Guidelines for Mainstreaming Biodiversity and Ecosystem Services in Extractive Industry

November 2015

Acknowledgements

The Guidelines for Mainstreaming Biodiversity and Ecosystem Services in Extractive Industry were formulated through an inclusive consultative process. Many thanks go to representatives of Member States who have been very supportive to this process and provided valuable guidance on the content from inception. The financial support provided by the European Union through the 10th European Development Fund (ACP line) to the development and formulation process is greatly appreciated. Further thanks goes to the Programme Officers in the SADC Secretariat's Directorate of Food, Agriculture and Natural Resources, who so ably guided the drafting process. Last but not the least, all could not have been achieved without the technical support of the International Union for Conservation of Nature (IUCN) and The Biodiversity Consultancy (TBC).

Guideline text compiled by L. A. Bennun, C. Fletcher, C. Savy, M. Starkey

THE BIODIVERSITY CONSULTANCY

Financial support through

BIOPAMA

Implemented by:

IUCN

European Commission
Joint Research Centre • Sito di Ispra

THE ABS CAPACITY DEVELOPMENT INITIATIVE

L'INITIATIVE DE RENFORCEMENT DES CAPACITÉS POUR L'APA

An initiative of the ACP Secretariat funded by the European Union under the 10th EDF

Technical support by

IUCN

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1 Summary of key recommendations

1.1 For governments

Guidance section	Project stage (see Figure 1)	Key BES management recommendations: Government
6 Strategic assessment and early screening	Discovery/reconnaissance Scoping/feasibility	• Develop and/or strengthen national BES information base • Develop and/or strengthen a strong information base on geological/mineralogical resources • Mandate and/or strengthen independent regulatory authority • Carry out integrated land-use planning that mainstreams BES considerations • Clarify 'no go' areas and overall BES requirements for extractive industry • Regulate for risk screening to inform BES assessment • Regulate for early application of the mitigation hierarchy (Avoidance step)
7 BES baselines, potential impacts and ESIA	Exploration/prospecting Pre-design and design	• Set clear criteria for identifying priority BES features, clear mitigation targets (e.g. 'No Net Loss') and "no project" option • Regulate for transparent process for early and continued stakeholder involvement • Develop certification mechanisms for experts conducting BES assessments • Develop cadre of well-trained, certified independent domestic experts/institutes to conduct assessments
8 Planning to mitigate impacts	Design	• Regulate for rigorous and iterative application of the mitigation hierarchy • Develop capacity for thorough review of ESIA within independent agency that includes all relevant sectors
9 Putting plans into effect	Development/ construction	• Develop regulatory framework and guidance for BES offsets, based on good practice principles and considering long-term financial arrangements • Consider and if appropriate develop an aggregated BES offsets approach nationally • Track implementation of mitigation measures by developers
	Operations	• Track developer implementation of agreed operations techniques, mitigation measures and BES outcomes • Track implementation of BES offsets

	Closure	• Track implementation of mitigation and restoration measures by developers • Track and audit BES outcomes to ensure targets met • Ensure implementation of long-term arrangements for offset financing and governance

1.2 For developers

Guidance section	Project stage (see Figure 1)	Key BES management recommendations: Government
6 Strategic assessment and early screening	Discovery/reconnaissance Scoping/feasibility	• Develop corporate policy/commitment on BES based on good practice • Develop mechanisms to mainstream BES considerations into corporate and project decision-making processes • Allocate resources for BES-related actions and closure restoration and mitigation activities in the overall project budget • Undertake early project risk-screening and identify priority BES features • Apply Avoidance step of mitigation hierarchy as early as possible • Engage stakeholders and understand stakeholder concerns
7 BES baselines, potential impacts and ESIA	Exploration/prospecting Pre-design and design	• Engage independent consultants with relevant expertise • Continue transparent stakeholder engagement • Carry out targeted but thorough baseline surveys
8 Planning to mitigate impacts	Design	• Apply the mitigation hierarchy iteratively through the ESIA process • Assess feasibility of BES offsets (where needed) for unavoidable residual impacts • Develop BES Strategy showing how mitigation targets will be met
9 Putting plans into effect	Development/ construction	• Compile mitigation measures and implementation approach in BES Action Plan (BAP) • Integrate costs for the BAP into the overall project budget • Integrate BES measures into project management systems • Develop and implement detailed BES offsets plans (where needed), including arrangements for partnerships, governance and long-term financing

	Operations	• Monitor implementation of BES measures and outcomes • Monitor implementation of agreed operations techniques throughout the project
	Closure	• Integrate BES measures into closure plans • Ensure arrangements in place for continued operation of BES offsets if needed

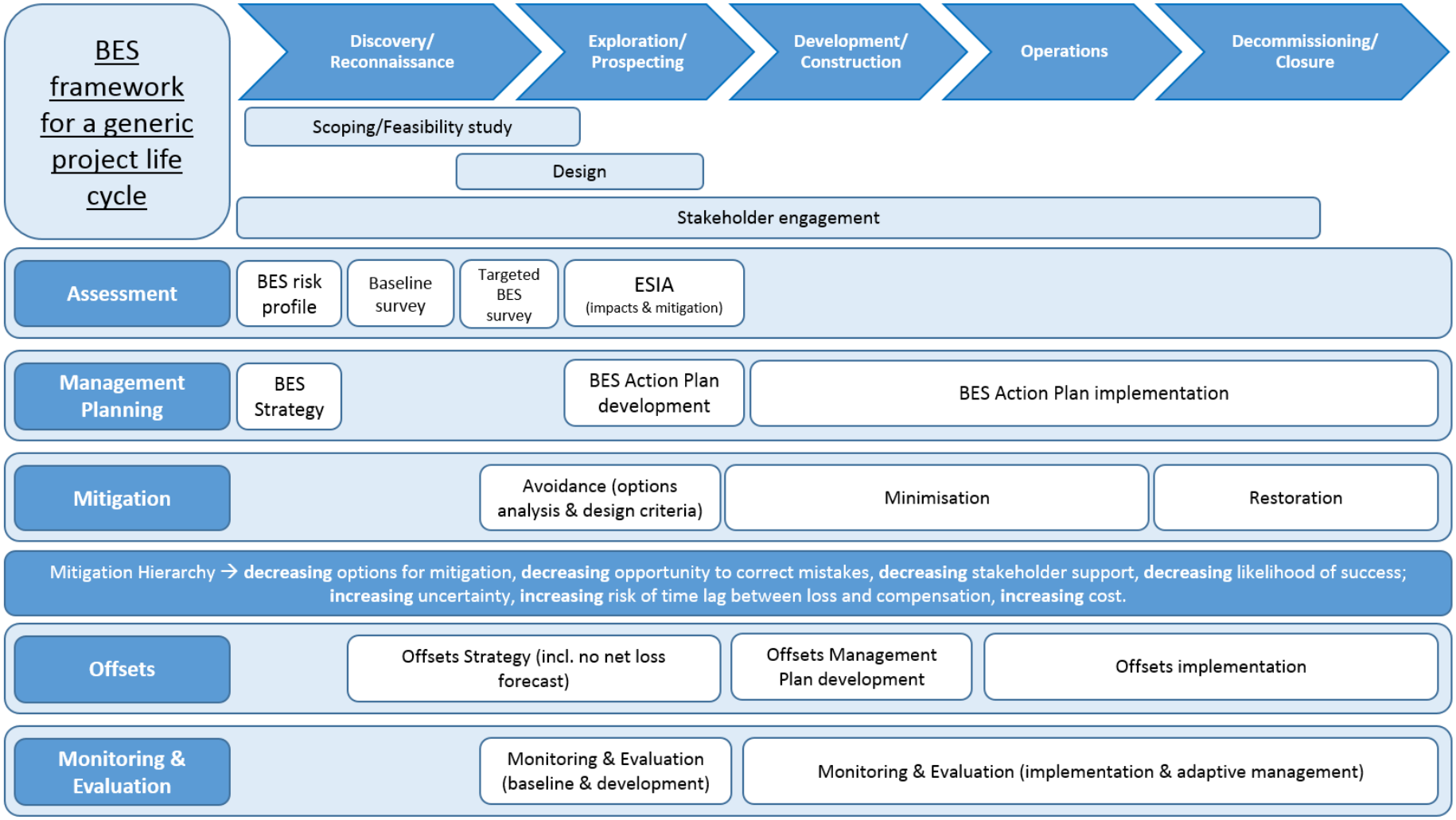

Figure 1: Summary diagram showing how key BES elements fit in a generic project lifecycle. More detail on these elements is provided in the following guidance.

2 Rationale for this Guidance

2.1 Background and context

The Southern African region has realised fast economic development over the last decades. One of the major contributors to this development in many countries of the region is the exploitation of mineral and hydrocarbon resources (aggregates of minerals, mineral ores, oil and gas) following the discovery of a number of large deposits/reservoirs. In addition, the region supports extraordinary biodiversity that also plays a key role in the region, contributing to national economies directly, in the form of e.g. nature tourism and employment opportunities and indirectly, in the form of ecosystem services that support most development, including extractive industries. Water in particular is an important ecosystem service relevant to the extractive industries sector. The challenge is that the extractive industry sector may have severe impacts on biodiversity and ecosystem services, at different levels of temporal and spatial scales, which may compromise vital ecosystem services and have far-reaching impacts on other major economic growth sectors such as tourism, especially when these activities take place in or in the vicinity of Protected Areas and other key biodiversity areas. In addition, the impact on ecosystem services even outside of Protected Areas needs careful consideration to ensure sustainable solutions.

Globally and regionally, some companies in the extractive industry sector have recognised the value of Protected Areas and biodiversity, and made a commitment to either not exploit minerals inside certain types of protected areas such as natural World Heritage sites, despite potential political and commercial disadvantages (no-go commitments) or take the necessary corrective and remedial measures to safeguard ecosystems. In addition, there is a global move towards more sustainable solutions for exploitation of mineral and hydrocarbon resources, showcased by e.g. the Net Positive Impact Alliance and the ICCM Good Practice Guidance for Mining and Biodiversity at global level.

Governments have to carefully weigh the, often shorter-term, income generated by the exploitation of natural resources against the, often longer-term, economic, social and environmental benefits of biodiversity conservation. This requires political balancing and internal coordination of various ministerial departments and services as well as strategic approaches to land use and possible scenario planning at a national scale. Governments need to engage with the extractive industry sector companies to identify opportunities in spatial planning, operational practices and management systems that allow for mineral extraction and environmental responsibility. The extractive industry also has to take a proactive role in ensuring that their operations seriously take into consideration the necessary management measures for the conservation and restoration of biodiversity. However more often both governments and developers lack proper guidance for ensuring sustainable exploitation of such resources.

It is against this background that in line with the key action "Develop guidelines on the exploitation of natural resources such as minerals in reserve or protected areas" defined in the SADC Biodiversity Action Plan approved by Ministers responsible for Environment and Natural Resources in November 2013, the SADC Secretariat in collaboration with the Biodiversity and Protected Area Management (BIOPAMA) Programme sought to develop

this Guideline for Mainstreaming Biodiversity and Ecosystem Services in Extractive Industry for the SADC Region. A consultative SADC workshop[A,1] in September 2014 developed the framework for these guidelines and this framework was fleshed out with the help of technical consultants and further engagement with the SADC Member States.

This guidance covers biodiversity and ecosystem services together. The two concepts are closely interlinked as ecosystem services flow from biodiversity, when biodiversity is combined and integrated into well-functioning ecosystems (Section 4). Biodiversity and ecosystem services may sometimes require distinct policy and management approaches (Box C), but can often be addressed together. Good practice is to consider both in processes of impact assessment and mitigation.

2.2 Aims

These guidelines aim to:

- ✓ Help mainstream considerations of biodiversity and ecosystem services (BES) into extractive industry in the SADC region, where (also see Section 10, Glossary):
  - o **Biodiversity** is the variability among living organisms from all sources (terrestrial, marine and aquatic ecosystems), including diversity within species, between species, and of ecosystems;
  - o **Ecosystem services** are the benefits that people, including businesses, derive from ecosystems. There are four categories: (i) provisioning services, the products people obtain from ecosystems; (ii) regulating services, the benefits people obtain from the regulation of ecosystem processes; (iii) cultural services, the nonmaterial benefits people obtain from ecosystems; and (iv) supporting services, the natural processes that maintain the other services;
  - o **Extractive industry (EI)** is the business of extracting metals, minerals or aggregates from the earth by mining, quarrying, dredging, and oil and gas operations; and
  - o SADC[2] is an intergovernmental organization comprising 15 Southern African Member States whose goal is to promote sustainable and equitable economic growth and socio-economic development across the region.
- ✓ Support more sustainable development of extractive industries, by minimizing impacts on biodiversity and ecosystem services and maximizing social and environmental opportunities;
- ✓ Bring together the essential information needed to inform BES strategy and decision-making throughout the project lifecycle;
- ✓ Provide framework recommendations, aligning with existing regional strategies and signposting more detailed information sources where relevant.

2.3 Scope

These guidelines apply to:

[A] Workshop held by the SADC Secretariat and Member States, with support from the International Union for the Conservation of Nature (IUCN), the Biodiversity and Protected Areas Management (BIOPAMA) Programme and the IUCN Pan-African Protected Areas and Conservation Programme.

- ✓ Non-renewable extractive industries (oil and gas, minerals and metals) on both large and small scales, including artisanal mining where appropriate;
- ✓ Both biodiversity and ecosystem services (BES), indicating where the two may require different approaches;
- ✓ All habitats (whether inland, coastal or marine), inside and outside protected areas; and
- ✓ The full project lifespan.

2.4 Audience

These guidelines are aimed at all involved in the guidance, planning, development (including strategic economic development) and management of extractive industry activities (Figure 2).

Figure 2: Audience for these guidelines

3 Guiding Principles

There are several key considerations for good practice BES management of EI. These are:

Principle		Detail
1	**Mainstreaming**	Mainstreaming biodiversity into decision-making is an essential step in ensuring sustainable development[3]. This guidance thus supports the achievement of Aichi Target 2 and the proposed UN Sustainable Development Goals 14 and 15. At both Government and business/project level, BES considerations need to be integrated fully with planning, implementation, monitoring and governance processes.
2	**Natural capital**	Biodiversity and ecosystem services are living Natural Capital. This guidance aims to secure the best return from Natural Capital, balancing economic, social and environmental considerations. For the most important biodiversity features and ecosystem services, good practice is to achieve a net gain, or at worst no net loss (see Box A). If this is not feasible, the trade-offs between living Natural Capital and other (e.g. economic) returns should at least be considered explicitly.
3	**Ecosystem approach**	The 'ecosystem approach' developed via the Convention on Biological Diversity is a strategy for the integrated, adaptive management of land, water and living resources that promotes conservation and sustainable use in an equitable way. A Sourcebook is available to help practitioners implement the ecosystem approach and to share experiences.
4	**Landscape or seascape scale**	An implication of the ecosystem approach is that assessment and planning should be considered on the scale of landscapes or seascapes. This ensures consideration of ecological coherence and connectivity, and that project impacts are considered on a wider geographical basis than the direct operational footprint (see Box C).
5	**Transboundary context**	In the SADC region, there are numerous ecological and social connections across national borders. Implementation of these guidelines should take a 'good neighbour' approach, considering project impacts and conservation interventions in a transboundary context where appropriate (see Box D).
6	**Full project lifecycle**	BES issues need to be integrated with planning and management, monitored and evaluated across the entire project lifecycle. This means from prefeasibility planning to closure, and beyond closure if remediative measures such as BES offsets need to continue for longer.
7	**Precautionary approach**	Projects should use the best available BES information. Where there are significant information gaps or inadequacies a precautionary approach should be taken – rather than assuming, say, that impacts will be insignificant, or restoration efforts successful. Alternatively or additionally, developers should pro-actively collect the new data needed to inform decision-making.
8	**Transparent stakeholder engagement**	A key guiding principle is the need to engage and involve stakeholders throughout the lifespan of a project (see Box F). Stakeholder expectations around BES need to be understood and taken into account as projects develop. Transparency (sharing information and responding to concerns) and accountability (taking responsibility for project impacts and activities) are important aspects of this.
9	**Mitigation hierarchy**	Full application of the mitigation hierarchy is at the heart of good practice (see Section 8). Wherever feasible and cost-effective this should prioritise preventative measures, particularly avoidance but also minimisation, over the remediative measures of restoration and offsets. Application of the mitigation hierarchy involves understanding BES baselines, assessing BES dependencies and potential impacts, mitigating and manage BES impacts and identifying BES opportunities, and selecting, measuring and reporting BES performance indicators.

4 What are biodiversity and ecosystem services?

Biodiversity and ecosystem services are elements of living Natural Capital (see Glossary). Biodiversity represents the stock of nature (genes, species and ecosystems). Ecosystem services are the benefits to people that flow from this stock, when it is combined into integrated and functioning systems. Although biodiversity underpins ecosystem services, there is not a straightforward relationship between the two. Thus, when managing a system there may be trade-offs across different kinds of ecosystem services, and between the provision of some services and the conservation of specific biodiversity features.

Ecosystem services come from the environment but they are defined by their benefits to people. For EI projects, assessment and mitigation of potential ecosystem service impacts (and compensation if required) involves a trans-disciplinary approach – combining both social and environmental expertise. Stakeholder consultation is crucial and not only Affected Communities[B] but also the project itself may rely on ecosystem services (such as the provision of clean freshwater). In the widely-applied International Finance Corporation Performance Standards the trans-disciplinary nature of ecosystem services is demonstrated by the integration of these issues into standards on community health and safety, cultural values and land acquisition, as well as those on biodiversity and living natural resources. Figure 3 illustrates the connection between biodiversity and ecosystem services.

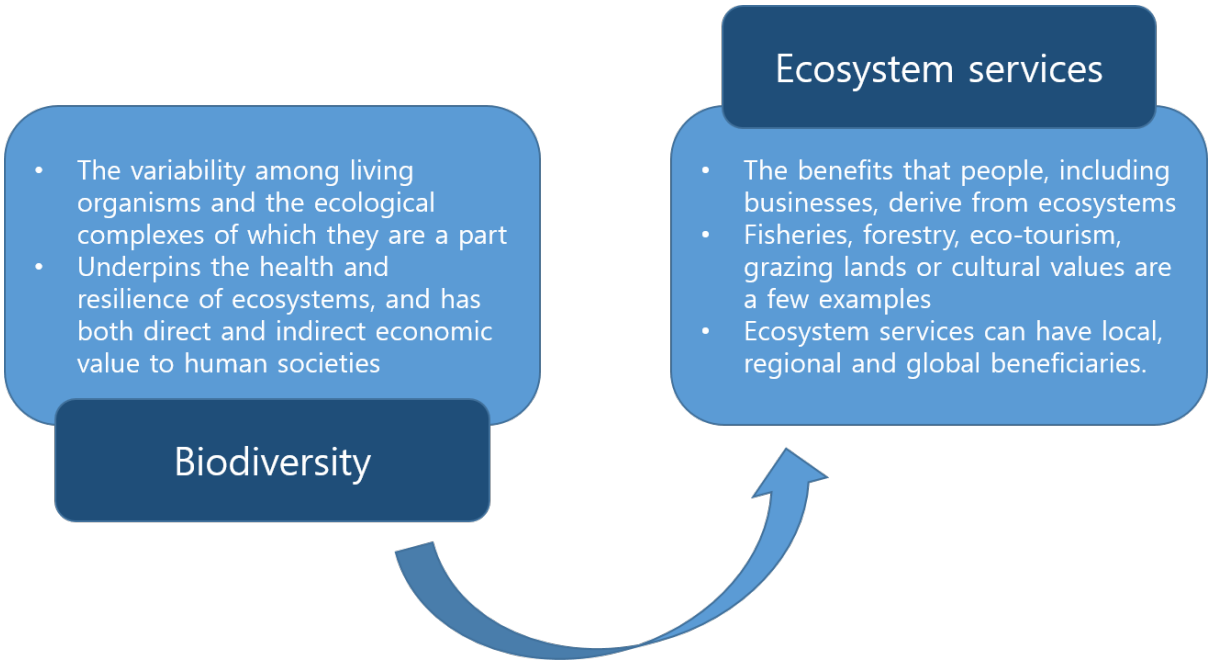

Figure 3: Biodiversity (or biological diversity[4]) and ecosystem services are inextricably linked. Ecosystem services depend on the functional and structural integrity of ecosystems, which in turn depend on the species in those ecosystems and their interactions.

[B] An Affected Community is defined as a group of stakeholders using an ecosystem that is affected by a project and reliant on that ecosystem service for their wellbeing.

5 The importance of biodiversity and ecosystem services

5.1 Summary of key points

Government

- Biodiversity and ecosystem services (BES) form important Natural Capital.
- BES considerations should be mainstreamed into economic and social decision-making, including for EI.
- There is a need for joined-up, cross-sectoral planning for EI that brings together relevant Ministries across government.
- Key elements to put in place for improved BES governance are (i) a robust legal and policy framework for BES, (ii) coherent and integrated development planning, (iii) relevant and accessible BES information, (iv) an independent and effective BES management authority and (v) strong technical support from skilled domestic BES consultants.

Developers

- There is a strong business case for good-practice BES management, for reasons related to regulation, reputation and project dependency.
- Good management of BES-related risk can translate into valuable opportunities. Poor management can have significant negative consequences.
- BES should be considered a strategic issue in corporate or project risk management frameworks.
- Biodiversity and ecosystem services are interlinked but may require distinct management approaches at times.

Lenders, local communities, non-governmental organizations

- Good-practice safeguards and standards are helping to drive improvements in BES management by EI.
- Institutional and individual capacity, and the information base, need strengthening to support effective BES integration into decision-making for EI.

5.2 BES as a significant issue: the business case

It is increasingly recognized that biodiversity and ecosystem services underpin sustainable development. This is reflected, for example, in commitments under the Convention on Biological Diversity and in the proposed Sustainable Development Goals. SADC's rich biodiversity and the ecosystem services this supports are vitally important to the regional economy and to human livelihoods and well-being. Avoiding damage to BES in extractive industry development is an important consideration for Government and for lenders. It is thus important for Governments to define, at the national/regional level, those BES features which should be

considered a priority – and therefore a focus for developer-led Environmental and Social Impact Assessment (ESIA). There are various means by which such priority can be established – more detail is provided in Box A

Companies are also recognizing that there is a strong business case for effective BES management[5] (Figure 4). As well as their intrinsic value, BES are important to business because they can impact the bottom line. Good management of BES-related risk can translate into valuable opportunities. Poor management can have significant negative implications. The UN Global Compact and IUCN (2012)[5] gives more detail on the nature of drivers for BES-related risk management.

Box A: Performance standards - global benchmarks and drivers for good practice

The BES performance standards of the Multilateral Financial Institutions (e.g. the International Finance Corporation, World Bank and African Development Bank) provide a useful framework for assessing the significance of BES-related risks and a benchmark for internationally accepted good practice on BES management.

The different MFI standards vary in detail but adopt broadly similar approaches. Most now require a landscape-level approach that considers direct, indirect and cumulative impacts. The high-priority BES features recognised in many standards include:

- Designated Protected Areas and 'internationally recognised areas' (Box E);
- Species or ecosystems at high risk of extinction, globally or nationally;
- Species with very restricted distributions;
- Species that gather in large congregations;
- Ecosystem services of key importance to local communities;
- Ecosystem services valued by global beneficiaries or other stakeholders; and
- Ecosystem services on which the project itself depends.

For the SADC region, important ecosystem services to consider would include the cultural values of sacred sites, and the tourism supported by particular sites and species.

The International Finance Corporation's Performance Standards are perhaps the most widely recognised and applied standard for assessing BES-related risk. Performance Standard 6[6] (PS6) on Biodiversity Conservation and Sustainable Management of Living Natural Resources has been adopted by many Export Credit Agencies and by the Equator Principles Financial Institutions, which include 80 of the world's biggest banks and cover over 70% of international Project Finance debt in emerging markets. IFC PS6 defines qualitative thresholds for the identification of priority biodiversity, and sets project goals of Net Gain for 'Critical Habitat'[C] (the most vulnerable and irreplaceable biodiversity features) and No Net Loss for 'Natural Habitat'[D] (also see Glossary). In terms of ecosystem services, IFC Performance Standard 5 (PS5) on Land Acquisition and Involuntary Resettlement provides a standard against which issues of project-related land acquisition and restrictions on land use can be managed with respect to the communities and persons that use the land.

[C] Areas with high biodiversity value, including habitats of significant importance to critically endangered or endangered species, restricted range or endemic species, globally significant concentrations of migratory and/or congregatory species, highly threatened and/or unique ecosystems and key evolutionary processes (paragraph 16: IFC, 2012a)

[D] Areas composed of viable assemblages of plant and/or animal species of largely native origin and/or where human activity had not essentially modified an area's primary ecological functions and species composition (paragraph 12: IFC, 2012a)

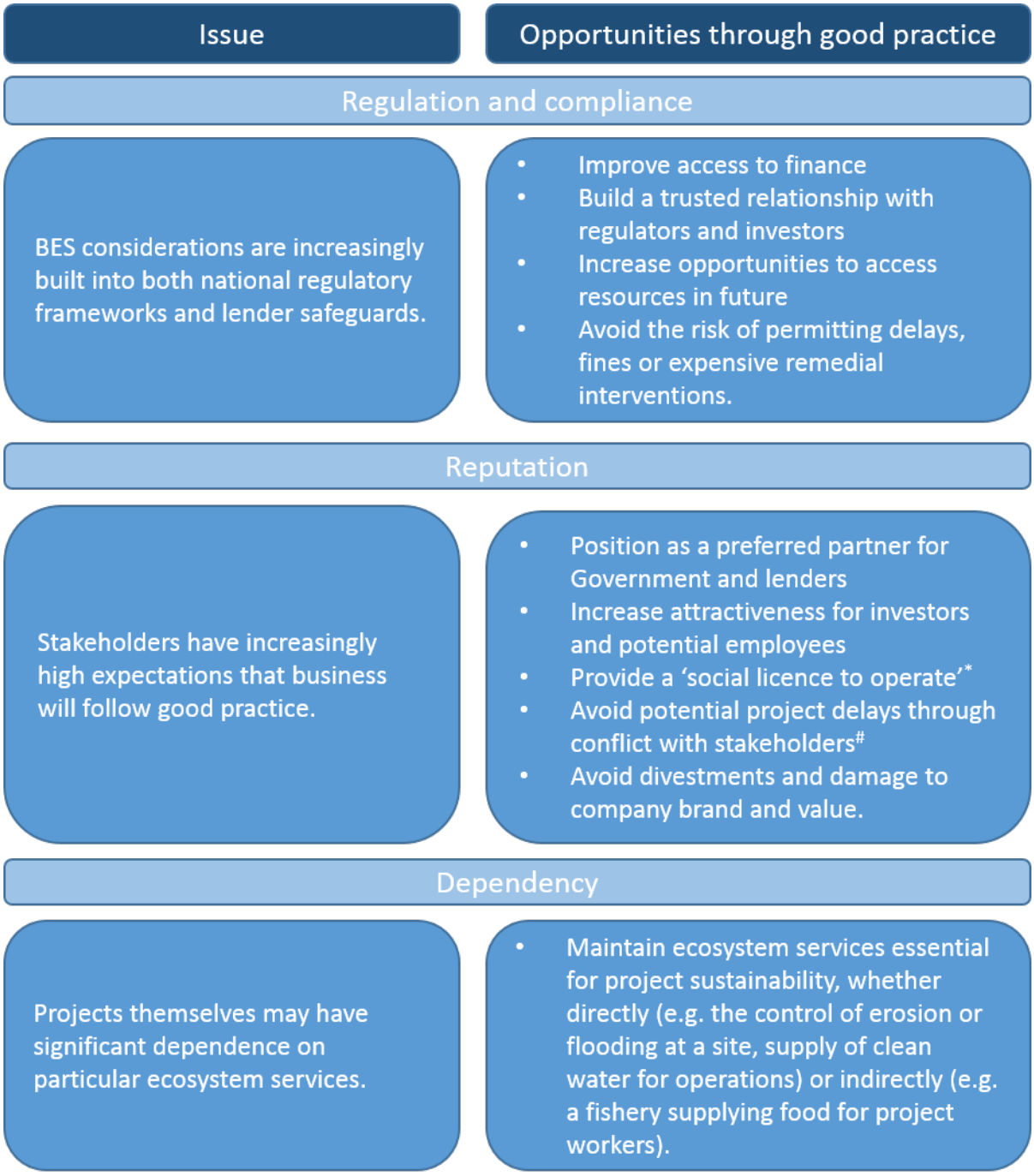

Figure 4: The business case for BES management: issues and opportunities.

*'Social licence to operate' - see[7] &[8]. #Given modern communications and growing awareness, local communities and other stakeholders have a significant ability to slow or stop project progress if transparent good practice is not followed.

5.3 Integrating BES into decision-making

5.3.1 BES Governance

For government, mainstreaming BES effectively into decision-making for EI may require strengthening of law and policy, institutional and individual capacity, and the information base. Five key, interlinked practical elements need to be in place for improved management of BES in relation to EI:

- Robust legal and policy framework for BES
- Coherent, integrated development planning
- Relevant, accessible BES information
- An independent and effective BES management authority
- Skilled domestic BES consultants.

These points are explained in more detail in Section 9.2).

Important to highlight is the need for joined-up planning and decision-making that brings together relevant Ministries across government. Plans that consider one sector alone with no wider context, e.g. only for Protected Areas or for mining concessions, are a recipe for subsequent conflict and confusion (Section 6.2). Governments need to balance immediate economic opportunities with considerations of long-term ecological sustainability, and with national and international commitments to biodiversity conservation.

5.3.2 BES Management Strategy

For business, BES should be considered a strategic issue in corporate or project risk management frameworks. Figure 5 below shows steps to developing a comprehensive BES management approach, and Figure 6 the elements this might contain. A growing number of corporates are also making public commitments to good-practice goals for BES management, such as No Net Loss of priority features. [9]

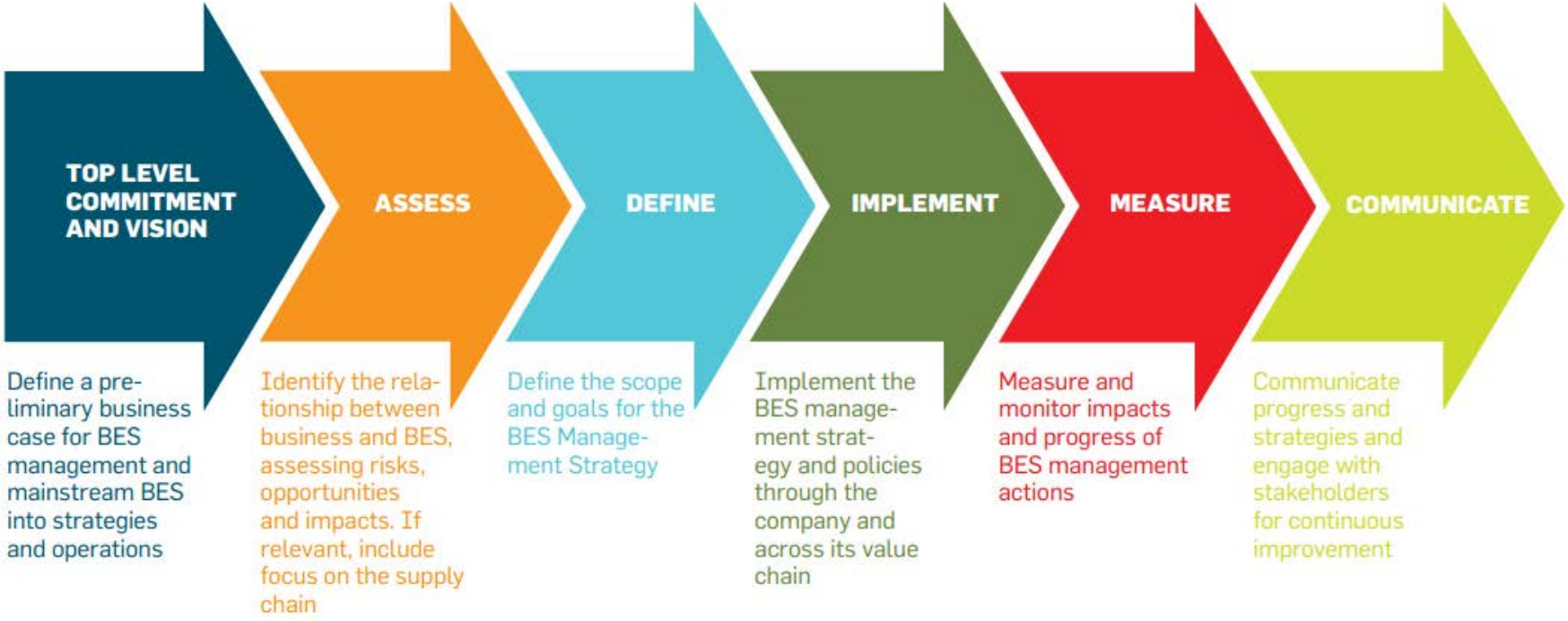

Figure 5: Steps to developing a comprehensive corporate BES Management approach (from UN Global Compact, 2012)

Identify BES dependencies and impacts	• See Section 5
Adopt the mitigation hierarchy	• Avoid, minimize and restore negative impacts, and then offset any unavoidable residual BES losses (see Section 6)
Start application of the mitigation hierarchy as early as possible	• To inform key planning and engineering decisions: the CSBI Timeline Tool demonstrates this approach (see Box C)
Strive to set BES targets	• Focus on achieving a net gain or at the minimum no net loss[1]
Identify landscape level ecosystem linkages	• Go beyond the operational site boundaries, and build linkages into operational plans
Contribute to local community development	• Respect land and land-use rights and safeguard livelihoods that depend on local natural resources
Engage with stakeholders	• To advance common goals and meet both environmental and social needs (see Section X)
Monitor, evaluate and report on BES impacts	• Build these results into company strategy and overall corporate sustainability (see Section 7)
Contribute to shaping public policies	• Enabling better integration of BES issues into business activities and creating a level playing field (see Section 7.3)
Extend the BES strategy along the supply chain	• Provide support to suppliers to follow the strategy and promote responsibility throughout the chain
Establish partnerships with others	• Partner with businesses, NGOs or Universities (among others) to amplify positive impacts and support BES policy implementation.

Figure 6. Elements to incorporate within a BES Management Strategy (summarised from UN Global Compact[5]):

The Implementation step of Figure 6 is perhaps the most challenging. The International Association of Oil and Gas Producers (IOGP) and IPIECA (the global oil and gas industry association for environmental and social issues) have produced a framework[10] that identifies four fundamentals for effectively operationalising BES management, with ten organisational elements (see Figure 7), intended to control risk and improve performance. For each of these elements, the framework provides a purpose statement and a set of expectations that define the intended outcome, plus a systematic and auditable 'Plan-Do-Check-Act' (PDCA) cycle.

Figure 7: The Operational Management System framework (OGP IPIECA, 2014)

Box B: Important business and BES initiatives
Several important global business initiatives have been formed in recent years to promote good practice in BES management and share experiences and lessons learned. IPIECA (the global oil and gas industry association for environmental and social issues) and the International Council on Mining and Minerals (ICMM) have developed an extensive range of guidance, reports and case studies on BES issues for their members, which are available on their websites.

The Cross-Sector Biodiversity Initiative (CSBI) is a partnership between IPIECA, ICMM and the Equator Principles Association, to develop and share good BES practices in the extractive industries. The initiative supports innovation and transparent application of the mitigation hierarchy and has two main work streams: tools and guidance, and knowledge sharing.

The Business and Biodiversity Offsets Programme (BBOP) is a voluntary collaboration of more than 90 companies, financial institutions, government agencies and civil society organisations working together to test and develop best practice in application of the mitigation hierarchy (see Section 8.2). BBOP has developed a set of principles and methods based on business experience to help developers demonstrate no net loss or net gain of biodiversity.

The International Union for the Conservation of Nature (IUCN) has a number of policy positions on the interface between extractive industries and biodiversity, resulting from different Resolutions and Recommendations adopted by IUCN Members. The Business and Biodiversity Programme is one example of IUCN's positions on extractive industries and supports private sector partners in addressing environmental and social issues. The Programme connects stakeholders, conducts independent scientific assessments and develops conservation policy standards and tools. Key resources for the extractives industry include Integrating Mining and Biodiversity Conservation: Case studies from around the world, Good Practice Guidance for Mining and Biodiversity, and Partnership for biodiversity: Making biodiversity part of business.

Box C: Managing ecosystem services vs biodiversity: similarities and differences

Biodiversity and ecosystem services are interlinked but distinct. Biodiversity represents the stock of nature (genes, species and ecosystems). Ecosystem services are the benefits to people flowing from this stock when it is combined into integrated and functioning systems.

- Ecosystem services assessment must focus on people as well as environment: it requires stakeholder consultation and both sociological and ecological expertise. In an ESIA process, the social and environmental components need to be brought together.
- Impacts on biodiversity and ecosystem services may be spatially different. Affected Communities (stakeholders reliant on an ecosystem service that is affected by the project) typically live close to the project site. This isn't always so – for example, impacts on water supply or quality could affect distant communities downstream.
- The project itself may depend on specific ecosystem services – so that its viability depends on maintaining these.
- Offsets for ecosystem services have to deliver to the Affected Communities, so may need to be separate from offsets for biodiversity.

- There may be a gap in time between biodiversity losses from impacts and gains from restoration or offsets. Time-lags for biodiversity mitigation are not ideal, but may be acceptable to stakeholders. However, time lags in ecosystem service provision are usually unacceptable to Affected Communities.
- Sometimes lost ecosystem services can only be compensated through an engineering solution (e.g. a borehole substituting flowing surface water) and/or through money. These approaches are usually not viable for compensating biodiversity impacts.
- It may not be possible to offset some biodiversity losses or to compensate for some ecosystem service losses (e.g. spiritual values). Such cases may constitute serious risks to project viability.
- In practice, there can be complex trade-offs between provision of different ecosystem services, services provided to different stakeholder groups, and biodiversity and ecosystem services. Where this is so a thorough understanding is needed of trade-offs and dependencies, with extensive stakeholder consultation and (likely) significant negotiation.
- Affected Communities may rely on ecosystem services that are accessed unlawfully (e.g. illegal timber cutting or bushmeat harvesting). These may seem outside the project's responsibility, but associated risks still need to be managed. Care is needed.
- It may be more complex to assess ecosystem services than biodiversity. Assessment may involve substantial mapping, measurement and modelling. Though a newer field than biodiversity assessment, there are many tools available in support: see Section 5.4.

5.4 Additional resources

- Cross-Sector Biodiversity Initiative and CSBI Timeline Tool – joint initiative for developing and promoting biodiversity good practice in the extractive industries.
- Ecosystem service modelling tools such as InVEST (www.naturalcapitalproject.org/InVEST.html) or ARIES.
- International Finance Corporation (2012) Performance Standard 6. Biodiversity Conservation and Sustainable Management of Living Natural Resources.
- IPIECA/OGP: Ecosystem services guidance. Biodiversity and ecosystem services guide and checklists. OGP Report Number 461.
- IUCN – Holcim: Partnership for biodiversity: Making biodiversity part of business
- South African National Biodiversity Institute (SANBI) – institute leading, coordinating, monitoring and reporting on state of biodiversity in South Africa
- UN Global Compact and IUCN (2012) A Framework for Corporate Action on Biodiversity and Ecosystem Services. <https://cmsdata.iucn.org/downloads/biodiversity2012.pdf>
- World Resources Institute: Weaving Ecosystem Services into Impact Assessment. A Step-by-Step Method

6 Long before development begins - strategic assessment and early screening

6.1 Summary of key points

Government

- Plans relating to EI need to bring together economic, social and environmental considerations via a Strategic Environmental Assessment (SEA) process
- An SEA *before* projects begin planning provides the framework for individual Environmental and Social Impact Assessments (ESIAs). It can help clarify trade-offs between BES and industry, reduce the assessment burden on companies and create a better investment climate
- Regulations should encourage BES risk screening at the earliest stage of project planning
- Good practice BES risk-screening and assessment takes into account the wider landscape or seascape.

Developers

- An early-stage screening process is crucial to identify priority BES, take advantage of options to avoid impacts, and identify gaps for baseline surveys
- Good practice BES risk-screening and assessment takes into account the wider landscape or seascape
- Stakeholders should be engaged as early in the process as possible.

Lenders, local communities, non-governmental organizations

- The BES risk profile early in the project lifecycle allows proper consideration of stakeholder input before project development progresses.

6.2 Integrating BES with economic and land-use planning

Often there is a potential conflict between conserving what is above the ground or sea-bed and extracting what is underneath it. Such conflicts are best dealt with by planning in advance, not after they have arisen. This can be done through a strategic approach to economic and land-use planning that fully integrates BES. Such an approach can help ensure that both development and conservation targets are met, highlight priorities for investment, and explicitly consider and resolve trade-offs between competing goals.

Local, regional and national Governments produce many plans relating to land- or sea-use. Examples are national or provincial Development Plans, Poverty Reduction Strategy Papers, National Adaptation Plans for climate change and National Biodiversity Strategies and Action Plans (NBSAPs). SADC as a regional body has produced a Regional Indicative Strategic Development Plan, as well as the Regional Biodiversity Strategy.

Often these plans are narrowly sectoral, setting up potential for conflict where their priorities overlap. A multi-stakeholder, multi-sectoral approach to planning is more effective, so that plans fully incorporate environmental, social and economic considerations, consider long-term sustainability, and support and align fully with other national plans and policies. Availability and exchange between sectors of good information on

available resources and opportunities for development from each sector are critical to inform strategic planning and decision-making.

Strategic Environmental Assessment (SEA) is a general term for a process and approach that integrates BES with economic and land-use planning. SEA in essence involves systematically identifying the environmental consequences of proposed policies, plans or programmes, so that they are fully included and appropriately addressed, on a par with economic and social considerations. The SEA approach could be applied to any of the plans mentioned above, wherever and whenever it is clear that environmental considerations need to be mainstreamed into planning.

SEAs may thus take many different forms. Typically it might be applied to an entire sector (such as a national policy on extractive industry, for example) or to a geographical area (for example, in the context of a regional or local development plan). SEA can also be applied at regional level and for transboundary co-operation (see Box D). SEA provides the context for individual development projects, and can help to streamline and focus the decision-making process and make project-level ESIA a more effective process. Individual ESIAs should fit within the framework of the SEA, as projects that have been anticipated, planned for and (while still needing scrutiny for BES and other impacts) given a degree of pre-approval.

Where multiple extractive projects are anticipated to take place, in a region or nationally, conducting a SEA is strongly recommended. This allows cumulative impacts (see also 7.3.1) to be assessed and managed better, options for avoiding sensitive BES to be explored, and possibilities for shared infrastructure to be identified. Such an SEA helps to clarify trade-offs between BES and industry, reduce the assessment burden on companies and create a better investment climate.

SEA works by structuring public and government debate, feeding this through a robust assessment of environmental consequences in relation to social and economic aspects, and ensuring that the results inform decision-making and implementation. The SEA process is usually led (or at least endorsed) by government but should bring together stakeholders to debate in a transparent manner, using relevant and high-quality information. Steps in a good-practice SEA are shown in Figure 8.

A SEA is no help if it is not used to inform decision-making. A genuinely cross-sectoral SEA that is 'owned' by all the relevant branches of government stands the best chance of being implemented. Although SEAs can be carried out ad-hoc as required, many countries now mandate a SEA process by law in particular circumstances.

A SEA is also ineffective if it is not supported by the legal regimes for land- and sea-use. It is not uncommon to find conflicting legal provisions relating to (for example) Protected Areas and to prospecting and resource extraction. Any 'no go' areas for extraction (e.g. in World Heritage Sites, as recommended by the World Heritage Committee[11]) should have a clear legal basis. The rules under which extraction can be considered elsewhere (e.g. No Net Loss of sensitive biodiversity) should also be clearly specified.

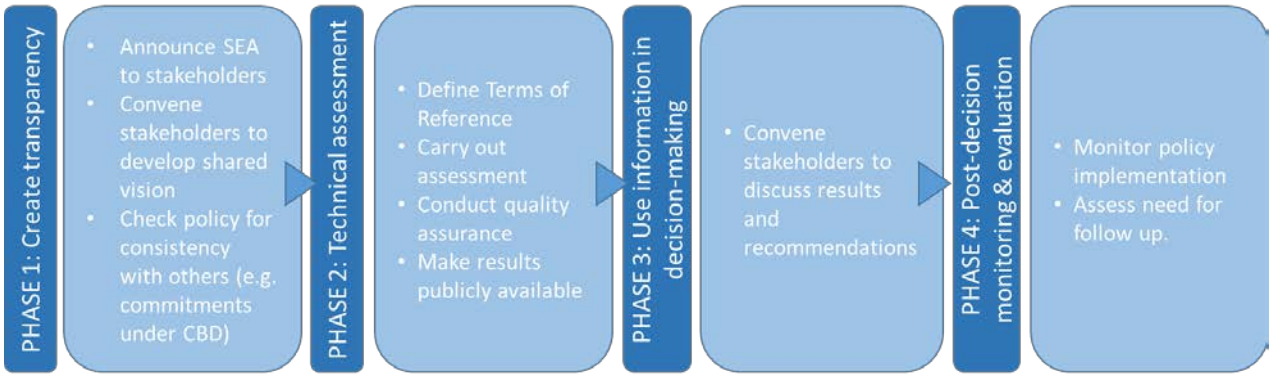

Figure 8. Steps in a good-practice SEA[E]

Box D: Transboundary issues

The SADC comprises fifteen Member States. The region's biodiversity and ecosystem services are generally not demarcated along national boundaries, so transboundary issues are important[12]. SADC has already explored transboundary co-operation, driven by the need to better manage shared resources, promote peace and security, and strengthen economic growth through regional integration and development[13,F]. The large-scale landscape/seascape approach to BES management is also a driver for transboundary cooperation. In addition, the World Heritage Convention explicitly requests State Parties of the Convention not to undertake activities that can damage World Heritage properties in other countries, therefore also requiring effective transboundary coordination, where sites are across borders or where there may be impacts across borders.

Transboundary BES management can build on existing approaches developed by SADC, such as Trans-frontier Conservation Areas (TFCAs) and Trans-boundary Natural Resources Management (TBNRM). This could be through mechanisms such as transboundary Strategic Environmental Impact Assessments for shared ecoregions, aggregated BES offsets (see Box I) that span borders, and mitigation measures to maintain or promote transboundary ecological connectivity. The SADC treaty may already provide an adequate legal framework for some mechanisms, but bilateral agreements may need to be negotiated to underpin others.

6.3 Thinking big: considering the wider landscape or seascape

A large-scale, landscape or seascape approach to managing BES is important for several reasons:

[E] Adapted from Convention on Biological Diversity. 2006. COP 8 Decision 28 Annex. Voluntary guidelines on biodiversity-inclusive impact assessment.

[F] The drive for economic integration is a rationale for the SADC Treaty, the founding document for the establishment of SADC.

6.3.1 Ecological context and linkages

The project site will be part of a larger suite of habitats with ecological interconnections. BES risks are better understood when considered in relation to the surrounding area. Landscape or seascape-scale assessment will look at:

- What values and sensitivities exist at the site and in its surrounds?
- How is the site ecologically linked to the landscape – for example, upstream or downstream effects; habitat fragmentation and connectivity; linear features (rivers and riparian vegetation, reefs, hills)?
- How do any migratory species use and move across the land- or sea-scape?
- What is the wider range and distribution of specific BES values at the project site?

6.3.2 Wider impacts:

Impacts are rarely confined to the project footprint. The spatial scope of impacts (direct or indirect, and cumulative) may extend well beyond this. Potential impacts on connectivity need to be considered too.

6.3.3 Opportunities:

At the earliest planning stage, a landscape or seascape scale approach is needed to spot opportunities for avoidance by site selection, if that is feasible (see Section 5.3). A large-scale overview is also important for identifying potential opportunities for offsets, if those are needed to achieve No Net Loss/Net Gain goals.

6.4 Screening/scoping BES risks and opportunities

Screening BES-related risks and opportunities is best undertaken *as early as possible in the planning process*. This allows an understanding of BES issues to inform all project decisions, maximizing the options to reduce impacts and minimizing the risk that plans might need expensive readjustment later.

Developing an early BES risk profile is a key step in BES management. Production of the risk profile requires an understanding of:

- Which BES features should be considered a priority;
- What is the conservation status of those features (global/national/local);
- What are the threats to these features; and
- How is the potential significance of a given impact determined?

It is beneficial for the criteria for prioritizing BES features to be established at the regulatory level, such that the national strategic context is taken into account, and subsequent project-specific risk assessments are standardized. IFC PS6 is one example of a framework for prioritizing BES features (see Box A). In some cases, such as Protected Areas (PAs) (see Box E), it may be clear that certain BES features are considered high value. The extent to which development in these areas is permitted depends on the regulatory framework. This risk is addressed by:

- Identifying the BES features for which the PA was established;
- Screen those BES features for priority status (according to regulatory criteria, or good practice standards such as IFC PS6); and
- Apply the Mitigation Hierarchy (see Section 8).

The screening/scoping stage involves only a high-level risk profile, usually confined to desktop work, to understand the nature and type of potential BES impact across a landscape or seascape. This pre-ESIA screening process often allows more effective avoidance and minimization of impacts (where feasible, see Section 8.3), and better scoping of the ESIA itself. A robust baseline is needed to properly understand BES risks and opportunities, but the detail needed depends on context.

Screening is focused on presence/absence data on potential risks that will inform subsequent planning and assessment (e.g. impact assessment or other detailed studies). This will draw on:

- Relevant national datasets, where available, as in SANBI Biodiversity Advisor for South Africa or national Red List assessments. These are likely to provide the most detailed and useful information.
- Global datasets such as those in IBAT[G]
- Relevant studies (e.g. ESIAs for neighbouring areas)
- Local experts.

The resulting risk profile forms the basis for subsequent detailed baseline studies to inform ESIA.

Screening should aim to identify where there may be gaps in the information needed for more detailed baseline assessment. This sets the agenda for subsequent baseline survey work (in the field or by remote sensing) to establish the distribution and abundance of priority BES features and more accurately assess potential impacts.

[G] The Integrated Biodiversity Assessment Tool (IBAT) www.ibatforbusiness.org brings together some of the most valuable global datasets for BES risk screening, and integrates these in a spatial interface. These include the World Database on Protected Areas (WDPA), the IUCN Red List of Threatened Species, and the Key Biodiversity Areas database (including Important Bird & Biodiversity Areas). These datasets are co-ordinated, checked and curated by the IBAT partners – BirdLife International, Conservation International, IUCN and the UNEP World Conservation Monitoring Centre (UNEP-WCMC).

Box E: Risk Screening, Protected Areas and other sensitive sites

A risk screening for BES will look at sensitive species, ecosystems and sites in the landscapes or seascapes that intersect with the project's area of influence. Sensitive sites include nationally or internationally recognised Protected Areas, and Key Biodiversity Areas (including Important Bird and Biodiversity Areas),

In some categories of sites, in some countries, EI development in such sites may be legally constrained. If development is permitted in principle in or near a sensitive site, it must be managed with great care to avoid damage to important BES, regulatory or financing delays, and potential opposition from stakeholders.

All SADC countries have networks of Protected Areas[H]. As well as sites designated under provincial, national or international law, there may be sites that are conserved by communities or privately-owned reserves Each Protected Areas network constitutes important Natural Capital, and EI development in or near Protected Areas should not risk undermining their integrity.

Because Protected Area nomenclature varies greatly between countries, IUCN has developed a classification of Protected Areas based on six management categories, ranging from Strict Nature Reserve to Protected Areas with Sustainable Use of Natural Resources[14]. These correspond roughly with levels of restriction on human use and include most of the kinds of sites that are protected in practice, across a wide range of governance arrangements. The legal regime for EI in Protected Areas differs from country to country. Very broadly, the higher the IUCN category (Category I being the highest) the more constraints (legal and otherwise) are likely to be placed on EI developments.

IFC's Performance Standard 6, an international benchmark for good practice (see Box A), notes that PAs in IUCN Categories I-II will qualify as Critical Habitat, requiring that development projects achieve a Net Gain for priority biodiversity features. Sites in categories III-VI may also qualify, depending on the biodiversity features they contain. UNESCO World Heritage Sites and Ramsar Wetlands of International Importance (two kinds of Protected Areas designated under international agreements) will also qualify automatically as Critical Habitat[15].

IUCN (as advisor to the World Heritage Convention) has called on governments not to allow any EI development within World Heritage Sites, and to avoid EI development elsewhere that could damage World Heritage sites[16] - reinforced by a policy around this adopted by the World Heritage Committee[11]. A number of extractives companies have made voluntary commitments not to explore or operate in World Heritage Sites.

Ramsar sites, on the other hand, are designated in accordance with the concept of Wise Use of wetlands – "the maintenance of their ecological character, achieved through the implementation of ecosystem approaches, within the context of sustainable development."

Key Biodiversity Areas are the world's most important sites for biodiversity, identified via a set of criteria based on the vulnerability and irreplaceability of their biodiversity features. KBAs have been identified and mapped globally for birds (BirdLife International's Important Bird and Biodiversity Areas) and less comprehensively for other taxonomic groups (this process is ongoing). Although KBAs overlap substantially with Protected Areas, many KBAs remain partly or entirely unprotected.

Risk screening must thus consider unprotected KBAs and other important sensitive sites, as well as Protected Areas. IFC PS6 notes that many KBAs (though not all) will be classed as Critical Habitat,

depending on the criteria used to identify them. One subset of KBAs, Alliance for Zero Extinction[I] sites, will all be classed as Critical Habitat.

There may be national datasets available on sensitive sites and Protected Areas. A global compilation of the most recent spatial and associated data for Protected Areas and KBAs can be accessed via IBAT, the Integrated Biodiversity Assessment Tool[G].

7 When development begins – integrating BES to ensure sustainability

7.1 Summary of key points

Government

- Regulations should set out clear criteria for identifying priority BES features
- BES assessment covers potential direct, indirect and cumulative impacts. Government has a key role in responding to potential indirect and cumulative impacts alongside developers.

Developers

- Baseline surveys should be thorough enough to provide reliable information, but carefully targeted at identified priorities and data gaps.
- BES assessment should cover potential direct, indirect and cumulative impacts, and may consider potential perceived impacts.
- Environmental and Social Impact Assessment (ESIA) is a process, not simply a one-off product
- BES impact assessment needs to begin in advance of the ESIA and continue afterwards. During the ESIA a repeated, iterative process is needed to ensure that BES objectives can be met
- Ecosystem services assessment requires environmental and social components of the ESIA to work closely together
- Early engagement of stakeholders is key to the assessment process.

Lenders, local communities, non-governmental organizations

- Stakeholders can help shape the BES objectives for EI projects.

7.2 Baseline and targeted BES surveys

The BES Risk Profile will highlight any gaps in the information needed to assess BES impacts and plan mitigation. Targeted surveys (in the field, possibly combined with remote sensing) will be needed to fill these gaps. Surveys will also usually be needed to assess the status of priority BES features, providing baselines for

[H] IUCN defines Protected Areas as 'A clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values.'

[I] AZE sites contain all (or very nearly all) the remaining global population of highly threatened (Critically Endangered or Endangered) species.

impact assessment, future monitoring and selection of mitigation measures. These surveys should be quantitative, based on good-practice scientific protocols, and repeatable to allow monitoring of change.

Surveys can be a costly undertaking. Survey design and implementation is usually best carried out by independent specialists. Gullison et al. (2015)[17] provide up-to-date guidance on BES surveys for EI. Baseline surveys should feed information back into national biodiversity databases to strengthen information holdings on BES (see Section 499.2).

7.3 Potential project impacts on BES

Good management of potential BES impacts depends on a clear understanding of their type, cause and magnitude, and of the project dependencies on BES features.

7.3.1 Categories of project impact

Table 1 describes the categories of impact that may be associated with a project. Indirect impacts are a secondary consequence of the project but they may be just as significant as direct impacts (or even more so).

Table 1: Categories of project impact

Category	*Description*
Direct	Impacts directly linked to project activity. These may happen at the project site or beyond it, and at the time of project activity or later. For example: • Natural habitat removed by land clearance and blasting within the project site • Ecological change and reduction in water availability downstream caused by project water abstraction • Habitat degradation outside the project site from dust originating within it, after project closure.
Indirect[17]	Impacts indirectly induced by the project, usually through changes in socio-economic dynamics. May also be called Induced or Secondary impacts. For example: • Charcoal burning and illegal hunting stimulated by in-migration to the project area • Vehicle-wildlife collisions from increased non-project traffic on a road upgraded by the project • Habitat clearance for small-scale agriculture in areas newly accessible along a project pipeline route.
Cumulative	The project's own impacts combined with the impacts from others (past, current or reasonably foreseeable future projects affecting the same biodiversity or natural resources (e.g. from a number of mines in the same water catchment or ecosystem); individual minor impacts can add up to major ones across many projects
Perceived	Impacts (actual or potential) that are perceived by stakeholders as being caused by the project, although they may have other causes in reality (e.g. reduced wetland

water levels caused by an irrigation project upstream, but perceived to be caused by the project's water extraction).

7.3.2 BES impact assessment

BES impact assessment should aim at understanding the significance of impacts (which could be on the composition of biodiversity, its structure or pattern, or on ecosystem function[18]). Significance depends on the scale of the impact (how long it lasts, what area it affects, and its intensity where and when it operates), the sensitivity of the biodiversity feature(s) affected (their vulnerability and irreplaceability) and/or the concerns of relevant stakeholders. Frameworks such as IFC PS6 (see Box A) provide methods for determining sensitivity of features (in this case, qualification as Critical or Natural Habitat, or as a priority ecosystem service). Mitigation measures should clearly focus where there is a risk of significant impact occurring. The greater the risk, the greater the attention needed for mitigation.

7.3.3 Responses to project impacts

The nature of project response to impacts varies according to the category of impact (Figure 9). Usually, developers will be required to mitigate direct project impacts. However, indirect, cumulative and perceived impacts may be at least partly beyond a developer's control. Both local and national government have a role to play here, along with civil society, partnering with developers so as to address these kinds of impacts.

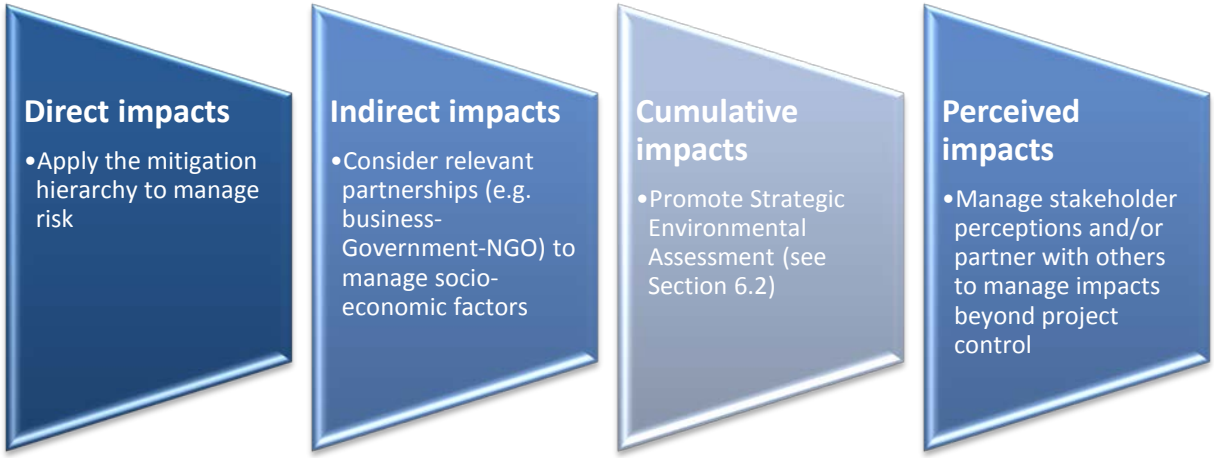

Figure 9: Appropriate responses to different classes of impact

7.4 Setting BES objectives

The screening/scoping exercise helps to define BES objectives. These should be linked to the potential BES risks, opportunities and specific impacts associated with a plan or project. BES objectives should be developed in consultation with all relevant stakeholders (see Box F). Preferably they are expressed as specific, measurable targets.

For policy and strategic planning, BES objectives are often related to the broad-scale implications of extractive industry activity in a given region. They may also be aimed at influencing industry behaviours with respect to BES features. Examples of regional and strategic BES objectives include:

- Enhancement of biodiversity and conservation management systems in a given region;
- Promotion of the sustainable use of biodiversity for improved economic growth and poverty reduction.

At the project level, BES objectives usually focus on specific species, habitats or ecosystem services where potential impacts may be significant. Targets will usually be determined by alignment with the risk management framework(s) in which a project is operating, e.g.

- Lender safeguards, e.g. IFC's requirement for NNL of Natural Habitat and Net Gain of Critical Habitat
- National regulatory requirements, e.g. to avoid downstream impacts on Protected Areas
- Corporate commitments, e.g. to ensure no negative impacts on World Heritage Sites
- Significant stakeholder concerns, e.g. maintenance of an artisanal fishery.

It may be necessary to develop different objectives according to different aspects of the project or landscape, depending on the BES aspects identified and the requirements and opportunities to mitigate impacts. An additional important consideration is the development of action plans and related budgets to respond to emergencies and accidents during operations. Examples of project-level BES objectives include:

- Successful reintroduction of key native flora or fauna species to mined areas;
- Full maintenance of migration/movement patterns;
- Protection of (and non-interference with) designated high conservation value sites; and
- Control of weeds and other pest species.

Actions to achieve the nominated objectives should be developed and then documented through Biodiversity Strategies (government/regional) or Action Plans (developer/project level) and/or within project Environmental and Social Management Systems (ESMS). An example template is given in Figure 10. Projects should set specific, realistic and measurable targets and associated budgets that are linked into the overall rehabilitation and end-of-project (e.g. mine closure) strategy. Each target should take into account availability of resources, any technical limitations, the expertise of personnel and contractors, views of landowners and the community, as well as long-term land management requirements.

Objective: Protection and restoration of wet grassland habitat for Southern Skimmer Dragonfly	
Action	Develop and implement community management project for sustainable grass harvesting
Priority	High
Owner	Environment and Communities Manager
Milestones	1. Management Agreement signed with Local Conservation Group - by July 20XX
	2. Monitoring shows 40% improvement in grassland quality index - by Dec 20XX
	3. Monitoring shows 50% increase in Southern Skimmer population - by Jun 20XX
Status	Not started

Figure 10. Example template for documenting BES management actions (extract from a hypothetical Biodiversity Action Plan)

Box F: Stakeholder engagement

A key element of leading practice in BES management is engagement with relevant stakeholder groups who have an interest in, or concern about, the project and its impacts. Stakeholders may include regulators, national or international NGOs, expert partners, local communities and beneficiaries of priority ecosystem services. Stakeholder engagement is as important during Strategic Environmental Assessment (Section 6.2) as it is for an individual project ESIA.

The first step in stakeholder engagement is a mapping exercise to understand who the relevant internal and external stakeholders are, noting that different aspects of risk management may have different categories of stakeholder. Stakeholder identification is an on-going process, with some stakeholders becoming more or less important as the project progresses. It should not be isolated from other company stakeholder engagement processes. The nature and location of the project are important in determining which groups should be consulted: however, proximity to the project is not necessarily a good indicator of stakeholder importance.

Engagement with stakeholders can take many forms and serve a variety of purposes. Stakeholders may be valuable as:

- Sources of biodiversity baseline or monitoring information and data (landholders, indigenous communities, universities and researchers, state environmental departments and NGOs);
- Land management partners (indigenous and local communities and NGOs);
- Groups potentially affected by project-related impacts on biodiversity (indigenous and local communities, regulators and individuals/organisations with an interest in the region's biodiversity).

Useful guidance on working with stakeholders can be found in IFC (2007) Stakeholder Engagement: A Good Practice Handbook for Companies Doing Business in Emerging Markets and for EI in the ICMM Good Practice Guidance for Mining and Biodiversity. The Australian Leading Practice Sustainable Development Program for the Mining Industry[19,20] has developed useful information on working with indigenous and local communities.

7.5 Integrating BES with the ESIA process

Regulatory frameworks nearly always require an Environmental and Social Impact Assessment (ESIA). Often, this is their main requirement and the document on which project approval is decided. The ESIA is the main tool for designing mitigation measures for priority BES features. It draws on BES risk-screening and baseline surveys and in turn should evolve into a detailed plan for implementation (Figure 1). For BES management, it is this important that impact assessment begins in advance of the ESIA, continues afterwards, and follows a repeated, iterative process during it to ensure that BES objectives can be met. Figure 11 below illustrates this in more detail.

A good quality ESIA is informed by the risk profile established in the screening/scoping exercise and addresses the data gaps and priority BES features identified. The ESIA process aims to identify, assess, mitigate and document potential environmental and social impacts arising from a given project or activity. Following the high level screening, more detailed baseline surveys will be required (see Section 7.2).

Assessment of BES impacts and dependencies has three major strands. These are closely related but require different methods and types of expertise:

1. Assessment of a project's potential impacts on biodiversity features;
2. Assessment of a project's potential impacts on ecosystem services; and
3. Assessment of a project's dependencies upon ecosystem services.

For assessment of ecosystem services impacts and dependencies, it is important to plan for collaboration between biodiversity and social specialists, and for incorporation of the two types of data into the ESIA.

An ESIA covers a wide range of environmental and social issues. For more effective communication and planning, it can be helpful to compile a separate BES Strategy as part of the ESIA documentation. This summarises the key findings of the ESIA relating to BES, and also sets out the proposed approach to mitigation through preventing or remediating impacts. Where there is an overarching BES goal, such as No Net Loss of priority biodiversity features, the Strategy would also include a technical rationale for how No Net Loss is expected to be achieved.

Following the ESIA, the BES Strategy should be expanded into a detailed implementation plan (see Section 9.3 for further detail).

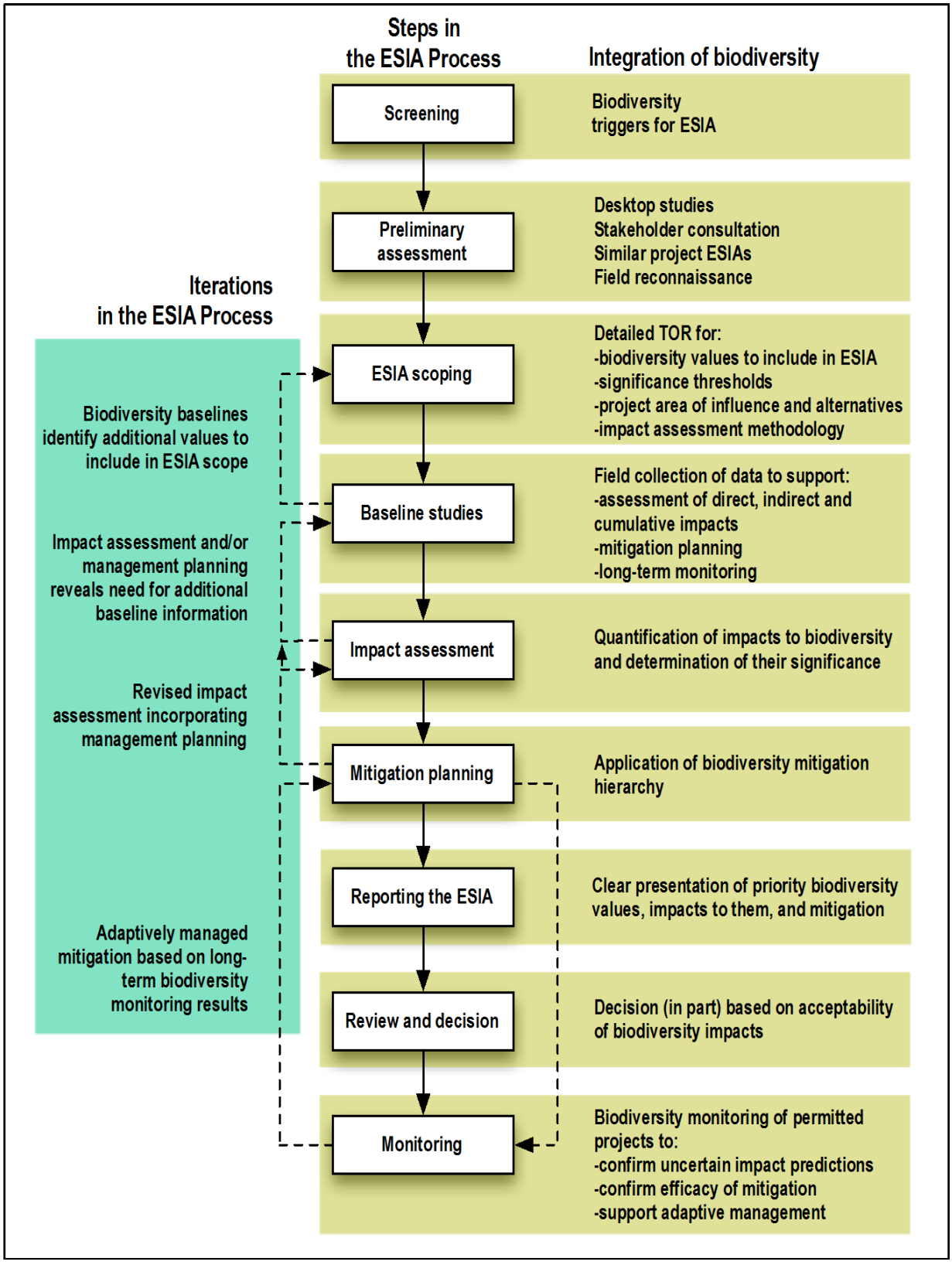

Figure 11: The key steps for BES assessment before, during and after an ESIA. From Hardner et al. 2015[17].

7.6 Additional resources

- BirdLife South Africa: national and global status of South African birds
- EBI 2003. Integrating Biodiversity into Environmental and Social Impact Assessment Processes http://www.theebi.org/pdfs/esia.pdf
- EBI 2003. Negative Secondary Impacts from Oil and Gas Development http://www.theebi.org/pdfs/impacts.pdf
- EBI 2003. Good practice in the prevention and mitigation of primary and secondary biodiversity impacts. http://www.theebi.org/pdfs/practice.pdf : typology of impacts
- IAIA 2005. Biodiversity in Impact Assessment. Special Publications Series No. 3. http://www.iaia.org/publicdocuments/special-publications/SP3.pdf
- International Council on Mining and Metals 2006. Good practice guidance for mining and biodiversity. https://www.icmm.com/document/13 : typology of impacts
- IUCN Red List of Threatened Species: global status of flora and fauna
- IUCN World Heritage Advice Note: Environmental assessment. https://cmsdata.iucn.org/downloads/iucn_advice_note_environmental_assessment_18_11_13_iucn_template.pdf
- SADC Biodiversity Action Plan: information on stakeholders and networking
- South African National Biodiversity Institute: national red list assessments of indigenous plants
- South African Reptile Conservation Assessment

8 Planning to mitigate impacts

8.1 Summary of key points

Government

Regulations should:

- Require rigorous application of the Mitigation Hierarchy, with emphasis on Avoidance and Minimisation
- Provide clarity on whether and how BES objectives can be partially met through BES offsetting, where there are unavoidable residual impacts
- Incorporate good-practice principles for planning and implementing BES offsets, where relevant.

Developers

- Rigorous application of the Mitigation Hierarchy is essential for effective BES risk management
- Early application of the Mitigation Hierarchy can save time and money later in the project cycle
- Where it is feasible, Avoidance offers the best BES outcomes and can often be the most cost-efficient.
- Offsets for biodiversity and for ecosystem services, when required, may need to be developed separately.

Lenders, local communities, non-governmental organizations

- The Mitigation Hierarchy is a transparent and logical tool, providing a standardized structure for stakeholder input
- Rigorous application of the Mitigation Hierarchy is essential for effective BES risk management, and for maintaining stakeholder and investor confidence.

8.2 The Mitigation Hierarchy across the project lifecycle

The Mitigation Hierarchy is a stepwise tool for mitigation planning and a fundamentally important method for managing BES risk and impacts across the EI project cycle. It consists of four components: Avoid, Minimise, Restore and Offset. Figure 1 shows broadly where these components are applied over the project lifecycle.

Detailed guidance on use of the Mitigation Hierarchy for EI can be found in CSBI (2015)[21]. Figure 12 illustrates some of the Mitigation Hierarchy's key characteristics.

In general, there are fewer options and higher risks as each step is taken along the Mitigation Hierarchy. Avoidance tends to be the most effective and reliable step but it is not always feasible – especially for EI projects, where the resource to be extracted is in a specific locality. Beyond Avoidance, mitigation options generally diminish while challenges related to cost, schedule and stakeholders often become more significant.

Although the Mitigation Hierarchy is applied in a stepwise way, this is not usually a simple linear process. To be most effective, the Mitigation Hierarchy is best applied repeatedly during project planning, using information on impacts and costs of mitigation options, to ensure that BES targets can be feasibly met and to maximise cost-effectiveness. Figure 11 (section 4.8) illustrates this iterative process within an ESIA.

The Mitigation Hierarchy can be applied for any project, in any location. There are some specific challenges in its application for aquatic habitats, where experience is less substantial than in the terrestrial realm. These are outlined in Box G.

Figure 12: Key characteristics of the Mitigation Hierarchy

Box G: Mitigation in aquatic environments

To date, most experience in BES management for EI has been in terrestrial systems. However, with, for example, the expansion of oil and gas exploration and of seabed mining, there is a growing recognition and application of the mitigation hierarchy in aquatic environments (see Box H).

Mitigation in aquatic environments is often seen as complex and difficult. However, the principles and methods are largely similar to those on land. Aquatic systems do, though, have some special characteristics that need to be considered[J]. They tend to be spatially complex and interconnected, so that impacts are often diffuse and extend far beyond the direct project footprint. For example, it can be challenging to assess the impact of sediment or pollutants that disperse far from their source, or of underwater noise for highly mobile marine mammal species. The connectivity of aquatic systems also means that many species have complex life histories, inhabiting different ecosystems at different life stages, or at different times of the day or year. Such ecological interactions can make species and ecosystems particularly vulnerable to certain impacts. In contrast, this interconnectedness also means that, under suitable conditions, ecological restoration can sometimes be more rapid and successful.

As yet there are few examples of BES offsets in the marine realm. The same principles (and, usually, regulatory regimes) apply to offsets at sea and on land (Section 8.6). However, unlike on land there are rarely opportunities to purchase or lease areas of sea for use as offsets. This does not rule out offsets at sea but is a constraint on the options available. In practice, some offsets for residual impacts at sea may be situated on land – e.g. to improve land management so as to reduce erosion and chemical pollution.

Box H: Mitigating and managing impacts on ecosystem services

The Mitigation Hierarchy can be applied both for biodiversity and for ecosystem services, in similar ways. Its application for ecosystem services is relatively recent, however, and experience is still accumulating.

Many different ecosystem services could be impacted by a project. The management response should be proportionate, focusing on any services that are of key significance (to stakeholders or to the project) and are also significantly impacted. Consultation with Affected Stakeholders is fundamental to developing mitigation responses, including compensation, that are appropriate and acceptable. In some cases, impacts might not be immediately apparent but could cause issues at some point in the future, for example if flood prevention capacity was compromised.

Assessing and compensating for impacts on ecosystem services necessitates expertise and stakeholder consultation in both the social and environmental arenas. Addressing ecosystem service issues thus requires bringing together both the social and environmental strands of the ESIA process, and later on both the social and environmental teams of the operation itself.

Residual project impacts on ecosystem services and on biodiversity may need to be remediated separately.

Biodiversity and ES maintenance goals can be in conflict, especially for provisioning services, and managing these situations may be challenging, potentially requiring negotiation between different stakeholders.

[J] TBC (2013) Marine and coastal biodiversity offsets

8.3 Avoidance

Avoidance is the first and arguably the most important step in the Mitigation Hierarchy. It is defined as 'measures taken to anticipate and prevent adverse impacts on biodiversity before actions or decisions are taken that could lead to such impacts'. For BES, Avoidance should be considered in the pre-planning stages of a project. There are three broad approaches to Avoidance (Figure 13). If left too late, after key project planning decisions have been taken, cost-effective options can easily be missed.

Avoidance has the advantage of certainty and immediacy. It may be the only way to meet regulatory or lender requirements to avoid impacts on high-value, irreplaceable BES features. However, to be most effective it requires early planning and action, at both landscape and location-specific scales. In some cases, Avoidance may not be feasible (or only partly feasible). This is commonly the case for EI, where resources are in a specific, fixed location.

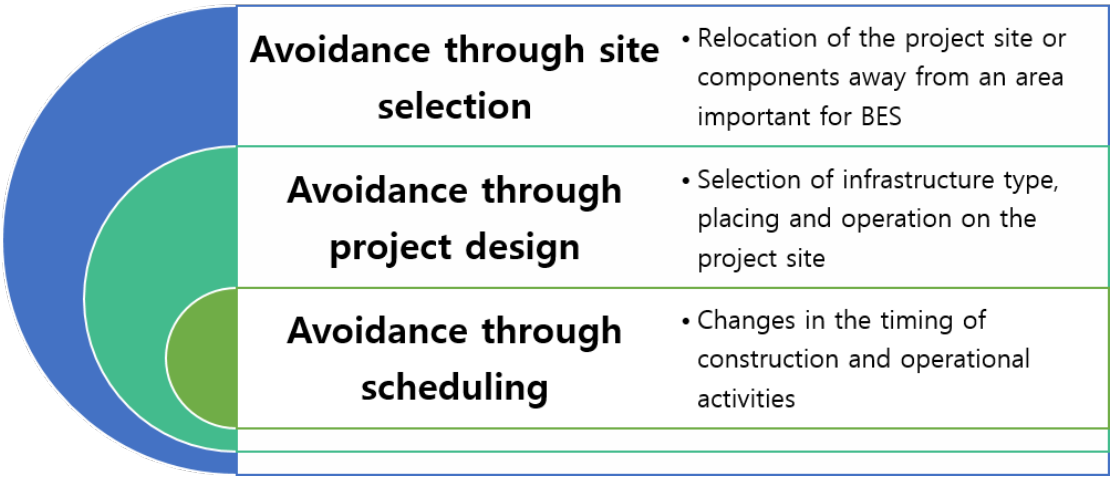

Figure 13: Three broad approaches to Avoidance

In EI projects, other key considerations for Avoidance are to understand the project site within the wider landscape, to use Avoidance throughout the project life cycle where possible; and to compile good information (including maps) on BES values and sensitivities through screening, stakeholder engagement and early field surveys.

Regulatory frameworks can require consideration of Avoidance at the pre-feasibility stage of project planning. Documentation of how Avoidance was considered and implemented (or why it was rejected) can form part of the required ESIA materials (e.g. via Alternatives Analysis). Governments can also mandate Avoidance by specifying 'no go' conditions – e.g. not permitting projects that might impact on certain classes of Protected Areas, or particular highly-threatened species or habitats. Such 'no go' requirements are clear and effective. They can have drawbacks too, but are better set by Government (thus establishing a level playing field) than by individual businesses or lenders.

8.4 Minimisation

Minimisation, the second step in the Mitigation Hierarchy, has a similar rationale to Avoidance. Minimisation is defined as 'measures taken to reduce the duration, intensity, significance and/or extent of impacts (including

direct, indirect and cumulative impacts, as appropriate) that cannot be completely avoided, as far as is practically feasible'[K].

Well-planned Minimisation can be effective, especially if implemented from the early stages of project design. Minimisation can also be used adaptively throughout the project lifespan, e.g. in response to performance monitoring. However, Minimisation is less certain to succeed than Avoidance, and by definition usually results in only the partial mitigation of impacts. Figure 14 shows three broad kinds of Minimisation. Minimisation measures are usually undertaken as a standard component of project Environmental Management Plans. Carefully managed execution and monitoring of these plans is the most important factor ensuring success.

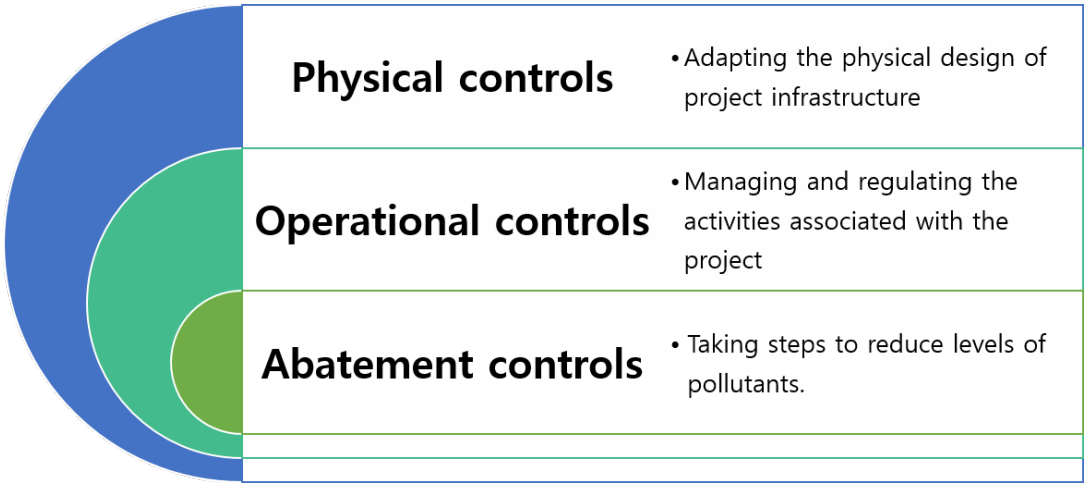

Figure 14: Three broad kinds of Minimisation

8.5 Restoration

In the context of the Mitigation Hierarchy, Restoration refers to measures taken to repair degradation or damage to specific biodiversity features and/or ecosystem services of concern, following project impacts that cannot be completely avoided and/or minimized.

When priority BES features are not the Restoration target, the activity is better termed Rehabilitation and counts as an Additional Conservation Action (see Section 8.6). An ACA may be valuable, but does not contribute directly to BES loss/gain accounting. Rehabilitation and Restoration (as defined here) may often be combined.

Restoration works best when planned early in the project lifecycle, when it involves early trials of different methods, and when techniques of proven success are used. In the best case, Restoration gains can accumulate over time, with decreasing management input as ecological re-establishment thresholds are overcome. Figure 15 shows three considerations for Restoration.

[K] In the Mitigation Hierarchy, and in this guidance, 'Minimisation' is used in a general sense to mean 'reduce' or 'limit' as far as feasible. It is not used in the legal sense current in some jurisdictions, where the term "minimise" means "reduce to zero". In many instances, it is not possible to reduce a biodiversity-related risk or impact to zero, and if it is possible, the net incremental environmental/social benefit may not justify the significant additional cost.

Usually, however, Restoration is more challenging than Avoidance and Minimisation, and often costs more too. Restoration measures are typically slow, with long time lags between losses and gains. This time lag can be a risk for vulnerable species and habitats that are impacted.

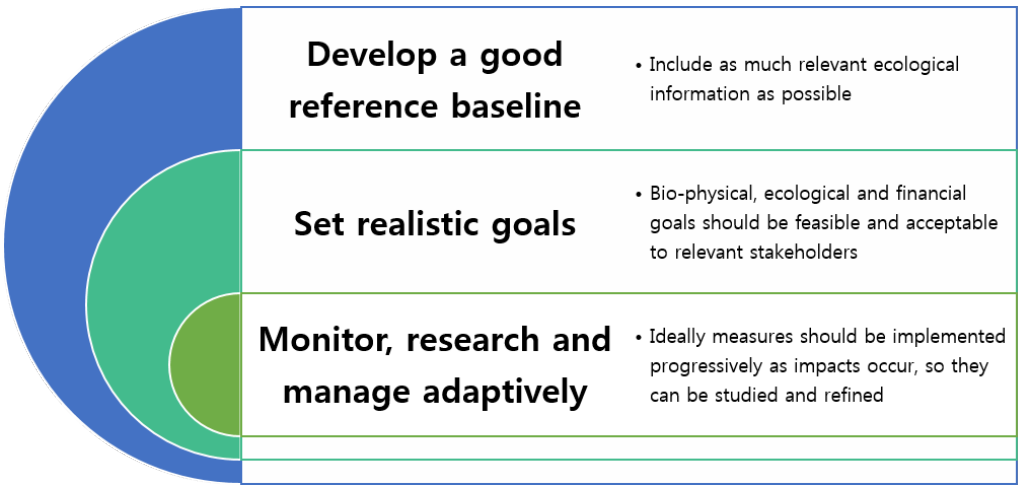

Figure 15: Three key considerations for Restoration

Restoration can hold great promise. However, regulators should be cautious about the BES gains that it can generate, and of its cost-effectiveness. Good practice usually requires some form of rehabilitation of a site, including to restore aesthetic values. It may be possible to direct this so that specific priority BES features are partially restored. This will often be worthwhile in itself and so as to refine restoration techniques. Regulation could mandate transparent sharing of the outcomes of restoration efforts, to facilitate faster learning.

8.6 Biodiversity offsets

Offsets are a measure of last resort to address residual BES impacts, after all other Mitigation Hierarchy components have been fully applied. Offsets can be defined as 'Measurable conservation outcomes, resulting from actions applied to areas not impacted by the project, that compensate for significant, adverse project impacts that cannot be avoided, minimized and/or rehabilitated/restored'[21].

Offsets require a specific and preferably quantitative goal that relates directly to residual project impacts on BES. Practical experience with offsets is still limited, but shows that they can be complex, expensive and uncertain in outcome. The need for Offsets should thus be reduced as far as possible through considered attention to earlier components in the Mitigation Hierarchy. Figure 16 shows the two types of Offset.

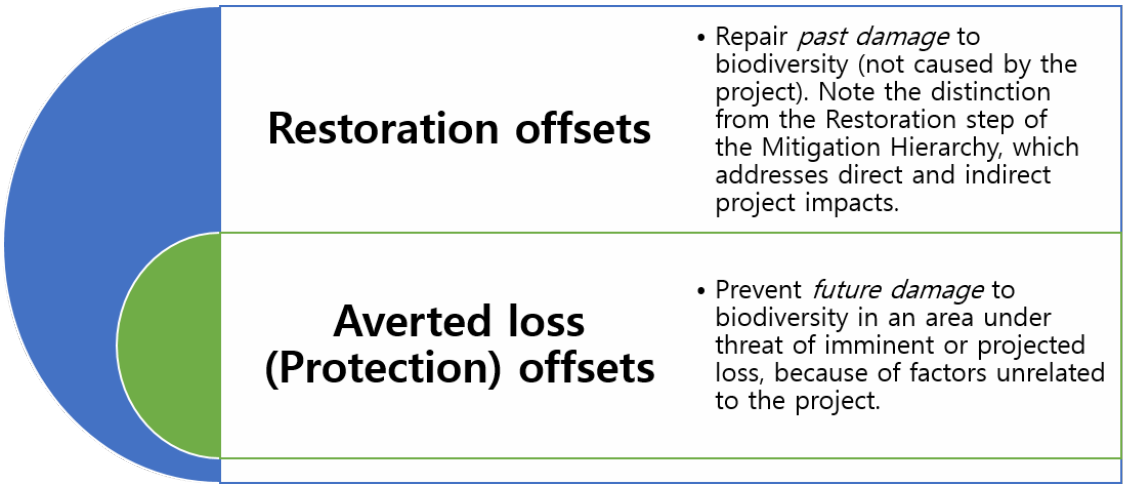

Figure 16: Two types of offset. These can be combined to achieve both outcomes, for example a restoration offset designed to remove invasive species may also protect against future habitat degradation.

In essence, Offsets usually involve improved BES management of areas of land or sea. Offsets may involve setting up new Protected Areas, or in certain circumstances improving the management of existing ones (when Offsets are clearly adding to, rather than replacing, existing or committed resources[22]). Identifying and setting up an appropriate Offset can be time-consuming. Although there may be many theoretically feasible Offsets, fewer options generally remain once technical and socio-political feasibility are assessed. Table 2 shows good-practice principles for Offsets.

Table 2: Good-practice principles for Offsets

Good-practice principles for Offsets*	
Apply the Mitigation Hierarchy	Offsets should compensate only for residual impacts that cannot feasibly be addressed via Avoidance, Minimisation or Rehabilitation. Systematic (and where appropriate iterative) application of the Mitigation Hierarchy is required.
Recognise limits	Not all impacts can be offset. Some impacts may be unacceptable to stakeholders or to regulators.
Ensure equivalence	Biodiversity gains from an offset should offer a fair exchange for what is lost. Generally a direct and clear correspondence of biodiversity features is expected. An exception is 'trading up', where (with regulator/stakeholder agreement) the offset focuses on biodiversity features considered to be higher priorities than those impacted. Time delays between impact and offset gain should be minimised, and any delays accounted for in the design of the offset (e.g. by discounting the predicted gains).
Ensure clear and additional outcomes	An offset should deliver specified and (where possible) quantitatively assessed outcomes for biodiversity, above and beyond those that would have resulted anyway.

Engage appropriate stakeholders	Stakeholders should be involved in the planning, design and implementation of the offset from an early stage. This is especially important where offset proposals may risk community and/or political opposition.
Ensure permanence	Financial and governance measures are required that will ensure the offset lasts at least as long as the project's impacts. For example, a trust fund might be set up that ensures the costs of managing the offset are met into the future.
*For more detail on principles for BES Offset design and implementation, see Business and Biodiversity Offsets Programme (2012) Standard on Biodiversity Offsets[23]; ICMM and IUCN (2012) Independent report on biodiversity offsets[24]; IUCN (2014) Technical conditions for positive outcomes from biodiversity offsets[25].	

As well as these principles, there are some important practical considerations for Offsetting:

- **Find the right site(s)**. Selecting sites that are already designated as conservation priorities (but may be inadequately protected) can reduce negotiation time and transaction costs, ease stakeholder discussions and (sometimes) de-risk land rights issues. Different offset sites may be needed for biodiversity and for ecosystem services. If the option is available, buying into an aggregated Offset (Box I) can greatly simplify the Offsetting process.
- **Involve partners or facilitators** from among relevant stakeholders. Designing and managing offsets is not usually developers' core skill and support may be needed from a range of institutions, for example:
    - National or provincial government agencies involved in BES management
    - Community-based organizations
    - Individual land owners or customary users
    - A partner NGO with national presence, institutional capacity and a track record of success in implementing site-based conservation; and
    - A specialist consultancy group.
- **Monitor outcomes.** A detailed Offsets Management Plan should include a plan for monitoring and evaluating progress, and for adaptive management to ensure results. This helps to guard against scope-shift, and to maintain schedule and budget targets.

Box I: Aggregated offsets

One large offset may be used to compensate for the collective impacts of more than one project. For developers, this aggregated offset approach has several advantages. It can reduce transaction costs and prevent schedule delays, and outsource many difficult technical and political questions to institutions that are mandated to address them.

For Government, aggregated Offsets allow integration of biodiversity Offsets with large-scale conservation planning. This can help ensure that agreed regional or national conservation priorities are well addressed, and that Offsets are large and well-connected enough to function effectively within wider landscapes – rather than being piecemeal, ad-hoc initiatives.

Few aggregated biodiversity Offsets yet exist, despite these positive attributes. Setting them up may require significant initial funding, with no guarantee of a return in future. With aggregated Offsets it may

also be more difficult to demonstrate equivalence, because they may conserve different biodiversity feature(s) than the ones being impacted. The link of an aggregated Offset (potentially distant from the project) to project impacts may also not be clear to stakeholders. Aggregated Offsets will rarely be appropriate for ecosystem services because they are likely to be sited well away from the affected communities.

Some governments are actively exploring the potential of aggregated Offsets as part of proposed regulatory frameworks (e.g. pilot projects in Mozambique and Liberia, supported by the World Bank).

Regulatory frameworks for Offsets should build in the principles outlined above, relating to: the mitigation hierarchy; limits; equivalence; additionality; stakeholders; and permanence. Experience with existing Offsets schemes shows that there are significant practical challenges around (in particular) equivalence, additionality and permanence. ten Kate and Crowe (2014)[26] review Government experience so far with Offsets schemes, and recommend a phased and incremental approach, beginning with fact-finding exercises on policy, biodiversity data and cost-benefit, and proceeding to pilot studies.

No SADC country yet has a full regulatory Offsets scheme in place. However, individual offsets are mandated by the EIA process in South Africa. Detailed offsets guidance exists for two South African provinces in South Africa (Western Cape[27] and Kwa-Zulu Natal[28]) and a national framework is in preparation. The South African approach is built on extensive spatial analysis and systematic conservation planning, including a comprehensive habitat classification and threat/protection analysis. The aim is to direct developments to areas of relatively low value for BES, and offsets towards areas earmarked as conservation priorities. The framework also establishes clear 'no go' areas for development. This could be a practical and instructive approach for other SADC countries to draw from.

8.7 Additional Conservation Actions

An optional final step in the Mitigation Hierarchy can be Additional Conservation Actions. These are targeted at conserving priority BES values but the benefits are generally not quantifiable. They might, for example, include field research or a schools education/awareness campaign.

ACAs are typically designed to deliver net gains for BES values after mitigation measures have eliminated significant adverse project impacts. They can play an important role in supporting other mitigation actions, including offsets, and can be a useful tool for addressing perceived impacts.

8.8 Additional resources

Business and Biodiversity Offsets Programme (2012) *Offset Design Handbook and Appendices*. BBOP, Washington, D.C. Available at: http://www.forest-trends.org/documents/files/doc_3101.pdf and http://www.forest-trends.org/documents/files/doc_3127.pdf

Business and Biodiversity Offsets Programme (2009) *Biodiversity Offset Cost-Benefit Handbook*. BBOP, Washington, D.C. Available at: http://www.forest-trends.org/documents/files/doc_3094.pdf

Business and Biodiversity Offsets Programme 2009. *Biodiversity Offset Implementation Handbook*. BBOP, Washington, D.C. Available at: www.forest-trends.org/biodiversityoffsetprogram/guidelines/oih.pdf

Cross-Sector Biodiversity Initiative (2013) Timeline Tool – A tool for aligning timelines for project execution, biodiversity management and financing. Available at: http://csbi.ipieca.org/Uploads/CSBI_timeline_tool.pdf.

CSBI (2013) Framework for Guidance on Operationalizing the Biodiversity Mitigation Hierarchy. December 2013. Available at: http://www.csbi.org.uk/workstreams/mitigation-hierarchy/

Cross-Sector Biodiversity Initiative (CSBI) 2015. Applying the Mitigation Hierarchy for biodiversity and ecosystem services management.

Cross-Sector Biodiversity Initiative (CSBI) 2013. Mitigation Hierarchy Charter

EBI 2003: Good Practice in the Prevention and Mitigation of Primary and Secondary Biodiversity Impacts http://www.theebi.org/pdfs/practice.pdf

International Council on Mining and Metals (2006). Good practice guidance for mining and biodiversity. ICMM, London. At: http://www.icmm.com/page/1182/good-practice-guidance-for-mining-and-biodiversity

International Council on Mining and Metals (2010). Mining and Biodiversity: A collection of case studies - 2010 edition. Available at: http://www.icmm.com/document/1246

International Finance Corporation (2012) Good practice handbook – cumulative impact assessment and management guidance for the private sector in emerging markets. Available at: http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/ifc+sustainability/learning+and+adapting/knowledge+products/publications/publications_handbook_cumulativeimpactassessment

International Finance Corporation (2012) Performance Standard 6 Biodiversity Conservation and Sustainable Management of Living Natural Resources. January 1, 2012. Available at: http://www.ifc.org/wps/wcm/connect/bff0a28049a790d6b835faa8c6a8312a/PS6_English_2012.pdf?MOD=AJPERES

International Finance Corporation (2012) Guidance Note 6 Biodiversity Conservation and Sustainable Management of Living Natural Resources. January 1, 2012. Available at: http://www.ifc.org/wps/wcm/connect/a359a380498007e9a1b7f3336b93d75f/Updated_GN6-2012.pdf?MOD=AJPERES

IPIECA/OGP 2005. A guide to developing Biodiversity Action Plans (BAP) for the oil and gas industry

http://www.ipieca.org/publication/guide-developing-biodiversity-action-plans-oil-and-gas-sector

IPIECA/OGP 2014. Managing biodiversity impacts: 10 Tips for success in the oil and gas industry

http://www.ipieca.org/publication/managing-biodiversity-impacts-10-tips-success-oil-and-gas-industry

IPIECA/OGP 2010. Alien Invasive Species and the oil and gas industry http://www.ipieca.org/publication/alien-invasive-species-and-oil-and-gas-industry

IPIECA/OGP 2011. Ecosystem services guidance. Biodiversity and ecosystem services guide and checklists http://www.ipieca.org/publication/ecosystem-services-guidance-biodiversity-and-ecosystem-services-guide

IPIECA/OGP (2011) Ecosystem services guidance. Biodiversity and ecosystem services guide and checklists. OGP Report Number 461. London, IPIECA and OGP. Available at www.ipieca.org/library

IUCN and ICMM (2004) Integrating Mining and Biodiversity Conservation: case studies from around the world. IUCN, Gland. ICMM, London. <https://portals.iucn.org/library/efiles/documents/2004-071.pdf>

WBCSD/OGP 2013. Environmental Management in Arctic oil and gas operations: Good practice guide. http://www.ogp.org.uk/pubs/449.pdf

WBCSD/WRI 2012. Corporate Ecosystem Services Review Version 2.0.
http://www.wri.org/publication/corporate-ecosystem-services-review

9 Putting plans into effect

9.1 Summary of key points

Government

- Key elements to put in place for an effective BES regulatory regime include (i) a robust legal and policy framework for BES, (ii) coherent and integrated development planning, (iii) relevant and accessible BES information, (iv) an independent and effective BES management authority and (v) strong technical support from skilled domestic BES consultants
- A parallel approach may be needed to manage BES impacts of artisanal mining, where these are significant
- Regulation should require regular monitoring of progress towards agreed BES objectives, with scope for remediative measures if progress is not satisfactory.

Developers

- Good practice is to integrate BES considerations fully into management plans and systems at both project and corporate level
- Well-designed BES monitoring should be carried out regularly using pre-defined indicators so as to assess progress towards project BES objectives and inform adaptive management
- Separate management and monitoring plans may be needed for BES offsets, where implemented
- Partnerships with local or national Government institutions, local communities, NGOs and/or universities can be valuable for BES monitoring and for offset management.

Lenders, local communities, non-governmental organizations

- Business partnerships with local communities, NGOs and/or universities can be valuable for BES monitoring and for offset management.

9.2 Strengthening regulatory regimes

Robust law and policy are a pre-requisite for an effective BES regulatory regime for EI. A first step therefore is to review and, as appropriate, revise legal and policy frameworks. There needs to be clarity regarding the scope for potential EI projects (are there 'no go' circumstances or places?), the permitting requirements and processes to be followed, and the BES objectives to be met. Legislation or guidance that is not consistent across different sectors, and could give rise to conflict, should be aligned.

A robust legal and policy framework is, however, far from sufficient – laws need to be enforced, and there needs to be the individual, institutional and informatics capacity to support and review the assessment and

permitting process. Figure 17 outlines some of the key elements that are likely to be required for effective regulation.

The regulatory and support regime for the formal mining sector may not be appropriate for artisanal and small-scale mining, which presents its own particular challenges. Box J outlines an approach that may succeed in maximizing the positive contributions, and minimizing the negative impacts, of this sub-sector.

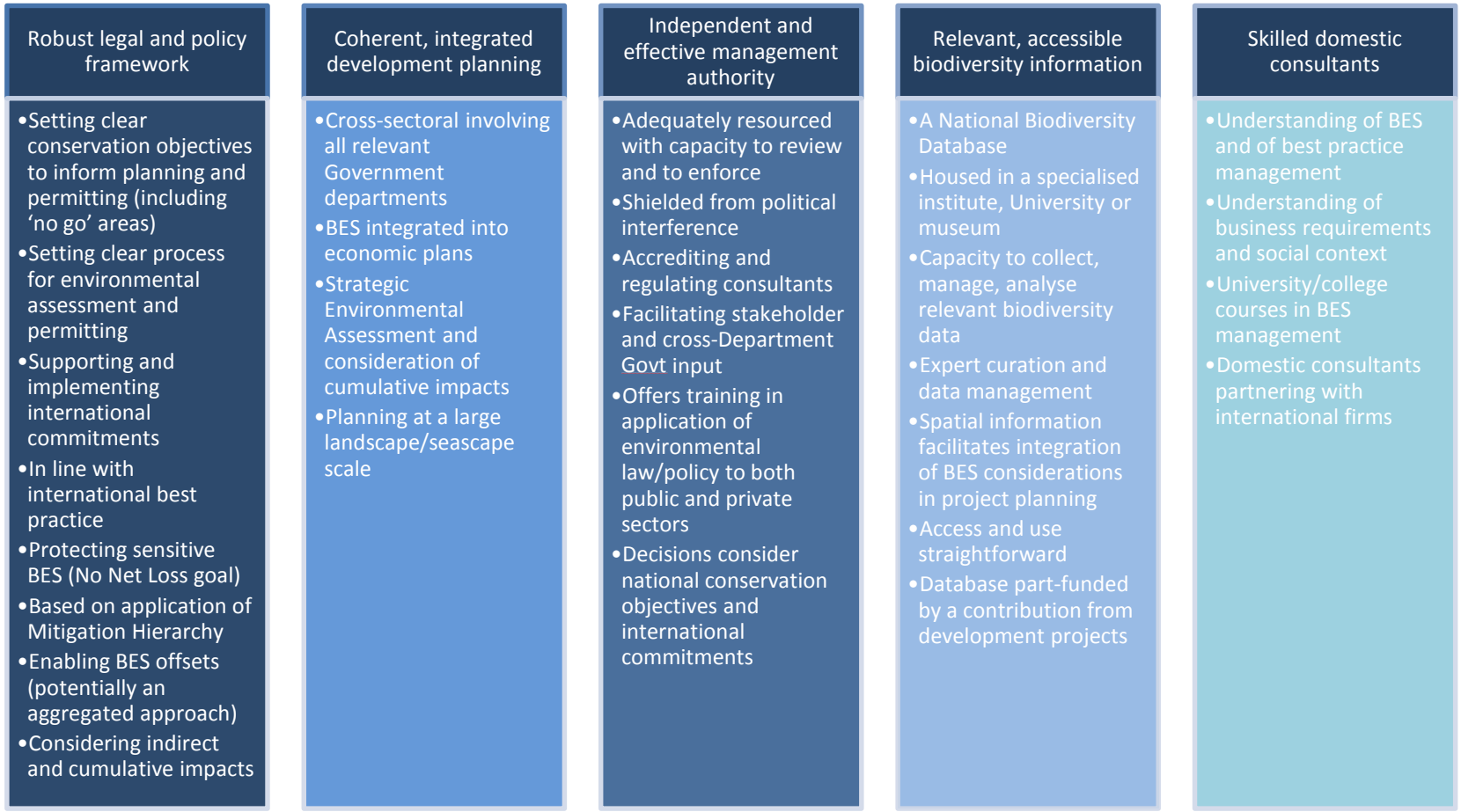

Figure 17: Key interacting elements recommended for an effective BES regulatory regime

Box J: Artisanal and small-scale mining

Artisanal and small-scale mining (ASM) generally refers to informal mining activities carried out by individuals, groups or communities using low technology or with minimal machinery. Distinctive features of ASM include[29]:

- Minimal machinery or technology, with reliance on simple techniques and physical labour;
- Operates without legal mining titles, or a valid contract with the title holder;
- Low productivity;
- Lack of safety measures, health care or environmental protections;
- Often practised seasonally or sporadically in response to high commodity prices; and
- Economic insecurity.

The ASM sector can be classified into four sub-groups at the site and individual levels:

- Permanent ASM: defined by a fixed location in which mining is constant, or where ASM is a permanent livelihood for an individual;
- Seasonal ASM: which is dictated by farming cycles and/or climatic factors;
- Rush ASM: which sees a number of miners rapidly descend on newly discovered mineral deposits; and
- Shock-push ASM: which is set in motion by a sudden shock, including natural disaster and job losses.

ASM activities often take place near to or within formal large-scale mining (LSM) concessions. This can create a number of risks, such as health, safety and security concerns, and unregulated/unmanaged environmental issues. Guidance is available on how LSM companies can manage relationships with ASM[30]. Significant environmental problems often associated with ASM are mercury and cyanide pollution, acid rock drainage, erosion damage and deforestation, and direct dumping of tailings and effluents into rivers. With many individual polluters often concentrated in an area, ASM can have substantial environmental impacts. Figure 18 illustrates the direct and indirect environmental effects of ASM in four spheres.

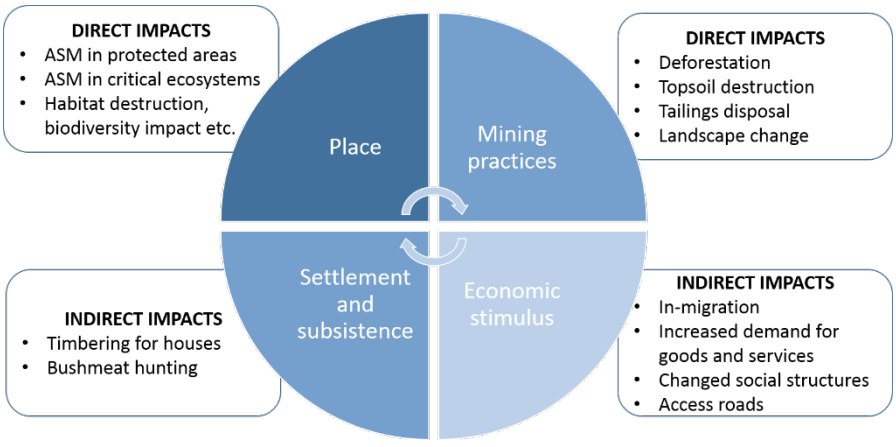

Figure 18: The four spheres of how ASM impacts the environment (after Kyngdon-McKay et al. 2014).

Addressing the problems posed by ASM has proved challenging. A recent review[31] for the SADC region makes these recommendations:

- Success is most likely with an enabling attitude, supporting ASM's contribution to economic development and the rights of miners to work
- Engagement and trust-building with ASM stakeholders is crucial
- A co-ordinated Government approach is needed, mandated from the highest level
- Strategies are best piloted and tested in lower-profile sites, not those most important and sensitive for biodiversity
- Traditional enforcement techniques are rarely effective: innovation is needed
- This could involve degazettement of select areas, multi-use zoning or negotiated access, permitting ASM but retaining oversight and the means of introducing responsible mining techniques (including restoration). Conditions of access should be tied to environmental performance and use of specific management techniques.
- Authorities could also consider cumulative impacts of *all* extractives activities in an area, requiring mining companies (via inherited liability laws) to rehabilitate former artisanal mine sites.

9.3 Management Strategies and Plans

At project level, following an ESIA the project BES strategy should be expanded into a detailed implementation plan. For project management, this should form an integrated part of a larger project Environmental and Social Management Plan (ESMP), and be implemented via the project Environmental and Social Management System (ESMS). This plan usually covers the project through to its closure and should include full restoration of the site. For communication with stakeholders and lenders it may also be useful to pull together BES material into a stand-alone Biodiversity (and Ecosystem Services) Action Plan (BAP). Implementation of offsets, where relevant, may also be covered in this document, or in a separate BES Offsets Plan (as it deals with management away from the project site). All plans should include provision for monitoring that is able to track progress and trigger adaptive management action if necessary (see Section 9.4). Some regulators requires that specific issues are covered in separate management plans, for example Protected Areas and Invasive Alien Species in the case of IFC PS6 (see Box J).

At company/business level, good practice is to integrate BES considerations fully into management systems and operational practices. This assures that the "plan-do-check-act" cycle is complete (see Section 5.3.2) and that BES risks are addressed throughout the asset life cycle and across company operations. A company-wide monitoring and reporting system should feed into adaptation and continuous improvement of BES risk-management approaches. At the company level, monitoring is linked to strategic decision-making and credibility with stakeholders. It addresses such issues as global exposure and credibility, the BES management capacity and the effectiveness of the management model in place.

The ICMM has adopted ten principles (with accompanying position statements) for implementing and measuring company performance in sustainable development. These are benchmarked against a number of leading international standards[L]. These principles are based on the issues identified in the Mining, Minerals and Sustainable Development Project[32].

Extractive projects have a finite life. Planning for project closure is important for BES management but in practice is often neglected. This represents the final opportunity to manage impacts and secure BES gains from restoration. How the site will be governed and managed, and how restoration and offset activities will continue if needed, should be spelled out in a closure plan (Box L). This is also another opportunity for constructive engagement of stakeholders.

Box K: The importance of partnerships
BES issues are complex. Many EI companies and projects are finding it valuable to develop strategic and technical relationships focused on BES with national and international NGOs, academic institutions and government partners (e.g. IUCN & Holcim 2010)[33]. Such partnerships can be important for project planning, design and implementation. In particular, external specialist advisory panels can help in

[L] Including the Rio Declaration, the Global Reporting Initiative, the Global Compact, OECD Guidelines on Multinational Enterprises, World Bank Operational Guidelines, OECD Convention on Combating Bribery, ILO Conventions and the Voluntary Principles on Security and Human Rights.

developing a full understanding of the multi-faceted nature of projects with challenging environmental, social, economic and engineering requirements. They enable the project to better identify and address BES features of mutual interest and concern, and are often an important component of stakeholder engagement and the social licence to operate (see **Box F**).

Over the project lifecycle the roles and usefulness of partnerships will change, according to project phase and mitigation requirements. For example, certain partnerships are required early on to support strategic planning, and others later on for practical on-going conservation support. By evolving and adapting the approach to partnerships, industry can gain access to specialist skills, expertise and collaborative networks to address key issues in a timely manner – particularly with respect to the implementation of longer-term elements of the mitigation hierarchy (e.g. restoration and offsets – see Sections 8.5 and 8.6). Partnerships and stakeholder engagement focused on BES should not be viewed in isolation, and will function more effectively if properly integrated with other company stakeholder engagement processes.

Box L: Planning for project closure

Planning for the closure of a mine (or other extractive industry project) can be as complex, and as important for BES, as the process for set-up and initiation. Mine closure planning should be an integral part of the project life cycle, particularly since the planning horizon is measured in decades, not months or years[34]. The ICMM Mine Closure Planning Toolkit outlines a framework for both a conceptual and a detailed mine closure plan with tools for closure planning. Guidelines from other regions provide useful information on context for and content of a mine closure plan (for example, Government of Western Australia Guidelines for Preparing Mine Closure Plans, 2011[35]).

A legal and regulatory framework for mine closure should[36]:

- Clarify issues relating to closure planning as part of the approval process;
- Specify mine closure procedures, environmental requirements and standards, and institutional responsibilities and authorities, including:
    - The requirements and procedures to ensure that effective and meaningful consultation takes place with local communities as part of mine closure preparation and planning;
    - Responsibilities for monitoring and ongoing management if environmental liabilities are incurred.
- Require regular updates of the closure plan throughout the life of the mine; and
- Allocate responsibilities for the provision of adequate financial resources to cover closure costs[37].

The following elements are recommended for a mine closure plan[36]:

- Clarity about time lines and costs;
- Specifics about the expected final landform and surface rehabilitation;
- Risk assessment to help set priorities for preparatory work;
- Cost-benefit analysis of different options as the plan is being prepared, reviewed and updated;
- A management plan for how closure will be implemented; and
- Proposals for post-closure monitoring arrangements (who monitors, for how long, who pays, who enforces compliance with environmental requirements).

Box M: Long-term financing for mitigation

The Mitigation Hierarchy is applied across the whole lifespan of a project, and particular activities to mitigate BES impacts may need to continue long beyond project closure. Minimisation measures may require ongoing investment while the project is operational. Restoration may take many years to reach targets for BES gains, while Offsets need to be implemented for as long as residual impacts remain. Ensuring long-term finance for these measures is a practical challenge.

There is no single 'right' answer to long-term financing – the approach has to be adjusted to in a pragmatic way to suit context and circumstances. Ongoing expenses during a project's lifetime may often best be treated as a continuing charge on the project budget. Lenders and regulators may require a commitment to meet such costs as part of the permitting process. For long-term BES offsets, a separate environmental fund may be more appropriate. Typically this would be a trust fund, endowed at the start of the offset with resources sufficient to generate revenue that covers ongoing offset management, monitoring and enforcement. Start-up costs could be included in such a fund or provided separately.

A similar fund could be created for aggregate offsets, into which projects pay in proportion to their mitigation requirements.

There are advantages to such funds being independent and managed by a body of trustees, rather than run directly by Government. This gives confidence to stakeholders and business decision-makers, and ensures that compensation is directed at offsets rather than entering general treasury funds. Governments should not regard offset resources as just another form of taxation, as this defeats the point of ensuring compensation for specific BES impacts.

Funds should have transparent governance involving a wide stakeholder base (both Government and civil society) as trustees and/or advisors, with clear rules and procedures, audit and reporting.

Such funds are not without potential drawbacks. Especially for a national or provincial fund covering many aggregated offsets, there are risks of distortion of priorities, divergence from original offset aims and targets, and of high overheads and running costs that effectively reduce investment in on-ground conservation. The one-off cost of providing an adequate endowment can also be off-putting to business, especially before a project has begun generating revenue. Future costs are difficult to predict accurately, with the risk that the fund may be either under- or over-provided.

The Conservation Finance Alliance works on innovative financing mechanisms, including for Protected Areas. Its Environmental Funds Toolkit brings together extensive documentation and experience-sharing from over 40 environmental funds around the world, and is a useful source of examples and guidance.

9.4 Monitoring and performance evaluation

Monitoring is the repeated, targeted collection of data over time, to detect changes in one or more parameters of interest. BES monitoring is an essential part of industry- and project-level good practice. Monitoring allows accounting of losses from impacts and gains provided by mitigation (including offsets). Evaluation is the process of decision-making based on monitoring results, allowing adaptation of mitigation actions to ensure that biodiversity objectives are met. Figure 19 shows the key questions for BES monitoring. Table 3 shows the considerations for the design of monitoring schemes.

Monitoring will usually be carried out by developers. However, government regulation needs to build in requirement for regular monitoring of progress towards agreed BES objectives, and appropriate measures if progress is not satisfactory. The independent management authority should have expertise to assess monitoring results and the adequacy of monitoring methods, and to commission audits or independent repeat monitoring (at the developers' expense) if necessary.

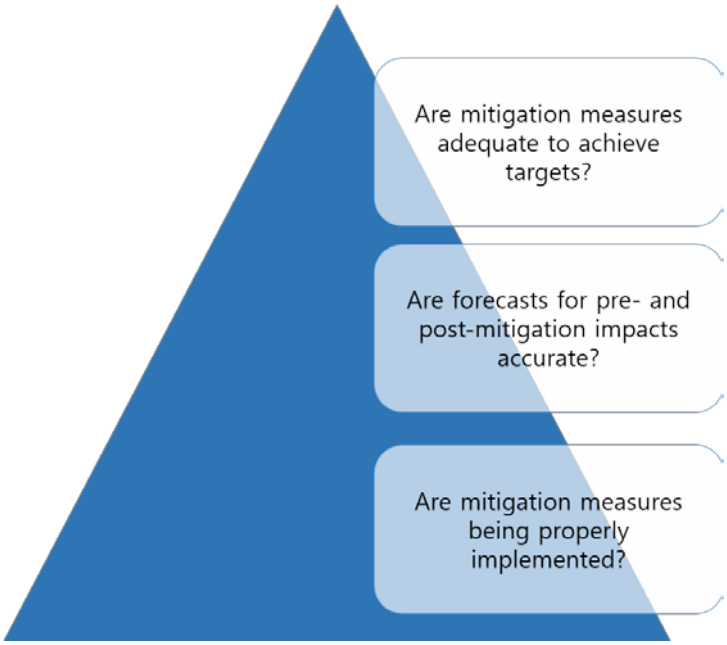

Figure 19. Questions answered by BES monitoring

Table 3: Considerations for the design of monitoring schemes

Considerations for the design of monitoring schemes	
Timing and frequency	For example, habitat and species surveys should account for seasonal variability
Responsibility	Who should undertake monitoring, what specialists are required and what is the appropriate level of expertise needed?
Data management	How will data be compiled, managed and analysed?
Relevance	All indicators/results must have a specific purpose, so that resource use is focused and effective
Context	Monitoring results need to be assessed in the context of long-term background processes
Adaptive management	Mitigation measures should be adapted if monitoring shows they are not working well, because set targets are not reached.

Monitoring at the site level is usefully carried out against a set of pre-defined indicators to assess progress towards project objectives/goals. A good indicator should be valid, reliable, precise, timely and measurable, and linked to the project objectives. The State-Benefit-Pressure-Response framework (Figure 20) is commonly used for developing project-specific BES indicators.

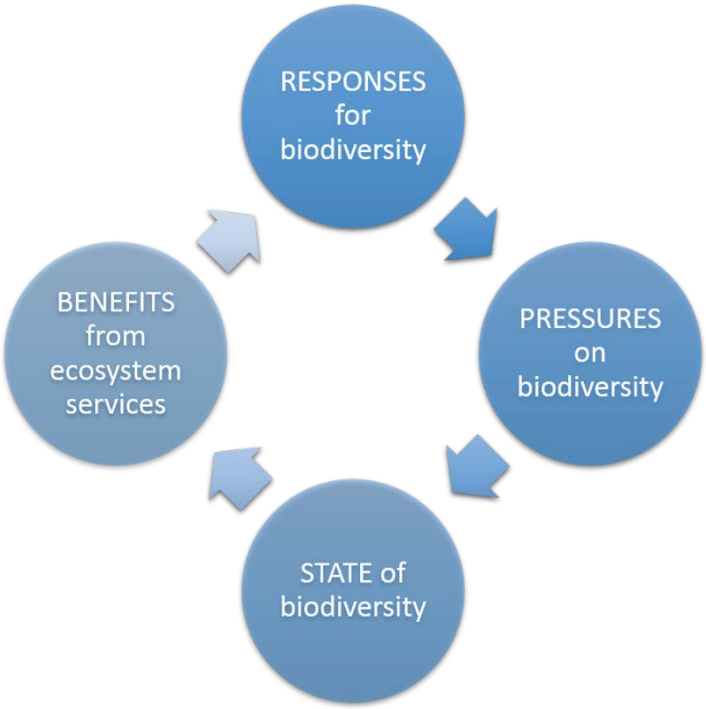

Figure 20: The State – Benefit – Response – Pressure framework for BES indicators. State indicators concern the condition of the biodiversity feature (e.g. numbers of a threatened species). Benefit indicators concern the quantity and/or economic value of ecosystem services (e.g. litres of clean freshwater). Pressure indicators concern the scale of impacts (e.g. mortality from road collisions) and derive from the ESIA. Response indicators concern mitigation actions (e.g. the proportion of project roads with access controls) and are documented in the relevant Management Plans.

An effective monitoring scheme requires balance. For a monitoring scheme to be sustained it should ideally be simple, manageable and affordable. On the other hand, data must be collected sufficiently intensively and frequently that change can be detected and responded to. There is an inbuilt tension between these requirements. An example of how this can be managed could be to identify a national institution with experience in monitoring that can maintain this activity in the long term with funding provided by the project and/or benefits derived from the exploitation.

9.5 Additional resources

Business and Biodiversity Offsets Programme 2009. *Biodiversity Offset Implementation Handbook*. BBOP, Washington, D.C. Available at: www.forest-trends.org/biodiversityoffsetprogram/guidelines/oih.pdf

Convention on Biological Diversity (2012) Technical Series No. 73 Best policy guidance for the integration of biodiversity and ecosystem services in standards. Secretariat of the Convention on Biological Diversity, Montreal, Canada. <https://www.cbd.int/doc/publications/cbd-ts-73-en.pdf>

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10 Glossary

Adaptive management	Adaptive management can be defined as a continuous sequence in which objectives are set, actions to manage biodiversity are taken, monitoring and evaluation of the ecosystem and human responses are assessed, results are compared against expectations and future actions are adjusted, as appropriate.
Affected Community	An Affected Community is defined as a group of stakeholders using an ecosystem that is affected by a project and reliant on that ecosystem service for their wellbeing.
ASM	Artisanal and small-scale mining
BAP	Biodiversity Action Plan
BBOP	Business and Biodiversity Offsets Programme
BES	Biodiversity and Ecosystem Services
Biodiversity	The variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species, and of ecosystems (Convention on Biological Diversity, 1992).
BIOPAMA	Biodiversity and Protected Areas Management Programme
CASM	Communities and Small-scale Mining
CBD	Convention on Biological Diversity
Critical Habitat	Areas with high biodiversity value, including habitat of significant importance to critically endangered or endangered species, restricted range or endemic species, globally significant concentrations of migratory and/or congregatory species, highly threatened and/or unique ecosystems and key evolutionary processes (paragraph 16: IFC, 2012a)
CSBI	Cross-Sector Biodiversity Initiative
Ecosystem Services	The benefits that people, including businesses, derive from ecosystems. Ecosystem services are organized into four categories: (i) provisioning services, which are the products people obtain from ecosystems; (ii) regulating services, which are the benefits people obtain from the regulation of ecosystem processes; (iii) cultural services, which are the nonmaterial benefits people obtain from ecosystems; and (iv) supporting services, which are the natural processes that maintain the other services (paragraph 2: IFC, 2012a). (see also: Priority ecosystem services)
EI	Extractive Industries (minerals and hydrocarbons)
EMS	Environmental Management System
ESIA	Environmental and Social Impact Assessment
ICMM	International Council on Mining and Metals

IOGP	International Association of Oil and Gas Producers
IPIECA	The global oil and gas industry association for environmental and social issues.
IUCN	International Union for Conservation of Nature
LSM	large-scale mining
MEA	Multilateral Environmental Agreement
Natural Habitat	Areas composed of viable assemblages of plant and/or animal species of largely native origin and/or where human activity had not essentially modified an area's primary ecological functions and species composition (paragraph 12: IFC, 2012a)
OMS	Operational Management System
PDCA cycle	Plan-Do-Check-Act cycle
Priority ecosystem services	Priority ecosystem services are two-fold: Type I are those services on which project operations are most likely to have an impact, resulting in adverse impacts on affected communities. Type II are those services on which the project is directly dependent for its operations (e.g. water) (paragraph 24: IFC, 2012a)
SADC	Southern African Development Community
SANBI	South African National Biodiversity Institute
TBNRM	Trans-boundary Natural Resources Management
TFCA	Trans-Frontier Conservation Area

11 Useful web links

Business and Biodiversity Offsets Programme (BBOP). <http://bbop.forest-trends.org/>

Cross-Sector Biodiversity Initiative (CSBI). <http://www.csbi.org.uk/>

Equator Principles Association. <http://www.equator-principles.com/>

International Council on Mining and Metals (ICMM). <http://www.icmm.com/>

International Union for Conservation of Nature (IUCN). <http://www.iucn.org/>

IPIECA <www.ipieca.org/>

IUCN Pan-African Protected Areas and Conservation Programme. <http://papaco.org/papaco1/>

South African National Biodiversity Institute (SANBI) < http://www.sanbi.org/>

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