DEPARTMENT OF FORESTRY, FISHERIES AND THE ENVIRONMENT

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NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998
(ACT NO. 107 OF 1998)

THE NATIONAL BIODIVERSITY OFFSET GUIDELINE

I, Barbara Dallas Creecy, Minister of Forestry, Fisheries and the Environment, hereby publish for implementation, under section 24J of the National Environmental Management Act, 1998 (Act No. 107 of 1998), the National Biodiversity Offset Guideline, set out in the Schedule hereto.

BARBARA DALLAS CREECY
MINISTER OF FORESTRY, FISHERIES AND THE ENVIRONMENT

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SCHEDULE

forestry, fisheries & the environment

Department:
Forestry, Fisheries and the Environment
REPUBLIC OF SOUTH AFRICA

NATIONAL BIODIVERSITY OFFSET GUIDELINE

issued under section 24J of the National Environmental Management Act

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Preface

This guideline has been published in terms of section 24J of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and must therefore be read together with the provisions of NEMA, including the national environmental management principles in section 2 of NEMA, as well as the Environmental Impact Assessment Regulations, 2014 (EIA Regulations) and other guidelines published under section 24J of NEMA. Of importance, the guideline must be read in the context of the mitigation hierarchy provided for in section 2(4)(a)(i) of NEMA as well as any national policy on environmental offsetting.

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Table of content

1. Introduction 12
2. Background 13
3. Legislative framework 15
4. Outcome statement and principles 16
4.1 Desired outcomes of biodiversity offsets 16
4.2 Principles for biodiversity offsetting 17
5. Biodiversity offsets in the environmental authorisation application process 20
5.1 An overview of the steps involved in the biodiversity offsetting process 20
5.1.1 Identifying the need for a biodiversity offset 21
5.1.2 Determining the requirements of a biodiversity offset and preparation for a Biodiversity Offset Report 22
5.1.3 Preparing biodiversity offset conditions for an EA 23
5.1.4 Selecting a biodiversity offset site 23
5.1.5 Securing the biodiversity offset site 24
5.1.6 Preparing the Biodiversity Offset Management Plan 24
5.1.7 Concluding a Biodiversity Offset Implementation Agreement 24
5.2 The roles and responsibilities of the different role-players in the biodiversity offsetting process 25
6. When are biodiversity offsets required? 27
6.1 Residual impacts 28
6.2 Impact significance 29
7. Determining biodiversity offset requirements 33
7.1 Assess significance of the residual negative biodiversity impacts 33
7.2 Determining the right size of the biodiversity offset 34
7.2.1 Standard approach to determining the required size of a biodiversity offset 34
7.2.2 Targeted approaches to determining the required size of the biodiversity offset 38
7.3 Taking into consideration unique or special biodiversity features 40
7.4 Selecting and securing candidate biodiversity offset sites 40

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7.4.1 Selecting candidate biodiversity offset sites 41
7.4.2 Assessing the potential for securing candidate biodiversity offset sites 42
7.4.3 Ensuring that the biodiversity offset options would be acceptable to the relevant conservation authority 44
7.5 Selecting the biodiversity offset site 44
7.6 Planning for biodiversity offset implementation 45
7.6.1 Management of the biodiversity offset site 45
7.6.2 Financing the biodiversity offset 47
7.7 Preparing the Biodiversity Offset Report 50
8. Engaging with conservation authorities and commenting authorities 52
9. Drafting biodiversity offset conditions for environmental authorisations 53
9.1 The biodiversity outcomes that must be achieved by a particular biodiversity offset 54
9.2 The selection and securing of a biodiversity offset site 54
9.3 The obligation to prepare a Biodiversity Offset Management Plan for the biodiversity offset site 55
9.4 Entering into a Biodiversity Offset Implementation Agreement 55
9.5 Lump sum payments for biodiversity offsets 55
9.6 Timeframes for taking the steps in the biodiversity offset process 56
9.7 The period of validity of the environmental authorisation 56
9.8 Suspensive and resolutive conditions 56
10. Biodiversity Offset Implementation Agreements 57
11. The National Biodiversity Offset Register 59
12. Implementation, monitoring and auditing 60
References 62

List of figures and tables

Figure 1 Overview of the steps involved in the biodiversity offsetting process in the EIA context 25
Figure 2 Flow diagram: When is a biodiversity offset required? 28
Figure 3 The mitigation hierarchy 29

Table 1 The importance of biodiversity and/ or ecological infrastructure 30

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Abbreviations and acronyms.

BA Report	Basic assessment report		**I&AP**	Interested and affected party
CA	Competent authority		**MEC**	Member of the Executive Council responsible for the environment in a Province
CBA	Critical Biodiversity Area		**Minister**	The Minister responsible for the environment
Constitution	Constitution of the Republic of South Africa, 1996		**NBA 2018**	National Biodiversity Assessment (2018)
DFFE	Department of Forestry, Fisheries and the Environment		**NBF**	National Biodiversity Framework 2019-2024
EA	Environmental authorisation		**NDP**	National Development Plan
EAP	Environmental assessment practitioner		**NEMA**	National Environmental Management Act, 1998 (Act No. 107 of 1998)
EIA Regulations	Environmental Impact Assessment Regulations, 2014		**NEMBA**	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
EIA Report	Environmental Impact Assessment Report		**NEMPAA**	National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003)
EMPr	Environmental management programme		**NEMICMA**	National Environmental Management: Integrated Coastal Management Act, 2008 (Act No. 24 of 2008)
EPL	Ecosystem Protection Level		**NGO**	Non-government organisation
ESA	Ecological Support Area		**NPO**	Non-profit organisation
			PBO	Public benefit organisation

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Definitions

In this guideline, unless expressly provided otherwise, or if the context provides otherwise, a word or expression to which a meaning has been assigned in the National Environmental Management Act, 1998 (Act No. 107 of 1998) (**NEMA**) or the Environmental Impact Assessment Regulations, 2014 (**EIA Regulations**), has the same meaning, and –

"biodiversity" means the variability among living organisms from all sources including, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part and also includes diversity within species, between species, and of ecosystems;

"biodiversity offset" means the measurable outcome of compliance with a formal requirement contained in an environmental authorisation to implement an intervention that has the purpose of counterbalancing[1] the residual negative impacts of an activity, or activities, on biodiversity, through increased protection and appropriate management, after every effort has been made to avoid and minimise impacts, and rehabilitate affected areas;

"Biodiversity Offset Implementation Agreement" means a legally binding agreement that is entered into between the holder of an environmental authorisation and a third party, or third parties, for the implementation of a biodiversity offset, more fully described in Chapter 10;

"Biodiversity Offset Management Plan" means a plan setting out the management actions to be taken at a biodiversity offset site to achieve and maintain specific conservation outcomes in the long term, more fully described in Chapter 7.6.1;

"biodiversity offset receiving area" means an area identified in an official policy, plan or programme as an optimal area for locating biodiversity offsets;

"Biodiversity Offset Report" means a report prepared by a relevant specialist, or specialists, and submitted to a competent authority together with a basic assessment report, or environmental impact assessment report, setting out the findings of a biodiversity offset study, more fully described in Chapter 7.7;

[1] Biodiversity offsets should be distinguished from trade-offs. A trade-off in the biodiversity context involves exchanging a negative outcome for biodiversity with another positive outcome, which does not *necessarily* benefit biodiversity, and where it benefits biodiversity, does not properly counterbalance the loss of biodiversity through a like-for-like approach. Trading off is not a form of mitigation, like biodiversity offsetting. Ecological compensation is an example of a trade-off in the biodiversity context. Ecological compensation can be described as the outcome of measurable actions to protect, rehabilitate and manage priority biodiversity, aimed at compensating for residual negative impacts on biodiversity and ecological infrastructure but is not designed to *counterbalance* those impacts. Trade-offs should be approached with extreme caution in the context of environmental authorisation applications given that South African law demands a rational link between impacts on the environment and conditions of environmental authorisations directed at addressing those impacts. Trade-offs fall outside the scope of this guideline.

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"biodiversity offset site" means a suitable area in the landscape which meets the offset requirements in an environmental authorisation and is secured for biodiversity conservation in the long term;

"biodiversity priority area" means an area identified as a priority for biodiversity conservation in a spatial biodiversity plan, and includes Critical Biodiversity Areas, Ecological Support Areas, Freshwater Ecosystem Priority Areas and focus areas for protected area expansion;

"biodiversity target"–

(a) when used in the context of ecosystems, means the minimum proportion of each ecosystem type that needs to be kept in good ecological condition in the long term in order to maintain viable representative samples of all ecosystem types and the majority of species associated with them, and is expressed as a percentage of the historical extent of an ecosystem type, measured as area, length or volume; or
(b) when used in the context of a species, means the minimum number of individuals in a population required to ensure the viability and persistence of that population, or the minimum number of populations of a species required to ensure the viability and persistence of that species, within a particular landscape context or defined in a provincial, national, continental or global conservation programme or strategy;

"candidate biodiversity offset site" means one of the potential biodiversity offset sites identified in a Biodiversity Offset Report;

"CBA Map" means a map of Critical Biodiversity Areas and Ecological Support Areas, based on a systematic biodiversity plan;

"coastal protection zone" means the area contemplated in section 16 of the National Environmental Management: Integrated Coastal Management Act, 2008 (Act No. 24 of 2008) (**NEMICMA**);

"coastal public property" means the area contemplated in section 7 of NEMICMA;

"conservation area" means an area with a conservation designation that is effective at achieving *in-situ* conservation of biodiversity outside of protected areas in the long term;

"conservation authority" means South African National Parks or the organ of state responsible for the conservation of biodiversity in a province

"conservation servitude" means a servitude registered against the title deed of a property placing restrictions on the landowner and successors-in-title for the purposes of conservation of biodiversity on the relevant property;

"Critical Biodiversity Area" (CBA) means an area that must be maintained in a good ecological condition (natural or near-natural state) in order to meet Biodiversity Targets for ecosystem types as

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well as for species and ecological processes that depend on natural or near natural habitat, that have not already been met in the protected area network;[2]

"Critical Biodiversity Area (CBA): Irreplaceable (CBA 1)" means a CBA that is essential for meeting biodiversity targets because there are insufficient other options for meeting biodiversity targets for the features associated with the site;[3]

"Critical Biodiversity Area: Optimal (CBA 2)" means a CBA that has been selected as the best option for meeting Biodiversity Targets based on complementarity, spatial efficiency, connectivity and/or avoidance of conflict with other land or resource use;[4]

CBA Maps

CBAs are identified in spatial biodiversity plans, such as CBA Maps and bioregional plans, which can be found at http://biodiversityadvisor.sanbi.org]

"ecological condition" means the extent to which the composition, structure and function of an area or biodiversity feature has been modified from a reference condition of "natural";

"ecosystem extent" means the proportion of an ecosystem type that remains intact (i.e. in a natural, near-natural or semi-natural condition) relative to its historical distribution[5];

"ecological infrastructure" means naturally functioning ecosystems that deliver valuable services to people, such as water and climate regulation, soil formation and disaster risk reduction;

"ecological processes" means the natural functions and processes that operate in a land- or seascape to maintain and generate biodiversity;

"Ecological Support Area" (ESA) means an area that must be maintained in at least fair ecological condition (semi-natural/ moderately modified state in which ecological function is maintained even though composition and structure have been compromised) in order to support the ecological functioning of a CBA or protected area, to generate or deliver key ecosystem services (e.g. water), or to meet remaining biodiversity targets for ecosystem types or species when it is not possible or necessary to meet them in natural or near-natural areas;

"ecosystem" means an assemblage of living organisms, the interactions between them and their physical environment;

[2] Please note that some provinces, such as the Western Cape Province, uses different methodologies for setting their biodiversity targets in systematic biodiversity plans.
[3] Please see footnote 1 above.
[4] Please see footnote 1 above.
[5] The vegetation map used in the most recent ecosystem assessment reflects the historical extent of vegetation prior to major anthropogenic land conversion (ca. 1750).

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"ecosystem protection level" means the indicator of how well represented an ecosystem type is in the protected area network, in which ecosystem types are categorised as well protected, moderately protected, poorly protected or unprotected, based on the proportion of the biodiversity target for each ecosystem type that is included in one or more protected areas;

"ecosystem services" means services and benefits to people and the economy provided by ecosystems, often classified into three broad categories: provisioning services, regulating services and cultural services;

"ecosystem threat status" means the indicator of how threatened an ecosystem type is (in other words the degree to which it is still intact or alternatively losing vital aspects of its function, structure or composition) in which Ecosystem types are categorised as Critically Endangered, Endangered, Vulnerable or Not Threatened, based on the proportion of ecosystem type that remains in good ecological condition relative to a series of biodiversity thresholds;

Ecosystem threat status
The status of the different ecosystem types in South Africa can be found in the list of ecosystems that are threatened or in need of protection published in terms of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (**NEMBA**). However, if a more recent ecosystem assessment has been conducted (such as the one that was done as part of the National Biodiversity Assessment (NBA), that ecosystem assessment should also be considered.

"ecosystem type" means an ecosystem unit, or set of ecosystem units, that has been identified and delineated as part of a hierarchical classification system, based on biotic and/ or abiotic factors, with ecosystems of the same type to likely share broadly similar ecological characteristics and functioning;

"fatal flaw" means a major defect or deficiency in a project proposal that should result in environmental authorisation being refused, and from a biodiversity perspective, a residual negative impact that would have a Very High significance rating as determined in Chapter 6.2;

"impact" includes direct impact, indirect impact and cumulative impact;

"irreplaceable biodiversity" means biodiversity identified through a systematic conservation assessment as being essential[6] to meet a biodiversity target;

"mitigation" means to avoid negative impacts, and where they cannot altogether be avoided, to minimise and remedy them, including through rehabilitation, restoration, and/or offsetting;

[6] "Essential" here means that there are no other options in the relevant systematic conservation planning domain for the relevant target to be met.

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"Other Natural Area" means an area in good or fair ecological condition (natural, near-natural or semi-natural) that is not required to meet biodiversity targets for ecosystem types, species or ecological processes;

"protected area" means an area recognised as a protected area in the National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003) (**NEMPAA**);

"rehabilitation" means returning a disturbed, degraded or destroyed ecosystem to sustainable, productive use, with the emphasis on repairing ecological processes and ecosystem services;

"residual negative impacts" means negative impacts that remain after the proponent has made all reasonable and practicable changes to the location, siting, scale, layout, technology and design of the proposed development, in consultation with the environmental assessment practitioner and specialists (including a biodiversity specialist), in order to avoid and minimise negative impacts, and/or rehabilitate any impacted areas within the prescribed timeframes specified for the completion of the rehabilitation in the EA;

"restoration" means returning a disturbed, degraded or destroyed ecosystem to its natural condition, with the species present being representative of the ecosystem that occurred on the site prior to disturbance, and ecological processes supporting the long-term persistence of the ecosystem and species, and the associated ecosystem services, through active (with interventions) or passive (without interventions) means;

In the terrestrial realm, confidence in the success of restoration in reinstating biodiversity is generally low and can take an extremely long time. In most instances therefore, especially when working in the terrestrial realm, restoration is not a realistic achievable goal for biodiversity offsetting.

"spatial biodiversity plan" means a spatial plan that identifies one or more categories of biodiversity priority area, using the principles and methods of systematic biodiversity planning;

"special habitat" means a biodiversity feature found nested within an ecosystem or spanning adjacent ecosystems, which contains or comprises unique elements that underpin or support species diversity, interaction or ecological processes within that ecosystem, and which can often only be identified at a finer scale than, for example, ecosystem assessments undertaken at national or provincial level;

"Strategic Water Source Areas" means areas of land that –

(a) supply a disproportionate (i.e. relatively large) quantity of mean annual surface water runoff in relation to their size and so are considered nationally important;
(b) have high groundwater recharge and where the groundwater forms a nationally important resource; or
(c) areas that meet both criteria (a) and (b); and

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Strategic Water Source Areas

SWSAs can be found at http://biodiversityadvisor.sanbi.org

"threatened ecosystem" means an ecosystem with an Ecosystem Threat Status of Critically Endangered, Endangered or Vulnerable as determined by the latest edition of the NBA, or the list of ecosystems that are threatened or in need of protection published in terms of NEMBA, whichever is more recent.

1. Introduction

The purpose of this guideline is to indicate when biodiversity offsets are likely to be required as mitigation by any competent authority (**CA**), to lay down basic principles for biodiversity offsetting and to guide offset practice in the environmental authorisation **(EA)** application context.

This guideline is an implementation guideline contemplated in section 24J of the National Environmental Management Act, 1998 (**NEMA**). Guidelines published in terms of that section give guidance on, *inter alia*, the implementation, administration and institutional arrangements of the Environmental Impact Assessment Regulations, 2014 (**EIA Regulations**) or subsequent regulations regarding the environmental impact assessment process.

This guideline is therefore applicable to applications for EA in terms of section 24 of NEMA. However, relevant authorities responsible for taking decisions in other regulatory contexts which may involve biodiversity offsetting may also find the guideline helpful. Those relevant authorities include the organs of state responsible for taking decisions regarding applications for EA in terms of section 24G of NEMA, emergency directives contemplated in section 30A of NEMA, applications for licences under the National Water Act, 1998, the National Forests Act, 1998 and the National Environmental Management: Waste Act, 2008, applications for development rights in terms of the Spatial Planning and Land Use Management Act, 2013 and requests for the de-proclamation, or the withdrawal of declarations, of protected areas in terms of provincial legislation or NEMPAA.

This guideline is applicable in the terrestrial and freshwater realms. It is therefore not applicable in the offshore marine realm and estuarine ecosystems. That does not however mean that biodiversity offsetting is not required for residual negative impacts on biodiversity in estuarine ecosystems and the marine realm. The guideline focuses on ecosystems as the primary unit for expressing ecosystem-based offset requirements, given the strong foundation that the EIA Regulations and EIA implementation already have in ecosystem concepts. However, some guidance on species and other biodiversity features are given, but to a lesser extent.

The guideline does not replace NEMA's provisions regarding EA processes, or the EIA Regulations. It guides the implementation of NEMA and the EIA Regulations in the context of mitigation of biodiversity impacts and use of biodiversity offsets and should therefore be read in conjunction with those laws.

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Biodiversity offsetting is a mitigation measure that is potentially applicable in all EA application processes regardless of the identity of the applicant. This guideline is therefore applicable to EA applications made by private persons or entities, as well as organs of state.

The guideline is for CAs, environmental assessment practitioners (**EAPs**), specialists in environmental assessment processes, commenting authorities, statutory conservation authorities, interested and affected parties (**I&APs**), applicants for EA and financial institutions funding proposed projects that require an EA.

It is acknowledged that biodiversity offsets and trade-offs are often done even when they are not required by law. This guideline does not deal with those types of offsets and trade-offs.

2. Background

Biodiversity is fundamental to the health and well-being of people, as well as economic activity and socio-economic upliftment. The National Biodiversity Assessment (2018) (**NBA 2018**) states that South Africa's biodiversity assets and ecological infrastructure contribute significantly towards meeting national development priorities.

Ecosystem services are delivered by ecological infrastructure, including healthy mountain catchments, rivers, wetlands, coastal dunes, and nodes and corridors of natural habitat, which together form a network of interconnected structural elements in the landscape. Ecosystem services are essential for human well-being and supports economic activities.

Many economic activities are directly linked to biodiversity: it was estimated in 2018 that more than 400 000 people are employed in the biodiversity economy in South Africa (NBA 2018). There is still an immense opportunity to further unlock the value of biodiversity and ecosystems in support of the country's development path, especially as the knowledge base on the value of ecosystems and their effective management expands.

South Africa has a rich natural and biodiversity heritage. It is classified as a megadiverse country, which means that South Africa's biodiversity is also important in an international context.

South Africa's biodiversity is being gradually eroded and degraded (NBA 2018). South Africa's primary development plan, the National Development Plan (2012-2030) (**NDP**), notes that South Africa is currently in "ecological deficit".[7] The loss of biodiversity has negative socio-economic impacts (such as adverse impacts on health, loss of livelihoods and the absence of protection against natural disasters or hazards). One specific challenge identified through the trends analysis in developing the National Framework for Sustainable Development (2008) was the need to reverse the "continuing

[7] An ecological deficit occurs when the footprint of a population exceeds the biocapacity (or the capacity of ecosystems to produce useful biological materials and to absorb waste materials generated by humans, using current management schemes and extraction technologies) of the area available to that population.

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degradation or loss of biodiversity and functioning ecosystems" on which sustainable development depends.

It is for that reason that the negative impacts of certain activities on biodiversity must be mitigated: avoided, and where they cannot altogether be avoided, are minimised, and remedied through rehabilitation and, should there still be a significant remaining impact, offsetting. Biodiversity offsetting has been identified as one way in which biodiversity loss can be slowed down. In the NDP, it is recommended that measures are adopted "to protect the country's natural resources including an environmental management framework in which developments that have serious environmental or social effects need to be *offset* by support for improvements in related areas and a target for the amount of land and oceans under protection" (emphasis added). Biodiversity offsets are specifically recognised as a policy option to slow the degradation and erosion of South Africa's biodiversity in the National Biodiversity Framework, 2019-2024 (**NBF**) published under NEMBA. One of the deliverables in the NBF is also to "complete, approve, publish, and implement" a national guideline on biodiversity offsetting "to guide the consistent implementation of biodiversity offsets in the country."

Biodiversity offsetting, if done correctly, can advance the environmental right in the Constitution of the Republic of South Africa, 1996 (**Constitution**). Section 24 of the Constitution provides that everyone has the right to, amongst other things, have the environment protected for the benefit of present and future generations through reasonable legislative and other measures that, amongst other things, promote conservation and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development. Biodiversity offsetting is one of the ways in which South Africa's protected and conservation areas can be expanded, thereby promoting conservation. It may well also help to secure ecologically sustainable development as it mitigates the adverse impact of economic and social development on biodiversity, which, in turn, underpins such development.

In short, biodiversity offsetting has the potential to encourage more rigorous consideration of feasible development alternatives which avoid and minimise negative impacts on biodiversity, to help remedy and counterbalance the degradation and loss of biodiversity through increased protection and appropriate management, and to help South Africa to meet its international biodiversity and protected area targets. Biodiversity offsetting can therefore play a role in ensuring that biodiversity and ecological infrastructure can continue to provide the ecosystem services on which people depend for their livelihoods and contribute to the achievement of the environmental right in section 24 of the Constitution.

Biodiversity offsetting is a relatively novel practice in South Africa. Unfortunately, it has not always been implemented in an evidence-based and consistent manner. This guideline intends to address the shortcomings of biodiversity offset practice in South Africa.

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3. Legislative framework

As already noted, section 24 of the Constitution gives everyone the right to an environment that is not harmful to health or well-being, and to have the environment protected, through reasonable legislative and other measures that, among other things, secure *ecologically* sustainable development and use of natural resources while promoting justifiable economic and social development. NEMA, including the EIA Regulations, is one of the legislative measures that have been taken to advance that right. Biodiversity offsets are an integral part of the environmental management system created under NEMA. One of the national environmental management principles, principles that guide all environmental decision making, is that the disturbance of ecosystems and loss of biodiversity should be avoided, or where it cannot altogether be avoided, is minimised and remedied.[8] Biodiversity offsetting is one of the best means of remedying such disturbance or loss, but only after the other steps in the mitigation hierarchy (i.e. avoidance, minimisation and rehabilitation) had been considered.

In the environmental management context, biodiversity offsetting consists of actions that are taken to comply with biodiversity offset outcomes required in conditions in EAs, Biodiversity Offset Implementation Agreements and environmental management programmes (**EMPrs**). The environmental management system provided for by NEMA and the EIA Regulations provide for a CA to grant EAs subject to conditions.[9] In appropriate circumstances (please see Chapter 6), a CA may grant an EA subject to the condition that a measurable biodiversity offset is implemented by the EA holder.

As already noted, this guideline is an implementation guideline contemplated in section 24J of NEMA. It must, in accordance with section 24O of NEMA and regulation 18 of the EIA Regulations, be taken into account by a CA when considering an application for an EA. It is therefore not absolutely binding and can be deviated from when justifiable under the circumstances.

Given that this is a guideline contemplated in section 24J of NEMA, it is not applicable to regulatory processes other than environmental authorisation applications in terms of NEMA, which could culminate in decisions to issue approvals subject to biodiversity offset conditions. However, parts of this guideline could be helpful to regulatory authorities charged with the administration of those other regulatory frameworks. When this guideline is used in the context of other regulatory processes, stakeholders, and decision-makers in particular, should take into consideration the differences between the EIA Regulations and the law governing those other regulatory processes. Examples of such other laws include the National Water Act, 1998 (Act No. 36 of 1998), the Spatial Planning and Land Use Management Act, 2013 (Act No. 16 of 2013) (**SPLUMA**), the National Forests Act, 1998 (Act No. 84 of 1998) and sections 30A and 24G of NEMA.

[8] Section 2(4)(a)(i) of NEMA.
[9] See Regulation 26(d) and (i) of the EIA Regulations.

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4. Outcome statement and principles

The outcome statements and principles in this chapter serve as the general framework within which it must be determined if a biodiversity offset is required and within which biodiversity offsets must be designed and implemented. The outcome statement and principles should also guide decision-making pertaining to biodiversity offsets and, as relevant, the setting of conditions regarding biodiversity offsets.

4.1 Desired outcomes of biodiversity offsets

The desired outcome of biodiversity offsets is to ensure the following:

1. That biodiversity is secured in the long term through the protection and appropriate management of ecosystems and species.

2. That efforts to protect biodiversity in the long term contribute to the expansion of South Africa's protected area network,[10] and are focussed in areas identified as biodiversity priorities, with particular emphasis on the consolidation of protected areas and biodiversity priority areas and securing effective ecological links between priority areas.

3. That ecological infrastructure and the services and benefits it provides are maintained and where necessary restored to an acceptable level.

4. That the cumulative impact of the authorised activity, or activities, and land and resource use change does not –
    - result in the loss of irreplaceable biodiversity or jeopardise the ability to meet biodiversity targets;
    - lead to any ecosystem with a threat status of Vulnerable or Least Concern becoming Endangered, or any Endangered ecosystem becoming Critically Endangered;
    - cause an irreversible decline in the conservation status of species and the presence of special habitats; or
    - cause a significant loss in ecosystem services.[11]

[10] As planned for in the National Protected Areas Expansion Strategy, provincial protected area expansion strategies and, where available, local protected area expansion strategies.

[11] Sometimes the loss of ecosystem services can be compensated for through artificial provision of a replacement service. However, this guideline does not deal with that type of compensation. It only deals with required mitigation (focussing on biodiversity offsets) for impacts on biodiversity, i.e., the *natural* ecosystem components that provide the ecosystem service.

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4.2 Principles for biodiversity offsetting

The following principles must be considered by a CA when taking decisions in relation to biodiversity offsets, and by environmental assessment practitioners and specialists when preparing basic assessment or environmental impact assessment reports, specialist reports and Biodiversity Offset Reports (See Chapters 5 and 7).

- ***Offsets are the final option in the mitigation hierarchy*** - Biodiversity offsets must only be considered once all the foregoing steps in the mitigation hierarchy have been considered to their full and feasible extent. The mitigation hierarchy dictates that the degradation and loss of biodiversity must be avoided, or where impacts cannot altogether be avoided, they should be minimised, and the area adversely impacted by relevant activity should be rehabilitated. When, after taking the aforementioned mitigation measures, there are likely to be residual negative impacts on biodiversity of medium to high significance, they must be offset.

- ***Ecological equivalence (like-for-like) is the preferred offset type*** – Only when offsets remain the only mechanism to manage residual negative impacts and in order to counterbalance a residual impact, biodiversity offsets should comprise - or benefit - the same or similar biodiversity components as those components that would be negatively affected by the development. ***Trading-up offset types***, or biodiversity offsets which secure priority areas of greater importance or priority to biodiversity conservation than the area being impacted, may however be considered under certain circumstances in order to contribute to conservation objectives.

  Residual impacts on irreplaceable biodiversity cannot be offset – Where there are no options left in the landscape to counterbalance a residual impact in accordance with the ecological equivalence (like-for-like) principle (see above), that residual impact cannot be offset. That is, there would be a residual impact on irreplaceable biodiversity, which would prevent national biodiversity targets from being met. In these cases, development would be a fatal flaw and the impacts should be avoided.[12]

- ***Additionality*** **-** Biodiversity offset interventions must be additional to, or over and above, biodiversity conservation measures that are already required by law, or that would have occurred had the biodiversity offset not taken place.

- ***The significance of residual impacts on biodiversity must be considered in decision making involving biodiversity offsetting*** – When considering the significance of the residual impact to be counterbalanced by an offset intervention, including the nature of the impacted biodiversity (e.g.

[12] Please also see the textbox below, the definition for "biodiversity offset" in the definitions section of this guideline as well as footnote 1 above. Please also consult DEA (2017), Guideline on Need and Desirability, Department of Environmental Affairs (DEA), Pretoria, South Africa.

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whether it is part of a priority area), its threat status and protection level, ecological condition, and the size of the impacted area must be considered at the very least.

- ***Biodiversity offsets should embody the ecosystems approach and promote connectivity in the wider landscape*** **-** Biodiversity offsets should ideally involve the integrated management of land, water and living resources in a way that promotes ecological functionality and persistence. Biodiversity offsetting should therefore take a landscape-scale, rather than a site-specific view, to enable consideration of cumulative impacts, to promote connectivity between biodiversity priority areas.

Integrated landscape scale interventions

Integrated landscape-scale interventions are more likely to yield far greater, and more sustained, conservation benefits at less cost and reduced administrative burden than a number of small-scale, isolated interventions. A 'patchwork' of small-scale, isolated offset interventions poses a number of challenges including, among others: the high risk of failure if upstream or bordering degradation is not addressed in some way; increased demands on ecological management, enforcement and compliance monitoring capacity; the potentially limited environmental value of small, unconnected pockets of natural features; and reduced opportunities for maximising the benefits that could be accrued by integrated, landscape-scale interventions.

- ***Biodiversity offsets must result in long-term protection and management of priority biodiversity*** **-** Biodiversity offsets should contribute to the long-term security of biodiversity priority areas and maintain or improve their ecological condition, thereby resulting in tangible and measurable positive outcomes for biodiversity conservation 'on the ground'. Biodiversity that is in good ecological condition promotes human well-being in the long term.

Timespan of a biodiversity offset

An offset can only contribute to the principal objective of slowing the loss and progressively reversing the degradation of biodiversity if it continues to counterbalance the residual negative impacts of the development to which it applies for as long as those residual impacts persist. For practical purposes, the counterbalancing outcomes of an offset intervention should ideally endure in perpetuity. The timespan of a biodiversity offset should not be confused with the duration of the responsibility of the EA holder to implement the biodiversity offset.

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- ***Biodiversity offset design must be evidence-based and transparent*** - The measure of the size and significance of the residual impacts on biodiversity caused by a proposed activity, as well as the design and implementation of biodiversity offsets, should be based on the best available biodiversity information and sound science, and should incorporate local, traditional and conventional knowledge and values as appropriate. Offsets must consider all significant residual impacts on biodiversity including direct, indirect and cumulative impacts. The scope of assessment must include the due consideration of impacts on priority biodiversity areas; impacts on biodiversity pattern (compositional and structural aspects of biodiversity, at the genetic, species or ecosystem level) and ecological processes (the functions and processes that operate to maintain and generate biodiversity); and impacts on ecosystems or species on which there is high dependence for health, livelihoods, safety and well-being. The Biodiversity Offset Report and audits of the offset performance, as well as biodiversity offset registers, must be made publicly available.

- ***Offsets must follow a risk averse and cautious approach*** - A biodiversity offset must be designed in a risk-averse and cautious way to take into account uncertainties about the measure of the extent and significance of the residual impacts (including uncertainties about the effectiveness of planned measures to avoid, minimize and rehabilitate impacts), and the uncertainties relating to the successful outcome and/ or timing of the biodiversity offset intervention.

- ***Offsets must be fair and equitable*** - The determination of residual impacts, and the design and implementation of biodiversity offsets to counterbalance these impacts, must be undertaken in an open and transparent manner, providing for stakeholder engagement, respecting recognised rights, and seeking positive outcomes for affected parties. Biodiversity offsets should not displace negative impacts on biodiversity to other areas or cause significant negative effects that in turn would need to be remedied.

- ***Offset intervention timing*** - Implementation of a biodiversity offset should preferably take place before the impacts of the activity occur, or as soon thereafter as reasonable and feasible.

Biodiversity offset options

For practical purposes, at the very least, biodiversity offset options must be fully described in the Biodiversity Offset Report submitted as part of a basic assessment or environmental impact assessment report to inform a biodiversity offset condition in an EA. This information should be formulated in a way that facilitates and enables the efficient and effective monitoring and enforcement of compliance with the implementation of the approved offset intervention, its timing and required outcome.

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- ***Biodiversity offsets must be measurable, auditable and enforceable*** **-** The required outcomes of a biodiversity offset must be practically measurable on the ground. Once the development is underway, residual impacts should be monitored and measured to ensure that the counterbalancing offset remains adequate. The offset's counterbalancing adequacy must, in turn, be monitored and audited in terms of clear and measurable management, performance and desired outcome targets, and provision must be made for corrective or adaptive actions where needed to ensure that targets are achieved.

5. Biodiversity offsets in the environmental authorisation application process

As already mentioned, this guideline is intimately linked with the environmental management system provided for in NEMA and the EIA Regulations. In this Chapter, the various steps of the biodiversity offsetting process are placed in the context of the **EA** application process provided for in NEMA and the EIA Regulations. The roles of the various role-players in both the EA application process in the context of biodiversity offsets are also explained.

For the purposes of this guideline, "EIA" must be taken to mean both "basic assessment" and "scoping and environmental impact assessment" as contemplated in the EIA Regulations.

5.1 An overview of the steps involved in the biodiversity offsetting process

This chapter gives a broad overview of the various steps of the biodiversity offsetting process in the context of the EA application process. More details on those steps are given in chapters 6, 7, 8, 9, 10, 11 and 12 below. *For the purposes of this chapter*, the EA application process is divided up into 4 phases: **the pre-application phase** (before the process for an EA application is commenced); t**he EIA phase** (the phase starting from before the submission of the EA application by, amongst others, the generation of a report through the National Environmental Web-based Screening Tool[13] (and consideration of the most suitable site for the proposed development) and the date on which a basic assessment report (BA Report) or environmental impact assessment report (EIA Report), and a draft EMPr, is submitted by an applicant to the CA; **the decision-making phase** (the process for taking a decision to grant or refuse EA, and to approve or reject an EMPr); and t**he post-authorisation phase** (any steps taken after a decision has been made to grant EA and approve an EMPr).

The biodiversity offsetting process, which only applies when a biodiversity offset is required (see Chapter 6) involves the following steps:

- Identifying the need for a biodiversity offset.

[13] Applicants for EAs must submit reports generated by the National Web-based Environmental Screening Tool, available at https://screening.environment.gov.za/screeningtool/, as part of applications for EA. That screening tool often provides an indication of the biodiversity sensitivity of the affected project area.

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- Determining the requirements of a biodiversity offset and compilation of a Biodiversity Offset Report.
- Preparing biodiversity offset conditions for an EA.
- Selecting the biodiversity offset site.
- Securing the biodiversity offset site.
- Preparing a Biodiversity Offset Management Plan.
- Concluding a Biodiversity Offset Implementation Agreement.

Generally, it takes much longer to complete all the steps in the biodiversity offsetting process than it does to complete the EA application process. The EIA Regulations provide for strict timeframes: The EIA Regulations provide that a BA Report must be submitted within 90 days of the receipt of an EA application[14] and that an EIA Report must be submitted to the CA no later than 106 days of the acceptance of a scoping report.[15] In contrast, and as illustrated below, the biodiversity offsetting process can take years to complete. In this chapter, the steps in the biodiversity offsetting are ***summarised*** for the purposes of giving an indication of where in the EA application process, as provided for the EIA Regulations, they could be completed in order for biodiversity offsetting to work in the EIA context. ***For more information on each step in the biodiversity offsetting process, please consult chapters 6, 7, 8, 9, 10, 11 and 12 below***.

5.1.1 Identifying the need for a biodiversity offset

Please see **Chapter 6** of this guideline for more information on this step.

In this step, the proponent's EAP, or a relevant specialist or specialists, applies the mitigation hierarchy (please see figure 3 below). If it is found that after all steps are taken to avoid and minimise the impact of an activity, or activities, on biodiversity, and to rehabilitate the affected area, there would still be a significant residual negative impact on biodiversity, an offset is required, provided that offsetting is possible under the circumstances. The need for an offset is most often only identified in the **EIA phase** after a report has been generated through the National Environmental Web-based Screening Tool and a site sensitivity verification report has been prepared, or when the issue has been raised by the applicant's EAP or specialist, the CA,[16] a commenting authority or an interested or affected party.

[14] Regulation 19 of the EIA Regulations.
[15] Regulation 23 of the EIA Regulations.
[16] A CA can, at any stage during the pre-application and EIA phases, advise a proponent, or applicant, of the likelihood or not that an environmental authorisation would be granted (based on the biodiversity sensitivity of the relevant area), or of a biodiversity offset being required in terms of Regulation 8(b) of the EIA Regulations. That regulation provides that a CA must advise the proponent or applicant of any matter that may prejudice the success of an application. The likelihood of a biodiversity offset being required is a factor that may well prejudice the success of an application.

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The EAP and a relevant specialist, or specialists, should start preparing a Biodiversity Offset Report (see Chapter 7) as soon as possible after the need for an offset has been identified.

It is important for a proponent, or applicant, or EAP to engage with relevant commenting authorities, including municipalities and, especially, conservation authorities when that proponent, applicant or EAP assesses whether or not a biodiversity offset is likely to be required (please see Chapter 8 below).

As already stated, it is possible that biodiversity offsets could be required as conditions to the granting of authorisations other than EA, such as licences in terms of the National Forests Act, 1998, which imposes restrictions on development in natural forest ecosystems. It is not desirable for an applicant to be required to implement more than one biodiversity offset for a single development. It is therefore recommended that the CA coordinates with the other regulatory authorities to ensure that the applicant is only required to implement one biodiversity offset for a single development.

There is of course nothing that prevents an applicant from instructing a specialist or specialists to do a preliminary assessment of whether a biodiversity offset would likely be required in the pre-application phase. This would allow the applicant to commence the other steps in the biodiversity offsetting process before the EA application is submitted to better ensure that the processes would run smoothly. It is emphasised here however that biodiversity offsets may never be used as a reason why a particular EA application should be approved. Biodiversity offsets are mitigation measures that must be implemented when EA is granted for other, overriding, reasons. A BA Report or EIA Report must always explain how the mitigation hierarchy has been applied to arrive at the conclusion that a biodiversity offset is required or is not required.

Pre-application studies and engagement

Pre-application studies and engagement do not mean that an offset can 'leapfrog' other, preferred forms of mitigation earlier in the mitigation hierarchy. A CA will require evidence of the effort invested to exhaust other mitigation measures and project alternatives, before resorting to biodiversity offsets. Pre-application studies are therefore not guarantees that EA will be granted for an activity, or activities – biodiversity offsets and ecological compensation should never be used as the reason to grant EA.]

5.1.2 Determining the requirements of a biodiversity offset and preparation for a Biodiversity Offset Report

Please see **Chapter 7** of this guideline for more information on this step.

This step involves the preparation by a relevant specialist, or specialists, in close collaboration with the EAP, of a Biodiversity Offset Report, which sets out, amongst other things, the biodiversity outcomes that must be achieved in implementing a biodiversity offset and the candidate biodiversity offset sites where those outcomes can be achieved.

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This step can be commenced either in the pre-application phase (see below) or in the EIA phase. The biodiversity offset study **must** however be completed in the EIA phase because the Biodiversity Offset Report must be submitted together with the BA Report or EIA Report to the CA before the legislated timeframes for the EIA phase lapse. The absence of a Biodiversity Offset Report may well result in an EA being refused by a CA, or the decision to grant an EA being set aside on appeal or judicial review.

A draft Biodiversity Offset Report must be subjected to public participation for at least 30 days. The EIA Regulations provide that, if after the public participation process, significant changes were made to, or significant new information has been included in a BA or EIA Report (of which the Biodiversity Offset Report forms part), those reports must be subjected to another 30-day public participation process.

There is nothing that prevents the applicant from instructing a specialist, or specialists, to prepare a Biodiversity Offset Report (if, after a pre-application assessment, it was found that a biodiversity offset would likely be required by the CA) in the pre-application phase to better ensure that the application process runs smoothly. The caution is however repeated here that the Biodiversity Offset Report should not be used as leverage for an EA that should not be granted due to a fatal flaw or other environmental or socio-economic reasons.

As with the previous step, it is crucial for the EAP and the specialist, or specialists to engage with commenting authorities, including municipalities, and especially, conservation authorities during this phase of the biodiversity offsetting process. The EAP or specialist, or specialists, would also need to engage with landowners, holders of rights in land and other stakeholders in the landscape during this phase.

5.1.3 Preparing biodiversity offset conditions for an EA

Chapter 9 gives more information on this step.

This step is applicable when the CA has decided to grant EA for an activity, or activities, subject to the condition that a biodiversity offset is implemented. It involves the CA preparing EA conditions that require that a biodiversity offset is implemented.

At the very least, a biodiversity offset condition in an EA must specify the biodiversity outcomes that must be achieved in implementing a biodiversity offset and that the EA holder must be required to enter into a Biodiversity Offset Implementation Agreement with a third party (please see chapter 5.1.7 below). It must also require the holder of the EA to select a biodiversity offset site, secure that site and prepare a Biodiversity Offset Management Plan for that site.

5.1.4 Selecting a biodiversity offset site

Please see **Chapter 7.5** for more information on this step.

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This step involves the selection of a biodiversity offset site that meets the biodiversity offset requirements specified in a Biodiversity Offset Report and/or the conditions of an EA. Preferably, the biodiversity offset site should be selected from a portfolio of candidate biodiversity offset sites given in a Biodiversity Offset Report. Given that the selection of a biodiversity offset site can take years, it is likely that the biodiversity offset site would only be selected in the post-authorisation phase, i.e. after the CA has granted the applicant an EA subject to the condition that a biodiversity offset that meets specific requirements is implemented.

However, in some circumstances, a biodiversity offset site can be selected before the decision-making phase. In such a case, if the CA is satisfied that the selected site is appropriate, the CA can issue an EA subject to the condition that a biodiversity offset that meets the specified requirements is implemented on that specific site.

5.1.5 Securing the biodiversity offset site

More information is given on this step in **Chapter 7.6.1**.

During this step, the EA holder takes the necessary steps to secure the biodiversity offset site in perpetuity. Ideally, the biodiversity offset site should be secured by the declaration of the site as a protected area in terms of the National Environmental Management: Protected Areas Act, 2003, or by the registration of a conservation servitude in respect of such land if the declaration of a protected area is not possible or appropriate under the circumstances. This step should always be taken in the post-authorisation phase.

5.1.6 Preparing the Biodiversity Offset Management Plan

More information on this step is given in **Chapter 7.6.1**.

In this step, the EA holder's specialist, or specialists, prepares a Biodiversity Offset Management Plan for the biodiversity offset site. A Biodiversity Offset Management Plan sets out the specific measures that must be undertaken to achieve the required biodiversity outcomes on the biodiversity offset site. Since biodiversity offset sites are typically only selected in the post-authorisation phase, it is likely that the Biodiversity Offset Management Plan is prepared in the post-authorisation phase. How soon in the post-authorisation phase the Biodiversity Offset Management Plan is developed depends on whether the biodiversity offset site was identified in the EA or whether a site still needs to be found. If the biodiversity offset site was identified in the EA, a specialist, on behalf of the EA holder, can commence with the preparation of the Biodiversity Offset Management Plan as soon as the EA is granted.

5.1.7 Concluding a Biodiversity Offset Implementation Agreement

More information on this step is given in **Chapter 11** below.

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This step is typically only taken after the biodiversity offset site has been selected and secured. As stated above, the applicant would typically be required in terms of an EA to enter into a Biodiversity Offset Implementation Agreement with an implementing party. In terms of such an agreement, the implementing party should agree to implement the Biodiversity Offset Management Plan and the EA holder should agree to make the funds available for such implementation.

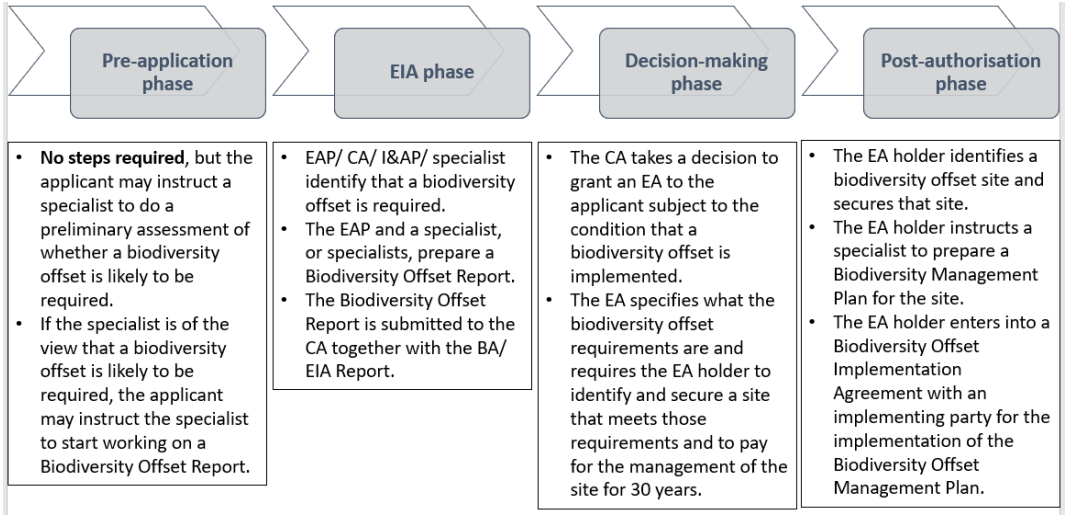

Figure 1 Overview of the steps involved in the biodiversity offsetting process in the EIA context

5.2 The roles and responsibilities of the different role-players in the biodiversity offsetting process

- **The proponent/ applicant** must appoint an EAP to carry out an EIA process on their behalf. When biodiversity offsets are likely to be required, the applicant should also appoint appropriately qualified specialists to compile relevant documentation for review by the CA, including but not limited to biodiversity specialist reports, Biodiversity Offset Reports, Biodiversity Offset Management Plans and Biodiversity Offset Implementation Agreements. All costs related to the investigation of biodiversity offsets would be to the applicant's account. If environmental authorisation is granted, the implementation of the biodiversity offset condition in the EA will be to the **EA holder's** account. These costs include the costs related to the design of the biodiversity offset (such as engaging landowners, preparing a Biodiversity Offset Management Plan and concluding necessary contracts), requesting the declaration of a protected area in respect of the biodiversity offset site, the management of the biodiversity offset site as well as the costs of auditing implementation against the Biodiversity Offset Management Plan.

- **The environmental assessment practitioner** (EAP) is responsible for coordinating the EIA process, drawing up Terms of Reference for specialists, and synthesising specialists' inputs. The EAP must ensure that the mitigation hierarchy has been adhered to (with due consideration of reasonable and feasible alternatives) and, where residual negative impacts on biodiversity are likely to be

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significant, may need to appoint biodiversity specialists (and other specialists, as appropriate) to investigate and evaluate potential biodiversity offsets. The EAP must also ensure that all relevant I&APs, including conservation authorities and other organs of state as well as the owners of land in which candidate biodiversity offset sites (see Chapter 7 below) are situated, have been adequately engaged about a proposed biodiversity offset and that offset-related issues and comments are accurately captured in the EIA documentation. Where offsets are required for terrestrial ecosystems as well as wetland ecosystems and/ or forest ecosystems, the specialist or specialists and the EAP should strive to integrate these different requirements in the Biodiversity Offset Report, and select candidate offset areas which would meet all offset requirements, where at all possible. Since the EAP takes his or her instructions from the applicant, the applicant bears ultimate responsibility for what the EAP does.

- **Specialists** will give site- and context-specific information, assess potential impacts of activities on biodiversity and ecological infrastructure and evaluate their significance, recommend lower-impact project alternatives where feasible, provide an estimate of residual negative biodiversity impacts, propose appropriate biodiversity offset metrics and components, and, where appropriate, investigate and advise on securing, protecting, rehabilitating and managing biodiversity offset sites. Specialists must have appropriate skills and experience and must generally be registered with the South African Council for Natural Scientific Professions. As part of the process of preparing Biodiversity Offset Reports, specialists engage the owners of land that could be selected as candidate biodiversity offset sites or biodiversity offset sites.

- **National and provincial conservation authorities** play a lead role in advising the CA[17] on proposed biodiversity offsets. Biodiversity specialists and EAPs must involve these authorities in EIA processes when the activities involved could have significant residual negative impacts on biodiversity or protected areas and engage staff with regard to finding optimum biodiversity offsets that align with national and provincial protected area expansion strategies. The management authorities for protected areas that would be expanded by the inclusion of a biodiversity offset site should report on those biodiversity offsets as part of their statutory reporting responsibilities.[18]

- **The competent authority** is responsible for evaluating, and taking decisions on, EA applications. As part of that role, the CA reviews, amongst other documents, BA reports, scoping reports and EIA reports submitted to them as part of EA applications. CAs may advise or instruct the proponent or applicant of the nature and extent of the processes that may or must be followed in an EA application process, or decision-support tools that must be used in order to comply with NEMA and the EIA Regulations. CAs should also advise the proponent or applicant of any matter that may prejudice the success of an application, such as unacceptable loss of biodiversity. In the context

[17] In some instances, organs of state other than conservation authorities may also need to advise on appropriate offset measures, in particular the Department of Water and Sanitation.
[18] See generally the National Environmental Management: Protected Areas Act, 2003.

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of biodiversity offsets, a CA must advise an applicant or its EAP when it is of the view that a biodiversity offset will be required, and that this guideline must be considered. The CA is also responsible for seeing that the mitigation hierarchy has been properly applied and formulating the biodiversity offset condition(s) in an EA.

- **Local authorities** are primarily responsible for taking decisions on how land in their respective municipal areas is used. Municipalities are therefore required to be consulted during the EIA phase to ensure that biodiversity offset areas may be used for conservation purposes. Some municipalities also have their own biodiversity targets and therefore need to be consulted on the identification of a biodiversity offset site. Municipalities are also authorised to require biodiversity offsets in terms of SPLUMA and applicable municipal by-laws (see the bullet point below).

- **Organs of state responsible for processing applications for other applicable regulatory approvals** should also be consulted during the biodiversity offsetting process. Other regulatory approvals, other than an EA in terms of NEMA, may well be required for the same development, such as licences in terms of the National Water Act, 1998, licences in terms of the National Forests Act, 1998, development rights in terms of SPLUMA (and applicable municipal by-laws) and requests for the de-proclamation, or withdrawal of the declaration, of protected areas in terms of provincial legislation or NEMPAA. As alluded to in Chapter 1, biodiversity offsets could also be required as conditions to those regulatory approvals. It is therefore important for the CA and applicant to liaise with those organs of state to ensure that only one biodiversity offset is required, to avoid duplication.

- **Organs of state whose functions could be affected by a proposed biodiversity offset**: A proposed biodiversity offset could have implications for the performance of certain functions by organs of state, such as land reform functions exercised by the Regional Land Claims Commissioners. Those organs of state should be consulted to resolve potential conflicts.

- **Interested and affected parties**: When conducting the public participation process prescribed in the EIA Regulations, it is important for the applicant or EAP to consult all relevant potentially interested and affected parties about the Biodiversity Offset Report (see Chapter 7), including relevant indigenous and traditional communities and NGOs/ NPOs active in the relevant landscape, to ensure the participation of those stakeholders in the biodiversity offsetting process. It is advisable to start engaging those I&APs as soon in the EIA process as possible.

6. When are biodiversity offsets required?

A biodiversity offset is required when a proposed listed or specified activity, or activities, is/are likely to have **residual negative impacts on biodiversity of medium or high significance.** These negative impacts could affect biodiversity patterns (e.g. threatened ecosystems, species or special habitats), ecological processes (e.g. migration patterns, climate change corridors enabling shifts in species

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distributions over time,[19] or wetland function), ecosystem services (e.g. provision of clean water) or a combination of all three.

In this Chapter, the concepts of residual impacts and impact significance are discussed. A flow diagram of the steps that need to be taken to determine if a biodiversity offset is required is given in **Figure 2**.

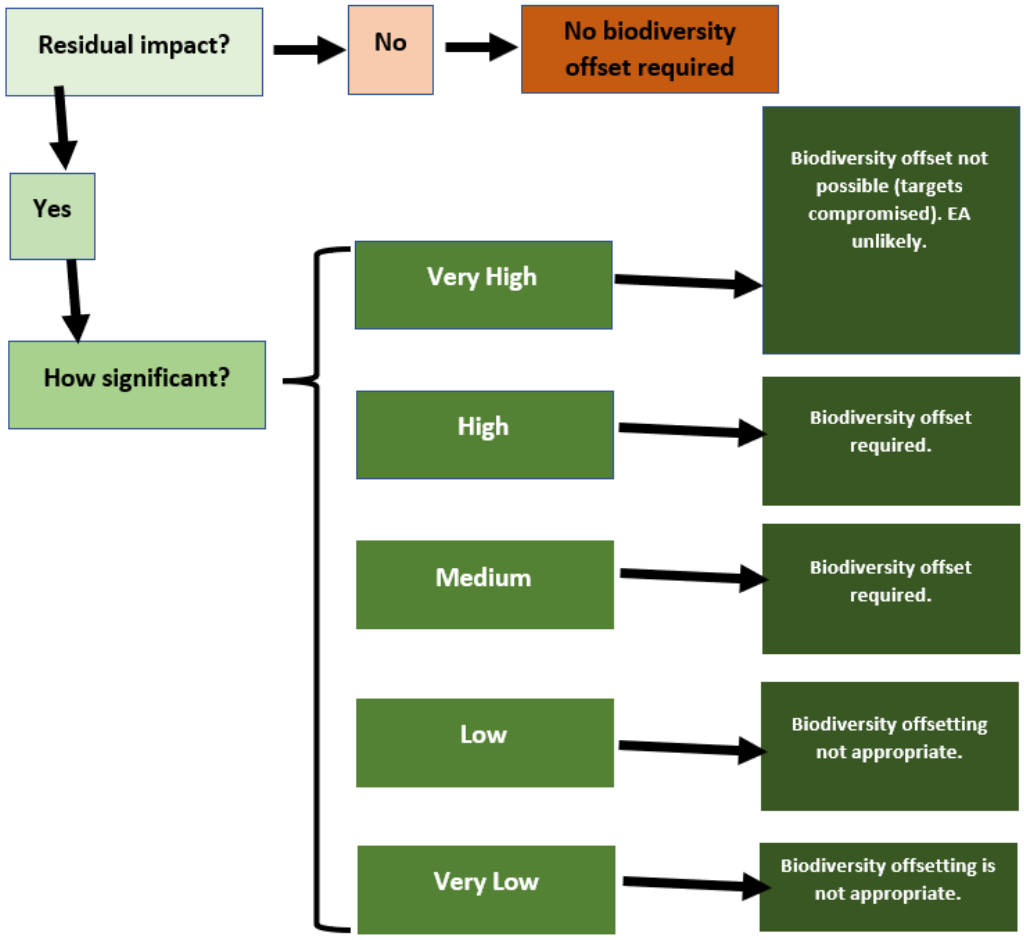

Figure 2 Flow diagram: When is a biodiversity offset required?

6.1 Residual impacts

A residual biodiversity impact is the impact of an activity, or activities, on biodiversity that remains after all efforts have been made to avoid and minimise the impacts of the activity, or activities, and to rehabilitate the affected area to the fullest extent possible.

[19] Climate change modeling projects shifts in climatic envelopes that are likely to affect biodiversity. There is however some uncertainty as to how it might affect biodiversity.

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As part of an EIA, an EAP or a specialist is required to predict the possible negative impacts of an activity, or activities, on biodiversity, including direct impacts, indirect impacts (including the potential impacts of an activity on the climate, where climate change could have negative impacts on biodiversity), and cumulative impacts.[20] After those impacts have been identified, the EAP or specialist must investigate alternative project locations, designs, technologies, scales and layouts to determine if and how potentially significant negative impacts on biodiversity could be avoided or minimised. The EAP or specialist must also determine if, to what extent, and how successfully, impacted areas could be rehabilitated.

If predictions in the EIA state that all negative impacts on biodiversity cannot be avoided, and/or that impact minimisation and rehabilitation of the affected area cannot, with a high degree of certainty, fully mitigate the impacts of the activity, or activities, on biodiversity, the proposed development would have residual negative biodiversity impacts.

The mitigation hierarchy, as set out in section 2(4)(a)(i) of NEMA, and applicable guidelines, should be followed to determine if there will likely be residual impacts.

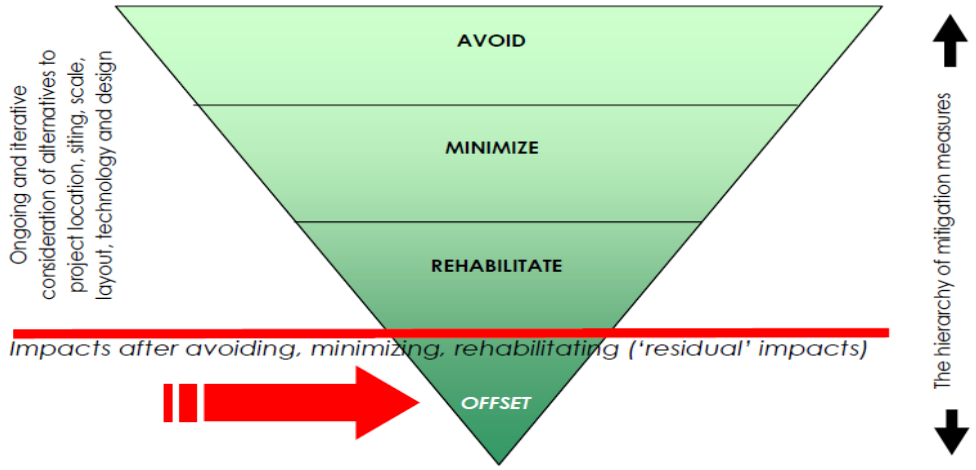

Figure 3 The mitigation hierarchy

6.2 Impact significance

Where residual negative biodiversity impacts are evaluated to be of medium or high significance, a biodiversity offset would be required. Biodiversity offsets are unlikely to be required when the residual negative impacts of a proposed activity, or activities, on biodiversity are evaluated to be of low significance. Biodiversity offsets are not appropriate when an activity, or activities, will have residual impacts on biodiversity of very high significance, including when residual negative impacts will result

[20] See Department of Environmental Affairs (2017), *Guideline on Need and Desirability, Department of Environmental Affairs (DEA), Pretoria, South Africa* at p14 for a description of "cumulative impacts."

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in loss of irreplaceable biodiversity. As already indicated, those developments are fatally flawed and should be avoided.

'Significance' is a combination of the consequence and likelihood of an impact occurring. At least the following factors must be considered as part of the process of assessing the significance of a negative impact on biodiversity:

- The **consequence** of an impact is a combination of the intensity, extent and duration of the impact.
    - Intensity (severity) of the ecological impact: the intensity of an ecological impact is given at a defined (usually spatial) scale. It is in influenced by such considerations as the condition or quality of the affected resource (i.e. the ecological condition) and the vulnerability of receptors to impacts. The biodiversity features of an area described in Table 1 below are relevant considerations[21] in intensity ratings. The greater the intensity, the greater the consequence, and the more significant the impact.
    - Extent: the scale of expected impacts as a proportion or range of a given biodiversity feature, inversely related to viability of the remaining portion of that feature when the biodiversity feature impacted on is ecosystems, ecosystem extent (available in the look-up table), and specific provincial biodiversity targets, should be considered as part of this factor. The greater the extent, the greater the consequence, and the more significant the impact.
    - Duration: how long the impact will last, from short-term to permanent, where permanent is a period of thirty years and above (unless the receiving environment justifies a shorter consideration of permanent). The longer the duration, the greater the consequence, and the more significant the impact.
- Likelihood of the occurrence of the impact: The more likely the impact, the greater the certainty of the impact significance. However, it is important to keep in mind that a risk-averse and cautious approach needs to be followed when the likelihood is more remote.

Table 1 The importance of biodiversity and/ or ecological infrastructure[22]

The importance of biodiversity and/ or ecological infrastructure
Irreplaceable biodiversity: residual impacts in this category cannot be fully counterbalanced by offsets because of the high threat status or irreplaceability of affected biodiversity or ecosystem services. Impacts in this category would generally be unacceptable (and the development thus fatally flawed) and could lead to – • irreversible and irreplaceable loss of ecosystem or species, such as impacts on –

[21] The biodiversity features identified in Table 1 should be considered alongside the site verification reports, as well as relevant biodiversity specialists' reports, submitted to the CA in the pre-application and EIA phases.
[22] Adapted from Department of Environmental Affairs and Development Planning (DEA&DP) 2015. Western Cape Guideline on Biodiversity Offsets. Prepared by Susie Brownlie and Mark Botha for DEA&DP, Cape Town.

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○ Critical Biodiversity Areas: Irreplaceable (CBA 1), especially where the feature(s) driving the designation as a CBA 1 is significantly negatively affected or will be compromised beyond its Biodiversity Target;[23] ○ protected areas, and more particularly, the natural or near natural parts[24] of protected areas; ○ Critically Endangered ecosystems outside of CBAs; ○ confirmed habitats of Critically Endangered species, where those areas have not been included in CBA 1s; or ○ Ramsar sites, where the impacts negatively affect the site's ecological character; ○ range-restricted species which have been identified in South Africa's Red List as Rare or Extremely Rare; or ○ areas evaluated to Very High Site Ecological Importance; or • irreplaceable loss of key ecological corridors recognised as important for evolutionary processes and climate change adaptation where no spatial options to safeguard these processes exist; • irreversible or irreplaceable loss of highly valued ecological infrastructure at national or provincial scale and/or where there is a high level of dependence on the associated ecosystem services by local communities for livelihoods and health, and no feasible substitutes; or • a high probability or risk of extinction of a plant or animal species.
Biodiversity of major potential concern: residual impacts in this category could lead to – • loss of vulnerable or potentially irreplaceable biodiversity in areas of recognised importance, such as – ○ Critical Biodiversity Areas: Optimal (CBA 2); ○ Endangered ecosystems outside of CBAs; ○ Natural forests; ○ buffer zones around protected areas and protected area expansion zones identified in protected area management plans; ○ the Coastal Protection Zone; ○ areas seawards of development setback lines, and where development setback lines have been determined, within 1 km of the High Water Mark; or ○ areas evaluated as having High Ecological Site Importance;[25] or • irreversible loss or deterioration of valued ecosystem services at provincial level; or • irreversible loss of – ○ Critically Endangered or Endangered Species; or ○ Range-restricted endemic species which have not been identified in South Africa's Red List as being Rare or Extremely Rare.
Biodiversity of potential concern: Residual impacts in this category could lead to – • irreversible loss of vulnerable biodiversity, such as - ○ Ecological Support Areas;

[23] Please take note that CBA 1s in some CBA Maps, such as the Western Cape Biodiversity Spatial Plan (2017), are not necessarily all regarded as irreplaceable. It is recommended that reasons are requested from a relevant conservation authority, such as CapeNature, as to why a particular area is a CBA 1.

[24] Development in protected areas, including the modified parts of protected areas (such as accommodation facilities and roads) require the consent of the relevant management authority. Development must also be aligned with the management plan for a specific protected area as well as the reasons for declaration of the relevant protected area.

[25] For a general explanation of Site Ecological Importance, please see section 8 of South African National Biodiversity Institute (SANBI). 2020. Species Environmental Assessment Guideline. Guidelines for the implementation of the Terrestrial Fauna and Terrestrial Flora Species Protocols for environmental impact assessments in South Africa. South African National Biodiversity Institute, Pretoria. Version 3.1. 2022.

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○ Strategic Water Source Areas; ○ Ecological infrastructure that provides highly significant ecosystem services, which is not within a SWSA and is not identified as an ESA; ○ conservation areas; ○ Vulnerable ecosystems or species; ○ areas that have two or more of the following characteristics: Threatened Ecosystem, confirmed habitat for Threatened Species; or important ecological process area or corridor; ○ areas within 32 meters of a watercourse; ○ areas evaluated as to be of Medium Site Ecological Importance; ○ Priority Focus Areas in the National Protected Areas Expansion Strategy; ○ endemic, but not range-restricted, species; or • irreversible loss or deterioration of valued ecosystem services at local level.
Biodiversity of Low concern: Residual impacts in this category could lead to irreversible loss of – • Other Natural Areas; • Not Threatened or Least Concerned ecosystems or species, where those species or ecosystems do not – ○ support Protected or Threatened ecosystems or species; ○ constitute important ecological process areas or corridors; ○ provide important ecosystem services; or • areas evaluated to be of Low Ecological Importance.
Biodiversity of negligible concern: Impacts in this category are on highly modified areas or areas identified as having Very Low Site Ecological Importance.

Sufficient rigour and adherence to specific guidance on assessing biodiversity impacts and evaluating their significance must be demonstrated to the CA, drawing firstly on the applicable biodiversity[26] and species[27] protocols, used in conjunction with the National Environmental Web-based Screening Tool (Screening Tool).[28] The report generated through the Screening Tool and a site sensitivity verification report by the EAP or specialist, could give an early indication of the significance of the possible negative impacts of an activity, or activities, on biodiversity. However, the nature of the possible impacts of a development on biodiversity should always be based on the best available information on the receiving area, including reports by relevant specialists.

[26] Procedures for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for environmental authorisation, published under Government Notice No. 320 in Government Gazette 43110 of 20 March 2020. These protocols cover terrestrial and freshwater biodiversity, and not marine biodiversity.

[27] Procedures for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for environmental authorisation, published under Government Notice No. 1150 in Government Gazette 43855 of 30 October 2020. These protocols cover terrestrial and freshwater species and not marine species.

[28] Available at https://screening.environment.gov.za. The notice in terms of which the use of the screening tool was made compulsory was published under Government Notice No. 960 in Government Gazette No. 42561 of 5 July 2019.

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Where the significance ratings for biodiversity impacts are contentious or contested, leading to uncertainty about the need for a biodiversity offset, the CA could call for independent peer review of a biodiversity specialist study and/ or biodiversity offset report.[29]

7. Determining biodiversity offset requirements

Once it has been determined that a biodiversity offset is needed, the requirements for that biodiversity offset must be determined. The requirements for a biodiversity offset are set out in a Biodiversity Offset Report, which must be prepared by a relevant specialist, or specialists, and be submitted to a CA together with a BA Report or EIA Report at the end of the EIA phase. In preparing the Biodiversity Offset Report, the specialist, or specialists, must take the following steps:

1. Assess the significance of the residual negative biodiversity impacts.

2. Determine the right size of the biodiversity offset.

3. Take into consideration unique or special biodiversity features.

4. Selecting and securing candidate biodiversity offset sites.

5. Selecting the biodiversity offset site.

6. Planning for biodiversity offset implementation.

7. Preparing the Biodiversity Offset Report.

In this Chapter, guidance is given regarding each of the steps outlined above.

7.1 Assess significance of the residual negative biodiversity impacts

The significant residual negative impact on biodiversity is assessed with reference to the factors listed and explained in Chapters 6.1 (residual impacts) and 6.2 (impact significance) above. The more significant the impact, the more significant the biodiversity outcomes that must be achieved to counterbalance the impact. The guidance in this chapter focusses on how to express the outcomes that must be achieved in the context of residual negative impacts on ecosystems (both terrestrial and freshwater). However, biodiversity offsets may well be required for significant residual negative impacts on biodiversity features other than ecosystems (e.g. threatened species). In those cases,

[29] Section 24I of NEMA provides that the Minister or MEC may appoint an external specialist reviewer, and may recover costs from the applicant, in instances where - (a) the technical knowledge required to review any aspect of an assessment is not readily available within the competent authority; (b) a high level of objectivity is required which is not apparent in the documents submitted, in order to ascertain whether the information contained in such documents is adequate for decision making or whether it requires amendment. A CA may of course also just request the additional information from the applicant or EAP.

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relevant specialist advice is required, over and above the guidance given for ecosystems in this guideline. That advice must at least include the metrics for loss and gain in populations of species.

7.2 Determining the right size of the biodiversity offset

This guideline gives a standard, area-based approach to calculating the size requirements for biodiversity offsets when the significant residual negative impact is on ecosystems (terrestrial, including coastal, and freshwater, but excluding offshore marine and estuarine). However, residual negative impacts on biodiversity cannot always be easily specified in terms of area. Residual negative impacts on species of conservation concern,[30] ecological processes or ecosystem services, are examples of such instances. In those cases, the size of the biodiversity offset must be determined based on the advice of an appropriate specialist, or specialists. In some cases, the biodiversity offset site(s) targeted to remedy residual impacts on ecosystems may also accommodate offset activities that address the particular needs of impacted species. In other instances, additional offset site(s) and activities may be required to counterbalance residual impacts on ecosystems, species of conservation concern and/ or key ecosystem services.

7.2.1 Standard approach to determining the required size of a biodiversity offset

The starting point for determining the size of a biodiversity offset is calculating an applicable ecosystem-based biodiversity offset ratio. A biodiversity offset ratio provides the area-based size of a biodiversity offset relative to the area of the residual negative biodiversity impact.

Given that the focus of this chapter is on ecosystems, the standard approach for determining ratios is based on Ecosystem Extent, Ecosystem Protection Level (**EPL**) and Ecosystem Threat Status. It is also recommended that it is taken into consideration which type of biodiversity priority area the relevant area is classified as. This is to ensure that biodiversity priorities can still be met in areas that are CBA2s but were not selected because of ecosystem threat level.

(1) Determining the basic offset ratio

The standard approach to determining a basic biodiversity offset ratio is based on biodiversity targets. Those targets are, in turn, based on Ecosystem Extent, Ecosystem Protection Level and Ecosystem Threat Status of the various ecosystem types identified in the ecosystem assessment conducted as part of the determination of ecosystems that are threatened and in need of protection in terms of the National Environmental Management: Biodiversity Act, 2004.[31] The proposed applicable ratios are listed in the look-up table, which is attached, marked **Annexure A**. The look-up table also sets out the

[30] For the purposes of this guideline, the term "species of conservation concern" includes protected tree species identified in terms of the NFA.
[31] At the date of publication of this guideline, the latest such list was the one published under Government Notice No. 2747 in Government *Gazette* No. 47526 of 18 November 2022.

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rationale for the standard approach in greater detail and will be reviewed periodically and updated, if and when necessary.

The standard approach is shortly as follows:

1. If the Ecosystem Extent is less than or equal to 30%, the precautionary principle demands that a 30:1 ratio must be applied.

2. If the Ecosystem Extent is between 30 and 70%, the ratios provided for in the look-up table, which takes into consideration Ecosystem Extent and EPL, should be applied. The ratios in that range of Ecosystem Extent vary between 1:22 to 1:1 depending on the extent of the ecosystem remaining and how much of the relevant ecosystem type is protected. In the table below, ratios were assigned to 6 different "bands" based on remaining ecosystem extent and ecosystem protection level:

Remaining Ecosystem Extent (%)			Not Protected		Poorly Protected		Moderately Protected		Well protected	
Bands	Low	High	Low	High	Low	High	Low	High	Low	High
1	0	30	TPC Ratio Applied							
2A	30	40	12.0	22.0	8.0	15.0	4.0	8.0	2.0	4.0
2B	40	50	7.0	12.0	4.0	8.0	2.0	4.0	0.0	2.0
3A	50	60	3.0	7.0	2.0	4.0	0.0	2.0	0.0	0.0
3B	60	70	0.0	3.0	0.0	2.0	0.0	0.0	0.0	0.0
4	70	100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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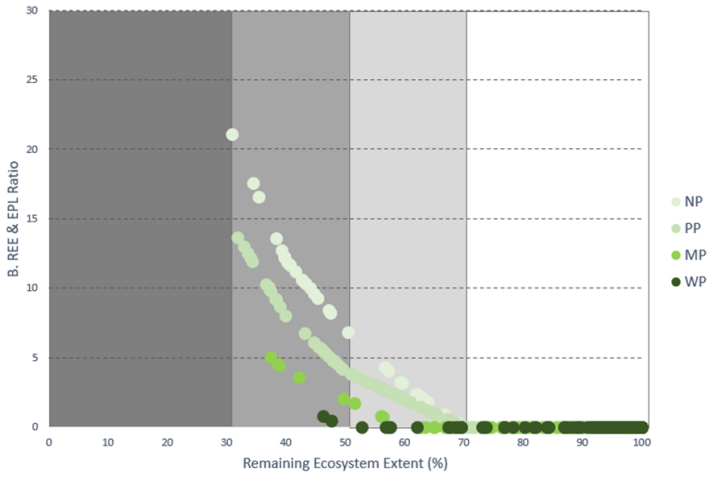
The starting ratios based on Ecosystem Extent and EPL are represented in the graph below



In the graph above, NP: Not Protected; PP: Poorly Protected; MP: Moderately Protected; and WP: Well Protected. REE: Remaining Ecosystem Extent; EPL: Ecosystem Protection Level.

3. Take into consideration the ecosystem threat status: it is recommended that the following ratios are applied for the different ecosystem threat statuses:

- Critically Endangered: 30:1.
- Endangered: 10:1.
- Vulnerable: 5:1.

Ecosystems are not only threatened by a reduction in range. They are also threatened for other reasons. Please see the textbox on the latest ecosystem threat status assessment below.

The latest ecosystem threat status assessment

The most recent **Ecosystem Threat Status** assessment was done in 2021. Like the assessment that was done as part of the NBA 2018, it is based on five criteria, namely the reduction in geographic distribution, restricted geographic distribution, environmental degradation, disruption of biotic processes and interactions, and a quantitative analysis that estimates the probability of ecosystem collapse. The approach for calculating the basic offset ratio is primarily based on the first of those criteria. The other criteria, however, also need to be considered when calculating the basic offset ratio. The fact that an ecosystem has restricted geographic distribution, or is generally in a poor ecological condition, for example, may well mean that the basic biodiversity offset ratio needs to be higher than it would have been in the absence of those factors.

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4. Following the precautionary approach, it is recommended that the highest of the two ratios described in 2 and 3 above is selected as the starting ratio.

It should be noted that a biodiversity offset could still be required for an activity, or activities, that are likely to have a significant residual negative impact on an ecosystem of Least Concern with an Ecosystem Extent of greater than 70%. In those cases, the starting ratio would be based on the information before the decision-maker, such as the reasons why the biodiversity offset is required (see Chapter 6 above).

It is emphasised here that the standard approach is not binding, but a guide based on relevant scientific information on ecosystems. Competent authorities must apply their minds to each case, which would involve considering additional factors, such as the size of the historical extent of the ecosystem measured against the extent of the residual negative impact (if a large percentage of the extent of the ecosystem would be impacted on, a higher ratio would be justified) and the cumulative residual negative impact of the activity, or activities, on biodiversity.

Some provincial conservation authorities or CAs have adopted, or may in future adopt, province-specific approaches to determining biodiversity offset ratios, based on province-specific biodiversity targets. Those approaches take precedence over the standard approach provided for in this guideline provided that they are scientifically defensible.

Consideration also needs to be given to how ratios are determined for development in the urban setting. It is likely that there would be good reasons for adjusting biodiversity offset ratios down for activities in the urban setting given the relative scarcity of space and natural areas in those areas. In this regard, consideration should be given to approaches for determining biodiversity offset ratios for development in the urban environment.

'Like-for-better' biodiversity offsetting/ 'trading-up'

Wherever possible, a 'like-for-like' biodiversity offset should be required and provided to ensure that residual negative impacts on the affected biodiversity features are appropriately compensated. In exceptional cases, targeting biodiversity of greater conservation concern (for example, ecosystems that have higher threat status than the impacted ecosystem, or areas of higher biodiversity priority as indicated in applicable systematic biodiversity plans), may be justifiable. Where such an approach of 'trading up' is being considered, a strong motivation should be provided for this choice (for example, when it can be shown that there are no suitable areas of the same or proxy habitat available). Such motivation should also show the relationship between the biodiversity offset site's biodiversity and impacted biodiversity.

(2) Determining the adjusted biodiversity offset ratio

To ensure that biodiversity priorities are considered as part of the determination of the size requirement for a biodiversity offset, the relevant CBA Map must also be considered as part of that

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process. While any loss in a CBA 1 is generally considered irreplaceable[32], if it is found that the negative significant impact on biodiversity will take place in a CBA 2, it is recommended that the basic biodiversity offset ratio should be adjusted by increasing it by a factor of 1.5 up to a maximum of 30:1.

Example of the application of the standard approach

The specialist report suggests that an activity, or activities, would have a significant residual negative impact on biodiversity in a Dry Coast Hinterland Grassland ecosystem, in an area which has been identified as a CBA2 in the relevant spatial biodiversity plan.

1. According to the look-up table, Ecosystem Extent is greater than 30%. A 30:1 ratio is therefore likely not applicable.
2. The starting ratio based on Ecosystem Extent and EPL is 8:1. (Ecosystem Extent is 41,6% and EPL is Not Protected. Band 2B is therefore applicable).
3. The ecosystem type is Vulnerable (because of range reduction and restricted range). The starting ratio based on ecosystem threat status is therefore 5:1.
4. Select the higher of the stating ratios determined in 2 and 3 above. The starting ratio is therefore 8:1.
5. Because the disturbed area is in a CBA2, increase the ratio by a factor of 1.5. The adjusted ratio is therefore 12:1.
6. Take into consideration other factors, such as the size of the historic extent of the ecosystem relative to the extent of the impacted area, the cumulative impact and whether the area is in an urban or rural setting. Adjust the ratio up or down depending on the information before the decision-maker.

7.2.2 Targeted approaches to determining the required size of the biodiversity offset

Biodiversity offsets require that ecosystems are considered, protected and managed within their landscape and functional context (also see the principle that biodiversity offsets should embody the ecosystems approach and promote connectivity in the wider landscape in Chapter 4.2 above). Some ecosystems, namely forests and wetlands, require a slightly different approach to determining the size of offsets from the standard approach described above. For these ecosystems, historical guidance,[33] mitigation practice, and/or specific legal protection, necessitate this different approach. However, it is desirable for there to be alignment between the different approaches to biodiversity offsetting wherever possible. The approaches for natural forests and wetlands are discussed below.

Forest ecosystem types

[32] Please take note that CBA 1s in some CBA Maps, such as the Western Cape Biodiversity Spatial Plan (2017), are not necessarily all regarded as irreplaceable. It is recommended that reasons are requested from a relevant conservation authority, such as CapeNature, as to why a particular area is a CBA 1.

[33] See, for example, Department of Agriculture, Forestry and Fisheries *Policy principles and guidelines for control of development affecting natural forests* (2010); and Macfarlane, D., Holness, S.D., von Hase, A., Brownlie, S. & Dini, J., 2014. *Wetland offsets: a best-practice guideline for South Africa.* South African National Biodiversity Institute and the Department of Water Affairs. Pretoria. 69 pages.

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Activities which have residual negative impacts on forest ecosystems often require both an EA and a licence in terms of the National Forests Act, 1998 (NFA). The NFA, the primary law for the protection of natural forests in South Africa, provides that natural forests must not be destroyed save in exceptional circumstances.[34] This implies that the target for conserving remaining forests is the remaining extent of the forest ecosystem type (i.e. they constitute irreplaceable biodiversity). Where an activity would have the effect of negatively impacting on a natural forest, and the "exceptional circumstances"[35] referred to in the NFA are present, ecological compensation[36] would be required. This compensation may include, but is not necessarily limited to, removing or reducing the activities or processes that impede or threaten forest regeneration, or that result in ongoing loss of that forest type, or a nearby related type. The strong protection given to natural forests by the National Forests Act, 1998 due the rarity of the biome and its high ecosystem services, in practice means that any impacts on such forests are regarded as serious, and in the case of endangered forest types, as fatally flawed.

As already stated, an offset may well be required where a listed or specified activity would involve the removal of one or more protected tree species, despite the fact that application of this guideline's approach for determining when an offset is required suggests that no biodiversity offset is required. In such instances, the biodiversity offset requirements should involve an offset area to maintain or increase viable populations of the same tree species as those impacted or involve reducing or removing other activities or processes that threaten the persistence, recruitment or survival of protected trees, or both.

Wetland ecosystem types

Wetland ecosystems require mitigation for the loss of biodiversity (i.e. wetland ecosystem type and wetland species), and for impacts on wetland (hydrological) functioning. The standard approach described in Chapter 7.1 above also applies to wetlands. However, the negative impacts of an activity, or activities, on wetland functioning need to be addressed through the rehabilitation of degraded wetland systems, careful location of biodiversity offset sites in the wider hydrological landscape, and/or the removal, reversal or curbing of activities or processes threatening their effective functioning. Increasing wetland offset area is often not a suitable substitute for improving wetland functioning as an offset. Please consult Wetland Offsets: A Best Practice Guideline for South Africa (2016) for more guidance on wetland offsets. That guideline must be read in conjunction with this guideline.

[34] Section 3(3)(a) of the National Forests Act, 1998.
[35] It is not possible to list all the circumstances under which development would be justified notwithstanding a fatal flaw. What is exceptional depends on the circumstances of each case. The term "exceptional circumstances" has been interpreted to mean something out of the ordinary, uncommon, rare or unusual (see, for example, *Avnit v First Rand Bank Ltd (20233/14) [2014] ZASCA 132 (23 September 2014).*
[36] See footnote 1.

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7.3 Taking into consideration unique or special biodiversity features

Once the adjusted biodiversity offset ratio has been determined, biodiversity features other than Ecosystem Extent, EPL, ETS and biodiversity priority status must be considered to adjust the biodiversity offset requirements, if necessary. Those features include, but is not limited to, the following:

(a) **The condition of the affected habitat and potential offset site(s)**: The ecological condition of the biodiversity offset site should be comparable to, or better than, the ecological condition of the area impacted by the relevant activity, or activities.

(b) **The presence of any threatened or restricted range species**: The biodiversity offset site(s) must cater for these species.

(c) **The presence of any special habitats**: The biodiversity offset site should include these habitats (e.g. wetlands, quartzite/ calcrete patches, unique geological or hydrological features).

(d) **The role of the affected area in the bigger landscape with regard to ecological processes**: If it has been found that the affected area acts, for example, as an important fixed or flexible ecological corridor across a gradient, then the biodiversity offset should provide an effective substitute corridor/ link.

(e) **The presence of ecological infrastructure in the area**: If there is ecological infrastructure in the area on which local human communities and/ or society as a whole are reliant for ecosystem services, the biodiversity offset should contain or re-establish similar ecological infrastructure to benefit the significantly affected dependants. Where it is not feasible for this ecological infrastructure to be re-established, or secured and managed, through a biodiversity offset, compensation to provide acceptable services to the affected community should be provided. This could include, for example, water provision by the developer to an affected community that has lost access to spring or stream as a result of development.

7.4 Selecting and securing candidate biodiversity offset sites

The Biodiversity Offset Report must include a portfolio of candidate biodiversity offset sites. This is the case even when the biodiversity offset site has already been selected before the Biodiversity Offset Report was completed. In such a case, the process for selecting the proposed biodiversity offset site needs to be clearly specified in the Biodiversity Offset Report, and reasons must be given why that particular site has been selected over other candidate biodiversity offset sites.

The potential for and viability of securing each candidate biodiversity offset site identified in the Biodiversity Offset Report should then be investigated and reported on. It is important to engage with

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the relevant conservation authority during the site selection process to ensure that they would consider biodiversity offset sites to be acceptable.

The identification of candidate biodiversity offset sites, assessing the potential of each of candidate biodiversity offsets to be selected as a biodiversity offset site, consulting with a relevant conservation authority and the selection of a biodiversity offset site from a portfolio of candidate biodiversity offset sites are dealt with under chapters 7.4.1, 7.4.2, 7.4.3 and 7.4.4 below.

7.4.1 Selecting candidate biodiversity offset sites

Once the biodiversity offset requirements have been determined, the relevant specialist, or specialists, appointed by the applicant should identify and screen a number of potential biodiversity offset sites, called "candidate biodiversity offset sites" for the purposes of this guideline. Biodiversity offset sites should ideally be located in biodiversity priority areas as determined in spatial biodiversity plans. These include Critical Biodiversity Areas, Ecological Support Areas, Freshwater Ecosystem Priority Areas and focus areas for protected area expansion.

The overriding principle of site selection is that, where possible, and as the highest priority for biodiversity offsetting, biodiversity offsets should be used to protect and maintain the irreplaceable elements of our biodiversity and natural heritage. The following principles must also guide site selection:

- Biodiversity offset sites should be selected for ecological equivalence (the "like-for-like" principle) or, where appropriate, there could be "trading-up" to select an area of relatively high or more urgent conservation priority.

- Selection should be guided as far as possible by existing biodiversity priority areas in the landscape (for example, the CBA and ESA network, Freshwater Ecosystem Priority Areas, and Priority Focus Areas in the National Protected Area Expansion Strategy or provincial, local, protected area expansion strategies) and/or areas identified as strategic from an ecological infrastructure perspective (such as Strategic Water Source Areas).

- Biodiversity offsets should strive to secure the best examples of the features which have been impacted and to improve connectivity in the landscape between protected and priority areas for biodiversity.

- The final selection can be influenced by the reasonable consideration of factors other than the biodiversity value of the different candidate sites, such as: ease of the management of the site by a relevant management authority; and threats to conservation due to conflicting land use rights, claims or land use classification. These other factors should be considered cautiously and in the context of the outcomes and principles of biodiversity offsets given in Chapter 4.

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For biodiversity offsets in **terrestrial ecosystems**, rehabilitation of areas in modified condition (i.e. no longer natural or near-natural) is seen as an integral part of the required management of the offset site. For this reason, it is optimal for candidate biodiversity offset sites to be in a good ecological condition (natural or near-natural state), to minimise the additional burden of having to rehabilitate an area.

In exceptional circumstances, where a specialist is considering selecting an area in a modified condition in the terrestrial realm as a candidate biodiversity offset site, the following principles need to be considered:

- The decline in condition of an ecosystem implies the loss of biodiversity pattern (i.e. species composition and ecosystem structure) and ecological functioning. The potential for rehabilitation decreases proportional to the extent of deterioration in condition, with growing effort and costs to achieve a return to a natural state. In areas of highly modified habitat, rehabilitation to an acceptable level is unlikely to be possible; an offset in such areas would not be acceptable.

- In terrestrial ecosystems, confidence in the success of restoration in reinstating biodiversity is generally low and can take an extremely long time. The removal of invasive alien species is a key strategy in rehabilitation and restoration, but in many cases is already a legal requirement (i.e. it would not satisfy the 'additionality' principle of offsetting).

- If rehabilitation or restoration in the terrestrial realm is proposed as a distinct and measurable contribution to a biodiversity offset, robust and evidence-based motivation would be needed, with evidence-based assurance of outcomes for biodiversity, and specific, measurable, time-bound outcomes to determine when success has been achieved.

In **wetland and freshwater ecosystems**, on the other hand, it is more acceptable to select ecosystems in a modified state as candidate biodiversity offset sites. Rehabilitation and restoration are recognised as delivering improvements in ecosystem function, and they are explicitly accounted for in determining offset requirements. That is, selecting areas with good potential for rehabilitation and restoration within recognised freshwater priority areas (FEPAs) or SWSAs may be advantageous. Those areas should be located in the same local or quaternary catchment, unless there are good reasons why they are not.

7.4.2 Assessing the potential for securing candidate biodiversity offset sites

Suitable biodiversity offset sites would need to be secured for biodiversity conservation in the long term. Ideally, sites need to be effectively protected in perpetuity. For this reason, a proponent would either have to own or purchase suitable land or enter into a biodiversity stewardship agreement with owners of land situated in biodiversity offset sites, in perpetuity. There are a host of legal mechanisms available for securing biodiversity offset sites, but the following mechanisms are the most common in practice:

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- **The declaration of a protected area in terms of NEMPAA**: This is the preferred mechanism for securing a biodiversity offset site, but it is not always possible or appropriate (see the bullet point below this one). Where possible, such declarations should be made in respect of areas adjacent to existing protected areas to increase the size of those protected areas. A written agreement underlying such a declaration should provide for ecological management in the long term, after the EA holder's responsibility in relation to the relevant development ends. Also note that protected areas can also be declared in terms of legislation other than NEMPAA. For example, forest nature reserves can be declared in terms of the National Forests Act, 1998, and World Heritage Sites can be declared in terms of the World Heritage Convention Act, 1999. However, given that NEMPAA comprehensively deals with the management of protected areas, declarations in terms of that Act are preferable.

- **Conservation servitudes**: It is recommended that conservation servitudes are considered as the mechanism for securing sites when the declaration of a protected area is not possible or where the biodiversity offset site is part of the development site (on-site offset). A conservation servitude is a real right in the property of another that allows the beneficiary, usually a conservation authority or a conservation NPO/ PBO, certain circumscribed entitlements with regard to the conservation of biodiversity on another person's property. Conservation servitudes are binding on successors-of-title and are enforceable against the world at large (not only one person). Conservation servitudes work best when the EA holder is also the owner of the land constituting a biodiversity offset site. However, the EA holder could also negotiate with a landowner for the conservation servitude to be registered in respect of his or her land. Ideally, a conservation servitude should be combined with a Biodiversity Offset Management Plan and penalties for breach and be valid in perpetuity.

Servitudes and positive obligations

Servitudes cannot impose positive obligations on a landowner (only restrictions). If the EA holder is also the owner of the biodiversity offset site, and a conservation servitude has been elected as the measure for securing that area, it is recommended that the deed of servitude incorporates a restriction on the sale of the property. The restriction should specify that the property may not be sold to any person who is not willing to undertake to allow the implementing party to carry out the measures prescribed in a Biodiversity Offset Management Plan on the relevant land.

Purchasing credits from a recognised biodiversity offset bank: A relevant authority may have approved a scheme that proactively delivers biodiversity offsets in biodiversity offset receiving areas and can sell credits. The purchase of specific credits must satisfy offset requirements, i.e. credits must trade in the same ecosystem or species habitat, and be of sufficient quantity. Please note that the different competent authorities may have specific governance frameworks for biodiversity offset banking.

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Purchasing credits in a biodiversity offset bank and environmental authorisations

Given the ease with which credits can be bought in a biodiversity offset bank in comparison to identifying, securing and managing a biodiversity offset site, credits in biodiversity offset banks would be in high demand. However, a biodiversity offset bank has limited credits. It is therefore recommended that CAs do not allow the purchasing of biodiversity offset credits when the development that must be offset had been authorised after the illegal commencement of the relevant activity, or activities in terms of section 24G of NEMA. Reserving credits for legal developments may well disincentivise the illegal commencement of activities.

The above mechanisms may require that the applicable land use, town-planning or zoning scheme be amended to ensure that the biodiversity offset site may be/ is used for conservation purposes.

7.4.3 Ensuring that the biodiversity offset options would be acceptable to the relevant conservation authority

As provided in Chapter 8 below, the specialist must engage conservation authorities and other relevant organs of state throughout the biodiversity offsetting process. As a general rule, a proposed biodiversity offset site should not be included as a candidate biodiversity offset site in a Biodiversity Offset Report (see below) unless it is acceptable to the relevant conservation authority. The Biodiversity Offset Report must confirm that the conservation authority has been engaged and supports the candidate biodiversity offset sites.

7.5 Selecting the biodiversity offset site

The selection of a biodiversity offset site is a crucial step in the biodiversity offset process. The content of a Biodiversity Offset Management Plan (see Chapter 7.6.1 below) depends heavily on which site has been selected for the offset and the delineation of that site. In this Chapter, some principles regarding site selection and stakeholder engagement in the process of site selection are given.

Once the general requirements for a biodiversity offset have been set, a specific biodiversity offset site, or sites, must be selected, preferably from the portfolio of candidate biodiversity offset sites identified in the Biodiversity Offset Report. The site selection principles are given in Chapter 7.4.1 above.

Stakeholder engagement is an important component of the final site selection process. The owners and/ or occupiers of, and rights holders in, the land constituting the candidate biodiversity offset sites must be engaged to assess whether or not those owners or occupiers are willing to negotiate the use of their land for conservation purposes. As noted in Chapter 7.4.2, where candidate offset sites abut, or are close to, existing protected areas, discussions with the conservation authorities would be essential regarding future implementation and management arrangements and agreements to include the biodiversity offset site into the relevant protected area. In addition, conservation NPOs or

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PBOs, especially those that are active in the relevant landscape, could be engaged on the optimum location and design of a biodiversity offset to receive their suggestions and gauge their support.

Once the biodiversity offset site has been selected, the required biodiversity offset site must be effectively delineated, preferably by maps that are clearly georeferenced since the biodiversity offset site will not necessarily always coincide with cadastral boundaries.

The period between selection and securing biodiversity offset sites

Once a biodiversity offset site has been selected, it may take some time for it to be secured through, for example, the declaration of the area as a protected area in terms of NEMPAA. The area could be lost to development before it can be secured. It is therefore important for the information to be recorded in the National Biodiversity Offset Register (see chapter 11) as soon as possible after it has been selected, and that the National Biodiversity Offset Register is made available to other organs of state responsible for regulating development so that those organs of state could take the biodiversity offset site into account when taking decisions impacting those sites.

7.6 Planning for biodiversity offset implementation

The applicant must consider the potential management arrangements for the biodiversity offset site as well as the financing of the relevant biodiversity offset. The management and financial arrangements must be recorded in a Biodiversity Offset Management Plan. However, if a biodiversity offset site cannot be selected before the decision-making phase, conceptual management and financial planning must be done during the EIA phase for each candidate biodiversity offset site identified in the Biodiversity Offset Report.

Managing the biodiversity offset site, and preparing Biodiversity Offset Management Plans is discussed in section 7.6.1 below. Financing biodiversity offsets is discussed in section 7.6.2 below.

7.6.1 Management of the biodiversity offset site

Planning for the management of a biodiversity offset site involves considering how the biodiversity offset site will be managed and who will be responsible for that management: the implementing party. The management arrangements for a biodiversity offset site should be recorded in a Biodiversity Offset Management Plan. A draft Biodiversity Offset Management Plan should ideally be submitted to the CA at the end of the EIA phase together with the Biodiversity Offset Report. However, when a biodiversity offset site has not been selected before the end of the EIA phase, conceptual management planning should be done for each candidate biodiversity offset site during the EIA phase, based on the ecosystem type and its typical management requirements, to aid the site selection process. That conceptual planning should then be included in the Biodiversity Offset Report.

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A Biodiversity Offset Management Plan sets out any required demarcation, rehabilitation, ongoing conservation management activities and biodiversity outcomes required of the offset, as well as monitoring, adaptive or corrective management, auditing and reporting requirements. It furthermore specifies the roles and responsibilities of different parties for these activities and outcomes. Biodiversity Offset Management Plans must, as a minimum, specify -

- the biodiversity offset objectives and measurable biodiversity outcomes, against which performance will be evaluated;
- the management actions and where they must be conducted;
- the timelines for, and frequency of, implementation of actions;
- the roles and responsibilities of the various role-players;
- the monitoring requirements and a monitoring schedule;
- the auditing requirements and auditing schedule;
- a schedule for the periodic review of the Biodiversity Offset Management Plan;
- reporting requirements with regard to the performance of the biodiversity offset; and
- a plan for the management of the biodiversity offset site after the liability period has expired, including a plan for financing such management.

It is strongly recommended that the specialist, or specialists, consult with relevant stakeholders on a draft Biodiversity Offset Management Plan before finalising the plan.

Once a Biodiversity Offset Management Plan has been prepared for the biodiversity offset site, the EA holder would need to enter into a Biodiversity Offset Implementation Agreement (see Chapter 11 below) with the implementing party.

The identification of the implementing party and preparation of a Biodiversity Offset Management Plan should be done with the required legal mechanism used to secure the biodiversity offset site in mind. In cases where the biodiversity offset site will be secured through the declaration of a protected area, the chosen implementing party should meet the requirements of a management authority contemplated in NEMPAA and the Biodiversity Offset Management Plan would need to be aligned with the requirements for management plans in NEMPAA.

NEMPAA provides that a management authority must be appointed by the Minister or an MEC for the management of a protected area.[37] In terms of NEMPAA, any suitable person, organisation or organ of state can be appointed as the management authority for special nature reserves, nature reserves

[37] Section 38 of NEMPAA.

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and protected environments.[38] A provincial conservation authority, municipality, non-profit organisation, public benefit organisation or conservation trust could therefore fill the role of implementing party. South African National Parks (SANParks) must however be appointed as the management authority for national parks.[39] SANParks would therefore need to be the implementing party in the case of a biodiversity offset resulting in the declaration of a new national park, or the extension of an existing national park.

The requirements for protected area management plans are set out in NEMPAA.[40] Ideally, the Biodiversity Offset Management Plan should meet those requirements to ensure that the terms of a Biodiversity Offset Management Plan can easily be translated into a protected area management plan, or incorporated into an existing protected area management plan, if an existing protected area will be expanded as part of a biodiversity offset. When a protected area is being expanded as part of a biodiversity offset, the management authority of the existing protected area must be consulted when the Biodiversity Offset Management Plan is being prepared.

When a biodiversity offset site will be secured by the declaration of a protected area, it is important to keep in mind that the EA holder will remain legally bound to deliver the required biodiversity outcomes despite the implementing party's appointment as the management authority of the protected area. It should also be kept in the mind that even though NEMPAA's requirements for protected area management plans, an existing management plan and consultations with a management authority should be taken into consideration when preparing a Biodiversity Offset Management Plan, the Biodiversity Offset Management Plan must always be designed to deliver the biodiversity outcomes required in the conditions to an EA.

Partnerships between conservation NPOs, PBOs, organs of state, community-based organisations and/or developers are effective in helping to secure and manage offsets, integrate conservation with other activities and land uses, and potentially deliver a range of socio-economic benefits to communities in the area of the biodiversity offset site and the wider public. It is also important to plan for the management of the biodiversity offset site after the liability period has expired.

7.6.2 Financing the biodiversity offset

EA holders are responsible for covering all of the costs of a biodiversity offset. These include the costs of securing and protecting a suitable biodiversity offset site, establishing the biodiversity site, rehabilitating it, and managing it effectively for an appropriate period. It is recommended that the liability period is at least 30 years[41] or as long as the duration of the authorised activity, whichever is longer.

[38] Sections 38(1)(a) and (2) of the National Environmental Management: Protected Areas Act, 2003.
[39] Section 38(1)(aA) of the National Environmental Management: Protected Areas Act, 2003.
[40] See sections 40 and 41 of NEMPAA.
[41] It is widely accepted that 30 years is the minimum period within which meaningful biodiversity outcomes could be achieved. In scientific literature on biodiversity offsetting, it is most often stated that the "recruitment period" of offsets should be 5-30 years and the "retention period" should be 20-50 years in order for offsets to

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Please take note that this guideline does not deal with financial provisioning, as envisaged in NEMA and the Financial Provisioning Regulations, 2015. Financial provisioning relates to financial security for the rehabilitation of areas disturbed by prospecting, mining, exploration and production, and related activities.[42] This guideline deals with financing biodiversity offsets (not rehabilitation) related to any of the listed or specified activities.

The financial planning for an offset includes estimating the costs of the biodiversity offset, which would typically comprise -

- once-off funds needed up front (e.g. land purchase and/or lease and/ or transfer costs, notary fees, baseline ecological surveys, management plan, legal fees, infrastructure and equipment costs, declaration costs and any specialist advice);

- funds for rehabilitation and/or authorisations linked to these activities; and

- funds for ongoing management (e.g. staffing, transport, firebreaks and controlled burns, invasive alien species control, grazing management, predator or pest management, erosion control, annual monitoring and evaluation, independent audits, replacement of broken infrastructure or equipment, legal compliance, insurance, financial management fees, a contingency amount, etc.).

Where developers enter into agreements with willing landowners to provide a biodiversity offset, payment to these landowners typically has two main components*, namely the amount of money required to finance biodiversity management of the offset site by the owner (covering any rehabilitation costs, specific and relevant management actions in line with a management plan, with monitoring and evaluation, and any specialist inputs), and a negotiable annual 'offset rental' to cover opportunity costs (i.e. change in market value of the site and/or income to the landowner because of the offset), administrative and/or management fees, and a profit and risk margin. These payments are negotiated between the landowner and developer.

* A landowner can sum these two amounts for the area to be made available as an offset and divide by the number of hectares (or habitat units) of particular ecosystem or habitat to arrive at a price per ha (or habitat unit).

The activities set out in the Biodiversity Offset Management Plan should be used to help determine the operational costs of the offset. Costs must be determined using current rates and adjusting for escalation over the liability period at least; i.e. the amount that needs to be invested to account for

yield proper biodiversity outcomes that properly counterbalance the loss of biodiversity. The proposed 30-year period is a good middle ground. Many foreign jurisdictions also require a liability period of 30 years. The 30-year period is moreover also based on the length of a human generation, which is more or less 30 years. By basing the liability period on the span of a human generation, the principle of inter-generational equity, enshrined in the Constitution and NEMA, is promoted.

[42] At the time of preparing this guideline, the National Environmental Management Laws Amendment Act, 2022 was proclaimed as Act 2 of 2022 but not yet brought into effect. In this Amendment Act the scope of financial provisioning is extended to all listed or specified activities, and not only mining and mining-related activities.

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future management requirements. The funds required to implement a biodiversity offset must be subject to an annual financial audit by qualified independent financial auditors.

The funds for the implementation of a biodiversity offset must be provided by the developer, either as a lump sum payment up front and/ or by scheduled regular payments, but there is a clear preference for the payment of a lump sum up front. When the developer is from the private sector, funds are best provided in full and up front as an endowment[43] or a 'sinking fund' to cover costs for the period of responsibility for the offset. There are also circumstances when the developer could be required to make a series of regular payments for the management of the biodiversity offset site. This can be considered when, for example, the developer is an organ of state or when the operational period of the activity (and therefore the validity period of the EA) is at least as long as the period for which the developer is liable for implementing the offset.

Offset funds can be received, held and administered by organs of state[44], or by conservation NPOs/ PBOs or Trusts. Who is best placed to receive and administer the funds required to implement a biodiversity offset is determined by, *inter alia*, who is best placed to facilitate and expedite the relevant actions that must be conducted to implement the biodiversity offset; the regulatory regime and financial controls associated with the different financial vehicles; the type and timing of activities required on the ground; and financial and/ or investment decisions.

- It should be kept in mind that organs of state are bound by legislation on public finance, such as the Public Finance Management Act, 1999. If funds are held by an organ of state, appropriate steps should be taken to ensure that the funds are not absorbed into the National Revenue Fund at the end of a budget cycle.

- The funds required to implement a biodiversity offset could be received, held, invested and disbursed by a trust. The trust deed must determine how the trust will function, the roles and responsibilities of the trustees and the identity of the beneficiaries. The trust could be set up by the developer or could be an independent trust set up by a conservation NPO/ PBO, or a voluntary association of persons with a constitution, or a combination.

There is a clear preference for a biodiversity offset that utilises an already established and dedicated entity such as a trust for the purposes of implementing the biodiversity offset and managing funds received from the project proponent. A trust is a dedicated, independent legal mechanism to cater for public interest objectives. It is better placed to offer perpetual succession and avoid being influenced by partisan (either private or public sector) interests. There are a number of examples of conservation trusts and associated funds in South Africa. The choice of financial instrument will, however, depend on the circumstances of each case.

[43] A fund based on the principal capital remaining intact for the duration of the period of responsibility for the offset, enabling it to be invested. The biodiversity offset is financed only through the income generated by the invested capital.
[44] To hold and administer funds for a biodiversity offset, an organ of state needs to be authorised to do so in terms of relevant legislation.

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Tax and rates incentives provided for in relevant legislation should also be kept in mind when calculating the funds required for the implementation of a biodiversity offset. The Income Tax Act, 1962 gives tax incentives to set aside land for conservation, particularly in the case of national parks and nature reserves; a percentage of the value of the conservation land can be deducted from the landowner's taxable income[45]. In terms of the Local Government: Municipal Property Rates Act, 2004 a municipality may not levy municipal property rates in respect of most parts of special nature reserves, national parks and nature reserves. That Act also authorises municipalities to provide for municipal property rate exemptions, reductions or rebates for the owners of land that constitute protected areas or conservation areas in their rates policies.

7.7 Preparing the Biodiversity Offset Report

It is strongly advised that a Biodiversity Offset Report is prepared by a specialist, or specialists, with the appropriate skills and experience, in collaboration with the EAP. A Biodiversity Offset Report is submitted by the EAP, together with the BA/ EIA Report, to the CA at the end of the EIA phase. The Biodiversity Offset Report must, as a minimum, specify the following:

- That the mitigation hierarchy, including due consideration of project alternatives to avoid or minimise impacts, has been appropriately applied before considering biodiversity offsetting. It is worth noting here that the EAP is also required to demonstrate the application of the mitigation hierarchy in the BA Report or EIA Report. The EAP, being in charge of the overall assessment process, is therefore in the best position to make a statement on the mitigation hierarchy. However, it recommended that the specialist preparing the Biodiversity Offset Report checks the application of the mitigation hierarchy and engages the EAP, particularly where it appears that residual negative impacts on biodiversity necessitating offsets could be eliminated or significantly reduced by adopting siting or design changes. The EAP would then modify the proposed project and activities and revise the measure of residual negative impacts which either still need to be offset, or could remove the need for an offset.

- A justification as to why a biodiversity offset is required under the circumstances, and where relevant, why the "no-go" option is not recommended.

- The degree of risk that residual negative impacts cannot be offset (i.e. residual negative impacts on irreplaceable biodiversity and/or major constraints on finding suitable biodiversity offset sites to meet the offset requirements) and how the risk is to be addressed or mitigated.

- A measure of significant residual negative biodiversity impacts which must be offset.

- The applicable biodiversity offset ratios for impacted ecosystems.

[45] 'Allowance in respect of land conservation in respect of nature reserves or national parks'. Taxpayers are entitled to deduct the value of land declared as a nature reserve or national park at 4% per annum over 25 years in terms of Section 37D.

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- Any other considerations which are relevant to determining the size and characteristics of the biodiversity offset (for example, impacts on species of conservation concern with specific habitat requirements, impacts on ecological corridors and connectivity in the landscape, and impacts on important ecological infrastructure), and how the size of offset is to be adjusted to take these considerations into account.

- An explicit statement on the required size of the biodiversity offset to remedy the residual negative biodiversity impacts, applying the basic offset ratio and adjustments as appropriate.

- The portfolio of candidate biodiversity offset sites, including the likelihood of each site's availability and feasibility.

- A description of the biodiversity offset site, and the reasons for the selection of that site from the portfolio of candidate biodiversity offset sites.

- The required biodiversity outcomes on the biodiversity offset site.

- The management measures that would need to be employed as part of the biodiversity offset for a defined period, for which the applicant would be responsible. It is recommended in this guideline that this period is not less than 30 years, and is longer if the impacting activity, or activities, will last beyond 30 years.

- The comments received from commenting authorities and interested and affected parties on the draft Biodiversity Offset Report as well as responses to those comments.

If available by the end of the EIA phase, a copy of the Biodiversity Offset Management Plan must be appended to the Biodiversity Offset Report.

Where the relevant information is available, a Biodiversity Offset Report should in those instances, also include the following information:

- An estimate of the financial needs related to securing, rehabilitating and managing a suitable biodiversity offset site for an appropriate period, which is recommended in this guideline to be a minimum of 30 years.

- The legal mechanism, or mechanisms, in terms of which the biodiversity offset site would be secured.

- Any comments received from, or the outcomes of discussions with, a relevant conservation authority regarding the candidate biodiversity offset sites, the proposed mechanism for securing those sites and the proposed biodiversity offset outcomes for those sites.

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The specialist, or specialists, preparing the report may well want to include proposed EA conditions. It should however be noted that the CA does not have to use those conditions.

A biodiversity offset report may recommend specific conditions that can be considered by the CA, to give effect to the requirements, commitments, opportunities and limitations encountered during the determination of the offset, location of, and arrangements for security and management of the offset site, or offset sites, to be included in an EA as a biodiversity offset condition (see Chapter 9).

Care should be taken in the Biodiversity Offset Report to avoid including potentially sensitive information such as personal information, as contemplated in the Protection of Personal Information Act, 2013, of landowners and other third parties, or detailed property descriptions where landowners have not yet been engaged by the applicant. The sharing of such sensitive information could lead to rent seeking behaviour,[46] or other behaviour that could prevent successful biodiversity offset implementation, on the part of landowners.

"Biodiversity Offset Reports" and "Specialist Reports"

Biodiversity Offset Reports are not "specialist reports" as envisaged in the EIA Regulations. However, it is important that they are prepared by specialists with appropriate skills and experience.

8. Engaging with conservation authorities and commenting authorities

Applicants must engage with conservation authorities and other relevant organs of state in confirming offset requirements, locating suitable offset sites and developing offset proposals for consideration. In some instances, conservation authorities or organs of state will be involved in the implementation of biodiversity offsets, and Implementation Agreements will need to be negotiated (see 12.1 below). Reaching agreement between parties can require extensive consultation time which must be factored into timelines for the EA process.

The management authority of a protected area must be engaged if a candidate biodiversity offset site is aimed at expanding that protected area or if there are likely to be implementation, management, auditing or reporting implications for that management authority. In such cases, a letter of support or non-objection from a relevant management authority may be required by the CA on the suitability of the proposals in the biodiversity offset report.

[46] In the biodiversity offset context, this can take the form of the owner of properties comprising a candidate biodiversity offset site inflating the price of his or her land, or making unreasonable financial demands for the use of the land as a biodiversity offset site.

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Significant residual negative impacts on freshwater ecosystems (especially Freshwater Ecosystem Priority Areas) and/or hydrological regimes with biodiversity impacts, require careful consideration. Water-related biodiversity offsets or ecological compensation measures should be discussed with relevant staff in the Department of Water and Sanitation and a relevant catchment management agency (if one has been established for a particular region) to ensure alignment with relevant guidance and appropriate compliance with general authorisations or water use licence requirements.

Residual negative impacts on State forests, natural forests or woodlands or protected trees should be discussed with the Forestry Management Branch in the Department of Forestry, Fisheries and the Environment prior to finalising biodiversity offset or ecological compensation proposals. Conservation authorities and the management authorities for protected areas would need to consent to biodiversity offset or ecological compensation proposals where protected areas are impacted or where protected areas are the focus of mitigation measures.

The EIA/ BA report should include an indication of all the meetings held with conservation and competent authorities and other organs of state on the proposed biodiversity offset.

Engagement with conservation authorities and commenting authorities is an ongoing process and is therefore relevant to all of the phases of the biodiversity offsetting process (please see Chapter 5.1).

9. Drafting biodiversity offset conditions for environmental authorisations

NEMA and the EIA Regulations make provision for EAs to be issued subject to conditions. Appropriate and carefully framed conditions are vital components of ensuring sound environmental management and to aid with compliance and enforcement. Given their complexity, biodiversity offsets often require lengthy and specific outcomes-focused conditions.

The principles of administrative justice apply when deciding on appropriate conditions. The key principles for offset conditions are that the conditions must not be vague (and must therefore be enforceable), they must be rationally related to the purpose for which the condition is being incorporated into the EA, and they must not be unreasonable.

EA conditions are binding on the EA holder. Non-compliance with, or contravention of, a condition of an EA is an offence in terms of section 49A of NEMA. An appropriately designated environmental management inspector may also issue a compliance notice to the EA holder for non-compliance with a condition of an environmental authorisation in terms of section 31L of NEMA.

In Chapters 9.1 to 9.8 below, guidance is given for particular elements of biodiversity offset conditions. The various elements given in Chapters 9.1 to 9.8 are not necessarily the only elements of an effective biodiversity offset condition: CAs are encouraged to apply their minds to each application to ensure that all of the elements of the biodiversity offsetting process are covered in biodiversity offset conditions.

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9.1 The biodiversity outcomes that must be achieved by a particular biodiversity offset

The most important component of a biodiversity offset condition is the one setting out the specific biodiversity outcomes that must be achieved through a biodiversity offset. This component includes the size of the relevant offset (see Chapter 7.2 above), the prescribed characteristics of the biodiversity that must be secured and managed as part of the biodiversity offset (see the like-for-like principle in Chapter 4.2 above, as well as the content of Chapters 7.3 and 7.4 above) and the specific outcomes that must be achieved in relation to a site that meets the size and biodiversity requirements.

9.2 The selection and securing of a biodiversity offset site

The biodiversity offset conditions must require the EA holder to select a biodiversity offset site that meet the requirements for an offset under the circumstances (see Chapter 9.1 above) and to secure that site (see Chapter 7.6.1 above).

Given that a Biodiversity Offset Report includes a portfolio of candidate biodiversity offset sites, the biodiversity offset site should ideally be selected from that portfolio. It is therefore recommended that, if the CA is satisfied that candidate biodiversity offset sites in the Biodiversity Offset Report meets the requirements for a biodiversity offset under the circumstances, the CA requires the EA holder to select a biodiversity offset site from the portfolio of candidate biodiversity offset sites, and only if each option fails, can the EA holder select a biodiversity offset site that is not identified in the Biodiversity Offset Report, but still meets the requirements for a biodiversity offset under the circumstances.

In Chapter 7.6.1, it is stated that the preferred method for securing biodiversity offset sites is through the declaration of that site as a protected area in terms of NEMPAA. However, the EA holder does not have the legislative power to *declare* a protected area. That function may only be performed by the Minister responsible for the environment (**Minister**) or a Member of the Executive Council responsible for the environment in a Province (**MEC**). The EA holder can, however, be required to submit a request for the declaration of the biodiversity offset site as a protected area to the Minister or an MEC, accompanied by required information. It is recommended that, if the declaration of an area as a protected area is the most appropriate way of securing the biodiversity offset site under the circumstances, the EA holder is only given the option to pursue other means of securing the biodiversity offset site (such as the registration of a conservation servitude) if the Minister or MEC refuses to declare a protected area under the circumstances.

Biodiversity offset sites must be secured in perpetuity even though the liability period is finite.

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9.3 The obligation to prepare a Biodiversity Offset Management Plan for the biodiversity offset site

As part of the EA conditions, the EA must require the EA holder to cause for a Biodiversity Offset Management Plan for the biodiversity offset site, once selected, to be prepared by a specialist, or specialists. It is strongly recommended that CAs require that Biodiversity Offset Management Plan contains the components specified in Chapter 7.6.1 above.

9.4 Entering into a Biodiversity Offset Implementation Agreement

The EA must also require the EA holder to enter into a Biodiversity Offset Implementation Agreement with an implementing party, in terms of which the EA holder undertakes to make funds available for the implementation of the Biodiversity Offset Management Plan by the implementing party, and the implementing party undertakes to implement the Biodiversity Offset Management Plan on behalf of the EA holder.

As pointed out in the 9.7 below, it is not always desirable for an EA to be valid for as long as the biodiversity offset liability lasts. The Biodiversity Offset Implementation Agreement therefore serves a legal mechanism through which the EA holder could be held legally liable to implement the offset for the period between the date on which the EA lapses and the date on which the biodiversity offset liability expires.

When requiring an EA holder to enter into a Biodiversity Offset Implementation Agreement, care should be taken by the CA to include a “deadlock-breaking” condition. If the EA holder and implementing party are not able to come to an agreement, provision must be made for ways to break the deadlock between the two parties in order to ensure that the biodiversity offset condition is enforceable. An example of a dreadlock-breaking condition is a condition requiring that a dispute between the parties must be referred to arbitration for an arbitration award.

It is also advisable that the biodiversity offset condition specifies some essential clauses that must be included in a Biodiversity Offset Implementation Agreement. Biodiversity Offset Implementation Agreements are dealt with in more detail in **Chapter 10** below.

9.5 Lump sum payments for biodiversity offsets

In most instances, it would be most appropriate for an EA holder to make a lump sum payment of the funds estimated to be required for delivering a biodiversity offset into an appropriate financial vehicle. The rationale for such a requirement is that an EA holder may cease to exist before the lapse of the liability period. In some cases, the EA holder can be required to make regular payments to the implementing party, such as when, for example, the EA holder is an organ of state or a mining company that has a mining right that authorises it to mine for the period for which the EA holder is liable to implement the biodiversity offset.

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Since, in most instances, the Biodiversity Offset Management Plan will only be developed and finalised in the post-authorisation phase, the lump sum and the financial vehicle should be specified in the Biodiversity Offset Implementation Agreement. It is however recommended that the EA specifies that sufficient funds should be made available by the EA holder for the implementation of the Biodiversity Offset Management Plan and that it is paid into an appropriate financial vehicle.

9.6 Timeframes for taking the steps in the biodiversity offset process

In most cases, the EA holder's responsibility to implement an offset will lapse after the expiry of the liability period specified in a biodiversity offset condition. However, in circumstances where the significant residual negative impacts on biodiversity are likely to endure for far longer, the period of liability can be linked to the lifespan of the activity that was authorised in the relevant EA (provided that such period exceeds the appropriate liability period). In the case of a mining operation conducted over a period in excess of the appropriate liability period, for example, an EA holder would be released from the obligation to implement a biodiversity offset when the mining operation ceases, and the area disturbed has been rehabilitated to the extent required in the EMPr.

The CA could also specify the timeframes for the completion of specific steps in the biodiversity offsetting process, which are taken in the post-application phase, in the biodiversity offset condition. In other words, deadlines can be set for the selection of a biodiversity offset site, the securing of a biodiversity offset site, the completion of a Biodiversity Offset Management Plan and the conclusion of a Biodiversity Offset Implementation Agreement. Those timeframes would depend on what is realistic under the circumstances.

9.7 The period of validity of the environmental authorisation

The EIA Regulations[47] provide that the CA must specify when an EA lapses in the EA. The date on which it lapses is determined by when the authorised activity, or activities, are completed, or when all the mitigation measures have been completed, whichever comes last. That does not however mean that EA containing a biodiversity offset condition must necessarily be valid for the full biodiversity offset liability period. As a rule, the EA must not lapse before the Biodiversity Offset Implementation Agreement has been concluded. If it lapses before that agreement has been concluded, there would be no way to hold the EA holder liable for the implementation of the offset.

9.8 Suspensive and resolutive conditions

A suspensive condition is a condition in an EA that suspends the commencement of the authorised activity until certain events occur. Suspensive conditions could, *but does not necessarily have to*, be used in the biodiversity offset context. In that context, a suspensive condition could suspend the

[47] See regulation 26 of the EIA Regulations.

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commencement of the authorised activity until a certain event in the biodiversity offsetting process has occurred, such as the conclusion of a Biodiversity Offset Implementation Agreement.

A resolutive condition is a condition that terminates an EA if a certain event does not occur within a certain timeframe. Resolutive conditions could also, *but does not necessarily have to*, be used in the context of biodiversity offsets. Such a condition in that context could specify that the EA terminates if an event in the biodiversity offsetting process does not occur within a given timeframe. Resolutive conditions must be used with due regard to realistic timeframes within which the steps in the biodiversity offset process can be completed.

10. Biodiversity Offset Implementation Agreements

As stated above, a Biodiversity Offset Implementation Agreement is a mechanism through which the requirement to implement a Biodiversity Offset Management Plan is made legally binding on, and therefore enforceable against, the EA holder after the EA has lapsed. Biodiversity Offset Implementation Agreements are contracts entered into between the EA holder and an implementing party in terms of which the EA holder agrees to make funds available for the implementation of the Biodiversity Offset Management Plan and the implementing party agrees to implement the Biodiversity Offset Management Plan on behalf of the EA holder.

An implementing party could be an appropriate organ of state, such as a conservation authority, an NPO/ PBO or private organisation, so long as the organ of state or organisation is highly likely to be in existence for as long as the liability period.

A Biodiversity Offset Implementation Agreement must, as a minimum, contain the following clauses:

- Descriptions of the parties to the Biodiversity Offset Implementation Agreement.

- The required outcomes of the biodiversity offset which need to be achieved, as specified in the EA condition.

- The primary activities that need to be conducted to achieve the outcomes of the biodiversity offset as per the Biodiversity Offset Management Plan. The Biodiversity Offset Management Plan can also just be appended to the Biodiversity Offset Implementation Agreement and referred to in the agreement.

- The timeframes within which the primary activities specified in the Biodiversity Offset Management Plan must be completed to achieve the outcomes successfully.

- Descriptions of the roles and responsibilities of the parties to the agreement. As already stated, the implementing party must be responsible for implementing the activities specified in the

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Biodiversity Offset Management Plan and the EA holder must be responsible for making the requisite funds available to the implementation of that plan by the implementing party.

- An undertaking on the part of the EA holder to make the funds necessary for the implementation of the biodiversity offset available to the implementing party into a specified financial vehicle to which the implementing party has access or by means of specified regular payments to the implementing party for the latter's services performed at specified milestones of the biodiversity offset implementation process.

    - When the EA holder will make regular payments (i.e. not a lump sum payment) to the implementing party at specified milestones of the biodiversity offset implementation process, the EA holder, if it is a private entity, it is strongly recommended that the implementing party is required in terms of the Biodiversity Offset Implementation Agreement to furnish the implementing party with a guarantee of finances necessary to implement the relevant biodiversity offset. In cases where the EA holder is a subsidiary company or a local subsidiary of an offshore company, it would be ideal if the holding/parent company gives such guarantee, and/or that the holding/parent company is held jointly and severally liable for the funding of the biodiversity offset.

- An undertaking by the implementing party to implement the Biodiversity Offset Implementation Agreement for the required liability period (which is recommended in this guideline to be a minimum of 30 years).

- The auditing and reporting requirements of the EA holder: the implementing party must appoint and pay for out of the funds made available by the EA holder, an independent auditor to undertake periodic performance audits. If the site had been secured by the declaration of a protected area, the auditing intervals must be linked to the auditing intervals provided for in NEMPAA. Audit reports must be submitted to the Minister or MEC if the site has been secured by the declaration of a protected area, and to the beneficiary of the conservation servitude if the biodiversity offset site had been secured by the registration of a conservation servitude. For more detail on auditing, adaptive/ corrective measures and enforcement, please see **Chapter 12** below.

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In contrast to the conditions of an EA, which can be enforced by the issuing of a compliance notice on a person who has not complied with the terms of such conditions in terms of section 31L of NEMA, the terms of a Biodiversity Offset Implementation Agreement are enforceable by one party against the other by force of the law of contract.

Onsite biodiversity offsets

The biodiversity offset site does not necessarily have to be in a different site to the site on which the development is going to take place. There are circumstances in which the most appropriate biodiversity offset site is on the development site. This is often the case in the agricultural context. In the case of onsite offsets, it is often more appropriate for the biodiversity offset site to be secured by way of a conservation servitude than the declaration of a protected area because it is likely in those circumstances that the developer is also the landowner, and because it may well be difficult to justify the declaration of a protected area near a developed area. However, in instances where it is feasible to declare an onsite biodiversity offset site as a protected area, this should be encouraged. When an onsite offset is proposed, the CA should be satisfied that the 'additionality' principle is observed and that the securing and better management of the proposed site would not duplicate existing environmental obligations the landowner may have. The CA should ensure that the EA conditions clearly exclude the biodiversity offset site from the geographical scope of the development.

11. The National Biodiversity Offset Register

It is recommended that the Department of Forestry, Fisheries and the Environment establishes, and maintains, an electronic register of biodiversity offset sites in South Africa, called the National Biodiversity Offset Register.

As soon as possible after a biodiversity offset site has been identified, it is recommended that the relevant CA records the site in the National Biodiversity Offset Register. The information in the National Biodiversity Offset Register should be updated regularly to ensure that a record is kept of the status of biodiversity offsets. The following information must be recorded in the National Biodiversity Offset Register:

- Province and municipal area;
- Date on which the EA was issued;
- EA number;
- EA holder;
- Biodiversity offset conditions and any amendments;
- Date on which the Biodiversity Offset Management Plan was completed;

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- Date on which the biodiversity offset site was secured (i.e. the date on which the relevant protected area was declared, servitude was registered, etc.);

- Delineation of the biodiversity offset site;

- Ecological description of the biodiversity offset site; and

- Date on which the Biodiversity Offset Implementation Agreement was concluded.

It is further recommended that a spatial layer representing the biodiversity offset sites is made publicly available online to ensure that the locations of biodiversity offset sites are known. It is also strongly recommended that all competent authorities, and organs of state that are authorised to take decisions that impact on the environment, are given access to the National Biodiversity Offset Register to ensure that those organs of state can take into consideration the location of biodiversity offset sites that have not yet been secured when taking decisions.

12. Implementation, monitoring and auditing

A biodiversity offset must be implemented in accordance with the biodiversity offset condition(s) in the EA, and the Biodiversity Offset Implementation Agreement. Once the EA has been granted, the EA holder is legally obligated, in terms of EA conditions, which are enforceable in terms of NEMA, to select a biodiversity offset site, to secure the biodiversity offset site, prepare a Biodiversity Offset Management Plan and enter into a Biodiversity Offset Implementation Agreement with an implementing party for the implementation of the biodiversity offset. For as long as an EA is valid, the EA holder is required to submit periodic audit reports to the CA. Non-compliance with EA conditions is an offence in terms of NEMA and can therefore result in administrative or criminal action being taken against the EA holder in terms of NEMA. If adaptive measures are required, the EA holder or the CA should initiate the process for an amendment to the EA in terms of the EIA Regulations.[48]

Typically, and especially so in the context of non-operational activities, it is desirable for an EA to lapse after the EA holder has complied with all his or her rehabilitation obligations. However, it is important that the CA does not allow an EA to lapse before the implementer has signed a Biodiversity Offset Implementation Agreement with an implementing party. If such an agreement is in place when the EA lapses, the developer would be liable in terms of that agreement. A failure on the part of the implementing party to make funds available for implementation is a breach of contract. The implementing party can obtain an order from a competent court directing the developer to make those funds available.

Oversight over the implementation depends on the way the biodiversity offset site had been secured:

[48] Regulations 31-33 of the EIA Regulations.

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- If the biodiversity offset site had been secured by the **declaration of a protected area**, the implementing party would be the management authority for that protected area and would be responsible for the implementation of the management plan for the protected area. The implementing authority would therefore be required to report to the MEC or Minister annually on the management of the protected area, and therefore on the implementation of the biodiversity offset management plan. If corrective or adaptive measures are required during the liability period, the management plan could be amended in accordance with NEMPAA. The Minister or MEC may take legal action, in terms of NEMPAA[49] or the common law, against management authorities that do not implement management plans satisfactorily.

- If the biodiversity offset site had been secured by the **establishment of a conservation servitude**, the implementing party must ideally be the landowner. The implementing party would have to enter into a deed of servitude with a third party, ideally a conservation authority (but it could also be an appropriate conservation PBO/ NPO), in terms of the which the implementing party undertakes not to develop the biodiversity offset site and to give the beneficiary access to the biodiversity offset site for the purpose of monitoring the implementation of the Biodiversity Offset Management Plan. The Biodiversity Offset Management Plan should clearly state at which intervals the independent auditor should prepare periodic audit reports, and that those reports must be submitted to the beneficiary. If adaptive or corrective steps are required, the deed of servitude or Biodiversity Offset Management Plan may be amended by the consent of both parties. In the event of the implementing party defaulting on the deed of servitude or Biodiversity Offset Management Plan, the beneficiary may resort to common law property and contractual remedies to enforce compliance.

For the reasons give above, it is recommended that auditing intervals are linked to the auditing intervals provided for in the EIA Regulations for as long as the EA is valid, and to the auditing intervals provided for in NEMPAA if the biodiversity offset site had been secured by the declaration of a protected area. If the biodiversity offset site had been secured by the establishment of a conservation servitude, it is recommended that the auditing intervals are required at least yearly.

Audit reports must be made available to interested and affected parties on request to ensure transparency and public accountability.

The responsibilities of EA holders for biodiversity offsets are finite (i.e. at minimum 30 years). At the end of the period for which the EA holder is responsible, the management of the biodiversity offset site must be handed over to a suitable organ of state, person or organisation, with their consent, to ensure that its biodiversity is maintained. The plan for handing over the biodiversity offset site at the end of the liability period should be included in a Biodiversity Offset Management Plan (please see Chapter 7.6.1). There may well be a need to amend the handover plan in the course of the liability

[49] See sections 43 and 44 of NEMPAA.

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period if circumstances change. It is important for the financial sustainability of the protected area or conservation area to be taken into consideration when doing a handover report.

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ANNEXURE A

forestry, fisheries & the environment

Department:
Forestry, Fisheries and the Environment
REPUBLIC OF SOUTH AFRICA

NATIONAL BIODIVERSITY OFFSET GUIDELINE

Biodiversity offset ratios look-up table

October 2022 (First Edition)

Note: This is the table referred to in section 7.2.1 of the Draft National Biodiversity Offset Guideline under *"(1) Determining the basic offset ratio"*. For more detail on how the proposed ratios were arrived at, please see the text below the look-up table.

Ecosystem Type	ETS	REE (%)	Transformation Band	A. TPC Ratio				B. RE & EPL Ratios				C. ETS Ratios				D. Starting Ratios			
				NP	PP	MP	WP	NP	PP	MP	WP	NP	PP	MP	WP	NP	PP	MP	WP
Aggeneys Gravel Vygieveld	LC	100	4					0				0				0			
Agter-Sederberg Shrubland	LC	98	4						0				0				0		
Agulhas Limestone Fynbos	CR	92	4						0				30				30		
Agulhas Sand Fynbos	CR	52	3A							2				30				30	
Albany Alluvial Vegetation	EN	46	2B						6				10				10		
Albany Arid Thicket	LC	100	4						0				0				0		
Albany Bontveld	LC	96	4						0				0				0		
Albany Broken Veld	LC	93	4							0				0				0	

Ecosystem Type	ETS	REE (%)	Transformation Band	A. TPC Ratio				B. RE & EPL Ratios				C. ETS Ratios				D. Starting Ratios			
				NP	PP	MP	WP	NP	PP	MP	WP	NP	PP	MP	WP	NP	PP	MP	WP
Albany Mesic Thicket	LC	80	4							0				0				0	
Albany Valley Thicket	LC	89	4							0				0				0	
Albertinia Sand Fynbos	EN	55	3A						3				10				10		
Alexander Bay Coastal Duneveld	CR	12	1	30								30				30			
Algoa Sandstone Fynbos	CR	43	2B						7				30				30		
Aliwal North Dry Grassland	LC	80	4					0				0				0			
Amathole Mistbelt Grassland	LC	98	4					0				0				0			
Amathole Montane Grassland	LC	85	4						0				0				0		
Amersfoort Highveld Clay Grassland	LC	56	3A						3				0				3		
Andesite Mountain Bushveld	LC	73	4							0				0				0	
Anenous Plateau Shrubland	LC	83	4					0				0				0			
Atlantis Sand Fynbos	EN	52	3A						4				10				10		
Auob Duneveld	LC	100	4								0				0				0
Barberton Montane Grassland	LC	57	3A								0				0				0
Barberton Serpentine Sourveld	LC	67	3B								0				0				0
Basotho Montane Shrubland	LC	84	4						0				0				0		
Baviaans Valley Thicket	LC	99	4								0				0				0
Baviaanskloof Shale Renosterveld	LC	100	4								0				0				0
Bedford Dry Grassland	LC	98	4					0				0				0			
Besemkaree Koppies Shrubland	LC	96	4						0				0				0		
Bethelsdorp Bontveld	LC	59	3A					3				0				3			
Bhisho Thornveld	LC	64	3B					2				0				2			
Bloemfontein Dry Grassland	LC	54	3A						3				0				3		
Bloemfontein Karroid Shrubland	LC	86	4							0				0				0	
Blombos Strandveld	LC	98	4							0				0				0	
Blouputs Karroid Thornveld	LC	99	4								0				0				0
Bokkeveld Sandstone Fynbos	LC	80	4						0				0				0		

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Ecosystem Type	ETS	REE (%)	Transformation Band	A. TPC Ratio				B. RE & EPL Ratios				C. ETS Ratios				D. Starting Ratios			
				NP	PP	MP	WP	NP	PP	MP	WP	NP	PP	MP	WP	NP	PP	MP	WP
Boland Granite Fynbos	EN	57	3A								0				10				10
Breede Alluvium Fynbos	EN	38	2A						9				10				10		
Breede Alluvium Renosterveld	EN	40	2A					12				10				12			
Breede Quartzite Fynbos	LC	94	4						0				0				0		
Breede Sand Fynbos	CR	47	2B						5				30				30		
Breede Shale Fynbos	EN	67	3B							0				10				10	
Breede Shale Renosterveld	EN	61	3B						2				10				10		
Buffels Mesic Thicket	LC	82	4						0				0				0		
Buffels Valley Thicket	CR	45	2B					9				30				30			
Bushmanland Arid Grassland	LC	100	4					0				0				0			
Bushmanland Basin Shrubland	LC	99	4					0				0				0			
Bushmanland Inselberg Shrubland	LC	100	4					0				0				0			
Bushmanland Sandy Grassland	LC	100	4					0				0				0			
Bushmanland Vloere	LC	94	4					0				0				0			
Canca Limestone Fynbos	LC	81	4					0				0				0			
Cape Flats Dune Strandveld	EN	56	3A							1				10				10	
Cape Flats Sand Fynbos	CR	24	1	30								30				30			
Cape Lowland Alluvial Vegetation	EN	37	2A						10				10				10		
Cape Seashore Vegetation	LC	98	4								0				0				0
Cape Winelands Shale Fynbos	CR	46	2B								1				30				30
Carletonville Dolomite Grassland	LC	63	3B						1				0				1		
Cathedral Mopane Bushveld	LC	100	4								0				0				0
Cederberg Sandstone Fynbos	LC	90	4								0				0				0
Central Coastal Shale Band Vegetation	LC	88	4								0				0				0
Central Free State Grassland	LC	67	3B						1				0				1		
Central Inland Shale Band Vegetation	LC	100	4								0				0				0
Central Knersvlakte Vygieveld	LC	100	4								0				0				0

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Ecosystem Type	ETS	REE (%)	Transformation Band	A. TPC Ratio				B. RE & EPL Ratios				C. ETS Ratios				D. Starting Ratios			
				NP	PP	MP	WP	NP	PP	MP	WP	NP	PP	MP	WP	NP	PP	MP	WP
Central Mountain Shale Renosterveld	LC	97	4					0				0				0			
Central Richtersveld Mountain Shrubland	LC	100	4								0				0				0
Central Ruens Shale Renosterveld	CR	12	1	30								30				30			
Central Sandy Bushveld	LC	65	3B						1				0				1		
Ceres Shale Renosterveld	CR	47	2B						5				30				30		
Citrusdal Shale Renosterveld	CR	28	1	30								30				30			
Citrusdal Vygieveld	LC	75	4						0				0				0		
Crocodile Gorge Mountain Bushveld	LC	81	4							0				0				0	
Crossroads Grassland Thicket	LC	87	4							0				0				0	
De Hoop Limestone Fynbos	LC	96	4							0				0				0	
Delagoa Lowveld	LC	76	4							0				0				0	
Die Plate Succulent Shrubland	LC	100	4					0				0				0			
Doringrivier Quartzite Karoo	LC	84	4					0				0				0			
Doubledrift Karroid Thicket	LC	88	4						0				0				0		
Drakensberg Afroalpine Heathland	LC	100	4						0				0				0		
Drakensberg Foothill Moist Grassland	LC	72	4						0				0				0		
Drakensberg-Amathole Afromontane Fynbos	LC	100	4								0				0				0
Dry Coast Hinterland Grassland	VU	47	2B					8				5				8			
Dwaalboom Thornveld	LC	80	4							0				0				0	
Dwarsberg-Swartruggens Mountain Bushveld	LC	88	4						0				0				0		
East Griqualand Grassland	EN	56	3A						3				10				10		
Eastern Coastal Shale Band Vegetation	EN	40	2A						8				10				10		
Eastern Free State Clay Grassland	VU	42	2B					11				5				11			
Eastern Free State Sandy Grassland	LC	57	3A						3				0				3		
Eastern Gariep Plains Desert	LC	99	4					0				0				0			

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Ecosystem Type	ETS	REE (%)	Transformation Band	A. TPC Ratio				B. RE & EPL Ratios				C. ETS Ratios				D. Starting Ratios			
				NP	PP	MP	WP	NP	PP	MP	WP	NP	PP	MP	WP	NP	PP	MP	WP
Eastern Gariep Rocky Desert	LC	100	4					0				0				0			
Eastern Gwarrieveld	LC	99	4						0				0				0		
Eastern Highveld Grassland	EN	33	2A						13				10				13		
Eastern Inland Shale Band Vegetation	LC	89	4								0				0				0
Eastern Little Karoo	EN	89	4					0				10				10			
Eastern Lower Karoo	LC	99	4						0				0				0		
Eastern Ruens Shale Renosterveld	EN	17	1	30								10				30			
Eastern Upper Karoo	LC	97	4						0				0				0		
Eastern Valley Bushveld	LC	70	4					0				0				0			
Eenriet Plains Succulent Shrubland	LC	100	4					0				0				0			
Egoli Granite Grassland	CR	22	1		30								30				30		
Elands Forest Thicket	LC	76	4						0				0				0		
Elgin Shale Fynbos	CR	30	1		30								30				30		
Elim Ferricrete Fynbos	EN	37	2A						10				10				10		
Escarpment Arid Thicket	LC	99	4							0				0				0	
Escarpment Mesic Thicket	LC	89	4						0				0				0		
Escarpment Valley Thicket	LC	98	4								0				0				0
Fish Arid Thicket	LC	93	4								0				0				0
Fish Mesic Thicket	LC	88	4						0				0				0		
Fish Valley Thicket	LC	96	4							0				0				0	
Frankfort Highveld Grassland	LC	57	3A					4				0				4			
Fynbos Riparian Vegetation	LC	98	4								0				0				0
Gabbro Grassy Bushveld	LC	100	4								0				0				0
Gamka Arid Thicket	LC	99	4						0				0				0		
Gamka Karoo	LC	100	4						0				0				0		
Gamka Valley Thicket	LC	97	4					0				0				0			
Garden Route Granite Fynbos	CR	41	2B					12				30				30			

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Ecosystem Type	ETS	REE (%)	Transformation Band	A. TPC Ratio				B. RE & EPL Ratios				C. ETS Ratios				D. Starting Ratios			
				NP	PP	MP	WP	NP	PP	MP	WP	NP	PP	MP	WP	NP	PP	MP	WP
Garden Route Shale Fynbos	EN	48	2B						5				10				10		
Gauteng Shale Mountain Bushveld	LC	70	4						0				0				0		
Geluk Grassland Thicket	LC	62	3B								0				0				0
Ghaap Plateau Vaalbosveld	LC	98	4					0				0				0			
Goariep Mountain Succulent Shrubland	LC	100	4								0				0				0
Gold Reef Mountain Bushveld	LC	81	4							0				0				0	
Gordonia Duneveld	LC	100	4							0				0				0	
Gordonia Kameeldoring Bushveld	LC	100	4								0				0				0
Gordonia Plains Shrubland	LC	100	4							0				0				0	
Goukamma Dune Thicket	LC	73	4								0				0				0
Gouritz Valley Thicket	CR	64	3B						1				30				30		
Graafwater Sandstone Fynbos	LC	73	4						0				0				0		
Grahamstown Grassland Thicket	LC	67	3B						1				0				1		
Granite Lowveld	LC	77	4								0				0				0
Grassridge Bontveld	LC	90	4							0				0				0	
Gravelotte Rocky Bushveld	LC	89	4						0				0				0		
Greyton Shale Fynbos	CR	59	3A						2				30				30		
Groot Brak Dune Strandveld	CR	48	2B						5				30				30		
Grootrivier Quartzite Fynbos	LC	100	4					0				0				0			
Hamburg Dune Thicket	LC	68	3B						0				0				0		
Hangklip Sand Fynbos	CR	64	3B							0				30				30	
Hantam Karoo	LC	96	4					0				0				0			
Hantam Plateau Dolerite Renosterveld	LC	98	4					0				0				0			
Hartenbos Dune Thicket	EN	83	4						0				10				10		
Hawequas Sandstone Fynbos	LC	96	4								0				0				0
Helskloof Canyon Desert	LC	100	4								0				0				0
Highveld Alluvial Vegetation	LC	68	3B						0				0				0		

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Ecosystem Type	ETS	REE (%)	Transformation Band	A. TPC Ratio				B. RE & EPL Ratios				C. ETS Ratios				D. Starting Ratios			
				NP	PP	MP	WP	NP	PP	MP	WP	NP	PP	MP	WP	NP	PP	MP	WP
Hopefield Sand Fynbos	LC	65	3B						1				0				1		
Humansdorp Shale Renosterveld	EN	43	2B					10				10				10			
Income Sandy Grassland	EN	50	3A					7				10				10			
Ironwood Dry Forest	LC	100	4								0				0				0
Ithala Quartzite Sourveld	LC	79	4						0				0				0		
Kaalrug Mountain Bushveld	LC	79	4							0				0				0	
Kahams Mountain Desert	LC	100	4								0				0				0
Kalahari Karroid Shrubland	LC	99	4					0				0				0			
Kamiesberg Granite Fynbos	LC	99	4					0				0				0			
Kamiesberg Mountains Shrubland	LC	99	4					0				0				0			
Kango Conglomerate Fynbos	LC	98	4						0				0				0		
Kango Limestone Renosterveld	LC	88	4						0				0				0		
KaNgwane Montane Grassland	EN	44	2B					10				10				10			
Karoo Escarpment Grassland	LC	98	4							0				0				0	
Kasouga Dune Thicket	LC	69	3B							0				0				0	
Kathu Bushveld	LC	98	4						0				0				0		
Kimberley Thornveld	LC	74	4						0				0				0		
Klawer Sandy Shrubland	CR	57	3A					4				30				30			
Klerksdorp Thornveld	LC	58	3A						2				0				2		
Knersvlakte Dolomite Vygieveld	LC	97	4							0				0				0	
Knersvlakte Quartz Vygieveld	LC	99	4								0				0				0
Knersvlakte Shale Vygieveld	LC	100	4						0				0				0		
Knysna Sand Fynbos	CR	23	1		30								30				30		
Kobee Succulent Shrubland	LC	98	4					0				0				0			
Koedoesberge-Moordenaars Karoo	LC	99	4					0				0				0			
Koedoeskloof Karroid Thicket	LC	90	4					0				0				0			
Kogelberg Sandstone Fynbos	CR	84	4								0				30				30

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Ecosystem Type	ETS	REE (%)	Transformation Band	A. TPC Ratio				B. RE & EPL Ratios				C. ETS Ratios				D. Starting Ratios			
				NP	PP	MP	WP	NP	PP	MP	WP	NP	PP	MP	WP	NP	PP	MP	WP
Koranna-Langeberg Mountain Bushveld	LC	100	4						0				0				0		
Kosiesberg Succulent Shrubland	LC	100	4					0				0				0			
Kouebokkeveld Alluvium Fynbos	CR	34	2A						12				30				30		
Kouebokkeveld Shale Fynbos	CR	50	2B							2				30				30	
Kouga Grassy Sandstone Fynbos	LC	92	4								0				0				0
Kouga Sandstone Fynbos	LC	91	4								0				0				0
Kuruman Mountain Bushveld	LC	98	4					0				0				0			
Kuruman Thornveld	LC	96	4					0				0				0			
Kuruman Vaalbosveld	LC	95	4					0				0				0			
Kwaggarug Mountain Desert	LC	100	4								0				0				0
KwaZulu-Natal Coastal Belt Grassland	EN	19	1	30								10				30			
KwaZulu-Natal Coastal Belt Thornveld	EN	39	2A					13				10				13			
KwaZulu-Natal Highland Thornveld	LC	64	3B						1				0				1		
KwaZulu-Natal Hinterland Thornveld	LC	69	3B					0				0				0			
KwaZulu-Natal Sandstone Sourveld	EN	16	1	30								10				30			
Lambert's Bay Strandveld	CR	70	4						0				30				30		
Langebaan Dune Strandveld	EN	87	4								0				10				10
Langkloof Shale Renosterveld	EN	35	2A					17				10				17			
Lebombo Summit Sourveld	EN	31	2A					21				10				21			
Legogote Sour Bushveld	EN	34	2A						13				10				13		
Leipoldtville Sand Fynbos	EN	40	2A					12				10				12			
Lekkersing Succulent Shrubland	LC	99	4							0				0				0	
Leolo Summit Sourveld	LC	94	4					0				0				0			
Lesotho Highland Basalt Grassland	LC	99	4					0				0				0			
Limpopo Ridge Bushveld	LC	97	4								0				0				0
Limpopo Sweet Bushveld	LC	90	4						0				0				0		

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Ecosystem Type	ETS	REE (%)	Transformation Band	A. TPC Ratio				B. RE & EPL Ratios				C. ETS Ratios				D. Starting Ratios			
				NP	PP	MP	WP	NP	PP	MP	WP	NP	PP	MP	WP	NP	PP	MP	WP
Little Karoo Quartz Vygieveld	LC	96	4						0				0				0		
Loerie Conglomerate Fynbos	LC	87	4						0				0				0		
Long Tom Pass Montane Grassland	LC	53	3A								0				0				0
Loskop Mountain Bushveld	LC	94	4							0				0				0	
Loskop Thornveld	LC	59	3A						2				0				2		
Lourensford Alluvium Fynbos	CR	22	1		30								30				30		
Low Escarpment Moist Grassland	LC	91	4						0				0				0		
Lower Gariep Alluvial Vegetation	LC	65	3B						1				0				1		
Lower Gariep Broken Veld	LC	99	4						0				0				0		
Lowveld Riverine Forest	VU	69	3B								0				5				5
Lowveld Rugged Mopaneveld	LC	78	4								0				0				0
Lydenburg Thornveld	LC	79	4						0				0				0		
Mabela Sandy Grassland	CR	34	2A					18				30				30			
Madikwe Dolomite Bushveld	LC	98	4								0				0				0
Mafikeng Bushveld	LC	62	3B					2				0				2			
Makatini Clay Thicket	LC	82	4								0				0				0
Makhado Sweet Bushveld	LC	64	3B						1				0				1		
Makuleke Sandy Bushveld	LC	77	4								0				0				0
Malelane Mountain Bushveld	LC	96	4								0				0				0
Mamabolo Mountain Bushveld	LC	90	4						0				0				0		
Mangrove Forest	LC	87	4								0				0				0
Maputaland Coastal Belt	EN	39	2A							4				10				10	
Maputaland Pallid Sandy Bushveld	LC	75	4							0				0				0	
Maputaland Wooded Grassland	EN	39	2A							4				10				10	
Marikana Thornveld	EN	38	2A						9				10				10		
Matjiesfontein Quartzite Fynbos	LC	99	4						0				0				0		
Matjiesfontein Shale Fynbos	LC	95	4								0				0				0

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				NP	PP	MP	WP	NP	PP	MP	WP	NP	PP	MP	WP	NP	PP	MP	WP
Matjiesfontein Shale Renosterveld	LC	87	4						0				0				0		
Midlands Mistbelt Grassland	EN	32	2A						14				10				14		
Moist Coast Hinterland Grassland	VU	38	2A					14				5				14			
Molopo Bushveld	LC	96	4						0				0				0		
Mons Ruber Fynbos Thicket	LC	94	4					0				0				0			
Montagu Shale Fynbos	LC	79	4						0				0				0		
Montagu Shale Renosterveld	LC	82	4						0				0				0		
Mooi River Highland Grassland	EN	61	3B						2				10				10		
Moot Plains Bushveld	LC	68	3B						0				0				0		
Mopane Basalt Shrubland	LC	100	4								0				0				0
Mopane Gabbro Shrubland	LC	100	4								0				0				0
Mossel Bay Shale Renosterveld	CR	40	2B					12				30				30			
Motherwell Karroid Thicket	CR	45	2B					10				30				30			
Mthatha Moist Grassland	EN	43	2B					11				10				11			
Muscadel Riviere	EN	41	2B					12				10				12			
Musina Mopane Bushveld	LC	92	4							0				0				0	
Muzi Palm Veld and Wooded Grassland	CR	77	4						0				30				30		
Namaqualand Arid Grassland	LC	100	4								0				0				0
Namaqualand Blomveld	LC	93	4						0				0				0		
Namaqualand Coastal Duneveld	LC	87	4							0				0				0	
Namaqualand Granite Renosterveld	LC	84	4					0				0				0			
Namaqualand Heuweltjie Strandveld	LC	78	4						0				0				0		
Namaqualand Heuweltjieveld	LC	91	4						0				0				0		
Namaqualand Inland Duneveld	LC	97	4						0				0				0		
Namaqualand Klipkoppe Shrubland	LC	97	4						0				0				0		
Namaqualand Riviere	LC	89	4						0				0				0		

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				NP	PP	MP	WP	NP	PP	MP	WP	NP	PP	MP	WP	NP	PP	MP	WP
Namaqualand Sand Fynbos	LC	86	4						0				0				0		
Namaqualand Seashore Vegetation	CR	82	4						0				30				30		
Namaqualand Shale Shrubland	LC	99	4					0				0				0			
Namaqualand Spinescent Grassland	LC	91	4						0				0				0		
Namaqualand Strandveld	LC	82	4						0				0				0		
Namib Lichen Fields	CR	80	4					0				30				30			
Namib Seashore Vegetation	CR	9	1	30								30				30			
Nanaga Savanna Thicket	LC	63	3B							0				0				0	
Nardouw Sandstone Fynbos	CR	67	3B					1				30				30			
Ngongoni Veld	VU	43	2B					11				5				11			
Nieuwoudtville Shale Renosterveld	CR	49	2B						5				30				30		
Nieuwoudtville-Roggeveld Dolerite Renosterveld	LC	90	4						0				0				0		
Noms Mountain Desert	LC	100	4								0				0				0
Norite Koppies Bushveld	LC	86	4						0				0				0		
North Hex Sandstone Fynbos	LC	95	4								0				0				0
North Kammanassie Sandstone Fynbos	LC	100	4								0				0				0
North Langeberg Sandstone Fynbos	LC	92	4								0				0				0
North Outeniqua Sandstone Fynbos	LC	85	4						0				0				0		
North Rooiberg Sandstone Fynbos	LC	100	4								0				0				0
North Sonderend Sandstone Fynbos	LC	98	4								0				0				0
North Swartberg Sandstone Fynbos	LC	99	4								0				0				0
Northern Afrotemperate Forest	LC	84	4								0				0				0
Northern Coastal Forest	LC	77	4								0				0				0
Northern Drakensberg Highland Grassland	LC	91	4								0				0				0

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				NP	PP	MP	WP	NP	PP	MP	WP	NP	PP	MP	WP	NP	PP	MP	WP
Northern Escarpment Afromontane Fynbos	LC	94	4								0				0				0
Northern Escarpment Dolomite Grassland	EN	39	2A						9				10				10		
Northern Escarpment Quartzite Sourveld	LC	56	3A							1				0				1	
Northern Free State Shrubland	LC	93	4						0				0				0		
Northern Inland Shale Band Vegetation	LC	94	4								0				0				0
Northern Knersvlakte Vygieveld	LC	100	4							0				0				0	
Northern KwaZulu-Natal Moist Grassland	VU	59	3A						2				5				5		
Northern Lebombo Bushveld	LC	100	4								0				0				0
Northern Mistbelt Forest	LC	74	4								0				0				0
Northern Nababiepsberge Mountain Desert	LC	99	4					0				0				0			
Northern Richtersveld Scorpionstailveld	LC	100	4								0				0				0
Northern Richtersveld Yellow Duneveld	LC	99	4					0				0				0			
Northern Upper Karoo	LC	95	4					0				0				0			
Northern Zululand Mistbelt Grassland	EN	55	3A						3				10				10		
Northern Zululand Sourveld	LC	72	4						0				0				0		
Nossob Bushveld	LC	100	4								0				0				0
Nwambyia-Pumbe Sandy Bushveld	LC	100	4								0				0				0
Ohrigstad Mountain Bushveld	LC	89	4							0				0				0	
Olifants Sandstone Fynbos	LC	95	4								0				0				0
Olifantshoek Plains Thornveld	LC	99	4						0				0				0		
Oograbies Plains Sandy Grassland	LC	100	4					0				0				0			
Oudtshoorn Karroid Thicket	LC	97	4								0				0				0
Overberg Dune Strandveld	EN	94	4								0				10				10
Overberg Sandstone Fynbos	EN	90	4						0				10				10		
Paulpietersburg Moist Grassland	EN	51	3A						4				10				10		

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				NP	PP	MP	WP	NP	PP	MP	WP	NP	PP	MP	WP	NP	PP	MP	WP
Peninsula Granite Fynbos	CR	37	2A							5				30				30	
Peninsula Sandstone Fynbos	CR	93	4								0				30				30
Peninsula Shale Fynbos	VU	48	2B								0				5				5
Peninsula Shale Renosterveld	CR	15	1		30								30				30		
Phalaborwa-Timbavati Mopaneveld	LC	92	4								0				0				0
Piketberg Quartz Succulent Shrubland	CR	22	1	30								30				30			
Piketberg Sandstone Fynbos	LC	89	4						0				0				0		
Pilanesberg Mountain Bushveld	LC	96	4								0				0				0
Platbakkies Succulent Shrubland	LC	100	4					0				0				0			
Polokwane Plateau Bushveld	LC	59	3A						2				0				2		
Pondoland-Ugu Sandstone Coastal Sourveld	VU	51	3A						4				5				5		
Postmasburg Thornveld	LC	96	4					0				0				0			
Potberg Ferricrete Fynbos	CR	49	2B						4				30				30		
Potberg Sandstone Fynbos	LC	94	4								0				0				0
Poung Dolomite Mountain Bushveld	LC	94	4							0				0				0	
Pretoriuskop Sour Bushveld	LC	68	3B								0				0				0
Prince Albert Succulent Karoo	LC	99	4						0				0				0		
Queenstown Thornveld	LC	84	4					0				0				0			
Rand Highveld Grassland	VU	45	2B						6				5				6		
Richtersberg Mountain Desert	LC	100	4								0				0				0
Richtersveld Coastal Duneveld	CR	68	3B						0				30				30		
Richtersveld Red Duneveld	LC	100	4						0				0				0		
Richtersveld Sandy Coastal Scorpionstailveld	LC	99	4					0				0				0			
Richtersveld Sheet Wash Desert	LC	100	4								0				0				0
Riethuis-Wallekraal Quartz Vygieveld	LC	99	4								0				0				0
Robertson Granite Fynbos	LC	84	4								0				0				0

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				NP	PP	MP	WP	NP	PP	MP	WP	NP	PP	MP	WP	NP	PP	MP	WP
Robertson Granite Renosterveld	LC	98	4								0				0				0
Robertson Karoo	LC	78	4						0				0				0		
Roggeveld Karoo	LC	98	4					0				0				0			
Roggeveld Shale Renosterveld	LC	98	4						0				0				0		
Roodeberg Bushveld	LC	80	4						0				0				0		
Rooiberg Quartz Vygieveld	LC	100	4								0				0				0
Rosyntjieberg Succulent Shrubland	LC	100	4								0				0				0
Ruens Silcrete Renosterveld	EN	15	1	30								10				30			
Saldanha Flats Strandveld	EN	37	2A						10				10				10		
Saldanha Granite Strandveld	CR	28	1		30								30				30		
Saldanha Limestone Strandveld	CR	82	4							0				30				30	
Saltaire Karroid Thicket	LC	98	4						0				0				0		
Sand Forest	LC	92	4								0				0				0
Sardinia Forest Thicket	LC	64	3B					2				0				2			
Scarp Forest	LC	91	4							0				0				0	
Schmidtsdrif Thornveld	LC	82	4						0				0				0		
Schweizer-Reneke Bushveld	VU	50	2B						4				5				5		
Sekhukhune Montane Grassland	LC	63	3B					2				0				2			
Sekhukhune Mountain Bushveld	LC	79	4						0				0				0		
Sekhukhune Plains Bushveld	EN	48	2B						5				10				10		
Senqu Montane Shrubland	LC	85	4					0				0				0			
South Eastern Coastal Thornveld	LC	60	3A						2				0				2		
South Hex Sandstone Fynbos	LC	99	4								0				0				0
South Kammanassie Sandstone Fynbos	LC	95	4								0				0				0
South Langeberg Sandstone Fynbos	LC	97	4								0				0				0
South Outeniqua Sandstone Fynbos	LC	69	3B								0				0				0

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				NP	PP	MP	WP	NP	PP	MP	WP	NP	PP	MP	WP	NP	PP	MP	WP
South Rooiberg Sandstone Fynbos	LC	99	4								0				0				0
South Sonderend Sandstone Fynbos	CR	93	4								0				30				30
South Swartberg Sandstone Fynbos	LC	100	4								0				0				0
Southern Afrotemperate Forest	LC	80	4								0				0				0
Southern Cape Dune Fynbos	LC	82	4						0				0					0	
Southern Coastal Forest	LC	82	4								0				0				0
Southern Drakensberg Highland Grassland	LC	91	4						0				0					0	
Southern Kalahari Mekgacha	LC	99	4							0				0				0	
Southern Karoo Riviere	LC	87	4						0				0					0	
Southern KwaZulu-Natal Moist Grassland	EN	46	2B						6				10					10	
Southern Lebombo Bushveld	LC	81	4						0				0					0	
Southern Mistbelt Forest	LC	83	4							0				0					0
Southern Nababiepsberge Mountain Desert	LC	100	4					0				0				0			
Southern Namaqualand Quartzite Klipkoppe Shrubland	LC	91	4						0				0				0		
Southern Richtersveld Inselberg Shrubland	LC	100	4					0				0				0			
Southern Richtersveld Scorpionstailveld	LC	100	4					0				0				0			
Southern Richtersveld Yellow Duneveld	LC	93	4							0				0				0	
Soutpansberg Mountain Bushveld	LC	75	4						0				0					0	
Soutpansberg Summit Sourveld	LC	98	4								0				0				0
Soweto Highveld Grassland	VU	41	2B					12				5				12			
Springbokvlakte Thornveld	VU	46	2B						6				5				6		
St Francis Dune Thicket	LC	86	4						0				0				0		
Steenkampsberg Montane Grassland	LC	71	4						0				0				0		
Stella Bushveld	LC	60	3A					3				0				3			

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				NP	PP	MP	WP	NP	PP	MP	WP	NP	PP	MP	WP	NP	PP	MP	WP
Steytlerville Karoo	LC	98	4					0				0				0			
Stinkfonteinberge Eastern Apron Shrubland	LC	100	4								0				0				0
Stinkfonteinberge Quartzite Fynbos	LC	100	4								0				0				0
Stormberg Plateau Grassland	LC	82	4					0				0				0			
Strydpoort Summit Sourveld	LC	98	4								0				0				0
Subtropical Alluvial Vegetation	LC	70	3B								0				0				0
Subtropical Dune Thicket	LC	93	4								0				0				0
Subtropical Seashore Vegetation	LC	95	4								0				0				0
Sundays Arid Thicket	VU	98	4							0				5				5	
Sundays Mesic Thicket	LC	90	4								0				0				0
Sundays Valley Thicket	LC	88	4							0				0				0	
Suurberg Quartzite Fynbos	LC	98	4							0				0				0	
Suurberg Shale Fynbos	LC	98	4								0				0				0
Swamp Forest	LC	73	4								0				0				0
Swartberg Altimontane Sandstone Fynbos	LC	100	4								0				0				0
Swartberg Shale Fynbos	LC	87	4						0				0				0		
Swartberg Shale Renosterveld	LC	96	4						0				0				0		
Swartland Alluvium Fynbos	EN	34	2A						12				10				12		
Swartland Alluvium Renosterveld	VU	62	3B					2				5				5			
Swartland Granite Renosterveld	EN	20	1	30								10				30			
Swartland Shale Renosterveld	CR	12	1	30								30				30			
Swartland Silcrete Renosterveld	CR	16	1	30								30				30			
Swartruggens Quartzite Fynbos	LC	98	4							0				0				0	
Swartruggens Quartzite Karoo	LC	100	4							0				0				0	
Swaziland Sour Bushveld	LC	76	4						0				0				0		
Swellendam Silcrete Fynbos	EN	48	2B						5				10				10		
Tanqua Escarpment Shrubland	LC	100	4							0				0				0	

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				NP	PP	MP	WP	NP	PP	MP	WP	NP	PP	MP	WP	NP	PP	MP	WP
Tanqua Karoo	LC	99	4							0				0				0	
Tanqua Wash Riviere	LC	94	4							0				0				0	
Tarkastad Montane Shrubland	LC	98	4						0				0				0		
Tatasberg Mountain Succulent Shrubland	LC	100	4								0				0				0
Tembe Sandy Bushveld	LC	79	4							0				0				0	
Thorndale Forest Thicket	LC	70	4						0				0				0		
Thukela Thornveld	LC	75	4						0				0				0		
Thukela Valley Bushveld	LC	74	4					0				0				0			
Transkei Coastal Belt	EN	56	3A						3				10				10		
Tsakane Clay Grassland	EN	37	2A						10				10				10		
Tsende Mopaneveld	LC	89	4								0				0				0
Tshokwane-Hlane Basalt Lowveld	LC	87	4								0				0				0
Tsitsikamma Sandstone Fynbos	LC	70	3B								0				0				0
Tsomo Grassland	LC	62	3B					2				0				2			
Tzaneen Sour Bushveld	EN	53	3A						3				10				10		
uKhahlamba Basalt Grassland	LC	100	4								0				0				0
Umdaus Mountains Succulent Shrubland	LC	100	4					0				0				0			
Umtiza Forest Thicket	CR	65	3B							0				30				30	
Uniondale Shale Renosterveld	LC	83	4						0				0				0		
Upper Annisvlakte Succulent Shrubland	LC	100	4							0				0				0	
Upper Gariep Alluvial Vegetation	LC	72	4						0				0				0		
Upper Karoo Hardeveld	LC	100	4						0				0				0		
Vaal Reefs Dolomite Sinkhole Woodland	LC	73	4					0				0				0			
Vaalbos Rocky Shrubland	LC	98	4						0				0				0		
Vaal-Vet Sandy Grassland	EN	29	1	30								10				30			
Vanrhynsdorp Gannabosveld	LC	85	4					0				0				0			

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				NP	PP	MP	WP	NP	PP	MP	WP	NP	PP	MP	WP	NP	PP	MP	WP
Vanrhynsdorp Shale Renosterveld	LC	95	4						0				0				0		
Vanstadens Forest Thicket	LC	99	4								0				0				0
VhaVenda Miombo	LC	94	4								0				0				0
Vredefort Dome Granite Grassland	CR	48	2B					8				30				30			
Vyftienmyl se Berge Succulent Shrubland	LC	100	4								0				0				0
Wakkerstroom Montane Grassland	LC	81	4						0				0				0		
Waterberg Mountain Bushveld	LC	93	4							0				0				0	
Waterberg-Magaliesberg Summit Sourveld	LC	97	4								0				0				0
Western Altimontane Sandstone Fynbos	LC	100	4								0				0				0
Western Bushmanland Klipveld	LC	100	4					0				0				0			
Western Coastal Shale Band Vegetation	EN	96	4								0				10				10
Western Free State Clay Grassland	LC	76	4						0				0				0		
Western Gariep Hills Desert	LC	93	4						0				0				0		
Western Gariep Lowland Desert	LC	92	4					0				0				0			
Western Gariep Plains Desert	LC	91	4					0				0				0			
Western Gwarrieveld	LC	98	4						0				0				0		
Western Highveld Sandy Grassland	EN	19	1	30								10				30			
Western Little Karoo	LC	96	4							0				0				0	
Western Maputaland Clay Bushveld	EN	42	2B							4				10				10	
Western Maputaland Sandy Bushveld	CR	58	3A								0				30				30
Western Ruens Shale Renosterveld	CR	15	1	30								30				30			
Western Sandy Bushveld	LC	93	4								0				0				0
Western Upper Karoo	LC	99	4					0				0				0			
Willowmore Gwarrieveld	LC	99	4					0				0				0			

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Ecosystem Type	ETS	REE (%)	Transformation Band	A. TPC Ratio				B. RE & EPL Ratios				C. ETS Ratios				D. Starting Ratios			
				NP	PP	MP	WP	NP	PP	MP	WP	NP	PP	MP	WP	NP	PP	MP	WP
Winburg Grassy Shrubland	LC	84	4						0				0				0		
Winterhoek Sandstone Fynbos	LC	93	4								0				0				0
Wolkberg Dolomite Grassland	LC	94	4								0				0				0
Woodbush Granite Grassland	CR	27	1		30								30				30		
Xhariep Karroid Grassland	LC	93	4						0				0				0		
Zastron Moist Grassland	LC	70	3B					0				0				0			
Zeerust Thornveld	LC	70	3B						0				0				0		
Zululand Coastal Thornveld	CR	28	1	30								30				30			
Zululand Lowveld	LC	65	3B							0				0				0	

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The standard approach for determining biodiversity offset ratios in more detail

Biodiversity offset ratios (also known as "multipliers" in other jurisdictions) are used to determine the size of a biodiversity offset site. They are expressed in the National Biodiversity Offset Guideline (**Guideline**) as a ratio between the extent of the significant residual negative impact on biodiversity to the extent of the area that should be selected and secured as a biodiversity offset site.

Ratios are necessary to address concerns that a biodiversity offset might not be sufficient to counterbalance the loss or degradation of biodiversity occasioned by a development. The concerns are primarily based on uncertainty in the ecological system, in offset implementation and time delays with offset delivery (Business and Biodiversity Offsets Programme 2012; Moilanen et al. 2009). Internationally, and in South Africa, ratios are designed to give effect to the precautionary principle, according to which the limits of current knowledge about the consequences of decisions and actions must be taken into consideration (section 2(4)(a)(vii) of the National Environmental Management Act, 1998 (NEMA)).

The Department of Forestry, Fisheries and the Environment considered the following factors when determining a proposed approach to calculating biodiversity offset ratios in the Guideline:

- Biodiversity offset ratios should be scientifically defensible and be based on the best available scientific information on the different ecosystem types occurring naturally in South Africa.
- The use of spatial biodiversity plans, which were designed to be key inputs into spatial planning and environmental decision-making, must be encouraged when determining ratios, but also noting that spatial biodiversity plans are constantly being refined and more investment is required to improve the quality of those plans.
- The risk-averse and cautious approach (also known as the precautionary principle) should be applied when calculating biodiversity offset ratios, where the limitations of data and the challenges with effectively implementing offsets in practice must be acknowledged.
- Biodiversity offset ratios must strengthen the application of the mitigation hierarchy (provided for in section 2(4)(a)(i) of NEMA), in terms of which significant impacts on important biodiversity should be avoided.
- The guideline on calculating biodiversity offsets should be sufficiently flexible for them to be refined at regional level and for special habitats.

The standard approach to determining biodiversity offset ratios is based on the best available information on ecosystems and ecosystem types at landscape level – the 2021 ecosystem assessment (the same assessment on which the latest List of the Ecosystems that are Threatened and in Need of Protection published in terms of the National Environmental Management: Biodiversity Act, 2004 is based) – and spatial biodiversity plans, setting out biodiversity priorities.

In the look-up table above, each ecosystem type has been allocated a final ratio. The final ratio is premised on (A) a punitive ratio for ecosystems that have crossed at Threshold of Potential Concern (TPC) for habitat remaining, (B) a ratio determined using each ecosystem's Remaining Extent and Protection Level (RE&P) and (C) the ratio determined using the Ecosystem Threat Status (ETS). The basis for the different computations is described below. The ecosystem assessment of 2021 is the best available information (at a landscape level) on the ecosystem types occurring in South Africa and the threat status is the best available information on how threatened each ecosystem type is and the reasons for the threat status.

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(A) Punitive ratios catering for Thresholds of Potential Concern

A Threshold of Potential Concern (TPC) was introduced because it is undesirable for ecosystem types to fall below certain thresholds. To avoid extinction, it is important to set limits (Simmonds, et al. 2019) to the transformation of ecosystems. As a rule of thumb, there is a big risk of an ecosystem becoming extinct if there is 20% or less of its historic range[50] remaining (SANBI, 2017). In applying the precautionary approach, the general threshold selected for the standard approach is an Ecosystem Extent of 30%. This is informed by the recent United Nations Biodiversity Conference (COP 15) which issued the Kunming Declaration to lay the foundation for the post-2020 Global Biodiversity Framework (GBF) to reverse the global extinction crisis. This specifically recognizes the call of many countries to protect and conserve 30% of land and sea areas through well-connected systems of protected areas and other effective area-based conservation measures by 2030. It is therefore recommended in the Guideline that an activity, or activities, that would have a significant negative impact on biodiversity in those ecosystem types are not authorised but, if they are authorised in exceptional circumstances, that a high punitive ratio of 30:1 is applied. This strengthens the application of the mitigation hierarchy because it may well encourage developers to avoid impacts in ecosystems that are threatened by dramatic range reduction.

(B) Ratios based on Remaining Ecosystem Extent and Ecosystem Protection Level

For ecosystems with a Remaining Ecosystem Extent (REE) of greater than 30% but smaller than 70%, a ratio between 22:1 and 1:1 is applied. As a general rule, the closer the REE is to the 30% threshold, the closer the ratio should be to 30:1, and the closer the REE is to the 70% threshold, the closer the ratio should be to 1:1. The rationale for setting higher ratios for ecosystems threatened by range reduction is to prevent ecosystems from getting closer to the 30% TPC. It is however acknowledged that the risk of Ecosystem Extent falling below 30% is reduced when ecosystem types are protected. Ecosystem Protection Levels (EPL) has therefore been used to moderate the ratios.

Several "transformation bands" were developed based on REE and EPL. Those bands are depicted in the table below.

Remaining Ecosystem Extent (%)			Not Protected		Poorly Protected		Moderately Protected		Well protected	
Bands	Low	High	Low	High	Low	High	Low	High	Low	High
1	0	30	TPC Ratio Applied							
2A	30	40	12.0	22.0	8.0	15.0	4.0	8.0	2.0	4.0
2B	40	50	7.0	12.0	4.0	8.0	2.0	4.0	0.0	2.0
3A	50	60	3.0	7.0	2.0	4.0	0.0	2.0	0.0	0.0
3B	60	70	0.0	3.0	0.0	2.0	0.0	0.0	0.0	0.0
4	70	100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

The ratios allocated to each band are based on expert advice and what according to the experts would be reasonable but would still promote the cautionary and risk averse approach and strengthen the application of the mitigation hierarchy. The transformation bands and the ratios associated with each transformation band are represented in the graph below. In that graph, NP is Not Protected; PP is Poorly Protected; MP is Moderately Protected; and WP is Well Protected.

[50] The baseline is 1750 (International Union for the Conservation of Nature, 2016).

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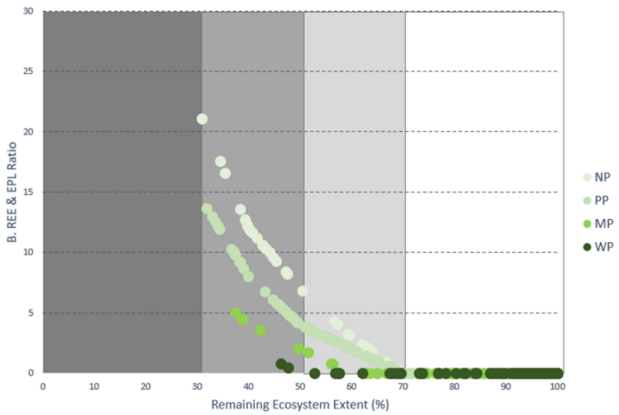
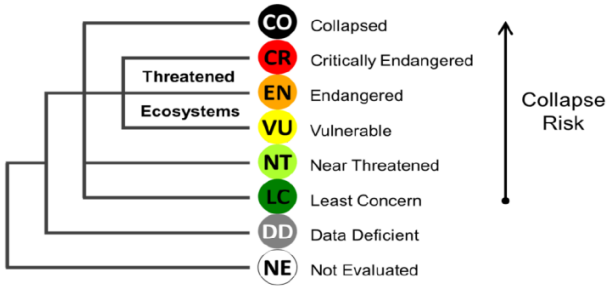


(C) Ratios based on Ecosystem Threat Status

The criteria for determining the Ecosystem Threat Status (ETS) recommended by the International Union for the Conservation of Nature (**IUCN**) (IUCN, 2016) were applied in the ecosystem assessment conducted in 2021 and include the following classes:



The ecosystem assessment of 2021 also culminated in an updated List of Ecosystems that are Threatened and in Need of Protection, which has been published in terms of NEMBA[51] (**List of Ecosystems**). For more information on the IUCN's recommended approach, please consult the IUCN's *Guidelines for the application of IUCN Red List of Ecosystems Categories and Criteria* (2016).

The ETS is recognized as a critical indicator of the health of the world's biodiversity. An important point to note is that an ecosystem type may be threatened by factors other than a reduction in remaining ecosystem extent. An overview of additional criteria that are used to inform ETS are summarized below:

	Criterion	*Purpose*
A	Reduction in geographic distribution	Identifies ecosystems that are undergoing declines in area, most commonly due to threats resulting in ecosystem loss and fragmentation.
B	Restricted geographic distribution	Identifies ecosystems with small distributions that are susceptible to spatially explicit threats and catastrophes.
C	Environmental degradation	Identifies ecosystems that are undergoing environmental degradation.
D	Disruption of biotic processes or interactions	Identifies ecosystems that are undergoing loss or disruption of key biotic processes or interactions.
E	Quantitative analysis that estimates the probability of ecosystem collapse	Allows for an integrated evaluation of multiple threats, symptoms, and their interactions.

[51] Published under Government Notice No. 2747 in Government Gazette 47526 of 18 November 2022.

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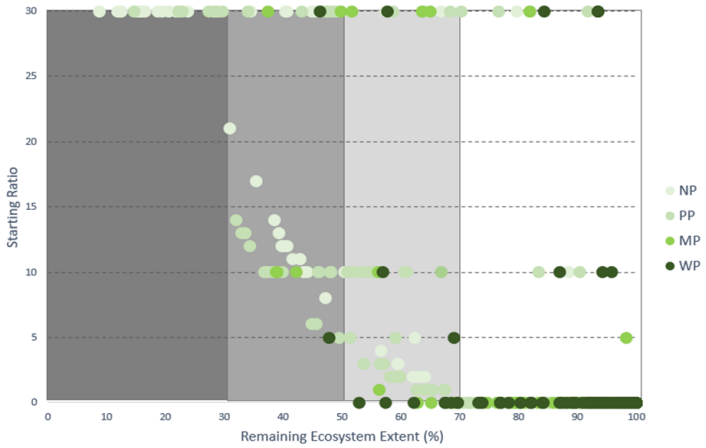
In order to account for additional criteria that may be used to elevate the importance of an ecosystem for conservation, separate ETS ratios were applied for all ecosystems. For the sake of simplicity, the following ratios applied:

- Critically Endangered: 30:1
- Endangered: 10:1
- Vulnerable: 5:1

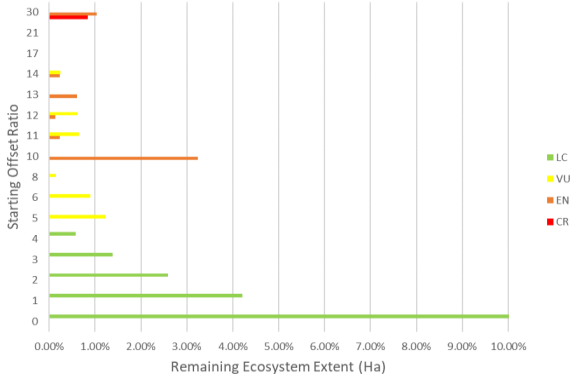
The ratios were determined by experts based on their assessment of what is reasonable but still applying the cautionary and risk averse approach as well as promoting the application of the mitigation hierarchy. The ratios were designed to prevent the threat status of threatened ecosystem types deteriorating over time.

(D) Setting a Starting Offset Ratio

A Starting Offset Ratio was calculated for each ecosystem by applying the cautionary and risk averse approach. This was done by simply selecting the higher of the ratios determined in (A), (B) and (C) above. The results of applying this approach are illustrated in the figure below:



Whilst this approach does suggest that quite a large number of ecosystems have a starting ratio of 30:1, this translates to <2% of remaining untransformed habitat. Indeed, for more than 80% of sites, offsets would typically not be required (Starting Offset Ratio = 0). The next graph provides an analysis of ratios applied across different ETS levels. Note however that the horizontal axis has been reduced so as to illustrate the relatively small proportion of sites with high starting offset ratios.



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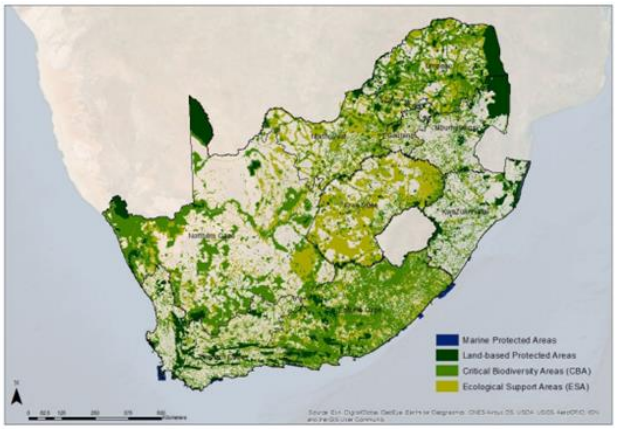
(E) Taking biodiversity spatial plans into consideration

As stated above, one of the factors influencing the standard approach was to consider biodiversity spatial plans. This was integrated so as to support the achievement of the biodiversity targets set in those plans. The biodiversity targets set in those plans are not based purely on Ecosystem Extent and Ecosystem Threat Status. Other factors also influence the identification of Critical Biodiversity Areas and Ecological Support Areas, such as the presence of species or important ecological infrastructure.

Biodiversity spatial plans in South Africa usually identify Critical Biodiversity Areas (CBAs) in their respective planning domains (they are ordinarily done at Provincial level). CBAs are areas that must stay in, or be rehabilitated to,[52] a largely natural ecological condition to ensure that a viable representative sample of all ecosystem types and species can persist. In most biodiversity spatial plans, there are two sub-categories of CBAs: CBA 1 and CBA 2. In most of those spatial biodiversity plans,[53] **CBA 1** sites are selected because there are no other options in the relevant planning domain for the relevant target to be met. They are therefore sometimes called CBA: Irreplaceable. The selection of **CBA 2** sites is based on a range of factors, including spatial efficiency, complementarity, connectivity, avoidance of conflict with other land uses, and alignment with socio-economic opportunities for conservation if these are known. They are often known as CBA: Optimal.

A Consolidated Critical Biodiversity Area (CBA) Map for South Africa based on the most recent available CBA Maps at sub-national level is provided below. For more information on biodiversity spatial plans in South Africa, please consult SANBI's *Technical Guidelines for CBA Maps: Guidelines for developing a map of Critical Biodiversity Areas & Ecological Support Areas using systematic biodiversity planning* (2017).



It is recommended in the Guideline that significant negative impacts on biodiversity in CBA 1s are avoided because of the irreplaceability of those sites. For this reason, a punitive 30:1 ratio is applied to all CBA sites. For significant residual negative impacts on biodiversity in CBA 2s, it is recommended that the Starting Offset Ratio (D) is multiplied by a factor of 1.5. The rationale for the latter

[52]Ideally, a site should only be selected as a CBA if it is currently in good ecological condition. However, in some circumstances it may be necessary to select a site in fair ecological condition as a CBA. Only in exceptional circumstances, when biodiversity targets for representation cannot otherwise be met, will a site that is severely modified be selected as a CBA. **It is therefore not always the case that only areas in good ecological condition are selected as CBAs**.

[53] Please note that CBA 1 and CBA 2 mean different things in some biodiversity spatial plans. For example, in the Western Cape Biodiversity Spatial Plan (2017), CBA 1s are areas CBAs in good ecological condition and CBA 2s are CBAs in fair or modified ecological condition.

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recommendation is that whilst CBA 2s represent the best locations to meet conservation targets, the sites are not irreplaceable and as such, the application of a punitive 30:1 ratio cannot be justified.

(F) Considering other factors

As stated above, one of the guiding principles for determining ratios is flexibility. The basic biodiversity offset ratio determined by considering (A) Thresholds of Potential Concern, (B) Remaining Ecosystem Extent and Ecosystem Protection Level, (C) Ecosystem Threat Status and (E) Biodiversity Spatial Plans as recommended above may have to be modified based on the unique circumstances of each case. As noted in the guideline, some factors may well justify a higher ratio than the proposed basic biodiversity offset ratios, such as when the extent of the impact on biodiversity is equal to large percentage of the size of the historical extent of the relevant ecosystem type. Other factors may justify smaller ratios, such as when the impact occurs in an urban setting where there are severe spatial constraints.

The law requires competent authorities to properly apply their minds to each case and not to apply the standard approach rigidly. While the standard approach may give a good indication of what ratio should be applied generally, the competent authority must consider all relevant factors when taking a decision on the applicable ratio. Competent authorities are therefore encouraged to critically evaluate Biodiversity Offset Reports and to consult with conservation authorities for advice on applicable ratios when considering which ratio to apply in a particular case.

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