GENERAL NOTICE

NOTICE 1477 OF 2009

DEPARTMENT OF ENVIRONMENTAL AFFAIRS

NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT, 2004 (ACT NO. 10 OF 2004)

DRAFT NATIONAL LIST OF THREATENED ECOSYSTEMS

I, Buyelwa Patience Sonjica, Minister of Water and Environmental Affairs hereby give notice of my intention to publish under section 52(1)(a) read with section 100 of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004), a draft national list of ecosystems that are threatened and in need of protection in the schedule hereto.

Interested persons are requested to submit written comments to the Director-General: Environmental Affairs, for attention:

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Comments must reach the department within 30 days of the date of notice. Comments after the closing date may not be considered

BUYELWA PATIENCE SONJICA
MINISTER OF WATER AND ENVIRONMENTAL AFFAIRS

SCHEDULE

Threatened Ecosystems in South Africa: General Information

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Acronyms

BMP-E	Biodiversity management plans for ecosystems
BMP-S	Biodiversity management plans for species
CBA	Critical biodiversity area
CR	Critically endangered
DEAT	Department of Environmental Affairs and Tourism
DWAF	Department of Water Affairs and Forestry
EIA	Environmental Impact Assessment
EIP	Environmental Implementation Plan
EMF	Environmental Management Framework
EMP	Environmental Management Plan
EN	Endangered
IDP	Integrated Development Plan
IUCN	World Conservation Union
NEMA	National Environmental Management Act
NLC	National Land Cover
NSBA	National Spatial Biodiversity Assessment
SANBI	South African National Biodiversity Institute
SDF	Spatial Development Framework
SEA	Strategic Environmental Assessment
TOPS	Threatened or Protected Species
VU	Vulnerable

Executive Summary

This document provides background information on the listing of threatened or protected ecosystems, including the purpose and rationale for listing ecosystems, the criteria used to identify listed ecosystems, the implications of listing ecosystems, and summary statistics and maps of listed ecosystems. It is accompanied by another document, *Threatened Ecosystems in South Africa: Descriptions and Maps*, which gives detailed information on each listed ecosystem. **These two documents, together with the spatial data, can be accessed on the BGIS website (http://bgis.sanbi.org).**

References are not provided in this executive summary, but can be found in footnotes in the main document.

The Biodiversity Act (Act 10 of 2004) provides for listing of threatened or protected ecosystems in one of the following categories:

- **critically endangered (CR) ecosystems**, being ecosystems that have undergone severe degradation of ecological structure, function or composition as a result of human intervention and are subject to an extremely high risk of irreversible transformation;
- **endangered (EN) ecosystems**, being ecosystems that have undergone degradation of ecological structure, function or composition as a result of human intervention, although they are not critically endangered ecosystems;
- **vulnerable (VU) ecosystems**, being ecosystems that have a high risk of undergoing significant degradation of ecological structure, function or composition as a result of human intervention, although they are not critically endangered ecosystems or endangered ecosystems;
- **protected ecosystems**, being ecosystems that are of high conservation value or of high national or provincial importance, although they are not listed as critically endangered, endangered or vulnerable

All stakeholders agreed early on that a **phased approach** should be taken to listing ecosystems, given the complexity of the process. The **current (first) phase of listing deals with threatened ecosystems in the terrestrial environment**. Future phases will deal with threatened ecosystems in the freshwater, estuarine and marine environments, and with protected

ecosystems in all environments. According to the Biodiversity Act, the list of ecosystems must be reviewed at least every five years.

At the request of DEAT, SANBI has led the process of identifying threatened ecosystems to be listed, working in close collaboration with provincial conservation authorities, DEAT, Department of Water Affairs and Forestry (DWAF) and relevant experts. **All listed ecosystems have been identified based on carefully developed and consistently applied national criteria**. There has been strong emphasis on the use of best available science as well as on the realities of implementation, to ensure that the list of threatened ecosystems is both scientifically rigorous and implementable.

The Biodiversity Act allows the Minister or an MEC to list ecosystems. The current list consists of national threatened ecosystems identified based on national criteria, and is thus listed by the Minister. A province may develop additional provincial criteria and identify additional ecosystems to be listed by the MEC. However, to avoid confusion this is discouraged until the process of listing national ecosystems has been well established.

The National Spatial Biodiversity Assessment (NSBA) 2004 included early attempts to identify threatened ecosystems. However, the identification of threatened terrestrial ecosystems for the current phase of listing has been much more detailed and comprehensive, using additional criteria and data. This means that the **list of threatened terrestrial ecosystems presented here supersedes the information regarding terrestrial ecosystem status in the NSBA 2004**.

Why list ecosystems?

The White Paper on the Conservation and Sustainable Use of South Africa's Biodiversity (1997) noted that little attention had historically been paid to protection of ecosystems outside protected areas. This laid the basis for the Biodiversity Act to introduce a suite of new legal tools for biodiversity conservation outside protected areas, including listed threatened or protected ecosystems, listed threatened or protected species, bioregional plans, biodiversity management plans for ecosystems or species, and biodiversity management agreements.

The **purpose of listing threatened ecosystems** is primarily to reduce the rate of ecosystem and species extinction. This includes preventing further degradation and loss of structure, function and composition of threatened ecosystems. The **purpose of listing protected ecosystems** is primarily to preserve witness sites of exceptionally high conservation value. For both threatened and protected ecosystems, the purpose includes enabling or facilitating proactive management of these ecosystems. It is likely that ecosystem listing will also play a symbolic and awareness-raising role; however, this is not the primary purpose of listing ecosystems.

The purpose of listing threatened or protected ecosystems is *not* to ensure the persistence of landscape-scale ecological processes or to ensure the provision of ecosystem services, even though listing ecosystems may contribute towards these important goals.

Bioregional plans published in terms of the Biodiversity Act will identify critical biodiversity areas, which will include threatened ecosystems as well as landscape-scale ecological features (such as ecological corridors and important catchments) which are crucial for biodiversity conservation but which will not be protected through listing of threatened or protected ecosystems. A *Guideline Regarding the Determination of Bioregions and the Preparation and Publication of Bioregional Plans* was gazetted for public comment in September 2007 and will be finalised during 2008.

Biodiversity management plans will be a useful tool for active management of threatened ecosystems. Norms and standards for biodiversity management plans for ecosystems have yet to be developed.

How were listed ecosystems identified?

As a starting point, several **principles** were established for identifying threatened or protected ecosystems:

- The approach must be explicit and repeatable;
- The approach must be target-driven[1] and systematic, especially for threatened ecosystems;

[1] Biodiversity targets are explicit quantitative targets that tell us how much of an ecosystem (or other biodiversity feature) needs to be conserved in order to meet our biodiversity goals of representation and persistence. Biodiversity targets are expressed as, for example, numbers of hectares of an ecosystem.

- The approach must follow the same logic as the IUCN approach to listing threatened species, whereby a number of criteria are developed and an ecosystem is listed based on its highest ranking criterion;
- The identification of ecosystems to be listed must be based on scientifically credible, practical and simple criteria, which must translate into spatially explicit identification of ecosystems.

In deciding on the appropriate **spatial scale** for identifying threatened or protected ecosystems, it was important to consider the purpose and rationale for listing ecosystems as well as the legal implications. These two considerations combined require that **listed ecosystems be defined at the local rather than the regional scale**. For the current phase of listing, threatened terrestrial ecosystems have been delineated based on one of the following: the South African Vegetation Map, national forest types recognised by DWAF, priority areas identified in a provincial systematic biodiversity plan, or high irreplaceability forests patches or clusters systematically identified by DWAF. For future phases of listing, ecosystems may be identified at a finer spatial scale than these units, but will not be identified at a broader spatial scale than these units.

The development of **criteria** for identifying threatened terrestrial ecosystems was done through extensive engagement and consultation with provincial conservation authorities, DWAF and relevant experts, and was based on best available science. The criteria and thresholds for critically endangered, endangered and vulnerable ecosystems are summarised in Table 1 and explained in more detail in the main document. If an ecosystem meets any one of the criteria, it should be listed. If an ecosystem meets more than one criterion, it should be listed based on its highest ranking criterion. For example, if an ecosystem meets the threshold for vulnerable on one criterion and the threshold for endangered on another criterion, it should be listed as endangered.

Table 1: Criteria used to identify threatened terrestrial ecosystems, with thresholds for critically endangered (CR), endangered (EN) and vulnerable (VU) ecosystems

Criterion	CR	EN	VU
A1: Irreversible loss of natural habitat	Remaining natural habitat = biodiversity target	Remaining natural habitat = (biodiversity target + 15%)	Remaining natural habitat = 60% of original area of ecosystem
A2: Ecosystem degradation and loss of integrity*	= 60% of ecosystem significantly degraded	= 40% of ecosystem significantly degraded	= 20% of ecosystem significantly degraded
B: Rate of loss of natural habitat**			
C: Limited extent and imminent threat*	--	Ecosystem extent = 3 000ha, and imminent threat	Ecosystem extent = 6 000ha, and imminent threat
D1: Threatened plant species associations	= 80 threatened Red Data List plant species	= 60 threatened Red Data List plant species	= 40 threatened Red Data List plant species
D2: Threatened animal species associations**			
E: Fragmentation**			
F: Priority areas for meeting explicit biodiversity targets as defined in a systematic biodiversity plan	Very high irreplaceability and high threat	Very high irreplaceability and medium threat	Very high irreplaceability and low threat

* Because of data constraints, Criteria A2 and C have been applied to forests but not to other vegetation types.
** Because of data constraints, Criteria B and D2 are dormant at this stage and thresholds have not been set for these criteria. Further testing of Criterion E is needed to determine whether it is a workable criterion for terrestrial ecosystems.

What are the implications of listing an ecosystem?

There are four main types of implications of listing an ecosystem:

- Planning related implications, linked to the requirement in the Biodiversity Act for listed ecosystems to be taken into account in municipal IDPs and SDFs;
- Environmental authorisation implications, in terms of NEMA and EIA regulations;
- Proactive management implications, in terms of the Biodiversity Act;
- Monitoring and reporting implications, in terms of the Biodiversity Act.

The **environmental authorisation implications** are summarised here. The other implications are discussed in the main document.

Subsection 24(2) of NEMA allows for provincial EIA supplementation maps which identify sensitive areas and additional activities that should trigger environmental authorisations in those areas, and "exclusion areas" where environmental authorisations should not be required. **Listed ecosystems should be included as sensitive areas in EIA supplementation maps.**

The EIA regulations include two lists of activities:

- Activities that require a basic assessment (R386 of 2006)
- Activities that require scoping and EIA (R387 of 2006)

Activity 12 in the list of activities that require a basic assessment (R386 of 2006) is: the **transformation or removal of indigenous vegetation** of 3 hectares or more OR OF ANY SIZE if the transformation or removal would occur within a critically endangered or endangered ecosystem listed in terms of the Biodiversity Act. In other words the **3 hectare threshold for a basic assessment falls away in a CR or EN ecosystem**.

The EIA regulations also provide for the development of Environmental Management Frameworks. **Listed ecosystems should be incorporated into EMFs**, with restrictions on any loss of natural habitat in CR and EN ecosystems.

It is important to note that **while the original extent of each listed ecosystem has been mapped, a basic assessment report in terms of the EIA regulations is only triggered in remaining natural habitat within each ecosystem** and not in portions of the ecosystem where natural habitat has already been irreversibly lost.

Summary statistics and maps of listed ecosystems

As shown in Table 2, the ecosystems listed in the current phase make up 9.5% of the country, with critically endangered and endangered ecosystems together accounting for 2.7% and vulnerable ecosystems a further 6.8%. The table shows how the ecosystems are distributed by province, and gives approximate areas. The area figures refer to the remaining natural habitat in listed ecosystems, not their original extent. Figure 1 and

Figure 2 show the original and remaining extent of the ecosystems respectively.

Table 2: Summary statistics for listed ecosystems

	CR		EN		VU		TOTAL	
	000 ha	%	000 ha	%	000 ha	%	000 ha	%
Eastern Cape	4	0.0	51	0.3	588	3.5	643	3.8
Free State	2	0.0	383	3.0	1 049	8.1	1 433	11.0
Gauteng	99	6.0	95	5.8	189	11.4	384	23.2
KZN	224	2.4	464	5.0	1 164	12.5	1 852	19.9
Limpopo	9	0.1	123	1.0	536	4.3	668	5.3
Mpumalanga	6	0.1	634	8.3	2 226	29.1	2 866	37.5
Northern Cape			35	0.1	109	0.3	144	0.4
North West	186	1.8	452	4.3	1 309	12.3	1 947	18.3
Western Cape	374	2.9	154	1.2	1 083	8.4	1 611	12.5
South Africa	**903**	**0.7**	**2 392**	**2.0**	**8 252**	**6.8**	**11 547**	**9.5**

Table notes:

- Area figures refer to remaining natural area. They have been rounded to nearest thousand hectares so totals may not add up exactly.
- A blank cell indicates that no ecosystems were identified. A zero indicates that one or more ecosystems have been identified but that their total remaining area is less than 1 000ha.

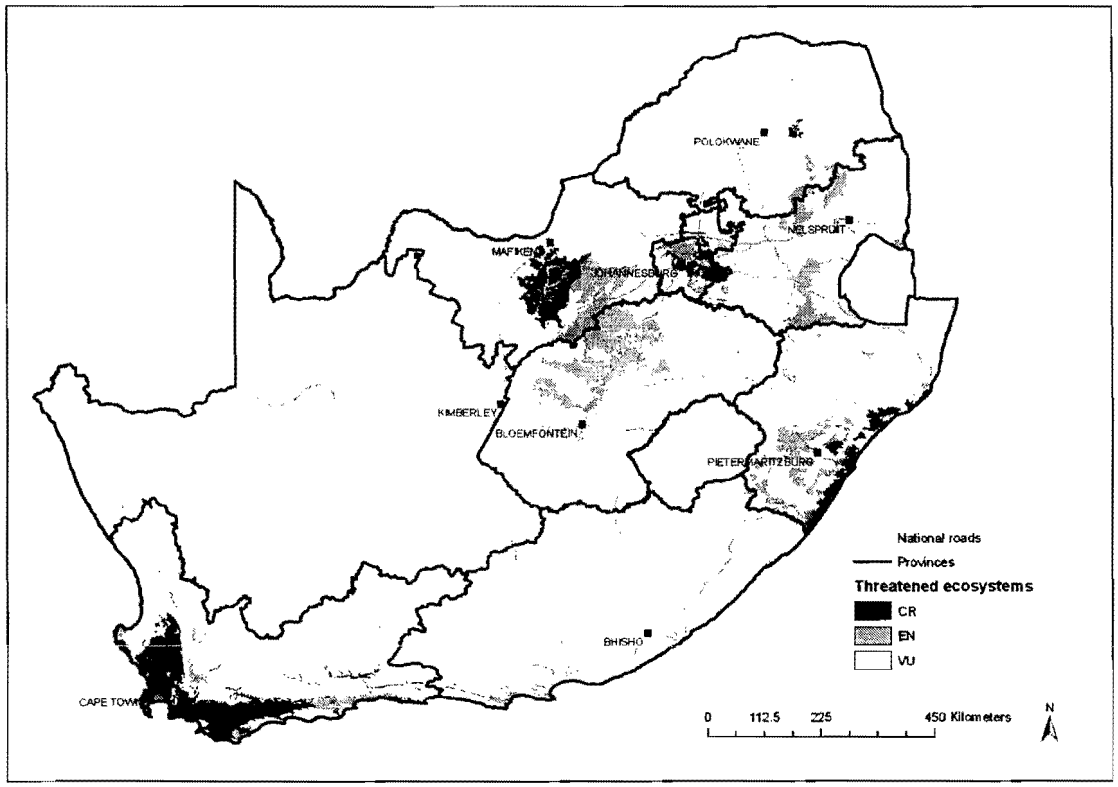

Figure 1: Map of listed ecosystems, showing original extent of ecosystems

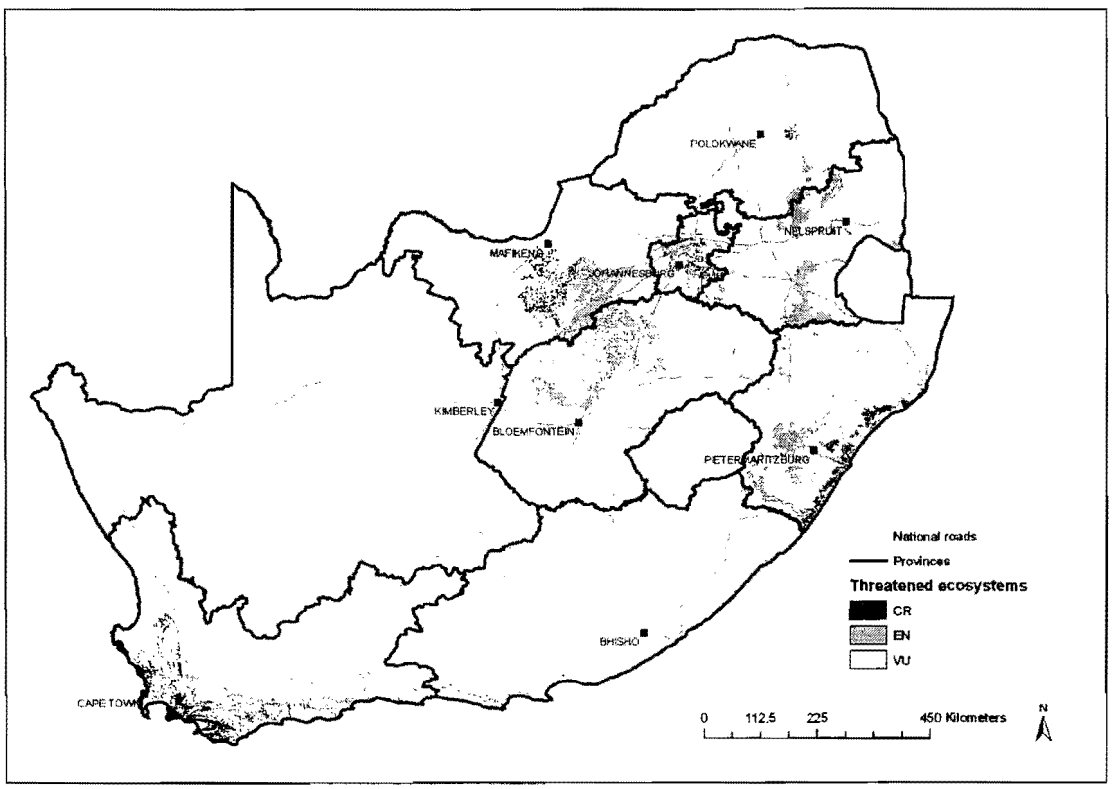

Figure 2: Map of listed ecosystems, showing remaining extent of ecosystems

1 Introduction

The National Environmental Management: Biodiversity Act (Act 10 of 2004) (hereafter referred to as the Biodiversity Act) provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), vulnerable (VU) or protected. The Department of Environmental Affairs and Tourism (DEAT) requested the South African National Biodiversity Institute (SANBI) to assist in the process of listing threatened or protected ecosystems.

The listing of threatened or protected ecosystems will take place across all environments including terrestrial, freshwater, estuarine and marine. However, all stakeholders have agreed that it makes sense to take a phased approach to listing of ecosystems, given the complexity of the task. The first list of ecosystems consists of **threatened terrestrial ecosystems only**; river, wetland, estuarine and marine ecosystems will be listed in subsequent phases.[2] Once these lists have been published they will be reviewed at least every five years as required in the Biodiversity Act.

SANBI has led the process of identifying threatened ecosystems to be listed, working in close collaboration with provincial conservation authorities, DEAT, Department of Water Affairs and Forestry (DWAF) and relevant experts. All listed threatened ecosystems have been identified based on carefully developed and consistently applied national criteria. There has been strong emphasis on the use of best available science as well as on the realities of implementation, to ensure that the list of threatened ecosystems is both scientifically rigorous and implementable.

The Biodiversity Act allows for the Minister or an MEC to list threatened or protected ecosystems. The current phase of listing ecosystems includes national listed ecosystems only. All ecosystems listed have been identified according to national criteria and are ecosystems of national significance. Provinces may choose to develop further provincial criteria and to identify additional ecosystems for provincial lists; however, for practical implementation-related reasons this is discouraged until the national listing process is well established (i.e. until ecosystems from all environments, terrestrial and aquatic, have been listed and the lists reviewed at least once).

[2] The exception to this is some azonal (e.g. weltand and alluvial) vegetation types identified in the South African Vegetation Map which have been included in the current phase. These azonal vegetation types represent transitions between the terrestrial and freshwater environments. See Section 4.2 for more on how ecosystems were defined.

The National Spatial Biodiversity Assessment (NSBA) 2004[3] included early attempts to identify threatened ecosystems. However, the identification of threatened terrestrial ecosystems for the current phase of listing has been much more detailed and comprehensive, using additional criteria and data. This means that, once finalised and published in terms of the Biodiversity Act, **the list of threatened terrestrial ecosystems presented here will supersede the information regarding terrestrial ecosystem status in the NSBA 2004.**

This document provides supporting information to accompany the first national list of threatened ecosystems. It is structured as follows:

- Section 2 explains the **purpose and rationale** for listing threatened ecosystems,
- Section 3 gives an overview of the relevant sections of the **Biodiversity Act and other legislation** with links to the listing of threatened ecosystems,
- Section 4 explains the principles established and the approach taken to listing ecosystems including the **criteria developed** for identifying threatened ecosystems,
- Section 5 deals with the **implications** of listing a threatened ecosystem,
- Section 6 gives **summary information on the threatened ecosystems** listed during this phase,
- Section 7 gives **contact details** for further information.

This document is accompanied by another document, *Threatened Ecosystems in South Africa: Descriptions and Maps*, which gives detailed information on each listed ecosystem. **These two documents, together with the spatial data, can be accessed on the BGIS website (http://bgis.sanbi.org).**

[3] Driver, A., Maze, K., Rouget, M., Lombard, A.T., Nel, J., Turpie, J.K., Cowling, R.M., Desmet, P., Goodman, P., Harris, J., Jonas, Z., Reyers, B., Sink, K. & Strauss, T. 2005. National Spatial Biodiversity Assessment 2004: Priorities for Biodiversity Conservation in South Africa. *Strelitzia* 17. South African National Biodiversity Institute, Pretoria.

2 Purpose and rationale for listing ecosystems

2.1 Purpose of listing ecosystems

The purpose of listing threatened ecosystems is primarily to reduce the rate of ecosystem and species extinction. This includes preventing further degradation and loss of structure, function and composition of threatened ecosystems. The purpose of listing protected ecosystems is primarily to preserve witness sites of exceptionally high conservation value. For both threatened and protected ecosystems, the purpose includes enabling or facilitating proactive management of these ecosystems. It is likely that ecosystem listing will also play a symbolic and awareness-raising role; however, this is not the primary purpose of listing ecosystems.

The purpose of listing threatened or protected ecosystems is *not* to ensure the persistence of landscape-scale ecological processes or to ensure the provision of ecosystem services, even though listing ecosystems may contribute towards these important goals. Bioregional plans published in terms of Section 40 of the Biodiversity Act will provide maps of critical biodiversity areas (CBAs), including areas important for the persistence of landscape-scale ecological processes. See Section 3.1.3 of this document for more on bioregional plans and the relationship between threatened ecosystems and critical biodiversity areas.

2.2 Rationale for listing ecosystems

In order to conserve biodiversity effectively, we need to:

- Conserve a **representative sample** of all components of biodiversity (genes, species, ecosystems), which is known as the principle of representation;
- Ensure the continued functioning of **ecological and evolutionary processes** that allow biodiversity to persist over time, which is known as the principle of persistence.

Systematic biodiversity planning (also referred to as systematic conservation planning) is a spatial planning approach, widely used and well developed in South Africa, which identifies geographic priority areas required to achieve these representation and persistence goals.

Broadly speaking, there are two main strategies for ensuring that the geographic priority areas identified in systematic biodiversity plans remain in a well managed natural state:

- Strategy 1: Consolidation and expansion of the protected area network;
- Strategy 2: Integrated management aimed at conservation of critical biodiversity areas outside the protected area network.

The protected area network, for various historical reasons, is biased towards certain ecosystems (such as savanna and mountain fynbos ecosystems) and does a poor job of protecting other ecosystems (such as succulent karoo, grasslands, fynbos lowlands, Nama karoo, almost all freshwater ecosystems, estuaries, and offshore marine ecosystems).

This makes the second strategy all the more important for ecosystems that are poorly protected by the protected area network. These ecosystems often occur in production landscapes where options for formal protection through the protected area network are reduced. Yet, as the White Paper on the Conservation and Sustainable Use of South Africa's Biodiversity (White Paper on Biodiversity, 1997) notes, **little attention has historically been paid to the protection of ecosystems outside protected areas**. The White Paper thus helped set the scene for listing of threatened or protected ecosystems even though it does not refer to them directly. Its Policy Objective 1.2 is especially relevant: maintain and strengthen existing arrangements to conserve South Africa's indigenous biodiversity, both inside and outside of protected areas.

In the discussion of this policy objective, the White Paper notes: "South Africa has a substantial body of law to conserve biodiversity, especially within protected areas and for several plant and vertebrate species. However, *past approaches to biodiversity conservation have not given adequate attention to the conservation of landscapes and ecosystems outside of protected areas...*" (emphasis added).

The White Paper commits government to achieving Policy Objective 1.2 through collaborating with interested and affected parties to:

- Conserve important components of biodiversity through a variety of mechanisms such as legislation, planning controls, guidelines, and protected area designations, giving priority to components of biodiversity requiring urgent protective measures;

- *Introduce legal measures and incentives to conserve important ecosystems, habitats, and landscapes outside of protected areas*, including rangelands and their associated vegetation and indigenous wildlife resources.

According to the White Paper, important components of biodiversity include ecosystems and habitats that:

- contain high diversity,
- contain large numbers of endemic or threatened species,
- are relatively pristine,
- are important nursery or spawning areas,
- are under particular threat,
- are important for endangered or migratory species,
- adjoin conserved ecosystems and habitats,
- are of social, economic, cultural or scientific importance,
- are unique, representative of or associated with key evolutionary, biological or other life-supporting processes.

In response to the historical lack of attention highlighted in the White Paper to conserving biodiversity outside the protected area network, the Biodiversity Act introduced several new legal tools, including listing of threatened or protected ecosystems. It is important to note that listing threatened or protected ecosystems is just one tool to achieve conservation objectives. Others include:

- Publishing bioregional plans,
- Listing threatened or protected species and accompanying regulations,
- Biodiversity management plans for ecosystems or species,
- Invasive alien species regulations.

Systematic biodiversity planning is an important element in the implementation of several of these tools. It provides the basis for bioregional plans published in terms of the Biodiversity Act (see Section 3.1.3) and for protected area expansion strategies (including the National Protected Area Expansion Strategy led by DEAT and recently approved), and assists with the identification of threatened ecosystems (see Section 4.3).

3 Relevant sections of the Biodiversity Act and other legislation

The Biodiversity Act establishes the framework for listing threatened or protected ecosystems, drawing on policy objectives established in the White Paper on Biodiversity. As noted, the Biodiversity Act also provides for several related tools, including bioregional plans, biodiversity management plans, biodiversity management agreements and listed species.

Several other pieces of legislation have direct or indirect links with the Biodiversity Act's provisions on listed ecosystems. Legislation with direct links to listed ecosystems includes:

- National Environmental Management Act (Act 107 of 1998, amended 2002 and 2004) (NEMA),
- NEMA Regulations on Environmental Impact Assessment (EIA Regulations).

Legislation with indirect links to listed ecosystems includes:

- National Environmental Management: Protected Areas Act (Act 57 of 2003),
- National Forests Act (Act 84 of 1998),
- National Water Act (Act 36 of 1998),
- Marine Living Resources Act (Act 18 of 1998),
- Integrated Coastal Management Bill (2007),
- National Heritage Resources Act (Act 25 of 1999).

This section briefly summarises the relevant sections of the Biodiversity Act and discusses links with other legislation.

3.1 Biodiversity Act

This section summarises the Biodiversity Act's provisions on listing of ecosystems, and looks at other relevant aspects of the Biodiversity Act dealing with:

- Listing of species,
- Bioregional plans,
- Biodiversity management plans and biodiversity management agreements,
- Regulations,

- Norms and standards,
- Consultation and public participation.

The full text of the relevant sections of the Biodiversity Act is available in Appendix A.

3.1.1 Listing of threatened or protected ecosystems

Sections 52 to 55 of the Biodiversity Act deal directly with listing threatened or protected ecosystems. The Minister may publish a national list of ecosystems that are threatened and in need of protection, and an MEC may publish a provincial list of such ecosystems with the concurrence of the Minister.[4]

The following categories of ecosystems may be listed:

- **critically endangered (CR) ecosystems**, being ecosystems that have undergone severe degradation of ecological structure, function or composition as a result of human intervention and are subject to an extremely high risk of irreversible transformation;
- **endangered (EN) ecosystems**, being ecosystems that have undergone degradation of ecological structure, function or composition as a result of human intervention, although they are not critically endangered ecosystems;
- **vulnerable (VU) ecosystems**, being ecosystems that have a high risk of undergoing significant degradation of ecological structure, function or composition as a result of human intervention, although they are not critically endangered ecosystems or endangered ecosystems;
- **protected ecosystems**, being ecosystems that are of high conservation value or of high national or provincial importance, although they are not listed as critically endangered, endangered or vulnerable.[5]

According to the Act:

- The location of each ecosystem on the list must be described "in sufficient detail".
- The Minister (or MEC) must review the published list of ecosystems at least every five years.

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[4] As noted in Section 1, the current phase of listing ecosystems includes national listed ecosystems only.
[5] As noted in Section 1, in the current phase of listing criteria for identifying protected ecosystems have not been developed and protected ecosystems have not been listed.

- The Minister may identify any process or activity in a listed ecosystem as a threatening process. Note that in the current phase of listing, threatening processes have not been identified.
- An organ of state that must prepare an environmental implementation or environmental management plan (EIP or EMP) in terms of Chapter 3 of NEMA (i.e. all national departments and provinces), and a municipality that must adopt an integrated development plan (IDP) in terms of the Municipal Systems Act (Act 32 of 2000), must take into account the need for the protection of listed ecosystems (see Section 5 for more on the implications of this important provision).

3.1.2 How do threatened ecosystems relate to threatened species?

The Biodiversity Act also provides for listing threatened or protected species (Sections 56-57). Lists of threatened or protected species with accompanying regulations were gazetted in February 2007 and amended in December 2007. A second set of amendments where recently gazetted for public comment.[6]

Only species threatened by restricted activities as defined in the Biodiversity Act have been included in the lists of threatened or protected species. The Biodiversity Act defines restricted activities as:

- hunting, catching, capturing or killing any living specimen;
- gathering, collecting or plucking any specimen;
- picking parts of, or cutting, chopping off, uprooting, damaging or destroying, any specimen;
- importing or exporting any specimen;
- having in possession or exercising physical control over any specimen;
- growing, breeding or in any other way propagating any specimen or causing it to multiply;
- conveying, moving or otherwise translocating any specimen;
- selling or otherwise trading in, buying, receiving, giving, donating or accepting as a gift, or in any way acquiring or disposing of any specimen.

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[6] Threatened or Protected Species Regulations R.152 (Government Gazette No. 29657, 23 February 2007); Publication of Lists of Critically Endangered, Endangered, Vulnerable and Protected Species R.151 (Government Gazette No. 29657, 23 February 2007); Threatened or Protected Species Amendment Regulations R.1188 (Government Gazette No. 30568, 14 December 2007); Amendment of Critically Endangered, Endangered, Vulnerable and Protected Species Lists R.1187 (Government Gazette No. 30568, 14 December 2007); Threatened or Protected Species Amendment Regulations R.209 (Government Gazette No. 31962, 27 February 2009).

This list of restricted activities does *not* include destruction of the habitat of a species, which is the main driver of loss of terrestrial species. Many species are threatened only by habitat loss; however, these species have not been listed in terms of the Biodiversity Act. Partly for this reason Criterion D: Threatened Species Associations was developed for listing ecosystems (see Section 4.3 of this document). This criterion identifies ecosystems containing high numbers of threatened species. However, it will not be possible to protect all species threatened by habitat loss via the ecosystem listing process, partly because knowledge of the locations of these species is incomplete.

3.1.3 Bioregional plans

The Biodiversity Act allows for the publishing of bioregional plans. The purpose of a bioregional plan is to provide a map of critical biodiversity areas with accompanying land-use planning and decision-making guidelines, to inform land-use planning, environmental assessment and authorisations, and natural resource management by a range of sectors whose policies and decisions impact on biodiversity. Bioregional plans are intended to feed into multi-sectoral planning and assessment processes such as Environmental Management Frameworks (EMFs), Spatial Development Frameworks (SDFs), IDPs, Strategic Environmental Assessments (SEAs) and EIAs.

A published bioregional plan is a spatial plan showing terrestrial and aquatic features in the landscape that are critical for conserving biodiversity and maintaining ecosystem functioning. These areas are referred to as critical biodiversity areas, and are those that should remain in their natural state. A bioregional plan must include guidelines for avoiding loss or degradation of natural habitat in critical biodiversity areas. **Critically endangered ecosystems will always form a subset of these critical biodiversity areas**, in regions for which bioregional plans have been published.

A *Guideline Regarding the Determination of Bioregions and the Preparation and Publication of Bioregional Plans* was gazetted in March 2009.[7] No bioregional plans have yet been published but several are in the process of being developed.

[7] Guideline Regarding the Determination of Bioregions and the Preparation and Publication of Bioregional Plans (Government Gazette No.32006, 16 March 2009).

3.1.4 Biodiversity management plans and biodiversity management agreements

Sections 43 to 46 of the Biodiversity Act deal with biodiversity management plans and biodiversity management agreements. Any person, organisation or organ of state can develop a draft biodiversity management plan and submit it to the Minister for approval, for:

- a listed ecosystem,
- an ecosystem which is not listed but which does warrant special conservation attention.

Biodiversity management plans can also be developed for species.

Before approving and publishing a draft biodiversity management plan, the Minister must identify a suitable person, organisation or organ of state willing to be responsible for the implementation of the plan, determine the manner of implementation of the plan, and assign responsibility for the implementation of the plan to the identified person, organisation or organ of state.

The Minister may enter into a biodiversity management agreement with the identified person, organisation or organ of state, or any other suitable person, organisation or organ of state, regarding the implementation of a biodiversity management plan.

A biodiversity management plan must be aimed at ensuring the long-term survival in nature of the species or ecosystem to which the plan relates, and must provide for the responsible person, organisation or organ of state to monitor and report on progress with implementation of the plan.

The Minister must review a published biodiversity management plan at least every five years, and assess compliance with the plan and the extent to which its objectives are being met.

National Norms and Standards for the Development of Biodiversity Management Plans for Species (BMP-S) have been developed by DEAT and gazetted in March 2009.[8]

Norms and standards for biodiversity management plans for ecosystems (BMP-E) still need to be developed.

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[8] Norms and Standards for the Development of Biodiversity Management Plans for Species R.214 (Government Gazette No. 31968, 3 March 2009).

3.1.5 Regulations

Section 97 of the Biodiversity Act deals with regulations. The Minister may make regulations relating to minimising the threat to the ecological integrity of a listed ecosystem. The Minister may also make regulations relating to the monitoring of compliance with and enforcement of norms and standards referred to in Section 9 of the Biodiversity Act (see Section 3.1.6).

3.1.6 Norms and standards

Section 9 of the Biodiversity Act deals with norms and standards. The Minister may issue norms and standards for the achievement of any of the objectives of the Act, including restriction of activities which impact on biodiversity and its components. Norms and standards may apply nationwide, in a specific area only, or to a specific category of biodiversity only. The Minister may set indicators to measure compliance with the norms and standards.

3.1.7 Consultation and public participation

Sections 99 and 100 of the Biodiversity Act deal with consultation and public participation. Before exercising the powers discussed above, the Minister must consult all Cabinet members whose areas of responsibility may be affected, consult the MEC for Environmental Affairs of each province that may be affected, and allow for public participation.

Public participation requirements are as follows: The Minister must give notice of the proposed exercise of the power in the Gazette, and in at least one newspaper distributed nationally or distributed in a particular area if only that area is affected. The notice must invite members of the public to submit written representations on, or objections to, the proposed exercise of the power within 30 days, and must contain sufficient information to enable members of the public to submit meaningful representations or objections. The Minister may in appropriate circumstances allow oral representations or objections. The Minister must give due consideration to all representations or objections received or presented before exercising the power.

3.2 Other legislation with direct links to threatened ecosystems

3.2.1 NEMA

The full text of the relevant sections of NEMA is available in Appendix B.

Section 24 of NEMA deals with environmental authorisations, and was amended quite extensively in 2004. Subsection 24(2) allows the Minister or MEC to identify geographical areas based on environmental attributes in which specified activities may not commence without environmental authorisation from the competent authority, and geographical areas based on environmental attributes in which specified activities do not require authorisation by the competent authority. The Minister or MEC may compile information and maps that specify the attributes of the environment in particular geographical areas, including the sensitivity, extent, interrelationship and significance of such attributes which must be taken into account by every competent authority. An MEC can also identify activities that require environmental authorisation over and above those on the national list.

Before identifying an activity or area in terms of Subsection 24(2), the Minister or MEC must publish a notice in the Gazette:

- specifying, through description, a map or any other appropriate manner, the activity or area that it is proposing to list,
- inviting interested parties to submit written comments on the proposed listing within a specified period,
- giving the competent authorities and the date on which the list comes into effect.

In terms of Subsection 53(2) of the Biodiversity Act, **a listed ecosystem is identified as a geographical area in terms of Subsection 24(2) of NEMA**. Also in terms of Subsection 53(2) of the Biodiversity Act, a threatening process in a listed ecosystem becomes a specified activity in terms of Subsection 24(2) of NEMA.

Subsection 24(2) of NEMA allows for provincial EIA supplementation maps which identify

- sensitive areas and additional activities that should trigger environmental authorisations in those areas,

- "exclusion areas" where environmental authorisations should not be required.

Some provinces have developed or are in the process of developing EIA supplementation maps. **Listed ecosystems**, especially critically endangered and endangered ecosystems, **should be included in EIA supplementation maps** when these are developed.

3.2.2 NEMA EIA Regulations

The EIA Regulations (R385 of 2006) were published in April 2006 and took effect on 1 July 2006.[9] They are intended to streamline the environmental authorisation process and make it less burdensome on developers and competent authorities (usually provincial environment affairs departments on behalf of MECs for the environment).

The EIA Regulations include two lists of activities:

- Activities that require a basic assessment (R386 of 2006),
- Activities that require scoping and EIA (R387 of 2006).

The basic assessment process is described in Regulations 22-26 of R385. The scoping and EIA process is described in Regulations 27-36 of R385. Activities listed in terms of Section 24D of NEMA trigger a basic assessment unless the Minister specifies that they should trigger scoping and EIA (Section 21).

The EIA regulations also provide for national and provincial guidelines on the implementation of the regulations (Regulations 73-76 of R385), and for Environmental Management Frameworks (EMFs) (Regulations 69-72 of R385). **Listed ecosystems should be incorporated into EMFs**, with restrictions on any loss of natural habitat in critically endangered or endangered ecosystems.

Activity 12 in R386 (the list of activities that require a basic assessment) is particularly important in terms of the listing of threatened ecosystems. This activity is: the transformation or removal of indigenous vegetation of 3 hectares or more *OR OF ANY SIZE if the transformation or removal*

[9] At the time of writing, the revised EIA Regulations were out for public comment (Notice 166 of 2009, Government Gazette No. 31885, 13 February 2009). No major changes were proposed to the clauses relating to threatened ecosystems, except for a change in the threshold.

would occur within a critically endangered or endangered ecosystem listed in terms of the Biodiversity Act. In other words **the 3 hectare threshold falls away in a critically endangered or endangered ecosystem.**

3.3 Other legislation with indirect links to threatened ecosystems

3.3.1 Protected Areas Act

The Protected Areas Act (2003) defines three main categories of protected areas:

- Special nature reserves (can be declared only by the Minister)
- Nature reserves (can be declared by the Minister or MEC)
- Protected environments (can be declared by the Minister or MEC)

World heritage sites are considered separately from these three categories.

Any of the three categories of protected area can be declared on privately owned land, at the request or with the consent of the landowner(s).

Protected ecosystems in terms of the Biodiversity Act are *not* intended to be equivalent to any of these categories. Listing of ecosystems is intended to complement the Protected Areas Act. There is no substitutability between the protected area categories and the listing categories.

However, there is potential overlap between the rationale for declaration of protected environments and listing threatened ecosystems. A protected environment can be declared "to protect the area if the area is sensitive to development" or "to protect a specific ecosystem outside a special nature reserve, world heritage site or nature reserve" (Subsection 28(2)).

In some cases, listed ecosystems may occur inside protected areas. It is important from the point of view of developing protected area management plans to know if there are ecosystems inside protected areas that require particular attention, so that these ecosystems can be appropriately managed.

Note that marine protected areas are declared in terms of the Marine Living Resources Act (see Section 3.3.4).

3.3.2 National Forests Act

In terms of the National Forests Act (1998), trees in all indigenous forests are protected, and some indigenous forests are declared specially protected forest areas.

Chapter 3 of the National Forests Act deals with special measures to protect forests and trees.

- Part 1 (Section 7) prohibits the destruction of indigenous trees in any natural forest without a licence. The Minister can declare a group of indigenous trees to be a forest even if their crowns are not largely contiguous, based on scientific advice that the trees make up a forest.
- Part 2 (Sections 8-11) allows the Minister to declare certain forests specially protected forest areas.
    - A state forest or part of it can be declared a specially protected forest area
    - Land can be purchased or expropriated and declared a specially protected forest area
    - At the request of or with the consent of a landowner outside a state forest, the Minister can declare a specially protected forest area.
- Specially protected forest areas must fall into one of the following categories: forest nature reserve, forest wilderness area, any other type of protected area which is recognised in international law or practice
- Part 3 (Sections 12-16) allows the Minister to declare a tree, a group of trees, a woodland, or a species of tree as protected
- Part 4 (Sections 17-18) gives the Minister powers to intervene urgently to prevent deforestation and to rehabilitate deforested areas

The process of declaring a specially protected forest area, protected woodland or a protected group of trees is considerably more onerous than the process of listing a threatened or protected ecosystem. The Biodiversity Act can therefore complement the National Forests Act in this regard.

3.3.3 National Water Act

The National Water Act (1998) defines a water resource as a watercourse (including wetlands), surface water, estuary or aquifer. The Act places strong emphasis on sustainable use of water resources, and its purpose includes "protecting aquatic and associated ecosystems and their biological diversity" (Subsection 2(g)).

Chapter 3 deals with protection of water resources, and establishes a series of measures for achieving this, including:

- A classification system for water resources (Part 1, Section 12);
- Resource quality objectives, which depend on the class of the water resource (Part 2, Sections 13-15);
- The Reserve (Part 3, Sections 16-18). The ecological reserve is the water required to protect the aquatic ecosystems of the water resource, and varies depending on the class of the water resource.

The implementation of the National Water Act is supported by the National Water Resource Strategy and the Water Resource Classification System. It includes the establishment of Catchment Management Agencies and the development of Catchment Management Strategies.

The listing of threatened or protected inland water ecosystems should complement the objectives of the National Water Act by highlighting aquatic ecosystems that require special attention from an ecological point of view. Listed freshwater and estuarine ecosystems should feed into the water resource classification process and the development of Catchment Management Strategies.

3.3.4 Marine Living Resources Act

Chapter 4 (Section 43) of the Marine Living Resources Act (1998) allows for the declaration of marine protected areas. Other spatial tools in the Act include the declaration of fisheries management areas (Section 15), priority fishing areas (Section 17) and subsistence fishing zones (Section 19).

As with terrestrial protected areas declared in terms of the Protected Areas Act, marine protected areas and listed marine ecosystems should complement each other. Also as with terrestrial protected areas, a listed marine ecosystem could occur within a marine protected area, highlighting the need for appropriate management of the ecosystem within the protected area.

3.3.5 Integrated Coastal Management Bill

The aims of the Integrated Coastal Management Bill published in August 2007 include establishing a system of integrated coastal and estuarine management in order to promote the conservation of the coastal environment, maintaining the natural attributes of coastal landscape and seascape, and ensuring that development and the use of natural resources within the coastal zone is socially and economically justifiable and ecologically sustainable.

Chapter 2 considers the coastal zone including the composition of the coastal protection zone (Section 16), the declaration of special management areas (Section 23), and the establishment of coastal set-back lines (Section 25) all of which should consider and include listed threatened or protected ecosystems.

Chapter 4 deals with estuaries and states that all estuaries must be managed in a co-ordinated and efficient manner and in accordance with a national estuarine management protocol to be prescribed by the Minister. This chapter also allows for the development of estuarine management plans. Listed estuarine ecosystems should be taken into account in the development of the national estuarine management protocol as well as in estuarine management plans.

Chapter 6 provides for the preparation and adoption of a national coastal management programme by the Minister (Section 44) for managing the coastal zone; the preparation and adoption of a provincial coastal management programme by the MEC of each coastal province (Section 46); and the preparation and adoption of a coastal management programme for the coastal zone in coastal municipalities (Section 47). Section 56 refers to zoning schemes within the coastal zone. Coastal management programmes and zoning schemes should take listed threatened or protected ecosystems into account.

Chapter 7 refers to the protection of the coastal environment with Part 2 (Section 62) referring to the regulation of the coastal zone and Part 3 (Sections 63-64) referring to integrated environmental authorisations. Again, these should take listed threatened or protected ecosystems into account.

3.3.6 National Heritage Resources Act

According to the National Heritage Resources Act (1999), the national heritage estate may include "landscapes and natural features of cultural significance" (Section 3). There are three grades of heritage resources, corresponding more or less to heritage resources of national, provincial and local significance (Section 7). Chapter 2 of the Act allows for the declaration of national and provincial heritage sites (Section 27), protected areas surrounding national or provincial heritage sites (Section 28), and heritage areas in town and regional planning schemes or other spatial plans (Section 31). An inventory of the national heritage estate must be compiled (Section 39); however, maps of spatial heritage resources do not seem to be required as part of this inventory.

It may be useful in subsequent phases of the ecosystem listing process to explore potential links between listed protected ecosystems in terms of the Biodiversity Act, and heritage sites, protected areas and heritage areas identified in terms of the National Heritage Resources Act.

4 Principles and criteria for identifying threatened ecosystems

From the outset of the process of listing threatened ecosystems, it was clear that a systematic, rigorous process was required to identify threatened or protected ecosystems for listing. There needed to be a clear set of criteria based on best available science, rather than a haphazard or unscientific approach.

As a starting point, SANBI researched similar processes in other countries. Not many countries have attempted something similar, with Australia the most similar. Most of the relevant initiatives are international, not linked to national legislation, and attempt to identify sites or regions of biodiversity importance rather than threatened ecosystems. Most focus on terrestrial environments only. Nevertheless, valuable lessons for South Africa included the following:

- criteria must be scientifically credible, practical and simple;
- different thresholds may be required for different environments;
- the most appropriate scale for mapping ecosystems depends on a range of factors including the nature of the ecosystems and the available data.

Sets of principles and criteria were then developed through a series of workshops with relevant stakeholders and experts (see Appendix C for a list of workshops held and organisations involved). In particular, the following provincial conservation authorities played a major role: CapeNature, Ezemvelo KwaZulu-Natal Wildlife, Gauteng Department of Agriculture, Conservation and Environment (GDACE), and Mpumalanga Tourism and Parks Agency (MTPA).

This section sets out the principles and criteria for identifying listed ecosystems, and briefly discusses how listed ecosystems have been defined and delineated.

4.1 Principles for identifying threatened or protected ecosystems

A set of principles was established to guide the approach to identifying threatened or protected ecosystems for listing:

- The approach must be explicit and repeatable;

- The approach must be target-driven[10] and systematic, especially for threatened ecosystems;
- The approach must follow the same logic as the IUCN approach to listing threatened species, whereby a number of criteria are developed and an ecosystem is listed based on its highest ranking criterion;
- The identification of ecosystems to be listed must be based on scientifically credible, practical and simple criteria, which must translate into spatially explicit identification of ecosystems.

These principles apply across all the environments (terrestrial, freshwater, estuarine and marine) even when the criteria and thresholds differ across the environments. Taking these principles into account, the following three-stage process was established to list ecosystems:

- Develop, test and refine criteria for identifying threatened or protected ecosystems;
- Identify threatened or protected ecosystems based on those criteria;
- List threatened or protected ecosystems.

4.2 How have listed ecosystems been defined?

4.2.1 At what spatial scale have ecosystems been defined?

The Biodiversity Act defines an ecosystem as a dynamic complex of animal, plant and micro-organism communities and their non-living environment interacting as a functional unit. This definition can be sensibly applied at a range of spatial scales, from very small (e.g. a small forest patch, a tidal pool, a rotting log) to very large (e.g. a primary catchment, the savannah biome).

In deciding on the appropriate spatial scale for listing threatened or protected ecosystems, it was important to consider the purpose and rationale for listing ecosystems as well as the legal implications. As discussed in Section 2.1, the purpose of listing threatened ecosystems is in the first instance to reduce the rate of ecosystem and species extinction, rather than to ensure the persistence of landscape-scale ecological processes or to ensure the provision of ecosystem services. As discussed in Section 3.2.2, any loss of natural habitat in a critically endangered or

[10] Biodiversity targets are explicit quantitative targets that tell us how much of an ecosystem (or other biodiversity feature) needs to be conserved in order to meet our biodiversity goals of representation and persistence (see Section 2.2). Biodiversity targets are expressed as, for example, numbers of hectares of an ecosystem.

endangered ecosystem automatically triggers a basic assessment report in terms of the NEMA EIA regulations. These two considerations combined require that **listed ecosystems be defined at the local rather than the regional scale**.

4.2.2 How have ecosystems been delineated?

For the current phase of listing, threatened terrestrial ecosystems have been delineated based on one of the following: the South African Vegetation Map[11], national forest types recognised by DWAF[12,13], priority areas identified in a provincial systematic biodiversity plan[14], or high irreplaceability forests patches or clusters systematically identified by DWAF.[15] For future phases of listing, ecosystems may be identified at a finer spatial scale than these units, but will not be identified at a broader spatial scale than these units.

It is important to note that **while the original extent of each listed ecosystem has been mapped, a basic assessment report in terms of the EIA regulations is only triggered in remaining natural habitat within each ecosystem** and not in portions of the ecosystem where natural habitat has already been irreversibly lost.

4.3 Criteria for identifying threatened ecosystems

The development of scientifically credible, practical and simple criteria was the starting point for identifying listed ecosystems. A rigorous process of developing and testing criteria for threatened

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[11] Mucina, L. & Rutherford, M.C. (eds). 2006. The Vegetation of South Africa, Lesotho and Swaziland. *Strelitzia* 19. South African National Biodiversity Institute, Pretoria.

[12] Von Maltitz, G., Mucina, L., Geldenhuys, C., Lawes, M., Eeley, H., Adie, H., Vink, D., Flemming, G. and Bailey, C. 2003. Classification system for South African Indigenous Forests. An objective classification for the Department of Water Affairs and Forestry. Environmentek Report ENV-P-C 2003-017, CSIR, Pretoria.

[13] The South African Vegetation Map identifies eight forest groups and four national forest types. DWAF recognises 26 national forest types, including the four national forest types identified in the South African Vegetation Map, and a further 22 national forest types which make up the eight forest groups identified in the South African Vegetation Map. For the purpose of listing ecosystems, DWAF's 26 national forest types have been used rather than the forest groups from the South African Vegetation Map.

[14] Provincial plans used in the current phase of listing were: Gauteng C-Plan V2 (2006), Mpumalanga Biodiversity Conservation Plan (2007), and KwaZulu-Natal Terrestrial Conservation Plan (C-Plan) V4 (2007).

[15] Berliner, D. 2005. Systematic conservation plan for the forest biome of South Africa: Approach, methods and results of the selection of priority forests for conservation action. Department of Water Affairs and Forestry, Pretoria. The National Forest Inventory did not include complete spatial data for all forest patches and clusters when the systematic biodiversity plan for the forest biome was undertaken. DWAF has subsequently identified and mapped some additional forest patches and clusters which are considered highly irreplaceable.

terrestrial ecosystems was followed, involving extensive expert engagement and consultation. See Appendix C for a list of workshops held and organisations represented.

As mentioned in Section 4.1, the decision was made to use the same logic as is used in the IUCN Red Listing process for species. If an ecosystem meets any one of the criteria, it should be listed. If an ecosystem meets more than one criterion, it should be listed based on its highest ranking criterion. For example, if an ecosystem meets the threshold for vulnerable (VU) on one criterion and the threshold for endangered (EN) on another criterion, it should be listed as endangered.

As discussed, a phased approach is being taken to listing ecosystems because of the complexity of the process, with the first phase focusing on threatened terrestrial ecosystems. Six criteria were developed to identify threatened terrestrial ecosystems. Of these six criteria, four (A, C, D and F) have been used in the current phase of listing and the remaining two (B and E) are dormant owing to lack of data. Table 1 summarises the six criteria and the thresholds for the four active criteria. Each criterion is explained in more detail below.

Table 1: Criteria used to identify threatened terrestrial ecosystems, with thresholds for critically endangered (CR), endangered (EN) and vulnerable (VU) ecosystems

Criterion	CR	EN	VU
A1: Irreversible loss of natural habitat	Remaining natural habitat = biodiversity target	Remaining natural habitat = (biodiversity target + 15%)	Remaining natural habitat = 60% of original area of ecosystem
A2: Ecosystem degradation and loss of integrity*	= 60% of ecosystem significantly degraded	= 40% of ecosystem significantly degraded	= 20% of ecosystem significantly degraded
B: Rate of loss of natural habitat**			
C: Limited extent and imminent threat*	--	Ecosystem extent = 3 000ha, and imminent threat	Ecosystem extent = 6 000ha, and imminent threat
D1: Threatened plant species associations	= 80 threatened Red Data List plant species	= 60 threatened Red Data List plant species	= 40 threatened Red Data List plant species
D2: Threatened animal species associations**			
E: Fragmentation**			

Criterion	CR	EN	VU
F: Priority areas for meeting explicit biodiversity targets as defined in a systematic biodiversity plan	Very high irreplaceability and high threat	Very high irreplaceability and medium threat	Very high irreplaceability and low threat

* Because of data constraints, Criteria A2 and C have been applied to forests but not to other vegetation types.
** Because of data constraints, Criteria B and D2 are dormant at this stage and thresholds have not been set for these criteria. Further testing of Criterion E is needed to determine whether it is a workable criterion for terrestrial ecosystems. Criterion E may be applied in future to most terrestrial ecosystems, but will not be applied to forest ecosystems as the forest biome is naturally fragmented.

Criterion A1: Irreversible loss of natural habitat

This criterion identifies ecosystems that have undergone loss of natural habitat, impacting on their structure, function and composition. Loss of natural habitat includes outright loss, for example the removal of natural habitat for cultivation, building of infrastructure, mining etc., as well as severe degradation. For this purpose, habitat is considered severely degraded it would be unable to recover to a natural or near-natural state following the removal of the cause of the degradation (e.g. invasive aliens, over-grazing), even after very long time periods.

For the current phase of listing, Criterion A1 has been applied to ecosystems defined as national vegetation types in the South African Vegetation Map[16] or as national forest types recognised by DWAF. The thresholds for this criterion are based on the biodiversity targets developed in the National Spatial Biodiversity Assessment (NSBA) 2004. The biodiversity target for a vegetation type is the proportion of the original extent of the vegetation type required to conserve the majority of species associated with that vegetation type.[17,18] It is expressed either as a percentage of the original extent of the vegetation type or in hectares. Biodiversity targets for national vegetation types range from 16% to 36%, with higher targets for more species rich

[16] For future phases, it may make sense to apply this criterion to recognised vegetation sub-types as well as to national vegetation types. However, an agreed on method for identifying vegetation sub-types and a process for recognising them would be a pre-requisite for this.
[17] Biodiversity targets are calculated based on the species-area curve method (Desmet, P. & Cowling, R. 2004. Using the species-area relationship to set baseline targets for conservation. *Ecology and Society* 9(2))
[18] The systematic biodiversity plan for the forest biome included targets for national forest types. However, these targets were not set using the species-area curve method developed in the NSBA 2004. For the purpose of listing ecosystems, the biodiversity targets for national forest types were revised using the species-area curve method.

vegetation types. For example, a species rich vegetation type with an original extent of 10 000ha could have a biodiversity target of 30% or 3 000ha.

An ecosystem is categorised as critically endangered if the extent of remaining natural habitat in the ecosystem is less than or equal to its biodiversity target. This threshold indicates a loss of species and change in species composition within the ecosystem. For example, a 10 000ha ecosystem with a biodiversity target of 30% would be categorised as critically endangered if 3 000ha or less of the ecosystem remained in a natural state (or conversely if more than 7 000ha of the original extent of the ecosystem had been lost). An ecosystem is categorised as endangered if the extent of remaining natural habitat in the ecosystem is less or equal to than the biodiversity target plus15%. This threshold provides a buffer for critically endangered ecosystems. For example, the 10 000ha ecosystem with a biodiversity target of 30% would be categorised as endangered if 4 500ha (45%) or less of the ecosystem remained in a natural state. An ecosystem is categorised as vulnerable if the extent of remaining natural habitat in the ecosystem is less than or equal to 60% of the original extent of the ecosystem. This threshold indicates a loss of ecosystem functioning. For example, a 10 000ha ecosystem would be categorised as vulnerable if 6 000ha or less of the ecosystem remained in a natural state. Note that while the Criterion A thresholds for critically endangered and endangered ecosystems vary depending on the biodiversity target for the ecosystem, the threshold for vulnerable ecosystems is independent of the biodiversity target.

The spatial analysis for this criterion used the best available land cover data. For Free State, Limpopo, North West and Northern Cape the best available land cover data is provided by combining the National Land Cover (NLC) 2000 and the NLC 1996. Eastern Cape, Gauteng, KwaZulu-Natal, Mpumalanga and Western Cape have land cover data layers that improve on the NLC 2000 and NLC 1996. These improved data layers were clipped into the combined NLC 2000 and NLC 1996 to make a new mosaic national land cover layer that represents the best available land cover data for the country. Information on severe degradation was included where available; however, degradation has to date been poorly mapped in South Africa, and distinctions between moderate and severe degradation are usually not made in available spatial information.

Criterion A2: Ecosystem degradation and loss of integrity

This criterion identifies ecosystems that are significantly degraded. For the purpose of ecosystem listing, significant degradation is defined as significant changes to the structure, function or composition of the ecosystem that would take several decades to recover if the cause of the degradation was removed.

Consistent national data on degradation in national vegetation types is not available, and definitions of degradation and methods for assessing the extent and degree of degradation have not been widely agreed on or standardised. This meant it was not possible to apply Criterion A2 to national vegetation types in the current phase of listing. However, for forest ecosystems there is sufficient agreement on definitions of degradation and approaches for assessing degradation to apply Criterion A2 to national forest types. Criterion A2 was thus applied only to forest ecosystems.

An expert assessment of the extent of degradation in national forest types was conducted. Forest ecosystems were assessed using the following three factors:

- Condition of the forest ecosystem including:
    - Canopy condition,
    - Forest margin condition (including fire),
    - Understorey condition (including invasive species, overgrazing and cattle trampling);
- Transformation of the matrix;
- Over-harvesting of particular species using a harvesting pressure index.

Thresholds for critically endangered, endangered and vulnerable ecosystems were determined by the proportion of the forest ecosystem that was significantly degraded. If more than 60% of the ecosystem was significantly degraded the ecosystem was categorised at critically endangered, if more than 40% was significantly degraded it was categorised as endangered, and if more than 20% was significantly degraded it was categorised as vulnerable. These thresholds are roughly equivalent to the thresholds used for Criterion A1, with slightly higher thresholds for critically endangered and endangered ecosystems to allow for the fact that the forest biome in South Africa is naturally rare and fragmented relative to other biomes.

Criterion B: Rate of loss of natural habitat

This criterion identifies ecosystems that have not yet lost a large amount of natural habitat but are experiencing unusually high rates of habitat loss. Criterion B is dormant for the current phase of listing as the data needed to operationalise the criterion is not available.

Criterion C: Limited extent and imminent threat

This criterion identifies ecosystems of small geographic extent that are faced with an imminent threat. The intention is to identify small ecosystems or ecosystems with very little remaining natural habitat that could be destroyed by a few developments (for example, a small coastal vegetation type in an area with significant coastal development pressures).

Ecosystems cannot be listed as critically endangered using this criterion because an ecosystem of limited extent has not necessarily *already* undergone severe degradation of ecological structure, function or composition as a result of human intervention (as is required by the definition in the Biodiversity Act of a critically endangered ecosystem). An ecosystem can be listed as endangered if it is less than 3 000 hectares in size and as vulnerable if it is less than 6 000 hectares in size. However, it can only be listed if there is a high degree of imminent threat associated with the ecosystem.

Criterion C was applied to national forest types. Imminent threat was based on the assessment of development pressure (including urban, industrial, mining) done as part of DWAF's systematic biodiversity plan for the forest biome.

Criterion D: Threatened species associations

This criterion identifies ecosystems that contain a high number of threatened species, indicating that the ecosystem itself is threatened even if it has not been identified as threatened under the other criteria (for example because of data limitations associated with the other criteria). Further, as discussed in Section 3.1.2, threatened species listed in terms of the Biodiversity Act include only those species threatened by restricted activities as defined in the Biodiversity Act. These restricted activities do not include habitat loss, yet habitat loss is one of the key threats facing most Red Listed species. Criterion D thus also helps to protect species threatened by habitat loss.

Criterion D is split into two sub-criteria: Criterion D1: Threatened plant species associations; and Criterion D2: Threatened animal species associations. In the current phase of listing only Criterion D1 has been applied. Criterion D2 will remain dormant until further data is available to operationalise the criterion. The thresholds for Criterion D2 will differ from those set for Criterion D1.

Criterion D1: Threatened plant species associations

An ecosystem is categorised as critically endangered if 80 or more threatened Red Data List plant species are associated with the ecosystem, endangered if 60 or more Red Data List plant species are associated with the ecosystem, and vulnerable ecosystems if 40 or more Red Data List plant species are associated with the ecosystem.

Threatened Red Data List plant species include the IUCN Red Data List categories of critically endangered (CR), endangered (EN), vulnerable (VU), extinct (EX), and extinct in the wild (EW). They do not include plant species listed under the category Vulnerable D2 (VU D2), which identifies species with a restricted area of occupancy (i.e. species that are naturally rare). In order to determine the number of threatened plant species associated with an ecosystem, both specimen records and observation records were used. Criterion D1 was applied to national vegetation types and national forest types.

Of all the ecosystems in South Africa, only fynbos ecosystems meet the high thresholds set for Criterion D1. This highlights both the exceptional diversity of the fynbos biome and the extent to which it is under pressure.

Criterion E: Habitat fragmentation

This criterion identifies ecosystems which have been compromised by habitat fragmentation. Initial testing was done on this criterion but due to the complexity of measuring fragmentation, which is heavily scale dependent, and of determining its effects on ecosystems, additional research and testing is required before Criterion E can be operationalised. It has been agreed that it does not make sense to apply Criterion E to forest ecosystems because of the naturally fragmented nature of the forest biome.

Criterion F: Priority areas for meeting explicit biodiversity targets as defined by a systematic biodiversity plan

This criterion allows for the very detailed biodiversity information used in systematic biodiversity plans to be drawn on in the ecosystem listing process. For the current phase of listing only provincial biodiversity plans have been considered, as well as DWAF's systematic biodiversity plan for the forest biome.[19] Systematic provincial biodiversity plans exist for Gauteng, Mpumalanga and KwaZulu-Natal (see Section 4.2.2). These provincial plans have been undertaken according to well-established systematic biodiversity planning principles, at a fine enough scale and with sufficient consistency between them to provide a strong basis for identifying national threatened ecosystems.[20]

A three-step methodology was used to identify ecosystems using Criterion F:

- Step 1: Identify clusters of very high irreplaceability planning units from the systematic biodiversity plan
- Step 2: Delineate ecosystems using ecological, topographical and/or geological features
- Step 3: Assess the threat value (high, medium or low) for each ecosystem based on data included in the systematic biodiversity planning process, to categorise as critically endangered, endangered or vulnerable respectively

4.4 How do listed threatened ecosystems relate to ecosystem status in the National Spatial Biodiversity Assessment 2004?

The NSBA 2004 was the first national spatial assessment of South Africa's terrestrial and aquatic biodiversity. It identified broad biodiversity priority areas for conservation action, and as mentioned in Section 1 included early attempts to identify threatened ecosystems in the terrestrial, river, estuarine and marine environments. An ecosystem status assessment

[19] A number of systematic biodiversity plans have been done at local and regional scales in various parts of the country. SANBI's recommendation is that even in future phases of ecosystem listing only systematic biodiversity plans that are recognised by provincial conservation authorities or by relevant national departments such as DWAF should be used to identify threatened ecosystems using Criterion F.

[20] Some other provinces have recently completed or are in the process of developing provincial systematic biodiversity plans. The Eastern Cape Biodiversity Conservation Plan and the North West Biodiversity Conservation Assessment were not completed in time to be included in this process, and may be at too broad a spatial scale to provide the basis for identifying ecosystems using Criterion F. Further testing would be required to determine this.

categorised ecosystems as critically endangered (CR), endangered (EN), vulnerable (VU) or least threatened (LT).

The methodology used to assess ecosystem status in the NSBA 2004 used only Criterion A1, and the thresholds for endangered and vulnerable ecosystems were different from those used for ecosystem listing. Available data on loss of natural habitat has improved since the NSBA 2004 was undertaken, and further criteria for identifying threatened ecosystems have been developed. **This means that the terrestrial ecosystem status results in the NSBA 2004 are superceded by this more detailed, comprehensive analysis.** Until more detailed analysis is done of the ecosystem status of aquatic ecosystems, the results of the NSBA 2004 for aquatic ecosystems stand. Future revisions of the NSBA will be brought in line with the ecosystem listing criteria.

5 Implications of listing threatened ecosystems

This section briefly discusses the implications of listing threatened ecosystems. Four main types of implications have been identified:

- Planning related implications, linked to IDPs and SDFs;
- Environmental authorisation implications, in terms of NEMA and EIA regulations;
- Proactive management implications, in terms of the Biodiversity Act;
- Monitoring and reporting implications, in terms of the Biodiversity Act.

5.1 Planning related implications

According to Section 54 of the Biodiversity Act, the need for protection of listed ecosystems must be taken into account in municipal Integrated Development Plans (IDPs) and by implication in Spatial Development Frameworks (SDFs).[21]

IDPs can take listed ecosystems into account by, for example:

- Identifying IDP projects or local economic development projects with biodiversity benefits, linked to management of threatened ecosystems (such as clearing of invasive aliens through Working for Water, or other forms of rehabilitation e.g. through Working for Wetlands, LandCare, CoastCare);
- Prioritising threatened ecosystems in the development of invasive species control and eradication plans (these are required of municipalities in terms of Subsection 76(2) of the Biodiversity Act, for any land under a municipality's control, and should form part of the IDP);
- Exploring options to formally protect and manage municipal land that supports threatened ecosystems;
- Ensuring that development projects identified by the IDP, especially those with large footprints, avoid conflict with or negative impacts on threatened ecosystems.

SDFs should take listed ecosystems into account by:

- Including a map of listed ecosystems and their accompanying descriptions;

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[21] The Municipal Systems Act (Act 32 of 2000) requires that an IDP must include a spatial component, the SDF. In practice, IDPs and SDFs are usually compiled separately by separate sets of consultants.

- Ensuring that listed ecosystems are reflected in the final integrated map of spatial planning categories or zones;
- Applying appropriately restrictive land-use guidelines to listed ecosystems, so that further loss and degradation of natural habitat in these ecosystems is avoided.

Zoning schemes or land-use management schemes should ultimately be consistent with and give effect to Spatial Development Frameworks, and should include appropriately restrictive zoning categories for ecologically important areas such as threatened ecosystems.

An important starting point is for municipalities to be aware of listed ecosystems that fall within their jurisdiction. To this end, SANBI and DEAT have embarked on a project to develop municipal biodiversity profiles, which will provide basic information on important biodiversity features per district municipality, initially in pilot provinces and later in all provinces. Municipal biodiversity profiles will be available on SANBI's BGIS website (http://bgis.sanbi.org), which already serves substantial amounts of spatial biodiversity information to municipalities, consultants and others.

The need for protection of listed ecosystems should also be taken into account in provincial growth and development strategies and provincial spatial development frameworks, which provide the provincial context for district and local IDPs and SDFs.

5.2 Environmental authorisation implications

As discussed in Section 3.2.1, Subsection 24(2) of NEMA allows for provincial EIA supplementation maps which identify:

- sensitive areas and additional activities that should trigger environmental authorisations in those areas
- "exclusion areas" where environmental authorisations should not be required.

Some provinces have developed / are developing EIA supplementation maps. **Listed ecosystems should be included as sensitive areas in EIA supplementation maps** when these are developed.

As discussed in Section 3.2.2, the EIA regulations include two lists of activities:

- Activities that require a basic assessment (R386)
- Activities that require scoping and EIA (R387)

Activity 12 in the list of activities that require a basic assessment (R386) is: the **transformation or removal of indigenous vegetation** of 3 hectares or more OR OF ANY SIZE if the transformation or removal would occur within a critically endangered or endangered ecosystem listed in terms of the Biodiversity Act. In other words the **3 hectare threshold for a basic assessment falls away in a CR or EN ecosystem.**

The table below summarises the implications of transformation or removal of indigenous vegetation in terms of the EIA regulations:

	CR or EN ecosystem	**Other areas**
Impact >20ha	Full scoping & EIA	Full Scoping & EIA
20ha > impact > 3ha	Basic Assessment Report	Basic Assessment Report
Impact <3ha	Basic Assessment Report	No EIA requirements

To establish whether a site falls within or contains part of a threatened ecosystem:

- Step 1: Go to BGIS website (http://bgis.sanbi.org) and select the "Services" tab.
- Step 2: Use the land-use decision support (LUDS) tool to locate your site and to determine whether the site falls within or contains part of a threatened ecosystem (or other biodiversity priority area). The assessment results from the LUDS tool include a biodiversity report (including the presence of any threatened ecosystems), a checklist list of Plants of southern Africa per quarter degree grid, and information on whether the site contains indigenous vegetation according to available land cover information (it is essential to ground truth this result – see Step 3). You will also have the option of creating a series of maps and exporting the site to Google Earth.
- Step 3: Ground-truth the presence of indigenous vegetation that is part of the ecosystem in question, preferably with an ecologist who knows the area (spatial data on the location of ecosystems and on land cover is always subject to errors of scale, and land cover data is never 100% up to date).

As discussed in Section 3.2.2, the EIA regulations also provide for the development of EMFs. **Listed ecosystems should be incorporated into EMFs**, with restrictions on any loss of natural habitat in CR and EN ecosystems.

5.3 Proactive biodiversity management implications

Listing of ecosystems allows for considerable focus of proactive management actions on these ecosystems to protect or rehabilitate them.

In terms of the Biodiversity Act:

- A Biodiversity Management Plan can be developed for a listed ecosystem and published. The Minister must identify an implementing agent for the management plan in order for it to be published, and must assess implementation of the plan every five years. Presumably a Biodiversity Management Plan could also be developed for a group of listed ecosystems. As noted in Section 3.1.4, norms and standards for Biodiversity Management Plans for ecosystems have not yet been developed.
- The Minister can enter into a Biodiversity Management Agreement with the implementing agent of a Biodiversity Management Plan.

Other proactive management actions that could be applied to listed ecosystems include the following:

- Regulation and control of invasive alien species could be prioritised in listed ecosystems
- Rehabilitation programmes such as Working for Wetlands could prioritise listed ecosystems
- Protected area management plans could pay particular attention to the need for careful management of threatened ecosystems within protected areas.

5.4 Monitoring and reporting implications

The functions of SANBI, set out in Section 11 of the Biodiversity Act, include monitoring and reporting regularly to the Minister on the conservation status of all listed species and listed ecosystems.

In terms of Section 49 of the Biodiversity Act, which deals with monitoring the status of biodiversity in the country, the Minister must designate monitoring mechanisms and set indicators to determine the conservation status of various components of South Africa's biodiversity, as well as any negative and positive trends affecting their conservation status. The Minister must report annually to parliament on these indicators and make the information publicly available.

SANBI has developed a National Biodiversity Monitoring and Reporting Framework, together with headline indicators, to provide an effective mechanism for reporting on the state of South Africa's biodiversity, including co-ordinating and aligning the biodiversity monitoring and reporting efforts of many organisations and individuals. The National Biodiversity Monitoring and Reporting Framework has a component that deals with the state of ecosystems, with headline indicators on the number and extent of threatened ecosystems (CR, EN and VU) in terrestrial and aquatic environments.

We recommend that provinces and municipalities developing State of Environment Reports align their biodiversity indicators as far as possible with those in the National Biodiversity Monitoring and Reporting Framework, and include indicators on the number and remaining area of threatened ecosystems, and the extent of further loss or degradation of threatened ecosystems.

6 Summary of listed ecosystems

This section provides summary information on the ecosystems listed in the current phase of listing. Detailed information on each of the ecosystems is available in the accompanying document, *Threatened Ecosystems in South Africa: Descriptions and Maps.*

As shown in Table 2, the ecosystems listed in the current phase make up 9.5% of the country, with critically endangered and endangered ecosystems together accounting for 2.7% and vulnerable ecosystems a further 6.8%. The table shows how the ecosystems are distributed by province, and gives approximate areas. The area figures refer to the remaining natural habitat in listed ecosystems, not their original extent. Figure 1 and
Figure 2 show the original and remaining extent of the ecosystems respectively.

Table 3 gives a summary list of all the ecosystems. The table is organised by category of threatened ecosystem (CR, EN and VU) and within each category the ecosystems are given in alphabetical order.

Table 2: Summary statistics for listed ecosystems

	CR		EN		VU		TOTAL	
	000 ha	%	000 ha	%	000 ha	%	000 ha	%
Eastern Cape	4	0.0	51	0.3	588	3.5	643	3.8
Free State	2	0.0	383	3.0	1 049	8.1	1 433	11.0
Gauteng	99	6.0	95	5.8	189	11.4	384	23.2
KZN	224	2.4	464	5.0	1 164	12.5	1 852	19.9
Limpopo	9	0.1	123	1.0	536	4.3	668	5.3
Mpumalanga	6	0.1	634	8.3	2 226	29.1	2 866	37.5
Northern Cape			35	0.1	109	0.3	144	0.4
North West	186	1.8	452	4.3	1 309	12.3	1 947	18.3
Western Cape	374	2.9	154	1.2	1 083	8.4	1 611	12.5
South Africa	**903**	**0.7**	**2 392**	**2.0**	**8 252**	**6.8**	**11 547**	**9.5**

Table notes:

- Area figures refer to remaining natural area. They have been rounded to nearest thousand hectares so totals may not add up exactly.
- A blank cell indicates that no ecosystems were identified. A zero indicates that one or more ecosystems have been identified but that their total remaining area is less than 1 000ha.

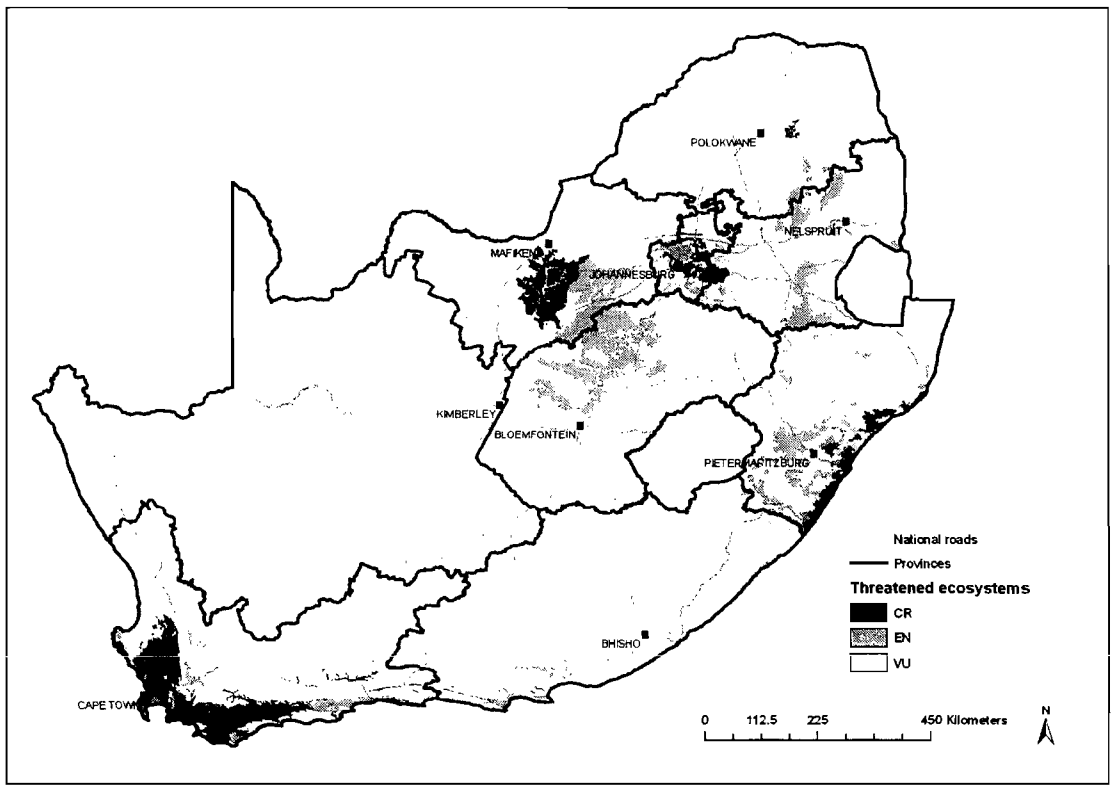

Figure 1: Map of listed ecosystems, showing original extent of ecosystems

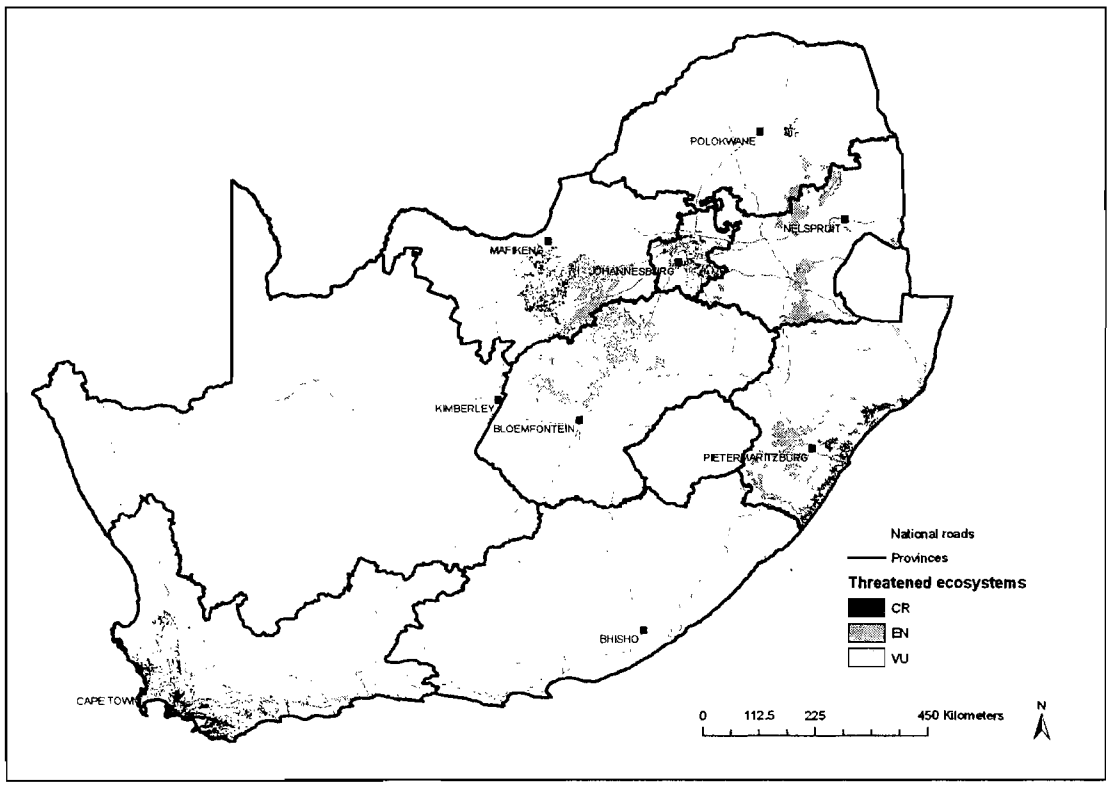

Figure 2: Map of listed ecosystems, showing remaining extent of ecosystems

Table 3: Summary of listed ecosystems, including reference numbers, divided into critically endangered, endangered and vulnerable ecosystems

No.	Ecosystem	Biome	Province	Criterion
Critically Endangered (CR)				
1	Atlantis Sand Fynbos (FFd 4)	Fynbos	Western Cape	D1
2	Blesbokspruit Highveld Grassland (GP 1)	Grassland/Savanna/ Wetland	Gauteng	F
3	Blinkwater Valley (KZN 1)	Grassland/Savanna	KwaZulu-Natal	F
4	Boesmanspruit Highveld Grassland (GP 2)	Grassland/Wetland	Gauteng	F
5	Bronberg Mountain Bushveld (GP 3)	Grassland/Savanna	Gauteng	F
6	Cape Flats Sand Fynbos (FFd 5)	Fynbos	Western Cape	A1 & D1
7	Cape Lowland Alluvial Vegetation (AZa 2)	Azonal	Western Cape	A1
8	Central Rûens Shale Renosterveld (FRs 12)	Fynbos	Western Cape	A1
9	Durban Metropole North Coast Grassland (KZN 2)	Indian Ocean Coastal Belt/Forest	KwaZulu-Natal	F
10	Eastern Rûens Shale Renosterveld (FRs 13)	Fynbos	Western Cape	A1
11	Elgin Shale Fynbos (FFh 6)	Fynbos	Western Cape	A1
12	Elim Ferricrete Fynbos (FFf 1)	Fynbos	Western Cape	A1
13	Entumeni Valley (KZN 3)	Indian Ocean Coastal Belt/ Savanna/Forest	KwaZulu-Natal	F
14	Eshowe Mtunzini Hilly Grasslands (KZN 4)	Indian Ocean Coastal Belt/ Savanna/Forest	KwaZulu-Natal	F
15	Glen Austin Pan (GP 4)	Grassland	Gauteng	F
16	Highover Nature Reserve and Roselands Farm Surrounds (KZN 5)	Grassland/Savanna/ Forest	KwaZulu-Natal	F
17	Interior North Coast Grasslands (KZN 6)	Indian Ocean Coastal Belt/ Savanna/Forest	KwaZulu-Natal	F
18	Interior South Coast Grasslands (KZN 7)	Indian Ocean Coastal Belt/ Savanna/Forest	KwaZulu-Natal	F
19	Kaapsehoop Quartzite Grasslands (MP 1)	Grassland/Forest	Mpumalanga	F
20	Klipriver Highveld Grassland (GP 5)	Grassland/Savanna/ Wetland	Gauteng	F
21	Knysna Sand Fynbos (FFd 10)	Fynbos	Western Cape	A1

No.	Ecosystem	Biome	Province	Criterion
22	Kogelberg Sandstone Fynbos (FFs 11)	Fynbos	Western Cape	D1
23	Kwambonambi Dune Forest (KZN 8)	Indian Ocean Coastal Belt/Forest	KwaZulu-Natal	F
24	Kwambonambi Hygrophilous Grasslands (KZN 9)	Indian Ocean Coastal Belt/Forest	KwaZulu-Natal	F
25	Langkloof Shale Renosterveld (FRs 17)	Fynbos	Western Cape Eastern Cape	A1
26	Lourensford Alluvium Fynbos (FFa 4)	Fynbos	Western Cape	A1
27	Magaliesberg Pretoria Mountain Bushveld (GP 6)	Grassland/Savanna	Gauteng	F
28	Margate Pondoland-Ugu Sourveld (KZN 10)	Indian Ocean Coastal Belt/Forest	KwaZulu-Natal	F
29	Mlazi Gorge (KZN 11)	Indian Ocean Coastal Belt/Forest	KwaZulu-Natal	F
30	Muscadel Riviere (AZi 8)	Azonal	Western Cape	A1
31	New Hanover Plateau (KZN 12)	Grassland/Savanna/ Forest	KwaZulu-Natal	F
32	Ngoye Scarp Forests and Grasslands (KZN 13)	Indian Ocean Coastal Belt/ Savanna/Forest	KwaZulu-Natal	F
33	North Coast Dune Forest (KZN 14)	Indian Ocean Coastal Belt/Forest	KwaZulu-Natal	F
34	North Coast Forest Collective (KZN 15)	Indian Ocean Coastal Belt/Forest	KwaZulu-Natal	F
35	Northern Coastal Grasslands (KZN 16)	Indian Ocean Coastal Belt/Forest	KwaZulu-Natal	F
36	Oakland and Townhill Ridge (KZN 17)	Grassland/Savanna/ Forest	KwaZulu-Natal	F
37	Overberg Sandstone Fynbos (FFs 12)	Fynbos	Western Cape	D1
38	Peninsula Granite Fynbos (FFg 3)	Fynbos	Western Cape	A1
39	Peninsula Shale Renosterveld (FRs 10)	Fynbos	Western Cape	A1
40	Rietvleiriver Highveld Grassland (GP 7)	Grassland/Wetlands	Gauteng	F
41	Roodepoort Reef Mountain Bushveld (GP 8)	Grassland/Savanna	Gauteng	F
42	Rûens Silcrete Renosterveld (FRc 2)	Fynbos	Western Cape	A1
43	Southern Coastal Grasslands (KZN 18)	Indian Ocean Coastal Belt/Forest	KwaZulu-Natal	F
44	Swartland Alluvium Fynbos (FFa 3)	Fynbos	Western Cape	A1
45	Swartland Granite Renosterveld (FRg 2)	Fynbos	Western Cape	A1 & D1
46	Swartland Shale Renosterveld (FRs 9)	Fynbos	Western Cape	A1 & D1

No.	Ecosystem	Biome	Province	Criterion
47	Swartland Silcrete Renosterveld (FRc 1)	Fynbos	Western Cape	A1
48	Umvoti Valley Complex (KZN 19)	Indian Ocean Coastal Belt/ Savanna/Forest	KwaZulu-Natal	F
49	Western Highveld Sandy Grassland (Gh 14)	Grassland	North West	A1
50	Western Rûens Shale Renosterveld (FRs 11)	Fynbos	Western Cape	A1
51	Wilge Mountain Bushveld (GP 9)	Grassland/Savanna	Gauteng	F
52	Witwatersberg Pretoria Mountain Bushveld (GP 10)	Grassland/Savanna	Gauteng	F
53	Woodbush Granite Grassland (Gm 25)	Grassland	Limpopo	A1
Endangered (EN)				
54	Agulhas Sand Fynbos (FFd 7)	Fynbos	Western Cape	A1
55	Albany Alluvial Vegetation (AZa 6)	Azonal	Eastern Cape	A1
56	Bazini Forest Complex (KZN 20)	Grassland/Savanna/ Forest	KwaZulu-Natal	F
57	Bivane Montane Grassland (KZN 21)	Grassland	KwaZulu-Natal	F
58	Blouberg Forest (FOR 1)	Forest	Limpopo	F
59	Blyde Quartzite Grasslands (MP 2)	Grassland/Forest	Mpumalanga	F
60	Brakfontein Reef Bushveld (GP 11)	Grassland/Savanna	Gauteng	F
61	Breede Alluvium Fynbos (FFa 2)	Fynbos	Western Cape	A1
62	Bronkhorstspruit Highveld Grassland (GP 12)	Savanna/Grassland/ Wetland	Gauteng	F
63	Cape Flats Dune Strandveld (FS 6)	Fynbos	Western Cape	D1
64	Cape Vernal Pools (AZf 2)	Azonal	Western Cape Northern Cape	A1
65	Chrissiesmeer Panveld (MP 3)	Grassland/Wetland	Mpumalanga	F
66	Cumberland Crest (KZN 22)	Savanna	KwaZulu-Natal	F
67	Deneysville Highveld Grassland (GP 13)	Grassland/Savanna	Gauteng	F
68	Dukuduku/St Lucia Grasslands and Forests (KZN 23)	Indian Ocean Coastal Belt/Forest	KwaZulu-Natal	F
69	Dullstroom Plateau Grasslands (MP 4)	Grassland/Forest	Mpumalanga	F
70	Egoli Granite Grassland (Gm 10)	Grassland	Gauteng	A1
71	Fort Metcalf Grasslands (KZN 24)	Grassland	KwaZulu-Natal	F
72	Garden Route Granite Fynbos (FFg 5)	Fynbos	Western Cape	A1
73	Gqunu Forest (KZN 25)	Grassland/Forest	KwaZulu-Natal	F

No.	Ecosystem	Biome	Province	Criterion
74	Greyton Shale Fynbos (FFh 7)	Fynbos	Western Cape	A1
75	Greytown North Grasslands (KZN 26)	Grassland	KwaZulu-Natal	F
76	Groot Brak Dune Strandveld (FS 9)	Fynbos	Western Cape	A1
77	Hangklip Sand Fynbos (FFd 6)	Fynbos	Western Cape	A1
78	Hlabeni State Forest (KZN 27)	Grassland/Forest	KwaZulu-Natal	F
79	Hlabisa Forest Complex (FOR 2)	Forest	KwaZulu-Natal	F
80	Humansdorp Shale Renosterveld (FRs 19)	Fynbos	Eastern Cape	A1
81	Impendle Highlands (KZN 28)	Grassland/Forest	KwaZulu-Natal	F
82	Karkloof Forest Collective (KZN 29)	Grassland/Savanna/ Forest	KwaZulu-Natal	F
83	Kobonqaba Forest Complex (FOR 3)	Forest	Eastern Cape	F
84	Kouebokkeveld Alluvium Fynbos (FFa 1)	Fynbos	Western Cape	A1
85	Kraanspoort Mountain Bushveld (GP 14)	Grassland/Savanna	Gauteng	F
86	KwaZulu-Natal Coastal Forest (FOz VII1)	Forest	KwaZulu-Natal	A2
87	KwaZulu-Natal Sandstone Sourveld (SVs 5)	Savanna	KwaZulu-Natal	A1
88	Loskop Grasslands (KZN 30)	Grassland	KwaZulu-Natal	F
89	Lower Gariep Alluvial Vegetation (AZa 3)	Azonal	Northern Cape	A1
90	Malmani Karstlands (MP 5)	Grassland/Savanna/ Forest	Mpumalanga Limpopo	F
91	Mananga-Lebombo Thornveld (MP 6)	Savanna/Forest	Mpumalanga	F
92	Mangrove Forest (FOa 3)	Forest	KwaZulu-Natal Eastern Cape	C
93	Mapungubwe/Greefswald Riverine Forest (FOR 4)	Forest	Limpopo	F
94	Mauchesburg Alpine Grasslands (MP 7)	Grassland/Forest	Mpumalanga	F
95	Mossel Bay Shale Renosterveld (FRs 14)	Fynbos	Western Cape	A1
96	Mount Thesiger Forest Complex (FOR 5)	Forest	Eastern Cape	F
97	Ngome Mistbelt Grassland and Forest (KZN 31)	Grassland/Savanna/ Forest	KwaZulu-Natal	F
98	Noordkaap Greenstone Bushveld (MP 8)	Savanna	Mpumalanga	F
99	Ntimbankulu Forest (FOR 6)	Forest	KwaZulu-Natal	F
100	Ntunjambili Valley Complex (KZN 32)	Savanna/Grassland	KwaZulu-Natal	F
101	Oribi-Port Edward Pondoland-Ugu Sourveld (KZN 33)	Indian Ocean Coastal Belt/ Savanna/Forest	KwaZulu-Natal	F
102	Peninsula Sandstone Fynbos (FFs 9)	Fynbos	Western Cape	D1

No.	Ecosystem	Biome	Province	Criterion
103	Pietermaritzburg South (KZN 34)	Grassland/Savanna/ Forest	KwaZulu-Natal	F
104	Potberg Ferricrete Fynbos (FFf 2)	Fynbos	Western Cape	A1
105	Qudeni Mountain Mistbelt Forest and Grassland (KZN 35)	Grassland/Savanna/ Forest	KwaZulu-Natal	F
106	Saldanha Granite Strandveld (FS 2)	Fynbos	Western Cape	A1
107	Sekhukhune Mountainlands (MP 9)	Grassland/Savanna	Mpumalanga Limpopo	F
108	Sekhukune Norite Bushveld (LP 1)	Savanna	Limpopo	F
109	Sihleza (KZN 36)	Grassland/Forest	KwaZulu-Natal	F
110	Southern Weza State Forest (KZN 37)	Grassland/Forest	KwaZulu-Natal	F
111	Stoffberg Mountainlands (MP 10)	Grassland	Mpumalanga	F
112	Tsakane Clay Grassland (Gm 9)	Grassland	Gauteng Mpumalanga	A1
113	Umgeni Valley Bushveld (KZN 38)	Grassland/Savanna/ Forest	KwaZulu-Natal	F
114	Vaal-Vet Sandy Grassland (Gh 10)	Grassland	North West Free State	A1
115	Wakkerstroom/Luneburg Grasslands (MP 11)	Grassland/Forest	Mpumalanga KwaZulu-Natal	F
116	Western Cape Milkwood Forest (FOz VI3)	Forest	Western Cape	C
117	Witwatersberg Skeerpoort Mountain Bushveld (GP 15)	Grassland/Savanna	Gauteng	F
Vulnerable (VU)				
118	Agulhas Limestone Fynbos (FFl 1)	Fynbos	Western Cape	D1
119	Albertinia Sand Fynbos (FFd 9)	Fynbos	Western Cape	A1
120	Algoa Sandstone Fynbos (FFs 29)	Fynbos	Eastern Cape	A1
121	Badplaas Mountainlands (MP 12)	Grassland/Savanna/ Forest	Mpumalanga	F
122	Barberton Mountainlands (MP 13)	Grassland/Savanna/ Forest	Mpumalanga	F
123	Beinn Mheadmon Mountain Grasslands (KZN 39)	Grassland	KwaZulu-Natal	F
124	Bivane Sour Grassveld and Bushveld (KZN 40)	Grassland/Savanna	KwaZulu-Natal	F
125	Black Rhino Range (KZN 41)	Indian Ocean Coastal Belt/ Savanna/Forest	KwaZulu-Natal	F
126	Bloemfontein Dry Grassland (Gh 5)	Grassland	Free State	A1

No.	Ecosystem	Biome	Province	Criterion
127	Bokkeveld Sandstone Fynbos (FFs 1)	Fynbos	Western Cape Northern Cape	D1
128	Boland Granite Fynbos (FFg 2)	Fynbos	Western Cape	D1
129	Boschhoek Forests (KZN 42)	Grassland/Forest	KwaZulu-Natal	F
130	Boschhoek Plateau (KZN 43)	Grassland/Forest	KwaZulu-Natal	F
131	Breede Alluvium Renosterveld (FRa 1)	Fynbos	Western Cape	A1
132	Breede Sand Fynbos (FFd 8)	Fynbos	Western Cape	A1
133	Bushmans Nek/Garden Castle Lowlands (KZN 44)	Grassland	KwaZulu-Natal	F
134	Cape Winelands Shale Fynbos (FFh 5)	Fynbos	Western Cape	A1
135	Cederberg Sandstone Fynbos (FFs 4)	Fynbos	Western Cape	D1
136	Ceres Shale Renosterveld (FRs 4)	Fynbos	Western Cape	A1
137	Chelmsford Grasslands (KZN 45)	Grassland	KwaZulu-Natal	F
138	Chelmsford North Grasslands (KZN 46)	Grassland/Savanna	KwaZulu-Natal	F
139	Croc Gorge Granite Mountainlands (MP 14)	Savanna/Forest	Mpumalanga	F
140	Drakensberg Foothill Wattled Crane Habitat (KZN 47)	Grassland/Forest	KwaZulu-Natal	F
141	Easingwold Grasslands (KZN 48)	Grassland/Forest	KwaZulu-Natal	F
142	Eastern Coastal Shale Band Vegetation (FFb 6)	Fynbos	Western Cape Eastern Cape	A1
143	Eastern Creighton and Donnybrook (KZN 49)	Grassland/Savanna	KwaZulu-Natal	F
144	Eastern Free State Clay Grassland (Gm 3)	Grassland	Free State	A1
145	Eastern Highveld Grassland (Gm 12)	Grassland	Mpumalanga Gauteng	A1
146	Eastern Little Karoo (SKv 11)	Succulent Karoo	Western Cape	A1
147	Eastern Scarp Forest (FOz V1)	Forest	KwaZulu-Natal	A2
148	Eastern Temperate Freshwater Wetlands (Azf 3)	Azonal	Northern Cape Eastern Cape Free State North West Gauteng Mpumalanga KwaZulu-Natal	A1
149	Eastlands (KZN 50)	Grassland/Savanna	KwaZulu-Natal	F
150	Elandshoek Summit Grasslands (MP 15)	Grassland	Mpumalanga	F
151	Elandshoogte Mountainlands (MP 16)	Grassland/Savanna/ Forest	Mpumalanga	F

No.	Ecosystem	Biome	Province	Criterion
152	eMondlo Sandy Moist Grassland (KZN 51)	Grassland	KwaZulu-Natal	F
153	Fort Nottingham Lowland Grasslands (KZN 52)	Grassland/Forest	KwaZulu-Natal	F
154	Garden Route Shale Fynbos (FFb 9)	Fynbos	Western Cape Eastern Cape	A1
155	Glen Cairn Valley (KZN 53)	Grassland/Savanna	KwaZulu-Natal	F
156	Gold Cliff Farm Surrounds (KZN 54)	Grassland/Savanna	KwaZulu-Natal	F
157	Harding East (KZN 55)	Savanna	KwaZulu-Natal	F
158	Harding West (KZN 56)	Grassland	KwaZulu-Natal	F
159	Hawequas Sandstone Fynbos (FFs 10)	Fynbos	Western Cape	D1
160	Himeville Lowlands and Ridge (KZN 57)	Grassland	KwaZulu-Natal	F
161	Hluhluwe Scarp Forest (KZN 58)	Grassland/Savanna/ Forest	KwaZulu-Natal	F
162	Hopefield Sand Fynbos (FFd 3)	Fynbos	Western Cape	A1 & D1
163	Imfolosi Savanna and Sourveld ((KZN 59)	Grassland/Savanna	KwaZulu-Natal	F
164	Impendle Lowland Grasslands (KZN 60)	Grassland/Forest	KwaZulu-Natal	F
165	Ixopo Surrounds (KZN 61)	Grassland/Savanna	KwaZulu-Natal	F
166	Kaalrug Mountainlands (MP 17)	Grassland/Savanna/ Forest	Mpumalanga	F
167	Kango Limestone Renosterveld (FRl 1)	Fynbos	Western Cape	A1
168	KaNgwane Montane Grassland (Gm 16)	Grassland	Mpumalanga KwaZulu-Natal	A1
169	Kouebokkeveld Shale Fynbos (FFh 1)	Fynbos	Western Cape	A1
170	Kromberg Plateau (KZN 62)	Grassland/Savanna/ Forest	KwaZulu-Natal	F
171	KwaMncane North Plateau (KZN 63)	Grassland/Forest	KwaZulu-Natal	F
172	KwaZulu-Natal Coastal Belt (CB 3)	Indian Ocean Coastal Belt	KwaZulu-Natal	A1
173	Lebombo Scarp Forest (KZN 64)	Grassland/Savanna/ Forest	KwaZulu-Natal	F
174	Lebombo Summit Sourveld (SVl 17)	Savanna	Mpumalanga KwaZulu-Natal	A1
175	Legogote Sour Bushveld (SVl 9)	Savanna	Limpopo Mpumalanga	A1
176	Leipoldtville Sand Fynbos (FFd 2)	Fynbos	Western Cape	A1 & D1
177	Loskop Mountainlands (MP 18)	Grassland/Savanna	Mpumalanga	F
178	Louwsberg Mistbelt Grassland (KZN 65)	Grassland/Forest	KwaZulu-Natal	F

No.	Ecosystem	Biome	Province	Criterion
179	Low Escarpment Mistbelt Forest (FOz II4)	Forest	Mpumalanga KwaZulu-Natal	A2
180	Lowveld Riverine Forest (FOa 1)	Forest	Mpumalanga KwaZulu-Natal Limpopo	A2
181	Mafikeng Bushveld (SVk 1)	Savanna	North West	A1
182	Magaliesberg Hekpoort Mountain Bushveld (GP 16)	Grassland/Savanna/ Forest	Gauteng	F
183	Majuba Mistbelt Forest and Moist Grassland (KZN 66)	Grassland/Forest	KwaZulu-Natal	F
184	Maputaland Wooded Grassland (CB 2)	Indian Ocean Coastal Belt	KwaZulu-Natal	A1
185	Marikana Thornveld (SVcb 6)	Savanna	North West Gauteng	A1
186	Marwaqa (KZN 67)	Grassland/Forest	KwaZulu-Natal	F
187	Michaelhouse Grasslands (KZN 68)	Grassland/Forest	KwaZulu-Natal	F
188	Midlands Mistbelt Grassland (Gs 9)	Grassland	KwaZulu-Natal Eastern Cape	A1
189	Midmar Valley (KZN 69)	Grassland	KwaZulu-Natal	F
190	Montagu Shale Renosterveld (FRs 7)	Fynbos	Western Cape	A1
191	Mount Gilboa Plateau (KZN 70)	Grassland/Forest	KwaZulu-Natal	F
192	Mount MacDonald Ridge and Wetlands (KZN 71)	Grassland	KwaZulu-Natal	F
193	Mthatha Moist Grassland (Gs 14)	Grassland	Eastern Cape	A1
194	Namib Seashore Vegetation (AZd 1)	Azonal	Northern Cape	A1
195	New Amalfi Wetlands (KZN 72)	Grassland	KwaZulu-Natal	F
196	Ngongoni Veld (SVs 4)	Savanna	KwaZulu-Natal Eastern Cape	A1
197	Nieuwoudtville Shale Renosterveld (FRs 2)	Fynbos	Northern Cape	A1
198	Nkandla Forests and Grasslands (KZN 73)	Grassland/Forest	KwaZulu-Natal	F
199	Nkunzi/Sundays River Grasslands (KZN 74)	Grassland/Forest	KwaZulu-Natal	F
200	Northern Escarpment Dolomite Grassland (Gm 22)	Grassland	Mpumalanga	A1
201	Northern Qudeni Mistbelt Grasslands (KZN 75)	Grassland	KwaZulu-Natal	F
202	Ntsikeni Vlei (KZN 76)	Grassland/Forest	KwaZulu-Natal	F
203	Oakspring Valley (KZN 77)	Grassland	KwaZulu-Natal	F

No.	Ecosystem	Biome	Province	Criterion
204	Paulpietersburg Moist Grassland (Gm 15)	Grassland	Mpumalanga KwaZulu-Natal	A1
205	Piketberg Quartz Succulent Shrubland (SKk 8)	Succulent Karoo	Western Cape	A1
206	Piketberg Sandstone Fynbos (FFs 6)	Fynbos	Western Cape	D1
207	Pondoland Scarp Forest (FOz V2)	Forest	KwaZulu-Natal Eastern Cape	A2
208	Pudsey/Otterburn Wetlands (KZN 78)	Grassland	KwaZulu-Natal	F
209	Rand Highveld Grassland (Gm 11)	Grassland	Gauteng North West Free State Mpumalanga	A1
210	Saldanha Flats Strandveld (FS 3)	Fynbos	Western Cape	A1
211	Schweizer-Reneke Bushveld (SVk 3)	Savanna	North West	A1
212	Sherwood Forest Collective (KZN 79)	Grassland/Forest	KwaZulu-Natal	F
213	Soweto Highveld Grassland (Gm 8)	Grassland	Gauteng/Free State/North West/ Mpumalanga	A1
214	Springbokvlakte Thornveld (SVcb 15)	Savanna	Limpopo Gauteng Mpumalanga North West	A1
215	Swamp Forest (FOa 2)	Forest	KwaZulu-Natal Eastern Cape	A2 & C
216	Swartberg/Franklin Vlei/Kokstad Ridge and Wetlands (KZN 80)	Grassland/Forest	KwaZulu-Natal	F
217	Swartland Alluvium Renosterveld (FRa 2)	Fynbos	Western Cape	A1
218	Swellendam Silcrete Fynbos (FFc 1)	Fynbos	Western Cape	A1
219	Transkei Coastal Forest (FOz V3)	Forest	Eastern Cape	A2
220	Tzaneen Sour Bushveld (SVl 8)	Savanna	Limpopo Mpumalanga	A1
221	Umvoti Vlei and Surrounds (KZN 81)	Grassland/Indian Ocean Coastal Belt	KwaZulu-Natal	F
222	Uyskop Valley (KZN 82)	Grassland	KwaZulu-Natal	F
223	Vaalkop Headlands (KZN 83)	Grassland/Savanna	KwaZulu-Natal	F
224	Vredefort Dome Granite Grassland (Gh 11)	Grassland	Free State North West	A1
225	Warley Commons (KZN 84)	Grassland/Savanna	KwaZulu-Natal	F

7 Contact details

For further information on the process of listing threatened or protected ecosystems in terms of the Biodiversity Act please contact Tammy Smith (smitht@sanbi.org) at SANBI.

For further information and advice on obtaining the relevant spatial information on threatened ecosystems please contact SANBI's Biodiversity GIS (BGIS) Unit (bgishelp@sanbi.org).

For further information on the National Biodiversity Monitoring and Reporting Framework please contact Jessica Grobler (grobler@sanbi.org) at SANBI.

Appendix A: Relevant sections of the Biodiversity Act

Sections of the Biodiversity Act that deal directly or indirectly with threatened ecosystems are:

- Sections 52-55 on protection of threatened and protected ecosystems
- Sections 43-46 on biodiversity management plans and biodiversity management agreements
- Section 97 on regulations that the Minister may make
- Section 9 on norms and standards that the Minister may issue
- Sections 99 and 100 on consultation and public participation

Protection of threatened or protected ecosystems

Ecosystems that are threatened or in need of protection

52. (1) (a) The Minister may, by notice in the Gazette, publish a national list of ecosystems that are threatened and in need of protection.
(b) An MEC for environmental affairs in a province may, by notice in the Gazette, publish a provincial list of ecosystems in the province that are threatened and in need of protection.

(2) The following categories of ecosystems may be listed in terms of subsection (1):
(a) critically endangered ecosystems, being ecosystems that have undergone severe degradation of ecological structure, function or composition as a result of human intervention and are subject to an extremely high risk of irreversible transformation;
(b) endangered ecosystems, being ecosystems that have undergone degradation of ecological structure, function or composition as a result of human intervention, although they are not critically endangered ecosystems;
(c) vulnerable ecosystems, being ecosystems that have a high risk of undergoing significant degradation of ecological structure, function or composition as a result of human intervention, although they are not critically endangered ecosystems or endangered ecosystems; and
(d) protected ecosystems, being ecosystems that are of high conservation value or of high national or provincial importance, although they are not listed in terms of paragraphs (a), (b) or (c).

(3) A list referred to in subsection (1) must describe in sufficient detail the location of each ecosystem on the list.

(4) The Minister and the MEC for environmental affairs in a relevant province, respectively, must at least every five years review any national or provincial list published by the Minister or MEC in terms of subsection (1).

(5) An MEC may publish or amend a provincial list only with the concurrence of the Minister.

Threatening processes in listed ecosystems

53. (1) The Minister may, by notice in the Gazette, identify any process or activity in a listed ecosystem as a threatening process.

(2) A threatening process identified in terms of subsection (1) must be regarded as a specified activity contemplated in section 24(2)(b) of the National Environmental Management Act and a listed ecosystem must be regarded as an area identified for the purpose of that section.

Certain plans to take into account in protection of listed ecosystems

54. An organ of state that must prepare an environmental implementation or environmental management plan in terms of Chapter 3 of the National Environmental Management Act, and a municipality that must adopt an integrated development plan in terms of the Local Government: Municipal Systems Act, 2000 (Act No. 32 of 2000), must take into account the need for the protection of listed ecosystems.

Amendment of notices

55. The Minister or the MEC for Environmental Affairs in any relevant province may, by notice in the Gazette, amend or repeal any notice published by him or her in terms of section 52(1) or 53(1).

Biodiversity management plans

43. (1) Any person, organisation or organ of state desiring to contribute to biodiversity management may submit to the Minister for his or her approval a draft management plan for—
(a) an ecosystem—
(i) listed in terms of section 52; or
(ii) which is not listed in terms of section 52 but which does warrant special conservation attention;

(2) Before approving a draft biodiversity management plan, the Minister must identify a suitable person, organisation or organ of state which is willing to be responsible for the implementation of the plan.

(3) The Minister must—
(a) publish by notice in the Gazette a biodiversity management plan approved in terms of subsection (1);
(b) determine the manner of implementation of the plan; and
(c) assign responsibility for the implementation of the plan to the person, organisation or organ of state identified in terms of subsection (2).

Biodiversity management agreements

44. The Minister may enter into a biodiversity management agreement with the person, organisation or organ of state identified in terms of section 43(2), or any other suitable person, organisation or organ of state, regarding the implementation of a biodiversity management plan, or any aspect of it.

Contents of biodiversity management plans

45. A biodiversity management plan must—
(a) be aimed at ensuring the long-term survival in nature of the species or ecosystem to which the plan relates;
(b) provide for the responsible person, organisation or organ of state to monitor and report on progress with implementation of the plan; and
(c) be consistent with—
(i) this Act;
(ii) the national environmental management principles;
(iii) the national biodiversity framework;
(iv) any applicable bioregional plan;
(v) any plans issued in terms of Chapter 3 of the National Environmental Management Act;
(vi) any municipal integrated development plan;
(vii) any other plans prepared in terms of national or provincial legislation that
is affected; and
(viii) any relevant international agreements binding on the Republic.
Review and amendment of biodiversity management plans

46. (1) The Minister must review a biodiversity management plan published in terms of section 43(3) at least every five years, and assess compliance with the plan and the extent to which its objectives are being met.
(2) The Minister, either on own initiative or on request by an interested person, organisation or organ of state, may by notice in the Gazette amend a biodiversity management plan published in terms of section 43(3).
(3) Before amending a biodiversity management plan, the Minister must consult—

(a) any person, organisation or organ of state implementing the plan; and

(b) any organ of state whose activities are affected by the implementation of the plan.

Regulations by Minister

97. (1) The Minister may make regulations relating to—

(a) the monitoring of compliance with and enforcement of norms and standards referred to in section 9;

(b) ... (vi) the minimising of the threat to the ecological integrity of a listed ecosystem;

Norms and standards

9. (1) The Minister may, by notice in the Gazette—

(a) issue norms and standards for the achievement of any of the objectives of this Act, including for the—

(i) management and conservation of South Africa's biological diversity and its components;

(ii) restriction of activities which impact on biodiversity and its components;

(b) set indicators to measure compliance with those norms and standards; and

(c) amend any notice issued in terms of paragraph (a) or (b).

...

(3) Norms and standards may apply—

(a) nationwide;

(b) in a specific area only; or

(c) to a specific category of biodiversity only.

(4) Different norms and standards may be issued for—

(a) different areas; or

(b) different categories of biodiversity.

Consultation

99. (1) Before exercising a power which, in terms of a provision of this Act, must be exercised in accordance with this section and section 100, the Minister must follow an appropriate consultative process in the circumstances.

(2) The Minister must, in terms of subsection (1)—

(a) consult all Cabinet members whose areas of responsibility may be affected by the exercise of the power;

(b) in accordance with the principles of co-operative governance set out in Chapter 3 of the Constitution, consult the MEC for Environmental Affairs of each province that may be affected by the exercise of the power; and

(c) allow public participation in the process in accordance with section 100.

Public participation

100. (1) The Minister must give notice of the proposed exercise of the power referred to in section 99—

(a) in the Gazette; and

(b) in at least one newspaper distributed nationally, or if the exercise of the power may affect only a specific area, in at least one newspaper distributed in that area.

(2) The notice must—

(a) invite members of the public to submit to the Minister, within 30 days of publication of the notice in the Gazette, written representations on, or objections to, the proposed exercise of the power; and

(b) contain sufficient information to enable members of the public to submit meaningful representations or objections.

(3) The Minister may in appropriate circumstances allow any interested person or community to present oral representations or objections to the Minister or a person designated by the Minister.

(4) The Minister must give due consideration to all representations or objections received or presented before exercising the power.

Functions of SANBI

11. (1) The Institute—

(a) must monitor and report regularly to the Minister on—

(ii) the conservation status of all listed threatened or protected species and listed ecosystems

Monitoring

49. (1) The Minister must for the purposes of this Chapter designate monitoring mechanisms and set indicators to determine—

(a) the conservation status of various components of South Africa's biodiversity; and

(b) any negative and positive trends affecting the conservation status of the various components.

(2) The Minister may require any person, organisation or organ of state involved in terms of subsection (1) in monitoring the matters referred to in that subsection to report regularly to the Minister on the results of such monitoring measured against the predetermined indicators.

(3) The Minister must—

(a) annually report to Parliament on the information submitted to the Minister in terms of subsection (2); and

(b) make such information publicly available.

Appendix B: Relevant sections of NEMA (as amended)

The relevant sections of NEMA are:

- 24(2)-(3)
- 24A
- 24B
- 24D

24. Environmental authorisations

(2) The Minister, and every MEC with the concurrence of the Minister, may identify -
(a) activities which may not commence without environmental authorisation from the competent authority;
(b) geographical areas based on environmental attributes in which specified activities may not commence without environmental authorisation from the competent authority;
(c) geographical areas based on environmental attributes in which specified activities may be excluded from authorisation by the competent authority;
(d) individual or generic existing activities which may have a detrimental effect on the environment and in respect of which an application for an environmental authorisation must be made to the competent authority:

Provided that where an activity falls under the jurisdiction of another Minister or MEC, a decision in respect of paragraphs (a) to (d) must be taken after consultation with such other Minister or MEC.

(3) The Minister, and every MEC with the concurrence of the Minister, may compile information and maps that specify the attributes of the environment in particular geographical areas, including the sensitivity, extent, interrelationship and significance of such attributes which must be taken into account by every competent authority.

[S.24 substituted by S.2 of Act 8/2004]

24A. Procedure for listing activity or area

Before identifying any activity or area in terms of section 24(2), the Minister or MEC, as the case may be, must publish a notice in the relevant Gazette -
(a) specifying, through description, a map or any other appropriate manner, the activity or area that it is proposing to list;

(b) inviting interested parties to submit written comments on the proposed listing within a period specified in the notice.

[S.24A inserted by S.3 of Act 8/2004]

24B. Procedure for delisting of activities or areas

(1) The Minister may delist an activity or area identified by the Minister in terms of section 24(2).
(2) An MEC may, with the concurrence of the Minister, delist an activity or area identified by the MEC in terms of section 24(2).
(3) The Minister or MEC, as the case may be, must comply with section 24A, read with the changes required by the context, before delisting an activity or area in terms of this section.

[S.24B inserted by S.3 of Act 8/2004]

24D. Publication of list

The Minister or MEC, as the case may be, must publish in the relevant Gazette a notice listing activities and areas identified in terms of section 24(2) and listing the competent authorities identified in terms of section 24C and the date on which the list is to come into effect.

[S.24D inserted by S.3 of Act 8/2004]

Appendix C: List of workshops and work sessions held

The following workshops and work sessions were held over the period October 2006 to April 2008, to develop criteria, test and identify the draft list of threatened terrestrial ecosystems. Organisations represented at each workshop or work session are provided.

Date	Workshop or work session	Organisations represented
24 – 26 October 2006	National Workshop: Development of Criteria for Listing Threatened or Protected Ecosystems in South Africa	African Environmental Centre Agricultural Research Council (ARC) Botanical Society of South Africa CapeNature Centre for Invasion Biology (University of Stellenbosch) Council of Scientific and Industrial Research (CSIR) Eastern Cape Parks Endangered Wildlife Trust (EWT) Ezemvelo KwaZulu-Natal Wildlife Free State Department of Tourism, Environment and Economic Affairs (DTEEA) Freshwater Consulting Group Gauteng Department of Agriculture, Conservation and Environment (GDACE) Limpopo Department of Economic Development, Environment and Tourism (LEDET) Mpumalanga Department of Agriculture and Land Affairs (DALA) Mpumalanga Tourism and Parks Agency (MTPA) National Department of Agriculture (DoA) National Department of Environmental Affairs and Tourism (DEAT) National Department of Water Affairs and Forestry (DWAF) Nelson Mandela Metropolitan University (NMMU) North West Department of Agriculture, Conservation and Environment (NW DACE) Northern Cape Department of Tourism, Environment and Conservation (DTEC) Percy Fitzpatrick Institute (University of Cape Town) South African Institute for Aquatic Biodiversity (SAIAB) South African National Biodiversity Institute (SANBI) South African National Parks Board (SANParks) University of Stellenbosch University of Witwatersrand Working for Wetlands (SANBI) Independent Biodiversity Planning and Vegetation Mapping Consultants
11 & 12 December 2006	Work Session: Testing Criterion A: Loss of Natural Habitat and Criterion D: Threatened Species Associations	Council for Scientific and Industrial Research (CSIR) Gauteng Department of Agriculture, Conservation and Environment (GDACE) Nelson Mandela Metropolitan University (NMMU) South African National Biodiversity Institute (SANBI)

Date	Workshop or work session	Organisations represented
8 February 2007	Work Session: Finalisation of Approach for Criterion A: Loss of Natural Habitat; Criterion D: Threatened Species Associations; and Criterion F: Priority Areas for Meeting Explicit Biodiversity Targets as Defined in a Systematic Biodiversity Plan at the 2007 Biodiversity Planning Forum	C.A.P.E. Fine-scale Biodiversity Planning Project CapeNature Council for Scientific and Industrial Research (CSIR) Eastern Cape Parks Ezemvelo KwaZulu-Natal Wildlife Free State Department of Tourism, Environment and Economic Affairs (DTEEA) Gauteng Department of Agriculture, Conservation and Environment (GDACE) Independent Biodiversity Planning Consultants Limpopo Department of Economic Development, Environment and Tourism (LEDET) Maloti-Drakensberg Transfrontier Project (MDTP) Mpumalanga Tourism and Parks Agency (MTPA) North West Department of Agriculture, Conservation and Environment (NW DACE) Northern Cape Department of Tourism, Environment and Conservation (DTEC) South African National Parks Board (SANPArks) South African National Biodiversity Institute (SANBI) Western Cape Department of Environmental Affairs and Development Planning (DEA&DP)
23 & 24 March 2007	Work Session: Testing of Criterion F Using Provincial Biodiversity Plans	Ezemvelo KwaZulu-Natal Wildlife Gauteng Department of Agriculture, Conservation and Environment (GDACE) Mpumalanga Tourism and Parks Agency (MTPA) South African National Biodiversity Institute (SANBI)
16 May 2007	Work Session: Development of Criteria for Threatened Forest Ecosystems and Planning for Stakeholder Workshop	Department of Water Affairs and Forestry (DWAF) Eco-Logic Consulting South African National Biodiversity Institute (SANBI)
28 & 29 May 2007	Stakeholder Workshop: Development of Criteria for Listing Threatened Forests Ecosystems	Botanical Society of South Africa Buffelskloof Private Nature Reserve Council for Scientific and Industrial Research (CSIR) Department of Water Affairs and Forestry (DWAF) Eco-Logic Consulting Forestwood cc Limpopo Department of Economic Development, Environment and Tourism (LEDET) Mpumalanga Tourism and Parks Agency (MTPA) South African National Biodiversity Institute (SANBI) University of KwaZulu-Natal
16 & 17 July 2007	Work Session: Review of Forest Targets and Testing of Draft Criteria for Threatened Forest Ecosystems	Department of Water Affairs and Forestry (DWAF) Eco-Logic Consulting Mpumalanga Tourism and Parks Agency (MTPA) South African National Biodiversity Institute (SANBI) University of Stellenbosch

Date	Workshop or work session	Organisations represented
21 – 23 November 2007	Work Session: Identify and Finalise Draft List of Threatened Terrestrial Ecosystems using Criteria A, D and F	Botanical Society of South Africa C.A.P.E Fine-scale Biodiversity Planning Project CapeNature Ezemvelo KwaZulu-Natal Wildlife Gauteng Department of Agriculture, Conservation and Environment (GDACE) Mpumalanga Tourism and Parks Agency (MTPA) South African National Biodiversity Institute (SANBI) Western Cape Department of Environmental Affairs and Development Planning (DEA&DP)
31 January 2008	Review of Threatened Terrestrial Ecosystems Identified Using Criterion F	Ezemvelo KwaZulu-Natal Wildlife Gauteng Department of Agriculture, Conservation and Environment (GDACE) Mpumalanga Tourism and Parks Agency (MTPA) South African National Biodiversity Institute (SANBI)
27 February 2008	Work Session: Results of Forest Target Review and Testing of Criteria for Threatened Forest Ecosystems	Department of Water Affairs and Forestry (DWAF) Eco-Logic Consulting Mpumalanga Tourism and Parks Agency (MTPA) South African National Biodiversity Institute (SANBI)
6 March 2008	Work Session: Final Review of Threatened Terrestrial Ecosystems Identified Using Criterion F	Ezemvelo KwaZulu-Natal Wildlife Gauteng Department of Agriculture, Conservation and Environment (GDACE) Mpumalanga Tourism and Parks Agency (MTPA) South African National Biodiversity Institute (SANBI)
12 & 13 March 2008	Workshop: Identification of Draft List of Threatened Forest Ecosystems	Department of Water Affairs and Forestry (DWAF) Eastern Cape Parks Eco-Logic Consulting Ezemvelo KwaZulu-Natal Wildlife Limpopo Department of Economic Development, Environment and Tourism (LEDET) National Department of Environmental Affairs and Tourism (DEAT) South African National Biodiversity Institute (SANBI) South African National Parks (SANParks) not present but provided input
22 & 23 April 2008	Work Session: Finalise Draft List of Threatened Ecosystems and Supporting Material for Submission to Working Group 1	Botanical Society of South Africa CapeNature Department of Water Affairs and Forestry (DWAF) Ezemvelo KwaZulu-Natal Wildlife Gauteng Department of Agriculture, Conservation and Environment (GDACE) Mpumalanga Tourism and Parks Agency (MTPA) South African National Biodiversity Institute (SANBI)