



## INTRODUCTION

South Africa is ranked as the third most biologically diverse country in the world and is home to a number of global hotspots of biodiversity<sup>11</sup> (WCMC, 1992). The Western Cape Province is fortunate to house two of these globally recognised hotspots – the Cape Floristic Region (CFR) and the Succulent Karoo (Figure 4.1). The CFR, one of the world's six plant kingdoms, is unrivalled in its richness of plant species with over 9 000 species, half of which are found nowhere else on earth. The Succulent Karoo, the only entirely arid global biodiversity hotspot, contains unique and highly specialised plants and animals. Almost 40% of the more than 6 300 plant species that occur here are endemic to this region (CNC, 2000). This irreplaceable biodiversity plays a very important role in maintaining and improving the quality of life of the people of the Western Cape through the ecosystem services it provides (e.g. fishing, grazing, tourism, clean water and air). These ecosystem services, and many more, rely on the existence of healthy functional ecosystems. However, the increasing social and economic demands of human activities in the Western Cape are placing ever increasing pressures on the province's unique and fragile ecosystems, undermining the very resource base which supports human well-being.

Measuring the health of the biodiversity of the Western Cape is an important task, providing information on the current status of the ecosystems which support life (including human life) in the Province. At present, no single measure exists for assessing the current status of the entire complexity of biodiversity. The majority of existing measures assess a single component of biodiversity, such as threatened species, while most other measures evaluate the drivers which impact on the health of biodiversity, such as land cover or climate change.

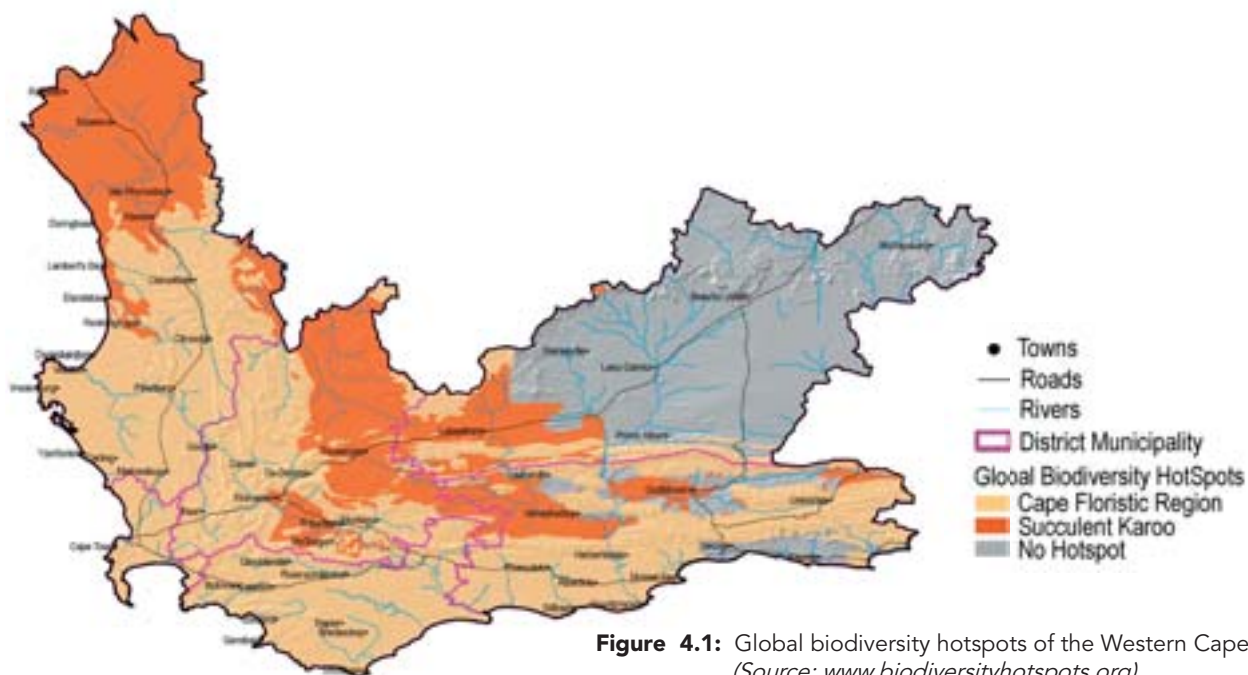
### The issues reported on in this chapter include:

- The loss and fragmentation of natural habitat ;
- Invasion by alien species; and
- Alteration of the fire regime.

## DRIVERS AND PRESSURES

Some of the driving forces and pressures that influence biodiversity in the Western Cape include:

**Land-cover change** – The conversion of natural ecosystems to areas for cultivation, commercial forestry, urban development and mining is one of the most significant drivers of decline in ecosystem health. The Western Cape has experienced significant change in its natural land cover. In 1996, land cover comprised almost 18% under cultivation, 3% degraded and the remainder mostly under natural cover (Table 3.1). Since 1996, land cover has changed dramatically in the Western Cape; however, no recent data on land cover exist for the province as a whole.



**Figure 4.1:** Global biodiversity hotspots of the Western Cape (Source: [www.biodiversityhotspots.org](http://www.biodiversityhotspots.org))


**Table 4.1:** Land Cover of the Western Cape based on 1996 Land Cover Data (Source: Thompson 1996)

| Land cover             | Percentage of Western Cape |
|------------------------|----------------------------|
| Cultivated Lands       | 17.41%                     |
| Degraded Lands         | 2.90%                      |
| Urban / Built-Up Lands | 0.82%                      |
| Forest Plantation      | 0.83%                      |
| Mines & Quarries       | 0.01%                      |
| Grassland              | 0.93%                      |
| Forest & Woodland      | 0.48%                      |
| Thicket & Bushland     | 75.97%                     |
| Waterbodies            | 0.38%                      |
| Wetlands               | 0.18%                      |

**Agricultural expansion** – According to figures from CapeNature, the total area of virgin land approved for cultivation in the Western Cape by the National Department of Agriculture, over the period 1989 to 2003, was approximately 45 550ha (456km<sup>2</sup>) (Verna Bowie, *pers com*). (Virgin land is defined as pristine veld, or agricultural land that has been fallow for ten years or more.) Of the area approved for cultivation over the period 1989 to 2003, nearly 80% was on the West Coast, where seed potato farming is expanding rapidly. Seed potato farming in the sandveld area of the West Coast relies on borehole irrigation, and is resulting in unsustainable rates of abstraction of groundwater as well as large-scale loss of natural habitat. The agricultural sector plays an important economic role in the province and is a major employer. Ways of achieving growth in the agricultural economy without placing further stress on threatened ecosystems and scarce water resources should be sought.

**Urban sprawl** – The expansion of human settlements increases the demand for land and the transformation and use of natural environment. Habitat destruction and fragmentation through urban sprawl is one of the most serious





threats to biodiversity in the Western Cape. Poor planning (such as the location of settlements in environmentally sensitive areas) and low urban densities increase the impact on the natural environment, unnecessarily. The Western Cape's population is expanding rapidly, chiefly as a result of in-migration. In this context, the role of clear urban edges and increased urban densities is not simply to improve the functioning of urban settlements and make public transport viable, but also to protect surrounding natural and agricultural land from urban encroachment.

**Economic Growth and Development** – An increase in economic growth and development results in an increase in the demand for natural resources and in the generation of pollution and waste. While economic growth is essential for the province, sustainable ways of achieving growth which limit and minimise the demands and impacts on the environment need to be sought.

**Climate change** – There is a growing body of evidence showing that climate change is already having significant impacts on the biodiversity and ecosystem services of South Africa and particularly the Western Cape (Foden et. al. 2003, Bond et. al. 2003). In addition to the impacts on biodiversity, the South African Country Study on Climate Change predicted that the most dramatic responses to climate change would be in the biodiversity and human health sectors (Van Jaarsveld and Chown 2000). A very disturbing prediction is the complete loss of the Succulent Karoo biome, as well as parts of the Fynbos biome and many of the drought sensitive plants (NBI, 2001). The rugged nature of the Western Cape provides some niches for plants to survive and the moderating effect of the ocean should help some of the coastal species. The protection of these habitats is thus of the utmost importance, as is the management of secondary effects (alteration in fires and pollinators) likely to exacerbate the impacts of climate change.

**Modification of rivers and water abstraction** – The social and economic demands of water stressed countries, like South Africa, has resulted in significant modification of our rivers along with significant abstraction from these rivers. These pressures on rivers have significant implications for the biodiversity they contain, including animal species and vegetation along their banks. The Western Cape is no exception and many of the province's rivers along with their biodiversity heritage have been significantly, even irreversibly, altered.

**Alien invasive species** – Alien invasive species are a significant driver of biodiversity loss in the Western Cape. The Western Cape has the most serious invasive alien plant problem in South Africa (Le Maitre et. al., 2000), with mountain catchments, riparian zones, and coastal dune systems being particularly badly affected.

**Altered fire regimes** – The fynbos and renosterveld shrublands, typical of many parts of the Western Cape, are both fire-prone and fire-dependent. All plant species in fire-prone shrublands are capable of surviving occasional fires (van Wilgen et. al. 1992a). Many of these plant species actually require fires to stimulate reproduction, and would become extinct in the absence of fires. Fire regimes are therefore an important determining factor for biodiversity in the Western Cape.

## ISSUE: LOSS AND FRAGMENTATION AND LOSS OF NATURAL HABITAT

Biodiversity is lost when natural habitats are transformed and disturbed or when they are broken up into smaller areas, i.e. fragmented. The fragmentation of natural habitats not only reduces the area of a habitat but also isolates one area from another. The distance between areas or fragments and the nature of the environment between them influences organisms' ability to move between natural areas and so influences the

viability of the ecosystem. Different populations of plants and animals require different minimum areas in order to survive. This means that even if an area is set aside for conservation, if it is too small or too isolated, biodiversity may be lost.

### STATE

#### Percentage of habitats lost in relation to conservation targets (i.e. status of terrestrial ecosystems)

Ecosystem status is an indicator which measures the amount of habitat lost in ecosystems (here measured as the vegetation types of Mucina and Rutherford, 2004), relative to conservation targets for those ecosystems. Biodiversity targets are quantitative targets reflecting the minimum area of land required to ensure the persistence of species and ecological processes in those ecosystems. The National Spatial Biodiversity Assessment (Driver et. al. 2005) of South Africa developed biodiversity targets for terrestrial ecosystems which are used in the development of this indicator.

The ecosystem have been placed into one of four categories based on the amount of natural habitat it has:

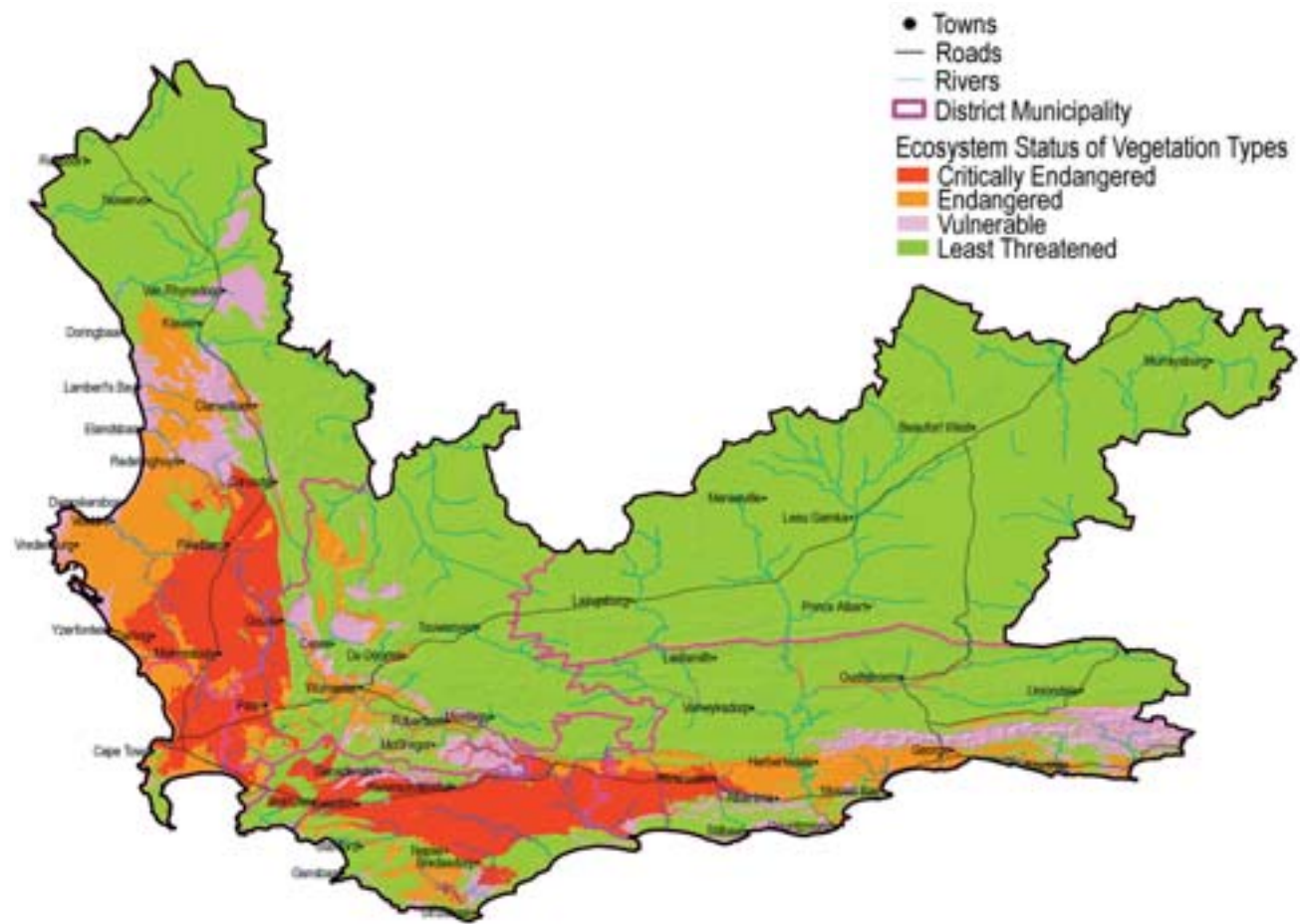
- east threatened ecosystems are still largely intact (more than 80% natural habitat);
- vulnerable ecosystems are reasonably intact, but are nearing the threshold beyond which they will start to lose ecosystem functioning (less than 80% and more than 60% natural habitat);
- endangered ecosystems have lost significant amounts of their natural habitat impairing their functioning (less than 60% natural habitat and less than the biodiversity target), and
- critically endangered ecosystems have so little natural habitat left that not only has their functioning been severely impaired but species associated with the ecosystem are being lost (less than the biodiversity target).

The results reveal that approximately 63% of the vegetation types in the Western Cape occur in the least threatened category (Figure 4.2). Just over 10% of the vegetation types in the province are classified as vulnerable. It is evident in Figure 4.2 that these vulnerable vegetation types are particularly concentrated in the south-east and north-west of the province. Approximately 17% of the vegetation types in the province are endangered. Endangered vegetation types such as Saldanha Granite Strandveld, Peninsula Granite Fynbos and Garden Route Shale Fynbos occur along the entire coastal and lowland areas of the province. A further 9% of vegetation types are critically endangered. Additionally, of South Africa's 21 critically endangered vegetation types, 17 occur in the Western Cape. Piketberg Quartz Succulent Shrubland, Swartland Shale Renosterveld and Elim Ferricrete Fynbos are examples of critically endangered vegetation types. Most of these are lowland renosterveld vegetation types and are restricted to the southern and south western parts of the Western Cape lowland areas (Figure 4.2).

#### Percentage of terrestrial ecosystems protected

The Western Cape has a large number of generally small protected areas which play an important role in biodiversity conservation. However, it is often the case that protected areas are established because of social and economic characteristics of the land rather than biodiversity requirements and as a result the protected area estate is often biased and not representative of the biodiversity in the region. Many of the Western Cape's protected areas are in unthreatened mountainous habitats.

The National Spatial Biodiversity Assessment developed an indicator of protection levels (Driver et. al. 2005) which measures the contribution made by protected areas to the achievement of the conservation targets of each ecosystem measured here as vegetation types (Mucina and Rutherford, 2004<sup>12</sup>).

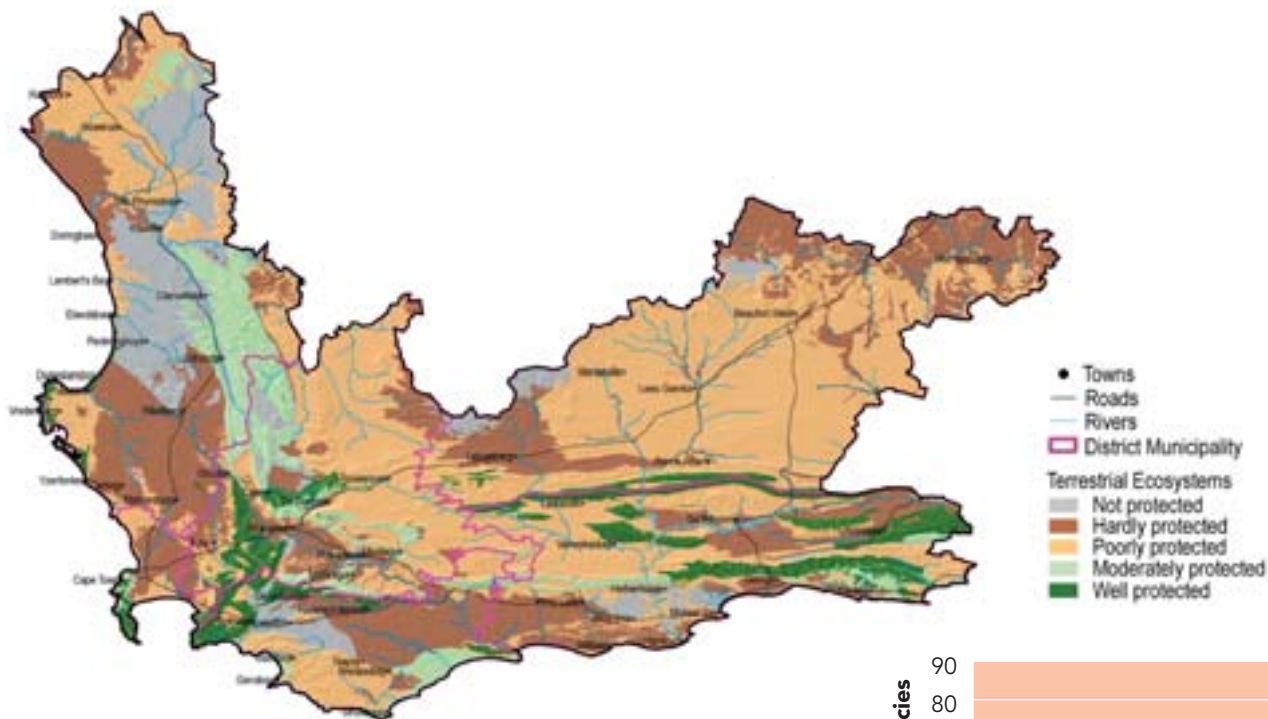


**Figure 4.2:** Ecosystem status of the vegetation types of the Western Cape (Source: Rouget et. al. 2004)

Almost 22% of the provinces' ecosystems are not protected at all (Figure 4.3). A further 54% are hardly protected or poorly protected. Moderately protected ecosystems account for 10%, and well protected ecosystems make up less

than 14% of the Western Cape. Overall, mountain fynbos ecosystems are relatively well protected, while lowland fynbos, succulent karoo and Nama karoo ecosystems are relatively poorly protected.

12. The analysis is limited to Type 1 protected areas which are formal reserves and include National Parks, Provincial Nature Reserves, Local Authority Nature Reserves and Department of Water Affairs and Forestry's Forest Nature Reserves.



**Figure 4.3:** Protection level of the terrestrial ecosystems of the Western Cape (Source: Mucina and Rutherford 2004)

#### Percentage of endemic and threatened species in the Western Cape

Many species in the Western Cape are highly threatened or have become extinct.

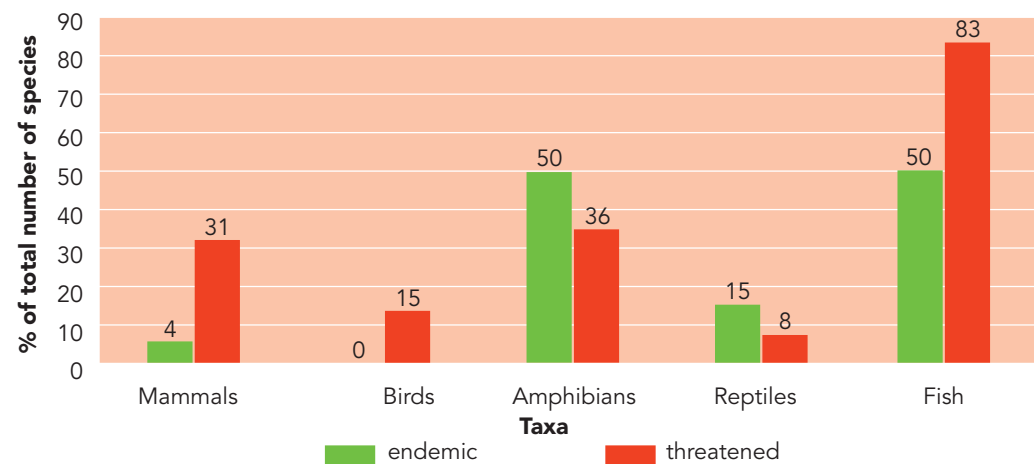
#### Flora

The last red list of plant species was completed in 1997. 1 961 plants that occur in the Cape Floral Region (CFR) were on that list, 42 species on the list were declared extinct and 413 listed as threatened with extinction. This means in 1997, 6% of the Cape flora was threatened with extinction. The red list is currently being updated and has not yet been completed. However some trends have already become apparent and the SANBI threatened species team predict that the red

list will show a minimum of a 20% increase in the number of Cape flora species threatened with extinction. Significant trends that have become apparent to date include a 31% increase in the number of threatened species in the Protea family (*Proteaceae*) and a 12% increase in the family of geophytes (*Amaryllidaceae*).

#### Fauna

CapeNature completed the first state of biodiversity report for the Western Cape in 2000. The report focussed on mammals, birds, amphibians, reptiles and fresh water fish (Figure 4.4). From the report it is clear that the Western Cape supports a significant percentage of the total taxa found in South Africa (57% of mammal species, 50% of bird species, 40% of amphibians, 41% of reptiles and 20% of fish species) (Scientific services, 2000). The report highlighted the fact that many of the taxa mentioned above are endemic<sup>13</sup> to the Western Cape and are threatened.



**Figure 4.4:** The percentage of endemic and threatened species in the Western Cape (Source: CapeNature, 2000)

13. Endemic is a relative concept which means that a species is limited in range to a specified geographical area. This means that species endemic to the Western Cape only occur in the Western Cape.

Figure 4.4 shows that most of the taxa assessed are highly threatened: 31% of mammals, 36% of amphibians and an alarming 83% of fresh water fish (15 of 18 species found in the Western Cape). This makes indigenous freshwater fish the most threatened biotic component in the Western Cape (Impson et. al. 2000).

The amphibian and fish taxa have relatively high levels of endemism at 50%. The province contains 145 reptile species and boasts the highest diversity of terrestrial tortoises in the world. Of the 40 known species worldwide, eight occur in this province. 15% of the reptiles are endemic and are considered to be at a much lower conservation risk compared to the other taxa (only 8% are regarded as threatened) (Baard and de Villiers 2000). There are no birds endemic to the Western Cape Province. There are, however, six species that are endemic to the Fynbos Biome, which extends outside the province. These species are therefore classified as near-endemic species (more than 70% of the population occurs within the province) (Kevin 2000). Apart from birds, the mammals also have a very low percentage of endemism at 3.75%.

Of concern is the large number of species that have become extinct in the province. An estimated 11 mammal (Lloyd 2000) and eight bird species, including the wattled crane, lappetfaced vulture and Cape parrot, are no longer found in the province.

## IMPACTS

- Loss of biodiversity results in a decline in ecosystem service delivery, such as water filtering, the prevention of erosion and the provision of clean air. Declines have a more immediate effect on less affluent communities who are not buffered by technology and wealth from these losses.
- The loss and fragmentation of biodiversity can lead the degradation of landscape quality and a loss of natural amenities for tourism and human use, such as recreation.
- The loss of biodiversity also results in long term economic costs as technological and other means have to be found to replace the resources and services we currently derive from the natural environment.

## ISSUE: INVASION BY ALIEN SPECIES

Alien species are those species that have been relocated outside of their normal distribution ranges. A relatively small number of these become invasive – that is they display the ability to reproduce and spread in their new environment, often dominating vegetation and water bodies or displacing native species. Thousands of plant species from other parts of the world have been introduced to the Western Cape for a range of purposes – as crop species, for timber and firewood, as garden ornamentals, for stabilizing sand dunes and as barrier and hedge plants. A small number of these are invasive. These invasions come at a considerable cost to the economy and the environment. Certain human activities such as poor land management and the disturbance of the natural vegetation facilitate alien plant invasions.

Many of the important invasive alien species are large woody trees, including pines, Australian wattles, hakeas and myrtles, and mesquite in drier Karoo areas. Up to 70% of the remaining natural fynbos is invaded to some degree by alien plants, about 2.5% severely so (Rouget et. al. 2003). In the Western Cape, invasive alien plant species use significant amounts of water (van Wilgen, Cowling, Burgers 1996), and are a threat to the biodiversity of fynbos and other ecosystems, where thousands of endemic plant species are at risk. The Western Cape is also affected by invasive

alien animals, notably freshwater fish, and a few important invertebrates. Invasive alien freshwater fish are widespread in our rivers, and include species of bass, trout, bluegill and carp. Invasive alien invertebrates include the Argentine ant and the parasitic Varroa mite. Invasive mussel species are also increasingly displacing indigenous species along the Western Cape coastline.

## STATE

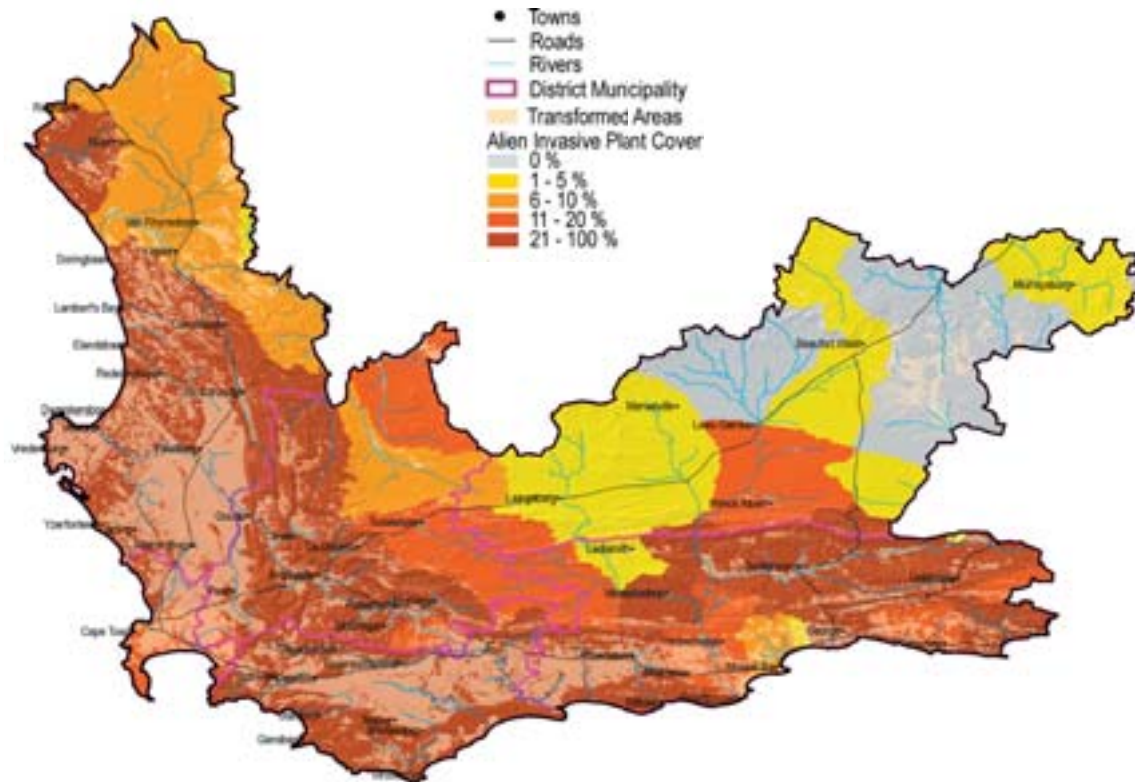
### Percentage of land covered by alien invasive plant species

Versveld et. al. (1998), Lloyd et. al. (1999) and Rouget et. al. (2003) have developed data layers on the distribution of invasive alien plant species in the Western Cape. Working for Water has adapted the database of Versveld et. al. (1998) which is presented in Figure 4.5.

Figure 4.5 illustrates the high levels of invasive alien plant infestation in the Western Cape, particularly in the South West and coastal catchments with some of these catchments showing more than 80% coverage by invasive alien plants. Alien plants contribute significantly to veld degradation, loss of indigenous vegetation and the high consumption of limited water in many of the river catchments, affecting catchment yields. The percentages represented in the figure above give an indication of current coverage by alien plants. This will have to be recorded on an ongoing basis in order to monitor this issue.

The use of biocontrol (for example the introduction of a certain type of wasp which prevents Port Jackson trees from reproducing) has been quite successful in the fight to eliminate alien vegetation. However, the removal of alien vegetation requires long-term commitment and once areas are cleared of alien plants the effective rehabilitation of the land is essential, if erosion and re-infestation are to be avoided.





**Figure 4.5:** Invasive Alien Plant Species Coverage for the Western Cape. (Source: Working for Water, 2005)

Note: White areas represent no data or zero values

#### Distribution of invasive alien freshwater fish in the Cape Floristic Region

Invasive alien fish species and habitat degradation by unsustainable agricultural development have possibly been the greatest constraints to the effective conservation of indigenous freshwater fish in the Western Cape Province. Indigenous freshwater fish frequently share their habitats with highly predatory invasive alien fish species such as the smallmouth bass (*Micropterus dolomieu*), carp

(*Cyprinus carpio*) and rainbow trout (*Oncorhynchus mykiss*) (Figure 4.6). These invasive alien fish species reduce or eliminate indigenous fish populations through predation, competition or habitat alteration. They are widespread in the Western Cape and dominate the fauna of many rivers of the province.

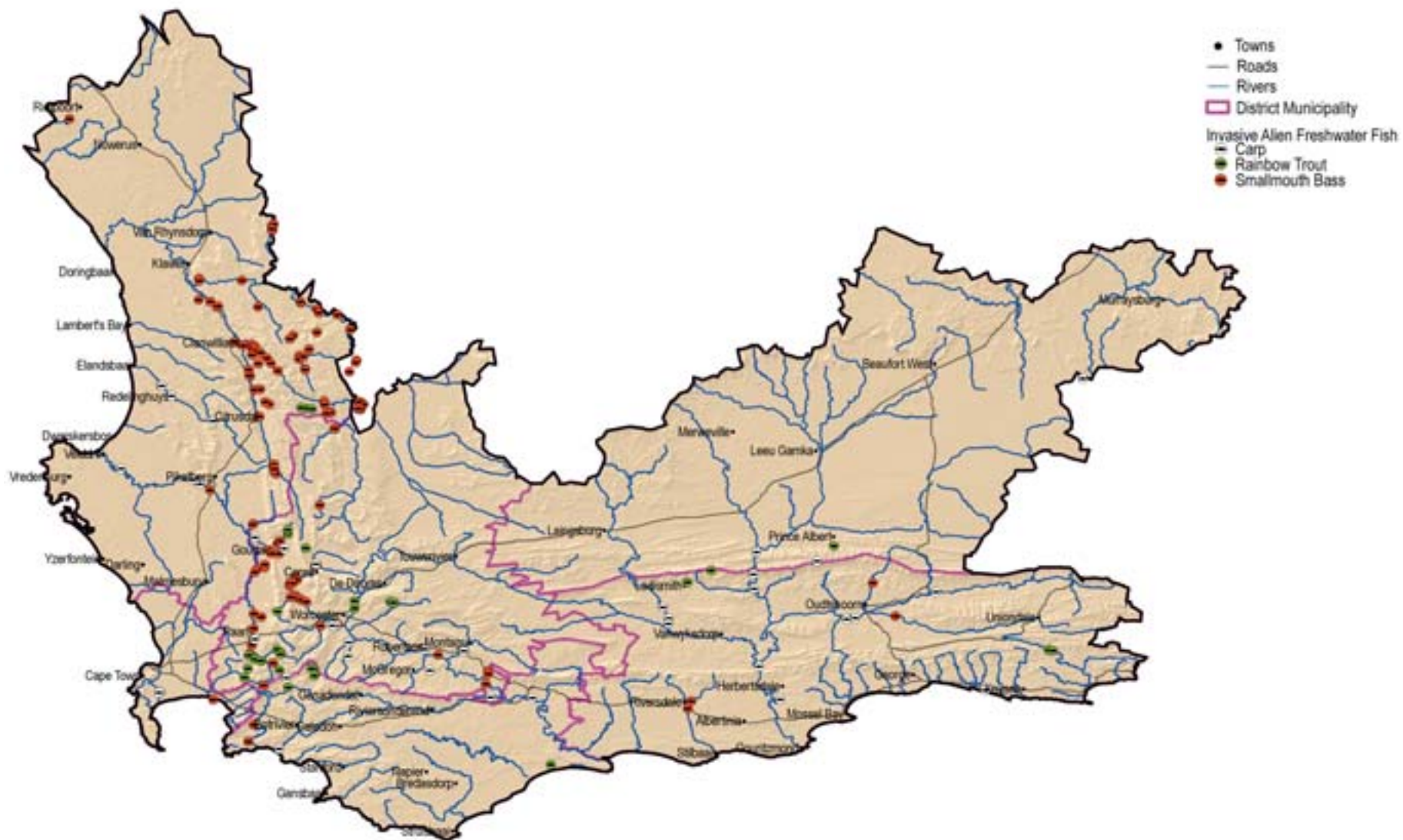
CapeNature has indicated that once a fish species has established itself it becomes almost impossible to eradicate.

Reasons include the absence of biological control agents and the fact that poisons such as Rotenone cannot be safely administered throughout a river system (Impson et. al. 2000).

Figure 4.6 reflects the current distribution of alien fish in the Western Cape, as with alien plants, this will have to be monitored on a continuing basis in order for trends to become established.

#### IMPACTS

- Invasive alien plants compete with indigenous plant species for food, water and space. In many instances the alien plants are hardier, with no natural enemies, and so pose a serious threat to indigenous species.
- Invasive alien fish reduce or eliminate indigenous fish and other animal species through predation.
- Alien plants have been found to use large quantities of water, depleting the province's scarce water resource. They also impact on the water flow and quality within catchment areas.
- Alien vegetation alters the frequency and intensity of fires. Many woody alien plant invaders have oily leaves which mean they burn easily causing fires to spread rapidly. Many aliens also burn with a greater intensity, so that the resulting fires are hotter than they would be naturally.
- Alien plant invaders also increase soil erodibility and erosion rates, by suppressing the ground-layer so that the root mat no longer effectively binds the soil (Le Maitre, 1999). Erosion in turn leads to soil degradation and the siltation of dams.
- The economic impacts of invasive alien plants include reduced water yield, loss of potentially productive land, loss of grazing and livestock production, the poisoning of humans and livestock and increased costs of fire protection (Le Maitre, 1999).



**Figure 4.6:** The distribution of invasive alien freshwater fish species in the Western Cape Province (Source *CapeNature, 2000*)



## ISSUE: ALTERATION OF FIRE REGIMES

The fynbos and renosterveld shrublands, typical of many parts of the Western Cape, are both fire-prone and fire-dependent. All plant species in fire-prone shrublands are capable of surviving occasional fires (van Wilgen et. al. 1992a). Many of these plant species actually require fires to stimulate reproduction, and would become extinct in the absence of fires. Fires would normally occur, on average, every 15 years or so, with actual intervals between fires ranging between four and 40 years. It is very rare to find areas that have not had fire for longer than 25 to 30 years, so the absence of fires for long periods is not as large a concern as fires that are too frequent. For example, if fire frequencies are increased from once in 15 years to once in five years, many plant species that

are killed by fire, and that rely on re-seeding to survive, would become extinct as they would not have enough time to mature and set seeds between fires (van Wilgen et. al. 1992b).

Given the increasing human population of the region, there is reason to believe that human sources of ignition could increase fire frequencies. Two other important factors which influence the fire regime include:

- Invasive alien plant species which result in fires spreading more rapidly and burning with greater intensity; and
- Small conservation areas set aside near to residential or other development. These areas are often prevented from burning as the fires pose a potential risk to the residential dwellings.



## STATE

### Frequency of veld fires

The health of fire-prone and fire-dependent ecosystems can be monitored using simple metrics based on the pattern of fires that occur (van Wilgen et. al. 1994). In the case of fynbos, the proportion of area burned annually should not exceed 10% (exceeding this implies that fire return periods are less than ten years, should this be maintained over many years). In addition, the intervals between successive fires on the same area should have a normal distribution range around the desired mean of ten to 15 years. The ability to monitor these indicators would require good fire records (Richardson et. al. 1994).

These records do not exist for the province as a whole, but some records from veld being managed by Cape Nature indicate that on average 60% of the veld that they manage is six years or younger at present, showing that veld age distribution is concerningly skewed towards young veld. Hence the prescribed fire intervals have been severely compromised with large tracts of land being burned more frequently (seven to ten years). There were 68 fires (approx 37 000 ha) reported on land managed by CapeNature during the 2004/05 fire season. Conservation Managers focus on actions that are aimed at fire suppression as opposed to fire management (i.e. controlling of invasive alien plants, controlled burning in high risk areas, setting up of fire protection agencies with private land owners, adoption of early detection technologies, etc).



## IMPACTS

- The increase in the frequency of fires in the Western Cape is resulting in the young veld being favoured and very little old veld having the chance to become established.
- If fires do not occur frequently enough, some plant species dependent of fires for reproduction may become extinct. This is especially likely in small conservation areas that are set aside in or near housing estates. These areas are generally not burnt as fires pose a potential threat to the surrounding residential development.
- Fires that occur too often or are too intense have the potential to kill many rare plant and animal species.
- Frequent and uncontrolled fires also pose a risk to human health and safety.

### Summary and status of indicators used in this chapter

| Biodiversity Indicators  | How we are doing? | Comment  |
|--|-------------------|--|
| Amount of habitat lost in ecosystems relative to Biodiversity targets (SANBI's status of terrestrial ecosystems) | ☹️                | 63% of our vegetation in least threatened category, but compared to national, we have a high number of critically endangered terrestrial ecosystems. |
| Percentage of ecosystems protected   | ☹️                | Only 14% of our vegetation is well protected.  |
| Percentage of endemic and threatened species in the Western Cape   | ☹️                | Increasing number of plant and animal species threatened with extinction   |
| Percentage of land covered by invasive alien plants  | ☹️                | High, but trend data not available   |
| The distribution of invasive alien fish species  | ☹️                | High, but trend data not available   |
| The frequency of veld fires  | ☹️ ?              | Available data is very limited but reflects that fire patterns are changing.   |

### Indicators Suggested for Future Monitoring

- The National Land Cover database is out-dated this should be updated on a more regular basis.
- Rate of land transformation or change in land use.
- The amount of illegal harvesting of plants and animals.
- The amount of trading of wildlife taking place.
- Classification and assessment of threatened species on regional scale.
- On-going mapping of alien vegetation cover and alien fish distribution is required to monitor these issues.

## RESPONSES

The table below summarises some of the legislation and other initiatives that have been implemented in response to the biodiversity issues discussed in this chapter.

|                      |  |   |
|----------------------|--|---|
| <b>International</b> | <ul style="list-style-type: none"> <li>• Convention on Wetlands of International Importance (Ramsar)</li> <li>• Convention on International Trade in Endangered Species of Fauna and Flora (CITES)</li> <li>• Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention)</li> <li>• World Heritage Conservation Act 49 of 1999</li> </ul>   |    |
| <b>National</b>      | <ul style="list-style-type: none"> <li>• National Environmental Management Act 107 of 1998 (NEMA)</li> <li>• National Environmental Management Protected Areas Act 57 of 2003</li> <li>• National Environmental Management Biodiversity Act 10 of 2005</li> <li>• Environment Conservation Act 73 of 1989 and associated EIA Regulations</li> <li>• Sea Birds and Seals Protection Act 46 of 1973</li> <li>• Marine Living Resources Act 18 of 1998, which aims to conserve marine living resources</li> <li>• Mountain Catchment Areas Act 63 of 1970</li> <li>• National Heritage Resources Act 25 of 1999, and provincial regulations</li> <li>• National Water Act 36 of 1998; particularly the ecological reserve determination</li> <li>• Conservation of Agricultural Resources Act 43 of 1983 [currently being revised] (invasive alien plants)</li> <li>• National Forests Act 84 of 1998 and regulations on protected species</li> <li>• Lake Areas Development Act 39 of 1975</li> <li>• National Environmental Management Draft Coastal Zone and Estuarine Bill (in preparation)</li> <li>• National Biodiversity Strategy &amp; Action Plan (in preparation)</li> <li>• The National Spatial Biodiversity Assessment (Driver et. al. 2005)</li> <li>• Control programmes, such as:               <ul style="list-style-type: none"> <li>– Working for Water</li> <li>– Working on Fire</li> <li>– Working for Wetlands</li> </ul> </li> <li>• River Health Programme</li> <li>• Environmental education and awareness programmes</li> </ul> | <b>Provincial</b> <ul style="list-style-type: none"> <li>• Bioregional programmes such as:               <ul style="list-style-type: none"> <li>– Cape Action for People and the Environment (CAPE)</li> <li>– Subtropical Thicket Ecosystem Plan (STEP)</li> <li>– Succulent Karoo Ecosystem Programme (SKEP)</li> <li>– Biodiversity Corridor initiatives such as Gouritz and Greater Cederberg</li> </ul> </li> <li>• Provincial Spatial Development Framework (PSDF, currently in progress)</li> <li>• Western Cape Nature Conservation Board Act 15 of 1998</li> <li>• CapeNature and its:               <ul style="list-style-type: none"> <li>– State of Biodiversity Programme</li> <li>– Spatial Information Management Programme</li> </ul> </li> <li>• The Fynbos Forum and its ecosystem-specific guidelines</li> <li>• Environmental education and awareness programmes</li> <li>• UNESCO Biosphere in the Western Cape</li> </ul> |
|                      |  | <b>Other (local)</b> <ul style="list-style-type: none"> <li>• City of Cape Town Biodiversity strategy (includes primary and secondary biodiversity networks)</li> <li>• Table Mountain Fund</li> <li>• Cape Argus Ukuvuka Operation Fire-stop initiative</li> <li>• Cape Flats Nature – Biodiversity for the people partnership project</li> <li>• Establishment of conservation areas, e.g. Blaauwberg conservation area</li> <li>• Environmental education and awareness programmes</li> </ul>  |

## LINKS

The theme of biodiversity links to many of the themes in this report, with closest links to:

**Inland Water and Water Supply** – the degradation of freshwater systems, including wetlands, is a critical issue that is resulting in the loss of biodiversity in these ecosystems and related terrestrial and estuarine ecosystems.

**Coastal Zone** – as with inland water the degradation of the coastal environment results in the loss of biodiversity.

**Land** – unsustainable agriculture has resulted in the extensive loss or degradation of natural habitats. Loss and degradation of natural habitat caused by overgrazing, crop production, vegetation removal and overexploitation of the land, among other things, generally leads to habitat fragmentation, impaired ecological functioning and loss of species.

**Urban development** – inappropriate urban development and urban sprawl pose one of the most serious threats to biodiversity in the Western Cape. Poorly planned urban development has already resulted in the loss and fragmentation of many important habitats.

**Tourism** – much of the tourism in the Western Cape is dependent on the natural environment and responsible tourism can aid in the conservation of biodiversity. Inappropriate tourism leads to a loss in biodiversity and the degradation of the natural environment.

## CONCLUSION

The Western Cape's terrestrial biodiversity is generally in a better condition than freshwater and estuarine biodiversity, with 63% of the vegetation falling into the least threatened

category. However some areas, particularly in the north west and interior of the province, are poorly protected or unprotected. Given the uniqueness of biodiversity in the Western Cape and the increasing pressures from human activity, alien vegetation and climate change, the protection of biodiversity and the eradication of invasive alien vegetation remain priority issues for the province.

The Western Cape has been at the forefront of innovative conservation actions in South Africa and the pressures facing the province's biodiversity are relatively well understood. Areas requiring conservation attention have been clearly identified in bioregional programs like CAPE and SKEP. Additionally, the South African National Biodiversity Institute was established in 2004 in terms of the Biodiversity Act. They also have a critical role to play in co-ordinating biodiversity-related data, research and monitoring.

The province does however face some of the greatest threats to biodiversity in the country with many of the above mentioned pressures being greater here than anywhere else in South Africa. There is thus a great urgency to implement appropriate responses to these pressures and, importantly, to monitor the effects of these responses.



## NOTES ON DATA

- The 1996 National Land Cover Database (Thompson 1996) is outdated and does not accurately reflect the current situation of land and terrestrial ecosystems in the Western Cape. The indicator might thus underestimate the current extent of transformed and degraded land cover and number of threatened ecosystems.
- The classification and assessment of threatened species is demanding on resources and therefore is not conducted frequently. Data on the conservation status of mammals, frogs, birds, reptiles and plants are therefore likely to be outdated or on an international rather than regional scale.
- In order to effectively manage alien species, detailed distribution data, as well as data on control efforts, are essential.
- Data on invasive alien fish are available, although it does not always capture the full extent of alien animal infestation and its impacts.
- Indicators of the extent and impacts of invasive alien plants do exist; however, data for these indicators are largely at an inappropriate scale or incomplete for the province. Information on invasive alien animals is far less prevalent than that for plants.

