



CITY OF CAPE TOWN | ISIXENKO SASAKHAPA | STAD KAAPSTAD

THIS CITY WORKS FOR YOU

CITY OF CAPE TOWN

BIODIVERSITY REPORT | 2008



LAB
Local Action for Biodiversity
AN I.C.L.E.I INITIATIVE



ENHANCING URBAN NATURE THROUGH A GLOBAL NETWORK OF LOCAL GOVERNMENTS



The Local Action for Biodiversity (LAB) Project is a 3 year project which was initiated by the City of Cape Town, supported by the eThekweni Municipality (Durban), and developed in conjunction with ICLEI – Local Governments for Sustainability and partners. ICLEI is an international association of local governments and national and regional local government organisations that have made a commitment to sustainable development. LAB is a project within ICLEI's biodiversity programme, which aims to assist local governments in their efforts to conserve and sustainably manage biodiversity.

Local Action for Biodiversity involves a select number of cities worldwide and focuses on exploring the best ways for local governments to engage in urban biodiversity conservation, enhancement, utilisation and management. The Project aims to facilitate understanding, communication and support among decision-makers, citizens and other stakeholders regarding urban biodiversity issues and the need for local action. It emphasises integration of biodiversity considerations into planning and decision-making processes. Some of the specific goals of the Project include demonstrating best practice urban biodiversity management; provision of documentation and development of biodiversity management and implementation tools; sourcing funding from national and international agencies for biodiversity-related development projects; and increasing global awareness of the importance of biodiversity at the local level.

The Local Action for Biodiversity Project is hosted within the ICLEI Africa Secretariat at the City of Cape Town, South Africa and partners with ICLEI, IUCN, Countdown 2010, the South African National Biodiversity Institute (SANBI), and RomaNatura. For more information, please visit www.iclei.org/lab

FOREWORD



The City of Cape Town (CCT) is part of the Cape Floral Kingdom which is a global biodiversity hotspot. This biodiversity is a valuable part of our heritage and also plays an important role in underpinning a healthy and sustainable urban environment. Retaining biodiversity in our green open space system can be a powerful driver of tourism, economic growth and social upliftment.

However, Cape Town is also developing one of the highest densities of threatened species in any metropolitan area on earth. We are committed to reversing this trend.

One of the most important steps taken by the CCT has been to prepare its Integrated Metropolitan Environmental Policy (IMEP). Since then, the City has developed a Biodiversity Strategy that provides a framework for linking important ecological systems across the City, and identifying key areas for interventions. This strategy also includes projects such as the Blaauwberg Conservation Area and False Bay Ecology Park, and innovative programmes such as Cape Flats Nature - our successful partnership programme targeting community conservation on the Cape Flats.

The CCT is also proud to be part of the new global urban biodiversity initiative Local Action for Biodiversity (LAB) project which was launched by ICLEI-Local Governments for Sustainability in 2006. This international partnership project links 21 world cities in 15 countries focused on enhancing the protection, management and appropriate use of biodiversity within municipal boundaries. The LAB initiative will assist the City in acting on the ground to protect and conserve our internationally recognized biodiversity.



MAYOR HELEN ZILLE | CITY OF CAPE TOWN



CONTENTS

FOREWORD	1	3.4 BIODIVERSITY STRATEGY VISION AND GOALS	43
CONTENTS	2	3.5 STRATEGIC OBJECTIVES	44
PREFACE	3	4 INSTITUTIONAL ARRANGEMENTS	46
EXECUTIVE SUMMARY	4	4.1 INSTITUTIONAL STRUCTURE	46
1 INTRODUCTION	6	4.2 MAINSTREAMING BIODIVERSITY INTO CITY GOVERNANCE	46
2 CAPE TOWN'S BIODIVERSITY	10	4.3 INTERACTION WITH OTHER AGENCIES	46
2.1 BIODIVERSITY DEFINITION	10	5 IMPLEMENTATION	48
2.2 ECOSYSTEM DIVERSITY	10	5.1 MANAGEMENT AND MONITORING OF BIODIVERSITY	48
2.3 BIODIVERSITY DESCRIPTION	10	5.1.1 Management of conservation sites	48
2.3.1 Terrestrial ecosystems	10	5.1.2 Monitoring performance in relation to biodiversity goals	50
2.3.2 Description of broad vegetation types	15	5.2 BIODIVERSITY AWARENESS AND COMMUNICATION	50
2.3.3 Fresh water ecosystems	19	5.2.1 Youth Environmental Schools (YES) programme	51
2.3.4 Marine ecosystems	20	5.2.2 Education centres based on reserves	52
2.3.5 Endemic and threatened species	24	5.2.3 Enviroworks newsletter	52
2.4 STATUS, VALUE AND THREATS TO BIODIVERSITY	28	5.2.4 Invasive species playing cards	52
2.4.1 Known history of biodiversity status in Cape Town	28	5.3 IMPLEMENTATION TOOLS	53
2.4.2 The value of biodiversity	29	5.3.1 Existing implementation tools	53
2.4.3 Economic value of biodiversity to Cape Town	29	5.3.2 Critical tools to be developed	55
2.4.4 Threats to biodiversity	30	5.4 CITY BIODIVERSITY PROJECTS AND PARTNERSHIPS	56
3 BIODIVERSITY STRATEGY	36	5.4.1 Blaauwberg Conservation Area (BCA)	56
3.1 HISTORY OF BIODIVERSITY MANAGEMENT	36	5.4.2 False Bay Ecology Park	59
3.2 ANALYSIS OF PERFORMANCE TO DATE	40	5.4.3 Cape Flats Nature	60
3.2.1 Aspects of biodiversity management that have been successful	40	5.4.4 Bottom Road Sanctuary: Rehabilitation and stewardship project	61
3.2.2 Aspects of biodiversity management that have not been successful	41	REFERENCES	63
3.2.3 Reasons for successes and challenges	42	CONTRIBUTORS	64
3.3 LINKS TO GLOBAL AND NATIONAL BIODIVERSITY GOALS	42	ACKNOWLEDGEMENTS	65

AUTHORS

Patricia Holmes, Julia Wood and Clifford Dorse, Biodiversity Management Branch

Red Disa (*Disa uniflora*)



Nigel Forshaw

Amaryllis Caterpillar on an *Ornithogalum conicum* bud



Cliff Dorse

Cape Rain Frog (*Breviceps gibbosus*)



Cliff Dorse

PREFACE

This document forms part of a set of biodiversity reports produced by participant cities of the Local Action for Biodiversity (LAB) Project. It represents a critical starting point: a status quo assessment of biodiversity and its management in each LAB city.

Each biodiversity report covers four key themes*, namely:

- Ecology
- Governance
- Integration
- Participation

Each biodiversity report will be drawn upon to contribute significant and useful information for the compilation, by the LAB Project Team, of a Biodiversity Toolkit document. This document will contain best practice theory and examples, principles, strategies etc. for use by cities to better manage and integrate biodiversity into planning. The Toolkit will in turn contribute towards further steps in the LAB process.

The five steps in the LAB process are as follows:

Step 1: Development of a biodiversity report that documents the current state of biodiversity and its management within each city

Step 2: Ensuring long-term commitment by city leadership to sustainable biodiversity management through LAB cities formally signing a local government biodiversity declaration

Step 3: Development of a 10-year biodiversity action plan and framework that will include commitments to biodiversity implementation plans and integration within broader city plans

Step 4: LAB cities' formal acceptance of their 10-year biodiversity action plans and frameworks

Step 5: Implementation of five new on-the-ground biodiversity interventions by the end of the three-year project

These reports create a unique opportunity for profiling the importance of urban biodiversity, and innovation in its management, on a global scale. They are the foundation not only of the long-term plans that each city will develop to enhance, protect and develop their urban biodiversity, but also collectively form the basis for the development of LAB as a highly effective global urban biodiversity initiative.

LAB Project Team

May 2007

Cape Town

**Some cities' Biodiversity Reports do not follow this specific order or these specific headings*

EXECUTIVE SUMMARY

The City of Cape Town (CCT) encompasses unique biodiversity and is a biodiversity hotspot without parallel. The CCT is located within the Cape Floral Kingdom (CFK), the smallest of only six floral kingdoms in the world. The Cape Floristic Region (the region in which the CFK occurs) has a high proportion of unique and endangered species, and as a result is considered a global biodiversity hotspot, placing an international responsibility on the CCT, Provincial Government and National Government to ensure its adequate conservation. This led to the Cape Action for People and Environment (CAPE) which is a partnership programme that aims to conserve the Cape Floristic Region in a way that will deliver significant benefits to the people of the region. The CCT is one of the founding signatories to the CAPE MOU which secures the commitment and participation of the implementing agencies to the CAPE Strategy.

The CCT presents a unique challenge for biodiversity conservation among cities within South Africa, and possibly globally, as the urban footprint coincides with many unique vegetation types and habitats. Of the 21 national vegetation types in South Africa that have been assigned the highest conservation status of Critically Endangered, eleven occur within the CCT.

Of these, three occur nowhere else but within the City borders. A further six threatened vegetation types occur in the CCT. The Cape Town Lowlands (Cape Flats) is an area that to date has been under-conserved and has experienced massive urban sprawl dating from planning policies in the Apartheid era. This area alone supports more than 1460 different plant species of which 203 species are threatened with extinction and five are globally extinct in the wild.

We need to conserve biodiversity, not only for its own sake and for future generations, but because intact natural habitats offer many benefits to humankind, including an improved quality of life and health through the many ecosystem goods and services they provide. Well-managed natural areas offer recreational and educational as well as sustainable harvesting and nature-based tourism opportunities, and are known to enhance adjacent property values. In the CCT, tourism is one of the most important industries in promoting employment opportunities.

The CCT has a history of good planning for green open space, beginning in the early 1980s, but apart from the occasional positive action, such as the proclamation of one



City of Cape Town

lowland nature reserve in 1986, most recommendations have not yet been implemented. The 1980s and 1990s were characterized by fragmented conservation management and a focus mainly on the Peninsula mountain chain environment. The establishment of the Table Mountain National Park in 1998 consolidated management along the mountain chain and enabled the focus of City Biodiversity Management staff to include the under-conserved lowland areas. Several flora conservation studies during the 1990s confirmed the importance of the latter areas. The adoption of an Integrated Management Environmental Policy in 2001, and from this a Biodiversity Strategy in 2003, set the framework of priorities for today's Biodiversity Management Branch. One of the strategic objectives of this strategy is to identify terrestrial and fresh-water priority sites and corridors, and to ensure effective management. In addressing this objective, the City continued its good record of planning, and applied scientific conservation planning techniques to prioritize remaining biodiversity sites in the City and produce a fine-scale conservation plan, known as the Biodiversity Network.

Although endorsed in principle by Council, securing the Biodiversity Network for conservation has hardly begun and several implementation tools will be required to overcome the many obstacles that lie ahead. For example, funding for all secured biodiversity sites is currently inadequate to ensure effective management. However, the recent consolidation of conservation planning and management under the Biodiversity Management Branch, nested within the Environmental Resource Management Department, will facilitate the implementation of strategy into action. In recent months, two conservation areas under CCT management have acquired official status, and various initiatives are underway, with internal and external partners, to consolidate conservation areas, restore degraded vegetation and educate and engage with the public about Cape Town's unique biodiversity.

It is with a renewed sense of urgency that CCT Biodiversity Management Branch staff plan to address the biodiversity conservation crisis in the Cape Town lowlands, and together with key partners, implement

projects to slow the rate of habitat loss in threatened ecosystems. The overarching goal for the branch is that biodiversity in the CCT is conserved and restored where appropriate, results in significant community involvement, and delivers benefits to its present and future citizens, in a way that is endorsed by the City.

Below: *Leucospermum concocarpodendron*

Bottom: Hout Bay



Nigel Forshaw



City of Cape Town

1. INTRODUCTION

LOCATION OF CAPE TOWN

Cape Town is a coastal city of 3.2 million people. The municipal area extends over 2 487 km² which comprises 1.9% of the Western Cape Province. About 70% of the province's people reside in Cape Town.

THE PEOPLE

Cape Town's population contains a diversity of cultures and races, with the main groups currently comprising about 48% Coloured, 32% Black, 18% White and 2% Asian. In terms of age demographics, 66% of the Black population are younger than 30 years compared to 47%, 40% and 54% in the Coloured, White and Asian populations, respectively. Afrikaans is the dominant first language at 41% of the population, compared to 29% and 28% for IsiXhosa and English, respectively.

THE ECONOMY

Cape Town is the economic heartbeat of the Western Cape and accounts for about 76% of economic activity in the province and contributes 11.2% to the national GDP (Anon 2006). The major sectors include finance and business services, manufacturing, wholesale and retail. The tourism industry is an important driver of the economy via its catering and accommodation requirements. Two distinct economies exist: the first characterised by a well-structured environment catering for the affluent; and the second characterised by under-development operating in the midst of poverty.

Cape Town is a major port city, being a hub for the busy shipping line in the Southern Atlantic Ocean and is a busy container port being second only to Durban in South Africa.

Major socio-economic challenges in Cape Town include poverty, housing backlogs, health and crime. HIV/Aids

MAP 1: LOCATION OF CAPE TOWN



and TB are prevalent in the poorest communities where living conditions are worst. Crime levels have worsened in the last five years: for example, drug-related crimes doubled during this period.

THE LOCAL AUTHORITY

The City of Cape Town Council is a recently forged, single municipal structure (or “unicity”) that replaces the old Cape Metropolitan Council and six Metropolitan Local Councils. Within the new structure there are 23 subcouncils, each comprising a number of wards. Each of the 105 wards has a specified elected councillor and a second councillor allocated according to proportional representation, yielding a total of 210 councillors. The City has approximately 22 000 employees distributed across 11 directorates.

In the City's draft five-year Integrated Development Plan (IDP) (2007/8–2011/12), which is a strategic business plan required in terms of the national Local Government Municipal Systems Act (Act 32 of 2000), the goals are:

- A prosperous City
- Effective and equitable service delivery, and
- A well-governed and efficiently run administration.

The ecosystem goods and services provided by natural ecosystems and their biodiversity underpin many of the seven strategic focus areas of the IDP, and are specifically mentioned in two:

- Sustainable urban infrastructure and services, and
- Integrated human settlements.

One of the core objectives under “Sustainable urban infrastructure and services” is the conservation of natural resources, implemented in order to:

- Reduce impact of flooding on community livelihoods and regional economies
- Conserve biodiversity and improve quality of living environments through greening, education and access, and
- Safeguard human health, protect natural aquatic environments and improve and maintain recreational water quality.

Above right: An informal settlement adjacent to Guguletu

Right: View across the Noordhoek wetlands to Chapman's Peak

Below: The Cape Peninsula



City of Cape Town



Cliff Dorse



Anton Pauw

Further, under “Integrated human settlements”, the City aims to:

- Develop and maintain zoned public open spaces, cemeteries, resorts and beaches.

CAPE TOWN'S NATURAL ENVIRONMENT AND BIODIVERSITY

Cape Town is endowed with a magnificent coastline and a varied skyline of rugged mountain peaks, gentle, rounded hills and flat sandy plains. These varied landscapes, together with the large range of soil types

and rainfall patterns, helped to shape over millennia the extremely rich biodiversity that today characterizes Cape Town. The City is renowned for its amazing variety of plants, from our national flower the iconic King Protea (*Protea cynaroides*) and locally endemic Silver Tree (*Leucadendron argenteum*) to the exquisite and Critically Endangered bulb *Ixia versicolor*. The Cape Flats Heath (*Erica verticillata*) was considered so attractive that it was picked to extinction in the wild (see p33 for this plant's rescue story). The Orange-breasted Sunbird (*Anthobaphes violacea*), Cape Sugarbird (*Promerops cafer*) and Table Mountain Beauty (*Aeropetes tulbaghia*) are among the important pollinators of indigenous fynbos plants.



Natio van Rooyen

Cape Town has a Mediterranean-type climate with cool, wet winters and hot, dry and windy summers. The majority of soils are extremely nutrient-poor sands, which together with the hot, dry summers create very harsh growing conditions for plants. The vegetation

Left: Cape Sugarbird (*Promerops cafer*)

Below: Cape Flats Dune Strandveld, Blaauwberg Conservation Area

Far right: Orange-breasted Sunbird (*Anthobaphes violacea*)

Below right: Kogelbaai, south of Gordon's Bay.



Cliff Dorse

adapted to growing under these conditions is dominated by fine-leaved plants and is termed “fynbos” meaning “fine bush” in Afrikaans. Most fynbos soils have an acidic pH, whereas close to the coastline where there are marine shell and calcrete deposits, the soils are alkaline and support different vegetation known as “strandveld” meaning “beach vegetation” in Afrikaans. This vegetation has fewer fine-leaved and more broad-leaved shrubs than fynbos. Many of these shrubs are common to the southern African coastline.

Natural vegetation plays an important role in preventing erosion and wind-blown sand, conserving water resources and providing attractive habitat for animals and people. Many homeowners are realizing the benefits of planting local plants in their gardens as this saves resources in terms of time spent gardening, water and fertilizer costs. Indigenous plants also attract birds and other animals to gardens providing additional pleasure.

- Cape Town’s unique biodiversity (discussed in chapter 2) is of global significance and the City, in partnership with other spheres of government, has

a responsibility to ensure its adequate conservation for future generations. We need to conserve this biodiversity not only for its own sake, but in order to ensure a sustainable future for people in Cape Town, because it is biodiversity that underpins the ecosystem goods and services upon which we all depend for our survival.



Natio van Rooyen



South African Tourism

2. CAPE TOWN'S BIODIVERSITY

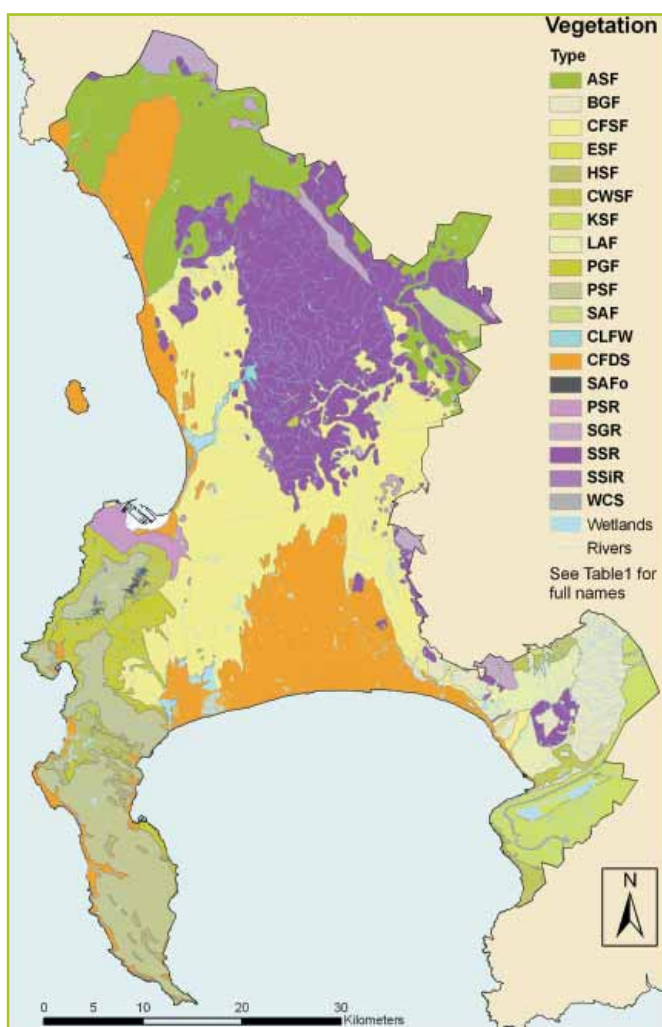
2.1 BIODIVERSITY DEFINITION

Biological diversity in Cape Town comprises the diverse vegetation types that clothe our landscapes, our coastal, marine and aquatic ecosystems, the many indigenous plant and animal communities within all these ecosystems as well as the genetic variety within and between the component species.

2.2 ECOSYSTEM DIVERSITY

The world-renowned richness of Cape Town's biodiversity is in large part due to the wide range of biophysical characteristics across the landscape, supporting many different terrestrial ecosystems (i.e.

MAP 2: VEGETATION TYPES, RIVERS AND WETLANDS (SEE TABLE 1, PAGE 16)



vegetation types), habitats and their associated flora and fauna. Vegetation type represents biodiversity at the landscape scale (Map 2). Wetlands, rivers and the coastal ecosystems also are important contributors to Cape Town's biodiversity. Table 1 links to Map 2 in providing information on the status of the different national vegetation types found within the city.

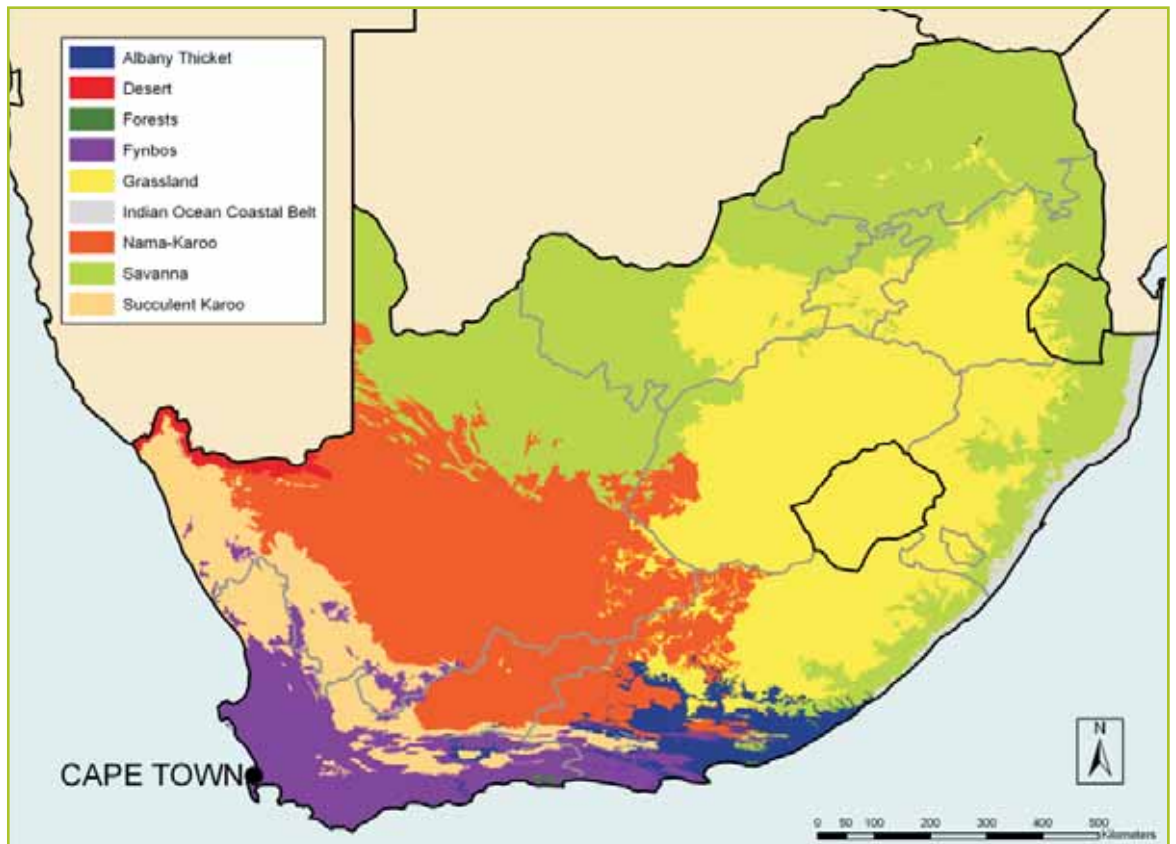
2.3 BIODIVERSITY DESCRIPTION

2.3.1 Terrestrial Ecosystems

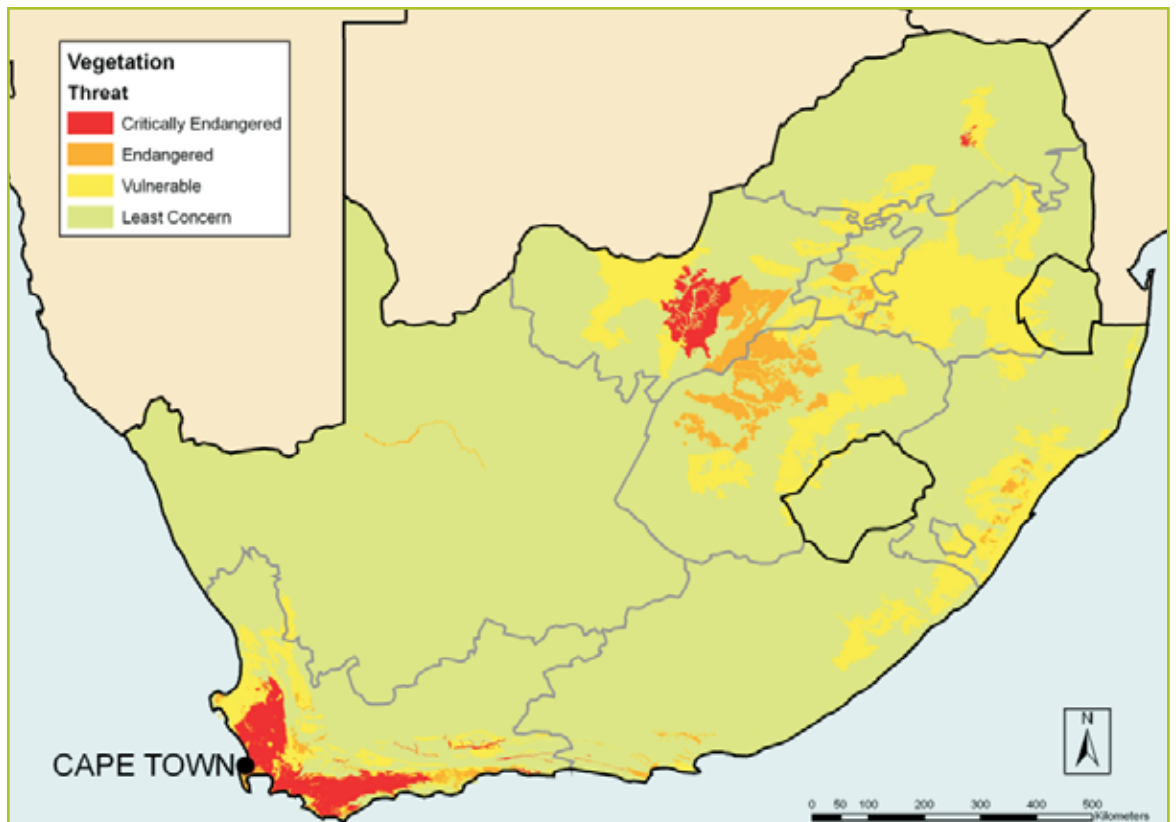
South Africa is a very biodiversity-rich country, in large part owing to the species-rich Cape Floristic Region (CFR) that is concentrated in the Western Cape Province. The CFR is encompassed by the northern boundary of the Fynbos Biome (Map 3 - SA biome map). South Africa has 18 000 flowering plant species and the Western Cape alone has over 9 000, 70% of which are endemic (i.e. confined) to the region (Davis et al. 1994). The CFR – also termed the Cape Floral Kingdom - is the smallest of six globally recognized floral kingdoms and is the only one located within a single country's borders. Although comprising only 4% of South Africa's land surface, the CFR encompasses half of the country's plant species, 176 (40%) of the 435 national vegetation types (103 are endemic to the region) and a highly disproportionate 20 out of 21 "critically endangered" national vegetation types (Driver in Prep. 2008, Rouget et al. 2004) (Map 4 - SA map of vegetation threat status). Cape Town, located in the south-west biogeographical region of the CFR, is an area harbouring a very high concentration of biodiversity and is a centre of endemism within the CFR, which as a whole is considered one of the 34 global "biodiversity hotspots". A biodiversity hotspot is a region rich in endemic plant species that has lost 70% of its habitat and is threatened with further destruction (Conservation International: www.biodiversityhotspots.org).

The CCT has two World Heritage sites and part of two Biosphere reserves within its boundaries. Examples of 18 national terrestrial as well as three azonal vegetation types occur within its borders and, in relation to conservation status, eleven vegetation types are critically endangered, three are endangered, three are

MAP 3:
BIOMES OF
SOUTH AFRICA



MAP 4:
MAP OF SOUTH
AFRICAN
VEGETATION
THREAT
STATUS

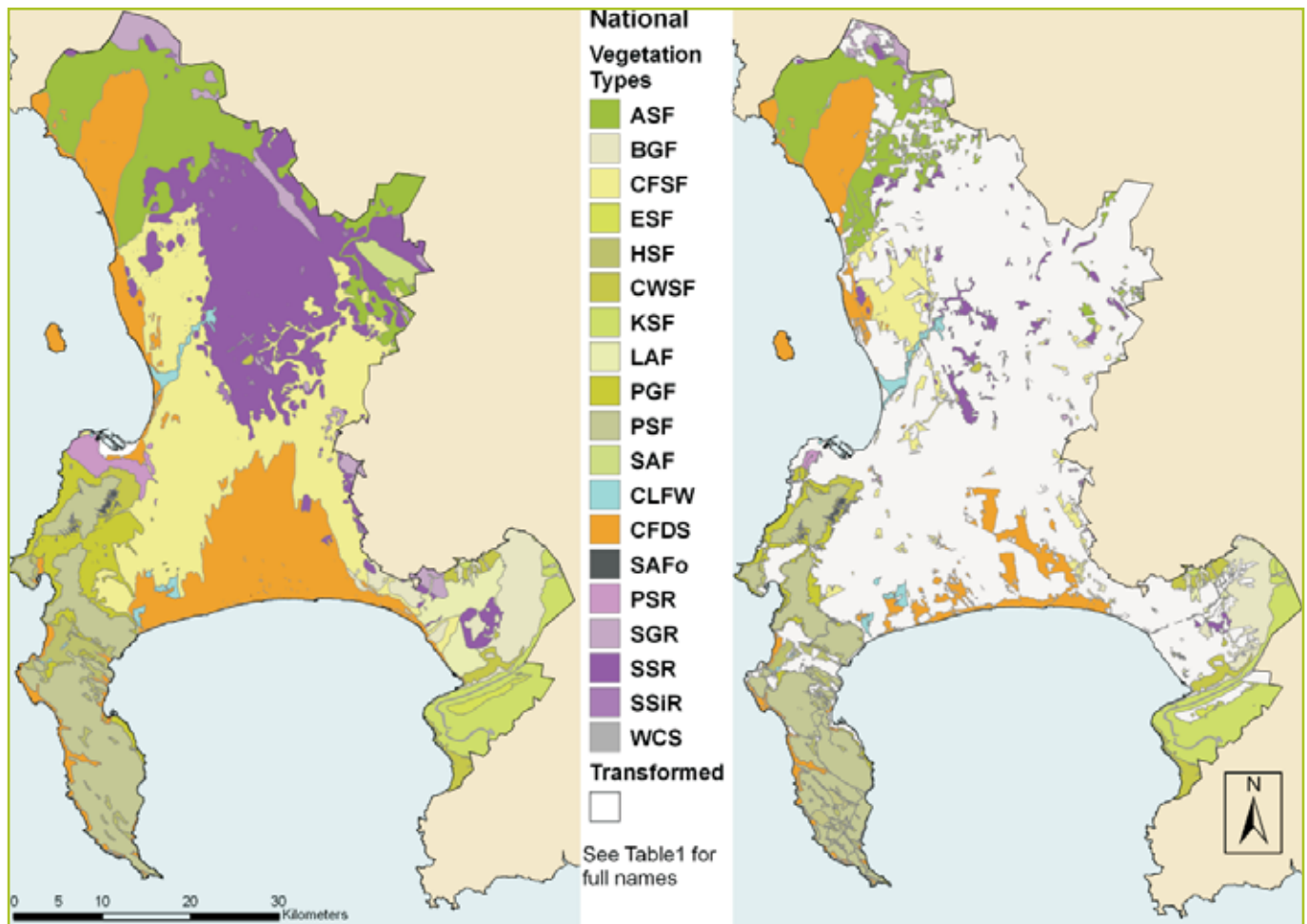


vulnerable and only four are least concern (Table 1). The extremely poor conservation status of the majority of the vegetation types within the city relates to the large-scale transformation that has taken place in the lowlands for commercial agriculture and urban development. The high concentration of localized vegetation types and their associated biota in the south-western corner of South Africa coincides with the footprint of Cape Town, therefore it is not surprising that we have been dubbed the “biodiversity megadisaster capital of the world” (Map 5 – historical & current vegetation coverage).

Currently there is an intensifying biodiversity conservation crisis in the Cape Town lowlands (a large part of which is known as the “Cape Flats”), with only extremely small areas of lowland vegetation formally conserved (Table 1). Although the City of Cape Town’s

Biodiversity Management Branch has identified in its Biodiversity Network the remnants required to conserve samples of this biodiversity, for many vegetation types (e.g. Cape Flats Sand Fynbos and Swartland Shale Renosterveld) it is too late to achieve the necessary conservation targets for adequate conservation of this biodiversity. In these cases, all remaining remnants are crucial to secure in retaining some of this biodiversity for posterity. For the few lowland vegetation types with sufficient habitat remaining to meet the required conservation targets (e.g. Cape Flats Dune Strandveld), there is as yet insufficient habitat secured and managed for biodiversity conservation. Although the City has a good record in biodiversity conservation planning (see Chapter 3), we need to accelerate the implementation of the Biodiversity Network before remaining options are lost.

MAP 5: HISTORICAL VEGETATION AND CURRENT (2008) VEGETATION



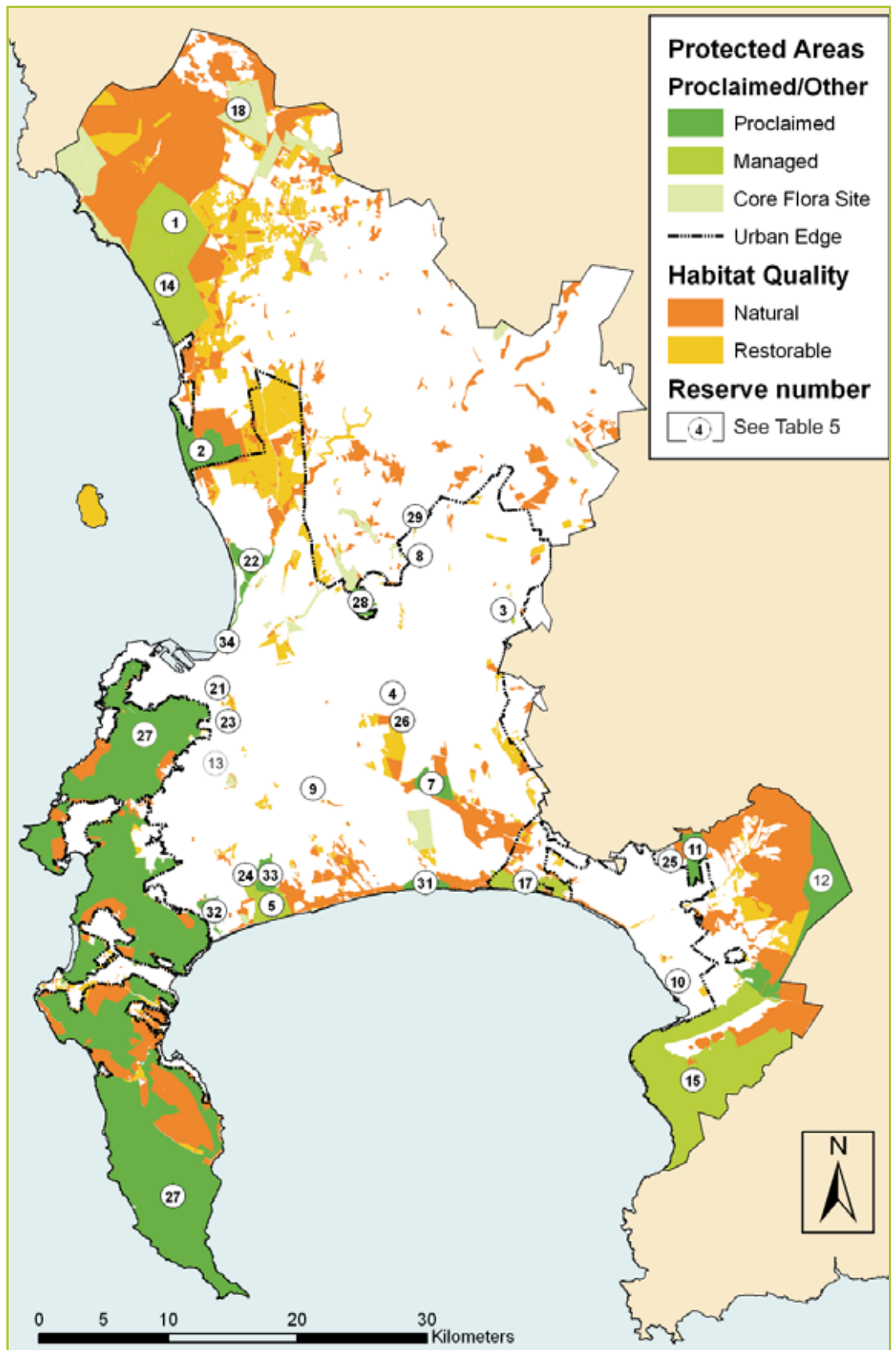
Refer to Table 1, page 16

MAP 6: BIODIVERSITY NETWORK SITES

KEY TO THE BIODIVERSITY NETWORK SITES SHOWN ON THIS MAP

- 1 Atlantis Dunefields
- 2 Blaauwberg Conservation Area
- 3 Bracken Nature Reserve
- 4 Cape Flats Nature Reserve
- 5 Cape Flats Waste Water Treatment Works
- 7 Driftsands Provincial Nature Reserve
- 8 Durbanville Nature Reserve
- 9 Edith Stephens Wetland Park
- 10 Harmony Flats Nature Reserve
- 11 Helderberg Nature Reserve
- 12 Hottentots Holland
- 13 Kenilworth Racecourse Conservation Area
- 14 Koeberg Nature Reserve
- 15 Kogelberg Nature Reserve
- 17 Macassar Nature Reserve
- 18 Mamre Nature Garden
- 21 Raapenberg Bird Sanctuary
- 22 Rietvlei Wetland Reserve (with Diep River corridor)
- 23 Rondebosch Common
- 24 Rondevlei Nature Reserve
- 25 Silverboomkloof
- 26 Symphony Way
- 27 Table Mountain National Park
- 28 Tygerberg Nature Reserve
- 29 Uitkamp Wetlands
- 31 Wolfgat Nature Reserve
- 32 Zandvlei Estuary Nature Reserve
- 33 Zeekoevlei Nature Reserve
- 34 Zoarvlei Wetlands

See Table 5, p49 for the complete list



Biodiversity in the sandstone and upper mountain habitats of the city remains relatively intact. For example, the Cape Peninsula mountain chain is well conserved in the Table Mountain National Park (Map 6 - managed areas and remnant status within Biodiversity Network). This narrow peninsula supports significant biodiversity, and includes 2 285 vascular plant species, 158 of which are local endemics (Helme & Trinder-Smith 2006). This represents the highest concentration of plant biodiversity within the CFR and is attributed to the steep topographic, edaphic and climatic gradients on the Cape Peninsula, leading to a high number of distinctive habitats and a consequently high turn-over in plant species composition in communities (Simmons & Cowling 1996).

It is probable that the entire city supports in excess of 3 000 indigenous vascular plant species. Thirteen plant



Common Sugarbush (*Protea repens*)

Nigel Forshaw

species are extinct or extinct in the wild with two others potentially extinct. Of the 450 Red Data listed species, an additional 318 are threatened with extinction of which 203 are on the Cape Flats (IUCN South African Red Data Plant List – November 2007 draft). New plant species are still being discovered across the Cape Floristic Region and occasionally those thought to be extinct are rediscovered (e.g. the beautiful red Irid, *Babiana blanda*).

Compared to the exceptionally high plant diversity which characterises the CFR, the diversity of the faunal groups is often regarded as low. While faunal diversity cannot compare with that of the flora, the perception that fynbos has a low faunal species diversity is not accurate. Much of the fauna is however inconspicuous, nocturnal and occurs at low densities. The CCT is blessed with 18 terrestrial vegetation types, numerous wetlands, an extensive coastline as well as great topographical

THE DISAPPEARANCE OF THE HERDS

The Fynbos Biome was once home to vast herds of game which today characterise the savannas of the eastern parts of Africa. Many of the larger game that occurred within the Western Cape were probably at much lower densities and with larger home ranges when compared to the savanna regions. Most of the game was probably highly nomadic and would move great distances in response to food availability, particularly favouring recently burnt vegetation. Renosterveld vegetation types, occurring on nutrient-rich clay soils supports palatable grasses that would have held far more game than the nutrient-poor fynbos vegetation types. Game animals were soon eradicated once the Cape was colonised. While most of these species have wide distribution ranges in Southern Africa, two species with restricted ranges were eradicated



South African Tourism

forever. These were the Quagga and the Blue Antelope. The Bontebok is also restricted to the Western Cape and became perilously close to extinction. This species was saved thanks to some farmers who decided to save the last 36 individuals! The reserves within the City are generally too small to be viable for the introduction of the larger game species such as Eland and Red Hartebeest. The City of Cape Town's primary obligation is to ensure that our Nature Reserves are managed according to ecologically sound principles. To this end, the reintroduction of game will only occur when it is clear that it will have no negative impacts on the biodiversity of a site. The small nature of our sites and the lack of large carnivores dictate that all populations of large mammals will require intensive management.



Cliff Dorse

Cape Dune Molerat (*Bathyergus suillus*)

variation. This diversity of habitat provides numerous niches that allow a large suite of faunal species to exist. Additional surveys and taxonomic work will undoubtedly reveal new cryptic species within the boundaries of the CCT. The invertebrate fauna in particular is in dire need of review. See Table 3 for the total species counts for the higher plants and vertebrates in the CCT.

2.3.2 Descriptions of broad vegetation types

More extensive, detailed information on the individual vegetation types is available in Mucina & Rutherford (2006).

Sand Fynbos

Cape Town has three types: Cape Flats Sand Fynbos, which is confined to Cape Town, Hangklip Sand Fynbos, which occurs on the Peninsula as well as east of False Bay, and Atlantis Sand Fynbos, which extends north of

Atlantis Sand Fynbos



Pat Holmes

Cape Town (Table 1). Sand Fynbos occurs on moderately undulating and flat plains on leached, acid Tertiary sand. The vegetation comprises dense, moderately tall, ericoid-leaved shrubland containing scattered emergent tall shrubs. Common ericoid shrubs include *Metalasia densa*, *Staavia radiata*, *Erica*, *Phyllica* and *Passerina* species. Proteoid and restioid fynbos are the dominant structural types, with asteraceous and ericaceous fynbos occurring in drier and wetter areas, respectively. All three Sand Fynbos types are species-rich and harbour a number of endemic plant species: for example, *Erica margaritacea* in Cape Flats Sand Fynbos and *Leucospermum parile* in Atlantis Sand Fynbos.

Alluvium Fynbos

Cape Town has two types: Lourensford Alluvium Fynbos, which is confined to Cape Town, and Swartland Alluvium Fynbos, which extends north of Cape Town. Alluvium Fynbos is either found on low-lying plains with duplex, silty soils or on granite and shale metasediments often with small cobbles and pebbles embedded. They are medium to dense shrublands with a short graminoid understorey. Structurally, restioid and asteraceous fynbos are dominant, although there is some evidence that proteoid fynbos might once have been dominant. Some remnants are exceptionally rich in bulbs. Previously this was considered to be part of renosterveld, but it is clearly a fynbos type. Daisies such as *Athanasia*, *Stoebe* and *Marasmodes* species and grasses *Themeda triandra* and *Tribolium uniolae* are common. There are several endemic species, such as *Diastella buekii* and *Marasmodes undulata* in Swartland Alluvium Fynbos.

Lourensford Alluvium Fynbos at Harmony Flats Nature Reserve



Rupert Koopman

Granite Fynbos

Cape Town has two types: Peninsula Granite Fynbos, which is confined to Cape Town, and Boland Granite Fynbos, which extends to the north-east of Cape Town. Granite Fynbos occurs on moderately undulating plains and hills or on steep to gentle slopes below the sandstone mountain slopes, with soils varying from extensive and deep, to localised deep soils between large granite domes and sheets. Structurally it is described as a fairly dense, 1–2 m tall closed shrubland



Peninsula Granite Fynbos

Tony Rebelo

with occasional low, gnarled trees dotted through the landscape. It is a diverse type, dominated by scrub, asteraceous and proteoid fynbos, but with patches of restioid and ericaceous fynbos in wetter areas. Waboomveld (with *Protea nitida* overstorey) is very typical and extensive within Granite Fynbos. On the Peninsula, groves of Silver Trees (*Leucadendron argenteum*) occur on the wetter slopes. Endemic taxa include *Leucospermum grandiflorum* (Boland Granite Fynbos) and *Hermannia micrantha* (Peninsula Granite Fynbos).

TABLE 1. NATIONAL VEGETATION TYPES IN CAPE TOWN AND THEIR STATUS*

National Vegetation Type	Code	Historical area in Cape Town (km ²)	% in Cape Town	Current area in Cape Town (km ²)	Conserved or managed in Cape Town (km ²)	National Ecosystem Status*
Atlantis Sand Fynbos	ASF	278	39.8	166	4	CR
Boland Granite Fynbos	BGF	95	19.2	61	3	VU
Cape Flats Dune Strandveld	CFDS	401	100	180	64	EN
Cape Flats Sand Fynbos	CFSF	547	100	77	5	CR
Cape Winelands Shale Fynbos	CWSF	41	37.5	22	18	VU
Elgin Shale Fynbos	ESF	2	0.9	2	<1	CR
Hangklip Sand Fynbos	HSF	34	41.8	21	14	VU
Kogelberg Sandstone Fynbos	KSF	107	11.7	106	75	CR
Lourensford Alluvium Fynbos	LAF	48	100	3	2	CR
Peninsula Granite Fynbos	PGF	92	100	39	33	EN
Peninsula Sandstone Fynbos	PSF	215	100	209	202	EN
Peninsula Shale Renosterveld	PSR	24	100	3	0	CR
Southern Afrotemperate Forest	SAFo	3	0.4	3	3	LC
Swartland Alluvium Fynbos	SAF	17	3.7	<1	<1	CR
Swartland Granite Renosterveld	SGR	58	6.2	8	<1	CR
Swartland Shale Renosterveld	SSR	464	9.4	40	3	CR
Swartland Silcrete Renosterveld	SSIR	10	10.1	2	2	CR
Western Coastal Shaleband Vegetation	WCSV	3	3.0	3	2	LT
Azonal Vegetation Types						
Cape Inland Salt pans	CIS	2	3.0	2	2	LC
Cape Lowland Freshwater Wetlands	SLFW	14	15.0	6	5	CR
Cape Seashore Vegetation	CSV	3	4.0	3	2	LC

* National vegetation types in bold typeface are confined to Cape Town; CR = Critically Endangered, EN = Endangered, VU = Vulnerable, LC = Least Concern (Driver in prep.)



Pat Holmes



Nigel Forshaw

Left: Peninsula Sandstone Fynbos
 Above: *Leucadendron strobilium*
 Right: Shale Fynbos with Silver Trees (*Leucadendron argenteum*)
 Below: *Mimetes fimbriifolius*



Tony Rebelo

Sandstone Fynbos

Cape Town has two types: Peninsula Sandstone Fynbos, which is confined to the Peninsula Mountain Chain in Cape Town, and Kogelberg Sandstone Fynbos, which extends to the south-east of Cape Town. Sandstone Fynbos occurs in the high mountains, on steep to gentle slopes, and on undulating plains and hills of varied aspect. The soils are acidic lithosols derived from Ordovician sandstones of the Table Mountain Group (Cape Supergroup). The general structure of the vegetation is a low, closed shrubland with scattered emergent tall shrubs. Proteoid, ericaceous and restioid fynbos dominate, while asteraceous fynbos is rare. Patches of thicket or scrub fynbos are common in rocky outcrops. Numerous seeps and seasonally saturated mountain-plateau wetlands (locally called 'suurvlaakte') are very common and support restioid and ericoid (dominated by *Bruniaceae*) fynbos. Both these vegetation types are extremely species-rich with a staggeringly high concentration of local endemic species (> 130 in each). Examples are *Mimetes fimbriifolius* and *Leucadendron strobilinum* on the Peninsula and *Erica sitiens*, *Leucospermum bolusii* and *Aspalathus acanthiloba* on the Kogelberg.



Nigel Forshaw

Western Coastal Shale Band vegetation is a narrow 80–200 m linear feature nested within Sandstone Fynbos and extends eastwards from the Kogelberg range. Within the City, the shale band supports proteoid fynbos shrubland.

Shale Fynbos

Two types occur in higher rainfall areas where the shale soils are sufficiently leached of nutrients: Cape Winelands Shale Fynbos (incorporating Peninsula Shale Fynbos), which extends north-east of Cape Town, and Elgin Shale Fynbos which extends to the east of Cape Town. Shale Fynbos occurs on moderately undulating plains and steep slopes against the mountains. Soils are acidic, moist clay-loams. Vegetation structure is an open to medium-dense tall proteoid shrubland over a matrix of moderately tall and dense evergreen shrubs, dominated by proteoid, asteraceous and closed-scrub fynbos, with ericaceous fynbos in the wetter sites. A large portion of Elgin Shale Fynbos in the City is under pine plantations and the flooded area of the Steenbras Dam, whereas most remaining Shale Fynbos on the Peninsula is conserved in the Table Mountain National Park. Many

species are shared with Granite Fynbos and include several local endemics (e.g. *Leucadendron argenteum*, *L. daphnoides* and *Leucospermum grandiflorum*).

Cape Flats Dune Strandveld

This vegetation type largely is confined to Cape Town, but shares affinities with coastal thicket vegetation to the east and succulent karoo to the north. Cape Flats Dune Strandveld occurs on flat to slightly undulating dune field landscapes. The soils are alkaline sands derived from Tertiary to recent calcareous sand of marine origin. Outcrops of limestone occur, particularly along the False Bay coastline. Structurally, strandveld is a tall, evergreen, hard-leaved shrubland with abundant grasses, annual herbs and succulents in the gaps. Examples of prominent shrub species include *Euclea racemosa*, *Metalasia muricata*, *Olea exasperata*, *Osteospermum monilifera* and *Roepera flexuosum*. Strandveld has few endemic species compared to fynbos, but one example is the succulent, *Lampranthus tenuifolium*.

Below: Spring flowers in Cape Flats Dune Strandveld

Bottom: Cape Seashore vegetation

Below right: Peninsula Shale Renosterveld on Signal Hill



Cliff Dorse



Anton Pauw

Cape Seashore vegetation

This is considered a separate national vegetation type in the latest vegetation book of South Africa (Mucina & Rutherford 2006); however it may be considered as a subcommunity of Cape Flats Dune Strandveld that occurs predominantly on the unstable fore-dunes above the beaches. Structurally, it is an open herbaceous and dwarf shrubby vegetation often dominated by a single pioneer species. Characteristic species include *Pelargonium capitatum*, *Tetragonia decumbens*, *Didelta carnosa* and *Carpobrotus acinaciformis*.

Renosterveld

Cape Town has four types: Peninsula Shale Renosterveld which is confined to Cape Town, and three other types which extend north of Cape Town on their respective soil types: Swartland Granite, Shale and Silcrete Renosterveld. Renosterveld occurs on soils with a heavier texture (clays and loams) where rainfall is not sufficiently high to leach out the nutrients (< 600mm p.a.). Clay soils are derived from Malmesbury Group Shales, and loams from Cape Granite or silcrete parent materials. Renosterveld is mainly found in the moderately undulating lowlands and foot slopes. Structurally the



Anton Pauw

vegetation is an open, low, cupressoid- and small-leaved, low to moderately tall shrubland with many succulents, dominated by renosterbos (*Elytropappus rhinocerotis*). Grasses are a prominent component and it is thought that prior to European colonization, the vegetation would have been grassland. Heuweltjies (*termitaria*) cause distinctive vegetation spots on the landscape and give the Tygerberg Hills their name. Groups of small trees and tall shrubs are associated with heuweltjies and rocky outcrops. Some renosterveld vegetation is rich in bulbs. Endemic plants include *Asteraceae*, succulent and bulb species (e.g. *Marasmodes oligocephala*, *Lampranthus dilutus*, *Babiana longiflora*).

Southern Afrotropical Forest

Southern Afrotropical Forest occurs throughout South Africa on a variety of substrata. In the Mediterranean-climate areas of the CFR forest is confined to fire-protected kloofs in the mountains. The emergent tree species have a subtropical affinity and are mostly widespread throughout South Africa. Tree species which occur in Cape Town Southern Afrotropical Forest patches include *Podocarpus latifolius*, *Rapanea menaphloeos*, *Cunonia capensis*, *Curtisia dentata* and *Kiggelaria africana*.



Suretha van Rooyen

Left: Southern Afrotropical Forest
Right: Zandvlei Estuary Nature Reserve

2.3.3 Fresh Water Ecosystems

In addition to its rich terrestrial biodiversity, Cape Town supports a variety of wetlands and rivers (Map 2 – showing wetlands & rivers). Historically a large proportion of lowland Cape Town was dotted with seasonal and perennial wetlands interconnected via the groundwater system (Day 1987). Low-lying areas of the Cape Flats which support marsh and floodplain wetlands, are known locally as “vleis”. As a result of urbanisation, most of the vleis and rivers on the Cape Flats have been modified, with vleis drained and the rivers canalised. An example is the Kuils River, which used to meander across the Cape Flats landscape on its way to the sea and many adjacent oxbow lakes were integral to the catchment. As a result of urban development, the Kuils River was straightened and canalised over the years and the links between most of these unusual wetlands and the main stream have been lost. The oxbows and other riparian wetlands consequently dried up, were filled in and developed. The vleis were mainly seasonal but the few remaining have been made permanent, resulting in loss of seasonal habitat for waders and other wetland fauna. Other examples include the Lotus River (flowing into Zeekoevlei) which was historically a series of vleis, but was canalised to facilitate development. Additionally, wetlands were historically saturated during the winter rainfall season only, but now receive urban stormwater and many have become permanently flooded systems (e.g. Zeekoevlei and Princessvlei), giving them artificial characteristics similar to permanent lakes. Some examples of seasonal marsh vleis still exist, for example Isoetes vlei on Edith Stephens Wetland Park, but these are now rare. In the vegetation book of southern Africa (Mucina & Rutherford 2006), two wetland types are described that occur in Cape Town. These are nested within the terrestrial vegetation types described above.



Cassy Sheasby

Cape Lowland Freshwater Wetlands

These wetlands occur on the Cape Flats and in landscape depressions and may be permanently or seasonally flooded areas. Soils may be fine sands, silts or clays. Typically the vegetation in the seasonal wetlands comprises restio, sedge or rush-beds as well as macrophytic vegetation embedded in the permanent water bodies. Important species include *Senecio halimnifolius*, *Pennisetum macrourum*, *Triglochin bulbosa*, *Bolboschoenus maritimus* and *Juncus kraussii*. An endemic species of seasonal marshes in the south is *Passerina paludosa*. Cape Vernal Pools are highly seasonal wetlands (20–100 m diameter), where the water level rarely exceeds 10 cm at the deepest point. They are located on fine clays or silts over an impermeable layer, but most have been lost to cultivation and none are currently recorded in Cape Town.

Cape Inland Salt Pans

These wetlands occur in areas that were formerly coastal lagoons that have been cut off from the sea and become seasonally dry. They are small depressions in the landscape dominated by low succulent scrub composed of creeping chenopods and salt-tolerant herbs and grasses. Examples may be seen at Rondevlei Nature Reserve, Zandvlei Estuary Nature Reserve and the Noordhoek Wetlands.

Noordhoek Beach with Wetlands centre left.



Pat Holmes



Maidens Cove with Camps Bay in the background

South African Tourism

2.3.4 Marine Ecosystems

Cape Town's shoreline is approximately 300 km long, and exhibits different coastal landforms such as rocky shores, sandy beaches, estuaries, islands and sea cliffs. The coastline supports an immensely diverse range of marine and coastal ecosystems, which are home to over 80 rare and endangered species. This is one of the most diverse and productive stretches of coastline in South Africa. Cape Town's coastal zone is also an area of high recreational activity and a sought-after living environment for both local people as well as national and international tourists. For these reasons, the City's coastline is one of its greatest ecological, social and economic assets.

The coastal waters around the CCT are situated in the transition zone between two biogeographic provinces: the cool temperate west coast, and the warm temperate south coast marine zones. The seas around the peninsula are rich in marine biodiversity because this is where the distributions of the organisms of the cold Benguela and warm Atlantic currents overlap. In addition, there are also organisms unique to the temperate waters of the transitional area between these two major zones, centred on False Bay. Of the approximately 2 000 marine species in False Bay, 61% are endemic to South African waters and 14% of these to False Bay itself.

MAP 7: MARINE PROTECTED AREAS

South African Tourism



Above: Llandudno Beach

South African Tourism



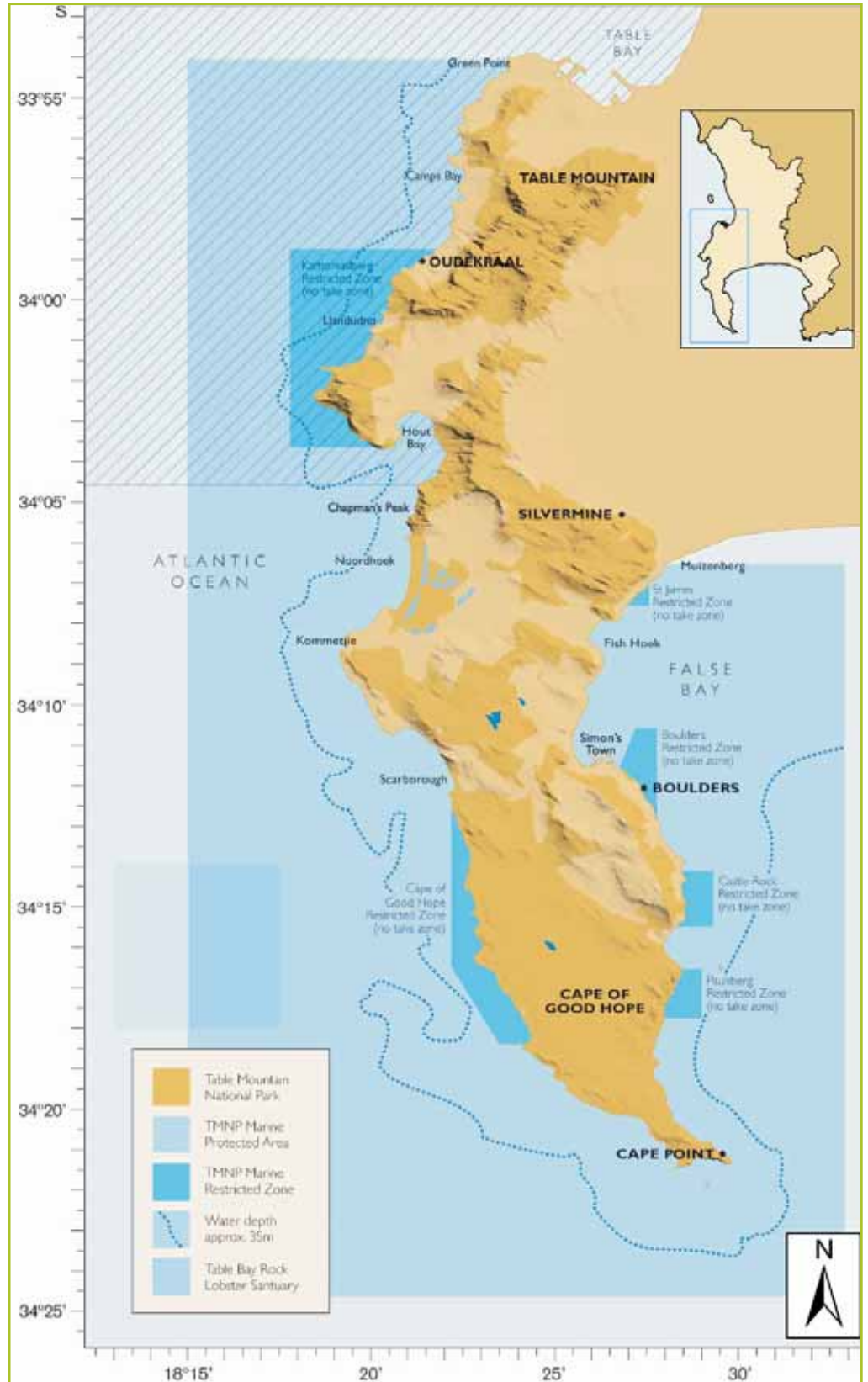
Above: Beach, Cape of Good Hope

South African Tourism



Above and below: Cape Point

Cliff Dorse



Intertidal habitats

The intertidal zone within the CCT consists of sandy beaches and rocky shores. It is a high energy coastline, which makes the sandy areas unstable, and a limited number of organisms find this environment suitable. Examples of these are Plough Snails (*Bullia digitalis*), White Mussels (*Donax serra*), Sea Lice (*Tylos granulatus*). Seabirds that feed in these areas are Kelp Gulls (*Larus dominicanus*), African Black Oystercatchers (*Haematopus moquini*), Hartlaub's Gulls (*Larus hartlaubii*), Whitefronted Plovers (*Charadrius marginatus*) and sandpipers (*Calidris species*). In contrast, the rocky shores have a much higher species richness, which could be accredited to the diversity of microhabitats within this zone (Table 2). The subtidal rocks provide a substrate for kelp beds

(*Ecklonia species*) to establish. This creates a sheltered habitat for a myriad of marine species that is one of the most productive systems in the world, surpassing even the best agricultural lands. Rocky reef systems are common, and are characterized by a wide range of organisms from many classes. Examples of these include plants, sponges, anemones, corals, soft corals, hydroids, flatworms, ringed worms, crustaceans, bryozoans, mollusks and starfish. Cape Clawless Otters (*Aonyx capensis*) are shy animals which frequent the intertidal zone along our coast.

Seabirds that feed in these areas are cormorants (*Phalacrocorax species*) and African Penguins (*Spheniscus demersis*). The deeper areas support species such as

TABLE 2: SOME REPRESENTATIVE ROCKY SHORE INTERTIDAL SPECIES

	Position	Intertidal zonation	Species
George Branch	High	Littoral zone	Littorina Snail (<i>Littorina africana</i>) Purple Laver (<i>Porphyra capensis</i>)
George Branch		Upper balanoid zone	Eight-shell Barnacle (<i>Octomeris angulosa</i>) Volcano Barnacle (<i>Tetraclita serrata</i>) Sea Lettuce (<i>Ulva spp.</i>) Granular Limpet (<i>Scutellastra granularis</i>) Granite Limpet (<i>Cymbula granatina</i>) Plum Anemone (<i>Actinia equine</i>)
George Branch		Lower balanoid zone	Dead Man's Fingers (<i>Splachnidium rugosum</i>) Slippery Orbits (<i>Aeodes orbitosa</i>) Spotted Iridaea (<i>Iridaea capensis</i>) Tongue Weed (<i>Gigartina radula</i>) Twisted Gigartina (<i>Gigartina stiriata</i>) Cape Reef Worm (<i>Gunnarea capensis</i>)
George Branch		Cochlear zone	Knobbly Anemone (<i>Bunodosoma capensis</i>) Black Mussel (<i>Chromytilus meridionalis</i>) Mediterranean Mussel (<i>Mytilus galloprovincialis</i>) Pear Limpet (<i>Scutellastra cochlear</i>) Argenville's Limpet (<i>Scutellastra argenvillei</i>)
George Branch	Low	Infratidal zone	Giant Chiton (<i>Dinoplax gigas</i>) Ribbed Mussel (<i>Aulacomya ater</i>) Cape Urchin (<i>Parechinus angulosus</i>) Sea Bamboo (<i>Ecklonia maxima</i>) Split-fan Kelp (<i>Laminaria pallida</i>) Spiny Starfish (<i>Marthasterias glacialis</i>)

bony fish, sharks, turtles, Cape Fur Seals (*Arctocephalus pusillus*), Cape Gannets (*Morus capensis*), whales and dolphins. Many of the bony fish species have been overexploited to the extent that their populations have collapsed, and although they still occur, are very rare. Examples of these are the Dageraad (*Chrysoblephus christiceps*), Red Stumpnose (*Chrysoblephus gibbiceps*), Poenskop (*Cymatoceps nasutus*), White Musselcracker (*Sparodon durbanensis*), Red Steenbras (*Petrus rupestris*), Seventy-four (*Polysteganus undulosus*) and White Steenbras (*Lithognatus lithognatus*).

During summer, the west coast of the CCT experiences a phenomenon that is rare in the rest of the world. The force of the prevailing southeasterly winds, and the coriolis force of the earth's rotation, creates a situation where inshore surface water is driven offshore, and cold water wells up from the Atlantic Ocean to replace the surface waters inshore. This cold water is rich in nutrients, and when it becomes exposed to sunlight, supports rapid plankton growth, which in turn supports large-scale food webs, including vast shoals of pelagic fish such as Anchovies (*Engraulis japonicus*), Pilchards (*Sardinops sagax*) and Snoek (*Thyrstites atun*).

The waters off the CCT are home to the White Shark (*Carcharodon carcharias*) one of the most spectacular large predators in the world, and vital to the healthy functioning of the marine ecosystem. The most common whales around the CCT are the Southern Right (*Balaena glacialis*) and the Humpback (*Megaptera novaeangliae*). The Common Dolphin (*Delphinus delphis*) and the Dusky Dolphin (*Lagenorhynchus obscurus*) also frequent the City's shores. The sharks, whales and dolphins of the Western Cape support rapidly growing ecotourism, adventure tourism, and video documenting industries.

Breeding sites

The CCT coast includes breeding sites of sea-birds and seals on offshore islands. Some species of sea-birds breed on the mainland and these are areas of concern for conservation agencies. The African Black Oystercatcher (*Haematopus moquini*) and African Penguin (*Spheniscus demersis*) are dependent on these breeding sites, and vulnerable to disturbance. All four species of cormorant (*Phalacrocorax spp.*) also breed along the CCT coast. A unique feature of

the Cape Peninsula is the sea cliffs at Cape Point which provide secure breeding habitats to many seabirds.

Estuaries

The CCT has two main estuaries at Milnerton and Zandvlei. Although these estuaries suffer immense development and pollution pressures, they still support estuarine fish such as Southern Mullet (*Liza richardsonii*) and Garrick (*Lichia amia*), and other estuarine fish, crustaceans and birds. These estuaries are important for biodiversity conservation and they provide a venue for several recreational user groups. Canoeists, anglers, windsurfers and yachtsmen all enjoy their favourite pastime on our estuaries.

Right: Cape Fur Seal
(*Arctocephalus pusillus pusillus*)
Below: African
Black Oystercatcher
(*Haematopus moquini*)
Bottom: African Penguin
(*Spheniscus demersis*)



South African Tourism



Natio van Rooyen



Laura Flint

TABLE 3: TOTAL SPECIES COUNTS FOR HIGHER PLANTS AND VERTEBRATES IN THE CCT

Taxon	Total indigenous species in CCT	% of South African taxon	Endemic to South Africa	Endemic to CCT	Red Data List	Extinct in CCT	Naturalized species
Plants	± 3 000	16.7%	± 2 800	190	450	49	> 350
Mammals*	83	28.1%	16	0	24	8	7
Birds	361	42.6%	18	0	22*	9	10
Reptiles	57	13.7%	28	0	8	4	6
Amphibians	27	32.14%	25	2	10	0	3
Fresh water fish***	6	5.36%	5	0	3**	1	12

* excluding vagrant and pelagic species ** including locally extinct species *** under taxonomic revision

TABLE 4: GLOBAL STATUS OF RED DATA TAXA OF HIGHER PLANTS AND VERTEBRATES IN THE CCT

Taxon	Total Red Data taxa	Data Deficient	Near threatened	Vulnerable	Endangered	Critically Endangered	Extinct in the wild	Extinct
Plants	450*	53	66	122	112	84	4	9
Mammals	24	9	9	5	1	0	0	0
Birds	22	0	13	7	2	0	0	0
Reptiles**	8	2	3	1	1	1	0	0
Amphibians	10	0	3	3	2	2	0	0
Fresh Water Fish	3	0	0	2	0	0	0	1

* Excludes 18 species still to be assessed (November 2007 draft of IUCN Red Data List of South African Plants)

** A review of the conservation status of South African Reptiles is currently underway.

In 2004 the Table Mountain National Park (TMNP) declared the Marine Protected Area (MPA) around the Cape Peninsula to help ensure that commercial and recreational use of the ocean is sustainable (Map 7). Its jurisdiction includes 1 000 square kilometres of the seas and coastline around the Cape Peninsula. This has promoted the sustainable management of the coast, and secured specific restricted areas to protect its ecosystems and associated rich biodiversity. While fishing is allowed in the majority of the MPA – subject to Marine and Coastal Management (MCM) permits, regulations and seasons - it also includes six restricted or “no-take” zones where no fishing or extractive activities are allowed. These no-take zones are important breeding and nursery areas for marine life and through leaving these undisturbed there will ultimately be an increase in marine stock and threatened species are given a chance to regenerate. Poaching of marine resources is still a significant threat to the marine biodiversity of the area.

2.3.5 Endemic & threatened species

A sixth of South Africa’s flora may be found in Cape Town (Table 3). This is a remarkable figure considering that Cape Town covers less than 0.1% of the country’s surface area! It is even more remarkable considering that most of these plant species are endemic to South Africa and a high proportion (70%) endemic to the CFR. At least 190 plant species are locally endemic to Cape Town (i.e. found nowhere else in the world). Unfortunately, Cape Town has already lost 49 plant species and 13 of these are now globally extinct or extinct in the wild. The precarious status of many of Cape Town’s habitats is reflected in the latest IUCN Red Data List total for plants, which includes a high tally of 450 taxa (Table 4).

Associated with the extremely rich plant diversity are rich small-vertebrate and invertebrate faunas. Of the 27 species of amphibian recorded from the boundaries

of the City of Cape Town, 25 are endemic to South Africa and 10 are threatened with extinction. There are two amphibian species that are endemic to the City. Fortunately both are found within the Table Mountain National Park although both have Red Data status. The enigmatic Table Mountain Ghost Frog (*Heliophryne rosei*) is considered as Critically Endangered due to its minuscule global distribution, low population densities and impacts of impoundments on the perennial streams on which it is dependant (see text box adjacent). The Lightfoot's Moss Frog (*Arthroleptella lightfooti*) is a tiny (males are < 15mm long) and inconspicuous species which is found only in marshes and near streams on the Peninsula Mountain Chain. This species, which is considered Near Threatened, is seldom seen but its incessant chirping is a feature of Peninsula Sandstone Fynbos. It is estimated that an impressive 57 species of reptile are to be found within the City. Twenty eight of these are endemic to South Africa and eight are considered to be threatened with extinction although this figure may change as the process to review the status of South Africa's reptiles is currently underway. Three species which used to occur within the City are now considered to be locally extinct. These are the Rinkhals (*Hemachatus haemachatus*), the Southern Adder (*Bitis armata*) and the Geometric Tortoise (*Psammobates geometricus*).

Clockwise:
 Chacma Baboon
 (*Papio ursinus*);
 Lightfoot's Moss
 Frog (*Arthroleptella
 lightfooti*);
 Spotted
 Harlequin Snake
 (*Homoroselaps
 lacteus*)



Anton Pauw



Cliff Dorse



Cliff Dorse

TABLE MOUNTAIN GHOST FROG *(Heliophryne rosei)*

This enigmatic species is seldom encountered. It is listed as Critically Endangered largely due to the fact that its entire global range is less than 10 km². In fact within this range



Atherton de Villiers

the species is currently known to breed in only 6 perennial streams mostly on the southern and eastern slopes of Table Mountain. Although this frog is protected and its entire range is within the Table Mountain National Park and the upper reaches of the Kirstenbosch National Botanical Gardens, its continued survival is not a *fait accompli*. This species is dependent on perennial streams as ghost frog tadpoles take more than 12 months to complete metamorphosis. The construction of reservoirs on Table Mountain in the past has undoubtedly reduced the extent of its habitat, and it is further threatened by invasive alien vegetation and the siltation of stream habitat through erosion. The monitoring of this species provides important information for the appropriate management of its habitat. Careful monitoring is essential when dealing with species which have tiny global ranges and very low total populations. Such species can become extinct in a very short space of time, and we need to ensure that the unusual Table Mountain Ghost Frog does not become the first of the currently recognized South African frog species to become extinct.

Over 360 bird species have been recorded from the CCT area. Eighteen of these are endemic to South Africa and 22 have been assigned Red Data status. This includes numerous species adapted to suburban gardens and a great diversity of water birds. Of special interest to the bird enthusiast are the six fynbos endemic birds, all of which are found within the City boundaries. These are the Protea Canary (*Serinus leucopterus*), Cape Siskin

Blacksmith Lapwing (*Vanellus armatus*)

ADAPTABLE BIRDS

It may be a surprise to many people that some of the most common birds in and around Cape Town were not here a couple of hundred years ago. This is largely due to the adaptable nature of birds. As Europeans colonised the Cape they transformed the habitat. Birds which historically occurred only towards the eastern parts of South Africa moved along the coast making use of this changed habitat. Familiar birds such as Blacksmith Lapwing (*Vanellus armatus*), Hadedea (*Bostrychia hagedash*) and Sacred Ibis (*Threskiornis aethiopicus*) are all species which never historically occurred here but have now become established within the boundaries of the City. The planting of exotic trees in an area which would have naturally had very few trees has allowed tree-loving birds such as Acacia Pied Barbet (*Tricholaema leucomelas*) to colonise large areas of the Western Cape. Other birds such as the Common Starling (*Sturnus vulgaris*) and House Sparrow (*Passer domesticus*) were deliberately introduced and have made quick work of colonising the entire country! The infamous Indian House Crow (*Corvus splendens*) reached our shores by travelling on ships and have only recently become well established. These crows, if left to spread, can have devastating consequences on our natural biodiversity as they are generalist predators eating anything and having a special skill for raiding other birds' nests. The impact of Indian House Crows and other exotic birds needs to be managed to prevent the loss of our indigenous species and local heritage.

(*Pseudochloroptila totta*), Victorin's Warbler (*Cryptillas victorini*), Cape Rockjumper (*Chaetops frenatus*) and the nectar feeding Orange-breasted Sunbird (*Anthobaphes violacea*) and Cape Sugarbird (*Promerops cafer*). Many interesting marine birds are also to be found along the rugged coast including the African Penguin (*Spheniscus demersus*), Cape Gannet (*Morus capensis*) and Bank Cormorant (*Phalacrocorax neglectus*). All three of these species are vulnerable to extinction and are endemic to South Africa.

Eighty three mammal species are thought to occur within the City boundaries and sixteen of these are endemic to South Africa. Many of the mammals in the Fynbos Biome are secretive and nocturnal and are therefore difficult to observe. However one can often see small Grey Mongoose (*Galerella pulverulenta*), Striped Mouse (*Rhabdomys pumilio*), Rock Hyrax (*Procavia capensis*) or one of the small antelope [Cape Grysbok (*Raphicerus melanotis*), Steenbok (*Raphicerus campestris*) and Duiker (*Sylvicapra grimmia*)] when visiting one of the reserves. The White-tailed Mouse (*Mystromys albicaudatus*) is classified as endangered and is one of the 24 species of mammal with Red Data status found within the City.

White-tailed Mouse (*Mystromys albicaudatus*)

Cliff Dorse

The City of Cape Town has a rather depauperate fresh water fish fauna largely due to the lack of major river systems within our boundaries. Of the six indigenous species recorded two are listed as Vulnerable and a third as extinct. The extinct species, a type of redfin (*Pseudobarbus* sp.), is reported to have been exterminated from the Eerste River. The *Galaxia* and *Sandelia* fish genera are however under taxonomic revision and this will result in some new species being described.

Preliminary results indicate that the Diep River *Galaxia* population may well be distinctive and will be a Red Data species. All our indigenous fish species are threatened by pollution, invasive vegetation and exotic fish species of which at least 12 alien species are established within CCT.

While the small vertebrates have not been adequately sampled it is glaringly evident that our invertebrate fauna has been grossly neglected! From the groups that are better known, such as the butterflies and dragonflies, it is evident that many species are under threat and some species have already been lost. (See text box on butterflies on page 27). The realisation that we are losing species we don't even know exist is a sobering thought.

HONEY BADGERS – CAN THEY SURVIVE IN THE CITY OF CAPE TOWN?

Honey Badgers can never be effectively conserved in the nature reserves we have within the boundaries of the City of Cape Town. This is due to the fact that the home range for a single Honey Badger would exceed the total area of all our reserves put together! While the badgers will frequent the reserves and some individuals may even reside within the boundaries of some, the animals will regularly leave the reserves while foraging or looking for mates. It is therefore critical that our nature reserves do not become islands of nature surrounded by a sea of development. It is also critical that farmers, on whose



Cliff Dorse

land Honey Badgers spend a great deal of time, are educated about the badgers. The scientific name for the Honey Badger is *Mellivora capensis* which means the Honey Eater of the Cape. While Honey Badgers have a sweet tooth and will readily raid bee hives, a farmer can badger-proof his hives quite easily – keeping them out of reach of the badgers. Unfortunately many honey farmers still use gin traps to protect their hives, an action which results in the unnecessary deaths of many badgers. It would be a sad day if we lost these small stocky carnivores within the City boundaries.

BUTTERFLIES – HIGHLY SPECIALISED AND SENSITIVE CREATURES

The Cape Peninsula has 68 species of butterfly. These stunning creatures not only brighten up our gardens and walks in the veld, but are an important part of ecosystems. Butterfly eggs, larvae, pupae and adults are an integral component of many food webs. Only 1% of butterfly eggs eventually become adults. Many adult butterflies are important pollinators. Many species of butterfly have developed highly specialized relationships. The Mountain Pride Butterfly (*Aeropetes tulbaghia*), as an example, is the only known pollinator of the Red Disa (*Disa uniflora*) orchid flowers. Other butterflies have larvae (caterpillars) that are partially or totally dependent upon specific ant species for their survival. This is an elegant example of a mutually beneficial relationship. These ant species can themselves be displaced by the introduced Argentine Ant (*Linepithema humile*). Specific indigenous ant species offer the butterfly larvae 24 hour bodyguard and security services. In return, the ants benefit by getting some 'fynbos padkos' in the form of some sweet droplets of liquid released by specialized honey glands on the backs of the caterpillars. Butterflies are especially sensitive to significant disturbances,

Chrysoritis dicksoni



Steve Woodhall

such as too frequent (and too seldom) fires and invasion by alien vegetation and ants. Additionally, many butterflies have very small distributional ranges (often smaller than a football field) and can be put under extreme threat by inappropriate development. Eleven of the proposed 63 Red Data (threatened) butterflies of South Africa occur within 100 km of Cape Town. Unfortunately, we appear to have already lost one species and two subspecies from the Peninsula. These include Dickson's Strandveld Copper (*Chrysoritis dicksoni*) from near Atlantis-Melkbosstrand, the Scarce Mountain Copper (*Trimenia malagrida malagrida*) from Lion's Head and Dickson's Monkey Blue (*Lepidochrysops methymna dicksoni*) from the Tygerberg Hills. Other threatened butterflies include the Critically Endangered Barber's Cape Flats Ranger (*Kedestes barbarae bunta*) and Dickson's Brown (*Stygionympha dicksoni*), the Endangered False Bay Ranger (*Kedestes lenis lenis*) and the Near Threatened Red Hill Copper (*Aloeides egerides*).

Red Data status from Jonathan Ball – unpublished 2006 MSc thesis in Conservation Ecology.

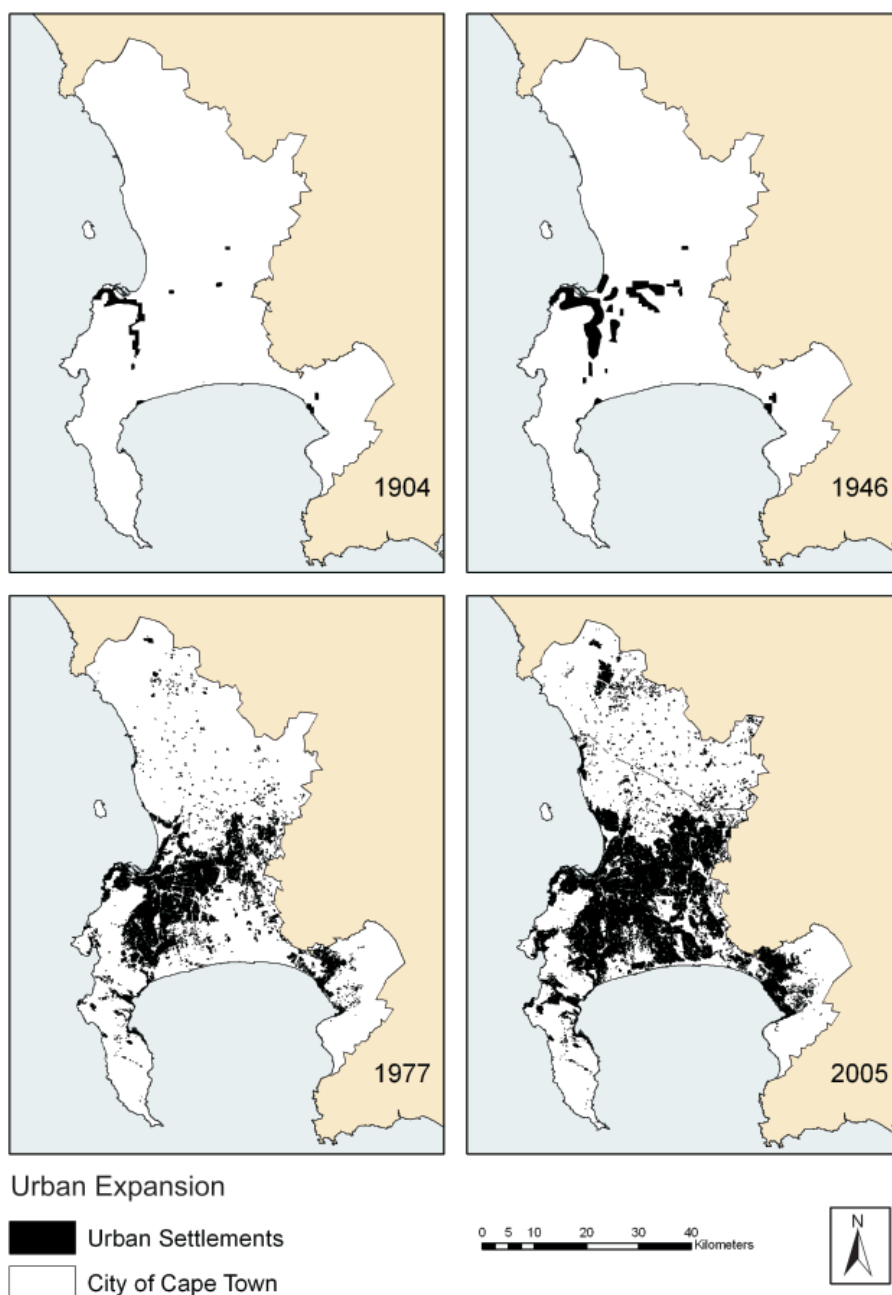
2.4 STATUS, VALUE AND THREATS TO BIODIVERSITY

2.4.1 Known history of biodiversity status in Cape Town

At the landscape level, the status of biodiversity in lowland Cape Town is inversely proportional to the footprint of the urban city: thus as the city grew, more natural habitat was consumed or became negatively impacted by surrounding developments, with a concomitant loss of biodiversity. Growth of Cape Town was slow until the 20th Century, after which human population growth accelerated, but with a disproportionately high increase in the urban footprint (Map 8 – urban growth in CCT). However biodiversity also was impacted by other land-use practices. The introduction of Australian acacias (now major invasive alien weeds) to the Cape Flats in the late 19th Century was triggered by the need to stabilize extensive areas of drift-sands (Shaughnessy 1980). This indicates that vegetation had already been removed, probably through over-grazing and inappropriate attempts to cultivate the land, on parts of the Cape Flats prior to urban development. In areas of richer clay soils, such as in the Tygerberg and Swartland, land was cultivated from early settler times for crop production, especially cereals. However, the extent of cultivated land greatly increased after the Second World War with the introduction of more powerful agricultural machinery. Exceptions are steep slopes previously ploughed by horses that are no longer cultivated (e.g. sections of Tygerberg

Nature Reserve). Loss of Cape Town’s biodiversity has thus been most significant during the past six to seven decades. The most severe transformation impacts are in the lowland habitats (sand fynbos, wetland, alluvium fynbos, strandveld and renosterveld vegetation types), lower mountain slopes (renosterveld, shale fynbos and granite fynbos vegetation types) and arable land on the fertile hills (renosterveld vegetation types).

MAP 8: URBAN GROWTH IN CAPE TOWN





2.4.2 The value of biodiversity

Ecological goods and services accruing to humankind via the conservation of natural and semi-natural areas are many and include: flood attenuation; filtering of run-off and air pollution; replenishment of ground water; atmospheric carbon sink; oxygen production; tourism; recreational, educational, cultural and spiritual space; and existence and future-use values of the biota. Thus conserving biodiversity offers many benefits to humankind, including an improved quality of life and health, but these are difficult to quantify in purely economic terms. Well-managed conservation and public open space areas are associated with enhanced property values, improved urban community relationships and reduced levels of violent crime in adjacent areas. However, at present, many communities in Cape Town's lowlands view natural remnants as crime havens and a threat to their safety. This is largely due to the fact that the sites are invariably covered in alien *Acacia* thickets and receive no management. The challenge is to find the necessary resources to implement effective management of these irreplaceable remnants and simultaneously change public perception to a positive one.

2.4.3 Data on economic values of biodiversity to Cape Town

Natural ecosystem goods and services are so basic that they are often overlooked and less often recognized for their importance. A recent study indicated that biodiversity in the Cape Floral Kingdom, including the Cape Town area, makes a substantial contribution to the Western Cape

economy, to the tune of at least R10 000 million per year (US\$1=R7; Turpie et al. 2003). For example in 2003, marine resources were worth R1.12 million per kilometre of coastline per year, and direct harvesting of products such as wildflowers and thatch from the vegetation was worth R27 per hectare per year (or R78 million per year for the entire region). The most widespread vegetation of the region – the various fynbos types – supplies bees for pollinating commercial fruit orchards and thus contributes to this important industry. Natural

resource-based tourism is one of the highest income generators and includes angling, whale watching, hiking and bird-watching. These figures exclude the role natural ecosystems play in water filtration, climate regulation and control of pests, diseases and floods.

In 2006, 2.5 million people entered the Table Mountain National Park through the paid entry points, contributing an estimated R49.1 million to South Africa's Gross Domestic Product. This figure excludes the commercial activities in the park such as private tourism operators and film crews. In addition, social benefits included 878 direct jobs in the park in 2006, with additional jobs being created through the multiplier effects of this employment.

World-wide, well-maintained natural areas have been shown to increase adjacent property values. A case study of the lower Silvermine River in Cape Town indicated a significantly positive net present value of rehabilitating the degraded wetland, primarily for flood control, but also to improve the ecological functioning, aesthetics and recreational potential of the area. Although the ecological benefits

BOX 1. ECOSYSTEM GOODS AND SERVICES CAN BE DIVIDED INTO FOUR MAIN TYPES

- **direct benefits:** many species are of direct use for food, raw materials, medicines and genetic stock for the development of horticultural cultivars; support of pollinators such as honeybees that are important in the agricultural industry;
- **indirect benefits (or non-consumptive use):** terrestrial and wetland vegetation regulate water flow, releasing it slowly into rivers to minimize flooding and provide water during the dry season; opportunities for recreation and ecotourism in visiting unique habitats or species; climate regulation and gas regulation (oxygen production and carbon sequestration); erosion control;
- **option benefits:** future use values as research yields new information, for instance an important plant chemical for medicinal use or plant breeding;
- **existence benefits:** the sense of well-being and spiritual value from the knowledge that a natural area exists and can be enjoyed; improved quality of life.

could not be quantified, benefits of improved flood attenuation and improved aesthetics, related to habitat integrity, resulted in a benefit cost ratio exceeding 4:1 (Van Zyl et al. 2004).

2.4.4 Threats to biodiversity

Urbanization

The city coincides with an extremely high concentration of unique biodiversity, making it almost impossible to completely avoid negative impacts of urban development. High immigration rates to Cape Town, particularly during the past two decades, and inappropriate development in the form of urban sprawl, constitute the greatest threats to remaining biodiversity in the city. Urbanization causes fragmentation of natural habitats, exposing flora and fauna to greater impacts of invasive alien species, pollution and other disturbances. In turn, these impacts lead to declines in populations and increased extinction risks. Loss of key species, such as insect pollinators, can then lead to a lack of seed production in plants.

Since the 1960's, town planning has favoured low-density housing developments further and further from the city centre (Map 8) and this trend continues in practice. Pressure from developers, who are often not local residents with an understanding that Cape Town's biodiversity is irreplaceable, adds to the threat of biodiversity loss in our remaining natural areas. However, at the planning level there is some recognition today that development in the Western Cape cannot continue along this path and that denser urban centres need to be created to facilitate efficient public transport systems and the retention of quality green open spaces, including natural and agricultural lands.

Urban sprawl viewed from Silvermine



Cliff Dorse



Cliff Dorse

Alien *Acacia saligna* invading Sand Fynbos

Invasive Species

The second most important threat to biodiversity conservation in Cape Town is invasive species. The CFR is particularly susceptible to invasion by alien trees, particularly species of Australian *Acacia*, *Hakea* and *Eucalyptus*, and pines from the Northern Hemisphere. Many of these trees are considered ecosystem transformers as they out-compete the indigenous vegetation and alter ecosystem processes, such as nutrient cycling, fire and the hydrological regime. In the mountains, the main invader species are pines and hakeas, and to a large extent these are being successfully controlled. However in lowland and riparian habitats where alien acacias predominate, control is less successful and biodiversity has been lost through alien-related degradation of habitat. The acacia species have large soil-stored seed banks, and in some species have strong re-sprouting capability which makes their control extremely difficult, time-consuming and expensive. Woody alien species accumulate much higher standing biomass than the indigenous vegetation and when wildfires occur these are of higher severity, resulting in damage to soils and indigenous soil seed banks. The dense cover created by the alien trees has various social implications as it creates cover for criminal activities as well as increasing the fire intensity.

In the lowlands, invasive alien herbaceous species are also a threat to biodiversity, particularly the perennial

grass Kikuyu (*Pennisetum clandestinum*) in moist sites, and annual grasses from the Mediterranean basin. These species proliferate and out-compete indigenous herbaceous species, such as bulbs, and may increase fire frequencies via the rapid accumulation of dry biomass and thus eliminate the slower growing indigenous perennial species.

Invasive alien animal species that are of concern include the Argentine Ant (*Linepithema humile*), which disrupts the fynbos seed dispersal mutualism with indigenous ants, the Mallard Duck (*Anas platyrhynchos*) which hybridizes with the indigenous Yellow-billed Duck (*Anas undulata*), and the Indian House Crow (*Corvus splendens*) which preys on all small indigenous animal species and birds' eggs. Control measures are ongoing for the two alien bird species. Feral and domestic cats are a major threat to vertebrate biodiversity in Cape Town, especially small mammals and reptiles, and require continuous control.

Agriculture

Most of the productive land in Cape Town has already been developed. However the ploughing of marginal agricultural land still occurs, particularly for extension of wine farms, and this can impact negatively on threatened biodiversity. An example includes the recent loss of Endangered Peninsula Granite Fynbos on high mountain slopes on the Cape Peninsula. Agricultural activity has caused fragmentation of natural remnants, particularly renosterveld vegetation types, with similar impacts to those mentioned above under urbanization.

Inappropriate fires

Fynbos is a fire-prone shrubland that requires fire for the long-term conservation of its species. However, if fires are too frequent, then slower-growing species may be eliminated. Conversely, if fires are excluded, then forest species invade and the rich fynbos community is lost. Not all vegetation types in Cape Town are fire-prone. For example, Cape Flats Dune Strandveld often has a high succulent and/or thicket component and does not require fire to persist, although it can withstand the occasional fire. Conversely if this vegetation type is burnt too often in quick succession it becomes degraded and alien species, especially grasses, invade. Grasses in

turn maintain the shorter fire-cycle and permanently change the vegetation structure and biodiversity value.

Mowing

Current City policy is to mow Public Open Spaces and road verges three times a year. In higher rainfall areas mowing eliminates all but the hardiest indigenous plant species (some winter-flowering geophytes can persist) and leads to a domination by grasses. In drier areas, mowing destroys most of the vegetation and reduces plant cover, with wind-blown sand often becoming a nuisance. However, because of the large scale of urban development in Cape Town, some of our vegetation types persist mainly in these pockets of Public Open Space systems, usually managed by the City's Parks Department. In some cases, the vegetation is too transformed to be amenable to restoration, but in other sites indigenous seed banks remain and there is potential to restore portions of the sites for biodiversity conservation if mowing is stopped and conservation-friendly management implemented.

Over-exploitation

The majority of Cape Town comprises relatively unpalatable vegetation on nutrient-poor, sandy soils. Historically, stock would have been grazed for short periods in some of this vegetation then moved on to better grazing ground with higher carrying capacity, such as the inland renosterveld areas. However today, small stock farmers are herding cattle and goats year-round on our low-nutrient vegetation types. This results in the vegetation being over-utilized, opening up gaps

Firefighting on the slopes of Lion's Head



Anton Pauw

for alien grasses to colonize. In turn, the dried grass fuels frequent fires and before long the vegetation becomes completely degraded and changed in structure from an indigenous shrubland to a low-diversity alien grassland.

The proximity of a large metropolitan area to the marine environment provides great challenges and opportunities for marine conservation. The exploitation of natural resources along the CCT coastline is an important source of recreation, employment and food. Unfortunately, the intensity of harvesting (including uncontrolled poaching in some species such as Abalone (*Haliotis midae*)) has exceeded the capacity of many of the fish species to recover, and many are severely overexploited. It is clear that the marine and coastal ecosystems surrounding the CCT need to be protected from further degradation and given the chance to recover.

Pollution

In terrestrial ecosystems, nitrogen deposition from car exhausts enriches the soil and makes it less suitable for fynbos species adapted to a low-nutrient regime. Competitive species, such as grasses, respond by growing more vigorously and out-competing other species. This changes the vegetation towards a more herbaceous structure and also causes a change in fire regime (as described above), usually resulting in more frequent fires.

A large part of the Cape Town lowlands comprises seasonal wetlands. These ecosystems and our rivers are all polluted to a greater or lesser extent via the stormwater system and failing sewerage systems. Nutrient enrichment of the wetlands causes the loss of indigenous biota and the colonization by less sensitive, often alien species.

Hydrology

Changes to hydrology resulting from urbanization on the Cape Flats, such as large-scale hardening of catchment areas, drainage and canalization of streams, alters natural ecosystem functioning in wetlands and vegetation remnants, and this can lead to changes in species composition over time. For example, historically

seasonal wetlands and rivers have become perennial systems owing to the inflow of stormwater during the dry season, whereas other areas have become drier owing to lowered infiltration in the catchment.

Crime

The currently high level of crime in the city, particularly relating to personal safety, is a major threat to the conservation of our natural ecosystems, as people perceive bushy remnants as areas that harbour criminals. Until crime prevention is countered more successfully, natural areas will be under threat from developments that may seem in the short-term to be more expedient, such as sand mining and housing. However, well-managed remnants generally support relatively low-stature vegetation, whereas unmanaged remnants become invaded by alien trees, especially *Acacia saligna* and *A. cyclops*, which grow taller than the indigenous vegetation and screen illegal activities. Therefore good vegetation management can contribute to reducing criminal activity in local areas. Activities such as the dumping of rubble and toxic waste, poaching and arson, also directly impact negatively on biodiversity.

CASE STUDY: THE DISCOVERY OF A NEW LIZARD SPECIES

In 2002 the first individual of a lizard species was discovered by two Americans in the Blaauwberg Conservation Area (BCA). Given the spectacular views of Table Mountain from this locality the animal was appropriately named *Scelotes montispectus* "montispectus" meaning "to behold the mountain" and "Scelotes" being the genus of dwarf burrowing skinks to which this animal belongs. The presence of this species within the BCA is of immense conservation importance and to date only six specimens of this enigmatic lizard have ever been found! The fact that this lizard was so long undiscovered while occurring so very close to Cape Town highlights the fact that more intensive and detailed sampling needs to be done.



Cliff Dorse

THE CAPE FLATS ERICA – LOST AND FOUND

Several decades ago on a small area of the Cape Flats an erica grew along the banks of the seasonal wetlands that form during the winter months. This prominent Erica (or heath), with others of its kind, contributed to the name of the well-known suburb: Heathfield. This was the Cape Flats Erica, *Erica verticillata*: it has showy pink flowers in whorls at the end of the branches. Growing up to two metres high, this impressive plant flowered in the height of summer, forming magnificent floral displays when much of the surrounding vegetation was drab and brown. And it was this habit of showing its beauty in summer that contributed to its extinction.



Erica verticillata

With the abundance and variety of flowers in the Cape, the picking and selling of flowers has been an industry for many years. As Cape Town developed in the early 1900's the demand for flowers grew, and the easily accessible plants were harvested first. An obvious candidate for the flower trade was the Cape Flats erica, being found not only on the flat terrain but flowering in summer when most other species were dull bushes.

By 1940 urbanisation, drainage of wetlands, alien vegetation and importantly flower picking were threatening it with extinction. By 1952 a botanist cataloguing the Cape Peninsula's flora listed its occurrence as: "Now very rare and perhaps exterminated ... recorded towards Zeekoe Vlei... ", and herbarium records from this time state the place of collection as "Adderly Street flower sellers". From here on the species dwindled in the wild, with no one knowing when the last plant disappeared.

A Kirstenbosch Horticulturist discovered a plant growing in a municipal park in Pretoria and managed to root cutting material!



Dalton Gibbs

The plants thrived in cultivation and in 1994 ten plants were planted in Rondevlei Nature Reserve. The first plants were planted on a trial and error basis, along a soil moisture gradient into a seasonal wetland. It soon became evident that *Erica verticillata* is quite fussy about its habitat requirements, growing only along the fringes of seasonally inundated wetlands. It also does not enjoy saline water, and so many of the initial plants died.

Renewed efforts were made and a viable site was found at Rondevlei. In 1999 Kirstenbosch produced a fine batch of 100 ericas, which were established there. A Mr Scout, who was born close to Rondevlei in 1922 recalled a large

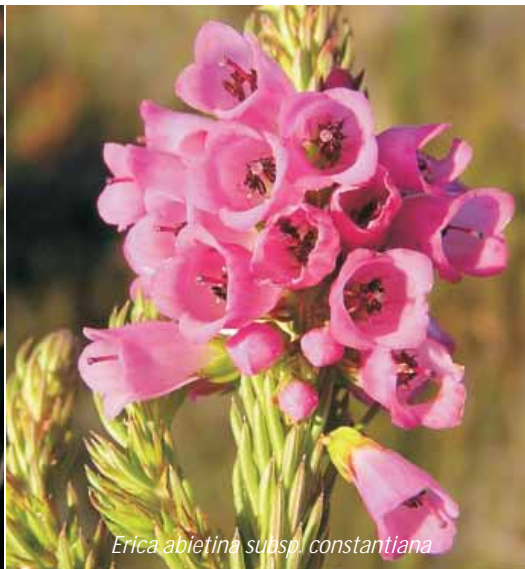
pink erica of his youth that grew head height on the exact field in which the plants now thrive - the Cape Flats Erica had indeed come home! Established plants were visited by Lesser Double-collared sunbirds (*Cinnyris chalybea*) and hawk moths (*Sphingidae sp.*). However no seed was being produced - all the plants in the wild were cloned from the original cutting and were not self-fertile!

Again the beauty of the Cape Flats erica was its saving grace: the erica expert, Ted Oliver, had seen a Cape Flats Erica in cultivation at botanical gardens in Austria. Following a request, at the South African Consulate, Vienna, in July 2001, cuttings of this plant were received amidst much publicity.

Ongoing research has uncovered five distinct forms of the *Erica* from botanical gardens around the world (Hitchcock 2007). These have been cultivated at Kirstenbosch and have since allowed viable seed to be produced. *Erica verticillata* is now available for sale to the public for planting in their Cape Town gardens, and has been planted in restoration projects, such as Bottom Road at Zeekoevlei.



Zantedeschia aethiopica



Erica abietina subsp. *constantiana*



Disa ferruginea



Disa draconis



Protea cynaroides



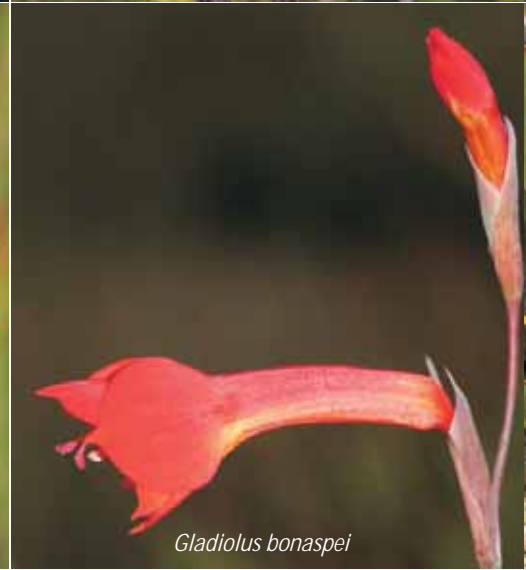
Erica mammosa



Moraea aristata



Diastella proteoides



Gladiolus bonaspei



Ursinia sp



Jordaniella dubia



Babiana villosula



Iris dubia



Euphorbia mauritanica



Therianthus bracteolatus



Leucospermum hypophyllo carpodendron



Xiphotheca reflexa



Ferraria crispa

3. BIODIVERSITY STRATEGY

3.1 HISTORY OF BIODIVERSITY MANAGEMENT

Historically, the conservation of natural areas and biodiversity was undertaken in a disjointed and ad hoc manner. This was driven by many factors, but significantly through the structure of the previous dispensation, that comprised no fewer than eight government organizations in the region now managed by the City of Cape Town. This included seven local authorities and the Western Cape Nature Conservation Board (now CapeNature), in addition to other government agencies such as the South African Defence Force, Public Works and South African Forestry Corporation. Little coordination and integration of efforts took place among these organizations, resulting in a fragmented approach to biodiversity and city-wide planning. However, the spectacular Peninsula Mountain Chain received more attention than the Cape Town Lowlands (Cape Flats), which were neglected under apartheid planning. Prior to 1982, a few reserves were proclaimed, such as Bracken, Helderberg and Tygerberg Nature Reserves and the Rondevlei and Zandvlei Bird Sanctuaries (now both renamed Nature Reserves).

In the late 1980's and early 1990's several floral and vegetation surveys were done to identify conservation-worthy areas on the Cape Flats (Jarman 1986, McDowell & Low 1990, Daines & Low 1993, Wood & Low 1995). McDowell & Low (1990) identified sites such as Kenilworth Racecourse and was critical in raising awareness among conservationists about the plight of Cape Town's biodiversity. In 1992 the then City of Cape Town Council accepted the recommendations of this study and used it as a reference document to guide decision-making with respect to future development proposals. Despite this Council resolution, the report failed to mobilise significant action and the Council adopted a passive role, particularly when dealing with areas threatened by development. There was no clear or organized strategy for implementation, no delegated body responsible for implementation, and the findings of the report were not communicated to a sufficiently wide audience.

In the early to mid-1990's many of the larger remnants were lost to development while others, even some

with protection status (local and provincial nature reserves) gradually degraded, owing to lack of on-the-ground management and changes to ecosystem processes, such as hydrology (e.g. Driftsands Nature Reserve). Between 1994 and 1997, the attention of government and civil society was focused on the consolidation of conservation areas and management on the Peninsula Mountain Chain, which culminated in the establishment of the Cape Peninsula National Park in 1998. Establishment of the park (now called Table Mountain National Park) is largely complete, thereby relieving local and provincial government of a large part of its conservation management responsibilities on the Peninsula Mountain Chain, although the City still controls some of the important ecological linkages within the Peninsula Mountain Chain.

Thereafter, attention returned to the Cape Flats. In 1997, the Botanical Society of South Africa, an NGO dealing with floral conservation issues in Cape Town, launched a study to identify floral conservation priorities, based on the principles and practices of target-driven systematic conservation planning (Maze & Rebelo 1999). This resulted in the identification of 38 Core Flora conservation sites as critical to the overall protection of biodiversity in Cape Town (see Box 2). The Core Flora sites and the formal conservation reserves formed the backbone of the Biodiversity Network and are still viewed as no-go areas for development, although one site has been lost to a development.

The Botanical Society also conducted a study of lowland renosterveld remnants in the Western Cape (Von Hase et al. 2003), and together with SANBI and the Table Mountain Fund (TMF) launched a project to focus on sustainable people-centred conservation on Core Flora sites (see 5.4.3).

Many remnants of natural vegetation in the City, especially in the lowlands, contain the highest number of threatened plant species per area relative to any other place on earth (Wood et al. 1994) and almost one third of the threatened plants in the CFR are found in the City. Even more important – many species occur in Cape Town and nowhere else (these species are known as local endemics). CAPE (Cape Action for People and the

Environment; see Box 3) focussed attention on the poor conservation status of the lowlands, raising their profile from the previous perception of some conservationists who viewed them as “isolated degraded environments” to unique and valuable gems worthy of the highest conservation effort. This was a dramatic shift from the past when the City had primarily focussed on the conservation of the Table Mountain Chain. The transfer of the management of the Table Mountain range to the South African National Parks (SANParks) in the mid-1990’s also re-focussed the City’s attention to the lowland habitats.

It is also important to remember that Cape Town is home to 3.2 million people. There remains a massive demand for housing, with more and more land being developed to accommodate an estimated 50 000 new migrants to the city every year. On top of that there is a backlog of 260 000 families on the housing waiting lists. It is therefore very important that the City plans and directs housing to suitable areas, while balancing the needs of our precious natural heritage. In line with CAPE and other international conservation efforts, a recent paradigm shift has resulted in the recognition that the protection of natural and cultural resources is everyone’s concern. Many cities in the world contain valuable biodiversity. However, it is only within the City of Cape Town that irreplaceable biodiversity of international significance is crammed into almost every open space and road verge. As such, the City recognises that the golden thread of biodiversity is an integral component of our city and is the responsibility of every City employee and Capetonian. By ensuring that the built, cultural and natural environments are integrated is the only option for future sustainability and improved quality of life. In addition, urban areas provide a huge opportunity to involve people in conservation and caring for our environment.

Although the lack of resources is still a challenge, since 2002 the number of City-owned sites managed by qualified conservators has increased from four to 21 and the number of City-managed conservation sites now stands at 27 (Map 6, Table 5. The recognition and commitment by Council, supported by the CAPE community, bodes well for the huge task of conserving

biodiversity of the unique threatened ecosystems in Cape Town.

RONDEVLEI HIPPOS – THE RETURN OF THE BIG BOYS!

Twelve days after Jan van Riebeeck arrived in South Africa in 1652, he shot his first hippo on what is now Cape Town’s Church Square. Hippos were plentiful in the Western Cape at the time and large herds inhabited wetlands on the Cape Flats, such as Rondevlei. By the 1700s, the Western Cape hippo population had been exterminated.

In 1979 *Hippopotamus amphibius* were reintroduced into Rondevlei after an absence of almost three hundred years. Two males and two females were relocated from Kwa-Zulu Natal. The population was initially brought in to control Vleigras, *Paspalum vaginatum*, an alien grass, which was smothering the wetland. The Vleigras prevented many of the bird species from reaching the mud layer, thus limiting their feeding ability. The hippos swiftly ate the Vleigras and opened up the reed beds, distributing nutrients throughout the system. Being bulk herbivores, capable of eating up to 100kg per day, these mammals play a vital role in maintaining biodiversity in the wetland system and cannot be substituted with any other herbivore. Once the Vleigras problem had been solved, the hippopotami fed on and still feed on indigenous buffalo grass and the invasive kikuyu grass. Besides their valuable ecological role hippos are also great for tourism and visitors to Rondevlei always delight in seeing hippos!



Howard Langley

BOX 2. HISTORY OF CONSERVATION PLANNING IN THE CCT

Twenty-five years ago the then Cape Town Municipality produced a forward-thinking report, the "Greening the City Report". This 1982 report is still recognized as a leading framework for sustainable development, and formed the basis for much of the biodiversity conservation work that followed, although few of the key recommendations have yet been implemented. One positive result was the proclamation of Wolfgat Nature Reserve along the False Bay coast in 1986. Earlier existing reserves were proclaimed on a site-specific basis, without a systematic prioritization approach being applied to ensure the conservation of representative and irreplaceable vegetation in the lowlands. In reality, many of today's conservation sites came about by default as they originally served as landfill sites, storm water control sites or were considered to have little urban development value.

The flora and vegetation surveys conducted during the late 1980s and 1990s identified important sites such as Kenilworth Racecourse and raised awareness of the plight of Cape Town's biodiversity. Although the recommendations of the McDowell and Low (1990) report were accepted by the City Council, insufficient action was mobilized and many important natural vegetation remnants continued to be lost to planned and unplanned developments in the early 1990s. In 1997 the Botanical Society of South Africa, an NGO dealing with floral conservation issues, launched a study to identify floral conservation priorities in the Cape Town lowlands, based on the principles and practices of target-driven systematic conservation planning. This resulted in the "Core Flora Conservation Areas on the Cape Flats" report (Maze & Rebelo 1999) in which 38 sites were identified as critically important contributors to Cape Town's biodiversity.

Central to the Biodiversity Strategy is the planning, development and implementation of a network of natural vegetation remnants, comprising both primary and secondary biodiversity areas. Primary areas refer to those fundamentally set aside for conservation where some compatible activities are permitted and secondary areas are those potentially fulfilling a more multifunctional and multipurpose role, including possible direct and indirect uses.

Owing to the international importance of Cape Town's biodiversity, and the high level of endemism (i.e. local restriction) in its vegetation types and species, the City used internationally accepted systematic conservation methodology (the conservation planning and analysis tool, C-plan) in the selection of the network of remnants. This tool uses a range of criteria to identify and select those remaining natural remnants, that in addition to existing nature conservation areas, best represent all vegetation types and species found within Cape Town. The tool incorporates the concepts of "complementarity" (i.e. remnants are first selected to conserve vegetation and species not already conserved), "flexibility" (an indication of alternatives to meet a particular

target) and "irreplaceability" (an indication of the importance of a particular remnant and the degree to which alternative remnants can be selected to still achieve conservation targets).

The C-plan analysis was updated in 2007 using a new natural habitat remnant layer (based on 2005 aerial photography) and a map of 43 local vegetation types aligned to the new national vegetation map (Mucina et al. 2005). Plant species data were obtained from the Protea Atlas and CREW (SANBI) and SaS species (Low 2002) locality databases. For the purposes of C-plan analysis, nature conservation areas included reserves with formal conservation status, other areas managed for biodiversity but without yet having official conservation status, and the Botanical Society's core flora sites (mostly without formal conservation status; Maze & Rebelo 1999). The analysis tool then selected additional natural habitat remnants to meet our local vegetation and species targets (Map 6, Table 5). The following criteria were used to determine the vegetation type targets:

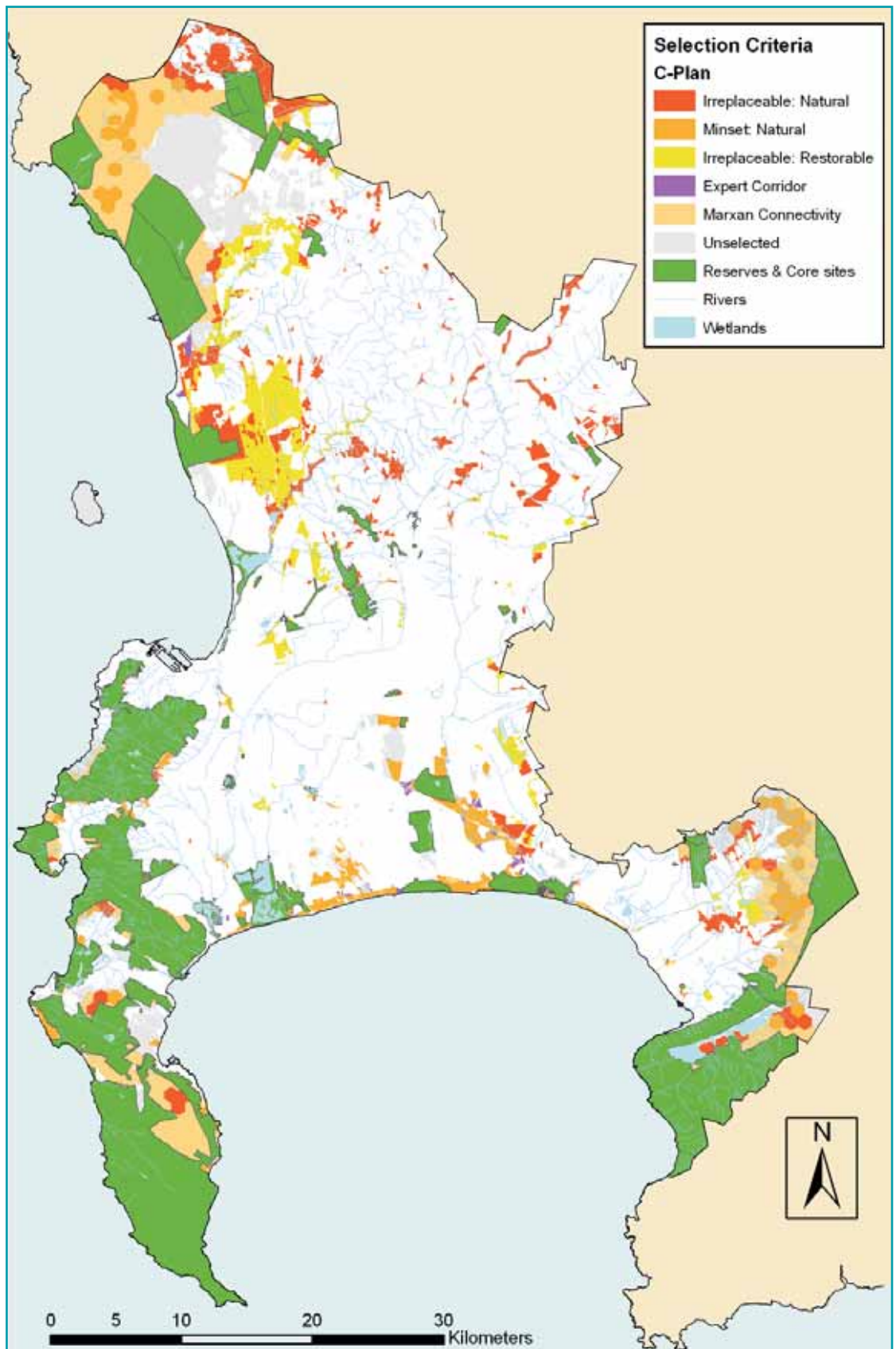
1. Historical rarity within the City (expressed as % of the CCT area covered by the historical distribution of each vegetation type).
2. Percentage of each national vegetation type historically occurring in the City.
3. The degree of transformation of each vegetation type within the City.

Vegetation types of lowest historical extent, highest proportional representation within the City and highest degree of transformation generated the highest percentage targets. Once vegetation remnants had been selected, the database was checked to ensure that plant species targets (i.e. a minimum of 5 populations or all populations if fewer than this) were met and additional remnants were added to satisfy species targets.

In 2008, after extensive field verification, the remnant layer was updated and C-plan was re-run using the national ecosystem targets. The programme "Marxan" was next applied, using a "Boundary Length Modifier" tool, to select additional remnants needed to improve connectivity among selected remnants. This, together with expert corridor sites, replaced the friction analysis used previously to identify corridors on the Biodiversity Network. Corridors help to conserve ecological processes, which include the dispersal and migration of plants and animals, necessary to conserve healthy populations in the long-term. All wetlands and rivers form part of the Biodiversity Network.

Although planning for conserving Cape Town's biodiversity began in the early 1980s, implementation has been slow, and it is with a renewed sense of urgency that CCT Biodiversity Management staff, together with internal City partners and external partners such as CAPE, CapeNature, SANParks and civil society groups, plan to take the Biodiversity Network forward into a more focussed implementation phase.

MAP 9:
BIODIVERSITY
NETWORK



3.2 ANALYSIS OF PERFORMANCE TO DATE

3.2.1 Aspects of biodiversity management that have been successful

The fine-scale conservation planning done in the City (see Box 2) has been an important first step towards halting biodiversity loss. Although the plans have been accepted by council, work has since been completed in ground-truthing the Biodiversity Network (terrestrial and wetland components) to ensure the best sites are included, and then the network will be implemented. Ongoing, close working relationships with colleagues

in other organizations, such as CapeNature, SANBI and SANParks is crucial in securing Cape Town's biodiversity. In another initiative, town planning staff will be alerted to important biodiversity sites through a Red Flagging system, which is currently being developed.

The introduction of a modified version of the WWF Management Effectiveness Tracking Tool (METTS) and the development of the Protected Areas Review in relation to nature reserve management has provided a mechanism to review and improve management on the ground. The results are also used by CAPE in their monitoring and evaluation system for protected areas.

LEAVING IT TOO LATE?

The story of *Serruria furcellata* (Ebrahim & Koopman 2004) epitomises the failure of biodiversity conservation and could be repeated, with a few name changes, for many of the other 317 threatened plant species (and their associated biota) in Cape Town. In the 1980's *Serruria furcellata* (spiderhead) – a member of the Protea family and confined to the lowlands of Cape Town in Cape Flats Sand Fynbos vegetation – was described as fairly frequent at a site in North Pine near Kraaifontein. When the site was revisited in 2004, it had been developed for new houses and an industrial area, with part of the original field managed as Public Open Space, and thus regularly mowed. The open space area was thickly covered with alien grasses and Australian acacias and at first inspection did not look promising for surviving indigenous species. However, eventually two stunted plants of *Serruria furcellata* were found, having been heavily pruned by mowing. Today only one plant survives, the last of this species remaining "in the wild". Horticulturists have propagated some cutting material, but the

re-establishment of this plant in nature will require finding a secure conservation area with the correct edaphic conditions.

Serruria furcellata



Cliff Dorse

BUTTERFLY ON THE BRINK....

The Barber's Ranger (*Kedestes barbaraebunta*) is a small brown skipper butterfly with elegant white markings particularly on the underwings. The only place in the world where you can see these butterflies is in the south western corner of the Cape Flats near Strandfontein. The larvae of this butterfly feed solely on Cotton Wool Grass (*Imperata cylindrica*). The species used to be found in dune slack wetlands and damp grassy locations in the vicinity of Retreat and Steenberg. These localities have since been destroyed by development. The last remaining population is bisected by Strandfontein Road and its continued survival is threatened by too frequent fires, alien vegetation encroachment and illegal dumping. It is imperative that the proposed Pelican Park Nature Reserve becomes a reality as this reserve would conserve a sizeable and intact portion of Endangered Cape Flats Dune Standveld of immense conservation significance. In addition to this, the reserve's boundaries would include the sole surviving Barber's Ranger population as well as a critical population of the endangered False Bay Ranger (*Kedestes lenis lenis*) skipper butterfly. It is critical that this species and its habitat receive urgent conservation management. If the status quo remains; the extinction of the Barbers Ranger is imminent.



Jonathan Ball

3.2.2 Aspects of biodiversity management that have not been successful

To date, many of the Core Flora sites and important

remnants are not managed and are being allowed to deteriorate in condition with a concomitant loss in biodiversity. This stems from insufficient resources being allocated to biodiversity management at

BOX 3. WHAT IS CAPE?

CAPE is a partnership for sustaining life in the fynbos and adjacent shores (www.capeaction.org.za).



The CFR's rich biodiversity is under serious threat for a variety of reasons, including conversion of natural habitat to permanent agriculture and rangelands for cattle, sheep and ostriches, inappropriate fire management, rapid and insensitive development, overexploitation of water resources, marine resources and wild flowers, and infestation by alien species. The region has been identified as one of the worlds "hottest" hotspots of biodiversity. In response to this, a process of extensive consultation involving various interested parties, including local government and non governmental organisations resulted in the establishment of a strategic plan referred to as the Cape Action Plan for the Environment.

Its development was made possible with an initial grant from the Global Environment Facility (GEF) in 1998. It identified the key threats and root causes of biodiversity losses that need to be addressed in order to conserve the floral kingdom. This resulted in a spatial plan identifying areas which need to be conserved and a series of broad programme activities which need to be undertaken over a 20 year period.

Based on the situation assessment and analysis of threats, three overarching themes that complement and reinforce one another were developed. CAPE will:

1. establish an effective reserve network, enhance off-reserve conservation, and support bioregional planning;
2. strengthen and enhance institutions, policies, laws, co-operative governance, and community participation; and
3. develop methods to ensure sustainable yields, promote compliance with laws, integrate biodiversity concerns into catchment management, and promote sustainable eco-tourism.

September 2000 marked the end of the strategic planning phase and the beginning of the implementation phase. CAPE has now become known as the Cape Action for People and the Environment, emphasizing its involvement with and benefit to the people across the CFR.

The goal of CAPE: "By the year 2020, the natural environment of the Cape Floristic Region will be effectively conserved and restored wherever appropriate, and will deliver significant benefits to the people of the region in a way that is embraced by local communities, endorsed by government and recognised internationally".

Building the biodiversity economy

During 2004-2009, the implementing agencies will accelerate the implementation of the CAPE 2000 Strategy by laying the foundations for an economy based on biodiversity. To do this:

- Capable institutions will co-operate to develop a foundation for mainstreaming biodiversity in the CFR into social and economic development; and
- Conservation of the CFR will be enhanced through piloting and adapting programmes for sustainable, effective management.

The six components of the programme will strengthen institutions, support conservation education, unleash the socio-economic potential of protected areas, facilitate community stewardship of priority areas, integrate biodiversity concerns into watershed management and ensure ongoing co-ordination, management and monitoring.

An important CAPE concept is that by cooperation and working together towards the vision, we are far more likely to achieve the vision. Thus the concept of "Fynbos Fynmense" (Fynbos Fine People) was coined for people who identify with the CFR as their unique heritage.

provincial and local government levels, and a failure to sufficiently implement other potential mechanisms, such as contractual nature reserves and rates rebates for conservation by private landowners. Other important biodiversity sites have been developed or have been approved for developments. This situation results from the intensive pressure for release of development land in Cape Town and also partly from a lack of understanding among the public, developers and some officials of the high irreplaceability value of Cape Town's biodiversity.

3.2.3 Reasons for successes and challenges

The increase in on-the-ground presence through qualified management staff and support via partnership projects has greatly increased the probability of successful biodiversity conservation. Individual commitment to conservation by various staff members also has played an enormous role in overcoming various challenges. However some of the challenges remaining to be tackled include the currently inadequate operational budgets to effectively manage the nature reserves and other important biodiversity sites and the separation of different departments that impact on biodiversity.

3.3 LINKS TO GLOBAL AND NATIONAL BIODIVERSITY GOALS

South Africa is a signatory to the 1992 Convention on Biological Diversity (CBD), and it is incumbent on municipalities to give local effect to the CBD's three fundamental objectives for biodiversity (conservation, sustainable use and equitable sharing) through appropriate management strategies. The CCT's Biodiversity Strategy is guided by national legislation, such as the National Environmental Management Act 107 of 1998 and the National Water Act 36 of 1998. All the legislation is aligned to The Constitution (Constitution of South Africa Act 108 of 1996) which states that people have the right to a healthy environment which is protected for present and future generations from ecological degradation.

The CCT has aligned its biodiversity conservation planning to the national planning under the National Environmental Management Biodiversity Act (No. 100

of 2004). This process has resulted in the identification of a network of sites (called the Biodiversity Network) that is needed to conserve a representative sample of the City of Cape Town's unique biodiversity and thus promote sustainable development. The City has adopted this plan subject to more detailed investigations of the sites and has recommended that the Biodiversity Network is declared a bioregional plan under the National Environmental Management Biodiversity Act. This will give the city's Biodiversity Network greater recognition and status.

In support of local efforts to conserve the unique biodiversity of the CFR, a grant from the Global Environmental Facility (GEF) was obtained to support the compilation of a vision and strategy for the conservation of the region. This resulted in CAPE (see Box 3). The CAPE Memorandum of Understanding (MOU), an informal mechanism, was introduced to secure the commitment and participation of the implementing agencies to the CAPE Strategy. To date the CAPE MOU has 23 signatories, the City being one of the founder members.

An important CAPE concept is that by co-operation and working together towards the vision, we are far more likely to achieve the vision. Thus the concept of "Fynbos Fynmense" (Fynbos Fine People) was coined for people who identify with the CFR (Fynbos) as their unique heritage.

CAPE has also been very successful in raising funds for conservation in the CFR. The original GEF grant included funds for setting up of the Table Mountain National Park and capitalizing the Table Mountain Fund (which supplies small grants to projects in the CFR). More recent grants included \$6 million from the Critical Ecosystems Partnership Fund (a global funder of conservation) and an additional \$11 million from GEF.

Finally, the 2004 National Biodiversity Spatial Assessment (run by SANBI) lists threatened ecosystems (using the 2004 SANBI vegetation types) and has set out conservation targets based on the area required to conserve 70% of that ecosystem's biodiversity. In the CCT we have nested our local vegetation units within

the national vegetation types so that we can report on our conservation achievements both at local and national levels. Vegetation units serve as the landscape-scale units of biodiversity, representing all flora, fauna and micro-organisms occurring in these ecosystems.

3.4 BIODIVERSITY STRATEGY VISION AND GOALS

The CCT's Biodiversity Strategy (Anon 2003) arises from the 2001 Integrated Metropolitan Environmental Policy (IMEP) that envisages a set of City-wide aligned strategies dealing with all aspects of the environment. The Biodiversity Strategy, which was adopted by Council in October 2003 after extensive discussions with a range of internal and external key stakeholders, is the basis for the Biodiversity Management Branch's mandate. The Biodiversity Strategy outlines the context, vision, goals and strategic objectives for conserving Cape Town's biodiversity.

The vision is:

To be a City that leads by example in the protection and enhancement of biodiversity. A City within which biodiversity plays an important role, where the right of present and future generations to healthy, complete and vibrant biodiversity is entrenched, and to be a City that actively protects its biological wealth and prioritizes long term responsibility over short-term gains.

The Biodiversity Strategy formed the basis for the recently developed Performance-based Management System for the Biodiversity Management Branch.

The long-term goal is that:

The unique environment of Cape Town is managed in a sustainable manner so as to promote and conserve our biodiversity, natural and cultural resources while optimising opportunities for current and future generations

2020 was chosen as the timeframe for the goal as it is vital, as a signatory of CAPE, that the City can fulfil its obligations and deliver in the 2020 time-frame of CAPE.

Principles which underpin the Biodiversity Strategy are:

- The importance of both biodiversity pattern and ecological process
- Best management practice
- Promotion of biodiversity as an asset in all communities
- No ecology without equity – no equity without ecology
- Conservation, enhancement and protection of biodiversity across the entire City
- Recognition of the unquestionable importance of all of Cape Town's biodiversity
- Equitable access to biodiversity for all
- Social upliftment & economic development through the conservation and enhancement of biodiversity
- Open, transparent & responsible governance
- Participation & partnerships
- Integrated, coordinated planning & management
- Responsible stewardship of our unique biodiversity
- Commitment to biodiversity goals
- The precautionary principle.

The Biodiversity Branch's Mission is:

- To manage biodiversity proactively and effectively
- To ensure an integrated approach to biodiversity between CCT line functions & departments and actively pursue external partnerships
- To adopt a long-term approach with regards to biodiversity
- To ensure sustainability of our rich biodiversity
- To adopt a holistic and multifaceted approach to biodiversity
- To continually measure and monitor the CCT's performance in the protection and enhancement of biodiversity
- To continually measure and monitor the state of biodiversity in Cape Town.

The overarching goal of the Biodiversity Management Branch is that:

Biodiversity in the City of Cape Town is conserved and restored where appropriate, and has resulted in significant involvement, and delivered benefits to its present and future citizens, in a way that is endorsed by the City.

Our purpose is that:

By 2010, the City is recognized as a leader in the conservation of its unique biodiversity. Furthermore biodiversity conservation in the City is providing benefits to both present and future citizens; is endorsed by the City, its IDP and 2030 year plan and is actively contributing to the CAPE vision.

3.5 STRATEGIC OBJECTIVES

The Biodiversity Management Performance-based Management System has six strategic objectives arising out of the Biodiversity Strategy, each divided into result areas, outputs, activities and objectively verifiable indicators that can be monitored on a regular basis.

The Strategic Objectives Are:

Strategic Objective 1: The enabling environment, policy, strategic and operational frameworks, capacity and systems required for effective biodiversity management in the City are effectively established.

Strategic Objective 2: Identified terrestrial and aquatic fresh-water priority sites and corridors are secured and effectively managed.

Strategic Objective 3: Sustainable socio-economic benefits and opportunities are identified, enhanced and maximised.

Strategic Objective 4: The control of priority invasive species is effectively established and maintained through coordination and management of the relevant City policies, strategies and eradication programmes.

Strategic Objective 5: Appropriate opportunities are created for Environmental Education & awareness programmes and for stakeholder involvement in biodiversity conservation.

Strategic Objective 6: The Branch has the capacity, management and operational systems required to implement, monitor, evaluate and review its strategy and plans



Southern Rock Agama (*Agama atra*)



Micro Frog (*Microbatrachella capensis*)



Cape Cobra (*Naja nivea*)



Cap Rock-thrush (*Monticola rupestris*)



Common Bluetail (*Ischnura sengalensis*)



Grysbok (*Raphicerus melanotis*)



Spotted Eagle-owl (*Bubo africanus*)



Painted Lady (*Vanessa cardui*) feeding on *Geranium incanura*



Small-spotted Genet (*Genetta genetta*)



Cape Rock Jumper (*Chaetops frenatus*)



Heady Maiden (*Syntomis sp*) feeding on *Serruria aemula*



Rock Hyrax (*Procavia capensis*)

4. INSTITUTIONAL ARRANGEMENTS

4.1 INSTITUTIONAL STRUCTURE

Recently, the Biodiversity Management Branch was consolidated under the Environmental Resource Management Department (See opposite). This has given an ideal opportunity to raise the profile of conservation in the City and ensure that the excellent planning and strategy documents are in fact implemented. The Biodiversity Strategy's implementation plan and the Biodiversity Network were accepted by Council in November 2006. This is a vast improvement on the situation as reported in 2002 in a paper written for the World Bank publication on Mainstreaming Biodiversity (Maze et al. 2002). This paper noted with concern the fragmented situation, lack of co-ordination, lack of resources and lack of support for biodiversity conservation in the City.

A fundamental aspect of the Biodiversity Management Branch's work is to ensure that an understanding and appreciation of biodiversity and nature is mainstreamed into everyday life, which includes delivering tangible benefits to all communities. More specifically, the branch is responsible for conservation planning, biodiversity management and alien species eradication. Huge challenges are facing the City of Cape Town's Biodiversity Management Branch: the first and foremost is that the City has one of the richest and most threatened set of vegetation types and species in the world. Coupled with this is a rapidly expanding population. Other challenges include lack of financial resources and fragmented staff structure. On the flip side, these challenges provide huge opportunities to mainstream biodiversity and provide all citizens with not only access to, but other benefits from the City's natural areas.

4.2 MAINSTREAMING BIODIVERSITY INTO CITY GOVERNANCE

The Environmental Resource Management Department has an extensive communication strategy and the Biodiversity Management Branch currently is finalizing its communications strategy, of which a component will comprise capacity building of City staff. In relation to nature areas, most City staff are aware of the conservation of the Table Mountain Chain and know about some of

the longer-established reserves such as Rondevlei and Helderberg.

Recognition that biodiversity is everyone's business, with important species and habitats located outside formal protected areas, is a key element of the Biodiversity Network. Thus, other Council line functions will be called upon to assist and draw up Service Level Agreements when they manage sites containing biodiversity or activities that impact on biodiversity. In the past an internal City Biodiversity Steering Committee dealt with these issues. However, the success of this committee was largely as a result of the good will of participants. It has been decided that a better way forward would be to constitute a high level environmental committee which deals with other environmental issues as well. This committee would comprise very senior management and thus have the necessary authority.

Similarly, important biodiversity on privately owned land will be prioritised for land consolidation and stewardship agreements. The focus for the City is securing the conservation of the critically threatened lowland and hillside sites (including renosterveld hills and lower mountain slopes), as the sandstone vegetation types of the higher mountain areas are generally well conserved in the Table Mountain National Park, Helderberg and Kogelberg.

External factors such as national legislation and bioregional programmes (e.g. CAPE) provide a solid framework and support for biodiversity conservation in the City. The consolidation of Biodiversity Functions in one department has assisted in forming an implementable work programme.

4.3 INTERACTION WITH OTHER AGENCIES

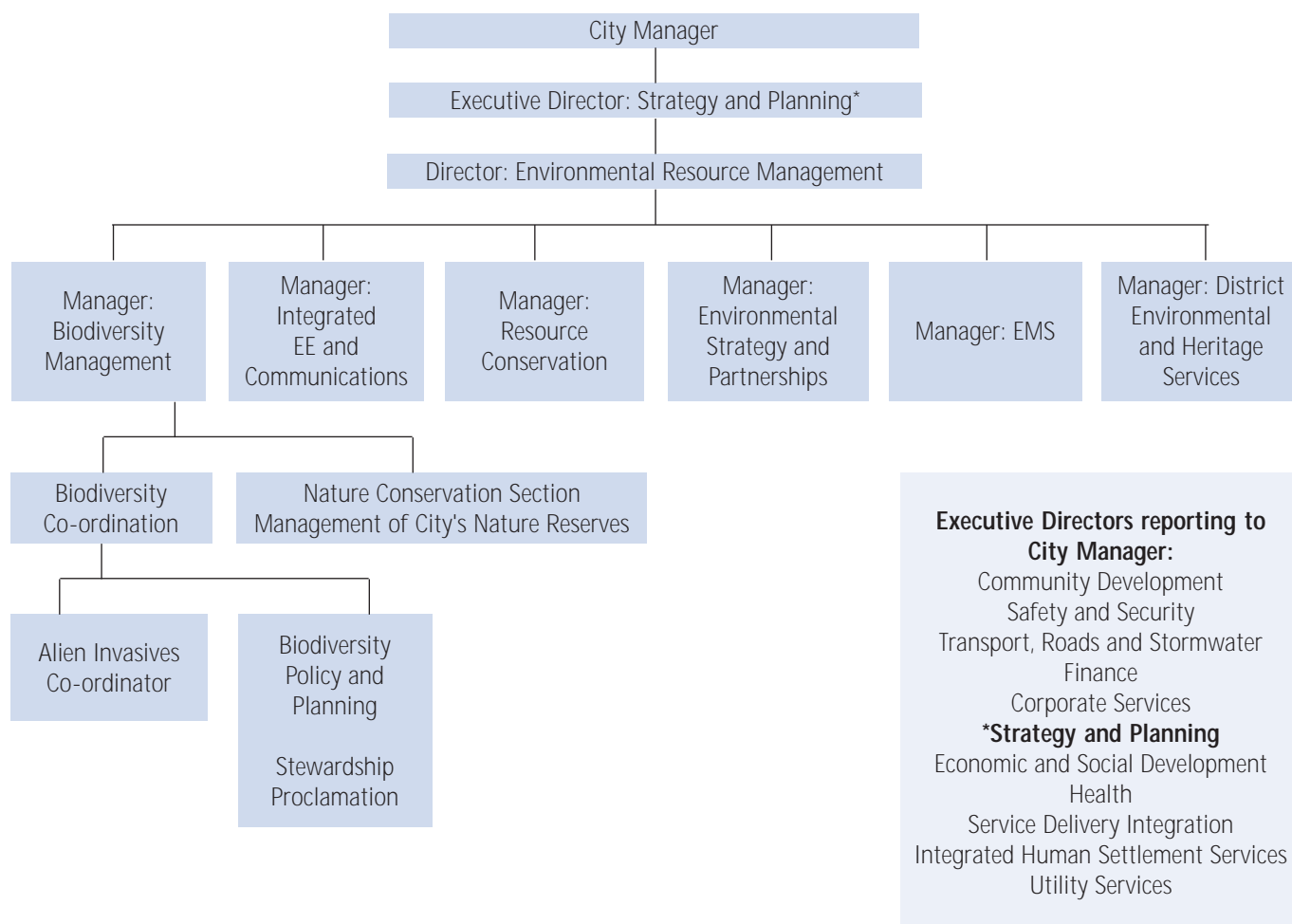
Geographically, the CFR spans 89 000 km², has nearly five million inhabitants and falls within three provinces with a wide variety of government bodies and non-government organisations interested in biodiversity either directly or indirectly. In support of local efforts to conserve the unique biodiversity of the CFR, a grant from the GEF was obtained to fund the compilation of the Cape Vision and Strategy.

In her message in the *Fynbos Fynmense: people making biodiversity work* publication (Ashwell *et al.* 2006), Mayor Helen Zille notes that: “The City of Cape Town is well aware of its unique position in the CFR. It has also taken seriously its responsibility to reverse the trends that have led to the City having one of the highest densities of threatened plants in the world” ... and ends her message “As one of the founding signatories of CAPE, the City of Cape Town is taking full responsibility for providing opportunities for its own “fynbos fynmense” to participate and benefit from making biodiversity a part of all Capetonians’ lives”.

To date, the major international partner who has contributed to biodiversity management in the City is GEF, via the Table Mountain Fund and Critical Ecosystems Partnership Fund. Both these initiatives are strongly aligned to CAPE.

The City of Cape Town is one of the participating cities in a three-year pilot project initiated by ICLEI (Local Governments for Sustainability), called “Local Action for Biodiversity” (LAB). Other partners in LAB include the IUCN, Countdown 2010, the South African National Biodiversity Institute, RomaNatura and another twenty selected global cities. LAB aims to facilitate understanding and communication among decision-makers, citizens and other stakeholders regarding urban biodiversity issues and the need for local action on the ground.

The City also plays host to the offices of Traffic, Conservation International, the Global Invasive Species Programme and the IUCN. These offices are based at SANBI in the Kirstenbosch Botanical Gardens.



5. IMPLEMENTATION

5.1 MANAGEMENT AND MONITORING OF BIODIVERSITY

5.1.1 MANAGEMENT OF CONSERVATION SITES

At present 28 conservation areas are managed primarily by the City's Biodiversity Management Branch (18 of which have qualified nature conservators on site), with four additional areas managed by other agencies, the largest being Table Mountain National Park (Map 6, Table 5). Land with formal conservation status corresponds to 352 km², some 79% of which is formally protected in the Table Mountain National Park, 8% in private nature reserves, 7% in provincial nature reserves, with CCT nature reserves totalling 4.8% (or 0.7% of the

total area of Cape Town). This reflects a historical bias towards conservation of mountain landscapes, and a lack of conservation in the lowlands. A further area (3.3% of Cape Town) is managed by the Biodiversity Management Branch as nature reserves, without any formal conservation status – the largest area being 69.8 km² in the Kogelberg Nature Reserve.

A process to apply for local authority nature reserve status has been initiated for all conservation areas managed by the City that currently do not have official status. The City is embarking on an external audit of the reserves based on the internationally recognised Management Effectiveness Tracking Tool (METT) drawn up by the World Wide Fund for Nature (WWF) and GEF.

Below: Cape Weed (*Arctotheca calendula*) and other Spring daisies
Bottom: Cape Flats Sand Fynbos at Kenilworth Race Course



South African Tourism



Pat Holmes



City of Cape Town



City of Cape Town

TABLE 5. CONSERVATION AREAS IN CAPE TOWN – LINKED BY NUMBER TO MAP 6.

Conservation Area Name		Status	Management	Area (km ²)
1	Atlantis Dunefields	None	City of Cape Town	30.00
2	Blaauwberg Conservation Area	Local Authority Nature Reserve	City of Cape Town	11.74
3	Bracken Nature Reserve	Local Authority Nature Reserve	City of Cape Town	0.36
4	Cape Flats Nature Reserve	Private Nature Reserve	University of the Western Cape	0.30
5	Cape Flats Waste Water Treatment Works	None	City of Cape Town	5.74
6	Dick Dent Bird Sanctuary	Local Authority Nature Reserve	City of Cape Town	0.11
7	Driftsands Provincial Nature Reserve	Provincial Nature Reserve	CapeNature	4.63
8	Durbanville Nature Reserve	Local Authority Nature Reserve	City of Cape Town	0.06
9	Edith Stephens Wetland Park	None	City of Cape Town & SANBI*	0.18
10	Harmony Flats Nature Reserve	Provincial Nature Reserve	City of Cape Town	0.19
11	Helderberg Nature Reserve	Local Authority Nature Reserve	City of Cape Town	4.27
12	Hottentots Holland	Provincial Nature Reserve	CapeNature	22.40**
13	Kenilworth Racecourse Conservation Area	None	City of Cape Town, Gold Circle & CapeNature	0.52
14	Koeberg Nature Reserve	Private Reserve	Eskom	28.52
15	Kogelberg Nature Reserve	Part of Biosphere Reserve	City of Cape Town	69.80
16	Lourens River	Protected Natural Environment	City of Cape Town	30.00
17	Macassar Nature Reserve	Natural Heritage Site	City of Cape Town	7.41
18	Mamre Nature Garden	None	City of Cape Town	2.32
19	Perdekop	None	City of Cape Town	0.18
20	Platteklouf Natural Heritage Site	Natural Heritage Site	Eskom	0.96
21	Raapenberg Bird Sanctuary	Local Authority Nature Reserve	City of Cape Town	0.15
22	Rietvlei Wetland Reserve (with Diep River corridor)	Protected Natural Environment	City of Cape Town	6.67
23	Rondebosch Common	National Monument	City of Cape Town	0.40
24	Rondevlei Nature Reserve	Local Authority Nature Reserve	City of Cape Town	2.33
25	Silverboomkloof	Natural Heritage Site	City of Cape Town	0.05
26	Symphony Way	None	City of Cape Town	0.25
27	Table Mountain National Park	National Park	SA National Parks	322.32
28	Tygerberg Nature Reserve	Local Authority Nature Reserve	City of Cape Town	2.78
29	Uitkamp Wetlands	None	City of Cape Town	0.29
30	Waterhof Bird Sanctuary	Local Authority Nature Reserve	Private	0.01
31	Wolfgat Nature Reserve	Local Authority Nature Reserve	City of Cape Town	2.64
32	Zandvlei Estuary Nature Reserve	Local Authority Nature Reserve	City of Cape Town	2.08
33	Zeekoevlei Nature Reserve	Local Authority Nature Reserve	City of Cape Town	3.49
34	Zoarvlei Wetlands	None	City of Cape Town	0.34

* South African National Biodiversity Institute – owners of the 3ha botanical reserve within the Edith Stephens Wetland Park

** Portion of reserve within City of Cape Town



Stakeholders other than the City who manage biodiversity in Cape Town

SANParks is mainly responsible for managing the Table Mountain Chain. The provincial nature reserve, Driftsands is managed by CapeNature and the Cape Flats Nature Reserve is managed by the University of the Western Cape. The Platteklouf Natural Heritage Site and Koeberg Nature Reserve are managed by Eskom (the country's electricity supplier). Several other government departments, parastatals and private landowners "manage" large tracts of Cape Flats land on which critical biodiversity is found. Certain private landowners manage land which is formally contracted to CapeNature. CapeNature, the provincial nature conservation authority, has some responsibility for off-reserve biodiversity management and feeding into CAPE and National conservation targets. They are similarly responsible for alien invasive management and "problem animal control" as well as the implementation of the provincial ordinance covering protected species. The City is now working closely with CapeNature to ensure common goals are achieved and has a Memorandum of Understanding that deals with all these issues. The City also has formal links with the management of biodiversity in the Table Mountain National Park via a bilateral forum and working groups.

5.1.2 MONITORING PERFORMANCE IN RELATION TO BIODIVERSITY GOALS

During mid-2007 the Biodiversity Management Branch initiated a process to set Key Performance Indicators (KPI's) for its goals. The KPI's and targets have to fall in line with the CAPE Monitoring and Evaluation KPI's. The CAPE goal also feeds into the vision, goal and targets for biodiversity conservation in South Africa for which SANBI is responsible.

Biodiversity is monitored in City reserves, with plans being put in place to monitor vegetation (in permanent plots) and selected Red Data List and endemic species. An internet-based interactive database has been developed to assist in recording species and locality information. At a higher level, the extent of invasive alien vegetation and clearing is monitored and the area of biodiversity remnants lost to developments or secured

for conservation is tracked. The latter monitoring data allows performance to be assessed in relation to the CAPE goal and National conservation targets.

The reserve managers have implemented the internationally accepted METT (Management Effectiveness Tracking Tool) on all the reserves and initiated a Protected Areas Review which assesses the management on the reserves each year. Results from these processes feed into CAPE Monitoring and Evaluation systems.

5.2 BIODIVERSITY AWARENESS AND COMMUNICATION

Central to the Branch's work is a people-centred approach to biodiversity management. During the year July 2005 to June 2006, a total of 39 207 learners (equivalent to 45 173 days of education) attended environmental education programmes on City reserves. The City's nature reserves are scattered throughout Cape Town and thus nearly every community is in walking distance or a short bus ride to a reserve. A dedicated effort has been made to reach out to the local communities.

A total of 99 354 people visited the four reserves with manned gates. Nearly every reserve managed by the City has a dedicated volunteer community group. These volunteers support the Biodiversity Management Branch's work in many ways, for example, by running environmental education programmes, clearing invasive alien species, removing litter and assisting with various management tasks. In addition, local communities participate in the advisory committees of the reserves.

Volunteers on a field trip to a lowland site



City of Cape Town



A guided botanical walk at the Blaauwberg Conservation Area

The high numbers of people living in Cape Town provides an ideal opportunity to demonstrate the importance of biodiversity conservation. Involving local communities and delivering benefits to them has really taken off over the last six years with the focus on the development of the False Bay Ecology Park and the Blaauwberg Conservation Area, of various heritage sites and nature reserves, such as Rondebosch Common, Rondevlei, Tygerberg and Helderberg, which conserve biodiversity, while delivering tangible benefits to the local communities in the form of environmental education, amenities and tourism; and the Cape Flats Nature Project.

An example of a partnership project that generates direct economic benefit to the community is “Imvubu Nature Tours” (Imvubu is Xhosa and Zulu for hippopotamus). The only hippopotamus population in the Western Cape resides in Rondevlei Nature Reserve from where Imvubu Tours operate. Imvubu Tours is a community based tourism company established at Rondevlei Nature Reserve in 2002. It is responsible for all tourism related activities at the reserve. Management, ownership and staff are all from the immediate local community, thereby providing economic benefits to the community as well as a more personalised service to Rondevlei guests. Where possible, all equipment, materials and labour are sourced locally.

5.2.1 Youth Environmental School (YES) programme

The first Youth Environmental School (YES) programme was hosted as part of the Cape Metropolitan Festival of the Environment in 1999, and 2 000 learners attended. Since then the programme has developed into one of the largest environmental education programmes in the country, with just over 30 000 learners attending during the week-long YES 2006 programme.

To date, the YES programme has been linked annually with World Environment Week, in June. For the past eight years, scores of primary and special schools across the City have come to expect a fun out-of-class and quality environmental education experience at its best as they planned their class excursions as part of the YES programme.

Building on the past successes of YES and addressing the need to integrate and expand environmental educational initiatives across Cape Town, the City has introduced a new all year-long Youth Environmental School (YES) programme. The same YES which encompasses social, built and natural environments, and will still include the successful World Environment Week programme, has now been expanded to include all major commemorative days and weeks on the annual calendar e.g. Energy Awareness, Arbor, Heritage, Water and Waste Weeks, World AIDS day, and many more.

Working closely with a host of internal and external partners across the City, the YES team from the City’s

City staff interacting with learners



City of Cape Town

Environmental Resource Management Department is dedicated to make YES more accessible to all schools, learners and educators alike. The emphasis on empowering and capacitating educators around environmental issues will also be renewed in the 'new' YES programme through a network called YES EduNet.

5.2.2 EDUCATION CENTRES BASED ON RESERVES

Environmental education programmes

There are 13 nature-based educational programmes run at City nature reserves. These provide programmes for about 9 000 learners (approximately 20 000 days of education). Eleven of these programmes are run from environmental education centres spread across the City's nature reserves, and three are overnight programmes, affording learners the opportunity to stay out on reserves in a "bush camp" experience.

Programmes are focused on nature and the surrounding environment while linked to the national curriculum and aligned with the YES programme. The City is helping to pilot a GIS module for high school geography learners which will provide hands-on experience of urban nature projects using GIS technology on three City reserves. Funding for the pilot project was secured by EnviroEds from the Table Mountain Fund, and other partners include the Western Cape Education Department, The Khanya Project, SANBI, GISSA Western Cape, Department of Land Affairs: Surveys and Mapping Department and the University of the Western Cape.

Education in some instances is shared with community-based Friends groups, who assist or run the programmes where resources are limited on reserves. At Helderberg Nature Reserve for example, the Friends group have successfully operated the reserve's educational programme for a number of years.

Cape Town Environmental Education Trust (CEET) started in 2000 as a partnership between WWF and the City of Cape Town. It is run by the trustees and manages the overnight programmes at Zeekoevlei and the False Bay Ecology Centre.

5.2.3 ENVIROWORKS NEWSLETTER

Produced by the City's Environmental Resource Management Department in collaboration with other City Departments, this bi-annual environmental newsletter gives a broad overview of the scope of environmental projects and initiatives happening in our city. In working towards environmental sustainability, we face many challenges. This newsletter, distributed (in hard copy and electronically) to a wide range of internal and external stakeholders, highlights the ways in which these are being addressed. It also presents a user-friendly vehicle to put people and pictures to the broad range of projects, events and initiatives. The approach of providing a 'vehicle' which cuts across City line functions, incorporating environmental information from various departments has contributed to its success.



5.2.4 Invasive species playing cards



The Environmental Resource Management Department has recently published a deck of playing cards that feature 52 invasive species from different taxa that are a threat to our local biodiversity. The cards were launched at the 3rd GEF Assembly where they were very well

received. Approximately 1 000 packs were distributed to delegates at the event, many of whom described the cards as one of the highlights of the assembly. Five hundred playing card packs are now being distributed to partner organisations in the prevention, reduction and removal of invasive species in Cape Town and a further 2 000 to the City Nature Reserves as an environmental education tool, to raise awareness of the

global and local threat that invasive species pose to the Cape’s internationally important biodiversity. Partners in this project include: Working for Water, Working for Wetlands, Working on Fire, SANParks, CapeNature, CAPE, National Government (DEAT and DWAF) and Provincial Government.

Working in partnership with a range of partners and providing a fun, attractive but educational resource contributed to the success of the playing cards. It also worked well to launch it at a large environmentally-related event such as the GEF Congress.

5.3 IMPLEMENTATION TOOLS

5.3.1 Existing implementation tools

Environmental policy and legislation

Development applications have to comply with national and provincial environmental and planning legislation. This includes the National Environmental Management Act (NEMA, Act 107 of 1998 – including the Environmental Impact Assessment (EIA) regulations, updated in 2006), the Environmental Conservation Act (Act 73 of 1989) and the National Water Act (Act 36 of 1998), and the provincial Land Use Planning Ordinance (LUPO, Ordinance 15 of 1985). Although environmental authorizations are given at a provincial level, comments and recommendations by local municipalities are taken into account. Rezoning and subdivision applications through the LUPO are processed at local authority level, when conditions of approvals can also be set. In addition, applications are screened according to City By-laws, spatial plans, zoning categories and development guidelines. The City’s Environmental Management Department strives to comment on every development application. Any potentially high biodiversity-impact

development applications are forwarded to the Biodiversity Management Branch for further comment. As the Biodiversity Network is widely recognized as a local conservation plan, there is generally good support for preventing or mitigating developments proposed on Biodiversity Network remnants. However, the system is not completely failsafe and irreplaceable biodiversity sites have been lost to development in the recent past. Applications for mining (mainly sand and clay in the CCT) are administered by the national Department of Mineral and Energy (DME) according to the Mineral and Petroleum Development Resources Act (Act 28 of 2002). Irrespective of a mining permit being approved by DME, the applicant also requires approval from the municipality for a temporary departure in land use according to the LUPO. This will be granted only if the post-mining land-use is compatible with the future development vision for the area and its zoning. In the case of irreplaceable biodiversity areas, the City should not grant mining approval. However, endangered biodiversity areas in the City have been lost to mining, and there is recognition that the 2000 Structure Plan for Mining needs to be updated in order to align with the latest national legislation. The City also needs to develop specific policy for handling mining applications on municipal land as well as finalize its biodiversity offsets policy (below).

City spatial planning and development guidelines

The City has a hierarchy of spatial and development plans in order to integrate and direct development and other land uses to appropriate areas (Table 6). The Provincial Spatial Development Framework is an important regional planning informant. The Cape Town Metropolitan Open Space System and the Biodiversity Network are important spatial informants in the current preparation of a city-wide Spatial Development

TABLE 6. HIERARCHY OF PLANNING TOOLS IN THE CITY OF CAPE TOWN

Level	Plan	Description	Status
1	Future Cape Town (2030)	Spatial concept plan indicating future broad planning goals	Discussion document
2	Integrated Development Plan	Sustainable development plan, operating on a 5-year cycle	Current
3	Spatial Development Framework	City-wide spatial plan which will be linked to the IDP	In preparation
4	District Plans	Spatial plans for each of the eight planning districts in the City	In preparation

Framework and the District Plans. The SDF and District Plans are intended to be approved in terms of LUPO and thereby replace the outdated Guide Plans which have been in use since the late 1980s.

The City has a number of development guidelines to protect natural resources, which simultaneously protect biodiversity. For example, according to the Floodplain Management Guidelines (CCT 2003), community and public facilities and most utility services are not permitted in the 1:100 year floodplain zone, and no formal residential developments are allowed in the 1:50 year floodplain zone.

Environmental compliance enforcement

The CCT has environmental compliance and enforcement responsibilities through the National and Municipal legislation. A City Enforcement Task Team has been set up to meet early in 2008 and address issues of safety and security, environmental enforcement and compliance. The Environmental Resource Management Department has secured significant funding from the National Treasury Restructuring Grant to implement two projects relating to environmental compliance. The first is training and capacity building among City staff in a range of departments that have environmental

impacts. This training will be extensive and extend over a period of two and a half years. The second project will draw up an environmental compliance strategy to be applied to the City's capital projects.

Stewardship

The CAPE Stewardship Programme, run by the Provincial Conservation Agency (CapeNature), has gone a long way to setting up mechanisms to ensure that private landowners conserve their remaining biodiversity. The incentive here has often not been monetary, but a recognition and pride to be conserving the unique biodiversity of the CFR. The Biodiversity and Wine Initiative also is successful in recognising landowners who conserve biodiversity and ensuring that their wine production adheres to accepted environmental guidelines. This has also resulted in accreditation of "environmentally friendly wines". Both of these programmes have successful examples in the City.

Land acquisition

Currently there is a fund available for consolidating land into the Blaauwberg Conservation Area, but not for other areas of the city with critical biodiversity. This is a tool that needs to be broadened to other areas in the City.

CASE STUDY: MUIZENBERG EAST HOUSING DEVELOPMENT

A proposal for a large-scale housing development on Endangered Cape Flats Dune Strandveld vegetation near Muizenberg was submitted in 2004. The vegetation remnant was invaded by aliens *Acacia cyclops* and *A. saligna*, but contained some relatively intact, botanically diverse areas providing valuable habitat for flora and fauna. Although not a selected remnant on the Biodiversity Network, it is positioned along one of the Biodiversity Network corridors. Owing to the threatened status of this ecosystem, negotiations ensued with the developer to set aside the highest quality area for conservation, with a budget for management

secured from a levy charged to each home owner. Although the development is not yet completed, a full-time conservator has been appointed on site, under supervision of the City's Biodiversity Management Branch, to secure the conservation area and provide the additional benefit of being a visible presence in the area thus improving environmental compliance. Furthermore, the landscaping of the development makes use of water-wise indigenous plants, some of which are locally indigenous, and a uniform design of biodiversity-friendly palisade fencing. It is planned to restore the conservation area by removing the invasive alien species and replacing them with local indigenous species where needed.



Tim Szöke

Invasive alien species control

Reserve managers strive to control invader species on their reserves and submit budgets for this management activity annually. However, coordination of alien species control across the CCT has, to date, been ad hoc and only initiated when sources of funding become available. Thus when crime levels increase, local communities request clearance of alien bush and funding is released. However, such programmes generally do not result in sustainable invasive alien control. The City has however appointed an Invasive Species Coordinator from February 2008, and a more coordinated approach to alien control across all line functions is now in the planning stages.



Leucadendron levisanus

include *Erica verticillata*, *Erica turgida* and *Leucadendron levisanus* at several City reserves.

Research

Through the annual Fynbos Forum conference (a three-day meeting of scientists, managers, landowners, consultants, non-governmental organizations and people interested in the CFR) relevant research and information is shared and collaborative research projects may be initiated. Useful information also

may be gleaned from nature conservation student projects that are done on CCT reserves (about 12 annually). The initiation of a monitoring programme (currently underway) will yield useful long-term data on vegetation and changes to species' populations.

Conservation action for species of special concern

In partnership with SANBI, some threatened plant species have been propagated and re-introduced to suitable habitats on City-managed land. Examples

5.3.2 Critical tools to be developed

Rates and Tax rebates for the wise management of biodiversity

Incentives have not been a major focus for the City to

WESTERN LEOPARD TOAD – A FLAGSHIP FOR URBAN CONSERVATION

The Western Leopard Toad (*Amietophrynus pantherinus*) is a charismatic species which is in danger of extinction. This large toad only occurs in the coastal region extending from the Cape Peninsula/Cape Flats area to the Agulhas Plain. The majority of the known breeding sites are generally water bodies in public open space or on private land, and the few protected sites are surrounded by urban sprawl which threatens and restricts the foraging areas of the toads. Therefore, the co-operation of residents whose gardens form foraging and sanctuary areas for the toads when they are not breeding, is vital for the continued survival of this endangered frog. Another major threat is road traffic and many toads die while moving to and from their breeding grounds in late winter to early summer. Incidentally, it is important to note that these toads are a protected species and it is illegal to collect and translocate them. To learn more about leopard toads and to become more toad friendly visit www.leopardtoad.co.za.



Cliff Dorse

date, but in the next five years this will change. At present the Biodiversity Management Branch is committed to investigating the incentives that the national rates legislation provides and how the City could apply this. Tax relief incentives are being investigated at a national level.

Disincentives in the City relate to high property values spearheaded by low-cost housing need and lucrative up-market development potential. High crime has resulted in a negative perception of open space as criminals may hide in areas of bush.

The Government Expanded Public Works Programmes (EPWP) such as Working for Water, Working for Wetlands, Working on Fire and CoastCare have provided the City with an opportunity to conserve and upgrade natural areas while providing large numbers of jobs. The Biodiversity Management Branch over the next five years is hoping to take advantage of these national government funding opportunities to assist in biodiversity management.

Red Flagging & tracking

Red Flagging is a tool used by planners to alert them to important or sensitive features of a site that is proposed for re-zoning, subdivision or development. A Red Flagging system is being developed to highlight Biodiversity Network sites and is scheduled to begin operation during 2008. A database called "Tracker" updates all property information in the City and the Red Flagging system will link to this database. The interface will be the Planning Viewer to which all town planners have access. It is hoped that this system will prevent important biodiversity sites being overlooked during the development application process.

Biodiversity Offsets

In cases of development where residual damage to natural habitats and biodiversity occurs despite mitigation efforts, these losses should be offset by securing alternative habitat for biodiversity conservation. The aim is to strive for no net loss of biodiversity (2007 Draft

Provincial Guideline on Biodiversity Offsets, Provincial Government of the Western Cape). Biodiversity Offsets are not applicable to Critically Endangered ecosystems, such as Cape Flats Sand Fynbos, for which all remaining remnants are 100% irreplaceable in conservation terms. The City has drafted a preliminary Biodiversity Offsets Policy, and this will be reviewed and finalized during 2008 as a tool to encourage conservation and compensate for unavoidable biodiversity loss.

5.4 CITY BIODIVERSITY PROJECTS AND PARTNERSHIPS

5.4.1. Blaauwberg Conservation Area (BCA)

Project Goals

The Vision for the project is: *"to conserve, protect and enhance the unique natural, historical and cultural resources of the area for the enjoyment and education of present and future generations."*

The BCA is home to a unique tapestry of natural, cultural and historical treasures that date back to the later Stone Age. In addition it also offers iconic views of Table Mountain, with Robben Island, Table Bay and the City Bowl in the foreground. The fauna and flora of the area are varied and include many rare and endangered species. Uniquely the BCA conserves three threatened vegetation types, as well as the transition zones between them. Due to the varied habitats within the reserve an impressive 559 plant species have been identified to date. Of these, 47 are classed as Red Data species. Five amphibian, 30 reptile, 39 mammal and 140 bird species have been recorded in the BCA since 2005. Fifteen of these are considered Red Data species. Some of the Red Data species that occur include the Honey

Badger (*Mellivora capensis*) and the White-tailed Mouse (*Mystromys albicaudatus*).

From a cultural-historical perspective, the BCA has much to offer the enthusiast – from later Stone Age KhoiSan middens along the coast, to World War II buildings on Blaauwberg Hill, to the site of the



Cliff Dorse

1806 Battle of Blaauwberg – which changed the rule at the Cape and is seen by many as a watershed event in South African history.

Time Frames

The idea of a Nature Reserve centred around Blaauwberg Hill was first mooted in the late 1970s, and was identified in the 1981 Atlantis and Environs Guide Plan. In 1998, a process commenced to prepare a Development and Action Plan for the BCA and a concept plan, report and recommendations in that regard were adopted by Council in 2000. A City Biodiversity Manager was transferred to the BCA on 17 November 2003, the same day the CEPF funding was approved. A staff complement, funded through the CEPF grant, commenced work at the BCA in the first quarter of 2004. The City-owned land in the BCA was proclaimed as a Local Nature Reserve in October 2006 and the Public Works Land as a Provincial Nature Reserve in March 2007.

There is significantly more work to be done, and further private land is to be consolidated into the BCA. A Business Framework and Business Plan is being developed that will provide guidance for investment and implementation priorities in order to fully realise the vision of the BCA.

Methods

The BCA has been established working in partnerships with a number of organisations – which has been a key factor in its success. Cognisance has always been taken of the sensitive biophysical and cultural/historical environment of the BCA, and interventions taken accordingly.

The success of the BCA today can be attributed to a number of factors, these include:

- Dedicated Reserve Management Staff, who particularly in the early days of on-the-ground management, worked extremely long hours and most weekends to ensure that the BCA was protected from inappropriate user groups and users, and performed a valuable PR function with the general public – and continue to do so.
- Involvement and education of people on the environment and enthusing local residents to take 'ownership of the area'. The Friends of the BCA, a civil society grouping has been an important component of this, as has the establishment of an Environmental Education programme based at an environmental centre in the BCA.
- Concerted effort to raise the profile of the project through media articles, publication of brochures

Opposite page: A World War II relect in the Blaauwberg Conservation Area. Below right: Kukumakranka (*Gethyllis ciliaris*), Blaauwberg Conservation Area. Below left: A 'Friends of the Blaauwberg Conservation Area' guided walk.



Cliff Dorse



Cliff Dorse

and posters. In the public call for comment on the proclamation of the City-owned land in the BCA, well over 280 positive and no negative responses were received; this being one of the greatest responses to a local nature reserve proclamation call for comment.

- Effort over the years, to getting the buy-in of political leadership in the City to the project. This has been in the form of council reports, site visits, launches, one-on-one meetings, etc. Great support has been forthcoming from all political parties in the City.

City Departments and Partners

The Project is spearheaded by the Biodiversity Management and Environmental Strategy and Partnerships branches of the Environmental Resource Management Department, City of Cape Town.

The Environmental Strategy and Partnerships branch (and formerly the Environmental Management Department of the CMC) has co-ordinated the project and driven it from a strategic perspective from its inception. The Biodiversity Management branch undertakes all the on-the-ground management of the area and is becoming more involved in the strategic aspects of the project.

The City's Tourism Department is involved, as the BCA is an establishing destination that has been identified in their business plan as important in its own right, but also in a catalytic function for tourism in the northern and western areas of the City and linking to the West Coast of the Western Cape Province.

Other departments in the City, i.e. Transport, Roads and Stormwater, Property Management, Planning and Building Development, Spatial Planning and Urban Design all contribute technical expertise to different aspects and issues of the project.

External Partners include:

CAPE: Cape Action for People and Environment is a partnership programme that aims to conserve the CFR in a way that will deliver significant benefits to the people of the region.

CapeNature: This is the provincial conservation agency in the Western Cape and is the registered management



At Blaauwberg:
Pelargonium triste
and *Oxalis hirta*

authority for a portion of the Blaauwberg Conservation Area land. A management agreement exists with them, and City manages their land with resource assistance from CapeNature, as required. Law enforcement and formal conservation status have been two other areas of significant co-operation.

Wildlife and Environment Society of South Africa (WESSA): Western Cape:

The recipient of the Critical Ecosystem Partnership Funding (CEPF) in partnership with the City for the start-up phase of on-the-ground management of the BCA, in late 2003. This CEPF funding was catalytic in getting management actions and resources onto the ground.

In addition to this many external partners play a significant role in providing strategic support when required. All of these departments or groups have a seat on the Blaauwberg Implementation and Coordination Committee. These groups include: **Provincial Government: Western Cape: Department of Environmental Affairs and Development Planning (DEA&DP); Department of Cultural Affairs; Friends of the BCA; Botanical Society of South Africa and the South African Heritage Association.**

Resource allocation: Financial

There have been significant allocations of budget to the BCA by the City since 1998. As an indication these are detailed below for years 1998/99 – 2006/07.

1.	PLANNING AND RELATED WORK Between 1998 and 2002:	R770,000
2.	LAND ACQUISITION Between 1999 and 2002:	R9,500,000
3.	CAPITAL BUDGET FOR INFRASTRUCTURE Between 2001 and 2006:	R4,040,000
4.	OPERATIONAL BUDGET Between 2002 and 2004:	R262,538

2006/2007 FINANCIAL YEAR (CURRENT BUDGET)

Operational budget:

The Biodiversity Management branch's operational funding for the area is combined with other reserves in the northern area. The total planned operational, excluding salaries, for the Northern Area of the Biodiversity Management branch is R732,146.80. Effectively, this budget is split between the BCA and Rietvlei Wetland Reserve, with the other biodiversity areas being managed as satellite sites of these main reserves.

R883,995.00 appears on the budget of the Environmental Strategy and Partnership branch for the BCA. Of this, R520,831.18 has been sourced externally. This funding is for the BCA Business Framework and Business Plan, Reserve Management Activities, and Environmental Education, Communication and Awareness.

Other funds have also been allocated to the project from Working for Wetlands, Working for Water, Table Mountain Fund, Development Bank of Southern Africa, and Critical Ecosystem Partnership fund (which allocated \$182 000 in 2003–2005)

False Bay Ecology Park: environmental education and recreation

Resource Allocation: Staff

The following staff are currently at BCA or operate partially within it:

Reserve staff: Reserve Manager, 3 experiential training students, foreman, storeman, senior worker and 10 workers

District staff: Environmental Education Officer, 3 Conservation Compliance Officers

5.4.2 False Bay Ecology Park

The vision for the False Bay Ecology Park (FBEP) is to become one of the leading conservation, environmental education, recreation and ecotourism centres in the country, and to provide environmental, tourism, social and economic opportunities and benefits for Capetonians, especially those in nearby disadvantaged areas.



City of Cape Town



City of Cape Town

The FBEP covers 1200 ha and includes the six key areas of Rondevlei and Zeekoevlei Nature Reserves, an adjacent coastal strip, the Cape Flats Waste Water Treatment Works, the Coastal Park Landfill Site and the CAFDA Stables Craft and Culture Centre.

The Rondevlei and Zeekoevlei Nature Reserves support examples of Cape Town’s threatened vegetation types: Cape Flats Sand Fynbos and Cape Flats Dune Strandveld, as well as wetland and open water habitats. A family of Hippopotamus are present in Rondevlei whereas Zeekoevlei is used for watersports. Contiguous to the nature reserves, the waste water treatment works (also known as Strandfontein) is one of South Africa’s “Important Birding Areas” where up to 20 000 birds gather, representing a remarkable diversity of species including nine Red Data species. The landfill site handles general waste for the south of Cape Town, where waste is sorted and either recycled or taken to the landfill.

The Cape Town Environmental Education Trust runs two overnight facilities with a focus on high quality, low cost outdoor education. Together these can accommodate 160 learners and educators. The new headquarters for FBEP recently opened along the southern shore of Zeekoevlei.

The FBEP faces many challenges, including encroaching urban developments, security, illegal dumping, littering and water pollution. However the great opportunities to provide recreation, social and economic upliftment and environmental education to a large population on its doorstep will hopefully overcome these threats. Involvement by a large number of stakeholders, as well as high-level profiling by politicians, has assisted in promoting the FBEP. For instance, the project was selected as the Mayor of Cape Town’s special project depicting partnerships at the UNEP World Environment Day event in San Francisco in 2005. This prominence was achieved through the involvement of a wide range of civil society organizations (e.g. Zeekoevlei Yacht Club, Cape Bird Club), NGO’s (e.g. Wildlife and Environment Society of South Africa, Cape Town and Western Cape Tourism), and ten City line functions that currently serve on the FBEP Steering Committee and are involved in planning and implementation of plans for the Park.

5.4.3 Cape Flats Nature

This partnership project builds good practice in sustainable management of nature sites in the City’s Biodiversity Network in a people-centred way that develops local leadership for conservation action and

Environmental Education in Helderberg Nature Reserve and on the beach at Macassar



City of Cape Town



City of Cape Town

benefits the surrounding communities, particularly townships where incomes are low and living conditions poor. It is a catalytic stewardship project that involves citizens and communities taking responsibility for management of biodiversity in partnership with City nature conservation officials.

The demonstration phase of the project was in 2002-2005, with the replication and roll-out phase being 2006-2009. Some aspects of the project's work may continue beyond this timeframe. In this project an effort is made to integrate nature conservation management and social development imperatives, and learn lessons about this integration process in the urban context.

The City of Cape Town's Biodiversity Management Branch is responsible for managing these sites, employs nature conservators to manage the project sites, and provides the operational budgets and management support required for them to do this.

The South African National Biodiversity Institute is the implementing partner of the project that employs the project team and is responsible for managing catalytic project implementation and administration.

The Table Mountain Fund is the donor and has leveraged City funds with co-financing and is responsible for supporting project development and spreading lessons from the project through the Fund's work in other areas.

The Botanical Society of South Africa was the catalyst for the project and is also a donor. The Botanical Society drove much of the scientific work that provided the basis for the development of the City's Biodiversity Network, and continues to provide technical expertise. It also funds small areas of project work in support of its objective to broaden its base in the townships.

The resources allocated to the project (staff, annual budget) approximate R1.5 million. This includes the project team: Project Manager, Communications Manager, Capacity Building Manager and Administrator.

Cape Flats Nature is a partnership between the City

of Cape Town, the South African National Biodiversity Institute, the Table Mountain Fund and the Botanical Society of South Africa, associated with national government's bio-regional programme Cape Action for People and the Environment. Cape Nature and the Table Mountain National Park have also recently joined the Cape Flats Nature partnership to draw and share lessons on people-centred biodiversity management in the City. Cape Flats Nature's relationship with its community partners varies, depending on the nature and strength of the community partner organisation. There are four broad levels at which community partners engage in conservation action at site level:

1. dedicated to the conservation of a site
2. lead activity implementation at a site
3. recruit their members for Cape Flats Nature activities at a site
4. lend support and/or expertise to activities.

Community partners include groups such as education centres, youth groups, people's centres and tourism and volunteer groups.

5.4.4 Bottom Road Sanctuary: Rehabilitation and stewardship project

The goals of this project are to rehabilitate a section of land adjacent to the Zeekoevlei and to get the local community involved in caring for the area once the rehabilitation work had been done. The project commenced in March 2005 and continues to the present date.

Bottom Road Sanctuary



Gavin Lawson



Bottom Road Sanctuary

In March 2005 a landmark meeting was held with the residents of Bottom Road who were building houses but had not yet established their gardens. They were introduced to the wonders of biodiversity and shown how beautiful the area could be if it was returned to nature. The result of this meeting was a strong desire from everybody to see the shoreline rehabilitated and a home created for the plants and animals that used to live there. Many residents were so enthusiastic about the idea that they volunteered much of their own garden towards the sanctuary. It was agreed that a partnership between “Working for Wetlands”, City Biodiversity Management and Residents would be established, and work began on a shoreline plan.

The site to be rehabilitated was in a highly disturbed state: it was full of rubble, alien Kikuyu grass, some alien acacias, and contained only a few indigenous species. In May 2005, staff of Working for Wetlands and Biodiversity Management cleared the site of rubble using a bulldozer, and created some new ponds.

In the mean time, local indigenous plants were being propagated for the project in the Working for Wetlands Nursery at Rondevlei Nature Reserve. In June 2005 the planting began and the Working for Wetlands team planted about 9 000 plants in suitable microhabitats across the site.

By December 2005, already a remarkable difference could be seen. The plants were thriving, frogs were breeding in the ponds, birds were returning, and the whole area was beginning to come alive. It was now time for the residents to get stuck in, and community weeding days were held. They soon got to know the plants, and learned which ones to remove and which needed looking after. Continuous support was given to the residents by the team Horticulturist and numerous small plantings were done. The Bottom Road Sanctuary was officially declared at a meeting on 29 April 2006 where residents were given certificates and a biodiversity pack. The future of the project was discussed and plans were made for the next phase.

Phase 2 of the project began in early May 2006 with the residents contributing to the bulk of the Bulldozer hire and clearing. Residents also helped to build path-ways and got involved in the planting. Another 8 000 plants were planted overall. Today in March 2007, Bottom Road looks completely different. Phase 1 continues to grow strongly and a whole new ecosystem has developed complete with birds, insects, amphibians, reptiles and mammals. Phase 2 is thriving and the residents are continuing with the maintenance with some help from Working for Wetlands and City Biodiversity Management.

Partner organizations driving the project were the City of Cape Town Biodiversity Management Branch (Area Manager Dalton Gibbs, who initiated the project), the Working for Wetlands: Peninsula Project (managed by Victoria Wilman, Conservation Horticulturist) and residents of Bottom Road, who donated land and resources. Dalton Gibbs drew up a “Neighbour’s Creed” and “Rules of Admission” in the interests of sound ecological management of the site. The resources allocated to this rehabilitation project approximated R92 000, excluding management. In addition about 1 500 person days were used in the project over the two years.

This project has demonstrated how hands-on restoration work to improve local environments can mobilize civil society in support of biodiversity conservation.

REFERENCES

- Anon 2003.** *Biodiversity Strategy*. ISBN 0-9584352-8-6
- Anon 2005.** *State of Rivers Report; Greater Cape Town's Rivers 2005*. River Health Programme, CSIR (www.csir.co.za/rhp).
- Anon 2006.** *Western Cape Socio Economic Profile: City of Cape Town 2006*.
- Ashwell A, Sandwith T, Barnett M, Parker A, Wisani F 2006.** *Fynbos Fynmense: people making biodiversity work*. SANBI Biodiversity Series 4, Pretoria. ISBN 1-919976-29-9.
- Branch, G. and Branch, M. 1981.** *The Living Shores of Southern Africa*. C. Struik, Cape Town.
- Brown, A.C. & McLachlan, A. (1990).** *Ecology of Sandy Shores*. Elsevier, Amsterdam.
- City of Cape Town. 2004.** *Biodiversity Network Prioritisation Project, Final Draft Report prepared by MLA-Sustainability Matters, in association with GISCOE, Biodiversity & Conservation Biology Department UWC, Settlement Planning Services & Freshwater Consulting Group*.
- City of Cape Town. 2007.** *The Identification and Prioritisation of a Biodiversity Network for the City of Cape Town, Final Report prepared by MLA-Sustainability Matters, in association with GISCOE (Pty) Ltd*.
- Daines A & Low A B 1993.** *Cape Metropolitan Area: West Coast environmental survey*. Unpublished Report SANBI, Cape Town.
- Davis S D, Heywood V H and Hamilton A C (WWF & IUCN) 1994.** *Centres of Plant Diversity. A Guide and Strategy for their Conservation. Volume 1. Europe, Africa, South West Asia and the Middle East*. IUCN Publication Unit, Cambridge UK.
- Day J A, 1987.** *Conservation and management of wetlands in the greater Cape Town area. 192-197. In: R.D. Walmesley and M.L. Botten (compilers). Proceedings of a Symposium on Ecology and Conservation of Wetlands in South Africa. Occasional Report Series No 28. Ecosystem Programmes. Foundation for Research Development, CSIR, Pretoria.*
- Driver A (in prep)** *Threatened ecosystems for listing under NEM:BA 2008, South African Biodiversity Institute, Pretoria.*
- Ebrahim I & Koopman R 2004.** *The last two Spiderheads: the rediscovery of Serruria furcellata*. Veld & Flora 90.
- Griffiths, C., Griffiths, R. and Thorpe, D. 1988** *Seashore Life*. Struik Publishers, Cape Town.
- Helme N A & Trinder-Smith TH, 2006.** *The endemic flora of the Cape Peninsula, South Africa*. South African Journal of Botany 72: 205-210.
- Hitchcock A. 2007.** *The return of Erica verticillata*. Veld & Flora 93: 14-17.
- Jarman M. L. 1986.** *Conservation priorities in lowland regions of the Fynbos Biome*. South African National Scientific Progress Report 87. CSIR, Pretoria.
- Low, A.B. 2002.** *SaS Species Locality Database*. Coastec, Cape Town
- Maze, K., Katzschner, T. and Mydral, B. (2002)** *Conserving an Embattled Flora: Mainstreaming Biodiversity in Urban Cape Town, In: Pierce, S.M., Cowling, R.M., Sandwith, T. and Mackinnon, K. Mainstreaming Biodiversity in Development*. The world Bank Environmental Department, Washington.
- Maze K E & Rebelo A G 1999.** *Core flora conservation areas on the Cape Flats. FCC Report 99/1*. Botanical Society of South Africa.
- McDowell C R & Low A B 1990.** *Conservation priority survey of the Cape Flats*. Unpublished Report, University of the Western Cape, Bellville.
- Mucina L, Rutherford M L & Powrie L W (editors) 2005.** *Vegetation Map of South Africa, Lesotho and Swaziland*. SANBI, Pretoria.
- Mucina L & Rutherford M L (editors) 2006.** *The vegetation of South Africa, Lesotho and Swaziland*. Strelitzia 19, SANBI, Pretoria.
- Payne, A.I.L., Crawford, R.J.M. and Van Dalsen, A. 1989.** *Oceans of life off Southern Africa*. Vlaeberg Publishers, Cape Town.
- Rebelo, Boucher, Helme, Mucina and Rutherford et al: Fynbos Biome in: Mucina and Rutherford: 2006. The vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19, SANBI, Pretoria.**
- Rouget M, Reyers B, Jonas Z, Desmet P, Driver A, Maze K, Egoh B & Cowling R M 2004.** *South African National Spatial Biodiversity Assessment. Technical Report Volume 1: Terrestrial Component*. SANBI, Pretoria.
- Shaughnessy G L, 1980.** *Historical ecology of alien woody plants in the vicinity of Cape Town, South Africa*. PhD thesis, University of Cape Town 421pp.
- Simmons M T & Cowling R M, 1996.** *Why is the Cape Peninsula so rich in plant species? An analysis of the independent diversity components*. Biodiversity and Conservation 5: 551-573.

Turpie J K, Heydenrych B J & Lamberth S J, 2003. *Economic value of terrestrial and marine biodiversity in the Cape Floristic Region: implications for defining effective and socially optimal conservation strategies.* *Biological Conservation* 112: 233-251.

Van Zyl H, Leiman A, Jansen A, 2004. *The Costs and Benefits of Urban River and Wetland Rehabilitation Projects with Specific Reference to Their Implications for Municipal Finance: Case Studies in Cape Town.* WRC Report No. K8/564.

Von Hase A, Rouget M, Maze K & Helme N, 2003. *A Fine-Scale Lowlands Conservation Plan for Cape Lowlands Renosterveld: Technical Report 2003/02,* Botanical Society of South Africa.

Wood J & Low A B 1995. *The Environmental Survey and Management Plan for the Tygerberg Hills and Environs.*

Wood J, Low A B, Donaldson J S & Rebelo A G 1994. *Threats to plant species diversity through urbanization and habitat fragmentation in the Cape Metropolitan Area, South Africa.* In: **Huntley B J (editor),** *Botanical Diversity in Southern Africa.* Strelitzia 1, Pretoria.

APPENDIX 1: CONTRIBUTORS

Name	Affiliation	Items	Email address
Gregg Oelofse	Environmental Strategy Branch, ERM, City of Cape Town	Conservation Planning & History	Gregg.oelofse@capetown.gov.za
Dalton Gibbs	Area Manager South, Biodiversity Management Branch, ERM, City Of Cape Town	Cape Flats Erica, lost & found; Environmental Education on reserves	Dalton.gibbs@capetown.gov.za
Joanne Jackson	Project coordinator, Environmental Strategy Branch, ERM, City Of Cape Town	Biodiversity Projects: False Bay Ecology Park and the Blaauwberg Conservation Area	Joanne.jackson@capetown.gov.za
Jacques du Toit	Coastal Ecosystems	Marine Ecosystems	Jacques.dutoit@capetown.gov.za
Michelle Preen	Environmental Education, Training & Communications Branch, ERM, City of Cape Town	Biodiversity awareness-raising/ education projects	Michelle.preen@capetown.gov.za
Zishan Ebrahim	GIS technicians, Environmental Resource Management Department, City of Cape Town	Production of maps	Zishan.ebrahim@capetown.gov.za
Tanya Goldman	Manager: Cape Flats Nature, South African National Biodiversity Institute	Cape Flats Nature Project	tanyagold@capeflatsnature.org
Victoria Wilman & Mandy Noffke	Working for Wetlands: Peninsula Project	Bottom Road Rehabilitation and Stewardship Project	victoria.wilman@envirosolutions.co.za

Imprint

LAB Biodiversity Report: City of Cape Town

Publisher

City of Cape Town

Editors

Patricia Holmes and Clifford Dorse

Authors

Patricia Holmes

Julia Wood

Clifford Dorse

Biodiversity Management Branch

Photos

City of Cape Town

Jonathan Ball

George Branch

Atherton de Villiers

Clifford Dorse

Patricia Holmes

Laura Flint

Nigel Forshaw

Dalton Gibbs

Rupert Koopman

Howard Langley

Gavin Lawson

Anton Pauw

Tony Rebelo

Cassy Sheasby

Bruce Sutherland

Tim Szöke

South African Tourism

Natio van Rooyen

Suretha van Rooyen

Steve Woodhall

Layout and print

Marianne Liebenberg Design Consultancy cc

Logo Print

Copyright

© City of Cape Town, 2008 and ICLEI Africa Secretariat, 2008

All rights reserved.

No part of this report may be reproduced or copied in any form

or by any means without the written

permission of the City of Cape Town and ICLEI Africa Secretariat.

Printed in South Africa on Recycled Paper

Obtainable from

Electronic copies obtainable upon request from:

Local Action for Biodiversity, ICLEI Africa Secretariat

E-mail: lab@iclei.org

Website: www.iclei.org/lab

Hard copies available upon request from: City of Cape Town

Email: biodiversity@capetown.gov.za

Website: www.capetown.gov.za

Acknowledgements

Fahiema Daniels and Tony Rebelo of the Threatened Species Research Unit at SANBI analyzed the latest data on extent of remaining national vegetation types and the SANBI Threatened Species Programme provided the latest information from the Red Data List of plants. Jonathan Ball edited the entries on insects and supplied facts from his unpublished 2006 thesis concerning the Red Data status of South African butterflies.



Local Action for Biodiversity
PO Box 16548
Vlaeberg
8018
South Africa

City of Cape Town Environmental Management Department
PO Box 16548
Cape Town
8018
South Africa

LOCAL ACTION FOR BIODIVERSITY PARTNERS

