

**WEST COAST NATIONAL PARK**  
**STATE OF KNOWLEDGE REPORT**

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## TABLE OF CONTENTS

<b>1.</b>	<b>ACCOUNT OF AREA</b> .....	<b>3</b>
1.1	Location.....	3
1.2	Proclamations.....	3
1.3	Size .....	3
1.4	Boundaries .....	3
1.5	Controlling Authority .....	4
1.6	Legislation .....	4
<b>2.</b>	<b>ABIOTIC CHARACTERISTICS</b> .....	<b>4</b>
2.1	Geology.....	4
2.2	Physiography.....	6
2.3	Physics.....	6
2.4	Chemistry .....	6
<b>3.</b>	<b>BIOTIC CHARACTERISTICS</b> .....	<b>7</b>
3.1	Flora .....	7
3.2	Fauna.....	8
3.3	Other life forms.....	14
<b>4.</b>	<b>HISTORY</b> .....	<b>14</b>
4.1	Palaeontology.....	14
4.2	Archaeology .....	15
4.3	Historical aspects .....	15
<b>5.</b>	<b>MANAGEMENT</b> .....	<b>15</b>
5.1	Management of vegetation.....	15
5.2	Management of animals .....	16
5.3	Resource utilization .....	16
5.4	Pathogens and diseases .....	17
5.5	Environmental modification .....	17
5.6	Zonation .....	17
5.7	Park expansion.....	18
5.8	Social ecology (people and tourism aspect) .....	18
<b>6.</b>	<b>REFERENCES / BIBLIOGRAPHY</b> .....	<b>19</b>
<b>7.</b>	<b>APPENDICES</b> .....	<b>37</b>
7.1	Species list – Marine algae.....	37
7.2	Communities – Plants .....	40
7.3	Species list – Plants .....	42
7.4	Species list – Redlisted species .....	48
7.5	Species list – Marine invertebrates.....	50
7.6	Species list – Fish .....	57
7.7	Species list – Birds .....	58
7.8	Species list – Mammals.....	63
<b>8.</b>	<b>SUMMARY OF AVAILABLE INFORMATION</b> .....	<b>65</b>
<b>9.</b>	<b>MAPS</b> .....	<b>65</b>
9.1	Map: Area.....	65
9.2	Map: Geology .....	65
9.3	Map: Hydrology .....	65
9.4	Map: Soils and Landtypes .....	65
9.5	Map: Vegetation .....	65

## 1. ACCOUNT OF AREA

The key conservation areas of West Coast National Park are Langebaan Lagoon and the offshore islands in Saldanha Bay, which together form the Langebaan Lagoon Ramsar site, a wetland of international importance (Ramsar 1990). The lagoon has a rich diversity of marine invertebrates and seaweeds (Day 1959; Schils 1998). It is also one of only two known habitat for *Siphonaria compressa*, South Africa's most endangered marine mollusc (Angel *et al.* 2006), and supports approximately 10% of the coastal wader population in South Africa (Underhill 1987a). The offshore islands provide important nesting areas for several IUCN Red-list seabird species (Berruti 1989; Crawford *et al.* 1990; IUCN 2003). The substantial terrestrial section of the park protects appropriately 12 % of the Langebaan Fynbos/Thicket habitat type, which outside the park is being threatened by agricultural activities and housing developments (Cowling *et al.* 1999). To the northeast of the park, at Langbaanweg and Elandsfontein, are important Plio/Pleistocene fossil deposits (Hendey 1970; 1980; 1985).

### 1.1 Location

The West Coast National Park is situated approximately 100 km northwest of Cape Town on the Cape West Coast (Chief Director: Survey and Mapping 1980, 1981). The co-ordinates of the park are 33°20' – 33°05'S, 17°54' – 18°15'E, and it straddles the magisterial districts of Hopefield, Malmesbury and Vredenburg.

### 1.2 Proclamations

Important proclamations are as follows:

- (i) Langebaan Lagoon, Jutten, Malgas and Marcus islands and the Atlantic shore were proclaimed as a national park in terms of section 2(2) of the National Parks Act, 1976 1985 (RSA Government Gazette No. 9904. G.R. 138, 30 August 1985).
- (ii) Portions of Geelbek, Papenkuilsfontein, Wilde Varkens Valley and coastal strip to Yzerfontein were included in the park (RSA Government Gazette No. 10860. G.R. 1753, 26 June 1987).
- (iii) Postberg properties were proclaimed a contractual part of the park in terms of section 2B(1)(b) of the National Parks Act , 1976 (RSA Government Gazette No. 10789. G.R. 1753, 14 August 1987).
- (iv) Erf 304 Langebaan was included in the park, and name changed to West Coast National Park (RSA Government Gazette No. 11345. G.R. 1490, 29 July 1987).
- (v) Geelbek, Abrahamskraal, portions of Schrywershoek and the seashore were included in the park (RSA Government Gazette No. 11978. G.R. 1347, 30 June 1989).
- (vi) 42 ha near Yzerfontein were excluded from the park (RSA Government Gazette No. 14176. G.R. 2159, 31 July 1992).
- (vii) A further portion of Wilde Varkens Valley was added to the park (RSA Government Gazette No. 15470. G.R. 183, 4 February 1994).
- (viii) Previously disputed land at Oude Post and coastal reserve were added to the park (RSA Government Gazette No. 16005. G.R. 1705, 7 October 1994).
- (ix) Part of Bottelary (Seeberg) was added to the park (RSA Government Gazette No. 16075. G.R. 1947, 18 November 1994).
- (x) Massenberg properties were included in the park (RSA Government Gazette No. 17073. G.R. 537, 4 April 1996).
- (xi) Portion 2 of Stofbergsfontein was included in the park (RSA Government Gazette No. 18600. G.R. 34, 30 December 1997).

### 1.3 Size

The park is approximately 26 km long and at its broadest 15 km wide. The extents of key areas are as follows:

Coastal reserves (Sixteen-mile beach) excluding the Marine Protected Area (MPA)	= c. 120 ha
Postberg Natuurreservaat	= c. 2 000 ha
Rest of the terrestrial section	= c. 21 700ha
Langebaan Lagoon MPA (lagoon, intertidal sandflats, marshlands)	= c. 6 000 ha
Total area of the West Coast National Park	= c. 29 820 ha

### 1.4 Boundaries

The terrestrial section of the park extends from Yzerfontein in the south to Plankiesbaai (in line with Langebaan Village) in the north, and from the Atlantic Ocean in the west to cross the West Coast Road (R27) in the east. The marine component is comprised of the nearshore islands (Jutten-, Malgas- and Marcus islands) and Langebaan Lagoon MPA. The latter incorporates the entire lagoon below the high

water mark and south of Leentjiesklip No 2, but excluding the National Defense Force area (RSA Government Gazette No. 21948, G.R. 1429, 29 December 2000, Marine Living Resources Act 1998 (Act No. 18).

### **1.5 Controlling Authority**

Postberg Nature Reserve is a contractual park managed by SANParks in collaboration with the Postberg Syndicate. Similarly the Langebaan Lagoon Marine Protected Area (MPA) is managed by SANParks in collaboration with Marine and Coastal Management, but no formal agreement has been signed between the two organizations in this regard. The rest of the park, including Jutten-, Malgas- and Marcus islands, is classed as a Schedule 1 national park, and administered solely by SANParks. The MPAs around Marcus, Malgas and Jutten Islands, and that off Sixteen Mile Beach are controlled by Marine and Coastal Management.

### **1.6 Legislation**

The management practices of South African National Parks must comply with several national policies and legislation, as well as international conventions (South African National Parks 2002). These are follows:

#### National Legislation

Constitution of the Republic of South Africa Act, No. 108 of 1996.

National Parks Act of 1976 (as amended)

National Environmental Management Act 107 of 1998 (RSA Government Gazette No 19519 No. 1540)

Environmental Conservation Act 73 of 1989

National Heritage Resources Act 25 of 1999

Conservation of Agricultural Resources Act 43 of 1983.

Veld and Forest Fire Act 101 of 1998

National Water Act 36 of 1998.

Mountain Catchment Areas Act 63 of 1970.

Sea Shore Act 21 of 1935

Marine Living resources Act 18 of 1998.

Seabirds and Seals Protection Act 46 of 1973

Expropriation Act 63 of 1975

Physical Planning Act 125 of 1991

Development Facilitation Act 67 of 1995.

Western Cape Planning and Development Act 7 of 1999.

Western Cape Land Administration Act 6 of 1998.

Western Cape Nature and Environmental Conservation Ordinance 19 of 1974

White Paper on Conservation and Sustainable Use of South Africa's Biological Diversity, 1997

White Paper on Coastal Development, 1999.

National Environment Management Act: Protected Areas Bill (Draft 8)

National Environment Management Act: Biodiversity Bill (Draft 8)

#### International Conventions, Treaties and Principles

Convention on Biological Diversity 1992

Convention on International Trade in Endangered species of Wild Fauna and Flora, 1973

Convention on Wetlands of International Importance especially as Waterfowl Habitat 1971,

Convention on the Prevention of Marine Pollution by dumping of Waste and Other Matter 1972

Convention on the Conservation of Migratory Species of Wild Animals 1979

## **2. ABIOTIC CHARACTERISTICS**

### **2.1 Geology**

#### **2.1.1 Geology**

The landscapes of the park are products of a long and complex geological history of geological folding, intrusions and sea level changes. The three main substrata are limestone, granite and sand, and the main formations found are as follows:

- Langebaan (limestone calcrete, partially cross-bedded and calcified parabolic dune sand) and Springfontyn (light grey to pale red sandy soils) of the Quaternary,

- Witzand (unconsolidated white sand with comminuted shells, or pebbles and shell along the beaches),
- Langebaan-Saldanha Pluton of the Malmesbury group. (Granite: mainly coarse grained with porphyritic biotic and fine- to medium-grained leucocratic variants; quartz monzonite, adamellite; quartz porphyry) (Chief Director of Geological Surveys 1990).

Studies of the Saldanha Quartz porphyry, suggests that the end of the Saldanian magmatic event was marked by a short period of peraluminous silicic magmatism, evident as a series of ignimbrite flows, quartz porphyry, and tuffisite intrusions. There is also a close relationship between high-level granitic intrusions present as granite porphyries in the Langebaan area and associated volcanic event (Scheepers & Poujol 2002).

Compton (2001) constructed a Holocene sea-level curve from the facies distribution and radiocarbon ages of sediments recovered from the southern salt marsh of the lagoon. The Flandrian Transgression flooded the lagoon to 0 – 3 m above present-day levels by 6750 years ago, with sea-level returning to present-day heights by 4 900 years ago, and has since remained within a metre of present-day levels. A strong relationship was recorded between elevation and foraminifera (zooplankton) zonation across the southern edge of the lagoon, thereby enhancing the estimates of sea-level changes (Franceschini 2003).

The beach sand at southern end of the 16 mile beach complex is 18 000 years old, while the dune carbonate are as old as 24 000 years (Franceschini 2003). The difference between the age of the beach sand and the dune sand suggest that the mobile dunes have been active over the last 6 000 years and the dunes appear to have migrated inland at an average rate of 4 m per year. Midden shell material suggests human occupation of the area occurred approximately 6 500 years ago (Franceschini 2003).

### 2.1.2 Soils / Sediments

According to 1:250 000 land type maps (Institute for Soil, Climate and Water 2004), WCNP contains three broad land types (Ha, Hb & Fc), and 10 individual landtypes. By far the most dominant landtypes are Hb21 and Hb19, which have excessively drained sandy soils and cover more than two thirds of the park. Boucher & Jarman (1977) lists the soil forms and series found in the Fynbos/Thicket (Strandveld) areas of the park (Table 1). The soils are highly calcareous at the coast, often underlain by calcrete and susceptible to wind erosion (Liengme 1987). Earth mounds or heuweltjies” are found in Postberg Nature Reserve (Heydenrych 1995).

**Table 1.** Soil forms and series found in the West Coast National Park

AREAS	FORM	SERIES
Coastal platforms	Mispah	Muden
	Oakleaf	Levubu
	Hutton	Maitengwe
Limestone areas	Mispah	Muden
Granite areas	Cartref	Kusasa
		Grovedale
	Estcourt	Darling
		Balfour
	Hutton	Gaudam
	Fernwood Nomanci	Fernwood Nomanci
Dunes	Mispah	Kalkbank
	Fernwood	Langebaan
	Clovelly	Sandspruit

## **2.2 Physiography**

### **2.2.1 Topography**

The Langebaan Peninsula, which abuts the Atlantic Ocean on the west and Langebaan Lagoon on the east, is about 2 km wide and 15 km long. It has granite outcrops in the north, the highest being Vlaeberg (193 m) and Konstabelkop (189 m). Between these outcrops are low ridges of limestone and calcrete. The calcrete ridges extend southward along the western side of the peninsula (Flemming 1977; Chief Director Survey and Mapping 1990). Along the seaward edge of the peninsula and 16 Mile Beach are unconsolidated sands, composed of Quaternary coastal/marine deposits (Flemming 1977). Near Yzerfontein the unconsolidated sands extends, as a large dunefield, in a northeasterly direction towards Van Niekerkspos (Chief director Survey and Mapping 1990). Inland of the lagoon the low-lying areas consist mainly of calcrete sheets and unconsolidated sands composed of Quaternary coastal/marine deposits (Flemming 1977).

### **2.2.2 Drainage**

The effective catchment area of the Langebaan Lagoon is relatively small, and surface-water in the park is scarce and of a seasonal nature (Flemming 1977). However, the underground Elandfontein Aquifer is a source of fresh water to the marshlands of the lagoon (Anon 2007).

### **2.2.3 Bathymetry**

The lagoon has extensive littoral sandflats and marshlands (Summers 1977). Most of the subtidal region of the lagoon is less than 4 m deep, but the water depth increases towards the mouth the Saldanha Bay, reaching depths of 20 – 25 m (Flemming 1977).

## **2.3 Physics**

### **2.3.1 Climate**

The climate is a semi-arid Mediterranean type, and frost is rare (Flemming 1977). The mean monthly maximum and minimum air temperatures recorded for Langebaanweg (15 km NE of Langebaan) range from 18.4 – 27.5°C and 7.1° – 14.9° C respectively. The average annual rainfall is 265 mm, falling mainly in winter (Weerburo 1988 in Heydenrych 1995). There are strong seasonal winds; southlies in summer and northlies in winter.

### **2.3.2 Hydrology**

The water column structure in Saldanha Bay is seasonal. Along the Atlantic coast strong, south-easterly winds, which are dominant in summer, push the surface water away from the shore, causing the upwelling of underlying cold, nutrient rich waters (Nelson & Walker 1984). This upwelled water is advected into Saldanha Bay, affecting the temperature and nutrient levels of the bay (Pitcher & Calder 1998), and during summer there is a strong thermal stratification of water column. Surface currents in Saldanha Bay/Langebaan Lagoon system are tidal, and current speeds do not appear to be appreciably affected by local winds. Current velocities in the bay during spring tides are generally between 10 – 20 cm/sec, but can reach speeds up to 100 cm/sec in the two main entrance channels to the lagoon, and then decreasing to approximately 20 – 25 cm/sec in the lower reaches. At neap tide the maximum flow rates at the entrance channels are about 25 – 50 percent that of spring tides. Approximately 12 percent of the volume of the lagoon-bay system is exchanged during a spring tide (Shannon & Stander 1977).

### **2.3.3. Oceanography**

#### **2.3.3.1. Sea temperature**

Work by Shannon & Stander (1977) suggest that the surface water temperature of Saldanha Bay generally lies between 14 – 19° C, but during summer and autumn a strong, shallow (5m) thermocline may occur at several sites in the bay. Outside the bay, along the Atlantic coastline, the inshore surface temperatures are typically 10 – 14°C in summer and 12 – 14°C in winter (Shannon & Stander 1977).

#### **2.3.3.2. Wave regimes**

No suitable data was found.

## **2.4 Chemistry**

### 2.4.1 Water chemistry

In the lagoon there appears to be no significant vertical variation to a depth of 10m in salinity (35 g/kg), phosphate (1.4 µg/l), total phosphate (2.1 - 2.2 µg/l), silica (18.9 – 19.9 µg/l), and chemical oxygen demand (7.9 – 8.2 mg/l). The mean dissolved oxygen values decreased from 6.0 mg/l on the surface to 4.8 mg/l at 10m depth, while mean nitrate values increased from 5.6 on the surface to 11.6 µg/l at a depth of 10 m (Shannon & Stander 1977).

### 2.4.2 Pollution

“Small Bay”, which is outside the park on the north-western side of the Saldanha/Sishen ore jetty, is polluted through organic loading from the fish factories and mariculture industries (Jackson & McGibbon 1991). There are also much higher faecal coliform levels in Small Bay than in Big Bay (Monteiro *et al.* 2000), and the offloading of crude petroleum at oil terminus of the jetty poses a threat of pollution of the lagoon and offshore islands.

### 2.4.3 General chemistry

No suitable data was found.

## 3. BIOTIC CHARACTERISTICS

### 3.1 Flora

#### 3.1.1 Non-vascular (Algae, Diatoms, Bryophytes)

##### 3.1.1.1 Phytoplankton

Saldanha Bay is linked to the Benguela upwelling system and is characterized by inputs of surface nitrate and high chlorophyll levels most of the year (Grant *et al.* 1998), and a mean water column chlorophyll *a* concentration of 8.6 µg/l, and a mean daily rate of production of 3.40 g of C/m<sup>2</sup>/day have been recorded (Pitcher and Calder 1998). The brown tide organism, *Aureococcus anophagefferens*, was detected for the first time in a tidal dam in Saldanha Bay in 1997, and *Aureococcus* blooms have resulted in reduced oyster production in this dam (Probyn *et al.* 2001).

Giffen (1976) described many of the benthic marine benthic marine diatoms from the Langebaan lagoon - Saldanha Bay system.

##### 3.1.1.2 Algae (seaweeds)

Studies by Stegenga *et al.* (1997) and then Schils (1998) complemented the work of Simons (1977), and a total of 200 marine algae species (33 Chlorophyta, 26 Phaeophyta and 141 Rhodophyta) have been recorded for the Saldanha Bay/Langebaan Lagoon system (Appendix 7.1). Schils (1998) recorded a clear gradient of impoverishment from the coast over the bay to the lagoon, with a marked boundary in species composition at the mouth of the lagoon. The lagoon supports seven algal species with an explicit (warm) south coast distribution (Schils 1998).

##### 3.1.1.3 Aquatic & semi aquatic plants

The saltmarsh plants *Spartina maritima* and *Sarcocornia perennis* reached maximum abundance in the southern half of the lagoon where nutrients in the marsh water were highest and current speeds reduced (Christie 1981). Boucher and Jarman (1977) described the various forms of two marshland plant communities along the lagoon (Appendix 7.2). The dominant plant species are *Arthrocnemum pillansii* var. *pillansii*, *Salicornia capensis* and *Disphyma crassifolium*, *Juncus kraussii*, *Scirpus nodosus*, *Nidorella foetida*, *Senecio halimifolius*, *Typha capensis* and *Phragmites australis* (Boucher & Jarman 1977, O'Callaghan 1990).

#### 3.1.2 Vascular plants (Pteridophytes, Spermatophytes)

The park conserves roughly 19 000 ha of Langebaan Fynbos/Thicket (synonyms = Dune Thicket and West Coast Strandveld) (Cowling *et al.* 1999) and approximately 2 000 ha of Hopefield Sand Plain Fynbos (Helme 2003). Both these habitat units were given a 50% Irreplaceability rating by the C.A.P.E. Project (Cowling *et al.* 1999), meaning that half of that which remains outside reserves should be conserved. However, Sand Plain Fynbos is regarded to be of higher conservation value than the Langebaan Fynbos/Thicket, due to very little being formally conserved and it being more threatened by alien plant invasion (Heijnis *et al.* 1999).

Sand Plain Fynbos is found in the eastern extremities of WCNP on deep acidic light-grey to pale-red sands of the Springfontyn formation, while the Langebaan Fynbos/Thicket vegetation occurs on the Langebaan peninsula and east of the Langebaan Lagoon on deep calcareous sands of the Langebaan formation (Chief Director of Geological Surveys 1990). The national survey of Mucina *et al.* (2005) subdivided the Langebaan Fynbos/Thicket of WCNP into the Langebaan Dune Strandveld (coastal and lagoon areas), Saldanha Flats Strandveld (inland areas) and Saldanha Granite Strandveld (Postberg area), and classified the marshes in the Langebaan Lagoon as Cape Estuarine Salt Marshes. Fine scale vegetation mapping of the Saldanha Peninsula recognized two new, undescribed vegetation types and redefined some of the boundaries presented in Mucina & Rutherford 2006 (Helme & Koopman 2007).

Boucher & Jarman (1977) working in the Langebaan Fynbos/Thicket areas northwest of Abrahamskraal described 12 broad terrestrial plant communities of the park (Appendix 7.2). Heydenrych (1995) complemented this work by studying the plant communities to the southeast of the lagoon, as well as producing a syntaxonomic classification of all the plant communities sampled in the park (Appendix 7.2). She also listed 482 plant species (including salt marsh species) for the park (Appendix 7.3), of which 24 are Red Data Book species (Appendix 7.4).

Australian acacias are invasive aliens in the sandy areas of the park. Musil (1993), working in lowland fynbos, found that indigenous forms regenerated less successfully in acacia-infested than in natural habitats, and seedling to parent ratios of proteoids, restioids and ericoids were between 32 and 65 percent of those in natural vegetation. The depletion of indigenous taxa, particularly obligate reseeding forms, beneath acacias stands result mainly from their poor seed regeneration success and associated increase risk of local extinction from stochastic causes in this habitat after fire. Moreover, Rutherford & Powrie (1993) noted that aqueous leachate derived from canopy phyllodes of invasive *Acacia cyclops* affected the growth of a range of shrub species. All plant showed a sub-lethal phytotoxic response (usually a decline in shoot mass).

## 3.2 Fauna

### 3.2.1 (Protozoa) Zooplankton

Grindley (1977) recorded more than 100 taxa in the zooplankton sampled from Langebaan Lagoon, and, although there was some overlap, the plankton composition was distinct from that of Saldanha Bay. The distribution of plankton in the lagoon resulted from an interaction between vertical migration and tidal transport. The highest biomass was noted in the middle of the lagoon (mean = 41.8 mg/m<sup>3</sup>) and lowest at the head of the lagoon (mean = 16.8 mg/m<sup>3</sup>). Common copepods included *Paracartia africana*, *Paracalanus crassirostris*, *Oithona similis*, *Pseudodiaptomus hessei* and *Tortanus capensis*.

### 3.2.2 Invertebrates

#### 3.2.2.1 Marine

##### Associated with soft substrata

The average density and diversity of meiofauna recorded in the soft substrata of the lagoon was higher than in that of Saldanha Bay (Verlinde 2000). A similar pattern existed for macrofauna (Simons 2000). Day (1959) recorded 402 macro-invertebrate species in the lagoon (Appendix 7.5). Christie & Moldan (1977), sampling the sandy subtidal areas, distinguished three faunal clusters (*viz.* the channel, island and sandbank groups). The channel cluster has the greatest biomass, the island group the highest species richness, while the sandbank group has the lowest biomass, but intermediate species richness. The benthic communities recorded at 12 sampling sites in Saldanha Bay in the 1960s differed significantly ( $p < 0.01$ ) from those sampled at these sites in 2001, due largely to higher abundance of the whelk *Nassarius speciosus* and the crab *Hymenosa orbiculare* in the 2001 samples (Kruger *et al.* 2005). Major developments in the area (such as breakwater and harbour construction, dredging, mining, fishing and mussel culture) were likely factors resulting in differences observed.

Bait digging has a marked impact on the composition of the macrofauna in the mudflats of the lagoon, with some polychaeta species (*Prionospio sexoculata* and *Polydora antennata*) being attracted to disturbed sites, while others (*Scoloplos uniramus* and *Notomastus latericeus*) avoid them (Simons 2000). Furthermore, Langebaan Lagoon is one of only two known habitat for *Siphonaria compressa*, South Africa's most endangered marine mollusc (Hebert 1999; Angel *et al.* 2006). This species is restricted to areas of high eel grass (*Zostera capensis*) cover and low exposure time (Angel 2002). The lower limit of zonation for *S. compressa* is apparently set by bioturbation by the sandprawn, which



excludes eelgrass from intertidal sandbanks, while its upper limit by physical stress (Angel *et al* 2006). Fluctuations in eelgrass abundance and limitation of *S. compressa* to just to two locations add to the risk of extinction of this stenotypic limpet (Angel *et al* 2006).

In the early 1900s approximately 800 000 sand prawns *Callinassa kraussi* were removed per annum from the central banks, disturbing 1300 kg of associated macrofauna. Experiments suggest that approximately 80% of this associated biomass is subsequently preyed upon by scavenging gulls (Wynberg & Branch 1991; 1994; 1997). The exploitation of sand prawns was further investigated by Nel (2005). Field studies by Siebert & Branch (2005a, 2005b) revealed that cover of eelgrass (*Zostera capensis*) was negatively correlated with the density of sand prawns, and at sites where eelgrass was absent sand prawns extended farther up the shore than in its presence. Moreover, sand prawns reached larger maximum sizes and burrowed deeper in sandbanks than in eelgrass beds. The faunal density was lower in sandflats than in eelgrass beds, but species richness and diversity were greater than, or equal to, values for eelgrass beds (Siebert & Branch 2005b, 2007). The density and sizes of the mud prawn *Upogebia africana* were greater in eelgrass beds than in sandflats dominated by sand prawns. The mud prawn seems to benefit directly from the eelgrass, but possibly also benefits indirectly from the exclusion of sand prawns by the eelgrass (Siebert & Branch 2005a; 2006). The sandprawn, through bioturbation of the substratum, also exerts a strongly negative influence on the feeding of the bivalve *Eumarcia pauperia* and the gastropod *Nassarius kraussianus*, and this may explain the scarcity of these organisms in areas of the lagoon containing high densities of sand prawns (Pillay *et al.* 2007). The presence of sandprawns in the sandbanks increases the number of bacteria, but causes a decline in meiofaunal numbers (Branch & Pringle 2003).

The snail *Assiminea globulus*, which constitutes about 63 percent of the invertebrate biomass in the surface layers of the intertidal mudflats of the lagoon (Puttick 1977), is the major prey item of the curlew sandpiper *Calidris ferruginea*, the most abundant summer migrant to the lagoon (Puttick 1980). The deeper burrowing mud prawn *Upogebia africana* is a food source for the kelp gull *Larus dominicanus*, grey plover *Pluvialis squatarola*, whimbrel *Numenius phaeopus* and common tern *Sterna hirundo* (Martin 1991).

The distribution and status of alien invertebrate species has been assessed in the Saldanha Bay - Langebaan Lagoon system (Robinson *et al.* 2004). The alien Mediterranean mussel *Mytilus galloprovincialis* was recorded in most (79%) of the sampling areas in Saldanha Bay - Langebaan Lagoon system that provided suitable rocky-shore habitat, while both the European periwinkle *Littorina saxatilis* and the alien anemone *Sagartia ornata* had limited distributions, but sizeable populations (>2 million individuals) within the lagoon (Robinson *et al.* 2004). Although only a dead carapace of the European shore crab *Carcinus maenas* was found in the survey, this species poses a major threat to the indigenous invertebrates, should it become established in the lagoon (Robinson *et al.* 2004; 2005). The Mediterranean mussel invaded two large intertidal sandbanks in the lagoon during the late 1990s and early 2000s (invasion of the sandbanks of the lagoon), and the effects of this invasion on the natural communities were investigated by Robinson & Griffiths (2002). Experiments on rocky shores have shown that a significant negative relationship between recruits of the Mediterranean mussel and the intensity of harvesting, with intensities greater than  $F = 0.3$  dramatically reducing recruitment (Robinson *et al.* 2007).

#### Associated with hard substrata

The benthic community of the subtidal hard substrata at Marcus Island differs from that at Malgas Island. The former has prolific beds of the black mussel *Choromytilus meridionalis*, accompanied by species, such as sea urchins, holothurians, brittle stars, whelks and barnacles, while Malgas Island is dominated by large populations of the lobster *Jasus lalandii* and has dense seaweed cover (Barkai & Branch 1988a). The role of the predator whelk *Burnupena papyracea* in this situation were investigated (Barkai & McQuaid 1988), and the effects of predation by rock lobster and drilling whelks on the growth and mortality of black and ribbed mussels at these islands were studied (Barkai & Branch 1988b).

At these islands the intertidal waters are enriched with nutrients from dissolved guano from the breeding seabird colonies. This enrichment enhances the growth of algae, and enables the herbivorous, granular limpet, *Scutellastra (Patella) granularis*, to grow fast and attain large shell lengths (Bosman & Hockey 1988). This fast growth rate reduces the period during which the granular limpet is vulnerable to predation by the African black oystercatcher (Bosman *et al.* 1989).

The affects of the invasive Mediterranean mussel on the natural intertidal communities at these islands have been investigated (Hockey & van Erkom Schurink 1992; Griffiths *et al.* 1992). The Mediterranean mussel has largely displaced the ribbed mussel, increased the standing stock and elevated the upper intertidal limit of the mussel beds, and thus enhanced food availability for predators (such as the African black oystercatcher). Griffiths & Hockey (1987) modeled the interactive roles of predation, competition and tidal elevation in structuring black mussel populations at Marcus Island, while Gibbons (1988) studied the impact of sediment accumulation, relative habitat complexity and elevation on rocky shore meiofauna.

#### 3.2.2.2. Terrestrial invertebrates

No checklist or detailed ecological studies of the invertebrate species of the park have been done. However, in general surveys investigating the distribution and systematics of several invertebrate species, sampling has been done in the park. These include the studies of Uhlig (1997) on the rove beetle *Erichsonius*, Eardley (2006) on the bee *Andrena notophila*, Eardley & Kuhlmann (2006) on southern and eastern African *Melitta*, and Riberia & Blake (in press) on diving beetles (Hyphdrini).

#### **3.2.3 Fish**

Clark (1997) studied the variation in surf zone fish community structure across a wave exposure gradient of the Saldanha Bay-Langebaan Lagoon system. The overall abundance of teleosts increased as wave exposure decreased, while the highest species richness and diversity of teleosts were recorded at intermediate levels of exposure. These data supplemented the checklist of Day (1959), and a total of 29 bony fish species and 5 elasmobranch species have been recorded in the lagoon (Appendix 7.6). A study of sandsharks *Rhinobatos annulatus* in the lagoon noted that the numbers and biomass of sharks netted increased in summer, and their distribution appeared to correlate with of prey biomass values (Harris *et al.* 1988). Eighty-eight percent of the sandsharks' diet consisted of crustaceans *Ampelisca palmata*, *Callianassa kraussi*, *Upogebia africana* and *Hymenosoma orbiculare*, and calculations suggest that a large proportion (26 - 77%) of the annual invertebrate production in the lagoon is consumed by sandsharks (Harris *et al.* 1988).

Studies covering the offshore Benguela system investigated major fish resources, responses of fish populations to environmental change, and long-term changes in the distribution of fish catches (Crawford *et al.* 1987; Shannon *et al.* 1988; Crawford & Shannon 1986).

#### **3.2.4 Amphibians**

The results from the current Frog Atlas study will a checklist of the amphibian species in the park.

#### **3.2.5 Reptiles**

A series of studies have been done on the angulate tortoise (*Chersina angulate*). The populations from WCNP and Dassen Island are genetically (mtDNA) well differentiated from the Kleinsee population less than 400 km to the north (Lesia *et al.* 2003). Angulate tortoises at WCNP have a cyclic reproductive pattern, initiating egg production in February and were gravid throughout most of the year. Clutch frequency ranged from one to six per year, with annual fecundity being influenced by the date of reproductive onset and egg-retention time. The retention time was highly variable and correlated to ambient temperature (inversely) and rainfall (positively) (Hofmeyr 2004). At WCNP the seasonal fluctuations in plant cover, species richness and diversity was lower than on Dassen Island and the density of angulate tortoises was substantially smaller (Joshua *et al.* 2005). In winter tortoises are active throughout the day, but become bimodal in the warmer and drier summer and autumn months (Ramsay *et al.* 2002). The daily activity patterns of the population at Dassen Island peaked between 10h00 and 12h00, reflecting the activity pattern of the more active sex, males (Keswick *et al.* 2006). Sexual selection influences the body shape and size in fighting angulate tortoises (Mann *et al.* 2006).

The melanistic *Cordylus niger* lizard population of the Saldanha-Langebaan area is restricted to a narrow belt along the coast between Mauritz Bay to Postberg Nature Reserve, and sections of the population outside the WCNP are being threatened by urban development (Cordes & Mouton 1996). Aysmptotic body sizes are similar between sexes (Cordes 1995), and the ecological significance of melanism was investigated (Cordes & Mouton 1995).

### 3.2.6 Birds

#### 3.2.6.1. Associated with Langebaan Lagoon

A checklist of the birds noted at Langebaan Lagoon (Liversidge & Broekhuysen 1958), was updated with one for the entire park (Percy FitzPatrick Institute of African Ornithology undated), which listed 255 species (Appendix 7.7). Langebaan Lagoon supports approximately 26 % of all waders in the wetlands of the southwestern Cape Province (Ryan *et al.* 1988). The median number of waterbirds recorded during summer counts in the lagoon for the periods 1975 to 1986 and 1975 to 1995 was 37 300 and 34 700 respectively (Underhill 1987a; Navarro *et al.* 1995). Of these approximately 90% were Palaearctic migrant waders. The most abundant species were Curlew sandpiper *Calidris ferruginea* (c. 56%), Grey plover *Pluvialis squatarola* (11%), Sanderling *Calidris alba* (8%), Knot *Calidris canutus* (8 %) and Turnstone *Arenaria interpres* (6%). In winter the total number of waterbirds decline to approximately 10 300 individuals, which included about 4 500 flamingoes (*Phoenicopus ruber* and *P. minor*) (Underhill 1987a; Navarro *et al.* 1995). During low tide periods, in both summer and winter, higher densities of waders are found on the intertidal sandflats than on the saltmarshes, but during high tide intervals most waders moved to the marshes (Summers & Kalejta-Summers 1996). In more recent counts (1996 – 2001) mean number of waterbirds recorded at the lagoon declined to approximately 28 400 in summer and 9 300 in winter ((Butterworth *in lit.* 2001). The marshland and areas adjacent to the lagoon are a good nesting habitat for the Vulnerable black harrier *Circus maurus* (Curtis *et al.* 2001, 2004; Anon. 2005).

More specialized studies have covered aspects such as:

- The relationship between the lemming cycle in Siberia and the age structure of the curlew sandpiper populations at Langebaan Lagoon (Underhill 1987b)
- Population, biometrics and movement of the sanderling in southern Africa (Summers *et al.* 1987).
- Ringing recoveries and biometrics of South African grey plovers, *Pluvialis squatarol* (which suggests a migration route that crosses the Mediterranean / Black Sea) (Serra *et al.* 1999; 2001).
- The ability of red knots *Calidris canutus* to adjust their metabolism, depending on ecological conditions and food types encountered (Piersma Bruinzeel and Wiersma 1996).
- Breeding biology of the whitefronted plover (Summer & Hockey 1980).
- The diet, foraging behaviour and energy requirements of curlew sandpipers at Langebaan Lagoon (Puttick 1978; 1979; 1980).

#### 3.2.6.2. Associated with the offshore islands

The inshore islands support large breeding colonies of seabird, which are:

- endemic to the nearshore regions of South Africa and Namibia (e.g. crowned cormorant, bank cormorant and African penguin),
- breed only along the coast or islands of South Africa and Namibia (e.g. Cape gannet and Cape cormorant), and
- widespread (e.g. swift tern and kelp gull) (Berruti 1989; Cooper *et al.* 1990).

These species are discussed below.

#### Cape gannets *Morus capensis*

classified as Vulnerable

The distribution, population size, movement and diving patterns, and diet of the Cape gannet have been comprehensively studied (Crawford *et al.* 1983b; Oatley 1988; Berruti & Colclough 1987; Berruti 1988; Crawford & Cocrane 1990; Ropert-Coudert *et al.* 2004). Between 1956 and 1985 the estimated number of breeding pairs on Malgas Island ranged from approximately 20 000 to 37 000 (Berruti 1989). These numbers have increased and in 2000 it was estimated that there were 70 000 nests/breeding pairs on this island (Du Toit *et al.* 2003). However, the extent of the colony retracted in 2003 and 2004 (Crawford *et al.* 2007). Breeding success, previously believed to be related mostly to diet (Crawford *et al.* 1983b; Berruti & Colclough, 1987; Berruti 1988; Crawford & Dyer 1995) has been shown also to be affected by guano collection (Jarvis 1971; Randall & Ross 1979; Crawford & Cochrane 1990) and predation by seals (David *et al.* 2003; Makhado *et al.* 2006)., which can have a marked impact on the fledglings (Crawford 2005; Crawford *et al.* 2007). Other studies investigated the energy expenditure and food consumption by breeding Cape gannets (Adams *et al.* 1991; Navarro & Visser 2005). Gannets from WCNP have discrete foraging grounds from those breeding at Lamberts Bay and Algoa Bay, foraging from approximately Cape Agulhas in the east to Cape Columbine in the west (Grémillet *et al.* 2004).

Most foraging flights of breeding gannets from the island were to the south-west, and 77% of radio-tagged gannets foraged more than 60 km from the island (Adams & Navarro 2005). Climate change and a substantial shift in the core distribution of the pelagic sardine *Sardinops sagax* have affected distribution and breeding success of several seabirds nesting on the islands off South Africa, in particular the African penguin (*Spheniscus demersus*), Cape gannet (*Morus capensis*) and Cape cormorant (*Phalacrocorax capensis*) (Crawford *et al.* 2008a, b & c).

African penguin *Spheniscus demersus*

classified as Vulnerable

Comprehensive studies have been done on aspects such as biology, ecology behaviour, population trends and conservation (Rand 1960; Frost *et al.* 1976; Cooper 1980; Broni 1983; Shelton 1984; Wilson; 1985; Duffy 1987; Laugsch *et al.* 1988; Randall 1989; Hockey & Hallinan 1981; La Cock *et al.* 1987; Crawford *et al.* 1990b). In 2001 1507 nest sites were recorded in park, the majority (1338 nests) of these occurred on Jutten Island (Du Toit *et al.* 2003). Juvenile penguins generally return to their natal colony, but some birds have the capacity to settle and breed at non-natal colonies (Whittington 2005a, 2005b). This emigration and immigration of penguins is thought to be driven by changes in the distribution and availability of their prey (Whittington 2005a). Penguin populations in the western Cape have been adversely affected by decreases in available stocks of anchovy and sardine (Crawford & Dyer 1995; Crawford 1998; Crawford *et al.* 2008a & c), oil pollution (Adams 1994; Underhill *et al.* 1997; 1999a; 2000; Crawford *et al.* 2000a; Parsons & Underhill 2005; Crawford 2007), predation by seals (David *et al.* 2003; Mecenero *et al.* 2005), and to a lesser extent avian cholera (Crawford *et al.* 1992a).

Cape cormorant *Phalacrocorax capensis*

classified as Near Threatened

The main breeding localities of the Cape cormorant are found at islands and guana platforms off Namibia and the Western Cape. Numbers decreased off southern Namibia in the early 1980s and off central Namibia in the early 1990s, when environmental perturbations reduced the availability of food (Crawford *et al.* 1986, 2007). Similarly, numbers decreased in the Western Cape (especially at Malgas, Jutten, Vondeling and Daasen Islands) in the 1990s (Crawford *et al.* 2007). Factors that influenced this decrease included mortality from avian cholera (Crawford *et al.* 1992; Williams & Ward 2002; Waller & Underhill 2007), predation by Cape fur seals (Marks *et al.* 1997; Ward & Williams 2004) and the great white pelican (Crawford *et al.* 1995). Furthermore in the mid 2000s there has been a large eastward displacement of sardine off South Africa (Fairweather *et al.* 2006). Numbers of breeding cormorants have remained low as cholera outbreaks continued and some pelagic fish were displaced to the east beyond the foraging range of breeding cormorants (Crawford *et al.* 2007; Crawford *et al.* 2008a). The overall population of Cape cormorant was in the order of 100 000 pairs in 1956-57, increased to approximated 250 000 pairs in the 1970s, but declined again to roughly 100 000 pairs in 2005-06 (Crawford *et al.* 2007). Individual breeding colonies vary in size from year to year (Duffy *et al.* 1987), and in 1978 approximately 33 000 nest sites were recorded in the park (Du Toit *et al.* 2003). The biology and ecology of this species have been studied (Cooper *et al.* 1982; Berry 1988).

Bank cormorant *Phalacrocorax neglectus*

classified as Vulnerable

The biology, ecology and behaviour of this species have been well-studied (Cooper 1981, 1985a, 1985b, 1986, 1987). Bank cormorants appear to breed after age 1 to 3 years (Crawford & Dyer 1996), and breeding on Malgas Island normally extends from May to October (Crawford *et al.* 1999a). In 2001 65 nest sites were recorded in the park (Du Toit *et al.* 2003). In Namibia the breeding populations fell 48% from 7 166 pairs in 1978 – 1980 to 3 735 pairs in 1995-1997, while a smaller (23%) decline was recorded in South Africa, due to substantial decreases at Malgas Island and Dassen Island (Crawford *et al.* 2008d). The bank cormorant is now classified as Vulnerable (Crawford *et al.* 1999a). These declines were due largely to human disturbance, displacement by seals and reduction food resources, in particular West Coast rock lobster (Crawford *et al.* 1999a; Crawford *et al.* 2008d).

Crowned cormorant *Phalacrocorax coronatus*

classified as Near Threatened

This species is endemic to the Benguela system and the western Agulhas Bank. In a census done between 1977 and 1981, 65% of the 2665 nests recorded occurred were off South Africa (Berruti 1989). In 2001 224 nest/breeding pairs were recorded in the park, with a further 245 on Meeuw Island in the military area bordering the park (Du Toit *et al.* 2003). The population and biology of this species has been studied (Williams & Cooper 1983; Crawford *et al.* 1982b).

Whitebreasted cormorant *Phalacrocoax cargo*

In the early 1980s the coastal population of whitebreasted cormorants (c. 2 500 breeding pairs) was confined to South Africa (Berruti 1989). Based on the results of staggered surveys (Jutten- Marcus- and Schaapen islands were done in 1977, 1981 and 2001 respectively) a total 323 nest sites were recorded

in the park (Du Toit *et al.* 2003). The biology, ecology and behaviour on the coastal population have been studied (Brooke *et al.* 1982).

African black oystercatcher *Haematopus moquini* classified as Near Threatened

Extensive studies of the biology, ecology and behaviour of African black oystercatcher have been done (Summers & Cooper 1977; Hockey 1981, 1982, 1983, 1984; Baker & Hockey 1984; Hockey & Branch 1984; Hockey & Underhill 1984). In the 1980s approximately 400 (or 12 percent of the world's population of) African black oystercatchers were found in the Saldanha Bay / Langebaan Lagoon system (Hockey 1983). In 2001 180 pairs (360 adults) were recorded at Malgas and Jutten islands (Du Toit *et al.* 2003).

Kelp gull *Larus dominicanus*

The overall population size of kelp gulls in southern Africa, first determined at approximately 11 200 pairs (Crawford *et al.* 1982a), is increasing (Steele & Hockey 1990), and 8 351 breeding pairs were noted in the park in 2001 (Du Toit *et al.* 2003). The feeding behaviour of kelp gulls has been described (Hockey 1980).

Hartlaub's Gull *Larus hartlaubii*

This bird is endemic to the Benguela system and the western Agulhas bank. The population size, distribution and conservation of this gull species have been described (Williams *et al.* 1990). In 2001 1669 breeding pairs were recorded in the park (Du Toit *et al.* 2003).

Swift Tern *Sterna bergii*

The swift tern of southern African is considered as an endemic subspecies (*Sterna bergii bergii*). Their breeding distribution extends from Swakopmund to Algoa Bay, and some of the largest colonies have been noted in park (Cooper *et al.* 1990). The diet, population trends and biology of this species have been studied (Walter *et al.* 1987; Laugksch *et al.* 1988; Cooper *et al.* 1990).

Caspian Tern *Hydropogone caspia*

A cosmopolitan species considered rare in South Africa, having a coastal population of approximately 80 pairs (Cooper *et al.* 1992).

White Pelican (*Pelicanus onocrotalus*) classified as Near Threatened

Williams & Randall (1995) reviewed the biography, status, feeding and breeding ecology and conservation of five-pelecaniform bird resident at wetlands in South Africa.

Other bird studies

Crawford and Shelton (1978) noted that the largest numbers of Cape gannet and Cape cormorant occur off South West Africa, where the biomass of fish is highest, but dominated by one species, the pilchard. The use of seabirds as potential indicators of pelagic fish stocks has been extensively investigated (Berruti 1983; Crawford *et al.* 1983a; Adams *et al.* 1992). Crawford *et al.* (1991) estimated that in the 1980s seabirds consume about 430 000 metric tons of food per annum off south-western Africa, and of this 34 % was eaten by Cape cormorants, 12 % by Cape gannet and 7 % by African penguins.

Between 1979 and 1985, regular beach patrols for beached seabirds were conducted along the coast of southern Africa (including 16-Mile beach) (Avery 1980; 1981; 1982; 1984; 1985; 1989). Over this 6-year period an average of 152 ± 45, Cape Cormorants, 44 ± 14 African penguins, 36 ± 20 Cape gannet, and 31 ± 8 kelp gulls were recorded per annum. Unusual stranding and events were also documented (Ryan *et al.* 1989; Brooke 1989; Avery 1989).

### **3.2.7 Mammals**

#### **3.2.7.1. Terrestrial mammals**

Compared with the more tropical regions of southern Africa, the South West Cape has a depauperate mammal fauna. Nevertheless a range of species have been recorded in the park including 19 rodent-, 11 insectivore-, 13 carnivores- and 10 ungulate species (Appendix 7.8). Unfortunately, several of these ungulate species were introduced into the park, in areas outside their normal distribution range (Avery, Rautenbach & Randall 1990). One of such species is the bontebok, which is one of six Red Data Book mammal species found in the park (Appendix 7.4).

Cavallini & Nel (1995) studied the comparative behaviour and ecology of the yellow mongoose *Cynictis penicillata* and small grey mongoose *Galerella pulverulenta*. The former species frequented open fields

and preyed mainly (c. 65%) on insects, while the small grey mongoose used the shrubland, and its prime (> 90%) prey items were rodents (Cavallini & Nel 1990b; Avenant & Nel 1992; Cavallini & Nel 1995). Further studies indicated an absence of dietary specialization and an opportunistic feeding behaviour by four sympatric carnivores in the park, namely yellow mongoose, small grey mongoose, water mongoose *Atilax paludinosus* and caracal *Felis caracal*. The width of the food niche changed seasonally, but rodents (mainly *Rhabdomys pumilio* and *Otomys unisulcatus*) were the main prey item of the last three mentioned carnivores (Avenant 1993; Avenant & Nel 1997; 2002). The use by caracal of specific plant communities showed a positive relationship to rodent biomass. Radio tracked male caracal had much larger home ranges ( $27 \pm 0.8 \text{ km}^2$ ) than female caracal ( $7 \pm 1.7 \text{ km}^2$ ) (Avenant & Nel 1998). The potential plant production of the Postberg Nature Reserve was assessed as  $561.5 \text{ kg dry mass}\cdot\text{ha}^{-1}\cdot\text{year}^{-1}$ , which is sufficient for the steenbok, grysbok and duiker populations. Numbers of small antelope in the reserve appear to be limited by plant growth structure and predation by caracal (Heydenrych 1995).

Other studies covered aspects such as:

- Shelters and activity of the bush Karoo rat *Otomys unisulcatus* at Postberg (Vermeulen & Nel 1988).
- Proportions of micro-mammals in pellet of barn owl reflecting the effect of rainfall on vegetation cover (Avery 1992).
- Comparative diet of the bat-eared fox *Otocyon megalotis* and mongooses at WCNP (MacDonald & Nel 1986).

### **3.2.7.2 Marine mammals**

The general distribution and diet of the Cape fur seal along the South African coastline have been investigated (David 1987; 1989). The seal colonies recorded on the offshore islands at Saldanha Bay in the past have greatly declined (Skead 1980). However, seals still forage in area and prey on the seabirds of the islands (David *et al.* 2003).

A variety of whale and dolphin species are found off the South African coast (Ross & Best 1989), and the impacts of whaling operations from Donkergat in Saldanha Bay on several of these cetaceans are discussed in Best & Ross (1989).

## **3.3 Other life forms**

### **3.3.1 Bacteria**

Tibbles & Rawling (1994b) isolated nitrogen-fixing bacteria from the sediment and water of the saltmarshes of the lagoon. Most of these bacteria appeared to be of the genera *Photobacterium* and *Vibrio*. Sediments supported much greater bacterial productivities (5 – 950-fold) and abundance (> 3 orders of magnitude) than the lagoon water (Tibbles *et al.* 1992). The bulk of organic material available to heterotrophic bacteria in saltmarshes is probably derived from primary production (Tibbles *et al.* 1994a). The gut flora of the sand prawn and mud prawn has been studied by Harris *et al.* (1991).

### **3.3.2 Viruses**

No data

### **3.3.3 Fungi**

No data

## **4. HISTORY**

### **4.1 Palaeontology**

Sediment analyses indicated that the Flandrian Transgression flooded the lagoon to 0 – 3 m above present-day levels by 6 750 years ago (or 6.8 ka), and that the sea level returned to present day levels by 4.9 ka. Changes in the macrobenthos assemblage since 1.5 ka (which included the die-off of the oyster *Ostrea atherstonei*, mussel *Arcuatula capensis* and periwinkle *Oxystele variegata*), reflect decreased tidal flow-velocities and loss of hard substrate, as reworked sands prograded into the southern lagoon (Crompton 2000).

Extremely rich Plio/Pleistocene fossil beds are found at Langebaanweg some 15 km north of the park, while important fossil remains from the middle to late Pleistocene occur at Elandsfontein (Hendey 1970,

1981, 1985). Faunal evidence from Elandsfontein strongly suggests that grassy "bushveld" type environment existed during the Middle to Late Pleistocene (Luyt *et al.* 2000).

The stratigraphy and geochronology of Cenozoic strata of the park was mapped (Roberts 1998), and the hominid fossil footprints at Kraalbaai were dated at approximately 117 000 years (Roberts & Berger 1997), confirming their archaeological importance (Gore 1997).

#### **4.2 Archaeology**

The evidence of human occupation of the park dates back to the middle Pleistocene, but most of the records date from the later Holocene, some 12 000 years ago. The open archaeological sites in the Geelbek Dunes (ca. 4 km<sup>2</sup> in extent) have been mapped and studied (Kandel *et al.* 2003; Prindiville & Conrad 2006). The calcretes and arensols, which developed on these ancient dunes, were used as both stratigraphic marker horizons and palaeoclimatic indicators (Felix-Henningsen *et al.* 2001). Late and Middle Stone Age artifacts found at the sites were spatially associated with faunal remains (Conrad *et al.* 1999). At three sites small ostrich eggshell beads (<5 mm) recovered, and these fell into Jacobson Type 1 site occupied by pre-pottery hunter-gathers. The <sup>14</sup>C dates of 550 – 380 cal BC supports this interpretation. This and the similarity of cultural remains suggest that groups of hunter-gathers occupied these three localities (Pottery, Shelly and Nora) episodically. Most of the beads at a fourth site (Toaster) correspond to Jacobson's type III site occupied by post-pottery herders, and this interpretation is supported by radiocarbon dates of samples of the beads and pottery shards (Kandel & Conrad 2005). The presence of stone points and segments suggest that hunting played an important role among the Stone Age activities documented at Geelbek. The low number and heterogeneity of the stone artifacts suggested that people of the Middle Stone Age were highly mobile and did not occupy open-air sites for long periods (Dietl *et al.* 2005). Late Stone Age people apparently used beached whales and tortoises as a source of food sources (Kandel & Conrad 2003; Avery *et al.* 2004). Avery & Underhill (1986) analyzing modern and archaeological data from the Western Cape assessed the seasonal exploitation of seabirds by late Holocene coastal foragers.

#### **4.3 Historical aspects**

The Langebaan area is also an important site in early history of European settlers in South Africa (Axelson 1977). Oudepost I was one of the first outposts erected by the Dutch in 1669. It was built to ward off the French, but later functioned more as an outpost trading with the Khoikhoi people (Krumm 1990). There are numerous historical "monuments" such as the homesteads at Geelbek and Bottelary, the Presbyterian Church at Churchhaven, the old "Postbox" at Postberg and the VOC beacon at Geelbek.

### **5. MANAGEMENT**

#### **5.1 Management of vegetation**

##### **5.1.1 Burning**

Prior to establishment of the park the wetlands between Geelbek and Bottelary were burnt in order to induce new growth for cattle grazing, but this practice ceased with the declaration of the park.

##### **5.1.2 Stocking rates**

Heydenrych (1995) estimated grass and total plant production in the Postberg Nature Reserve to be 194.8 and 561.6 kg dry mass / ha / year respectively.

##### **5.1.3 Alien plant control**

The overall level of alien invasive plant infestation in the park is generally low to moderate. An exception is the south region of the park, where historically wood harvesting was permitted. Through inappropriate clearing methods and high levels of disturbance the alien invasive plant problem has worsened. A total of seven alien invasive plant species (excluding emergent and garden weeds) have been recorded in the park. They are *Acacia cyclops* (rooikranz), *A. saligna* (Port Jackson willow), *Pinus pinaster* (pines), *Eucalyptus globulus* (blue gum), *Myoporum serratum* (manatoka), *Datura ferox* (thorn apple) and *Nicotiniana glauca* (wild tobacco). *Acacia cyclops* is most abundant and wide spread. Management action has been undertaken with limited success.

##### **5.1.4 Rare Plants**

No active management programme exists for nurturing rare plant species in the park.

### **5.1.5 Vegetation Monitoring**

Three sets of total and partial exclusion plots have been monitored at Postberg since 2003.

## **5.2 Management of animals**

### **5.2.1 Introductions / Translocations**

Substantial numbers of extra-limital (Boshoff & Kerley 2001) herbivores occur within the Postberg contractual area, some of which have spread to the remainder of WCNP. Various requests were made in the past for the removal of these species but to no avail. Exotic or extra-limital species compromise natural biodiversity and ecosystem functioning as a result of competitive exclusion and associated effects (Bothma 2005). In the context of WCNP these species were furthermore found to inhibit natural recovery of the old lands at Postberg (Heydenrych 1995). Removal of these species from the entire park (including Postberg) should be a matter of high priority.

Other mammal species that could potentially be reintroduced into WCNP are discussed in Boshoff and Kerley (2001), and Boshoff et al. (2001). Previous attempts at reintroducing species into SANParks areas have not always been successful (Novellie and Knight 1994).

### **5.2.2 Culling**

Limited culling has taken place in the park.

### **5.2.3 Alien animal control**

The rabbit *Oryctolagus cuniculus* was introduced to all the islands in the park, probably from the 17<sup>th</sup> century onwards. However, some of the islands had very little vegetation and currently rabbits are found only on Jutten and Schaapen islands (Skinner & Smithers 1990).

### **5.2.4 Rare animals**

A predator proof wall was erected around the perimeter of Marcus Island to protect the endemic, breeding seabirds.

Although the Redlisted bontebok is the least common antelope species in the southern African subregion, its potential pre-historical occurrence in the WCNP area cannot justify keeping this species in the park, since climatic change (and associated vegetation change) has taken place since this time, and it is therefore currently considered to be extralimital. Furthermore, there are some doubts as to the WCNP population's genetic integrity, and this requires investigation.

## **5.3 Resource utilization**

### **5.3.1 Water supply / abstraction**

No data

### **5.3.2 Plant harvesting**

At present, two forms of extractive resource utilization are permitted in WCNP. These are regulated harvesting of marine biota for bait and food purposes, and felling alien Acacia tree species for firewood. Harvesting of firewood from alien tree species is undertaken in allocated sections of the park by contractors.

### **5.3.3 Invertebrate collecting (e.g. bait)**

Bait collecting (with the exception of perlemoen) is allowed in the multi-use zone of the Langebaan Lagoon MPA, and then in accordance with the legislation referred in the Marine Living Resources Act (Gov. Gazette No. 18930, 27 May 1998).

### **5.3.4 Fishing**

Recreational fishing is allowed in the multi-use zone in accordance with the legislation listed in the Marine Living Resources Act (Gov. Gazette No. 18930, 27 May 1998). Verlinde (2000) recorded a catch per unit effort (cpue) of 405 fish/fishing day/boat for small scale commercial fishers operating from Langebaan Lagoon in areas outside the park. This cpue is similar to that for the average for the West Coast (Verlinde 2000).



In the late 1990s 21 permits were issued to the certain local fishermen of Langebaan and Churchhaven to "traditional" drift net fish for mullets in the limited recreational zone of the park (Joseph & Parris 2000). In the mid 2000s the number of permits was reduced to 11.

Extractive resource use is the biggest threat to the marine environment in the South-western Cape Bioregion (Lombard *et al.* 2004), and staff from WCNP and Marine and Coastal Management undertake regular patrols to encourage compliance with the legislation through summons and prosecutions. In the future the above and other potential natural resource use activities will be aligned with SANParks corporate policy on extractive use, which is still to be developed.

### **5.3.5 Vertebrate harvesting**

In 1967 the commercial harvesting of penguins eggs on the offshore islands, as well as the whaling operation conducted from Donkergat were terminated (Randall 1989, Best & Ross 1989). Currently there is no vertebrate harvesting in the park.

## **5.4 Pathogens and diseases**

### **5.4.1 Virology**

Some of the African penguins treated at SANCCOB were found to be infected with the avian parasite *Leucocytozoon tawaki* (Apicomplexa: Leucocytozoidae) and a piroplasm *Babesia peircei* sp. nov. (Earle *et al.* 1992; 1993), and avian malaria (Brossy 1992; Graczyk *et al.* 1995a; 1995b), while avian cholera has adversely affected wild seabird populations (Crawford *et al.* 1992a)

### **5.4.2 Bacteriology**

No relevant published data was found

### **5.4.3 Parasitology**

No relevant published data was found

## **5.5 Environmental modification**

Numerous factors have negatively impacted on the ecology of the lagoon. These are:

- the building of a breakwater between the mainland and Marcus Island in the late 1970's, which enabled predators to invade the African penguins, swift terns and bank cormorants colonies on the island,
- collecting of guano on the inshore islands until the mid 1980's,
- ongoing military activities at Donkergat, near the mouth of the lagoon,
- processing of harpooned whales at Donkergat in the 1950s and 1960s.
- the introduction of rabbits onto the inshore islands, (Schaapen- and Jutten islands still have significant numbers),
- the spread of aliens species into the park, especially rooikrans *A. cyclops* and Mediterranean mussel *M. galloprovincialis*, and to a lesser extent the European periwinkle *L. saxatilis* and the anemone *S. ornata* (Robinson *et al.* in lit.),
- the construction of unapproved dwellings, house boats and a canal at Bokramsloot for the launching of boats at the southern end of the lagoon,
- the cultivation of wheat at Oudepos,
- erosion of the beaches at Langebaan village and rock revertment barriers erected at Leentjiesklip (Watermeyer Pestedge Retief 1999),
- oil spills and windblown ore dust pollution from the Saldanha-Sishen terminal, and
- over fishing of pelagic fish stocks that serve as the main food sources of many of the seabirds.

Jackson & McGibbon (1991) recorded substantial difference between the macrobenthic communities of "Big Bay" and "Small Bay" with an apparent increase in deposit feeding species and decline in suspension feeders in the latter. These changes are attributed to the organic loading from the fish factories and mariculture industries together with restrictions imposed on water circulation by harbour construction. Comparative studies by Kruger *et al.* (2005) further support the concept that changes have occurred in fauna of Saldanha Bay due to anthropogenic activities.

## **5.6 Zonation**

A draft zoning plan was compiled in 2006 to establish a coherent spatial framework in the park to guide and co-ordinate conservation, tourism and visitor experience initiatives (Holness *in lit.* 2006). The zoning

of WCNP was based on an assessment of the park's biophysical, heritage and scenic resources; and an assessment of the park's current and planned infrastructure and tourist routes/products. The key use zones are:

Primitive Zone: The prime characteristic of the zone is the experience of wilderness qualities with access controlled in terms of numbers, frequency and size of groups. The zone has wilderness qualities, but with limited access roads, hiking trails and the potential for basic small-scale self-catering accommodation facilities such as small bush camps or trail camps. The areas designated as Primitive include the park east of the R27, the islands, lowland areas adjacent to Langebaan Lagoon, the coastal strip inland of 16 Mile Beach, and most of the southern section.

Low Intensity Leisure Zone: The underlying characteristic of this zone is motorized self-drive access with the possibility of small basic camps without facilities such as shops and restaurants. Low intensity leisure areas were designated in current game, flower and landscape viewing areas, as well as along access routes.

High Intensity Leisure Zone: The main characteristic is that of a high density tourist development node with amenities such as shops, restaurants and interpretive centres. This is the zone where more concentrated human activities are allowed and is accessible by motorized transport on high volume transport routes. High Intensity Leisure areas were designated in the existing high usage areas of Geelbek, Kraalbaai, Preekstoel and Langebaan.

Marine A: Multi-use Zone: This area is managed as a marine Controlled Zone with enforcement of the Marine Living Resource Act. Fishing and motorized vessels are allowed.

Marine B: Restricted Zone: Access to this zone is controlled, and fishing and the use of any motorized vessel can only take place on authority of and in accordance with a permit obtained from the management authority.

Marine C: Wilderness Zone: This is an exclusion zone, with no boating or fishing activities.

## **5.7 Park expansion**

The desired state of the park, in the context of park expansion, includes:

- The unification of the marine protected seascape incorporating marine-island-lagoon-mainland linkages;
- The consolidation of untransformed lowland fynbos
- Minimizing impacts of inappropriate surrounding developments.

## **5.8 Social ecology (people and tourism aspect)**

### **5.8.1 Environmental interpretation and education**

Geelbek Gold Field Environmental Centre is managed by the South African National Parks, and has a permanently employed socio-ecologist. The centre has overnight facilities, and is used to host conferences, run environmental educational courses for school children and teachers, show educational films and videos, and serves as an assembly point from which the public is taken on educational excursions (Moore, pers. comm. 2003; Joseph & Parris 2000). Every year the centre hosts the regional round of the annual Environmental Youth Symposium, and the social ecologist visits approximately 34 schools each year (Joseph & Parris (2000).

### **5.8.2 Opinion surveys**

No data.

### **5.8.3 Tourism potential**

The potential of the park with regard to tourism is under-utilized. Accommodation facilities and structured tourist activities are required to encourage the tourists to stay longer.

### **5.8.4 Recreational carrying capacity**

There are two periods when the carrying capacity of the park is severely tested, namely the spring flower season and the December school holidays, for the rest the park is under-utilized.

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## 7. APPENDICES

### 7.1 Species list – Marine algae

**Appendix 7.1** Checklist of seaweed species recorded in the Saldanha Bay - Langebaan Lagoon system (Modified from Schils 1998). Key: Source: S = Stegenga *et al.* 1997; Sc = Schils 1998; Si = Simons 1977

Species	Source	Species	Source
<b>Chlorophyta</b>		<b>Phaeophyta</b>	
<b>Chlorophyceae</b>		<b>Ectocarpales</b>	
<b>Chaetophorales</b>		<i>Ectocarpus acutus</i>	S
<i>Stromatella</i> sp.	S	<i>Ectocarpus siliculosus</i>	S; Sc
<i>Ulvella</i> sp.	S	<i>Feldmannia irregularis</i>	S
<b>Ulvales</b>		<i>Hincksia granulosa</i>	S; Sc
<i>Blindingia marginata</i>	S ; Sc	<i>Streblonema codii</i>	S; Si
<i>Blindingia minima</i>	S	<b>Choradariales</b>	
<i>Enteromorpha atroviridis</i>	S	<i>Ralfsia verrucosa</i>	S; Si
<i>Enteromorpha compressa</i>	S	<i>Leathesia difformis</i>	S
<i>Enteromorpha intestinalis</i>	S; Sc	<i>Myriocladia capensis</i>	S
<i>Enteromorpha</i> sp.	S; Sc	<i>Myriocladia abbreviata</i>	S
<i>Enteromorpha prolifera</i>	S; Sc	<i>Papenfussiella gracilis</i>	S
<i>Ulva fascaliata</i>	S; Sc	<i>Myriocladia capensis</i>	
<i>Ulva lactuca</i>	S; Sc	<i>Chordariopsis capensis</i>	S; Si; Sc
<i>Ulva rhacodes</i>	S	<i>Splachnidium rugosum</i>	S; Si; Sc
<i>Ulva rigida</i>	S	<b>Sphacelariales</b>	
<b>Cladophorales</b>		<i>Stypocaulon funiculare</i>	S
<i>Chaetomorpha capillaris</i>	S	<b>Dictyotales</b>	
<i>Chaetomorpha robusta</i>	S	<i>Dictyota dichotoma</i>	S
<i>Cladophora capensis</i>	S; Si; Sc	<i>Dictyota liturata</i>	S; Sc
<i>Cladophora contexta</i>	S; Sc	<b>Desmarestiales</b>	
<i>Cladophora flagelliformis</i>	S; Sc	<i>Desmarestia firma</i>	S; Sc
<i>Cladophora isaacii</i>	S; Si; Sc	<b>Scytosiphonales</b>	
<i>Cladophora mirabilis</i>	S; Si;	<i>Colpomenia sinuosa</i>	S; Si; Sc
<i>Cladophora radiosa</i>	S; Sc	<i>Petalonia fascia</i>	S; Sc
<i>Cladophora sericea</i>	S	<i>Scytosiphon simplicissima</i>	S; Si;
<i>Cladophora implexum</i>	S	<b>Laminariales</b>	
<i>Rhizoclonium lubricum</i>	S	<i>Laminaria pallida</i>	S; Si; Sc
<i>Rhizoclonium riparium</i>	S; Sc	<i>Ecklonia maxima</i>	S; Si; Sc
<b>Codiales</b>		<i>Macrocystis angustifolia</i>	S
<i>Codium duthieae</i>	S; Si; Sc	<b>Fucales</b>	
<i>Codium extricatum</i>	S; Sc	<i>Axillariella constricta</i>	S;
<i>Codium fargile</i>	S; Si; Sc	<i>Bifurcaria brassicaeformis</i>	Si
<i>Codium isaacii</i>	S; Si;	<i>Bifurcaria capensis</i>	S; Si; Sc
<i>Codium stephensiae</i>	S; Si; Sc	<i>Sargassum heterophyllum</i>	S; Si; Sc
<b>Derbesiales</b>		<b>Rhodophyta</b>	
<i>Bryopsis africana</i>	S; Si; Sc	<b>Bangiophyceae</b>	
<i>Bryopsis hypnoides</i>	S; Sc	<b>Porphyridiales</b>	
<i>Bryopsis plumosa</i>	S; Sc	<i>Stylonema alsidii</i>	Sc
<i>Bryopsis setacea</i>	S; Si; Sc		

Appendix 7.1. continued

Species	Source	Species	Source
<b>Bangiales</b>		<b>Gigartinales</b>	
<i>Bangia atropurpurea</i>	Sc	<i>Haematocelis</i> sp.	S
<i>Porphyra capensis</i>	S; Si; Sc	<i>Nemastoma lanceolatum</i>	S
<i>Porphyra saldanhae</i>	S; Sc	<i>Schizymenia obovata</i>	S; Si; Sc
<i>Porphyra</i> sp. <i>indep.</i>	S;	<i>Callophyllis variegata</i>	S; Si;
<b>Florideophyceae</b>		<i>Caulacanthus ustulatus</i>	S; Si; Sc
<b>Namalionales</b>		<i>Heringia mirabilis</i>	S; Sc
<i>Acrochaetium catenulatum</i>	S	<i>Rhodophyllis reptans</i>	S
<i>Acrochaetium secundatum</i>	S	<i>Plocamium cartilagineum</i>	S; Si
<i>Audouinella balliae</i>	S	<i>Plocamium cornutum</i>	S; Si; Sc
<i>Audouinella pectinata</i>	S	<i>Plocamium glomeratum</i>	S
<i>Colaonema caespitosum</i>	S	<i>Plocamium maxillosum</i>	S; Sc
<i>Colaonema codicolum</i>	S	<i>Plocamium rigidum</i>	S; Si; Sc
<i>Colaonema daviesii</i>	S	<i>Hypnea eckonii</i>	S,
<i>Colaonema nemalionis</i>	S	<i>Hypnea musciformis</i>	S, Sc
<i>Colaonema panduripodium</i>	S	<i>Hypnea rosea</i>	Sc
<i>Colaonema plumosum</i>	S	<i>Hypnea specifera</i>	Si
<i>Rhodothamniella floridula</i>	S	<i>Trematocarpus flabellatus</i>	S; Si; Sc
<i>Nothogenia erinacea</i>	S; Si; Sc	<i>Trematocarpus fragilis</i>	S; Si; Sc
<i>Nothogenia ovalis</i>	S; Si; Sc	<i>Ahnfeltiopsis complicata</i>	S; Si; Sc
<i>Gelidium micropterum</i>	Si	<i>Ahnfeltiopsis glomerata</i>	S; Si; Sc
<i>Gelidium pteridifolium</i>	S,	<i>Ahnfeltiopsis polyclada</i>	S; Sc
<i>Suhria vittata</i>	S; Si; Sc	<i>Ahnfeltiopsis vermicularis</i>	S; Si; Sc
<b>Hildenbrandiales</b>		<i>Gymnogongrus dilatatus</i>	S; Si; Sc
<i>Hildenbrandia lecanellierii</i>	S; Si	<i>Gigartina bracteata</i>	S; Sc
<i>Hildenbrandia rubra</i>	S;	<i>Gigartina pistillata</i>	S; Sc
<b>Cryptonemiales</b>		<i>Gigartina radula</i>	S; Si; Sc
<i>Aeodes orbitosa</i>	S; Si; Sc	<i>Gigartina scutellata</i>	S; Si; Sc
<i>Aeodes ulvoidea</i>	S	<i>Gigartina stiriata</i>	S; Si; Sc
<i>Grateloupia doryphora</i>	S; Sc	<i>Gigartina teedii</i>	S; Sc
<i>Grateloupia filicina</i>	S; Si; Sc	<i>Iridaea capensis</i>	S; Si; Sc
<i>Pachymenia carnosae</i>	S; Si; Sc	<b>Rhodymeniales</b>	
<i>Pachymenia cornea</i>	S; Sc	<i>Epymenia capensis</i>	Si
<i>Phyllymenia belangeri</i>	S; Si; Sc	<i>Epymenia obtusa</i>	S; Si; Sc
<i>Polyopes constrictus</i>	S; Sc	<i>Rhodymenia natalensis</i>	S
<i>Kallymenia agardhii</i>	S, Sc	<i>Champia compressa</i>	S; Si; Sc
<i>Kallymenia schizophylla</i>	S; Si; Sc	<i>Champia obtusa</i>	S; Si; Sc
<i>Pugetia harveyana</i>	S; Sc	<i>Chylocladia capensis</i>	S; Si; Sc
<i>Thamnophyllis discigera</i>	S; Si	<i>Lomentaria diffusa</i>	S
<i>Thamnophyllis pocockiae</i>	S		
<b>Gracilariales</b>			
<i>Gracilaria gracilis</i>	S; Si; Sc		
<i>Gracilariopsis lemaneiformis</i>	S; Sc		

Appendix 7.1. continued

Species	Source	Species	Source
<b>Ceramiales</b>		<i>Laurencia glomerata</i>	Si
<i>Anothrichium tenue</i>	S; Sc	<i>Polysiphonia incompta</i>	Sc
<i>Antithamnionella spirographidis</i>			<i>Polysiphonia</i>
<i>kowiensis</i>	S; Sc		
<i>Aristothamnion collabens</i>	S; Si; Sc	<i>Polysiphonia namibiensis</i>	Sc
<i>Ballia sertulariodes</i>	S	<i>Polysiphonia urbana</i>	S; Si; Sc
<i>Callithamnion hookeri</i>	S	<i>Polysiphonia virgata</i>	S; Si; Sc
<i>Carpoblepharis flaccida</i>	S; Si; Sc	<i>Pterosiphonia cloiophylla</i>	S; Si; Sc
<i>Carpoblepharis minima</i>	S	<i>Pterosiphonia spinifera</i>	Sc
<i>Centroceras clavulatum</i>	S; Si; Sc	<i>Streblocladia camptoclada</i>	Sc
<i>Ceramium arenarium</i>	S; Sc	<i>Streblocladia corymbifera</i>	S; Si
<i>Ceramium atrorubescens</i>	Sc	<i>Tayloriella tenebrosa</i>	S
<i>Ceramium capense</i>	S; Si; Sc		
<i>Ceramium diaphanum</i>	Si	<b>Corallinales</b>	
<i>Ceramium dawsonii</i>	Sc	<i>Amphiroa beauvoisii</i>	Sc
<i>Ceramium obsoletum</i>	S; Sc	<i>Amphiroa ephedraea</i>	Sc
<i>Ceramium papenfussianum</i>	S; Si; Sc	<i>Arthrocardia filicula</i>	S; Si; Sc
<i>Ceramium planum</i>	S; Si; Sc	<i>Arthrocardia flabellata</i>	S; Si; Sc
<i>Ceramium sp indet.</i>	S	<i>Cheilosporum sagittatum</i>	Sc
<i>Ceramium tenerrimum</i>	S	<i>Corallina officinalis</i>	Sc
<i>Euptilota pappeana</i>	S	<i>Jania crassa</i>	Sc
<i>Griffithsia confervoides</i>	S; Sc		
<i>Lomathamnion humile</i>	S		
<i>Microcladia gloria-spei</i>	S		
<i>Platythamnion recurvatum</i>	S		
<i>Pleonosporium filicinum</i>	Sc		
<i>Pleonosporium harveyanum</i>	Sc		
<i>Pleonosporium paternoster</i>	S		
<i>Pleonosporium ramulosum</i>	S		
<i>Pleonosporium tysonii</i>	S; Si; Sc		
<i>Tiffaniella schmitziana</i>	S		
<i>Wrangelia purpurifera</i>	S		
<i>Botryocarpa prolifera</i>	Si		
<i>Botryoglossum platycarpum</i>	S; Si; Sc		
<i>Caloglossa leprieurii</i>	S, Sc		
<i>Delesseria papenfussii</i>	S; Si; Sc		
<i>Hymenena venosa</i>	S; Sc		
<i>Myriogramme livida</i>	S; Sc		
<i>Neuroglossum binderianum</i>	S; Si; Sc		
<i>Platyclinia sp.</i>	S		
<i>Platysiphonia intermedia</i>	S; Si		
<i>Taenioma perpusillum</i>	S,		
<i>Dasya scoparia</i>	S		
<i>Heterosiphonia crispa</i>	S		
<i>Heterosiphonia dubia</i>	S		
<i>Heterosiphonia pellucida</i>	S		
<i>Bostrychia intricata</i>	S		
<i>Bostrychia moritziana</i>	S; Sc		
<i>Bostrychia scorpioides</i>	S; Sc		
<i>Chondria capensis</i>	S; Si; Sc		
<i>Herposiphonia heringii</i>	S; Sc		
<i>Herposiphonia prorepens</i>	S; Sc		

## 7.2 Communities – Plants

**Appendix 7.2** The syntaxonomic classification of the plant communities in West Coast National Park based on the work of Boucher (1987) for Western Cape Lowlands and new classification (nov) by Heydenrych (1995). Communities described by Boucher & Jarman (1977) are indicated by (B&J) and the original names are given in brackets, while those of Heydenrych (1995) are denoted by (H).

### Semi-aquatic

**Class:** *Sarcocornietea pillansiae*

**Order** *Sarcocornia – Juncetalia kraussii* (*Juncus kraussii* dense shrublands (B&J))

Association : *Junco – Lycietum decumbentis* (H)

Association : *Junco – Nidorelletum foetidi* (*Juncus kraussii* shrubland *Nidorella-Senecio* form (B&J))

Association : *Junco – Chondropetaletum tectorum*

Association : *Junco – Phragmitetum australis* (*Juncus kraussii* shrubland *Phragmites australis* form (B&J))

**Order** *Sarcocornia – Sarcocornietalia meyeranae* (*Chenolea-Salicornia* Dwarf Succulent Shrubland (B&J))

Association : *Salicornio – Disphymetum crassifolii* (*Limonium-Disphyma* form (B&J))

Association : *Salicornio – Spattinetum maritimae* (*Spartina-Triglochin* form (B&J))

### Terrestrial

**Class** *Arctothecetea populiofoliae*

**Order** *Arctotheco – Cladoaphietalia cyperiodis*

**Alliance** *Cladoraphio – senecion elegantis*

Association : *Senecioni – Ammophiletum arenariae* (H)

Association : *Senecioni – Passerinetum ericoidiae* (H) (nov)

Association : *Senecioni – Felicetum hyssopifoliae* (H) (nov)

Association : *Senecioni – Metalasietum muricatae* (H)

Association : *Senecioni – Ficinietum pallentis* (*Didelta-Psoralea* Littoral-dune Open Grassland (B&J))

**Class** *Ehrtetea calycinae*

**Order** *Eharto – Eucleetalia racemosae*

**Alliance** *Eucleo – Zygophyllion morgasanae*

**Sub alliance** *Zygophyllo – Ruscion geminiflora* (nov)

Association : *Ruschio – Pteroniteum uncinatae* (H) (nov)

Association : *Ruschio – Lycietum decumbentis* (H) (nov)

**Sub alliance** *Zygophyllo – Protasparagenion littoralis*

Association: *Protasparago – Atriplicetum semibaccatae* (*Atriplex-Zygophyllum* Coastal-shelf Dwarf Shrubland (B&J))

Association: *Protasparago – Muraltietum dumosae* (*Pelargonium-Muraltia* Coastal-shelf Dwarf Shrubland (B&J))

Association: *Protasparago – Galienietum crystallinae* (*Galenia-Senecio* Hillside Closed Dwarf Shrubland (B&J))

**Sub alliance** *Zygophyllo – Maytenion lucidae*

Association *Mayteno – Clutietum daphnoidiae* (nov)

Sub-association *Mayteno – Clutietum daphnoidiae nylandtetosum* (H) (nov)

Sub-association *Mayteno – Clutietum daphnoidiae othonnetosum* (H) (nov)

Variant *Mayteno – Clutietum daphnoidiae othonnetosum* var. *Didelta* (H) (nov)

Variant *Mayteno – Clutietum daphnoidiae othonnetosum* var. *Crassula* (H) (nov)

Association: *Mayteno – Oleetum exasperatae* (H) (nov)

Sub-association : *Oleetum exasperatae rhoetosum* (nov)

Association: *Mayteno – Protasparagetum retrofractus* (H) (nov)

Association : *Mayteno – erepsietum carterae* (H) (nov)

Association: *Myateno – Maurocenetum frangulariae* (*Ehrharta-Maurocenia* Hillside Dense Shrubland (B&J))

Association: *Myateno – Festucetum Scabrae* (*Nenax-Maytenus-Zygophyllum* Limestone Evergreen Shrubland (B&J))



## Appendix 7.2 continued

Association: *Myateno* – *Willdenowietum incurvatae* (*Willdenowia stricta* Consolidated-dune Dense Evergreen Restioid Shrubland (B&J))

Association: *Myateno* – *Crassuletum ammophilae* (*Maytenus-Kedrostis* Consolidated-dune Dense Evergreen Shrubland (B&J))

Association: *Myateno* – *Thamnochortetum spicigeri* (*Thamnochortus spicigerus* Dune Dense Tall Restioid Herbland (B&J))

Association: *Myateno* – *Pteronietum uncinatae* (*Pteronia uncinata* Limestone Evergreen Dwarf Shrubland (B&J))

**Alliance** *Eucleo* – *Passerinion paleaceae* (nov)

**Sub alliance** *Passerino* – *Metalasion muricatae* (nov)

Association : *Metalasio Chondropetletum microcarpii* (H)

**Sub –alliance** *Passerino* – *Ischyrolepion eleocharidis* (nov)

Association : *Ischyrolepo* – *Phylicetum ericoidiae* (H) (nov)

Association : *Ischyrolepo* – *Hermannietum pinnatae* (*Hermannia pinnata* Littoral-dune Dwarf Succulent Shrubland (B&J))

Association : *Ischyrolepo* – *Myricetum quercifoliae* (*Metalasia-Myrica* Dune Dense Evergreen Ericoid Shrubland (B&J))

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**Alliance** : *Eucleo* – *Willdenowia incurvatae*

**Sub alliance** : *Willdenowio* – *Diospyrion austro-africanae* (nov)

Association *Diospyro* – *Muratietum demissae* (H) (nov)

Sub association *Diospyro* – *Muratietum demissae gnidietosum* (H) (nov)

Sub association: *Diospyro* – *Muratietum demissae leyseretosum* (H) (nov)

Sub association: *Diospyro* – *Muratietum demissae hermannietosum* (H) (nov)

Sub association: *Diospyro* – *Muratietum demissae ischyrolepetosum* (H) (nov)

Association *Diospyro* – *Maytenetum heterophyllae* (H) (nov)

Association *Diospyro* – *Agathosometum thymifoliae* (H) (nov)

Association *Diospyro* – *Diosmetum oppositifoliae* (H) (nov)

Association *Diospyro* – *Senecietum burchelliae* (H) (nov)

Association *Diospyro* – *Otholobietum hirtae* (H) (nov)

### 7.3 Species list – Plants

**Appendix 7.3.** Checklist of vascular plant species recorded in semi-aquatic and terrestrial habitats in West Coast National Park (modified from Heydenrych 1995).

#### Species

##### ADIANTACEAE

*Cheilanthes hastata*  
*Cheilanthes multifida*

##### POACEAE

*Ammophila arenaria*  
*Avena fatua*  
*Bromus diandrus*  
*Bromus hordeaceus molliformis*  
*Bromus inermis*  
*Bromus pectinatus*  
*Chaetobromus dregeanus*  
*Cladiraphis cyperoides*  
*Cynodon dactylon*  
*Ehrharta brevifolia* var. *cuspidata*  
*Ehrharta calycina*  
*Ehrharta delicatula*  
*Ehrharta longiflora*  
*Ehrharta villosa*  
*Festuca scabra*  
*Hordeum capense*  
*Lolium multiflorum* (x *L. perenne*)  
*Parapholis incurva*  
*Pentaschistis airoides*  
*Pentaschistis pallida*  
*Phalaris canariensis*  
*Phalaris minor*  
*Poa annua*  
*Poaceae*  
*Puccinellia angusta*  
*Schismus inermis*  
*Sporobolus virginicus*  
*Trisbolium echinatum*  
*Trisbolium hispidum*  
*Vulpia muralis*  
*Vulpia myuros*

##### CYPERACEAE

*Ficinia bulbosa*  
*Ficinia capitella*  
*Ficinia dunensis*  
*Ficinia indica*  
*Ficinia nigrescens*  
*Ficinia paradoxa*  
*Ficinia secunda*  
*Ficinia trichodes*  
*Hellmuthia membranacea*  
*Isolepis antarctica*  
*Isolepis inocomtula*  
*Scurpus thunbergianus*  
*Tetraria* sp.

#### Species

##### ARACEAE

*Zantedeschia aethiopica*

##### RESTIONACEAE

*Chondropetalum microcarpum*  
*Ischyrolepis capensis*  
*Ischyrolepis eleocharis*  
*Thamnochortus spicigerus*  
*Willdenowia incurvata*

##### JUNCACEAE

*Juncus acutus*  
*Juncus* cf. *bufonius*  
*Juncus krausii*

##### COLCHICACEAE

*Wurmbea monopetala*  
*Wurmbea marginata*

##### ASPHODELACEAE (part 1)

*Bulbine haworthioides*  
*Bulbine lagopus*  
*Bulbine tuberosa*  
*Bulbinella cauda-felis*  
*Chlorophytum undulatum*  
*Trachyandra* cf. *revoluta*  
*Trachyandra* cf. *falcata*  
*Trachyandra* sp.  
*Trachyandra ciliata*  
*Trachyandra divaricata*  
*Trachyandra muricata*  
*Trachyandra revoluta*

##### ASPHODELACEAE (part 2)

*Aloe* cf. *framesii*

##### HYACINTHACEAE

*Albuca altissima*  
*Drimia* cf. *elata*  
*Lachenalia ameliae*  
*Lachenalia bulbifera*  
*Lachenalia hirta* var. *hirta*  
*Lachenalia pustulata*  
*Lachenalia rubida*  
*Ornithogalum dubium*  
*Ornithogalum maculatum*  
*Ornithogalum suaveolens*  
*Ornithogalum thyrsoides*  
*Urginea altissima*  
*Veltheimia capensis*

## Appendix 7.3 continued

### Species

#### ASPARAGACEAE

*Myrsiphyllum asparagoides*  
*Myrsiphyllum declinatum*  
*Myrsiphyllum fasciculatum*  
*Protasparagus aethiopicus*  
*Protasparagus capensis* var. *capensis*  
*Protasparagus compactus*  
*Protasparagus retrofractus*

#### HAEMODORACEAE

*Wachendorfia* sp.  
*Wachendorfia thysiflora*

#### AMARYLLIDACEAE

*Hessea* sp.  
*Haemanthus coccineus*  
*Haemanthus pubescens*  
*Amaryllis belladonna*  
*Brusvigia appendiculata*  
*Brusvigia orientalis*  
*Gethyllis* cf. *ciliaris*  
*Gethyllis* cf. *villosa*

#### HYPOXIDACEAE

*Empodium veratrifolium*  
*Spiloxene capensis*  
*Spiloxene gracilipes*  
*Spiloxene ovata*  
*Spiloxene serrata*  
*Pauridia minuta*

#### TECOPHILAEACEAE

*Cyanella hyacinthoides*

#### IRIDACEAE

*Anomatheca viridis*  
*Aristea dichotoma*  
*Babiana ambigua*  
*Babiana ringens*  
*Babiana tubulosa* var. *tubiflora*  
*Chasmanthe floribunda* var. *floribunda*  
*Ferraria crispa*  
*Ferraria densepunctulata*  
*Galaxia fugacissima*  
*Galaxia ovata*  
*Geissorhiza inflexa*  
*Gladiolus gracilis*  
*Homeria miniata*  
*Homeria minor*  
*Hesperantha erecta*  
*Hesperantha falcata*  
*Hesperantha radiata*

### Species

#### Hexaglottis virgata

*Ixia lutea* Eckl. var. *lutea*  
*Ixia lutea* Eckl. var. *ovata*  
*Lapeirousia jacquinii*  
*Melasphaerula ramosa*  
*Moraea fugax*  
*Moraea gawleri*  
*Romulea* cf. *hirsuta*  
*Romulea flava* var. *hirsuta*  
*Romulea saldanhensis*  
*Synnotia parviflora*  
*Watsonia hysterantha*  
*Watsonia marginata*

#### ORCHIDACEAE

*Corycium orobanchoides*  
*Satyrium erectum*

#### MYRICACEAE

*Myrica cordifolia*  
*Myrica quercifolia*

#### URTICACEAE

*Didymodoxa caffra*  
*Didymodoxa capensis*

#### PROTEACEAE

*Leucadendron* sp.

#### LORANTHACEAE

*Septulina glauca*

#### VISCASEAE

*Viscum capense*

#### SANTALACEAE

*Colpoon compressum*  
*Thesidium fragile*  
*Thesidium hispidulum*  
*Thesidium spinosum*

#### CHENOPODIACEAE

*Atriplex* cf. *cinerea*. subsp. *bollusi*  
*Atriplex vestita* var. *iappendiculata*  
*Chenolea diffusa*  
*Exomis microphylla* var. *axyrioides*  
*Manochyamys albicans*  
*Sarcocornia pillansii*

#### AMARANTHACEAE

*Amaranthus deflexus*  
*Amaranthus* sp.

## Appendix 7.3 continued

### Species

#### AIZOACEAE

*Adenogramma mollugo*  
*Aizoon zeyheri*  
*Galenia fruticosa* var. *prostrata*  
*Limeum africanum*  
*Pharnaceum elongatum*  
*Tetragonia spicata*  
*Tetragonia chenopodioides*  
*Tetragonia fruticosa*

#### MESEMBRYANTHEMACEAE

*Carpobrotus edulis*  
*Cephalophyllum* cf. *gracile*  
*Cheiridopsis* cf. *tuberculata*  
*Cheiridopsis purpurascens*  
*Dorotheanthus bellidiformis*  
*Drosanthemum delicatulum*  
*Erepsia* cf. *carterae*  
*Jordaaniella dubia*  
*Lampranthus aureus*  
*Lampranthus* cf. *lunatus*  
*Lampranthus vernalis*  
*Mesembryanthemum crystallinum*  
*Ruschia* cf. *festiva*  
*Ruschia geminiflora*  
*Ruschia* sp.

#### CARYOPHYLLACEAE

*Agrostemma githago*  
*Cerastium capense*  
*Polycarpon tetraphyllum*  
*Silene clandestina*  
*Spergularia media*  
*Stellaria media*

#### RANUNCULACEAE

*Knowltonia vesicatoria vesicatoria*

#### MENISPERMACEAE

*Cissampelos capensis*

#### FUMARIACEAE

*Fumaria muralis*  
*Phacocarpus cracca*  
*Cysticapnos vesicaria*

#### BRASSICACEAE

*Erucastrum trigosum*  
*Heliophila africana*  
*Heliophila amplexicaulis*  
*Heliophila arenaria*  
*Heliophila coronopifolia*  
*Heliophila* sp.

### Species

#### CRASSULACEAE

*Adromischus* sp.  
*Cotyledon orbiculata* var. *orbiculata*  
*Crassula ammophila*  
*Crassula* cf. *dejecta*  
*Crassula decumbens* var. *brachyphylla*  
*Crassula dichotoma*  
*Crassula expansa expansa*  
*Crassula glomerata*  
*Crassula natans* var. *natans*  
*Crassula saxifraga*  
*Tylecodon grandiflorus*  
*Tylecodon paniculatus*

#### ROSACEAE

*Cliffortia polygonifolia* var. *polygonifolia*

#### NEURADACEAE

*Grielum humifusum*

#### FABACEAE

*Acacia cyclops*  
*Argyrolobium* sp.  
*Aspalathus hispida*  
*Aspalathus pinguins occidentalis*  
*Aspalathus recurva*  
*Aspalathus sericea*  
*Aspalathus spinosa spinosa*  
*Crotalaria excisa*  
*Dipogon lignosus*  
*Indigofera meyeriana*  
*Indigofera procumbens*  
*Lebeckia* cf. *multiflora*  
*Lebeckia cinerea*  
*Lebeckia spinescens*  
*Lessertia herbacea*  
*Lessertia tomentosa*  
*Lotononis fastigiata*  
*Medicago polymorpha*  
*Melilotus indica*  
*Melolobium aethiopicum*  
*Otholobium bracteolatum*  
*Otholobium fruticans*  
*Otholobium hirtum*  
*Otholobium striatum*  
*Podalyria sericea*  
*Psoralea repens*  
*Sutherlandia frutescens*  
*Vicia sativa*  
*Wiborgia* cf. *fusca macrocarpa*

## Appendix 7.3 continued

### Species

#### GERANIACEAE

*Erodium cicutarium*  
*Erodium moschatum*  
*Erodium* sp.  
*Pelargonium capitatum*  
*Pelargonium cucullatum*  
*Pelargonium fulgidum*  
*Pelargonium gibbosum*  
*Pelargonium hirtum*  
*Pelargonium lobatum*  
*Pelargonium longicaule* var. *longicaule*

#### OXALIDACEAE

*Oxalis flava*  
*Oxalis glabra*  
*Oxalis hirta*  
*Oxalis livida*  
*Oxalis luteola*  
*Oxalis multicaulis*  
*Oxalis obtusa*  
*Oxalis pes-caprae*  
*Oxalis purpurea*  
*Oxalis tenuifolia*

#### ZYGOPHYLLACEAE

*Zygophyllum cordifolium*  
*Zygophyllum flexuosum*  
*Zygophyllum morgsana*  
*Zygophyllum spinosum*

#### RUTACEAE

*Agathosma capensis*  
*Agathosma imbricata*  
*Agathosma serpyllacea*  
*Agathosma thymifolia*  
*Coleonema album*  
*Diosama hirsuta*  
*Diosama oppositifolia*  
*Diosama ramosissima*

#### POLGALACEAE

*Muraltia demissa*  
*Nylandtia spinosa*  
*Polygala myrtifolia*  
*Polygala pappeana*

### Species

#### EUPHORBIACEAE

*Adenocline violifolia*  
*Clutia daphnoides*  
*Clutia rubricaulis*  
*Euphorbia burmannii*  
*Euphorbia caput-medusae*  
*Euphorbia hamata*  
*Euphorbia mauritanica*

#### ANACARDIACEAE

*Rhus crenata*  
*Rhus glauca*  
*Rhus longispina*  
*Rhus laevigata laevigata*  
*Rhus lucida*  
*Rhus pterota*

#### CELASTRACEAE

*Cassine aethiopica*  
*Maytenus heterophylla*  
*Maytenus lucida*  
*Maurocena frangularia*  
*Pterocelastrus tricuspidatus*  
*Putterlickia pyracantha*

#### MELIANTHACEAE

*Melianthus minor*

#### RHAMNACEAE

*Phyllica cephalantha*  
*Phyllica ericoides*  
*Phyllica emberbis*  
*Phyllica* sp.  
*Phyllica stipularis*

#### MALVACEAE

*Anisodontea scabrosa*  
*Malva parviflora*

#### STERCULIACEAE

*Hermannia althaeifolia*  
*Hermannia pinnata*  
*Hermannia scabra*  
*Hermannia scordifolia*

#### THYMELAEACEAE

*Gnidia nodiflora*  
*Gnidia oppositifolia*  
*Passerina ericoides*  
*Passerina paleaceae*  
*Passerina* sp.  
*Passerina vulgaris*

## Appendix 7.3 continued

### Species

#### APIACEAE

*Arctopus echinatus*  
*Annesorrhiza capensis*  
*Capnophyllum africanum*  
*Dasispermum suffruticosum*  
*Lichtensteinia beiliana*  
*Lichtensteinia obscura*  
*Peucedanum sp.*  
*Sonderina hispida*  
*Sonderina tenuis*  
*Torilis arvensis*

#### PLUMBAGINACEAE

*Limonium acuminatum*  
*Limonium depauperatum*  
*Limonium perigrinum*  
*Limonium longifolium*

#### EBENACEAE

*Diospyros austro-africana*  
*Diospyros sp.*  
*Euclea racemosa*

#### OLEACEAE

*Olea exasperata*

#### GENTIACEAE

*Chironia baccifera*  
*Chironia decumbens*

#### GENTIANACEAE

*Orphium frutescens*  
*Sebaea albens*  
*Sebaea exacoides*

#### ASCLEPIADACEAE

*Aslepias concellata*  
*Cynanchum africanum*  
*Cynanchum obtusifolium*  
*Microloma sagittatum*

#### BORAGINACEAE

*Amsinckia calycina*

#### LAMIACEAE

*Ballota africana*  
*Mentha aquatica*  
*Salvia africana-lutea*  
*Salvia lanceolata*  
*Stachys aethiopica*  
*Stachys bolusii*

### Species

#### SOLANACEAE

*Lycium cf. afrum*  
*Lycium cf. decumbens*  
*Lycium ferocissimum*  
*Lycium sp.*  
*Solanum hermannii*  
*Solanum guineense*

#### SCROPHULARIACEAE

*Diascia cf. diffusa*  
*Diascia sp.*  
*Hemimeris montana*  
*Hemimeris sabulosa*  
*Hyobanche sanguinea*  
*Sutera lychnidea*  
*Manulea altissima*  
*Manulea sp.*  
*Manulea thyrsoiflora*  
*Manulea tomentosa*  
*Nemesia barbata*  
*Nemesia bicornis*  
*Nemesia ligulata*  
*Nemesia psammophila*  
*Nemesia versicolor*  
*Oftia africana*  
*Phyllopodium capillare*  
*Phyllopodium sp.*  
*Polycarena cf. capensis*  
*Polycarena sp.*  
*Sutera sp.*  
*Zaluzianskya parviflora*  
*Zaluzianskya villosa*

#### SELAGINACEAE

*Hebenstretia dentata*  
*Hebenstretia cf. paarlensis*  
*Hebenstretia repens*  
*Selago friticosa*  
*Selago fruticulosa*  
*Selago polystachya*  
*Selago stricta*

#### PLANTAGINACEAE

*Plantago cafra*  
*Plantago crassifolia var. crassifolia*

#### RUBIACEAE

*Anthospermum sp.*  
*Anthospermum aethiopicum*  
*Anthospermum galioides*  
*Anthospermum spathulatum spathulatum*  
*Galium tomentosum*

## Appendix 7.3 continued

### Species

#### CUCURBITACEAE

*Kedrostis nana*

#### CAMPANULACEAE

*Lightfootia adpressa*

*Lightfootia diffusa*

*Microcodon hispidulum*

*Wahlenbergia capensis*

*Wahlenbergia paniculata*

#### LOBELLIACEAE

*Cyphia crenata*

*Lobelia anceps*

*Monopsis lutea*

#### ASTERACEAE

*Amellus tenuifolius*

*Arctotheca calendula*

*Arctotheca populifolia*

*Arctotis acaulis*

*Arctotis breviscarpa*

*Arctotis cuprea*

*Arctotis hirsuta*

*Arctotis sp.*

*Arctotis stoechadifolia*

*Athanasia cf. trifurcata*

*Athrixia phyllicoides*

*Berkheya rigida*

*Castalis nudicaulis var. nudicaulis*

*Cenia duckittae*

*Cenia turbinata*

*Chrysanthemoides incana*

*Chrysanthemoides monifera*

*Chrysocoma ciliata*

*Cineraria geifolia*

*Cotula coronopifolia*

*Cotula filifolia*

*Didelta carnosa var. carnosa*

*Didelta carnosa var. tomentosa*

*Dimorphotheca pluvialis*

*Dimorphotheca sinuata*

*Eriocephalus africanus*

*Euryyops linifolius*

*Felicia australis*

*Felicia dubia*

*Felicia elongata*

*Felicia filifolia*

*Felicia hyssopifolia glabra*

*Felicia tenella*

*Foveolina tenella*

*Gazania pectinana*

### Species

*Gymnodiscus capillaris*

*Helichrysum asperum*

*Helichrysum bachmannii*

*Helichrysum crispum*

*Helichrysum cymosum*

*Helichrysum hebelepis*

*Helichrysum indicum*

*Helichrysum niveum*

*Helichrysum revolutum*

*Helichrysum teretifolium*

*Helichrysum tricostatum*

*Hypochoeris glabra*

*Ifloga verticillata*

*Leysera gnaphalodes*

*Metalasia muricata*

*Nidorella foetida*

*Oncosophon sabulosum*

*Oncosophon suffruticosum*

*Osteospermum clandestinum*

*Osteospermum dentatum*

*Osteospermum sinuatum*

*Othonna arborescens*

*Othonna coronopifolia*

*Othonna cylindrica*

*Othonna perfoliata*

*Pteronia divaricata*

*Pteronia onobromoides*

*Pteronia ovalifolia*

*Pteronia uncinata*

*Relhania rotundifolia*

*Relhania tricephala*

*Senecio abruptus*

*Senecio aloides*

*Senecio arenarius*

*Senecio burchellii*

*Senecio cf. hastatus*

*Senecio elegans*

*Senecio glabrifolius*

*Senecio halimifolius*

*Senecio littoreus*

*Senecio maritimus*

*Senecio pterophorus*

*Senecio succulentus*

*Sonchus oleraceus*

*Steirodiscus tagetes*

*Stoebe plumosa*

*Troglophyton parvulum*

*Ursinia anthemoides anthemoides*

## 7.4 Species list – Redlisted species

### Appendix 7.4. Checklist of Red Data Book species recorded in West Coast National Park

Used Hilton Taylor 1996 and \* Victor (2002) for plants, IUCN Redlist (2006) for fish and reptiles, Barnes (2000) for birds and Friedmann & Daly (2004) for mammals.

#### Scientific name

#### Common name

##### Plants

##### Rare

*Aloe distans*

*Felicia elongata*

*Ixia purpureorosea*

*Juncus krausii* (rare for area)

*Leucospermum tomentosum*

*Phillipia chamissonia* (rare for this area)

##### Vulnerable

*Gethyllis ciliaris*

*Hessea chaplinii*

*Hessa mathewsii*

*Lachenalia viridiflora*

*Limonium acuminatum*

*Romulea elliptica*

*Romulea saldanhensis*

##### Indeterminate

*Agathosoma thymifolia*

*Geissorhiza lewisae*

*Gladiolus gracilis* var *latifolius*

*Oxalis subsessilis*

*Limonium capense*

*Muraltia harveyana*

*Oxalis burtoniae*

*Phylica greyii*

*Watsonia hysterantha*

##### Uncertain

*Ferraria densepuctulata*

*Senecio succulentus*

##### Fish

##### Vulnerable

*Squalus acanthias*

Piked dogfish

##### Near-Threatened

*Poroderma africanum*

Pyjama shark

*Triakis megalopterus*

Spotted gullyshark

##### Reptiles

##### Critically Endangered

*Dermochelys coriacea* #

Leatherback sea turtle

##### Endangered

*Caretta caretta* #

Loggerhead Sea turtles

##### Birds

##### Endangered

*Sterna dougallii*

Roseate tern

*Sterna balaenarum*

Damara tern



**Appendix 7.4.** continued

**Scientific name**

**Common name**

Vulnerable

*Spheniscus demersus*  
*Diomedea exulans*  
*Diomedea cauta*  
*Diomedea chrysostoma*  
*Morus capensis*  
*Phalacrocorax neglectus*  
*Circus ranivorus*  
*Anthropoides paradiseus*

African penguin  
Wandering albatross  
Shy albatross  
Greyheaded albatross  
Cape gannet  
Bank cormorant  
African marsh harrier  
Blue crane

Near-Threatened

*Diomedea melanophris*  
*Diomedea chlororhyncus*  
*Macronectes giganteus*  
*Macronectes halli*  
*Procellaria aequinoctialis*  
*Pelecanus onocrotalus*  
*Phalacrocorax capensis*  
*Phalacrocorax coronatus*  
*Ciconia nigra*  
*Phoenicopterus ruber*  
*Phoenicopterus minor*  
*Sagittarius serpentarius*  
*Circus maurus*  
*Falco peregrinus*  
*Falco biarmicus*  
*Haematopus moquini*  
*Charadrius pallidus*  
*Glareola nordmanni*  
*Hydropogne caspia*

Blackbrowed albatross  
Yellow-nosed albatross  
Southern giant petrel  
Northern giant petrel  
White-chinned petrel  
White pelican  
Cape cormorant  
Crowned cormorant  
Black stork  
Greater flamingo  
Lesser flamingo  
Secretary bird  
Black harrier  
Peregrine falcon  
Lanner falcon  
African black oystercatcher  
Chestnutbanded plover  
Blackwinged pratincole  
Caspian tern

**Mammals**

Vulnerable

*Damaliscus dorcas dorcas*  
*Eremitalpa granti*  
*Equus zebra zebra*

Bontebok  
Grant's golden mole  
Cape mountain zebra

Near-Threatened

*Mellivora capensis*  
*Rhinolophus clovisus*  
*Rhinolophus capensis*

Honey badger  
Geoffroy's horseshoe bat  
Cape horseshoe bat

## 7.5 Species list – Marine invertebrates

**Appendix 7.5.** Checklist of marine invertebrate species recorded in Saldanha Bay (SB) and Langebaan Lagoon (LL). Source: B = Barkai & Branch (1988); D = Day (1959); G = Grindley (1977); M = Christie & Moldan (1977); N = Millar (1962); P = Puttick (1977); W = Wynberg (1991). Abundance at localities C = common, FC = fairly common, P = present.

Species	SB	LL	Species	SB	LL
<b>Porifera</b>			<b>Coelenterata; Hexacoralia</b>		
<i>Chondrosia reniformis</i>		P	<i>Actinia equina</i>	P	C
<i>Ciocalyptra alleni</i>		P	<i>Anthothoe stimpsoni</i>	C	C
<i>Dysidea fragilis</i> (?)		P	<i>Bunodactis reynaudi</i>	C	C
<i>Geodia littoralis</i>		P	<i>Bunodosoma capensis</i>	C	C
<i>Haliclona anonyma</i>		P	<i>Corynactis annulata</i>	FC	FC
<i>Haliclona hospitalis</i> (?)		P	<i>Isanthus capensis</i>		P
<i>Hymeniacedon perlevis</i>	C	C	<i>Pseudactinia flagellifera</i>	FC	C
<i>Leucosolenia coriacea</i>		P			
<i>Leucosolenia</i> sp		P	<b>Platyhelminthes</b>		
<i>Myxilla arenaria</i> (?)		P	<i>Notoplana patellarum</i>		FC
<i>Oceanapia polysiphonia</i> (?)		P			
<i>Polymastia mammillaris</i>	P	P	<b>Nemertea</b>		
<i>Tethya auratia</i>		P	<i>Amphiporus pulcher</i> (?)	P	
			<i>Cerebratulus aerugatus</i> (?)	P	
<b>Coelenterata: Hydrozoa</b>			<i>Cerebratulus fuscus</i>	FC	
<i>Aglaophenia pluma</i>	P	P	<i>Emplectonema ophiocepalum</i> (?)	P	
<i>Beroe</i> sp		P	<i>Lineus bilineatus</i> (?)	P	
<i>Staurocladia (Cnidonema) vallentini</i>		P	<i>Lineus ruber</i> (?)	P	
			<i>Tetrastemma candidum</i> (?)	P	
<b>Coelenterata: Hydrozoa</b>			<i>Tetrastemma nigrolineatum</i> (?)	P	
? <i>Dinophyes</i>		P	<i>Tubulanus nothus</i> (?)	C	
<i>Hydractinia altispina</i>	P	P	<i>Zygonemertes capensis</i>	P	
<i>Pleurobrachia</i> sp ( <i>pileus</i> )		P			
<i>Hydractinia marsupialis</i>		P	<b>Polyzoa</b>		
<i>Kirchenpaueria pinnata</i>	P	P	<i>Alcyonidium nodosum</i>	P	P
<i>Obelia dichotoma</i>		P	<i>Beania inermis</i> (?)		P
<i>Obelia geniculata</i>	P	P	<i>Bugula calathus</i> (?)	P	P
<i>Gattya (Paragattya) intermedia</i>	P	P	<i>Bugula neritina</i>	P	P
<i>Plumularia lagenifera</i>		P	<i>Bugula avicularia?</i> ( <i>Cellepora avicul.</i> )		P
<i>Plumularia setacea</i>	P	P	<i>Celleporella hyalina</i>		P
<i>Salacia articulata</i>	P	P	<i>Chaperia acanthina</i>	P	P
<i>Sertularella africana</i>		P			
<i>Symplectoscyphus macrogonus</i>		P	<b>Polyzoa</b>		
<i>Zyzyzus solitarius (Turbularia solit.)</i>	P	P	<i>Dakaria suboviodea</i> (?)		FC
<i>Turbularia warreni</i>		P	<i>Electra (pilosa) verticillata</i>	P	FC
			<i>Menipea triseriata</i>		P
<b>Coelenterata; Octocoralia</b>			<i>Reteporella (Retepora)</i>		
<i>Parerythropodium wilsoni</i>		P	<i>Rhaphonotus inermis</i> (?)		P
<i>Virgularia schultzei</i>		FC	<i>Schizoretepora</i> sp ( <i>Schizoporella</i> sp.)		P
			<i>Smittina ? landsborovii</i> (?)		P

Appendix 7.5 continued

Species	SB	LL	Species	SB	LL
<b>Chaetognatha</b>			<b>Annelida: Polychaeta continued</b>		
<i>Sagitta friderici</i>	P	P	<i>Lysidice natalensis</i>	FC	P
<i>Podon polyphemoides</i>	FC	P	<i>Marphysa capensis</i>	FC	P
<b>Brachiopoda</b>			<i>Marphysa depressa</i>		P
<i>Kraussina sp.</i>		P	<i>Marphysa sanguinea</i>		P
<b>Annelida: Polychaeta</b>			<i>Mediomastus capensis</i>		
<i>Antinoe lactea</i>		FC	<i>Myrianida phyllocera</i>		P
<i>Arabella iricolor v caerulea</i>	P	P	<i>Naineris laevigata</i>	FC	P
<i>Arenicola africana (assimilis) affinis</i>		FC	<i>Nematonereis unicornis</i>		P
<i>Arenicola loveni</i>		FC	<i>Nephtys capensis</i>		FC
<i>Boccardia ligerica (?)</i>		P	<i>Nephtys hombergi</i>		P
<i>Timarete capensis (Audouinia austr )</i>	FC	FC	<i>Nephtys sphaerocirrata</i>		P
<i>Timarete (Audouinia) tentaculata</i>	P	FC	<i>Nereis caudata</i>		P
<i>Autolytus tuberculatus</i>		P	<i>Nereis operta</i>	P	P
<i>Ceratonereis erythraeensis</i>		P	<i>Nereis cirratulus</i>		P
<i>Chaetopterus varieopedatus</i>			<i>Nicolea macrobranchia</i>	FC	FC
<i>Cirratulus chrysoderma</i>	P	P	<i>Nicomanche lumbricalis</i>		P
<i>Euclymene (Clymene) glandularis</i>		P	<i>Notomastus latericeus</i>		FC
<i>Euclymene (Clymene) luderitziana</i>	P	FC	<i>Odontosyllis polycera</i>	P	P
<i>Euclymene (Clymene) lombricoides</i>		P	<i>Orbinia angrapequensis</i>		FC
<i>Macroclymene (Clymene) saldanha</i>		P	<i>Orbinia dayi (?)</i>		P
<i>Dasybranchus bipartitus</i>	P		<i>Phylo (Orbinia) foetida v lingustica</i>		P
<i>Branchiomma (Dasych.) natalensis</i>	P	FC	<i>Desdemona ornata (Oridia parvula)</i>		P
<i>Branchiomma (Dasychone) violacea ?</i>		P	<i>Pectinaria capensis</i>		
<i>Diopatra monroi</i>	P	P	<i>Perinereis nuntia v vallata</i>		FC
<i>Diopatra sp</i>	P	P	<i>Perinereis falsovariegata</i>	P	FC
<i>Dodecaceria pulchra</i>	FC	FC	<i>Petaloproctus terricola</i>		P
<i>Schistomeringos (Dorvillea) neglecta</i>		P	<i>Pista quadrilobata (qolora)</i>		
<i>Ephesiella (Ephesia) gracilis</i>	P		<i>Phyllochaetopterus socialis</i>	P	P
<i>Eteone foliosa</i>			<i>Phyllodoce castanea</i>		P
<i>Eulalia (Eumida) sanguinea</i>			<i>Platynereis australis</i>	P	P
<i>Eulalia cf. trilineata</i>	P		<i>Platynereis dumerlii</i>	FC	FC
<i>Eulalia (viridis v ) capensis</i>		P	<i>Polycirrus tenuisetis</i>	P	
<i>Eunice aphroditois</i>	FC	FC	<i>Polydora antennata</i>		
<i>Eunoe assimilis</i>		P	<i>Polydora cf ciliata</i>	FC	
<i>Euphrosine capensis</i>		P	<i>Polydora flava</i>		LA
<i>Exogone verugera</i>	P		<i>Polydora hoplura</i>	C	
<i>Flabelligera affinis</i>		P	<i>Polynoe erythrotaenia</i>		P
<i>Glycera tridactyla (G.convoluta)</i>	P	FC	<i>Polynoe scolopendrina</i>		P
<i>Gunnarea capensis</i>	C	FC	<i>Potamilla reniformis</i>	FC	
<i>Harmothoe aequiseta</i>	P	P	<i>Prionospio sexulata</i>		P
<i>Harmothoe fraser-thomsoni</i>	P	P	<i>Procerastea perrieri</i>	FC	
<i>Harmothoe saldanha</i>			<i>Branchiomaldane vincenti (Protocap.)</i>		P
<i>Harmothoe (Lagisa) waahli</i>	P	P	<i>Protula tubularia v anomala</i>		P
<i>Caulleriella (Heterocirrus) capensis</i>	P	P	<i>Pseudonereis variegata</i>	P	
<i>Lepidonotus semitectus clava</i>	FC	FC	<i>Scalisetosus fragilis (pellucidus)</i>	P	P
<i>Lumbrineris coccinea</i>	FC	P	<i>Scolecopsis squamata</i>		P
<i>Lumbrineris heteropoda</i>	P		<i>Scoloplos johnstonei</i>		P
<i>Lumbrineris tetraura</i>	P	FC	<i>Spermosyllis capensis</i>		P
<i>Namanereis (Lycastis) quadraticeps</i>		P	<i>Spio filicornis</i>		FC
			<i>Spirorbis patagonicus</i>	C	FC
			<i>Sthenelais boa</i>		P

Appendix 7.5 continued

Species	SB	LL	Copepoda continued	SB	LL
<b>Annelida: Polychaeta continued</b>			<i>Nannocalanus minor</i> P		
<i>Piromis (Stylarioides) arenosus</i>	P	P	<i>Oithoma brevicornis (O. nana)</i>		P
<i>Pherusa (Stylaroides) monroi</i>		P	<i>Oithoma similis</i>	C	FC
<i>Syllidia armata</i>	P	P	<i>Paracalanus crassirostris</i>	C	C
<i>Syllis armillaris</i>	P	P	<i>Paracalanus parvus</i>	P	P
<i>Syllis variegata</i>	C	P	<i>Porcellidium sp.</i>		P
<i>Telothelepus capensis</i>		FC	<i>Pseudodiaptomus hessei</i>	P	C
<i>Terebella pterochaeta</i>		P	<i>Pseudodiaptomus nudus</i>	P	
<i>Terebella schmardai</i>	P	P	<i>Rhincalanus nasutus</i>	P	P
<i>Timarete (Cirriformia) tentaculata</i>		FC	<i>Saphirella stages</i>	C	FC
<i>Thelepus pequenanus</i>	P	FC	<i>Tortanus capensis</i>	P	P
<i>Trypanosyllis gemmulifera</i>		P	<i>Tegastes sp.</i>	P	P
<i>Vermiliopsis glandigerus</i>		P			
<b>Annelida: Echiuroidea &amp; Sipunculoidea</b>			<b>Crustacea: Leptostraca</b>		
<i>capensis</i>		P			<i>Nebalia</i>
<i>Dendrostoma minor (?)</i>	P	P			
<i>Ochetostoma capense</i>	FC		<b>Crustacea: Amphipoda</b>		
<i>Golfingia capensis</i>	P	FC	<i>Afrochiltonia capensis</i>		P
<i>Phascolosoma japonicum</i>		P	<i>Amaryllis macrophthalma</i>	P	P
			<i>Ampelisca anomala</i>	P	
<b>Annelida: Hirudinea</b>			<i>Ampelisca diadema</i>	P	P
<i>Branchellion sp (parasite)</i>					FC
			<i>Ampithoe falsa</i>		P
<b>Crustacea: Cirripedia</b>			<i>Ampithoe ramondi</i>		P
<i>Notomegabalanus (Balanus) algicola</i>	C	C	<i>Aora sp. (A. typica)</i>	P	
<i>Balanus amphitrite v denticulata</i>	P	C	<i>Aristias symbiotica</i>	P	P
<i>Austromegabalanus cylindricus )</i>	C	C	<i>Atylus guttatus</i>		P
<i>Balanus trigonus</i>	P		<i>Atylus swammerdami</i>		P
<i>Chthamalus dentatus</i>	P		<i>Austrochiltonia subtenius</i>		P
<i>Octomeris angulosa</i>	C	C	<i>Bathyporeia sp. (B. gracilis)</i>		P
<i>Tetraclita serrata</i>	C	C	<i>Calliopiella michaelsoni</i>		P
<b>Ostracoda</b>			<i>Caprella cicur</i>	P	P
<i>Astropteron dayii</i>	P	P	<i>Caprella danilevski</i>		P
<i>Cycloleberis christiei</i>	P	P	<i>Caprella equilibra</i>	P	P
<i>Physocypria capensis</i>	P	P	<i>Caprella penantis</i>		P
<i>Synasterope sp.</i>	P	P	<i>Caprella scaura</i>	P	P
			<i>Caprellina longicollis</i>	P	FC
<b>Crustacea: Copepoda</b>			<i>Caprellina spiniger</i>	P	P
<i>Acrocalanus sp.</i>	P		<i>Ceradocus rubromaculatus</i>	C	FC
<i>Arcartia (Pararcartia) africana</i>	C	C	<i>Cheiriphotis magacheles</i>		FC
<i>Arcartia (Pararcartia) longipatella</i>		FC	<i>Colomastix sp.</i>		P
<i>Calanoides carinatus</i>	P	P	<i>Corophium acherusicum</i>		P
<i>Centropages brachiatus</i>	FC	P	<i>Corophium triaonyx</i>		P
<i>? Clausidium sp.</i>	P	FC	<i>Cunicus profundus</i>		
<i>Corycaeus sp.</i>	P		<i>Exampithoe natalensis (Cymadusa )</i>	P	P
<i>Ctenocalanus vanus</i>	P	P	<i>Cymadusa filosa</i>		
<i>Euterpina acutifrons</i>	P	P	<i>Elasmopus affinis</i>	FC	FC
<i>Halicyclops spp.</i>	P	FC	<i>Erichthonius brasiliensis</i>	P	
<i>Harpacticus sp.</i>	P	FC	<i>Gitanopsis pusilla</i>		P
<i>Hemicyclops spp.</i>	P	FC	<i>Grammaropsis (Eurystheus) atlanticus</i>		FC
			<i>Grammaropsis (Eurystheus) holmesi</i>		P

Appendix 7.5 continued

Species	SB	LL	Species	SB	LL
<b>Amphipoda continued</b>			<b>Crustacea: Isopods</b>		
<i>Hippomendon normalis</i>		FC	<i>Antias uncinata</i>		P
<i>Eusiroides monoculoides</i>		P	<i>Cirolana hirtipes</i>		P
<i>Gitanopsis pusilla</i>	P		<i>Cirolana parva</i>	P	
<i>Hyale grandicornis</i>		P	<i>Cirolana rugicauda</i>		P
<i>Hyale hirtipalma</i>	LC		<i>Cirolana saldanhae</i>		P
<i>Hyale maroubrae</i>		P	<i>Cirolana sulcata</i>	FC	FC
<i>Hyale saldanha</i>	P	FC	<i>Cirolana venusticauda</i>	FC	P
<i>Iphimedia capicola</i>		P	<i>Cirolana venusticauda v simplex</i>		P
<i>Jassa falcate</i>	P	P	<i>Cyathura estuarina ? (C. carinata)</i>		P
<i>Laetmatophilus tridens</i>		P	<i>Cymodoce setulosa</i>		FC
<i>Lemboides afer</i>		P	<i>Cymodoce uncinata</i>		P
<i>Lemboides crenatipalma</i>		P	<i>Cymodoce unguiculata</i>		P
<i>Lembos hirsutipes</i>	P		<i>Cymodoce valida</i>	P	P
<i>Pseudomegamphopus jassopsis</i>	P	C	<i>Cymodocella pustulata</i>		P
<i>Leucothoe richiardi</i>	P	P	<i>Cymodocella sublevis</i>		P
<i>Leucothoe spinicarpa</i>		P	<i>Deto echinata</i>	FC	P
<i>Lysianassa ceratina</i>	FC	FC	<i>Dynamenella australis</i>	LC	
<i>Lysianassa variegata</i>	P	P	<i>Dynamenella huttoni</i>	C	P
<i>Maera hironellei</i>		P	<i>Dynamenella ovalis</i>	P	P
<i>Maera inaequipes</i>	P		<i>Eurydice longicornis</i>	P	
<i>Maera vagans</i>		P	<i>Exosphaeroma antikraussii</i>		P
<i>Megaluropus agilis</i>			<i>Exosphaeroma hylecoetes</i>	P	
<i>Melita orgasmos</i>		P	<i>Exosphaeroma kraussii</i>		FC
<i>Melita zeylancia</i>			<i>Exosphaeroma pallidum</i>		P
<i>Nototropis guttatus</i>	FC		<i>Exosphaeroma planum</i>	P	P
<i>Orchomene (Orchomenella) plicata</i>			<i>Exosphaeroma porrectum</i>	P	P
<i>Paramoera capensis</i>	C	FC	<i>Exosphaeroma truncatitelson</i>	P	P
<i>Paraphoxus oculatus</i>			<i>Glyptidotea lichtensteini</i>		P
<i>Periocolodes longimanus</i>			<i>Gnathia africana</i>		P
<i>Phtisica marina</i>			<i>Gnatholana mandibularis</i>	FC	
<i>Podocerus inconspicuus (P. cristalus)</i>		P	<i>Haliophasma coronicauda</i>		P
<i>Podocerus inconspicuus</i>	P		<i>lais pubescens</i>	P	
<i>Polycheria atollii</i>	FC	FC	<i>Idotea indica</i>	P	
<i>Talorchestia australis</i>	C		<i>Idotea ziczac</i>	P	
<i>Orchestia gammarella (Talor- inaeq.)</i>	P		<i>Jaeropsis curvicornis</i>	P	
<i>Talorchestia quadrispinosa</i>	FC	FC	<i>Janira falcifera? (J. capensis)</i>	P	P
<i>Temnophilias capensis</i>	P		<i>Janira extans</i>		P
<i>Hippomedon (Typhosa) onconotus</i>		P	<i>Janiroopsis (Janiroopsis) palpalis</i>	P	P
<i>Urothoe elegans</i>		P	<i>Lanocira gardineri</i>	FC	FC
<i>Urothoe grimaldii</i>		FC	<i>Leptanthura laevigata</i>		P
<i>Urothoe pulchella</i>		FC	<i>Ligia dilatata v gracilior</i>	C	C
<b>Crustacea: Tanaidacea</b>			<i>Marioniscus spatuliformis</i>		P
<i>Leptocheilia savignyi</i>	FC	P	<i>Mesathura catenula</i>	P	
<i>Parapseudes spongicola</i>	P		<i>Paramunna concavifrons (?)</i>	P	
<i>Tanais annectans</i>		P	<i>Panathura serricauda</i>	FC	P
<i>Tanais philetaerus</i>	P	P	<i>Paranthura punctata</i>	FC	
<i>Tanaiomera columbina (?)</i>	P		<i>Paridotea unguolata</i>		FC
<i>Leptocheilia timida (?)</i>	P		<i>Parisocladus perforatus</i>	P	FC
			<i>Parisocladus stimpsoni</i>		P
			<i>Pontogeloides laticeps</i>		FC
			<i>Rocinela dumerilli</i>		P

Appendix 7.5 continued

Isopods continued	SB	LL	Crustacea: Brachyura	SB	LL
<i>Sphaeramene polytylotos</i>			<i>Pilumnus hirsutus</i>	P	P
<i>Steretrium crassimanus</i>	P		<i>Plagusia chabrus</i>	P	P
<i>Synidotea hirtipes</i>	C	P	<i>Pseudodromia latens</i>	FC	
<i>Tylos granulatus</i>	C	C	<i>Thaumastoplax spiralis</i>		
<b>Crustacea: Mysidacea</b>			<b>Insecta</b>		
<i>Gastrosaccus brevifissura</i>	P	FC	<i>Anurida maritima</i>	FC	FC
<i>Gastrosaccus psammodytes</i>		FC	<i>Philonthus sp</i>	FC	
<i>Mesopodopsis africanus</i>		P	<i>Fucellia (Xanthocanace) capensis</i>	FC	FC
<i>Mesopodopsis slabberi</i>	P	P			
<i>Mysidopsis similis</i>	P	P	<b>Arachnida</b>		
<i>Rhopalophthalmus terranatalis</i>		P	<i>Achelia quadridentata</i>	P	
<i>Siriella dayii (?)</i>	P	P	<i>Desis formidabilis (D. tubicola)</i>	P	P
			<i>Hannonia typica (?)</i>		P
<b>Cumacea</b>			<i>Nymphopsis cuspidata</i>		P
? <i>Eocuma foveolatum</i>		P	<i>Queubus jamesanus</i>	P	
<i>Iphinoe capensis (I. brevidactyla)</i>		P	<i>Tanystylum breviceps</i>	P	P
? <i>Nannastacan</i>		P			
<i>Pseudocuma longicornis</i>	P	P	<b>Mollusca: Amphineura</b>		
			<i>Acanthochiton garnoti</i>	FC	C
<b>Crustacea: Macrura</b>			<i>Chaetopleura papilio</i>	P	P
<i>Betaeus jucundus</i>	P	P	<i>Chiton nigrovirescens</i>	P	C
<i>Hippolyte kraussiana</i>	P	P	<i>Chiton tulipa</i>		P
<i>Jasus lalandii</i>	FC		<i>Ischnochiton bergoti (I. hewitti)</i>	P	P
<i>Macropetasma africana</i>	P		<i>Ischnochiton textilis</i>		P
<i>Ogyrides saldanhae</i>	P	P	<i>Ischnochiton oniscus (I. tigrinus)</i>		P
<i>Palaemon pacificus</i>	C	FC			
<i>Alpheus crassimanus (Synalpheus )</i>	P	P	<b>Mollusca: Pelecypoda</b>		
			<i>Aligena ovalis (?)</i>		P
<b>Crustacea: Anomura</b>			<i>Barbatia obliquata (B. decussata)</i>		P
<i>Callianassa kraussi</i>		C	<i>Melliteryx (Bornia) fortidentata (?)</i>		P
<i>Callianassa rotundicaudata</i>		P	<i>Carditella rugosa</i>	P	FC
<i>Diogenes brevirostris</i>	P	C	<i>Donax serra</i>	P	P
<i>Paguristes engyops</i>	P	FC	<i>Limaria (Lima) rotundata</i>		P
<i>Paguristes gamianus</i>	P	P	<i>Lasaea adansoni turtoni (Kellya rubra)</i>		
	P				
<i>Porcellana streptocheles</i>	P	P	<i>Macoma ordinaria</i>		
<i>Upogebia africana</i>		LC	<i>Mactra glabrata (M. adansoni)</i>		P
<i>Upogebia capensis</i>	FC	P	<i>Aulacomya ater ? (Mytilus crenatus)</i>	A	FC
			<i>Choromytilus (Mytilus) meridionalis</i>	A	FC
<b>Crustacea: Brachyura</b>			<i>Mytilus galloprovincialis</i>	C	
<i>Cleistostoma algoense</i>			<i>Perna perna (Mytilus perna)</i>	P	
<i>Cleistostoma edwardsii</i>		FC	<i>Nucula (sp.) nucleus</i>		FC
<i>Cryptodromiopsis spongiosa</i>	P	FC	<i>Ostrea atherstonei</i>	P	P
<i>Cyclograpsus punctatus</i>	C	C	<i>Venerupis (Tapes) corrugatus</i>	FC	FC
<i>Dehaanius dentatus</i>	P		<i>Tellina gilchristi</i>		P
<i>Dromidia hirsutissima</i>	P	P	<i>Tellina trilatera (T. triangularis)</i>		FC
<i>Hymenosoma orbiculare</i>	FC	FC	<i>Thecalia concamerata</i>	P	A
<i>Macropodia falcifera</i>		P	<i>Ungulina sp. (?)</i>		P
<i>Nautilocorystes ocellata</i>		P	<i>Venus verrucosa v. capensis</i>		P
<i>Ovalipes trimaculatus (O. punctatus)</i>		P			
<i>Philyra punctata</i>	P	P			
<i>Pilumnoides perlatus</i>	C	FC			

Appendix 7.5 continued

<b>Gastropoda: Prosobranchiata</b>	<b>SB</b>	<b>LL</b>	<b>Gastropoda: Prosobranchiata</b>	<b>SB</b>	<b>LL</b>
<i>Afrocominella capensis</i> (A. lacertina)	P	P	<i>Scutellastra</i> (Patella) <i>argenvillei</i>	C	P
<i>Dendrofissurella</i> (Amblych.) <i>scutellum</i>	FC	C	<i>Scutellastra</i> (Patella) <i>barbara</i>	C	FC
<i>Argobuccinum pustulosum</i> (A. argus)	P	FC	<i>Scutellastra</i> (Patella) <i>cochlear</i>	C	FC
<i>Assimineea globulus</i>		FC	<i>Cymbula</i> (Patella) <i>compressa</i>	P	P
<i>Assimineea ovata</i> (isosceles) (?)		C	<i>Cymbula</i> (Patella) <i>granatina</i>	C	C
<i>Bullia annulata</i>	P	P	<i>Scutellastra</i> (Patella) <i>granularis</i>	A	C
<i>Bullia digitalis</i>		FC	<i>Cymbula</i> (Patella) <i>miniata</i>	P	P
<i>Bullia laevisissima</i>	P	FC	<i>Cymbula</i> (Patella) <i>oculus</i>	C	C
<i>Burnupena cincta</i>	C	C	<i>Nucella</i> (Purpura) <i>wahlbergi</i>		P
<i>Burnupena catarrhacta</i> (B. delalandii)	C	C	<i>Anachis</i> (Pyrene) <i>kraussii</i>	FC	P
<i>Burnupena papyracea</i>	P	P	<i>Siphonaria aspera</i>	FC	C
<i>Burnupena lagenaria</i> (B. tigrina)			<i>Siphonaria capensis</i>	P	P
<i>Calyptraea chinensis</i> (C. capensis)		P	<i>Siphonaria compressa</i> n sp		FC
<i>Clionella</i> (Clavatula) <i>sinuata</i>	P	C	<i>Natica tecta</i> (Tectonatica <i>genuana</i> )	P	FC
<i>Conus mozambicus</i> (C. elongatus)	P	P	<i>Nucella cingulata</i> (Thias <i>cingulata</i> )	P	P
<i>Coriandria nigra</i> (?)	P		<i>Nucella dubia</i> (Thias <i>dubia</i> )	C	FC
<i>Coriandria cf gisia</i>		FC	<i>Nucella squamosa</i> (Thias <i>squamosa</i> )		FC
	P				
<i>Crepidula porcellana</i> (C. hepatica)	C	C	<i>Tellimya trigonia</i> (sp.)		P
<i>Crepidula aculeata</i> (C. rugulosa)	P	P	<i>Demoulia</i> (Tommichia) <i>ventricosa</i>		FC
<i>Cabestana cutaceum v africanum</i>		P	<i>Tricolia capensis</i>	P	P
<i>Cinysca</i> (Cynisca) <i>granulosa</i>		P	<i>Tricolia kraussii</i> (?)	P	
<i>Demoulia abbreviata</i>		P	<i>Tricolia neritina</i>	P	P
<i>Fissurella mutabilis</i> (Diodora)	P	P	<i>Tritonalia puncturata</i> (T. scrobiculata)		
	P				
<i>Diodora parviforata</i>		P	<i>Cingulina</i> (Turbonilla) <i>trachealis</i>		P
<i>Austrodrillia</i> (Drillia) <i>hottentota</i>		P	<i>Turbonilla kraussi</i>	P	FC
<i>Drillia sp</i> (?)		P	<i>Protomela capensis</i> (T. knysnaensis)		
	FC				
<i>Fasciolaria lugubris</i>	P	P	<i>Serpula vermicularis</i> (Vermetus coral.)		
	C				
<i>Fusinus ocelliferus</i> (Fusus <i>verrucul.</i> )		P	<i>Serpulorbis natalensis</i> (Vermetus nat.)		P
	C				
<i>Trimusculus</i> (Gadinia) <i>costatus</i>	P	P			
<i>Gibbula beckeri</i>		P	<b>Gastropoda: Opisthobranchs</b>		
<i>Gibbula capensis</i>	P		<i>Berthellina citrina</i> (Berthella <i>granulata</i> )		
	P				
<i>Gibbula cicer</i>	P	FC	<i>Philina aperta</i>	P	P
<i>Gibbula zonata</i> (rosea)		P	<i>Polycera capensis</i> (P. <i>nigrocrocea</i> )		P
<i>Haliotis midae</i>	P	P			
<i>Heliccion dunkeri</i>	P		<b>Mollusca: Cephalopoda</b>		
<i>Heliccion pectunculus</i>	C	FC	<i>Aphrodoctopus schultzi</i> (Eledone sp.)		
<i>Heliccion pruinus</i>	P	P	<i>Sepia typica</i> (Hemisepius <i>typicus</i> )	FC	P
<i>Hydrobia sp.</i>		P	<i>Octopus granulatus</i>	P	
<i>Nodilittorina africana knysnaensis</i>	A	C	<i>Octopus vulgaris</i> (O. <i>rugosus</i> )	P	P
<i>Littorina glabrata</i> (L. <i>punctata</i> )		FC	<i>Sepia vermiculata</i>	FC	
<i>Volvarina zonata</i> (Marginella <i>biannul.</i> )		FC			
<i>Volvarina</i> (Marginella) <i>capensis</i>		P	<b>Echinodermata: Asteroidea</b>		
<i>Marginella rosea</i>		P	<i>Patiriella exigua</i> (Asterina <i>exigua</i> )	C	C
<i>Mitra picta aerumnosa</i>	P	P	<i>Henericia ornata</i>	FC	P
<i>Nassarius kraussianus</i>		FC	<i>Marthasterias glacialis</i>	FC	
<i>Nassarius speciosus</i>		FC	<i>Patiria granifera</i>	P	P
<i>Nassarius plicatellus scopularcus</i>		FC			
<i>Natica gualteriana</i>		P			
<i>Oxystele tigrina</i>	C	C			
<i>Oxystele variegata</i>	C	C			
<i>Oxystele zonata</i> (?)	P	P			

**Appendix 7.5** continued

<b>Echinodermata: Ophiuroidea</b>	<b>SB</b>	<b>LL</b>
<i>Amphipholis squamata</i>	FC	P
<i>Amphiura capensis</i>	P	P
<i>Ophiactis carnea</i>	P	
<i>Ophiarachnella capensis</i>		P
<i>Ophioderma wahlbergi</i> ( <i>O. leonis</i> )	P	LC
<i>Ophiothrix fragilis</i> ( <i>O. triglochis</i> )	FC	FC-C
<b>Echinodermata: Echinoidea</b>		
<i>Parenchinus angulosus</i>	C	FC
<b>Echinodermata: Crinoidea</b>		
<i>Annametra occidentalis</i>		P
<b>Echinodermata: Holothuroidea</b>		
<i>Cucumaria frauenfeldii</i>	C	P
<i>Pseudocnella (Cucumaria) insolens</i>	C	C
<i>Pentacta doliolum</i>	C	FC
<i>Taeniogyrus dayi</i> (?)	P	P
<i>Thyone aurea</i>	C	FC
<b>Chordata: Enteropneusta</b>		
<i>Balanoglossus capensis</i>		FC
<b>Chordata: Tunicata</b>		
<i>Ascidia sydneyensis</i>		P
? <i>Botrylloides leachi</i>	P	
<i>Botryllus anomalus</i>	P	
<i>Botryllus magnicoecum</i>	P	P
<i>Botryllus schlosseri</i> (?)	P	P
<i>Ciona intestinalis</i>	P	
<i>Corella eumyota</i>		P
<i>Cnemidocarpa asymmetra</i>		P
? <i>Didemnum stilense</i>		P
<i>Diplosoma listerianum</i>	P	P
<i>Eudistoma illotum</i>		P
<i>Microcosmus oligophyllus</i>		P
<i>Mogula scutata</i>	P	P
<i>Pyura stolonifera</i>	A	C
<i>Styela pupa</i> (?)	P	P
<i>Trididemnum cerebriforme</i>	P	P
<b>Species - Phylum unknown</b>		
<i>Lepton fortidentata</i>		P
<i>Asteropteron nodulosum</i>		P
<i>Haliophasma sp.</i>		P
<i>Cyclolebris galathea</i>		P
<i>Paraphoxus oculatus</i>		P



## 7.6 Species list – Fish

**Appendix 7.6.** A checklist of marine fish species recorded in Saldanha Bay (SB) and Langebaan Lagoon (LL) Key: Source D = Day (1959); C = Clark (1997).

Abundance at localities: C = common, FC = fairly common, P = present

Red Data Book Status from IUCN Redlist (2006), V = vulnerable, NT = Near-Threatened

<b>Chondrichthyes</b>	<b>Common name</b>	<b>Source</b>	<b>SB</b>	<b>LL</b>	<b>RDB status</b>
<i>Callorhynchus capensis</i>	Soupin shark		D, C	P	P
<i>Dasyatis pastinaca</i>	Blue stingray	D		P	
<i>Mustelus mustelus</i>	Smooth-hound	C		P	
<i>Mustelus palumbus</i>	Wh-spotted sm-hound	D		P	
<i>Myliobatis aquila</i>	Eagle ray	D		FC	
<i>Poroderma africana</i>	Striped catshark	C	P		NT
<i>Rhinobatos annulatus (R. blochii)</i>	Lesser guitarfish	D, C		C	
<i>Squalus acanthias</i>	Piked dogfish	D		P	V
<i>Torpedo fuscomaculata (T. marmorata)</i>	Bl-spotted electric ray	D		P	
<i>Triakis megalopterus (Mustelus nigro.)</i>	Spotted gullyshark	D		FC	NT
<b>Osteichthyes</b>					
<i>Antherina breviceps</i>	Cape silverside	D, C,G	P	P	
<i>Apletodon pellegrini</i>	Chubby clingfish	C	P		
<i>Batrachthys (Gymnobatrachus) apiatus</i>	Snakehead toadfish	D		P	
<i>Blennophis anguillaris</i>	Lace klipfish	D		P	
<i>Caffrogobius (Gobius) nudiceps</i>	Barehead goby	D, C		FC	
<i>Caffrogobius caffer</i>	Banded goby	C	FC		
<i>Cancellopus (longior) burrelli</i>	Slender platanna kl-fish	C	P		
<i>Caffrogobius (Gobius) saldanha</i>	Commafin goby	D			
<i>Chaetodon marleyi</i>	Doublesash butterflyfish	D, C		P	
<i>Chelidonichthyes capensis</i>	Cape gurnard	C			
<i>Chorisochismus dentex</i>	Rocksucker	D		P	
<i>Clinus (Blenniomius) cottoides</i>	Bluntnose klipfish	D		P	
<i>Clinus agilis (Ophthalmolophis anne)</i>	Agile klipfish	D, C		P	
<i>Clinus latipennis</i>	False Bay klipfish	C			
<i>Clinus superciliosus</i>	Super klipfish	D, C		P	
<i>Diplodus cervinus hottentotus</i>	Zebra	C	P		
<i>Diplodus sargus capensis</i>	Blacktail	D, C			
<i>Etrumeus terres</i>	East coast roundherring	C		P	
<i>Galeichthyes feliceps</i>	White seacatfish	C	P		
<i>Heteromycteris capensis</i>	Cape sole	D, C		P	
<i>Lichia amia</i>	Garrick		C		P
<i>Liza richardsonii (L. ramada)</i>	Southern mullet	D, C		P	
<i>Muraenoclinus dorsalis</i>	Nosestripe klipvis	D		FC	
<i>Oplegnathus conwayi</i>	Cape knifejaw	C	P		
<i>Pachymetopon blochii</i>	Hottentot	D	FC		
<i>Parablennius (Blennius) cornutus</i>	Horned blenny	D		P	
<i>Pavoclinus pavo</i>	Peacock klipfish	D		P	
<i>Pomatomus saltatrix</i>	Elf	C	P		
<i>Psammogobius knysnaensis</i>	Knysna sandgoby	D, C		FC	
<i>Rhabdosargus globiceps</i>	White stumpnose	D, C		P	
<i>Sarpa salpa</i>	Strepie	C	P		
<i>Solea bleekeri</i>	Blackhand sole	D, C			
<i>Spondyliosoma emarginatum</i>	Steentjie	C		P	
<i>Syngnathus acus</i>	Longsnout pipefish	D, C		FC	
<i>Trachurus trachurus capensis</i>	Maasbanker	D		P	
<i>Trigla spp.</i>	Gurnard	C	P		

## 7.7 Species list – Birds

**Appendix 7.7.** Checklist of bird species recorded in the West Coast National Park (modified from Percy FitzPatrick Institute of African Ornithology (undated). Key: Status code: C = abundant to fairly common, U = uncommon to rare, V = vagrant, R = resident; S = summer visitor, W = winter visitor. Red Data Book status (from Barnes 2000) codes : E = Endangered, V = Vulnerable, NT = Near-threatened

Roberts No	Scientific Name	Common Name	Status	RDB status
1	<i>Struthio camelus</i>	Ostrich	CR	
3	<i>Spheniscus demersus</i>	African penguin	CR	V
6	<i>Podiceps cristatus</i>	Great Crested grebe	VS	
7	<i>Podiceps nigricollis</i>	Blacknecked grebe	VS	
8	<i>Tachybaptus ruficollis</i>	Dabchick (Little grebe)	UW	
10	<i>Diomedea exulans</i>	Wandering albatross	VW	V
11	<i>Diomedea cauta</i>	Shy albatross	UW	V
12	<i>Diomedea melanophris</i>	Blackbrowed albatross	UW	NT
13	<i>Diomedea chrysostoma</i>	Greyheaded albatross	VW	V
14	<i>Diomedea chlororhynchus</i>	Yellow-nosed albatross	VW	NT
17	<i>Macronectes giganteus</i>	Southern giant petrel	UW	NT
18	<i>Macronectes halli</i>	Northern giant petrel	UW	NT
19	<i>Fulmarus glacialis</i>	Antarctic fulmar	VW	
21	<i>Daption capense</i>	Pintado petrel	UW	
23	<i>Pterodroma macroptera</i>	Greatwinged petrel	US	
24	<i>Pterodroma mollis</i>	Softplumaged petrel	UW	
27	<i>Pterodroma brevis</i>	Kerguelen petrel	VW	
28	<i>Halobaena caerulea</i>	Blue petrel	VW	
29	<i>Pachyptila vittata</i>	Broadbilled prion	UW	
30	<i>Pachyptila belcheri</i>	Slenderbilled prion	VW	
32	<i>Procellaria aequinoctialis</i>	White-chinned petrel	CW	NT
34	<i>Calonectris diomedea</i>	Cory's shearwater	US	
35	<i>Puffinus gravis</i>	Great shearwater	US	
37	<i>Puffinus griseus</i>	Sooty Shearwater	CR	
38	<i>Puffinus puffinus</i>	Manx shearwater	VS	
39	<i>Puffinus assimilis</i>	Little shearwater	VW	
42	<i>Hydrobates pelagicus</i>	European storm petrel	VS	
43	<i>Oceanites leucorhoa</i>	Leach's storm petrel	VS	
44	<i>Oceanites oceanicus</i>	Wilson's petrel	UW	
47	<i>Phaethon rubricauda</i>	Redtailed tropicbird	VS	
49	<i>Pelecanus onocrotalus</i>	White pelican	UR	NT
53	<i>Morus capensis</i>	Cape gannet	CR	V
54	<i>Morus serrator</i>	Australian gannet	VS	
55	<i>Phalacrocorax carbo</i>	White-breasted cormorant	CR	
56	<i>Phalacrocorax capensis</i>	Cape cormorant	CR	NT
57	<i>Phalacrocorax neglectus</i>	Bank cormorant	CR	
58	<i>Phalacrocorax africanus</i>	Reed cormorant	CR	
59	<i>Phalacrocorax coronatus</i>	Crowned cormorant	CR	NT
60	<i>Anhinga melanogaster</i>	Darter	VS	
62	<i>Ardea cinerea</i>	Grey heron	CR	
63	<i>Ardea melanocephala</i>	Black-headed heron	CR	
65	<i>Ardea purpurea</i>	Purple heron	CR	
67	<i>Egretta garzetta</i>	Little egret	CR	
68	<i>Egretta intermedia</i>	Yellow-billed egret	UW	
71	<i>Bubulcus ibis</i>	Cattle egret	CR	
76	<i>Nycticorax nycticorax</i>	Blackcrowned night heron	UR	

Roberts No	Scientific Name	Common Name	Status	RDB status
78	<i>Ixobrychus minutus</i>	Little bittern	UR	
81	<i>Scopus umbretta</i>	Hamerkop	VW	
83	<i>Ciconia ciconia</i>	White stork	US	
84	<i>Ciconia nigra</i>	Black stork	UR	NT
91	<i>Threskiornis aethiopicus</i>	Sacred ibis	CR	
93	<i>Plegadis falcinellus</i>	Glossy ibis	UR	
94	<i>Bostrychia hagedash</i>	Hadedda ibis	CR	
95	<i>Platalea alba</i>	African spoonbill	CR	
96	<i>Phoenicopterus ruber</i>	Greater flamingo	CR	NT
96	<i>Phoenicopterus minor</i>	Lesser flamingo	UR	NT
102	<i>Alopochen aegyptiacus</i>	Egyptian goose	CR	
103	<i>Tadorna cana</i>	South African shelduck	CW	
104	<i>Anas undulata</i>	Yellowbill duck	CR	
106	<i>Anas capensis</i>	Cape teal	CR	
108	<i>Anas erythrorhyncha</i>	Redbilled teal	UR	
112	<i>Anas smithii</i>	Cape shoveller	UR	
116	<i>Plectropterus gambensis</i>	Spurwing goose	UW	
118	<i>Sagittarius serpentarius</i>	Secretary bird	V	NT
126	<i>Milvus nigrans</i>	Yellow billed kite	CS	
127	<i>Elanus caeruleus</i>	Black-shouldered kite	CR	
131	<i>Aquila verreauxii</i>	Black eagle	UR	
136	<i>Hieraaetus pennatus</i>	Booted eagle	VS	
148	<i>Haliaeetus vocifer</i>	African fish eagle	V	
149	<i>Buteo buteo</i>	Steppe buzzard	CS	
152	<i>Buteo rufofuscus</i>	Jackal buzzard	UR	
165	<i>Circus ranivorus</i>	African marsh harrier	CR	V
166	<i>Circus pygargus</i>	Montagu's harrier	VS	
168	<i>Circus maurus</i>	Black harrier	CR	NT
170	<i>Pandion haliaetus</i>	Osprey	VS	
171	<i>Falco peregrinus</i>	Penegrine falcon	VS	NT
172	<i>Falco biarmicus</i>	Lanner falcon	UR	NT
181	<i>Falco tinnunculus</i>	Rock kestrel	UR	
190	<i>Francolinus africanus</i>	Greywing francolin	CR	
195	<i>Francolinus capensis</i>	Cape francolin	CR	
200	<i>Coturnix coturnix</i>	Common quail	US	
203	<i>Numida meleagris</i>	Helmeted guineafowl	CR	
208	<i>Anthropoides paradiseus</i>	Blue crane	V	V
210	<i>Rallus caerulescens</i>	African rail	CR	
213	<i>Amaurornis flavirostris</i>	Black crane	CR	
217	<i>Sarothrura rufa</i>	Redchested flufftail	CR	
226	<i>Gallinula chloropus</i>	Moorhen	UR	
228	<i>Fulica cristata</i>	Redknobbed coot	UR	
232	<i>Neotis ludwigii</i>	Ludwig's bustard	VS	
239	<i>Eupodotis afra</i>	Black korhaan	CR	
243	<i>Haematopus ostralegus</i>	European oystercatcher	VS	
244	<i>Haematopus moquini</i>	African black oystercatcher	CR	NT
245	<i>Charadrius hiaticula</i>	Ringed plover	CS	
246	<i>Charadrius marginatus</i>	Whitefronted sandplover	CR	
247	<i>Charadrius pallidus</i>	Chestnutbanded plover	UR	NT
248	<i>Charadrius pecuarius</i>	Kittlitz's plover	CR	
249	<i>Charadrius tricollaris</i>	Threebanded sandplover	UR	
251	<i>Charadrius leschenaultii</i>	Sand plover	US	
252	<i>Charadrius asiaticus</i>	Caspian plover	VS	
253	<i>Pluvialis dominica</i>	Lesser golden plover	VS	
254	<i>Pluvialis squatarola</i>	Grey plover	CS	

Roberts No	Scientific Name	Common Name	Status	RDB status
255	<i>Vanellus coronatus</i>	Crowned plover	CR	
258	<i>Vanellus armatus</i>	Blacksmith plover	CR	
262	<i>Arenaria interpres</i>	Turnstone	CS	
263	<i>Xenus cinereus</i>	Terek sandpiper	CS	
264	<i>Tringa hypoleucos</i>	Common sandpiper	CS	
266	<i>Tringa glareola</i>	Wood sandpiper	US	
268	<i>Tringa totanus</i>	Redshank	VS	
269	<i>Tringa stagnatilis</i>	Marsh sandpiper	CS	
270	<i>Tringa nebularia</i>	Greenshank	CS	
271	<i>Calidris canutus</i>	Knot	CS	
272	<i>Calidris ferruginea</i>	Curlew sandpiper	CS	
274	<i>Calidris minuta</i>	Little stint	CS	
281	<i>Calidris alba</i>	Sanderling	CS	
283	<i>Limicola falcinellus</i>	Broadbilled sandpiper	VS	
284	<i>Philomachus pugnax</i>	Ruff	CS	
286	<i>Gallinago nigripennis</i>	Ethiopian snipe	CR	
287	<i>Limosa limosa</i>	Blacktailed godwit	VS	
288	<i>Limosa lapponica</i>	Bartailed godwit	CS	
289	<i>Numenius arquata</i>	Curlew	CS	
290	<i>Numenius phaeopus</i>	Whimbrel	CS	
291	<i>Phalaropus fulicarius</i>	Grey phalarope	VS	
292	<i>Phalaropus lobatus</i>	Rednecked phalarope	VS	
294	<i>Recurvirostra avosetta</i>	Avocet	CR	
295	<i>Himantopus himantopus</i>	Blackwinged stilt	CR	
297	<i>Burhinus capensis</i>	Spotted dikkop	CR	
298	<i>Burhinus vermiculatus</i>	Water dikkop	UR	
305	<i>Glareola nordmanni</i>	Blackwinged pratincole	VS	NT
307	<i>Stercorarius parasiticus</i>	Arctic skua	US	
308	<i>Stercorarius longicaudus</i>	Longtailed skua	VS	
309	<i>Stercorarius pomarinus</i>	Pomarine skua	VS	
310	<i>Catharacta antarctica</i>	Subantarctic skua	UW	
312	<i>Larus dominicanus</i>	Kelp gull	CR	
315	<i>Larus cirrocephalus</i>	Greyheaded gull	UR	
316	<i>Larus hartlaubii</i>	Hartlaub's gull	CR	
317	<i>Larus pipixcan</i>	Franklin's gull	VS	
318	<i>Larus sabini</i>	Sabine's gull	US	
322	<i>Hydropogone caspia</i>	Caspian tern	CR	NT
324	<i>Sterna bergii</i>	Swift tern	CR	
326	<i>Sterna sandvicensis</i>	Sandwich tern	CS	
327	<i>Sterna hirundo</i>	Common tern	CS	
328	<i>Sterna paradisaea</i>	Arctic tern	US	
329	<i>Sterna vittata</i>	Anarctic tern	CW	
330	<i>Sterna dougallii</i>	Roseate tern	VS	E
334	<i>Sterna balaenarum</i>	Damara tern	VS	E
335	<i>Sterna albifrons</i>	Little tern	US	
339	<i>Chlidonias leucopterus</i>	Whitewinged tern	US	
344	<i>Pterocles namaqua</i>	Namaqua sandgrouse	CR	
348	<i>Columba livia</i>	Feral pigeon	CR	
349	<i>Columba guinea</i>	Rock pigeon	CR	
352	<i>Streptopelia semitorquata</i>	Redeyed dove	CR	
354	<i>Streptopelia capicola</i>	Cape turtle dove	CR	
355	<i>Streptopelia senegalensis</i>	Laughing dove	CR	
356	<i>Oena capensis</i>	Namaqua dove	CR	
385	<i>Chrysococcyx klaas</i>	Klaas's cuckoo	CS	
386	<i>Chrysococcyx caprius</i>	Diederik cuckoo	US	

Roberts No	Scientific Name	Common Name	Status	RDB status
391	<i>Centropus superciliosus</i>	Burchell's coucal	UR	
392	<i>Tyto alba</i>	Barn owl	UR	
395	<i>Asio capensis</i>	Marsh owl	UR	
401	<i>Bubo capensis</i>	Spotted eagle owl	CR	
405	<i>Caprimulgus pectoralis</i>	Fiery-necked nightjar	CR	
412	<i>Apus barbatus</i>	Black swift	CS	
415	<i>Apus caffer</i>	White-rumped swift	CS	
416	<i>Apus horus</i>	Horus swift	VS	
417	<i>Apus affinis</i>	Little swift	CS	
418	<i>Apus melba</i>	Alpine swift	US	
424	<i>Colius striatus</i>	Speckled mousebird	CR	
425	<i>Colius colius</i>	Whitefaced mousebird	CR	
426	<i>Urocolius indicus</i>	Redfaced mousebird	CR	
428	<i>Ceryle rudis</i>	Pied kingfisher	CR	
429	<i>Megaceryle maxima</i>	Giant kingfisher	UR	
431	<i>Alcedo cristata</i>	Malachite kingfisher	VW	
438	<i>Merops apiaster</i>	European bee-eater	CS	
446	<i>Coracias garrulus</i>	European roller	VS	
451	<i>Upupa epops</i>	Hoopoe	CR	
465	<i>Lybius leucomelas</i>	Pied barbet	CR	
480	<i>Geocolaptes olivaceous</i>	Ground woodpecker	VW	
495	<i>Mirafra apiata</i>	Clapper lark	UR	
500	<i>Mirafra curvirostris</i>	Longbilled lark	CR	
502	<i>Mirafra albescens</i>	Karoo lark	UR	
507	<i>Calandrella cinerea</i>	Redcapped lark	CR	
512	<i>Galerida magnirostris</i>	Thickbilled lark	CR	
518	<i>Hirundo rustica</i>	European swallow	CS	
520	<i>Hirundo albigularis</i>	Whitethroated swallow	CS	
523	<i>Hirundo dimidata</i>	Pearl breasted swallow	US	
526	<i>Hirundo cucullata</i>	Greater striped swallow	CS	
529	<i>Hirundo fuligula</i>	Rock martin	CR	
530	<i>Delichon urbica</i>	Common house martin	US	
533	<i>Riparia paludicola</i>	Brown-throated martin	CR	
534	<i>Riparia cincta</i>	Banded Martin	US	
536	<i>Psolidoprogne holomelas</i>	Black sawwing swallow	V	
548	<i>Corvus albus</i>	Pied crow	CR	
550	<i>Corvus albicollis</i>	Whitenecked raven	US	
551	<i>Parus afer</i>	Southern grey tit	CR	
557	<i>Anthoscopus minutus</i>	Cape penduline tit	UR	
566	<i>Pycnonotus capensis</i>	Cape bulbul	CR	
577	<i>Turdus olivaceus</i>	(Southern) Olive thrush	US	
582	<i>Monticola explorator</i>	Sentinel rock thrush	V	
589	<i>Cercomela familiaris</i>	Familiar chat	CR	
591	<i>Cercomela sinuata</i>	Sicklewinged chat	UW	
595	<i>Myrmecocichla formicivora</i>	Anteating chat	CR	
596	<i>Saxicola torquata</i>	(Common) Stonechat	CR	
601	<i>Cossypha caffra</i>	Cape robin	CR	
614	<i>Erythropygia coryphaeus</i>	Karoo robin	CR	
621	<i>Parisoma subcaeruleum</i>	Titbabbler	CR	
622	<i>Parisoma layardi</i>	Layard's titbabbler	CR	
631	<i>Acrocephalus baeticatus</i>	African marsh warbler	CS	
635	<i>Acrocephalus gracilirostris</i>	Cape reed warbler	CR	
638	<i>Bradypterus baboecala</i>	African sedge warbler	CR	
645	<i>Apalis thoracica</i>	Barthroated apalis	CR	
651	<i>Syvietta rufescens</i>	Longbilled crombec	CR	

Roberts No	Scientific Name	Common Name	Status	RDB status
661	<i>Sphenoeacus afer</i>	Grassbird	UR	
664	<i>Cisticola juncidis</i>	Fantailed cisticola	UR	
666	<i>Cisticola textrix</i>	Cloud cisticola	UR	
669	<i>Cisticola subruficapilla</i>	Greybacked cisticola	CR	
677	<i>Cisticola tinniens</i>	Le Valliant's cisticola	CR	
686	<i>Prinia maculosa</i>	Spotted prinia	CR	
689	<i>Muscicapa striata</i>	Spotted flycatcher	US	
698	<i>Sigelus silens</i>	Fiscal flycatcher	CR	
713	<i>Motacilla capensis</i>	Cape wagtail	CR	
716	<i>Anthus novaeseelandiae</i>	Richard's (African) pipit	CR	
717	<i>Anthus similis</i>	Long-billed pipit	UR	
727	<i>Macronyx capensis</i>	Orangethroated longclaw	CR	
732	<i>Lanius collaris</i>	Fiscal shrike	CR	
746	<i>Telephorus zeylonus</i>	Bokmakierie	CR	
750	<i>Telephorus olivaceus</i>	Olive bush shrike	CR	
757	<i>Sturnus vulgaris</i>	European starling	CR	
759	<i>Spreo bicolor</i>	Pied starling	CR	
760	<i>Creatophora cinerea</i>	Wattled starling	CR	
769	<i>Onycognathus morio</i>	Red-winged starling	US	
773	<i>Promerops cafer</i>	Cape sugarbird	UW	
775	<i>Nectarinia famosa</i>	Malachite sunbird	CR	
777	<i>Nectarinia violacea</i>	Orange-breasted sunbird	VW	
783	<i>Nectarinia chalybea</i>	L-double collar sunbird	CR	
796	<i>Zosterops pallidus</i>	Cape white eye	CR	
801	<i>Passer domesticus</i>	House sparrow	CR	
803	<i>Passer melanurus</i>	Cape sparrow	CR	
813	<i>Ploceus capensis</i>	Cape weaver	CR	
814	<i>Ploceus velatus</i>	Masked weaver	CR	
824	<i>Euplectes orix</i>	Red bishop	CR	
827	<i>Euplectes capensis</i>	Yellowrumped widow	CR	
846	<i>Estrilda astrild</i>	Common waxbill	CR	
860	<i>Vidua macroura</i>	Pin-tailed whydah	CS	
872	<i>Serinus canicollis</i>	Cape canary	CR	
876	<i>Serinus alario</i>	Blackheaded canary	VS	
877	<i>Serinus sulphuratus</i>	Bully canary	UR	
878	<i>Serinus flaviventris</i>	Yellow canary	CR	
879	<i>Serinus albogularis</i>	Whitethroated canary	CR	
881	<i>Serinus gularis</i>	Streakyheaded canary	V	
885	<i>Emberiza capensis</i>	Cape bunting	CR	
887	<i>Emberiza impetuani</i>	Larklike bunting	VS	
914		Hudson godwit	VS	
	<i>Charadrius mongolus</i>	Mongolian plover	VS	
	<i>Anous stolidus</i>	Common noddy	VS	
	<i>Oenanthe monticola</i>	Mountain chat	UW	
	<i>Oenanthe pileata</i>	Capped wheatear	CR	

## 7.8 Species list – Mammals

**Appendix 7.8.** Checklist of land mammals of WCNP (modified from Avery *et al.* 1990) and using reference numbers from Skinner & Smithers (1990). Red Data Book status (from Friedmann & Daly 2004) codes: V = vulnerable, NT = Near-Threatened

No	Scientific Name	Common name	Status	Occurrence	Extralimital
3	<i>Myosorex varius</i>	Forest shrew			
5	<i>Suncus varilla</i>	Lesser dwarf shrew			
10	<i>Crocidura cyanea</i>	Reddish-grey musk shrew			
21	<i>Chrysochloris asiatica</i>	Cape golden mole			
23	<i>Eremitalpa granti</i>	Grant's golden Mole	V		
39	<i>Elephantulus edwardii</i>	Cape rock elephant-shrew		Historical	
63	<i>Tadarida aegyptiacea</i>	Egyptian free-tailed bat			
82	<i>Eptesicus hottentotus</i>	Long-tailed serotine bat			
86	<i>Neoromicia (Eptes.) capensis</i>	Cape serotine bat			
98	<i>Nycteris thebaica</i>	Egyptian slit face bat			
106	<i>Rhinolophus clovisus</i>	Geoffroy's horseshoe bat	NT		
106	<i>Rhinolophus capensis</i>	Cape horseshoe bat	NT		
117	<i>Papio ursinus</i>	Chacma baboon			
122	<i>Lepus capensis</i>	Cape hare			
129	<i>Bathyergus suillus</i>	Cape dune molerat			
132	<i>Cryptomys hottentotus</i>	Common molerat			
133	<i>Georychus capensis</i>	Cape molerat			
134	<i>Hystrix africae australis</i>	Cape porcupine			
150	<i>Parotomys brantsii</i>	Brant's whistling rat			
152	<i>Otomys laminatus</i>	Laminate vlei rat			
155	<i>Otomys saundersiae</i>	Saunders's vlei rat			
156	<i>Otomys irroratus</i>	Vlei rat			
158	<i>Otomys unisulcatus</i>	Bush Karoo rat			
163	<i>Rhabdomys pumilio</i>	Striped mouse			
168	<i>Mus musculus</i>	House mouse			####
172	<i>Mus minutoides</i>	Pygmy mouse			
179	<i>Aethomys namaquensis</i>	Namaqua rock mouse			
183	<i>Rattus rattus</i>	House rat			
186	<i>Gerbillurus paeba</i>	Hairyfoot gerbil			
191	<i>Tatera afra</i>	Cape gerbil			
199	<i>Dendromus melanotis</i>	Grey climbing mouse			
200	<i>Dendromus mesomelas</i>	Brants's climbing mouse			
204	<i>Steatomys krebsii</i>	Kreb's fat mouse			
244	<i>Proteles cristatus</i>	Aardwolf		Historical	
245	<i>Hyaena brunnea</i>	Brown hyaena	NT	Historical	
246	<i>Crocuta crocuta</i>	Spotted hyaena	NT	Historical	
248	<i>Panthera pardus</i>	Leopard		Historical	
249	<i>Panthera pardus</i>	Lion	V	Historical	
250	<i>Felis caracal</i>	Caracal			
251	<i>Felis lybica</i>	African wild cat			
252	<i>Felis nigripes</i>	Black-footed cat			
255	<i>Otocyon megalotis</i>	Bat-eared fox			
257	<i>Vulpes chama</i>	Cape fox			
259	<i>Canis mesomelas</i>	Black-backed jackal			
262	<i>Mellivora capensis</i>	Honey badger	NT		
264	<i>Ictonyx striatus</i>	Striped polecat			
267	<i>Genetta genetta</i>	Small-spotted genet?			
268	<i>Genetta tigrina</i>	Large-spotted genet			
272	<i>Cynictis penicillata</i>	Yellow mongoose			
275	<i>Galerella pulverulenta</i>	Small grey mongoose			

No	Scientific Name	Common name	Status	Occurrence	Extralimital
278	<i>Atilax paludinosus</i>	Water mongoose			
288	<i>Orycteropus afer</i>	Aardvark			
289	<i>Loxodonta africana</i>	Elephant		Historical	
290	<i>Procavia capensis</i>	Rock dassie			
296	<i>Diceros bicornis</i>	Black rhinoceros	V	Historical	
297	<i>Equus zebra zebra</i>	Cape mountain zebra	V	Introduced	####
298	<i>Equus burchellii</i>	Burchell's zebra		Removed	####
305	<i>Connochaetes gnou</i>	Black wildebeest			
306	<i>Connochaetes taurinus</i>	Blue wildebeest		Removed	####
308	<i>Alcelaphus buselaphus</i>	Red Hartebeest		Introduced	
309	<i>Damaliscus dorcas dorcas</i>	Bontebok	V		####
313	<i>Sylvicapra grimmia</i>	Common duiker			
314	<i>Antidorcas marsuialis</i>	Springbok			####
318	<i>Raphicerus campestris</i>	Steenbok			
319	<i>Raphicerus melanotis</i>	Grysbok			
324	<i>Pelea capreolus</i>	Grey rhebok		Present?	
327	<i>Oryx gazella</i>	Gemsbok			
332	<i>Tragelaphus strepsiceros</i>	Koedoe			####
333	<i>Taurotragus oryx</i>	Eland			



## **8. SUMMARY OF AVAILABLE INFORMATION**

The summary of available information can be downloaded as an independent file from [www.sanparks.org](http://www.sanparks.org).

## **9. MAPS**

The following maps can be downloaded as independent files from [www.sanparks.org](http://www.sanparks.org):

**9.1 Map: Area**

**9.2 Map: Geology**

**9.3 Map: Hydrology**

**9.4 Map: Soils and Landtypes**

**9.5 Map: Vegetation**