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GOVERNMENT NOTICE

DEPARTMENT OF ENVIRONMENTAL AFFAIRS

No. 824 **31 October 2013**

AFRICAN PENGUIN BIODIVERSITY MANAGEMENT PLAN

Minister, B. E. E. Molewa, Minister of Water and Environmental Affairs, hereby publish African Penguin Biodiversity Plan, as set out in the Schedule hereto.

Copies of the English version of African Penguin Biodiversity Management Plan are available at the offices of the Department's Oceans and Coasts branch, located at East Pier Building, East Pier Road, V and A Waterfront and on the Department's website at www.environment.gov.za.

B. E. E. MOLEWA
MINISTER OF WATER AND ENVIRONMENTAL AFFAIRS

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

SCHEDULE

BIODIVERSITY MANAGEMENT PLAN FOR THE AFRICAN PENGUIN *Spheniscus demersus*

EXECUTIVE SUMMARY

The African Penguin *Spheniscus demersus* is endemic as a breeding species to southern Africa and it is the only penguin that breeds in Africa. Its usual non-breeding range extends around the coastline from Namibia to KwaZulu-Natal, but vagrant birds have been recorded north to Gabon on the West African coast and to the Limpopo River mouth on the east coast. African Penguins may be found up to 100 km offshore but most occur within 20 km of the coast.

The African Penguin was South Africa's most abundant seabird. However, it has suffered a massive reduction in abundance. The overall population may have been of the order of one million pairs in the 1920s, but it decreased to about 147 000 pairs in 1956/57, 75 000 pairs in 1978, 63 000 pairs in 2001 and 25 000 pairs in 2009. Therefore, the present population is only some 2.5% of its level 80 years ago. The species has a Red List status of Endangered because the breeding population has decreased by > 50% in the three most recent generations and the decrease is continuing.

The decrease in the number of African Penguins between the 1920s and the mid 1950s was probably mainly attributable to overexploitation of eggs. Up to 48% of all eggs produced were harvested for human consumption. In 1897, 762 400 eggs were collected; in 1899, 801 500 eggs; in 1905, 745 250 eggs. The last authorised egg collections were in 1967. There was also substantial modification of the habitat at seabird islands. In the mid 1800s, historical deposits of seabird guano were removed from many of the islands. In instances, this forced penguins to nest on the surface of islands, whereas formerly they had been able to burrow into the guano. Surface nests are sometimes flooded, their eggs and chicks are more accessible to aerial predators than those in burrows and adults and chicks are subjected to heat stress, sometimes causing the abandonment of breeding attempts. Surface nesting also may have rendered African Penguins more susceptible to displacement from breeding sites by larger animals such as Cape fur seals *Arctocephalus pusillus*. Breeding habitat has additionally been affected by the introductions of terrestrial predators to some islands and the connection of other islands to the mainland. Some mainland colonies are visited by large numbers of tourists annually and require careful management to avoid harmful disturbance of birds.

At-sea factors are likely to have been responsible for most of the recent decreases of African Penguins. Oil spills have had substantial impact: in 2000, for example, 19 000 penguins were oiled following sinking of the *Treasure* between Dassen and Robben islands off South Africa's Western Cape; another 19 000 penguins were relocated to prevent their becoming oiled and some 3 000 orphaned chicks were rescued. Oil can kill penguins and impair their later breeding success. The main prey of African Penguins is small shoaling pelagic fish, especially sardine *Sardinops sagax* and anchovy *Engraulis encrasicolus*. There are three groups of breeding colonies for African Penguins: southern Namibia, Western Cape and Algoa Bay in the Eastern Cape. Trends in numbers of penguins breeding in each of these regions where significantly correlated with national estimates of the abundance of sardine and anchovy. Penguins compete with purse-seine fisheries for these fishes. Recently, an eastward shift and decrease of sardines off South Africa led to a mismatch in the distributions of the breeding localities and prey of penguins off the Western Cape and decrease prey and large decreases in penguins.

In October 2010, a workshop was held at Arniston to consider developing a Biodiversity Management Plan for the African Penguins in terms of the National Environmental Management: Biodiversity Act (Act No. 10 of 2004). The proceedings of that workshop were published in 2011 and were used to draft a Biodiversity Management Plan, which has been further refined in the light of comments received from a number of sources. This is the first management plan for the species and will lay the foundation for the plans that will follow. In laying the foundation for future plans this plan concentrates substantially on establishing guidelines around various aspects of African Penguin conservation and consolidating existing conservation work.

DEFINITIONS

"Biodiversity Management Plan - Species" means a species management plan in terms of section 43 of the National Environmental Management: Biodiversity Act (Act No. 10 of 2004)

"Collaborators" means those individuals and/or organisations that will be approached/included in the process to complete the action.

"Conservation Authorities" means those organisations mandated in terms of legislation with the conservation of South Africa's biota.

"Management Authorities" in relation to a protected area, means the organ of state or other institution or person in which the authority to manage the protected area is vested.*

"Permitted Rehabilitation Centres" refers to those centres that are authorised by means of a permit issued in terms of national or provincial conservation legislation, to rehabilitate penguins as specified on the permit.

"Protected Area" means any of the protected areas referred to in section 9 of the National Environmental Management: Protected Areas Act (Act No. 57 of 2003).

"Protected Area Management Plans" means those management plans developed for protected areas as set out in section 39 of the National Environmental Management: Protected Areas Act (Act No. 57 of 2003)

"Rehabilitation" means the re-establishment of part of the productivity, structure, function and processes of the original ecosystem.

"Responsible Party" means the organisation or body that has the delegated authority to carry out an action either through legislation or through delegation of that authority.

"Restoration" means that all of the key ecological processes and functions are re-established and all of the original biodiversity is re-established.

"Stakeholder" means any group or individual who can affect, or is affected by, any of the actions in the Biodiversity Management Plan.

"Steering Committee" means a group of individuals elected by the Department of Environmental Affairs (Oceans and Coasts) to oversee the implementation of the management plan in accordance with the determined terms of reference for the Committee.

"Working Group" means a number of individuals invited to form a group in order to complete an action or actions set out in the Biodiversity Management Plan. The tenure of such a group may be till the completion of the action or for the duration of the Management Plan.

* Since Robben Island, Stony Point and Burgher's Walk are not covered in terms of the NEM:PAA, they are not considered as Management Authorities as per the definition above, and will therefore be referred to separately in the text of this BMP where relevant.

ABBREVIATIONS

CITES:	Convention on International Trade in Endangered Species of Wild Fauna and Flora
IUCN:	International Union for Conservation of Nature
NEM: BA:	National Environmental Management: Biodiversity Act (No. 10 of 2004)
NEM: PAA:	National Environment Management: Protected Areas Act (No. 57 of 2003)
SANCCOB:	Southern African Foundation for the Conservation of Coastal Birds
TOPS:	Threatened or Protected Species as listed in terms of section 56 of the National Environmental Management: Biodiversity Act (No. 10 of 2004)

ACKNOWLEDGMENTS

The development of a Biodiversity Management Plan for the African Penguin would not have been possible without the enthusiastic contributions of the stakeholders listed in Appendix 1 both during the Workshop in October 2010 and subsequent comments on the workshop proceeding and later on the comments and inputs into the draft Biodiversity Management Plan. The October Stakeholder Workshop would not have been possible without the sponsorship from the Hans Hoheisen Charitable Trust, which covered the bulk of the expenses. Additional funding was provided by SANCCOB and BirdLife South Africa. The Leiden Conservation Trust provided the funds to cover the expenses of Dr Susie Ellis, the facilitator the October workshop.

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1) INTRODUCTION

1.1 Why the African Penguin requires a Biodiversity Management Plan?

The status of the African Penguin was re-assessed according to the International Union for Conservation of Nature (IUCN) criteria in 2010 and its status was uplisted from vulnerable to endangered (IUCN 2011). Data has revealed that the species is undergoing a very rapid population decline and this trend currently shows no sign of reversing despite conservation efforts by relevant National and Provincial authorities and conservation orientated Non-governmental Organisations. Research has shown that shortage of food is probably the factor driving the recent decline (Crawford *et al.* 2007; Crawford *et al.* 2011b), but it is unclear as to what is causing this shortage. Other factors such as unnaturally high predation rates by seals on adult birds and by Kelp Gulls on eggs and chicks and continuous oiling of birds also play a role in the population decline and needs to be managed.

There are a number of organisations both national and international, government and non-government that are involved in the conservation of the African Penguin, unfortunately not always in a coordinated manner. The biodiversity management plan provides the mechanism whereby the efforts of individuals and organisations can be coordinated to the benefit of the species.

1.2 Aim and objectives of the Biodiversity Management Plan

A workshop was held in October 2010 to identify threats to the African Penguin and possible mitigation measures to reduce or eliminate these threats. At this workshop a vision and desired state for African Penguin conservation was debated and agreed upon by the workshop participants (Shaw *et al.* 2011).

1. *The decline of the African Penguin population in South Africa, as measured by the number of breeding pairs, will have been halted within two years of the implementation of this plan.*
2. *Thereafter, the population, as measured by the number of breeding pairs, will have an average of at least 1% growth per year over 5 years in each of three penguin breeding areas in South Africa (Orange River to Cape Point, Cape Point to Cape Agulhas and Cape Agulhas to Algoa Bay) (Fig: 1). This would correspond with a South African population, for which the baseline is 21 000 breeding pairs, to increase to a minimum population of 35 000 breeding pairs over 50 years.*
3. *The African Penguin will have been removed from the IUCN threatened categories within one human generation (30 years) from the implementation of this plan.*

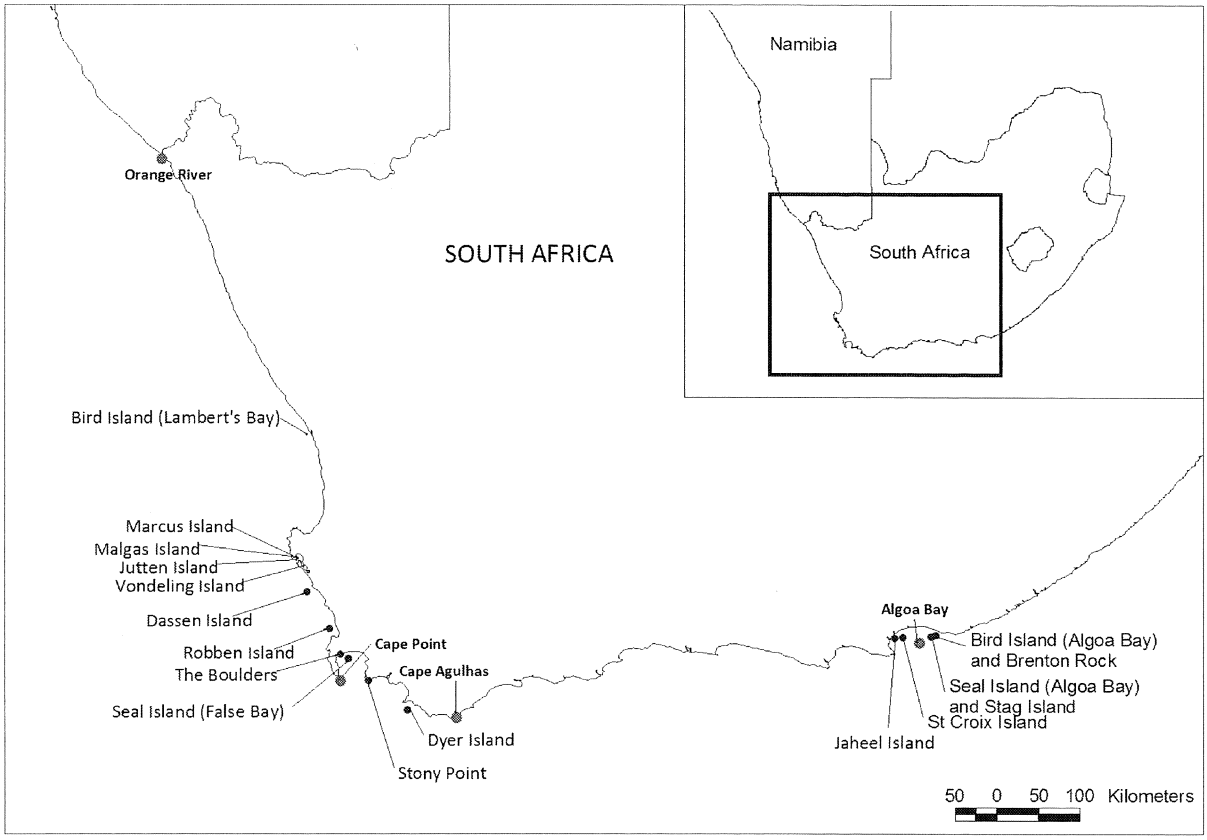

Figure 1: Current (2011) African Penguin breeding colonies in South Africa, except for Bird Island at Lambert's Bay, an important colony which became extinct in the early 21st century

The vision and desired state was used to develop the aim of the Biodiversity Management Plan:

To halt the decline of the African Penguin population in South Africa within two years of the implementation of the management plan and thereafter achieve a population growth which will result in a down listing of the species in terms of its status in the IUCN Red List of Threatened Species.

In order to achieve this aim the principle objectives of the management plan will be to:

- Establish a unified approach to the conservation of African Penguins that is agreed upon and supported by all individuals and organisations involved in African Penguin Conservation.
- Establish a steering committee to manage and monitor the implementation of the actions specified in the management plan either directly or through the establishment of working groups.

1.3 Benefits of the Biodiversity Management Plan

The African Penguin has, and continues to be, the focus of much research and management intervention. Despite this, the population is still declining. The management plan will formalise much of the work that is currently being conducted and provide the mechanism whereby this effort can be coordinated, directed and implemented to the benefit of the species. Furthermore it will also identify those areas where necessary additional interventions are required to address issues impacting on the species. The process undertaken to identify the threats impacting on the species has facilitated increased collaboration between those that work with and those that impact on the African Penguin, and highlighted the dire state of the species. The plan will strive to achieve the management of the penguin population in its entirety including those populations occurring outside South Africa through international agreements.

1.4 Anticipated Outcomes

The anticipated outcomes of the management plan are as follows:

- A coordinated national approach to African Penguin conservation in terms of management, monitoring and research.
- Confirmation of mandates concerning the protection of the species and threat mitigation.
- A research and communication strategy that will identify priorities within these two fields.
- All colony sites afforded a level of protection in terms of the National Environmental Management: Protected Areas Act (No. 57 of 2003).
- The management of the African Penguin population in its entirety.
- The control of captive populations including those residing temporarily in rehabilitation centres.
- Clarification on the registration and permitting process and requirements for captive institutions and their facilities
- Identify the reasons for the current decline.
- To have in place procedures to prevent, prepare for and respond to catastrophic events such as oil spills and disease outbreaks.
- The halt of the current decline in the population and ultimately ensure a steady increase in the population.

2) BACKGROUND

2.1 Conservation Status and Legislative Context

2.1.1 International

The IUCN Red List is a mechanism for evaluating the conservation status of a species. The goals of the Red List are to identify and document those species most in need of conservation attention if global extinction rates are to be reduced; provide a global index of the state of change of biodiversity and to provide an internationally recognised standard of describing the conservation status of a species. In 2010, the IUCN Red List status (as evaluated by BirdLife International – IUCN's official Red List Authority for birds) for the African Penguin changed from 'Vulnerable' to 'Endangered. This species is therefore considered to be facing a very high risk of extinction in the wild.

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is an international voluntary treaty conceived to ensure that the international trade in specimens of animals and plants does not threaten their survival in the wild. This convention lists species in appendices, based on certain criteria. The African Penguin is listed in Appendix II, which lists all species that are not necessarily threatened currently with extinction but that may become so unless trade is closely controlled. International trade in specimens of Appendix-II species may be authorized by the granting of an export permit or re-export certificate. No import permit is necessary for Appendix-II species under CITES (although a permit is needed in some countries that have taken stricter local measures than what CITES requires). Permits or certificates should only be granted if the relevant authorities are satisfied that certain conditions are met, above all that trade will not be detrimental to the survival of the species in the wild. South Africa's inclusion in CITES was ratified on 15 July 1975, and it came into force on 13 October 1975. The Department of Environmental Affairs is the South African national implementing authority for CITES. The Department has in turn delegated this authority down to those provinces that have the resources to implement CITES. African Penguins cannot be transported to international destinations without a CITIES permit that is issued by the Department of Environmental Affairs or a provincial conservation authority.

The Convention on the Conservation of Migratory Species of Wild Animals (also known as the Bonn Convention) is an intergovernmental voluntary treaty, concluded under the auspices of the United Nations Environment Programme, concerned with the conservation of wildlife and habitats on a global scale. The convention entered into force in 1979 with the aim to conserve terrestrial, marine and avian migratory species throughout their range. Convention listed species are assigned to different categories according to set criteria. The treaty allows for the establishment of agreements between countries to protect a specie or species that migrates between them. The African Penguin is listed in Appendix II in terms of the Convention on the Conservation of Migratory Species of Wild Animals. There is as yet no international agreement between governments for this species. Should such an agreement take place, it would include Angola, Namibia, South Africa, and Mozambique.

2.1.2 National

The Seabirds and Seals Protection Act (No. 46 of 1973)

The Seabirds and Seals Protection Act (No. 46 of 1973) makes provision for the control of certain islands and rocks; the protection and, control of capture and killing of seabirds and seals; and the disposal of the products of seabirds and seals.

The Policy on the Management of Seals, Seabirds and Shorebirds

The policy on the Management of Seals, Seabirds and Shorebirds was gazetted in 2007. The purpose of the policy was to set out the considerations that will apply to the management of Seals, Seabirds and Shorebirds when the Seabirds and Seals Protection Act (No. 46 of 1973) was to be updated. The objectives of this policy are to:

- facilitate and ensure the management of conservation of seals, seabirds and shorebirds;
- co-operative management;
- sustainable, non-consumptive use of seals, seabirds and shorebirds; research and monitoring;
- management of adverse interactions; and
- the implementation of international obligations.

With respect to the African Penguin, the policy aims to reduce mortality through incidental capture by fisheries, losses due to introduced predators, insufficient food, displacement from breeding sites, degradation of breeding habitat, disturbance by humans, destruction of nests, oil pollution, other forms of pollution. The policy also places a strong emphasis on co-ordinated, co-operative management of seals, seabirds and shorebirds at a local and regional scale.

The policy recognises the importance of captive breeding programmes, including for conservation purposes and that the holding of seabirds will only be allowed under permit. The need for management of interactions between threatened or near-threatened seabirds that may negatively influence the conservation status of seabirds is also recognised. It specifies management interventions that may be adopted such as culling, removal or relocation of predators, where sound, relevant scientific data is used as a basis for these decisions. However in the absence of conclusive data, the precautionary approach will be adopted. The policy also recognises the need for research and monitoring, and that research should be undertaken to ensure the sound management and conservation of seals, seabirds and shorebird populations.

The policy has yet to be incorporated into a formal piece of legislation. This policy therefore guides management actions, but there are no regulations associated with this policy which are enforceable.

The National Environment Management: Protected Areas Act (No. 57 of 2003) (NEM: PAA)

Most breeding colonies of African Penguins in South Africa are protected in terms of this Act as they are in areas which have been proclaimed as Provincial Nature Reserves or National Parks. NEM:PAA acknowledges any previous proclamation in terms of provincial conservation acts/ ordinances, forestry

legislation and the National Parks Act (No. 57 of 1976) and as such, considers those areas protected under NEM:PAA. This act is specific in the manner in which these areas need to be managed. With the exception of the colony at Betty's Bay (Stony Point) and Robben Island, all areas containing African Penguin breeding colonies are protected under this Act. Furthermore, Section 39 states that when a protected area management plan is being prepared by the management authority, the authority concerned must consult with municipalities, other organs of state, local communities and other affected parties which have an interest in the protected area. This gives all those interested in African Penguin conservation the opportunity to be part of the management planning process for the relevant protected areas. Table 1 lists the protected areas that contain breeding colonies of African Penguins and the relevant management authorities and organisations responsible for their management.

Table 1: The Management authorities and organisations managing African Penguin Colonies in South Africa

COLONY	MANAGEMENT AUTHORITIES AND ORGANISATIONS
Lambert's Bay Penguin Island	CapeNature
Malgas Island	SANParks
Marcus Island	SANParks
Jutten Island	SANParks
Vondeling Island	CapeNature
Dassen Island	CapeNature
Robben Island	Robben Island Museum (Department of Arts and Culture)
Boulders	SANParks
False Bay – Seal Island	CapeNature
Stony Point	Overstrand Municipality
Dyer Island	CapeNature
Geyser Island	CapeNature
De Hoop Marine Reserve	CapeNature
Jahleel Island	SANParks
Brenton Island	SANParks
St Croix Island	SANParks
Seal Island - Algoa Bay	SANParks
Stag Island	SANParks
Bird Island - Algoa Bay	SANParks

The National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM:BA)

Chapter 3 contains the sections relevant to Biodiversity and Planning and makes provision for the compilation of bioregional plans and Biodiversity management plans for threatened species and ecosystems.

Chapter 4 relates to threatened or protected ecosystems and species. The purpose of this chapter is to:

- provide for the protection of ecosystems that are threatened or in need of protection to ensure the maintenance of their ecological integrity (Section 52-55);
- provide for the protection of species that are threatened or in need of protection to ensure their survival in the wild (Section 56-58);
- give effect to the Republic's obligations under international agreements regulating international trade in specimens of endangered species (Section 59–62); and
- ensure that the utilisation of biodiversity is managed in an ecologically sustainable way.

Chapter 7 makes provision for the regulation of the issuing of permits (Section 87-97) and covers the application process, permit contents, risk assessment, cancellation of permits and appeals to decisions regarding the permit application.

Chapter 8 covers the administration of the Act and provides for the making of regulations, consultation and public participation. In terms of the regulations and of specific pertinence to the African Penguin is the Threatened or Protected Species (TOPS) Regulations, 2007, which were published in *Gazette* No. 29657 on 23 February 2007, and entered into force on 1 June 2007. The purpose of these regulations include to:

- further regulate the permit system set out in Chapter 7 of the Biodiversity Act that relate to restricted activities involving specimens of listed threatened or protected species;
- provide for the registration of captive breeding operations, commercial exhibition facilities, game farms, nurseries, scientific institutions, sanctuaries and rehabilitation facilities and wildlife traders;
- provide for the prohibition of specific restricted activities involving specific listed threatened or protected species;
- provide for the protection of wild populations of listed threatened species; and
- provide for the composition and operating procedure of the Scientific Authority.

Permits involving threatened or protected species are issued by the Department of Environmental Affairs, as well as by provincial conservation authorities. Any person, organisation or organ of state carrying out any restricted activities, needs to have a TOPS permit for the species listed. The African Penguin is listed as "Protected" in terms of Section 56 of NEM: BA. In addition, any person, organisation or organ of state involved in facilities that relate to the breeding in captivity, rehabilitation or permanent care of African penguins, have to register such facilities in terms of the TOPS Regulations.

The Minister may in terms of Section 9 of NEM: BA publish Norms and Standards in order to achieve any of the objectives stated within NEM: BA. Norms and Standards have been gazetted for the compilation of 'Biodiversity Management Plans for Species' (3 March 2009). Under these Norms and Standards, CapeNature and Department of Environment Affairs (Oceans and Coasts) have facilitated the initiation of a Biodiversity Management Plan for the African Penguin, the process of which started in March of 2010. Stakeholders were sent a notification of the intent to initiate the development of the Biodiversity Management Plan with a request to indicate their support of this process. The Minister signed and

approved the African Penguin Management Plan on the 11th of September 2013. The African Penguin Biodiversity Management Plan is a legal document, and those agencies and organisations listed as implementing agents are therefore held accountable for the actions required of them in the plan. An annual progress report on the achievement of objectives in the Biodiversity Management Plan will need to be submitted to the Minister, and the management plan is to be reviewed every five years.

2.1.3 Provincial

Each of the nine provinces have their own ordinance or act enabling the delegated provincial authority to conserve the indigenous fauna and flora of the province. These pieces of legislation are subservient to national legislation and therefore may be stricter but cannot contradict national legislation. The provincial acts or ordinances are compiled according to the needs and requirements of the particular province and as these may differ between provinces slight differences may occur between the pieces of legislation.

2.2 Information Pertinent to the Management of the African Penguin

The information below has been drawn primarily from Crawford *et al.* (2011a) and with specialist input from Dr K Ludynia, C McGeorge, L Nupen, Dr L Pichegru, M Ruthenberg, T Shaw, Dr R Sherley, and Dr A Steinfurth.

2.2.1 Taxonomic Description

No subspecies is recognised. The species is one of four in the genus *Spheniscus*. The current classification of S. *demersus* is as follows (Hockey *et al.* 2005):
Order: Ciconiiformes
Family: Spheniscidae
Genus: Spheniscus
Species: demersus (Linnaeus 1758)

2.2.2 Distribution

The African Penguin is endemic to the greater Benguela upwelling ecosystem off south-western Africa (Crawford *et al.* 2011b). It breeds at 28 localities (Kemper *et al.* 2007a) from Hollams Bird Island, central Namibia, to South Africa's Eastern Cape Province at Bird Island (Hockey *et al.* 2005). In South Africa, penguins breed in two groups of localities, one in the Western Cape Province and the other in the Eastern Cape Province, which are separated by c. 600 km (Crawford *et al.* 2011b), the distances having been increased by extinctions of colonies at Lambert's Bay in 2006 (Crawford *et al.* 2008) and Mossel Bay around 1926 (Shelton *et al.* 1984).

The usual non-breeding range extends along some 3 200 km of coast between ca. 18°S on the Namibian coast and 29°S on coast of KwaZulu-Natal. Vagrant birds have been recorded north to Sette Cama (2°32'S), Gabon on the West African coast (Malbrant and Maclatchy 1958) and to the Limpopo River

mouth (25°S), Mozambique on east coast (Shelton *et al.* 1984). African Penguins have been recorded up to 100 km offshore (Rand 1960). Most occur within 20 km of the coast (Wilson *et al.* 1988), except on the Agulhas Bank where the distribution of their prey extends farther offshore (Shelton *et al.* 1984).

2.2.3 Population Status and Trends

The overall (Namibian and South African) population may have been of the order of one million pairs in the 1920s but had decreased to about 141 000 pairs in 1956/57 (Kemper *et al.* 2007a). It fell to about 69 000 pairs in 1979/80, to c. 63 000 pairs in 2001, 57 000 pairs in 2004/05 and 36 000 pairs in 2006/07 (Kemper *et al.* 2007a). By 2011, there were c. 20 000 breeding pairs in South Africa (Department of Environmental Affairs (Oceans and Coasts) unpubl. Data).

Since 1956 numbers decreased at most Namibian colonies from an estimated 42 000 pairs in 1956/57 to 12 000 pairs in 1978/79 and 3000 pairs in 2006/07 (Kemper *et al.* 2007a). This decline occurred especially to the south of Lüderitz where large declines occurred and two colonies became extinct.
In South Africa and in the Western Cape, it is estimated that there may have been close to one million pairs at Dassen Island in the 1920s (Crawford *et al.* 2007). Some 92 000 pairs bred in this province in 1956, decreasing to 41 000 pairs in 1979 (Crawford *et al.* 1995c), 34 000 pairs in 2001 (Underhill *et al.* 2006) and 11 000 pairs in 2009 (Crawford *et al.* 2011b). Further declines occurred in 2010 and 2011 such that the number of breeding pairs in the Western Cape province stands at c. 8700 in 2011 (Department of Environmental Affairs (Oceans and Coasts) unpubl. Data).

In the Eastern Cape, numbers increased from about 6 000 pairs in 1956 to an average of 22 000 pairs from 1985–2001 and then decreased to an average of 10 000 pairs from 2003–2009 (Crawford *et al.* 2009). Approximately 11 000 breeding pairs were recorded in 2011 (Department of Environmental Affairs (Oceans and Coasts) unpubl. Data).

2.2.4 Habitat

Twenty four of 28 extant breeding localities are coastal islands and there are two mainland localities in South Africa's Western Cape. Breeding is usually colonial but solitary nests occur. Nests are built by both sexes in burrows in guano or sand, in clefts between rocks, in disused buildings and on the surface, preferably under shade (Shelton *et al.* 1984, Crawford *et al.* 1995a). Burrows have a more constant microclimate than surface nests. Relative humidity is higher, air temperatures fluctuate less, wind effect is negligible and birds are not exposed to direct sunlight (Frost *et al.* 1976a). Nesting material includes seaweed, pieces of vegetation, rocks, shells, bones and feathers but some nests have no lining.
As the *Spheniscus* penguins are equipped to forage in cold water, they can become heat stressed on land (Frost *et al.* 1976a). The large-scale collection of guano deposits along the coasts of southern Africa since the mid-nineteenth century has removed much of the breeding habitat resulting in these birds breeding in a variety of suboptimal habitats (Frost *et al.* 1976b; Wilson and Wilson 1989). They breed more successfully in nest sites with cover, relative to those in the open (e.g. Frost *et al.* 1976b; Seddon and van Heezik 1991).

2.2.5 Breeding

African Penguins usually breed for the first time at between four and six years of age (Whittington *et al.* 2005). Once they have bred, adults generally show strong fidelity to colonies and mates as well as some nest-site fidelity (e.g. Randall *et al.* 1987; La Cock *et al.* 1987; La Cock and Cooper 1988; Whittington *et al.* 2005). First-time breeders have flexibility to emigrate and hence to take advantage of long-term changes in the distribution of food (Crawford 1998). Breeding is monogamous (Randall 1983, Crawford *et al.* 1995a).

The clutch is usually 2 eggs, sometimes 1, rarely 3 (Crawford *et al.* 1999, 2000b). Eggs are rounded oval, white, becoming stained as incubation proceeds. The laying interval is 3–3.2 days (Williams 1981, Williams and Cooper 1984). Lost clutches may be replaced and successful breeders may relay (Randall and Randall 1981, La Cock and Cooper 1988). Incubation starts with the first-laid egg, lasts 38–41 days (ca. 37–38 d/egg) and is shared equally by both sexes (Rand 1960, Williams and Cooper 1984, Randall 1989).

Chicks generally hatch asynchronously, usually about two days apart (Williams and Cooper 1984; Seddon and van Heezik 1991). Chicks are closely attended by adults until about 26–30 days when they are mostly left unguarded and may form crèches of up to 25 chicks (Seddon and Van Heezik 1993, Erasmus and Smith 1974). Chicks fledge when between 55 and 130 days old (Seddon and Van Heezik 1993, Kemper 2006). Often both chicks will fledge from two chick broods but survival from hatching to fledging is variable and influenced by a multitude of factors such as burrow collapse, exposure, drowning and accidental death in nest and predation by Kelp Gulls *Larus dominicanus*, starvation or heat stress (Seddon and Van Heezik 1991; Barham *et al.* 2007; Kemper *et al.* 2007b; Sherley 2010).

2.2.6 Moult

Moult in birds is considered unexpectedly energetically expensive (Hoye and Buttemer 2011). Moult in penguins is unique, since they replace all their feathers in a relatively short period of time compared to that of other birds, ranging from 13o 40 days depending on the species (Stonehouse 1967). Moult in penguins is an essential feature to them being able to remain waterproof and thus insulated in cold waters while foraging (Stonehouse 1967, Payne 1972). Penguins become hyperphagic during the pre-moult period (Otsuka *et al.* 2000), and the acquisition of sufficient body reserves during pre-moult foraging can be considered a greater priority than at any other time in the annual cycle (Croxall and Davis 1999, Wolfaardt *et al.* 2008b, 2009b). Penguins are thus dependant on high and predictable food availability during the pre-moult fattening and post moult recovery phases. An understanding of timing of moult, including when and where pre-moult fattening and post moult recovery takes place is of critical importance for penguin conservation management. Studies of moult patterns in terms of synchrony and seasonality have shown colony specific variability (Underhill and Crawford 1999, Crawford *et al.* 2006b, Kemper 2006, Wolfaardt *et al.* 2009a), which may be attributed to variation in available food resources around the colonies. Ensuring adequate food supply during the pre-moult

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fattening and post moult conditioning is essential in order for African Penguins to survive the Moult (Wolfaardt *et al*. 2008b, 2009b, Waller 2011).

2.2.7 Population Genetics

To date, no published information is available on the population genetics of this species. A PhD study is currently underway by L Nupen of the Percy FitzPatrick Institute of African Ornithology. While data is still being analysed, initial results suggest that African Penguins have low genetic diversity and there seems to be little evidence of genetic difference between the colonies across the full range of the species (Nupen pers. Comm).

2.2.8 Foraging and Prey

African Penguins feed solitarily or in small to large groups, up to >150 birds (Rand 1960; Wilson and Wilson 1990; Ryan *et al*. in review). They may dive to 130 m but usually forage at depths < 80 m, with dives lasting 1-2 minutes in average. They may hunt co-operatively, swimming rapidly round a school of fish to compress it (Wilson 1985b; Wilson and Wilson 1990; Ryan *et al*. in review). Most food is caught between 10h00 and 18h00, with a lull in feeding activity around midday (Wilson and Wilson 1995; Petersen *et al*. 2006; Ludynia 2007; Waller 2011). Birds generally do not feed at night (Wilson 1985a). When breeding, most foraging trips last < 24h and adult penguins generally remain within 40 km of colonies (Heath and Randall 1989; Petersen *et al*. 2006; Ludynia 2007; Pichegru *et al*. 2010; Waller 2011), performing between 200 and 400 dives in a foraging trip (Ryan *et al*. 2007). Foraging effort increases with the growing chicks, and parents brooding large chicks can forage for 3-5 days (Ludynia, Waller unpubl. Data). Outside the breeding season, birds may travel up to 120-350 km (Ludynia 2007; Waller 2011).

African Penguins feed mainly on active, free-swimming prey, usually schooling pelagic fish, which they may locate using their olfactory sense (Write *et al*. 2011). Especially important are anchovy, sardine and, in Namibia, pelagic goby *Sufflogobius bibarbatus* (Hockey *et al*. 2005; Crawford *et al*. 2011b; Ludynia *et al*. 2010). Other prey includes cephalopods (e.g. Randall and Randall 1986), horse mackerel *Trachurus capensis* and juvenile hake *Merluccius sp*. (MFMR unpubl. data).

2.2.9 Ex Situ Population and their Status

The African Penguin studbook currently contains information from nine institutions holding African Penguins: Bayworld (some of which are housed at the Pretoria Zoo), Bester Birds, East London Aquarium, Hartbeespoort Aquarium, SANCCOB, Sea World Durban (housing the largest amount of birds), Tenikwa Wildlife Awareness Centre, Two Oceans Aquarium, and World of Birds. The total South African captive population amounts to 169 penguins, 65 of which are males, 83 of which are females, and 21 (or 12%) are of unknown sex. Given the parameters established through the studbook, in order to be able to maintain a stable population, which retains 90% of wild heterozygosity over 100 years, a

population size of approximately 150 animals needs to be maintained. This is well within the current carrying capacity of South Africa's captive population of 169 birds (Shaw pers Comm.).

2.2.10 The Species Role in Ecosystem

About 95% of seabirds are colonial breeders, and become central place foragers (Orians and Pearson 1979) in breeding seasons in order to brood and feed chicks. Being highly adapted to the environment in which they live, they are sensitive to ecosystem changes (Croxall 1992), and thus seabirds are highly vulnerable to threats at and around their breeding colonies.

Since seabirds are near-apex predators, they have the potential to provide an index of the health of marine ecosystems (Underhill and Crawford 2005). They are ocean samplers, and can be used as indicators of location and variability of marine resources, including those exploited by commercial fisheries (Berruti *et al.* 1993; Cherel and Weimerskirch 1995; Weimerskirch *et al.* 2008; Mullers and Navarro 2010), and also of ecosystem changes and changes in rates of fished resources (Crawford *et al.* 2002; Boersma 2008). Dietary data from top predators such as penguins are relatively inexpensive and easily obtained and are able to be collected at a more frequent and broader spatial scale that conventional oceanographic methods are not able to (Imber and Berruti 1981; Cherel and Weimerskirch 1995). The study of top predators such as the African Penguin, have been identified as a source of information useful in the management of prey resources and the detection of ecosystem change (Benguela Current Large Marine Ecosystem Top Predators Project Steering Committee 2007).

2.2.11 Threats

Section 3 discusses all known threats to the African Penguin. The threats which are thought to have had a substantial impact resulting in its current population status are briefly highlighted below.

Factors contributing to the decline in the early part of the 19th century included egg exploitation, habitat degradation and disturbance as a result of guano scraping (Frost *et al.* 1976b; Shannon and Crawford 1999). Official records since 1881 showed over 13 million eggs were removed in the 30 year period 1900–1930 (Frost *et al.* 1976b). The impact to the African Penguin was substantially more, since partially incubated eggs were discarded, and well incubated eggs were deliberately destroyed to induce the penguins to relay to allow the collection of freshly laid eggs (Frost *et al.* 1976b). Breeding birds were disturbed during this practise, causing nest desertion and predation on eggs and chicks by Kelp Gulls *Larus dominicanus* (Frost *et al.* 1976). Guano harvesting removed breeding habitat, and caused further disturbance to breeding birds causing nest abandonment and Kelp Gull predation on eggs and small chicks. Although this practise has since ceased, the build-up of guano deposits has been prevented due to the low numbers of seabirds in the 21st century. African Penguins are not able to make burrows in the guano and so in most colonies, now breed on the surface, exposing the adults and chicks to heat stress, and eggs and small chicks to kelp gull predation. These two practises resulted in poor recruitment into the population in the 1900s (Shannon and Crawford 1999).

Wolfaardt *et al.* (2009b) provided a review of the impact that oiling has had on seabirds in South Africa, particularly African Penguins and Cape Gannets. Two of the most notable oil spills the *Apollo Sea* in 1994 and the *Treasure* in 2000 (Underhill *et al.* 1999, 2006, Crawford *et al.* 2000; Barham *et al.* 2007; Wolfaardt *et al.* 2009b). These two spills not only oiled an estimated 10 000 and 19000 birds respectively, but Wolfaardt *et al.* (2008b) reported on the lower breeding productivity of de-oiled African Penguins. It is not only major spills that have an impact on this species. Chronic oiling through oil from leaking containers, or through the illegal practise of ships cleaning their bilges out at sea result in a number of penguins being oiled each year (Parsons and Underhill 2005).

Makhado (2009) documented the extent of Cape fur seal predation on South African breeding seabirds, a source of seabird mortality which is considered unsustainable at some colonies. The great white shark *Carcharodon carcharias* is known to predate on African Penguins (Johnson *et al.* 2006). The number of Kelp Gulls at some colonies has increased steadily at some colonies and is a source of predation pressure of African Penguin eggs and small chicks (Kemper *et al.* 2007a).

One of the most important current threats to African Penguins is considered to be the abundance and availability of prey (Crawford *et al.* 2007; Crawford *et al.* 2011b). In the Benguela Upwelling Ecosystem, changes in the relative abundance of sardine and anchovy have been linked to changes in diet, breeding population size and breeding success of various seabird populations, including Cape Gannet *Morus capensis*, African Penguin, Cape Cormorant *Phalacrocorax capensis*, and Swift Terns *Sterna bergii* populations (Crawford and Dyer 1995; Crawford 2003; Crawford *et al.* 2006a; 2007; Underhill *et al.* 2006). The reported eastward shift past Cape Agulhas in the relative distributions of both sardines (Coetzee et al. 2008) and anchovy adults (Roy *et al.* 2007) is considered to have resulted in a mismatch between fish availability and seabird breeding colonies during the summer spawning period, with significant implications for seabirds of the region (Crawford et al., 2011).

2.2.12 Known Diseases

Heavy infestation of the first 0.5 m of the small intestine of chicks by trematodes *Cardiocephaloides physalis* caused mortality of chicks and recently-fledged juveniles at St Croix Island (Randall and Bray 1983). Haemoparasites including avian malaria *Plasmodium relictum* was found in 22% of penguins at a mainland rehabilitation centre (SANCCOB) in the summer months (often with fatal outcome) but only in 0.7% of penguins from Saldanha Bay (Brossy 1992; Brossy *et al.* 1999). If diagnosed, malaria can be treated (Ellis *et al.* 1998). African Penguins are also infected by *Leucocytozoon tawaki* (Brossy 1993); an avian piroplasm *Babesia peircei*, for which the vector is probably the tick *Ornithodoros capensis* (Earlé *et al.* 1993; Brossy *et al.* 1999); and avian cholera *Pasteurella multocida* (Crawford *et al.* 1992). Other diseases affecting African Penguins include aspergillosis, pneumonia (viral or coccal) and Newcastle Disease. In captivity bumblefoot, may be caused by *Staphylococcus* bacteria associated with damp floors (Ellis *et al.* 1998). Captive birds may die of infections of *Salmonella typhimurium*, *Escherichia coli* and *Staphylococcus aureus* (Westphal and Rowan 1971).

2.2.13 Utilisation

Historically, penguins were killed for food, for fuel to supply ship boilers, and to be rendered down for their fat (Randall 1989). Egg collections may have been up to 48% of the total number of eggs produced and caused population decreases (Shannon & Crawford 1999). In 1897, 762 400 eggs collected; in 1899, 801 500 eggs; in 1905, 745 250 eggs. The last authorised egg collections were in 1967 (Shelton *et al.* 1984). Additionally, seabird guano (including African Penguin) was scraped from most colonies, impacting on the quality of their breeding habitat (Frost *et al.* 1976b, Shannon and Crawford 1999). These practices have sinced ceased in South Africa and utilisation of African Penguin products now no longer occurs.

2.2.14 Past Conservation Measures

Measures that have been taken to provide for the conservation of this species include the ceasing of egg collection and guano scraping at the breeding colonies where legislation has been gazetted to provide protection of this species in terms of utilisation and the protection of the breeding colonies.

Interventions during oil spills have included the rescue and rehabilitation of oiled birds, the translocation of non-oiled birds to prevent their becoming oiled and captive rearing and release of orphaned chicks (e.g. Crawford *et al.* 2000). Each of these interventions proved successful, although 27% of rehabilitated oiled birds did not breed and those that did had reduced breeding success and an increased cost of reproduction (Barham *et al.* 2006, 2007, 2008, Wolfaardt *et al.* 2008a,b, 2009a,b).

Shelters created to provide penguins with artificial nesting sites have been deployed at a number of colonies to improve breeding success. The removal of cats and alien predators from breeding colonies has also been carried out to reduce penguin mortality.

2.2.15 Socio-economic issues

Most colonies of African Penguins are inaccessible to the general public. Two mainland colonies (Boulders and Stony Point) however provide opportunities for the public to observe African Penguins in their natural habitat, and have become popular tourist destinations. The economic benefits of these colonies include the provision of income through gate fees, provision of jobs at the colonies, as well as associated tourism benefits to the surrounding areas. Negative interactions with neighbours to these areas as well as the risk of penguins being killed by road traffic is managed by the relevant authorities.

At Stony Point, the number of visitors to the colony increased from 42 870 in 2008 to 69 068 in 2010, with over 10 000 visitors to the colony recorded in December 2010 (McGeorge pers Comm). The Boulders colony in Simons town has c. 500 000 visitors annually (M Ruthenberg pers Comm).

A task team under the Pelagic Working Group of the Department of Agriculture Fisheries and Forestry is investigating the merits of closures to purse seine-fishing of all or part of regions surrounding African Penguin breeding colonies for pre-determined periods. Part of the terms of reference for this task team will be to consider the socio-economic implications of these proposed closures (fisheries 2011/SWG_PEL/Island Closure Task Team/02).

2.2.16 Research Inventory and Summary

The African Penguin is a well- researched species with well over 200 papers published on this species. It has been a focus of at least ten PhDs, as well as a number of Masters and Honours projects. Research has covered amongst others aspects such as breeding behaviour and annual cycles at a number of colonies, moult, foraging behaviour, movements between colonies, impact of oiling, diet, chick growth and condition.

The most populous colonies are regularly counted for breeding pairs and number of moulting adults and juveniles. These counts provide population estimates for this species. Re-sightings of individually marked birds are regularly conducted at a number of colonies.

2.3 Planning Methodology

2.3.1 The Role Players and organisations involved in developing and implementing the Biodiversity Management Plan

Role players include (Table 2):

- Those government departments (at a national, provincial and local level) that have been mandated in terms of legislation, to protect this species, and to implement the actions identified in this plan in order to ensure the survival of this species in the wild.
- Other government departments involved in regulating activities that may negatively impact the species.
- Tertiary institutions involved with research relevant to the species.
- permitted rehabilitation organisations that provide assistance with rehabilitation of African Penguins
- Captive institutions housing African Penguins for captive breeding, exhibition and educational purposes.
- Non-governmental organisations, at both a national and international level providing funding for research, students and projects.

Table 2: Organisations that are involved in developing and implementing various aspects of the African Penguin Biodiversity Management Plan.

National Government	Department of Agriculture, Forestry and Fisheries Department of Environmental Affairs (Biodiversity and Conservation) Department of Environmental Affairs (Oceans and Coasts) Robben Island Museum (Department of Arts and Culture) South African Maritime Safety Association South African National Biodiversity Institute South African National Parks
Provincial Government	Northern Cape Province: Department of Environment and Nature Conservation CapeNature Eastern Cape Province: Department of Economic Development and Environmental Affairs Ezemvelo KZN Wildlife Gauteng Province: Department Agriculture and Rural Development
Local Government	Overstrand Municipality
Academic Institutions	University of Bristol University of Cape Town: Animal Demography Unit University of Cape Town: Marine Research Institute University of Cape Town: Marine Resource Assessment and Management Group University of Cape Town: Percy FitzPatrick Institute of African Ornithology
Permitted Rehabilitation Facility	Penguins Eastern Cape South African Marine Rehabilitation and Education Centre SANCCOB
Captive Institution	East London Aquarium National Zoological Gardens of South Africa Port Elizabeth Museum at Bayworld South African Association for Marine Biological Research – uShaka Sea World Tenikwa Two Oceans Aquarium
Fishing Industry	Gansbaai Marine South African Pelagic Fishing Industry Association
Non-Government Organisations	BirdLife South Africa, Dyer Island Conservation Trust, WWF
Other	Leiden Conservation Fund Bristol Zoological Society National Research Council – Argentina

2.3.2 Process Followed to Compile the Biodiversity Management Plan

A stakeholder workshop was held in October 2010. The aim of the workshop was to identify threats to the African Penguin and measures to mitigate them. All discussions were captured in a proceeding (Shaw *et al.* 2011) and distributed to the stakeholders. The proceedings were used to compile the draft Biodiversity Management Plan for the African Penguin. This draft was compiled by representatives of

CapeNature and Department of Environmental Affairs (Oceans and Coasts). The sections of the draft Biodiversity Management Plan that contained the threats and actions were sent to the stakeholders for comment. These comments were then incorporated in the Biodiversity Management Plan, with all the supporting background information. The draft African Penguin Biodiversity Management Plan, will be submitted to the Department of Environmental Affairs to take it through the formal approval process.

2.3.3 Process Followed for Stakeholder Consultation

An email was sent out on the 26 March 2010 to a list of people known to be involved in African Penguin conservation alerting them to the intent of CapeNature and Department of Environmental Affairs (Oceans and Coasts) to draft a Biodiversity Management Plan for the species. They were asked to go through the list and recommend additional stakeholders that could contribute to the compilation of the Biodiversity Management Plan. The final list was used to inform stakeholders of the intent to draft the Biodiversity Management Plan for the African Penguin and to host a Stakeholder Workshop.

The Stakeholder Workshop was held in October 2010 where participants discussed threats to the African Penguin and suggested measures to mitigate them. The discussions of this workshop were incorporated into the Proceedings (Shaw *et al.* 2010), which were used to compile the first draft of the African Penguin Biodiversity Management Plan. The Threats (Section 3) and Action Plan (Section 4) component of the draft Biodiversity Management Plan was sent to all stakeholders for comment. Where applicable, these comments were incorporated into the draft African Penguin Biodiversity Management Plan by the Workshop Steering Committee.

2.3.4 Agreements to be developed with implementers of the Biodiversity Management Plan

The implementing agent for the Biodiversity Management plan is Department of Environmental Affairs specifically the Branch: Oceans and Coasts. For those actions where the responsible party for the action is other than Department of Environmental Affairs (Oceans and Coasts) those parties need to agree to the actions.

2.3.5 Relevant Documents, Agreements and Policies

A number of policies, conventions and acts are applicable to the African Penguin, the majority of which were adequately dealt with under Section 2 subsection 2.1. Furthermore the species has received a lot of attention both from management and research and most of the resulting documentation and research papers are included in Section 7.

2.3.6 Verification and approval by experts on quality and context of the species related issues

The stakeholders who have been involved in the compilation of this Biodiversity Management Plan include the leading experts on this species and related issues. They have provided input and commented on this plan throughout the compilation process.

3 THREATS

3.1 Legislative Framework

The function of biodiversity conservation has concurrent competency whereby various organs of state in the national and provincial spheres of government have the mandate to develop and implement legislative provisions (various acts/ ordinances/ by-laws) aimed at penguin conservation. This has led to legislative provisions and the implementation thereof being fragmented, inconsistent or even outdated. Furthermore the interpretation of these provisions is inconsistent and there may be ineffective inter- and intra-governmental communication. In short the principle of cooperative governance has not been achieved, leading to penguin conservation not being adequately addressed. The recent transfer of some functions of the then Marine and Coastal Management branch of the Department of Environmental Affairs to the Department of Agriculture, Fisheries and Forestry has further clouded the legal issue in that the mandates to implement and enforce the various pieces of legislation have not been clearly defined. This has resulted in overlapping management decisions, unclear permitting responsibilities and confusion amongst stakeholders. In addition the breeding range of the African Penguin extends outside South African waters and there are no formal agreements between the countries (South Africa and Namibia) to manage the penguin population in its entirety.

3.2 Anthropogenic Impacts

The African Penguin is restricted to breeding at ca. 28 sites of which the majority are offshore islands. There is a lack of suitable alternative sites on the southern African coast line and anthropogenic actions may have contributed to the decline of colonies in the past, e.g. the construction of a land-bridge and renovation of buildings at Bird Island, Lambert's Bay and a breakwater at Marcus Island. At the colony scale, nesting habitat has been removed or degraded at a number of colonies, causing birds to nest on the surface in some cases, or to utilise lower quality nesting habitat (e.g. vegetation). Surface nesting birds are susceptible to heat stress and flooding, as well as more likely to suffer predation (both aerial and terrestrial). Surface nesting may have also rendered birds more susceptible to displacement (e.g. by seals) and disturbance (e.g. by humans). Guano scraping is still a threat at some colonies in Namibia. Other disturbance to birds on land, which may cause increased stress, abandonment of chicks and/or eggs, destruction of nests and impacts on survival, usually results from direct human presence in the colony due to, amongst others, research, filming, eco-tourism and poaching. Fire and vehicle strikes are potential threats at specific colonies and also need to be considered. At sea impacts on penguins include those that interfere with foraging behaviour or directly influence behaviour at sea - for example boat strikes, incidental by-catch of birds in fishing operations and ghost nets.

A number of institutions keep African Penguins in captivity, most of which are birds going through the process of rehabilitation. There are also a number of birds that are kept in captivity for exhibition purposes and/or may form part of a co-ordinated captive breeding programme depending on the outcomes of a modeling and viability exercise currently underway. The species is currently

listed under Appendix II of the CITES Convention and international trade is therefore regulated according to this Convention's guidelines. Movement between captive populations in South Africa is however regulated by a permitting system in accordance with relevant national or provincial ordinances or acts. Despite this level of control over the movement of African Penguins there is a lack of knowledge on the current level of trade, the status of some as yet unmanaged captive populations and the impact of trade on wild populations. Furthermore monitoring of birds entering rehabilitation centres is limited and it is possible that this could be a source of African Penguins for the captive industry outside of professional conservation led zoo associations. The suitability of captive birds for release into the wild (especially those that have been in rehabilitation for long periods and those that have been bred in captivity) needs to be assessed, controlled and monitored as this action could have detrimental effects on the wild populations of African Penguins due to genetic contamination and the introduction of diseases.

3.3 Fish and Fishing

The primary prey species of African Penguins in South Africa are sardine and anchovy. Because fisheries, and in particular the small pelagic industry, are targeting the same prey as penguins, they must reduce the total food available for the birds to some extent.

African Penguins, when breeding, have a limited foraging range. Insufficient food within the foraging area may affect breeding success, recruitment processes (of penguins) and survival. In addition, in order to survive the fasting moult period, adequate prey needs to be available prior to the African Penguin moulting season.

There may be a spatial mismatch between catches of adult sardine by the fishing industry and the actual location of this species. In years of low fish abundance/availability, competition between penguins and the pelagic fishery may have been higher where foraging ranges and fishing areas overlap. In some localities, the fishery may further reduce fish availability on a temporal and spatial scale that could impact penguins during periods of high energy demands. There is thus possible competition with fisheries around breeding colonies.

Data at the finer temporal and spatial scales are needed to better understand the relationships between penguin reproductive success, survival and recruitment processes and food availability around islands.

Currently research and management has focused on the small pelagic fishery and the impacts on African Penguins. There is a need to investigate potential impacts of other commercial fishing sectors (e.g. squid fisheries) on disturbance to and mortality of African Penguins.

3.4 Natural Threats

Predation on African Penguins (adults, chicks and eggs) is a natural phenomenon and has always occurred. Predation by Kelp Gulls and Cape fur seals has been recorded at some African Penguin colonies. These levels are in some instances unsustainable and occur due to numbers of Kelp Gulls increasing at some colonies and learned behaviours of Cape fur seals. Shark predation has probably always existed, but the levels are unknown and it is difficult to determine if they are having an impact on the African Penguin population. The impact of introduced predators to islands, such as mice, rats and small carnivores, has been well documented in the literature and measures need to be taken to remove predators where they occur and have a harmful impact, and to restrict them from colonising islands. Mainland colonies are at risk from many of the natural predators (jackals, mongoose, genets, etc.) and "introduced" predators (dogs, cats, mice etc.) that easily gain access to the colonies. While the threat of predation is common knowledge, there is a lack of information regarding the impact that species-specific predation has on the African Penguin and this needs to be addressed through further research.

3.5 Catastrophic Events

The most important catastrophic events that have affected African Penguin in recent times are oil spills; for example the spill from the MV Treasure in 2000 impacted around 40% of the world population at that time. Continuing chronic oiling events affect several hundred penguins every year. The effects of oil on penguins include the loss in waterproofing that results in hypothermia, dehydration, starvation and oil may have long-term physiological impacts on penguins. While the rehabilitation and release of oiled African Penguins has been shown to be an effective conservation management intervention, some oiled birds have had lower reproductive success than un-oiled birds. Survivorship of oiled birds is sometimes compromised. Oiling events also disrupt the breeding season, leading to chick mortality and interruption of pair bonds.

Disease outbreaks in South Africa have had a significant impact on seabird species such as the Cape Cormorant. While disease has not had a major impact on the African Penguin, there is potential that this could occur. It is unclear to what extent impacts such as noise, air, physical and thermal pollution, as well as exposure to hazardous and noxious substances (H&NS) have on the African Penguin and this needs to be clarified.

3.6 Research

Although there is considerable knowledge available regarding the African Penguin, there are important gaps that are necessary to fill in order to formulate effective conservation management strategies. Furthermore, there is no overall research strategy stipulating research priorities for the species. In addition there are problems with data collection, capture and storage, which, combined with a limited analytical capacity and lack of data sharing agreements, result in delayed analysis of data and feedback to all organisations managing colonies.

3.7 Education and Awareness

There is a general lack of understanding both within stakeholder groups and amongst the broader public with regard to various aspects concerning the African Penguin. This is probably due to the various stakeholders involved with, or impacting on, African Penguins not being able to cooperate, collaborate or share information, or working in isolation. The importance of supplying correct, concise information via the various media options needs to be addressed.

4) ACTION PLAN

4.1 Legislative Framework

Objective 4.1.1
To implement the African Penguin Biodiversity Management Plan.

Action 4.1.1.1: Establish a Steering Committee for the implementation of the African Penguin Biodiversity Management Plan and develop the terms of reference for the Steering Committee.	
Responsible Party	Department of Environmental Affairs (Oceans and Coasts)
Collaborators	Mandated authorities
Timeline	Within six months of the Biodiversity Management Plan being gazetted
Resources Needed	Internal
Indicator	Steering Committee established with Terms of Reference

Objective 4.1.2
To review and align applicable legislation, define mandates and investigate the development of an international agreement.

Action 4.1.2.1: Identify and list all legislation applicable to the African Penguin.	
Responsible Party	Department of Environmental Affairs (Oceans and Coasts in consultation with Biodiversity and Conservation) through the Steering Committee
Collaborators	Relevant authorities mandated with applicable legislation
Timeline	Within one year of the Biodiversity Management Plan being gazetted
Resources Needed	Internal and legal expertise
Indicator	Document listing relevant legislation

Action 4.1.2.2: Identify shortcomings and overlap of existing legislation with regard to conservation of the African Penguin.	
Responsible Party	Department of Environmental Affairs (Oceans and Coasts in consultation with Biodiversity and Conservation) through the Steering Committee
Collaborators	Relevant authorities mandated with applicable legislation
Timeline	Within two years of the Biodiversity Management Plan being gazetted
Resources Needed	Internal and legal expertise
Indicator	A report on legislative shortcomings

Action 4.1.2.3: Recommend amendments to legislation to cover shortfalls and overlaps identified in 4.1.2.2.	
Responsible Party	Department of Environmental Affairs (Oceans and Coasts in consultation with Biodiversity and Conservation) through the Steering Committee
Collaborators	Relevant authorities mandated with applicable legislation
Timeline	Within the time frame of the gazetted Biodiversity Management Plan
Resources Needed	Internal and legal expertise
Indicator	Recommended legislative amendments

Action 4.1.2.4: Clarify mandates and responsibilities of all authorities.	
Responsible Party	Department of Environmental Affairs (Oceans and Coasts) through the Steering Committee
Collaborators	Relevant authorities mandated with applicable legislation
Timeline	Within the time frame of the gazetted Biodiversity Management Plan
Resources Needed	Internal and legal expertise
Indicator	Document defining mandates for all authorities

Action 4.1.2.5: a) Investigate mechanism under which cooperative management with Namibia can be undertaken regarding conservation and management of the African Penguin and b) explore the establishment of such cooperation.	
Responsible Party	Department of Environmental Affairs (Oceans and Coasts in consultation with Biodiversity and Conservation)
Collaborators	Relevant Authorities
Timeline	a) Within two years of the Biodiversity Management Plan being gazetted b) Within the time frame of the gazetted Biodiversity Management Plan
Resources Needed	Internal and legal expertise
Indicator	Document making recommendations with regard to the establishment of cooperation with Namibia

Objective 4.1.3

To ensure effective compliance and enforcement of restricted and listed activities, particularly in terms of the National Environmental Management Act (Act No. 107 of 1998) and related acts.

Action 4.1.3.1: Communicate to Western Cape Province: Department of Environmental Affairs Development and Planning, Eastern Cape Province: Department of Economic Development and Environmental Affairs and relevant municipal planning sections to highlight African Penguin breeding colonies when developments are planned in close proximity and advise that Environmental Impact Assessment applications must follow the correct approval and commenting process.	
Responsible Party	Department of Environmental Affairs (Oceans and Coasts in consultation with Biodiversity and Conservation)
Collaborators	None
Timeline	Within six months of the Biodiversity Management Plan being gazetted
Resources Needed	Internal
Indicator	Letters to Western Cape Province: Department of Environmental Affairs Development and Planning, Eastern Cape Province: Department of Economic Development and Environmental Affairs and relevant municipal planning sections

Objective 4.1.4

To clarify and communicate permitting procedures

Action 4.1.4.1: Document the national and provincial permit process for issuing permits for export, import, transport, holding, and rehabilitation, establishment of new captive institutions, commercial activities and research of African Penguins.	
Responsible Party	Department of Environmental Affairs (Oceans and Coasts, Biodiversity and Conservation) through the Steering Committee
Collaborators	Relevant Provincial Conservation Authorities and SANParks
Timeline	Within 2 years of the Biodiversity Management Plan being gazetted
Resources Needed	Internal
Indicator	Document re. permit process made available to interested and affected parties

Objective 4.1.5

To secure the protected status of all extant African Penguin colonies, including those not currently formally protected, and to consider the establishment of new breeding sites.

Action 4.1.5.1: Enter into a stewardship agreement (Contract Stewardship and Management Agreement) with the Overstrand Municipality in order to secure protection of the Stony Point Colony.	
Responsible Party	CapeNature
Collaborators	Overstrand Municipality
Timeline	Within the time frame of the gazetted Biodiversity Management Plan
Resources Needed	Internal
Indicator	Management agreement and Stewardship Contract in place

Action 4.1.5.2: Investigate mechanisms including a possible stewardship agreement to protect the African Penguin at Simons Town.	
Responsible Party	City of Cape Town Municipality, CapeNature
Collaborators	SANParks
Timeline	Within the time frame of the gazetted Biodiversity Management Plan
Resources Needed	Time
Indicator	Management agreement or Stewardship Contract in place

Action 4.1.5.3: Investigate the legal framework within which an Integrated Conservation Management Plan for Robben Island can be developed, which would ensure adequate protection of the penguins.	
Responsible Party	Department of Environmental Affairs (Oceans and Coasts, Legal Services)
Collaborators	Robben Island Museum, CapeNature
Timeline	Within three years of the Biodiversity Management Plan being gazetted
Resources Needed	Internal
Indicator	Legal opinion drafted indicating mechanisms and responsibilities

Action 4.1.5.4: Ensure on an ongoing basis a formal protected area status of all other localities that contain African Penguin breeding colonies.	
Responsible Party	Department of Environmental Affairs (Oceans and Coasts) through the Steering Committee
Collaborators	Management authorities
Timeline	Within the time frame of the gazetted Biodiversity Management Plan
Resources Needed	Internal
Indicator	Protected area proclamations

Action 4.1.5.5: Ensure that actions of the Biodiversity Management Plan for the African Penguin are incorporated into the Protected Area Management Plans.	
Responsible Party	Management authorities
Collaborators	Department of Environmental Affairs (Oceans and Coasts)
Timeline	Within the time frame of the gazetted Biodiversity Management Plan
Resources Needed	Internal
Indicator	Protected Area Management Plans

Action 4.1.5.6: Investigate the desirability and feasibility of attempting to establish new/re-establishing old African Penguin colonies.	
Responsible Party	Department of Environmental Affairs (Oceans and Coasts, Ocean and Coastal Research) through the Steering Committee
Collaborators	Relevant conservation authorities and Non-governmental Organisations
Timeline	Within the time frame of the gazetted Biodiversity Management Plan
Resources Needed	Internal and external
Indicator	Document on the desirability and feasibility of attempting to establish new/re-establishing old African Penguin colonies

4.2 Anthropogenic Impacts

Objective 4.2.1
To improve breeding habitat for African Penguins

Action 4.2.1.1: Establish a Working Group to advise on improvement and maintenance of breeding habitat.	
Responsible Party	Department of Environmental Affairs (Oceans and Coasts) through the Steering Committee
Collaborators	None
Timeline	Within one year of the Steering Committee's first meeting.
Resources Needed	Internal
Indicator	Establishment of Working Group with Terms of reference

Action 4.2.1.2: Working Group to oversee the research of artificial nest suitability and, if deemed appropriate, to develop guidelines for their manufacture, deployment and assessment.	
Responsible Party	Working Group
Collaborators	Management authorities, Overstrand Municipality, City of Cape Town, Robben Island Museum, tertiary institutions and non-governmental organisations
Timeline	Within the time frame of the gazetted Biodiversity Management Plan
Resources Needed	Internal and external
Indicator	a) document that assesses suitability of artificial nests b) guidelines for manufacture and deployment of appropriate nests if design deemed suitable

Action 4.2.1.3: Working Group to advise and develop guidelines for management of breeding habitats, including identification of sites suitable for restorative or rehabilitative actions.	
Responsible Party	Working Group
Collaborators	Management authorities, Overstrand Municipality, City of Cape Town, Robben Island Museum, tertiary institutions and non-governmental organisations
Timeline	Within two years of the establishment of the Working Group
Resources Needed	Internal and external
Indicator	Breeding habitat management guidelines

Objective 4.2.2
To minimise disturbance and incidents of road mortality at breeding colonies.

Action 4.2.2.1: Develop and implement guidelines to minimise disturbance and prevention of road mortality.	
Responsible Party	Department of Environmental Affairs (Oceans and Coasts) through the Steering Committee
Collaborators	Management authorities, Overstrand Municipality, City of Cape Town, Robben Island Museum, tertiary institutions and non-governmental organisations
Timeline	Within three years of the Biodiversity Management Plan being gazetted
Resources Needed	Internal and external
Indicator	Guideline document on minimising disturbance and road mortality

Action 4.2.2.2: Investigate and evaluate the efficacy of air restrictions over breeding colonies.	
Responsible Party	Department of Environmental Affairs (Oceans and Coasts) through the Steering Committee
Collaborators	Relevant Management Authorities, Overstrand Municipality, City of Cape Town, Robben Island Museum, South African Civil Aviation Authority, South African National Air Force
Timeline	Within the time frame of the Biodiversity Management Plan
Resources Needed	Internal and legal expertise
Indicator	Document findings and recommended actions

Objective 4.2.3

To minimise human disturbance of African Penguins at sea around breeding localities.

Action 4.2.3.1: Investigate the possibility of placing permanent or temporary exclusion/buffer zones around breeding localities and develop guidelines (e.g. routing of boats and ship traffic).	
Responsible Party	Department of Environmental Affairs (Oceans and Coasts) through the Steering Committee
Collaborators	Relevant Management Authorities, Overstrand Municipality, City of Cape Town, Robben Island Museum, Harbour authorities, South African Maritime Safety Authority
Timeline	Within the time frame of the gazetted Biodiversity Management Plan
Resources Needed	Legal input, time, data
Indicator	Document findings and recommended actions

Objective 4.2.4

To account for and regulate all penguins kept in captivity in South Africa, and to determine guidelines for rehabilitation and release of penguins.

Action 4.2.4.1: Penguins in captivity within South Africa that cannot be rehabilitated must be uniquely identified and recorded in the African Penguin stud-book.	
Responsible Party	Department of Environmental Affairs (Biodiversity and Conservation) (National) and relevant provincial conservation authorities (Provincial) or as determined under Action 4.1.2.4
Collaborators	PAAZAB, appointed African penguin studbook keeper, and all other South African captive facilities
Timeline	Within the timeframe of the Biodiversity

	Management Plan with updates as and when required
Resources Needed	Internal and external
Indicator	a) Appropriate permit conditions b) Completed and maintained studbook

Action 4.2.4.2: Establish guidelines and permit conditions for rehabilitation centres for penguins that can be rehabilitated to be released into the wild.	
Responsible Party	Department of Environmental Affairs (Oceans and Coasts in consultation with Biodiversity and Conservation) through the Steering Committee
Collaborators	Relevant mandated authorities and rehabilitation centres
Timeline	Within one year of the Biodiversity Management Plan being gazetted
Resources Needed	Internal
Indicator	a) Guidelines guiding the rehabilitation and release of African Penguins into the wild b) Permit condition

Action 4.2.4.3: Finalize and implement minimum standards and protocols for a) seabird rehabilitation and rehabilitation facilities and b) facilities where seabirds are kept in captivity for purposes other than for rehabilitation.	
Responsible Party	Department of Environmental Affairs (Oceans and Coasts) through the Steering Committee
Collaborators	Provincial Conservation Authorities, South African Bureau of Standards, Permitted rehabilitation centres
Timeline	Within three years of the Biodiversity Management Plan being gazetted
Resources Needed	Internal and external
Indicator	a) Finalized minimum standards document including an implementation and evaluation plan for rehabilitation centres b) Finalized minimum standards document including an implementation and evaluation plan for other facilities other than rehabilitation centres

Objective 4.2.5

To account for and regulate trade in African Penguins.

Action 4.2.5.1: Preclude international trade in wild-caught penguins.	
Responsible Party	Department of Environmental Affairs (Biodiversity and Conservation in consultation with Oceans and Coasts)
Collaborators	Provincial Conservation Authorities
Timeline	Within three years of the Biodiversity Management Plan being gazetted
Resources Needed	Internal
Indicator	Decision from Department of Environmental Affairs

Action 4.2.5.2: Regulate the national and international trade on non-wild caught penguins through permits.	
Responsible Party	Department of Environmental Affairs (Oceans and Coasts, Biodiversity and Conservation),
Collaborators	As identified by the "Responsible Party"
Timeline	Within one year of the Biodiversity Management Plan being gazetted
Resources Needed	Funding and time
Indicator	Permits and relevant documentation

Objective 4.2.6

To halt, and if possible reverse, further decline or loss of colonies and to prevent further fragmentation of the African Penguin population.

Action 4.2.6.1: a) Appoint a Working Group to b) formalise guidelines for rescuing, rearing and releasing chicks that are unlikely to survive without intervention and c) advise on the suitability of bolstering existing colonies and the establishment of new colonies with orphaned and possible captive-bred penguins.	
Responsible Party	Department of Environmental Affairs (Oceans and Coasts) through the Steering Committee
Collaborators	Conservation management bodies, permitted rehabilitation centres, South African National Biodiversity Institute
Timeline	a) within one year of Biodiversity Management Plan being gazetted b) within one year of Working Group established c) within three years of Working Group established

Resources Needed	Internal and external
Indicator	a) establishment of working group b) guidelines for rescuing, rearing and releasing abandoned chicks c) document advising on the suitability of bolstering existing colonies and the establishment of new colonies with orphaned and possible captive-bred penguins

Action 4.2.6.2: Compile guidelines relating to the release of captive bred penguins from South African and international captive institutions into wild populations.	
Responsible Party	Department of Environmental Affairs (Oceans and Coasts, Ocean Conservation, Biodiversity and Conservation)
Collaborators	Relevant conservation authorities, captive institutions, tertiary institutions and non-governmental organisations.
Timeline	Within the time frame of the gazetted Biodiversity Management Plan
Resources Needed	Internal
Indicator	a) Guidelines for the release of captive bred penguins b) Permit conditions

Action 4.2.6.3: Capture, raise and release chicks that are unlikely to survive without intervention.	
Responsible Party	Management authorities, Overstrand Municipality, City of Cape Town, Robben Island Museum.
Collaborators	SANCCOB, permitted rehabilitation centres, Bristol Zoological Society and Department of Environmental Affairs (Oceans and Coasts)
Timeline	Ongoing
Resources Needed	Internal and external
Indicator	Annual rehabilitation reports

Action 4.2.6.4: Investigate possible collaboration with fishing industry to provide pelagic fish for birds in care during large oil spills and to feed rescued chicks.	
Responsible Party	Department of Agriculture, Forestry and Fisheries
Collaborators	South African Pelagic Fishing Industry Association,

	permitted rehabilitation centres
Timeline	Within one year of the Biodiversity Management Plan being gazetted
Resources Needed	Internal and external
Indicator	a) letter of support from industry b) provision of fish to feed rescued birds and chicks at permitted rehabilitation centres

4.3 Fish and Fishing

Objective 4.3.1

To ensure an adequate abundance of prey for penguins.

Action 4.3.1.1: Attempt to ensure adequate prey for penguins a) in areas close to their breeding localities and b) during non-breeding periods of their life cycle.	
Responsible Party	Department of Agriculture, Forestry and Fisheries and Department of Environmental Affairs (Oceans and Coasts)
Collaborators	Management authorities, Overstrand Municipality, City of Cape Town, Robben Island Museum, tertiary institutions and non-governmental organisations and relevant stakeholders.
Timeline	Ongoing
Resources Needed	Internal and external
Indicator	Annual recommendations

Action 4.3.1.2: Investigate and monitor the possible impact of fishing near penguin colonies on the biology of African Penguins.	
Responsible Party	Department of Environmental Affairs (Oceans and Coasts) through the Steering Committee
Collaborators	Department of Agriculture, Forestry and Fisheries SANParks, CapeNature, University of Cape Town's Animal Demography Unit, Percy FitzPatrick Institute of African Ornithology, Marine Resource Assessment and Management Group, Robben Island Museum and University of Bristol
Timeline	An island closure feasibility study is already underway, to be concluded by 2014
Resources Needed	Internal and external
Indicator	a) Report from feasibility study b) Decision regarding full experiment

Action 4.3.1.3: Undertake small boat surveys to measure local penguin prey abundance around selected localities throughout the year.	
Responsible Party	Department of Agriculture, Forestry and Fisheries
Collaborators	Organisations represented by participants of the Island Closure Task Team
Timeline	Surveys until end of feasibility study with possible continuation until end of experiment considered under action 4.3.1.2
Resources Needed	Small boats and acoustic equipment, availability of suitably qualified staff, and funding
Indicator	Annual reports on survey results

Action 4.3.1.4: Continue monitoring long term distribution and abundance of pelagic fish.	
Responsible Party	Department of Agriculture, Forestry and Fisheries
Collaborators	Department of Environmental Affairs (Oceans and Coasts), relevant tertiary institutions
Timeline	Ongoing
Resources Needed	Internal and ship time
Indicator	Annual Pelagic Working Group documents and State of Resources Report

Action 4.3.1.5: Investigate relationships between long term abundance and distribution of pelagic fish and its catch on African Penguin numbers.	
Responsible Party	Department of Environmental Affairs (Oceans and Coasts), Department of Agriculture, Forestry and Fisheries
Collaborators	SANBI, CapeNature, , SANParks, University of Cape Town's Animal Demography Unit, Percy FitzPatrick Institute of African Ornithology, Marine Resource Assessment and Management Group.
Timeline	Within the timeframe of Biodiversity Management Plan
Resources Needed	Internal and statistical expertise
Indicator	Research report

Action 4.3.1.6: Develop models and procedures to incorporate findings in 4.3.1.5 in management of small pelagic fish stocks.	
Responsible Party	Department of Agriculture, Forestry and Fisheries
Collaborators	South African National Biodiversity Institute, University of Cape Town's Marine Resource

	Assessment and Management Group, University of Cape Town's Marine Research Institute, BirdLife South Africa, CapeNature and Department of Environmental Affairs (Oceans and Coasts), SANParks
Timeline	Within three years of the Biodiversity Management Plan being gazetted
Resources Needed	Internal
Indicator	a) completed models b) model selection c) management procedures

Action 4.3.1.7: Investigate the possibility of implementing spatial fishery management strategies that address spatial mismatches between fish location and catches to the benefit of the African Penguin.	
Responsible Party	Department of Agriculture, Forestry and Fisheries
Collaborators	Small Pelagic Scientific Working Group
Timeline	Within the 5 year time frame of the gazetted Biodiversity Management Plan
Resources Needed	Internal
Indicator	Recommendation to Chief Director Marine Resource Management regarding spatial management

4.4 Threats from Predators

Objective 4.4.1

Improve survival rates of African Penguins during all their life cycle stages by preventing or reducing predation impacts.

Action 4.4.1.1: a) Develop and b) implement guidelines around the management of natural predators in relation to African Penguins (e.g. Cape fur seals and Kelp Gulls).	
Responsible Party	Department of Environmental Affairs (Oceans and Coasts) through the Steering Committee
Collaborators	CapeNature, SANParks, Northern Cape Province: Department of Environment and Nature Conservation, Robben Island Museum, Overstrand Municipality, Tertiary Institutions
Timeline	Within three years of the Biodiversity Management Plan being gazetted
Resources Needed	Internal, external, specialist skills and equipment
Indicator	a) guideline document b) reduced predation events

Action 4.4.1.2: Develop and implement a program for the control of introduced alien predators at colonies that have harmful impacts on African Penguins.	
Responsible Party	Management authorities, Overstrand Municipality, City of Cape Town, Robben Island Museum.
Collaborators	Relevant tertiary institutions and non-governmental organisations
Timeline	Within one year of the Biodiversity Management Plan being gazetted
Resources Needed	Internal, external, specialist skills and equipment
Indicator	Control programme developed and implemented

Action 4.4.1.3: Develop and implement guidelines to prevent introduction of alien predators to islands.	
Responsible Party	a) Department of Environmental Affairs (Oceans and Coasts) through the Steering Committee b) Management authorities, Overstrand Municipality, City of Cape Town, Robben Island Museum.
Collaborators	Relevant tertiary institutions and non-governmental organisations
Timeline	Within one year of the Biodiversity Management Plan being gazetted
Resources Needed	Funding, time, skilled human capacity
Indicator	Guideline document completed and implemented

Objective 4.4.2

To improve scientific monitoring and understanding of the scale of predation, as well as the effectiveness of actions implemented.

Action 4.4.2.1: Develop monitoring and research guidelines and programmes to evaluate the impact that any predation has on the African Penguin and the effectiveness of any mitigation measures implemented.	
Responsible Party	Working Group established by Action 4.6.1.1
Collaborators	Department of Environmental Affairs (Oceans and Coasts), CapeNature, SANParks, Robben Island Museum, Overstrand Municipality, tertiary institutions, permitted rehabilitation centres and non-governmental organisations
Timeline	Within two years of the establishment of Working Group
Resources Needed	Internal and external
Indicator	Monitoring and research programme to determine impacts of predation on the African Penguin.

4.5 Catastrophic Events

Objective 4.5.1

To minimise the impact of pollution (Oil, Hazardous and Noxious Substances) on African Penguins through a) preventing spills, b) ensuring adequate preparedness, c) appropriate response and d) monitoring success

Action 4.5.1.1: Reasonable measures be taken to prevent pollutants, especially oil, entering the water and impacting African Penguins and their habitat.	
Responsible Party	South African Maritime Safety Authority
Collaborators	Department of Environmental Affairs (Oceans and Coasts) and Department of Transport
Timeline	Ongoing
Resources Needed	Operational budget, infrastructure and skilled capacity
Indicator	Marine Notices and annual report to DEA via Department of Transport

Action 4.5.1.2: South Africa to: a) promote and enforce the Southern South African Special Waters Area b) monitor compliance regarding the Southern South African Special Waters Area c) create awareness of safe shipping practices with the aim to reduce pollution of the marine environment	
Responsible Party	South African Maritime Safety Authority
Collaborators	Department of Transport, Department of Environmental Affairs (Oceans and Coasts)
Timeline	Ongoing
Resources Needed	Operational budget, infrastructure and skilled capacity
Indicator	Annual report to DEA via Department of Transport

Action 4.5.1.3: Continue with: a) long-range identification and tracking (LRI&T) of vessels at sea b) Satellite Automatic Identification System to identify likely vessels responsible for released pollution in order to take action.	
Responsible Party	South African Maritime Safety Authority
Collaborators	Department of Transport, Department of Environmental Affairs (Oceans and Coasts)
Timeline	Ongoing
Resources Needed	Satellite subscription time
Indicator	Signed contract, and documented fulfilment of contractual obligations

Action 4.5.1.4: Investigate the effectiveness of environmental surveillance to identify oil spills.	
Responsible Party	South African Maritime Safety Authority
Collaborators	Department of Environmental Affairs (Oceans and Coasts), Department of Transport
Timeline	Ongoing
Resources Needed	Internal
Indicator	Document on effectiveness of different technologies

Action 4.5.1.5: Conduct a Risk Assessment for spills of Oil and Hazardous and Noxious Substances to inform strategies within the National Oil Spill Contingency Plan.	
Responsible Party	South African Maritime Safety Authority
Collaborators	Department of Environmental Affairs (Oceans and Coasts), Department of Transport
Timeline	Within two years of the Biodiversity Management Plan being gazetted
Resources Needed	Risk Assessment consultants
Indicator	A Risk Assessment Document

Action 4.5.1.6: Update the Environmental Sensitivity Atlas to identify areas (all colonies and areas used by both foraging breeders and non-breeders) that are particularly vulnerable to pollution. These findings to be included in regional oil spill response plans.	
Responsible Party	Department of Environmental Affairs (Oceans and Coasts) through the Steering Committee
Collaborators	South African Maritime Safety Authority, Department of Transport
Timeline	Within two years of the Biodiversity Management Plan being gazetted
Resources Needed	Internal
Indicator	Recommendation for updates/amendments to regional oil spill response plans

Action 4.5.1.7: Identify wrecks along the South African coastline that have the potential to cause chronic pollution.	
Responsible Party	South African Maritime Safety Authority
Collaborators	South African National Hydrographer, Department of Environmental Affairs (Oceans and Coasts)
Timeline	Within two years of the Biodiversity Management Plan being gazetted
Resources Needed	Internal
Indicator	Document detailing the location of identified wrecks that may be leaking pollutants

Action 4.5.1.8: Determine, document and implement actions to prevent oil from escaping from the wrecks identified in Action 4.5.1.7.	
Responsible Party	South African Maritime Safety Authority
Collaborators	Department of Environmental Affairs (Oceans and Coasts)
Timeline	Within three years of the Biodiversity Management Plan being gazetted
Resources Needed	Internal and specialist skills
Indicator	a) Document outlining steps to be taken to mitigate the potential escape of pollutants b) A report on actions that have been taken to prevent oil from escaping from vessels identified in 4.5.1.7.

Action 4.5.1.9: Develop and maintain the National Oil Spill Contingency Plan.	
Responsible Party	Department of Environmental Affairs (Oceans and Coasts)
Collaborators	Department of Transport, SAMSA and additional stakeholders identified in the draft National Oil Spill Contingency Plan
Timeline	Within 12 months of the Biodiversity Management Plan being gazetted, and annually thereafter
Resources Needed	Internal
Indicator	Annual updated National Oil Spill Contingency Plan distributed to all stakeholders

Action 4.5.1.10: Regularly update and maintain Regional Oil Spill Contingency Plans.	
Responsible Party	Department of Environmental Affairs (Oceans and Coasts, Integrated Coastal Management)
Collaborators	South African Maritime Safety Authority and stakeholders identified in Regional Oil Spill Contingency Plans
Timeline	Within one year of the Biodiversity Management Plan being gazetted and annually thereafter
Resources Needed	Internal
Indicator	Annual updated Regional Oil Spill Contingency Plans distributed to all stakeholders

Action 4.5.1.11: Develop and regularly update individual African Penguin colony oil spill contingency plans (in line with the National Oil Spill Contingency Plan). These plans are to include shoreline clean up strategies for the islands.	
Responsible Party	Management authorities, Robben Island Museum, Overstrand Municipality and City of Cape Town
Collaborators	Department of Environmental Affairs (Oceans and Coasts, Integrated Coastal Management), South African Maritime Safety Authority and permitted seabird rehabilitation centres
Timeline	Within two years of the Biodiversity Management Plan being gazetted and annually thereafter
Resources Needed	Internal
Indicator	Updated colony oil spill contingency plan

Action 4.5.1.12: Conduct training in order to familiarise and train stakeholders with updated oil spill contingency plans and mitigation and response techniques.	
Responsible Party	Department of Environmental Affairs (Marine and Coastal Pollution)
Collaborators	Stakeholders identified in oil spill contingency plan, South African Maritime Safety Authority
Timeline	Within one year of the Biodiversity Management Plan being gazetted and annually thereafter
Resources Needed	Time and budget for workshops
Indicator	Workshop reports

Action 4.5.1.13: Effective monitoring for oil pollution through aerial flights	
Responsible Party	Department of Environmental Affairs (Marine and Coastal Pollution)
Collaborators	N/A
Timeline	a) Within two years of the Biodiversity Management Plan being gazetted b) Ongoing
Resources Needed	Funding, equipment, skilled personnel
Indicator	a) Strategy to monitor through aerial flights b) Effective aerial monitoring

Objective 4.5.2
To monitor the impact of oil pollution on the penguins

Action 4.5.2.1: Ongoing monitoring to determine the number of birds impacted in oiling events and the success of implemented response measures.	
Responsible Party	Management authorities, Overstrand Municipality, City of Cape Town, Robben Island Museum.
Collaborators	University of Cape Town's African Bird Ringing Unit, permitted rehabilitation centres, relevant tertiary institutions and Department of Environmental Affairs (Oceans and Coasts)
Timeline	Ongoing
Resources Needed	Internal and external
Indicator	Annual monitoring report

Action 4.5.2.2: Build a bank of oiled feathers for oil fingerprinting analysis.	
Responsible Party	SANCCOB
Collaborators	Permitted rehabilitation centres
Timeline	Ongoing
Resources Needed	External
Indicator	Annual report on bank of feather samples

Objective 4.5.3
To minimise the impact of hazardous & noxious substances (toxic), marine litter, physical, air, noise and thermal pollution (other than oil) on the African Penguin.

Action 4.5.3.1: Document potential impacts of pollutants other than oil on the African Penguin.	
Responsible Party	Department of Environmental Affairs (Marine and Coastal Pollution)
Collaborators	South African Maritime Safety Authority, CapeNature, SANParks, Eastern Cape Province: Department of Economic Development and Environmental Affairs and rehabilitation centres
Timeline	Within the time frame of the gazetted Biodiversity Management Plan
Resources Needed	Time and funding
Indicator	Documents listing potential impacts and measures to mitigate these

Objective 4.5.4

To develop strategies for surveillance, diagnosis and management of disease for seabird colony management authorities, Overstrand Municipality, City of Cape Town, Robben Island Museum.

Action 4.5.4.1: Develop guidelines for an African Penguin disease surveillance and diagnosis programme.	
Responsible Party	SANCCOB
Collaborators	CapeNature, SANParks, Eastern Cape Province: Department of Economic Development and Environmental Affairs, Overstrand Municipality, City of Cape Town, Robben Island Museum, State Veterinary Service, Tertiary Institutions and permitted rehabilitation centres.
Timeline	Within one year of the Biodiversity Management Plan being gazetted for implementation
Resources Needed	Internal, external and specialist skills
Indicator	African Penguin disease surveillance and diagnosis guidelines

Action 4.5.4.2: Management authorities, Overstrand Municipality, City of Cape Town, Robben Island Museum to implement African Penguin Disease Surveillance and Diagnosis Programme	
Responsible Party	Management Authorities, Overstrand Municipality, City of Cape Town, Robben Island Museum
Collaborators	Department of Environmental Affairs (Oceans and Coasts), permitted rehabilitation centres and State Veterinary Service
Timeline	Within the timeframe of the Biodiversity Management Plan
Resources Needed	Internal, external, skilled veterinarians, trained staff
Indicator	Annual reports

Action 4.5.4.3: Conduct a disease Risk Assessment for seabird breeding islands. Assessment to include documentation highlighting diseases already recorded, activities which may influence disease, ranking of importance of disease of concern.	
Responsible Party	SANCCOB
Collaborators	CapeNature, SANParks, Eastern Cape Province: Department of Economic Development and Environmental Affairs and relevant veterinary personnel
Timeline	Within two years of the Biodiversity Management Plan being gazetted for implementation
Resources Needed	External and specialised skills
Indicator	Risk assessment document

Action 4.5.4.4: Draft disease contingency plans for African Penguin colonies.	
Responsible Party	Management authorities, Overstrand Municipality, City of Cape Town, Robben Island Museum
Collaborators	State Veterinary Service, Department of Environmental Affairs (Oceans and Coasts) and SANCCOB
Timeline	Within two years of the Biodiversity Management Plan being gazetted
Resources Needed	Internal and specialised skills
Indicator	Disease contingency plans drafted

Objective 4.5.5
To mitigate the effects of extreme weather and other natural disasters on the African Penguin population.

Action 4.5.5.1: Ensure that provision is made for mitigating the effects of extreme weather and other natural disasters on the African Penguin population.	
Responsible party	Management Authorities, Overstrand Municipality, City of Cape Town, Robben Island Museum
Collaborators	Department of Environmental Affairs (Oceans and Coasts)
Timeline	Within two years of the Biodiversity Management Plan being gazetted
Resources Needed	Internal
Indicator	Document containing contingency plans

4.6 Research

Objective 4.6.1
To coordinate, prioritise, and evaluate monitoring and research on African Penguins.

Action 4.6.1.1: Appoint a Working Group to coordinate, prioritise, and evaluate monitoring and research on African Penguins.	
Responsible Party	Department of Environmental Affairs (Oceans and Coasts) through Steering Committee
Collaborators	None
Timeline	Within six months of the Steering Committee being established
Resources Needed	Internal
Indicator	Established Working Group with terms of reference

Action 4.6.1.2: Prioritise and evaluate present and future monitoring and research requirements for the African Penguin, assessing amongst others individual recognition and those research questions identified at the Arniston workshop (See Appendix 2).	
Responsible Party	Working Group as established in Action 4.6.1.1
Collaborators	Relevant mandated authorities, Tertiary Institutions, relevant museums, SANBI, permitted rehabilitation and captive centres
Timeline	One year from Working Group being established
Resources Needed	Internal and external
Indicator	Recommended research and monitoring strategy document

Objective 4.6.2
To ensure proper standardised data collection, curation and availability of data that is required to inform conservation management of the African Penguin.

Action 4.6.2.1: Recommend standardised data collection methods and means to clean and curate data that are collected.	
Responsible Party	Working Group as established in Action 4.6.1.1
Collaborators	Parties represented on Working Group
Timeline	Within one year of appointment of Working Group
Resources Needed	Internal, external, specialist expertise
Indicator	Protocol detailing standardised data collection and curation

4.7 Education and Awareness

Objective 4.7.1
To raise awareness of the African Penguin through various education and communication media.

Action 4.7.1.1: a) Establish a Working Group to b) develop a communication, awareness and education strategy. (This Working Group to consider actions identified in Appendix 3).	
Responsible Party	a) Department of Environmental Affairs (Oceans and Coasts) through the Steering Committee b) Working Group
Collaborators	a) None b) Relevant conservation authorities, captive and rehabilitation centres, non-governmental organisations
Timeline	a) Within one year of the establishment of the Steering Committee b) Within the timeframe of the Biodiversity management Plan
Resources Needed	Funding, time
Indicator	a) established Working Group

	b) a Communication, Awareness and Education Strategy Document

5) MONITORING

A function of the Steering Committee established in terms of this Biodiversity Management Plan will be to evaluate and track the progress of the actions stipulated in Section 4 above. This process will ultimately result in an annual report to the National Minister Department of Environment Affairs via the Department of Environmental Affairs (Ocean and Coasts) representative delegated with the responsibility of sitting on the committee. The report will not only indicate the progress but may also make recommendations based on the evaluation of the progress to amend or adapt the management plan where required.

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7) APPENDICES

Appendix 1: Stakeholders involved in the compilation of the African Penguin Biodiversity Management Plan

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Appendix 2: The following list of research needs was identified at the workshop and should be considered for inclusion in the Research Strategy Document (Action 4.6.1.2). This list is not considered to be the complete list and could be expanded upon during the development of the Strategy Document.

- Identify and produce suitable flipper bands or alternative form of identification in order to monitor survival of penguins.
- Address the gap in knowledge of the impact of oil pollution on African Penguins.
- To improve the ongoing success of rehabilitation.
- Initiate research to establish whether H&NS pollutants are a threat and support existing research.
- Initiate research into the possible effects of noise pollution on African Penguins and their prey (avoidance behaviour).
- Increase the number of analysts trained, and the training of existing analysts. E.g. statistical ecology programme (UCT) and human capital development strategy for the biodiversity sector (SANBI).
- Finalising "Penguin Pressure Model" (decision-making tool bringing all aspects of penguin biology together, allowing sensitivity analysis, identifying gaps in data, aid management).
- Integrated population model to estimate African Penguin demography.
- Cause of African Penguin population decline, and identifying methods of halting the decline and increasing population.
- Obtain accurate population numbers, and calculate what the ideal population is?
- Disease/health baseline, including effects of toxins.
- Movements of juveniles and non-breeders.
- Trophic levels above and below penguins (includes predation, competition, ecosystem effects).
- Impact of fisheries.
- Small population effects – genetics.
- Spatial and temporal mismatch between penguins and their food.
- Factors affecting breeding of rehabilitated birds.
- Reasons and cause of shift of food stocks.
- Effects of the shift on ecosystem and penguins.
- Cumulative effect of environmental change and fisheries, including study on effects of mitigating fisheries impact on food availability.
- Implement frequent and regular diet sampling at all major penguin breeding colonies.
- Detailed study on fish biology and energetic content of identified prey species.
- Research into developing climatic niche model & necessary baseline data. Initiate model development and required data collection for coordinated research project.
- Focussed research to improve clarity in terms of effects of climate change on the African Penguin population.
- Obtain baseline genetic data, such as genetic diversity (heterozygosity) and population genetic processes (gene flow, population differentiation) across the species range. Continue current range-wide population genetic study.
- Quantify degree of genetic bottleneck.
- Obtain baseline demographic data, such as age structure, sex ratio and life tables, for all breeding colonies.
- Quantify annual energetic requirements for African Penguins
- Investigate thresholds of prey density for sufficient reproduction and survival of African Penguins at colonies.

- Investigate possible impacts of other commercial fishing sectors on the African Penguin.
- Establish whether the amount of fish removed by the fisheries has contributed to the declines in African Penguins.
- Investigate the possibility of providing incentives not to fish in specific areas.
- Model future prey distribution patterns under different environmental scenarios for advising on possible establishment of new penguin colony/colonies.
- Identify critical habitat of penguins at sea.
- Identify and conduct research on the possible threats to penguins while foraging at sea and mitigations thereof (e.g. boat strikes, disturbance from boat traffic, incidental by-catch).
- impact of hazardous & noxious substances (toxic), marine litter, physical, air, noise and thermal pollution (other than oil) on the African Penguin

Appendix 3: The following list of products and actions were identified at the African Penguin Workshop and need to be considered for inclusion in the Communication, Awareness and Education Strategy Document (Action 4.7.1.1). This list is not considered to be the complete list and could be expanded upon during the development of the Strategy Document.

- Legislative booklet/brochure/material outlining the pertinent parts of the SEMA's supporting the protection of the African Penguin for stakeholders/general public.
- Signage at colonies and relevant beaches visited by general public containing species information, appropriate (site-specific) human behaviour for interacting (or otherwise) with penguins and emergency contact details if penguins appear injured, etc.
- Public awareness campaign like 'Save the Penguin'.
- Media campaign to report on progress towards meeting the Biodiversity Management Plan vision/desired state.
- Public awareness around protection measures – implemented and proposed.
- Public awareness around disturbance to penguins.
- Increased education and awareness of:
    - oil pollution
    - toxic pollution
    - physical pollution (including beach clean ups, public and fishing industries)
    - air pollution
    - noise pollution.
- structured information sharing about the management of the pelagic fish stocks and the implementation of the ecosystem approach to fisheries.
- Formalise stakeholder forum – annual meeting (Dev terms of reference and address communication challenges).
- Establish a web based forum.
- Establish and African Penguin newsletter.
- Develop a communication strategy that will create cohesion among various disciplines that impact on the conservation of the African Penguin.
- Ongoing education to increase the awareness of the reality of climate change with the general public.
- Use African Penguin as flagship species to further highlight the impacts of climate change.
- Organise a *Spheniscus* workshop.
- Organise a management workshop at the next International Penguin Conference.
- Invite penguin specialists on other penguin species to the next African Penguin conference/workshop.
- Develop and circulate a brochure highlighting the impacts of unmanaged waste sites on gull populations and the associated negative impact on penguins to local authorities and other waste managers, and those responsible for Environmental Impact Assessment approvals (authorizing agents).
- Develop and circulate an awareness brochure regarding negative impacts of natural and introduced predators on penguins.
- Develop and circulate a brochure and guidelines to developers and government authorities for Environmental Impact Assessment approvals (authorizing agents), of the impacts of constructions in the vicinity of penguin colonies, and in particular the potential impact of giving predators access to penguin colonies.

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