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Environmental management

South Africa is known for its impressive coastline, breathtaking scenery, and diverse and interesting wildlife and plant species. It also boasts a geological wonderland (See chapter 16: *Minerals, energy and geology.*)

The Department of Environmental Affairs and Tourism is the central policy-formulating and co-ordinating body responsible for taking care of South Africa's precious environment.

The Department's mission is to lead the sustainable development of South Africa's environment, by:

- promoting the sustainable development and conservation of the country's natural resources
- protecting and improving the quality and safety of the environment
- promoting a global sustainable-development agenda.

At regional level, the provincial conservation agencies are major role-players, and independent statutory organisations such as South African National Parks (SANParks) and the South African National Biodiversity Institute (SANBI) (until recently the National Botanical Institute [NBI]) are valuable partners in the country's total conservation effort.

In accordance with the National Environment Management Act, 1998 (Act 107 of 1998), the Committee for Environmental Co-ordination was established to harmonise the work of government departments on environmental issues, and to co-ordinate environmental implementation and national

management plans at provincial level. The Act sets principles for effective management of the environment, which all organs of the State have to comply with in their decision-making. The Act also makes provision for the National Environmental Advisory Forum, where stakeholders and experts advise the Minister of Environmental Affairs and Tourism on environmental-management issues.

The National Environmental Management Act, 1998 requires national and provincial departments to compile Environmental Implementation Plans (EIPs) and Environmental Management Plans, providing a legal framework for environmental development.

One of the most far-reaching interventions around co-operative governance since 1994 has been the introduction of Environmental Impact Assessments (EIAs). Some EIAs are considered at national level, but the vast majority of development applications are processed by the provinces.

The Department processes 100 applications in terms of the EIA regulations annually. During 2003/04, it authorised applications with an equitable value of about R20 billion. As part of its law-reform process, the Department of Environmental Affairs and Tourism has identified the need to revise the current approach to the regulation of EIAs.

The new draft EIA regulations aim to, among other things:

- facilitate a streamlined administrative process
- clearly specify listed activities to remove existing

uncertainties
- provide for stricter application in sensitive areas
- provide a mechanism to exclude certain activities in areas which are not sensitive
- provide a mechanism for municipalities to control environmental impact in certain instances through the planning process
- provide for more appropriate public participation and the assessment of issues raised by communities.

After taking into account public comment, the final draft regulations were expected to be promulgated in 2005.

The Department has developed a series of information documents on integrated environmental management, which are available in printed and electronic format.

State of the environment

The greatest challenge for South Africa and the rest of the world is to improve the quality of human life for both present and future generations, without depleting its natural resources. This can only be achieved through a healthy natural environment which supplies raw material; absorbs and treats waste products; and maintains water, soil and air quality.

Food security, water provision and climatic stability depend on having properly functioning ecosystems, stable levels of biodiversity, sustainable rates of resource extraction, and a minimal production of waste and pollution.

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 Desertification Day: 17 June
National Arbor 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

To this end, the United Nations (UN) General Assembly Conference on Environment and Development adopted Agenda 21 in 1992 as the global strategy for sustainable development.

South Africa has taken several steps to implement Agenda 21 at national and local level, including reforming environmental policies, ratifying international agreements, and participating in many global and regional sustainable-development initiatives.

World Summit on Sustainable Development (WSSD)

Johannesburg hosted the WSSD, which took place from 26 August to 4 September 2002.

Representatives of nearly 200 countries with widely divergent positions attended. 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 incorporate decisions taken by world bodies since the Rio Earth Summit in 1992.

Among the victories 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 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, a better environment for the world's poor, and targets for the reduction of poverty and protection of the environment.

Targets set at the Summit will have an enormous impact:
- 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.

The former Minister of Environmental Affairs and Tourism, Mr Mohammed Valli Moosa, chaired the 11th Session of the UN Commission on Sustainable Development (CSD) in New York in April 2003.

A Multi-Year Programme of Work to be achieved by 2016/17 was drawn up according to different thematic clusters:

- 2004/05: Water, Sanitation and Human Settlements
- 2006/07: Energy for Sustainable and Industrial Development, and Air Pollution/Atmosphere Climate Change
- 2008/09: Agriculture, Rural Development, Land, Drought, Desertification and Africa
- 2010/11: Transport, Chemicals, Waste Management, Mining and a 10-year framework of programmes on Sustainable Consumption and Production Patterns
- 2012/13: Forests, Biodiversity, Biotechnology, Tourism and Mountains
- 2014/15: Oceans and Seas, Marine Resources, Small Island Developing States, Disaster Management and Vulnerability
- 2016/17: Overall Appraisal of the Implementation of Agenda 21, the Programme for the Further Implementation of Agenda 21, and the Johannesburg Plan of Implementation.

Johannesburg +2 Sustainable Development Conference

The follow-up to the WSSD, the Johannesburg +2 Sustainable Development Conference, was held in Sandton, Johannesburg, in September 2004. The Conference was held as part of the second anniversary of the WSSD.

Discussions were largely informed by the work of the CSD.

The Conference aimed to:

- enhance South African dialogue on sustainable development implementation
- enhance public awareness of WSSD implementation
- strengthen relationships with civil society and business
- build a common commitment to sustainable development.

The themes for the Conference were:

- Water and Sanitation
- Human Settlements
- Energy/Climate Change, and Air Pollution/ Industrial Development
- Agriculture and Food Security
- Means of Implementation (governance, finance, trade, corporate responsibility, etc.)
- Technology.

The key presentations focused on government's Vision 2014 for South Africa, sustainable development and poverty eradication in South and southern Africa, the Millennium Development Goals, sustainable development in Africa, the international climate, and the challenges of implementation.

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. For example, over 3 700 marine species occur in South African waters and nowhere else in the world. The remarkable richness of South Africa's biodiversity is largely the result of the mix of tropical Medit-

Cabinet declared February 2004 Environmental Health Month. The theme for the Month was *Let's Protect Our Human Environment, Our People, Our Nation, Our World*. This coincided with the 8th Environmental Health World Congress that was hosted by the South African Institute of Environmental Health in Durban.

The primary objective of the Congress was to provide an international forum to discuss issues, exchange ideas, promote awareness and facilitate networking opportunities.

The Congress focused on, among other issues, environmental health management; food management and safety; the effect of pollution on present and future generations; Agenda 21; water and sanitation as a right; and waste management and legislation as a key to environmental health implementation.

Emphasis was also placed on finding solutions for environmental problems encountered in Africa.

About 600 health experts from across the globe attended the Congress.

erranean and temperate climates and habitats occurring in the country. Some 18 000 vascular plant species occur within South Africa's boundaries, of which 80% occur nowhere else. More plant species occur within 22 000 hectares (ha) of the Table Mountain National Park (formerly the Cape Peninsula National Park), than the whole of the British Isles or New Zealand.

In addition to South Africa's extraordinarily varied plant life, a wealth of animal life exists in the region. The country hosts an estimated 5,8% of the world's total mammal species, 8% of bird species, 4,6% of the global diversity of reptile species, 16% of the total number of marine fish species, and 5,5% of the world's classified insect species. In terms of the number of mammal, bird, reptile and amphibian species which occur in this country only, South Africa is the 24th-richest country in the world and the fifth-richest in Africa.

South Africa is home to a diversity of spiders – 66 families comprising more than 6 000 species. The country also boasts 175 species of scorpion.

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*, 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 easiest way to describe the country's natural heritage is on the basis of 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. Known as the Cape Floral Kingdom, this area 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 is found in South Africa.

There are eight major terrestrial biomes, or habitat types, in South Africa. These biomes 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.

Biodiversity values in South Africa

			Number of species				
	Biome	**Veld type**	**Plant**	**Mammal**	**Bird**	**Amphibian**	**Reptile**
Eastern Cape	6	29	6 383	156	384	51	57
Free State	3	19	3 001	93	334	29	47
Gauteng	2	9	2 826	125	326	25	53
KwaZulu-Natal	3	19	5 515	177	462	68	86
Limpopo	2	14	4 239	239	479	44	89
Mpumalanga	2	20	4 593	160	464	48	82
Northern Cape	4	20	4 916	139	302	29	53
North West	2	10	2 483	138	384	27	59
Western Cape	6	19	9 489	153	305	39	52

Source: Department of Environmental Affairs and Tourism. Plant defined as angiosperm and gymnosperm. Data taken from the National Herbarium Pretoria Computerised Information System database, May 2003.
Biome counts taken from Rutherford (1997) with thicket from Louw & Rebelo (1998).
Veld types taken from Acocks (1988).

Savanna Biome

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 bush-veld is home to species such as the knob thorn (*Acacia nigrescens*), bushwillow (*Combretum spp.*), monkey thorn (*Acacia galpinii*), mopani (*Colophos-permum mopane*) and wild fig (*Ficus spp.*) In the valley bushveld of the south, euphorbias and *spekboom* trees (*Portulacaria afra*) dominate.

An abundance of 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, Greater St Lucia Wetlands Park (GSLWP) and other reserves are located in the Savanna Biome.

Nama-Karoo Biome

This Biome includes the Namaland area of Namibia, and the 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. The bat-eared fox, black-backed jackal, ostrich, suricate and ground squirrel are typical of the area.

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

This Biome is a summer-rainfall area with heavy thunderstorms and hail, 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 river beds. 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. Three of these, namely the black wildebeest, blesbok and eland, do not occur outside the Grassland Biome.

The area is internationally recognised as an area of high species endemicity as far as birds are concerned. Birds commonly found in the area include the black korhaan, blue crane, guinea-fowl and other grassland birds.

Only 1,1% of the Grassland Biome is officially protected. The wilderness areas of the KwaZulu-Natal Drakensberg are the most significant.

Succulent Karoo Biome

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 National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004), was signed into law in June 2004.

The Act aims to ensure the management and conservation of South Africa's biological diversity, the sustainable use of biological resources, and the fair and equitable sharing of benefits arising from the use and application of genetic resources and material.

The Act also provides for the establishment of the South African National Biodiversity Institute, replacing the National Botanical Institute. The Biodiversity Institute will regulate and manage botanical gardens, and act as an advisory and consultative body to State organs and biodiversity stakeholders on related matters.

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 have improved the conservation status of this Biome considerably.

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. It 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 evergreen plants with small, hard leaves (such as those in the Erica family). It is made up mainly of three groups of plants, namely 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 home to 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 grysbok, the geometric tortoise, the Cape sugar-bird and the protea seed-eater, which are endemic to the area. The mountains are the habitat of the leopard, baboon, honey-badger, caracal, rhebuck and several types of eagle.

South Africa's entry for the 2004 Chelsea Flower Show in London, United Kingdom, in May 2004, entitled *Under an African Sun*, celebrated South Africa's 10 Years of Freedom and marked the country's 26th gold medal at the show.

Forest Biome

South Africa has few forests. The only forests of significance are the Knysna and Tsitsikamma forests in the Western and Eastern Cape, respectively.

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. Animals include the endangered samango monkey, bushpig, bushbuck and the delicate blue duiker.

Thicket Biome

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 the Biome.

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 to the coast, the role of coastal fog also governs the distribution of certain species commonly associated with the desert.

The Desert Biome includes an abundant insect fauna which includes many tenebrionid beetles, some of which can utilise 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.

Preserving biodiversity

Biodiversity plays a crucial role in sustainable development and poverty eradication. Fundamental changes to the legislative, policy and institutional framework for natural resource management have resulted in a shift in focus over the last 10 years, from an elitist conservation approach to a management approach based on South Africa's recognition of the contribution of biological resources to food security, science, economy, cultural integrity and well-being.

The country's conservation areas contribute to job creation and socio-economic upliftment, and continue to serve as a foundation of the tourism industry.

South Africa is a very popular tourist destination. The main attractions are nature-based tourism facilities such as national parks and private game reserves.

There are some 9 000 privately owned game ranches in South Africa, expanding at a rate of 300 000 ha per year. The contribution of these areas in maintaining South Africa's unique biodiversity is incalculable.

The Department of Environmental Affairs and Tourism hosted the first National Biodiversity Strategy and Action Plan Workshop in March 2004.

The main strategic objectives of the National Biodiversity Strategy and Action Plan are to:

- ensure that the protection of biodiversity is a priority for all South Africans and forms an integral part of all economic sectors
- enhance institutional effectiveness and efficiency to ensure good governance in the biodiversity sector
- ensure that benefits derived from biodiversity and the costs of maintaining a sustained flow of environmental goods and services are equally shared
- ensure the direct and indirect consumptive use of biological resources in a sustainable manner
- engage with the international community to promote and develop cross-boundary and international co-operation and partnerships, to meet South Africa's international obligations and commitments as far as possible, within the context of national priorities and constraints.

Many successes have been achieved in South Africa by various role-players in terms of the conservation of endangered species, e.g. white rhinoceros, African elephant, the cheetah and the wild dog.

Conservation areas

South Africa is committed to meeting the World Conservation Union (IUCN) target of 10% of land area under protection.

There are a number of management categories of protected areas in South Africa, which conform to the accepted categories of the IUCN.

The National Environment Management: Protected Areas Act, 2003 (Act 57 of 2003), seeks to establish a representative system of protected areas as part of a national strategy to protect South Africa's biological diversity, and to ensure that biodiversity is able to bring about sustainable benefits for future generations.

With over 500 bird species, including black coucals, narina trogons, Pel's fishing owls, crowned eagles, black eagles and the African finfoot, the Kruger National Park is a birding paradise. The Park is tapping into its wealth of bird species to boost its income. The Park hosts an annual Big Birding Day, which is becoming a very popular event.

The Park is home to an impressive number of species: 1 990 plant, 53 fish, 35 amphibian, 118 reptile and 148 mammal species.

It also enables the Minister of Environmental Affairs and Tourism to acquire private land by purchasing land rights for the creation of protected areas.

The Protected Areas Amendment Bill, which was expected to be passed in 2004, will further address issues of co-operative governance with provincial and local authorities. It will empower the Department to conclude fair negotiations with communities and private landowners for the inclusion of some of their land in South Africa's protected areas.

Scientific reserves

Scientific reserves are sensitive and undisturbed areas managed for research, monitoring and 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 since no vehicles are allowed. The highest management priority is the maintenance of the intrinsic wilderness character. Examples of wilderness areas are the Cedarberg Wilderness Area and Dassen Island in the Western Cape, and the Baviaanskloof Wilderness Area in the Eastern Cape.

Marine protected areas (MPAs)

In June 2004, the Minister of Environmental Affairs and Tourism, Mr Marthinus van Schalkwyk, announced four new MPAs to complement and consolidate the country's existing marine and coastal conservation areas.

The new areas are Aliwal Shoal on the south coast of KwaZulu-Natal, the coastal and marine environment of Pondoland in the Eastern Cape, the Bird Island Group at Algoa Bay, and Table Mountain National Park in the Western Cape.

By mid-2004, the Department of Environmental Affairs and Tourism was still negotiating the protection of a large area of continental shelf off Namaqualand.

The proposed MPAs will not prohibit tourism activities such as sport-diving operations, but rather aim to regulate them. Managerial authority for three of the proposed MPAs (Namaqualand, Bird Island and Table Mountain National Park) will be vested with SANParks.

Some of the protection measures to be implemented will be restrictions for people who want to fish, as well as restrictions for stowing fishing gear when fishing with a vessel. Spear fishers will not be allowed in these areas.

Scuba divers will be required to obtain permits when diving at the restricted zones in the Table Mountain National Park.

The Pondoland MPA will be one of South Africa's largest protected areas. Including 90 km of coastline and extending about 15 km out to sea (to the 1 000 m isobath), it will cover 1 300 km^2. The extremely narrow continental shelf off Pondoland marks the start of the annual sardine run, which *National Geographic* has rated as the most exciting diving opportunity in the world. The development of tourism in this impoverished region is a priority, and the establishment of the MPA is the first step in realising the potential of this scenic stretch of coastline.

The protection of the Bird Island Group (Bird, Seal and Stag islands) in Algoa Bay is the first step in the seaward extension of the Greater Addo Elephant National Park. Bird Island is home to several species of red-data listed seabirds (such as the Cape gannett, roseatte tern and African penguin), while the reefs around the Island are important for abalone and linefish, many species of which are threatened. Bird Island has been the target of abalone poachers, and the immediate protection of the Island is regarded as a priority.

The Table Mountain National Park MPA includes all the coastal waters around the Cape Peninsula from Mouille Point in the west to Muizenberg in the east. It is the area that has the longest history of commercial fishing in South Africa.

The MPA will be an extension of the Table Mountain National Park. It will include six areas that are closed to fishing, but the majority of the MPA will remain open to fishing. The closed areas have been located for the protection of abalone, rock lobster, linefish and penguin, and scuba-diving sites.

Aliwal Shoal has long been in need of protection. The diving industry in particular will benefit from such protection, and KwaZulu-Natal will add another well-managed natural resource to its already-impressive list of tourist destinations.

National parks and equivalent reserves

SANParks manages various national parks, representative of the country's important ecosystems and unique natural features. Commercial and tourism-conservation development and the involvement of local communities are regarded as performance indicators. These areas include national parks proclaimed in terms of the National Parks Act, 1976 (Act 57 of 1976), provincial parks, nature reserves and indigenous State forests.

Some of these natural and scenic areas are extensive in size, and include large representative areas of at least one of the country's biomes. Since 1994, parks under SANParks have expanded by 166 071 ha.

The national parks are: Kruger National Park; Kalahari Gemsbok National Park (part of the Kgalagadi Transfrontier Park); Addo Elephant National Park; Bontebok National Park; Mountain Zebra National Park; Golden Gate Highlands National Park; Tsitsikamma National Park; Augrabies Falls National Park; Karoo National Park; Wilderness National Lakes Area; West Coast National Park; Tankwa Karoo National Park; Knysna National Lakes Area; Marakele National Park; Richtersveld National Park; Vaalbos National Park; Aghulhas National Park; Namaqua National Park; Table Mountain National Park, which incorporates the Cape of Good Hope, Table Mountain and Silvermine nature reserves; and the Mapungubwe National Park, which was opened in September 2004.

During 2003/04, more land was brought under protection; resulting in the expansion of the Addo Elephant and Mountain Zebra national parks in the Eastern Cape, Marakele in Limpopo, the Namaqualand Park in the Northern Cape, as well as the Cape Agulhas and Table Mountain national parks in the Western Cape.

The Free State Government agreed in principle to link the Qwa-Qwa Game Reserve with the Golden Gate Highlands National Park and to bring the two areas under SANParks' management. The former Minister of Environmental Affairs and Tourism and the Free State Government signed a Memorandum of Understanding to this effect in March 2004.

The consolidated Park will span almost 34 000 ha of grassland, presenting an opportunity to expand the Park along the lines of the Transfrontier Conservation Area (TFCA) Programme.

Agreement was also reached with the Eastern Cape Government on the management of Woody Cape by SANParks, as an integral part of the greater Addo Elephant National Park.

During 2003/04, SANParks contributed to socio-economic development among historically disadvantaged neighbouring communities in a number of ways. More than 75% of about R35 million worth of commercial development projects was allocated to empowerment contracts.

In July 2004, the Minister of Environmental Affairs and Tourism proclaimed more than 66 480 ha of new land to be incorporated into the country's national park system.

The expansion includes the Vhembe-Dongola National Park in Limpopo which will acquire more than 1 725 ha of land, the Western Cape's Agulhas National Park which will acquire 3 636 ha; the Karoo National Park, 17 405 ha; the Namaqua National Park, 34 246 ha; Augrabies Falls National

The Mapungubwe National Park in Limpopo boasts numerous archaeological sites dating from the Early Stone Age to the present. Situated on the international borders between Botswana, Zimbabwe and South Africa, the Park was proclaimed a World Heritage Site on 5 July 2003.

The South African Government invested about R100 million in the consolidation and development of the 22 500 hectares core area.

By September 2004, the restoration of the archaeological sites; and the construction of roads, rest camps, fencing and other infrastructure had provided some 1 000 temporary jobs.

Mapungubwe showcases some of the most threatened large mammals on earth, such as the white rhinoceros and the wild dog.

Park, 2 121 ha; the West Coast National Park, 6 772 ha; and the Table Mountain National Park, 573 ha of additional land.

There are currently six TFCAs along borders with neighbouring countries, at various stages of development: the Great Limpopo Transfrontier Park (GLTP), Kgalagadi, Lubombo, Ais-Ais/Richtersveld, Maloti-Drakensberg and Limpopo-Shashe. These are conservation landmarks, significantly promoting regional integration, greater biodiversity, environmental tourism and economic growth.

The proposed GLTP covers South Africa's Kruger National Park, Mozambique's Limpopo National Park and the Gonarezhou National Park in Zimbabwe.

In 2004, South Africa dropped large portions of the border fence and completed the construction of the South African side of the Giriyondo Border Post. South Africa also invested R40 million in tourism-related infrastructure.

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.

In May 1997, South Africa ratified the World Heritage Convention. The South Africa World Heritage Convention Committee is responsible for the identification of possible sites in South Africa and the co-ordination of the Convention.

The World Heritage Convention Act, 1999 (Act 49 of 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 six world heritage sites proclaimed by the United Nations Educational, Scientific and Cultural Organisation, namely Robben Island; the GSWLP; 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; and the Cape Floral Kingdom.

Covering a total of more than 553 000 ha, the Cape Floral Kingdom World Heritage Site comprises eight separate protected areas stretching from the Cape Peninsula to the Eastern Cape.

The Site is also unique because it is the first in the world to include a botanical garden, the Kirstenbosch National Botanical Garden.

By July 2004, the number of world heritage sites stood at 788. A total of 154 were natural sites, 611 cultural sites, while 23 were mixed sites.

In September 2004, the Minister of Environmental Affairs and Tourism, Mr Marthinus van Schalkwyk, and the Mpumalanga Provincial Government signed a Memorandum of Understanding for the establishment of the Blyde River Canyon National Park.

The proposed National Park will be proclaimed in phases, starting in early 2005. It will feature a total consolidated area of 50 000 hectares located in the north-east escarpment and the central Lowveld bioregion in Mpumalanga.

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 utilisation of products on a sustainable basis in 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.

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

Wetlands

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 streambank wetlands.

South Africa became a contracting party to the Ramsar Convention in 1975. The country's Ramsar sites include Nylsvlei 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 and the Orange River Mouth Wetland.

The Directorate: Biodiversity Management of the Department of Environmental Affairs and Tourism 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 is aimed at building on past efforts to protect wetlands in South Africa against degradation and destruction, while striving for the ideal of 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.

South Africa celebrated World Wetlands Day on 2 February 2004 at the Gatberg Wetlands in the Eastern Cape.

The theme for the Day was *From the Mountains to the Sea – Wetlands at Work for Us*.

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

Botanical gardens

The South African National Biodiversity Institute (SANBI) was established on 1 September 2004 with the renaming of the NBI in terms of the Biodiversity Act, 2004 (Act 10 of 2004). SANBI, with its head office at Kirstenbosch National Botanical Garden in Cape Town, is an autonomous State-aided institute, which collects, displays and cultivates plants indigenous to South Africa; undertakes and promotes research into indigenous plants and related matters; studies and cultivates endangered plant species; promotes utilisation of the economic potential of indigenous plants; and runs environmental education programmes.

SANBI manages eight national botanical gardens in five of South Africa's nine provinces. The largest is Kirstenbosch, situated on the eastern slopes of Table Mountain in Cape Town. It houses 5 300 indigenous plant species, and was voted one of the top seven botanical gardens in the world at the World Botanical Gardens Congress in 2000.

Kirstenbosch receives more than 680 000 visitors annually. The Kirstenbosch National Botanical Garden features the Centre for Home Gardening, which includes an indigenous 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, Natal in Pietermaritzburg, Lowveld in Nelspruit, Walter Sisulu (formerly Witwatersrand) in Roodepoort, and the Pretoria National Botanical Garden.

The Pretoria National Botanical Garden houses the National Herbarium of South Africa, the largest in the southern hemisphere. Research is conducted

South African National Parks hosted a Big Elephant *Indaba* at the Kruger National Park in October 2004.

The *Indaba* focused on:

- the possible impact of elephants on biodiversity
- the conservation status and future of elephants in protected areas in southern Africa
- ethics and values for the management of elephants
- the social impact of protected areas (potential risks and benefits to neighbours)
- options for managing elephants (translocation, contraception, etc.)

on 800 991 specimens of southern African plants, 150 000 tropical African specimens, 50 000 others from around the world, and 25 000 cultivated specimens.

There are also regional herbaria in Durban and at the Kirstenbosch Research Centre.

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

Some municipalities have botanical gardens which are not controlled by SANBI. These include the Wilds and Melville Koppies in Johannesburg, the Johannesburg Botanic Garden, the Grahamstown Botanical Garden (now managed by Rhodes University) and the Municipal Durban Botanic Gardens.

Other botanical gardens in South Africa not controlled by SANBI include the Manie van der Schijff Botanical Garden (University of Pretoria), University of Stellenbosch Botanical Garden, North West University Botanical Garden (Potchefstroom Campus), University of KwaZulu-Natal Botanical Garden (Pietermaritzburg Campus), the Lost City Gardens (near Sun City, North West) and the Garden Route Botanical Garden.

The Walter Sisulu Botanical Garden owns one of the biggest collections of lithops in the world. These are found only in the southern regions of Africa.

It also accommodates more than 600 naturally occurring plant species, more than 230 bird species, as well as a number of reptiles and small mammals such as jackal and antelope, which occur in the natural areas of the Garden.

The Garden, which receives some 160 000 visitors annually, is the fastest-growing of the gardens managed by SANBI. It covers almost 300 ha and consists of landscaped and natural veld areas. All the plants in the Garden are indigenous to southern Africa.

During 2003, the former NBI completed new visitor facilities at Kirstenbosch, and was expected to complete new education, restaurant and visitor facilities at the Lowveld, Pretoria, Walter Sisulu and Free State botanical gardens during 2004. Many of these capital projects have been co-financed by the Department of Environmental Affairs and Tourism's Poverty-Relief Unit.

SANBI is the management agency for the US$12-million Cape Action Plan for People and the Environment Project, which aims to conserve biological diversity within the Cape Floral Kingdom. It is also the management agency for the US$5-million Southern African Botanical Diversity Network Project that is aimed at upgrading facilities and strengthening the level of botanical expertise throughout the subcontinent. The participating countries are Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Zambia and Zimbabwe.

The SANBI has also taken over the management of the R30-million Working for Wetlands Programme, with its offices now based at the Pretoria National Botanical Garden.

In addition to the herbarium and taxonomic research, the Kirstenbosch Research Centre in Cape Town is a centre of excellence for biodiversity research. The research programme focuses on the impact of climate change, invasive alien species and land-use on biodiversity, as well as the development of conservation plans for threatened ecosystems and species. The Centre has developed a new vegetation map for South Africa and maintains some of the most comprehensive plant databases available in South Africa.

The Leslie Hill Molecular Systematics Laboratory is one of the facilities at the Kirstenbosch Research Centre. A DNA Bank has been established at the Laboratory, in collaboration with the Royal Botanic Gardens, Kew, in the United Kingdom (UK). The Bank is funded by the UK-based Darwin Initiative and the objectives are to archive the DNA of at least one species of all 2 200 genera of South Africa's flowering plants, to train South African researchers and students in high-profile biotechnologies, and to produce a tree of life of South African plants.

The former NBI joined the Millennium Seed Bank Project in 2000. This Project is an international plant conservation programme running from 2001 to 2010, which was developed and is managed by the Seed Conservation Department at the Royal Botanic Gardens, Kew, in the UK.

Ultimately, the SANBI hopes to contribute the seed of about 2 500 of South Africa's indigenous species to this conservation effort, through the collection of verified and well-documented seed collections. This represents about 10% of South Africa's flowering plants.

Zoological gardens

The National Zoological Gardens of South Africa in Pretoria, or the Pretoria Zoo, celebrated its centenary in October 1999. It is the only zoo in South Africa with national status and is a member of the World Association of Zoos and Aquariums; the Pan-African Association of Zoological Gardens, Aquaria and Botanical Gardens; the International Union of Zooculturists; and the International Association of Zoo Educators.

The Pretoria Zoo, considered to be one of the 10 best in the world, extends over an area of about 80 ha. In 2003, the Zoo attracted 523 072 visitors.

On 1 January 2004, the Zoo's collection included 569 specimens of 97 mammal species, 1 091 specimens of 136 bird species, 14 184 specimens of 275 fish species, 56 specimens of 15 invertebrate species, 382 specimens of 90 reptile species, and 69 specimens of six amphibian species. The animal collections at the two game-breeding centres include 1 574 specimens of 52 mammal species and 97 specimens of 20 bird species.

The National Zoological Gardens of South Africa created a zoo and animal park at the Emerald Safari Resort and Casino in Vanderbijlpark. The resulting Animal World covers 314 ha consisting of a game park and zoo, which house, among others, rhino, buffalo, hippo, wild dog and a variety of bird and animal species.

The Emerald Safari Resort has 303 specimens of 44 mammal species, 212 specimens of 52 bird species, 63 species of 27 reptile species, and three specimens of three species of amphibians. All the animals were provided by the Pretoria Zoo and its two satellite breeding centres.

In March 2004, the National Zoological Gardens was declared a national research facility, subject to the provisions of the National Research Foundation (NRF). All of the Pretoria Zoo's assets and liabilities were transferred to the NRF with effect from 1 April 2004. This presents a remarkable opportunity for the Zoo to reposition itself as one of the world leaders in breeding and researching endangered species. The NRF is a government agency responsible for supporting and promoting research and the provision of research facilities to facilitate the creation of knowledge, innovation and development in all fields of science and technology. (See chapter 18: *Science and technology*.)

The Johannesburg Zoological Gardens, or Johannesburg Zoo, covering some 81 ha and boasting more than 10 000 animals, celebrated its 100th birthday in 2004.

In January 2004, four southern screamers (a rare type of South American waterfowl), made their appearance at the Johannesburg Zoo – the first time such birds had ever hatched in South Africa.

The Zoo is also renowned for its other successful programmes for breeding several endangered South African bird species such as the wattled crane and ground hornbill.

The animals are kept in open-air enclosures, separated from the public by dry or water moats. The enclosures include the internationally acclaimed gorilla complex, the pachyderm section and the section for large carnivores.

Of particular interest are the African elephants, golden lion tamarins and sitatunga.

Breeding centres

There are a number of breeding centres in South Africa. The National Zoological Gardens of South Africa is responsible for the management of the Lichtenburg Game-Breeding Centre, which covers

The Johannesburg Zoo's most famous resident, Max the gorilla, died in May 2004.

The 250-kg primate became a household name in 1997 when a criminal on the run from the police entered the gorilla's enclosure in an effort to escape pursuit and was attacked by Max, who interpreted his presence as a threat to his mate, Lisa.

Max celebrated his 33rd birthday on 6 March 2004.

an area of some 4 500 ha, and the Game-Breeding Centre near Mokopane, covering an area of 1 334 ha. The two centres supplement the Zoo's breeding programme for various endangered animals, and the Zoo's own animal collection.

The Lichtenburg Game-Breeding Centre houses, among other animals, Père David's deer, pygmy hippopotamus, white rhino, 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 serves as a natural haven for waterbirds such as spoonbills, kingfishers, ibises and herons.

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

The renowned De Wildt Cheetah Breeding and Research Centre, situated near Pretoria, is best known for its highly successful captive-breeding programme. De Wildt also breeds a number of rare and endangered African species, the most spectacular of which is the magnificent king cheetah. It also plays a major role in the breeding of wild dogs.

The Hoedspruit Research and Breeding Centre for Endangered Species in Mpumalanga is another well-known breeding centre. The Centre caters for, among other things, five species of vulture: Cape griffins, whitebacked, hooded, whiteheaded and lappetfaced vultures.

Aquaria

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

The Aquarium and Reptile Park of the Pretoria Zoo 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 home to seal, dolphin and fish families indigenous to the Eastern Cape coastline. East London has a smaller aquarium, which is also well worth visiting.

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 in and around the Cape coast. This is the largest aquarium in South Africa.

uShaka Marine World in Durban incorporates 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 offers edutainment tours and special interactive activities such as snorkelling and scuba diving. It also features a rocky touch pool, where visitors can touch a starfish or sea cucumber with the help of a specially trained guide.

Snake parks

The Hartbeespoort Dam Snake and Animal Park on the northern shore of the Hartbeespoort Dam near Pretoria has a fine reptile collection.

The Transvaal Snake Park at 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.

In Durban, the Fitzsimons Snake Park houses more than 100 exotic and indigenous species of snake.

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

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

Marine resources

The South African fishing industry, which was once concentrated in the hands of a few, largely White-owned companies, has undergone intensive transformation over the past 10 years.

It is estimated that at least 60% of commercial fishing rights have been allocated to historically disadvantaged individuals (HDIs) or majority HDI-owned companies. Transformation has taken place in a very short space of time, without compromising the principle of sustainable utilisation fundamental to the management of fisheries. South Africa's industrial fisheries are widely regarded as among the best-managed in the world.

The South African coastline covers more than 3 200 km, linking the east and west coasts of Africa. From the coral reefs of northern KwaZulu-Natal, to the cool-water kelp forests of the Northern Cape, South Africa's shores are particularly rich in biodiversity. Some 10 000 species of marine plants and animals have been recorded.

The productive waters of the west coast support a number of commercially exploited marine life, including hake, anchovy, pilchard, horse mackerel, tuna, snoek, rock lobster and abalone. On the east coast, squid, linefish and a wide range of intertidal resources provide an important source of food and livelihood for coastal communities. Marine life that is not harvested, such as whales, dolphins and seabirds, is increasingly recognised as a valuable resource for nature-based tourism.

The responsible utilisation and management of the country's marine and coastal resources is of vital importance to the well-being of South Africa's people and economy. About 29 000 South Africans, many of them from impoverished rural communities, are directly employed by the fishing industry. A further 60 000 people are estimated to be employed in related sectors.

In South Africa, the utilisation of marine resources is regulated by a rights-allocation system.

Through regular scientific research, the Department of Environmental Affairs and Tourism establishes what the optimal utilisation of each fish species should be. This is done annually and ensures that fish stocks are managed sustainably.

Researchers provide advice on a wide range of parameters such as the estimated size of a resource, the age distribution of its component fish, the quantity that may safely be harvested, the effect and desirability of declaring closed fishing seasons and areas, the optimum mesh size of nets that may be used, and the effect that environmental factors have on resources.

The Department's functions include the management of commercial, subsistence and recreational fisheries, as well as a wide variety of other activities, including boat-based whale watching and shark-cage diving. Fishing vessels are licensed annually, according to their port of origin and the purpose for which they are used.

The Department is also responsible for monitoring the catches of commercial, subsistence and recreational fishers; and the regulation and thorough inspection of fishing boats, fish-processing plants and other places where fish is sold or stored.

Recent developments have led to a dramatic improvement in the field of fisheries compliance:

- An observer programme has been initiated in the offshore fisheries. These on-board observers gather a wide variety of biological data and verify that regulations are adhered to on fishing vessels.
- All commercial fishing vessels are now obliged to carry a vessel-monitoring system on board.
- New levels of partnership between the Department of Environmental Affairs and Tourism, the South African Police Service and the South African National Defence Force have increased investigations, leading to arrests and prosecutions which, in turn, have had a deterrent effect on would-be poachers.
- The first environmental court at Hermanus in the Western Cape has achieved a conviction rate of 70%. In the past, an estimated 10% of abalone-poaching and related offences were successfully prosecuted and many cases took years to conclude. A second environmental court was opened in Port Elizabeth on 24 February 2004.
- The amending of laws has ensured that loopholes have been closed and that the severity of sanctions has been increased. For example, the fine for abalone poaching was increased from R40 000 to R800 000 in 2003.
- In 2004/05, the Department will take delivery of three purpose-built environmental-protection vessels. The vessels are being built at a cost of

R515 million and will boost the Department's capacity to apprehend and inspect non-compliant fishing vessels. The first vessel was handed over to the Department in November 2004.

Transformation

With the publishing of the *White Paper on Marine Fisheries Policy* in 1997, and the passing of the Marine Living Resources Act, 1998 (Act 18 of 1998), the fundamental policy and regulatory framework for fisheries management in South Africa was put in place.

A serious challenge facing government after the first democratic election in 1994 was to re-allocate fishing rights (or quotas) in a way that would ensure that the underrepresentation of HDIs and HDI-owned companies in the fishing industry would be corrected.

By 2000, it was clear that a revised strategy was required to build a rational, legally defensible and transparent allocation system to promote government's objective of transforming the fishing industry. This strategy was introduced in 2000.

In mid-2001, the Department called for applications for medium-term fishing rights of between two and 15 years duration across all commercial fisheries.

The policy guidelines that were developed for the 2001 rights-allocation process identified investment and experience in the fishing industry, as well as Black Economic Empowerment and employment equity as key criteria for securing fishing rights.

Deep-sea hake fishery

In 1992, only 21 predominantly White-owned and controlled companies had rights to utilise the deep-sea hake resource. By 2002, this number had more than doubled, to 53 right-holders. There is also a more equitable distribution of quotas among the deep-sea fishing companies in South Africa, a trend that is reflected by the fact that more than 92% of the Total Allowable Catch (TAC) was held by the top five companies in 1992, compared with less than 74% in 2002.

By mid-2004, 74% of right-holders in the deep-sea hake fishery were HDI-owned and managed. In comparison, it is estimated that in 1992, HDI shareholding in the deep-sea hake fishery amounted to less than 0,5%.

Pelagic fishery

Allocation records show that 73% of right-holders in the pelagic fishery are majority HDI-owned companies. These companies hold 75% of the pelagic TAC. Therefore, access to the pelagic fishery by HDIs increased tenfold, from less than 7% in 1992 to more than 70% in 2002.

South coast rock lobster fishery

The offshore nature of this fishery requires the use of large vessels (30 m to 60 m), which are expensive to purchase and operate. These vessels need to fish a relatively large quota to make their operational costs viable. This makes it difficult for smaller right-holders to participate in the fishery. In spite of these constraints, 65% of south coast rock lobster right-holders are small, medium and micro-enterprises (SMMEs). Remarkably, 77% of the south coast rock lobster resource is controlled by HDIs. This was achieved by allowing new entrants into the fishery, and through substantial changes in the ownership of the larger companies.

West coast rock lobster fishery

As many as 90% of right-holders in the west coast rock lobster fishery were classified as SMMEs in 2002. Sixty-six percent of these companies were majority HDI-owned, compared with 1992 when the majority of the lobster TAC was in the hands of White individuals and White-owned companies. Furthermore, 91,5% of fishing rights that were allocated on a limited scale were allocated to HDIs or HDI-owned SMMEs. This means that about 70% of the global west coast rock lobster TAC is HDI-controlled.

Conservation

Extending the conservation agenda is a key objective. The passing of the Coastal Management Bill is central to this objective. The promulgation and effective management of four, and eventually five, new MPAs will bring 19% of South Africa's coastline under protection.

Forthcoming years will also witness the extension of subsistence fishing rights along the coasts of the Eastern Cape and KwaZulu-Natal. This will involve large numbers of people legally harvesting fish. Plans to open up new commercial fisheries are also developing rapidly. The aim is to expand the economy through new fisheries, and to create new jobs and associated wealth. Beyond this, the Department is involved in extensive planning to ensure that when the current four-year fishing rights expire, new, long-term rights are allocated.

The groundwork for the 2005 long-term rights allocation is being laid and a comprehensive policy is being developed for each fishery.

The drive to build a marine science and management capacity of high standing that is able to play a constructive role on the African continent is well underway. This entails, among other things, formulating an ecosystem approach to fisheries management, exploring the potential of new and underutilised fisheries, developing the legal and scientific framework that is required to boost aquaculture production in South Africa, and assisting other African nations to build equally robust fishery-management regimes.

Sustaining marine resources

Since the 1977 declaration of a 200-nautical mile (370 km) exclusive fishing zone, South Africa has adopted a policy of stock rebuilding in several of its major commercial fisheries. This policy has paid off in the hake, pelagic and rock lobster fisheries, where catches have grown steadily in recent years.

However, while South Africa's offshore fisheries may be among the best-managed in the world, a somewhat different picture has emerged for some of South Africa's inshore stocks. Several species of linefish have collapsed in recent years and the small but valuable abalone fishery is severely threatened by poaching and changing environmental conditions.

Pelagic fishery

Pelagic fish form large shoals in the surface layers of the sea – the pelagic zone. Small pelagic fish include sardines, anchovy, horse mackerel and red-eye herring – fish that are targeted by South Africa's purse seine fleet.

The pelagic fishery is the largest in South Africa in terms of catch volumes, and the second-most important in terms of value. Sardines are canned for human consumption, while anchovy, red-eye herring and small numbers of juvenile horse mackerel are reduced to fish meal, an important ingredient in animal feeds.

Over the past decade, populations of anchovy, sardine and red-eye herring have shown a remarkable increase. The total combined population of these three species doubled from just over three million tons (Mt) in 1991 to peak at almost 7,5 Mt in 2001. In 2002, it remained at this high level, a large decrease in anchovy biomass being off-set by an increase in sardine abundance.

The South African fishing industry has made the most of the boom years. In 2001, 2002 and 2003, the purse seine fleet landed over half a million tons of pelagic fish. This feat had previously been recorded only five times in the past five decades.

Demersal fishery

Demersal fish live on the sea bed and include the Cape hakes (*Merluccius paradoxus* and *Merluccius capensis*), monk (*Lophius vomerinus*), kingklip (*Genypterus capensis*) and sole (*Austroglossus pectoralis*).

In South Africa, the Cape hakes form the basis of the country's demersal fishery. About 160 000 t of hake are landed every year. Monk, kingklip and sole are important by-catch species. Hake is landed by large deep-sea trawlers, smaller inshore trawlers, longlines, and by fishers who use small boats to catch hake on handlines.

Deep-sea trawling is the most technologically sophisticated and the most capital- and labour-intensive of the four fishing methods. The deep-sea hake fishery catches the largest portion of the annual TAC for hake, with 6% of the TAC being allocated to inshore fishery, and about 10 000 t being landed by line fisheries.

Hake catches have remained steady since the late 1980s. However, scientists and the fishing industry have recorded a downturn in hake catches over the past three years. As a result, the TAC for hake has been decreased by 3 000 t over the past

two years and a further decrease of 3 000 t is expected in 2005.

Lobster fisheries

West coast rock lobsters were first exploited commercially in South Africa late in the 19th century from small row-boats using hand-hauled hoopnets. Catches increased steadily during the early part of the 20th century, peaking at about 10 000 t in the early 1950s. This high level of exploitation was maintained for a while, but by 1965 it had began to decline, even though the fishing effort was increasing.

Catches stabilised in the 1980s at about 4 000 t a year. However, by 1990, environmental and fishing-related conditions caused the natural growth rate of the west coast rock lobsters to decrease, with fewer young lobsters entering the fishery. By 1996, the TAC was decreased to just below 1 500 t. However, a stock-rebuilding strategy that was instituted in 1996, aimed at achieving a 15% recovery in stocks by 2006, paid off sooner than expected. The global TAC for west coast rock lobster increased from 3 206 t in 2003/04 to 3 527 t for the 2004/05 fishing season.

In total, 745 west coast rock lobster fishing licences were allocated in 2002, compared with only 39 right-holders in 1992. An initial 511 disadvantaged fishers were allocated west coast rock lobster rights on a limited scale in 2002, and a further 274 fishers were allocated commercial fishing rights for rock lobster in the newly opened fishing grounds to the east of Cape Hangklip in 2004.

South Africa hosted the first International Whale Watching Workshop in March 2004.

The main objective of the Workshop was to develop international scientific advisory frameworks for the proper management of whale watching.

The Workshop focused on the socio-economic benefits of whale watching for coastal communities.

The Workshop was supported by the International Whaling Commission. Representatives from 12 countries attended.

South Africa was chosen as host country because of its vast experience in shark-cage tourism and whale watching.

The allocation of rights on a limited scale was part of a strategy by government to encourage the development of SMMEs, and to meaningfully address the legitimate demands of disadvantaged fishers who depend on inshore resources such as rock lobster and abalone for their livelihoods. Each licence is valid for four years and provides the right-holder with a guarantee of a small income from fishing until 2005. Right-holders are only allowed to use hoop nets to catch their quota.

South coast rock lobsters are found in deep-water off the south coast and are caught by traps that are deployed on longlines.

An assessment of the south coast rock lobster resource in 1994 indicated that the population was in decline, and a programme of reducing the annual TAC was subsequently introduced. The south coast rock lobster stock has shown signs of recovery and the TAC was increased slightly in 2004.

Abalone fishery

Rampant illegal fishing between 1996 and 2003 decimated the abalone resource, leading to the closure of the recreational fishery and the setting of a global TAC of just 282 t in 2003.

In 2004, a new system of co-management, based on the Territorial User Rights Fishery (TURF) System was introduced. According to the TURF System, each right-holder is able to catch only his/her quota in a stipulated zone. The aim of the TURF System is to involve right-holders and members of fishing communities in the management of the abalone fishery. The System is premised on the notion that, by allocating a small fishing zone to a small number of divers who are known to enforcement officials and the community members who reside adjacent to that fishing zone, access to the abalone fishing grounds by unauthorised divers would be effectively closed.

Line-fishery

Commercial fishing rights for the hake handline fishery and the tuna pole fishery were allocated for the first time in 2003.

These fisheries are considered to be stable, with healthy stocks. However, in December 2000, the

Minister of Environmental Affairs and Tourism declared the traditional line-fishery, which targets coastal species such as snoek (*Thysites atun*) and yellowtail (*Seriola lalandi*) in the Western Cape, and kob (*Argyrosomus spp.*) and reef fish in KwaZulu-Natal, to be in a state of environmental crisis. Many linefish stocks, including kabeljou, rock cod, red steenbras, white steenbras, Roman, daggeraad, poenskop and slinger, have collapsed.

A collapsed stock is one that has been fished to levels at which the number of sexually mature adults has dropped to below 20% of the unfished (pristine) stock. This means that the stock cannot produce sufficient young fish to replenish itself.

The Department of Environmental Affairs and Tourism has taken a two-pronged approach to rehabilitating these stocks.

The strategically located new MPAs allow for a higher level of stock protection by managing the marine area in terms of sanctuary or no-take zones, as well as by concentrating enforcement strategies and resources in a more confined area.

A new line-fish management plan has been devised, dividing the fishery into three subsectors (handline hake, tuna and traditional line-fish). These follow the guidelines set for each of the exploited species through the Linefish Management Protocol, which intends to set catch guidelines for each species.

In addition, the traditional line-fishery is managed in terms of a Total Applied Effort, restricting effort in this fishery to no more than 450 vessels and 3 450 crew.

New fisheries

The Department plans to develop 12 new fisheries over the next five years. Some of the fisheries that have been earmarked for development are Eastern Cape abalone, limpet, ornamental fish, east coast rock lobster, sand soldier and Indian Ocean squid in KwaZulu-Natal.

The proposed fisheries will initially be managed as experimental fisheries to collect data for scientific analysis and ensure that the fisheries do not expand more quickly than the acquisition of information necessary for their management.

Policies and guidelines for an experimental octopus fishery were developed in 2002, and applications for experimental permits were called for in 2003. It is anticipated that the bulk of the octopus catch will be exported to Mediterranean countries where there is a high demand for octopus products.

The last foreign fishing boats left South African waters in January 2003 following the termination of South Africa's 25-year-old fisheries agreements with Japan and Taiwan. This paved the way for the development of a South African fishery for large pelagic fish, such as tuna and swordfish.

A policy for the allocation of 10-year fishing rights for catching large pelagic fish by longline method was finalised in 2004, and it was anticipated that fishing rights would be allocated by mid-year.

Aquaculture

Aquaculture production in South Africa is in the region of 4 000 t a year, of which much is attributable to abalone and mussel production.

Since 2002, abalone farms on the south coast have collectively produced more abalone products for export than the wild abalone fishery.

These farms are creating a substantial demand for fresh kelp fronds which are fed to cultured abalone. Research into seaweed cultivation is being undertaken by the Department of Environmental Affairs and Tourism to establish whether the nutrient-rich wastewater from abalone farms can be effectively used to cultivate seaweeds for abalone feed. If this method of culture proves to be feasible, it would have the added benefit of purifying the wastewater that is pumped out of abalone farms into the sea.

The success of the abalone farming industry has prompted new interest in the culture of fin fish in South Africa. One of the most exciting local species for the aquaculture industry is the dusky kob (*Argyrosomus japonicus*). Research carried out in land-based tanks and cages at Rhodes University showed that this species takes to captivity very well, growing from fingerlings to over 1 kg in less than a year. Subsequently, a number of fishing companies and other interested parties have taken up the challenge of farming dusky kob and are

following their own paths to the commercialisation of the species.

The coast

The *White Paper for Sustainable Coastal Development in South Africa* recognises that the co-ordination between the lead department in each province, and other departments and role-players whose work forms part of the overall coastal management effort, is essential. The White Paper proposes that a coastal committee be established in each of the four coastal provinces. This has been achieved and progress has been made towards the establishment of a national coastal committee.

It is envisaged that the Coastal Management Bill, which was drafted in 2002, will be promulgated during 2005. The Bill provides for important interventions that will regulate, enhance, preserve or rehabilitate sensitive or overexploited coastal areas. It also ensures equitable access to South Africa's coastline, and aligns South African legislation with international laws and conventions.

During 2003/04, a number of initiatives were implemented under the Coastcare banner. These included the formulation of interpretive signage for the coast, the Adopt a Beach Programme, and a Coastcare induction programme. Adopt a Beach aims to increase awareness of coastal-management issues among participant groups, while the induction programme is aimed at building capacity among provincial and local authorities.

The *Blue Flag* Campaign was expanded to include seven beaches, five in KwaZulu-Natal and one each in the Western Cape and Eastern Cape. The international *Blue Flag* Campaign is an incentive scheme that encourages local authorities along the coast to manage their beaches in an environmentally friendly manner. Beaches that meet specific criteria on safety, cleanliness, services, water quality and amenities are awarded a blue flag which may be flown as part of the local authority's tourism marketing strategy.

The Blue Flag beaches for 2004/05 are:

- Umhlanga Rocks main beach
- South beach, Durban
- Hibberdene beach, south coast of KwaZulu-Natal
- Lucien beach, south coast of KwaZulu-Natal (new)
- Margate
- Ramsgate
- Marina/San Lameer beach, south coast of KwaZulu-Natal
- Well's Estate, north of Port Elizabeth (new)
- Humewood, Port Elizabeth
- Dolphin beach, Jeffrey's Bay (new)
- Grotto beach, Hermanus
- Kleinmond beach, near Hermanus (new)
- Mnandi beach, Strandfontein (new)
- Clifton 4th beach, Cape Town (new).

Other coastal projects being run by the Department include local demonstration projects and sustainable coastal livelihoods projects that are being funded by the British Department for International Development.

The proliferation of off-road vehicles in South Africa has created a variety of negative environmental impacts. Bird and turtle nesting areas are particularly susceptible to damage from off-road vehicles, as are certain coastal land forms such as dunes, salt marshes, estuarine sand and mud flats.

The off-road vehicle regulations that were promulgated by the Minister of Environmental Affairs and Tourism in 2001 were amended during 2004 to increase their effectiveness and ease of implementation.

The monitoring of stretches of coast has indicated that the banning of off-road vehicles has enabled several shore-breeding birds – especially the Damara tern and the African black oystercatcher – to breed successfully once more. The ban has enabled the Damara tern to complete breeding far earlier in the season than in other monitored years.

Bird counts have also shown a marked increase in the numbers of sanderlings, common terns, and crowned and blacksmith plovers. The number of birds counted at Bird Island in Lamberts Bay fell after the ban was imposed. Scientists propose that Bird Island acted as a refuge for these birds prior to the ban on off-road vehicles coming into force.

According to conservationists from Ezemvelo KwaZulu-Natal Wildlife, the number of loggerhead and leatherback turtles hatching successfully on the beaches of northern KwaZulu-Natal has increased

since the ban was enforced. In the past, leatherback and loggerhead turtle hatchlings that left their nests became trapped in the tyre ruts left by off-road vehicles. This left them susceptible to predation, mostly by seabirds.

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 is reforming environmental law to introduce reform in biodiversity conservation, pollution, waste management and environmental planning.

Climatic and atmospheric change

According to the *State of the Environment Report*, South Africa is sensitive to climatic changes, and contributed about 1,2% to global warming in 1990.

In order to address this challenge, government developed the National Climate Change Response Strategy which was launched on 7 October 2004. This Strategy provides a comprehensive framework for dealing with climate change issues in South Africa. The approach used in developing this Strategy was to ensure, as far as possible, that climate change response actions in South Africa would facilitate sustainable development.

Government approved accession to the Kyoto Protocol of the UN Framework Convention on Climate Change in March 2002, demonstrating South Africa's commitment to further enhance the effectiveness of environmental legislation.

The Kyoto Protocol is a legally binding instrument whereby developed countries undertake to reduce greenhouse gas emissions by at least 5% of their 1990 levels. One of the Protocol's features is the incorporation of market-based mechanisms designed to allow developed countries to achieve their required emission reductions at the lowest possible cost.

South Africa hosted the International Conference on Global Climate Monitoring in February 2004. The Conference, organised by the intergovernmental organisation Group of Earth Observations, was attended by government officials and scientists from more than 40 countries.

It was held as part of preparations for the Second Earth Observation Summit which took place in Tokyo, in April 2004.

The Conference focused on plans to develop a globally integrated mechanism for observing climatic change and other environmental trends.

The Department is operating three climatic change projects. A sum of US $5 million has been donated to South Africa by the United States of America (USA) in terms of the USA-South Africa Bilateral Agreement on Climate Change Support. The three climatic change projects are:

Cities for Climate Protection

This project involves the improvement of management capacity in local government. It will run for three years, with a budget of US$1,2 million to help local governments identify and implement actions that meet their objectives, as well as address global climate change.

Demonstration projects linking climate change and sustainable development

Various institutions, including educational institutions, private, and non-profit organisations have implemented a number of projects on behalf of the Department countrywide. These projects include the promotion of ecovillages in urban and rural areas; rural energisation; renewable energy technology such as biomass gasification and ethanol production; community-based greening and waste recycling; low-tech energy solutions such as thermally efficient and renewable-energy solutions in housing, clean transport systems, and carbon sequestration and conservation; and industrial energy efficiency.

Climate change, public awareness and education

The objective of this project is to increase public awareness of global climate change in South Africa, and to assist government in its efforts to educate

students on the importance of such change within the country.

Erosion and desertification

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

About 81% of the total land area of South Africa is being 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 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 Convention to Combat Desertification, which was ratified on 30 September 1997. The main objectives of the Convention include co-operation 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 co-ordinator 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, among others, to foster scientific and technological co-operation.

Waste management

Towards the end of 2002, government published the *White Paper on Integrated Pollution and Waste Management*, which outlines its new thinking in relation to pollution and waste management.

Government believes that pollution prevention is one of the most effective means of protecting South Africa's people and the environment. Pollution prevention eliminates costly and unnecessary waste and promotes sustainable development. It aims to reduce risks to human health and the environment by trying to eliminate the causes of pollution, instead of treating the symptoms.

Effective pollution prevention not only focuses on the installation of pollution-abatement equipment in industry, but also on the shared responsibility of all sectors of society to protect South Africa's natural resources, which involves:

- innovation in product design and production
- encouraging cost savings through efficiencies and conservation
- insisting on sound management of persistent bio-accumulative and toxic substances, and eliminating their use where necessary.

Municipalities and provincial governments will play an important role in implementing national strategies addressing waste and pollution management.

Specific functions to be carried out by municipalities will include:

- compiling and implementing general waste-management plans
- fostering public awareness
- collecting data for the Waste Information System
- providing general waste-collection services and managing waste-disposal facilities
- implementing and enforcing appropriate waste minimisation and recycling initiatives
- where possible, regional planning, establishing and managing landfill sites, especially for regionally based general waste landfills.

Cabinet approved the draft Radioactive Waste Management Policy and Strategy in 2004. The Policy aims to establish a comprehensive radioactive waste governance framework and discusses the following:

- international and national principles for the safe management of radioactive waste
- the responsibilities of government, radioactive waste generators and regulators
- management structures to service the radioactive waste-management obligations of the Minister of Minerals and Energy, in consultation with the Ministers of Environmental Affairs and Tourism and of Water Affairs and Forestry, as

provided for in the Nuclear Energy Act, 1999 (Act 46 of 1999),
- the basic principles and evaluation/authorisation processes for radioactive waste-management plans
- a national radioactive waste-classification scheme
- a long-term radioactive waste management fund
- the best long-term option for spent-fuel management.

The Department of Minerals and Energy conducted several workshops in areas situated close to nuclear installations to gather public input during 2004. The Policy was expected to be finalised by the end of 2004.

The Department also recommended during 2003 that the International Convention on the Safe Management of Spent Nuclear Fuel and Radioactive Waste be signed by South Africa.

An agreement containing regulations governing plastic shopping bags was signed in September 2002 by the 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, but that manufacturers will be allowed to continue using their existing machinery to make bags of 24-micron thickness for the next 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 if the ink is not environmentally friendly. In situations where the ink is acceptable, this area can be increased to 50%. A toll-free line was established by the Department to deal with queries relating to plastic bags.

The plastic bags agreement and supporting regulations have dramatically reduced the environmental impact of this highly visible waste stream, resulting in a 50% reduction in the consumption of plastic bags since the introduction of the regulations. 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 (SABS). The Department commissioned a study to determine the impact of the regulations, which was expected to be completed in December 2004.

The Minister of Finance, Mr Trevor Manuel, approved a revised levy on plastic bags in May 2004. The levy of three cents per bag, applicable to all sizes of plastic shopping bags, was implemented with effect from 1 June 2004. The three-cents-per-bag levy is used to address environmental objectives and accommodate concerns relating to employment and competitiveness of the affected industries. A portion of the revenue raised is used to promote the recycling of plastic waste and general environmental awareness among all sectors of society.

The Deputy Minister of Environmental Affairs and Tourism, Ms Rejoice Mabudafhasi, announced at a workshop hosted by the Association of Cementitious Material Producers in February 2004, that government was in the process of developing waste tyre regulations. These regulations will focus on environmental performance as well as a waste-tyre management system. To complement the regulations, the tyre industry has agreed to sign a Memorandum of Agreement in which they will agree to certain targets with respect to the collection and recycling of waste tyres.

The burning of waste tyres to retrieve metal wires causes serious environmental pollution.

The Department of Environmental Affairs and Tourism is implementing the National Waste Management Strategy projects. The main components of the Strategy are waste information, healthcare waste recycling, and capacity-building. The projects aim to show visible results through the implementation of decentralised, or on-the-ground demonstration and pilot projects.

Water-quality management

The Directorate: Water-Quality Management of the Department of Water Affairs and Forestry is responsible for the quality management of national water resources in South Africa.

Water-quality management involves the maintenance of the fitness of water resources for use on a sustained basis, by achieving a balance between socio-economic development and environmental protection. From a regulatory point of view, water-quality management entails the ongoing process of planning, development, implementation and administration of water-quality management policy; the authorisation of water-uses that may have, or may potentially have, an impact on water quality; as well as the monitoring and auditing of the aforementioned.

The National Water Act, 1998 (Act 36 of 1998), further enables the Department of Water Affairs and Forestry to manage water quality through source-directed and resource-directed measures. Source-directed measures include the issuing of licences to water users with a potential impact on the resource.

The Act requires that all significant water resources be classified in accordance with the prescribed classification system. (See chapter 23: *Water affairs and forestry*.)

Air pollution

The Air-Quality Management Bill was approved by Parliament in 2004.

The Chief Directorate: Regulatory Services was established in September 2003 in the Department of Environmental Affairs and Tourism. Its main function is the effective implementation of the Department's pollution and waste-management compliance, enforcement and protection responsibilities.

The Chief Directorate is building close working relationships with other specialised government organisations such as the Scorpions, the Asset Forfeiture Unit, the Joint Anti-Corruption Task Team, the South African Police Service's Forensic Science Laboratory, and the South African Revenue Service.

By mid-2004, the Department of Environmental Affairs and Tourism was working on various initiatives aimed at attaining an increase in environmental enforcement.

This includes officials from all spheres of government training as dedicated environmental management inspectors.

The Bill, which will repeal the Atmospheric Pollution Prevention Act, 1965 (Act 45 of 1965), seeks to give effect to the integrated pollution and waste-management policy to ensure that all South Africans have access to clean air.

The National Environmental Management Act, 1998 introduced the 'polluter pays' principle. The Air-Quality Management Bill turns this into a reality and takes the principle to a new level. The Bill provides for cost-recovery, and for ambient and emission monitoring by industry itself.

It provides for stiff penalties for non-compliance, with fines up to the maximum allowed by the Criminal Procedure Act, 1977 (Act 51 of 1977), and jail sentences of up to 10 years.

Although the Bill contains a list of initial ambient air-quality standards, a protocol for the setting of new standards was drafted, and an initial round of standard-setting was expected to commence before the end of 2004. This included the identification of hot-spots for prioritised action, the listing of activities requiring atmospheric-emission licences, and the listing of controlled emitters.

The Department of Environmental Affairs and Tourism is in the process of establishing several initiatives aimed at ensuring better air quality.

Durban South, in KwaZulu-Natal, is the second-largest industrial area in South Africa, and home to several fuel refineries, a pulp-and paper-mill, sugar refineries and a number of smaller industries. Eleven air-pollution monitoring stations were launched in the basin in January 2004, in response to the high levels of industrial pollution in the area. The stations form part of the Multi-Point Plan approved by the Cabinet in November 2000.

The Vehicle Emission Strategy, which forms part of the Air-Quality Management Bill, is designed to ensure that emissions from vehicles do not lead to unacceptably poor air quality. The Strategy will enable the development of regulations, which will mandate the setting of tailpipe emission standards, and which will be phased in over a period of 10 years. The Department of Transport will enforce these standards as part of the vehicle roadworthy testing regime. The Draft Strategy was published for comment in November 2003.

The Ambient Air Standards give guidelines in terms of acceptable emissions into the atmosphere, as well as the monitoring and enforcement of transgressors. A standard-setting technical committee convened by the Department of Environmental Affairs and Tourism, and facilitated by the SABS, developed two technical documents which recommend limit values and levels of tolerance for various priority pollutants and provide scientific basis for the setting of those standards. A process for the peer review of these technical standards documents has been initiated. It was expected that the Standards would be promulgated by early 2005.

Marine pollution

More than 80% of marine pollution originates from land-based sources such as pipeline discharges, rivers and stormwater run-off.

There are many places where water or water containing waste is discharged into the sea. Forty sea outfalls have been formalised through exemptions issued by the Department of Water Affairs and Forestry in terms of the Water Act, 1956 (Act 54 of 1956).

The same principles used for the issuing of other water-use licences apply to licences for sea outfalls. Such effluents include raw and treated sewage, industrial effluents, or a mixture of the two. In the past, many of these discharges were made into the surf zone, or even onto the shore, but the current tendency is to extend the pipelines further offshore. Permit conditions generally include the monitoring of adverse effects of such discharges in the marine environment.

An increasing source of concern is non-point-source pollution, especially pollution originating from the burgeoning informal settlements that form part of many coastal cities. Such pollution is generally the result of inadequate sanitation and other infrastructure, and is very difficult to control or monitor.

Shipping also contributes significantly to marine pollution, particularly with regard to specific types of pollutants. Of the estimated 6,1 million mt of oil entering the oceans every year, some 45% originates from shipping activities.

The balance comes from industrial discharges, urban run-off, and oil exploration and production – which contributes only 2%. Of the pollution emanating from shipping activities, the majority comes from vessel operations, with only 12% from tanker accidents.

Nevertheless, due to the notorious sea conditions along its coastline, South Africa has experienced a number of major oil spills, and, as a consequence, has a well-developed response capability. This includes contingency plans, salvage tugs, dispersant spraying vessels, a reconnaissance aircraft, and a stockpile of oil-spill-response equipment.

Other pollutants linked to the operational activities of ships include sewage and garbage, ballast water discharges, air pollution, and cargoes which enter the sea through accidents. Sewage, garbage and air pollution are regulated by annexes to MARPOL, an international convention controlling pollution from ships, to which South Africa is a party. New regulations to control ballast water discharges are being developed.

A major concern is the translocation of alien species, including pathogens, which may have serious ecological, social (public health) and economic consequences. South Africa is involved in an international project aimed at implementing international guidelines on ballast water management in developing countries.

Another potential source of marine pollution is the dumping of waste at sea. This activity is regulated under the Dumping at Sea Control Act, 1980 (Act 73 of 1980), and, since 1995, has excluded indus-

In September 2004, the Deputy Minister of Environmental Affairs and Tourism, Ms Rejoice Mabudafhasi, launched the 2004 National Atmospheric Week in Rustenburg in the North West.

The Week is celebrated to raise awareness about atmospheric pollution in the country.

Activities for the Week, 13 – 18 September 2004, included:

- a National Climate Change Committee Workshop
- International Ozone Day, which focused on the alternatives to methyl bromide as a fumigator in the agricultural sector
- Ozone Layer Preservation Day, which was celebrated in KwaZulu-Natal
- the National Global Climate Change school competition.

trial waste. The main categories of waste dumped in South Africa are dredged material from the ports; obsolete vessels; and, occasionally, spoiled cargoes.

Chemicals

Although relatively small by international standards, the chemical industry is a significant player in the South African economy, contributing about 5% to Gross Domestic Product and providing employment to about 200 000 people. The industry produces 1 301 t of primary and secondary process chemicals annually, making it the largest of its kind in Africa.

Several steps have been taken to align current legislation with the Constitution of the Republic of South Africa, 1996 (Act 108 of 1996), and with global chemicals management:

- A special unit has been set up in the Department of Environmental Affairs and Tourism to implement a system aimed at preventing major industrial accidents, as well as systems for emergency preparedness and response.
- The Minister has initiated an integrated safety, health and environment approach for the management of chemicals in South Africa. This government-level initiative, funded by the UN Institute for Training and Research, will involve a multi-stakeholder forum, including labour representatives, and aims to integrate legislation. At present, the laws governing chemicals are fragmented.

The Department has embarked on a process to develop the South African National Chemicals Profile. The Profile is intended to contribute to a better understanding of the problems relating to the management and impact of chemicals. It will also help to identify important gaps and weaknesses in the existing system, as a first step in defining whether further efforts may be required.

The development of the Profile was motivated by the recommendations of the International Programme on Chemical Safety, as a follow-up to the Rio Declaration on Environment and Development in 1992.

South Africa has signed the Stockholm Convention on Persistent Organic Pollutants, and the Rotterdam Convention on Prior Informed Consent Procedure for Certain Hazardous Chemi-cals and Pesticides in International Trade.

Recycling

Almost every type of paper produced in South Africa has a recycled content. Each ton of waste paper that is recycled saves about 17 pine trees, and a ton of recycled paper saves 3 m^3 of landfill space. South Africa saves 10 million trees annually.

Collect-a-Can celebrated its 10th birthday in April 2003.

Thanks to its efforts, the recycling of cooldrink cans increased from 18% in 1993 to 66% in 2003. This is higher than the recycling rate in the USA and the European Union.

Over the past 10 years, more than 530 t of cooldrink cans and 400 000 t of scrap metal have been recycled.

According to a recent survey by Collect-a-Can, more than 37 000 people earn a living by picking up cans for recyling. In excess of R270 million has been paid to can collectors over the past 10 years.

Urban conservation

Rapid urbanisation and its concomitant environmental impact are posing serious challenges for South African planners and environmentalists.

Up to 16 000 ha of farmland is lost to urban development each year. Low-density urban sprawl and the rapid growth of informal settlements contribute to increasing competition between urban land-users for diminishing space and resources.

As a result, many informal settlements are located on marginal and environmentally sensitive land, posing serious threats to human well-being and ecosystems.

The environmentally friendly use and development of land can be promoted through official planning processes such as integrated development plans and land-development objectives.

New planning and environmental legislation provide for environmental concerns in urban planning and development.

Environmental injustices

The negative effect of asbestos on the environment and other environmental-injustice issues are a priority for the Department.

Efforts that are being undertaken by the South African Government to deal with the asbestos problem include:

- eradicating mine-dumps
- developing occupational health and safety regulations on asbestos
- developing safety standards and establishing a single compensation office
- formulating a code of best practice for the maintenance, demolition and disposal of asbestos-containing material
- abolishing the use of asbestos in road construction
- gradually phasing out asbestos-use in housing.

During 2004, the Department of Environmental Affairs and Tourism paid particular attention to the lethal impact of asbestos on human health. Although no asbestos is currently mined in South Africa, and 65 of the country's major mines have been rehabilitated, much still needs to be done.

In terms of the amendments to the Environment Conservation Act, 1989 (Act 73 of 1989), government can control products even before they become waste.

Government was expected, during 2004, to publish regulations prohibiting the use of asbestos.

International co-operation

The Department promotes South Africa's interests by participating in a number of international commissions, such as the International Commission for the Conservation of Atlantic Tunas, the Commission for the Conservation of Antarctic Marine Living Resources, and the International Whaling Commission.

South Africa, through the Department, has adopted the Benguela Fisheries Interaction and Training (BENEFIT) Programme and the Benguela Current Large Marine Ecosystem (BCLME) Programme as integral parts of the New Partnership for Africa's Development (NEPAD) initiative.

BENEFIT is a joint initiative between South Africa, Namibia and Angola to conduct scientific investigations into commercially important living marine resources and their interactions with the environment in the Benguela region.

The BCLME Programme is another initiative by these three countries to facilitate the sustainable management and protection of the Marine Ecosystem. It is primarily aimed at improving the structures and capacities of these three countries to deal with problems and issues which occur across national boundaries, so that the ecosystem may be managed as a whole.

The following important instruments have been acceded to, or ratified:

- Agreement for the Implementation of the Provisions of the UN Convention on the Law of the Sea on 10 December 1982 Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (Straddling Stocks Agreement)
- Agreement on the Conservation of Albatrosses and Petrels (ACAP)
- Convention for the Protection, Management and Development of the Marine and Coastal Environment of the East African Region and Related Protocols (Nairobi Convention)
- Convention for Co-operation in the Protection and Development of the Marine and Coastal Environment of the West and Central African Region and Related Protocol (Abidjan Convention)
- Southern African Development Community (SADC) Protocol on Fisheries.

United Nations Framework Convention on Climate Change (UNFCCC)

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 greenhouse gas 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 greenhouse gases (the greenhouse gases exclude those listed in the Montreal Protocol)
- formulate, implement and update national and regional programmes containing measures to mitigate climate change
- promote and co-operate in the development and transfer of technology that controls, reduces or prevents anthropogenic emissions of greenhouse gases
- promote sustainable management, conservation and enhancement of sinks and reservoirs of greenhouse gases
- co-operate 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 on the economy, public health and the quality of the environment
- promote and co-operate in the timeous and transparent exchange of information, including scientific, technological, socio-economic and legal information and research
- promote and co-operate in education, training and public awareness
- report to the Conference of the Parties (COP).

South Africa acceded to the Kyoto Protocol in July 2002. As a signatory party, it is required to submit an initial national communication to the UNFCCC Secretariat reporting, among other things, on national circumstances, the national greenhouse gas inventory, vulnerability and adaptation, mitigation options, and preliminary needs assessments. To prepare this document, the Department of Environmental Affairs and Tourism commissioned detailed country studies to be undertaken to evaluate a broad range of likely climate change impacts in South Africa. The results of these studies were compiled into the initial national communication to the UNFCCC Secretariat, which was submitted during the ninth COP of the UNFCCC that was held in Milan, Italy, in December 2003.

The Kyoto Protocol provides for economic instruments to be used while trying to achieve the objectives of the Convention. Three mechanisms have been created and only one, the Clean Development Mechanism (CDM), involves the participation of developing countries like South Africa. The functions of operationalising the CDM have been delegated to the Department of Minerals and Energy. This Mechanism allows developed countries to conduct greenhouse gas-reducing projects in South Africa while assisting South Africa with sustainable development.

On 14 September 2004, the Minister of Environmental Affairs and Tourism, Mr Marthinus van Schalkwyk, and his Norwegian counterpart, Mr Svein Ludvigsen, signed a R40-million Marine Fisheries Business Plan for the period 2005 to 2009 in Cape Town.

The Plan is expected, among other things, to provide the fishing industry with much-needed research capacity, skills training and the tools to develop coastal communities.

Norway and South Africa have co-operated in marine fisheries since 1996. In 2000, this co-operation was formalised in a programme that has focused on policy and legislation development, scholarships and training, scientific capacity-building, and the management of subsistence fisheries.

The value of the Norwegian marine fisheries assistance to South Africa over the past 10 years is estimated at over R45 million.

About half of all historically disadvantaged scientists employed by the Marine and Coastal Management Branch have been trained in Norway.

Convention on International Trade in Endangered Species (CITES)

CITES, also known as the Washington Convention, was negotiated in 1973 when it was realised that international trade in wildlife and wildlife products could lead to the over-exploitation of certain species, thereby threatening them with extinction.

CITES came into force in South Africa on 13 October 1975. 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.

South Africa attended the COP 13 of CITES, which took place in October 2004, in Bangkok, Thailand. The COPs role is to assess the implementation of the Convention and make recommendations to improve its effectiveness, as well as amend the appendices. The parties meet every two and a half years.

Leading up to the COP, parties submit proposals for interpretative resolutions and amendments to the appendices of the Convention. Species may be added to the appendices, transferred between appendices, or removed from the appendices. At the COP, procedures for control of the trade in species of fauna and flora listed in the appendices are examined and adapted where necessary.

In 2004, South Africa made proposals on the black rhino and leopard.

Montreal Protocol

South Africa, as a signatory to the Montreal Protocol, has a national obligation to safeguard the ozone layer from depletion.

South Africa has phased out chlorofluorocarbons (CFCs), 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 (ODSs), the following control measures constitute the overall position of South Africa on the Montreal Protocol:

- working groups were constituted to assist government to implement the Protocol
- regulated ODSs 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),
- ODSs can only be imported after an environmental levy of R5 per kg of CFC has been paid
- information is disseminated to interested and affected parties
- Africa Network Meetings, as arranged by the UN Environment Programme, are attended, where views, experiences and problems are shared to improve and co-operate within the region and as per NEPAD requirements.

Obligations include:

- ensuring that South Africa, as a party to the Protocol, protects human health and the environment against harm from human activities which 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 ODSs as collected from dealers and relevant departments.

The Department of Environmental Affairs and Tourism has embarked on a national project to

The World Wildlife Fund (WWF) presented its prestigious Gift to the Earth Award to South Africa in July 2004.

The Award is made by the WWF to countries in recognition of globally significant conservation achievements that address biodiversity protection, and the global threats posed by the unsustainable use of resources.

South Africa received the Award in recognition of its four new marine protected areas.

It is the third time South Africa has received an award from the WWF.

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 must reduce their respective methyl bromide consumption by 20% as per phase-out timetable.

International Agreement on the Conservation of Albatrosses and Petrels

The ACAP, which South Africa ratified in November 2003, came into force on 1 February 2004. South Africa became the fourth country to ratify the Agreement, following Australia, Ecuador and New Zealand.

The ACAP aims to reduce the threat of extinction of the 28 species of albatrosses and larger petrels covered by the Agreement. All these species are killed as by-catch in longline fishing operations. The birds attempt to snatch baited hooks as they are being deployed, and are then dragged beneath the sea surface and drowned. Simple effective by-catch mitigation measures, such as bird-scaring streamers and line-setting at night, need to be widely adopted if these birds are to be saved from extinction.

The Agreement, which includes an action plan, describes a number of conservation measures to be implemented by signatory states to improve the conservation status of the increasingly threatened albatrosses and larger petrels.

Apart from reducing seabird by-catch from longline fishing, these include research and monitoring, the eradication of introduced species such as rats and feral cats at breeding sites, the reduction of disturbance and habitat loss, and the reduction of marine pollution.

South Africa is particularly important in the conservation of albatrosses and petrels, since it is a range state to 15 of the 28 species covered under the ACAP. South Africa's sub-Antarctic Prince Edward Islands are important breeding sites for nine of these species, most of which have a formal threatened conservation status.

The Prince Edward islands are particularly important to the wandering albatross, hosting more than 40% of the world's population of this species. The wandering albatross is the largest of all albatrosses, with a wingspan of up to 3,5 m. It is expected that South Africa joining the ACAP will boost conservation-related research on the islands, allowing for the best management of these important populations of threatened species.

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, and more than 30 botanical and horticultural organisations. Among these are:

- BirdLife South Africa
- Wildlife and Environment Society
- Worldwide Wildlife Fund South Africa
- Green Trust
- Earthlife Africa
- Endangered Wildlife Trust
- Wilderness Trust of Southern Africa
- Environmental Justice Networking Forum
- Dolphin Action Protection Group
- Keep South Africa Beautiful
- Trees and Food for Africa
- South African National Foundation for the Conservation of Coastal Birds
- Rhino and Elephant Foundation
- EcoLink.

Acknowledgements

BuaNews
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Department of Environmental Affairs and Tourism
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South African National Biodiversity Institute
South African National Parks
www.southafrica.info
www.collectacan.co.za
www.gov.za

Suggested reading

Beinart, W. *Rise of Conservation in South Africa: Settlers, Livestock and the Environment, 1770 – 1950*. Oxford: Oxford University Press, 2002.
Bethlehem, L. and Goldblatt, M. *The Bottom Line: Industry and the Environment in South Africa*. Rondebosch: University of Cape Town Press, 1997.
Bond, P. *Unsustainable South Africa: Environment, Development and Social Protest*. Pietermaritzburg: University of Natal Press, 2002.
Clarke, J. *Back to Earth. South Africa's Environmental Challenges*. Halfway House: Southern Book Publishers, 1991.
Dovers, S. ed. *South Africa's Environmental History: Cases and Comparisons*. Cape Town: David Philip, 2002.
Ecology and Empire: Environmental History of Settler Societies. Editors: T. Griffiths and L. Robin. Pietermaritzburg: University of Natal Press and Keele University Press, 1997.
Environmental Potential Atlas for South Africa. Editors: W. van der Riet *et al*. Pretoria: Van Schaik for the Department of Environmental Affairs and Tourism, 1997.
Environmental Management in South Africa. Editors: R.F. Fuggle and M.A. Rabie. Rev. ed. Cape Town: Juta, 1996.
Fuggle, R.F. and Rabie, M.A. *Environmental Management in South Africa*. Cape Town: Juta, 1992.
Going Green: People, Politics and Other Environment in South Africa. Editors: J. Cock and E. Koch. Cape Town: Oxford University Press, 1991.
Hattingh, J. *et al*. eds. *Environmental Education: Ethics and Action in Southern Africa*. Pretoria: Human Sciences Research Council (HSRC), 2002.
Hosking, S. *Exploring the Case for Increasing Glass Recycling Through Regulation*. Pretoria: HSRC, 2000.
Hugo, M. L. *Environmental Management: An Ecological Guide to Sustainable Living in South Africa*. Pretoria: Ecoplan, 2004.
Hulme, D. and Murphee, M. eds. *African Wildlife and Livelihoods: The Promise and Performance of Community Conservation*. Cape Town: David Philip, 2001.
Koch, E. *et al. Water, Waste and Wildlife: The Politics of Ecology in South Africa*. Johannesburg: Penguin, 1990.
Kok, P. and Pietersen, J. *Biodiversity*. Pretoria: HSRC, 2000 *(National Research and Technology Foresight Project)*.
Kok, P. and Pietersen, J. *Environmental Management*. Pretoria: HSRC, 2000.
McDonald, D. ed. *Environmental Justice in South Africa*. Cape Town: University of Cape Town Press, 2002.
Mills, G. and Harvey, M. *African Predator*. Cape Town: Struik, 2001.
Nürnberger, K. *Prosperity, Poverty and Pollution: Managing the Approaching Crisis*. Pietermaritzburg: Cluster Publications, 1999.
Payne, A.I.L. and Crawford, R.J.M. *Oceans of Life off Southern Africa*. 2nd ed. Cape Town: Vlaeberg, 1995.
Phezulu, L. *Leigh Voigt's African Album: A Miscellany of Paintings, Curiosities, Lore and Legend by a Bushveld Naturalist*. Cape Town: David Philip, 1999.
Restoring the Land: Environment and Change in Post-Apartheid South Africa. Editor: M. Ramphele. London: Panos, 1991.
Ritchie, J. *The Environment Funding Guide: A Comprehensive Guide to Raising Funds for the Environment*. Cape Town: Papillon Books for Nedbank, c.1997.

South Africa. Editor: J. Haape. 2nd ed. Basingstroke (UK): GeoCentre International, 1995.
Van Oudtshoorn, F. *Guide to the Grasses of South Africa*. Photographs by E. van Wyk and F. van Oudtshoorn. Pretoria: Briza, 1999.
Van Wyk, B. and Gericke, N. *People's Plants: A Guide to Useful Plants of Southern Africa*. Pretoria: Briza, 1999.
Weinberg, P. ed. and photographer. *Once We Were Hunters: A Journey with Indigenous People*. Cape Town: David Philip, 2000.
White Paper on the Conservation and Sustainable Use of South Africa's Biological Diversity. Pretoria: Department of Environmental Affairs and Tourism, 1997.
Wildlife of Southern Africa: A Field Guide to the Animals and Plants of the Region. Editors: V. Carruthers and M. Pearson. Halfway House, Gauteng: Southern Book Publishers, 1997.