

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 (DEA) 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 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.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 DEA, provincial conservation authorities, the Branch: Forestry previously of the Department of Water Affairs and Forestry (DWAF) now located in the Department of Agriculture, Fisheries and Forestry (DAFF), 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

² The exception to this is some azonal (e.g. wetland 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.

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). The National Spatial Biodiversity Assessment (NSBA) 2004³ 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.** When the National Biodiversity Assessment (NBA) 2011 is published, it will be aligned and consistent with this published list of threatened terrestrial ecosystems.

This document contains the first national list of threatened terrestrial ecosystems, provides supporting information to accompany the list, and includes individual maps and detailed information for each listed ecosystem. It is structured as follows:

- Section 2 explains the **purpose and rationale** for listing threatened or protected ecosystems,
- Section 3 gives an overview of the relevant sections of the **Biodiversity Act and other legislation** with links to the listing of threatened or protected 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 list of threatened terrestrial ecosystems,
- Section 7 provides **individual maps and descriptions** for each listed ecosystem,
- Section 7 gives **contact details** for further information.

This document, together with spatial data for listed ecosystems, can be accessed on SANBI's Biodiversity GIS (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 provide maps of critical biodiversity areas, 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, or
- 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,
- Biodiversity management agreements
- 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 DEA and approved in March 2009), 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, as amended) (NEMA),
- NEMA Environmental Impact Assessment Regulations (EIA Regulations),
- NEMA Environmental Management Framework Regulations (EMF 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 Act (Act 24 of 2008),
- 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.

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, January 2008 and February 2009.⁶

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.

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.69 (Government Gazette No. 30703, 28 January 2008); Threatened or Protected Species Amendment Regulations R.209 (Government Gazette No. 31962, 27 February 2009); Threatened or Protected Species Second Amendment Regulations R.210 (Government Gazette No. 31963, 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 Environmental Impact Assessments (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 ecological processes. These areas are referred to as critical biodiversity areas, and should remain in a natural or near-natural state. A bioregional plan may also identify ecological support areas which support the ecological functioning of critical biodiversity areas and/or deliver ecosystem services, and which should remain in at least an ecologically functional state. A bioregional plan must include guidelines for avoiding loss or degradation of natural habitat in critical biodiversity areas and ecological support areas. **Critically endangered ecosystems will always form a subset of 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 Several bioregional plans are in the process of being developed.

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 DEA and were gazetted in March 2009.⁸

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

Norms and standards for biodiversity management plans for ecosystems (BMP-E) are in the process of being developed.

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

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

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, which has been amended several times, deals with environmental authorisations. Subsections 24(2) and (3) allow the Minister or MEC to identify geographical areas, based on environmental attributes and as specified in spatial development tools that have been adopted by the competent authority, in which specified activities may not commence without environmental authorisation or in which specified activities may be excluded from environmental authorisation. 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.

Before identifying an activity or geographical 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.

3.2.2 NEMA EIA Regulations

The current EIA Regulations (R543, R544, R545, R546 of 2010)⁹ were promulgated in June 2010 and came into effect on 2 August 2010. They are intended to streamline the environmental authorisation process for developers and for competent authorities (usually provincial environmental affairs departments on behalf of MECs for the environment).

The EIA Regulations include three lists of activities that require environmental authorisation:

- Listing Notice 1: activities that require a basic assessment (R544 of 2010),
- Listing Notice 2: activities that require scoping and environmental impact report (EIR) (R545 of 2010),
- Listing Notice 3: activities that require a basic assessment in specific identified geographical areas only (R546 of 2010).

The list of threatened ecosystems is directly relevant to Activity 12 in Listing Notice 3. Activity 12 relates to the clearance of 300m² of more of vegetation, which will trigger a basic assessment in the following geographical areas:

- within any critically endangered or endangered ecosystem listed in terms of Section 52 of the Biodiversity Act, or prior to the publication of such a list within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004,
- within critical biodiversity areas identified in bioregional plans,
- within the littoral active zone or 100m inland from the high water mark of the sea or an estuary, whichever distance is the greater, excluding where such removal will occur behind the development setback line in urban areas.

A basic assessment in terms of Listing Notice 3 is triggered only in those parts of critically endangered and endangered ecosystems where natural habitat remains.

DEA and some provincial environmental affairs departments have developed guidelines on the interpretation of listed activities, which should be consulted for more detail.

⁹ Government Gazette No. 33306, 18 June 2010, as corrected on 30 July 2010 (R660 of 2010) and 10 December 2010 (R1159 of 2010).

3.2.3 NEMA EMF Regulations

NEMA Section 24(3) provides the basis for the development of Environmental Management Frameworks, for which regulations have been published (R547 of 2010). An EMF is an environmental planning tool that specifies areas where certain land uses are most compatible or incompatible with environmental opportunities and constraints in the landscape. **Listed ecosystems should be incorporated into EMFs**, with restrictions on any loss of natural habitat in critically endangered or endangered ecosystems.

3.3 Other legislation with indirect links to threatened ecosystems

3.3.1 Protected Areas Act

The National Environmental Management: Protected Areas Act (2003) (hereafter referred to as the Protected Areas Act) defines four main categories of protected areas:

- Special nature reserves (can be declared only by the Minister)
- National Parks (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)

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

The Protected Areas Act also recognises world heritage sites, marine protected areas, specially protected forest areas, and mountain catchment areas, all of which are declared in terms of other Acts.

Protected ecosystems in terms of the Biodiversity Act are *not* intended to be equivalent to any of these categories of protected areas. 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 are threatened, so that these ecosystems can be appropriately managed.

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, which are recognised by the Protected Areas Act. 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 Act

The aims of the Integrated Coastal Management Act (2008) 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 48). Section 56 provides for coastal planning schemes. Coastal management programmes and coastal planning 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 environmental authorisations for coastal activities. 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.