occurs in the montane grasslands. Another species, *Tetradactylus eastwoodae* (EX), was endemic to this IBA, but it is thought to be extinct, as pine trees were planted throughout its remaining habitat. Mammals include *Manis temminckii* (LR/nt).

### ■ Conservation issues

The site includes Serala State Forest, which was established in 1977, and several other important forest reserves including Woodbush State Forest and De Hoek, Grootbos, Broederstroom, Baccarat, New Agatha and Mamatlhola Forest Reserves. It also includes the unprotected Duiwelskloof Forest to the north of Tzaneen, the Northern Province Nature Conservation-administered Wolkberg Wilderness Area, the Merensky Trust-owned Westfalia Estates and the Lekgalameetse Nature Reserve, which was established in 1979 and proclaimed in 1984.

The region is used extensively for forestry, and plantations cover vast portions of the IBA. The dramatically reduced and highly fragmented indigenous forest that remains should be protected at all

costs. The remaining indigenous forest is under considerable threat from the spread of non-native trees from surrounding plantations. Several important rivers have their sources in these mountains, including the Molototsi, Nwandi, Hlangana and Letsitele rivers, most of which eventually run into the Letaba river. The Letaba, which runs into the Kruger National Park (IBA ZA001) and neighbouring Mozambique, periodically runs dry owing to the loss of catchment water from the water-thirsty plantations. Water conservation is a high-priority issue on the escarpment, and water utilization requires intense monitoring and management.

### Pietersburg Nature Reserve

**ZA005**

Admin region Northern

Coordinates 23°56'S 29°30'E

Area 3,200 ha Altitude 1,300 m

A1

Nature Reserve

### ■ Site description

This site lies 3 km south of Pietersburg, and comprises flat, open broadleaved savanna and grassland, with trees of *Burkea*, *Terminalia*, *Combretum*, *Dichrostachys*, *Ziziphus* and *Acacia*, and shrubs such as *Ochna*, *Grewia* and *Barleria*. On the flat bottomlands and termitaria zones, *Acacia* savanna occurs.

### ■ Birds

See Box for key species. The reserve supports at least 250 bird species. It is the only reserve in South Africa holding the isolated Pietersburg Plateau population of *Certhilauda chuana*. Birds of this disjunct population are quite distinct from those of the much larger, western population centred on south-eastern Botswana. In the surrounding woodland, *Sagittarius serpentarius*, *Gyps africanus* and *G. coprotheres* are scarce visitors. Other woodland specials include *Eupodotis ruficrista*, *Turdoides bicolor*, *Cossypha humeralis*, *Cercotrichas paena*, *Eremomela usticollis*, *Calamonastes fasciolatus*, *Bradornis mariquensis*, *Laniarius atrococcineus*, *Eurocephalus anguitimens*, *Lamprotornis australis*, *Sporopipes squamifrons*, *Uraeginthus granatina*, *Estrilda erythronotus* and *Vidua regia*.

#### Key species

- A1 *Certhilauda chuana*

### ■ Other threatened/endemic wildlife

None known to BirdLife International.

### ■ Conservation issues

Clarification of the taxonomic status of the two populations of *Certhilauda chuana* is a high priority. Should the Pietersburg Plateau population be shown to be substantially different, then it is inadequately conserved, and measures should be taken to increase the proportion of the population under formal conservation or under appropriate veld management.

### Waterberg system

**ZA006**

Admin region Northern

Coordinates 24°17'S 28°05'E

Area c.375,000 ha

Altitude 900–1,670 m

A1, A4ii

 National Park,  
 Nature Reserve

### ■ Site description

The site consists of the Waterberg range and its cliffs. The range is about 150 km long and it runs from 15 km north-east of Thabazimbi, eastwards, to Hanglip Point c.30 km west of Potgietersrus. The Kransberg, a massif within the western sector of the Waterberg range, has been incorporated into Marakele National Park. The region is surrounded by granite, basalt and sandstone ridges, which are eroded into natural blocks by the Mogol and Lephalala rivers.

The area is characterized by open broadleaved woodland that is common on the plains below the Waterberg mountains, dominated by trees of *Faurea*, *Terminalia*, *Acacia*, *Burkea* and *Peltophorum* in the deep sandy areas, with *Kirkia* and *Englerophytum* characteristic on the rocky slopes. Other trees scattered throughout various communities include species of *Heteropyxis*, *Dombeya*, *Lansea* and

*Pterocarpus*. Natural climax grassland is scarce and it occurs only in the highest regions where it is restricted to the highest plateaus or cool south-facing slopes. On deep sands, where termitaria occur, typical bushveld clumps become common. Proteoid shrubland occurs on cool slopes. Forest and thicket communities develop in the kloofs and ravines, holding trees of *Podocarpus*, *Mimusops*, *Combretum*, *Olea*, *Calodendrum*, *Ficus*, *Diospyros*, *Maytenus* and other forest elements.

### ■ Birds

See Box for key species. Kransberg holds the largest *Gyps coprotheres* colony in the world; it comprised c.900 breeding pairs in 1984, but by 1998 numbers had fallen to c.700 pairs. Most of the vulture cliffs are situated outside Marakele National Park, which should be enlarged to incorporate the key breeding cliffs. The Kransberg also holds breeding *Ciconia nigra*. The grasslands support small populations of *Neotis denhami* and *Eupodotis senegalensis*. *Promerops gurneyi* occurs at higher altitudes where *Protea roupelliae* dominates the proteoid shrubland. The woodland at the base of the mountains holds *Bucorvus cafer* and *Ardeotis kori*, which breed near Ellisras, and are regular within the IBA. Other woodland birds include *Eupodotis ruficrista*, *Mirafra passerina*, *Bradornis marquensis*, *Lamprotornis australis*, *Cercotrichas paena*, *Calamonastes fasciolatus*, *Laniarius atrococcineus*, *Vidua regia* and *Eurocephalus anguithimens*.

Key species			
A1	<i>Gyps coprotheres</i>	<i>Grus paradisea</i>	
A4ii		Breeding (pairs)	Non-breeding
	<i>Gyps coprotheres</i>	700–900	1,800–2,200

### ■ Other threatened/endemic wildlife

The threatened butterfly, *Eriksonia acraeina*, occurs here. The global ranges of the cycad *Encephalartos eugene-maraisii*, and the reptiles *Lygodactylus waterbergensis*, *Cordylus breyeri* and *Platysaurus minor*, are virtually restricted to these mountains. Both *Platysaurus guttatus* and *P. relictus* (LR/nt) have global ranges restricted to the Waterberg and nearby Soutpansberg (IBA ZA002). The mammal *Loxodonta africana* (EN) has been reintroduced in various high-profile conservation areas.

### ■ Conservation issues

Within the Waterberg system, the Kransberg in the west is protected in Marakele National Park (44,000 ha) and the adjoining Welgevonden Private Nature Reserve (14,000 ha). Ironically, most of the vulture breeding cliffs fall outside the protected areas; reserve boundaries should be reconsidered in order to include these. Strychnine poisonings (from surrounding farmland) have been recorded regularly, and pose a major threat to vultures that feed on poisoned carcasses set for vermin. Hundreds of vultures can be killed in a single irresponsible poisoning incident. A vulture-awareness campaign for farmers may help reduce poisonings. Disturbance by recreational mountaineers has been shown to greatly reduce hatching success and has been recognized as a major source of mortality to both eggs and young. Collisions with radio and television towers have also caused substantial vulture mortality.

### ■ Further reading

Benson and Dobbs (1984), Benson *et al.* (1990), Coetzee *et al.* (1981).

Nyl river flood-plain		ZA007
Admin region	Northern	
Coordinates	24°39'S 28°42'E	A1, A4i, A4iii
Area	16,000 ha	Nature Reserves
Altitude	1,050–1,140 m	

### ■ Site description

The Nyl river forms a 70-km-long grassland flood-plain, one of the largest in South Africa. It runs from 10 km south of Naboomspruit north to Potgietersrus. The area, known as Nylsvley, is located in extensive undulating to flat terrain between 1,050 and 1,080 m. The flood-plain starts to widen at the western edge of Nylsvley Nature Reserve and it attains its greatest width, of five to six kilometres, on the farms downstream from there: Vogelfontein, Weltevreden, Zyferkraal, Du Toits Kraal (the last three embraced by the Mosdene Private Nature Reserve), Groenvaley and Zandpan. At its northern

end, on the farm Vaalkop, it narrows and assumes the character of a normal river. The only prominent hills occur at Maroelakop (1,140 m) and Stemmerskop (1,090 m), both are on Nylsvley Nature Reserve and are in close proximity to each other. The system derives its floodwaters from rain that falls in the nearby foothills of the Waterberg range (IBA ZA006).

This is the largest wetland of its kind in South Africa and it is basically a grass-dominated, seasonally inundated flood-plain, which in years of poor rainfall may not be flooded at all. It requires rainfall of at least 10% above the annual mean to produce significant inundation. The dominant grass in flooded areas is *Oryza longistaminata*, which may grow up to 2 m tall and provides cover, food and nesting material for many wetland birds. Many other grass species occur. Dominant sedges include *Cyperus*, *Schoenoplectus* and *Eleocharis*. Large stands of reed *Phragmites* are also found.

Bushes and trees, many of *Acacia*, are scattered throughout the flood-plain and provide nesting sites for herons, bitterns and egrets. On some of the high-lying areas the vegetation comprises broadleaved savanna and grassland, with trees (up to 9 m tall) of *Acacia*, *Burkea*, *Terminalia* and *Combretum*. The well-drained low termitaria support *Acacia* thickets.

### ■ Birds

See Box for key species. The area has a list of 426 bird species, about 46% of the species found in southern Africa. The flood-plain occasionally erupts with activity, holding up to 80,000 birds during high rainfall years. *Egretta vinaceigula*, *Ardeola rufiventris*, *Sarothrua boehmi* and *Porzana pusilla* breed erratically, whenever conditions are suitable. A relatively large *Crex crex* population occurs here in the austral summer. The wetland also occasionally supports extremely large numbers of *Casmerodius albus*, *Ardeola ralloides*, *Nycticorax nycticorax*, *Platalea alba* and *Netta erythrophthalma*. *Tyto capensis* is fairly common in the flooded grasslands and *Glareola nordmanni* occasionally occur in large numbers in the drier grassland surrounding the flood-plain. Almost every species of South African duck is found here from time to time, some in very large numbers. The surrounding woodland holds several restricted-range and biome-restricted species.

Key species			
A1	<i>Glareola nordmanni</i>		
A4i		Breeding (pairs)	Non-breeding
	<i>Casmerodius albus</i>	200–500	400–600
	<i>Ardeola ralloides</i>	300–550	600–1,300
	<i>Nycticorax nycticorax</i>	500–700	1,000–1,600
	<i>Ixobrychus sturmii</i>	200–300	500–800
	<i>Platalea alba</i>	100–120	350–600
	<i>Thalassornis leuconotus</i>	50–60	120–220
	<i>Netta erythrophthalma</i>	400–600	1,000–2,000
	<i>Glareola nordmanni</i>	—	180–500
	<i>Gallinago nigripennis</i>	250–400	500–1,000
A4iii	More than 20,000 waterbirds occur.		

### ■ Other threatened/endemic wildlife

The reserve holds the mammal *Hyaena brunnea* (LR/nt).

### ■ Conservation issues

Eight hundred hectares of flood-plain are protected in the 3,985 ha Nylsvley Nature Reserve, which was established in 1967; additional flood-plain habitat is protected in the neighbouring private Mosdene Nature Reserve. The Nyl flood-plain is one of the most important wetlands in South Africa, and it has recently been proposed as a Ramsar Site; concerted efforts should be made to increase the area of flood-plain under formal protection. The system is reliant on rain falling in the Waterberg (IBA ZA006) and inundating the plain. Any impoundment or disturbance to river flow on the handful of rivers that contribute to the flood-plain could seriously affect Nylsvley. Plans to build a large storage dam on the flood-plain's main source of water, the Olifantsspruit, were shelved in 1995 as a result of an environmental impact assessment which concluded that the dam's impact on the flood-plain could be severe. A conservation programme was initiated by 'Friends of Nylsvley' to clear non-native vegetation from river-edges in the Nyl's catchment, thereby enhancing the run-off onto the flood-plain. The river is subjected to small-scale damming, dykes and the extraction of sand, all of which may alter the flooding regime that drives this rather dynamic system.

Other threats to the system include the development of agriculture and grazing on, and in the vicinity of, the flood-plain. Despite being previously used for cattle-grazing, the reserve's vegetation has been well conserved. The same cannot be said for the remainder of the flood-plain; monitoring and management of grazing and agriculture on the flood-plain are essential to secure the long-term integrity of the site. Purchasing of private land for State conservation, or promoting the management of private land for conservation purposes, should be encouraged. A further threat is the poisoning of birds and fish by aerial spraying of *Quelea quelea* roosts in *Phragmites* reedbeds.

#### Further reading

Coetzee *et al.* (1977), Harmse (1977), Tarboton (1979, 1987a,b, 1996), Tarboton *et al.* (1987).

### Blyde river canyon

Admin region Mpumalanga, Northern Province

Coordinates 24°40'S 30°50'E

A1, A2 (089), A3 (A07), A4ii

Area c.50,000 ha

Nature Reserve,

Altitude 1,100–1,832 m

State Forests

ZA008

#### Site description

Located approximately 8 km north of Graskop and 18 km south-west of Hoedspruit, the Blyde river canyon (700 m deep in places) stretches for nearly 20 km as it cuts a spectacular path through the granite of the great South African escarpment. The site includes the Blyde River Canyon Nature Reserve and the Swadini and Manoutsa portions of the Mpumalanga Drakensberg escarpment, which fall outside the reserve, and the forestry-owned areas of Mariepskop, Salique, Hebron, Welgevonden and Onverwacht State Forests. Marakalala (1,133 m) and Mogologolo (1,746 m) peaks, and their associated sheer cliff-faces to the north of the reserve's border, dominate the landscape. At the confluence of the Blyde and Origstad rivers, in the northern portion of the reserve, an impoundment forms the Blydepoort Dam. The spectacular gorge is flanked by some remarkable peaks (up to 1,749 m).

Large patches of Afromontane forest are found in valleys, along scarp basins, and in moist areas throughout the Blyde river canyon. Forest trees of general occurrence include species of *Xymalos*, *Podocarpus*, *Trichocladus*, *Rhus* and *Halleria*. Ferns, shrubs and small trees such as *Rapanea* are often abundant along the forest edges. Forest-related bush clumps occur on the edge of the escarpment, with woody species of *Psychotria*, *Myrica*, *Vaccinium* and *Englerophytum* dominating. Away from the moist gullies, the open tree-savanna is dominated by *Terminalia*, *Combretum*, *Acacia*, *Ficus* and *Strychnos*. Montane grassland dominates on open, exposed slopes where frost and fire are regular. *Protea* bushes dominate the woody component.

#### Birds

See Box and Tables 2 and 3 for key species. This is the only site in South Africa that supports breeding *Falco fasciinucha*. At least one pair inhabits the gorges and there is potential habitat for several more birds. The cliffs at Manoutsa hold over 660 pairs of *Gyps coprotheres*, making it the world's fourth-largest colony. The gorges also hold breeding *Ciconia nigra*, *Falco peregrinus* and *Bubo capensis*. The surrounding grassland supports *Turnix hottentotta*, *Sarothrura affinis*, *Saxicola bifasciata*, *Neotis denhami*, *Grus paradisea*, *Bucorvus cafer*, *Tyto capensis* and *Geronticus calvus*, which breed within the reserve along the cliff gorges. The proteoid hillslopes hold *Promerops gurneyi*. The forest and forest edge support *Stephanoaetus coronatus*, *Buteo oreophilus*, *Lioptilus nigricapillus*, *Tauraco corythaix*, *Bradypterus barratti*, *Telophorus olivaceus*, *Cossypha dichroa*, *Cercotrichas signata*, *Estrilda melanotis* and *Serinus scotops*.

#### Key species

A1	<i>Geronticus calvus</i>	<i>Saxicola bifasciata</i>
	<i>Gyps coprotheres</i>	<i>Lioptilus nigricapillus</i>
	<i>Grus paradisea</i>	
A2 (089)	South African forests EBA: Five of the seven species of this EBA that occur in South Africa have been recorded at this site; see Table 2.	
A3 (A07)	Afrotropical Highlands biome: 17 of the 23 species of this biome that occur in South Africa have been recorded at this site; see Table 3.	
A4ii	Breeding (pairs)	Non-breeding
	<i>Gyps coprotheres</i>	660–773 1,400–1,500

#### Other threatened/endemic wildlife

Flora: the grassland in this reserve holds many localized South African endemic or near-endemic plant species. Well-represented are members of the Liliaceae, Iridaceae, Compositae, Lamiaceae and Orchidaceae. Spectacular species endemic to northern South Africa include *Protea laetans* (VU), *P. rubropilosa*, *Aloe minima*, *Dombeya autumnalis*, *Gladiolus varius*, *G. vernus*, *Watsonia transvaalensis* and *Clivia caulescens*. The cycad *Encephalartos cupidus* is endemic to the catchment of this river and also occurs within the reserve. The cycad *E. inopinus* is another rare and localized plant occurring within the reserve. Amphibians: the forests are known to hold highly localized populations of *Bufo pardalis* and *Breviceps verrucosus*. The fish *Barbus treurenensis* (LR/cd) is restricted to a 4.5 km stretch of river on the Blyde river outside the IBA, where it is highly localized and threatened, having already lost most of its global range—this is the last remaining population. Reptiles: a new, as-yet-undescribed subspecies of the endemic *Afroedura multiporis* was recently found here. *Lygodactylus nigropunctatus* and *L. ocellatus*, endemic to the Soutpansberg and Mpumalanga/Swaziland Drakensberg, have been recorded in the reserve's rocky montane grassland areas.

#### Conservation issues

The Mpumalanga Parks Board owns the Blyde River Canyon Nature Reserve, which was proclaimed in 1965. The Department of Water Affairs and Forestry (DWAFF) own Mariepskop, Salique, Hebron, Welgevonden and Onverwacht State Forests. The privately owned Manoutsa Raptor Conservancy is on the escarpment to the north of the reserve. The greatest threat in this region is afforestation of the escarpment grasslands with non-native *Pinus* and *Acacia* trees. Attention should be focused on monitoring and combating proposed afforestation. Surrounded by some of the most spectacular scenery in Africa, this area has potential to become one of South Africa's primary ecotourism hubs. The spectacular God's Window and Bourke's Luck Potholes, combined with the dramatic canyon, offer fantastic ecotourism opportunities. Potential development of additional recreational facilities within the park should be carefully considered. The active tufa waterfall in the reserve is threatened by water pollution from upstream villages.

#### Further reading

Allan (1988), Allan *et al.* (1987, 1997), Benson and Dobbs (1984), Benson *et al.* (1990), Tarboton (1997b,c), Wagner and Jenkins (1996).

### Graskop grasslands

Admin region Mpumalanga

Coordinates 24°54'S 30°49'E

Area c.10,000 ha Altitude c.1,463–1,807 m

ZA009

A1

Unprotected

#### Site description

This site lies within South Africa's mistbelt region and consists of two areas of fragmented, gently undulating sour grassveld, which are separated from one another by a plantation. The first grassland area, Graskop 564 KT, lies immediately west of Graskop Town and is infiltrated by narrow drainage-lines lying between 1,463 and 1,807 m. The grassland in this area is severely fragmented; there are only three blocks of continuous grassland, and each is surrounded by plantation.

The first block of primary grassland occurs at Townlands West; to the south, a narrow grassland tongue known as Malidyke stretches for 3 km from the western portion of Townlands West. The third grassland block, the hilly Stanley Bush Kop, lies farther west, south of Pilgrim's Rest. The grasslands at Graskop 564 KT are separated from those at Lisbon Ridge by the farm Driekop 546, which is entirely afforested with pines *Pinus*. Lisbon Ridge lies c.8 km due north of Graskop Town. Patches of fynbos elements, such as *Erica* and *Protea*, also occur. The forests, which are restricted to the more mesic valleys, are dominated by *Rapanea*, *Xymalos*, *Podocarpus*, *Pterocelastrus* and *Syzygium*. Other natural habitat-types include rocky outcrops and sheer cliffs, which form part of the Mpumalanga escarpment. Up to 20% of the grassland in this area has been encroached upon by large, dense stands of tall non-native trees, including *Acacia*, *Eucalyptus* and *Pinus*. Non-native trees continue to spread uncontrolled.

## ■ Birds

See Box for key species. These two fragmented grassland areas hold the second largest population of breeding *Hirundo atrocaerulea* in South Africa. *Neotis denhami*, *Bucorvus cafer*, *Vanellus melanopterus* and other grassland specials such as *Saxicola bifasciata* also occur. Although the fragmented grassland comprises less than 2,500 ha (25%) of the site's area, the birds probably move between the grassland patches and it is appropriate to treat the system as a single unit. The proteoid woodland holds *Promerops gurneyi*.

### Key species

A1 *Hirundo atrocaerulea* *Saxicola bifasciata*

## ■ Other threatened/endemic wildlife

None known to BirdLife International.

## ■ Conservation issues

The Graskop 564 KT plot is state-owned (by the Department of Land Affairs), but it is managed by Mpumalanga Parks Board. It is hoped that the land will receive Nature Reserve status in the near future. A management plan proposed by Mpumalanga Parks Board is in place to meet the needs of non-native vegetation removal, clearing the grassland, creating firebreaks and implementing grassland rejuvenation, to maximize the breeding success of *Hirundo atrocaerulea*. Lisbon Ridge, however, is state-owned land that has been leased to the South African Forestry Company (SAFCOL). This is prime land for forestry, but it has not yet been planted as the mining rights to the land are held by other parties. Both sectors of land are currently used for water management and nature conservation.

The area faces several significant conservation issues. The proposed mining of mineral deposits within the reserve complex is serious; it may result in the extinction of *Hirundo atrocaerulea* at this site. Irresponsible behaviour by tourists may elevate the frequency of burns and disturbance of breeding birds. Weed invasion of the grassland is also occurring, reducing the foraging area of *Hirundo atrocaerulea*. Artificial manipulation of ant-bear (*Orycteropus*) holes to make them more suitable for breeding *Hirundo atrocaerulea* has been shown to elevate breeding success and should be pursued as a research priority.

## ■ Further reading

Allan (1988), Allan *et al.* (1987), Evans (1996, 1997, 1998), Huggett (1995, 1996), Maclean (1993), Snell (1963, 1969, 1970, 1979), Tarboton (1997b,c).

### Mac-Mac escarpment and forests

Admin region Mpumalanga

Coordinates 25°02'S 30°50'E A1, A2 (089), A3 (A07)

Area c.35,000 ha Altitude 1,200–1,700 m Unprotected

ZA010

## ■ Site description

Located within the South African mistbelt, between Graskop and Sabie, this site consists of a patchwork of forestry plantations that still hold superb patches of fragmented indigenous forest, as well as some remaining grassland and sheer cliffs. The site consists of Mariti, Waterhoutboom, Mac-Mac, Frankfort, Bergvliet, Klipkraal, Rietfontein, Waterfal and Ceylon plantations. Approximately 60% of the area is under pine *Pinus* plantation, while the remaining 40% holds escarpment cliffs with associated grassland and indigenous forest.

Fragmented patches of indigenous habitat may be found in and around the plantation matrix. The thornveld of mountain slopes holds scrubby *Phymaspermum*, *Buddleja* and *Leucosidea* along the streams. Patches of fynbos holding *Erica* and *Protea* bushes also occur. The forests, which are restricted to the more mesic valleys, are dominated by trees of *Rapanea*, *Podocarpus*, *Trichocladus* and *Curtisia*. Dense stands of non-native trees, including wattle *Acacia* and *Eucalyptus*, have invaded and replaced much of the remaining indigenous vegetation, and continue to spread uncontrolled, encroaching on the remaining grassland.

## ■ Birds

See Box and Tables 2 and 3 for key species. The rivers running through the area support small populations of *Gorsachius leuconotus* and

*Podica senegalensis*. The remaining grasslands hold a relatively large population of *Bucorvus cafer*. Other notable birds include *Saxicola bifasciata* (grassland) and *Promerops gurneyi* (in the proteoid woodland). The forest patches are the most interesting natural habitat within the complex, supporting *Stephanoaetus coronatus*, *Buteo oreophilus*, *Tauraco corythaix*, *Zoothera gurneyi*, *Lioptilus nigricapillus*, *Cossypha dichroa*, *Cercotrichas signata*, *Bradypterus barratti*, *Estrilda melanotis* and *Serinus scotops*.

### Key species

A1 *Saxicola bifasciata* *Lioptilus nigricapillus*  
 A2 (089) South African forests EBA: Five of the seven species of this EBA that occur in South Africa have been recorded at this site; see Table 2.  
 A3 (A07) Afrotropical Highlands biome: 17 of the 23 species of this biome that occur in South Africa have been recorded at this site; see Table 3.

## ■ Other threatened/endemic wildlife

Among frogs, the forests are known to hold *Breviceps verrucosus*, and the river also holds *Strongylopus wageri* and the rare, localized endemic, *Heleophryne natalensis*. The snake *Amplorhinus multimaculatus* may occur, and the geckos *Lygodactylus nigropunctatus* and *L. ocellatus*, endemic to the Soutpansberg and Mpumalanga/Swaziland Drakensberg, have been recorded in rocky montane grassland areas.

## ■ Conservation issues

The remaining patches of forest in this IBA are of the Mpumalanga escarpment's highest quality. The primary threat to these patches is that the remaining indigenous vegetation patches may be used for plantations, or that encroachment of alien vegetation from the plantations, or other sources, will affect forest functioning. Forest fragmentation is also of concern. The remaining land should be used for water management and nature conservation. Areas where exotics have invaded should be rehabilitated, and encroachment by exotic vegetation should be monitored and combated.

## ■ Further reading

Earlé and Oatley (1983).

### Blue Swallow Natural Heritage Site

ZA011

Admin region Mpumalanga

Coordinates 25°30'S 30°45'E A1, A2 (089), A3 (A07)

Area 1,500 ha Altitude 1,400–1,740 m Natural Heritage Site

## ■ Site description

Lying c.30 km south-west of Nelspruit, this site consists of gently undulating sour grassland. Narrow drainage lines dissect the grassland, which holds several ponds and small water-bodies. Patches of fynbos (*Erica*, *Protea*) also occur, and other scrubby forest-edge species form thickets along the rivers and in the valleys. Forest occurs in the more mesic valleys, dominated by trees of *Rapanea*, *Xymalos*, *Podocarpus*, *Pterocelastrus* and *Syzygium*. Other habitats include rocky outcrops and open rock cliffs. Exotic trees, primarily wattle *Acacia*, have invaded much of the remaining grassland.

## ■ Birds

See Box and Tables 2 and 3 for key species. This small site holds the third-largest breeding population of *Hirundo atrocaerulea* in South Africa. The swallows are concentrated in the remaining 461 ha of grassland lying south of Kaapse Hoop village; all the nests are restricted to this primary grassland. *Turnix hottentotta*, *Vanellus melanopterus* and other grassland species, such as *Saxicola bifasciata*, also occur at Kaapse Hoop. The proteoid woodland holds *Promerops gurneyi*. The forest patches are home to *Lioptilus nigricapillus*, *Tauraco corythaix* and *Buteo oreophilus*.

### Key species

A1 *Hirundo atrocaerulea* *Lioptilus nigricapillus*  
*Saxicola bifasciata*  
 A2 (089) South African forests EBA: Five of the seven species of this EBA that occur in South Africa have been recorded at this site; see Table 2.  
 A3 (A07) Afrotropical Highlands biome: 17 of the 23 species of this biome that occur in South Africa have been recorded at this site; see Table 3.

### ■ Other threatened/endemic wildlife

None known to BirdLife International.

### ■ Conservation issues

This is a patch of state-owned land that has been leased to the South African Forestry Company (SAFCOL). A proposal by the ironically named Blue Swallow Exploration and Mining Company to reopen an underground mine threatens the entire population of *Hirundo atrocaerulea* at this site. The plans include highly destructive alluvial or opencast mining, which would destroy a minimum of six nest-sites. Although this land is currently used for nature conservation and water management, the continuation of this practice is unlikely given the mineral claims. Efforts to maintain the area's status quo as a nature reserve and prevent mining should be maximized. A management plan has been proposed to meet the needs of exotic vegetation clearance and grassland. Uncontrolled use of the environment by ecotourists also poses a potential threat. Artificial manipulation of ant-bear holes has been shown to elevate the breeding success of *Hirundo atrocaerulea*, and should be further investigated.

The Blue Swallow Working Group (BSWG) of the Endangered Wildlife Trust (EWT) aims to preserve the integrity of the Blue Swallow Natural Heritage Site through research and conservation management. The BSWG are also involved in liaison and cooperation with SAFCOL, the Department of Water Affairs and Forestry (DWAF), and other interested parties.

### ■ Further reading

Allan (1988), Allan *et al.* (1987), Evans (1996, 1997, 1998), Huggett (1995, 1996), Maclean (1993), Morgan (1995), Snell (1963, 1969, 1970, 1979), Tarboton (1988, 1994, 1997b,c).

#### Steenkampsberg

Admin region Mpumalanga

Coordinates 25°21'S 30°04'E

Area c.100,000 ha

Altitude 1,700–2,274 m

ZA012

A1, A2 (091), A3 (A07), A4i, A4ii

Nature Reserve,

Unprotected

### ■ Site description

This large area consists of c.150 private farms in the Belfast-Dullstroom region. The Belfast District border defines the northern, eastern and western limits of the site. The Middelburg–Belfast–Lydenburg road forms the southern boundary. The area lies on the central South African plateau, and it consists primarily of rolling high-altitude grassland (1,700–2,100 m), interspersed with rocky outcrops. North of Dullstroom, the southern portion of the Steenkampsberg, with peaks up to 2,274 m, breaks the rolling plateau grasslands. Within the Steenkampsberg area, two wetland systems are particularly important: (1) Lakensvleispruit (25°35'S 30°05'E) lies 8 km north-east of Belfast. This area is deeply flooded. The critically important northern edge of the vlei, known as Middelpunt (25°32'S 30°07'E), is dominated by reed *Phragmites* on permanently saturated to flooded ground. In some areas there are large tracts of virtually uniform sedge *Carex*, particularly at the vlei's north-eastern end. (2) Verloren Valei, lying c.9 km north of Dullstroom, comprises a large area of scattered wetland patches. The wetlands have mainly short vegetation, predominantly grasses, forbs and short sedges less than 50–60 cm tall. Some marshy depressions hold patches of *Typha*, various *Scirpus* and *Pycreus* and taller sedges. Moist, sandy highveld grassland is found to the south-west of Belfast. The remainder of the area is covered by north-eastern mountain grassland, especially along the Steenkampsberg towards Dullstroom. The area also supports a wide variety of forbs and ferns, including many South African endemics. Rocky slopes, gullies and ravines favour the development of thickets dominated by *Leucosidea*.

### ■ Birds

See Box and Tables 2 and 3 for key species. Lakensvleispruit is a very important wetland, and the northern portion, known as Middelpunt Vlei, is one of the few sites in the world where *Sarothrura ayresi* is regularly recorded. This species favours patches of dry to moist *Carex*-dominated marsh, including areas intermixed with scattered single stems of *Phragmites*, in shallowly flooded, dense marsh vegetation, 0.5–1.5 m tall. It also occurs in taller, more deeply flooded, dense

vegetation. *Crex crex* has been recorded here occasionally. Several pairs of *Grus carunculatus* frequent the Steenkampsberg area, especially at Verloren Valei. *Grus paradisea* and *Balearica regulorum* are widespread at low densities, although populations are greatly reduced compared to the mid-1980s.

The grassland in the surrounding area, especially at Verloren Valei Nature Reserve, supports *Heteromirafra ruddi*, which is highly localized within open, moderately to heavily grazed, level grassland. *Anthus chloris* is fairly common in mid-altitude, well-developed, lightly grazed grassland. *Geronticus calvus* breeds at two colonies within the IBA, and birds roost and forage throughout the area. *Neotis denhami*, *Eupodotis senegalensis* and *Vanellus melanopterus* are found throughout the region. On exposed outcrops and rocky slopes at higher altitude, *Geocolaptes olivaceus*, *Saxicola bifasciata* and *Monticola explorator* are found. *Promerops gurneyi* is found in the vicinity of proteoid woodland on the escarpment. Occasionally, migrants such as *Falco naumanni*, *Circus maurus* and *C. macrourus* are found within the area.

#### Key species

A1	<i>Geronticus calvus</i>	<i>Geocolaptes olivaceus</i>
	<i>Falco naumanni</i>	<i>Heteromirafra ruddi</i>
	<i>Grus carunculatus</i>	<i>Anthus chloris</i>
	<i>Grus paradisea</i>	<i>Saxicola bifasciata</i>
	<i>Sarothrura ayresi</i>	
A2 (091)	Southern African grasslands EBA: Two of the three species of this EBA that occur in South Africa have been recorded at this site; see Table 2.	
A3 (A07)	Afrotropical Highlands biome: Six of the 23 species of this biome that occur in South Africa have been recorded at this site; see Table 3.	
A4i	Breeding (pairs)	Non-breeding
	<i>Geronticus calvus</i>	30–40 100–350
	<i>Sarothrura ayresi</i>	— 6–12
A4ii	<i>Falco naumanni</i>	— 1,000–3,000

### ■ Other threatened/endemic wildlife

North-eastern mountain grassland holds 78 endemic and near-endemic plant species on the Black Reef quartzites, several of which species are present within this site, including *Zantedeschia pentlandii* and *Gladiolus cataractarum*. The global range of the cycad *Encephalartos humilis* is restricted to this site and the surrounding districts.

### ■ Conservation issues

This severely threatened region consists primarily of private and state-owned land. The only formally conserved area is the small Verloren Valei Nature Reserve (5,500 ha), which is managed by Mpumalanga Parks Board; it is the only reserve in the world holding *Heteromirafra ruddi*.

General threats to the area include afforestation of the grasslands with *Pinus* and *Eucalyptus*, wetland degradation, increased acid rain and sulphur emissions from local power stations, and accidental and targeted poisoning of cranes. Although the generally shallow and leached soils on the Steenkampsberg make them marginal for forestry purposes, plantations do occur around Belfast and Dullstroom in the southern portion of the IBA. Commercial afforestation of other areas in the southern portion of the IBA is feasible and remains the greatest threat to the area. Afforestation also deleteriously affects wetlands; planting of non-native trees with poor water-utilization efficiency results in reduced run-off around wetlands, leading to their drying out.

Wetlands face several other significant threats. The construction of dams, particularly for trout fishing, floods these ecosystems, disrupting ecosystem processes downstream and turning them into sterile stretches of open water. Overgrazing and burning of marshy areas in winter leads to accelerated run-off, soil erosion, and the formation of eroded ravines.

The Steenkampsberg once supported much larger populations of *Grus paradisea* and *Grus carunculatus*. The cranes have been negatively affected by various land-use activities, including intensive crop farming, increased rural and urban human populations, and the construction of dams for trout production, which impact breeding sponges directly by flooding them or attracting anglers, whose presence disturbs the birds. Cranes have suffered dramatically from intentional and accidental poisoning incidents. *Grus carunculatus* is now on the verge of extinction in Mpumalanga, and *Grus paradisea* lost 90% of its population in the Steenkampsberg during the dramatic 1980s crash.

To combat the widespread poisoning, the Highlands Crane Group have initiated a farmer-awareness programme.

Providing incentives for land-owners to manage grassland plots on their farms for particular species, or communities of birds, can be a very effective conservation strategy. Preventing habitat loss in grassland areas does not necessarily mean adding land to the existing protected area network, but it does require the continued practice of non-intensive pastoral farming in the grasslands. Appropriate conservation action within this region would be to stimulate the creation of conservancies and cooperation between groups of land-owners (farmers), conservationists and scientists who share a common vision for the conservation and management of the area's biota.

#### Further reading

Allan *et al.* (1997), Batchelor (1984), Bloem (1988), de Wet (1991), Hockey *et al.* (1988), Kotze and Taylor (1995), Kotze *et al.* (1994), Tarboton (1984a,b,c, 1995b, 1997a,b,c), Tarboton and Johnson (1992), Taylor (1994, 1997a,b).

### Songimvelo Game Reserve

**ZA013**

Admin region Mpumalanga

Coordinates 25°55'S 31°02'E A1, A2 (089), A3 (A07)

Area c.56,000 ha Altitude 1,200–1,851 m Game Reserve

#### Site description

Located in eastern Mpumalanga, just south of Barberton, this site abuts Swaziland's Malolotja Nature Reserve (IBA SW001). It includes some of the most rugged mountain terrain in southern Africa, as the reserve is located along South Africa's eastern Drakensberg escarpment. The eastern highlands, which form the border with Swaziland, are dominated by two high peaks, Mlembe (1,851 m) and Sibubule (1,750 m). The area is bisected by the deeply eroded Lomati and Komati rivers, which have carved numerous cliffs, deep gorges and valleys.

The vegetation is divided into mountain sourveld and lowveld sour bushveld, with relict patches of proteoid woodland on the escarpment. The sheltered valleys and kloofs at high altitude hold pockets of Afromontane forest, which are linked to riparian forest lower down via thickets that occur along mountain streams. Afromontane forest trees include *Podocarpus*, *Calodendrum*, *Olea*, *Syzygium* and *Rapanea*. Other habitats include rocky outcrops and the sheer cliffs that form part of the Drakensberg escarpment.

#### Birds

See Box and Tables 2 and 3 for key species. To date, 309 bird species have been recorded in the reserve. *Geronticus calvus* may breed on some cliffs within the reserve—they breed in the neighbouring Malolotja Nature Reserve (IBA SW001) in Swaziland. *Neotis denhami*, *Eupodotis senegalensis*, *E. caerulescens* and *Sarothrura affinis* are breeding residents. *Saxicola bifasciata* is found on exposed rocky grassland slopes and, where proteoid woodland occurs, *Promerops gurneyi* is regular. Occasionally, *Gyps coprotheres* and *Falco naumanni* pass through the area. The riverine forest and thicket hold breeding *Gorsachius leuconotus*, *Podica senegalensis*, *Alcedo semitorquata*, *Tauraco corythaix*, *Lioptilus nigricapillus*, *Zoothera gurneyi*, *Cossypha dichroa*, *Cercotrichas signata*, *Bradypterus barratti*, *Telophorus olivaceus*, *Lamprotornis corruscus*, *Nectarinia olivacea*, *Estrilda melanotis*, *Mandingoa nitidula* and *Serinus scotops*.

#### Key species

A1	<i>Eupodotis caerulescens</i>	<i>Lioptilus nigricapillus</i>
	<i>Saxicola bifasciata</i>	
A2 (089)	South African forests EBA: Five of the seven species of this EBA that occur in South Africa have been recorded at this site; see Table 2.	
A3 (A07)	Afrotropical Highlands biome: 16 of the 23 species of this biome that occur in South Africa have been recorded at this site; see Table 3.	

#### Other threatened/endemic wildlife

Songimvelo holds most of the global population (300 individuals) of the cycad *Encephalartos heenanii* and the bulk of the remaining global population of *E. paucidentatus*. The natural range of the fish *Astatotilapia brevis* is restricted to the Lomati and Komati rivers, both of which run through the reserve. The mammal *Ceratotherium simum* (LR/cd) has been reintroduced.

#### Conservation issues

This reserve was established in 1984 in the former KaNgwane homeland. It was handed over to the Mpumalanga Parks Board when the South African government reformed in 1994. Mining since 1882 has also contributed to environmental degradation of the area, especially the reckless deforestation practices during the 'gold-boom' of the late 1800s and early 1900s. Modern prospecting, which was active until the establishment of the reserve, saw large areas of wooded hillside being bulldozed and blasted away. The vegetation will take a while to recover from these drastic and destructive mining practices.

#### Further reading

Hughes (1966), Lawson (1982), Lawson and Edmonds (1983), Ledger (1981).

### Amersfoort–Bethal–Carolina District

**ZA014**

Admin region Mpumalanga

Coordinates 26°32'S 29°50'E A1, A2 (089), A3 (A07), A4i, A4ii

Area c.120,000 ha Altitude 1,650–1,832 m Unprotected

#### Site description

This area is bounded by the main roads between the following towns: Ermelo, Amersfoort, Bethal, Hendrina and Carolina. It consists mostly of flat to undulating farmland between 1,650 and 1,832 m. In a landscape dominated by maize, several remnant patches of moist clay highveld grassland are scattered throughout the district, growing on black vertic clays. The grasslands hold several streams and pans, as well as the Willem-Brummer Dam near Ermelo. Rocky slopes, gullies and ravines favour the development of thicket, dominated by *Leucosidea*, *Buddleja* and *Rhamnus*. In the deeper, fire-protected gullies, secondary forest occasionally develops, with trees of *Euclea*, *Diospyros*, *Myrsine* and *Rhus*.

#### Birds

See Box and Tables 2 and 3 for key species. This site holds a large proportion of the global population of *Spizocorys fringillaris*. The grassland areas also hold *Neotis denhami*, *Eupodotis senegalensis*, *Saxicola bifasciata*, *Monticola explorator* and *Geronticus calvus*. *Falco naumanni*, *Glareola nordmanni* and (less frequently) *Circus macrourus* can be seen quartering the grasslands. Occasionally, all of South Africa's crane species can be found in the grasslands or cropfields within the site.

#### Key species

A1	<i>Geronticus calvus</i>	<i>Glareola nordmanni</i>
	<i>Falco naumanni</i>	<i>Spizocorys fringillaris</i>
	<i>Grus paradisea</i>	<i>Saxicola bifasciata</i>
A2 (089)	South African forests EBA: One of the seven species of this EBA that occur in South Africa has been recorded at this site; see Table 2.	
A3 (A07)	Afrotropical Highlands biome: Five of the 23 species of this biome that occur in South Africa have been recorded at this site; see Table 3.	
A4i	Breeding (pairs)	Non-breeding
	<i>Geronticus calvus</i>	20 50–300
	<i>Glareola nordmanni</i>	— 100–1,000
A4ii	<i>Falco naumanni</i>	— 1,000–2,000

#### Other threatened/endemic wildlife

Two highly localized and threatened forbs, *Gladiolus robertsoniae* and *Nerine gracilis*, are found in the remaining grassland patches within this site.

#### Conservation issues

Globally, *Spizocorys fringillaris* has lost c.79% of its favoured grassland habitat to agriculture, primarily maize-fields. Establishing state-owned nature reserves would not necessarily enhance the conservation status of *Spizocorys fringillaris*, which tends to favour closely cropped grassland. Today such habitat is found on sheep farms where grazing is intense. *Spizocorys fringillaris* may be better off on sheep farms than in inappropriately managed protected areas. The details of this species's ecological requirements are poorly known; determining the exact type of habitat and veld management it requires for breeding and foraging are high-priority research questions. For *Spizocorys fringillaris*, effective conservation is not necessarily about establishing reserves, but about ensuring that deleterious land-use practices are minimized or prevented in areas where they occur.

Much of South Africa's remaining natural grassland is farmland used for stock production. Private land-owners should be encouraged to embrace the 'conservancy concept', and farming practices should be directed at maintaining habitat for all species and habitats that require conservation. Continued habitat destruction through agriculture is a major cause for concern. Other threats include mining, certain fire regimes and grazing practices. Fortunately, no afforestation is permitted in the Vaal catchment, owing to the water requirements of Gauteng. Provided that this status quo remains, massive scope exists for conservation alongside agriculture in this district. Urgent research is needed concerning the landscape-level impacts of grassland fragmentation and the consequent disruption of ecosystem-level processes.

#### Further reading

Allan *et al.* (1983, 1997), de Wet (1991), Hockey *et al.* (1988), Tarboton (1997a,b,c).

#### Chrissie Pans

Admin region Mpumalanga

Coordinates 26°19'S 30°15'E

Area c.62,500 ha Altitude 1,808 m

ZA015

A1, A4i, A4ii, A4iii

Unprotected

#### Site description

This site comprises a system of over 320 pans on private land c.30 km east of Breyten. The primary area of pans runs from Tvrede se Pan (26°13'S 30°11'E) in the north to Burgerspan (26°28'S 30°10'E) in the south, and from Goedeverwachtingpan (26°16'S 30°07'E) in the west to Lake Banagher (26°21'S 30°23'E) in the east. The Chrissie system comprises a remarkable variety of pans. Reed pans are mostly permanent, usually retaining water throughout the year. They have a diverse flora, characterized by *Phragmites*, which forms a dense extensive reedbed covering most of the pan basin. Sedge pans are semi-permanent, usually drying up during the winter and/or dry spells, when they are almost devoid of vegetation. Saline pans are characterized by their glaring white basins when dry and have extremely saline substrata and water. The basins of these pans usually lack vegetation. There is considerable overlap in the common plants between the three pan-types. The pans, and their functioning, remain intact, despite existing in a matrix that consists almost exclusively of maize (80%), interspersed with small fragmented patches of natural grassland (20%).

#### Birds

See Box for key species. The Chrissie Pans support very large numbers (from a southern African perspective) of flamingos (*Phoenicopterus ruber* and *P. minor*). The system is probably also an important refuge for the small floating population of *Grus carunculatus* remaining in Mpumalanga. Other species present in large numbers include *Balearica regulorum*, *Charadrius pallidus* and *Circus ranivorus*. When inundated, these wetlands also support large numbers of waterbirds, with total numbers regularly exceeding 20,000 individuals. In addition to the aquatic birds, several dryland species use the extensive *Phragmites* beds in the reedpans for roosting, including *Falco amurensis* and *Hirundo rustica*, which roost at the pans in flocks numbering thousands. The surrounding grassland-maize matrix occasionally supports *Geronticus calvus*, *Falco naumanni*, *Grus paradisea*, *Neotis denhami*, *Eupodotis senegalensis*, *Tyto capensis*, *Glareola nordmanni* and *Circus maurus*.

#### Key species

A1	<i>Geronticus calvus</i>	<i>Grus carunculatus</i>	
	<i>Phoenicopterus minor</i>	<i>Grus paradisea</i>	
	<i>Falco naumanni</i>	<i>Glareola nordmanni</i>	
A4i		Breeding (pairs)	Non-breeding
	<i>Geronticus calvus</i>	—	80–100
	<i>Phoenicopterus ruber</i>	—	1,991 (av.)–3,522
	<i>Glareola nordmanni</i>	—	5,000 (max.)
A4ii	<i>Falco naumanni</i>	—	1,000–5,000
A4iii	More than 20,000 waterbirds occur.		

#### Other threatened/endemic wildlife

The plant *Odontelytrum abyssinicum* is a highly localized and threatened pan specialist.

#### Conservation issues

A major threat to the pans comes from agricultural development. Many pans in crop farming regions are subject to contamination by pesticides and nutrient pollution by fertilizers. The closed-basin nature of pans exacerbates this problem, with toxic substances, including poisons that pose a threat to wildlife, concentrating in their basins. Ploughing, overgrazing and excessive trampling by livestock further damage shoreline vegetation, increase wind erosion, and lead to the siltation of pan basins. Opencast mines can totally destroy pans. Coal mines and associated power stations produce acid rain (<pH 3), which dramatically affects the alkaline pans, reducing pH, interfering with pan functioning and modifying the vegetation and fauna inhabiting these systems. Power lines and telephone lines running close to pans are a major cause of mortality to waterbirds that occasionally fly into these structures.

Commercial afforestation around pans is a growing threat. Plantations cause increased levels of evapotranspiration, and decreased amounts of water draining into the pans, ultimately lowering the water-table. The effect of afforestation would be to reduce run-off from an effective 700 mm per year to 400 mm. Land acquisition to conserve this area is somewhat impractical, as the pan system is widely dispersed throughout agriculturally productive land. Similarly, few of the pans are ever flooded and functional at any one time, making acquisition of a portion of the system as a reserve inadequate.

Appropriate management strategies, aimed at managing land under private ownership, are as important as land acquisition for formal nature reserves. Awareness programmes for land-owners and other interested and affected parties who affect these systems is urgently required. Legislation and its effective enforcement should be considered, so as to halt wanton environmental degradation of pans.

#### Further reading

Allan (1985, 1987), Allan and Brown (1991), Allan *et al.* (1995), Breen *et al.* (1993), Sharp and Allan (1985), Tarboton (1997a,b,c), Wellington (1943).

#### Grassland Biosphere Reserve (proposed)

Admin region Mpumalanga, Free State, KwaZulu-Natal

Coordinates 27°15'S 30°01'E A1, A2 (091), A3 (A07), A4i, A4ii, A4iii

Area 1,050,000 ha

Altitude 1,700–2,291 m

Nature Reserves,

Natural Heritage Sites, Ramsar Site

ZA016

#### Site description

This vast area is centred on the towns of Volksrust and Wakkerstroom. The proposed Biosphere Reserve comprises some 800 private farms, several municipalities and conservancies and a considerable amount of state-owned land. The site comprises gentle rolling hills on the South African plateau (1,700–1,800 m) that are broken regularly by parts of the Mpumalanga Drakensberg escarpment, small ranges such as the Gembokberg (2,095 m), Versamelberg (2,139 m) and Balelesberg (2,055 m), and higher peaks around Wakkerstroom, such as Ntshela (2,291 m), Ossewakop (2,170 m), Kanonkop (2,112 m) and KwaMandlangampisi (2,266 m). The area covers several catchments and holds many perennial rivers and wetlands.

The following wetlands are of international importance and deserve the highest possible conservation attention. Wakkerstroom vlei (27°22'S 30°07'E), which lies on the border of the town, is a marsh, predominantly a mosaic of *Carex* and *Leersia* stands. Seekoeivlei (27°35'S 29°35'E), a Ramsar Site, is situated in the north-eastern Free State, 500 m from the town of Memel. It consists of a flood-plain holding numerous seasonally flooded oxbow lakes, which are drained by the Klip river, a tributary of the Vaal. Heyshope Dam (27°00'S 30°30'E), a proposed Ramsar Site, is a large impoundment in the Assegai river catchment of south-eastern Mpumalanga. The privately owned Vanger Natural Heritage Site (27°52'S 29°40'E) lies about 30 km south-east of Memel. Blood river vlei (27°47'S 30°35'E) is situated 20 km south-west of Vryheid.

Several other small important wetlands are scattered throughout the IBA. The terrestrial vegetation is dominated by some of the finest rolling grasslands remaining in South Africa.

The most dominant grassland-type is moist sandy highveld grassland. The eastern boundary of the proposed Biosphere Reserve holds north-eastern mountain grassland. Small patches of moist clay highveld grassland grow on the black vertic clays that are scattered throughout the area, mostly in and around the Wielspruit catchment. Rocky slopes, gullies and ravines favour the development of thickets dominated by

*Leucosidea*, which forms dense monospecific stands in places. Particularly in the Pongola Bush Nature Reserve, Ncundu Bush Nature Reserve and several privately owned areas along the escarpment, the thicket has developed into Afromontane forest, holding trees of *Podocarpus*, *Rhus*, *Trichocladus*, *Curtisia*, *Halleria* and *Kiggelaria*.

### ■ Birds

See Box and Tables 2 and 3 for key species. This area holds a significant proportion of South Africa's small known population of the globally endangered *Sarothrura ayresi*. Three wetlands within the proposed Biosphere Reserve are known or thought regularly to hold *Sarothrura ayresi* in seasons of suitable rainfall. *Crex crex* is also regular at some of the reserve's wetlands. Seekoeivlei supports large numbers of a rich diversity of resident and migratory waterbirds. The site also holds all three of South Africa's crane species, including important numbers of *Grus carunculatus*. Heyshope Dam is known to hold extremely large numbers of at least 52 species of resident, migratory and nomadic waterbirds. Small portions of the dam, which are regularly counted, hold up to 45,000 waterbirds, suggesting that the entire system may hold an extrapolated total of some 100,000 individuals.

Of the terrestrial birds, most of South Africa's threatened and endemic grassland species have their core populations centred on the proposed Biosphere Reserve. An estimated 85% of the global population of *Heteromirafra ruddi* is thought to occur within the proposed reserve. *Spizocorys fringillaris*, which also occurs within this site, is highly localized within moist clay highveld grassland on black clays or dolerite soils. *Anthus chloris* favours mid-altitude, well-developed lightly grazed or ungrazed grassland. The largest breeding colonies of *Geronticus calvus* in the world occur within the proposed Biosphere Reserve. Large numbers also forage and roost throughout the area. *Grus paradisea*, *Neotis denhami* and *Eupodotis senegalensis* are widespread at low densities. *Glareola nordmanni* occasionally occurs in very large numbers during the austral summer. On exposed outcrops and rocky slopes at higher altitudes, *Anthus crenatus*, *Geocolaptes olivaceus*, *Saxicola bifasciata* and *Monticola explorator* are common. *Promerops gurneyi* is found around proteoid woodland on the escarpment, and *Ciconia nigra* breeds on steep cliffs. Pongola Bush Nature Reserve and other forest patches hold *Cossypha dichroa*, *Serinus scotops*, *Lioptilus nigricapillus* and *Zoothera gurneyi*.

#### Key species

A1	<i>Geronticus calvus</i>	<i>Geocolaptes olivaceus</i>
	<i>Falco naumanni</i>	<i>Heteromirafra ruddi</i>
	<i>Grus carunculatus</i>	<i>Spizocorys fringillaris</i>
	<i>Grus paradisea</i>	<i>Anthus chloris</i>
	<i>Crex crex</i>	<i>Saxicola bifasciata</i>
	<i>Sarothrura ayresi</i>	<i>Lioptilus nigricapillus</i>
	<i>Glareola nordmanni</i>	
A2 (091)	Southern African grasslands EBA: All of the three species of this EBA that occur in South Africa have been recorded at this site; see Table 2.	
A3 (A07)	Afrotropical Highlands biome: 19 of the 23 species of this biome that occur in South Africa have been recorded at this site; see Table 3.	
A4i	Breeding (pairs)	Non-breeding
	<i>Tachybaptus ruficollis</i>	1,000–5,000
	<i>Podiceps cristatus</i>	200–500
	<i>Podiceps nigricollis</i>	100–250
	<i>Ciconia nigra</i>	10–30
	<i>Bostrychia hagedash</i>	1,000–10,000
	<i>Geronticus calvus</i>	1,000–4,000
	<i>Thalassornis leuconotus</i>	100–500
	<i>Oxyura maccoa</i>	100–500
	<i>Anas undulata</i>	10,000–30,000
	<i>Anas sparsa</i>	400–1,000
	<i>Anas smithii</i>	200–600
	<i>Netta erythrophthalma</i>	500–1,000
	<i>Grus paradisea</i>	200–500
	<i>Sarothrura ayresi</i>	30–70
	<i>Fulica cristata</i>	25,000–60,000
	<i>Glareola nordmanni</i>	1,000–5,000
	<i>Vanellus senegallus</i>	1,000–1,300
	<i>Gallinago nigripennis</i>	1,000–3,000
	<i>Chlidonias leucopterus</i>	2,500–10,000
	<i>Vanellus melanopterus</i>	500–1,000
A4ii	<i>Falco naumanni</i>	1,000–5,000
A4iii	More than 20,000 waterbirds occur.	

### ■ Other threatened/endemic wildlife

North-eastern mountain grassland holds 78 endemic and near-endemic plant species on the Black Reef quartzites, and there are a further 31 endemics on dry dolomite. Most of these endemics are present within the site. Many endemic animals also occur here.

### ■ Conservation issues

The proposed Grassland Biosphere Reserve is undoubtedly one of the most important biodiversity areas in Africa. It consists primarily of private and state-owned land; a few small protected areas are found within its boundaries, including Wakkerstroom and Seekoeivlei Nature Reserves. More than 20,000 ha of private land have been registered as Natural Heritage Sites. Despite 'proposed Biosphere Reserve' status, this area is severely threatened and it faces some monumental conservation problems. Foremost amongst these are grassland afforestation, wetland degradation, accidental and targeted poisoning of cranes and increased acid rain from local power station sulphur emissions.

Commercial afforestation is the most looming threat. Although virtually none of this area is currently afforested, over 100,000 ha has been designated as prime plantation area. Plantations consume vital grassland habitat supporting many globally and nationally threatened taxa. Furthermore, the impacts of grassland fragmentation and other landscape-level changes are unclear, but could be catastrophic. Afforestation is also known to affect wetlands; the planting of non-native trees with poor water-utilization efficiency results in reduced run-off around wetlands.

Wetlands within the proposed Biosphere Reserve face several other threats. Dam construction floods these ecosystems, turning them into sterile stretches of open water, and ecosystem processes are also disrupted downstream. Drainage by canals detrimentally affects wetlands. Overgrazing and burning of marshy areas in winter leads to temporary damage, with accelerated run-off, soil erosion and the formation of dongas. Several threatened species are affected dramatically by this wetland degradation, including *Sarothrura ayresi*. Although the proposed Biosphere Reserve and its biota face many threats, establishing state-owned nature reserves would not necessarily enhance the conservation status of grassland birds. Some species, *Spizocorys fringillaris* for example, favour closely cropped grassland, kept short by frequent fires and grazing. Today, such habitat is found on sheep farms where grazing is frequent. Providing incentives for land-owners to manage the grassland on their farms for particular species or communities of birds can be a very effective conservation strategy. Appropriate conservation action within this region would be to stimulate the creation of conservancies and cooperation between groups of land-owners (farmers), conservationists and scientists who share a common vision for the conservation and management of the proposed Biosphere Reserve's biota. Detailed research into the ecological requirements of the threatened endemics is a high priority. Without this information, it will be impossible to implement effective management and conservation strategies.

### ■ Further reading

Allan *et al.* (1983, 1997), Cowan and Marnewick (1996), de Wet (1991), Herholdt and Grobler (1987), Hockey *et al.* (1988), Kotze *et al.* (1994), Pocock and Uys (1967), Stoltz and Geyser (1973), Tarboton (1984c, 1992, 1995a,b, 1997a,b,c), Tarboton *et al.* (1987), Taylor (1994, 1997a,b).

## Pilanesberg National Park

**ZA017**

Admin region North-west

Coordinates 25°15'S 27°05'E

**A1**

Area 50,000 ha Altitude 1,000–1,669 m

National Park

### ■ Site description

Pilanesberg National Park (called a national park because it used to belong to the homeland of Bophuthatswana) is managed by North-west Nature Conservation. It lies c.160 km north-west of Johannesburg, and is the fourth-largest protected area in South Africa. The park covers a wide range of habitats, including vleis, lakes, streams, thick bush, broadleaved and *Acacia* woodland, koppies, open grasslands and former farmlands. The park encompasses the Pilanesberg mountains. The resulting structure is a ring-complex of concentric koppies, the highest being 1,669 m, interspersed in a matrix of low-lying plains.



The Mankwe river and its five major tributaries provide most of the park's water. In the past, farmers constructed additional water-storage dams for livestock in order to supplement non-perennial streams. The largest impoundment, Mankwe Lake, is in the centre of the park. There is a sharp contrast between the tree-dotted hill-slope vegetation and the pure grassland of the pediments. Areas of secondary grassland occur on old cultivated fields. In the valleys, there are trees of *Acacia*, *Spirostachys*, *Rhus*, *Ziziphus* and *Combretum*. The pediment savannas hold trees of *Faurea* and to a lesser extent *Acacia*. The hill savanna is wooded mainly with trees of *Combretum* and *Dombeya*.

### ■ Birds

See Box for key species. The park holds over 300 species of bird. Situated midway between the colonies of *Gyps coprotheres* at Magaliesberg (IBA ZA018; c.100 km away) and at Waterberg (IBA ZA006; c.150 km away), this site regularly holds foraging birds of this species. The park also holds small numbers of *Gyps africanus* and occasionally *Torgos tracheliotus*. The reserve is also good for other raptors and supports small numbers of *Polemaetus bellicosus*, *Terathopius ecaudatus*, *Aquila verreauxii*, *A. rapax*, *A. wahlbergi* and *Hieraaetus spilogaster*. The surrounding woodland-grassland mosaic is known to hold *Ardeotis kori* and *Grus paradisea*. Other woodland species include *Mirafra passerina*, *Cossypha humeralis*, *Cercotrichas paena*, *Eremomela usticollis*, *Bradornis mariquensis*, *Laniarius atrococcineus*, *Eurocephalus anguithimens*, *Passer motitensis*, *Sporopipes squamifrons*, *Uraeginthus granatina*, *Estrilda erythronotos* and *Vidua regia*.

#### Key species

A1 *Gyps coprotheres* *Grus paradisea*

### ■ Other threatened/endemic wildlife

The spectacular plant, *Erythrophysa transvaalensis*, is restricted to c.250 individuals, most of which occur within the Pilanesberg. Several threatened species of large mammal were reintroduced through 'Operation Genesis', the restocking programme of the early 1980s, including *Ceratotherium simum* (LR/cd), *Diceros bicornis* (CR), *Loxodonta africana* (EN) and *Acinonyx jubatus* (VU). Owing to their secretive nocturnal habits, *Hyaena brunnea* (LR/nt) and *Manis temminckii* (LR/nt) have maintained natural populations in the area without being hunted out.

### ■ Conservation issues

The establishment of a national park (in the then homeland of Bophuthatswana) in the Pilanesberg was first suggested in 1969. Several commissions and inquiries were launched by the Bophuthatswana government into the potential of such a venture. The establishment of Sun City in 1978 made the park viable from a tourism perspective. The park came into being with the appointment of its first director in 1980. Game was purchased for reintroduction to the area, via 'Operation Genesis', for which WWF South Africa (formerly the South African Nature Foundation) provided a substantial portion of the funding.

Since South Africa's independence in 1994, and the amalgamation of the homelands back into the South African governmental structure, the park has been controlled by North-west Nature Conservation. All the streams flowing through the park originate within its boundaries; administrators are therefore able to take constructive steps to remedy any water-related problems. There is widespread and indiscriminate use of poison by small-stock farmers neighbouring the area, to combat mammalian predators such as jackals, caracals and domestic dogs. As a result, poisonings of scavenging raptors are regularly recorded in neighbouring farmland and pose a major threat to the re-establishment of large raptor populations within the park. *Gyps coprotheres* is particularly vulnerable, as it regularly forages within the park and throughout the area adjacent to it. The restoration of a pseudo-natural ecosystem in the Pilanesberg provides food (including vital bone fragments) for vultures, but owing to the relatively small numbers of top carnivores in the park and the paucity of carcasses, a vulture restaurant has been established, to supplement vulture diets further.

### ■ Further reading

Benson *et al.* (1990), Brett (1989), Hancock (1985), Ryan and Isom (1990).

## Magaliesberg and Witwatersberg

**ZA018**

Admin region North-west

Coordinates 25°45'S 27°40'E

Area c.80,000 ha Altitude 1,100–1,851 m

 A1, A4i, A4ii  
Nature Reserves

### ■ Site description

This large area includes the magisterial districts of the former Bophuthatswana, Brits, Rustenburg, Swartruggens, Ventersdorp, Koster and Oberholzer. The Magaliesberg range extends in an arc from just south of Rustenburg in the west to Hartbeespoort Dam near Pretoria in the east. Peaks in the west include Tshufi (1,592 m) and Rustenburgkloof (1,688 m), in the centre Nooitgedacht (1,851 m) and Doornhoek (1,786 m), and in the east Versigtig (1,563 m), Myoko (1,523 m) and Sun Glory (1,601 m) are found in the vicinity of Hartbeespoort Dam.

To the south, the Witwatersberg range runs parallel to the Magaliesberg, extending from the town of Magaliesberg in the west to Hartbeespoort Dam in the east. The Ben-Tor Gloster (1,674 m), Harthebeeshoek (1,585 m) and Skeerpoort (1,544 m) peaks dominate the Witwatersberg. Several large rivers have their headwaters in these mountains, including the Crocodile, Sterkstroom, Magalies and Skeerpoort rivers. Three major impoundments lie along the Magaliesberg; the massive Hartbeespoort Dam in the east, Buffelspoort Dam in the centre and Olifantsnek Dam about 7 km south of Rustenburg.

The mountain peaks and slopes are clothed in open broadleaved woodland of *Faurea*, *Acacia*, *Bequaertiodendron*, *Burkea*, *Peltophorum*, *Kirkia*, *Combretum*, *Albizia* and *Diplorrhynchus*, and proteoid shrubland occurs on cool slopes. The surrounding land, especially that to the north of the mountain range, is used primarily for cattle-ranching, with some intensive crop and fruit-farming on the northern slopes of the Magaliesberg range.

### ■ Birds

See Box for key species. *Gyps coprotheres* breeds at two main colonies—the larger Skeerpoort (25°45'S 27°45'E) and the sister colony at Robert's Farm (25°50'S 27°17'E)—as well as a satellite colony at Nooitgedacht. There appears to be a decline in the numbers of vultures breeding at Robert's Farm, and it seems that birds may have transferred to Nooitgedacht, following the introduction of a vulture restaurant there, below an abandoned colony. Many other raptor species have been recorded at Skeerpoort, including *Gyps africanus* and *Torgos tracheliotus*. Patches of grassland are known to hold small numbers of *Grus paradisea*.

#### Key species

A1	<i>Gyps coprotheres</i>	<i>Grus paradisea</i>	
A4i		Breeding (pairs)	Non-breeding
	<i>Ciconia nigra</i>	3–4	10–20
A4ii	<i>Gyps coprotheres</i>	100–250	250–600

### ■ Other threatened/endemic wildlife

*Hyaena brunnea* (LR/nt) is a major large predator in the area.

### ■ Conservation issues

Most of the area falls within the Magaliesberg Protected Natural Environment. This large area has legal conservation status under the Environment Protection Act. Within the IBA, several publicly owned protected areas occur. The Diepsloot Nature Reserve, controlled by the Johannesburg Municipality, lies 10 km south of Hartbeespoort Dam. Other protected areas within the IBA include Rustenburg Nature Reserve, 2 km south-west of the town, Mountain Sanctuary Park and Hartbeespoort Dam Nature Reserve as well as several private reserves and conservancies.

There is widespread, indiscriminate use of poison by small-stock farmers in the area to combat mammalian predators such as jackals, caracals and domestic dogs. Poisonings pose a major threat to the vulture colonies as hundreds of birds, which scavenge on carcasses set for vermin, can be unintentionally killed in a single poisoning incident. Most natural populations of large ungulates, and their associated predators, have disappeared from the Magaliesberg. It is hypothesized that depleted food supply, and the loss of vital nutrients in the diet, have resulted in increased vulture mortalities as a result of metabolic bone disease, osteodystrophy, and other physiological abnormalities.

The Vulture Monitoring Project, through the Vulture Study Group, counts nestlings annually as a measure of breeding success, which can

fluctuate alarmingly in this population. The Magaliesberg vultures forage quite widely, some travelling to the Pilanesberg (IBA ZA017) nearly 100 km away. Several vulture restaurants have been established near the colonies to provide a regular food supply to breeding birds. The restaurant on Nooitgedacht Farm is supported by the land-owners. A second lies 1 km south of the colony at Leopard Lodge, a third is in operation 27 km north of Skeerpoort at Rhino Park, near Zwartkop, and a fourth at the De Wildt Captive Breeding Centre. The Robert's Farm colony is still in need of a regular food supply.

#### Further reading

Boshoff (1990), Komen (1992a,b), Verdoorn and Becker (1992), Verdoorn *et al.* (1989, 1992).

### Barberspan and Leeupan

Admin region North-west

Coordinates 26°33'S 25°36'E

Area c.4,000 ha Altitude 1,350 m

ZA019

A1, A4i, A4ii, A4iii

Nature Reserve, Ramsar Site

#### Site description

Situated 15 km north-east of Delareyville, these two pans, along with Klippan, are in a closed basin at 1,350 m. Barberspan is a large (6 × 4 km), permanent, shallow (max. depth 11 m), alkaline lake, which has its own small catchment of 30 km<sup>2</sup>. It is the largest of a series of pans in the fossil bed of the Paleo-Harts river. The lake is fed by the Harts river and is situated in open flat grassland that can be described as a great undulating plain, much of which is cultivated for summer crops, such as maize, sunflowers and groundnuts. The nearby Leeupan is connected to Barberspan via a narrow channel. Leeupan is saline, shallow, and is subject to considerable fluctuations in water-level, drying up in most winters. This often results in conditions that are favourable for some wetland species but adverse for others.

The marginal vegetation is comprised primarily of rushes and sedges, especially *Juncus* and *Cyperus*. Aquatic vegetation is dominated by *Potamogeton*. Located at the ecotone of three biomes, the terrestrial vegetation consists of dry sandy highveld grassland, with Karoo invaders, and clumps of well-developed Kalahari thornveld (thickets of *Acacia*, *Rhus* and *Diospyros*) scattered throughout.

#### Birds

See Box for key species. More than 320 bird species have been recorded at the site and in the surrounding nature reserve. Barberspan is particularly important as a drought refuge and a moulting site for waterbirds, which congregate in large numbers (exceeding 20,000 individuals) during the dry season (April–October) when all the small wetlands in the surrounding districts have dried up completely. All but one of South Africa's indigenous duck species have been recorded here. The waterbirds disperse to breed in sheltered temporary pans and vleis once the summer rains arrive. Breeding species include *Charadrius pallidus* and *Sterna caspia*, which occur sporadically at low densities. *Fulica cristata* almost always breed in huge numbers: once over 12,000 breeding pairs were recorded.

Barberspan is also vitally important for regionally nomadic waterbirds and as a stop-over site for Palearctic migrant waders. The water-level determines which species are present on the pans. When low, conditions are suitable for large numbers of waders. In wet years, the shoreline consists of mainly inundated grassland, which results in large numbers of herons, egrets and *Podiceps cristatus* moving in to breed. During the austral summer, the adjacent Barberspan Nature Reserve supports many migrant *Falco naumanni*, while resident *Cercomela sinuata*, *Cercotrichas paena*, *Laniarius atrococcineus* and *Malcorus pectoralis* breed here.

#### Key species

A1 *Falco naumanni*

A4i		Breeding (pairs)	Non-breeding
	<i>Podiceps cristatus</i>	Breeds	73 (av.)–128
	<i>Phoenicopterus ruber</i>	—	510 (av.)–5,000
	<i>Tadorna cana</i>	Breeds	543 (av.)–1,000
	<i>Anas undulata</i>	Breeds	2,139 (av.)–5,281
	<i>Netta erythrophthalma</i>	Breeds	54 (av.)–500
	<i>Fulica cristata</i>	Breeds	7,425 (av.)–27,000
	<i>Chlidonias leucopterus</i>	Breeds	2,860

A4ii		Breeding (pairs)	Non-breeding
	<i>Falco naumanni</i>	—	100–1,000
A4iii	More than 20,000 waterbirds occur.		

#### Other threatened/endemic wildlife

None known to BirdLife International.

#### Conservation issues

In 1954 the old Transvaal Provincial Administration (TPA) Nature Conservation Division purchased 452 ha of land around the strategic, shallow, northern end of Barberspan, where bird densities are the greatest. During the 1970s and 1980s the administration gradually acquired more land, and converted it into a Bird Sanctuary and Nature Reserve, including the entire shoreline of Barberspan. Leeupan is as yet unprotected. The pan was designated a Ramsar Site in 1975.

It is the permanence of water, caused by the diversion of flow from the Harts river into Barberspan, that makes the pan so important. Indications from recent research suggest that Barberspan is slowly silting up, which may significantly change the ecological character of the site. Any interference with the river channels will deprive the pan of its water. The reserve is divided into two areas. With the intensification of crop-growing in the district, the sanctuary will be the only area in the region protecting good portions of the now highly fragmented dry sandy highveld grassland (although the area was cultivated prior to protection). The reserve should be enlarged or managed to include the entire basin (including Leeupan), together with the flood-plain, and the system should be managed as a single unit.

#### Further reading

Cowan (1995), Cowan and Marneweck (1996), Farkas (1962, 1966), Mayer (1973), McAllister (1986), Milstein (1968, 1970a,b,c, 1975), Shewell (1959), Skead (1977), Skead and Dean (1977).

### Kalahari-Gemsbok National Park

Admin region Northern Cape

Coordinates 25°40'S 20°20'E

Area 959,103 ha Altitude 500–700 m

ZA020

A3 (A11)

National Park

#### Site description

Situated in the sliver of land between Botswana and Namibia, 320 km north of Upington, the Kalahari-Gemsbok National Park (KGNP) forms a relatively small but vital part of the large semi-arid southern Kalahari ecosystem. The park adjoins Botswana's Gemsbok National Park and the Mabuasehube Game Reserve (IBA BW012), forming a huge area (3.6 million hectares) under official conservation. The vegetation is largely Kalahari thornveld, occurring as open tree-, dune- or shrub-savanna. Tree- and dune-savanna are found adjacent to the Nossob and Auob rivers, with scattered trees of *Rhus*, *Terminalia*, *Boscia* and *Acacia*. Occasionally, narrow dune-belts separate the extensive flat plains that occur between the two rivers. Locally, the broad plains hold shallow, grassy depressions. The Nossob and Auob rivers are important features of the park, holding the greatest densities of tall trees. All along the river course, trees of *Boscia* and *Acacia* dominate, with grassy ground-cover. The park's abundant calcareous and salt pans are mineralogically richer than the surrounding sandveld and consequently support different vegetation.

#### Birds

See Box and Table 3 for key species. The park supports over 214 bird species. Only 75 of these are resident; the large majority of the remainder are characteristically nomadic. This park supports important populations of several raptor species, especially vultures. *Gyps africanus* and *Torgos tracheliotus* occur in good numbers.

The vultures show a preference for the Nossob and Auob riverbeds as both have large trees suitable for nesting and roosting. Other breeding raptors include *Terathopius ecaudatus*, *Polemaetus bellicosus* and *Aquila rapax*. The wide plains of the reserve are home to *Ardeotis kori*, *Neotis ludwigii* and *Eupodotis vigorsii*. Waterholes attract *Pterocles burchelli* and *P. namaqua*, which occasionally gather in very large numbers. The Kalahari thornveld holds typical Kalahari basin

birds, such as *Cercotrichas paena*, *Laniarius atrococcineus*, *Lamprotornis australis*, *Vidua regia*, *Mirafra passerina*, *Bradornis mariquensis* and *Philetairus socius*, which constructs huge communal nests in the larger trees. Wherever seeding grasses sprout, *Amadina erythrocephala*, *Estrilda erythronotos* and *Uraeginthus granatina* are found. *Eremalauda starki* and *Eremopterix australis* are nomadic species that sporadically occur in the park when conditions are favourable.

#### Key species

A3 (A11) Kalahari–Highveld biome: Five of the six species of this biome that occur in South Africa have been recorded at this site; see Table 3.

#### Other threatened/endemic wildlife

*Typhlosaurus garipeensis* is endemic to the vegetated sand ridges in the dune fields of the southern Kalahari, and is almost restricted to the park. The southern African endemic *Dipsina multimaculata*, *Monopeltis leonhardi*, *Meroles suborbitalis*, *Colopus wahlbergii* and *Zelotomys woosnami* are all common within the park.

The KGNP is the second largest national park in South Africa and one of a few remaining wilderness areas in the country supporting natural populations of large mammals. The park supports important populations of *Acinonyx jubatus* (VU), *Hyaena brunnea* (LR/nt) and *Manis temminckii* (LR/nt).

#### Conservation issues

The KGNP was established on 3 July 1931. The erection of game and cattle fences in Botswana has prevented the migration of the Kalahari's larger mammals. The only way these animals can now survive during drought periods is from the water provided at human-constructed pumps and reservoirs. Vultures tend to nest close to these water-points, which attract them; they occasionally slip into the water while attempting to bathe, and invariably drown. Measures to curtail this mortality are being investigated. Raptor monitoring projects have been undertaken.

#### Further reading

Bothma and de Graaf (1973), Broekhuysen *et al.* (1968), de Villiers (1958), Fitzsimons and Brain (1958), Herholdt (1995), Herholdt and de Villiers (1991), Herholdt and Kemp (1997), Knight (1987), Labuschagne (1959), Leistner (1959), Leistner and Werger (1973), Maclean (1966, 1970, 1971), Mills (1976), Prozesky and Haagner (1962), Werger (1973), Winterbottom (1969).

### Spitskop Dam

Admin region Northern Cape, North-west  
Coordinates 28°04'S 24°33'E  
Area 2,495 ha Altitude 1,050 m

ZA021

A1, A4i  
Unprotected

#### Site description

Spitskop Dam lies 33 km south-west of Jan Kempdorp. This is one of the largest wetlands in the semi-arid Northern Cape region. It holds water permanently, and is a vital water-source when all the other ephemeral and temporary wetlands in the region have dried up. The dam lies on the Harts river, and is surrounded by open Kimberley thorn-bushveld savanna, dominated by trees of *Acacia* and *Boscia*. The shrub layer is moderately developed in places and includes species of *Tarchonanthus*, *Grewia* and *Lycium*.

#### Birds

See Box for key species. This wetland regularly supports over 10,000 birds, and has occasionally supported up to 18,000. Occurring in a region where rainfall is unpredictable, any permanent water-body is of major importance during drier periods when other wetlands dry up. The dam supports notable numbers of *Pelecanus rufescens*, *Sterna caspia*, *Phoenicopterus ruber* and *Phoenicopterus minor*. Other species that also occur in significant numbers include *Podiceps cristatus*, *Phalacrocorax carbo*, *Anhinga rufa*, *Platalea alba*, *Tadorna cana*, *Anas undulata*, *Fulica cristata* and *Recurvirostra avosetta*. The Kalahari thornveld holds *Cercotrichas paena*, *Pterocles burchelli* and *Pterocles namaqua*, among other species.

#### Key species

A1 *Phoenicopterus minor*

A4i	Breeding (pairs)	Non-breeding
<i>Podiceps cristatus</i>	Breeds	50–100
<i>Anhinga rufa</i>	—	300–600
<i>Platalea alba</i>	—	120–257
<i>Tadorna cana</i>	—	1,000–2,451
<i>Fulica cristata</i>	—	2,000–5,425
<i>Recurvirostra avosetta</i>	—	417

#### Other threatened/endemic wildlife

None known to BirdLife International.

#### Conservation issues

The dam is not formally protected and ownership falls into three categories, the Department of Water Affairs and Forestry (DWAf), private farmland, and undeclared state land. A single body, DWAf, however, manages the dam for water consumption and recreation. In the rural northern sector, the land is intensively grazed by small and large stock. Excessive livestock-grazing in the former homeland of Bophuthatswana, hunting and poaching of birds, and pollution from agricultural pesticides and fertilizers remain a threat to the system. The Northern Cape Nature Conservation Service conducts bi-annual waterbird surveys on the dam.

#### Further reading

Anderson (1994b), Bezuidenhout (1994), Leistner (1967).

### Augrabies Falls National Park

Admin region Northern Cape  
Coordinates 28°35'S 20°20'E  
Area 25,900 ha Altitude 582–914 m

ZA022

A3 (A12)  
National Park

#### Site description

The Augrabies Falls National Park is situated on the vast Bushmanland peneplain where it straddles the Orange river, c.380 km inland of Alexander Bay. Between Kakamas and the Augrabies Falls, a distance of c.35 km, the river flows through a wide, flat, cultivated valley. From the 146-m-high falls at the park headquarters it meanders down a deep, narrow gorge for several kilometres before reaching the level surface of the surrounding plains once again. The rest of the park is flat with low relief, scattered with large rounded domes. Drainage channels are sandy, gravelly and dry and are mostly very shallow, or occasionally deeper with rocky sides and broad beds. The area is classed as an arid to semi-arid cold desert.

The park's vegetation comprises mainly Orange river Nama-Karoo, typically with trees and shrubs of *Sarcostemma*, *Acacia*, *Rhus*, *Salix*, *Rhigozum*, *Boscia* and *Cadaba*, and succulents (*Aloe*, *Euphorbia*) on the steep, rocky mountain-slopes. In the riverbeds, sandy deposits occasionally form islands that hold a tall open grassland. Upstream of the falls, the Orange river is a braided stream with much fine alluvial sand and silt forming complex islands, which hold gallery forest along the river arms, dominated by *Ziziphus*, *Euclea*, *Maytenus*, *Rhus*, *Acacia* and *Tamarix*, with *Lycium* and *Diospyros* in the shrub layer. *Phragmites* grows in patches along the river. In the gorges downstream of the waterfall *Ficus* grows sparsely on the rocks.

#### Birds

See Box and Table 3 for key species. A total of 195 species have been recorded in the park. Despite the low diversity, the park is important for many biome-restricted assemblage birds, as well as a host of other arid-zone species. The lowland plains are particularly good for large wide-ranging species such as *Polemaetus bellicosus*, *Ardeotis kori*, *Neotis ludwigii* and *Eupodotis vigorsii*. The plains also support *Certhilauda albescens*, *Cercomela schlegelii*, *C. tractrac*, *C. sinuata* and *Malcorus pectoralis*. *Serinus alario* occurs wherever there is seeding grass and water. The belts of riverine *Acacia* woodland hold *Cercotrichas coryphaeus*, *C. paena*, *Phragmacia substriata*, *Sylvia layardi*, *Bradornis mariquensis*, *Sporopipes squamifrons* and *Agapornis roseicollis* and provide food, shelter and breeding habitat for many other species. Large trees occasionally support the massive *Philetairus socius* nests with the associated *Polihierax semitorquatus* frequently in attendance. In very wet years nomadic *Eremopterix australis* move in and breed in large numbers, and are then absent until the next heavy rains, which can be

decades apart. *Onychognathus nabouroup*, *Apus bradfieldi* and the secretive and localized *Euryptila subcinnamomea* occur in the river's steep gorges and associated rocky kloofs.

#### Key species

A3 (A12) Namib-Karoo biome: 13 of the 19 species of this biome that occur in South Africa have been recorded at this site; see Table 3.

#### Other threatened/endemic wildlife

Among plants, the distinctive southern African endemic *Aloe dichotoma* is common within the park. The permanently flowing sections of the river support two important fish species, the Vaal-Orange river endemic *Austroglanis sclateri* (DD) and *Barbus hospes* (LR/nt), which is restricted to the Orange river below the Augrabies Falls. Among herptiles, this is the only protected area in the world supporting the endemic frog *Phrynomerus annectens* and the lizard *Platysaurus broadleyi*; the latter is restricted to the lower Orange river valley between Augrabies and Pella. The threatened mammal *Diceros bicornis* (CR) was reintroduced to the park in 1985.

#### Conservation issues

The park, proclaimed in 1966, is controlled by the South African National Parks Board and is a strong tourist attraction, drawing c.70,000 visitors per year. A land claim against the park's northern bank has been made, but all attempts are being made to continue with the management of this area as a contractual park. Threats to the system include overgrazing of the surrounding farmland, resulting in degradation of habitat outside the park, potentially reducing populations of wide-ranging species such as the bustards (Otididae) that depend on large foraging areas that fall mostly outside of the park's borders. Poisons, including strychnine, are being used in neighbouring farming areas. The impacts that these are having on several threatened raptor species are unknown.

#### Further reading

Leistner (1967), Leistner and Werger (1973), Low and Rebelo (1996), Rautenbach *et al.* (1979), Werger (1973).

### Orange river mouth wetlands

Admin region Northern Cape

Coordinates 28°36'S 16°28'E

Area 9,600 ha Altitude 0–10 m

ZA023

A1, A3 (A12), A4i, A4iii  
Ramsar Site (unprotected)

#### Site description

The Orange river mouth is located on the arid Atlantic coast at South Africa's border with Namibia. The nearest towns are Alexander Bay in South Africa and Oranjemund in Namibia. This site is a 13 km long section of the Orange river, including its flood-plain and terrestrial matrix, running from the ocean to Pachtvlei, just east of the Sir Ernest Oppenheimer Bridge. The delta-type river mouth consists of a series of braided troughs interspersed with sandbanks, channel bars and small islands, with a tidal basin and a saltmarsh on the south bank. The Orange river drains the largest catchment in South Africa, with an area of 549,700 km<sup>2</sup> and a mean annual run-off of 12,000 million cubic metres.

The major vegetation-types include islands dominated by *Scirpus*, *Phragmites* and *Sporobolus*. The peripheral marshes are dominated by various herbs, sedges and grasses. The upper flood-plain vegetation consists primarily of *Lycium*, *Tamarix* and *Juncus*, which gradually give way to terrestrial vegetation. On the lower flood-plain the soils have a high salinity as a result of evaporation and the peripheral marshland is dominated by salt-tolerant *Sarcocornia*.

#### Birds

See Box and Table 3 for key species. The Orange river mouth is considered to be the sixth most important coastal wetland in southern Africa in terms of the overall number of wetland birds that it supports, which can be as high as 26,000 individuals, from a total of 56 species recorded. Numbers drop off considerably in winter, suggesting that the large majority of the birds are migratory or indulge in local movements. The Orange river mouth is used by birds primarily for breeding or as a stop-over on migration. At times the area supports more than 1% of the world populations of *Phalacrocorax capensis*, *Tadorna cana*, *Anas smithii* and *Larus hartlaubii*. The wetland and

adjacent coastal dunes also support substantial numbers of *Sterna balaenarum*. Substantial proportions of the southern African populations of *Podiceps nigricollis*, *Oxyura maccoa*, *Charadrius pallidus*, *Sterna bergii*, and *Sterna caspia* are periodically supported at the Orange river mouth. *Circus ranivorus* occur along marshy sections of the riverbank and in the surrounding lucerne fields. The mouth supports a few resident *Haematopus moquini* and, in summer, large numbers of migrant Palearctic waders.

Near Pachtvlei, the terrestrial vegetation surrounding the wetland supports *Francoelinus capensis*, *Cercomela tractrac* and two recently recognized larks, *Certhilauda barlowi* and *C. curvirostris*. The latter two species have restricted ranges (covering less than 50,000 km<sup>2</sup> each) that overlap, indicating that the Secondary Area of avian endemism recognized in this part of the Karoo (the restricted-range species *Certhilauda burra* occurs at three nearby IBAs: 025, 026, 027) should be upgraded to the status of Endemic Bird Area (EBA) when the global EBA classification is next revised.

#### Key species

A1 *Sterna balaenarum*

A3 (A12) Namib-Karoo biome: Five of the 19 species of this biome that occur in South Africa have been recorded at this site; see Table 3.

A4i	Breeding (pairs)	Non-breeding
<i>Podiceps nigricollis</i>	—	344 (av.)–1,022
<i>Phalacrocorax capensis</i>	831–5,000	7,500 (av.)–10,000
<i>Tadorna cana</i>	—	350 (av.)–854
<i>Anas smithii</i>	—	162 (av.)–353
<i>Recurvirostra avosetta</i>	—	402 (av.)–588
<i>Larus dominicanus</i>	85 (av.)–150	1,036 (av.)–1,676
<i>Larus hartlaubii</i>	0–30	1,152 (av.)–2,511
<i>Sterna hirundo</i>	—	10,000
A4iii	More than 20,000 waterbirds occur.	

#### Other threatened/endemic wildlife

The system holds several endemic and threatened fish species, including *Barbus hospes* (LR/nt) and *Austroglanis sclateri* (DD). Several endemic and localized amphibians and reptiles occur in the terrestrial vegetation surrounding the estuary, and consideration should be given to securing a conservation area including the terrestrial matrix. Three highly range-restricted endemic frogs, *Cacosternum namaquense*, *Breviceps macrops* and *B. namaquensis* occur in the dunes and rocky outcrops adjacent to the mouth, particularly in the Alexkor restricted mining area to the south. Endemic mammals in the surrounding habitat matrix include *Bathergus janetta* (LR/nt).

#### Conservation issues

After years of continuous habitat degradation as a result of several factors, including adjacent diamond-mining activities, flow regulation of the river and its catchment, and poor management of the mouth, the future is finally looking more positive for the Orange River Mouth Ramsar Site. The unprotected mouth (currently managed on an ad hoc basis by Alexkor, a diamond-mining company) and its saltmarsh are soon to be declared a provincial nature reserve and will be afforded the protection of a full-time nature conservator. A management plan will be developed, and rehabilitation options will be explored. A substantial proportion of the wetland falls within Namibia, where it is managed by Namdeb (Oranjemund), another diamond-mining company. Negotiations are currently under way to acquire the property for a trans-national conservation area. The southern African west coast is characterized by a lack of large, significant wetland systems. The Olifants river mouth (IBA 078), some 300 km south of the Orange, is the nearest wetland holding significant waterbird habitat. To the north, Walvis Bay (IBA NA013) lies c.700 km away. The Orange river mouth is thus of primary importance as one of the few major stop-over wetlands for migratory waders along the arid east Atlantic flyway, as well as being one of the few permanent wetlands for nomadic or moulting waterbirds.

The Orange river system, South Africa's largest, has become highly regulated by virtue of 23 major dams and numerous weirs within its catchment. Water abstraction and regulation have resulted in changed flow patterns, from a pronounced seasonal flow, primarily during summer, to a nearly even flow distribution. The total annual flow has also been reduced by half. To add to this, the functioning of the Orange river will be altered dramatically with the full implementation of the Lesotho Highlands Water Scheme. Worst-case scenarios project periodic

drying up of the Orange river that would have extremely negative consequences for the functioning of the river system and its mouth. The saltmarsh on the south bank of the river has been degraded by a dyke, which was built to allow Alexkor personnel access to the beach. Furthermore, material from the Alexkor dumps has been blown across the saltmarsh, and through abrasion, clogging and other factors, has killed much of this vegetation. These anthropogenic impacts have resulted in the wetland having been placed on the Montreux Record (in September 1995), which is a register of sites administered by the Ramsar Bureau, that have suffered considerable detrimental action as a result of human activities. Alexkor have promised to rehabilitate the area and restore the saltmarsh, although it is unlikely that it will return to its former state.

#### Further reading

Allan and Jenkins (1993), Brooke *et al.* (1982), Brown (1959), Cooper and Hockey (1981), Cooper *et al.* (1982), Courtenay-Latimer (1963), Cowan (1995), Cowan and Marnewick (1996), Day (1981), Frost and Johnson (1977), Grindley (1959), Manry (1978), Morant and O'Callaghan (1990), Noli-Pearce and Williams (1991), Plowes (1943), Roberts (1989), Ryan and Bloomer (in press), Ryan and Cooper (1985), Ryan *et al.* (1998), Swart *et al.* (1988), van Zyl (1991), Whitelaw *et al.* (1978), Williams (1986).

#### Kamfers Dam

Admin region Northern Cape  
Coordinates 28°44'S 24°46'E  
Area 400 ha Altitude 1,170 m

ZA024

A4i  
Unprotected

#### Site description

Kamfers Dam is located 2 km north of Kimberley at the junction of three biomes; the Karoo, Kalahari and Grasslands. The dam is actually a non-perennial, closed-basin pan in a semi-arid environment, receiving water from three primary sources; its 160 km<sup>2</sup> catchment, 14 megalitres of treated sewage effluent from Kimberley per day, and half of the town's stormwater. During 5- to 10-year dry cycles, the pan dries out between October and December, and fills between February and March. There is always permanent water at the south-western end of the pan, owing to the continuous inflow of sewage effluent, and this has resulted in the establishment of extensive beds of *Phragmites*, *Typha*, *Scirpus*, *Juncus* and *Cyperus* marsh, sedge- and reedbeds.

The Kalahari thornveld surrounding the pan is dominated by *Acacia*. Panveld grows on the water's edge and lower slopes, and is characterized by plants that grow on heavy/brackish/saline soils. Unfortunately, invasive non-native plants (such as *Tagetes*, *Agave*, *Argemone*, *Prosopis* and *Salsola*) cover areas adjacent to the pan.

#### Birds

See Box for key species. Probably due to the nutrient-rich sewage input, this pan is highly productive and supports large numbers of birds. It regularly holds 4,000–10,000 individuals of resident, migratory and nomadic waterbird, and up to 20,000 have been recorded during periods of drought, when the site provides a reliable refuge while many of the surrounding ephemeral water-bodies dry out. The threatened *Circus ranivorus* and *Charadrius pallidus* occur at Kamfers Dam, which also occasionally holds large numbers of *Alopochen aegyptiaca*, *Podiceps nigricollis* and *Tadorna cana*. During winter, when Palearctic migrants are absent, the site supports substantially fewer birds.

#### Key species

A4i	Breeding (pairs)	Non-breeding
<i>Podiceps nigricollis</i>	—	900
<i>Phoenicopterus ruber</i>	—	1,208 (av.)–18,000
<i>Alopochen aegyptiaca</i>	—	6,000
<i>Tadorna cana</i>	—	92 (av.)–500

#### Other threatened/endemic wildlife

None known to BirdLife International.

#### Conservation issues

The major part (95%) of the fringe of Kamfers Dam is privately owned; a small portion of land (5%), in the south-western corner, belongs to the Kimberley Municipality. An unofficial bird sanctuary has been established here and the pan has been registered as a Natural Heritage

Site. It is proposed that funds be raised to purchase more land surrounding the pan and to afford the area legal protection at a provincial level as a first priority. The pan's catchment is used for large stock-farming and to provide the city of Kimberley and its surrounding townships with drinking water. The pumping of treated sewage effluent into the pan has contributed to major changes in water-levels within the wetland, and the pan now seldom dries out, as it used to do under natural conditions. In recent years the pan has not supported as many waterbirds as in the 1970s, when as many as 6,000 *Alopochen aegyptiaca*, 1,000 *Plectropterus gambensis* and 500 *Tadorna cana* were recorded. The reason for the dramatic decline is uncertain, but it has been attributed to the conflict between waterbirds and farmers in the adjacent grain-producing areas, where many birds are being shot or poisoned.

The low purity and high quantity of the treated sewage that is discharged into the pan, and the high pollutant levels in the stormwater run-off from Kimberley, are also both threats to the integrity of the pan system. The surrounding *Acacia* savanna is threatened by overgrazing and trampling by cattle and game, and the natural vegetation is threatened through infestation by invasive non-native plant species. Only recently has the pan's potential as an environmental education and tourism destination been appreciated. As a result, the economic feasibility of constructing environmental education facilities, interpretative centres, trails and bird-hides is being investigated by the Northern Cape Region of the Wildlife and Environment Society of South Africa. Designation as a Ramsar Site has been proposed.

#### Further reading

Anderson (1994a,c), Anderson and Koen (1994), Koen (1993).

#### Mattheus-Gat Conservation Area (proposed)

Admin region Northern Cape

Coordinates 29°05'S 19°35'E

Area c.52,000 ha Altitude 815–1,150 m

ZA025

A1, A2 (s047), A3 (A12)

Unprotected

#### Site description

Situated due east of Pofadder, this site consists of four farms: Mattheus-Gat (18,000 ha), Gembokvlakte (10,000 ha), Pofadder East (14,000 ha) and Konkoonies (10,000 ha). Mattheus-Gat forms the central portion of the site and, in the south of the property, holds the granitic Mattheus-Gat mountains which rise some 300 m above the surrounding plains and which provide habitat for both mountainous and mountain-slope bird species. Away from the mountains, there are sandy plains to the north, comprising perennial desert grasslands that change into a red-dune system that runs from north-west to south-east (the fossil Koa river valley).

The vegetation consists of grasses and shrubs scattered between bare sand patches. The koppies hold shrubs of *Adenolobus* and *Rhus*, especially on the mid-slopes and peaks, while the cobble-strewn bases are covered by melkboom *Euphorbia* in places. The gravel-plains are covered with a sparse dwarf shrubland, including species of *Rhigozum*, *Pteronia*, *Tetragonia*, *Tarchonanthus*, *Ceraria*, *Lycium* and *Boscia* on sandy patches. There are a few sparsely vegetated drainage lines that run from south to north. The drainage lines support taller woody vegetation and occasionally hold large *Acacia* trees, which provide good nesting habitat for larger bird species.

#### Birds

See Box and Tables 2 and 3 for key species. This is one of few sites to hold both the globally threatened *Certhilauda burra* (200–300 pairs), which inhabits the red sand-dunes, and the near-threatened *Spizocorys sclateri* (up to 500 birds), which occurs occasionally on the barren stony plains. The site holds most of the species restricted to the Namib-Karoo biome, as well as a host of other arid-zone birds. The rocky outcrops of the Mattheus-Gat mountains are home to *Geocolaptes olivaceus*, *Euryptila subcinnamomea* and *Onychognathus nabouroup*. The plains hold *Circus maurus*, *Polemaetus bellicosus*, *Ardeotis kori*, *Neotis ludwigii*, *Eupodotis vigorsii*, *Cursorius rufus*, *Pterocles namaqua*, *Eremalauda starki*, *Cercomela tracterac*, *C. sinuata*, *C. schlegelii*, *Eremomela gregalis* and *Malcorus pectoralis*. During good rains, the nomadic *Eremopterix australis*, *E. verticalis*, *Serinus alario* and *Emberiza impetuani* can be superabundant. Low, scrubby vegetation holds *Parus afer*, *Anthoscopus*

*minutus*, *Sylvia layardi*, *Batis pririt*, *Stenostira scita*, *Nectarinia fusca*, *Sporopipes squamifrons* and *Serinus albogularis*. The large trees occasionally hold the communal nests of *Philetairus socius* with *Polihierax semitorquatus* frequently in attendance. The newly recognized *Certhilauda subcoronata* also occurs in this region.

#### Key species

A1	<i>Circus maurus</i> <i>Geocolaptes olivaceus</i>	<i>Certhilauda burra</i> <i>Spizocorys sclateri</i>
A2 (s047)	<i>Certhilauda burra</i>	
A3 (A12)	Namib–Karoo biome: 15 of the 19 species of this biome that occur in South Africa have been recorded at this site; see Table 3.	

#### Other threatened/endemic wildlife

None known to BirdLife International.

#### Conservation issues

All the farms are privately owned and are not conserved in any manner. Individual properties are too small, on their own, to maintain viable populations of many of the species occurring there. It is important that these properties are managed as a unit and that the primary management problems are tackled from a holistic perspective. Heavy grazing and trampling by domestic livestock changes the vegetation on the red dunes, making it unsuitable for *Certhilauda burra*. Only 1,400 km<sup>2</sup> remains of the 5,625 km<sup>2</sup> of habitat that was once suitable for *Certhilauda burra*. Cattle uproot forbs and graze down the grasses, particularly *Stipagrostis ciliata*, an important element of *Certhilauda burra* habitat, leaving the shrubs untouched. Sheep selectively remove forbs and annual grasses. Goats impact *Certhilauda burra* habitat the least, by browsing shrubs (*Monechma* and *Lycium*) and some grasses (*Cladoraphis* and *Centropodia*), but mostly leaving *Stipagrostis ciliata* untouched.

If possible, some or all of these farms should be purchased by the State or an NGO and incorporated into a nature reserve. Alternatively, a private conservancy may be established. An appropriate conservation action for the entire region would be to eliminate or reduce cattle stocking in the sensitive red-dune areas within this IBA.

#### Further reading

Allan (1989, 1994b), Dean (1989, 1995, 1997), Dean and Hockey (1989), Dean and Lombard (1994), Dean and Siegfried (1997), Dean *et al.* (1991), du Plessis (1992), Edwards (1974), Ryan and Bloomer (in press), Steyn and Myburgh (1989), Vernon (1986), Watkeys (1986, 1987).

### Haramoep and Black Mountain Mine Nature Reserve

**ZA026**

Admin region Northern Cape

Coordinates 29°10'S 18°49'E

A1, A2 (s047), A3 (A12)

Area c.54,408 ha Altitude 489–1,141 m

Nature Reserve

#### Site description

Situated 12 km north-west of Aggeneys, the farm Haramoep (29°07'S 18°40'E; 14,745 ha) forms the central portion of the site. The remainder is formed by neighbouring farms: Dabenoris, Koeries Wes, Koeries Oos, Katkop and the adjoining Goldfields-owned private nature reserves, Black Mountain Mine and the farm Aggeneys. The area consists of extensive sandy and gravel-plains holding perennial desert grassland and shrubs scattered between bare sand patches. The granitic Haramoep mountains lie in the central and eastern parts of the farm, with gravel-plains stretching to the south.

The koppies hold shrubs of *Adenolobus* and *Rhus*, especially on the mid-slopes and peak of the Haramoep mountains. The cobble-strewn bases of the koppies are covered with melkboom *Euphorbia*. The western and northern regions comprise red sand-dunes overlying the fossil course of the Koa river. The gravel-plains are covered by sparse dwarf shrubland and grassland. The drainage lines support taller woody vegetation including shrubs of *Euclea*, *Ozoroa*, *Acacia* and *Tamarix*, as well as a patch of *Prosopis* near the homestead.

#### Birds

See Box and Tables 2 and 3 for key species. This is one of few sites that protect both the globally threatened *Certhilauda burra* (700–900 pairs), which inhabits the red sand-dunes, and the near-threatened *Spizocorys sclateri* (up to 500 individuals), which occurs sporadically

on the barren stony plains. This site also holds most of the species restricted to the Namib–Karoo biome and a host of other arid-zone birds. The rocky outcrops of the Haramoep mountain support *Geocolaptes olivaceus*, *Euryptila subcinnamomea*, *Anthus crenatus* and *Onychognathus nabouroup*.

The extensive plains support *Circus maurus*, *Polemaetus bellicosus*, *Neotis ludwigii*, *Eupodotis vigorsii*, *Cursorius rufus*, *Pterocles namaqua*, *Eremalauda starki*, *Cercomela tractor*, *C. sinuata*, *C. schlegelii*, *Eremomela gregalis* and *Malcorus pectoralis*. During good rains the nomadic *Eremopterix verticalis*, *E. australis*, *Serinus alario* and *Emberiza impetuani* can be superabundant. Low scrubby vegetation holds *Parus afer*, *Anthoscopus minutus*, *Nectarinia fusca*, *Sylvia layardi*, *Batis pririt*, *Bradornis infuscatus*, *Stenostira scita*, *Sporopipes squamifrons* and *Serinus albogularis*. Some large trees hold the communal nests of *Philetairus socius* with the associated *Polihierax semitorquatus* in attendance. The newly recognized *Certhilauda subcoronata* occurs at the site.

#### Key species

A1	<i>Circus maurus</i> <i>Geocolaptes olivaceus</i>	<i>Certhilauda burra</i> <i>Spizocorys sclateri</i>
A2 (s047)	<i>Certhilauda burra</i>	
A3 (A12)	Namib–Karoo biome: 16 of the 19 species of this biome that occur in South Africa have been recorded at this site; see Table 3.	

#### Other threatened/endemic wildlife

None known to BirdLife International.

#### Conservation issues

The only protected parts of the Koa river valley dune system are the Black Mountain Mine Nature Reserve (76 km<sup>2</sup>) and the adjacent Aggeneys farm (7,000 ha), owned by the Black Mountain Mineral Development Company and presently set aside as a conservation area. The remainder of the properties within the IBA are privately owned and are unprotected. The addition of Koeries farm (12,920 ha) to Haramoep would result in the consolidation of a substantial conservation area in excess of 40,000 ha. Black Mountain Mine Nature Reserve supports 7.5% of the global population of *Certhilauda burra*, and the whole IBA is expected to support c.15–20% of the global population. As such, incorporation of these farms into a conservation network, either through the State or NGOs purchasing these properties and converting them into nature reserves, or alternatively, establishing a private conservancy run by the land-owners, is essential.

Heavy grazing and trampling by domestic livestock on many of the private farms change the vegetation on the red dunes, making them unsuitable for *Certhilauda burra*. Globally, only 1,400 km<sup>2</sup> remain of the 5,625 km<sup>2</sup> that were formerly suitable for *Certhilauda burra*, and this area is estimated to support less than 10,000 birds. Although grazing is widespread within the IBA, all stock were recently removed from Aggeneys, Black Mountain Mine and Haramoep. The grass and shrub cover is generally in good condition, and even the most heavily impacted areas are not considered to be permanently damaged. An appropriate conservation action at a landscape level would be to eliminate or reduce cattle-stocking in the remaining sensitive red-dune areas within this IBA.

#### Further reading

Allan (1989, 1994b), Dean (1989, 1995, 1997), Dean and Hockey (1989), Dean and Lombard (1994), Dean and Siegfried (1997), Dean *et al.* (1991), du Plessis (1992), Edwards (1974), Ryan and Bloomer (in press), Steyn and Myburgh (1989), Vernon (1986), Watkeys (1986, 1987).

### Bitterputs Conservation Area (proposed)

**ZA027**

Admin region Northern Cape

Coordinates 29°50'S 19°00'E

A1, A2 (s047), A3 (A12)

Area c.45,540 ha Altitude 882–1,021 m

Unprotected

#### Site description

Situated 65 km south-west of Pofadder, this site consists of five farms; Bitterputs (107 and 110) (29,555 ha), Bitterputs 111 (3,224 ha), Bosluis (5,101 ha), Kanaip (6,175 ha) and Oorstoot (1,485 ha). Bitterputs (107 and 110) forms the central portion of the IBA and consist mainly of flat gravel-plains with a red dune system that runs from north to south

in the central and western portion of the property. Coarse, pale red sandy soils and red dunes form the southern portion of the fossil Koa river valley. Towards the east, sandy plains comprising perennial desert grassland and granitic gravel-plains occur.

The koppies hold shrubs, e.g. *Adenolobus* and *Rhus*, especially on the mid-slopes and peaks, while the cobble-strewn bases are often covered with melkboom *Euphorbia*. The drainage lines support taller woody vegetation, such as *Euclea*, *Ozoroa*, *Acacia* and *Tamarix* shrubs. The gravel-plains are covered with a variety of sparse dwarf shrubs.

### ■ Birds

See Box and Tables 2 and 3 for key species. This is one of few IBAs holding both the globally threatened *Certhilauda burra* (150–250 pairs), which inhabits the red sand-dunes, and the near-threatened *Spizocorys sclateri* (up to 100 individuals), which occurs erratically on the barren stony plains. The site also holds many of the Namib–Karoo biome-restricted species, as well as a host of other arid-zone birds. The plains support *Circus maurus*, *Ardeotis kori*, *Neotis ludwigii*, *Eupodotis vigorsii*, *Cursorius rufus*, *Pterocles namaqua*, *Eremalauda starki*, *Cercomela tractrac*, *C. sinuata*, *C. schlegelii*, *Eremomela gregalis* and *Malcorus pectoralis*. During good rains the nomadic *Eremopterix australis*, *Serinus alario* and *Emberiza impetuani* can be superabundant. Low scrubby vegetation holds *Anthoscopus minutus* and *Nectarinia fusca*. Rocky outcrops hold *Euryptila subcinnamea* and the recently recognized *Certhilauda subcoronata*.

#### Key species

A1	<i>Circus maurus</i>	<i>Spizocorys sclateri</i>
	<i>Certhilauda burra</i>	
A2 (s047)	<i>Certhilauda burra</i>	
A3 (A12)	Namib–Karoo biome: 13 of the 19 species of this biome that occur in South Africa have been recorded at this site; see Table 3.	

### ■ Other threatened/endemic wildlife

None known to BirdLife International.

### ■ Conservation issues

All the farms are privately owned and are not conserved in any manner. Individual properties are too small, by themselves, to maintain viable populations of many of the species occurring there. It is important that these properties are managed as a unit and that the primary management problems are tackled from a holistic perspective. Heavy grazing and trampling by domestic livestock change the vegetation on the red dunes, making it unsuitable for *Certhilauda burra*. Globally, only 1,400 km<sup>2</sup> remain of the 5,625 km<sup>2</sup> that were once suitable habitat for this species, and this area is estimated to support less than 10,000 birds.

If possible, some, or all of these farms should be purchased by the State or an NGO and incorporated into a nature reserve. Alternatively, a private conservancy may be established. An appropriate conservation action for the entire region would be to eliminate or reduce cattle stocking in the sensitive red-dune areas within this IBA. Protection and management of the remaining suitable habitat is a high priority for the conservation of *Certhilauda burra*.

### ■ Further reading

Allan (1989, 1994b), Dean (1989, 1995, 1997), Dean and Hockey (1989), Dean and Lombard (1994), Dean and Siegfried (1997), Dean *et al.* (1991), du Plessis (1992), Edwards (1974), Ryan and Bloomer (in press), Steyn and Myburgh (1989), Vernon (1986), Watkeys (1986, 1987).

## Platberg-Karoo Conservancy

Admin region Northern Cape

Coordinates 30°37'S 24°10'E

Area 1,200,000 ha

Altitude 1,100–1,691 m

ZA028

A1, A3 (A12), A4i, A4ii

Nature Reserve,

Unprotected

### ■ Site description

The conservancy covers the entire districts of De Aar, Philipstown and Hanover in the south-eastern portion of the Northern Cape Province. Although the land in the IBA is primarily used for grazing and agriculture, it includes the suburban towns of De Aar, Philipstown, Petrusville and Hanover. This huge area lies in the plains of the central

Great Karoo, forming part of the South African plateau. The conservancy consists primarily of open-plain country, locally interrupted by dolerite hills and small mountain ranges which rise 200–300 m above the surrounding plateau, which varies from 1,100–1,400 m in altitude.

Just north of De Aar, the ephemeral Brak river flows in an arc from south-east to north-west, eventually feeding into the Orange river basin. Several other ephemeral rivers occur in the IBA, including the Hondeblaf, Seekoei and Elandsfontein, which all have rocky beds with intermittently wide flood-plains that contribute to the Orange river catchment. Kriegerspoort Dam in the south and the Vanderkloof (formerly P. K. le Roux) Dam in the north-east form permanent water features in the area.

The vegetation that covers much of the plains and lower escarpment is dominated by shrubs, which seldom exceed 70 cm in height. The numerous kloofs are sparsely wooded and the hills and mountains are more grassy than the plains. During rainy periods, however, many patches of grass sprout on the rocky mountain slopes. The characteristic shrubs of the hills are species of *Rhus*. There are extensive sectors of dense thornveld dominated by *Acacia*, which forms belts of riverine woodland lining the mostly dry riverbeds.

### ■ Birds

See Box and Table 3 for key species. This area holds vitally important populations of two globally threatened species, several biome-restricted species and important populations of other arid-zone birds. The lowland karroid plains are particularly good for *Neotis ludwigii*, *Ardeotis kori*, large numbers of *Eupodotis vigorsii*, *Certhilauda albescens*, *Cercomela schlegelii*, *C. tractrac*, *C. sinuata*, *Emberiza impetuani* and the recently recognized *Certhilauda subcoronata*. In the grassier areas, *Eupodotis caerulescens* are common. *Circus maurus* are occasionally seen quartering the plains, where huge numbers of *Grus paradisea* regularly congregate. *Aquila rapax* and *Polemaetus bellicosus* breed on the power lines in the area. The belts of riverine *Acacia* woodland support *Phragmacia substriata*, *Sylvia layardi* and *Parus afer*. *Onychognathus nabouroup* and *Anthus crenatus* occur in rocky gorges and kloofs. Other arid-zone species occurring within the conservancy are *Melierax canorus*, *Batis pririt*, *Stenostira scita* and *Serinus albugularis*. *Falco naumanni* have roosts throughout the area, including large roosts in the towns of De Aar, Hanover and Philipstown; they are frequently seen foraging in the conservancy in summer. Some of the dams are important roosts—during summer 1996/97, more than 850 *Grus paradisea* were counted on a dam in the area.

#### Key species

A1	<i>Falco naumanni</i>	<i>Eupodotis caerulescens</i>
	<i>Grus paradisea</i>	
A3 (A12)	Namib–Karoo biome: 11 of the 19 species of this biome that occur in South Africa have been recorded at this site; see Table 3.	
A4i	Breeding (pairs)	Non-breeding
	<i>Grus paradisea</i>	200–400
	<i>Ciconia nigra</i>	10–20
A4ii	<i>Falco naumanni</i>	—
		5,000–10,000

### ■ Other threatened/endemic wildlife

None known to BirdLife International.

### ■ Conservation issues

The only formally conserved reserve in the area is the small government-owned Rolfontein Nature Reserve (6,938 ha) in the north-east, which was declared in 1970. Small isolated reserves seldom fulfil the conservation requirements of large, wide-ranging, non-passerine birds. The only feasible long-term approach to conserving these species is to manage the agricultural landscape within which they live to suit their needs. The Platberg-Karoo Conservancy is an ideal example of how conservation goals can be achieved without sacrificing the farming potential of the land. Despite being an informal conservation area, the land-owners' activities dramatically affect the important species that use this site, and their cooperation contributes enormously to establishing and maintaining vitally important and valuable conservation areas and populations of threatened species.

Threats in the area include overgrazing of the surrounding farmland, resulting in habitat degradation that potentially reduces populations of wide-ranging species, such as bustards and cranes. Strychnine and other poisons are used for problem-animal control in farming areas, which may affect scavenging raptor populations. *Falco*

*naumanni* is also susceptible to poisoning through taking locusts in the midst of spraying operations. The effect that pesticides are having on this species is currently unknown.

Power lines in the district are a threat to large terrestrial birds such as cranes and bustards, which collide with them, and to raptors, which have been electrocuted while perching on them. Power lines can, however, also be beneficial to large raptors such as *Polemaetus bellicosus* which breed on them. The Northern Cape Nature Conservation Service (NCNCS) is undertaking a study of bird/power-line collisions in the Karoo and (with funding from Eskom) is attempting to devise mitigation measures.

#### Further reading

Allan (1989, 1994b, 1995b), Dean (1995, 1997), Dean and Hockey (1989), Dean and Lombard (1994), Dean and Siegfried (1997), Kieser and Kieser (1978), Pepler (1994a,b).

### Sandveld and Bloemhof Dam Nature Reserves

**ZA029**

Admin region Free State, North-west

Coordinates 27°40'S 25°45'E

Area 55,372 ha Altitude 1,228–1,271 m

A1, A4i

Nature Reserves

#### Site description

The reserves lie on the Free State/North-west Province border, surrounding the Bloemhof Dam, an impoundment on the Vaal river. Sandveld Nature Reserve protects a remnant patch of the eastern form of Kalahari Thornveld, which projects into the grassland biome. The Kalahari Thornveld in this region previously covered a much greater area. The central portion of the reserve supports some excellent dense stands of *Acacia* savanna with *Brachiaria* as a co-dominant. The remainder of the reserve is dominated by open short grassveld, with clumps of *Tarchonanthus* and small thickets of *Ziziphus*, *Rhus* and *Acacia* scattered throughout.

There are also extensive areas which, in the past, were cleared for grazing or cultivation; these open areas persist in the reserve either as open grassland or regenerating woodland. There is also an area of previously intensely overgrazed grassland, where karroid vegetation has invaded. Most of the reserve is very flat; there are a few low koppies and ridges, covered mainly with hillside bush of *Olea* and *Rhus*. Although the level of Bloemhof Dam can show large fluctuations, there are also times when it remains low for extended periods because the Vaal Dam, upstream, captures the major part of the catchment waters. Pans form under these conditions, and the exposed dam basin is colonized by grasses and extensive stands of annuals.

#### Birds

See Box for key species. The dam regularly supports more than 5,000 waterbirds and it has once supported more than 10,000 individuals. At times, when the water-level is low, islands and aquatic vegetation become exposed, making the system highly productive and suitable for many species of waterbird. Several mixed heronries are found around the dam, supporting a variety of breeding egrets, herons and cormorants. One heronry, c.1 km north-east of the bridge over the Vaal river, regularly supports over 3,500 breeding pairs. Another, on the southern shore (c.30 km from the first colony), regularly supports 2,200 breeding pairs. The dam regularly holds notable numbers of *Phoenicopterus minor*, *Sterna caspia*, *Mycteria ibis* and a few pairs of *Circus ranivorus*. The Kalahari thornveld surrounding the dam supports several large raptors and terrestrial birds, including breeding *Aquila rapax*, *Gyps africanus* and *Ardeotis kori*, as well as visiting *Circus macrourus* and *Polemaetus bellicosus*.

#### Key species

Key species	Breeding (pairs)	Non-breeding
A1 <i>Phoenicopterus minor</i>		
A4i <i>Tachybaptus ruficollis</i>	—	150 (av.)–540
<i>Podiceps cristatus</i>	—	75
<i>Anhinga rufa</i>	40–50	273 (av.)–610
<i>Platalea alba</i>	6–10	67 (av.)–193
<i>Phoenicopterus ruber</i>	—	760 (av.)–1,632
<i>Anas smithii</i>	—	183 (av.)–490
<i>Recurvirostra avosetta</i>	—	271 (av.)–716

#### Other threatened/endemic wildlife

Several large mammals have been reintroduced, including *Ceratotherium simum* (LR/nt).

#### Conservation issues

The area consists of two provincial reserves surrounding Bloemhof Dam: the Bloemhof Dam Nature Reserve (22,072 ha) was declared in 1975, and Sandveld Nature Reserve (14,700 ha) in 1980. The Department of Water Affairs and Forestry (DWAF) manages the dam water-level. The government controls the land along the Free State shoreline of the dam, but the narrow buffer strip that extends from 27°36'S 25°50'E to 27°32'S 26°12'E, about 100 km upstream, is leased to farmers. The surrounding land is commercial farmland.

Threats to some aquatic birds include poor dam management—water is released into and out of the dam without consulting the reserve manager. Threats to scavenging raptors include foraging from carcasses that have been poisoned by farmers to eradicate vermin. Certain invasive plants have caused minor problems in the reserves. Two species of prickly pear *Opuntia* are controlled with herbicides, introduced *Cactoblastus cactorum* and cochineal insects. *Prosopis* scrub has also invaded and there are plans to remove it.

#### Further reading

Colahan (1992a,b, 1993a,b, 1994a,b), Kopij and Nuttall (1996), Nuttall (1993, 1995).

### Sterkfontein/Merinodal

**ZA030**

Admin region Free State

Coordinates 27°51'S 29°26'E

Area 5,800 ha Altitude 1,840–2,055 m

A1, A2 (091), A3 (A07), A4i

Unprotected

#### Site description

This site consists of eight farms (Otterhoek 768, Merino Dal 673, Wateryk 638, Kleinplaas 1613, Koekpan 660, Sterkfontein 353, Grootfontein 1844 and Groenfontein 331), located c.22.5 km south-west of Memel. The proposed Grassland Biosphere Reserve (IBA ZA016) lies just to the north. The site comprises a valley through which the Cornelis river flows. The river is bounded by undulating, hilly, high-altitude grassland on the plateau to the north and south of the river. To the north of the river there are steep-sloped hillsides, with some rock outcrops and cliffs. The plateau is higher in the east (2,055 m) than in the west (1,840 m). Uncultivated areas consist of natural sourveld grassland, with only a small proportion of the farming district being cultivated. The most dominant grassland type is moist sandy highveld grassland. Small patches of moist clay highveld grassland grow on the black vertic clays that are scattered throughout the area.

#### Birds

See Box and Tables 2 and 3 for key species. This area supports some highly threatened grassland species, including *Heteromirafra ruddi*, *Spizocorys fringillaris*, *Anthus chloris* and breeding *Geronticus calvus*. Several other grassland species, such as *Monticola explorator* and *Eupodotis caerulescens*, also occur here. The rockier areas support *Saxicola bifasciata*, *Anthus crenatus* and *Geocolaptes olivaceus*.

#### Key species

Key species	Breeding (pairs)	Non-breeding
A1 <i>Geronticus calvus</i>		
<i>Eupodotis caerulescens</i>		
<i>Geocolaptes olivaceus</i>		
<i>Heteromirafra ruddi</i>		
A2 (091) Southern African grasslands EBA: Two of the three species of this EBA that occur in South Africa have been recorded at this site; see Table 2.		
A3 (A07) Afrotropical Highlands biome: Five of the 23 species of this biome that occur in South Africa have been recorded at this site; see Table 3.		
A4i <i>Geronticus calvus</i>	10	120

#### Other threatened/endemic wildlife

None known to BirdLife International.

#### Conservation issues

The IBA is located within a privately owned farming district and it does not receive any legislative protection. The land is used primarily



for agriculture. Overgrazing threatens several bird species, as different intensities of grazing suit different species. Management practices such as burning the grassland in November, during the primary breeding season, may affect bird populations. Many important grassland birds have been seen on adjacent farms, and it is possible that the IBA should be larger than the area defined in this account.

#### Further reading

Herholdt and Grobler (1987), Stoltz and Geyser (1973).

<b>Voordeel Conservancy</b>	<b>ZA031</b>
Admin region Free State	
Coordinates 27°57'S 29°40'E	A1, A2 (091), A3 (A07)
Area 380 ha Altitude 1,840–2,000 m	Unprotected

#### Site description

This conservancy comprises a single farm, Voordeel 681, situated on the Free State/KwaZulu-Natal border c.30 km south-east of Memel. The area consists of undulating, natural sourveld grassland on a hilly, high-altitude plateau, together with the steeply sloping grassy hillsides and the valley of the main tributary of the Klip river. A proportion of the conservancy is cultivated. The dominant types of natural grassland are moist clay highveld grassland, moist cool highveld grassland and north-eastern mountain grassland.

#### Birds

See Box and Tables 2 and 3 for key species. This area supports some highly threatened grassland species, including *Heteromirafra ruddi*, *Spizocorys fringillaris*, *Anthus chloris* and *Geronticus calvus*. Several other grassland species, such as *Monticola explorator*, *Saxicola bifasciata* and *Eupodotis caerulescens*, occur here. The rocky outcrops hold *Anthus crenatus* and *Geocolaptes olivaceus*.

##### Key species

A1	<i>Geronticus calvus</i>	<i>Spizocorys fringillaris</i>
	<i>Eupodotis caerulescens</i>	<i>Anthus chloris</i>
	<i>Geocolaptes olivaceus</i>	<i>Saxicola bifasciata</i>
	<i>Heteromirafra ruddi</i>	
A2 (091)	Southern African grasslands EBA: Two of the three species of this EBA that occur in South Africa have been recorded at this site; see Table 2.	
A3 (A07)	Afrotropical Highlands biome: Five of the 23 species of this biome that occur in South Africa have been recorded at this site; see Table 3.	

#### Other threatened/endemic wildlife

None known to BirdLife International.

#### Conservation issues

The site is located within a privately owned farming district and it is not officially protected. The land is used primarily for agriculture. Overgrazing threatens several species as different intensities of grazing suit different species. Management practices such as burning the grassland in November, during the primary breeding season, may affect bird populations. Research should be directed at establishing the impacts of alternative management practices on breeding success of threatened species. Treatments can then be applied to different portions of the grassland so that selected species can benefit.

#### Further reading

Herholdt and Grobler (1987), Stoltz and Geyser (1973).

<b>Alexpan</b>	<b>ZA032</b>
Admin region Free State	
Coordinates 28°09'S 29°18'E	A1
Area c.900 ha Altitude 1,760–1,840 m	Unprotected

#### Site description

This site consists of the farm Alexpan 1529, c.20 km north-east of Harrismith. The farm consists of flat grassveld plains, which are mostly used for growing maize, wheat, soya beans and pasture grass, while most of the remaining natural grassland on the slopes is grazed by sheep and cattle. In the north-west corner of the farm, near the district

road, there is a shallow dam c.7.5 ha in extent, and there are six smaller ones (less than 2 ha) on various other drainage lines. The most dominant grassland type is moist sandy highveld grassland. Small patches of moist clay highveld grassland grow on the black vertic clays that are scattered throughout the area.

#### Birds

See Box for key species. The largest dam on the farm is of considerable significance, being a regular roost for large numbers of cranes. *Grus carunculatus* used to be resident, but now it is only an uncommon visitor to the area. *Grus paradisea* and *Balearica regulorum* are seasonally abundant in a mixed roost. The surrounding grassland holds *Geronticus calvus* and excellent habitat for *Heteromirafra ruddi*, *Spizocorys fringillaris* and *Anthus chloris*.

##### Key species

A1	<i>Heteromirafra ruddi</i>	<i>Spizocorys fringillaris</i>
	<i>Geronticus calvus</i>	<i>Anthus chloris</i>

#### Other threatened/endemic wildlife

None known to BirdLife International.

#### Conservation issues

The farm is privately owned and receives no legislative protection. It lies in a region of commercial farmland and much of the natural grassland is used for sheep- and cattle-grazing, with the remaining area under cultivation. Threats to the area include the construction of a proposed highway that will run into KwaZulu-Natal via De Beers Pass; the highway will pass within 20 m of the largest dam. Poisoned grain has occasionally been responsible for the mass mortality of many cranes, particularly *Grus paradisea*, which are vulnerable to intentional or inadvertent poisoning.

#### Further reading

Colahan (1990), Nuttall (1995), Stoltz and Geyser (1973).

<b>Bedford/Chatsworth</b>	<b>ZA033</b>
Admin region Free State	
Coordinates 28°13'S 29°34'E	A1, A4i
Area c.410 ha Altitude 1,700 m	Unprotected

#### Site description

This site consists of a wetland on the private farms Wilge Rivier, Chatsworth and Bedford c.20 km east of Harrismith. The farms consist primarily of flat grassveld plains, most of which are used for growing maize, wheat, soya beans and pasture grass, while most of the remaining natural grassland on the slopes is grazed by sheep and cattle. A very large, impressive wetland is situated on the properties. This wetland is minimally disturbed or modified, and is possibly only grazed lightly for part of the year. The vlei has three major arms, which unite in a main channel running below a steep ridge on the wetland's northern border. On sections of the vlei adjacent to the steeper slopes, there are extensive, broad beds of *Phragmites*, up to 2.5 m tall, which often contain a rich mixture of other plant species such as *Carex*, *Cyperus*, *Typha*, *Schoenoplectus* and *Leersia*. On the side of the wetland adjacent to the shallow slopes, the vegetation comprises extensive patches of *Typha* and mixed sedges, with some grass. Around the edges there are numerous small depressions and inlets with combinations of sedges and grasses, which further increase the diversity of the vegetation.

#### Birds

See Box for key species. *Sarothrura ayresi* has been recorded at the site. There is enough habitat to support between 30 and 50 birds, a higher estimated total than for any other single site in South Africa. Potential habitat for *Porzana pusilla* occurs regularly around the edges of the wetland, and it may also breed here. *Balearica regulorum* occurs at the site regularly.

##### Key species

A1	<i>Geronticus calvus</i>	<i>Sarothrura ayresi</i>
A4i	<i>Sarothrura ayresi</i>	Breeding (pairs) Non-breeding
		— 30–50

### ■ Other threatened/endemic wildlife

None known to BirdLife International.

### ■ Conservation issues

The farms on which this wetland occurs are privately owned. The site appears to be in an excellent and minimally disturbed or modified condition. It is apparently only grazed lightly, possibly for only part of the year. This extensive wetland is undoubtedly one of the best high-altitude palustrine wetlands in South Africa, and is probably the best in terms of its undisturbed nature. It may hold more *Sarothrura ayresi* than do the best sites in other Provinces. It should be accorded the highest possible conservation status and its vegetation and avifauna should be studied in detail at the earliest possible opportunity. This impressive and beautifully sited wetland holds phenomenal ecotourism potential. A scoping exercise to determine the feasibility of building a dam on the wetland has been conducted—such dam-building should be avoided at all costs.

### ■ Further reading

Taylor (1997a,b).

#### Murphy's Rust

Admin region Free State

Coordinates 28°18'S 29°23'E

Area c.58 ha Altitude 1,640 m

ZA034

A1, A4i

Unprotected

### ■ Site description

The farm Murphy's Rust 209 is located c.20 km east of Harrismith. It consists primarily of flat grassveld plains, most of which are used for growing maize, wheat, soya beans and pasture grass, while the remaining natural grassland on the slopes is grazed by sheep and cattle. An important wetland is situated on the property. Located in rolling high-altitude grassland, the wetland is dominated at both its upper and lower ends by beds of *Phragmites*; at the lower end, it has dense well-grown beds of *Eleocharis*, much trampled by cattle, and some good stands of *Typha* and *Leersia* in shallow water. The middle section of the wetland comprises excellent habitat, hardly damaged or penetrated by cattle: it has extensive areas of *Cyperus*, with *Typha* growing through it in patches or as single stems, *Schoenoplectus* at the edges and occasionally wet grass and forbs.

### ■ Birds

See Box for key species. The site holds *Sarothrura ayresi*, principally in areas of mixed *Cyperus*, *Schoenoplectus* and *Typha*. There is good habitat for *Ixobrychus minutus*, and it is conceivable that *Botaurus stellaris* might occur if the site was not extensively disturbed or the reedbeds penetrated by cattle.

#### Key species

A1	<i>Sarothrura ayresi</i>		
A4i		Breeding (pairs)	Non-breeding
	<i>Sarothrura ayresi</i>	—	10–15

### ■ Other threatened/endemic wildlife

None known to BirdLife International.

### ■ Conservation issues

The farm is privately owned and it receives no official protection. It lies in a region of commercial farmland, with much of the natural grassland being used for grazing sheep and cattle, and much of the surrounding areas being cultivated. Until the discovery of the critically threatened *Sarothrura ayresi* at the site, it was not rated as being significant by local conservationists, as it is heavily grazed. The greatest threats to the site include overgrazing and burning. The area is apparently much more heavily grazed in years of normal rainfall. This should be investigated and ways should be sought to limit or manage the grazing to improve the wetland habitats, and to avoid disturbance and trampling during the summer breeding season. Murphy's Rust should be regarded as a very important wetland, especially because it supports *Sarothrura ayresi* and it possesses locally rare vegetation and habitat-types. Every effort should be made to lessen the grazing pressure at the site, to investigate its birds in more detail and to involve its owners in conservation-related

management. It deserves a high rating on a regional, national and global scale.

### ■ Further reading

Taylor (1997a,b).

#### Sterkfontein Dam Nature Reserve

ZA035

Admin region Free State, KwaZulu-Natal

Coordinates 28°27'S 29°01'E

A1, A2 (089), A3 (A07)

Area 17,770 ha Altitude 1,700–2,328 m

Nature Reserve

### ■ Site description

The northern boundary of this reserve lies 13 km south-west of Harrismith, while the southern edge lies along the border with KwaZulu-Natal, just west of Oliviershoek Pass. Most of the eastern boundary runs along the Free State section of the road (R74) through the pass. The reserve lies in the grassland and alpine belt between 1,700 and 2,328 m, and consists of rolling sour grassland surrounding the state-owned Sterkfontein Dam, which receives most of its water from the Tugela river. The vegetation is primarily high-altitude montane grassland. The western portion of the reserve includes part of the northern end of the 'Little Drakensberg' section of the escarpment, holding cave sandstone cliffs that are dissected by streams to form valleys and gorges. High-altitude shrubs form a heath of *Protea*, *Erica*, *Chrysocoma* and *Helichrysum*. Stands of *Leucosidea* occur on some of the slopes and small patches of Afromontane forest are found in a few gorges.

### ■ Birds

See Box and Tables 2 and 3 for key species. This area supports some highly threatened grassland species including the critically threatened *Heteromirafra ruddi*; it also supports breeding *Geronticus calvus* and holds a breeding *Gyps coprotheres* colony, which falls just outside the reserve. Both *Grus paradisea* and *Balearca regulorum* are found in the reserve. Small numbers of *Neotis denhami*, *Circus macrourus* and *Tyto capensis* are found on the reserve. Several other grassland species, such as *Saxicola bifasciata*, *Geocolaptes olivaceus*, *Anthus crenatus*, *Promerops gurneyi*, *Monticola explorator* and *Eupodotis caerulescens*, also occur here. The small patches of Afromontane forest support *Serinus scotops* and *Lioptilus nigricapillus*.

#### Key species

A1	<i>Geronticus calvus</i>	<i>Heteromirafra ruddi</i>
	<i>Gyps coprotheres</i>	<i>Saxicola bifasciata</i>
	<i>Eupodotis caerulescens</i>	<i>Lioptilus nigricapillus</i>
	<i>Geocolaptes olivaceus</i>	
A2 (089)	South African forests EBA: Two of the seven species of this EBA that occur in South Africa have been recorded at this site; see Table 2.	
A3 (A07)	Afrotropical Highlands biome: Six of the 23 species of this biome that occur in South Africa have been recorded at this site; see Table 3.	

### ■ Other threatened/endemic wildlife

The reserve is known to hold the following threatened or endemic reptiles: *Cordylus giganteus* (VU), *Tetradactylus breyeri* (VU) and *Bradypodion dracomontanum*. The mammal *Myotis lesueri* (VU) is known to occur in the surrounding grassland.

### ■ Conservation issues

This IBA is a Provincial Nature Reserve (proclaimed in 1987) surrounding a state dam; the water-level is managed by the Department of Water Affairs and Forestry (DWAF). Most of the land that formed the farm Craighielea 598 is managed, under contract, as part of the surrounding reserve. The western perimeter of the reserve borders on a state-subsidised scheme for small-scale farmers, the dam wall and area below it are controlled by DWAF, and the remainder of the reserve boundary lies adjacent to commercial farmland, used primarily for sheep and cattle-grazing. The southern boundary tends to follow the edge of the escarpment, including the section falling in the farm Ingwe 8547, below which lies the breeding colony of *Gyps coprotheres*.

Emergency grazing of cattle in the reserve during extreme drought has been permitted in the past, but is not likely to occur again. The surrounding land is used primarily for agriculture. Overgrazing

threatens several birds, as different intensities of grazing suit different species. Management practices, such as burning the grassland in November during the primary breeding season, may affect certain bird populations. Vultures feed upon poisoned carcasses that are set for vermin by commercial farmers, and the entire colony is thus at risk from a single poisoning incident. In addition, vultures are used for traditional medicinal and ceremonial purposes and traditional practitioners target them. There is a vulture restaurant in the reserve that is utilized by *Gyps coprotheres* and *Gypaetus barbatus*, which visit 2–3 times a week. The restaurant is maintained using cattle carcasses from natural mortality in a nearby cattle feedlot.

#### Further reading

Colahan (1992a,b, 1993a,b, 1994a,b), Herholdt and Grobler (1987).

### Golden Gate Highlands and Qwaqwa National Parks

**ZA036**

Admin region Free State

Coordinates 28°31'S 28°40'E A1, A2 (090), A3 (A07), A4i, A4ii

Area 36,229 ha Altitude 1,700–2,840 m National Parks

#### Site description

These two parks are situated in the Rooiberg mountain range in the north-eastern Free State, along the border with Lesotho. Within the park, there is an altitude difference of some 1,140 m between the lowest point in the Little Caledon river valley (1,700 m) and the highest peak, Ribbokkop (2,840 m). The eastern sector of this IBA is characterized by deep valleys with dense vegetation. The only major feature is Qwaqwa mountain, on an isolated range near the south-east border of Qwaqwa National Park.

Highland sourveld dominates the vegetation, and alpine tussock-grassland is particularly common above 2,000 m. In the deeper valleys and krantzies, woody communities encroach; dominants in the thickets include *Cliffortia*, *Cussonia*, *Rhus*, *Diospyros* and *Protaspargus*. On the flatter, deeper soils of the mountain slopes and plateau, *Protea* woodland dominates. In the steeper, wetter gorges, shrubby patches of *Leucosidea*, *Buddleja* and *Kiggelaria* enter the landscape. An extensive marsh area, dominated by *Phragmites*, is situated along the Klerkspruit, Rietspruit and Rietvlei drainage lines.

#### Birds

See Box and Tables 2 and 3 for key species. Together these parks support at least 188 bird species. Two *Geronticus calvus* breeding colonies occur within the IBA, including the famous site at Cathedral Cave; they are regularly seen foraging alongside *Grus paradisea*, *Balearica regulorum*, *Eupodotis senegalensis* and *E. caerulescens* in the grasslands. The short, cropped, high-altitude grasslands also hold *Anthus chloris*. *Gyps coprotheres*, *Gypaetus barbatus* and *Polemaetus bellicosus* no longer breed in the IBA, but all are regular visitors. The high-altitude rocky outcrops support *Chaetops aurantius*, *Anthus crenatus* and *Geocolaptes olivaceus*. The intervening grassy slopes are home to *Turnix hottentotta*, *Serinus symonsi*, *Saxicola bifasciata*, *Monticola explorator*, *Anthus hoeschi*, *Sphenoeacus afer* and (on *Protea*-covered slopes) *Promerops gurneyi*, and *Lioptilus nigricapillus* occurs in wooded gullies. *Falco naumanni* is a regular summer visitor to the parks and *Circus maurus* is a regular winter visitor.

#### Key species

A1	<i>Geronticus calvus</i>	<i>Anthus chloris</i>
	<i>Gyps coprotheres</i>	<i>Anthus hoeschi</i>
	<i>Circus maurus</i>	<i>Chaetops aurantius</i>
	<i>Falco naumanni</i>	<i>Saxicola bifasciata</i>
	<i>Grus paradisea</i>	<i>Lioptilus nigricapillus</i>
	<i>Eupodotis caerulescens</i>	<i>Serinus symonsi</i>
	<i>Geocolaptes olivaceus</i>	
A2 (090)	Lesotho highlands EBA: Two of the three species of this EBA that occur in South Africa have been recorded at this site; see Table 2.	
A3 (A07)	Afrotropical Highlands biome: Seven of the 23 species of this biome that occur in South Africa have been recorded at this site; see Table 3.	
A4i	Breeding (pairs)	Non-breeding
	<i>Geronticus calvus</i>	20–40 100–200
A4ii	<i>Falco naumanni</i>	— 500–1,000

#### Other threatened/endemic wildlife

None known to BirdLife International.

#### Conservation issues

The Golden Gate Highlands National Park was established in September 1963. The Qwaqwa National Park was established in 1992; it is the newest national park in South Africa, and is under the jurisdiction of the Highlands Development Corporation. Once a common species in the Free State, *Gyps coprotheres* has declined dramatically since the nineteenth century. Desertion of the colonies at Thaba Nchu and Zastron, both in the Free State, are evidence of its contraction in distribution, which has been attributed to widespread poisonings by small-stock farmers attempting to poison mammalian predators such as caracals and jackals. Vultures are inadvertently attracted to the carcasses and unintentionally poisoned. Vultures are unlikely to return to the Free State as a breeding species unless there are dramatic changes in land-use patterns that are more sympathetic to vulture foraging habits.

#### Further reading

Bates (1991), Botha (1993), de Swardt and van Niekerk (1996), Earlé and Lawson (1988), Groenewald (1986), Hutsebaut *et al.* (1992), Kopij (1995), Pocock and Uys (1967), Potgieter (1982), Roberts (1969), Stoltz and Geyser (1973).

### Fouriesburg–Bethlehem–Clarens

**ZA037**

Admin region Free State

Coordinates 28°32'S 28°15'E

Area c.40,000 ha Altitude 1,469–1,756 m

A1, A4i

Unprotected

#### Site description

This IBA consists primarily of private farmland in the Fouriesburg, Bethlehem and Clarens districts. The major part of the area is cultivated land, but some large patches of natural grassland and areas of rocky outcrops remain in this matrix. Several areas of sandstone are deeply incised by rivers, creating impressive cliffs. Highland sourveld dominates the vegetation. In the deeper valleys and krantzies, woody communities encroach; dominants in the thickets include *Cliffortia*, *Leucosidea*, *Buddleja*, *Cussonia*, *Rhus*, *Diospyros* and *Protaspargus*. On the flatter, deeper soils of the mountain slopes and plateau, *Protea* woodland dominates.

#### Birds

See Box for key species. This site supports several breeding colonies of *Geronticus calvus*. The larger and better-known colonies occur on the farms Avondzon (13+ pairs), Belleuvue 399 (10+ pairs), Bramley's Hoek 52 (13+ pairs), Welgelegen 102 (20+ pairs) and on the South African National Defence Force (ZANDF) owned Vaalbank Training Area (22–30 pairs). Many other smaller colonies and individual pairs breed elsewhere in the district, but birds do not remain faithful to these sites. *Geronticus calvus* are regularly seen foraging alongside *Grus paradisea*, *Balearica regulorum* and *Eupodotis caerulescens* in the grasslands. *Gyps coprotheres*, *Gypaetus barbatus* and *Polemaetus bellicosus* are occasional visitors to the area, but no longer breed in the IBA. The grassy slopes are home to *Saxicola bifasciata*, *Monticola explorator* and (on *Protea*-covered slopes) *Promerops gurneyi*. *Falco naumanni* is a regular summer visitor and *Circus maurus* a regular winter visitor.

#### Key species

A1	<i>Geronticus calvus</i>	<i>Grus paradisea</i>
	<i>Circus maurus</i>	<i>Eupodotis caerulescens</i>
	<i>Falco naumanni</i>	<i>Saxicola bifasciata</i>
A4i	Breeding (pairs)	Non-breeding
	<i>Geronticus calvus</i>	80–100 200–300

#### Other threatened/endemic wildlife

None known to BirdLife International.

#### Conservation issues

Several conservancies are located within the IBA, including the well-known Bloemhoek (28°36'S, 28°02'E) and Gilboa (28°42'S, 28°03'E) conservancies. *Geronticus calvus* are occasionally poisoned inadvertently

when they eat grain that has been laced with organophosphates or pesticides. Some birds are taken for traditional medicinal or ceremonial purposes, and humans disturb some breeding birds.

#### Further reading

Bates (1991), Earlé and Lawson (1988), Hutsebaut *et al.* (1992), Kopij (1995), Pocock and Uys (1967), Roberts (1969), Stoltz and Geysler (1973).

### Ndumo Game Reserve

**ZA038**

Admin region KwaZulu-Natal

Coordinates 26°53'S 32°16'E

A1, A2 (092), A3 (A09)

Area 12,420 ha Altitude 22–120 m

Game Reserve

#### Site description

Located c.100 km north of the town of Mkuze, Ndumo Game Reserve is situated on the Zululand coastal plain, with the altitude ranging from 22 to 120 m. It nestles at the eastern foot of the Lebombo mountains, at the junction of the Pongola and Usuthu flood-plain systems. The Pongola river runs through the reserve, from south to north, while the Usuthu river forms the northern border (which is also the international border with Mozambique). The topography is very flat, with a few small hills. There are two major semi-permanent flood-plain pans and many smaller permanent and ephemeral pans within the reserve.

The flood-plain vegetation is characterized by abundant water-lilies *Nymphaea*, pondweed *Potamogeton* and papyrus *Cyperus*. Trees that form the adjacent riverine woodland strip include *Acacia*, *Ficus* and *Syzygium*. The tree communities occurring along seasonal stream banks include *Spirostachys*, *Schotia* and *Acacia*. Further away from the river, a deciduous tree and shrub community becomes dominant, although *Acacia* woodland dominates on the stony boulder outcrops. There is very little open grassland. In places, there are relict patches of well-developed sand forest, including trees of *Sclerocarya*, *Albizia*, *Azelia*, *Terminalia*, *Newtonia*, *Cladostemon* and *Balanites*.

#### Birds

See Box and Tables 2 and 3 for key species. The rivers, flood-plains, pans, dams and vleis are important for many wetland birds, and species include *Pelecanus onocrotalus*, *P. rufescens*, *Ciconia episcopus*, *Anastomus lamelligerus*, *Ephippiorhynchus senegalensis*, *Balearica regulorum*, *Phoenicopterus minor*, *Ardeola rufiventris*, *Gorsachius leuconotus*, *Microparra capensis* and *Centropus grillii*. The only recorded successful breeding of *Anastomus lamelligerus* in South Africa took place in Ndumo in 1972. The riverine forest holds *Scotopelia peli* and *Podica senegalensis*. This reserve is one of the few in KwaZulu-Natal that holds most of its original complement of raptors. The sand forest holds *Nectarinia neergaardi* (80–120 breeding pairs) and *Hypargos margaritatus*.

#### Key species

A1 *Nectarinia neergaardi*

A2 (092) South-east African coast EBA: Three of the four species of this EBA that occur in South Africa have been recorded at this site; see Table 2.

A3 (A09) East African Coast biome: 10 of the 12 species of this biome that occur in South Africa have been recorded at this site; see Table 3.

#### Other threatened/endemic wildlife

Large mammals are well represented in Ndumo, including threatened species such as *Ceratotherium simum* (LR/cd) and *Diceros bicornis* (CR).

#### Conservation issues

The reserve was first proclaimed in 1939, and was for many years administered by the Natal Parks Board. In 1986 control passed to the KwaZulu Bureau for Natural Resources. With the subsequent amalgamation of that body with Natal Parks Board, the new organization—the KwaZulu-Natal Nature Conservation Service—runs the reserve. Veld management policies used to include the culling of large mammals and controlled burning.

Poaching is regular, a function of the proximity of a national border. However, invasion by non-native plants, notably *Chromolaena*, *Ricinus*, *Lantana*, *Psidium* and *Melia*, is most serious. This became an issue after Cyclone Dempo, and is a recurring problem on the flood-

plain. The Pongola is permanently infested with non-native water-hyacinth *Eichhornia*. Plans have been mooted to link Ndumo with the much larger Tembe Reserve to the east, by means of a corridor. This would greatly increase the viability of both areas.

#### Further reading

Cowan (1995), Cowan and Marneweck (1996), de Moor *et al.* (1977), Dixon (1966), Dutton (1972), Pooley (1965).

### Kosi Bay system

**ZA039**

Admin region KwaZulu-Natal

Coordinates 26°59'S 32°48'E

A1, A2 (092), A3 (A09)

Area 11,000 ha Altitude 0–10 m

Nature Reserve, Ramsar Site

#### Site description

The Kosi Bay system is situated in a warm, humid, subtropical climate 470 km north-east of Durban; Mozambique borders it in the north and the Indian Ocean in the east. The system is composed of four interconnected, roughly circular, fresh to brackish lakes (Makhawulani, Mpungwini, Nhlange and aManzimnyama), a broad channel leading to an estuary that opens to the Indian Ocean, and three extensive areas of swamp.

The lakes are separated from the ocean by a strip of forested sand-dunes. Two principal rivers feed the system. The Sidhadla river is c.30 km long, receives water from 12 tributaries, and enters Lake aManzimnyama. The Nswamanzi river runs for c.15 km, receiving water from nine tributaries before feeding into the western shore of Lake Nhlange. Numerous sandy mudbanks, emergent at low tide, occur in the lower part of the system. The wetland shows complex patterns and interactions in thermal properties, salinity and nutrient levels through the various lakes.

The main vegetation-types include marshes, sedge-beds, submerged plants (in lakes, pans and streams), swamps and other aquatic communities dominated by reed *Phragmites*, sedge *Cladium* and the fern *Achrostichum*. Various semi-emergent plants such as water-lilies *Nymphaea* are common along the edges of the system. The swamp-forest contains *Barringtonia* trees and conspicuous climbers such as *Stenoclaena*, and in places it is dominated by raffia palm *Raphia*. The swampy vegetation is surrounded by undulating grassland, among which palms *Phoenix* are interspersed. The surrounding woodland includes trees of *Syzygium*, *Acacia*, *Trichilia*, *Albizia* and *Dialium*.

#### Birds

See Box and Tables 2 and 3 for key species. The avifauna is prolific and diverse, largely as a result of the undisturbed condition of the marginal vegetation along the water's edge. Only 85 of the 296 bird species that have been recorded at Kosi Bay are estuary-associated. The system is important for various species of migratory and nomadic birds. *Phoenicopterus ruber* and *P. minor* are almost always present, and the open water occasionally supports *Sterna caspia*, *Pelecanus rufescens* and *P. onocrotalus*. It is assumed that Kosi Bay acts as a staging post for migrating waders as part of the east coast flyway.

The swamp-forest and associated overhanging vegetation supports several rare, localized and specialized bird species, including *Gorsachius leuconotus*, *Podica senegalensis* and *Scotopelia peli*. The larger riverine trees are suitable for *Macheiramphus alcinus* and *Circaetus fasciolatus*, which probably breed there. The sand forest supports *Hypargos margaritatus* and *Apalis ruddi*, two restricted-range species. The forests are home to *Cercotrichas signata*, *Cossypha dichroa*, *Batis fratrum*, *Lamprolornis corruscus* and *Nectarinia veroxii*.

#### Key species

A1 *Circaetus fasciolatus*

A2 (092) South-east African coast EBA: Two of the four species of this EBA that occur in South Africa have been recorded at this site; see Table 2.

A3 (A09) East African Coast biome: Eight of the 12 species of this biome that occur in South Africa have been recorded at this site; see Table 3.

#### Other threatened/endemic wildlife

Eight fish species of global conservation concern are known to have populations in the Kosi system, including *Redigobius dewaali* (LR/nt), *Silhouettea sibayi* (LR/nt) and *Hypseleotris dayi* (LR/nt).

### ■ Conservation issues

The area was proclaimed as a Nature Reserve under control of the KwaZulu-Natal Bureau of Natural Resources in 1987. Kosi is a large but relatively isolated estuarine system; this results in minimal transfer of estuarine organisms to and from other systems. If Kosi ceased to function, a barrier would be created obstructing movement of estuarine species from north to south of Kosi and vice versa. The Kosi system also provides the only recruitment area for several species of marine spat found along the KwaZulu-Natal coast, and it is undoubtedly the most pristine and best preserved large estuarine system in KwaZulu-Natal. Despite being slightly degraded, it still supports a great diversity of fish and other aquatic fauna. It is still a natural system in that humans, while making extensive use of the fish, have not yet substantially altered the system. Efforts are being made to increase the tourist use of the area in order to give greater benefit to the local communities; 25% of the gross revenue from visitors is given to the local tribal authority.

Afforestation and increased use of fertilizers in the catchment area pose threats to the system, by reducing water run-off and increasing nutrient-levels in the water that does reach the lake. Human population pressure is increasing as people attempt to get more land for habitation and cultivation. *Pereskia aculeata* and other non-native plants grow well, and need to be controlled before they overwhelm the indigenous vegetation.

### ■ Further reading

Blaber (1978), Cowan (1995), Cowan and Marnewick (1996).

### Lake Sibaya

Admin region KwaZulu-Natal

Coordinates 27°20'S 32°38'E

Area 7,759 ha Altitude 21 m

ZA040

A4iii

Nature Reserve, Ramsar Site

### ■ Site description

Situated 165 km north of Richards Bay in eastern Maputaland, Lake Sibaya is a freshwater coastal lake on the Mozambique coastal plain. Lake Sibaya is a drowned valley lake with a maximum depth of 43 m and a mean depth of 13 m; at its deepest point it extends 20 m below sea-level. It is the largest natural freshwater lake in South Africa and is fed only by minor streams; most of its water is supplied by seepage. Many pans typical of those elsewhere in the region surround Lake Sibaya. It has relatively little emergent fringing vegetation, which is largely confined to inlets and sheltered shorelines as small patches of *Typha*, *Phragmites*, *Scirpus*, *Eleocharis* and *Cyperus*, and a limited amount of floating vegetation in the same areas, e.g. floating emergent grasses. The western fringes of the lake merge into grassland. The eastern shore abuts a very rich dune forest, typically with trees of *Mimusops*, *Deinbollia*, *Drypetes*, *Teclia*, *Cassipourea* and *Diospyros*.

### ■ Birds

Water-bodies on the surrounding coastal plain often dry up completely during years of low rainfall; Lake Sibaya is then the only source of permanent water for birds in the area. The lake occasionally holds more than 20,000 waterbirds, including many locally rare and threatened species, some of which reach their southern limit in this vicinity. These diverse waterbird assemblages include *Ciconia episcopus*, *Mycteria ibis*, *Ephippiorhynchus senegalensis*, *Circus ranivorus*, *Sterna caspia*, *Glareola pratincola*, *Nettapus auritus*, *Porphyrio alleni* and *Microparra capensis*. The adjacent flooded grassland and grassland dunes hold *Macronyx ameliae*, *Neotis denhami* and *Caprimulgus natalensis*. The forests around the lake's margin hold *Smithornis capensis capensis* (a subspecies endemic to South Africa), *Cercotrichas signata*, *Apalis ruddi*, *Batis fratrum*, *Nectarinia veroxii* and *Lamprotornis corruscus*.

#### Key species

A4iii More than 20,000 waterbirds occur.

### ■ Other threatened/endemic wildlife

The lake contains a goby *Silhouettea sibayi* (LR/nt) which occurs nowhere else, apart from a single record from Kosi Bay (IBA ZA039).

### ■ Conservation issues

The water surface is state-owned and has been declared a Nature Reserve. The area is currently being fenced and it is expected that the

whole lake will eventually be managed as a formally protected area. The State-owned land surrounding the lake is under no protection, and it is currently used for communal grazing. Lake Sibaya is of international importance for many reasons, and it has been recognized as such by the Ramsar Bureau, having been designated a Ramsar Site on 28 June 1991. It is an important link between the wetlands of the Kosi Bay and St Lucia systems, and the wetland supports many rural people who, in many cases, are totally dependent on the lake and the sustainable use of its biota.

### ■ Further reading

Cowan (1995), Cowan and Marnewick (1996), Taylor (1997a,b).

### Pongolapoort Nature Reserve

Admin region KwaZulu-Natal

Coordinates 27°20'S 31°58'E

Area 11,971 ha

Altitude 130–598 m

ZA041

A1, A2 (092)

Nature Reserve,  
Biosphere Reserve

### ■ Site description

The site is located 30 km south-east of Pongola town. Up to two-thirds of the site consists of an artificial impoundment, depending upon water-level. The Pongola river, which flows in from the north-west, feeds the dam; only a small drowned section of the river lies inside the reserve. Aquatic vegetation is not usually well developed. Most of the surrounds are fairly flat but the eastern shore is steep to precipitous, rising to the boundary of the reserve at the top of the Lebombos. The vegetation consists of Zululand thornveld and arid lowveld. Mountain slopes have a fairly dense woodland, including trees of *Berchemia*, *Dombeya*, *Acacia*, *Diospyros* and *Galpinia*. The flat clay soils have a good grass cover. *Acacia* woodlands are extensive on these flats, and thickets of *Salvadora*, *Acacia*, *Dichrostachys* and *Maytenus* line the watercourses.

### ■ Birds

See Box and Table 2 for key species. The dam and associated wetlands are important for many wetland-dependent birds. Many species probably surpass the '1% of the biogeographic population' threshold, but few data exist to support this. *Mycteria ibis* have bred twice in this habitat, but have been absent for several years. *Circus ranivorus*, *Centropus grillii* and *Tyto capensis* occur throughout the grassland areas of the reserve, which still hold reasonable numbers of raptors, including small populations of *Torgos tracheliotus*, *Gyps africanus*, *Terathopius ecaudatus*, *Polemaetus bellicosus* and *Aquila rapax*. *Circus macrourus* occasionally visit the reserve. Flooded grassland favours *Centropus grillii* and *Gallinula angulata*. Large dense thickets support *Apalis ruddi*, *Nectarinia neergaardi* (20–50 birds; breeding needs confirmation) and *Hypargos margaritatus*. The open savanna holds a small population of *Serinus citrinipectus*.

#### Key species

A1 *Nectarinia neergaardi*

A2 (092) South-east African coast EBA: All of the four species of this EBA that occur in South Africa have been recorded at this site; see Table 2.

### ■ Other threatened/endemic wildlife

The mammal *Ceratotherium simum* (LR/cd) has been recently reintroduced. The cycads *Encephalartos ngoyanus* and *E. lebomboensis* occur on the mountain slopes.

### ■ Conservation issues

The trees where the pelicans and storks were breeding were killed by recent fluctuations in water-level, and will soon rot away. Since the dam is, in principle, now to be filled to its maximum extent, the supply of suitable dead trees must come to an end. Similarly, the flooded grassland must be regarded as a temporary feature. Dropping the water-level in future is unlikely to restore the original habitat, because the exposed bare areas will be a focus for invasive non-native plants. Controlled water-level fluctuations will, however, favour ducks and geese. Periodic releases of water from the dam could achieve this, and are part of the management plan. This practice was initiated originally to simulate normal flooding on the flood-plain downstream, in order to recharge the pans there. Unfortunately, repairs dictate most water

releases, and irrigation might claim much of the water in future. Nutrient pollution in the dam's north-west extremity occurs early in most winters, a result of fertilizer run-off from the cane-lands. Dense growth of blue-green algae temporarily degrades the best area of the dam for both birds and fish. The site is part of a much larger Biosphere Reserve, and one of the adjoining areas is Gwalaweni Forest, which is fully conserved.

### Itala Game Reserve

Admin region KwaZulu-Natal

Coordinates 27°30'S 31°25'E

Area 29,653 ha Altitude 350–1,550 m

ZA042

A1, A3 (A09), A4i

Game Reserve

#### Site description

Itala Game Reserve is located 15 km from Louwsburg in the rolling hills south of the Pongola river. Drainage lines and deep valleys, extending predominantly north–south, and opening mostly into the Pongola river basin, cleave the area. This results in an extremely varied topography and rugged terrain, with steep rocky cliff-faces and deep gorges dissected by numerous streams with a network of pools. The area varies in altitude from 350 m at the Pongola river to 1,550 m on the plateau to the west of Louwsburg.

Three woodland-types are recognized: one is found in the valley bottoms, another at intermediate altitudes, and the third on the highest plateau. The lowland community is dominated by trees of *Acacia*, *Combretum*, *Ficus* and *Albizia*. The middleveld also holds *Acacia* and *Combretum* (especially on stony hill-slopes), as well as *Faurea*, *Protea*, *Pavetta* and *Cussonia*. Along the watercourses *Combretum*, *Ziziphus*, *Rhus* and *Catha* are found. The region on the high plateau, above 1,250 m, is open and treeless and dominated by grass. Bulbous geophytes are common and the shrub community is dominated by *Euclea* and *Leucosidea*.

#### Birds

See Box and Table 3 for key species. The reserve is known to support over 300 bird species. This diversity can be attributed to the reserve's ecotonal nature and the variety of habitats it supports. The riverine forest provides habitat for many of the more secretive, river-dependent species such as *Podica senegalensis*, *Gorsachius leuconotus* and *Alcedo semitorquata*. The mountainous cliffs hold a colony of *Geronticus calvus*. Several large raptor species that are rare outside South Africa's large parks occur here, including *Gyps africanus*, *Torgos tracheliotus*, *Polemaetus bellicosus*, *Terathopius ecaudatus* and *Aquila rapax*. *Bucorvus cafer*, *Neotis denhami*, *Eupodotis senegalensis* and *Tyto capensis* occur in the grassland areas in small numbers. The thicket and forest areas support *Poicephalus cryptoxanthus* and *Telophorus quadricolor*, both East African Coast specials.

#### Key species

A1	<i>Geronticus calvus</i>	<i>Grus paradisea</i>	
A3 (A09)	East African Coast biome: Three of the 12 species of this biome that occur in South Africa have been recorded at this site; see Table 3.		
A4i		Breeding (pairs)	Non-breeding
	<i>Geronticus calvus</i>	20–30	50–80

#### Other threatened/endemic wildlife

Several mammal species have been reintroduced here, including *Ceratotherium simum* (LR/cd), *Diceros bicornis* (CR), *Loxodonta africana* (EN) and *Acinonyx jubatus* (VU), and there is a naturally occurring population of *Hyaena brunnea* (LR/nt).

#### Conservation issues

Historically the area was situated in the Vryheid Republic. It bordered on South Africa's first ever—if short-lived—game reserve, the Pongola Game Reserve, proclaimed in 1895. Originally proclaimed in 1973, Itala has been enlarged over the years with the acquisition of additional farmland. The area is owned by the state and administered by the KwaZulu-Natal Nature Conservation Service. The areas that were previously farmland are recovering from overgrazing and erosion from the cultivation of slopes. However, most of the area was minimally modified, and is still a region of exceptional diversity, a function of its topography, geology and geographical position. Many of the larger mammals were historically hunted out of the region, but have been reintroduced from surrounding KwaZulu-Natal reserves. The main

conservation problems are soil erosion, and especially the control of invasive non-native plants. This latter task would be greatly eased if continual reinfestation, from the presently unconserved north bank of the Pongola river, could be addressed.

#### Further reading

Rautenbach *et al.* (1981).

### Mkuzi Game Reserve

Admin region KwaZulu-Natal

Coordinates 27°40'S 32°17'E

Area 36,474 ha Altitude 30–480 m

ZA043

A1, A2 (092), A3 (A09), A4i

Game Reserve

#### Site description

Mkuzi Game Reserve is situated on the subtropical Mozambique coastal plain, c.330 km north of Durban and c.110 km north of Mtubatuba. The topography of the area is mainly flat or gently undulating, and is intersected by seasonal drainage lines alternating with low ridges. The western sector, which comprises the foothills of the Lebombo mountains, is rugged. The Mkuze river flows through an impressive gorge in the Lebombo mountains; the lower end of the gorge is located within the reserve.

The terrestrial vegetation is mainly lowveld of the tropical bush savanna, and is exceptionally diverse. The tall tree-savanna in the Lebombo mountains is characterized by *Combretum*, with grass dominating the understorey. Clay soils tend to be dominated by *Acacia* woodland, with associated *Dichrostachys*. Thickets on poorly drained, heavy black soils, are dominated by *Acacia* and *Euclea*, with occasional emergent trees of *Spirostachys*, *Schotia*, *Pappea*, *Sideroxylon* and *Berchemia*. Sandy soils support a completely different woodland, of *Combretum*, *Acacia*, *Sclerocarya*, *Ziziphus* and *Terminalia*.

The Tongoland sand-forest, around Kubube and Kumasinga hides, is a very specialized vegetation-type, unique to northern KwaZulu-Natal and southern Mozambique, which occurs in parallel strips on the white sandy soils of the fossil dunes. The canopy (up to 10 m high) is dominated by *Newtonia*, *Cleistanthus*, *Dialium*, *Strychnos* and *Pteleopsis*. There is a discontinuous subcanopy tree layer, and a well-developed shrub layer, but the substratum is poorly developed. Lianas are present.

The fig forest surrounding Nsumo Pan and the riverine forest adjacent to the banks of the Mkuze river are well developed and are dominated by *Ficus* and *Trichilia*; associated trees are *Rauwolfia*, *Celtis*, *Blighia* and *Acacia*. Flood-plain grasslands occur on seasonally inundated flats adjacent to the Mkuze and Msunduzi rivers. Characteristic plants are reed *Phragmites*, sedge *Cyperus* and grasses (*Echinochloa*, *Eriochloa*, *Sorghum*). The major pans, particularly Nsumo Pan, are nutrient-rich and characterized by floating vegetation such as *Nymphaea*, *Nymphoides*, *Potamogeton* and *Trapa*.

#### Birds

See Box and Tables 2 and 3 for key species. Mkuzi Game Reserve supports c.420 species of birds, the richest area for its size in the whole of South Africa. The Ediza–Hlonhlehla–Nsumo pans comprise a very diverse mosaic of open water, marsh, flood-plain and wet grasslands and, in terms of diversity of habitats and potential for waterbirds, constitute a highly significant wetland system. The pans regularly support more than 20,000 waterbirds and certain species almost certainly aggregate in numbers that exceed the 1% threshold, although not enough detailed data are available to show this.

Nsumo Pan is the only regular breeding locality for *Pelecanus rufescens* in South Africa. Several other species occur at the pan in good numbers, including *Anastomus lamelligerus*, *Mycteria ibis* (which breeds in most years, with up to 50 nests), and *Chlidonias hybridus*. The fig forest supports small populations of *Scotopelia peli*, *Circus fasciolatus*, *Podica senegalensis* and *Gorsachius leuconotus*. The Mkuze Gorge holds a small colony of *Geronticus calvus*, which forage primarily in grassland habitat outside the reserve, as the vegetation within Mkuzi is unsuitable. As one of the larger reserves in South Africa it holds populations of larger scavengers and terrestrial species, numbers of which have dwindled outside South Africa's protected-area network. Mkuzi is a stronghold for *Gyps africanus*, holding perhaps 200 nesting pairs. It also holds small populations of *Torgos tracheliotus*, *Trigonoceps occipitalis*, *Polemaetus bellicosus*, *Terathopius ecaudatus*, *Aquila rapax*, *Leptoptilos crumeniferus*,

*Ciconia nigra*, *Ephippiorhynchus senegalensis* and *Bucorvus cafer*. *Gyps coprotheres*, which breed elsewhere, are occasionally seen foraging in the reserve, particularly young non-breeding birds.

The sand-forest holds the nominate subspecies of *Smithornis capensis* (endemic to South Africa) as well as significant populations of several restricted-range species, including *Apalis ruddi*, *Nectarinia neergaardi* (200–300 breeding pairs) and *Hypargos margaritatus*. The Ilala palm specialist, *Serinus citrinipectus*, is also present in patches of palm-savanna throughout Mkuzi.

#### Key species

A1	<i>Geronticus calvus</i> <i>Circaetus fasciolatus</i>	<i>Crex crex</i> <i>Nectarinia neergaardi</i>	
A2 (092)	South-east African coast EBA: All four species of this EBA that occur in South Africa have been recorded at this site; see Table 2.		
A3 (A09)	East African Coast biome: 10 of the 12 species of this biome that occur in South Africa have been recorded at this site; see Table 3.		
A4i	<i>Chlidonias hybridus</i>	Breeding (pairs) —	Non-breeding 64 (av.)–179

#### Other threatened/endemic wildlife

Among plants, the Lebombos support many rare species, including the cycads *Encephalartos ngoyanus* and *E. lebomboensis*, as well as *Pachypodium saundersii*, *Hemizygia ramosa*, *Pachycarpus lebomboensis* and *Polystachya zuluensis*, while low-lying grassland holds *Rhus kwazuluana*, and the sand-forest holds *Combretum mkuzense* (LR/nt). Large mammals are well represented, and include *Ceratotherium simum* (LR/cd), *Diceros bicornis* (CR) and *Acinonyx jubatus* (VU); *Loxodonta africana* (EN) have recently been reintroduced to Mkuzi.

#### Conservation issues

The Mkuzi Game Reserve was established and proclaimed in 1912 and is administered by the KwaZulu-Natal Nature Conservation Service. Prior to that, the Veterinary Department controlled it. During that regime, game eradication and spraying to control tsetse fly *Glossina* were the principal activities; these had a great impact on the reserve. In more recent times, Mkuzi was one of the key reserves that the KwaZulu-Natal Nature Conservation Service (formerly the Natal Parks Board) used to re-establish the world's population of *Ceratotherium simum*. The abundance of rhinos and the diversity of birdlife has made Mkuzi Game Reserve a major ecotourism destination. An indirect consequence of Mkuzi's tourism-friendly nature has been habitat degradation. Mkuzi has never had much permanent water, and in order to retain animals at the hides beside the temporary pans, for viewing purposes, an artificial water-supply has been provided. The surrounding vegetation is now exploited throughout the year by animals that would otherwise have had to move to the permanent pans.

Since Cyclone Demoina, Nsumo Pan has been fed directly by the Mkuze river. Prior to that it was not in the main river channel, so was recharged only at irregular intervals by heavy floods. The intervening drying-down periods were exceptional for birds: now the pan is usually too full to have a bare edge, resulting in great diminution in bird numbers. The wandering course of the Mkuze river, although beyond all control, is cause for concern. Legally it marks one of the reserve boundaries. Disputes with neighbours over which are the correct boundaries are inevitable. Because of frequent flooding it is impossible to fence the 'high-water' mark on the distal bank, so incursions by cattle into the reserve occur. The recent acquisition of the few farms separating Mkuzi from Ozabeni has greatly increased the viability of both conservation areas.

#### Further reading

Davies (1967), Dixon (1964), Moll (1968), Pooley (1965), Taylor (1997a,b).

### Lake St Lucia and Mkuze swamps

Admin region KwaZulu-Natal

Coordinates 28°01'S 32°29'E

Area 167,700 ha

Altitude 0–180 m

ZA044

A1, A2 (092), A3 (A09), A4i, A4iii

Nature Reserve, Game Reserve,

State Forests, Park, Ramsar Site

#### Site description

Situated c.80 km north of Richards Bay, Lake St Lucia is a subtropical coastal estuary with a long narrow channel to the sea. Located on the

north-eastern KwaZulu-Natal coastal plain, the system is bounded by the Umfolozi river and its associated swamps in the south, and by the Mkuze river and Ozabeni in the north. The lake system is about 70 km long, and, excluding The Narrows, between 3 km and 18 km wide for most of its length. It is the largest estuarine system in Africa, with a water surface area that varies from 225–417 km<sup>2</sup>. The mean depth is less than 1 m, and the water turbidity is high because the substrate is mainly fine silt. Hydrological conditions in the lake vary seasonally and in the long-term, with long periods of hypersalinity that result in large changes in the composition and abundance of plant, invertebrate and bird species.

Mangrove-fringed tidal banks extend into the estuary, where the mangroves *Avicennia* and *Bruguiera* are common, as is saltmarsh rush *Juncus*. Islands, estuarine mudflats and shallows are frequent. Aquatic vegetation (*Potamogeton*, *Ruppia* and *Zostera*) develops in the lake after prolonged periods of low salinity. Tall beds of reed and sedge, primarily *Phragmites*, *Sporobolus*, *Scirpus*, *Cyperus* and *Typha*, dominate the marginal vegetation. Surrounding these, above the water-table, are fringes of open vlei grassland. The grasslands and swamp flood seasonally, during longer-term wet cycles, to surround the patches of bush and forest on higher ground. The dry sand-forest around False Bay is never flooded, and dominants include *Terminalia*, *Newtonia*, *Balanites*, *Dialium*, *Sclerocarya*, *Acacia* and *Strychnos*. On the eastern shores, the coastal sand-dunes hold dune forest that runs parallel to the seashore in a band between one and three kilometres wide. The western shores hold the Dukuduku State Forest, a particularly dense and extensive patch of coastal forest, with trees of *Trema*, *Ficus*, *Albizia* and *Ekebergia*. There are also freshwater pans, vleis, reedbeds and sedge swamps. Extensive pine *Pinus* plantations occur around much of the estuary.

To the north of St Lucia, the Mkuze river, which forms the northern and eastern borders of Mkuzi Game Reserve (IBA ZA043), forms a massive wetland complex after it leaves the reserve, before it drains into the northern portion of Lake St Lucia. It contains large beds of reed *Phragmites* and papyrus *Cyperus*, marsh with sedges and grass, nutrient-rich pans with good floating, fringing and emergent vegetation, swamp-forest of *Ficus*, *Voacanga*, *Ilex*, *Urena* and *Syzygium*, and dense, short coastal grassland (interspersed with muddy creeks and narrow channels). To the north of the main swamp are Muzi, Mpempe and Mdlanzi pans, which are long, narrow cut-off lakes with predominantly bare shorelines. Tall woodland or thicket surrounds these pans where the water-table permits. Further east, in the Ozabeni area, the soil becomes progressively more sandy, and open grassland dominates. Surrounding the marginal vegetation are fringes of open vlei grassland. Apart from isolated clumps, the only real forest in this area is a broad strip of swamp-forest associated with the Mbazwane Stream. The whole Mkuze Swamps and Ozabeni area holds a very diverse mosaic of wetland vegetation and appears to be largely undisturbed.

#### Birds

See Box and Tables 2 and 3 for key species. The St Lucia system supports over 350 bird species and is the most important breeding area for waterbirds in South Africa, with at least 48 breeding species recorded. Owing to its subtropical position, several bird species reach the southern limits of their ranges at St Lucia. Owing to the variability of the system, the lake may often hold very important numbers of a species in some years and almost insignificant numbers in others. At times, Lake St Lucia holds extremely large numbers of *Pelecanus rufescens*, *P. onocrotalus*, *Platalea alba*, *Anas smithii*, *A. undulata*, *Recurvirostra avosetta* and *Phoenicopterus minor*. *Phoenicopterus ruber* bred here in 1972, when some 30,000 birds and 6,000 nests were recorded owing to an increase in food, produced by a period of low salinity that followed a long hyper-saline period. St Lucia also holds the only breeding population of *Ephippiorhynchus senegalensis* in KwaZulu-Natal and is one of only three breeding sites for *Mycteria ibis* in KwaZulu-Natal. The lake can hold over 80% of South Africa's breeding population of *Sterna caspia*. The colony of *Pelecanus onocrotalus* is the only known breeding colony in south-east Africa. Large numbers of Palearctic migrant waders occur in summer.

Forests on the eastern shores of Lake St Lucia hold *Circaetus fasciolatus*. In winter the coastal forest also holds small numbers of the globally threatened *Zoothera guttata*. In wet years, the flooded grassland between St Lucia and Cape Vidal supports *Macronyx ameliae*. Three restricted-range species are common here—*Apalis ruddi*,

*Nectarinia neergaardi* (100–150 breeding pairs) and *Hypargos margaritatus*—and all occur in sand-forest thickets surrounding the lake.

The Mkuze swamps and Ozabeni areas are less well known. However, the area is thought to be excellent for waterbirds, particularly rails (Rallidae). Swampy backwaters with overhanging vegetation are home to *Gorsachius leuconotus*, *Podica senegalensis* and *Scotopelia peli*. The open flood-plain and flooded grasslands with dunes hold *Anthus brachyurus*, *Turnix hottentotta*, *Caprimulgus natalensis*, *Centropus grillii* and *Macronyx ameliae*. Although seldom recorded, *Botaurus stellaris* almost certainly occurs widely in the very extensive reedbeds.

#### Key species

A1	<i>Phoenicopterus minor</i>	<i>Zoothera guttata</i>
	<i>Circaetus fasciolatus</i>	<i>Nectarinia neergaardi</i>
A2 (092)	South-east African coast EBA: Three of the four species of this EBA that occur in South Africa have been recorded at this site; see Table 2.	
A3 (A09)	East African Coast biome: 10 of the 12 species of this biome that occur in South Africa have been recorded at this site; see Table 3.	
A4i	Breeding (pairs)	Non-breeding
	<i>Pelecanus onocrotalus</i>	500–1,500
	<i>Platalea alba</i>	1,550 (av.)–3,978
	<i>Phoenicopterus ruber</i>	200–500
	<i>Anas undulata</i>	426 (av.)–1,577
	<i>Anas smithii</i>	6,000 (once)
	<i>Recurvirostra avosetta</i>	6,317 (av.)–30,000
	<i>Larus cirrocephalus</i>	Breeds
	<i>Sterna caspia</i>	503 (av.)–1,706
A4iii		110 (av.)–512
		Breeds
		1,265 (av.)–3,460
		300
		733 (av.)–1,332
		180–300
		158 (av.)–572
	More than 20,000 waterbirds occur.	

#### Other threatened/endemic wildlife

As befits a World Heritage Site, St Lucia has a wealth of Red Data and endemic species. Endemic to the IBA are the plants *Kalanchoe luciae*, *Rhus kwazuluana* and a new species of *Aloe*, and five species of butterfly. The mammal *Diceros bicornis* (CR) has been reintroduced.

#### Conservation issues

The site includes a network of several reserves that together make up the Greater St Lucia Wetland Park. It consolidates a number of protected areas previously considered separate entities—St Lucia Game Reserve, False Bay Nature Reserve, St Lucia Park, Cape Vidal State Forest, Sodwana Bay, Sodwana State Forest (now called Ozabeni), Dukuduku State Forest, Umfolozi Swamps State Forest, Mkuze Swamps, Mhlatuze State Forest and Eastern Shores State Forest—which are owned and administered by the KwaZulu-Natal Nature Conservation Service, the Department of Water Affairs and Forestry (DWAF) and the South African National Defence Force. The entire area will eventually fall under the control, management and administration of the KwaZulu-Natal Nature Conservation Service. The lake was designated as a Ramsar Site in 1986, and nominated for World Heritage Site status in 1994. Although the lake is protected, the state of the ecosystem is dependent on the conditions within the catchment area, so the continued health of the lake is not guaranteed. The lake habitats are ephemeral, and change according to fluctuations in water-level and salinity, both of which are highly variable. The system has become more vulnerable to drought and salinity fluctuation because of decreased supply of freshwater, due to swamp draining and agricultural activity in the catchment.

Lake St Lucia depends heavily on the input of sufficient freshwater to function. Freshwater inflow reduces salinity within the lake, and flushes sand and sediment that would otherwise clog the mouth. Suggestions to avoid high salinity and clogging include diverting the Umfolozi river into the estuary basin, or linking the Umfolozi to the Nyalazi so that more water could flow into False Bay and create stable and desirable biological conditions. Such suggestions overlook the fact that the Umfolozi river and the lake originally had a common mouth, and that silt from the Umfolozi was thought to be filling the lake. A separate mouth was dredged for the Umfolozi in 1959 for that reason.

Controversy surrounded the plans to mine part of the dune system around the sensitive eastern shores of Lake St Lucia. The mining operation would have potentially resulted in some severely negative impacts to the topography, soil, vegetation and fauna in the proposed mine path. Mining advocates claimed that these impacts could be mitigated in the long term. It was suggested that the mining might alter the topography and the hydrological functioning of the lake,

dramatically affecting the biota, especially the sensitive bird species. On 6 March 1996 it was announced by the South African Cabinet that mining would not be permitted in the area. The cabinet further decided in favour of an integrated development and land-use planning strategy, which included conservation of the entire region; this was in concurrence with the recommendations of the Ramsar Monitoring Mission. The newly designated region is to be administered by the KwaZulu-Natal Nature Conservation Service.

Dukuduku State Forest is the largest and finest example of coastal lowland forest left in South Africa. Recently, rural squatters have taken up residence in Dukuduku where they are using forest resources at an unsustainable rate. NGOs and concerned individuals have started awareness programmes and the local residents are accepting the idea of sustainable use of forest resources.

Colonial breeding sites of birds are vulnerable to damage by human disturbance. Colonially breeding species were negatively affected during the 1950s and 1960s when disturbance due to wood-cutting, nest-robbing and uncontrolled burning of surrounding grasslands (to improve grazing) occurred widely. More recently, disturbance to breeding colonies has been kept to a minimum. In 1983 the breeding colony of *Pelecanus rufescens* at the mouth of the Hluhluwe river in False Bay was deserted. The birds moved to Nsumo Pan in Mkuze Game Reserve (IBA ZA043), where they still breed today, for reasons not particularly obvious. *Rynchops flavirostris* used to breed on the shallow sandbanks at St Lucia; disturbance and man-induced changes in its main breeding and feeding areas led to these birds abandoning the site. This resulted in the extinction of the species in South Africa as it did not occur elsewhere in the country.

#### Further reading

Barnes (1995), Berruti (1980a,b, 1983), Breen *et al.* (1993), Cowan (1995), Cowan and Marnewick (1996), Day *et al.* (1954), Millard and Broekhuysen (1970), Porter and Forrest (1974), Lawson (1987), Robson and Horner (1996), Taylor, P.B. (1997a,b), Taylor, R.H. (1982), Whitfield (1977), Whitfield and Blaber (1978, 1979a,b), Whitfield and Cyrus (1978).

### Chelmsford Nature Reserve

**ZA045**

Admin region KwaZulu-Natal

Coordinates 27°57'S 29°57'E

Area 5,984 ha Altitude 1,240–1,290 m

 A1, A4i  
Nature Reserve

#### Site description

Located 26 km south of Newcastle, Chelmsford Nature Reserve features a gently undulating landscape with lightly wooded hills and flat-bottomed valleys. The Chelmsford Dam, a large, man-made impoundment, and the Ngagane river are the dominant features in the area. The surrounding grassland is a good example of Natal sour sandveld. Soils are shallow, badly drained and sandy. Woodland is sparse and restricted in extent. Some grassland areas hold a few scattered *Acacia* trees, and fire refuges have clumps of *Acacia* and *Diospyros* trees.

#### Birds

See Box for key species. A breeding colony of *Geronticus calvus* is located a few metres outside the reserve. The birds nearly always forage somewhere within the reserve. The wetlands and surrounding grasslands are frequented by *Grus carunculatus*, *G. paradisea* and *Balearica regulorum*. Other wetland and grassland species of concern include *Circus ranivorus*, *C. maurus*, *Crex crex*, *Tyto capensis*, *Sagittarius serpentarius*, *Neotis denhami*, *Eupodotis caerulescens* and *E. senegalensis*. The rocky outcrops hold *Geocolaptes olivaceus*.

#### Key species

A1	<i>Geronticus calvus</i>	<i>Grus paradisea</i>
	<i>Circus maurus</i>	<i>Eupodotis caerulescens</i>
	<i>Crex crex</i>	<i>Geocolaptes olivaceus</i>
A4i	Breeding (pairs)	Non-breeding
	<i>Geronticus calvus</i>	40–60
		80–150

#### Other threatened/endemic wildlife

Two near-endemic plants, *Rhus gerrardii* and *Kniphofia breviflora*, are present. Among mammals, *Ceratotherium simum* (LR/cd) has been reintroduced.



### ■ Conservation issues

This state-owned reserve was proclaimed in 1980, and is administered by the KwaZulu-Natal Nature Conservation Service. The grassland is of a type poorly represented elsewhere, and formally conserved only at this site. Although the colony of *Geronticus calvus* falls outside the reserve boundaries, it is included within the limits of the IBA.

#### Hluhluwe-Umfolozi Park

**ZA046**

Admin region KwaZulu-Natal

Coordinates 28°11'S 31°52'E

A1, A2 (092), A3 (A09)

Area 96,453 ha Altitude 90–580 m

Park

### ■ Site description

The Hluhluwe-Umfolozi Park (HUP) lies 20 km north-west of Mtubatuba, at the junction of the coastal plain and the foothills of the KwaZulu-Natal interior. The landscape is undulating to hilly. There is a gradual drop in altitude from west to east along the Natal Monocline. The Hluhluwe river and its tributary, the Nzimane, dissect the northern portion of the park. In the south, the Black Umfolozi and White Umfolozi rivers meander widely, before uniting at the south-eastern corner of the park. All these rivers flow permanently. There are many other seasonal streams and ephemeral rivers.

The park's vegetation is classified as lowveld and Zululand thornveld. Accounts from the early 1800s describe grassland with very few trees. Another from 1921 describes Hluhluwe as mainly thornveld. Bushveld encroachment accelerated owing to the decimation of the large game that drove the regeneration of the open grassveld. Today the bushing-up process and spread of closed-canopy forest is fairly rapid. The transition from grassland to parkland can be seen in the Corridor, which links Hluhluwe to Umfolozi. Well-developed woodland occurs over much of the reserve, with *Acacia* usually dominating on sandy soils, with associated *Strychnos*, *Albizia* and *Grewia*, and *Combretum* occasionally forming monospecific stands on stony slopes. Closed evergreen forest occurs in the higher-rainfall areas of the north. The most important tree genera in these forests are *Harpephyllum*, *Celtis*, *Vitellariopsis*, *Croton* and *Ficus*. Riverine forest, dominated by *Ficus*, used to line large stretches of the major rivers until Cyclone Demoina swept nearly all away in 1984.

### ■ Birds

See Box and Tables 2 and 3 for key species. The park is known to support over 400 bird species, about 46% of the species found in the southern African subregion. The bird diversity within the park can be attributed to the variety of habitats in this area. Large riverine trees provide habitat for many of the more secretive river-dependent species such as *Gorsachius leuconotus* and *Podica senegalensis*. The rivers, flood-plains, pans, dams and vleis are important for many wetland-dependent and associated birds, including *Ciconia nigra*, which breed in gorges in the nearby mountains. *Ciconia episcopus*, *Anastomus lamelligerus* and *Ephippiorhynchus senegalensis* occur in small numbers. Several pairs of *Geronticus calvus* are known to breed within the complex, but they forage mostly outside the area. Several large species that are rare outside South Africa's large parks are locally common here, including *Gyps africanus*, *Torgos tracheliotus*, *Trigonoceps occipitalis*, *Polemaetus bellicosus*, *Terathopius ecaudatus* and *Aquila rapax*. *Bucorvus cafer*, *Neotis denhami*, *Circus macrourus* and *Tyto capensis* occur in smaller numbers. The small patches of palm-savanna support *Serinus citrinipectus*.

#### Key species

A1	<i>Geronticus calvus</i>	<i>Crex crex</i>
	<i>Gyps coprotheres</i>	
A2 (092)	South-east African coast EBA: Three of the four species of this EBA that occur in South Africa have been recorded at this site; see Table 2.	
A3 (A09)	East African Coast biome: Eight of the 12 species of this biome that occur in South Africa have been recorded at this site; see Table 3.	

### ■ Other threatened/endemic wildlife

This area is one of the most important conservation areas in South Africa for mammals, as it is one of the last havens for large numbers of ungulates and the predators they support. Many threatened species occur throughout the park, including *Ceratotherium simum* (LR/cd), *Diceros bicornis* (CR), *Lycyaon pictus* (EN), *Loxodonta africana* (EN),

*Acinonyx jubatus* (VU) and *Panthera leo* (VU). Rare trees include *Celtis mildbraedii*, *Albizia suluensis*, *Warburgia salutaris* and *Buxus natalensis*.

### ■ Conservation issues

HUP is a site of considerable historical significance. Stone Age archaeological sites are present, as are San rock paintings. Bantu people first established themselves here by about 1500 AD, and until 1818 HUP was the home of the Mtetwa Clan. From 1818 to 1828 HUP was King Shaka's hunting preserve. The area was then vacated because of the impact of malaria on humans and nagana (carried by tsetse fly *Glossina*) on cattle. Subsequently, humans reoccupied the area sporadically up until 1875. Both Hluhluwe and Umfolozi—but not the intervening land—were proclaimed reserves, first in 1895, and again in 1897. However, the tsetse flies remained a source of nagana for surrounding cattle farms, and wild antelopes—considered a permanent reservoir for nagana—were heavily culled in the reserves between 1920 and 1945. In addition, much of the thick bush that constituted habitat for tsetse flies was cut down in 1942. The reserves were actually deproclaimed in 1945 and nearly all the large animals were slaughtered. Only in 1952 was the area returned to the KwaZulu-Natal Nature Conservation Service (formerly the Natal Parks Board), to be administered in the style seen today. The Corridor was formally incorporated into HUP in 1982.

By the late 19th century most of the large mammal populations in South Africa had been severely decimated by uncontrolled hunting. Some species, such as *Ceratotherium simum*, became locally extinct. It was the survival of the two rhino species in the area between the two Umfolozi rivers that led to the initial protection of the reserve, and even today it remains the most important place in Africa for rhinos.

The park's main contribution to bird conservation is in providing space and habitat for larger birds of prey. While none of the species has a population that is viable in isolation, the park provides an adequate focus for such populations. A strength of the park is that it is a well-established tourist destination, and that its birds of prey are very much in the public eye. Its long history as, in the broadest sense, a conservation area gives it great credibility, and there are unlikely to be any further attempts, by neighbours, to erode its boundaries or functions. Workable coal deposits exist in the Corridor, and in the 1980s a suggestion was made that these should be exploited. However, these plans appear to have been shelved, perhaps because of the marginal profitability anticipated. There is some poaching and uncontrolled fires. There are plans for a barrage on the Hluhluwe river.

### ■ Further reading

Bourquin *et al.* (1971), Downing (1972), Foster (1955), Henkel (1937), King (1970), Macdonald and Birkenstock (1980), Mentis (1970), Porter (1972, 1975), Vincent (1970), Whateley and Brooks (1985).

#### Umlalazi Nature Reserve

**ZA047**

Admin region KwaZulu-Natal

Coordinates 28°58'S 31°47'E

Area 1,318 ha Altitude 0–30 m

A1, A3 (A09)

Nature Reserve

### ■ Site description

Umlalazi lies directly adjacent to the town of Mtunzini, 120 km north of Durban. It is bounded in the north by the Umlalazi river and its lagoon, in the west by a prawn farm and cane and timber lands, in the south by Amatikulu Nature Reserve, and in the east by the sea. It is bisected by the Siyayi river, which has its own lagoon. The terrain is flat. Dune forest occupies much of the reserve, with trees of *Olea*, *Vepris*, *Ekebergia*, *Dovyalis* and *Scolopia*. Wet areas beyond the influence of brackish water bear extensive stands of reed *Phragmites*. Fringing the Siyayi Lagoon is a swamp-forest with *Barringtonia* and *Hibiscus*. By contrast, around the Umlalazi Lagoon is a beautiful mangrove forest of *Avicennia* and *Bruguiera*, with saltmarsh in the upper tidal reaches.

### ■ Birds

See Box and Table 3 for key species. The belts of coastal forest are important wintering grounds for *Zoothera guttata*, *Telophorus quadricolor*, *Cossypha dichroa*, *Cercotrichas signata*, *Lamprolornis corruscus* and *Nectarinia veroxii*. The mangroves in the estuary hold a healthy wintering population of *Halcyon senegaloides*. The freshwater portion of the river has many backwaters, with overhanging vegetation suitable for *Gorsachius leuconotus*, *Podica senegalensis* and *Scotopelia peli*.

**Key species**

A1	<i>Crex crex</i>	<i>Zootera guttata</i>
A3 (A09)	East African Coast biome: Five of the 12 species of this biome that occur in South Africa have been recorded at this site; see Table 3.	

**Other threatened/endemic wildlife**

The orchid *Didymopanax verrucosum* is endemic to the reserve and its immediate surrounds. Two Red Data fish, *Eliotris melanosoma* and *Taenioides jacksoni* (LR/nt) are almost certainly present in the estuary.

**Conservation issues**

Umlalazi is a KwaZulu-Natal Nature Conservation Service reserve, proclaimed in 1948. The mangrove swamp is one of the finest remaining examples in South Africa, and the most accessible for education purposes. The southern part of the dune forest is not well patrolled, due to lack of funds, and is being abused by neighbours. Uncontrolled fires cause damage, cattle are grazed illicitly, and plants are exploited. The Umlalazi river and its estuary receive nutrient-enriched wastewater from the prawn farm. So far, major damage has not been noted, but the scale of pollution could increase. Four private properties remain as an enclave within the reserve. They are a source of cats and dogs, a seemingly trivial problem. However, uncontrolled cats in particular pose a major threat to *Zootera guttata*, individuals of which are tame and often forage on the ground near dwellings.

**Natal Drakensberg Park**
**ZA048**

Admin region KwaZulu-Natal

Coordinates 29°20'S 29°28'E A1, A2 (090), A3 (A07), A4i, A4ii

Area 242,813 ha Nature Reserve, Game Reserve, State Forests,

Altitude 1,280–3,409 m Wilderness Area, Ramsar Site

**Site description**

This huge, crescent-shaped park, which forms part of southern Africa's eastern escarpment, extends for c.200 km along most of KwaZulu-Natal's south-western border with Lesotho. The border follows the watershed above the Drakensberg escarpment, which is a continuous, abrupt and rugged scarp or mountain wall with many sheer cliffs (some over 500 m high) and several peaks over 3,000 m. The cliffs are capped by extensive, horizontally bedded basalt lava slabs, which create a high-altitude plateau lying between 1,830 and 2,440 m. The basalt is deeply incised by the tributaries of the three largest rivers in KwaZulu-Natal, the Tugela, Mkhomasi and Mzimkulu. At lower altitudes, the cliffs give way to grassy slopes that form a large terrace of variable width, interspersed with bands of exposed basalt. Lower still the grassy terrace falls away as cave sandstone cliffs are dissected by rivers and streams to form valleys, gorges and inselbergs. These two lines of cliffs, the larger basalt cliffs and the lower sandstone cliffs, run the entire length of the Natal Drakensberg.

Three primary vegetation zones occur: the montane zone (1,280–1,830 m), the subalpine zone (1,830–2,865 m) and the alpine zone (2,865–3,500 m). The montane belt extends from the valley floors up to the lowermost basalt cliffs. Grassland dominates, but on most spurs and crests there is *Protea* parkland. The grassland continues up into the subalpine belt, with species of *Helichrysum* and *Senecio*, but grades into climax heath in the alpine belt, dominated by *Erica*, *Chrysocoma* and *Helichrysum*. The park holds almost all of the remaining subalpine and alpine vegetation in KwaZulu-Natal. The summits are generally rocky, with patches of bare, shallow soil and rock sheets near the escarpment. Throughout the area, scrub and/or small trees develop in fire-protected areas and, in the montane belt, patches of tall evergreen forest survive on mesic streambanks and in deep kloofs where fire is excluded, dominated by trees of *Podocarpus*, *Olinia*, *Kiggelaria* and *Scolopia*.

**Birds**

See Box and Tables 2 and 3 for key species. The park is one of the world's primary breeding strongholds of *Gyps coprotheres*; it is thought to hold over 1,325 birds, comprising at least 215 breeding pairs. The birds forage over a wide area, with some estimated to travel to carcasses up to 54 km away from their breeding colonies, suggesting a foraging range of some 9,200 km<sup>2</sup>. Other widespread cliff-nesting species include *Buteo rufofuscus*, *Falco biarmicus* and *Ciconia nigra*; the latter forages in or

near streams and vleis. The alpine heath supports *Parus afer*, *Cercomela sinuata* and *Sylvia layardi*.

The park forms a critical part of the Lesotho highlands Endemic Bird Area, as it holds important populations of all three restricted-range species: *Chaetops aurantius* and *Serinus symonsi* are common and widespread within the park, especially above 2,000 m, while *Anthus hoeschi* is found at very high altitude, mostly above 3,000 m, where it is a locally common breeding migrant. The climax grassland areas with moist vleis and marshes support *Grus paradisea*, *G. carunculatus*, *Balearica regulorum*, *Geronticus calvus*, *Neotis denhami*, *Circus ranivorus*, *Turnix hottentotta*, *Anthus brachyurus* and *A. chloris*, the latter particularly common between 2,000 and 2,300 m.

South Africa's main population of *Sarothrura affinis* is found in the Drakensberg region, where it may be locally numerous. Rocky outcrops are the favoured haunts of *Bubo capensis*, *Geocolaptes olivaceus*, *Saxicola bifasciata*, *Anthus crenatus* and *Monticola explorator*, while *Circus maurus* hunts over any relatively open grassland. The *Protea* woodland holds *Promerops gurneyi*, and the thicket and forest patches in the kloofs and gullies are home to *Cossypha dichroa*, *Lioptilus nigricapillus*, *Bradypterus barratti* and *Serinus scotops*.

**Key species**

A1	<i>Geronticus calvus</i>	<i>Anthus chloris</i>
	<i>Gyps coprotheres</i>	<i>Anthus hoeschi</i>
	<i>Circus maurus</i>	<i>Chaetops aurantius</i>
	<i>Crex crex</i>	<i>Saxicola bifasciata</i>
	<i>Grus carunculatus</i>	<i>Lioptilus nigricapillus</i>
	<i>Grus paradisea</i>	<i>Serinus symonsi</i>
	<i>Geocolaptes olivaceus</i>	
A2 (090)	Lesotho highlands EBA: All of the three species of this EBA that occur in South Africa have been recorded at this site; see Table 2.	
A3 (A07)	Afrotropical Highlands biome: 17 of the 23 species of this biome that occur in South Africa have been recorded at this site; see Table 3.	
A4i	Breeding (pairs)	Non-breeding
	<i>Ciconia nigra</i>	10–15 35–70
	<i>Geronticus calvus</i>	60–100 200–400
A4ii	<i>Gyps coprotheres</i>	200–230 1,000–1,325

**Other threatened/endemic wildlife**

The alpine floral communities found in the Lesotho and Drakensberg mountains are unique in southern Africa and they hold over 300 endemic plant species, including *Protea nubigena*; it is likely that many species remain to be discovered. The park supports a substantial proportion of the global range of the endemic cycad *Encephalartos ghellinckii*. Among mammals, near-threatened species include *Hyaena brunnea* (LR/nt) and restricted-range species include *Myxomys albicaudatus* (VU). Among frogs, the regionally endemic *Heleophryne natalensis*, *Rana vertebralis*, *Strongylopus hymenopus* and *Arthroleptella hewitti* occur, as do *Rana dracomontana* (LR/nt) and *Leptopelis xenodactylus* (VU). Among reptiles, the regionally threatened *Bradypodion dracomontana* and the range-restricted *Pseudocordylus langi* (LR/nt) and *P. spinosus* (LR/nt) are known from the park, and a new snake, *Montaspis gilvamaculata*, was described as recently as 1991.

**Conservation issues**

Most of the region has been declared Wilderness Area, Nature Reserve or Game Reserve. The major part of it is owned and administered by the KwaZulu-Natal Nature Conservation Service and the KwaZulu-Natal government. Some small areas are demarcated as State Forest land and are administered by the Department of Water Affairs and Forestry (DWAF). The area is extremely rich in Khoisan rock art and archaeological findings, and is highly significant from a cultural heritage perspective. The Natal Drakensberg is regarded as the most important mountain catchment in South Africa because of the high yield and quality of water that flows from it. The wetlands within this area have been designated as a Ramsar Site, as they play a key role in the hydrological cycle. Various farming communities, villages, and a number of large towns are directly dependent on these rivers and their catchments for water supplies.

Poisonings pose the greatest threat to the colonies of *Gyps coprotheres* that remain in the Drakensberg. Up to 34% of farmers in the areas adjacent to the park have been shown to use poisons that are potentially lethal to Cape Vultures. It is imperative that farmers using poisons are made aware of the dangers that poisoned carcasses pose to vultures. Another threat faced by vultures is a depleted food supply, which can result in bone abnormalities. The establishment of more vulture

restaurants along the Drakensberg escarpment could alleviate this problem. Restaurants may also encourage vultures to remain within the park during foraging forays, thus reducing their exposure to poisoned carcasses on private property neighbouring the park. Collisions with man-made structures outside the IBA, human encroachment and environmental pollution are other minor sources of threat to the survival of these colonies.

#### Further reading

Bourquin and Channing (1980), Brown (1992a,b), Brown and Piper (1988), Cowan and Marneweck (1996), Killick (1961, 1963), Manry (1984, 1985a,b), Mendelsohn (1984), Piper (1994), Robertson (1989), Taylor (1997a).

### Ngoye Forest Reserve

**ZA049**

Admin region KwaZulu-Natal

Coordinates 28°51'S 31°38'E

A1, A2 (089), A3 (A07)

Area 3,906 ha Altitude 300–500 m

Forest Reserve

#### Site description

Ngoye Forest is located c.11 km inland of Mtunzini and c.20 km east of Eshowe. Most of the forest is situated on a range of gneiss rock. The range is drained by the Umhlatuzana river and its tributaries to the north, and the tributaries of the Umlalazi river to the south. The climax forest has a continuous canopy of large trees (25–30 m high) and poorly developed shrub and field layers. Trees of *Chrysophyllum*, *Millettia* and *Margaritaria* are dominant. Epiphytic ferns and orchids are common. Some of the valleys hold open *Syzygium* woodland. The open, wind-exposed ridges of the reserve hold extensive patches of grassland, with a very diverse forb community.

#### Birds

See Box and Tables 2 and 3 for key species. This is the only forest patch in southern Africa holding *Stactolaema (olivacea) woodwardi*. Pending a full investigation of this taxon's status, it should be regarded as a valid species. In ideal habitat, in the higher-lying parts of the western half of the forest, it occurs at a density of one pair per 4–5 ha, but very few live in the eastern half of the forest. The forest also holds small breeding populations of *Columba delegorguei* and the globally threatened *Zoothera guttata*, and supports good populations of *Stephanoaetus coronatus*, *Smithornis capensis*, *Telophorus olivaceus*, *Tchagra tchagra*, *Cossypha dichroa*, *Cercotrichas signata*, *Lamprolornis corruscus*, *Estrilda melanotis* and *Serinus scotops*.

#### Key species

A1 *Zoothera guttata*

A2 (089) South African forests EBA: Two of the seven species of this EBA that occur in South Africa have been recorded at this site; see Table 2.

A3 (A07) Afrotropical Highlands biome: Five of the 23 species of this biome that occur in South Africa have been recorded at this site; see Table 3.

#### Other threatened/endemic wildlife

Ngoye is especially noted for its plants. The only known example of the cycad *Encephalartos woodii* was found here. This species is now extinct in the wild, but up to 500 plants exist in collections around the world (no female plant exists). *Encephalartos ngoyanus* is near-endemic; another population occurs around Pongolapoort Dam. Other Red Data and rare plants present include *Bolusiella maudiae*, *Corymborkis corymbosa*, *Stenoglottis woodii*, *Asclepias gordon-grayae*, *Dahlgrenodendron natalense* (EN), *Olinia radiata*, *Phyllanthus cedrelifolius*, *Cryptocarya wyliei*, *Ficus bizanae* (VU), *Loranthus woodii*, *Streptocarpus wendlandii*, *Alchornea hirtella* and *Asastasia vara*. Ngoye is one of the few forests in the country that has its own endemic mammal, *Paraxerus palliatus ornatus* (VU). The reptile *Bradypodion nemorale* (LR/nt), a localized KwaZulu-Natal endemic, is abundant in Ngoye.

#### Conservation issues

This reserve is state land, administered by the KwaZulu-Natal Nature Conservation Service. In principle it is run as a reserve, but in practice there is not much control over casual exploitation. Cattle graze the grassland, and adversely affect forest undergrowth in places. Collection of firewood has been implicated as a potential reason for the absence of breeding hole-nesters, such as barbets and woodpeckers, from forest-edge habitat, and this needs closer analysis.

Because *Stactolaema (olivacea) woodwardi* is globally restricted to Ngoye, it is essential that the forest be properly managed as a reserve, with some management action being planned around the species. The probable reason that it is found only in Ngoye, and not in other apparently similar forests in the vicinity, is a function of fig *Ficus* diversity. Ngoye has eight species, while few other forests have more than three. Figs are the staple diet for both adults and young, and diversity of fig species guarantees a year-round food supply. Two fig species brought to nestlings come from the bush clumps outside the forest proper. This suggests that the barbets are not afraid to cross open space, and are not 'trapped' in remnant habitat.

#### Further reading

Du Plessis (1995), Huntley (1965), Kruger and Lawes (1997).

### Entumeni Nature Reserve

**ZA050**

Admin region KwaZulu-Natal

Coordinates 28°53'S 31°22'E

A1, A2 (089), A3 (A07)

Area 508 ha Altitude 570–781 m

Nature Reserve

#### Site description

Entumeni is located 8 km west of Eshowe. Most of the site slopes steeply. The Ngoje river, which rises just outside the reserve, runs through the forest. The greater part of the site is coastal scarp forest. Common trees include *Ficus*, *Calodendrum*, *Zanthoxylum*, *Millettia* and *Margaritaria*. *Podocarpus* is rare, but there are few saw-pits, and commercial exploitation of the forest has been slight. The understorey is very rich; typical trees are *Rawsonia* and *Rinorea*, with *Duvernoia* along drainage lines. Two patches of grassland, totalling 34 ha, are also present on the site, as is a further 38 ha of lightly wooded grassland.

#### Birds

See Box and Tables 2 and 3 for key species. The forest holds a small breeding population of the globally threatened *Zoothera guttata*. The forest also holds the following important species: *Columba delegorguei*, *Cossypha dichroa* and *Cercotrichas signata*. *Lioptilus nigricapillus* and *Bradypterus barratti* occur as uncommon winter visitors. *Polemaetus bellicosus* breeds in the reserve, and a family of *Bucorvus cafer* includes the Entumeni grasslands in its territory. The forest also supports *Smithornis capensis*, *Telophorus olivaceus*, *Mandingoa nitidula* and *Tchagra tchagra*.

#### Key species

A1 *Zoothera guttata*

A2 (089) South African forests EBA: Four of the seven species of this EBA that occur in South Africa have been recorded at this site; see Table 2.

A3 (A07) Afrotropical Highlands biome: Eight of the 23 species of this biome that occur in South Africa have been recorded at this site; see Table 3.

#### Other threatened/endemic wildlife

The forest is botanically diverse. Three rare trees, *Alchornea hirtella*, *Millettia sutherlandii* and *Cryptocarya wyliei* are present, as is the orchid *Eulophia speciosa* and the cycad *Encephalartos villosus*. The population of the latter is the most important in South Africa, and extensive stands occur.

#### Conservation issues

The forest is in fairly good condition. Past exploitation has been minimal. Few non-native, invasive plant species are present, and the main infestation on the western boundary is being controlled. There are no threats to the forest, nor plans for any development.

### Dhlinza Forest Nature Reserve

**ZA051**

Admin region KwaZulu-Natal

Coordinates 28°54'S 31°27'E

A1, A2 (089), A3 (A07)

Area 202 ha Altitude 530 m

Nature Reserve

#### Site description

The site is located on fairly level ground on the outskirts of Eshowe, abutting directly onto the south-western boundary of the town. Dhlinza consists almost entirely of forest that has species characteristic

of both coastal lowland forest and of mistbelt forest, and that is sometimes called coastal scarp forest. Tree genera include *Harpephyllum*, *Albizia*, *Chrysophyllum*, *Margaritaria*, *Halleria*, *Prunus*, *Podocarpus*, *Eugenia* and *Combretum*.

### ■ Birds

See Box and Tables 2 and 3 for key species. The forest is a regular breeding site of the globally threatened *Zoothera guttata* and *Columba delegorguei*. The forest also holds *Cossypha dichroa* and *Cercotrichas signata* is a rare transient. *Lioptilus nigricapillus* and *Bradypterus barratti* occur as uncommon winter visitors. The forest also supports *Stephanoaetus coronatus*, *Smithornis capensis*, *Telophorus olivaceus*, *Mandingoa nitidula* and *Tchagra tchagra*.

#### Key species

- A1 *Zoothera guttata*  
 A2 (089) South African forests EBA: Three of the seven species of this EBA that occur in South Africa have been recorded at this site; see Table 2.  
 A3 (A07) Afrotropical Highlands biome: Five of the 23 species of this biome that occur in South Africa have been recorded at this site; see Table 3.

### ■ Other threatened/endemic wildlife

The forest is noted for its plant diversity, and the presence of many rare species. Included are the cycads *Encephalartos villosus* and *Stangeria eriopus*, an orchid *Bolusiella maudiae*, the spectacular epiphyte *Dermatobotrys saundersii*, and the trees *Alchornea hirtella*, *Oxyanthus pyriformis* (VU), *Cryptocarya wyliei* and *Millettia sutherlandii* (known from very few other localities). Other rare and localized trees include *Drypetes gerrardii*, *Garcinia gerrardii* and *Strychnos mitis*.

### ■ Conservation issues

Dhlinza is one of the most important sites in South Africa for *Zoothera guttata*, with many pairs breeding here during the summer. The forest is very much part of Eshowe, and several public roads run through it. An artificial clearing, the Bishop's Seat, was created in the forest years ago, before it was a declared reserve. Both this and the road are occasionally used for low-impact public occasions. A proposal exists to build a skywalk at canopy level. No major earthworks are envisaged, and once the initial disturbance of building has passed, this should serve to publicize a vital conservation area, which is superbly sited to exploit the ecotourism market.

## Umvoti vlei

Admin region KwaZulu-Natal  
 Coordinates 29°09'S 30°34'E  
 Area 2,800 ha Altitude 970 m

**ZA052**

 A1  
 Nature Reserve

### ■ Site description

Umvoti vlei lies 11 km due south of Greytown. It forms the headwaters of the Umvoti river. The terrain is almost flat. The wetland owes its existence to a sill of tough sandstone that has retarded downcutting of the Umvoti river. There is some open water at the lower end of the vlei, where clay soils impede drainage. However, the major part of the site, where the soils are alluvial, is a dense, tall, permanently flooded reedbed *Phragmites*. Sedge meadows with *Cyperus*, *Carex*, *Leersia* and *Juncus* form narrow fringes in places.

### ■ Birds

See Box for key species. The wetland areas are good for *Grus carunculatus* and *Balearica regulorum*, which winter here in large numbers. The surrounding grassland supports several species of conservation concern, including *Geronticus calvus*, *Grus paradisea*, *Neotis denhami* and *Circus maurus*. The site is suspected to hold several pairs of *Botaurus stellaris*. The *Carex* beds have good potential for *Sarothrura ayresi*.

#### Key species

- A1 *Geronticus calvus* *Grus paradisea*  
*Circus maurus* *Crex crex*  
*Grus carunculatus*

### ■ Other threatened/endemic wildlife

None known to BirdLife International.

### ■ Conservation issues

Of the greater Umvoti vlei (2,800 ha), only about a quarter (675 ha) is permanent wetland and less than half of this falls within a proclaimed reserve. So the fortunes of the reserve, in particular its water-levels and fire regime, are linked to those of the whole vlei. The vlei has a long history of mismanagement. The first drains were cut in 1918. In 1949, the Lion Match Company, one of the major land-owners, excavated a large canal that lowered the water-table by 30–90 cm. Only 32 ha of land suitable for poplar planting were so created. Public outcry prompted the Ministry of Agriculture to expropriate the affected land in 1950. Attempts to build barriers across the canals were generally unsuccessful, and uncoordinated fires were especially damaging. In dry years the peaty soils catch fire, making fire-break creation almost impossible. Restoration of the damaged area was proving so difficult that in 1975 the expropriated lot was given to the KwaZulu-Natal Nature Conservation Service (formerly the Natal Parks Board) and proclaimed a Nature Reserve. Since then all the artificial drains have been blocked with clay-filled bags, raising the water-table by up to 30 cm. In an attempt to improve habitat diversity, some of the *Phragmites* has been removed in order to create more open water (recolonization is prevented by fire and a higher water-table). The main threats now to Umvoti vlei are land-use practices within the catchment. Both forestry and crop farming, which require much irrigation, lessen the flow of water into the vlei. The vlei has a gradient of 0.15%, the ideal for maximizing silt entrapment and flood reduction, and its functioning is considered essential for the well-being of the whole Umvoti river system.

### ■ Further reading

Taylor (1997a,b).

## KwaZulu-Natal mistbelt forests

**ZA053**

Admin region KwaZulu-Natal

Coordinates 29°56'S 30°03'E

Area 11,948 ha Altitude 560–1,720 m

A2 (089), A3 (A07)

State Forests

### ■ Site description

The mistbelt forms an irregular band through the KwaZulu-Natal midlands, extending from Weza in the south-west to Ngome in the north-east. It once had a large grassland component, which is now almost entirely transformed by agriculture and commercial timber. The forest component consists of a series of patches occurring mainly on southern slopes where evaporation is less and the effects of fire reduced. Before colonial settlement in the 1800s these forests were larger and more numerous, and many may have been contiguous.

Mistbelt forest represents a southern extension of the Afrotropical forests of tropical Africa. In KwaZulu-Natal most of these forests occur between 1,200 and 1,400 m, but may extend as low as 560 m or as high as 1,720 m. This habitat has as its unifying feature, in the climax stage of succession, the dominance of *Podocarpus* trees (three species are present in KwaZulu-Natal). In the early stages of forest succession, trees of *Celtis* and *Kiggelaria* are typical. Common mistbelt trees in later stages are of *Combretum*, *Calodendrum*, *Zanthoxylum*, *Scolopia*, *Vepris*, *Ekebergia* and *Halleria*. *Ilex*, *Ficus* and *Prunus* are more common alongside streams.

Because of the scattered nature of mistbelt forests, none of which is outstandingly better than the others, it is difficult to single out individual blocks as IBAs; equally, it is impractical to designate them all, since the total number must run into thousands. The forest patches function in unison as a single ecological unit. Therefore the selection criteria adopted for inclusion in this blanket IBA are a minimum patch size of 50 ha and the presence of the bird species that is the best indicator of climax forest, *Poicephalus robustus robustus*. The IBA thus comprises 23 such forests, of which 12 are State Forests (3,832 ha), nine are privately owned (2,772 ha), and four have mixed ownership (5,344 ha). There are a further 42 forests in the mistbelt that individually exceed 50 ha in extent, and which total 9,071 ha, but they are not listed here because they do not support *Poicephalus robustus robustus*.

### ■ Birds

See Box and Tables 2 and 3 for key species. The forests hold many important species, including the largest remaining population of the

threatened *Poicephalus robustus robustus*. Bird parties are frequent, and typical forest birds include *Ceratogymna bucinator*, *Apaloderma narina*, *Zoothera gurneyi*, *Lioptilus nigricapillus*, *Tauraco corythaix*, *Coracina caesia*, *Cossypha dichroa*, *Pogonocichla stellata*, *Phylloscopus ruficapilla*, *Trochocercus cyanomelas*, *Telophorus olivaceus*, *Estrilda melanotis* and *Serinus scotops*. The quiet forest streams hold *Alcedo semitorquata* and *Motacilla clara*.

#### Key species

- A1 *Lioptilus nigricapillus*  
 A2 (089) South African forests EBA: Four of the seven species of this EBA that occur in South Africa have been recorded at this site; see Table 2.  
 A3 (A07) Afrotropical Highlands biome: 12 of the 23 species of this biome that occur in South Africa have been recorded at this site; see Table 3.

#### Other threatened/endemic wildlife

Of the trees, *Podocarpus henkelii* is endemic to the mistbelt forests, and *Ocotea bullata* is exceptionally rare. Other flowering plants of interest are *Geranium natalense* and *Polystachya ottoniana*. Mistbelt forests are very rich in endemic invertebrates, notably spiders, beetles, earthworms, snails and millipedes: many are still being described. Of exceptional interest is the presence, only in Ingele Forest, of the onychophoran *Opisthopatus roseus* (EX).

#### Conservation issues

Protection of mistbelt forest is not strong. About 56% of the total area of the IBA is privately owned, and even the state-owned forests receive little real protection. They are often located in inaccessible places, with steep terrain, making monitoring difficult. Exploitation of the mistbelt forests began early in colonial history. Useful tree species were plundered. Today, commercial interest in *Podocarpus* has dissipated, but old specimens are still exploited, especially if senescence is apparent. Felling permits are required, but these are still readily obtainable from the Forestry Department. The logic is that a resource 'going to waste' might as well be used. This logic takes no account of the vital role played by senescent *Podocarpus* trees in the ecology of *Poicephalus robustus robustus*. The oldest trees are the biggest fruit producers, and most parrot nests are in the larger dead branches.

Quite apart from the loss of a vital forest component, felling and extracting a giant *Podocarpus* creates damage out of all proportion to the cash value of the timber. A focus for desiccation is created, and invasive non-native plants become rampant. Young *Podocarpus* require a fairly shady nursery if they are to grow straight and be capable of attaining the eventual stature ideal for parrots; wasteful exploitation precludes such conditions.

Other frequent sources of damage to mistbelt forest are the grazing of cattle in the understorey, which can suppress regeneration, and uncontrolled bark-stripping for use in traditional medicine. Ill-timed grass fires often erode forest margins. *Poicephalus robustus robustus* is semi-nomadic and moves between the forest patches in response to food abundance. This means that temporarily vacated forests are as important as those currently in use to the integrity of the whole system. Despite its rarity, *Poicephalus robustus robustus* is still occasionally taken from the wild, on the ground at drinking places, by the cage-bird trade. Mistbelt forests play a vital role in altitudinal migration in KwaZulu-Natal. Several bird species from montane forests, or at least a section of their populations, winter in the mistbelt, or use the mistbelt forests as corridors on their way to coastal forests.

#### Further reading

McCracken (1987), Wirminghaus (1998).

#### Hlatikulu Nature Reserve

Admin region KwaZulu-Natal **ZA054**  
 Coordinates 29°17'S 29°40'E A1  
 Area 186 ha Altitude 1,600–1,620 m Nature Reserve

#### Site description

The site is located 32 km west of Mooi river, in the foothills of the Drakensberg. Highmoor, a division of the Natal Drakensberg Park (IBA ZA048) bounds it on one side, and the other boundaries abut onto private land. The terrain is almost flat. The vegetation consists of grasslands and wetlands classified as Highland Sourveld. The

original grass community has been severely modified by past use as farmland. Permanent wetlands are dominated by *Phragmites* and *Typha*, with species of *Cyperus*, *Pycreus* and *Juncus* on the fringes.

#### Birds

See Box for key species. The vlei and surrounding grasslands hold *Grus carunculatus*, *Balearica regulorum* and *Grus paradisea*. *Botaurus stellaris* is regularly recorded, and is a speciality of the vlei, which also holds *Circus ranivorus* and *Ciconia nigra*. *Neotis denhami*, and *Tyto capensis* frequent the surrounding grasslands.

#### Key species

- A1 *Grus carunculatus* *Geronticus calvus*  
*Grus paradisea*

#### Other threatened/endemic wildlife

None known to BirdLife International.

#### Conservation issues

The South African Crane Foundation (ZACF) and Mondi Forests established this reserve as the Hlatikulu Crane, Waterfowl and Wetland Sanctuary. The ZACF has a lease that extends until 2020. Initially the ZACF concentrated on rehabilitation of the wetland area. In the past it had been severely impacted by the construction of drains, and by ridge-and-furrow agriculture. These practices interfered with the passage of water through the upper reaches of the western arm of the vlei. Hundreds of damlets have now been built in the furrows, together with three larger dams to raise the water-table. Cranes nesting on adjacent farms now move into these wetlands when not breeding. Subsequently, holding and breeding pens have been set up for captive cranes, as well as rehabilitation facilities for sick or wounded cranes and an education centre. None of the birds held has been taken from the wild; all derive from rescues of injured cranes, or confiscations of cranes illegally held.

The main threat to the sanctuary comes from uncontrolled human access, and the accompanying grazing of cattle and snaring practised by a section of a neighbouring community. Stock-grazing, in particular, disturbs the wetland rehabilitation process. In 1996 the sanctuary was declared a national 'Site of Conservation Significance' (number 126).

#### Further reading

Guthrie (1995).

#### Karkloof Nature Reserve

Admin region KwaZulu-Natal **ZA055**  
 Coordinates 29°24'S 30°16'E A1, A2 (089), A3 (A07)  
 Area 1,748 ha Altitude 1,200–1,720 m Nature Reserve

#### Site description

The site is located 19 km north of Howick. It is not the same entity as the Karkloof Forest, which is part of the KwaZulu-Natal mistbelt forest (IBA ZA053). The western part of the reserve consists mainly of evergreen forest, with some Natal mistbelt grassland. Trees of *Podocarpus*, *Celtis*, *Combretum*, *Cryptocarya* and *Xymalos* are characteristic of the mature forest. In the lower forest strata *Halleria*, *Maytenus* and *Carissa* are typical. Forest-edges and forest patches in early successional stages have shrubs of *Leucosidea*, *Buddleja* and *Rhamnus*. In places in the grassland, *Protea* forms sparse open woodland. The eastern part of the reserve is mostly vlei and wet grassland (highland sourveld). There are two major vleis, Melmoth (104 ha) and Nyumbhakazi (35 ha). These are mainly sedge meadows with *Cyperus*, *Carex*, *Mariscus*, *Pycreus* and *Kyllinga*.

#### Birds

See Box and Tables 2 and 3 for key species. The forest holds many important species, including small numbers of *Poicephalus robustus robustus* and *Columba delegorguei*. *Guttera pucherani symonsi*, an isolated and endemic subspecies, is found only here and in a couple of small forests nearby. Bird parties are frequent and typical forest birds include *Ceratogymna bucinator*, *Apaloderma narina*, *Zoothera gurneyi*, *Lioptilus nigricapillus*, *Tauraco corythaix*, *Coracina caesia*, *Cossypha dichroa*, *Pogonocichla stellata*, *Phylloscopus ruficapilla*, *Trochocercus*

*cyanomelas*, *Telophorus olivaceus*, *Estrilda melanotis* and *Serinus scotops*. The quiet forest river streams hold *Motacilla clara*. *Promerops gurneyi* occurs where *Protea* woodland dominates the grassland. The surrounding grasslands hold *Sarothrura affinis*, breeding *Grus paradisea* and *Neotis denhami*. *Gyps coprotheres* are regular visitors. *Grus carunculatus* and *Tyto capensis* are resident in the vleis. *Monticola explorator* and *Saxicola bifasciata* inhabit rocky outcrops.

#### Key species

A1	<i>Grus carunculatus</i>	<i>Saxicola bifasciata</i>
	<i>Grus paradisea</i>	<i>Lioptilus nigricapillus</i>
A2 (089)	South African forests EBA: Four of the seven species of this EBA that occur in South Africa have been recorded at this site; see Table 2.	
A3 (A07)	Afrotropical Highlands biome: 14 of the 23 species of this biome that occur in South Africa have been recorded at this site; see Table 3.	

#### Other threatened/endemic wildlife

Several rare trees are found in the forest including *Ocotea bullata*, *Curtisia dentata* and *Scolopia flanaganii*, with *Alberta magna* (LR/nt) on the margin. Near-endemic plants in the grassland include *Geranium natalense* and *Dierama luteo-albidum*. Mammals include the South African endemic *Pelea capreolus*. An exceptionally rare and localized butterfly, *Orachrysops ariadne* (VU), occurs just outside the reserve and may well be found within it.

#### Conservation issues

The original reserve consisted of a 99-year lease of 223 ha of forest, proclaimed in 1980. It was extended by two more, renewable 10-year leases of 410 ha and 269 ha of forest in 1983. The final extension was a state purchase of the adjacent farm, Melmoth, in 1989. The KwaZulu-Natal Nature Conservation Service administers the whole area.

The genetic integrity of the unique, isolated population of *Guttera pucherani symonsi* is threatened by ill-informed attempts by neighbouring land-owners to introduce the species to forest patches where it does not occur. A different subspecies is common in Zululand, and these are the birds that might well be introduced. The vlei is one of the few conserved areas in South Africa where *Grus carunculatus* breeds. It also breeds on several adjacent farms which, assuming no financial or other constraints, would make suitable additions to the reserve. *Hirundo atrocaerulea* occurred in the Karkloof until the 1950s. The reason for its disappearance is not fully understood—suitable grassland, including many aardvark holes, still exists on the slopes below the forest.

The forest holding represents less than a third of the whole of the Karkloof Forest, and even this is a pale shadow of the original forest—in 1860, it was at least 34,000 ha in extent and held populations of very large mammals (*Loxodonta africana*, *Syncerus caffer* and *Diceros bicornis*). The forest has been plundered of its best timber since 1845, and a permit to fell a large *Podocarpus* tree was issued as recently as 1990. The rarity of *Poiccephalus robustus robustus* here must be related to the reduction of *Podocarpus falcatus*, its favourite food-plant. Bark-stripping, to supply the traditional medicine trade, is rife, particularly of *Ocotea* and *Curtisia*, but 13 other tree species are exploited too. Stripping is done without any attempt at sustainable harvesting, and stripped trees nearly always die. Felling and stripping facilitate the invasion of non-native trees, which are becoming a serious problem. The vleis are vulnerable to poorly timed fires, and during the 1992 drought large quantities of peat burned over a period of several weeks. Eventually this will alter the composition of the vlei plant-community.

#### Further reading

Taylor (1961), Taylor (1997b).

### Umgeni Vlei Nature Reserve

Admin region KwaZulu-Natal

Coordinates 29°29'S 29°50'E

Area 957 ha

Altitude 1,840–2,081 m

ZA056

A1

Nature Reserve,  
Natural Heritage Site

#### Site description

Umgeni Vlei is located 20 km due south-west of Nottingham Road in the KwaZulu-Natal midlands. The main vlei is about 300 ha in extent, and is underlain by Karoo dolerite. It lies at an altitude of 1,840 m,

with the highest hill in the reserve at 2,081 m. The vlei functions as a large sponge that is the source of the Umgeni river. The centre of the vlei has extensive areas of *Carex* marsh, with a 'hummock-depression' structure in places, intermixed with *Cyperus*, *Pycreus* and *Juncus*, and submerged vegetation such as *Lagarosiphon* and *Utricularia*. The grassland surrounding the vlei is an example of highland sourveld.

#### Birds

See Box for key species. The extensive vlei is good for cranes (Gruidae), and both *Grus carunculatus* and *Balearica regulorum* regularly breed there. It is the premier site in South Africa for *Grus carunculatus*—up to six pairs have nested in the main vlei, with four others nesting in four smaller vleis, all within the reserve boundary. At least two pairs of *Balearica regulorum* and one pair of *Grus paradisea* are also present in the IBA, the latter in the grassland surrounding the vlei, which also supports several other species of threatened bird, including *Anthus chloris*. The vlei could potentially support *Sarothrura ayresii*. *Cisticola brunnescens* forage and breed in the flooded grassland adjacent to the vlei. The rocky terrain at higher altitude supports *Geocolaptes olivaceus*, *Saxicola bifasciata*, *Monticola explorator* and *Chaetops aurantius*. Both *Gyps coprotheres* and the rare but widespread *Gypaetus barbatus* are regular visitors to the area.

#### Key species

A1	<i>Anthus chloris</i>	<i>Geocolaptes olivaceus</i>
	<i>Grus paradisea</i>	<i>Chaetops aurantius</i>
	<i>Grus carunculatus</i>	<i>Saxicola bifasciata</i>

#### Other threatened/endemic wildlife

None known to BirdLife International.

#### Conservation issues

The site has been little modified in the past, having been used only for cattle and sheep-grazing. A proposal to develop some of the surrounds for agriculture in the early 1980s precipitated the acquisition of the site by NPB in 1987, in order to protect *Grus carunculatus*. Cattle are currently excluded from the reserve, probably to the detriment of the cranes. Typically only 5–6 pairs nest there now, and consideration must be given to allowing controlled grazing again, since cattle create some structural diversity in the vegetation that appears to benefit cranes. Apart from its biodiversity value, Umgeni Vlei is a valuable water-catchment area, supplying as it does the Umgeni river, which supports a substantial proportion of South Africa's gross national product, and the whole of the catchment above the vlei is now conserved, either within the reserve or in a Natural Heritage Site.

#### Further reading

Breen *et al.* (1985), Johnson and Barnes (1991).

### Impendle Nature Reserve

Admin region KwaZulu-Natal

Coordinates 29°42'S 29°53'E

Area 8,759 ha Altitude 935–1,586 m

ZA057

A1

Nature Reserve

#### Site description

The reserve centre lies 11 km due south of Impendle town, and about 50 km west of Pietermaritzburg. The terrain is undulating, steep and rocky at the highest points, and dissected by small rivers that fall over a minor escarpment as they join the Umkomaas river, which forms much of the site's southern boundary. The site is predominantly grassland. Some of this has been lost to agriculture, but over 2,000 ha remain, mostly as highland sourveld but with some southern tall grassveld remaining. There are small stands of *Protea* on some of the higher rocky slopes. About 900 ha of forest is present in the reserve, and the famous 'seven-mile-bush' is part of this. Trees of *Podocarpus* and *Scolopia* are dominant, with *Kiggelaria* and *Pittosporum* also occurring commonly.

#### Birds

See Box for key species. The vlei is very good for *Balearica regulorum* and occasionally for *Grus carunculatus*. The surrounding rolling grassland holds six pairs, perhaps eight, of *Hirundo atrocaerulea*. *Grus paradisea* and *Neotis denhami* are also present. A flock of *Geronticus*

*calvus* is often present. The forest is home to *Lioptilus nigricapillus*, *Zoothera gurneyi*, *Tauraco corythaix* and *Serinus scotops*.

#### Key species

A1	<i>Geronticus calvus</i>	<i>Hirundo atrocaerulea</i>
	<i>Grus paradisea</i>	<i>Lioptilus nigricapillus</i>

#### Other threatened/endemic wildlife

None known to BirdLife International.

#### Conservation issues

The reserve consists of a series of farms that were first settled by colonists over 100 years ago. Most of the land was devoted to cattle-grazing, but small areas have been used for crops. The farms were purchased in the late 1970s by the government for the purpose of consolidating the old KwaZulu homeland. They have been uninhabited since 1980. The value of this Trust Land to conservation was recognized in 1983 with the proposal to formally convert the area into Impendle Nature Reserve. However, the reserve has yet to be formally proclaimed, the ownership resting with the Department of Land Affairs. It is administered by the KwaZulu-Natal Nature Conservation Service. All the long-term objectives of the reserve have yet to be decided; one possibility is a 'community reserve', where controlled use of natural resources might be allowed. In the interim, limited grazing is allowed under permit. This almost certainly benefits *Hirundo atrocaerulea*, and is a practice that should be continued. Impendle is the only 'conserved' area in KwaZulu-Natal that is home to *Hirundo atrocaerulea*. It also holds one of the largest populations remaining in South Africa. As such, it is vital that it be formally proclaimed, with the primary objective of managing the grassland for *Hirundo atrocaerulea*.

A vigorous plan is needed to counteract the invasion of the grassland by shrubs and non-native plants. The slow invasion by *Helichrysum* and *Pteridium* can be halted by proper use of fire, while the potentially rapid invasion by bramble *Rubus*, bugweed *Solanum mauritianum* and wattle *Acacia* can only be controlled mechanically and with herbicides. The problem is being addressed, and progress in weed control is being made.

### KwaZulu-Natal mistbelt grasslands

Admin region KwaZulu-Natal

Coordinates 29°12'S 30°37'E

Area c.5,000 ha Altitude 920–1,340 m

ZA058

A1, A4i

Unprotected

#### Site description

This site consists of a disconnected series of patches of Natal mistbelt grassland on 28 farms located in the temperate midlands of KwaZulu-Natal. The quoted area of 5,000 ha refers to the sum of these patches. The region is bounded roughly as follows: in the west by the Umtamvuna river; in the south and east by the 900 m contour line (below this the climate is too warm and dry for mistbelt grassland), and in the north by high ground above c.1,300 m (where the climate becomes too cold for mistbelt grassland). The terrain consists of rolling hills, dissected by rivers and streams, and lower-lying valleys thus occupy the intervening ground in places. Soils are often deep, allowing small streams to run underground, and sinkholes are a typical feature. The criteria for the inclusion of a farm within the IBA was the presence of one or more viable units of mistbelt grassland. Nearly all of these patches support *Hirundo atrocaerulea*, but two of the farms were included for their role in conserving other important grassland birds.

#### Birds

See Box for key species. This area holds one of the highest concentrations of *Hirundo atrocaerulea* in the southern African subregion. Thirty-eight nests are known, with another 10–12 likely within the IBA, and perhaps a further 10 at other sites near Ixopo (outside the IBA as currently defined) that have not yet been properly explored. *Neotis denhami* is relatively common, and two traditional lekking sites are located here. A colony of *Geronticus calvus* occurs on the Umzimkulu cliffs. All three cranes in South Africa—*Grus carunculatus*, *Grus paradisea* and *Balearica regulorum*—nest in the district.

#### Key species

A1	<i>Geronticus calvus</i>	<i>Grus paradisea</i>
	<i>Gyps coprotheres</i>	<i>Crex crex</i>
	<i>Grus carunculatus</i>	<i>Hirundo atrocaerulea</i>
A4i		Breeding (pairs) Non-breeding
	<i>Geronticus calvus</i>	30–40 60–120

#### Other threatened/endemic wildlife

Mistbelt grassland is noted for its diversity of flowering plants and their high level of endemism. Rarities typical of, or confined to, the Ixopo area—the heart of the range of *Hirundo atrocaerulea* in KwaZulu-Natal—include *Satyrium rhodanthum*, *Gerbera aurantiaca*, *Dierama nixonianum* and *Helichrysum citricephalum*. The frog *Arthroleptella ngongoniensis* is a highly localized endemic to this habitat. Invertebrate life is rich: two new endemic earthworms have been recently discovered, *Proandricus bulwerensis* and *P. adriani*.

#### Conservation issues

The entire area consists of privately owned farmland, having been settled by European-style farmers for 150 years. Because the land was ideal for farming, no provision for formal conservation was made. Nevertheless, the nature of the way the land was used allowed most wildlife to survive. Cattle-grazing, for example, is a land-use entirely compatible with the well-being of *Hirundo atrocaerulea*. However, from about 1950 onwards timber has been more profitable, and the trend towards afforestation has accelerated since the 1980s. The climate and soils of the mistbelt are exceptionally favourable for timber, and there is great incentive for farm owners to sell their properties, or lease parts of them, to large paper-mill companies for the growing of plantations. Much of the region has now been converted into timber monoculture, and this remains the most direct threat to the largest population of *Hirundo atrocaerulea* remaining in KwaZulu-Natal. Even in the late 1990s, applications to plant timber in the few remaining grassland fragments are still received by the Department of Water Affairs and Forestry (DWAF).

Creative incentives to prevent sale of these fragments, and conversion to timber, will have to be implemented soon if this population of *Hirundo atrocaerulea* is to survive. Thirsty timber causes reduction or even cessation of stream flow, so new underground channels (nesting habitat for this species) are now most unlikely to be created. One solution to the nest-hole shortage is for interested land-owners to dig substitute holes. This measure has already had considerable success, and may offer the most realistic chance of conserving *Hirundo atrocaerulea* in the short term.

Quite apart from the presence of *Hirundo atrocaerulea*, these grasslands merit conservation in their own right. Natal mistbelt grassland is endemic to KwaZulu-Natal, yet it has the poorest conservation status of all KwaZulu-Natal vegetation-types. Only 1,278 ha in total are formally conserved, a mere 0.3% of the original extent of this habitat. There are no prospects for increasing this figure, making privately held mistbelt grassland all the more important.

#### Further reading

Johnson *et al.* (1996), Scott-Shaw *et al.* (1996).

### Richards Bay Game Reserve

Admin region KwaZulu-Natal

Coordinates 28°50'S 32°01'E

Area c.1,200 ha Altitude 0–10 m

ZA059

A1, A4i, A4iii

Game Reserve

#### Site description

Located c.190 km north of Durban, this site consists of Richards Bay Game Reserve, which was formed when a four-kilometre-long causeway was erected across Richards Bay estuary in 1976, as part of the development of the harbour. To the south-west of this berm, the bay was left undisturbed as a Nature Reserve (or sanctuary area). Here, three rivers (all are canalized) flow into the shallow mudflats and estuarine area: the Mtantatweni river drains Lake Cubhu, which lies to the south; an unnamed channel, in the south-west corner of the sanctuary, drains the sugar-cane lands on the flood-plain; and the primary river, the Mhlatuze, forms the estuary itself. The estuarine lagoon opens to the sea via an artificially created outlet, and river flows play an important part in keeping this mouth open. The lagoon is tidal

and very shallow, and is fringed by extensive stands of mangroves *Rhizophora* (the best surviving population in KwaZulu-Natal). Vegetation along the Richards Bay–Empangeni road consists of extensive stands of papyrus, with tall, dense, coarse grass and forbs at the edge. Other sites in the area have *Phragmites*, or mixed emergent sedges, grass and *Typha*.

The once extensive papyrus swamps on the Mhlatuze river flood-plain have been largely drained and the land used for sugar-cane cultivation. The nearby Thulazihleka Pan owes its origin to the disposal of spoil dredged in 1976. It has shallow water with beds of emergent *Phragmites*, *Typha* and *Schoenoplectus*, much aquatic vegetation such as *Lemma*, *Potamogeton* and *Ceratophyllum*, and much emergent and floating matted grass mixed with patches of the tall reeds and sedges. On the harbour side of the development, saltmarsh and mangroves have been, or are in the process of being, eliminated. A well-preserved remnant of climax coastal dune forest remains on the eastern side of the sanctuary area. Savanna communities overlook the sanctuary from higher land near Lake Cubhu. Ilala palms *Hyphaene* are scattered throughout.

### Birds

See Box for key species. The site is important for migratory and nomadic waterbirds. The sanctuary portion of Richards Bay regularly holds over 20,000 waterbirds and, when Palearctic migrants are present in summer, up to 50,000 waterbirds have been counted. *Phoenicopterus ruber* and *P. minor* are almost always present, and the open water occasionally supports *Sterna caspia*. Species which occur in good numbers include *Pelecanus rufescens*, *Platalea alba*, *Thalassornis leuconotus* and *Nettapus auritus*. Gulls and terns are present in large numbers, including significant numbers of *Larus cirrocephalus*, *Sterna bengalensis*, *S. hirundo*, *S. albifrons*, *Chlidonias hybridus* and *C. leucopterus*. Richards Bay provides an important staging post for migrating waders as part of the east coast flyway, with the most numerous species including *Pluvialis squatarola*, *Tringa cinerea*, *Calidris ferruginea*, *C. minuta* and *Numenius phaeopus*. The flood-plain and surrounding marginal grassland is suitable for *Balearica regulorum*, *Glareola pratincola*, *Turnix hottentotta* and *Crex crex* (occasional records). *Botaurus stellaris* has been recorded in the past from a pan remnant near the harbour, and may still occur in the area.

#### Key species

A1	<i>Phoenicopterus minor</i>		
A4i		Breeding (pairs)	Non-breeding
	<i>Platalea alba</i>	30–40	69 (av.)–150
	<i>Thalassornis leuconotus</i>	—	70 (av.)–238
	<i>Sterna hirundo</i>	—	3,573 (av.)–13,000
	<i>Chlidonias leucopterus</i>	—	1,157 (av.)–2,037
A4iii	More than 20,000 waterbirds occur.		

### Other threatened/endemic wildlife

None known to BirdLife International.

### Conservation issues

The harbour, which was officially opened in 1976, was developed to serve the coalmines of the interior. The KwaZulu-Natal Nature Conservation Service and Richards Bay Borough own the sanctuary area to the south-west of the berm. Almost all of the rivers that used to flow into the estuary have been canalized as land claim has proceeded.

The primary threat to the small area of estuary remaining in Richards Bay is the ever-increasing amount of sugar-cane that is grown on the flood-plain and the increasing levels of silt deposition in the sanctuary area; these threaten to change the dynamics of the estuary. Other threats to the system include inappropriate manipulation of the water-level, drainage and loss of habitats as a result of increased industrialization; pollution may also be a problem. Richards Bay was once a very important nursery ground for many fish and invertebrate populations along the KwaZulu-Natal coast. This function has now mostly been lost. Various local extinction events are evident, especially for species that associate with eel-grass *Zostera* beds.

Thulazihleka Pan is borough-owned and zoned for industrial development. So despite its diversity of habitats and abundance of birdlife it has no protected status, and could be developed at any time. The same is true of the other habitat fragments between and around industrial sites. Many of these contribute substantially to the diversity and abundance of birds in Richards Bay. There is no doubt that, had

there been no industrial development at Richards Bay, it would have been one of the finest wetlands for birds in Africa.

### Further reading

Begg (1978), Taylor (1997b).

## Greater Ingwangwana river

**ZA060**

Admin region KwaZulu-Natal

Coordinates 29°57'S 29°27'E

Area c.2,000 ha Altitude 1,250–1,745 m

A1

Nature Reserve

### Site description

Located c.18 km due south of Underberg, the major feature of the site is the Ingwangwana river, which flows south-south-eastwards through the southern portion of Coleford Nature Reserve. The flood-plain is fairly flat and narrow, rising up gently from the south bank to a series of low hills, which overlook its major tributary, the Ndowana river. The terrestrial vegetation consists of sour grassveld, with a dense, fairly short sward. Five small wetlands lie alongside the river. These are often seasonally flooded, and lie in natural depressions such as old oxbows. The vegetation in these wetlands is predominately wet grassland with extensive stands of sedge *Carex*.

### Birds

See Box for key species. *Sarothrura ayresi* has been seen at this site, and it holds enough potential for 6–8 birds, but it remains to be established whether the habitat is only suitable in some years. The vlei also holds *Grus carunculatus*. The surrounding rolling grassland holds *Circus maurus*, *Grus paradisea* and *Neotis denhami*. The small patches of forest in the gullies are home to *Lioptilus nigricapillus*, while the rocky outcrops support *Saxicola bifasciata* and *Monticola explorator*.

#### Key species

A1	<i>Gyps coprotheres</i>	<i>Saxicola bifasciata</i>
	<i>Circus maurus</i>	<i>Lioptilus nigricapillus</i>
	<i>Sarothrura ayresi</i>	

### Other threatened/endemic wildlife

None known to BirdLife International.

### Conservation issues

The area includes the Coleford Nature Reserve, which was established in 1948 and proclaimed in 1959 and is currently administered by the KwaZulu-Natal Nature Conservation Service. The wetlands alongside the river were modified prior to reserve acquisition. Drainage ditches were cut, and water-levels lowered. In a pilot experiment in 1984, one of the vleis was 'restored' by blocking the ditch, with dramatic results. *Grus carunculatus* started nesting within a month, and Coleford was a well-known nest-site for this species until 1990. Since then there has been no nesting, and the species is not always present. The probable reason is disturbance. The nest-sites were close to a fisherman's path, and grazing horses often harassed the cranes. It is likely that, if properly managed, the vleis would again support the species. The site has potentially excellent habitat for *Sarothrura ayresi*, but it is not yet known how regularly the bird occurs here.

In a recent exercise aimed at streamlining the KwaZulu-Natal Nature Conservation Service, and discarding assets that ran at a loss, Coleford was identified as being expendable. A final decision has not yet been made.

### Further reading

Taylor (1997a,b).

## Franklin vlei

**ZA061**

Admin region KwaZulu-Natal

Coordinates 30°18'S 29°25'E

Area 5,244 ha Altitude 1,224–1,411 m

A1, A4i

Unprotected

### Site description

Franklin vlei is a large, complex wetland that has several areas of significance. The first of these is Vogelvlei, which is comparatively



undisturbed. It is not burned annually, and normally has moderate grazing pressure. The dominant vegetation in the most deeply flooded areas is extensive beds of *Typha* and *Phragmites*, while permanently shallowly flooded to saturated ground is dominated by large sedges, principally *Carex*, *Cyperus* and *Schoenoplectus*.

The second significant area is the causeway that crosses a wet zone of the vlei near Franklin village. The area adjacent to the causeway is permanently flooded and contains very large beds of *Typha*, large stands of *Phragmites* (most commonly along the river channels), much floating and emergent grass (principally *Leersia*), many patches of open water which are often secluded, areas of tall flooded sedges *Cyperus*, and a mixture of sedges (especially *Eleocharis*) and reeds.

The Llewellyn area is an arm of the main Franklin vlei and has similar vegetation to most other areas of the main wetland. Rhebokfontein has extensive beds of almost monospecific *Carex*, stands of *Phragmites* and *Typha* in its more deeply flooded areas, excellent mixed sedges including *Cyperus*, *Schoenoplectus* and *Eleocharis*, and, in wet areas, smaller sedges such as *Pycnus*, *Kyllinga* and *Cyperus* together with wet grassland.

Flitwick Grange has a large central area of *Carex* with mixed sedge-beds of *Cyperus*, *Eleocharis* and *Schoenoplectus*, and fringing mixed tussocky sedges, *Juncus* and grasses. Holwell is a much-degraded wetland dominated by grass and short sedge species including *Cyperus*, *Eleocharis*, *Pycnus*, *Fuirena* and *Schoenoplectus*, which has been partially drained by the digging of a furrow along its centre. It is grazed and quite frequently burned. The Ruswarp area is predominantly moist grassland, with sedge meadow in wetter depressions, along the Mzintlava river. It is heavily grazed by sheep over much of its area, frequently burned, and has some poplar plantations near the river. Dominant sedges include *Pycnus*, *Fuirena*, *Eleocharis*, *Cyperus* and *Schoenoplectus*. *Juncus* and *Cyperus* fringe the river channel in many places. Hebron is largely protected and has excellent beds of *Carex*, stands of *Typha* and *Phragmites* along stream channels, and areas of mixed sedges and wet grassland.

#### ■ Birds

See Box for key species. Franklin vlei has the largest known (i.e. properly counted/estimated) population of *Sarothrura ayresi* in South Africa. The species inhabits the *Carex*-dominated areas and the taller vegetation at Vogelvlei. The principal interest at Llewellyn is a breeding pair of *Grus carunculatus*. The vegetation is too short and sparse over most of the area to support many rallids, although the listed wetland species do occur in pockets of suitable cover, while *Crex crex* occurs in wet grassland at the edge of the wetland, especially in years when patches of moist mixed grassland are allowed to develop without disturbance.

Key species			
A1	<i>Grus carunculatus</i>	<i>Sarothrura ayresi</i>	
	<i>Crex crex</i>		
A4i		Breeding (pairs)	Non-breeding
	<i>Sarothrura ayresi</i>	—	40–75

#### ■ Other threatened/endemic wildlife

None known to BirdLife International.

#### ■ Conservation issues

This is one of the few sites in the world where *Sarothrura ayresi* is known to occur annually, and to be present throughout the summer, arriving in November and departing in March. The vlei is mostly under private ownership. For many years the site has been subjected to virtually uncontrolled modification, damage and mismanagement, with the self-interested actions of individual land-users taking priority over considerations of the impact such actions have on the wetland system and on other land-users.

Factors currently affecting Franklin vlei adversely include the following: (1) drowning of large wetland areas by building dams; (2) reducing of inflow to the vlei by damming tributary streams and not releasing sufficient water from dams at the right times of the year; (3) wasteful irrigation, including centre-pivots; (4) digging of boreholes; (5) annual burning and spring grazing of large sections of the palustrine wetland vegetation; (6) the uncontrolled spread of invasive, non-native wattle trees *Acacia* along the Mzintlava river and the adjacent veld.

The recent granting of afforestation permits to 12 farmers within the immediate catchment of Franklin vlei, although reducing the area requested for planting from 9,000 ha to 6,000 ha, apparently did

nothing to address the serious environmental problems that could well arise from the afforestation. The calculated drop in water entering the vlei system as a result of the afforestation will be c.10%, and this, especially in view of the abuses that are already practised on the wetland system, represents an unacceptably high reduction in water input. It appears that the proposals were not put out to review in the manner laid down by the current legislation, nor was the EIA made properly available to interested parties. No attempt has been made to ensure the implementation of proper controls on the afforestation and the subsequent activities of the land-users, and the 80 or more objections lodged against the proposed afforestation have apparently not been given the proper treatment.

The immediate catchment of the Llewellyn sector of Franklin vlei, at the northern end of this wetland, is due to be afforested. This would result in direct run-off being reduced by 38%, which would seriously affect the character of this portion of the wetland. This, coupled with concomitant disturbance, erosion and siltation will probably effectively destroy the Rhebokfontein portion of the wetland, while the adjacent grassland will probably also be afforested.

The Franklin vlei system is rated as one of the priority wetlands of KwaZulu-Natal, with important functional values for water-storage, streamflow regulation, flood attenuation, sediment trapping, waste assimilation and wildlife protection. It holds the globally threatened *Sarothrura ayresi* and breeding *Grus carunculatus*. Its importance to conservation cannot be overemphasized. It is a prime example of a wetland system which requires the long-term protection that only an area directive can afford, and an integrated management plan for the whole Franklin catchment is urgently required.

#### ■ Further reading

Begg (1989), Taylor (1994, 1995, 1997a,b).

### Matatiele Commonage

**ZA062**

Admin region KwaZulu-Natal

Coordinates 30°20'S 28°50'E

A1, A2 (090), A3 (A07)

Area 5,050 ha Altitude 1,500–2,066 m

Unprotected

#### ■ Site description

Matatiele town is situated in the most westerly part of southern KwaZulu-Natal and is bordered in the north, west and south by the Eastern Cape. A notable feature of the landscape is the wide valley, the Cedarville Flats, which runs from east to west. The valley is flanked to the north by the Drakensberg and to the south by high-lying ground, which rises above 2,000 m. Matatiele Commonage lies due south of Matatiele town, and abuts directly onto it. Most of the site is pure grassland, transitional between highland sourveld and *Cymbopogon-Themeda* veld. Some of the higher ridges and spurs bear a sparse *Protea* woodland, and sheltered drainage lines and rocky areas, protected from fire, have scrub.

#### ■ Birds

See Box and Tables 2 and 3 for key species. Matatiele mountain holds some extremely interesting and rare high-altitude grassland birds. *Heteromirafra ruddi* is present. *Anthus chloris* is the commonest bird in the grasslands on top of the mountain. Other pipits occurring are *Anthus brachyurus*, *A. crenatus* and *A. hoeschi*. Some of the rocky gorges in the vicinity hold *Bubo capensis*, whilst above 2,000 m *Saxicola bifasciata* and *Chaetops aurantius* are common. *Protea* stands here, and on the edge on the mountain, hold *Promerops gurneyi*. Other species in the grasslands include *Francolinus afer*, *Neotis denhami*, *Vanellus melanopterus* and *Circus maurus*. *Monticola explorator* occur around rocky outcrops in the grassland. *Gyps coprotheres* and *Gypaetus barbatus* regularly fly over the mountain.

#### Key species

A1	<i>Geronticus calvus</i>	<i>Anthus chloris</i>
	<i>Circus maurus</i>	<i>Anthus hoeschi</i>
	<i>Grus paradisea</i>	<i>Chaetops aurantius</i>
	<i>Heteromirafra ruddi</i>	<i>Saxicola bifasciata</i>
A2 (090)	Lesotho highlands EBA: All of the three species of this EBA that occur in South Africa have been recorded at this site; see Table 2.	
A3 (A07)	Afrotropical Highlands biome: Seven of the 23 species of this biome that occur in South Africa have been recorded at this site; see Table 3.	

### Other threatened/endemic wildlife

None known to BirdLife International.

### Conservation issues

The commonage is municipally owned and it receives some protection, but the remainder of the area is entirely unprotected. The Matatiele area is one of the five widely separated population fragments that *Heteromirafra ruddi* exists in. It is the only terrestrial bird in KwaZulu-Natal that does not occur in a nature reserve. It was not seen during the Natal Atlas period (1970–1980), but must have been present, since it resurfaced when it was specifically searched for in the 1980s.

The Matatiele municipality has controlled the commonage since the founding of the town. It has been used as a source of income since then, yet is protected in the sense that it has never been ploughed, cultivated or built upon. It has been modified only in that the species composition of the grassland must have altered as a result of the fairly intensive grazing regime to which it has been subjected. That this regime favours *Heteromirafra ruddi* must be regarded as the most fortuitous of coincidences. The balance between keeping the grass short, yet excluding unpalatable invasive forbs could easily be very fine. However, there is no immutable policy that guarantees the status quo. Indeed, there is an element in the municipality that wishes to sell the commonage, mainly to be absolved of further responsibility for it. In the present political and financial climate it is not practicable for a government-funded agency to take over the site, however logical and desirable this may appear. The best long-term plan is for Matatiele to retain its best asset, and combine leased grazing with ecotourism. The site has the qualifications for Natural Heritage Site status. This, coupled with its fine scenery, makes it an ideal nature reserve; all that is required is suitable publicity.

#### Penny Park

Admin region KwaZulu-Natal  
Coordinates 30°30'S 29°29'E  
Area 120 ha Altitude 1,300 m

ZA063

A1  
Unprotected

### Site description

The site is located 5 km north-east of Kokstad, occupying the valley bottom along the meandering course of the Manzimnyama river amidst agricultural land. It lies within a narrow finger of transition between highland sourveld and *Cymbopogon-Themedra* veld. The permanently saturated to flooded areas are *Typha*-dominated, particularly the lowest depressions in the vlei. Tall sedges of *Cyperus* and *Mariscus* are locally dominant in less permanently and deeply flooded conditions, often with other *Cyperus*, *Schoenoplectus* and *Juncus*. The sedges extend into the seasonally flooded areas, where they occur alongside *Eleocharis*, *Leersia* and *Paspalum*. Seasonal or ephemeral flooding in sedge meadow and wet grassland is often extensive, and up to 50 cm deep, but in some years much of the flood-plain remains almost completely dry.

### Birds

See Box for key species. This is one of only four sites in South Africa known to have held *Sarothrura ayresi* regularly over the last eight years. This site has held up to four *Sarothrura ayresi* in years of good flooding and, if vegetation were allowed to develop more naturally, without annual burning and spring grazing, it would probably support more than twice this number. *Crex crex* is probably annual in grassland around the vlei. *Botaurus stellaris* is resident and is presumed to breed. The winter reedbed roost of *Balearica regulorum* builds up to numbers in excess of 100.

#### Key species

A1 *Sarothrura ayresi*

### Other threatened/endemic wildlife

None known to BirdLife International.

### Conservation issues

This is a significant site in view of the occurrence of *Sarothrura ayresi* and *Botaurus stellaris*. It is unique among sites for *Sarothrura ayresi* in South Africa in having no *Carex*-dominated vegetation—the birds occur in vegetation-types from which they are not recorded elsewhere in the country. The wetland contains flood-plain habitat found

nowhere else in East Griqualand, and it merits the highest possible conservation status. Grazing, trampling by cattle and annual burning detract from the value of the site, but do not undermine its significance. In the early 1990s there was a proposal to dam the entire wetland but, after discussion and objections, this plan was abandoned. As the site is only voluntarily protected, further threats of this and other types could recur at any time.

### Further reading

Begg (1989), Taylor (1994, 1997a,b).

#### Oribi Gorge Nature Reserve

Admin region KwaZulu-Natal

Coordinates 30°43'S 30°14'E

Area 1,917 ha Altitude 120–680 m

ZA064

A1, A2 (089), A3 (A07)

Nature Reserve

### Site description

This reserve is situated 21 km west of Port Shepstone. It holds a spectacular gorge with many steep, sheer cliffs. Between the Oribi and Murchison Flats (plains that are north and south of the reserve respectively), the Umzimkulwana river has cut a 500-m-deep gorge through the soft sandstone down to the granite. The Umzimkulwana river is mature, with a bouldery substrate and short, shallow rapids with a few low waterfalls. Three artificial impoundments span the river within the reserve. Eight different vegetation-types have been distinguished in the reserve, the most extensive being forest and thicket. Shrubland, woodland, grassland and rocky communities occur to a lesser degree. Species-richness is high and the forests are dominated by trees such as *Celtis*, *Chrysophyllum*, *Commiphora*, *Heywoodia*, *Margaritaria*, *Nuxia* and *Protorhus*. Rocky outcrops are characterized by *Tarchonanthus*, *Tricalysia*, *Cryptocarya* and *Loxostylis*. The grassland is Ngongoni veld, and has a diversity of small flowering plants. In places there are stands of *Protea*.

### Birds

See Box and Tables 2 and 3 for key species. The grassland and lightly wooded areas hold *Balearica regulorum* and *Bucorvus cafer*. The forest holds small numbers of *Zoothera guttata* (wintering), *Tauraco corythaix*, *Campethera notata* (at its northern and eastern extremity), *Cossypha dichroa*, *Cercotrichas signata* and *Serinus scotops*. The cliff just outside the boundary of the reserve holds a small breeding colony of *Gyps coprotheres*. These vultures visit the feeding station (restaurant) within the reserve whenever it is provisioned. The backwaters of the river hold *Podica senegalensis*.

#### Key species

A1	<i>Gyps coprotheres</i>	<i>Zoothera guttata</i>
	<i>Campethera notata</i>	
A2 (089)	South African forests EBA: Five of the seven species of this EBA that occur in South Africa have been recorded at this site; see Table 2.	
A3 (A07)	Afrotropical Highlands biome: 10 of the 23 species of this biome that occur in South Africa have been recorded at this site; see Table 3.	

### Other threatened/endemic wildlife

Botanically, the site is exceptionally rich in rare and localized species. Examples are *Encephalartos ghellinckii*, *Leucospermum innovans*, *Podalyria burchellii*, *Acalypha wilmsii*, *Brachystelma tenellum*, *Huernia hystrix*, *Ceropegia rudatisii*, *Riocreuxia alexandrina* and *Plectranthus oribiensis*.

### Conservation issues

Prior to its proclamation as a Nature Reserve in 1950, most of the area was called Umzimkulwana State Forest (a demarcated government forest). The KwaZulu-Natal Nature Conservation Service currently administers the reserve. The nature of the terrain has precluded habitat modification, and the site exists in an almost pristine state. Private farms where sugar-cane is the main crop bound the reserve. A private commercial game-ranch borders the reserve on the eastern boundary, and occasionally game species that have been introduced here are seen within the reserve.

### Further reading

Beater (1970), Bews (1920), du Toit (1946), Glen (1972), King (1942).

**Umtamvuna Nature Reserve**
**ZA065**

Admin region KwaZulu-Natal

Coordinates 31°00'S 30°10'E

A1, A2 (089), A3 (A07), A4ii

Area 3,257 ha Altitude 0–447 m

Nature Reserve

**Site description**

Located 5 km west of Port Edward, Umtamvuna Nature Reserve occupies the eastern side of a steep gorge on the Umtamvuna river. The river gorge meanders through the reserve for 25 km before it enters the Indian Ocean, 2 km beyond the reserve boundary. Many precipitous side-streams join the river within the reserve. The river is flanked by evergreen forests, overtopped with up to 240 m of often sheer cliffs of Pondoland sandstone. Above the cliffs, on either side, are gently undulating sandy grassy plains, with scattered and little eroded rocky outcrops. There are many seepages and small vleis.

The vegetation is Pondoland coastal plateau sourveld, and consists of forest and grassland, each vegetation-type occupying c.1,500 ha. The forest boasts over 330 woody species. It has typical coastal elements, together with species usually associated with the mistbelt, but many of the dominant trees are near-endemics. Common canopy trees include *Celtis*, *Harpephyllum*, *Ficus*, *Pseudoscolopia*, *Cassipourea*, *Rhus*, *Orcia*, *Vepris* and *Cryptocarya*. Cliff-edges and fire-protected rocky outcrops have dense clumps of *Schefflera*, *Brachylaena*, *Cassine*, *Protorhus*, *Diospyros*, *Cryptocarya* and *Rhus*. The grassland is also exceptionally diverse and only a third of its species are grasses, the remainder being sedges and forbs.

**Birds**

See Box and Tables 2 and 3 for key species. The extensive series of cliffs in the Umtamvuna Gorge hold one of the only coastal colonies of *Gyps coprotheres* in South Africa. The colony is thriving, and is one of the few in South Africa that is not declining. Typically 20–30 chicks fledge each year. The viewing opportunities, for seeing the vultures at their nests, and cruising around the breeding cliffs, without causing any disturbance, are without parallel in South Africa. The reserve holds a vulture restaurant, where carcasses are provided, without any particular timetable, in order to encourage the vultures to forage near home. The grasslands hold species of conservation concern such as *Grus paradisea*, *Neotis denhami* and *Circus maurus*. The wetlands in the reserve hold *Balearica regulorum*. The backwaters of the river hold *Podica senegalensis*. The forest in the gorge supports a small population of *Zoothera guttata* (in winter), as well as *Tauraco corythaix*, *Campethera notata*, *Cossypha dichroa*, *Cercotrichas signata* and *Serinus scotops*.

**Key species**

A1	<i>Gyps coprotheres</i>	<i>Campethera notata</i>
	<i>Circus maurus</i>	<i>Zoothera guttata</i>
A2 (089)	South African forests EBA: Five of the seven species of this EBA that occur in South Africa have been recorded at this site; see Table 2.	
A3 (A07)	Afrotropical Highlands biome: 10 of the 23 species of this biome that occur in South Africa have been recorded at this site; see Table 3.	
A4ii	Breeding (pairs)	Non-breeding
	<i>Gyps coprotheres</i>	40–48      100–150

**Other threatened/endemic wildlife**

Umtamvuna is an ancient centre of botanical endemism, and is the finest remaining example of the highly diverse Pondoland sandstone flora. Some of the plants are extremely rare and localized. *Raspalia trigyna*, for example, was at one time thought to be represented by only a single individual plant. This was killed in an accidental fire. Subsequently, the species has been reintroduced, using cuttings from a second plant recently discovered in the former Transkei. The forest is the only, or principal, home of a host of rare trees. Examples are *Catha abbottii*, *Ochna chilversii*, *Colubrina nicholsonii* (EN), *Manilkara nicholsonii* (EN), *Pseudosalacia streyi* (VU), *Eugenia umtamvunensis* (VU), *E. verdoorniae* (LR/nt), at least three other species of *Eugenia* awaiting description, *Dahlgrenodendron natalensis* (EN), *Syzygium pondoense* (VU), *Indigofera braamtonyi*, *Maytenus abbottii* (VU) and *M. bachmannii*.

Rare grassland plants include *Rhus pondoensis*, *Leucadendron spissifolium*, *Encephalartos laevifolius*, *Raspalia trigyna*, *Podalyria velutina*, *Psoralea abbottii*, *Phyllanthus arvensis*, *Anisodonta scabra*, *Erica abbottii*, *Brachystelma australe*, *Selago peduncularis* and *Helichrysum diffusum*. Rock outcrops bear *Anthospermum streyi*, *Apodytes abbottii*, *Craterostigma nanum*, *Canthium suberosum* and *C.*

*vanwykii*. The chameleon *Bradypodion caffrum*, a Pondoland coastal plateau endemic, is present, as are the butterflies *Charaxes pondoensis* and *Durbania amakosa albescens*.

**Conservation issues**

Umtamvuna was owned from 1939 onwards by the Forestry Department, with the original intention of planting timber. However, the land was absolutely unsuitable for this purpose, never developed, and was given to the KwaZulu-Natal Nature Conservation Service (formerly the Natal Parks Board) to be proclaimed a Nature Reserve in 1971. The reserve was enlarged in 1983. During the 1980s two threats loomed, both of which seem to have receded. The first was a proposal to dam the river downstream of the reserve, to boost the water supply for Port Edward. The dammed water would have backed up into the reserve, inundating the adjacent riverine vegetation. The second was a plan to mine bauxite in the catchment upstream of the reserve. There can be little doubt that severe contamination of the river would have resulted.

**Further reading**

Piper (1985, 1994).

**Mkambati Nature Reserve**
**ZA066**

Admin region Eastern Cape

Coordinates 31°16'S 29°59'E

A1, A2 (089), A3 (A07), A4ii

Area c.8,000 ha Altitude 0–300 m

Nature Reserve

**Site description**

The Mkambati Nature Reserve is situated on the coast of north-east Pondoland in the Eastern Cape. It is bounded by the Mtenu river in the north and the Mzikaba river in the south; in the east, between the two river mouths, it holds a 13 km stretch of pristine coastline. The reserve stretches inland c.5 km along the Mzikaba river and c.9.5 km along the Mtenu river. The gentle topography is interrupted by two steps (ancient shorelines) parallel to the coast, the first at 85 m elevation and the second at 190 m. The Mtenu river reaches the ocean through a long, incised and meandering gorge. Table Mountain sandstone cliffs flank the river, rising 300 m from the riverbed to meet the surrounding plains. The Mtenu river forms a spectacular waterfall c.9 km upstream of the coast. The waterfall has cut an almost straight cliff-face some 500 m wide. The cliffs are for the most part sheer, beginning at the coast and continuing inland for about 10–20 km.

The vegetation is primarily Pondoland coastal plateau sourveld grassland, on poor but well-drained soils. The grasses are low in nutrient content and are of little agricultural value to commercial or subsistence farmers. Surprisingly large numbers of fynbos species also occur, in unburned grasslands or on rock outcrops where they are protected from regular fires. Small forest patches exist in the river gorges and on the coastal sand-dunes.

**Birds**

See Box and Tables 2 and 3 for key species. The cliffs on the Mtenu river hold one of the largest remaining colonies of *Gyps coprotheres* in the Eastern Cape. This colony is also one of the few protected breeding sites in the world. The grassland supports *Balearica regulorum*, *Neotis denhami* and *Saxicola bifasciata*. Scattered *Protea* bushes hold *Promerops gurneyi*. The small forest patches hold *Cossypha dichroa*, *Cercotrichas signata* and *Zoothera guttata*, which may breed here. *Campethera notata*, nearing the northern limit of its distribution here, is uncommon. *Turnix hottentotta*, *Crex crex* and *Sarothrura affinis* have all been recorded in grassland areas nearby, and almost certainly occur within the reserve. The Mtenu river and its tributaries have thick overhanging riverine vegetation which support *Gorsachius leuconotus*, *Podica senegalensis* and *Alcedo semitorquata*.

**Key species**

A1	<i>Gyps coprotheres</i>	<i>Zoothera guttata</i>
	<i>Campethera notata</i>	<i>Saxicola bifasciata</i>
A2 (089)	South African forests EBA: One of the seven species of this EBA that occur in South Africa has been recorded at this site; see Table 2.	
A3 (A07)	Afrotropical Highlands biome: 10 of the 23 species of this biome that occur in South Africa have been recorded at this site; see Table 3.	
A4ii	Breeding (pairs)	Non-breeding
	<i>Gyps coprotheres</i>	40–70      85–140

### Other threatened/endemic wildlife

The area is particularly rich in highly localized endemic frogs—*Afrixalus knysnae*, *Arthroleptella hewitti* and *Arthroleptis wahlbergi* all occur along this coastal region and possibly occur within the reserve. There are c.1,600 reintroduced wild ungulates in the reserve, including the nationally endemic *Damaliscus dorcas phillipsi*.

### Conservation issues

The site is located in a region where stock densities are intense, husbandry techniques traditional and stock mortality high. Although the vultures are relatively safe at their breeding sites within the reserve, they move considerable distances inland while foraging and may be exposed to a suite of threats. Poisoned carcasses set for vermin, or more commonly by traditional practitioners for ‘muti’, or medicine, may be responsible for considerable numbers of vulture mortalities (hundreds can be killed in a single poisoning incident). In order to implement an effective awareness campaign informing local land-users of the vultures and their significance, it is vital that the extent of the vultures’ foraging area be determined. At the nests, adults that are disturbed, for even short periods, may lose their eggs or nestlings for that year. The period of greatest vulnerability extends from egg-laying in April (peak in May), through peak hatching in July, to fledging by October/November.

The conversion of natural grassland to arable plots in the former Transkei has resulted in greater shortage of indigenous grass species used for thatch, such as *Cymbopogon validus*. Residual supplies in conservation areas such as Mkambati could assume great importance. If access to these supplies was permitted, there would be a concomitant increase in conservation awareness among the local people who are deriving a tangible benefit from this protected area.

### Further reading

Piper and Ruddle (1986), Shackleton (1990), Shackleton *et al.* (1991).

### Collywobbles vulture colony

Admin region Eastern Cape

Coordinates 32°00'S 28°37'E

Area c.2,000 ha Altitude 280–625 m

ZA067

A1, A4ii

Unprotected

### Site description

Collywobbles is an ancestral vulture colony occurring along the cliffs of the convoluted gorge formed by the meandering mBashe river in the Idutywa District (former Transkei). The colony is situated c.5 km from the Collywobbles store. This colony has been in existence since at least the 1890s. The river, which has cut a deep broad gorge, lies 300 m below the surrounding plains.

### Birds

See Box for key species. The number of *Gyps coprotheres* at Collywobbles has fluctuated dramatically over the last 20 years. Approximately 200 pairs inhabited the cliffs in the late 1970s. Breeding numbers increased sharply in the early 1980s, rising to over 300 pairs, and then stabilized. The elevated total persisted until the end of the decade (at which time it was one of the largest colonies in the world). Numbers then decreased rapidly between 1989 and 1993 before fixing on lowered, more stable totals of 60–90 pairs per year. The vultures have nested on 13 separate cliffs—Main, mSikiti and Ledger cliffs support the largest numbers of breeding pairs and, together, they regularly represent up to 60% of all the breeding vultures at Collywobbles. Annual fluctuations in numbers of breeding birds may be more extreme at the other 10 cliffs.

#### Key species

A1 *Gyps coprotheres*

A4ii

*Gyps coprotheres*

Breeding (pairs)

60–90

Non-breeding

150–250

### Other threatened/endemic wildlife

None known to BirdLife International.

### Conservation issues

This colony is located in a region which has always been used by pastoralists, where stock densities are high and husbandry techniques traditional. However, trends in land-use patterns are shifting and it would appear that the vultures are responding to these changes. Until 1989 this

colony of *Gyps coprotheres* had been one of the largest and most successful in southern Africa, with over 800 birds (7% of the global population) present here at any one time. The dramatic reduction in vulture numbers was attributed to improved husbandry techniques and changes in pastoralist practices, including a reduction in livestock density, which has been a result of peri-urbanization and an abandonment of traditional lifestyles by rural residents. The vultures’ continued existence at this site is under severe threat. At the nests, adults that are disturbed, for even short periods, may lose their eggs or nestlings for that year. The period of greatest vulnerability extends from egg-laying in April (peak in May), through peak hatching in July to fledging by October/November.

Although vultures face many problems at their breeding sites, they also move considerable distances inland while foraging, and are exposed to a different suite of threats. Poisoned carcasses set for vermin, or more commonly by traditional practitioners for ‘muti’, or medicine, may be responsible for considerable numbers of vulture mortalities (hundreds can be killed in a single poisoning incident). In order to implement an effective awareness campaign that informs local land-users of the vultures and their significance, it is vital that the extent of the vultures’ foraging area be determined. The Vulture Monitoring Project of the Vulture Study Group counts nestlings at Collywobbles as a measure of the success of this population. It is important that the colony remains under constant monitoring.

### Further reading

Jarvis *et al.* (1974), Vernon and Piper (1988), Vernon *et al.* (1980, 1982, 1983, 1984).

### Dwesa and Cwebe Nature Reserves

ZA068

Admin region Eastern Cape

Coordinates 32°16'S 28°53'E

A1, A2 (089), A3 (A07)

Area 6,050 ha Altitude 0–300 m

Nature Reserves

### Site description

This IBA consists of two adjoining reserves on the north-eastern Pondoland coast, one on either side of the mBashe river. These two reserves contain 20 km of pristine coastline and coastal forest. The topography rises step-wise from the coast to 300 m and is composed of Karoo sediments and Ecca shales and sandstones. The area is drained by a number of rivers, the most important being the mBashe. Growing on well-drained but poor soils, the vegetation is typical of edaphic coastal plateau sour grasslands that constitute part of the Tongaland–Pondoland mosaic. The grasses are low in nutrient content and are of little agricultural value to commercial or subsistence farmers. Small forest patches exist in the river gorges and on the coastal sand-dunes. The primary canopy trees in the coastal forest are of *Millettia*, *Albizia*, *Drypetes*, *Heywoodia*, *Sideroxylon*, *Celtis*, *Combretum*, *Ficus* and *Protorhus*. In the coastal sand-dune forest, *Millettia* and *Buxus* are found. Mangroves of *Bruguiera*, *Avicennia* and *Rhizophora* are quite extensive at the site, which lies at the southern limit of the East African mangrove belt.

### Birds

See Box and Tables 2 and 3 for key species. The coastal forest at this site is vitally important for *Zoothera guttata*, which breeds here. Bird parties are frequent and typical forest birds include *Ceratogymna bucinator*, *Apaloderma narina*, *Tauraco corythaix*, *Campethera notata*, *Coracina caesia*, *Cossypha dichroa*, *Pogonochila stellata*, *Cercotrichas signata*, *Trochocercus cyanomelas*, *Telophorus olivaceus*, *Estrilda melanotos* and *Serinus scotops*. The quiet forest streams hold *Alcedo semitorquata* and *Motacilla clara*. The moist grassland patches surrounding the forest hold *Balearica regulorum* and, occasionally, *Neotis denhami*. The coastal mangroves hold the only protected breeding population of *Halcyon senegaloides* in South Africa. The rugged coastline, and its associated musselbeds, support *Haematopus moquini*.

#### Key species

A1 *Haematopus moquini*

*Zoothera guttata*

*Campethera notata*

A2 (089) South African forests EBA: Five of the seven species of this EBA that occur in South Africa have been recorded at this site; see Table 2.

A3 (A07) Afrotropical Highlands biome: Eight of the 23 species of this biome that occur in South Africa have been recorded at this site; see Table 3.

### Other threatened/endemic wildlife

The reptiles *Macrelaps microlepidotus* and *Dasypteltis inornata*, endemic to South Africa, are known to occur within the reserve. The area is also particularly rich in highly localized endemic frogs—*Hyperolius semidiscus*, *Leptopelis natalensis*, *Breviceps verrucosus* and *Natalobatrachus bonebergi* have all been recorded within the reserves.

### Conservation issues

Both reserves were gazetted in 1975 in the apartheid homeland of the Transkei. This area, like many other coastal forest areas along the south-east coast, may suffer from deforestation and firewood removal by adjacent rural populations. Removal of old-growth trees could affect hole-nesting species such as *Ceratogymna bucinator* and *Phoeniculus purpureus*. Populations of these birds should be monitored as they may elucidate trends in old-growth removal. These reserves could suffer from land claims, and the return of the land to its original inhabitants through deproclamation is not impossible; this should be avoided at all costs, and any land claims in this area should be closely monitored.

### Further reading

Benson (1950, 1952), Clancey (1955, 1957a,b), Johnson and Cawe (1987), Quickelberge (1969).

## Karoo Nature Reserve

Admin region Eastern Cape

Coordinates 32°15'S 24°32'E

Area 17,500 ha Altitude 805–1,565 m

ZA069

A1, A3 (A12), A4ii  
Nature Reserve

### Site description

This reserve is located in the southern foothills of the curving Sneeuberg range on the central Great Karoo plains. It is unusual in that it virtually surrounds the historic town of Graaff-Reinet. Both the reserve and town are included in the IBA. The reserve is largely mountainous and it ranges in altitude from the Sundays river up to the impressive peaks at Spandaukop (1,316 m), Valley of Desolation (1,399 m) and the tallest in the region, Drie Koppe (1,565 m) in the east. The northern edge of the Camdeboo Plain is located within the reserve. This plain is a large basin that is sharply dissected by the Sundays river and its tributaries, the Vöel, Melk, Klip and Swart rivers. The Van Rhyneveld's Pass Dam, on the Sundays river, falls within the reserve and covers 1,000 ha when full.

The reserve's vegetation is transitional between the characteristic scrub of the Great Karoo and the typical thornveld and bush clumps of the Eastern Cape, which accounts for the considerable diversity of veld-types found here. Dwarf shrubs dominate the karroid scrub, which covers much of the plains and lower escarpment, together with succulents and grasses. Dense and extensive thornveld, dominated by *Acacia*, forms belts of riverine woodland lining the mostly dry riverbeds that stretch throughout the plains of the reserve. The hills are essentially grassveld. The lower slopes of the mountains, especially where north-facing, are covered with dense stands of succulent mountain scrub, characterized by spekboom *Portulacaria*. Shrubland grows on rocky slopes and ridges, and includes *Rhus*, *Maytenus*, *Lycium*, *Grewia*, *Buddleja* and *Olea*.

### Birds

See Box and Table 3 for key species. Over 200 bird species have been recorded in the diverse array of habitats in the reserve. The lowland karroid plains are particularly good for *Ardeotis kori*, *Neotis ludwigii* and *N. denhami*, and this is one of the few areas in South Africa where all three bustards are sympatric. The plains also hold *Grus paradisea*, *Eupodotis vigorsii* and *Malcorus pectoralis*. The belts of *Acacia* woodland hold *Phragmacia substriata*, *Sylvia layardi*, *Parus afer* and *Sporopipes squamifrons*. *Monticola rupestris*, *Onychognathus nabouroup* and *Geocolaptes olivaceus* occur in rocky gorges and kloofs. Other arid-zone species occurring within the reserve are *Melierax canorus*, *Stenostira scita* and *Serinus albogularis*. *Serinus alario* occurs seasonally, whenever there is seeding grass and water. *Falco naumanni* have a large roost near the town's railway station and are frequently seen hawking over the reserve.

#### Key species

A1	<i>Falco naumanni</i>	<i>Geocolaptes olivaceus</i>
	<i>Grus paradisea</i>	

A3 (A12) Namib-Karoo biome: Eight of the 19 species of this biome that occur in South Africa have been recorded at this site; see Table 3.

A4ii	Breeding (pairs)	Non-breeding
<i>Falco naumanni</i>	—	500–3,000

### Other threatened/endemic wildlife.

The snake *Bitis inornata* (VU) has a minuscule range, confined to the Sneeuberg, near Graaff-Reinet, and it may occur within the reserve. The reserve supports other reptiles: *Bradypodion karrooicum*, *Homopus boulengeri*, *H. femoralis*, *Psammobates tentorius*, *Chersina angulata*, *Lamprophis guttatus*, *Pseudocordylus microlepidotus*, *Pachydactylus capensis*, *P. bibronii*, *P. maculatus* and *P. mariquensis*. It is conservation policy to restock the reserve with game species that roamed these plains prior to human intervention, and the threatened endemic mammal *Equus zebra* (VU) has been reintroduced.

### Conservation issues

The land for this reserve was purchased by the World Wide Fund for Nature (WWF-South Africa) (formerly the Southern African Nature Foundation) in 1979, and the reserve was proclaimed in 1983, and is controlled by the Directorate of Nature Conservation of the Eastern Cape Province. The reserve is easily accessible to the public and contains the well-known scenic view site, 'The Valley of Desolation' which, with its sweeping panorama over the Plains of Camdeboo, attracts many visitors.

The reserve and surrounding farmland hold important habitat for South Africa's three bustards, *Grus paradisea* and *Polemaetus bellicosus*. All of these threatened species are large and wide-ranging. They depend on private land surrounding the reserve, which is subject to overgrazing and resultant habitat degradation. The reserve, in isolation, probably would not support viable populations of these wide-ranging birds. Because the area provides a unique opportunity to safeguard all of these species within a single sanctuary, two options ought to be considered. (1) Enlarging the reserve. Atlas data suggest that all target species are more common to the south of the reserve on the Camdeboo Plains. Enlarging the area under formal protection, particularly to the south, would add considerably to the biological integrity of the reserve system. (2) The reserve fulfils an important educational function: the Camdeboo Environmental Centre was established to promote environmentally responsible lifestyles among South Africans and has various educational facilities and an education officer. An awareness campaign highlighting the reserve's unique avifaunal nature should be launched within the Graaff-Reinet District. Farmers to the south of the reserve should be encouraged to create a conservancy, specifically for the management of bustards, cranes and large raptors.

Poisons and pesticides that affect raptors are used in the farming areas. *Falco naumanni* have been observed taking locusts in the midst of spraying operations. The effects that pesticides are having on this threatened species are currently unknown.

### Further reading

Allan (1989, 1994c, 1995b), Martin *et al.* (1991), Palmer (1989a,b), Pepler (1994a,b).

## Katberg-Readsdales forest complex

Admin region Eastern Cape

Coordinates 32°36'S 26°35'E

Area c.20,000 ha

Altitude 880–1,828 m

ZA070

A1, A2 (089), A3 (A07)

Game Reserve,  
State Forests

### Site description

The centre of this IBA lies in the Mpofu District c.80 km west of King William's Town; it consists of several interconnected montane forest blocks, the rolling grasslands of the Mpofu Game Reserve, and the surrounding fragmented urban and rural areas. Much of the area comprises steep cliff-faces with numerous small perennial and non-perennial streams. The area has several high peaks, including Katberg (1,828 m) and Devil Bellow's Neck (1,726 m). The region supports an array of diverse plant communities, including both wet and dry forests, with scrub-forest and rolling grasslands at lower altitudes. Dominant plants of the forest canopy include *Podocarpus*, *Xymalos*, *Rapanea*,

*Ptaeroxylon* and *Vepris*. *Pinus* plantations, which abut the indigenous forests directly, occur as small, isolated, scattered pockets throughout the area.

### ■ Birds

See Box and Tables 2 and 3 for key species. The forests in this IBA hold a considerable number of the escarpment form of *Poicephalus robustus robustus*. Populations of *Zoothera gurneyi* and *Lioptilus nigricapillus* are also found here. Other forest specials include *Buteo oreophilus*, *Tauraco corythaix*, *Campethera notata*, *Cossypha dichroa*, *Cercotrichas signata* and *Serinus scotops*. At higher altitudes, where the barren rocky slopes become prominent, *Geocolaptes olivaceus*, *Chaetops aurantius*, *Saxicola bifasciata* and *Monticola explorator* become common. In the low-altitude rolling grasslands *Circus maurus*, *Vanellus melanopterus*, *Neotis denhami*, *Grus paradisea* and *Balearica regulorum* occur.

#### Key species

A1	<i>Circus maurus</i>	<i>Chaetops aurantius</i>
	<i>Campethera notata</i>	<i>Saxicola bifasciata</i>
	<i>Geocolaptes olivaceus</i>	<i>Lioptilus nigricapillus</i>
A2 (089)	South African forests EBA: Six of the seven species of this EBA that occur in South Africa have been recorded at this site; see Table 2.	
A3 (A07)	Afrotropical Highlands biome: 13 of the 23 species of this biome that occur in South Africa have been recorded at this site; see Table 3.	

### ■ Other threatened/endemic wildlife

The Katberg-Readsdale forest complex, along with the Amatole forests (IBA ZA071), supports the highly localized *Anhydrophyrne rattrayi* and *Afroedura amatolica*.

### ■ Conservation issues

The complex includes the adjoining Katberg and Readsdale State Forests as well as the Mpofu Game Reserve. Although this area was previously managed by Ciskei Forestry, control of all indigenous forests was handed over to the Directorate of Nature Conservation of the Eastern Cape Province authorities in 1996, and management plans for all forests are in preparation. Commercial forestry (SAFCOL) and smaller private forestry concerns are operational within and surrounding the area. It is important that their interests are monitored. There are no grazing or hunting rights as specified in the Forest Conservation Act, although resource extraction (fuelwood, bark, building materials, etc.) does take place. The boundaries of the forests are not physically demarcated and there is considerable movement of faunal populations between adjacent forest areas. Together, the complex forms a large forest network, which is likely to maintain its biological integrity provided no further fragmentation or habitat destruction occurs. Water-hungry non-native plantations, above indigenous forest zones, deprive indigenous forests of water, potentially changing forest structure and functioning. Plantations should be managed to ensure that the indigenous forests receive their water requirements.

Other threats to the area's forests include unsustainable harvesting of indigenous timber, targeting *Podocarpus* in particular. *Poicephalus robustus robustus* is threatened by illegal trapping for the cage-bird trade. Illegal hunting using dogs, snares and weapons poses a threat to several small mammals and birds. Grazing of domestic livestock occurs within the forest and at forest margins, resulting in ecotone degradation.

### ■ Further reading

Castley (1996), Castley and Kerley (in press), Cawe and McKenzie (1989a,b), Commins (1962), Everard and Hardy (1992, 1993a,b,c), Feely (1954), Gaylard and Castley (1996), Hardy and Everard (1993), Johnson and Cawe (1987), Maddock (1986), Poduschka (1980), Skead (1964a,b, 1971), Story (1952), Thompson (1991), Wells (1973).

### Amatole forest complex

Admin region Eastern Cape

Coordinates 32°39'S 27°08'E

Area c.42,000 ha Altitude 496–2,016 m

ZA071

A1, A2 (089), A3 (A07)

State Forests

### ■ Site description

The centre of this site lies c.20 km north-west of King William's Town and 24 km south-west of Stutterheim. The IBA consists of a series of

montane forest blocks surrounding fragmented urban and rural areas. The forest complex runs from Hogsback State Forest in the east to Fort Cunningham State Forest in the west, and includes large State-owned forest blocks as well as smaller patches which provide continuity between the larger blocks, especially in the Keiskammahoek area. The boundaries are not distinct and the forests merge with the rural and urban areas on the borders of the IBA.

The area is generally rugged and comprises cliffs, steep slopes and thickly forested gorges, with several high peaks such as Elandsberg (2,016 m) and Gaika's Kop (1,963 m). There are numerous perennial and non-perennial streams. The largest of these, the Buffalo river, feeds the Maden and Rooikrantz dams, which supply water to the greater King William's Town/Bisho District. The Amatole mountains support a diverse array of plant communities, with 442 plant species described from the area. The forest complex holds both wet and dry forests, with scrub-forest at lower altitudes. Dominant trees of the canopy include *Podocarpus*, *Xymalos*, *Rapanea*, *Ptaeroxylon*, *Canthium*, *Celtis*, *Trichocladus*, *Curtisia* and *Vepris*. *Pinus* plantations, which abut the indigenous forests directly, occur as small, isolated, scattered pockets throughout the area. The highest areas, particularly in the rain-shadow, are characterized by a mixture of montane grassland and fynbos heath.

### ■ Birds

See Box and Tables 2 and 3 for key species. The forests in this IBA hold a considerable number of the escarpment race of *Poicephalus robustus robustus*. Southern Africa's most southerly populations of *Zoothera gurneyi* and *Lioptilus nigricapillus* are also found in the Amatole Forests. Other forest specials include *Buteo oreophilus*, *Tauraco corythaix*, *Campethera notata*, *Cossypha dichroa*, *Cercotrichas signata* and *Serinus scotops*. The localized patches of open proteoid woodland in the grassy areas hold both *Promerops cafer* and *P. gurneyi* (the only area where these species are sympatric). At high altitudes, where barren rocky slopes become prominent, *Geocolaptes olivaceus*, *Chaetops aurantius*, *Saxicola bifasciata* and *Monticola explorator* are found. In the lower-altitude regions of rolling grassland, *Circus maurus*, *Vanellus melanopterus*, *Neotis denhami*, *Grus paradisea* and *Balearica regulorum* occur.

#### Key species

A1	<i>Circus maurus</i>	<i>Chaetops aurantius</i>
	<i>Campethera notata</i>	<i>Saxicola bifasciata</i>
	<i>Geocolaptes olivaceus</i>	<i>Lioptilus nigricapillus</i>
A2 (089)	South African forests EBA: Six of the seven species of this EBA that occur in South Africa have been recorded at this site; see Table 2.	
A3 (A07)	Afrotropical Highlands biome: 15 of the 23 species of this biome that occur in South Africa have been recorded at this site; see Table 3.	

### ■ Other threatened/endemic wildlife

The tributaries of the Kieskamma and Buffalo river systems, which occur within the IBA, hold two endemic threatened and highly localized fish species, *Sandelia bainsii* (EN) and *Barbus trevelyani* (CR). Among herptiles, the Amatoles are the only home to the extremely range-restricted *Bufo amatolicus* (VU) and, along with the Katberg-Readsdale forests (IBA ZA070), they also support *Anhydrophyrne rattrayi*, which is endemic to both of these mountain blocks. The Amatoles also support the South African endemic *Afroedura amatolica*, *Bradypodion ventrale* and an isolated population of *Macrelaps microlepidotus*.

### ■ Conservation issues

Although this area was previously managed by Ciskei Forestry, control of all indigenous forests was handed over to the Directorate of Nature Conservation of the Eastern Cape Province authorities in 1996, and management plans for all forests are in preparation. Commercial forestry (SAFCOL) and smaller private forestry concerns are operational within and surrounding the area. It is important that their interests are monitored. There are no grazing or hunting rights as specified in the Forest Conservation Act, although resource extraction (fuelwood, bark, building materials, etc.) does take place.

The boundaries of the forests are not physically demarcated and there is considerable movement of faunal populations between adjacent forest areas. Together, the complex forms a large forest network, which is likely to maintain its biological integrity provided no further fragmentation or habitat destruction occurs. Water-hungry

non-native plantations, above indigenous forest zones, deprive indigenous forests of water, potentially changing forest structure and functioning. Plantations should be managed to ensure that the indigenous forests receive their water requirements.

Other threats to the area's forests include unsustainable harvesting of indigenous timber, targeting *Podocarpus* in particular. *Poicephalus robustus robustus* is threatened by illegal trapping for the cage-bird trade. Illegal hunting using dogs, snares and weapons poses a threat to several small mammals and birds. Grazing of domestic livestock occurs within the forest and at forest margins, resulting in ecotone degradation.

#### Further reading

Castley and Kerley (in press), Castley (1996), Cawe and McKenzie (1989a,b), Commins (1962), Everard and Hardy (1992, 1993a,b,c), Feely (1954), Gaylard and Castley (1996), Hardy and Everard (1993), Johnson and Cawe (1987), Maddock (1986), Poduschka (1980), Skead (1964a,b, 1971), Story (1952), Thompson (1991), Wells (1973).

### Kouga–Baviaanskloof complex

**ZA072**

Admin region Eastern Cape, Western Cape

Coordinates 33°37'S 23°42'E

A1, A2 (088), A3 (A13)

Area c.172,000 ha

State Forest,

Altitude 376–1,757 m

Wilderness Area

#### Site description

The Kouga–Baviaanskloof complex encompasses large areas of mountainous terrain in the western portion of the Eastern Cape. The Kouga and Baviaanskloof ranges are c.120 km long and run parallel to one another from Uniondale in the west to Patensie in the east. The Baviaanskloof valley, which separates the ranges, lies c.40 km due north of the coastline, and to the south the Langkloof and Tsitsikamma ranges separate these mountains from the coast. The larger and more extensive Kouga range contains many high peaks at its central and western extent, up to 1,757 m. The eastern edge of the range is less rugged, and consists of plateaus and rolling hills falling below 900 m. Relative to Kouga, the linear Baviaanskloof range is far narrower and much more uniform in shape, peaking at 1,625 m. The north-facing slopes drop steeply into the Great Karoo.

Three main rivers drain the area: the Baviaans and Kouga rivers flow eastwards into the Kouga Dam, and the Groot river flows through a spectacular gorge before joining the Gamtoos river, which runs to the coast. The mainly leached and acid soils support mesic mountain fynbos. Trees of *Pappea*, *Schotia* and *Euclea* are common. Patches of Afromontane forest occur in deep, secluded, mesic gorges and are dominated by trees of *Cunonia*, *Halleria*, *Pterocelastrus*, *Rapanea* and *Podocarpus*. Arid veld occurs on the xeric northern slopes, dominated by *Aloe*, *Euphorbia* and *Crassula*. Spekboomveld is found on the steepest slopes at lowest altitude and is dominated by *Portulacaria* and *Putterlickia*. On the plains of the Great Karoo, karroid scrub appears, dominated by *Tetragonia*, *Pteronia*, *Euclea*, *Euphorbia*, *Crassula* and *Cotyledon*.

#### Birds

See Box and Tables 2 and 3 for key species. The Kouga–Baviaanskloof complex and the surrounding plains hold a remarkable number of avian habitats, making it home to approximately 300 bird species. Within the low fynbos scrub, *Sarothrura affinis* is found and the western race (*nana*) of *Turnix hottentotta* is suspected. *Nectarinia violacea* is widespread in ericas, while *Promerops cafer* and *Serinus leucopterus* occur in the proteoid elements and tall scrub. *Francolinus capensis*, *Pycnonotus capensis* and *Serinus totta* are widespread within the fynbos, while *Bradypterus victorini* is found in moist seeps in the hilly areas. *Geocolaptes olivaceus* is common on most rocky slopes above 1,000 m, while *Chaetops frenatus* is inexplicably rare, with a few records from the western Baviaanskloof area. The isolated forest patches, particularly in the south, hold several forest endemics, including *Campethera notata* and *Serinus scotops*.

The Great Karoo plains and northern foothills of the complex hold *Eupodotis vigorsii*, *Cercomela sinuata* and *Malcorus pectoralis*. *Serinus alario* occurs occasionally, whenever there is seeding grass and water. The belts of riverine *Acacia* woodland hold *Phragmacia substriata*, *Sylvia layardi* and *Parus afer*. *Onychognathus naboroupp* occurs in

rocky gorges and kloofs. Several small roosts of *Falco naumanni* occur; the birds disperse during the day to forage on the plains. Furthermore, the coastal grassland belt to the south holds *Grus paradisea*, *Neotis denhami* and *Circus maurus*.

#### Key species

A1	<i>Circus maurus</i>	<i>Geocolaptes olivaceus</i>
	<i>Grus paradisea</i>	<i>Serinus leucopterus</i>
	<i>Campethera notata</i>	<i>Serinus totta</i>
A2 (088)	Cape fynbos EBA: All of the six species of this EBA that occur in South Africa have been recorded at this site; see Table 2.	
A3 (A13)	Fynbos biome: Eight of the nine species of this biome that occur in South Africa have been recorded at this site; see Table 3.	

#### Other threatened/endemic wildlife

This area is thought to hold in excess of 2,000 plant species, and there are many endemic species of Ericaceae and Restionaceae in the southern Kouga–Baviaanskloof complex. Among herptiles, *Goggia hewitti* has most of its global range restricted to the Baviaanskloof mountains and the rare *Lamprophis fuscus* (LR/nt) has been recorded here, as has the highly localized *Heleophryne regis* and an as-yet-undescribed species of *Bradypodion*.

#### Conservation issues

Most of this terrain forms the Kouga/Baviaanskloof Wilderness Area (172,208 ha, comprising 155,323 ha demarcated State Forest and 16,885 ha undemarcated State Forest). An additional 157,829 ha have been proposed as Wilderness Area, in accordance with the policy of the Department of Water Affairs and Forestry (DWAF) (formerly the Directorate of Forestry and Environmental Conservation) to extend reserves for more effective water management.

Invasive non-native trees of *Acacia*, *Hakea* and *Pinus* pose a serious threat to the conservation of water and natural vegetation in these mountains. In places, these exotic taxa dominate thousands of hectares of natural vegetation, significantly modifying communities and threatening many indigenous taxa with extinction. Non-native trees are also known to accelerate riverbank erosion and reduce in-stream flow. They are also responsible for changes in fire regime and alteration of plant community composition. Physical removal, bio-control and the use of fire as a control agent are now appropriately incorporated into most management plans.

Within the IBA, limited and controlled agricultural and urban development is allowed, in which grazing, game-farming and flower- and plant-harvesting are permitted on a scale that is compatible with ecosystem preservation. The greater human usage of this mountain area increases the chance of dispersal of the exotic Argentine ant *Iridomyrmex humilis* into these ecosystems. This species ousts the indigenous ants that are responsible for seed dispersal of numerous fynbos species. The loss of the indigenous ants could have a major negative impact on the local biota.

#### Further reading

Cowling (1992), Euston-Brown (1995), McGill (1992), Richardson *et al.* (1992), van Wilgen *et al.* (1992).

### Alexandria coastal belt

**ZA073**

Admin region Eastern Cape

Coordinates 33°42'S 26°16'E

A1, A2 (089), A3 (A07)

Area 15,460 ha Altitude 0–408 m

Nature Reserve, State Forest

#### Site description

This IBA is a stretch of coastal dunefield, 57.5 km in length and c.2.1 km wide, running from the Sundays river mouth to Cannon Rocks. The IBA includes Alexandria Forest and the coastal grasslands inland of the dunefield. The Woody Cape Nature Reserve holds the Alexandria Dunefield, which consists of open sand and several series of dune-slacks, interdune hollows and depressions between the dunes. This vast dune sea is considered by some to be the best example of a mobile dune system in the world. The dune-slacks support a distinctive coastal dune herbland. In stable dunes, thicket vegetation comprises many forest-precursor tree species. The dense, low-altitude (100–357 m) Alexandria State Forest, situated on the northern shores of Algoa Bay, lies inland of Cape Padrone. The forest backs the dunefield

on the eastern extreme where rainfall is considerably higher. Although the vegetation is designated as Tongaland–Pondoland lowland forest, it has Afrotropical affinities. Dominant trees include *Ochna*, *Apodytes*, *Cassine* and *Sideroxylon*, while frequently encountered sub-dominants include *Euclea*, *Pittosporum*, *Rapanea*, *Strychnos*, *Pterocelastrus* and *Schotia*.

### ■ Birds

See Box and Tables 2 and 3 for key species. The dry, unvegetated dunes and coastal slacks of the Woody Cape Nature Reserve hold c.17% of South Africa's breeding population of *Sterna balaenarum*, the only such colony in the Eastern Cape. They also hold 2% of the global breeding population of *Haematopus moquini*. The wide open beaches and dunes hold large numbers of waders in summer. *Circus maurus*, *Neotis denhami* and *Vanellus melanopterus* all occur at very low densities in the partially vegetated dune-slacks and in the short, fringing inland grassland. Forest patches are highly localized and the dunes are filled with mostly secondary scrub, the only large patch of climax forest being found in Alexandria State Forest. The forest here holds *Stephanoaetus coronatus*, *Buteo oreophilus*, *Tauraco corythaix*, *Telophorus olivaceus*, *Apaloderma narina*, *Bradypterus sylvaticus*, *Campethera notata*, *Cossypha dichroa*, *Cercotrichas signata* and *Serinus scotops*.

#### Key species

A1	<i>Circus maurus</i>	<i>Sterna balaenarum</i>
	<i>Haematopus moquini</i>	<i>Campethera notata</i>
A2 (089)	South African forests EBA: Six of the seven species of this EBA that occur in South Africa have been recorded at this site; see Table 2.	
A3 (A07)	Afrotropical Highlands biome: 10 of the 23 species of this biome that occur in South Africa have been recorded at this site; see Table 3.	

### ■ Other threatened/endemic wildlife

The cycad *Encephalartos arenarius* has a global range restricted to sandy habitats of the coastal dune-forest and bush in the Alexandria District, where it is found within the site. Among reptiles, the global ranges of *Nucras taeniolata*, *Scelotes anguinus* and *Cordylus tropidosternum* are virtually restricted to the Algoa Bay region of the Eastern Cape and a large proportion of their populations occur within the site. Habitat exists for *Bitis albanica*, an Algoa Bay endemic, but it is yet to be recorded in the site. The coastal thicket and dunes support *Bradypodion ventrale*, *Chersina angulata*, *Leptotyphlops nigricans* and *Acontias meleagris*.

### ■ Conservation issues

The coastal environment has been placed under increased pressure to be developed for recreational activities. Sandy coasts are particularly vulnerable to human activity and off-road vehicles are a cause for concern. The dune-breeding *Sterna balaenarum* and *Haematopus moquini* are particularly sensitive to human activity in their breeding areas. Although officially under conservation management, the Alexandria Dunefield is intensely disturbed by vehicular traffic and there are high levels of nest destruction and elevated levels of chick and adult mortality. It has been shown that over 25% of vehicles drive well above the high-water mark, showing general disregard for reserve regulations. Unfortunately, the summer peak breeding season for sensitive coastal seabirds coincides with peak dunefield utilization by recreational users. Management practices need to be reviewed, and access, particularly to off-road vehicles, should be strictly controlled. Education campaigns and increased awareness of how users of the coastal-zone impact the environment should be promoted.

The region's forests have endured a history of exploitation. Part of the management plan is to eradicate non-native plantations and allow natural vegetation to recover. Threats include subsistence hunting activities by rural residents, although this is now much reduced. Forest removal and bush encroachment as a result of agricultural activities are also potential problems.

### ■ Further reading

Briers (1993), Hockey (1983), Jeffery (1987), Johnson and Cawe (1987), Martin (1991a), McLachlan *et al.* (1980), Randall and McLachlan (1982), Underhill *et al.* (1980), van der Merwe (1988), van Teylingen *et al.* (1993), Ward (1990), Watson (1992, 1995), Watson and Kerley (1995), Watson *et al.* (1996, 1997), Young (1987).

## Algoa Bay Island Nature Reserve

**ZA074**

Admin region Eastern Cape

Coordinates 33°49'S 26°02'E

Area 40 ha Altitude 0–58 m

A1, A4i, A4ii, A4iii

Nature Reserve

### ■ Site description

Located to the east of Port Elizabeth, in the large arc of Algoa Bay, this group of coastal islands is clustered in two groups of three islands each. One group comprises the large St Croix Island with the much smaller stacks of Jahleel and Brenton Rocks closer inshore. St Croix Island lies 4 km from the mainland and is situated between the Coega and Sundays river mouths, 21 km north-east of the harbour at Port Elizabeth. This rocky 12 ha island rises to 58 m and supports minimal vegetation. The second island group consists of Bird, Seal and Stag Islands, and lies some 40 km east of the first group (i.e. 53 km due east of Port Elizabeth) and 7 km from the nearest land fall at Woody Cape Nature Reserve (IBA ZA073). Bird Island (19 ha) is the largest of the Algoa Bay islands; it is relatively flat and rises to only 9 m. Seal Island is a small island (0.6 ha) lying 360 m north of Bird Island, and Stag Island is even smaller (0.1 ha), lying 320 m north-west of Bird Island. Much of the island group is covered by sparse growth of mixed vegetation dominated by the fleshy herb *Mesembryanthemum*. *Tetragonia* and *Chenopodium* form localized thickets that provide cover for some seabirds. The Algoa Bay Islands are of considerable importance as they are the only islands along a 1,777 km stretch of coastline between Cape Agulhas and Inhaca Island in Mozambique.

### ■ Birds

See Box for key species. Fourteen species of seabirds, several species of shorebirds and 33 species of terrestrial birds have been recorded on the island group. Eight seabird species currently breed on the Algoa Bay islands. These are the only islands off southern mainland Africa where *Sterna dougallii* breeds regularly. The Algoa Bay islands currently hold 43% of the global population of *Spheniscus demersus*, the majority of which are on St Croix. St Croix also holds a locally significant breeding population of *Phalacrocorax capensis*. Bird Island is one of only six breeding sites in the world for *Morus capensis*. *Larus dominicanus* and *Haematopus moquini* are found throughout the Algoa Bay complex. The island group is also known to hold large numbers of *Sterna vittata*, which in winter roost on the island in their thousands (regularly holding between 10% and 20% of the estimated total Afrotropical non-breeding population).

#### Key species

A1	<i>Spheniscus demersus</i>	<i>Haematopus moquini</i>	
	<i>Morus capensis</i>		
A4i		Breeding (pairs)	Non-breeding
	<i>Haematopus moquini</i>	16–20	40–50
	<i>Larus dominicanus</i>	500–900	1,000–1,950
	<i>Sterna dougallii</i>	180	400
	<i>Sterna vittata</i>	—	500–5,000
A4ii	<i>Spheniscus demersus</i>	21,200	60,000
	<i>Morus capensis</i>	59,000	140,000
A4iii	More than 20,000 waterbirds occur.		

### ■ Other threatened/endemic wildlife

St Croix Island holds significant populations of two lizards, the Algoa-Bay endemic *Cordylus tasmani* and *Pachydactylus maculatus*.

### ■ Conservation issues

The island group is administered as part of the Woody Cape Nature Reserve. In 1981 the St Croix Group, and a 300 m marine zone around each island, was proclaimed South Africa's first island marine reserve. The Guano Islands section of the Division of Sea Fisheries formerly controlled the island group. Eastern Cape Nature Conservation, which subsequently became the Directorate of Nature Conservation of the Eastern Cape Province, has managed the islands since April 1992. A management plan was compiled in 1995. A proposed harbour and heavy-industry complex at the Coega river mouth, opposite Jahleel Island, poses a huge threat to the seabirds of the St Croix group. The development would result in increased pollution and shipping activity, which would affect all breeding seabirds negatively.

The population of *Spheniscus demersus* at the Algoa Bay Islands has been increasing steadily during the last century. There are only a



few growing colonies in the world, and it is thought that these birds may be relocating here from colonies that are in decline in the Western Cape or farther afield. Certain factors are known to affect seabirds throughout their ranges. Competition with commercial fisheries, especially purse-seining for surface-shoaling fish such as anchovy *Engraulis capensis* and pilchard *Sardinops sagax*, has been implicated as one of the most significant factors causing seabird population declines, especially of *Spheniscus demersus*, *Morus capensis* and *Phalacrocorax capensis*. A recommendation has been made that marine reserves with a radius of 25 km be created around important breeding islands. Within these zones commercial fishing should be banned or restricted.

An unpredictable threat, which is difficult to control, is chronic pollution by crude oil or other pollutants which spill into the ocean when tankers break open, wash their tanks, dump cargo or pump bilge. *Spheniscus demersus* is particularly susceptible to these events, and a single oil disaster has the ability to severely affect populations. It is believed that the breeding sites in Algoa Bay, at the eastern extremity of the species's range, are at highest risk as they are closest to the major oil-shipping routes.

### Further reading

Adams (1991), Branch (1991), Broekhuysen *et al.* (1961), Brooke and Prins (1986), Brooke *et al.* (1988), Cooper and Berruti (1989), Cooper and Brooke (1986), Cooper *et al.* (1982, 1983, 1984, 1990), Crawford (1995), Crawford and Dyer (1995), Crawford and Shelton (1978, 1981), Crawford *et al.* (1982a, 1983, 1989, 1990, 1994, 1995c), Every (1970), Frost *et al.* (1976), Furness and Cooper (1982), Hockey (1983), Hockey and Hallinan (1981), Jarvis (1971), Klages (1994), Klages *et al.* (1992), la Cock (1995), McGill (1970), McLachlan (1974a,b), McLachlan and McLachlan (1974), Morant *et al.* (1981), Rand (1963), Randall and Randall (1984, 1987), Randall and Randall (1980, 1981a,b, 1982), Randall *et al.* (1980, 1981, 1991), Randall and Ross (1979), Ross (1971, 1978), Shelton *et al.* (1982), Siegfried (1982), Summers and Cooper (1977), Underhill (1992), Urquhart and Klages (1996), Wilson *et al.* (1988).

### Swartkops estuary, Redhouse and Chatty saltpan

Admin region Eastern Cape  
Coordinates 33°51'S 25°35'E  
Area 926 ha Altitude 0–10 m

ZA075

A1, A4i, A4iii  
Nature Reserve

### Site description

The Swartkops estuary is located on the outskirts of Port Elizabeth, 15 km north of the harbour. The catchment of this river lies in the Groot Winterhoek mountains west of Uitenhage. The lower river receives water primarily from the Swartkops and Elands rivers, which flow parallel to each other, in relatively steep narrow valleys, and have their confluence shortly after entering the flood-plain. The estuary is tidal for c.16 km upstream, the upper reaches are narrow (c.90 m wide), channel-like, and twist their way through steep banks of muddy sand. In the upper estuary there is a small, sandy intertidal area. The estuary widens slightly and becomes less convoluted between Bar None saltpan and Brickfields in the middle reaches. Below Brickfields, the steep banks flatten and the estuary broadens considerably (c.350 m wide) into open mudflats.

The permanently open mouth is covered with eelgrass *Zostera* beds, which disappeared in 1983 resulting in the formation of extensive intertidal mudflats. The *Zostera* has since returned and the mudflat area has receded. Redhouse saltpan is situated on the north bank of the Swartkops flood-plain, within the Swartkops Valley Nature Reserve. Chatty saltpans occur south of the Swartkops–Redhouse railway-line near Brickfields. Three islands occur at Redhouse saltpan. The primary plants in the saltpans are the macrophytes *Ruppia* and *Enteromorpha*. The terrestrial vegetation surrounding the estuary consists of coastal dune herbland, flood-plain scrubland, grassland and thicket.

### Birds

See Box for key species. This site holds, on average, 14,500 birds each year, and occasionally it passes the 20,000-bird threshold. Redhouse saltpan and the Swartkops estuary each regularly hold more than 4,000 birds a year. On the estuary, up to 3,300 of these are Palearctic migrants, present mainly during the summer months. The estuary and

the saltpans provide distinctly different habitats for the 70 waterbird species that regularly occur there. The intertidal mudflats near the mouth of the estuary support the greatest density of birds, including notable numbers of *Haematopus moquini*, *Pluvialis squatarola*, *Numenius phaeopus* and *Tringa cinerea*. Thirteen species have been recorded breeding at Redhouse saltpan. Two islands at Redhouse saltpan host the second largest coastal breeding colony of *Phalacrocorax carbo* in southern Africa. *Larus dominicanus* also breed in large numbers and the pan regularly supports over 430 nests. Redhouse saltpan also holds the second largest breeding colony of *Sterna caspia* in South Africa, including 20% of the country's breeding birds in some years.

#### Key species

A1	<i>Haematopus moquini</i>		
A4i		Breeding (pairs)	Non-breeding
	<i>Recurvirostra avosetta</i>	Breeds	490 (max.)
	<i>Arenaria interpres</i>	—	363 (max.)
	<i>Larus dominicanus</i>	430 (max.)	1,112 (max.)
A4iii	More than 20,000 waterbirds occur.		

### Other threatened/endemic wildlife

The reptiles *Bradypodion ventrale* and *Scelotes anguineus*, two Algoa Bay endemics, are resident.

### Conservation issues

The Swartkops estuary basin is administered by the Port Elizabeth City Council. Future water demands in and around this growing urban centre may result in the establishment of more impoundments, which will substantially reduce flow and potentially disrupt the ecological functioning of the estuary. A number of state and local bodies are concerned with the estuary and its management and conservation. The Swartkops Trust, in particular, has played an important role in planning and controlling the estuary and environs. Being located in a major urban centre, the adjacent land is used for a variety of purposes, including residential townships, industry and clay mining.

It is essential that encroachment by development be prohibited, particularly between the railway-bridge and Redhouse. Redhouse saltpan (owned by the local authority) is regarded as the most important area for breeding seabirds on the Eastern Cape mainland, and it has now been incorporated into the Swartkops Valley Nature Reserve. Redhouse saltpan is still operated as a commercial venture, ensuring that adequate funds and manpower are available for the maintenance of the retaining walls and the continued operation of the waterpump; these commercial functions are vital for waterbird management at the site. The remainder of the site is unprotected; Chatty saltpans are owned by Swartkops Seesout, and the Swartkops estuary is zoned as public open space, which is multifunctional, for the purposes of conservation, recreation and development. Access to the saltpans is restricted to permit holders, but trespassing frequently occurs. Humans steal eggs and cause disturbance, which is probably the main problem facing the breeding birds. The Redhouse saltpan is managed on the basis of a management plan. The Swartkops Valley Nature Reserve, along the northern border of the estuary, conserves this area's terrestrial vegetation.

### Further reading

Baird *et al.* (1986), Crawford *et al.* (1982a), Martin (1991b), Martin and Baird (1987, 1988a,b), Martin and Randall (1987).

### Maitland–Gamtoos coast

Admin region Eastern Cape  
Coordinates 33°58'S 25°09'E  
Area c.1,800 ha Altitude 0–10 m

ZA076

A1, A4i  
Unprotected

### Site description

This IBA is a stretch of coastal dunefield, 23 km in length and 0.75 km wide, running from the Gamtoos river mouth to the Maitland river mouth. This area holds extensive coastal dunefields consisting primarily of open sand and a series of dune-slacks, interdune hollows and depressions between dunes. Coastal dune herbland grows along the coast, with patches of grassland adjacent. In stable dunes, there is thicket vegetation. Non-native *Acacia* and *Eucalyptus* also occur.

## Birds

See Box for key species. This area holds approximately 4% of the global breeding population of *Haematopus moquini* and it also holds suitable breeding habitat for *Sterna balaenarum*.

### Key species

A1	<i>Haematopus moquini</i>		
A4i	<i>Haematopus moquini</i>	Breeding (pairs)	Non-breeding
		60–70	150–200

## Other threatened/endemic wildlife

None known to BirdLife International.

## Conservation issues

The coastal environment is under increased pressure from development and recreation activities. Sandy coasts are particularly vulnerable to human activity and off-road vehicles in these areas are a cause for concern. The dune-breeding *Haematopus moquini* is particularly affected by human activity in these areas. Although legislation and management guidelines prohibit vehicular traffic, vehicles gain access to this area illegally, resulting in high levels of nest destruction and elevated chick and adult mortality. The management practices need to be reviewed, access should be strictly controlled and off-road vehicles should be excluded from this area. Education campaigns and increased awareness of the impacts of beach-goers' activities should be promoted.

## Further reading

Hockey (1983), Jeffery (1987), McLachlan *et al.* (1980), Underhill *et al.* (1980), van der Merwe (1988), van Teylingen *et al.* (1993), Ward (1990), Watson (1992, 1995), Watson and Kerley (1995).

## Tsitsikamma National Park

**ZA077**
**Admin region** Eastern Cape, Western Cape

**Coordinates** 34°12'S 23°55'E

A1, A2 (089), A3 (A13)

**Area** 24,000 ha **Altitude** 0–239 m **National Park, Nature Reserve**

## Site description

The Tsitsikamma National Park is situated in the De Vasselot area of the Eastern Cape. It stretches for about 80 km from the mouth of the Groot river at Nature's Valley in the west to another Groot river, which has its source near Kareedouw, in the east. The IBA also includes the De Vasselot Nature Reserve. The park extends 3–4 km inland along the 40–220 m high gorges of the Brak, South, Bobbejaans and Groot rivers. The coastal plain, the sheer cliffs dropping into the ocean, and the deep narrow valleys cut by rivers flowing down from the Tsitsikamma mountains are the dominant topographical features of the park. The interior is hilly, rugged, and deeply incised by narrow valleys. The impressive gorges of the Storms, Groot, Elands, Elandsbos, Lottering and Bloukrans rivers all dissect the park.

The vegetation of the coastal belt is primarily dominated by typical Afromontane forest, as part of the large Knysna Afromontane Forest complex. On hot, dry aspects with shallow soils, thorny shrubs and very dry scrub-forest occur, including elements such as *Maytenus*, *Carissa*, *Scutia* and *Dovyalis*. On well-drained steep slopes with shallow soils and warm aspects, dry high-forest occurs, including dominants such as *Cassine*, *Rhus*, *Maytenus* and *Canthium*. In valleys and on deeper soils, moist, tall forest develops, including dominants such as *Podocarpus*, *Celtis*, *Ocotea*, *Diospyros*, *Apodytes*, *Maytenus*, *Ilex*, *Cunonia*, *Trichocladus* and *Rapanea*. There are two primary fynbos communities: the mesic mountain fynbos, which grows on the steep coastal escarpment, and a second community on the inland escarpment, which varies from tall closed shrubland to low, open restioid cover. The park also holds a number of coastal cliffs, offshore stacks and small islands.

## Birds

See Box and Tables 2 and 3 for key species. At least 280 bird species have been recorded in the Tsitsikamma National Park. Both *Turnix hottentotta nana* and *Sarothrura affinis* have been recorded in low fynbos scrub adjacent to the park, and they almost certainly occur within it. *Nectarinia violacea* is widespread in the ericas, while *Promerops cafer* is almost restricted to the proteoid elements. *Francolinus capensis*, *Pycnonotus capensis* and *Serinus totta* are widespread within the fynbos, while *Bradypterus victorini* is found in moist seeps in the hilly areas.

The isolated forest patches hold several forest endemics, including *Buteo oreophilus*, *Tauraco corythaix*, *Campethera notata*, *Cossypha dichroa* and *Serinus scotops*. The area also probably holds more than 10% of the world population of *Bradypterus sylvaticus*. Other forest species include *Telophorus olivaceus*, *Apaloderma narina* and *Stephanoaetus coronatus*. The grassland patches hold *Neotis denhami*, *Circus maurus* and *Sagittarius serpentarius*.

### Key species

A1	<i>Circus maurus</i>	<i>Serinus totta</i>
	<i>Campethera notata</i>	
A2 (089)	South African forests EBA: Five of the seven species of this EBA that occur in South Africa have been recorded at this site; see Table 2.	
A3 (A13)	Fynbos biome: Six of the nine species of this biome that occur in South Africa have been recorded at this site; see Table 3.	

## Other threatened/endemic wildlife

The endangered proteoid *Leucospermum glabrum* occurs in De Vasselot. The national park is important for a number of vertebrate species with global ranges restricted to South Africa's southern coastal strip, including *Myosorex longicaudatus* (VU), *Chlorotalpa duthieae* (VU), *Bradypodion damaranum*, *Cordylus coeruleopunctatus*, *Breviceps fuscus* and *Heleophryne regis*. The threatened sea-turtles *Chelonia mydas* (EN), *Caretta caretta* (EN) and *Eretmochelys imbricata* (CR) all occur irregularly in the waters of the Eastern Cape.

## Conservation issues

The park was proclaimed in December 1964. In 1987, the De Vasselot Nature Reserve, which was originally established in 1974, was transferred from the Forestry Department to the stewardship of the National Parks Board. The clearing of indigenous vegetation in the Tsitsikamma region for the development of pine plantations and agricultural pastures has fragmented the fynbos in various areas. Much of the Afromontane forest and fynbos of the Eastern Cape is controlled by the Department of Environment Affairs and Tourism (DEAT) and the Directorate of Nature Conservation of the Eastern Cape Province. Although some of the areas could be commercially afforested in the future, theoretically their conservation status appears secure.

On the coast there is a high rate of nest desertion in *Haematopus moquini*, presumably due to disturbance. The protection of nest-sites from humans during the breeding season has been suggested as a conservation measure.

## Further reading

Branch and Hanekom (1987), Hanekom *et al.* (1989), Skead and Liversidge (1967).

## Olifants river estuary

**ZA078**
**Admin region** Western Cape

**Coordinates** 31°42'S 18°12'E

A3 (A12), A4i

**Area** c.2,000 ha **Altitude** 0–30 m

Unprotected

## Site description

The Olifants river estuary lies c.250 km north-west of Cape Town. The nearest towns are Lutzville and Vredendal, 23.5 km and 42 km east of the estuary respectively. The Olifants river rises in the Agterwitzenberg, a plateau lying between the Winterhoek and the Skurweberg mountains. The flanks of the estuary hold extensive saltmarsh; on both sides of the mouth, a steep rocky shoreline rises to form a gravel terrace.

Marine algae grow on rocks near the river mouth, to the west of the island, and in the marshes, both at the mouth and farther upstream. The saltmarsh vegetation is well stratified. The flood-plain also holds numerous plant species with more terrestrial affinities. Reedbeds of *Scirpus* and *Phragmites* line the banks of the river upstream from Olifantsdrif. The terrestrial vegetation on higher ground is of considerable interest, as it is one of the few areas where karroid vegetation reaches the west coast. After spring rains the veld breaks out in mass flowering displays.

## Birds

See Box and Table 3 for key species. Approximately 125 bird species have been recorded at the estuary and its environs, with at least 60 of these being waterbirds. The Olifants river estuary regularly supports over 15,000 waterbirds. *Pelecanus onocrotalus*, which breed at the

nearby Dassen Island (IBA ZA088), use the estuary as a primary foraging and roosting area during the non-breeding season. *Sterna balaenarum* occasionally forage in the estuary. Large numbers of *Tadorna cana*, *Calidris ferruginea* and *Larus hartlaubii* use the estuary when conditions are suitable. Although waterbird numbers are not exceptional, this estuary acts as a vital staging point for both Palearctic migrants and flamingos between the Orange river mouth (IBA ZA023), and the important wetlands to the south and east, such as the Berg river wetlands (IBA ZA083), Langebaan Lagoon (IBA ZA084), Rietvlei (IBA ZA090) and the Wilderness-Sedgefield Lakes complex (IBA ZA093). The vegetation surrounding the estuary is suitable for many of the species restricted to the Namib–Karoo biome and for other arid-zone birds, including *Eupodotis vigorsii*, *Parus afer*, the recently recognized *Certhilauda albescens*, *Cercomela traetrac*, *C. schlegelii*, *C. sinuata* and *Serinus alario*. *Phragmacia substriata* occur in the *Acacia* thickets and reedbeds along the river margin. The recently described *Certhilauda curvirostris*, a restricted-range species (see account for IBA ZA023), also occurs here.

#### Key species

A3 (A12)	Namib–Karoo biome: Nine of the 19 species of this biome that occur in South Africa have been recorded at this site; see Table 3.		
A4i	Breeding (pairs)	Non-breeding	
	<i>Calidris ferruginea</i>	—	2,131 (av.)–5,362

#### Other threatened/endemic wildlife

The IBA lies in the centre of the ranges of many Namaqualand-endemic reptiles; most of them have been recorded in the vicinity and are probably present in the terrestrial succulent Karoo vegetation matrix surrounding the wetland, including *Homopus signatus*, *Bitis schneideri* (VU), *B. cornuta*, *Acontias litoralis*, *Typhlosaurus caecus*, *Scelotes sexlineatus*, *Meroles knoxii*, *Cordylus macropholis*, *Gerrhosaurus typicus* (LR/nt), *Bradypodion occidentale* and *Pachydactylus austeni*.

#### Conservation issues

The Cedarberg Divisional Council controls the estuary. Marine diamond-mining restricts general public access along the northern shore. The Olifants' catchment is mostly rural, with farming being the most important activity. Most of the Olifants catchment is protected in the Groot Winterhoek (81,427 ha) and Koue Bokkeveld (96,348 ha) mountain catchment areas (both included in IBA ZA080), which are managed by the Department of Water Affairs and Forestry (DWAF). Although the mouth meets the criteria for recognition as a wetland of international importance, the site does not have Ramsar status. The expansive flood-plain is criss-crossed with vehicle tracks, and off-road vehicles have damaged the vegetation extensively. The terrestrial vegetation has also become drastically overgrazed in places. The passage of vehicles and pedestrians should be severely restricted, especially on the flood-plain and saltmarshes. Grazing by livestock should be controlled as the denudation of the vegetation is causing serious erosion.

#### Further reading

Cooper *et al.* (1976), Day (1981), Morant (1984), Ryan *et al.* (1988), Summers *et al.* (1977), Turpie (1995).

### Bird Island

Admin region Western Cape

Coordinates 32°05'S 18°18'E

Area 3 ha Altitude 0–8 m

ZA079

A1, A4i, A4ii, A4iii

Provincial Nature Reserve

#### Site description

Situated on the Atlantic coast, c.150 km north of Cape Town, this small island lies in Lambert's Bay harbour, extremely close to shore. A concrete causeway that forms the fishing harbour has linked the island to the mainland since 1959. Rising to only 7.6 m, the island is rocky and virtually devoid of vegetation.

#### Birds

See Box for key species. Historically this island was dominated by *Spheniscus demersus* and was devoid of breeding *Morus capensis*. It would appear that the gannets only colonized this island in 1912; today, it is one of only six localities where they breed. The birds form a single undivided colony in the centre of the island. Breeding numbers have

fluctuated dramatically; the population declined steadily between 1956 and 1967, but by 1971 it had recovered, and by 1981 it was 50% larger than it had been in 1971. Numbers of breeding birds have continued to increase since the early 1980s. *Phalacrocorax capensis* have also nested extensively on the island, occasionally reaching numbers of 61,000 birds. Numbers of *Spheniscus demersus* halved between the late 1970s and early 1990s, and have subsequently dwindled to a handful of breeding birds. *Phalacrocorax coronatus*, *Larus dominicanus* and, occasionally, *Sterna bergii* breed on the outlying rocks. *Phalacrocorax neglectus* ceased breeding in 1997, and now only a few roost on the island. *Larus hartlaubii* and various species of tern roost in large numbers.

#### Key species

A1	<i>Spheniscus demersus</i> <i>Morus capensis</i>	<i>Phalacrocorax coronatus</i>	
A4i		Breeding (pairs)	Non-breeding
	<i>Phalacrocorax coronatus</i>	5–10	100–170
A4ii	<i>Morus capensis</i>	4,000–6,000	8,000–15,000
A4iii	More than 20,000 waterbirds occur.		

#### Other threatened/endemic wildlife

None known to BirdLife International.

#### Conservation issues

Between 1956 and 1980 the global population of *Morus capensis* declined some 50%. The collapse was attributed to the decline in stocks of pilchard *Sardinops sagax*, the gannet's primary food source. Despite the global decline, the Bird Island colony has been increasing since the 1970s, which correlates with the local recovery of pilchard stocks in the Western Cape. *Spheniscus demersus* and *Phalacrocorax capensis* are also thought to have been affected by competition with commercial fisheries, especially purse-seining, for surface-shoaling fish such as anchovy *Engraulis capensis* and pilchard, which are their primary prey. A recommendation has been made that marine reserves with a radius of 25 km be created around important breeding islands. Commercial fishing should be banned or restricted within these zones.

In addition to being affected by overfishing, *Morus capensis* and *Spheniscus demersus* are also susceptible to human disturbance. In the past, visitors to the colony at Bird Island disturbed prospecting birds at the edge of the colony and caused chicks to desert their nests. The area open to the public was fenced in 1974 and a high-tech viewing facility erected in 1998, and now visitors rarely disturb seabirds.

Seals are known to eat *Morus capensis*, *Spheniscus demersus* and *Phalacrocorax* spp. The ability of seals to outcompete and displace birds at breeding islands has been identified as a substantial potential threat.

An unpredictable threat, which is difficult to control, is chronic pollution by crude oil or other pollutants that spill into the ocean when tankers break open, wash their tanks, dump cargo or pump bilge. *Spheniscus demersus* are particularly susceptible to these events, and a single oil disaster can severely affect populations. The South African National Foundation for the Conservation of Coastal Birds (ZANCCOB) cleaned, rehabilitated and returned some 3,000 penguins to the wild between 1981 and 1991.

#### Further reading

Adams (1991), Branch (1991), Broekhuysen *et al.* (1961), Brooke and Prins (1986), Brooke *et al.* (1982), Cooper (1981), Cooper and Berruti (1989), Cooper and Brooke (1986), Cooper *et al.* (1983, 1984), Crawford (1995), Crawford and Dyer (1995), Crawford and Shelton (1978, 1981), Crawford *et al.* (1982a,b, 1983, 1989, 1990, 1994, 1995c), Frost *et al.* (1976), Furness and Cooper (1982), Hockey (1983), Hockey and Hallinan (1981), Jarvis (1971), Jarvis and Cram (1971), Morant *et al.* (1981), Randall *et al.* (1980), Shelton *et al.* (1982), Siegfried (1982), Summers and Cooper (1977), Williams (1995), Wilson *et al.* (1988).

### Cedarberg–Koue Bokkeveld complex

ZA080

Admin region Western Cape

Coordinates 32°38'S 19°18'E

Area c.500,000 ha

Altitude 363–2,026 m

A1, A2 (088), A3 (A13)

State Forests,

Wilderness Areas

#### Site description

The north-westerly trending Cedarberg mountains are c.90 km long by 25 km wide and rise steeply above the Olifants river valley (170 m).

Citrusdal, at about 170 m, is barely 17 km from Sneeuberg (2,027 m), the highest peak in the range. The Cedarberg forms the northern spine of the watershed between the Olifants river to the west and the Tankwa-Doring river system to the east. Directly south of the Cedarberg Wilderness Area, the Koue Bokkeveld and Groot Winterhoek mountains are the continuation of this sandstone chain.

The flora is extremely diverse, with mesic mountain fynbos grading into xeric succulent Karoo. Species of the Proteaceae, Ericaceae and Restionaceae dominate the mesic south. The northern Cedarberg holds xerophytic communities on the slopes, while the highest peaks hold typical fynbos. *Protea* bushes are frequent. *Widdringtonia* woodland occurs in patches. Moving east, karroid vegetation begins to dominate, and in the flatter, low-altitude terrain of the Tankwa Karoo, varied dwarf succulent shrubland is dominated by Mesembryanthemaceae and seasonally by annuals and geophytes. The varied flora holds many succulents. The shrub layer includes *Tetragonia*, *Pteronia*, *Rhus*, *Salsola* and *Lycium*. Belts of riverine vegetation, which line the mostly dry riverbeds, are dominated by *Acacia* and create a network of well-wooded veins that stretch throughout the plains and gullies. Other habitats that occur within the site are constructed farm dams, human habitation, gardens and stands of non-native *Eucalyptus* and *Populus* trees.

### ■ Birds

See Box and Tables 2 and 3 for key species. The mountain fynbos holds all of the Cape Fynbos restricted-range and biome-restricted species. *Nectarinia violacea* is widespread in the ericas, while *Promerops cafer* is almost restricted to the proteoid elements and *Serinus leucopterus* is found in proteoid woodland and arid scrub at the base of the Cedarberg. *Francolinus capensis*, *Pycnonotus capensis* and *Serinus totta* are widespread within the fynbos, while *Bradypterus victorini* is found at moist seeps in the hilly areas. *Chaetops frenatus* is common on most rocky slopes above 1,000 m.

The karroid vegetation of the Tankwa and Doring river valleys also holds many Namib–Karoo biome-restricted assemblage birds and other arid-zone specials. The Ceres–Karoo lowland plains are good for *Eupodotis vigorsii*, *E. afra*, *Chersomanes albofasciata*, *Galerida magnirostris*, *Certhilauda albescens*, *Cercomela schlegelii*, *C. traetac*, *Eremomela gregalis* and *Malcorus pectoralis*. The thickets of riverine *Acacia* woodland hold *Phragmacia substriata* and provide food, shelter and breeding habitat for *Sylvia layardi* and *Parus afer*. *Onychognathus nabouroup* and the scarce and elusive *Eurypytila subcinnamomea* are common in rocky gorges and kloofs of the Koue Bokkeveld foothills.

#### Key species

A1	<i>Chaetops frenatus</i>	<i>Serinus totta</i>
	<i>Serinus leucopterus</i>	
A2 (088)	Cape fynbos EBA: All of the six species of this EBA that occur in South Africa have been recorded at this site; see Table 2.	
A3 (A13)	Fynbos biome: Eight of the nine species of this biome that occur in South Africa have been recorded at this site; see Table 3.	

### ■ Other threatened/endemic wildlife

Although botanical description of this area is incomplete it is known to hold an exceptional number of plant species, many of which are endemic. The cedar *Widdringtonia cedarbergensis* (EN) occurs in the special Cedar Reserve within the Cedarberg Wilderness Area. The IBA holds most of the Olifants river catchment, which has a remarkable incidence of endemism among freshwater fish. It is one of only two river systems in southern Africa to have more than two taxa restricted to its catchment. All eight of the catchment's endemic species are found in this IBA, including *Barbus phlegethon* (EN), *B. erubescens* (CR), *B. serra* (EN), *B. capensis* (VU), *B. calidus* (EN), *Austroglanis barnardi* (CR), *A. gilli* (VU) and *Labeo seeberi* (CR).

Among herptiles, both *Bitis rubida*, described in 1997, and *Cordylus mclachlani* (VU) have global ranges virtually restricted to the Tanqwa Karoo portion of this IBA. *Goggia hexapora* and *G. microlepidota* are globally restricted to the mountains of the IBA. *Australolacerta australis* occurs in only this IBA and one other, the Eastern False Bay mountains (IBA ZA086). *Capensibufo tradouwi* breeds in moist depressions, vleis and springs in Western Cape mountains and it is found in the Cedarberg and the Southern Langeberg mountains (IBA ZA092). *Nucras tessellata*, *Cordylusaurus subtessellatus*, *Gerrhosaurus typicus* (LR/nt), *Cordylus cataphractus* (VU), *C. polyzonus*, *Pseudocordylus capensis*, *Agama hispida*, *Afrogecko porphyreus*,

*Chondrodactylus angulifer*, *Goggia lineata*, *Pachydactylus rugosus* and *P. serval* are all found within the Cedarberg–Koue Bokkeveld complex.

### ■ Conservation issues

The Cedarberg was proclaimed a Mountain Catchment Area in 1897 and it has been under state control for over 100 years. Its change of status to the Cedarberg Wilderness Area in 1976 was based on the decline of an endemic and threatened tree species, *Widdringtonia cedarbergensis*. It was one of the first proclaimed Wilderness Areas (71,000 ha), in accordance with the policy of the former Directorate of Forestry and Environmental Conservation (now under control of the Department of Water Affairs and Forestry (DWAF) to extend reserves for more effective water management. Similarly, the Groot Winterhoek Wilderness Area (81,188 ha; 30,369 ha State Forest and 50,819 ha private land) in the south-west was established for the sake of water conservation in 1981. These two areas support the majority of the catchments of the Berg and Olifants rivers, two of the Western Cape's most important river systems.

Management objectives in all mountain catchment areas are similar. The prime goals are production of potable water and nature conservation, with fire-hazard reduction, wildflower harvesting, recreation and grazing being of lesser importance. In creating a reserve network, the Cedarberg, Koue Bokkeveld and Groot Winterhoek mountains form the source and lifeblood of many of the freshwater systems in the Western Cape, including a large portion of the Olifants river catchment, which irrigates the arid lands to the west; the mouth and estuary of this river form another IBA (IBA ZA078).

Invasive non-native trees of *Acacia*, *Hakea* and *Pinus* pose a serious threat to the conservation of water and vegetation in these mountains. In places, these exotic taxa dominate thousands of hectares, significantly modifying natural communities and threatening many indigenous taxa with extinction. Alien trees are also known to accelerate riverbank erosion, reduce in-stream flow, cause changes in fire regime and alter the composition of the soil and natural plant and animal communities.

Alien taxa are now widespread, and the control of these elements is now the largest single task facing most managers in this biome. Bio-control agents, including fungus and insects, have been introduced to prevent the spread of alien species. Some of these agents have been extremely successful. The ingenious 'Working for Water' programme initiated by DWAF involves physical removal of alien plants in water-catchment areas. This increases water run-off and simultaneously employs people.

### ■ Further reading

Cowling (1992), le Maitre (1984), Manders (1985), Privett (1994), Taylor (1997a), van Wilgen *et al.* (1992).

## Karoo National Park

Admin region Western Cape

Coordinates 32°15'S 22°35'E

Area 32,795 ha Altitude 1,032–1,932 m

ZA081

A1, A3 (A12), A4ii  
National Park

### ■ Site description

The semi-arid Karoo National Park is situated in the central Great Karoo, just north of Beaufort West. The IBA incorporates the park, the town of Beaufort West and its sewage works. The dominant topographical feature is the impressive Nuweveld escarpment, which towers over the lower plains. Riverbeds, which are dry for most of the year, descend sharply from the escarpment to meander across the flat plains in the far west and east of the park.

The stark variation in altitude yields a wide diversity of microhabitats, resulting in a distinct contrast between the harsher vegetation of the upper plateau, where grassveld intruded by fynbos elements is dominant, and the lower plain where dwarf scrub dominates and thornveld occurs in the moister valleys and watercourses. The scrub vegetation, which covers much of the plains and lower escarpment, is dominated by Nama Karoo shrubs seldom exceeding 70 cm in height. The vegetation becomes non-succulent as the altitude increases, with thicket of *Dodonaea* and *Rhus* occurring at height. Grasses begin to dominate on the Nuweveld Plateau. Belts of riverine *Acacia* thicket line the mostly dry riverbeds, creating a network of tree-lines that stretch throughout the park's plains.

## Birds

See Box and Table 3 for key species. A total of 170 species have been recorded in the park; 77 are resident and 29 are breeding visitors. The lowland plains are particularly good for *Neotis ludwigii*, *Eupodotis vigorsii*, *Chersomanes albofasciata*, *Certhilauda albescens*, *Eremopterix verticalis*, *Cercomela tractrac*, *C. schlegelii*, *Eremomela gregalis* and *Malcorus pectoralis*. *Serinus alario* occurs whenever there is seeding grass and water. The belts of riverine *Acacia* woodland hold *Phragmacia substriata*. The thicket and scrub on the slopes support *Sylvia layardi* and *Parus afer*. In very wet years, nomadic *Eremopterix australis* and *Emberiza impetuani* move in and breed in large numbers, and are then absent until the next heavy rains, which may be decades apart. The secretive and localized *Euryptila subcinnamomea*, *Anthus crenatus*, *Onychognathus naborourop* and *Geocolaptes olivaceus* occur in rocky gorges and kloofs, while *Cercomela sinuata* is found on the grass and scrub of the plateau. The newly described *Certhilauda subcoronata* is common throughout the park. The town of Beaufort West is included in the IBA because it has several large *Eucalyptus* trees which support thousands of roosting *Falco naumanni* in summer; the birds disperse during the day to forage on the plains surrounding the town.

### Key species

A1	<i>Falco naumanni</i>	<i>Geocolaptes olivaceus</i>
A3 (A12)	Namib-Karoo biome: 15 of the 19 species of this biome that occur in South Africa have been recorded at this site; see Table 3.	
A4ii	Breeding (pairs)	Non-breeding
	<i>Falco naumanni</i>	— 1,000–3,000

## Other threatened/endemic wildlife

Among reptiles, *Goggia braacki* and *Pachydactylus kladeroderma* both have global ranges restricted to the eastern portion of the Nuweveld escarpment, and they may occur within the park. *Cordylus cloetei*, another Nuweveld-escarpment endemic, occurs at nearby Fraserberg and should be searched for in the park. It is conservation policy to restock the park with mammalian game species that roamed these plains prior to human intervention, and the threatened *Diceros bicornis* (CR), *Equus zebra* (VU; the second largest population in the world) and *Bunolagus monticularis* (EN) have been reintroduced.

## Conservation issues

The park, controlled by the National Parks Board, was purchased with financial assistance from the World Wide Fund for Nature (WWF-South Africa) (formerly the Southern African Nature Foundation), and proclaimed in September 1979 to protect a portion of the Nama-Karoo. The park originally encompassed 80% mountainous Karoo, with only 20% being typical Karoo plains. This imbalance was corrected when the park was enlarged to include more arid plains habitat. The neighbouring farms Doringhoek and Sandrivier were incorporated into the reserve in 1983 and 1989 respectively, expanding the total conserved area to 330 km<sup>2</sup>. Gamka Dam and Grootplaai in the north-east are in the process of being exchanged for the farm Die Hoek on the plains boundary of the park. This action is to obviate the management problems of having the park split by the Molteno Pass. The National Parks Board hope to purchase more land on the plains with the ultimate aim of increasing the total park area to 1,000 km<sup>2</sup>. Gamka Dam is important for various cliff-nesting species and waterbirds, and it should remain under conservation management, despite its newly acquired privately owned status.

General threats include overgrazing of the farmland surrounding the park, resulting in habitat degradation and potential population reduction in wide-ranging species, such as *Neotis ludwigii*. Poisons and pesticides used in the surrounding farming areas may affect scavenging raptor populations. This probably led to the extinction of the colony of *Gyps coprotheres*, which is thought to have occurred on the Nuweveld Escarpment as recently as the 1970s. The National Parks Board is amenable to a reintroduction programme and would be prepared to help provide food at a vulture restaurant. *Falco naumanni* have been observed taking locusts in the midst of spraying operations just outside the park boundary. The effects that the pesticides are having on this threatened species are currently unknown.

## Further reading

Allan (1989, 1994b), Claassen and Claassen (1991), Davies (1994), de Graaf *et al.* (1979), Martin and Martin (1970), Martin *et al.* (1985, 1986, 1987, 1988), Pepler (1994a,b).

## Verlorenvlei

Admin region Western Cape

Coordinates 32°23'S 18°28'E

Area 1,700 ha Altitude 0–343 m

ZA082

A4i

Ramsar Site (Unprotected)

## Site description

Verlorenvlei is an estuary, fed by an intermittently flowing river, on the Atlantic Ocean, 3 km east of Elands Bay and 25 km south of Lambert's Bay. It is connected to the sea via a shallow, narrow, 2.5-km-long channel, but a rocky sand-covered bar at the mouth and other artificial obstructions make Verlorenvlei a virtually closed system. Because of its intermittent connection with the ocean, Verlorenvlei can be regarded as a coastal lake and reed-swamp system. It is one of the largest natural wetlands along southern Africa's west coast, and it is one of the few coastal freshwater lakes in South Africa.

The lake is located north of a ridge of rugged hills with high krantzes near the sea. The main body of the lake is approximately 13.5 × 1.4 km, with an average depth of c.3 m and a maximum depth of c.4.5 m during the wet season. During winter the lake fills and overflows into the sea near Eland's Bay, but during summer it gradually desiccates, reaching its lowest levels at the end of the dry season.

Large masses of filamentous green algae are common in the channel, where the water is often stagnant and hyper-saline. The vlei is dominated by aquatic vegetation, including *Myriophyllum* which, at times, occupies large areas, e.g. in the upper reaches below reedbeds. Marsh vegetation of *Typha*, *Phragmites*, *Cyperus* and *Juncus* is common and widespread on the fringes of the lake. The terrestrial vegetation surrounding the vlei is transitional between karroid and fynbos vegetation, resulting in a high diversity of ecotonal communities.

## Birds

See Box for key species. Verlorenvlei supports over 189 bird species, of which 75 are waterbirds. The wetland regularly supports over 5,000 birds and occasionally it holds over 20,000, including more than 1,000 waders of at least 11 different species. Most importantly, the area is a moulting ground and summer refuge for ducks (Anatidae), and it regularly supports extremely large numbers of *Anas undulata*, *A. smithii* and *Tadorna cana*. Large numbers of *Podiceps cristatus*, *Fulica cristata*, *Larus hartlaubii* and *Phalacrocorax carbo* are also supported. There is a high density of *Circus ranivorus*, which forage over the marsh and reedbank areas. *Haematopus moquini* and *Charadrius pallidus* are recorded at the estuary mouth from time to time. The palustrine habitats are diverse and rich and hold populations of secretive rails (Rallidae), including large numbers of *Sarothrura rufa*, *Rallus caerulescens* and *Porzana pusilla*. The diverse ecotonal terrestrial vegetation around Verlorenvlei's fringes supports several restricted-range and/or biome-restricted species, including the recently described *Certhilauda curvirostris* (see account for IBA ZA023).

### Key species

A4i		Breeding (pairs)	Non-breeding
	<i>Podiceps cristatus</i>	5–20	87 (av.)–123
	<i>Tadorna cana</i>	Breeds	288 (av.)–470
	<i>Anas smithii</i>	Breeds	103 (av.)–600
	<i>Recurvirostra avosetta</i>	—	78 (av.)–452
	<i>Larus hartlaubii</i>	—	209 (av.)–377

## Other threatened/endemic wildlife

Rare plants include *Ferraria foliosa*, *F. densepunctulata*, *Cercium venoum* (presumed extinct) and *Cullumia floccosa*. The fish *Barbus burgi* (CR) has a global range restricted to the Verlorenvlei system and some of the upper catchment streams of the Berg river. Among reptiles, the IBA lies in the centre of the ranges of several Namaqualand endemics, most of which have been recorded in the vicinity and may be present in the succulent Karoo terrestrial vegetation surrounding the wetland: *Homopus signatus*, *Bitis schneideri* (VU), *B. cornuta*, *Acontias litoralis*, *Typhlosaurus caecus*, *Scelotes sexlineatus*, *Meroles knoxii*, *Cordylus cataphractus* (VU), *C. macropholis*, *Gerrhosaurus typicus* (LR/nt), *Bradypodion occidentale* and *Pachydactylus austeni*.

## Conservation issues

This wetland is of great significance, especially in terms of its large area, the diversity of its habitats, the large populations of waterbirds

that it supports, and the relative scarcity of similar habitats in the Western Cape. Despite being one of the most important estuarine/lacustrine systems in South Africa, Verlorenvlei does not have any formal protection status and neither statutory control nor any form of management is currently in existence. The Ramsar-designated land is state-owned and is managed by Cape Nature Conservation.

Several man-made obstructions disrupt water flow in the system—a concrete causeway, a rubble causeway at the railway bridge, and road causeways (500 m, 1 km and 2.6 km upstream of the mouth) all prevent natural flow and disturb the sensitive ecological functioning of the system. These obstructions disrupt hydrological fluctuations within the wetland, causing flooding upstream, extensive siltation and reduction of freshwater load into the estuary, and also prevent fish migration. As such, urgent action is required to maintain free water movement in Verlorenvlei as a whole; unnecessary obstructions, especially the illegal causeway near the mouth, should be removed, while necessary crossing points should be modified to return the system to a natural state. Verlorenvlei may become irreparably damaged if conservation action is not rapidly forthcoming.

The land surrounding the lake is privately owned, and the vlei faces several threats from intensive farming practices in this area. The surrounding vegetation has become considerably degraded through extensive agricultural and grazing pressure. The introduction of mechanized irrigation systems, which use underground lake water, may impact the lake considerably. Non-native fish compete with indigenous freshwater species and alter the vegetation structure, potentially altering system dynamics. Similarly, the invasive non-native tree *Acacia cyclops* was introduced to stabilize the coastal dunes; it has now spread throughout the area where it threatens the indigenous vegetation.

#### Further reading

Baxter and Davies (1994), Cooper *et al.* (1976), Cowan (1995), Cowan and Marnewick (1996), Grindley and Grindley (1987), Sinclair *et al.* (1986), Summers *et al.* (1977), Taylor (1997a,b), Underhill and Cooper (1984).

### Lower Berg river wetlands

Admin region Western Cape

Coordinates 32°47'S 18°16'E

Area c.6,621 ha Altitude 0–30 m

ZA083

A4i, A4iii  
Unprotected

#### Site description

The Berg river wetlands are located 140 km north of Cape Town. The town of Laaiplek lies directly north of the river mouth; 6 km upstream of the mouth lies the town of Velddrif. The Berg river forms one of only four perennial estuaries on the arid west coast of southern Africa. The IBA includes only the lower Berg river, but this system is reliant on the management of its catchment, which extends c.160 km upstream from the river mouth to its source in the Franschhoek and Drakenstein mountains.

In addition to the river channel, the flood-plain encompasses eight major wetland types: ephemeral pans, commercial saltpans, reed-marsh, sedge-marsh, saltmarsh, halophytic flood-plain, xeric flood-plain and intertidal mudflats. The ephemeral pans comprise monospecific stands of *Juncus* during summer. After winter rains, abundant *Aponogeton* develops, along with other aquatic plants. Reed-marsh is found mainly on inner riverine beds, and is dominated by *Phragmites*, *Scirpus* or *Cyperus*. Sedge-marshes are dominated by *Juncus*, with smaller sedge species occurring in a varied mosaic. The saltmarsh experiences tidal flooding by saline water twice a day and is dominated by fleshy-leaved salt-tolerant species. Halophytic flood-plain vegetation consists primarily of *Sarcocornia*, which may be interspersed with open patches, which are colonized by ephemeral growth during spring. The xeric flood-plain vegetation is highly diverse. Succulents include Mesembryanthemaceae and Asparagaceae. *Rhus* and *Lycium* bushes also occur. The flood-plain can be inundated for up to two weeks at a time when the Berg river floods.

#### Birds

See Box for key species. An analysis of the importance of South Africa's estuaries for wetland birds consistently showed the Berg river wetlands to be in the top three and, along with Lake St Lucia (IBA

ZA044) and Langebaan Lagoon (IBA ZA084), it was considered to be an indispensable site for waterbird conservation in South Africa. Since 1975, approximately 250 bird species have been recorded on and adjacent to the lower Berg river; 127 of which are waterbirds.

The most important habitats for foraging birds are the estuarine mudflats and ephemeral flood-plain pans. The most important breeding sites are riparian marshes and the commercial saltpans. On average, more than 12,000 non-passerine waterbirds occur at the estuary during summer and 6,000 non-passerine waterbirds during winter. A count of both the estuary and the flood-plain yielded 46,234 waterbirds in December 1992, and in combination, the estuary and flood-plain regularly support over 20,000 birds.

Waterbird numbers are strongly influenced by the influx of Palearctic migrants, and more than 8,000 migrant waders are regularly present in summer, especially *Calidris ferruginea* and *C. minuta*. The commercial saltpans support many breeding species, including very large numbers of *Sterna caspia*, incorporating up to 13% of the South African breeding population. *Charadrius pallidus* breed here regularly. *Larus dominicanus* and *L. hartlaubii* are resident at the Berg river and occur in large numbers, breeding in midsummer and early winter respectively. *Sterna bergii* breed sporadically. Large numbers of *Pelecanus onocrotalus* occur regularly on the lower Berg river, which is a key foraging and roosting area for the Dassen Island (IBA ZA088) breeding population during the non-breeding season.

*Podiceps cristatus* and *P. nigricollis* breed occasionally. *Tadorna cana* use the estuary in large numbers as a moulting site and they also breed regularly. *Anas undulata*, *A. capensis*, *A. smithii* and *Fulica cristata* breed in the inundated saltmarshes in the upper estuary. There is a large heronry c.1 km west of the Kersefontein farmhouse. The heronry, which is known to have existed for the past 300 years, holds 13 breeding species, including substantial numbers of *Mesophoyx intermedia*, *Platalea alba* and *Plegadis falcinellus* (which appears to be increasing).

#### Key species

A4i	Breeding (pairs)	Non-breeding
<i>Platalea alba</i>	20–50	152 (av.)–294
<i>Phoenicopterus ruber</i>	—	1,564 (av.)–3,932
<i>Anas smithii</i>	20–100	113 (av.)–603
<i>Recurvirostra avosetta</i>	Breeds?	236 (av.)–2,273
<i>Charadrius pecuarius</i>	200–400	496 (av.)–1,087
<i>Calidris ferruginea</i>	—	8,281 (av.)–16,881
<i>Larus dominicanus</i>	250–500	657 (av.)–1,640
<i>Larus hartlaubii</i>	500–670	1,341 (av.)–2,030
<i>Sterna caspia</i>	20–32	106 (av.)–199
<i>Sterna bergii</i>	Breeds	160 (av.)–646
<i>Sterna sandvicensis</i>	—	695 (av.)–1,555
<i>Chlidonias leucopterus</i>	—	394 (av.)–2,623
A4iii	More than 20,000 waterbirds occur.	

#### Other threatened/endemic wildlife

Three endemic, highly localized and threatened reptiles occur on the xeric flood-plain of the Berg river: the west-coast endemic *Scelotes gronovii* (LR/nt), *S. kasneri* (VU) and *Cordylus macropholis* all occur here. A fourth threatened reptile, *Psammodromus leightoni*, is also found on the flood-plain.

#### Conservation issues

The permanent water-body and intertidal mudflats are State-owned and controlled by Cape Nature Conservation. The saltmarshes, saltworks and most of the flood-plain and catchment area are all privately owned. The Berg river supports both high numbers as well as a great diversity of waterbirds, and is of sufficient importance for waterbirds to satisfy the criteria for registration with the Ramsar Convention. However, the South African national committee has repeatedly refused registration because the site receives no legislative protection and it does not have a management plan. Whereas registration is desirable, attention should be focused on affording the estuary protection at a national level.

Existing developments in the Berg river basin, including water supply to the Greater Cape Town Metropolitan Area, have reduced Mean Annual Run-off (MAR) by 23%. These alterations have not yet affected the seasonal pattern of water flow in the Berg river. The largest threat to this wetland is the further reduction of MAR, which would significantly affect seasonal water-flow patterns and volumes.

The MAR may be reduced by a proposed impoundment upstream of the estuary and water volumes will almost certainly be reduced by the construction of the Corex steel smelter (Saldanha Steel) and the associated industries near Saldanha Bay, which will require considerable quantities of water for operation. It has been proposed that water be abstracted from the Berg river for these purposes.

Winter inundation of the flood-plain, either naturally or through controlled releases, is essential for the continued ecological functioning of the flood-plain and estuary. Lack of winter flooding may result in the development of hyper-saline conditions and consequent biological sterility on the flood-plain. Other threats to the Berg river include the dredging of the mouth to allow access to boats. Dredging increases the velocity of the tidal flow, the turbidity of the water and the penetration of salt water upstream, and also increases erosion within the system. Nutrient pollution of catchment waters from intense farming activities upstream, including excessive fertilizer run-off, impacts estuarine functioning further.

The Lower Berg river is currently the most important wetland in South Africa that does not enjoy legislative protection. The rich birdlife offers substantial tourism potential if managed appropriately. Furthermore, the lower flood-plain is vital as a nursery area for juvenile fish, many species of which form the basis of employment for hundreds of families who live on the west coast. Any deleterious impacts that affect commercially valuable fish species—and many are already in decline—will lead to a decline in the well-being of many human communities in the area. Protection of the lower estuary, and the waters that inundate its flood-plain, is imperative.

#### Further reading

Cooper *et al.* (1976), Day (1981), de Witt *et al.* (1994), Hockey (1993), Hockey and Hockey (1980), Hockey and Velasquez (1992), Hockey *et al.* (1992), Kalejta (1991, 1992a,b,c), Kalejta and Hockey (1994), Little (1993), Summers *et al.* (1977), Turpie (1995), van Wyk (1983), Velasquez (1992, 1993), Velasquez and Hockey (1992), Velasquez *et al.* (1991).

### West Coast National Park and Saldanha Bay islands

**ZA084**

Admin region Western Cape

A1, A4i, A4ii, A4iii

Coordinates 33°09'S 18°05'E

National Park, Nature Reserve,

Area 27,600 ha Altitude 0–60 m

Ramsar Site

#### Site description

The West Coast National Park adjoins the town of Langebaan, c.100 km north of Cape Town. The park includes Langebaan Lagoon, a wetland of international importance, Postberg Nature Reserve, much of 16 Mile Beach, and the islands of Jutten (43 ha), Malgas (18 ha), Marcus (17 ha) and Schaapen (29 ha). Meeuw Island (7 ha), which still belongs to the South African National Defence Force (ZANDF), is also included in the IBA. The lagoon is a sheltered arm of Saldanha Bay; it is c.15 km long, 3 km wide, and up to 6 m deep.

Extensive areas of mudflat, sandflat and succulent saltmarsh (concentrated in the south) are exposed at low tide. The rich mud of the saltmarshes supports dense populations of molluscs and crustaceans. The localized freshwater input in the southern portion of the lagoon permits the growth of a diversity of palustrine wetland vegetation. There are large, tall *Phragmites* and *Typha* beds and extensive areas of mixed sedges and rushes dominated by species such as *Juncus*, *Schoenoplectus*, *Scirpus* and *Cladium*. Well-developed strandveld, comprising low bushes and succulents, dominates the terrestrial vegetation surrounding the lagoon. Many flowering annuals occur in spring and there are also elements of coastal sclerophyllous fynbos, especially in the east.

The large, triangular island of Jutten lies c.800 m from Jut Point at the southern entrance to Saldanha Bay, and rises to c.60 m. Sparse vegetation grows over numerous boulders strewn across the flat perimeter and sides of two small hills. Buildings and walls subdivide the island intricately. Large boulders are scattered across the largely unvegetated island of Malgas, which is circular and flat, lying across from Jutten at the northern entrance to Saldanha Bay. Marcus Island, which rises to just over 7 m, lies deep in Saldanha Bay about 1.2 km south of Hoedjies Point, and has been connected to the mainland since 1976 via a 2 km long causeway, which was built as part of the harbour development for the export of iron ore and the import of crude oil.

Meeuw and Schaapen islands, which lie about 800 m from one another, are near the shore of Donkergat Bay and Langebaan town respectively.

#### Birds

See Box for key species. Over 250 bird species have been recorded in the park. Langebaan Lagoon regularly supports more than 37,500 non-passerine waterbirds in summer, of which 34,500 are waders (93% of which are Palearctic migrants). In some years, wader numbers can increase from 4,000 in winter to 50,000 in summer. *Pluvialis squatarola*, *Calidris ferruginea*, *C. alba*, *C. canutus* and *Arenaria interpres* are the major components of the summer wader assemblage. The coastal strandveld supports several restricted-range and/or biome-restricted species, including the recently described *Certhilauda curvirostris* (see account for IBA ZA023).

In winter, the lagoon regularly supports more than 10,500 birds, of which 4,500 are *Phoenicopterus ruber* and 4,000 are waders. Langebaan Lagoon is the most important wetland for waders in South Africa, regularly accounting for c.10% of South Africa's coastal wader numbers. The marginal habitat is important for *Circus ranivorus*, *C. maurus*, *Sarothrura rufa* and *Rallus caerulescens*.

The five islands in Saldanha Bay are home to nearly 250,000 coastal seabirds. Malgas Island is one of only six breeding colonies of *Morus capensis* in the world, supporting 25% of the global population; it is known to have been in use since at least 1648. Together, the islands hold notable numbers of *Spheniscus demersus*. Nearly 10% of the global population of *Larus hartlaubii*, 7.3% of the global population of *Phalacrocorax coronatus*, and populations of *P. neglectus*, *P. capensis* and *Sterna bergii*, also breed at the various islands. Twelve percent of the world population of *Haematopus moquini* is found scattered throughout the park, mostly on the islands. The largest known colony of *Larus dominicanus* in southern Africa is found on Schaapen Island.

#### Key species

A1	<i>Spheniscus demersus</i>	<i>Phalacrocorax neglectus</i>
	<i>Morus capensis</i>	<i>Circus maurus</i>
	<i>Phalacrocorax coronatus</i>	<i>Haematopus moquini</i>
A4i		Breeding (pairs) Non-breeding
	<i>Phalacrocorax coronatus</i>	500–600 1,000–1,200
	<i>Phalacrocorax neglectus</i>	220–300 500–600
	<i>Phalacrocorax capensis</i>	4,000–10,000 12,000–32,000
	<i>Phoenicopterus ruber</i>	— 3,791 (av.)–8,724
	<i>Haematopus moquini</i>	150–170 528 (av.)–607
	<i>Recurvirostra avosetta</i>	— 127 (av.)–307
	<i>Pluvialis squatarola</i>	— 3,643 (av.)–8,228
	<i>Charadrius pecuarius</i>	50–100 1,000–2,000
	<i>Charadrius marginatus</i>	100–200 2,000–4,000
	<i>Arenaria interpres</i>	— 1,963 (av.)–4,587
	<i>Calidris canutus</i>	— 2,504 (av.)–6,219
	<i>Calidris ferruginea</i>	— 17,940 (av.)–25,347
	<i>Calidris alba</i>	— 1,229 (av.)–2,643
	<i>Larus dominicanus</i>	500–3,347 1,407 (av.)–8,000
	<i>Larus hartlaubii</i>	2,000–3,000 5,000–7,000
	<i>Sterna bergii</i>	50–4,070 203 (av.)–9,000
	<i>Sterna hirundo</i>	— 1,299 (av.)–9,658
A4ii	<i>Morus capensis</i>	20,200 40,000–50,000
A4iii	More than 20,000 waterbirds occur.	

#### Other threatened/endemic wildlife

A host of endangered and endemic plant species are found in the reserve. Among reptiles, the highly localized *Bitis armata* occurs around the town of Langebaan, while three endemic, highly localized and threatened lizards, the west coast endemic *Scelotes gronovii* (LR/nt), *S. kasneri* (VU) and *Cordylus macropholis*, occur on the xeric saltmarsh.

#### Conservation issues

Langebaan Lagoon and the Saldanha Bay Islands were proclaimed a National Park in 1985, and in 1987 Postberg Nature Reserve was added. The farm Wildevarkevallei was incorporated in 1988 and an additional 0.6 ha was purchased at Langebaan Lodge. Although Donkergat military area (including Meeuw Island), at the northern extreme of the park's western arm, is not part of the park, the ZANDF manage it as a conservation area. The lagoon was designated a Ramsar Site in 1988.

Since the completion of the Sishen–Saldanha railroad in the early 1970s and the completion of a deep-water harbour in Saldanha Bay, the area has been committed as a major iron ore port. The town has

experienced growth from gradual industrial development. Metal pollution from the iron-ore berth and pollution and oiling incidents from urbanization and shipping pose a threat to the future of the lagoon.

The South African Iron and Steel Corporation (ISCOR) recently announced through Saldanha Steel that it is soon to embark on the construction of a Corex steel smelter near Saldanha Bay. Controversy surrounding this project has resulted in various requests that the likelihood of change in ecological character of the system be investigated. The smelter, which is to go ahead, could cause potential damage to at least two highly valuable systems: through water abstraction on the Lower Berg river (IBA ZA083), and indirectly at Langebaan Lagoon and the Saldanha Bay Islands.

An unpredictable threat, which is difficult to control, is chronic pollution by crude oil or other pollutants that spill into the ocean when tankers break open, wash their tanks, dump cargo or pump bilge. *Spheniscus demersus* is particularly susceptible to these impacts, and a single oil disaster could severely affect populations.

*Morus capensis*, *Spheniscus demersus* and *Phalacrocorax capensis* are also thought to have been affected by competition with commercial fisheries, especially purse-seining for surface-shoaling fish, such as anchovy *Engraulis capensis* and pilchard *Sardinops sagax*. A recommendation has been made that marine reserves with a radius of 25 km be created around important breeding islands. Commercial fishing should be banned or restricted within these zones.

Owing to the causeway to Marcus Island, several mammalian predators, which are a threat to breeding seabirds, have periodically occurred on the island. Since the construction of the causeway, populations of all breeding seabirds on Marcus Island have declined.

#### Further reading

Adams (1991), Boucher and Jarman (1977), Branch (1991), Broekhuysen *et al.* (1961), Brooke and Prins (1986), Cooper (1976, 1981), Cooper and Berruti (1989), Cooper and Brooke (1986), Cooper *et al.* (1976, 1983, 1984, 1990, 1992), Cowan (1995), Crawford and Dyer (1995), Crawford and Shelton (1978, 1981), Crawford *et al.* (1982a,b, 1983, 1989, 1990, 1994, 1995c), Frost *et al.* (1976), Furness and Cooper (1982), Jarvis (1971), Johnson (1994), Hockey (1983, 1984, 1985a,b, 1987a,b, 1995) Hockey and Hallinan (1981), la Cock *et al.* (1987), Morant *et al.* (1981), Pringle and Cooper (1975), Rand (1963), Randall *et al.* (1980), Robertson (1979), Shelton *et al.* (1982), Siegfried (1982), Summers (1977), Summers and Cooper (1977), Summers *et al.* (1977), Underhill (1986, 1987), Williams *et al.* (1990), Wilson *et al.* (1988).

### Swartberg mountains

Admin region Western Cape

Coordinates 33°20'S 22°04'E

Area c.500,000 ha

Altitude 700–2,325 m

ZA085

A1, A2 (088), A3 (A13)

State Forests,

Mountain Catchment Areas

#### Site description

The mainly sandstone Swartberg mountain range runs east–west parallel to the Outeniqua mountains (IBA ZA091). The Seweweekspoort splits the Swartberg into the western Klein Swartberg and the eastern Groot Swartberg. The Groot Swartberg runs some 170 km from the Seweweekspoort to c.20 km south-west of Willowmore. East of Blesberg peak, the range recedes, forming the Great Karoo plateau to the north and Little Karoo to the south.

The stark variation in altitude yields a wide diversity of microhabitats. Montane fynbos is found at higher altitudes and karroid and renosterfeld shrubland are found on the lower slopes. The northern slopes support arid fynbos. Very small pockets of Afromontane forest are found in deep secluded mesic gorges on the southern slopes and are dominated by trees of *Cunonia*, *Halleria*, *Pterocelastrus* and *Rapanea*. The base of the southern slopes consists of renosterbosveld.

#### Birds

See Box and Tables 2 and 3 for key species. The site is extremely rich in both fynbos and karroid endemics. At high altitudes, the fynbos is home to *Pycnonotus capensis*, *Nectarinia violacea*, *Serinus totta*, *Promerops cafer* and *Serinus leucopterus* near *Protea* thickets. *Chaetops frenatus* becomes common on exposed rocky slopes above 1,200 m. *Francolinus capensis* is widespread. Habitat suitable for *Sarothrura affinis* and *Turnix hottentotta* occurs. *Onychognathus naboroupp*, *Geocolaptes olivaceus* and the secretive and localized *Anthus crenatus*

occur in rocky gorges and kloofs. The lowland karroid plains, particularly to the north of the range, are good for *Neotis ludwigii*, *Eupodotis vigorsii*, *Certhilauda albescens*, *Chersomanes albofasciata*, *Cercomela schlegelii*, *Eremomela gregalis* and *Malcorus pectoralis*. *Serinus alario* occurs whenever there is seeding grass and water. Belts of riverine *Acacia* woodland support *Phragmacia substriata* and provide food, shelter and breeding habitat for many species, while the thicket and scrub on the slopes support *Sylvia layardi* and *Parus afer*.

#### Key species

A1	<i>Geocolaptes olivaceus</i>	<i>Serinus leucopterus</i>
	<i>Chaetops frenatus</i>	<i>Serinus totta</i>
A2 (088)	Cape fynbos EBA: All of the six species of this EBA that occur in South Africa have been recorded at this site; see Table 2.	
A3 (A13)	Fynbos biome: Eight of the nine species of this biome that occur in South Africa have been recorded at this site; see Table 3.	

#### Other threatened/endemic wildlife

Being in the centre of the Cape Floral Kingdom, this area is thought to hold c.2,000 plant species, several of which are endemic and/or threatened. Thirteen species of high-altitude or alpine endemics are restricted to the Swartberg mountains: *Agathosma purpurea*, *Protea pruinoso*, *Restio papyraceus*, *Leucadendron dregei*, *Phyllica stokoei*, *P. costata*, *Pentameris swartbergensis*, *Thamnochortus papyraceus*, *Cliffortia setifolia*, *C. crassinerve*, *Euryops glutinosus*, *Erica constatisepala* and *E. toringbergensis*. The global range of the recently described lizard *Afrogecko swartbergensis* is restricted to the northern slopes of summits in the Swartberg mountains.

#### Conservation issues

Most of this mountain range is protected as the Anysberg/Klein Swartberg Mountain Catchment Area (58,785 ha, of which 23,010 ha is demarcated State Forest and 35,775 ha is private land proclaimed Mountain Catchment Area) and as the Groot Swartberg Mountain Catchment Area (121,002 ha, of which 99,010 ha is demarcated State Forest and 21,992 ha is private land proclaimed Mountain Catchment Area). These Mountain Catchment Areas were established in 1979 and 1978 respectively, in accordance with the policy of the former Directorate of Forestry and Environmental Conservation (now the Department of Water Affairs and Forestry (DWAF)) to extend reserves for more effective management, and are managed by Cape Nature Conservation.

Invasive, non-native trees of *Acacia*, *Hakea* and *Pinus* pose a serious threat to both vegetation and water conservation in these mountains. Locally, these exotic taxa can dominate thousands of hectares, significantly modifying soil composition, fire regime and natural plant and animal communities, threatening many indigenous species with extinction. Alien trees are also known to accelerate riverbank erosion and reduce in-stream flow through excessive transpiration. The control of invasive alien taxa is the single largest task facing most managers in this biome. Biocontrol agents, including fungus and insects, have been introduced to prevent the spread of alien species; some of these agents have been extremely successful. The 'Working for Water' programme, initiated by DWAF, involves physical removal of alien plants in water-catchment areas. This ingenious programme increases water run-off and simultaneously employs people.

Threats on the lower karroid plains include overgrazing of the surrounding farmland, which results in habitat degradation that potentially affects wide-ranging species such as *Neotis ludwigii*, and the use of pesticides and poisons which may affect raptor, crane and bustard populations.

#### Further reading

Bond (1981), Winterbottom (1968).

### Eastern False Bay mountains

Admin region Western Cape

Coordinates 33°47'S 19°08'E

Area c.250,000 ha

Altitude 150–2,000 m

ZA086

A1, A2 (088), A3 (A13)

Nature Reserves, State Forests, Mountain

Catchment Areas, Biosphere Reserve

#### Site description

The site encompasses a chain of mountains that have been designated as State Forests, Mountain Catchment Areas and Nature Reserves.



The IBA runs north from the Kogelberg State Forest (near Betty's Bay and Kleinmond) for 120 km to the Kluitjieskraal State Forest south-west of Tulbagh. The mesic mountain fynbos is dominated by a multitude of communities; the primary fynbos constituents are species of Proteaceae, Ericaceae and Restionaceae. Small, isolated Afromontane forest patches, in deep secluded mesic gorges, are dominated by trees of *Cunonia*, *Halleria*, *Pterocelastrus*, *Rapanea* and *Podocarpus*. Shrubs, ferns, climbers and epiphytes also occur.

### ■ Birds

See Box and Tables 2 and 3 for key species. Within the low fynbos scrub, both *Turnix hottentotta* and *Sarothrura affinis* are found. Among the fynbos endemics, *Nectarinia violacea* is widespread in the ericas while *Promerops cafer* and *Serinus leucopterus* are almost restricted to the proteoid elements. *Francolinus capensis*, *Pycnonotus capensis* and *Serinus totta* are widespread, while *Bradypterus victorini* is locally common within moist seeps in hilly areas. *Chaetops frenatus* and *Geocolaptes olivaceus* are common on most exposed rocky slopes above 1,000 m. The isolated forest patches hold some forest specials including *Buteo oreophilus* and *Serinus scotops*. The agricultural wheat-growing belt to the south-east supports *Grus paradisea*, *Neotis denhami*, *Circus maurus*, *Sagittarius serpentarius* and *Ciconia ciconia*, all of which regularly forage within the agricultural matrix at the base of the mountain ranges.

#### Key species

A1	<i>Circus maurus</i>	<i>Chaetops frenatus</i>
	<i>Grus paradisea</i>	<i>Serinus leucopterus</i>
	<i>Geocolaptes olivaceus</i>	<i>Serinus totta</i>
A2 (088)	Cape fynbos EBA: All of the six species of this EBA that occur in South Africa have been recorded at this site; see Table 2.	
A3 (A13)	Fynbos biome: Eight of the nine species of this biome that occur in South Africa have been recorded at this site; see Table 3.	

### ■ Other threatened/endemic wildlife

This area is thought to contain c.2,500 plant species, most of which are endemic to the Cape Floral Kingdom, and many have global ranges entirely restricted to the IBA. Within the IBA, the Kogelberg area alone has 150 endemic plant species, and is often considered to be the heart of the Cape Floral Kingdom. Many spectacular species occur in the IBA, including the endemic, critically threatened 'marsh rose' *Orothamnus zeyheri* (Proteaceae). Once on the brink of extinction, it is now known to occur on several inaccessible peaks in the IBA. The endangered *Mimetus hottentoticus* and *M. capitulatus* are also found here. *Microbatrachella capensis* (EN) occurs in the south.

The IBA covers a large portion of the catchment of the Berg river, and along with it, supports several of the Western Cape's endemic fish, including *Barbus burgi* (CR) and *B. andrewi* (VU). *Pseudocordylus nebulosa* has a global range restricted to the mountains of this IBA. *Poyntonia paludicola*, described in 1989, is also virtually endemic to this IBA, where it breeds in shallow streams, seepages and marshy areas on upper mountain slopes.

*Australolacerta australis* occurs here and at only one other site (IBA ZA080), and *Cacosternum capense*, *Breviceps gibbosus*, *B. montanus* and *Afroedura hawequensis* have most of their global ranges in this IBA. Western Cape endemics occurring in the Eastern False Bay mountains include *Tropidosaura gularis*, *Pseudocordylus capensis*, *Afrogecko porphyreus* and the spectacular *Heleophryne purcelli*, *Arthroleptella lightfooti* and *Capensibufo rosei* (LR/nt), which are all restricted to perennial streams in forested boulder-strewn gorges in montane areas and shallow, water-filled depressions in montane fynbos. *Hyperolius horstockii* occurs in the lowlands with flowering lilies.

### ■ Conservation issues

The IBA consists of a network of many formal and contractual conservation areas. Some fynbos reserves have been established to conserve particular, single species. The proclamation of the Kogelberg State Forest was based on securing the future of the endemic and greatly threatened plant *Orothamnus zeyheri*. The Kogelberg Nature Reserve (18,000 ha) has since been shown to hold a great number of other localized, threatened and endemic plant species. This reserve, which was transferred from the Department of Forestry to Cape Nature Conservation in 1987, lies on the eastern flank of False Bay and is now managed according to the internationally accepted principles of a Biosphere Reserve, with the bordering agricultural fields

and pine plantations of the South African Forestry Company Limited (SAFCOL) forming a buffer zone. This area is continuous with the Highlands and Lebanon State Forests to the east and north respectively. Nuweberg State Forest links Highlands and Lebanon to the Hottentots Holland Nature Reserve (42,000 ha). Farther north the Hawequas and Kluitjieskraal State Forests form the northern portion of this IBA chain. All these protected areas fall within the Hottentots Holland and Hawequas Mountain Catchment Areas, which also hold substantial proportions of privately owned land.

Invasive non-native trees of *Acacia*, *Hakea* and *Pinus* pose a serious threat to both vegetation and water conservation in these mountains. Locally, these exotic taxa can dominate thousands of hectares, significantly modifying soil composition, fire regime and natural plant and animal communities, threatening many indigenous species with extinction. Alien trees are also known to accelerate riverbank erosion and reduce in-stream flow through excessive transpiration. The control of invasive alien taxa is the single largest task facing most managers in this biome. Bio-control agents, including fungus and insects, have been introduced to prevent the spread of alien species; some of these agents have been extremely successful. The 'Working for Water' programme, initiated by DWAF, involves physical removal of alien plants in water catchment areas. This ingenious programme increases water run-off and simultaneously employs people.

This IBA is close to Cape Town and it is surrounded by intensively farmed areas (for wheat and wine), towns and hamlets. The mountain chain is used extensively for hiking and other recreational purposes. The greater human usage of this mountain range increases the chance of dispersal of the non-native Argentine ant *Iridomyrmex humilis* into these ecosystems. This ant ousts the indigenous ant species that disperse the seeds of numerous fynbos plants; the loss of the indigenous ant species could have a major negative impact on the local biota.

### ■ Further reading

Cowling (1992), le Maitre (1984), Richardson *et al.* (1992), van Wilgen *et al.* (1992).

## Anysberg Nature Reserve

**ZA087**

Admin region Western Cape

Coordinates 33°25'S 20°37'E

Area 34,015 ha

Altitude 1,000–1,622 m

A1, A2 (088), A3 (A13)

 Nature Reserve,  
Mountain Catchment Area

### ■ Site description

Located 20 km south of Matjiesfontein and 20 km south-west of Laingsburg, the Anysberg Nature Reserve is situated on the poorly known western fringe of the Little Karoo in a broad fynbos–Karoo transition zone. The reserve is one of the largest in the Western Cape and it lies in part of the Anysberg Mountain Catchment Area, which drains into the Gourits river system. The topography is mainly mountainous, interspersed with wide open valleys. The southern and northern boundaries of the reserve are formed by the Anysberg (1,622 m) and Suurkloofse Berg (1,512 m) ranges respectively. A third, drier mountain range, Matjiesgoedberg, dominates the central sector of the reserve.

Two major vegetation-types are present: Karoo scrub and bush on the plains and lower slopes, and montane fynbos at higher elevations. The great altitudinal variation yields a wide diversity of microhabitats. The scrub vegetation of the plains and lower escarpment consists chiefly of shrubs smaller than 70 cm in height. Members of the Mesembryanthemaceae, which can be very local in their distribution, dominate the vegetation. Belts of *Acacia*-dominated vegetation line the mostly dry riverbeds. Low stony ridges hold transitional vegetation, with *Rhigozum* dominating. As the vegetation stretches up the mountains, fynbos elements appear, and there are extensive stands of *Protea* woodland in the wetter areas.

### ■ Birds

See Box and Tables 2 and 3 for key species. A total of 164 bird species have been recorded in the reserve. The lowland karroid plains are particularly good for *Neotis ludwigii*, *Eupodotis vigorsii*, *Certhilauda albescens*, *Cercomela schlegelii*, *Eremomela gregalis* and *Malcorus pectoralis*. *Circus maurus* are sometimes seen quartering the plains where *Grus paradisea* occasionally occur. *Serinus alario* occurs

whenever there is seeding grass and water. The belts of riverine *Acacia* woodland support *Phragmacia substriata* and provide food, shelter and breeding habitat for many species, while the thicket and scrub on the slopes supports *Sylvia layardi* and *Parus afer*. *Onychognathus nabouroup* and *Geocolaptes olivaceus* occur in the rocky gorges and kloofs. At higher altitudes, fynbos holds *Nectarinia violacea* and *Serinus totta*. *Promerops cafer* is associated with the *Protea* bushes. *Bradypterus victorini* occurs locally in the seeps and adjacent mesic scrub while *Chaetops frenatus* are found on exposed rocky slopes at high altitudes. Occasionally *Falco naumanni* are seen foraging over the reserve.

#### Key species

A1	<i>Geocolaptes olivaceus</i>	<i>Serinus totta</i>
	<i>Chaetops frenatus</i>	
A2 (088)	Cape fynbos EBA: All of the six species of this EBA that occur in South Africa have been recorded at this site; see Table 2.	
A3 (A13)	Fynbos biome: Eight of the nine species of this biome that occur in South Africa have been recorded at this site; see Table 3.	

#### Other threatened/endemic wildlife

Among reptiles, this is one of the very few places holding the highly range-restricted *Bitis rubida*, *Scelotes caffer*, *Bradypodion gutturale* and *Goggia hewitti*.

#### Conservation issues

The land for this reserve was purchased by WWF-South Africa (formerly the Southern African Nature Foundation) and proclaimed in 1988, and is controlled by Cape Nature Conservation. Threats include overgrazing of the surrounding farmland resulting in degradation of habitat outside the reserve, which potentially reduces populations of sensitive wide-ranging species such as *Neotis ludwigii*. Several pesticides and poisons are used in the farming areas surrounding the reserve. The effect that they are having on bustards, cranes, raptors and other tertiary consumers in the region is unknown.

#### Further reading

Allan (1989, 1994b, 1995b), Martin *et al.* (1988), Pepler (1994a,b).

### Dassen Island

Admin region Western Cape  
Coordinates 33°25'S 18°05'E  
Area 273 ha Altitude 0–19 m

ZA088

A1, A4i, A4ii, A4iii

Provincial Nature Reserve

#### Site description

Dassen Island, South Africa's second largest coastal island, lies 9 km from the mainland between Saldanha Bay and Cape Town. This island reaches 19.2 m at its highest point, and is generally flat or gently sloping, with extensive sandy areas and a few patches of exposed rock. It is richly covered with vegetation in winter. Several buildings occur in the north-east, as does a large manned lighthouse in the south-east. The island is partially enclosed by a low solid concrete wall. Hedges of non-native manitoka *Myoporum* occur near the buildings.

#### Birds

See Box for key species. Owing to its proximity to the mainland, comparative isolation, and suitable cover, the island offers sanctuary to a variety of land and seabirds. The most important resident is *Spheniscus demersus*. Numbers have been stable since 1989, following a 26% decrease during the late 1970s. Dassen Island also holds up to 4.6% of the global population of *Haematopus moquini*—the largest island population in South Africa. Dassen Island and Lake St Lucia (IBA ZA044) in KwaZulu-Natal are the only two sites in South Africa supporting breeding *Pelecanus onocrotalus*. Unlike most pelican populations, the Western Cape population has increased substantially during the twentieth century. The numbers on Dassen Island's Boom Point have increased from less than 100 pairs in the mid-1970s to c.550 pairs in 1996. The island also supports healthy breeding populations of *Phalacrocorax coronatus*, *P. capensis*, *Larus dominicanus*, *L. hartlaubii* and *Sterna bergii*, as well as supporting many *Arenaria interpres* and other migratory waders during summer. *Phalacrocorax neglectus*, which used to breed in large numbers, has decreased dramatically over the last five years. *Oceanodroma leucorhoa* breeds on this island in very small numbers.

#### Key species

A1	<i>Spheniscus demersus</i>	<i>Phalacrocorax neglectus</i>	
	<i>Phalacrocorax coronatus</i>	<i>Haematopus moquini</i>	
A4i		Breeding (pairs)	Non-breeding
	<i>Phalacrocorax coronatus</i>	80–175	400
	<i>Phalacrocorax neglectus</i>	30–50	50–200
	<i>Phalacrocorax capensis</i>	13,767–48,000	30,000–100,000
	<i>Haematopus moquini</i>	100	221–436
	<i>Arenaria interpres</i>	—	416 (max.)
	<i>Larus dominicanus</i>	5,000–7,500	12,000–18,000
	<i>Larus hartlaubii</i>	30–100	250
	<i>Sterna bergii</i>	0–3,038	400–7,000
A4ii	<i>Spheniscus demersus</i>	8,000–9,000	30,000
A4iii	More than 20,000 waterbirds occur.		

#### Other threatened/endemic wildlife

*Scelotes gronovii* (LR/nt), a reptile endemic to the west coast, occurs on the island.

#### Conservation issues

Dassen Island was proclaimed a Provincial Nature Reserve in 1988, and an island warden who enforces regulations currently mans it. Many non-native plants have been introduced, as have mice *Mus musculus*, cats *Felis catus* and rabbits *Oryctolagus cuniculus*. The cats, which eat mostly rabbits, are also known to prey on *Haematopus moquini* and *Sterna hirundo*, and in 1983 cats were estimated to take some 2,000 nestlings of *Spheniscus demersus* each year. Cat numbers have been reduced considerably since 1983 and now only a handful remain. These should be eliminated from Dassen Island as soon as possible. Cat predation on Dassen probably results in lowered breeding success compared to cat-free islands.

Certain problems are known to affect seabirds throughout their ranges. Competition with commercial fisheries, especially purse-seining for surface-shoaling fish such as anchovy *Engraulis capensis* and pilchard *Sardinops sagax*, has been implicated as the most significant factor causing seabird population declines, especially in populations of *Spheniscus demersus* and *Phalacrocorax capensis*. A recommendation has been made that marine reserves with a radius of 25 km be created around important breeding islands. Commercial fishing should be banned or restricted within these zones.

An unpredictable threat, which is difficult to control, is chronic pollution by crude oil or other pollutants that spill into the ocean when tankers break open, wash their tanks, dump cargo or pump bilge. *Spheniscus demersus* is particularly susceptible to these events and a single oil disaster could severely affect populations. The South African National Foundation for the Conservation of Coastal Birds (ZANCCOB) cleaned, rehabilitated, and returned some 3,000 penguins to the wild between 1981 and 1991.

#### Further reading

Adams (1991), Berruti (1986), Branch (1991), Brooke and Prins (1986), Cooper (1981), Cooper and Berruti (1989), Cooper and Brooke (1986), Cooper *et al.* (1983, 1984), Crawford (1995), Crawford and Dyer (1995), Crawford and Shelton (1978, 1981), Crawford *et al.* (1982a,b, 1983, 1989, 1990, 1994, 1995b,c), Frost *et al.* (1976), Furness and Cooper (1982), Hockey (1983), Hockey and Hallinan (1981), Morant *et al.* (1981), Randall *et al.* (1980), Shelton *et al.* (1982), Siegfried (1982), Summers and Cooper (1977), Underhill (1992), Williams *et al.* (1990), Wilson *et al.* (1988).

### Robben Island National Historical Monument

ZA089

Admin region Western Cape  
Coordinates 33°49'S 18°22'E  
Area 574 ha Altitude 0–30 m

A1, A4i, A4ii, A4iii  
National Historical Monument,  
World Heritage Site

#### Site description

Robben Island, South Africa's largest coastal island (5 × 2 km), lies 11 km from Table Bay harbour in Cape Town and 7 km from Bloubergstrand (its closest point to the mainland). The island was one of the first areas in South Africa to be colonized by European settlers, and has been extensively altered through a long history of human inhabitation, exploitation and use. The terrestrial vegetation is

dominated by non-native *Acacia* and *Myoporum* and plantations of *Pinus* and *Eucalyptus*, dense stands of which cover large tracts inland.

### ■ Birds

See Box for key species. *Spheniscus demersus* recolonized Robben Island in 1983 after an absence of about 180 years. Numbers of penguins have increased from nine pairs in 1983 to 2,000 pairs in 1992 and to over 4,000 pairs in 1996. It is thought that birds may be relocating here from Dyer Island (IBA ZA099), where the population has decreased markedly since the mid-1980s. The breeding area was only a few square metres in 1983, but had extended to over 55 ha by 1996. The main nesting areas are under the shade of trees or bushes along the north-east sector of the island. Recently, one pair of penguins was found breeding in the south. The island also holds the largest numbers of breeding *Phalacrocorax neglectus* in the Western Cape and significant populations of *P. coronatus*, *Haematopus moquini*, *Larus hartlaubii* and *Sterna bergii*.

Key species			
A1	<i>Spheniscus demersus</i>	<i>Phalacrocorax neglectus</i>	
	<i>Phalacrocorax coronatus</i>	<i>Haematopus moquini</i>	
A4i		Breeding (pairs)	Non-breeding
	<i>Phalacrocorax coronatus</i>	40–108	300
	<i>Phalacrocorax neglectus</i>	57–106	180–250
	<i>Phalacrocorax capensis</i>	1,000–3,000	5,000–10,000
	<i>Haematopus moquini</i>	20–35	40–90
	<i>Larus hartlaubii</i>	1,000 (av.)–4,309	5,000–10,000
	<i>Sterna bergii</i>	2,300	500–3,000
A4ii	<i>Spheniscus demersus</i>	4,000–5,000	8,000–14,000
A4iii	More than 20,000 waterbirds occur.		

### ■ Other threatened/endemic wildlife

Among reptiles, *Bradypodion pumilum* (CR) and the west-coast endemic *Scelotes gronovii* (LR/nt) occur on the island.

### ■ Conservation issues

The island is protected as a National Historical Monument and has been declared a World Heritage Site. This level of protection, however, is primarily for the historical and cultural value of the site. The island is famous as the location where Nelson Mandela and other political freedom-fighters were imprisoned during the years of apartheid. As a result, the island has a complex infrastructure, including many buildings. Wildlife management is yet to become a priority on the island.

Competition with commercial fisheries, especially purse-seining for surface-shoaling fish such as pilchard *Sardinops sagax*, has been implicated as one of the most significant factors causing the global population decline of *Spheniscus demersus*. It is thought that penguins may be relocating to Robben Island and Boulders Bay (IBA ZA096) because of the restrictions on purse-seine fishing in Table Bay and False Bay respectively. It has been speculated that the localized protection of their food resources may allow for improved breeding success and survival. Vehicular traffic on Robben Island has been known to disturb and kill penguins.

Many introduced species occur on Robben Island, including 38 exotic plants that have considerably modified the island and occupied a large proportion of it. Many introduced mammals also occur here, including *Rattus rattus* and *Felis catus*, which prey on bird eggs and young fledglings.

Owing to its status as a monument, the island is open to tourism, and it is expected that visitor numbers will increase substantially in the next few years. Management options need to be carefully considered in order to direct tourism activities away from sensitive seabird areas. It is expected that with the establishment of the monument, uncontrolled and unmitigated disturbance in the most sensitive areas will be reduced, and many breeding seabirds will return.

An unpredictable threat, which is difficult to control, is chronic pollution by crude oil or other pollutants, which spill into the ocean when tankers break open, wash their tanks, dump cargo or pump bilge. *Spheniscus demersus* is particularly susceptible to these events and a single oil disaster can severely affect populations. The South African National Foundation for the Conservation of Coastal Birds (ZANCCOB) cleaned, rehabilitated and returned some 3,000 penguins to the wild between 1981 and 1991. Most penguins rehabilitated at the South African National Foundation for the Conservation of

Coastal Birds (ZANCCOB) are released on Robben Island, from where they return to their breeding colonies.

### ■ Further reading

Adams (1991), Branch (1991), Brooke and Prins (1986), Cooper (1981), Cooper and Berruti (1989), Cooper and Brooke (1986), Cooper *et al.* (1983, 1984), Crawford (1995), Crawford and Dyer (1995), Crawford and Shelton (1978, 1981), Crawford *et al.* (1982a,b, 1983, 1989, 1990, 1994, 1995a,c), Frost *et al.* (1976), Furness and Cooper (1982), Hockey (1983), Hockey and Hallinan (1981), Kriel *et al.* (1980), Little (1995), Morant *et al.* (1981), Randall *et al.* (1980), Shelton *et al.* (1982), Siegfried (1982), Summers and Cooper (1977); Williams *et al.* (1990), Wilson *et al.* (1988)

## Rietvlei Wetland Reserve

**ZA090**

Admin region Western Cape

Coordinates 33°50'S 18°29'E

A1, A4i

Area 527 ha Altitude 0–10 m

Provincial Nature Reserve

### ■ Site description

This reserve lies between Tableview and Milnerton in the northern sector of the Greater Cape Town Metropolitan Area, 10–15 km north-east of the city centre. A range of natural and semi-natural habitats exists in this fluctuating wetland, which floods in winter and dries out in summer when the estuary mouth closes. These habitats include shallow marine waters, estuarine waters, sand/shingle shores, tidal mudflats, saltmarshes, coastal brackish saline lagoons, rivers, streams and creeks, permanent freshwater lakes and permanent and seasonal freshwater marshes and pools.

Five distinctive wetland plant communities occur: perennial wetland, reed-marsh, sedge-marsh, open pans and sedge pans. The perennial wetland is characterized by scant aquatic vegetation, dominated by *Ruppia*, *Potamogeton* and *Enteromorpha*. The reed-marsh is dominated by *Phragmites*, invaded in places by *Typha*. The sedge-marsh is dominated by *Bolboschoenus* and *Juncus*. The open pans are sparsely covered in macrophytes, consisting mainly of *Limosella* and *Salicornia*, and the sedge pans are dominated by *Bolboschoenus* in summer and *Aponogeton* and *Spiloxene* in winter. Zooplankton multiply rapidly after winter flooding and disappear in summer as the water dries up. In the estuary there is a range of salinities, resulting in a diverse community of zooplankton. The invertebrate fauna is a vital food source for birds and fish, the most abundant fish in the wetland being *Liza richardsoni*.

### ■ Birds

See Box for key species. A total of 173 species have been recorded at Rietvlei, of which 102 are waterbirds and 76 are present regularly. Breeding has been confirmed for 23 waterbird species and is suspected for a further 13 species. The high diversity of waterbirds is due to the wide range of wetland habitats present and the proximity of Rietvlei to the ocean, which allows both freshwater and coastal species to exploit the system. Fluctuating water-levels are intrinsic to Rietvlei's biological value. During peak floods, swimming birds of deep, open water abound. Birds of marshy habitats replace these as the water recedes, and waders exploiting shallow mudflats occur in great abundance just prior to the wetland drying up. Rietvlei has been ranked as the sixth most important coastal wetland in South Africa for waterbirds, and it supports an average of 5,550 birds in summer; during good years, however, numbers are boosted above 15,000. *Phoenicopterus minor*, a species of global conservation concern, occurs at the site, but not in globally significant numbers.

#### Key species

A1	<i>Haematopus moquini</i>		
A4i		Breeding (pairs)	Non-breeding
	<i>Podiceps cristatus</i>	—	54
	<i>Anas smithii</i>	Breeds	337 (av.)–506
	<i>Recurvirostra avosetta</i>	—	263 (av.)–669
	<i>Larus dominicanus</i>	—	665
	<i>Larus hartlaubii</i>	150–375	543 (av.)–1,102

### ■ Other threatened/endemic wildlife

Urban development and encroachment by non-native plants threaten the herptiles *Cacosternum capense* (LR/nt), *Hyperolius horstockii*,

*Bradypodion pumilum* (CR) and *B. occidentale*, which all live on the wetland fringes.

### ■ Conservation issues

The sedge-pan habitat represents one of the rarest ecological systems in South Africa and is of high conservation value. The open pan, perennial wetland and sedge-marsh communities are also extremely valuable ecologically. The Blouberg Municipality owns the major part of the wetland; Transnet has recently donated the Flamingo Vlei portion to the municipality. Rietvlei was declared a Nature Area in August 1984, and a management committee was appointed in 1985. In 1989 the area was upgraded to a Protected Natural Environment and Caltex provided funds to the Blouberg Municipality for the express purpose of establishing a nature reserve in 1993. The Caltex donation funded the purchase of most of the Rietvlei Protected Natural Area, specifically the area previously owned by Milnerton Estates. The deal was brokered by WWF-South Africa (formerly the Southern African Nature Foundation). Ownership was transferred to the Blouberg Municipality and the area known as the Rietvlei Wetlands Reserve was established on 27 July 1993. The consolidation of the entire system into a single conservation unit could lead to Rietvlei's registration as a wetland of international importance under the Ramsar Convention. Two permanent wetland pools at the north-western extremity are to be incorporated into the reserve in the near future.

The most obvious and dramatic human-induced modification at Rietvlei was the dredging of the entire north-west section between 1974 and 1976. Seawater was pumped into the pans to facilitate the operation and a vast area was dredged to a depth of 9m. The ecological consequences were profound and irreversible; Rietvlei swapped a sizeable portion of its shallow ephemeral pans for a permanent deep-water lake, which resulted in a total change in ecological character for this portion of the system. The demise of the nearby Blouvlei, which used to support a large heronry holding 12 breeding species, is cause for considerable concern. Most of these birds used to forage at Rietvlei and would contribute substantially to the large numbers of birds occurring here. The loss of this breeding area to make way for the Century City development will probably result in fewer birds visiting the Rietvlei area. Other threats to the wetland include siltation, which results from erosion, and pollution and eutrophication from fertilizers, pesticides, sewage works, stormwater run-off and livestock manure. Petroleum factories and suburban areas on the margin of the system also pose problems.

Vast areas of the mudflats and saltmarsh have been smothered by thick mats of non-native grasses, notably *Paspalum vaginatum*, resulting in habitat loss for waders, the most diverse and abundant community of waterbirds at Rietvlei. The grasses are virtually useless to birds and also contribute to the siltation problem by binding the soil. The reedbeds would probably benefit from periodic burning and the invasive grass could probably be controlled by the occasional introduction of a few domestic cattle, which would certainly provide an improved range of substrate and habitat conditions. Other non-native species, including stands of *Acacia*, are being cleared from large areas around the margin of the wetland.

### ■ Further reading

Allan (1993b, 1995c, 1996a), Allan *et al.* (1996b), Branch (1988), Cooper *et al.* (1976), CSIR (1994), Grindley and Dudley (1988), Kalejta and Allan (1993), Kalejta-Summers *et al.* (in press a), Rowlands (1983), Ryan *et al.* (1988), Scott (1954), Summers *et al.* (1976, 1977), Turpie (1995), Underhill and Cooper (1984), Winterbottom (1960, 1968b).

## Outeniqua mountains

Admin region Western Cape

Coordinates 33°53'S 22°37'E

Area c.180,000 ha

Altitude 300–1,521 m

ZA091

A1, A2 (088), A3 (A13)

State Forest,

Mountain Catchment Area

### ■ Site description

The Outeniquas rise from the coastal plain north of Mossel Bay and run c.100 km to the east before dropping into the Keurbooms river valley, which enters the ocean at Plettenberg Bay. They run parallel to the Swartberg (IBA ZA085). The southern slopes are gentle, and rise to form a series of peaks; the steep northern slopes drop sharply into the

Little Karoo, which forms a broad low-lying valley north of the Outeniquas. The stark variation in altitude and conditions yields a wide diversity of habitats, resulting in a distinct contrast between the moist high-altitude montane fynbos, the karroid and renosterveld shrubland on the northern slopes, where low rainfall promotes non-fynbos scrub, and Afromontane forest on the mesic south-facing slopes.

### ■ Birds

See Box and Tables 2 and 3 for key species. The IBA is extremely rich in birds of fynbos, forest and the arid zone. At high altitudes, the fynbos holds *Nectarinia violacea* and *Serinus totta*. *Promerops cafer* and *Serinus leucopterus* breed and forage in the larger *Protea* stands. Low, dense reseed thicket holds *Sarothrura affinis* and may hold *Turnix hottentotta nana*. *Bradypterus victorini* is locally common in the seeps and neighbouring mesic fynbos, and *Chaetops frenatus* and *Geocolaptes olivaceus* occur on exposed rocky slopes, primarily above 1,000 m. The lowland karroid plains north of the range are particularly good for *Eupodotis vigorsii*, *Cercomela schlegelii* and *Malcorus pectoralis*. *Circus maurus* and *Falco naumanni* are occasionally seen quartering the plains. *Serinus alario* occurs whenever seeding grass and water abound. The isolated forest patches on the southern slopes of the Outeniquas hold several forest endemics including *Tauraco corythaix*, *Campethera notata*, *Telophorus olivaceus*, *Cossypha dichroa*, *Bradypterus sylvaticus* and *Serinus scotops*. Other forest species include *Apaloderma narina* and *Stephanoaetus coronatus*.

#### Key species

A1	<i>Campethera notata</i>	<i>Serinus leucopterus</i>
	<i>Geocolaptes olivaceus</i>	<i>Serinus totta</i>
	<i>Chaetops frenatus</i>	
A2 (088)	Cape fynbos EBA: All of the six species of this EBA that occur in South Africa have been recorded at this site; see Table 2.	
A3 (A13)	Fynbos biome: Eight of the nine species of this biome that occur in South Africa have been recorded at this site; see Table 3.	

### ■ Other threatened/endemic wildlife

This area is thought to hold over 2,000 plant species, many of which are endemic and threatened. *Barbus tenuis* (EN) is restricted to the tributaries of the Keurbooms and Gourits rivers; the former forms the northern boundary of this IBA and may hold small populations of this threatened and highly localized fish species.

### ■ Conservation issues

The major part of this mountain range is protected as the Outeniqua Mountain Catchment Area (158,515 ha, of which 72,300 ha is demarcated State Forest, 461 ha undemarcated State Forest and 85,754 ha proposed Mountain Catchment Area), established in 1970. The Mountain Catchment Areas were proclaimed in accordance with the policy of the former Directorate of Forestry and Environmental Conservation to extend reserves for more effective water management and are now under the control of the Department of Water Affairs and Forestry (DWAf).

Invasive non-native trees of *Acacia*, *Hakea* and *Pinus* pose a serious threat to both vegetation and water conservation in these mountains. Locally, these exotic taxa can dominate thousands of hectares, significantly modifying soil composition, fire regime and natural plant and animal communities, threatening many indigenous species with extinction. Alien trees are also known to accelerate riverbank erosion and reduce in-stream flow through excessive transpiration. The control of invasive alien taxa is the largest task facing most managers in this biome. Biocontrol agents, including fungus and insects, have been introduced to prevent the spread of alien species; some of these agents have been extremely successful. The 'Working for Water' programme, initiated by DWAf, involves physical removal of alien plants in water catchment areas. This ingenious programme increases water run-off and simultaneously employs people.

This IBA is located close to Knysna, the hub of the world-famous Garden Route, and many thousands of tourists pass through the area each year. The mountain chain is used extensively for hiking and other recreational purposes. Greater human usage of this mountain range increases the chance dispersal of the non-native Argentine ant *Iridomyrmex humilis* into these ecosystems. This ant ousts indigenous ant species that are responsible for seed dispersal in numerous myrmecochorous fynbos plants, and this could have a major negative impact on the local biota.

Threats on the karroid plains of the Little Karoo to the north include overgrazing of the surrounding farmland, resulting in the degradation of habitat, potentially reducing populations of wide-ranging, sensitive species. Several pesticides and poisons are used in the farming areas. The effects that they are having on bustards, cranes, raptors and other tertiary consumers in the region are currently unknown.

### Southern Langeberg mountains

**ZA092**

Admin region Western Cape

Coordinates 33°55'S 20°44'E

A1, A2 (088), A3 (A13)

Area c.175,000 ha

Nature Reserve,

Altitude 1,166–1,690 m

State Forest, Wilderness Area

#### Site description

The southern Langeberg is defined as the Langeberg Range between Kogmanskloof and the Gourits river. The Langeberg is one of several east–west trending mountain ranges in the Western Cape. The mountain range runs c.170 km from 35 km west of Swellendam in the west, to c.30 km north-east of Riversdale in the east. South of the range the Agulhas Plain and Overberg wheatbelt (IBA ZA094) stretch towards the coast. To the north lie the open plains of the Little Karoo. The area can be divided into three distinct sectors: Marloth Nature Reserve; Boosmansbos Wilderness Area; and the Bergfontein–Rooiwaterspruit–Phesantfontein area which holds Garcia State Forest. The mesic mountain fynbos is dominated by a multitude of plant communities. Afromontane forest patches, found in deep secluded mesic gorges, are dominated by trees such as *Cunonia*, *Halleria*, *Pterocelastrus*, *Rapanea* and *Podocarpus*. On the northern slopes and plains of the Little Karoo, karroid scrub appears. The Little Karoo is rocky and hilly, and concentrates run-off into pockets, resulting in a varied flora. On some hills and ridges, renosterbos is frequently present.

#### Birds

See Box and Tables 2 and 3 for key species. In the fynbos, *Nectarinia violacea* is widespread in ericas, while *Promerops cafer* and *Serinus leucopterus* are almost restricted to the proteoid elements. *Francolinus capensis*, *Pycnonotus capensis* and *Serinus totta* are widespread, while *Bradypterus victorini* is localized, restricted to moist seeps in hilly areas, where it is common. *Chaetops frenatus* and *Geocolaptes olivaceus* are common on most rocky slopes above 1,000 m. Within the low fynbos scrub both *Turnix hottentotta* and *Sarothrura affinis* are found. The isolated forest patches in the range hold several forest endemics, including *Campethera notata*, *Bradypterus sylvaticus* and *Serinus scotops*. Other forest species, some of which are at the western limit of their distribution, include *Telophorus olivaceus*, *Apaloderma narina* and *Stephanoaetus coronatus*.

The Little Karoo plains and foothills of the north-facing Langeberg hold *Eupodotis vigorsii*, *Certhilauda albescens*, *Cercomela sinuata*, *Cercomela schlegelii* and *Malcorus pectoralis*. *Serinus alario* occurs whenever there is seeding grass and water. Belts of riverine *Acacia* woodland and hill scrub provide food, shelter and breeding habitat for many species, including *Sylvia layardi* and *Parus afer*. *Anthus crenatus*, *Onychognathus nabouroup* and the secretive and localized *Euryptila subcinnamomea* occur in rocky gorges and kloofs. Other arid-zone species occurring in the Little Karoo portion of the IBA include *Melierax canorus*, *Batis pririt*, *Stenostira scita* and *Serinus albogularis*.

The agricultural wheat-growing belt to the south, which nestles up against the Langeberg slopes, holds populations of *Grus paradisea*, *Neotis denhami*, *Circus maurus*, *Sagittarius serpentarius* and *Ciconia ciconia*, all of which forage regularly within the modified agricultural matrix of the Langeberg.

#### Key species

A1	<i>Circus maurus</i>	<i>Chaetops frenatus</i>
	<i>Grus paradisea</i>	<i>Serinus leucopterus</i>
	<i>Campethera notata</i>	<i>Serinus totta</i>
	<i>Geocolaptes olivaceus</i>	
A2 (088)	Cape fynbos EBA: All of the six species of this EBA that occur in South Africa have been recorded at this site; see Table 2.	
A3 (A13)	Fynbos biome: Eight of the nine species of this biome that occur in South Africa have been recorded at this site; see Table 3.	

#### Other threatened/endemic wildlife

Of the 1,228 plant species recorded in the southern Langeberg, 160 (13%) are restricted to the range. The monotypic family Geissolomataceae is endemic to the range as is the monotypic genus *Langebergia* (Compositae). There are 48 endemic ericas and 17 endemic restios in the southern Langeberg. This area is also home to several special vertebrate species; *Breviceps acutirostris* is virtually endemic to the Langeberg. *Barbus tenuis* (EN) is globally restricted to the tributaries of the Keurbooms and Gourits rivers; the latter forms the eastern border of this IBA and it may hold a small population of this threatened and highly localized fish species. The spectacular *Heleophryne purcelli* is restricted to perennial streams in forested, boulder-strewn gorges in montane areas; it is endemic to the Western Cape. Other localized amphibians found in the Langeberg include *Breviceps fuscus* and *Strongylopus bonaspei*, which are restricted to the Cape Floral Kingdom. *Capensibufo tradouwi* breeds in moist depressions, vleis and springs, and it is found in the Langeberg and the Cedarberg–Koue Bokkeveld complex (IBA ZA080).

#### Conservation issues

In 1928 Marloth Nature Reserve, 129 ha in size, was set aside behind Swellendam for the local residents. In 1981, in accordance with the policy of the former Directorate of Forestry and Environmental Conservation (now under control of the Department of Water Affairs and Forestry) to extend reserves for more effective management, the reserve was enlarged to more than 11,000 ha. Farther east, the Boosmansbos Wilderness Area (14,200 ha), proclaimed in 1978, forms part of the Grootvadersbosch State Forest. Similarly, Garcia State Forest (12,000 ha) is managed principally to protect the water-catchment area.

Invasive non-native trees of *Acacia*, *Hakea* and *Pinus* pose a serious threat to both vegetation and water conservation in these mountains. Locally, these exotic taxa can dominate thousands of hectares, significantly modifying soil composition, fire regime and natural plant and animal communities, threatening many indigenous species with extinction. Alien trees are also known to accelerate riverbank erosion and reduce in-stream flow through excessive transpiration. The control of invasive alien taxa is the single largest task facing most managers in this biome. Biocontrol agents, including fungus and insects, have been introduced to prevent the spread of alien species, and some have been extremely successful. The ‘Working for Water’ programme, initiated by DWAF, involves physical removal of alien plants in water-catchment areas. This ingenious programme increases water run-off and simultaneously employs people.

Threats to the karroid plains of the Little Karoo to the north include overgrazing of the surrounding farmland, resulting in degradation of habitat, potentially reducing populations of sensitive wide-ranging species. Several pesticides and poisons are used in the farming areas. The effects that they are having on bustards, cranes, raptors and other tertiary consumers in the region are currently unknown.

#### Further reading

Cowling (1992), McDonald (1993a,b,c, 1995), Richardson *et al.* (1992), van Wilgen *et al.* (1992).

### Wilderness–Sedgefield Lakes complex

**ZA093**

Admin region Western Cape

Coordinates 34°00'S 22°44'E

A2 (089), A3 (A13), A4i, A4iii

Area c.12,250 ha

National Park, Nature Reserve,

Altitude 0–50 m

Ramsar Site

#### Site description

The Wilderness–Sedgefield Lakes complex (WSLC) incorporates the Wilderness National Park and the Goukamma Nature Reserve along the coastal belt east of Wilderness. The entire lakes complex lies below the 5 m contour line on the flat Touw river flood-plain. Three discrete lake systems comprise the Wilderness–Sedgefield Lakes complex. The first, to the west, is the Wilderness lakes system, which consists of a natural channel, the Serpentine, which links the Touw river to its estuary and flood-plain. The channel also runs between Eilandvlei to two other lakes, Langvlei and Rondevlei. The central system is known as Swartvlei, and it consists of a large lake, Swartvlei, which is

connected to the sea via the Swartvlei estuary. The last system, which lies to the east, is a single landlocked lake known as Groenvlei. Collectively, they are the only warm-temperate coastal lakes with a marine connection in South Africa.

Whenever a lake's connection to the estuary is periodically closed by longshore drift, a lagoon, dominated by freshwater, forms. When the connection to the estuary opens, it becomes flooded with seawater. When water-levels are low, exposed sand/mudflats appear on the periphery of most of the water-body. Submerged plants that grow in the lakes, channels and estuaries include *Chara*, *Lamprothamnium*, *Potamogeton*, *Najas*, *Zostera* and *Ruppia*. The fluctuations in salinity and water transparency can sometimes cause total dieback of such plants. The surface waters are clear and open in the central areas. Beds of fringing vegetation, such as *Phragmites*, *Scirpus*, *Juncus*, *Typha*, *Cladium* and *Bolboschoenus*, occur in the littoral zone. The lakes support a diverse community of estuarine macroinvertebrates and fish.

Forests dominated by *Podocarpus*, *Diospyros*, *Gonioma*, *Olea*, *Cassine*, *Pterocelastrus*, *Trichocladus* and *Rapanea* border the lakes and comprise most of the terrestrial vegetation within the Wilderness National Park. A 38-km stretch of coastline, including a series of high undulating coastal sand-dunes, is protected within the park and the neighbouring Goukamma Nature Reserve. The Nature Reserve holds dune fynbos.

### ■ Birds

See Box and Tables 2 and 3 for key species. The site supports an average of 10,868 non-passerine waterbirds every month, and the monthly total has ranged between 4,841 and 24,427 waterbirds between 1980 and 1984. The system is important for Palearctic migrant waders and southern African waterbirds, especially ducks (Anatidae), which moult and breed here. The lakes support 72 waterbird species, including good numbers of *Thalassornis leuconotus* and *Anas undulata*. The marsh and reedbeds surrounding the lakes hold *Circus ranivorus*, *Rostratula benghalensis*, *Ixobrychus minutus*, *Porzana pusilla*, *Sarothrura rufa*, *Rallus caerulescens* and small numbers of *Tyto capensis*. The coastline holds notable numbers of *Haematopus moquini*. Although not present in very significant numbers, up to 6,000 Palearctic waders, consisting primarily of *Calidris ferruginea*, *C. minuta* and *Philomachus pugnax*, can be found within the system during the austral summer. The well-wooded backwaters on Swartvlei and Groenvlei hold small numbers of *Podica senegalensis* and *Alcedo semitorquata*.

#### Key species

A2 (089) South African forests EBA: Four of the seven species of this EBA that occur in South Africa have been recorded at this site; see Table 2.

A3 (A13) Fynbos biome: Five of the nine species of this biome that occur in South Africa have been recorded at this site; see Table 3.

A4i	Breeding (pairs)	Non-breeding
<i>Podiceps cristatus</i>	Breeds	163 (av.)–260
<i>Podiceps nigricollis</i>	—	382 (av.)–1,738
<i>Anas smithii</i>	Breeds	767 (av.)–2,700
<i>Netta erythrophthalma</i>	—	825 (av.)–2,795
<i>Fulica cristata</i>	Breeds	5,280 (av.)–18,698

A4iii More than 20,000 waterbirds occur.

### ■ Other threatened/endemic wildlife

The forests hold several endemic plant species including *Gladiolus vaginatus* and *Satyrium princeps*. The endemic and threatened fish *Hippocampus capensis* (EN) occurs in the Swartvlei estuary. The terrestrial vegetation surrounding the wetland system supports the endemic vertebrates *Myosorex longicaudatus* (VU), *Myosorex varius* and *Breviceps fuscus*.

### ■ Conservation issues

The Wilderness Lakes are a Ramsar Site. The Wilderness National Park incorporates the entire site except for the eastern fringe of Groenvlei. The adjacent Goukamma Nature Reserve, established in 1960, includes the eastern fringe of Groenvlei, the lower sections of the Goukamma river and its estuary, extensive sand-dunes and 14 km of rocky coastline, beaches and marine reserve. The national park also incorporates most of the terrestrial matrix lying between the lakes. The IBA is threatened by the burgeoning expansion of tourism demands on the coastal zone between Knysna and George, which has become one of the premier holiday resort sectors in South Africa. The

lakes are particularly susceptible to high-impact use by tourists. It is vital that development and human activity be monitored and controlled to minimize the anthropogenic impacts on the lakes system. In 1981 a sluice-gate was installed in the Serpentine to manipulate the water-level in the upper Wilderness Lakes system as a means of artificial control. The normal flooding regime of the system was upset because of the development of low-lying properties within the area.

The mouth of the Wilderness Lagoon has to be regularly bulldozed to protect low-lying properties from the threat of flooding. In the early 1980s it became obvious that the artificial opening of the mouth, which had resulted in lower than average water-levels, had caused an expansion of emergent macrophytes, which were interfering with ecosystem processes and disrupting recreation activities. The primary concern within the flood-plain should be to improve water exchange whenever possible. It would appear that flood control and selective dredging might be necessary management practices to improve the flow regime of the estuary.

Several invasive, non-native tree and shrub species represent a major threat to the indigenous flora of the flood-plain. *Albizia lophantha*, *Sesbania punicea* and *Acacia cyclops* have become serious problem species, requiring special attention. Non-native fish, such as *Oreochromis mossambicus*, have been introduced to the lakes and are causing problems by competing with indigenous fish species. Pollution is also of primary concern, as it may be seriously disrupting ecosystem processes. Effluent from residential and industrial sectors should be monitored to detect changes in pollution levels. It is recommended that partial cutting of fringing reeds and sedges be practised on a biennial cycle in order to reduce the amount of moribund vegetation and improve the habitat for rallids and other birds.

### ■ Further reading

Allanson and Whitfield (1983), Boshoff and Palmer (1991), Boshoff and Piper (1992, 1993), Boshoff *et al.* (1991a,b,c), Cowan (1995), Cowan and Marneweck (1996), Hart (1995), Martin (1960), Robarts (1976a,b), Taylor (1997a,b), Underhill *et al.* (1980), Weisser and Howard-Williams (1982), Whitfield *et al.* (1983).

## Overberg wheatbelt

**ZA094**

Admin region Western Cape

Coordinates 34°25'S 19°54'E

A1, A2 (088), A3 (A13), A4i

Area c.300,000 ha Altitude 0–400 m

Unprotected

### ■ Site description

Located at the southern tip of the African continent, this large agricultural district stretches from Caledon to Riversdale and encompasses the area south of these two towns, running between the coastal towns of Hermanus and Stilbaai. De Hoop Nature Reserve, which abuts this area, is considered a separate IBA (IBA ZA098). The topography consists of low-lying rolling coastal plains. The landscape consists primarily of cereal croplands and cultivated wheat pastures and crop fields, although a fair amount of natural vegetation still remains along the coast, especially on the Soetansysberg and Agulhas Plain, which hold at least 1,700 plant species. The coast holds thicket, which is dominated by forest patches of milkwood *Sideroxylon*. Localized, fragmented patches of renosterveld are found throughout the area.

### ■ Birds

See Box and Tables 2 and 3 for key species. The Overberg holds the largest population of *Grus paradisea* in the world. Numbers increase during the winter months when many pairs, which have completed breeding activities, join large loose flocks that congregate in this area. At times this IBA can hold nearly 20% of this species's global population, as well as holding large numbers of *Neotis denhami*. *Gyps coprotheres*, which breed at Potberg in the De Hoop Nature Reserve (IBA ZA098), occasionally forage over the agricultural matrix, where *Circus maurus* is also found frequently. The site also covers a large proportion of the global range of the recently described *Certhilauda brevirostris*. Within this area, it is almost confined to stony wheatfields and pastureland. Despite its limited range, the species appears to be secure, provided that current land-use patterns persist. Some typically karroid birds are also found within the wheat matrix and the occasional renosterveld patches, including *Eupodotis vigorsii*, *Parus afer* and *Cercomela sinuata*.

**Key species**

A1	<i>Circus maurus</i>	<i>Grus paradisea</i>
A2 (088)	Cape fynbos EBA: Three of the six species of this EBA that occur in South Africa have been recorded at this site; see Table 2.	
A3 (A13)	Fynbos biome: Six of the nine species of this biome that occur in South Africa have been recorded at this site; see Table 3.	
A4i	Breeding (pairs)	Non-breeding
	<i>Grus paradisea</i>	— 2,914 (av.)–3,484

**Other threatened/endemic wildlife**

The area is extremely rich in highly threatened endemic flora, including the spectacular *Leucadendron elimense*, *L. modestum* and *L. laxum*. The discovery of a new species of Proteaceae, *Serruria nova*, in 1998, suggests that complete surveys of the area will yield many new endemic species. Among frogs, the spectacular *Hyperolius horstockii* occurs and *Heleophryne purcelli* may occur in montane rivers in the wheatbelt matrix.

**Conservation issues**

The Bredasdorp coastal strip once supported significant areas of a large variety of natural habitats; the area has been extensively transformed through the establishment of a wheatbelt, which now occupies over 85% of the IBA. Very small, isolated, local patches of natural habitat now remain, and these are brimming with critically threatened populations of a range of endemic plant species that were once more common throughout this landscape. These plants are extremely vulnerable to extinction as a result of habitat destruction and physical disturbance to their environment. The small remnant populations are constantly being encroached upon or mismanaged as their significance is not fully appreciated. Renosterbosveld occurring farther inland is even more threatened because more than 90% has been ploughed up for agriculture.

Although *Grus paradisea* seem to have benefited from the agricultural changes that have occurred within the region over the past 30 years, the remaining patches of indigenous lowland fynbos in the IBA are unique and intensely threatened by the wheatbelt. It is imperative that the remaining lowland fynbos in this area be conserved at all costs. Under no circumstances should this IBA description be used as motivation to increase the area under wheat.

*Grus paradisea* has recently expanded its range into, and become remarkably common in, the agricultural sectors of the fynbos biome, having originally been absent from this area. Flocks of *Grus paradisea* are attracted to agricultural fields where they may feed on fallen grain and recently germinated crops. They also gather to feed on supplementary food put out for small stock, especially during times of drought. This has earned them the enmity of some farmers, and occasionally a few have spread poisoned grain on their fields and around feedlots to kill cranes. Most of South Africa's cranes and crane habitats, particularly in the Overberg, are on privately owned farmland; their future lies firmly in the hands of private land-owners. Poisonings in the Overberg are now very scarce, thanks to an effective awareness campaign by the Overberg Crane Working Group and Cape Nature Conservation, and a very responsive farming community in the area. This project should act as a model for farmer awareness schemes in other parts of South Africa.

Additional threats to *Grus paradisea* include overhead power cables and electricity structures, which they occasionally strike during flyovers. Eskom (Electricity Supply Commission) and the Endangered Wildlife Trust are attempting to implement a strategy to reduce bird strikes on electricity structures, including marking them with various devices to make them more visible to birds at sites where strike rates are highest. Birds in this area breed in agricultural fields and cultivated pastures. The wheatlands can be managed to benefit the cranes and bustards in this altered landscape. In the Overberg, cranes avoid natural fynbos vegetation and inhabit cereal croplands and cultivated pastures. By contrast, they inhabit natural vegetation in the Karoo and grassland biomes, but also feed in crop fields.

*Gyps coprotheres*, from the breeding colony at De Hoop Nature Reserve (IBA ZA098), forage outside the reserve structure and are vulnerable to indiscriminate use of poison by small-stock farmers in the area, who may use poison to combat mammalian predators such as jackals and dogs. Although farmers in this region are eager to contribute to conservation schemes, it should be emphasized that a single poisoned carcass could decimate the entire colony. In the nearby

Albertina District, farmers have activated a vulture restaurant of their own accord, and the increase in vulture numbers has been ascribed to the active cooperation of enlightened farmers in the area.

**Further reading**

Allan (1989, 1992, 1993a, 1994a,c, 1995a,b, 1996b), Allan and Young (1998), Anderson (1990), Cowling *et al.* (1988), Hitchcock (1996), Scott (1992), Siegfried (1985), Tarboton (1992), van Ee (1981).

**False Bay Park (proposed)**

Admin region Western Cape

Coordinates 34°05'S 18°31'E

Area c.3,000 ha Altitude 0–20 m

ZA095

A1, A4i, A4iii

Unprotected

**Site description**

This proposed park is centred on Strandfontein Sewage Works, but also includes Zeekoevlei and Rondevlei. Situated on the Cape Flats between Muizenberg and Mitchell's Plain, 20 km south of Cape Town, Strandfontein, like many wetlands around South Africa's major cities, is almost entirely man-made. Prior to 1922 the only wetland habitat at the site was the small temporary marsh Tamatievlei. In 1922, a small sewage works was built, and additional water was channelled into the system from the nearby Zeekoevlei. Over the years the complex has been enlarged progressively. By 1976 the small water-body, Tamatievlei, had been converted into 34 settling ponds covering over 306 ha.

The system provides a range of semi-natural habitats, including deep and shallow open water, seasonal open ponds, canals with aquatic vegetation, reed, rush and sedge-beds, bare and vegetated shorelines and islands. Well-grassed banks separate the ponds. The sewage works functions entirely by algal decomposition, a process that requires a large number of shallow vleis. The algae and the large number of copepods which accompany them provide a rich food supply for many bird species.

**Birds**

See Box for key species. The wetlands act as a network, but the majority of the birds are centred on the Strandfontein Sewage Works, where a total of 168 species has been recorded; of these, 76 are freshwater wetland species and a further 18 are coastal species that visit the area to roost or breed. Breeding has been confirmed for 45 waterbird species. This high diversity of waterbirds is due to the wide range of wetland habitats present, and the proximity of Strandfontein to the ocean, which permits both freshwater and coastal species to exploit the system. The abundance of waterbirds supported by Strandfontein has increased progressively since the 1950s, reaching an average of over 23,200 individuals during the period 1980–1990. During extreme years, numbers rise above 30,000. The following nationally threatened and near-threatened species are found at Strandfontein: *Phoenicopterus ruber*, *Pelecanus onocrotalus*, *Circus ranivorus*, *Sterna caspia* and *Charadrius pallidus*. The site holds a regular tern roost of some 3,000 birds when the water is low enough for islands to form in the shallow pans, including fairly large numbers of *Sterna hirundo*, *S. sandvicensis* and *S. bergii*.

**Key species**

A1	<i>Phoenicopterus minor</i>	<i>Haematopus moquini</i>
A4i	Breeding (pairs)	Non-breeding
	<i>Tachybaptus ruficollis</i>	Breeds 403 (av.)–628
	<i>Podiceps cristatus</i>	Breeds 25 (av.)–51
	<i>Podiceps nigricollis</i>	Breeds 328 (av.)–1,380
	<i>Phalacrocorax capensis</i>	1,000–15,000 2,665 (av.)–40,000
	<i>Phoenicopterus ruber</i>	— 1,878 (av.)–4,328
	<i>Tadorna cana</i>	— 87 (av.)–477
	<i>Anas capensis</i>	Breeds 468 (av.)–1,799
	<i>Anas smithii</i>	Breeds 603 (av.)–1,418
	<i>Netta erythrophthalma</i>	Breeds 346 (av.)–1,332
	<i>Recurvirostra avosetta</i>	— 467 (av.)–942
	<i>Larus dominicanus</i>	Breeds 996 (av.)–3,685
	<i>Larus hartlaubii</i>	Breeds 1,156 (av.)–3,506
	<i>Sterna bergii</i>	— 753
	<i>Sterna sandvicensis</i>	— 3,027
	<i>Chlidonias leucopterus</i>	— 1,025 (av.)–6,832
A4iii	More than 20,000 waterbirds occur.	

### ■ Other threatened/endemic wildlife

None known to BirdLife International.

### ■ Conservation issues

The Strandfontein Sewage Works is administered by the Cape Town City Council. Birds that breed at the nearby Rondevlei Nature Reserve, currently the only protected vlei on the Cape Flats, probably forage extensively at the sewage works. During the 1980s, a coastal park linking the Strandfontein Sewage Works to Rondevlei and Zeekoovlei was proposed. The proposed park was never realized owing to a money shortage. Newly proposed developments in the area, which would isolate Rondevlei and Zeekoovlei, have led to renewed calls for the establishment of a reserve protecting these important wetlands and their surrounding endangered strandveld vegetation, which is under threat from invasive non-native trees *Acacia*.

### ■ Further reading

Allan *et al.* (1990), Ashkenazi (1986), Berruti and Sinclair (1983), Broekhuysen and Frost (1968), Chittenden (1992), Cooper and Pringle (1977), Cooper *et al.* (1976), Kalejta-Summers *et al.* (in press b), Longrigg (1982), Ryan *et al.* (1988), Schneider (1996), Summers *et al.* (1977), Turpie (1995), Underhill and Cooper (1984), Winterbottom (1960, 1968b).

#### Boulders Bay

Admin region Western Cape  
Coordinates 34°12'S 18°27'E  
Area 2 ha Altitude 0–15 m

ZA096

A1

National Park

### ■ Site description

Boulders Bay is situated in Simon's Town, on the False Bay coast of the Cape Peninsula, 35 km south of Cape Town. The site consists of small beaches holding sandstone boulders and thickets of strandveld vegetation.

### ■ Birds

See Box for key species. *Spheniscus demersus*, which breed primarily under the strandveld vegetation, but also on the beach and in every available rock crevice, colonized Boulders Bay in 1985. The colony has increased steadily, and there were more than 700 active nests in 1997. This is one of the few growing colonies in the world, and it is thought that birds may be relocating here from Dyer Island (IBA ZA099) where the population has decreased markedly since the mid-1980s. It is also one of only three mainland breeding sites in the world. Small numbers of *Phalacrocorax coronatus* occasionally roost on the rocks and *Haematopus moquini* are occasionally seen along the beach.

#### Key species

A1 *Spheniscus demersus*

### ■ Other threatened/endemic wildlife

None known to BirdLife International.

### ■ Conservation issues

This area has recently been incorporated into the Table Mountain National Park, and is under the jurisdiction of National Parks Board. Competition with commercial fisheries, especially purse-seining for surface-shoaling fish such as pilchard *Sardinops sagax*, has been implicated as one of the most significant factors causing the global population decline of *Spheniscus demersus*. The penguins may be relocating to Boulders Bay and Robben Island (IBA ZA089) because of the restrictions on purse-seine fishing in False and Table Bay respectively. It has been speculated that the localized protection of their food resources may allow for improved breeding success and survival.

Threats at Boulders include predation by *Felis catus* and *Genetta genetta*. Although disturbance by tourists may be a problem, the penguins at this site are remarkably tame and the colony continues to increase in numbers and size despite exposure to large numbers of people. Measures to control excessive disturbance by visitors are being implemented. The education value of the site is immense and many thousands of visitors come here for the express purposes of viewing penguins. The education and tourism potential is massive, and it remains largely untapped.

Another problem which is difficult to predict or control is chronic pollution by crude oil or other environmental pollutants when tankers break open, tank wash, dump cargo or pump bilge. Penguins are affected particularly badly by these activities and a single oil disaster can severely affect populations. The Apollo Sea oil-spill disaster in the late 1980s resulted in many penguin deaths in and around the Cape Peninsula. The South African National Foundation for the Conservation of Coastal Birds (ZANCCOB) cleaned, rehabilitated and returned some 3,000 penguins to the wild between 1981 and 1991.

### ■ Further reading

Adams (1991), Cooper *et al.* (1984), Crawford (1995), Crawford and Dyer (1995), Crawford and Shelton (1978, 1981), Crawford *et al.* (1982b, 1990, 1994, 1995c), Frost *et al.* (1976), Hockey (1983), Hockey and Hallinan (1981), Morant *et al.* (1981), National Parks Board (1997), Peterson (1995), Randall *et al.* (1980), Shelton *et al.* (1982), Siegfried (1982), Summers and Cooper (1977), Wilson *et al.* (1988).

#### Botrivierlei and Kleinmond estuary

ZA097

Admin region Western Cape

Coordinates 34°20'S 19°10'E

Area c.1,400 ha Altitude 0–20 m

A4i, A4iii

Unprotected

### ■ Site description

The Botrivierlei and Kleinmond estuary lie between the coastal towns of Kleinmond and Onrus on the south-west coast of the Western Cape. The 42-km-long Bot river and its main tributary, the 48-km-long Swart river, drain the Houhoek, Groenland, Swart, Shaw's and Babilonstoring mountains, covering a catchment area of c.1,000 km<sup>2</sup>. Although the Bot drains a relatively small catchment, it forms one of the largest coastal, open-water lagoons in the Western Cape.

The Bot river flows into the Botrivierlei, which is a shallow triangular coastal lake (lagoon), situated in a broad valley flanked by mountains. The water-levels of the lake vary considerably and it can be up to 7 km long by 2 km wide. The lake is separated from the sea by a 100–200-m-wide coastal dune belt, 3–6 m high, through which washover from the sea occasionally spills. At the seaward western end of the main lagoon there is a shallow sidearm, Rooisand, which is connected to the main vlei by a narrow bottleneck called die Keel.

When water-levels in the main lagoon are low, Rooisand is dry, but when the water-levels rise sufficiently, the Botrivierlei overflows through this area and into the Kleinmond estuary, allowing excess floodwater to escape without breaking open the dune barrier to the sea. Occasionally, the dunes have been artificially breached, with the aim of re-establishing estuarine conditions (particularly suitable for angling fish), but the gaps have been closed relatively quickly by wave-driven sand movements. The aquatic vegetation is dominated by *Ruppia*, which occurs throughout the vlei in water shallower than 3 m. Algae, such as *Chara*, seem to be present throughout the vlei. *Potamogeton* occurs in dense isolated patches in the upper reaches. Dense reed-swamps of *Phragmites* and *Scirpus* occur in some marginal waterlogged areas.

### ■ Birds

See Box for key species. The site supports over 163 bird species, at least 62 of which are waterbirds. The wetland regularly supports an average of 25,000 individual birds and on occasion it can hold over 40,000. The wetland is important as a summer refuge for waterbirds, when ephemeral water-bodies dry up and birds are forced to seek out permanent water. The system regularly supports extremely large numbers of duck (Anatidae), including *Anas undulata*, *Netta erythrophthalma* and *Tadorna cana*. *Fulica cristata* is the dominant waterbird and numbers often exceed 20,000 individuals when conditions are favourable (probably the largest regular congregation in South Africa). The system also supports important numbers of *Anas smithii*, *Podiceps nigricollis* and *P. cristatus*, which breed here. *Haematopus moquini* occurs near the estuary mouth and along sandy beaches on the seaward side of the coastal dune-fields where it has been recorded breeding. In summer this wetland regularly supports over 4,000 waders of at least 11 different species, with *Calidris ferruginea* being dominant. Terns, which are at times very abundant, use the estuary largely as a roosting area, from where they move to marine environments to feed.



Key species		
A4i		Breeding (pairs) Non-breeding
	<i>Podiceps cristatus</i>	Breeds? 62 (av.)–152
	<i>Podiceps nigricollis</i>	Breeds? 68 (av.)–1,100
	<i>Tadorna cana</i>	— 229 (av.)–787
	<i>Anas smithii</i>	Breeds? 172 (av.)–404
	<i>Netta erythrophthalma</i>	Breeds 326 (av.)–1,132
	<i>Fulica cristata</i>	Breeds 18,283 (av.)–36,000
A4iii	More than 20,000 waterbirds occur.	

### Other threatened/endemic wildlife

*Hyperolius horstockii*, *Microbatrachella capensis* (EN) and *Bradypodion pumilum* (CR) are threatened herpetiles that occur in the IBA. The South-African-endemic amphibians *Bufo angusticeps*, *Breviceps rosei* and *Tomopterna delalandii* have been found nearby and may well be present in the IBA. The lizard *Scelotes bipes* occurs in the nearby strandveld.

### Conservation issues

The Botrivierlei and its entire catchment fall within the jurisdiction of the Caledon Divisional Council. The State-owned land on the Houhoek and Groenland mountains is administered by the Department of Water Affairs and Forestry (DWF). The remainder of the catchment consists of privately owned farmland. About 60% of the drainage basin is used for agriculture, primarily wheat, while the remainder of the farmland is used for sheep pasturage. Soil in the catchment is poor, and fertilizers are used extensively; there is run-off into rivers which poses a major problem. As much as 150 tons of sediment per square kilometre of catchment may be eroded annually, and siltation is a major problem for the estuary. An annual sediment load of 122,000 tons can be expected to reach the vlei from the catchment; this can severely impede river flow and alter the system's estuarine dynamics. Measures such as switching from wheat to pasturage, or alternating between wheat and pasturage, would reduce erosion in the catchment area considerably.

There is controversy concerning management of the system, with regard to the artificial breaching of the dune barrier, which allows estuarine conditions to develop in Botrivierlei. If the dune barrier is breached every 3–5 years, juvenile fish enter the vlei, resulting in good angling in subsequent years. Conversely, angling is poor in years in which breaching does not occur. It has been shown, however, that artificial breaching has detrimental ecological consequences. When considering management options, a range of values should be considered, especially the ecological integrity of the system, as well as interests of the local community, tourism and general aesthetic value. The lowering of water-levels exposes the vlei bottom, resulting in massive macrophyte dieback, consequent eutrophication, and the destruction of much of the aquatic flora and fauna, as well as a reduction in the recreational potential of the area for a considerable period. Any artificial opening should only be made after consultation with Cape Nature Conservation and other concerned biologists.

The major obstruction to the Bot river has been the construction of the road-bridge, which cuts across the extensive *Phragmites* flood-plains at the head of the estuary where the river enters the vlei; it is wholly inadequate in terms of allowing water to pass between the two sections of the flood-plain. Modifications should be made to obstruct the watercourse as little as possible.

### Further reading

Bally *et al.* (1985), Branch *et al.* (1985), Cooper *et al.* (1976), Heyl and Currie (1985), Koop (1982), Koop *et al.* (1983), Ryan *et al.* (1988), Summers and Cooper (1977), Summers *et al.* (1977), Underhill and Cooper (1984).

## De Hoop Nature Reserve

Admin region Western Cape

Coordinates 34°26'S 20°29'E A1, A2 (088), A3 (A13), A4i, A4iii

Area 40,000 ha Altitude 0–611 m Nature Reserve, Ramsar Site

ZA098

### Site description

De Hoop Nature Reserve is situated near the southern tip of the African continent, c.56 km east of Bredasdorp. This reserve comprises a unique diversity of natural habitats and it is situated in the heartland of a mosaic of grainfields and wheat pastures. The reserve holds the Ramsar-designated De Hoop Vlei, a coastal lake, which formed when

the mouth of the Sout river was blocked by the emergence of estuarine sandbars, creating a landlocked, brackish expanse of water, separated from the ocean by 2.5 km of mobile sand-dunes, and fed by the Sout and Potteberg rivers and by several springs.

The lake is c.15 km × 500 m in extent and its depth varies considerably, reaching a maximum of 8 m during periods of flooding, which may persist for several years. During floods, large areas of adjacent land, mainly to the south-west, are inundated. On the other hand, the lake has dried up completely during drought periods. Salinity can vary considerably, with fluctuations of between 3‰ and 49‰ being recorded over a three-year period. The dominant aquatic plants are *Ruppia* and *Potamogeton*. Marginal vegetation includes small reedbeds *Phragmites* and patches of sedge-marsh *Scirpus*.

Surrounding the lake are localized forest patches of *Sideroxylon*, *Celtis* and *Euclea*. The coastal plain supports dune fynbos, with proteoid fynbos farther inland. The Potberg mountain range, which rises abruptly in the north-eastern part of the reserve, is an inselberg of sandstone and quartzite. The isolated and unique nature of this mountain has resulted in the evolution of an unusual dry mesic heath, holding many species endemic to the mountain.

The reserve's astonishing terrestrial diversity is coupled with a rugged coastline, which is gently concave and faces the broadest part of the Agulhas Bank. The meeting of the icy Benguela and warm subtropical Agulhas currents offshore contributes to the variety of habitats, both terrestrial and marine, found within the reserve. The marine system is dominated by various marine algae such as kelp *Ecklonia*, *Macrocystis*, *Ulva* and *Laminaria*. There is an area of shifting dunes at Koppie Alleen which covers some 1,000 ha; some dunes are up to 100 m high. The dunes hold few plant species, but the unique dune fynbos is adapted to this unstable environment.

### Birds

See Box and Tables 2 and 3 for key species. At least 260 bird species have been recorded at the reserve, of which 97 are waterbirds, primarily dependent on the Ramsar-designated De Hoop Vlei. The vlei, on average, supports over 8,000 birds. However, the system is highly variable, and numbers of waterbirds visiting and breeding vary considerably, depending on water-levels and salinity. In good years, the vlei has supported over 30,000 birds, but during drought years it may be dry. This is the only locality in South Africa where *Phoenicopterus ruber* has bred successfully (in 1960 and 1963); they still occur regularly at the vlei. Other species supported by the vlei include *Sterna caspia* and *Charadrius pallidus*. The vlei also sometimes has extremely large numbers of *Anas undulata*, *A. smithii*, *Fulica cristata* and *Alopochen aegyptiacus*. *Sterna balaenarum*, which breed at the nearby Heuningnes estuary (IBA ZA100), are occasionally seen within De Hoop. The beaches hold breeding pairs of *Haematopus moquini*.

A cliff on Potberg has the only remaining breeding colony of *Gyps coprotheres* in the Western Cape. Unfortunately, the total number of vultures had been showing a general and progressive decrease. However, thanks to vulture-friendly agricultural methods implemented by the local farming community, this trend has been reversed. The short restioid fynbos on the slopes of Potberg is known to hold both *Sarothrura affinis* and *Turnix hottentotta*. *Grus paradisea*, *Neotis denhami* and *Circus maurus* have large populations in the modified agricultural matrix of the Overberg Wheatbelt (IBA ZA094) surrounding the reserve; the open plains in the reserve also support important numbers of these species. Some typically karroid birds are also found here, including *Eupodotis vigorsii* and *Parus afer*, and the recently described *Certhilauda brevirostris* also occurs. *Campethera notata* occurs scarcely in forested gorges.

### Key species

A1	<i>Gyps coprotheres</i>	<i>Haematopus moquini</i>
	<i>Circus maurus</i>	<i>Campethera notata</i>
	<i>Grus paradisea</i>	
A2 (088)	Cape fynbos EBA: Three of the six species of this EBA that occur in South Africa have been recorded at this site; see Table 2.	
A3 (A13)	Fynbos biome: Six of the nine species of this biome that occur in South Africa have been recorded at this site; see Table 3.	
A4i	Breeding (pairs)	Non-breeding
	<i>Podiceps cristatus</i>	Breeds? 95 (av.)–180
	<i>Phoenicopterus ruber</i>	Breeds 1,473
	<i>Anas undulata</i>	Breeds 319 (av.)–4,626
	<i>Anas smithii</i>	Breeds? 604 (av.)–3,004

A4i ... continued	Breeding (pairs)	Non-breeding
<i>Fulica cristata</i>	Breeds	2,886 (av.)–24,400
<i>Haematopus moquini</i>	5–10	50–70
A4iii	More than 20,000 waterbirds occur.	

### Other threatened/endemic wildlife

The reserve is thought to contain more than 1,500 plant species, representing one of the highest diversities within the Cape Floristic Kingdom. At least 108 fynbos plants are threatened and/or endemic to De Hoop and its immediate vicinity. There are at least 50 endemic species; 12 occur only on Potberg, the remainder on the limestone outcrops. Fourteen plant species were recently discovered and remain undescribed, of which eight are not known to occur outside De Hoop Nature Reserve. Among mammals, the reserve holds a healthy population of the South African endemic *Equus zebra zebra* (VU) and the world's largest population of *Damaliscus dorcas dorcas*; the latter subspecies is endemic to the Cape Floristic Kingdom. The marine reserve off the coast protects a wide diversity of organisms, notably the whale *Eubalaena australis* (LR/cd), which mates and calves here annually between June and December.

### Conservation issues

The De Hoop Nature Reserve was established in 1956 for the purpose of breeding game; it is currently administered and managed by Cape Nature Conservation. Since establishment, several farms have been bought and incorporated into the reserve. De Hoop Vlei was designated a Ramsar Site in 1975 and expanded in 1986 to include all of the vlei between the causeway at Apolsfontein in the north and De Mond in the south. The marine reserve, which extends three nautical miles off the coast, was also included in 1986. The development of the Overberg Test Range, adjacent to the reserve, by the South African Armaments Corporation (ARMSCOR) in 1983, resulted in increased activity, vehicular use, construction, noise pollution and vegetation burning, all of which have impacted on the neighbouring reserve.

*Gyps coprotheres* forages widely outside the reserve and it is vulnerable to indiscriminate use of poison by small-stock farmers targeting mammalian predators such as jackals, caracals and dogs. Although farmers surrounding De Hoop are highly responsible and very eager to contribute to conservation programmes, it must be emphasized that a single poisoned carcass could decimate the entire colony. In the nearby Albertina District, concerned farmers have activated a vulture restaurant of their own accord, and the increase in vulture numbers in the district has been ascribed to the active cooperation of enlightened role-model farmers in this area.

In the past, patches of veld were burnt frequently in order to improve grazing, often at an undesirable frequency, intensity and season. This resulted in many Proteaceae being destroyed before they had time to produce seeds. The Bredasdorp coastal strip supports a large variety of natural floral communities, with many endemics occurring in small localized populations. These plants are extremely vulnerable to extinction as a result of habitat loss and physical disturbance to their environment. Renosterbosveld occurring farther inland is critically threatened; more than 90% of it has been ploughed up for agriculture.

Infestation by non-native plants, such as *Acacia saligna* and *A. cyclops*, is a major threat to the indigenous vegetation within the reserve, and its removal is a conservation priority. In terms of recreational and aesthetic value, the reserve offers a unique spectrum of ecotourism activities, making it economically valuable.

### Further reading

Boshoff (1981, 1987, 1990), Boshoff and Currie (1981), Boshoff and Robertson (1985), Boshoff and Scott (1990), Coetzee (1986), Cowan (1995), Cowling *et al.* (1988), Scott (1991), Scott (1995).

## Dyer Island Nature Reserve

Admin region Western Cape

Coordinates 34°41'S 19°25'E

Area 20 ha Altitude 0–9 m

ZA099

A1, A4i, A4ii, A4iii  
Nature Reserve

### Site description

Dyer Island is one of two low-lying islands situated 4.7 km south-east of Danger Point. The nearest harbour is at Kleinbaai/Franskraal, just

south of Gansbaai. The coastline is rugged with some low rocky areas spreading inland. The island is flat and low-lying, with a pebbly surface. The vegetation consists primarily of Mesembryanthemaceae and non-native weeds (including conspicuous stands of *Lavatera*). In the south-eastern part of the island are several buildings that house the island staff, boats and stores.

### Birds

See Box for key species. The discovery of *Oceanodroma leucorhoa* in several of the stone walls on the island in October 1995 was the first evidence of a procellariiform bird breeding in southern Africa. In November 1996 it was estimated that 8–9 pairs were breeding. In 1996, after an absence of some 25 years, *Sterna dougallii*, which breed regularly only at two other islands in southern Africa (Bird and St Croix islands in Algoa Bay; IBA ZA074), attempted to breed again at Dyer Island. The breeding attempt failed owing to suspected human disturbance. The population of *Spheniscus demersus* at Dyer Island is in rapid decline, and although the island supported some 72,500 birds in 1976, it is thought that the population may have fallen below 3,000 pairs in 1997.

Many other species breed on this island, including large numbers of *Phalacrocorax capensis* and small numbers of *P. carbo*, *P. neglectus* and *P. coronatus*. Several large colonies of *Larus hartlaubii* and *Sterna bergii* breed at the island. *Sterna sandvicensis*, *S. hirundo*, *S. paradisaea* and *S. vittata* form large, mixed tern roosts with the breeding *S. bergii*. Dyer Island is estimated to hold over 1% of the world population of *Haematopus moquini*.

#### Key species

A1	<i>Spheniscus demersus</i>	<i>Phalacrocorax neglectus</i>
	<i>Phalacrocorax coronatus</i>	<i>Haematopus moquini</i>
A4i	Breeding (pairs)	Non-breeding
	<i>Phalacrocorax coronatus</i>	60–238
	<i>Phalacrocorax capensis</i>	35,580 (max.)
	<i>Haematopus moquini</i>	160
	<i>Larus dominicanus</i>	88–130
	<i>Larus hartlaubii</i>	110
	<i>Sterna bergii</i>	300
A4ii	<i>Spheniscus demersus</i>	3,050
A4iii	More than 20,000 waterbirds occur.	

### Other threatened/endemic wildlife

The waters around the island hold a large population of the shark *Carcharodon carcharias* (VU).

### Conservation issues

Dyer Island is state-owned and administered and managed by the Hermanus branch of Cape Nature Conservation. This island used to support the largest colony of *Spheniscus demersus* in the world, but since the 1980s numbers have decreased greatly. The average number of penguins between 1978 and 1986 was 18,231, but between 1990 and 1992 it had decreased to 5,325. Events such as the mass abandonment of nests in February 1991 have accelerated the decline. The most likely cause of these desertions and consequent breeding failure is scarcity of food.

Competition with commercial fisheries, especially purse-seining for surface-shoaling fish such as anchovy *Engraulis capensis* and pilchard *Sardinops sagax*, has been implicated as one of the most significant factors causing seabird population declines in the region. Anchovy recruitment was impaired and stocks were greatly reduced between 1989 and 1990, which may have triggered mass penguin emigration. It is thought that birds which used to breed at Dyer Island may have relocated to Stony Point, Boulders Bay (IBA ZA096), Robben Island (IBA ZA089) and as far east as St Croix in the Algoa Bay group (IBA ZA074) where the populations are growing steadily. It has been recommended that marine reserves with a radius of 25 km be created around important breeding islands. Commercial fishing should be banned or restricted within these zones. Regulations of this type may prevent local depletion of food resources that contribute to low breeding success and which may precipitate mass desertion of these colonies.

The population of the seal *Arctocephalus pusillus* on the nearby Geyser Island has been growing steadily, and there has been an increase in the number of cases of seals mauling and killing penguins. Certain 'rogue' individuals seem to be the principal agents of this mortality

and it is important that management action be introduced to eliminate the responsible animals. Furthermore, increased seal numbers, coupled with their ability to outcompete and displace birds at breeding islands, pose a major threat to all breeding seabirds.

Certain problems are known to affect seabirds throughout their ranges. An unpredictable threat, which is difficult to control, is chronic pollution by crude oil or other pollutants that spill into the ocean when tankers break open, wash their tanks, dump cargo or pump bilge. *Spheniscus demersus* is particularly susceptible to these events and a single oil disaster can severely impact populations. The South African National Foundation for the Conservation of Coastal Birds (ZANCCOB) cleaned, rehabilitated and returned some 3,000 penguins to the wild between 1981 and 1991.

Tourism to the reefs around the island to see the shark *Carcharodon carcharias* is increasing, and the industry needs to be carefully monitored. Landings on the island are not currently permitted. Several introduced species occur on the treeless Dyer Island, including 15 exotic plants, which are mostly small weeds and forbs.

### Further reading

Adams (1991), Branch (1991), Brooke and Prins (1986), Cooper (1981), Cooper and Berruti (1989), Cooper and Brooke (1986), Cooper *et al.* (1983, 1984), Crawford (1995), Crawford and Dyer (1995), Crawford and Shelton (1978, 1981), Crawford *et al.* (1982a,b, 1983, 1989, 1990, 1994, 1995c), Frost *et al.* (1976), Furness and Cooper (1982), Hockey (1983), Hockey and Hallinan (1981), Morant *et al.* (1981), Rand (1963), Randall and Randall (1980), Randall *et al.* (1980), Shelton *et al.* (1982), Siegfried (1982), Summers and Cooper (1977), Whittington (1996), Whittington and Dyer (1995), Whittington *et al.* (1998), Williams *et al.* (1990), Wilson *et al.* (1988).

### Heuningnes river and estuary system

Admin region Western Cape  
Coordinates 34°43'S 20°00'E  
Area 9,000 ha Altitude 0–20 m

ZA100

A1, A4i  
State Forest, Ramsar Site,  
Unprotected

### Site description

This complex wetland system, located at the southern tip of the African continent, 25 km south of Bredasdorp, consists of the Nuwejaarsrivier and its associated marshes, Soetendalsvlei and the Heuningnes river and its estuary (the southernmost estuary in Africa). The area of interest extends from 5 km upstream of the Nuwejaarsrivier–Soetendalsvlei confluence to the mouth of the Heuningnes river. The vlei acts as a reservoir, and when it overflows, the run-off spills over into the Heuningnes river, which feeds the estuary. The primary wetland area is found between Heuningrug and Wiesdrif.

Vegetation includes mixed and monospecific stands of tall to short sedges, reeds and grasses (*Eleocharis*, *Cyperus*, *Scirpus*, *Typha*, *Phragmites*), open mud patches, shallow water, *Isolepis* mats, deep pools and shallow pan-like pools. A second wetland area is the 5 km stretch of the Nuwejaarsrivier close to Moddervlei. The Wiesdrif pan on the farm is a shallow flooded depression in grassland, with much emergent vegetation. Many of the river channels are poorly defined and drainage into the estuary occurs via vleis and marshes, which constitute large areas of wetland.

The estuary mouth comprises an extensive bay with sand, mudflats and tidal saltmarsh, dominated by *Limonium*, *Salicornia* and *Sarcocornia*. Heavily grazed and degraded flood-plain vegetation is found between the saltmarsh and the sandbanks. Patches of reed *Phragmites* occur at places along the riverbanks. The terrestrial vegetation adjacent to the estuary consists of dune scrub (coastal fynbos). The estuary is important as a nursery ground for marine fish.

### Birds

See Box for key species. *Larus dominicanus* regularly nests in the dunes a few kilometres to the north-east of Heuningnes mouth. The pebble slacks behind the beach are one of only two protected, confirmed breeding sites for *Sterna balaenarum* in South Africa, holding 15% of the national breeding population, and *Sterna caspia*, *Haematopus moquini*, *Charadrius pecuarius* and *Plectropterus gambensis* all breed regularly. *Rostratula benghalensis*, of the isolated and declining Western Cape breeding population, is also present in good numbers. *Grus paradisea* occasionally roosts and feeds at open pools in the middle of

the wetland. *Circus maurus* and *C. ranivorus* have been recorded at the site. *Pelecanus onocrotalus* occasionally occurs in large numbers.

The Nuwejaarsrivier marshes are excellent for secretive rails and crakes. *Porzana pusilla* is numerous and probably breeds, *Sarothrura rufa* has been recorded at a density of one pair/0.25 ha in excellent habitat, and *Rallus caeruleus* and *Amaurornis flavirostris* are widespread and abundant. Small numbers of migrant Palearctic and resident waders regularly use the site, including *Charadrius hiaticula*, *C. pecuarius*, *Calidris ferruginea* and *C. minuta*.

#### Key species

A1	<i>Sterna balaenarum</i>		
A4i		Breeding (pairs)	Non-breeding
	<i>Larus dominicanus</i>	300–450	700–1,000

### Other threatened/endemic wildlife

The reptile *Bradypodion pumilum* (CR) is thought to occur in the area.

### Conservation issues

De Mond State Forest was established in 1975 to preserve the Heuningnes estuary and the adjoining coastal fynbos vegetation. The estuary and dunes on either side form a Ramsar Site, designated in 1986. The remainder of the site, including the highly sensitive Nuwejaarsrivier marshes, is privately owned and unprotected.

This site is worthy of the maximum possible protection. Detailed vegetation surveys would yield interesting information on plant-species composition and habitat diversity. Most of the catchment (upstream from the site) is on privately owned farmland, and several irrigation dams and weirs have been constructed on the Karsrivier. Any further damming of the tributaries could have serious implications for freshwater input to the estuarine system. A causeway in the intertidal zone 1.3 km upstream of the mouth is a considerable obstruction to tidal exchange, which has altered the character of the upper estuary, which now resembles a slackish turbid river. In its natural state water would dam up behind the dune barrier; during floods, the barrier would be periodically breached and the mouth would open up. An elongated lagoon about 2.5 km long used to form between the dune-ridges. The estuary mouth probably moved considerably, shifting by up to 2 km along the beach. However, whenever the mouth closed, extensive flooding occurred in the hinterland, which had been developed for farming; crops were destroyed and extensive topsoil was lost. In 1937 the Department of Agriculture and Forestry took steps to keep the river mouth open to reduce backsliding and appease local farmers.

The sand-dunes on either side of the estuary and to the north are now stabilized by non-native marram grass *Ammophila*. The mouth width has also been reduced and confined artificially by brushwood barriers and dune afforestation. The barriers prevent large-scale migration of the mouth or the formation of a natural sand-spit. The considerable stabilization of the area and alteration of the natural flux may have affected the functioning of this estuary. The construction of road-protection levees has reduced tidal activity, resulting in areas of saltmarsh becoming colonized by coastal dune plants. Above the saltmarsh, the flood-plain vegetation is heavily grazed. A major threat to *Sterna balaenarum* is the extensive disturbance caused by careless off-road vehicle drivers who insist on driving in the sensitive areas where the birds breed, despite signs prohibiting such activities.

### Further reading

Bickerton (1984), Burger *et al.* (1980), Cowan (1995), Cowan and Marnewick (1996), Crawford *et al.* (1982a), Summers *et al.* (1976), Taylor (1997a,b), Underhill and Cooper (1984).

### Prince Edward Islands Special Nature Reserve

Admin region Subantarctic Islands  
Coordinates 46°47'S 37°48'E  
Area c.33,400 ha Altitude 0–1,230 m

ZA101

A1, A4i, A4ii, A4iii  
Special Nature Reserve

### Site description

The subantarctic Prince Edward Island group, consisting of Marion Island (46°54'S 37°45'E; 290 km<sup>2</sup>; max. elevation 1,230 m) and Prince Edward Island (46°37'S 37°57'E; 44 km<sup>2</sup>; 672 m), lies in the southern Indian Ocean, c.2,300 km south-east of Cape Town and 250 km north

of the Antarctic Polar Front. The islands are surrounded by steep coastal cliffs, between 5 m and 500 m high, with very few beaches. A large proportion of the islands consist of poorly drained coastal plains and slopes.

On Marion, the coastal plain on the northern, eastern and southern portions of the island forms a rim, 4–5 km wide, rising gently from sea-level to the foot of the mountainous interior at about 300 m. The landscape looks barren, lacking trees and shrubs, and lichens, mosses and liverworts are an important component of the tundra-like vegetation. The coastal plains and slopes hold a mosaic of communities, dominated by tussock grassland. Mires and herbfields occur in wet depressions and drainage lines. The central, mountainous portion of Marion Island has a permanent ice-plateau. The islands are subject to a low average temperature with small diurnal and seasonal ranges, high rainfall and a high incidence of gale-force winds.

### ■ Birds

See Box for key species. Twenty-nine species of bird, 28 of them seabirds, are thought or known to breed at the Prince Edward Islands. Only one other island group in the southern Oceans, the Crozets, holds more species of breeding seabird. The Prince Edward Islands are estimated to support c.2.5 million pairs of breeding seabirds and may support up to 8 million seabirds in total. The islands hold c.15% and 5% of the global populations of *Aptenodytes patagonicus* and *Eudyptes chrysolophus* respectively. Numbers of both species are thought to be stable. The islands also support a large proportion of the population of *Eudyptes chrysocome*. Large numbers of breeding albatrosses occur, including 36% of the breeding population of the globally threatened *Diomedea exulans*, which was recently split from other 'Great Albatross' forms (*D. dabbenena*, *D. gibsoni* and *D. antipodensis*). The islands also hold breeding *Diomedea chlororhynchos* (this form was recently split to become *Thalassarche carteri*), 9% of *Diomedea* (now *Thalassarche*) *chrysostoma* and 18% of *Phoebastria fusca* populations. Extremely large numbers of *Pachyptila salvini* and *Pterodroma* petrels breed on the islands, as do small numbers of *Pygoscelis papua* (1,755 pairs), *Pachyptila turtur* (100s of pairs), *Garrodia nereis* (breeding possible, but not proven), *Pelecanoides georgicus* (100s of pairs) and the endemic subspecies *Chionis minor marionensis*, which appears to be declining on Marion Island.

Key species			
A1	<i>Diomedea exulans</i>	<i>Macronectes halli</i>	
	<i>Diomedea chrysostoma</i>	<i>Sterna virgata</i>	
	<i>Phoebastria fusca</i>		
A4i		Breeding (pairs)	Non-breeding
	<i>Phalacrocorax atriceps melanogenis</i>	463–961	1,050–2,050
	<i>Larus dominicanus</i>	230	480
	<i>Sterna vittata</i>	50	120
	<i>Sterna virgata</i>	35	90
A4ii	<i>Aptenodytes patagonicus</i>	220,000	512,000
	<i>Eudyptes chrysocome</i>	208,000	490,000
	<i>Eudyptes chrysolophus</i>	417,000	990,000
	<i>Diomedea exulans</i>	3,000	8,200
	<i>Diomedea chrysostoma</i>	8,100	19,000
	<i>Diomedea chlororhynchos</i>	7,000	20,000
	<i>Phoebastria fusca</i>	2,400	5,500
	<i>Phoebastria palpebrata</i>	290	700
	<i>Macronectes giganteus</i>	3,310	8,000
	<i>Macronectes halli</i>	590	1,400
	<i>Pterodroma brevirostris</i>	10,000s	10,000s
	<i>Pterodroma macroptera</i>	10,000s	10,000s
	<i>Pterodroma mollis</i>	1,000s	1,000s
	<i>Halobaena caerulea</i>	100,000s	100,000s
	<i>Pachyptila salvini</i>	100,000s	100,000s
	<i>Procellaria aequinoctialis</i>	10,000s	10,000s
	<i>Procellaria cinerea</i>	1,000s	1,000s
	<i>Fregetta tropica</i>	1,000s	1,000s
	<i>Chionis minor</i>	3,270	7,000
	<i>Catharacta antarctica</i>	960	2,150
A4iii	More than 20,000 waterbirds occur.		

### ■ Other threatened/endemic wildlife

*Elaphoglossum randii*, a small fern that grows on black lava-flows, is endemic to the Prince Edward Islands. Several other plant species, such as *Ranunculus moseleyi*, *Polystichum marionense*, *Poa cookii*, *Colobanthus*

*keruelensis* and *Pringlea antiscorbutica* are shared with the Crozet and Kerguelen groups. A high incidence of local and provincial endemism exists amongst the hepatic flora. At least eight species of insect are endemic to the Prince Edward Islands. Increasing populations of the seals *Arctocephalus tropicalis* and *A. gazella* occur on the islands, as does a rapidly declining population of *Mirounga leonina*.

### ■ Conservation issues

South African sovereignty over these islands was declared on 12 January 1948. Both islands have recently been gazetted as Special Nature Reserves, down to the low-water mark. Prince Edward is arguably the world's most pristine subantarctic island of significant size and it merits World Heritage Site status.

Feral cats *Felis catus*, which were the greatest threat to several bird species at Marion Island, were eliminated in 1991 after an extremely effective eradication programme. *Pelecanoides urinatrix* is no longer thought to breed at Marion Island owing to cat predation. Prior to eradication, the cats were major predators of burrowing *Pterodroma macroptera*, *P. mollis* and *Halobaena caerulea*, which have all exhibited an increase in breeding success since cats were eradicated.

A recent development of unprecedented concern is the establishment of a longline fishery for Patagonian toothfish *Dissostichus eleginoides* on the islands' shelf waters. Certain species of seabird are prone to alighting on the baited hooks, becoming snagged, and drowning during line setting; this source of mortality affects populations of procellariiform seabirds dramatically. Albatrosses and large *Procellaria* petrels are particularly vulnerable to being caught on longlines. Longline fishing has been implicated as the primary factor responsible for the global decline of *Diomedea exulans* in the last three decades. The Patagonian toothfish fishery off Marion and Prince Edward is responsible for large catches of *Diomedea chrysostoma* and *Procellaria aequinoctialis*, which is of particular concern for the former species, which only breeds biennially. There are suggestions that the numbers of *Procellaria aequinoctialis* in study colonies on South Georgia have decreased by up to a third in the last 10 years, suggesting detrimental effects from longline fisheries on this population. Furthermore, *Procellaria aequinoctialis* caught in the South African hake longline fishery may be birds breeding on Marion Island.

The use of bird poles to scare birds, night-setting and the correct use of deck lighting are a few of the recommendations by the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) which have become almost standard in most of the world's legal longline fisheries in an attempt to eliminate seabird mortality. A factor that makes the Prince Edward Islands fishery particularly threatening is that CCAMLR regulations are difficult to enforce, and extensive rule-breaching almost certainly occurs. Despite an initial recommendation by the Sea Fisheries Research Institute that only four toothfish permits be issued, an official fleet exceeding this operated in Prince Edward waters during the year that the fishery opened, and a larger illegal, unlicensed, and uncontrolled fleet is poaching in these waters. If the appropriate mitigation measures are not enforced, and access to this area is not controlled through an efficient observer programme and enforcement of legislation, seabird populations on the island are set to plummet.

*Eudyptes chrysocome filholi*, which is under taxonomic revision and may be split from its congeners *E. c. chrysocome* and *E. c. moseleyi*, is suffering a considerable decline in parts of its range. The causal factor for the decline is unknown. The threatened population of the seal *Mirounga leonina* on Marion Island is decreasing at a rate of 4.8% per year. This has important implications for breeding giant petrels *Macronectes*, which rely on the pupping season as an important food source. Other threats to the islands include oil pollution (there have been two small spills in less than two years), marine pollution from fisheries and other ships, and potential disturbance from tourism. The Department of Environment and Tourism have written and established a management plan that is being rigorously followed. An environmental impact assessment on the potential impacts of tourism has been produced.

### ■ Further reading

Barnes *et al.* (1997), Cooper and Brown (1990), Cooper *et al.* (1995), Croxall and Gales (1998), Dept. of Environmental Affairs and Tourism (1996b), Gales (1998), Heymann *et al.* (1987), Hofmeyr *et al.* (1997), Johnstone (1985), Smith (1978a,b), Smith and Lewis-Smith (1987), van Zinderen Bakker *et al.* (1971), Williams *et al.* (1979).

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