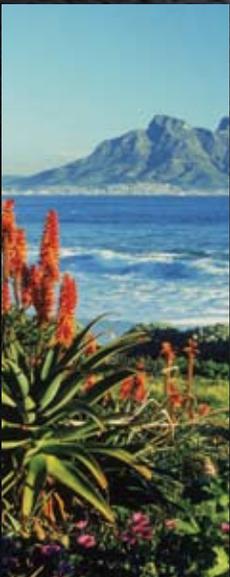




SA YEARBOOK 2009/10
ENVIRONMENTAL AFFAIRS



South Africa is the third most biodiversity-rich country in the world. It has a diversity of landscapes and natural beauty to match the variety in culture and language. Increasingly, this natural beauty is used to untangle the social injustices of the past and unlock economic benefits to local communities.

In 2009, the Department of Environmental Affairs and Tourism's fisheries responsibilities moved to the Department of Agriculture, Forestry and Fisheries. The tourism component became a separate department.

The vision of the Department of Environmental Affairs is a prosperous and equitable society living in harmony with its environment and natural resources.

The department's objective is to maximise economic growth while effectively managing the interface between the environment and development. Furthermore, the department also leads the environmental sector of the Expanded Public Works Programme and promotes the global sustainable development agenda.

The provincial conservation agencies are major role players, and independent statutory organisations such as the South African National Parks (SANParks) and the South African National Biodiversity Institute (Sanbi) are valuable partners in the country's total conservation effort.

Policy and legislation

The National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004), provides a regulatory framework to protect South Africa's valuable species, ecosystems and its biological wealth. It implements the *White Paper on the Conservation and Sustainable Use of South Africa's Biological Diversity (1997)* and multilateral agreements such as the United Nations (UN) Convention on Biological Diversity (CBD), which came into force in December 1993.

South Africa is a signatory to the CBD, which provides the framework, norms and standards for the conservation, sustainable use and equitable benefit-sharing of South Africa's biological resources.

The National Environmental Management: Protected Areas Act, 2003 (Act 57 of 2003), provides for the protection and conservation of ecologically viable areas that are representative of South Africa's biological diversity, its natural landscapes and seascapes, and the management of these.

The Act envisages a national register of protected areas, with a simplified classification system of national parks, nature reserves and protected environments.

It also introduces the concept of biological-diversity protection and ecosystem management. Biodiversity, conservation and ecosystem management are noted as important aims in policy and legislation that govern marine and coastal resources, fresh water and natural forests.

The Act proposes a new system of protected areas, linking various kinds of protected environments to replace the existing fragmented system.

In addition, the Act enables the Minister of Environmental Affairs to acquire private land by purchasing land rights for the creation of protected areas.

Based on experience with biosphere reserves, and informed by the new bioregional approach to conservation (linking the protected-area network along mountains, rivers, wetlands, the coastline and other areas of natural vegetation), the Act will result in an interlocking system of protected areas that explicitly encourages the inclusion of private land.

It recognises that people are the custodians of the land, that they need to be involved in the management of the protected land and that they should benefit from it.

The Act caters for concurrent competence in the management of protected land. For example, an area with national-park status can now be managed by another agency, such as a provincial parks authority. Steps have been taken to ensure that standards are upheld.

Regulations in terms of the National Environmental Management: Protected Areas Amendment Act, 2004 (Act 31 of 2004), provide for the proper administration of specific nature reserves, national parks and world heritage sites.

South Africa is one of only two countries in the world to have promulgated legislation specifically related to the World Heritage Convention (the other being Australia), which was adopted by the UN in 1972.

The country's World Heritage Convention Act, 1999 (Act 49 of 1999), stipulates that all world heritage sites must have an integrated management plan in place to ensure cultural and environmental protection and sustainable development of the site.

The National Environmental Management: Waste Act, 2008 (Act 59 of 2008), came into effect on 1 July 2009. The Act, with its focus on the waste sector, will change the way in which waste is dealt with. The legislation provides for the drawing up of a National Waste-Management Strategy within two years.

A consultation process has been initiated for the Waste Information System Regulations, as well as the Healthcare Risk Waste Regulations. These regulations are expected to be finalised during 2010/11.

The national policy on the thermal treatment of hazardous and general waste has been finalised and will be implemented during 2010/11.

The implementation of the asbestos regulations, promulgated in 2007/08 to prohibit the use, manufacture, import and export of asbestos and asbestos-containing materials, has progressed well.

World Summit on Sustainable Development (WSSD)

Johannesburg hosted the WSSD in September 2002. The agreements reached in Johannesburg are a guide to action that will take forward the UN Millennium Summit Declaration's goal of halving world poverty by 2015, and will incorporate decisions taken by world bodies since the Rio Earth Summit in 1992.

Among the achievements of the WSSD was the launch of over 300 partnerships, including 32 energy initiatives, 21 water programmes and 32 programmes for biodiversity and ecosystem management.

The biggest success was getting the world to turn the UN Millennium Declaration into a concrete set of programmes and to mobilise funds for these programmes. The WSSD focused on the most marginalised sectors of society, including women, the youth, indigenous people and people with disabilities. The implementation plan includes programmes to deliver water, energy, healthcare, agricultural development and a better environment for the world's poor. It also incorporates targets for the reduction of poverty and the protection of the environment.

Targets set at the summit will have an enormous impact, including the following:

- the number of people without basic sanitation and access to safe drinking water will be halved by 2015
- biodiversity loss is to be reversed by 2010, and collapsed fish stocks restored by 2015
- chemicals with a detrimental health impact will be phased out by 2020

- energy services will be extended to 35% of African households over the next 10 years.

National Framework for Sustainable Development (NFSD)

The purpose of the NFSD is to enunciate South Africa's national vision for sustainable development and indicate strategic interventions to reorientate South Africa's development path in a more sustainable direction. It proposes a national vision, principles and area for strategic intervention that will enable and guide the development of the national strategy and action plan.

The NFSD seeks to build on existing programmes and strategies that have emerged in the first 16 years of democracy. It sets the framework for a common understanding and vision of sustainable development, describes the South African context and defines areas for strategic intervention. The NFSD complements current efforts aimed at reducing poverty and growing the economy. It enhances the need for coherence and consideration of natural resource constraints and ecosystem services.

In the Johannesburg Plan of Implementation (JPoI), negotiated at the WSSD, countries committed to preparing and implementing national strategies for sustainable development.

In line with the WSSD targets, the former Department of Environmental Affairs and Tourism led a process towards the development of a single, coherent framework that articulates South Africa's development context, and sets out the common vision and strategic areas of intervention for achieving sustainable development. Phase One of a three-phase process, through a series of dialogues, has culminated in the development of the NFSD.

Biological diversity

South Africa enjoys the third-highest level of biodiversity in the world. The country's rich natural heritage is vast and staggering in its proportions.

Although the country covers only 2% of the world's land area, nearly 10% of the world's plants and 7% of its reptiles, birds and mammals are found here. In terms of the number of endemic species of mammals, birds, reptiles and amphibians, South Africa is ranked as the fifth richest country in Africa and the 24th richest in the world. It is one of only 17 countries that collectively contain two thirds of the world's biodiversity. The three internationally recognised biodiversity hotspots in South Africa are the Cape Floral Region in the south, the Succulent Karoo

that the country shares with Namibia, and that of Maputoland-Pondoland in the east, which extends into Swaziland and Mozambique.

South Africa's marine life is similarly diverse, partly as a result of the extreme contrast between the water masses on the east and west coasts.

Three water masses – the cold Benguela current, the warm Agulhas current, and oceanic water – make the region one of the most oceanographically heterogeneous in the world.

According to the *White Paper on the Conservation and Sustainable Use of South Africa's Biological Diversity (1997)*, over 10 000 plant and animal species – almost 15% of the coastal species known worldwide – are found in South African waters, with about 12% of these occurring nowhere else.

The country's natural heritage is best described according to a systematic classification of regions, or biomes. A biome is a broad ecological unit representing a major life zone, which extends over a large area, and contains relatively uniform plant and animal life closely connected with environmental conditions, especially climate.

The White Paper states that South Africa is one of six countries in the world with an entire plant kingdom within its national confines. The Cape Floral Kingdom has the highest-recorded species diversity for any similar-sized temperate or tropical region in the world.

Other biomes in the country are also of global conservation significance. For example, one third of the world's succulent plant species are found in South Africa.

There are eight major terrestrial biomes, or habitat types, in South Africa, which can, in turn, be divided into 70 veld types.

The degree to which each of these biomes is threatened varies, depending on the fertility of the soil, the economic value derived from use of the area, human population pressures and the extent to which the biome is conserved in protected areas.

The conservation status of important biomes, including grassland, succulent karoo and lowland fynbos, was improved through some inclusions into the national parks system. Some 24 000 ha of grassland was added to the Golden Gate Highlands National Park in November 2008 with the declaration of the former QwaQwa Reserve as part of the national park.

An agreement was signed with De Beers in November 2008 for the incorporation into the Namaqua National Park of 35 000 ha of the

sandveld vegetation type between the Groen and Spoeg rivers. Both the Namaqua National Park and the Tankwa Karoo National Park in the succulent Karoo Biome have been expanded to over 100 000 ha. The Addo Elephant National Park has been extended to over 164 000 ha.

Savanna Biome

The Savanna Biome is the largest biome in southern Africa, occupying 46% of its area, and over one third the area of South Africa. This biome is an area of mixed grassland and trees, and is generally known as bushveld.

In the Northern Cape and Kalahari sections of this biome, the most distinctive trees are the camel thorn (*Acacia erioloba*) and the camphor bush (*Tarchonanthus camphoratus*).

In Limpopo, the portly baobab (*Adansonia digitata*) and the candelabra tree (*Euphorbia ingens*) dominate. The central bushveld is home to species such as the knob thorn (*Acacia nigrescens*), bushwillow (*Combretum spp.*), monkey thorn (*Acacia galpinii*), mopani (*Colophospermum mopane*) and wild fig (*Ficus spp.*). In the valley bushveld of the south, euphorbias and spekboom trees (*Portulacaria afra*) dominate.

Abundant wild fruit trees provide food for many birds and animals in the Savanna Biome. Grey loeries, hornbills, shrikes, flycatchers and rollers are birds typical of the northern regions. The subtropical and coastal areas are home to Knysna loeries, purple-crested loeries and green pigeons. Raptors occur throughout the biome. The larger mammals include lion, leopard, cheetah, elephant, buffalo, zebra, rhinoceros, giraffe, kudu, oryx, waterbuck, hippopotamus and many others.

About 8,5% of the biome is protected. The Kruger National Park, Kgalagadi Transfrontier Park, Hluhluwe-Umfolozi Park, iSimangaliso Wetlands Park (formerly Greater St Lucia Wetlands Park) and other reserves are located in the Savanna Biome.

Nama-Karoo Biome

The Nama-Karoo is the third-largest biome in South Africa, covering about 20,5% of the country or more than 260 000 km². It stretches across the vast central plateau of the western half of the country and is a semi-desert that receives a little rain in summer.

Rainfall varies from about 200 mm a year in the west to 400 mm a year in the north-east. Summer is very hot and winter is very cold with frequent frost.

Most of the plants are low shrubs and grass. Many plants are deciduous. Trees such as the sweet thorn (*Acacia karoo*) are usually only found along rivers or on rocky hillsides.

Common animals include the bat-eared fox, ostrich, spring hare, tortoises and brown locust. The riverine rabbit is a threatened species found in the Nama-Karoo Biome.

This biome includes the Namaland area of Namibia, and the central Karoo area of South Africa.

Because of low rainfall, rivers are non-perennial. Cold and frost in winter and high temperatures in summer demand special adaptations from plants. The vegetation of this biome is mainly low shrubland and grass, with trees limited to water courses.

Only 1% of the Nama-Karoo Biome falls within officially protected areas, of which the Karoo and Augrabies national parks are the largest.

Overgrazing and easily eroded soil surfaces are causing this semi-desert to creep slowly in on the neighbouring savanna and grassland biomes.

Grassland Biome

The Grassland Biome is found chiefly on the high central plateau of South Africa, and the inland areas of KwaZulu-Natal and the Eastern Cape. The topography is mainly flat and rolling, but includes the escarpment itself. Altitude varies from near sea level to 2 850 m above sea level.

The Grassland Biome covers an estimated 339 237 km of South Africa's landscape and stretches across seven of the country's nine provinces. This biome is a summer-rainfall area with heavy thunderstorms and hail in summer, and frost in winter.

A number of perennial rivers such as the Orange, Vaal, Pongola, Kei and Umzimvubu originate in, and flow through, the area.

Trees are scarce and are found mainly on hills and along riverbeds.

Karee (*Rhus lancea*), wild currant (*Rhus pyroides*), white stinkwood (*Celtis africana*) and several acacia species are the most common.

The Grassland Biome has the third-largest number of indigenous plant species in the country.

Eight mammal species endemic to South Africa occur in a wild state in this biome. Two of these, namely the black wildebeest and the blesbok, occur mainly in the Grassland Biome.

The area is internationally recognised as an area of high species endemism as far as birds are concerned. Birds commonly found in the area

include the black korhaan, blue crane, guinea-fowl and other grassland birds.

Succulent Karoo Biome

The Succulent Karoo Biome covers a flat to gently undulating plain, with some hilly and "broken" veld, mostly situated to the west and south of the escarpment, and north of the Cape Fold Belt.

One of the natural wonders of South Africa is the annual blossoming of the Namaqualand wild flowers (mainly of the family *Asteraceae*), which transforms the semi-desert of the Northern Cape into a fairyland. After rain, the drab landscape is suddenly covered from horizon to horizon with a multicoloured carpet (from August to October, depending on the rainfall).

This is a winter-rainfall area with extremely dry and hot summers. Succulents with thick, fleshy leaves are plentiful. Most trees have white trunks to reflect the heat.

The quiver tree (*Aloe dichotoma*) and the human-like elephant's trunk (*Pachypodium namaquanum*) are prominent in the Richtersveld. Grass is scarce.

The animal life is similar to that of neighbouring biomes (Fynbos and Nama-Karoo).

The Richtersveld, Tankwa Karoo and Namaqua national parks as well as the new Hantam National Botanical Garden outside Nieuwoudtville in the Northern Cape have improved the conservation status of this biome considerably.

The Succulent Karoo Biome includes 2 800 plant species at increased risk of extinction.

Fynbos Biome

The Fynbos Biome is one of the six accepted floral kingdoms of the world. This region covers only 0,04% of the land surface of the globe.

Fynbos is found mainly in the Western Cape. This is a winter-rainfall area and the fynbos vegetation is similar to that of Mediterranean regions.

Fynbos is the name given to a group of ever-green plants with small, hard leaves (such as those in the Erica family). It is made up mainly of the protea, heathers and restio, and incorporates a diversity of plant species (more than 8 500 kinds, over 6 000 of which are endemic).

The Fynbos Biome is famous for the protea, for which South Africa is renowned. The biome also contains flowering plants now regarded as garden plants, such as freesia, tritonia, sparaxis and many others.

Protected areas cover 13,6% of the Fynbos Biome and include the Table Mountain and Agulhas national parks.

This biome is not very rich in bird and mammal life, but does include the endemic Cape grysbok, the geometric tortoise, Cape sugarbird and the protea seed-eater. The mountains are the habitat of the leopard, baboon, honey-badger, caracal, reedbuck and several types of eagle and dassies.

Forest Biome

South Africa's only significant forests are those of the eastern escarpment, and on the eastern seaboard. Forest giants such as yellowwood (*Podocarpus spp.*), ironwood (*Olea capensis*) and lemonwood (*Xymalos monospora*) dominate.

Other reasonably large forest patches that are officially protected are in the high-rainfall areas of the eastern escarpment, and on the eastern seaboard. Forest giants such as yellowwood (*Podocarpus spp.*), ironwood (*Olea capensis*) and lemonwood (*Xymalos monospora*) dominate.

The indigenous forests are a magical world of ferns, lichens, and colourful forest birds such as the Knysna loerie, the endangered Cape parrot and the rameron pigeon. Mammals include the endangered samango monkey, bushpig, bushbuck and the delicate blue duiker.

Thicket Biome

The Thicket Biome is the second smallest biome in South Africa, and is known for its high biodiversity.

Subtropical thicket ranges from closed shrubland to low forest, dominated by evergreen succulent trees, shrubs and vines.

It is often impenetrable and has little herbaceous cover. Roughly 20% of the species in the Thicket Biome are endemic to it.

The Thicket Biome is centred predominantly in the Eastern Cape.

Important dates:

World Wetlands Day: 2 February
National Water Week: 19 to 25 March
Earth Day: 20 March
World Water Day: 22 March
World Meteorological Day: 23 March
World Environment Day: 5 June
World Oceans Day: 8 June
World Desertification Day: 17 June
National Arbour Week: 1 to 7 September
International Day for the Protection of the Ozone Layer:
16 September
World Tourism Day: 27 September
World Habitat Day: 4 October
National Marine Day: 20 October



The Thicket Biome in the Eastern Cape supports four species of tortoises: the leopard tortoise (*Geochelone pardalis*), angulate tortoise (*Chersina angulata*), tent tortoise (*Psammobates tentorius*) and parrot-beaked tortoise (*Homopus areolatus*).

Desert Biome

True desert is found under very harsh environmental conditions, which are even more extreme than those found in the Succulent Karoo and the Nama-Karoo biomes. The climate is characterised by summer rainfall, but also by high levels of summer aridity. Rainfall is highly variable from year to year. Desert is found mostly in Namibia, although it does occur in South Africa in the lower Orange River Valley.

The vegetation of the Desert Biome is characterised by the dominance of annual plants (often annual grasses). This means that after a rare season of abundant rain, the desert plains can be covered with a sea of short annual grass, whereas in drier years, the plains appear bare with the annual plants persisting in the form of seeds.

Perennial plants are usually encountered in specialised habitats associated with local concentrations of water. Common examples of such habitats are broad drainage lines or washes. Nearer the coast, the role of coastal fog also governs the distribution of certain species commonly associated with the desert.

The Desert Biome incorporates an abundant insect fauna, which includes many tenebrionid beetles, some of which can use fog water. There are also various vertebrates, including reptiles, springbok, ostrich, gemsbok, snakes and geckos.

Some areas in the Desert Biome are formally protected in the Richtersveld National Park.

Conserving biodiversity

Biodiversity plays a crucial role in sustainable development and poverty eradication.

South Africa as a biodiversity-rich country, is committed to the conservation and sustainable management of biological resources and is signatory to the following biodiversity-related multilateral agreements:

- CBD
- Cartagena Protocol on Biosafety
- Ramsar Convention
- Convention on International Trade in Endangered Species (Cites)
- Convention to Combat Desertification (UNCCD)
- Convention on Migratory Species.

South Africa's commitment as a signatory to these agreements is shown by its compliance with their

many requirements and provisions. South Africa has developed a suite of biodiversity-related laws, policies and programmes, cutting across various government departments to address its priority policies and to comply with international agreements.

The publication in 2006 of the *National Spatial Biodiversity Assessment* (NSBA) by the then Department of Environmental Affairs and Tourism and Sanbi, revealed that 34% of South Africa's ecosystems were threatened, with 5% critically endangered; while 82% of the 120 main rivers were threatened and 44% critically endangered. Of the 13 groups of estuarine biodiversity, three are in critical danger and 12% of marine biozones are under serious threat.

Because of the geographic spread and diversity of South Africa's plant and animal species – up to 80% of significant biodiversity lies outside existing protected areas – a traditional approach to conservation is inadequate. Biodiversity priorities have to be integrated with all policies, plans and programmes.

South Africa's National Biodiversity Strategy and Action Plan (NBSAP) guides conservation and the management of biodiversity to ensure sustainable and equitable benefits for all communities.

The NBSAP highlights five strategic objectives, such as the need for a network of protected areas that conserves a sample of all South Africa's biodiversity; specifies how these are to be realised; and sets five- and 15-year targets for each.

The NBSAP also provides for the entrenchment of biodiversity concerns in production sectors, such as mining and forestry, by focusing on the inclusion of biodiversity priorities in guidelines and codes of best practice, and on measures to encourage sustainable production practices.

The NBSAP informs the creation, in law, of the National Biodiversity Framework to ensure an integrated, coordinated and consistent approach to biodiversity management by organs of state in all spheres of government, non-governmental organisations (NGOs), the private sector, local communities, other stakeholders and the public.

South African Biosystematics Initiative (Sabi)

Sabi is an initiative of the National Research Foundation (NRF) and plays a leading role in the application of innovative approaches to systematics and taxonomy as fundamental sciences underpinning biological research.

In this way, it plans to unlock the full potential of South Africa's biological and human resources through the enhanced practice of biosystematic science, and to use modern technology to build on an existing rich historical scientific legacy, including indigenous knowledge systems.

Some of Sabi's primary objectives include establishing a framework and strategy to:

- address the diminishing national capacity in biological systematics and taxonomy
- provide leadership and coordination to promote innovative research in the field of biosystematics
- empower South African biosystematists to employ and develop modern scientific technologies and approaches regarding the documentation and use of biological resources
- enhance the ability of South African biosystematists to contribute to the National System of Innovation and the information society, and thus respond to national priorities in agriculture, health, sustainable development and conservation.

South African Environmental Observation Network (SAEON)

The SAEON is a facility of the NRF. Its main aim is to establish and maintain environmental observatories, field stations and sites, linked by an information-management network, to serve as research and education platforms for the long-term study of ecosystems. It provides for incremental advances in understanding ecosystems and the ability to detect, predict and react to environmental changes.

The SAEON satisfies the need for public-decision support by generating information relevant to the sustainable management of natural resources and habitats over a spectrum of ecoregions and land uses, ranging from pristine to urbanisation-transformed landscapes.

Wildlife Biodiversity Resources or Biobank South Africa

With the growing global market in biomaterial and biodiversity informatics, developing countries such as South Africa face the challenge of setting up systems for governing access to biodiversity and the sustainable use of their biodiversity heritage.

The biosciences field is recognised as the driving force behind the next revolutionary wave of scientific and technological advancement.

Biobank facilities (genebanks) are increasingly becoming a key strategic research infrastructure

for countries worldwide. Their importance in the conservation and sustainable use of biodiversity has, among other things, been emphasised in the Consolidated Plan of Action for Science and Technology.

This has led to the then Department of Environmental Affairs and Tourism collaborating with Wildlife Biodiversity Resources or Biobank South Africa to help facilitate, through its member organisations, an integrated and coordinated drive to access, collect, enhance and bank a representative range of biomaterial from key South African and African wildlife and indigenous livestock species for conservation, research and biotechnology development purposes.

This facility also provides general custodianship to South Africa's wildlife biomaterial and/or genetic resources.

Genebanks

The Department of Science and Technology and the Agricultural Research Council (ARC) support the maintenance, management and development of national public assets for the benefit of the broader science community.

They are national repositories of genetic information and terrestrial data related to the environment, and include specimens of and facilities that house all insects and support arachnids, nematodes, fungi and various other genebanks.

South Africa has international obligations that compel it to keep reference collections of all agricultural specimens regarding the import and export of agricultural produce.

The national collections and genebanks house these reference collections and make an important contribution to scientific studies, biodiversity replenishment, sustainable development and production, food security and invader-pest identification.

South African National Biodiversity Institute

Sanbi was established on 1 September 2004 with the renaming of the National Botanical Institute in terms of the National Environmental Management: Biodiversity Act, 2004.

Sanbi with its head office based at the Pretoria National Botanical Garden, is an autonomous state-aided institute whose vision is to be the leading institution in biodiversity science in Africa, facilitating conservation and the sustainable development of living resources and human well-being. In addition to new biodiversity-related initiatives linked to the Act, traditional activities undertaken by Sanbi include:

- collecting, displaying and cultivating plants indigenous to South Africa
- undertaking and promoting research into indigenous plants and related matters
- studying, researching and cultivating threatened plant species
- promoting the economic potential of indigenous plants
- running environmental-education programmes.

Sanbi manages nine national botanical gardens (classified as "conservation gardens") in five of South Africa's nine provinces. The gardens collectively attract over 1,25 million visitors a year, are signatories to the International Agenda for Botanic Gardens in Conservation, which was launched in 2000, and are founding members of the African Botanic Gardens Network.

The largest garden is Kirstenbosch, situated on the eastern slopes of Table Mountain in Cape Town. It displays 5 300 indigenous plant species.

Kirstenbosch receives more than 750 000 visitors annually. The Kirstenbosch National Botanical Garden houses the Kirstenbosch Research Centre, the Rufford Maurice Laing Centre for Biodiversity Conservation, Gold Fields Environmental Education Centre, the Botanical Society Conservatory, two restaurants, a conference venue, gift shops, a coffee bar, concert venues, sculpture exhibits and the Centre for Home Gardening, which includes an indigenous plant retail nursery.

The other gardens in the national network are the Karoo Desert in Worcester, Harold Porter in Betty's Bay, Free State in Bloemfontein, KwaZulu-Natal in Pietermaritzburg, Lowveld in Nelspruit, Walter Sisulu in Roodepoort/Mogale City, Hantam outside Nieuwoudtville, and the Pretoria National Botanical Garden.

The Pretoria National Botanical Garden houses the National Herbarium of South Africa, the second-largest herbarium in the southern hemisphere.

The Harold Porter National Botanical Garden boasts *Disa uniflora* in its natural habitat (flowering from mid-December to the end of January), and South Africa's national flower, the king protea (*Protea cynaroides*).

The Walter Sisulu National Botanical Garden accommodates more than 600 naturally occurring plant species, over 230 bird species and a number of reptiles and small mammals. These include jackal and antelope, which occur in the natural areas of the garden.

This garden receives some 180 000 visitors annually and is the fastest-growing of the Sanbi-managed gardens. It covers over 275 ha

and consists of landscaped and natural areas. All the garden's plants are indigenous to southern Africa.

Hantam, South Africa's ninth National Botanical Garden, covers 6 300 ha of land on the Bokkeveld Plateau, which is famous for its range and density of bulbous plants, to the extent that Nieuwoudtville is often referred to as the "Bulb Capital of the World".

Some 40% of the local flora consist of bulbs that create spectacular displays every autumn and spring. The garden also incorporates large natural patches of renosterveld fynbos and succulent Karoo vegetation. Almost a third of the species endemic to the Bokkeveld Plateau are threatened with extinction.

Sanbi operates environmental-education programmes within its national botanical gardens, and outreach greening programmes focused on promoting indigenous gardening at disadvantaged schools in surrounding areas.

Herbaria and taxonomic research

Sanbi documents, investigates, classifies and names southern Africa's biota. It is here that fundamental biodiversity information is generated and made available to other stakeholders.

Sanbi researches the evolution, diversity, distribution and relationships of southern Africa's 24 000 species of plants, based on the Sanbi collection of over 1,8 million specimens. Biosystematics research at Sanbi focuses on morphological, molecular and anatomical observational studies and is mostly carried out in Sanbi's three herbaria.

The National Herbarium in Pretoria houses more than 1,2 million preserved plant specimens.

The Crompton Herbarium in Cape Town focuses mainly on the flora of the winter-rainfall region of southern Africa, while the KwaZulu-Natal Herbarium in Durban primarily focuses on the flora of the subtropical eastern region of South Africa, in particular the flora of the province.

South Africa, with its 11 700 endemic plant species, has the richest temperate flora in the world. Sanbi is increasingly embracing biodiversity in its broadest sense through inclusion of the country's fauna as part of its taxonomic research mandate. Sanbi is coordinating a catalogue of all South Africa's species (at least 100 000), including animals, through the South African Tree of Life Project.

Biodiversity research **Applied biodiversity research**

The Applied Biodiversity Research Division aims to use Sanbi's position and resources to strengthen research in key areas of applied biodiversity research. It builds on the success of past work in conservation science and sustainable use but also develops research in several new directions.

The underlying objective of the research is to develop a predictive understanding of biodiversity dynamics within the context of a changing environment and ongoing interactions between people and biodiversity.

The research focuses on three main areas:

- risks and responses to threats
- the value and use of species and ecosystems
- understanding the dynamics of species and ecosystems of special concern.

There are also three important cross-cutting functions that contribute to all the research areas, namely:

- long-term research and monitoring
- molecular ecology
- population demography and statistical ecology.

Risks and responses

Many decisions relating to biodiversity depend on understanding the risks to biodiversity and society and the opportunities associated with addressing these risks. The research focuses on understanding and managing the risks of invasive species, land use and other global change drivers, as well as the impact of genetically modified organisms released into the environment.

Climate change is a significant risk factor and the Applied Biodiversity Research Division therefore works together with Sanbi's climate-change and bio-adaptation divisions to provide an understanding of global-change issues.

Sustainable use of species and ecosystem services

South Africa has a wealth of biodiversity and all communities in the country rely to some extent on goods and services linked to biodiversity. The livelihoods of the country's poor, especially in rural areas, will continue to depend on natural resources but ecosystems also provide services that are essential for overall economic development, sustainable agriculture and tourism, and meeting the millennium development goals. This portfolio of research focuses on the sustainable use of species and ecosystem services and the link between biodiversity and these services.

Species and ecosystems of special concern

Decisions regarding conservation management, planning and regulation often require information on particular species or ecosystems, or knowledge about how species and ecosystems are responding to particular threats. Sanbi promotes research that focuses on threatened species and ecosystems and species of special concern such as elephants.

Cross-cutting programmes

The division hosts the Fynbos Node of the SAEON, which is a key network for long-term monitoring of the environment, and also provides scarce skills in molecular ecology and statistical ecology, which are essential for many applied biodiversity projects.

Millennium Seed Bank (MSB)

The MSB Project in South Africa is part of a 10-year international programme that aims to collect and conserve 10% of the world's seed-bearing plant species (some 24 000 species) in the MSB facility of the Royal Botanic Gardens in Kew by 2010. The MSB International Programme has established major partnerships with organisations in 16 countries worldwide.

Sanbi joined the international programme in 2000 and aims to make a significant contribution to this effort by collecting and conserving 2 500 of South Africa's indigenous flora in the seed bank. Priority is given to plant species of conservation concern as well as species occurring in threatened ecosystems and habitats.

During 2008/09, 403 seed collections were made, of which 290 collections were estimated to be new additions to the MSB. By mid-2009, the MSB Project in South Africa had collected and conserved seed of about 2 475 species and was well on track of reaching the target of 2 500 indigenous plant species by 2010.

Greening the Nation Programme

The Department of Environmental Affairs has funded a national greening initiative through the Poverty Relief Fund. This initiative is implemented by Sanbi and aims to:

- provide a green, clean and healthy environment in schools and other public spaces, such as cultural villages, streets, graveyards and other urban public spaces
- create job opportunities for local people where this initiative is being implemented
- build the capacity of the previously disadvantaged by providing skills-based training

that will allow them permanent opportunities either in the job market or in accessing further education

- support the National School Nutrition Programme by developing fruit and vegetable gardens in schools
- enhance environmental education in schools by developing indigenous gardens, which are designed for educational purposes.

The programme has been implemented in Gauteng, Eastern Cape, Northern Cape, Western Cape, Free State, Mpumalanga and Limpopo.

By 2009, the following had been achieved:

- Over 200 schools throughout the country had been "greened" by developing indigenous gardens, vegetable gardens and the planting of fruit trees.
- Thousands of job opportunities had been created.
- More than 120 teachers nationally had been provided with formal and accredited training in environmental education through a partnership with Rhodes University.
- Seventy people had been trained in horticulture and landscaping skills at the Durban University of Technology and the University of South Africa.
- Thousands of indigenous trees had been planted throughout the country.
- Four community nurseries, which are owned by schools and/or communities, had been developed to support the greening projects.
- Over 40 small, medium and micro-enterprises (SMMEs) were developed and used to access material and equipment. Those who were not registered were assisted to register and provided with equipment, and trained to provide horticultural services and maintenance in schools, cultural villages, parks and nurseries.

Working for Wetlands

Sanbi also manages the Working for Wetlands Programme, with its offices based at the Pretoria National Botanical Garden. The National Inventory Project, the first systematic assessment of the extent of South Africa's wetland resources, was completed.

A total of 121 642 individual wetlands were mapped, accounting for 7% of the country's surface area. Working for Wetlands has rehabilitated 91 wetlands, employed 1 710 people and provided 28 547 training days.

National Municipal Biodiversity Programme

Sanbi, in partnership with the former departments of provincial and local government and environmental affairs and tourism, has initiated the National Municipal Biodiversity Programme. The objective of the programme is to ensure that biodiversity and ecosystem services are effectively managed and are contributing to sustainable economic development and human well-being in municipalities across South Africa.

The programme completed an initial design phase during which lessons learnt from existing initiatives, programmes and projects were incorporated into a framework to guide the implementation of the programme.

Urban Conservation Programme

The Urban Conservation Programme is expanding its focus from being a Cape Town-based programme to becoming a national programme for biodiversity conservation in urban landscapes. The six-year old flagship project, Cape Flats Nature, is a partnership between Sanbi, the City of Cape Town, the Botanical Society of South Africa, Table Mountain Fund, Table Mountain National Park (TMNP) and CapeNature.

The project aims to mainstream biodiversity-management practice in urban landscapes, while taking into account socio-economic priorities. The Urban Conservation Programme also plays a role in the implementation of the Working for Wetlands Programme through restoring priority wetlands in the Cape Town metro.

The programme is a partner in the international Local Action for Biodiversity Project headed by ICLEI (Local Governments for Sustainability), which includes a team of 20 cities from around the world working to develop a set of appropriate interventions to address biodiversity-related issues within a cities context.

Policy support

Sanbi provides support to the Department of Environmental Affairs on the development of key biodiversity policy and implementation tools. This included further development of the National Biodiversity Framework.

Sanbi led the development of the draft list of threatened terrestrial ecosystems to be listed in terms of the National Environmental Management: Biodiversity Act, 2004. Ecosystems are listed as critically endangered or vulnerable, based on a set of criteria developed as part of the process. Sanbi supported the department in the development of a

guideline for publishing bioregional plans in terms of the Act.

The guideline provides advice on the content of bioregional plans, and the process of developing and publishing such plans. Listing threatened ecosystems and publishing bioregional plans are key tools for enabling the integrated management of priority terrestrial and aquatic ecosystems and improving the quality of environmental authorisation decisions.

Sanbi provided technical support to the department on the development of the National Protected Area Expansion Strategy (NPAES). South Africa's protected area network currently falls short of sustaining biodiversity and ecological processes. The goal of the NPAES is to achieve cost-effective protected area expansion for ecological sustainability and increased resilience to climate change.

Bioregional and ecosystem programmes

Sanbi coordinates a number of bioregional and ecosystem programmes. Bioregional programmes are biome-wide biodiversity initiatives that coordinate a wide range of multisectoral projects with integrated conservation and development outcomes.

Sanbi coordinates the Grasslands Programme, the Fynbos Programme, Cape Action for People and the Environment (CAPE), the Succulent Karoo Ecosystem Programme (SKEP) and the Eastern Cape Bioregional Programme.

It also coordinates two ecosystem programmes, namely the Marine Ecosystem Programme and the Freshwater Ecosystem Programme.

Grasslands Programme

The Grasslands Programme is a partnership between government, the private sector, the academic sector and civil society with the aim of sustaining and securing the rich biodiversity and ecosystem services of the Grasslands Biome. The programme provides an enabling environment for mainstreaming biodiversity in production landscapes, including agriculture, forestry, urban development and coal mining.

The Global Environmental Facility (GEF) approved funding of US\$8,3 million for the programme to catalyse mainstreaming interventions within the Grasslands Biome. The programme was officially launched on International Biodiversity Day in May 2008.

Implementation of the programme has been initiated in the production sectors through a

number of demonstration projects, including securing stewardship sites in the Wakkersroom/Luneburg area in Mpumalanga; priority biodiversity sites in urban areas in Gauteng; developing a biodiversity toolkit; securing stewardship sites on forestry-owned land and ensuring appropriate expansion of new forestry plantations; and ensuring that the expansion of coal mining incorporates biodiversity information.

Cape Action for People and the Environment

CAPE is a programme involving a range of government and civil-society partners working on biodiversity-conservation projects within the Cape Floristic Region. The goal of the programme is to ensure that by 2020, the rich biological heritage of the Cape Floristic Region is protected, while delivering significant benefits to the people of the region. The programme continued to roll out the GEF-funded Biodiversity Conservation and Sustainable Development Project with a key focus on strengthening cooperative governance for improved biodiversity management in the Cape Floristic Region.

The programme has successfully consolidated and expanded the protected area estate through landscape initiatives and innovative stewardship contracts with landowners; developed fine-scale biodiversity plans for priority areas; developed management-effectiveness tracking tools for conservation areas; established business and biodiversity initiatives; and initiated partnerships for alien clearing.

Succulent Karoo Ecosystem Programme

SKEP aims to achieve people-focused biodiversity conservation through the development of strong partnerships in the Succulent Karoo Biome. The goal is to provide an opportunity for the people of the Succulent Karoo to take ownership of and enjoy their unique living landscape in a way that maintains biodiversity and improves livelihoods now and into perpetuity.

The programme has resulted in new land being added to the conservation estate through the establishment of conservancies and stewardship agreements; improvement in land management through alien clearing and biodiversity-friendly management practices; development of best-practice guidelines; and projects contributing to the alleviation of poverty via job creation and improvement in livelihoods.

The SKEPIES Fund, a small grants fund enabling synergy between conservation initia-

tives and local economic development activities, created 19 businesses and 109 jobs, added value to existing businesses and developed the capacity of 350 people to engage in development and conservation activities.

Eastern Cape Bioregional Programmes

Sanbi coordinates the Eastern Cape Implementation Committee (ECIC), which is a cooperative governance committee established in partnership with the Eastern Cape Department of Economic Development and Environmental Affairs. The ECIC is a multistakeholder committee through which participating agencies can coordinate biodiversity-related activities and align environmental, social and economic development goals.

The Mainstreaming Biodiversity into Planning and Development Project is a partnership project aimed at building capacity for Eastern Cape land-use planners and decision-makers. Through this project, Sanbi hosted training workshops to guide the use of the Eastern Cape Biodiversity Conservation Plan in municipal planning processes to support sustainable economic growth.

Marine Ecosystem Programme

The Marine Ecosystem Programme has been a partnership between Sanbi, World Wide Fund for Nature South Africa (WWF-SA) and Marine and Coastal Management. The programme has focused on its flagship project, the Offshore Biodiversity Initiative, which promotes ecosystem-based management of South African's marine territory through the establishment of a network of offshore marine protected areas (MPAs) and cooperative biodiversity management.

Through this initiative, offshore industries, government and civil society are working together to secure the overall health of offshore marine ecosystems to meet the needs of present and future generations. Sanbi published the *Guidelines for Offshore MPAs in South Africa*, which were developed through research and stakeholder meetings. Sanbi initiated the Reef Atlas Project in collaboration with researches and offshore industries to improve knowledge of coral reefs, which have been identified as a vulnerable marine habitat.

Freshwater Ecosystem Programme

This programme aims to expand and consolidate the freshwater activities within Sanbi. This includes the management of the Working for Wetlands Programme on behalf of the departments of water affairs; environmental affairs; and agriculture, forestry and fisheries.

Sanbi is a partner of a nine-year research programme on wetlands that was initiated in 2002 to look at wetland rehabilitation, wetland health and integrity, and the sustainable use of wetlands. Sanbi and the Water Research Commission funded the development of the WET Management Series, a set of tools designed to help wetland workers assess the goods and services that wetlands provide, and to measure wetland health.

Assessing and monitoring indigenous fauna and flora **Biodiversity planning**

Sanbi identifies priority areas for biodiversity conservation in South Africa through systematic biodiversity planning, providing a mechanism to guide the strategic use of limited conservation resources.

Sanbi has continued to support the initiation and development of provincial biodiversity plans, which are used as the basis for provincial protected area-expansion strategies and the publishing of bioregional plans. In 2008, the North West Biodiversity Conservation Assessment was completed. Five provinces, namely Gauteng,

KwaZulu-Natal, Mpumalanga, Eastern Cape and North West, have spatial provincial biodiversity plans. The four remaining provinces have all initiated the process of developing such plans.

Sanbi is involved in a project funded by the Biodiversity Monitoring Transect Analysis in Africa Project to map land degradation in Namaqualand, an arid area recognised internationally as one of the biodiversity hotspots. The results from this project will be used for biodiversity planning initiatives and for monitoring the state of biodiversity in the area.

Assessing and monitoring threatened flora and fauna

Sanbi's Threatened Species Programme (TSP) focuses on assessing and monitoring threatened species and includes two subprogrammes: one on the conservation of threatened plants and the other on the conservation of threatened animals.

The threatened plant component of the TSP has conducted Red List conservation-status assessments of all 20 476 plant taxa in South Africa. Internationally, only 4% of the world's plant species have been assessed. The vast task of assessing South Africa's plants has resulted in an additional 6% of the world's flora being assessed, bringing the total global assessments to over 10%.

The threatened plant monitoring project, Custodians of Rare and Endangered Wildflowers, which involves volunteers from a range of socio-economic and cultural backgrounds in the monitoring and conservation of threatened plants, has expanded with seven new volunteer groups starting in KwaZulu-Natal, Mpumalanga and the Eastern Cape.

The threatened animal component of the TSP coordinates several projects, which aim to capture species-occurrence records for groups of animals through public participation. The information from these projects is used to produce conservation assessments. The following projects are underway:

- The Southern African Butterfly Conservation Assessment (Sabca) was launched in May 2007. Sabca is a four-year partnership project between Sanbi, the Lepidopterists' Society of Africa and the Avian Demography Unit (ADU) at the University of Cape Town. The project aims to determine the distribution of and conservation priorities for all butterfly species in southern Africa (South Africa, Lesotho and Swaziland), especially those threatened with extinction (www.sabca.adu.org.za).

The Deputy Minister of Environmental Affairs, Ms Rejoice Mabudafnisi, launched the National Youth Service Programme Pilot Project on Environment in Saldanha, Western Cape, in June 2009.

The department's commitment to youth development in the environment sector is illustrated by its R25-million investment in three youth-service pilot projects in the 2008/09 and 2009/10 financial years.

About 150 unemployed youth between the ages of 18 and 35 in the Saldanha municipal area were officially welcomed into a year of full-time service. The Saldanha Project will be expanded to include a further 250 youth in the next two years.

The youth will be working on environmentally focused projects, which include greening the environment, conserving natural resources, coastal management, waste management and upgrading public infrastructure.

In addition to serving their communities, the youth will be further empowered through training accredited by the National Qualifications Framework in the following areas: computer skills, entrepreneurship awareness, environmental technical training, as well as training to obtain a driver's licence. The youth will receive a stipend to cover their transport and basic necessities.

The other environmental youth-service pilot projects spearheaded by the department are in Johannesburg, Gauteng, and Hermanus in the Western Cape.



- The South African National Survey of Arachnida, a partnership project between Sanbi and the Agricultural Research Council, launched in 2006, conducted successful field trips, identifying about 15 000 spiders and digitising 10 500 arachnid records. New species were collected and data on the 72 spider families were uploaded onto the website (www.arc.agric.za).
- The Southern African Reptile Conservation Assessment, the first of the atlas projects launched, continued to attract public attention through television and radio broadcasts and other media. Over 4 000 records were submitted to the virtual museum and a number of field surveys were conducted (www.sarca.adu.org.za).
- The second South African Bird Atlas Project, a partnership project between Sanbi and the ADU, was relocated to the Sanbi's TSP (www.sabap2.adu.org.za).

Knowledge and information management

Sanbi developed the Knowledge and Information Management Strategy to coordinate and manage all of Sanbi's information resources. The South African Biodiversity Information Facility portal was transferred to Sanbi from the NRF. The South African Biodiversity Information Facility includes a network of data-providers and promotes the sharing of data and information under a common set of standards. Sanbi's Integrated Biodiversity Information System Project, which aims to centralise Sanbi's biodiversity-information databases and provide a web-based interface to improve access to resources, underwent final testing.

The Biodiversity Geographical Information System (BGIS) provides access to spatial biodiversity information on the website (<http://sanbi.bgis.org>) to inform biodiversity planning, research and land-use decision-making. A number of new spatial biodiversity planning projects have been uploaded on the website. BGIS provides training courses on how to use the website and the information provided. The website was replicated on a DVD, which has been widely distributed. The innovative Land-Use Decision Support Tool was developed to support land-use decision-making and provides a user-friendly, web-based decision-support system that assists environmental practitioners to assess the possible impacts of developments or land-use change.

Sanbi is mandated with monitoring the status of the country's biodiversity and has developed the National Monitoring and Reporting Framework and identified a set of headline indicators

to achieve this. These indicators provide key statistics to give a quantitative measure of the status of various aspects of biodiversity. Sanbi developed the Species Status Database (<http://www.speciesstatus.sanbi.org>), which provides a centralised storage location for information on the status of South African species.

Climate Change and Bio-Adaptation Division

This division draws together the climate change-related projects that Sanbi has undertaken as part of its research activities, which began in the early 1990s. It is organised around five major themes:

- providing guidance on the policy implications of climate change for sustainable use of ecosystems and human livelihoods
- assessing the vulnerability of South Africa's biodiversity assets to climate change
- monitoring and projecting the impact of climate change on biodiversity (including species and ecosystem processes, such as wild fires)
- developing guidelines for adaptation to these changes
- communicating key climate-change findings to a wide range of stakeholders.

The division holds leadership positions in national and international science bodies, such as the Global Carbon Project, which assesses vulnerability of the global carbon cycle; and the South African Scientific Committee on Global Change.

Division members also hold leadership positions in international policy-relevant bodies, such as co-chairpersonship of the Ad Hoc Technical Expert Group on Climate Change and Biodiversity of the CBD and as part of the South African negotiating team for the UN Framework Convention on Climate Change (UNFCCC).

The division is leading the development of South Africa's Second National Communication to the UNFCCC, which comprises an assessment of climate-change vulnerability and adaptation across all affected sectors.

Division scientists are actively pursuing innovative experiment-, modelling- and monitoring-based approaches to assess ongoing and future impacts of climate change on species and ecosystems. Several of these approaches engage members of the public in gathering and reporting data, and much effort has been made to produce various vehicles for the communication of findings, including pamphlets, public lectures and short courses.

Several products published by division scientists are widely cited and influential. The division attracts postdoctoral candidates from around

the world and trains postgraduate students who contribute to the effectiveness of further knowledge-generation and capacity-building in the field of climate change. Division scientists played a leading role in the Nobel-Prize winning *Intergovernmental Panel on Climate Change Fourth Assessment Report*.

Protected areas

The CBD, to which South Africa is a signatory, requires that 10% of the terrestrial and 20% of marine biodiversity be conserved by 2010. There are a number of management categories of protected areas in South Africa, which conform to the accepted categories of the International Union for Conservation of Nature (IUCN).

South Africa has a long-term strategy to expand the conservation areas under formal protection from 6% to the international standard of 10% of the total area of the country. The Department of Environmental Affairs has developed mechanisms for the establishment and expansion of protected areas. Emphasis has been placed on the expansion and consolidation of protected areas, as well as the settlement of land claims in these areas. These efforts have resulted in the establishment of a new national park and the addition of large areas to existing national parks.

The department has committed significant financial resources towards the expansion of formal protected areas, bringing the number of national parks to 22, and the total formal conservation estate to four million hectares. Since 2004, the department declared four new MPAs, thus increasing the total coastline under protection to 20%.

The NSBA confirms that the current protected area network does not conserve a true representative sample of South Africa's biodiversity. Because of historical reasons, formal protected

areas were often established with limited consideration to biodiversity and the maintenance of ecological processes. A large proportion of biological diversity and critical ecosystem processes are therefore found outside of terrestrial MPAs.

This has led to the development of the National Protected Areas Expansion Strategy. This strategy sets out a framework for the expansion of the protected areas network in South Africa so that a more representative sample of biological diversity may be conserved and managed.

Scientific reserves

Scientific reserves are sensitive and undisturbed areas managed for research, monitoring and the maintenance of genetic sources. Access is limited to researchers and staff. Examples of such areas are Marion Island and the Prince Edward islands near Antarctica.

Wilderness areas

These areas are extensive in size, uninhabited and underdeveloped, and access is strictly controlled with no vehicles allowed. The highest management priority is the maintenance of the intrinsic wilderness character.

Examples of wilderness areas are the Cederberg Wilderness Area and Dassen Island in the Western Cape, and the Baviaanskloof Wilderness Area in the Eastern Cape.

National parks and equivalent reserves

SANParks promotes the conservation of the country's natural and cultural heritage at local, national and international level, and plays an important role in promoting ecotourism.

South Africa's national parks are:

- Addo Elephant National Park
- Agulhas National Park
- Au-grabies Falls National Park
- Bontebok National Park
- Blyde River National Park
- Camdeboo National Park
- Golden Gate Highlands National Park
- Groenkloof National Park
- Kalahari Gemsbok National Park (part of the Kgalagadi Transfrontier Park)
- Karoo National Park
- Knysna National Lake Area
- Kruger National Park
- Marakele National Park
- Mapungubwe National Park
- Mokala National Park
- Mountain Zebra National Park

SA Act Now! Combat Climate Change was the theme chosen to celebrate National Environment Month in June 2009.

South Africa is raising the bar on climate change as a significant element of its development agenda, with the March 2009 Climate Change Summit having laid the foundation for a participatory process to shape the way South Africans respond to climate change. The theme was particularly significant as it came at a time when South Africa was drafting a policy framework for climate change.

The Long-Term Mitigation Scenario on Climate Change was approved by Cabinet in 2008.



- Namaqua National Park
- Ai-Ais/Richtersveld Transfrontier National Park
- TMNP (which incorporates the Cape of Good Hope, Table Mountain and Silvermine nature reserves)
- Tankwa Karoo National Park
- Tsitsikamma National Park
- Wilderness National Park
- West Coast National Park
- Wild Coast National Park.

Several flagship resource-use projects were initiated during 2008/09. A post-restitution programme to ensure sustainable resource use resulted in an agreement on cultural heritage resource-use protocols with the Khomani San community, including the contentious issue of traditional hunting and gathering of plants in the Kgalagadi Transfrontier National Park.

Other projects in national parks included the Suurvy Harvesting Project in Agulhas, the Rustafarian Rooiwortel Nursery Project in Knysna, the Kruger National Park Thatch Grass-Harvesting Project, the Outeniqua Eco Honeybee Farming Project in Wilderness, the Mopane Worm Harvesting Project in Mapungubwe and the Fern Harvesting Project in Tsitsikamma.

Transfrontier conservation areas (TFCAs)

A TFCA is a cross-border region. The conservation status of the areas within a TFCA ranges from national parks, private game reserves and communal natural-resource management areas to hunting-concession areas.

Although fences, highways, railway lines or other barriers separate the constituent areas, they are managed jointly for long-term sustainable use of natural resources. Unlike in transfrontier parks, free movement of animals between the components of a TFCA is not always possible.

TFCAs aim to facilitate and promote regional peace, cooperation and socio-economic development. The success of TFCAs depends on community involvement. In turn, TFCAs are likely to provide local communities with opportunities to generate revenue.

TFCAs are expected to allow tourists easy movement across international boundaries into adjoining conservation areas.

The seven TFCAs are as follows:

- Ai-Ais/Richtersveld TFCA
- Kgalagadi Transfrontier Park
- Kavango-Zambezi
- Greater Mapungubwe (former Limpopo-Shashe) TFCA

- Great Limpopo Transfrontier Park
- Lubombo Transfrontier Conservation and Resource Area
- Maloti-Drakensberg Transfrontier Conservation and Development Area.

Boundless Southern Africa (BSA), the consolidated TFCA brand, was officially launched by nine southern African countries at the Tourism Indaba in Durban in May 2008.

Angola, Botswana, Lesotho, Mozambique, Namibia, South Africa, Swaziland, Zambia and Zimbabwe unanimously showed their support for the brand as a means of showcasing the TFCAs in the Southern African Development Community region.

The BSA expedition departed from the Indaba in May 2009. The four-month long expedition raised awareness about TFCAs as tourist and investment destinations.

The 10 000-km expedition covered the nine countries, seven TFCAs and 30 national parks and nature reserves. It ended at the mouth of the Orange River in the Ai-Ais/Richtersveld TFCA in August 2009.

Biosphere reserves

The National Environmental Management: Protected Areas Amendment Act, 2004 protects South Africa's biosphere reserves, which are generally formed around existing core conservation areas.

The Prince Edward islands are a recognised biodiversity hotspot and breeding ground for a spectacular array of marine birds and mammals, such as leopard seals, skuas and cormorants. Creatures such as the 14-m long colossal squid, which has never been caught alive, have also been sighted in their waters.

The islands are home to four penguin species, which establish their rookeries on the rugged beaches. There are substantial populations of king and macaroni penguins (450 000 and 750 000 respectively), 5% of all the southern rockhopper penguins on Earth and 0,5% of gentoo penguins.

The southern rockhopper species is endangered, while macaroni penguins are vulnerable and gentoos are near threatened. The king penguin is not under threat.

Other birds found on the islands include five species of albatross, namely the wandering, grey headed, Indian yellow-nosed, dark-mantled and light-mantled sooty varieties. All are in varying degrees of danger. In addition, 14 species of petrels make their home there.

Three species of seal breed on the Prince Edward islands. These are the southern elephant seal and the sub-Antarctic and Antarctic fur seal.



Biosphere reserves exist in partnership with a range of interested land-owners, and can incorporate development, as long as it is sustainable, while still protecting terrestrial or coastal ecosystems.

South Africa added a sixth biosphere reserve to its register when the Vhembe region of Limpopo became one of 22 newly proclaimed reserves by the United Nations Educational, Scientific and Cultural Organisation (Unesco). The 22 new biospheres, located in 17 countries, were added to Unesco's World Network of Biosphere Reserves during the 21st session of the International Coordinating Council of the Man and the Biosphere Programme. In 2009, there were 553 sites in 107 countries.

Unesco's Man and the Biosphere Programme addresses the impact of man on the environment by studying the social, ecological and economic implications of biodiversity loss. It then takes steps to minimise this loss through the sharing of knowledge, research and monitoring, education and training and multilateral decision-making.

Biosphere reserves are nominated by their governments for inclusion in the Man and the Biosphere Programme.

Whether they are terrestrial, freshwater, coastal or marine in nature, all are experimental areas where different approaches to integrated environmental management are tested. This is important as it helps to deepen the knowledge of what works in conservation and sustainable development.

The new addition is situated in the north-east of Limpopo. It is famous not only for its bird and animal life, but also for its rich cultural history, dating far back to the awe-inspiring rock paintings of the San people. Vhembe encompasses

the ancient African kingdoms of Thulamela and Mapungubwe. The latter is one of South Africa's eight world heritage sites and was inscribed on the Unesco list in 2003.

Vhembe includes the northern part of the Kruger National Park; the Makuleke Wetland, which are protected under the Ramsar Convention; the Soutpansberg and Blouberg biodiversity hot spots; and the Makgabeng Plateau, which boasts hundreds of rock-art sites.

The other biosphere reserves are:

- The 100 000-ha Kogelberg Reserve on the country's southern coast sits in the middle of the Cape Floral Region and is home to 1 880 different plant species, 77 of which are found only in this region.
- The Cape West Coast Biosphere Reserve starts in Cape Town in the southern suburb of Diep River and stretches up the west coast as far as the Berg River, encompassing parts of the Cape Floral Region. The reserve includes the Ramsar-protected Langebaan Lagoon as well as Dassen Island, a penguin colony. The Koeberg Nuclear Power Station falls within its boundaries.
- The Cape Winelands Biosphere Reserve includes a part of the Cape Floral Region as well as the wine-growing region. The historic settler-founded towns of Stellenbosch, Paarl and Franschhoek lie here.
- In the northern reaches of South Africa lies the Waterberg Biosphere Reserve, an area of some 400 000 ha in Limpopo. It is an important catchment area for the Limpopo Basin, with four large rivers originating within its borders – the Lephalele, Mokolo, Matlabas and Magalakwena rivers. San rock art abounds, as does the flora and fauna of the area.
- The Kruger-to-Canyons Biosphere Reserve is so named because it stretches from the Kruger National Park to the Blyde River Canyon. It is an important conservation area in South Africa as it also covers three biomes.

The new Garden Route National Park (GRNP) was gazetted in March 2009. The park will comprise some 121 000 ha, including the existing national parks of Wilderness and Tsitsikamma (68 000 ha) as well as about 52 500 ha of newly proclaimed land. The individual parks will retain their identity and become camps in the GRNP. The establishment of the GRNP is part of a long-term strategy to expand the protected areas in South Africa under formal protection from 6% to 8% of the total area of the country. The Garden Route is one of the most important conservation areas in South Africa. South African National Parks is the second-largest employer in the region and its total economic contribution to the region is estimated to be almost R95 million per year.



National and cultural monuments

These are natural or cultural features, or both, and may include botanical gardens, zoological gardens, natural heritage sites and sites of conservation significance.

World heritage sites

By August 2009, there were 890 world heritage sites. A total of 176 were natural sites, 689 were cultural sites and 25 were mixed sites.

The South Africa World Heritage Convention Committee is responsible for identifying possible world heritage sites in South Africa and coordinating the convention. The World Heritage Convention Act, 1999 allows for cultural and natural sites in South Africa to be granted world heritage status. The convention obliges the South African Government to guarantee its implementation, ensure legal protection and develop management plans and institutional structures for periodic monitoring.

The Act makes the principles of the convention applicable to South Africa's world heritage sites, and further provides for the adequate protection and conservation of these sites to promote tourism in a culturally and environmentally responsible way.

South Africa has eight world heritage sites proclaimed by Unesco, namely Robben Island; the iSimangaliso Wetlands Park; the hominid sites at Swartkrans, Sterkfontein and Kromdraai (known as the Cradle of Humankind); the Ukhahlamba-Drakensberg Park (a mixed natural and cultural site); the Mapungubwe Heritage Site; the Cape Floral Kingdom; the Vredefort Dome; and the Richtersveld Cultural and Botanical Landscape.

The Vredefort Dome is an ancient extra-terrestrial impact site spanning the Free State and North West provinces. Formed two billion years ago, it is the world's most ancient meteorite impact site and the third-largest, measuring 140 km across.

The world heritage status of Sterkfontein's fossil hominid sites was extended in July 2005 to include the Taung skull fossil site in North West and the Mokopane Valley in Limpopo.

The Cradle of Humankind has one of the world's richest concentrations of hominid fossils, evidence of human evolution over the past 3,5 million years.

Found in Gauteng and North West, the fossil sites cover an area of 47 000 ha. The remains of ancient forms of animals, plants and hominids are captured in a bed of dolomite deposited around 2,5 billion years ago.

Although other sites in south and east Africa have similar remains, the cradle has produced more than 950 hominid fossil specimens. The R347-million Cradle of Humankind development, initiated by the Gauteng Provincial Government, is the first public-private partnership of its kind in South Africa. The aim is to develop and manage the world heritage site as a premier tourist destination.

Other partners include the University of the Witwatersrand, which owns the Sterkfontein caves and is the major excavator of the cradle site.

The Richtersveld Cultural and Botanical Landscape was declared a world heritage site in June 2007. It covers 160 000 ha of dramatic mountainous desert in the north-west of South Africa. It is the only area where the Nama still construct portable rush-covered domed houses, or Iharu oms.

Habitat- and wildlife-management areas

These areas are subject to human intervention, based on research into the requirements of specific species for survival. They include conservancies; provincial, regional or private reserves created for the conservation of species habitats or biotic communities; marshes; lakes; and nesting and feeding areas.

Protected land and seascapes

These areas are products of the harmonious interaction of people and nature, and include natural environments protected in terms of the Environment Conservation Act, 1989 (Act 73 of 1989), scenic landscapes and historical urban landscapes.

Sustainable-use areas

These areas emphasise the sustainable use of protected areas such as the Kosi Bay Lake System in KwaZulu-Natal.

Nature areas in private ownership are proclaimed and managed to curtail undesirable development in areas with high aesthetic or conservation potential.

In October 2009, Africa's first – and largest – transfrontier marine conservation area was established, connecting Maputaland in South Africa's world heritage site, the iSimangaliso Wetland Park, with Mozambique's first marine conservancy, the Ponto de Ouro Marine Protected Area.

This creates a vast protected marine area covering 300 km of unbroken coastline and near-pristine beaches, from St Lucia in the south to Mozambique's Maputo Special Reserve.

It is made up of 220 km on the South African side and 80 km in Mozambique.

Activities such as commercial fishing, fishing on coral reefs and fishing with explosives are banned. Driving on the beaches is also prohibited. However, recreational fishing – under strict controls – is permitted.



Conservancies are formed to involve the ordinary landowner in conservation. Landowners can establish a conservancy where conservation principles are integrated with normal farming activities.

Wetlands

Through the *National Wetland Inventory*, South Africa has identified 120 000 wetlands, which cover 7% of the country's surface area.

Wetlands include a wide range of inland and coastal habitats – from mountain bogs and fens to midland marshes, swamp forests and estuaries, linked by green corridors of stream bank wetlands.

South Africa became a contracting party to the Ramsar Convention in 1975. The country's Ramsar sites include Nylsvley Nature Reserve, Blesbokspruit, Barberspan, Seekoeivlei, Ukhahlamba-Drakensberg Park, Ndumo Game Reserve, the Kosi Bay System, Lake Sibaya, the turtle beaches and coral reefs of Tongaland, the St Lucia System, Wilderness lakes, De Hoop Vlei, De Mond State Forest, Langebaan, Verlorenvlei, the Orange River Mouth Wetland and the Makuleke Wetland.

The IUCN identifies wetlands as the third most important support system on Earth.

The Directorate: Biodiversity Management of the Department of Environmental Affairs is responsible for the South African Wetlands Conservation Programme. The programme ensures that South Africa's obligations in terms of the Ramsar Convention are met.

The programme aims to protect wetlands in South Africa against degradation and destruction, while striving for the ideal in wise and sustainable use of resources, to ensure that the ecological and socio-economic functions of wetlands are sustained for the future.

South Africa is a member of Wetlands International, an international body dedicated to conserving the world's wetlands.

The Working for Wetlands Programme focuses on wetland restoration, while maximising employment creation; support for SMMEs; and transfer of skills to the beneficiaries of the programme's projects.

World Wetlands Day marks the date of the signing of the Convention of Wetlands on 2 February 1971 in the Iranian city of Ramsar.

Zoological gardens

Founded in 1899, the National Zoological Gardens (NZG) of South Africa in Pretoria is the only zoo in South Africa with national status. It also enjoys membership to the World Association of

Zoos and Aquariums, the African Association of Zoological Gardens, the International Union of Zooculturists and the International Association of Zoo Educators.

The NZG of South Africa is a proud national research facility of the NRF. The NRF is a government agency responsible for supporting and promoting research, and providing research facilities to encourage the creation of knowledge, innovation and development in all fields of science and technology. (See Chapter 19: *Science and technology*.) The 85-ha zoo in Pretoria houses 3 117 specimens of 209 mammal species, 1 358 specimens of 202 bird species, 3 871 specimens of 190 fish species, 388 specimens of four invertebrate species, 309 specimens of 93 reptile species, and 44 specimens of seven amphibian species. These figures comprise the animals housed at the zoo in Pretoria as well as at the two biodiversity conservation centres in Lichtenburg in the North West, and Mokopane in Limpopo, and the satellite zoo and animal park at the Emerald Animal World complex in Vanderbijlpark.

The NZG is the largest zoo in the country and more than 600 000 people visit it annually. The total length of its walkways is about 6 km.

An aquarium and reptile park also form part of the zoo facility in Pretoria. The aquarium is the largest inland marine aquarium in the country.

The Johannesburg Zoological Gardens, or Johannesburg Zoo, celebrated its centenary in 2004. The core business of Johannesburg Zoo, which is registered as a non-profit company, is the accommodation, enrichment, husbandry and medical care of wild animals.

It is also renowned for its successful breeding programmes involving several endangered South African bird species such as the wattled crane and ground hornbill. The zoo covers 54 ha and houses more than 2 000 animals from 365 species.

Breeding centres

There are a number of game-breeding centres in South Africa. The NZG of South Africa is responsible for the management of the Lichtenburg Biodiversity Conservation Centre, which covers an area of some 6 000 ha, and the Mokopane Biodiversity Conservation Centre, covering an area of 1 333 ha.

The two centres supplement the zoo's breeding programme for various endangered animals, and the zoo's own animal collection.

The Lichtenburg Biodiversity Conservation Centre houses, among other animals, Père David's deer, pygmy hippopotamus, white rhinoceros,

the endangered addax, and scimitar-horned and Arabian oryx. Large herds of impala, springbok, zebra, blesbok and red hartebeest also roam the area.

About 32 ha of the wetland area at the centre have been developed into a system of dams and pans, which serve as a natural haven for waterbirds such as spoonbills, kingfishers, ibises and herons.

The Mokopane Biodiversity Conservation Centre is home to an abundance of exotic and indigenous fauna such as lemur, the rare tsessebe, roan antelope and black rhino.

The De Wildt Cheetah-Breeding and Research Centre, situated near Pretoria, is best known for its highly successful captive-breeding programme that contributed to the cheetah being removed from the endangered list of the *South African Red Data Book – Terrestrial Mammals* in 1986.

De Wildt also breeds a number of rare and endangered African species. The most spectacular of these is the magnificent king cheetah, which is a true cheetah, but with a variation of coat patterns and colouring. De Wildt also plays a major role in breeding and releasing wild dogs. It has donated breeding nucleuses of the highly endangered riverine rabbit and suni antelope to the Kruger National Park.

The De Wildt Vulture Unit is a rehabilitation and holding facility for injured, poisoned and disabled vultures.

The Hoedspruit Endangered Species Centre in Mpumalanga was initially established as a breeding programme for the then endangered cheetah. Following the success of the cheetah-breeding programme, it has evolved into a breeding programme for other endangered African animal species. The centre caters for, among other animals, five species of vulture: Cape griffins, and white-backed, hooded, whiteheaded and lappet-faced vultures. The centre is also known for its wild-dog-breeding programme.

The Hoedspruit Research and Breeding Programme also includes the rare black-footed cat, the vulnerable African wild cat, ground hornbills (in cooperation with the NZG in Pretoria), bald ibis and the endangered blue crane. Elephant, white rhino, buffalo, caracal, Sable antelope, bushbuck and tsessebe have also been cared for and rehabilitated there.

Aquaria

There are well-known aquaria in Pretoria, Port Elizabeth, Cape Town and Durban.

The Aquarium and Reptile Park of the NZG is the largest inland aquarium in Africa, with the largest collection of freshwater fish. It is also the only aquarium in South Africa that exhibits a large variety of marine fish in artificial sea water.

The Port Elizabeth Oceanarium is one of the city's major attractions. Exhibits include an underwater observation area, a dolphin research centre, various smaller tanks of 40 different species of bony fish and two larger tanks that display sharks and stingrays. East London has a smaller aquarium.

At the Two Oceans Aquarium situated at the Victoria and Alfred Waterfront, Cape Town, more than 3 000 specimens represent some 300 species of fish, invertebrates, mammals, birds and plants supported by the waters along the Cape coast.

UShaka Marine World in Durban incorporates both fresh and sea water, and is the fifth-largest aquarium in the world by water volume. It comprises Sea World, Dolphin World, Beach World, and Wet and Wild World.

Sea World incorporates a unique shipwreck-themed aquarium, a penguin rookery and a 1 200-seater dolphin stadium (the largest dolphinarium in Africa).

It also offers edutainment tours and special interactive activities such as snorkelling and scuba diving. In addition, it features a rocky touch-pool, where visitors can touch a starfish or sea cucumber with the help of specially trained guides.

Snake parks

The Transvaal Snake Park in Midrand, between Pretoria and Johannesburg, houses up to 150 species of snakes and other reptiles and amphibians from southern Africa and elsewhere. The emphasis is on the development of breeding programmes for animals in captivity.

The Port Elizabeth Snake Park at Bayworld has a wide variety of South African and foreign reptiles, including tortoises, boa constrictors, pythons, crocodiles, lizards and deadly venomous snakes such as cobras, mambas and rattlers.

Rare and threatened species, including the Madagascar ground boa, are housed safely in realistically landscaped glass enclosures.

The Aquarium and Reptile Park situated at the NZG in Pretoria houses 80 reptile species from all over the world.

The Hartbeespoort Dam Snake and Animal Park near Pretoria features one of the finest reptile col-

World Environment Day (WED) was celebrated globally on 5 June 2009, under the theme *Your Planet Needs You – Unite to Combat Climate Change*. WED was established by the United Nations' (UN) General Assembly in 1972 to mark the opening of the Stockholm Conference on the Human Environment. It is one of the vehicles that the UN uses to stimulate worldwide awareness of the environment and enhance political attention and public action.



lections in southern Africa. It offers seal shows and snake-handling demonstrations.

Conservation challenges

South Africa faces many of the problems experienced by developing countries, in which rapid industrialisation, population growth and urbanisation pose a threat to the quality of the environment. The Department of Environmental Affairs is reforming environmental law to introduce reform in biodiversity conservation, pollution, waste management and environmental planning.

Environmental impact management

Section 24(2)(b) of the National Environmental Management Act (Nema), 1998 (Act 107 of 1998), provides for the identification of sensitive geographical areas based on environmental attributes within which specified activities would require an environmental authorisation in terms of the Environmental Impact Assessment Regulations, 2006, as amended.

In 2008/09, the following were achieved:

- the identification of sensitive attributes and areas
- the identification of additional activities
- a draft listing notice has been prepared.

The Strategic Important Developments Guideline and Energy Response Plan Guideline were developed.

The Nema Amendment Act, 2008 (Act 62 of 2008), was approved by Parliament in 2008. This amendment focused, among other things, on the introduction of enabling provisions for tools other than environmental impact assessment (EIA), cooperation between organs of state and the alignment of the Nema, 1998 and Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002), legislative processes.

The Nema Amendment Act, 2008 was assented to by former President Kgalema Motlanthe in January 2009 and came into effect in May 2009. Draft amendments to the 2006 EIA regulations

and the listed activities that require assessment were compiled, approved and published on three separate occasions for public comment (May 2007, June 2008 and February 2009).

In a concerted effort between the former Department of Environmental Affairs and Tourism and the off-road industry, the Strategy Towards Co-Regulation of the Off-Road Sector in South Africa was signed by the minister in March 2009. The strategy aims to minimise the impact of off-road driving on the environment by giving direction to off-road users and owners to develop and use inland routes in sensitive areas in a responsible manner. This requires drivers and riders to gain competence through appropriate training, off-road guides to be qualified and registered, and trails and tracks to meet specified criteria. The strategy will be applicable to the inland recreational use of off-road vehicles, including two-wheel, three-wheel and four-wheel vehicles, which include 2x4 and 4x4 motor vehicles, quad bikes and motorbikes.

Waste management

The Department of Environmental Affairs has prioritised four projects within the framework of the National Waste-Management Strategy. They are:

- recycling
- a waste-information system
- healthcare waste
- capacity-building.

Central to these are pilot projects that are being set up countrywide. The department welcomes partnerships with business to ensure that these projects are successful and become a core of better waste management in South Africa.

In dealing with the waste-management challenges, the department started the development of the National Environmental Management: Waste Bill in 2005 as subsidiary legislation, which seeks to give legal effect to the *White Paper on Integrated Pollution and Waste Management*. The Waste Bill was signed into law by former President Motlanthe in March 2009.

The National Environment Management: Waste Act, 2008 provides for the following:

- institutional arrangements for waste management that outline the roles and responsibilities of all spheres of government in respect of waste management
- strategic and planning frameworks, as well as norms and standards for waste management
- obligations relating to various aspects of waste management

- licensing of waste-management activities
- compliance monitoring and enforcement
- related administrative matters.

The Waste Act, 2008 will repeal the Environmental Conservation Act, 1989 and all regulations passed under that Act will be considered regulations passed under the Waste Act, 2008.

The department has a memorandum of understanding (MoU) with the Glass-Recyclers Association of South Africa. The objective of the MoU is to establish a glass-recycling company that is responsible for promoting reuse and recycling of glass in South Africa.

The National Policy on the Thermal Treatment of Hazardous and General Waste has been finalised and will be implemented in 2009/10.

An agreement containing regulations governing plastic shopping bags was signed in September 2002 by the then Minister of Environmental Affairs and Tourism and representatives from various labour and business organisations.

The agreement, which came into effect on 9 May 2003, stipulates that the thickness of plastic bags be 30 microns. However, manufacturers were allowed to continue using their existing machinery to make bags of 24-micron thickness for the following five years before having to comply with the 30-micron standard.

The agreement states that printing will only be allowed on 25% of the surface area of plastic bags if the ink is not environmentally friendly. In situations where the ink is acceptable, this area can be increased to 50%. The department has a toll-free line to deal with queries about plastic bags.

The plastic-bags agreement and supporting regulations have dramatically decreased the environmental impact of this highly visible waste stream, with a 50% reduction in the consumption of plastic bags since the introduction of the regulations.

As part of the implementation of the plastic-bag regulations, Buyisa-e-Bag, a non-profit company, was set up to promote waste minimisation and awareness initiatives in the plastics industry. The company is expected to expand collector networks and to create jobs, as well as to kick-start rural collection SMMEs and create additional capacity in NGOs.

Work is in progress to follow this success with targeted and customised agreements in respect of other problem waste streams, including tyres and glass. The compliance and enforcement of the regulations have been assigned to the South African Bureau of Standards.

The Radioactive Waste Management Policy, which assures citizens that there is a nuclear waste-management plan and strategy, is being implemented, starting with the creation of the National Committee on Radioactive Waste Management.

The National Radioactive Waste Management Agency Bill was approved by Cabinet in April 2008.

During the processing of the Bill, the department and the Parliamentary Portfolio Committee agreed that the title of the agency be changed to the National Radioactive Waste Disposal Institute (NRWDI).

The objects of the Bill are to:

- provide for the establishment of the NRWDI
- manage radioactive waste disposal nationally
- manage its functions effectively
- regulate staff matters
- manage all relevant functions.

The establishment of the institute will allow the operators/generators to focus on their core business. However, the generators will remain financially responsible for the disposal of waste.

This institute will be solely responsible for handling radioactive waste disposal, predisposal management and storage at the disposal site.

To measure success on the implementation of policies and strategies, the department has developed a waste-information system that will

The Waste-Tyre Regulations of 2009 came into effect on 30 June 2009. The purpose of the legislation is to regulate the management of waste tyres by providing for regulatory mechanisms. The regulations will affect waste-tyre producers, dealers, stockpile owners, landfill site owners and tyre recyclers.

In terms of the regulations, no person may:

- Recycle, recover or dispose of a waste tyre, at any facility or on any site, unless the recycling, recovery or disposal of that waste tyre is authorised by law.
- Recover or dispose of a waste tyre in a manner that is likely to cause pollution of the environment or harm to human health and well-being.
- Dispose of waste tyres at a disposal facility two years from the date of commencement of the regulations unless such a waste tyre has been cut into quarters. No quartered waste tyres may be disposed five years from the date of promulgation of these regulations unless such waste tyres have been shredded, excluding in both instances bicycle tyres and tyres with an outside diameter above 1 400 mm and tyres used as engineering material.



be implemented nationally. The Waste Act, 2008 makes it mandatory to report waste information to the waste-information system. This assists the department in tracking progress with implementation of the waste legislation.

South Africa actively participates in the Stockholm, Rotterdam and Basel conventions.

During 2008, South Africa participated in various international preparatory processes and negotiations on chemicals and waste management. Key achievements included a decision:

- to enhance cooperation and coordination between the Basel, Rotterdam and Stockholm conventions
- at the Basel Conference of Parties (CoP) 9 to provide additional institutional support to regional centres for the implementation of the Basel Convention
- at the UN Environmental Programme (UNEP) Governing Council to initiate an intergovernmental negotiating process on the development of a legal instrument for the international control of mercury
- of the Montreal Protocol on the replenishment of the Multilateral Fund by US\$490 million.

Air-quality management and climate change

Air quality remains an important and challenging environmental issue in South Africa, especially as it influences the health and welfare of the population. Many pollutant concentrations exceed recognised thresholds and have reached unacceptable levels in a number of suburban areas.

Smoke from coal fires in residential settlements is the primary source of pollution in suburban areas, particularly in dense, low-income communities. This problem escalates in the winter months.

For this reason, the then Department of Environmental Affairs and Tourism launched the Winter Cleaner Fires Campaign in July 2008 in collaboration with the former Department of Minerals and Energy and the Central Energy Fund. The first campaign was conducted in the Vaal Triangle Air-Shed Priority Area, which has been identified as the country's first priority area under the Air Quality Act, 2004 (Act 39 of 2004).

The campaign is aimed at promoting the top-down Basa Njengo Magogo fire-making methodology in national priority areas. This methodology has a proven track record of reducing smoke from coal-burning fires by up to 80%, and is being promoted by various municipalities and industry as a means of reducing pollution in households

that burn fossil fuels for space heating and cooking. The campaign was repeated in the winter of 2009.

The 2007 National Framework for Air-Quality Management in South Africa was updated and amended and informs the Air Quality Act, 2004 (Act 39 of 2004), which was brought into full effect in September 2009. This final amendment of the national framework includes new work on climate-change monitoring and modelling.

The Air-Quality Management Plan for the Vaal Triangle Air-Shed Priority Area was finalised and published for public comment. The department also drafted second-generation ambient air-quality standards for criteria pollutants, which were published for public comment in March 2009. The model air-quality management by-laws were completed.

The South African Air-Quality Information System (SAAQIS) is an essential resource for improving the country's air quality. The Chief Directorate: Air-Quality Management and Climate Change aims to set up 18 ambient air-quality monitoring stations that will provide information to the SAAQIS. In March 2009, the SAAQIS ambient air-quality information modules were fully embedded in the South African Weather Service, and 10 stations were fully operational. The Vaal Triangle and Highveld air-shed ambient air-quality monitoring networks were installed, and are fully operational.

Key municipalities were assisted in the compilation of their first-generation air-quality management plans and by-laws. To provide further assistance, the *Air-Quality Management Planning Manual* was launched at the 2008 Annual Air-Quality Governance Lekgotla, an event at which all government air-quality officers convened to discuss the effective implementation of the Air Quality Act, 2004.

Climate change is one of the most serious and urgent sustainable-development issues to face not only South Africa, but also the global community. Because South Africa ratified the United Nations Framework Convention on Climate Change (UNFCCC) and its associated Kyoto Protocol, much of the department's work is driven by responding to the obligations of this convention.

In addition to this, the department undertook the Climate-Change Long-term Mitigation Scenario (LTMS) process. This is a research and scenario-planning process to ensure that the country has a sound evidence base on which to develop its climate-change response policy and international negotiation positions. The LTMS

process was concluded and the LTMS and a set of national policy direction themes were approved by Cabinet in July 2008.

During March 2009, the department hosted the National Climate-Change Summit in partnership with the Department of Science and Technology. The department is working with business and industry sectors to update the greenhouse-gas (GHG) inventory. The first draft of the third national GHG inventory (base year 2000) was presented at the Climate-Change Summit.

The summit initiated a participatory national climate-change policy development process. Its purpose is to develop a common understanding of the most recent climate-change research and other South African climate-change response initiatives and interventions among all key climate-change response stakeholders, and to provide a platform to develop a framework for a national climate-change response policy.

The Department of Environmental Affairs hosted a national information and consultation session on the international climate-change talks in August 2009. The national session was aimed at providing stakeholders with an opportunity to discuss South Africa's priorities and build a common understanding and approach towards the 15th session of the CoP of the UNFCCC, which took place from 7 to 18 December 2009, in Copenhagen, Denmark.

Urban environmental management

South Africa is an urbanised economy with 58% of the population living in cities and towns. By 2015, it is expected that 68% of the population will live in urban areas due to continued migration from rural areas mainly to the larger cities, which will lead to many environmental challenges in South Africa's cities.

In February 2009, the then Department of Environmental Affairs and Tourism's Environmental Management Inspectorate (EMI) hosted the third Environmental Compliance and Enforcement Lekgotla under the theme *Sharpening the Sting*. The focus of the lekgotla was on developing strategies to overcome challenges and to significantly increase the impact of the work of the inspectorate. Commonly known as Green Scorpions, the EMI was launched in 2006 and is a network of designated environmental-management inspectors from various partner institutions involved in environmental compliance, monitoring and enforcement. Compliance and enforcement issues include biodiversity, waste pollution, environmental impact assessments and marine and coastal management.



The launch of the five-year Danish-funded Urban Environmental Management Programme (UEMP) in June 2006 marked a milestone in environmental cooperation between Denmark and South Africa.

The UEMP Conference took place in May 2009, where it was reported that the UEMP was in the process of implementing more than 275 projects in waste management, air quality, environmental planning and environmental health in South Africa, of which 80 projects had been completed. In 2008/09, special attention was given to climate change and energy efficiency.

The UEMP allocated R60 million in 2008 to the four metros within the programme (Johannesburg, Cape Town, Ekurhuleni and eThekweni) to supplement their existing projects in combating climate change and reducing GHG emissions. These projects included roll-out and implementation of projects such as the establishment of energy offices, retrofitting of council buildings, streetlight retrofitting, climate proofing of urban communities and the roll-out of solar water-heaters.

The main purpose of the hosting of the UEMP Conference was to enhance dialogue and collaborative effort through reflection, sharing of experiences and facilitating linkages and cooperation between the different project implementers of the UEMP as well as a wider spectrum of partners nationally and regionally.

The Royal Danish Embassy and the South African Cities Network also launched the UEMP case study file. The resource file is the first set of 39 case studies cutting across all the UEMP themes. The resource file supports the knowledge-management objectives of the UEMP and is aimed at sharing information and lessons among the programme partners.

Erosion and desertification

Most South African soil is unstable. The country loses an estimated 500 million ton of topsoil annually through erosion caused by water and wind.

About 81% of the total land area of South Africa is farmed. However, only 70% of this area is suitable for grazing. Overgrazing and erosion diminish the carrying capacity of the veld and lead to land degradation. This process has already claimed more than 250 000 ha of land in South Africa.

The Department of Agriculture, Forestry and Fisheries administers the Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983), in terms of which various measures are being implemented to prevent or contain soil erosion.

In January 1995, South Africa signed the UNCCD, which was ratified on 30 September 1997. The main objectives of the convention include cooperation between governments, organisations and communities to accomplish sustainable development, especially where water resources are scarce.

The convention aims to support member countries in Africa to prevent desertification and its consequences. These countries support one another at technical and scientific level, as they share similar climatic conditions.

South Africa also acts as coordinator for the Valdivia Group for Desertification.

The group consists of countries in the southern hemisphere, namely Australia, New Zealand, Argentina, Chile, Uruguay, South Africa and Brazil, whose aim it is to, among other things, foster scientific and technological cooperation.

The country has introduced legislation such as the National Environmental Management: Biodiversity Act, 2004 to promote the conservation of biodiversity, and fight desertification and land degradation.

Recycling

Collect-a-Can was established in 1993. It is a joint venture between ArcelorMittal South Africa, which is Africa's major steel producer and producer of tinplate for food and beverage cans and Africa's largest packaging company and beverage can producer, Nampak.

In March 2009, South Africa was among the 16 nations invited to a series of high-level meetings on climate change convened by the President of the United States of America (USA), Mr Barack Obama. South Africa was the only nation from Africa invited to the meetings, and as such was representing the interests of the continent as a whole.

According to a statement from the White House, the forums facilitated a candid dialogue between key developed and developing countries and helped generate the political leadership necessary to achieve a successful outcome at the United Nations climate-change negotiations in December 2009 in Copenhagen.

The meetings also advanced the exploration of concrete initiatives and joint ventures that increase the supply of clean energy while cutting greenhouse-gas emissions.

Representatives from Australia, Brazil, Canada, China, the European Union, France, Germany, Denmark, India, Indonesia, Italy, Japan, Korea, Mexico, Russia, the United Kingdom and the USA joined South African leaders attending the forum.

By June 2009, Collect-a-Can had recovered and recycled more than 750 000 ton of used beverage cans.

Collect-a-Can annually embarks on various projects which run throughout the year. The biggest project is the schools' competition, a project which aims to encourage, educate and inform children on the importance of a clean environment and how such an environment can be achieved through recycling waste such as used beverage cans. The company works within the community to support recycling initiatives and has a strong commitment to socio-economic empowerment.

International cooperation United Nations Framework Convention on Climate Change

South Africa ratified the UNFCCC in 1997. The convention is a global commitment to take collective responsibility for climate change, and is a mandate for action to address the problem.

The convention was signed at the Rio Earth Summit in 1992 by heads of state and other senior representatives from 154 countries (and the European Community), and came into effect on 21 March 1994.

Since mid-1998, some 175 states have ratified or acceded to the convention.

The objective of the convention is to stabilise GHG concentrations in the atmosphere at a level that will not have an adverse effect on the climate.

The convention aims to control this level over a period of time to:

- allow ecosystems to adapt naturally to climate change
- ensure that food production is not threatened
- enable economic development to proceed in a sustainable manner.

All countries that have ratified the convention are required to:

- develop, update and publish national inventories of anthropogenic emissions by sources, and removals by sinks of GHG (the GHG excludes those listed in the Montreal Protocol)
- formulate, implement and update national and regional programmes containing measures to mitigate climate change
- promote and cooperate in the development and transfer of technology that controls, reduces or prevents anthropogenic emissions of GHG
- promote sustainable management, conservation and enhancement of sinks and reservoirs of GHG
- cooperate in preparing for the adaptation to the impact of climate change

- take climate-change considerations into account where feasible, in relevant social, economic and environmental policies and actions, to minimise the adverse effects of climate change on the economy, on public health and on the quality of the environment
- promote and cooperate in the timeous and transparent exchange of information, including scientific, technological, socio-economic and legal information and research
- promote and cooperate in education, training and public awareness
- report to the COP.

Commission on Sustainable Development (CSD)

The CSD was created in 1992 to monitor and report on implementation of the Earth Summit agreements at local, national, regional and international levels. Its mandate was reaffirmed by the WSSD held in Johannesburg in 2002.

At its 11th session, the CSD drafted a multi-year programme of work organised on the basis of two-year cycles, with each cycle focusing on selected thematic clusters of issues. Year one of the cycle is a reviewing year that evaluates progress made in implementing sustainable development goals and identifying obstacles and constraints to implementation. During year two, policy actions are negotiated, aimed at addressing the challenges and constraints.

South Africa has actively participated in the CSD process. The drafting of the South African country report to CSD-16 highlighted the status of implementation with regard to the themes of agriculture, rural development, land, drought, desertification and Africa, as well as the challenges faced in achieving the targets set out in the JPol. South Africa participates in the negotiating session of the CSD to ensure that policy decisions are adopted that will expedite implementation of the thematic targets set in the JPol.

Convention on International Trade in Endangered Species

Unregulated trade in wildlife has become a major factor in the decline of many species of animals and plants. In 1975, Cites was established to prevent international trade from threatening species with extinction.

South Africa, together with the other 149 member countries, acts by regulating and monitoring international trade in species which are, or may be, affected by this trade.

Montreal Protocol

The Montreal Protocol on Substances that Deplete the Ozone Layer (a protocol to the Vienna Convention for the Protection of the Ozone Layer) is an international treaty designed to protect the ozone layer by phasing out the production of a number of substances believed to be responsible for ozone depletion. It is believed that if the international agreement is adhered to, the ozone layer is expected to recover by 2050.

South Africa became a signatory to the Montreal Protocol in 1990 and has a national obligation to safeguard the ozone layer from depletion. South Africa has phased out chlorofluorocarbons, halons, methyl chloroform and carbon tetrachloride – making it the only developing country in the world that has achieved so much in line with the phase-out schedule for developed countries. Although South Africa is classified as a developing country, its consumption of these substances is equal to that of some developed countries.

To demonstrate the country's commitment towards the phasing out of ozone-depleting substances (ODS), the following control measures constitute the overall position of South Africa on the Montreal Protocol:

- working groups were constituted to assist government in implementing the protocol
- regulated ODS can only be imported or exported after applying for an import/export permit through the Department of Trade and Industry under the Import and Export Control Act, 1963 (Act 45 of 1963)
- ODS can only be imported after an environmental levy has been paid
- information is disseminated to interested and affected parties
- Africa network meetings, as arranged by the UNEP, are attended, where views, experiences and problems are shared to improve co-operation within the region and as per

Towards the end of April 2009, the Southern African Foundation for the Conservation of Coastal Birds (Sanccob) saved 129 oiled African penguins off the coast of Luderitz in Namibia, before they were transferred 1 300 km to Sanccob's centre in Cape Town for treatment. African penguins are listed as "vulnerable" to extinction on the *Red Data* list. There are only around 27 000 breeding pairs of these charismatic birds left, down from about four million in the last century. The oiled penguins were the result of an oil spill from an unknown source around the Mercury, Ichaboe, Halifax and Possession islands just off the coast of Luderitz.



New Partnership for Africa's Development requirements.

Obligations include:

- ensuring that South Africa, as a party to the protocol, protects human health and the environment against harm from human activities that modify or are likely to modify the ozone layer
- ensuring the protection of the ozone layer by taking precautionary measures to equitably control total global emissions of substances that deplete the ozone layer, with the ultimate objective of totally eliminating them
- reporting and sending to the Ozone Secretariat data on production, imports, exports and consumption of regulated ODS as collected from dealers and relevant departments.

The former Department of Environmental Affairs and Tourism embarked on a national project to establish methyl bromide consumption trends, and a database of suitable, feasible and economically viable alternatives to methyl bromide.

This document will form the basis for an intensive research/evaluation project to phase out, in the short term, 20% of methyl bromide usage, mainly in the agricultural sector. As of 1 January 2005, all developing countries were to have reduced their respective methyl bromide consumption by 20%, as per the phase-out timetable.

Private-sector involvement

Numerous private bodies are involved in conservation activities. There are more than 400 organisations in the country concentrating on conservation, wildlife and the general environment, as well as more than 30 botanical and horticultural organisations.

Among these are:

- BirdLife South Africa
- Botanical Society of South Africa
- Centre for Rehabilitation of Wildlife
- Conservation International
- Delta Environmental Centre
- Dolphin Action Protection Group
- EcoLink
- Endangered Wildlife Trust
- Ezemvelo KZN Wildlife
- Green Trust
- Keep South Africa Beautiful
- KwaZulu-Natal Sharks Board
- National Conservancy Association of South Africa
- Peace Parks Foundation
- Southern African Foundation for the Conservation of Coastal Birds
- Trees and Food for Africa
- Wildlife and Conservation Society of South Africa
- WWF-SA.

Acknowledgements

Business Report

Department of Environmental Affairs

Estimates of National Expenditure, 2009,

published by National Treasury

DEAT Annual Review 2008/09

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National Zoological Gardens of South Africa

South African National Biodiversity Institute

www.cites.org

www.collectacan.co.za

www.csir.co.za

www.dwaf.gov.za

www.deat.gov.za

www.ekapa.ioisa.org.za

www.environment.gov.za

www.gov.za

www.nzg.ac.za

www.plantzafrica.com

www.southafrica.info

www.sagoodnews.co.za

www.ucmp.berkeley.edu

<http://eprints.ru.ac.za>

<http://en.wikipedia.org>

Suggested reading

Bakkes, C. 2008. *In Bushveld and Desert: A Game Ranger's Life*. Cape Town: Human & Rousseau.

Beinart, W. 2008. *The Rise of Conservation in South Africa: Settlers, Livestock and the Environment 1770 – 1950*. Oxford: Oxford University Press.

Branch, B *et al.* 2007. *Southern Africa: South Africa, Namibia, Botswana, Zimbabwe, Swaziland, Lesotho, and Southern Mozambique*. Northampton, Mass: Interlink Books.

Bryden, B. 2008. *Game Ranger Remembers*. Johannesburg: Jonathan Ball.

Burton, S *et al.* 2007. *Intergrated [sic] Research for Use in Constructed Wetlands for Treatment of Winery Wastewater*. (CD-ROM). Gezina: Water Research Commission (WRC).

Cock, J. 2007. *The War Against Ourselves: Environmental Justice in South Africa*. Johannesburg: Wits University Press.

Colvin, C *et al.* 2007. *Aquifer Dependent Ecosystems in Key Hydrogeological Typesettings in South Africa*. Gezina: WRC.

De Villiers, B. 2008. *People and Parks: Sharing the Benefits*. Johannesburg: Konrad Adenauer Stiftung.

Dickens, C *et al.* 2008. *The Impacts of High Winter Flow Releases From an Impoundment on In-Stream Ecological Processes*. Gezina: WRC.

Fig, D. 2007. *Staking Their Claims: Corporate Social and Environmental Responsibility in South Africa*. Pietermaritzburg: University of KwaZulu-Natal Press.

Joubert, L. 2007. *Scorched: South Africa's Changing Environment*. Johannesburg: Wits University Press.

Joubert, S. 2007. *Kruger National Park: A History*. Johannesburg: High Branching Publications.

McCracken, DP. 2008. *Saving the Zululand Wilderness: An Early Struggle for Nature Conservation*. Auckland Park: Jacana.

Owuor, K *et al.* 2007. *Environmental Factors Affecting the Persistence of Toxic Phytoplankton in the Hartbeespoort Dam: Report to the Water Research Commission*. Gezina: WRC.

Reinecke, MK and King, JM. 2007. *The Nature and Invasion of Riparian Vegetation Zones in the South Western Cape: Report to the Water Research Commission*. Gezina: WRC.

Selley, R. 2009. *West of the Moon: Early Zululand and a Game Ranger at War in Rhodesia*. Johannesburg: 30° South.

South Africa. 2009. *National Environmental Management Act and Regulations 107 of 1998; Environment Conservation Act and Regulations 73 of 1989*. Edited by Juta's Statutes editors. Cape Town: Juta.

Thomas, V, Moll, E and Grant, R. 2008. *Tree Spotting: Cape: From Coast to Kalahari*. Johannesburg: Jacana.