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Strengthening implementation of the mitigation hierarchy: managing biodiversity risk for conservation gains

Seri Balhaf, a Yemen LNG carrier at the Yemen LNG Plant in Balhaf

http://www.yemenlng.com/ws/uploads/English_Brochure.pdf

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Strengthening Implementation of the mitigation hierarchy: managing biodiversity risk for greater conservation gains

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Executive Summary

The scale and pace of development is intensifying across the mining, oil & gas, agriculture, infrastructure, forestry and housing sectors. Such rapid and large scale expansion in commercial development threatens to irreversibly transform landscapes around the world, putting pressure on biodiversity and the people that depend on it for their livelihoods and well-being.

Understanding the ecological and social impacts of proposed development and planning appropriate measures to mitigate those impacts wherever possible is critical. The mitigation hierarchy is a process that when used properly can ensure that development results in No Net Loss (NNL) of, or a Net Positive Impact (NPI) on biodiversity. It involves four key stages beginning with the avoidance of impacts. Where avoidance is not possible, the developer must seek to minimize impacts and restore areas. The last stage, and final resort, is to consider the potential to offset residual impacts. Given the inherent risks and uncertainty involved with offsetting, it should only ever be undertaken as a last resort, when harm to biodiversity cannot be avoided or mitigated. If it is not possible to avoid, minimize or adequately offset harm, the development should not proceed.

The first and arguably most important stage in the mitigation hierarchy - **avoidance** - requires that *"measures* [are] *taken to anticipate and prevent adverse impacts on biodiversity before actions or decisions are taken that could lead to such impacts"* (CSBI, 2015). Effective impact avoidance is vital to achieving NNL or NPI goals and reducing business risk. Yet in practice, impact avoidance is often overlooked, misunderstood and poorly applied. There is also a paucity of information available to support the design and implementation of effective avoidance strategies.

This report has been brought together through the collaboration of BirdLife International, UNEP-WCMC, FFI, RSPB and the University of Cambridge in a project funded by the Cambridge Conservation Initiative. The purpose of the project is to strengthen the application of the mitigation hierarchy by promoting widespread and effective implementation of avoidance strategies in order to safeguard biodiversity and support NNL or NPI goals. Using 18 case studies and a regulatory review from 9 regions, the project analyses the drivers for impact avoidance, identifies practical examples of avoidance measures from a range of sectors and geographies, highlights potential barriers to the widespread adoption of effective impact avoidance and provides recommended actions to strengthen the application of the mitigation hierarchy and maximise impact avoidance potential.

Drivers for avoiding impact

Legislative requirements will often be the most significant driver for the development and application of impact avoidance measures. The mitigation hierarchy is found in both policy and legislation through various tiers of government around the world and is frequently associated with Environmental Impact Assessment (EIA)/Environmental and Social Impact Assessment (ESIA) requirements. Yet there is no standardised framework for avoidance and it varies considerably between countries. Not all countries place a strong emphasis on carrying out avoidance and the majority lack comprehensive guidance on the extent of avoidance necessary before moving on to the subsequent stages of the mitigation hierarchy.

Where legislation is lacking or inadequate to incentivise avoidance, and where legislation exists but is not enforced, **corporate policies**, **third party certification standards**, and **financial loan**

requirements that require impact avoidance through adherence to the mitigation hierarchy are of paramount importance. While these do exist they are not ubiquitous, are variable in their stated requirements and not all are adequately enforced or monitored. This can create an un-level playing field, a major disincentive for responsible operators.

Case Study Analysis

Spatial avoidance was the most common type of avoidance and was seen across all sectors. This is where the location of planned development activity is altered or re-sited to avoid impacts on key biodiversity values. Case studies illustrate spatial avoidance of certain habitats/species and areas of conservation importance (e.g. using outputs from landscape level planning and/or high level risk and opportunity assessment tools to inform avoidance of Important Bird and Biodiversity Areas (IBAs)). One issue with this form of avoidance is the transference of impacts to other areas deemed to be of lower biodiversity value.

Temporal avoidance is a relatively new concept but is gaining traction through the increased application of International Finance Corporation Performance Standard 6 which requires consideration of ecological components within impact assessment processes including breeding and migratory seasons. Temporal strategies may include limiting development activity during a particular time period to avoid impacts for certain ecosystem functions (e.g. river flow) or a specific species (e.g. turtle nesting behaviour that can be disrupted by using floodlights during the nesting period).

Project design was also used to avoid impacts with, for example, the type and placement of infrastructure and its mode of operation. In Madagascar, for example, a nickel and cobalt mine used avoided impacts on terrestrial and coastal habitats by designing a pipeline around forest fragments and tunnelling below important waterways. In Yemen, the Materials Offloading Facility of an extractive development was re-designed to be in between two coral banks using a rock pile bridge to maintain ocean current flow and reduce the footprint of the infrastructure.

Barriers to effective avoidance

One of the main barriers identified through case study analysis was '**knowing what to avoid**' (Section 5.1). This included: lack of access to data and data availability more generally, and a lack of landscape level conservation and land use plans. Challenges are also associated with understanding the complex nature of development impacts (direct, indirect and cumulative) and prioritizing biodiversity values at an appropriate scale. Barriers to the delivery of **optimal and long-term avoidance** also warrant serious consideration. The issue of longevity is important to ensure that areas avoided are maintained. Avoidance strategies can be costly, may depend on innovative engineering, and require impact assessment processes to take place prior to the design of a project. They likely require effective co-ordination across departments and the need for cross-sectoral, multi-stakeholder engagement processes to ensure biodiversity values are maintained in perpetuity.

Recommendations:

Governments

There is an urgent need for Governments to establish clear and enforced regulation that requires adherence to the mitigation hierarchy and specifies areas that are off-limits to development based on local, national, and international priorities. The need to safeguard areas of local and national biodiversity importance is paramount. As signatories to Multilateral Environmental Agreements such as the World Heritage Convention, provisions within national legislation that protect sites of international importance are a key consideration. Avoiding harm in these areas may also help countries progress towards global conservation goals such as the Aichi Targets of the Convention on Biological Diversity. This is in addition to the need to safeguard areas of local and national biodiversity importance. Thus it is vital that national authorities are engaged in landscape level and strategic conservation planning, as well as the integration of biodiversity data into development plans. This will require inter-Ministerial cooperation and collaboration to share data and information, and reduce potential for conflicting priorities. Governments can also support effective avoidance through recognising unprotected areas of biodiversity importance such as High Conservation Value (HCV) areas and Key Biodiversity Areas (KBAs), and exhibiting a preference for operators that comply with international best practice.

International Finance Institutions (IFIs)

IFI's play an important role in guiding development decisions; particularly in countries where national legislation is weak or poorly enforced. Safeguards associated with lending requirements for adhering to the mitigation hierarchy and promoting its early application, comprehensive ESIA, reporting on impacts, avoiding specified areas of biodiversity importance, and achieving targets of NNL or NPI are strong drivers for improving performance. Monitoring implementation of avoidance strategies as part of the loan agreement and requiring demonstration of adaptive management and iterative improvement will be crucial. IFIs also play a role in incentivising governments to improve their policy frameworks for supporting the implementation of the mitigation hierarchy. Furthermore, IFIs provision of technical assistance can develop national level expertise to generate and interpret data required for impact avoidance.

Corporate sector

Businesses are ultimately responsible for implementing avoidance strategies as part of the mitigation hierarchy framework. As a bare minimum this must comply with national legislation and any existing management plans for protected areas and other designated sites of biodiversity importance. Sometimes there will be a business case for going beyond this to align with international standards, such as implementing the performance standards of the International Finance Corporation. According to a recent report (TBC, 2012), 38 companies (15 of which were extractives companies) have now set ambitious biodiversity commitments towards NNL or NPI that will require significant avoidance of biodiversity impacts (see also Rainey et al, 2014). Greater uptake of these internal policies will be needed for the widespread application of impact avoidance. Further recommendations to support effective avoidance at the project level include: stakeholder consultation, adopting a landscape level approach, commitment to high quality baseline surveys and impact assessments that employ multi-disciplinary teams, identifying avoidance strategies early on in project site selection and design, using existing prioritisation approaches (e.g. KBAs) and available tools, and developing a long-term management plan for safeguarding areas that have been avoided.

Non-Governmental Organisations (NGOs)

NGOs play an important supporting and lobbying role to build capacity and elicit change, influencing both governments and private sector companies. They operate at a variety of scales from building local capacity to supporting corporate strategies and the integration of effective avoidance requirements within legislation, financial lending requirements and voluntary standards. Local, national and international NGOs can provide the necessary scientific expertise, data and tools for companies to carry out effective avoidance strategies and there is an ongoing need for greater collaboration between NGOs to deliver better aligned support.

Further Guidance

As a key barrier identified was lack of knowledge around **knowing what to avoid**, this section of the report highlights a range of information gathering tools and databases available to support and inform biodiversity avoidance decisions at different scales (see Section 6.1 and Appendix Table 10). These include: Integrated Biodiversity Assessment Tool (IBAT), Toolkit for Ecosystem Service Site-based Assessment (TESSA), Migratory Soaring Bird Sensitivity Map and Biodiversity Risk and Opportunities Assessment (BROA).

Planning for **optimal and long-term avoidance** requires operators to maximise avoidance potential before moving onto the next stage of the mitigation hierarchy and to adopt an iterative approach to reassess avoidance potential throughout the project lifecycle. The adoption of NNL or NPI targets can incentivise this approach given the often greater conservation gains of avoidance compared to other stages of the mitigation hierarchy. Ensuring that avoidance is long-term remains an area of considerable uncertainty. Where avoidance is mandated through legislation, for example, longevity may be more likely as all operators must avoid the identified site, and companies can support with financing and constructive coordination with other operators and local regulators. However, where other incentives are driving avoidance (i.e. conditions of investment, company policy and/or voluntary standards) the situation is more complex and long term biodiversity conservation gains are more uncertain. The appropriate mechanism for securing avoided areas for conservation over the long-term will depend on the local context, legislation and tenure systems in each country. The need for cross-sectoral and multi-stakeholder coordination and collaboration is paramount in the development of avoidance strategies that can be maintained in order to secure biodiversity conservation gains in the long term.

Contents

Acronyms

Abbreviation	Definition
ACA	Additional Conservation Action
ADB	Asian Development Bank
AfDB	African Development Bank
BBOP	Business and Biodiversity Offsets Programme
BES	Biodiversity and Ecosystem Services
CBO	Community Based Organisation
CI	Conservation International
CCI	Cambridge Conservation Initiative
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CSBI	Cross-Sector Biodiversity Initiative
EIA	Environmental Impact Assessment
EIB	European Investment Bank
EBRD	European Bank for Reconstruction and Development
ESHIA	Environmental, Social and Health Impact Assessment
ESMS	Environmental and Social Management System
ESMP	Environmental and Social Management Plan
FFI	Fauna and Flora International
FSC	Forest Stewardship Council
HCS	High Carbon Stock
HCV	High Conservation Value
IADB	Inter-American Development Bank
IBA	Important Bird and Biodiversity Area
IFC	International Finance Corporation
IFI	International Financial Institutions
IUCN	International Union for the Conservation of Nature
KBA	Key Biodiversity Area
LLA	Landscape Level Assessment
LLP	Landscape Level Planning
NGO	Non-Governmental Organisation
NNL	No Net Loss
NPI	Net Positive Impact
PEFC	Programme for the Endorsement of Forest Certification
RSPB	Royal Society for the Protection of Birds
SANG	Suitable Alternative Natural Greenspace
SPA	Special Protection Area
SEA	Strategic Environmental Assessment
TBA	Tropical Biology Association
TBC	The Biodiversity Consultancy
UNEP-WCMC	United Nations Environmental Programme – World Conservation Monitoring Centre
UNESCO	United Nations Educational, Scientific and Cultural Organisation
WCS	Wildlife Conservation Society
WHS	World Heritage Sites

1. Introduction

This report summarises the findings of a collaborative research project undertaken from September 2014 to May 2015 by BirdLife International, UNEP-WCMC, FFI, RSPB and Cambridge University and funded by the Cambridge Conservation Initiative. It aims to enable more effective and widespread implementation of the avoidance stage of the mitigation hierarchy, and promote the role of dialogue and partnerships at multiple levels and in a variety of sectors to better safeguard biodiversity. It uses lessons learned from existing case studies to identify the enabling conditions, barriers and opportunities for the implementation of effective avoidance measures to safeguard biodiversity and achieve no net loss or net positive outcomes for biodiversity.

Report overview
This report includes:

- A summary of legislative frameworks, International Finance Institution (IFI) standards and voluntary standards relevant to the avoidance stage of the mitigation hierarchy and collates examples of how different policies enable and/or impede effective implementation (Section 3).

- Case studies from mining, oil & gas, energy, infrastructure, housing, forestry and agriculture to illustrate different ways in which impacts have been avoided in practice (Section 4).

- Analysis of the barriers to widespread uptake and effective implementation of avoidance strategies to reduce biodiversity impacts (Section 5).

- Recommendations for Government, Corporate Sector, IFIs, and Non-Government Organisations (NGOs)/civil society to support the successful uptake and implementation of impact avoidance strategies and improve the application of the mitigation hierarchy (Section 6).

The findings of this report are based on a review of nine regional and national legislative frameworks and the analysis of 18 case studies selected from the recommendations of experts in the field. Discussions were also held with key individuals such as site level Environmental Managers, Project Engineers, as well as consultants, NGOs and individuals from IFIs (see Appendix (i) for more detail).

Limitations

The information for this report has been gained through discussions with key practitioners identified by the project team and publicly available documentation (mainly EIAs, ESIAs, and SEAs). These case studies provide a snap-shot in time of projects. We cannot guarantee that the avoidance strategies presented in this review have been implemented to the extent discussed or maintained as stated.

Multiple social, economic and political factors influence decision-making. The case studies presented focus on avoidance of biodiversity (e.g. in terms of avoiding habitat and/or species), but in reviewing them, readers should be aware that there may be other contextual factors that we have not discussed.

2. What is effective avoidance?

This section sets out the definitions of avoidance, its place within the mitigation hierarchy, the current status of approaches to avoidance and the implications of failing to effectively avoid.

Avoidance as a part of the mitigation hierarchy

Biodiversity loss and ecosystem degradation poses a risk to businesses; threatening their reputation, access to finance and license to operate (Grigg et al 2011). Ecosystem degradation also places pressure on the natural resources that support business operations, such as water, local construction materials and food for their employees (Grigg et al. 2011). As a result, corporates are now more likely to include biodiversity in their risk management. However, transparent and reliable reporting of biodiversity impacts at high risk sites remains more variable. Yet the effective management of biodiversity impacts also presents opportunities (such as competitive advantage associated with good biodiversity management) that are increasingly being recognised in certain industrial sectors (such as mining) as well as the finance sector. The most widely recognized process for limiting these risks is the mitigation hierarchy (Figure 1).

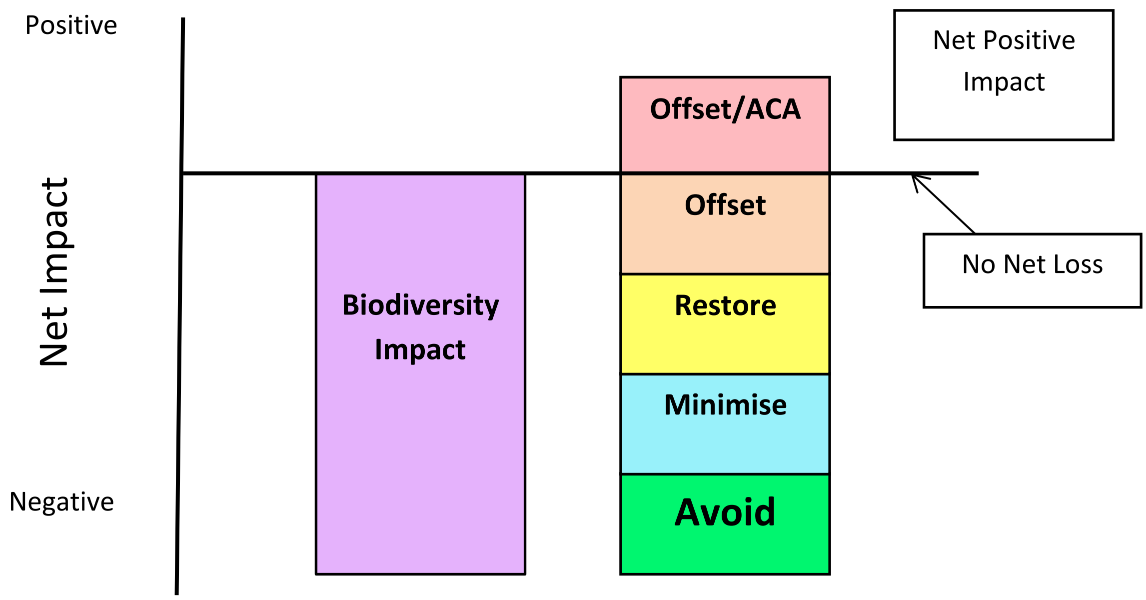


Figure 1: Diagram illustrates how the mitigation hierarchy can be used to achieve either No Net Loss[1] of biodiversity or a Net Positive Impact. (*ACA - Additional Conservation Actions[2]) (Adapted from: The Biodiversity Consultancy, 2013)

[1] According to IFC Performance Standard 6, no net loss is defined as the point at which project-related impacts on biodiversity are balanced by measures taken to avoid, minimize, restore and finally offset significant impacts.

[2] Supporting actions such as awareness raising, environmental education, research and capacity building are a welcome contribution to conservation and can be important to the overall success of a biodiversity offset, but they are not considered part of the core offset, unless there is evidence of measurable on the ground conservation outcomes.

The mitigation hierarchy is the process whereby a developer works towards mitigating impacts to achieve a No Net Loss (NNL) of, or a Net Positive Impact (NPI) on, biodiversity. This begins by avoiding impacts as much as possible, minimizing those which cannot be avoided, restoring areas where required, and finally offsetting any residual impacts (BBOP, 2009). The mitigation hierarchy is embedded in the national legislation of some countries, as well as in safeguard policies of IFIs and companies. However, there are concerns within the conservation community that the mitigation hierarchy is not always appropriately or consistently followed, and that insufficient emphasis is placed on the initial stage of avoidance which, if implemented according to best practice, could deliver the most efficient conservation gains. Delivering effective avoidance is especially important given the inherent complexity and risks associated with moving biodiversity around or recreating habitat, thus making it very difficult to successfully offset harm. Evidence from the around the world - including in countries that have been doing large-scale offsetting for a number of years under heavily regulated systems, shows that in the majority of cases it has failed to actually compensate for the lost biodiversity. There may also be negative social implications if you move wildlife away from communities and remove their access to nature (RSPB, 2013).

Defining avoidance activities

Avoidance activities are defined as follows:

- "*Measures taken to anticipate and prevent adverse impacts on biodiversity before actions or decisions are taken that could lead to such impacts*" (CSBI, 2015).
- "*Measures taken to avoid creating impacts from the outset, such as careful spatial or temporal placement of elements of infrastructure, in order to completely avoid impacts on certain components of biodiversity*" (BBOP and UNEP 2010)

Table 1 Spatial, Temporal and Design avoidance definitions (CSBI, 2015)

Type of Avoidance	Definition
Spatial i.e. site selection	**Using available tools, technology and data** to carry out landscape level assessments in order to select a project site which avoids impacts to important (or sensitive) biodiversity areas, while also considering the cumulative impacts of development in the area at the earliest possible stage of project planning. This is a high level screening process that eliminates sites from potential development on the basis of the sensitivities of biodiversity or ecosystem features and would form part of landscape or national level spatial and strategic planning.
	Relocation of project site or components away from an area recognized for its high BES value: This type of avoidance involves screening for BES values very early in the planning process, followed by an analysis of alternative project locations.
Temporal i.e. scheduling	**Changes in the timing of project activities:** Impacts may be avoided by understanding and taking into account seasonal and diurnal patterns of species behaviour (e.g. breeding, migration) and ecosystem functioning (e.g. river flow) as well as the use of natural resources by local communities (e.g. fishing and hunting seasons and locations).
Project design	**On the project site, the selection of the type and placement of infrastructure and its mode of operation:** Impacts may be avoided through careful placement of infrastructure and careful choice of construction and operational methods.

How effectively is the avoidance concept being applied?

While there is a growing amount of information and guidance around biodiversity offsetting, there is a paucity of information available on avoidance. Impact mitigation has formed a significant part of the scope of work undertaken under the remit of environmental and social impact assessment (EIA or ESIA); EIA practitioners have often neglected or poorly articulated the systematic approaches necessary to implement the mitigation hierarchy (pers.comm. Pippa Howard, FFI). The lack of a systematic approach makes it challenging to respond appropriately to those impacts identified and defined in the impact assessment. Often, the ESIA is undertaken when project feasibility and design plans are already advanced and therefore the opportunity to intervene early to address avoidance strategies, including the identification of alternative site selection is missed. Furthermore, ESIA practitioners have often skipped or misunderstood the relevance of the avoidance stage in the early stages of planning as this may not be seen as part of their remit (pers.comm. Pippa Howard, FFI).

The implications of ineffective avoidance strategies

Failure to adopt a robust process for implementing the mitigation hierarchy that starts with a credible avoidance strategy will lead to less effective protection of biodiversity, as well as a weakening of the concept and increasing skepticism from some stakeholders (e.g. NGOs, IFIs, and Governments). For companies, this may lead to:

- **Increased costs associated with project delays:** If spending on avoidance activities is not frontloaded, and the necessary baseline data is not collected, unexpected environmental impacts are more likely to arise, leading to costly delays for the developer (FFI, 2014). Project delays (and therefore risk of incurring increased costs) may also be more likely where a company plans to utilise already limited resources, or where operations are due to occur in a sensitive environment. For example, delays caused by a Greenpeace campaign against Cairn due to their proposed Arctic drilling was estimated to cost the company in the region of US$ 4 million per day (Grigg et al. 2011).
- **Reputational damage**: Both investors and companies are now realizing that a company's license to operate will depend on good environmental stewardship and active engagement with a broad range of stakeholders (Grigg et al. 2011). For example Vedanta was refused permission from the Indian government to develop a mine due to infringements of environmental and human rights laws (Telegraph, 2010).

An effective avoidance strategy relies on coordination of project development, biodiversity impact assessment and financial timelines, which in turn supports better risk management. Figure 2 below illustrates an ideal project timeline that highlights when impact mitigation activities are most appropriately planned. It is therefore desirable to 'frontload' investment in biodiversity management – by investing more in initial avoidance actions – to help reduce the long-term costs and impacts that may arise. The spending profile of a project was shown to affect the overall risk that the project was subject to (see Figure 3) which may make progress towards achieving NNL or NPI more challenging.

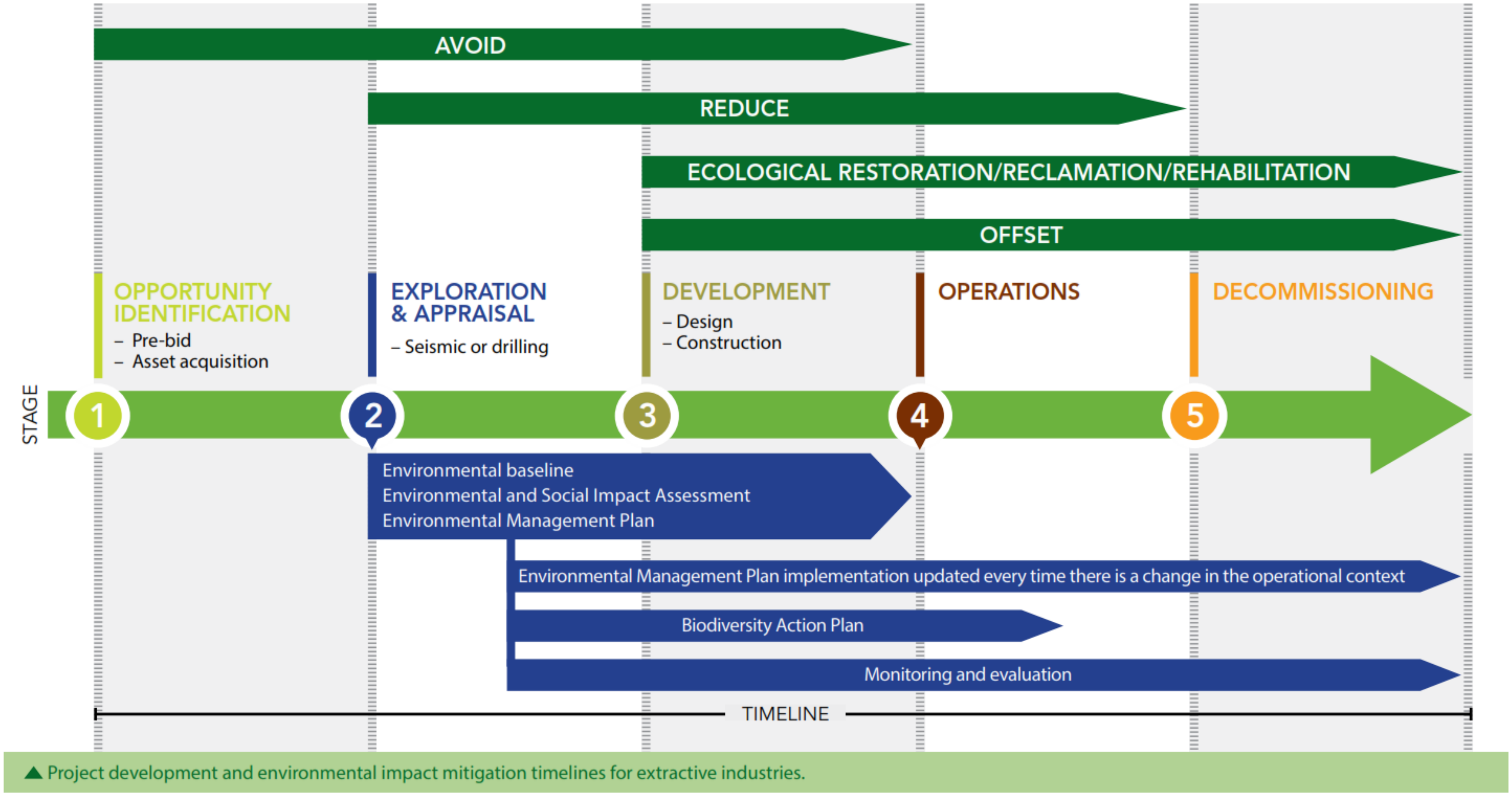
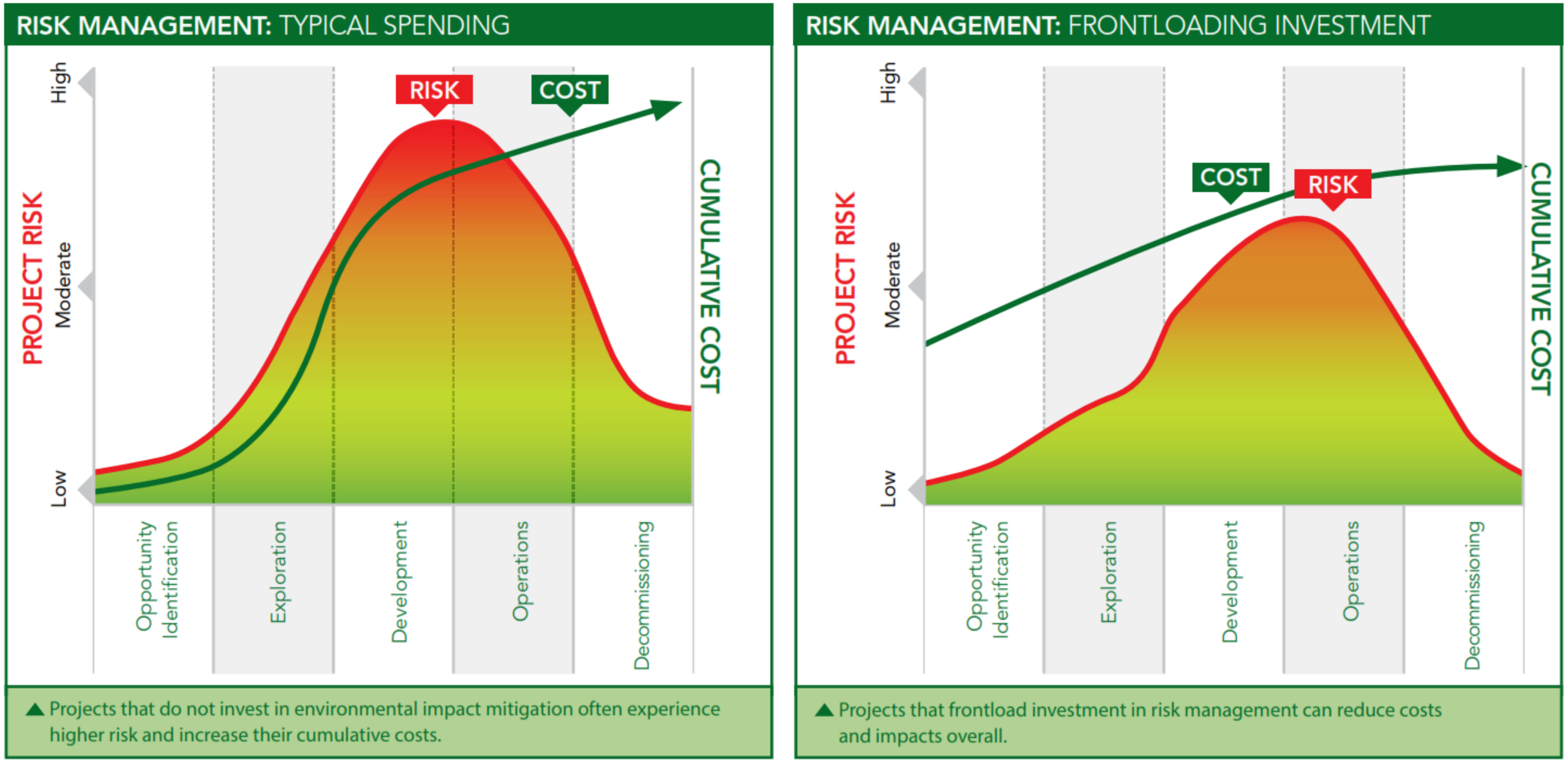


Figure 2: Project development and environmental impact mitigation timelines for extractive industries (FFI, 2014)



<u>Figures 3a and 3b:</u> Risk management graphs showing risk and cost depending on spending strategy - either typical project spending or frontloading investment respectively (FFI, 2014).

3. Drivers of avoidance – a review

This section sets out the range of drivers in place to incentivise effective uptake of avoidance activities by the private sector. Uptake of the mitigation hierarchy by the private sector - and the application of avoidance activities within this - is being driven by:

- Legal requirements governing biodiversity conservation and project development
- More robust IFIs lending requirements and safeguard policies that include clear avoidance measures that are appraised by IFIs
- A need to comply with certification schemes that require certain avoidance of impacts to specific habitats or species
- Peer action, whereby standard is raised across sectors through companies competing with each other to be seen as conducting good practice in terms of environmental management.

In order to drive corporate behaviour, these emerging standards and legal requirements must clearly set out the definitions of avoidance activities within the context of the mitigation hierarchy and provide guidance on how they can best be undertaken. If some or all of these drivers are in place, successful avoidance strategies can be developed and implemented. A brief overview of each is provided below.

3.1 National legislation on avoidance

Regulatory requirements are perhaps one of the strongest potential drivers for effective mitigation activities. A review of national policy and law that incorporates the definition of mitigation hierarchy and avoidance across eight different countries and regions showed that:

- The mitigation hierarchy is found in both policy and legislation through various tiers of government, from local to international, and is frequently associated with EIA requirements
- Although there is some variation, the mitigation hierarchy is generally understood as (1) avoid, (2) mitigate or reduce or compensate, (3) restore, (4) offset/compensate with variations of language in second, third and last step
- There are more variations on the 2nd stage of the mitigation hierarchy that are either defined as reduce, compensate, or minimize, with some including 3 steps instead of 4 with these variations
- Options for avoidance stated in regulations include; alternative site selection; comprehensive planning; areas of exclusion; avoiding impacts on species, habitats, nature, landscapes or the environment; using the precautionary principle; and NNL.

This suggests that, whilst the mitigation hierarchy has been adopted and tailored to a variety of national priorities (Table 2), it is inconsistently defined and applied as a concept. This may weaken the mitigation hierarchy as a framework and pose issues for companies and IFIs that operate globally. A number of these issues are explored in more detail below.

Table 2: Summary of aspects of legislation that may contribute to avoidance of biodiversity impacts at the national or regional level for a subset of the regions which were reviewed (For more detail and references see Appendix Table 8).

Country or region	Summary of legislation
UK	National Planning Policy (2012) – administrative authorities issuing building permits must comply – defines MH as avoidance, reduction and compensation. Specifically avoidance is defined as locating on an alternative site with less harmful impacts.
EU	Habitats Directive, EIA Directive and SEA Directive. MH defined in EIA directive as avoid, reduce and, if possible, remedy significant adverse effects. Avoidance is defined within the EIA directive as to avoiding any deterioration in the quality of the environment and any net loss of biodiversity. Within the Habitats Directive, Article 6.1 states: Avoid damaging activities that could significantly disturb these species or deteriorate the habitats of the protected species or habitat types.
Australia	The Environment Protection and Biodiversity Conservation Act (1999) - Avoidance and mitigation measures are described as primary strategies for managing significant impacts (focus is on offsets). Avoidance achieved through comprehensive planning and suitable site selection.
Brazil	National Environmental Policy (6938/1981) on environmental licensing, and National System for Nature Conservation Units (SNUC: 9985/00) on offsets. No explicit mention of MH but environmental licensing requires first avoidance, mitigation, then offsets for 'residual impacts' (those that cannot be avoided or mitigated).
Colombia	Resolución 1517 – Colombian national legislation requires strict adherence to MH. When applying for an environmental license applicants must ensure compliance with prevention (avoidance), minimization and restoration measures as the first stage. Prevention (avoidance) measures include the identification of any 'areas of exclusion'

There is no standardised framework for avoidance in existence

Avoidance is generally described as the first step in the mitigation hierarchy in national legislation. However, not all countries place strong emphasis on carrying out avoidance before moving on to other steps, and the majority lack comprehensive descriptions of how these steps relate to one another. In Latin America, for example, a number of countries focus on offsetting rather than the earlier stages of the mitigation hierarchy (Villaroya et al. 2014).

The most influential legislation, in terms of language on avoidance approaches and reach across the EU member state countries, in existence is the EU Habitats Directive that compliments the EU Birds Directive and together they create a legal framework that places strong emphasis on avoidance particularly of Natura 2000 sites. Specifically, the Habitats Directive Guidance on Article 6(4) provides guidance on how a project demonstrates the least impact on habitats and species, regardless of economic considerations. It provides a comprehensive guidance applicable to individual EU member states on topics such as alternative solutions, imperative reasons of overriding public interest, compensatory measures and overall coherence.

This type of ambitious legislation is rarely found elsewhere. Where the mitigation hierarchy is defined, offsetting is generally more prominent compared to avoidance. This has resulted in limited availability of guidance materials on avoidance and a larger focus on offsets. Where available guidance on avoidance exists, it is usually formulated as a set of questions that guide developers in their planning decisions[3]. These are not comprehensive and lack the necessary detail developers would require to adopt robust avoidance decisions and to enable effective governmental oversight of their implementation.

Integration of the concept of avoidance into impact assessment regulation

It is fundamental for the SEA and EIA regulatory requirements to include robust avoidance measures in the context of the mitigation hierarchy. In the UK[4], for example, planning permissions can be refused if a project fails to demonstrate how it has avoided significant impacts to the environment. On the other hand, EIAs that are meant to consider cumulative impacts of other nearby developments do not usually place as much emphasis on small losses as they are considered immaterial to a planning decision. This creates a risk where small losses may amount to a significant loss at a national scale[5]. Hence it is important that the project/ development impacts are considered and enforced on a landscape scale and cumulative basis.

Latin American countries such as Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela all have national-level EIA laws or regulations. Some Latin American countries, such as Brazil, Columbia, Mexico and Peru require the implementation of offsets, however these and other Latin American countries have weak requirements regarding impact avoidance and further guidance is required on how offsets conform to the mitigation hierarchy (Villaroya et al. 2014). The wider adoption of offset policies compared to avoidance, or adoption of offset policies without the mitigation hierarchy framework, may imply that developers bypass avoidance and other mitigation measures and move straight to offsetting[6]. Such a focus is likely to raise concerns amongst NGO stakeholders by providing developers a 'license to trash'. This may undermine the credibility of the regulation and impact negatively on those companies that must abide by it in terms of reputation, brand vale and operational costs if they face development delays as a result of NGO campaigns.

Standardisation of the avoidance concept could strengthen regulatory frameworks

Much work is needed in combining best practice applications of avoidance and standardizing them in legislative frameworks (see Section 5.2). IFIs may play a pivotal role by introducing their safeguards and supporting their implementation in countries with weaker legal requirements, and IFI funded companies operating in such countries will benefit from improved legislation which 'levels the playing field' – requiring all operators to adhere to the same social and environmental standards.

3.2 International Financial Institutions Safeguards

Accessing finance from IFIs and from the Equator Principles Banks requires companies to operate in accordance with the IFI's environmental and social safeguard policies. Such policies have the potential to drive robust standards of environmental performance and to ensure adoption of

[3] UK Government Website, Planning Practice Guidance;

[4] Houses of Parliament, Parliamentary Office of Science & Technology, Biodiversity & Planning Decisions, Number 429 February 2013.

[5] A 2005 study of lowland heathland in the UK indicated that biodiversity loss was occurring because of cumulative impacts of developments, Houses of Parliament, Parliamentary Office of Science & Technology, Biodiversity & Planning Decisions, Number 429 February 2013.

[6] Growing focus on offsetting has seen the emergence of mitigation banking activities that trade on these activities. It is difficult to conceive of an equivalent measure for avoidance.

effective avoidance activities. A review of the safeguard policies of the IFC, EIB, EBRD, AfDB and ADB showed that:

- It is apparent from IFI safeguards that avoidance has not been discussed. Very few IFIs have included a definition of avoidance as a concept, even though the majority agree that it is the most important step in the mitigation hierarchy
- Some IFIs refer to avoiding impacts but not in the context of the mitigation hierarchy
- Little guidance is provided for developers and consultants to enable robust consideration of avoidance needs before moving to the second stage of the mitigation hierarchy

IFIs embed avoidance in concepts such as 'alternatives' and 'set-asides'

The majority of IFIs examine avoidance through:

- **Alternatives:** project scenarios that provide alternatives to the project's current location (spatial), design, technology and environmental and social impacts. Most IFIs refer to alternatives in terms of spatial location. Use of alternatives based on altered design (e.g. IADB includes altered management systems in alternatives) and technology is less common. Safeguards require that project developers document the rationale for selecting a particular alternative.

Only a select few employ the concept of:

- **Set asides**: land/water areas and systems within the project site or areas over which the client has management control that have high biodiversity value and are to be excluded from development.

The extent to which the use of alternatives or set asides is employed is unclear as documents and processes are not made public.

IFI's are underpinning alternatives with the NNL concept

The NNL concept is widely employed. All studied IFIs: IFC, EBRD, ADB, AfDB and EIB referred to the NNL concept in the identification of alternatives. EIB further elaborates that NNL also applies to impacts on areas that are not designated under legal provisions (such as protected areas) but to all environments, regardless of their state of conservation. Adopting a NNL approach, across all environments, is fundamental to implementation of the mitigation hierarchy. Such an approach requires an environmental and biodiversity baseline survey and ongoing monitoring to credibly ascertain that NNL was met; however this was not made conditional across all IFIs that stated they apply a NNL approach.

Some IFIs have requirements to consider a no-project option

Some IFIs set standards that are akin to no-go policies, particularly the ADB, EBRD, IADB and EIB. These render the project ineligible for financing if there is an infringement of environmental conventions (e.g. CBD, CMS), or if there are no feasible alternatives and the environmental impacts of the operation involve significant conversion or degradation of critical natural habitat. ADB and EIB's safeguard policies require consideration of a "no project" scenario (i.e. what would happen if the project did not exist) and employment of the precautionary principle[7]. Requirements of this nature strengthen the credibility of social and environmental safeguards over project finance and are fundamental to effective avoidance strategies.

Lending exclusions are employed for controversial/ high environmental and social impact projects

EIB for example, does not invest in projects within protected areas, critical habitats and heritage sites without adequate compensation/mitigation. It is fundamental to have both biodiversity and wider environmental impacts reflected in exclusion lists, particularly if they are severe and can lead to human rights, welfare and health violations. EIB, EBRD, IFC and IADB also apply relevant CITES[8] regulations where lending is excluded from activities that fail to meet the international regulatory requirements of CITES.

Safeguards on human rights could also drive BES avoidance activities

The inclusion of human rights across the environmental and social standards and principles of IFIs[9] such as IFC, EBRD and EIB provides a further driver for effective consideration of impact avoidance. It is becoming increasingly apparent that health and wellbeing - a basic human right - are dependent on the health of the ecosystem and the services it provides, such as clean air, food and climate change regulation. These issues are assessed in SEAs and ESIAs and may take the form of trans-boundary pollution assessments (in order to avoid impacts to vital water sources), public participation in decision-making and access to justice in environmental matters. EIB for example, has a detailed human rights section in their safeguards with a separate mitigation hierarchy for human rights premised on the principle of remedy rather than compensation that is accompanied by a human rights impact assessment.

A more effective avoidance framework is required within IFI safeguard policies

As the mitigation hierarchy gains credibility and traction with the private sector and their investors, it will become increasingly important that IFIs clearly set out their expectations of avoidance within safeguard policies. IFIs would require strengthening of the language in their safeguards to meet international best practices. Figure 4 is based on the review of IFI safeguard policies and emerging thinking on the mitigation hierarchy. It outlines the areas that need to be included or clarified within existing safeguard policies.

[7] The precautionary principle enables rapid response in the face of a possible danger to human, animal or plant health, or to protect the environment. In particular, where scientific data do not permit a complete evaluation of the risk, recourse to this principle may, for example, be used to stop distribution or order withdrawal from the market of products likely to be hazardous. (Summaries of EU Legislation)

[8] Convention on the International Trade in Endangered Species of Wild Fauna and Flora

[9] Other IFIs use human rights, human well-being and human health in certain issues or sectors, for example, ADB focuses on indigenous people and natural resource use, IADB refers to human health in hazardous materials.

IFI Avoidance Framework

Avoidance measures are embedded in alternatives, set-asides and are driven by NNL commitments or a combination of these. Ensuring adequate implementation of avoidance within IFI safeguards will require the following best practice components:

- Clear definition and guidance on avoidance measures including clarity on avoidance types: design, temporal, spatial, technology, management systems
- A no-go or no-project option where environmental and social impacts are deemed too significant
- Clarity on the steps required to credibly design and demonstrate a NNL commitment e.g. biodiversity and ecosystem services baseline survey which considers social aspects of BES impacts
- Cumulative Impact Assessments and trans-boundary impacts to ensure potential links between health of ecosystem and human rights
- Clear habitats and species definitions in line with international standards
- Applicable to all environments beyond legally designated areas and environmental systems (i.e. a landscape level approach should be adopted)
- Clarity on the interplay between an Environmental and Social Impact Assessment ESIA), Environmental and Social Management System (ESMS), Environmental and Social Management/Action Plan (ESMP/ESAP) and the mitigation hierarchy
- Adopt the Precautionary Principle throughout the decision making process

Figure 4: IFI Avoidance Framework: Potential ways to strengthen IFI safeguard policies.

3.3 Voluntary standards systems

Requirements set by voluntary standards e.g. certification and verification schemes for products or operations can also drive avoidance activities. These are most prominent in the agriculture and forestry sector, but are increasing in other sectors such as mining. Our review indicated that:

- Many of these standards specify areas for which avoidance is either required or advised depending on the potential for negative impacts
- While voluntary standards systems emphasise the avoidance and minimisation of biodiversity impact, very few apply this as part of the mitigation hierarchy.
- Targets towards a NNL or NPI of biodiversity are also rare, although a number of them do set commitments towards a 'positive impact' (UNEP-WCMC, 2011)

The lack of uptake of the mitigation hierarchy and NNL and NPI approaches by voluntary standards systems is perhaps a reflection of their focus on the agriculture and forestry sectors. There are however, opportunities for these sectors to adopt these approaches as, although the scale of their direct impacts on biodiversity greatly outweighs the extractive and infrastructure sectors and their extended supply chains can make implementation of NNL more complex, they are less restricted in the location of their operations and there are therefore more impact avoidance options available[2]. There are also more social constraints however, and rather than moving from suppliers (particularly low income farmers), it may be more effective to work with them to help avoid impacts (both social and environmental).

Requirements for avoidance

A review of 31 international voluntary standards that contain biodiversity relevant criteria showed that 84% of standards include protected areas with requirements such as no adverse impact or the need to respect their legal status[1]. A number of standards referred to the need to avoid impacts on areas identified as important for biodiversity, but not legally protected e.g. 32% referred to a need to avoid High Conservation Value areas (32%), and Key Biodiversity Areas (13%) or one of their current subsets. Many standards refer to specific habitat types, predominantly forests, or their own definition of an important area. Most include a no loss or habitat conversion policy for these specified land types (UNEP-WCMC, 2011).

3.4 Peer activity

Increasingly, companies are developing internal corporate policies on biodiversity management and commitments to NNL or NPI (see Boxes 1 and 2 for examples of policies). According to a recent report, 38 companies (15 of which were extractives companies) have now set ambitious biodiversity commitments towards NNL or NPI that will require significant avoidance of biodiversity impacts (TBC, 2012). Whilst companies making such commitment are under close scrutiny by stakeholders, they are driving the development of tools and methodologies which enable companies to better understand and avoid impacts. For example, the recent International Council of Mining and Metals (ICMM) report (2014) identified that developing internal guidance regarding avoiding areas of high biodiversity value beyond World Heritage Sites was a key priority beyond 2014. This study also showed that over the last 10 years, "*ICMM members have shown a significant increase in the extent and sophistication of biodiversity management systems*". A number of challenges remain with regards to effective avoidance. For example the speed by which corporate decisions need to be made may preclude effective analysis of the avoidance options/need to avoid. Corporate implementation of avoidance strategies are discussed in more detail in section 4.

<u>Box 1:</u> Rio Tinto NPI policy (Rio Tinto Biodiversity Strategy, 2004)

"Rio Tinto's goal is to have a "net positive impact" (NPI) on biodiversity. This means minimising the impacts of our business and contributing to biodiversity conservation to ensure a region ultimately benefits as a result of our presence. Our biodiversity strategy was launched in 2004 at the IUCN World Congress in Bangkok.

The biodiversity strategy and NPI goal is a voluntary commitment Rio Tinto has made in response to both changing societal expectations and our understanding of business value.

To achieve NPI, we first seek to understand the biodiversity elements of the regions where we operate, as well as the intrinsic and societal "values" placed upon those elements. We then prioritise our actions, focusing on the biodiversity elements that have the highest conservation significance"

<u>Box 2:</u> CEMEX-BirdLife International Joint Statement (2014)

"We stress the importance of adherence to the mitigation hierarchy as a basic approach to site developments; such an approach enables site developments to work towards NPI."

4. Case Study Overview

This section sets out the results of our review of 17 case studies from extractive (9), energy (3), housing (1), infrastructure (1), agriculture (1) and forestry (2) sectors. A summary is provided in Table 3 with a more detailed description of each in Appendix (i).

The analysis

Case studies were selected based on recommendations of the project partners and other experts in the field. These case studies illustrate the different ways in which avoidance of impacts can be achieved in terrestrial, coastal and off shore landscapes across a range of geographies.

The majority of the case studies (9 of the 17) come from the extractives sector (i.e. mining and Oil & Gas) as these industries are currently most advanced in adopting the mitigation hierarchy in conjunction with the goal of NNL of, or NPI on, biodiversity. However, we also include examples from energy, infrastructure and residential property housing to illustrate how avoidance has been carried out in other sectors. A summary of the key findings is listed below:

4.1 Type of Avoidance

Of the case studies investigated, Rössing Uranium Mine and the Pasto Mocoa Road used landscape level plans or tools to identify the most appropriate development site, and the Simandou Mine and the Lewis Wind Farm based avoidance decisions on the presence of legally designated or protected species. Sakhalin Energy adopted temporal avoidance for migratory species and breeding seasons of important species, and the Ambatovy mine and the Corrib Project used technological design innovations such as tunnelling to avoid land-based impacts entirely.

Spatial avoidance was cited by all examples (often in addition to other types of avoidance) – perhaps because it is most straightforward to identify and it is relatively easy to clearly demonstrate quantifiable avoidance e.g. number of hectares or priority habitat type (e.g. coral reef) avoided. Rössing Uranium Limited (RUL) stated the use of Landscape Level Planning for its expansion project in order to avoid key biodiversity features such as the IBA, illustrating avoidance at a later stage in the project lifecycle.

Temporal avoidance is a relatively new concept but is gaining traction through the increased application of IFC PS6 standards which require consideration of ecological components within the ESHIA process including breeding and migratory seasons. Six of the illustrative case studies include a temporal avoidance component. This was shown in the Sakhalin Energy case study where significant effort was made to avoid disturbance to the Stellar's sea-eagle during their breeding/nesting period by establishing buffer zones and reducing site construction traffic. Temporal avoidance requires good knowledge of the ecological parameters of the ecosystem where the project was sited and, to demonstrate it, clear delineation of the temporal constraints that were factored into the project timeline e.g. the timing constraints placed on construction or seismic activities of a project.

The case studies presented here were all were based on avoidance on the basis of an identified habitat or species, and there is a paucity of examples based on avoiding impacts on the provision of socio-economic values associated with biodiversity, such as areas important for the provision of food and water to local communities.

4.2 Transferred impact

In most cases of spatial avoidance of areas of biodiversity importance, there will be transference of impacts to alternative sites. In the case studies these alternative sites were areas or routes which were seen to be of lower biodiversity value (e.g. tropical forest that does not support chimpanzee populations). It is however unknown what other biodiversity values may have been present and impacted at alternative sites and the degree of consideration to ecosystem service values of these areas is unknown. Some projects used routes which had already been developed (e.g. Block Island used existing rights of way for the onshore infrastructure) or avoided above ground impacts altogether by tunnelling underground (e.g. Shell's Corrib Project), thereby limiting the transference of impacts to other areas with potential biodiversity and ecosystem service values.

4.3 Drivers

The avoidance of key biodiversity areas, protected areas and species in these case studies was driven primarily by the need for a legal license to operate, with 8 of the 18 case studies being in response to legislative requirements. This is especially the case in developed nations/regions such as North America, Australia and the EU, whereby proponents are required to demonstrate avoidance decisions and planning processes undertaken during project development as part of their permit requirement.

Improved reputation and other non-regulatory drivers were also cited in the case studies as incentives to avoid listed sites (Protected Areas, World Heritage Sites, Key Biodiversity Areas, Natura 2000) or species (e.g. IUCN Red List, Annex 1 of EU Birds Directive). Of significance in this regard are company policies and the safeguards of IFIs such as the IFC and EIB. The avoidance strategies of the Sakhalin Energy Project for example were heavily influenced by the need to comply with the IFC Performance Standards in order to receive funding. It is therefore crucial that these institutions have robust avoidance policies, particularly in countries where legislation is lacking on poorly enforced. Projects such as Rio Tinto's Simandou Iron Ore development have developed avoidance strategies to comply with internal NPI policy and the need to comply with IFC PS6.

Table 3: Overview of case studies according to sector, type of avoidance, key actions taken and the main drivers in the decision to avoid impacts. The case studies are colour coded into sector groups.

Case Study (CS)		Sector		Type of Avoidance	Avoidance Strategy	Key Drivers in avoidance decision*
1	Ambatovy Mine, Madagascar. Sherrit Int.	Extractives	Nickel and Cobalt	Spatial, Temporal, Design	Spatially avoided locating the mine site in littoral forest habitat to protect unique forest habitat (IFC critical habitat) which contained populations of endemic and IUCN Red List of Threatened Species including lemurs and mantilla species. Pipeline designed around forest fragments and tunnelled below important waterways. Temporal avoidance measures including postponing soil clearance were implemented in response to the discovery of dwarf lemurs which were hibernating in the soil in one area of the site.	Company policy and financial - IFC, EIB
2	Carmichael Coal and Rail, Australia. Adani Mining Ltd.	Extractives	Coal	Pre-site selection, Spatial	Rail link connecting mine site to coastal port spatially avoided federally listed (EPBC Act) fauna species and Brigalow threatened ecological community habitat. Publically available sensitive habitat mapping (using GIS) in conjunction with ground-truthing was obtained and fed into the rail design process in order to locate the rail route (and the mine infrastructure) in areas of low biodiversity value relative to the surrounding landscape and engineering constraints.	Legislation (and company policy)
3	Cobre Panama, Panama. First Quantum Minerals Ltd.	Extractives	Copper	Spatial, Temporal	Spatially avoided constructing facilities at Playa Rincón, an important nesting area for leatherback, hawksbill, green and loggerhead turtles (IUCN Red List of Threatened Species). Temporal avoidance of light impacts by prohibiting the use of floodlights at night, to avoid impacts on female nesting behaviour during the nesting period.	Company policy
4	Corrib project, Ireland. Shell Ireland.	Extractives	Gas	Spatial, Design	Spatially avoided loss of tidal estuary, mobile dune and dune grassland habitat through creation of a 4.8km tunnel under Sruwaddacon Bay which is a Special Area of Concern (SAC). This was in response to a request from the Local Government to alter the pipeline route based on the need to avoid sensitive habitat.	Company policy and legislation

5	Rossing Uranium, Namibia. Rio Tinto	Extractives	Uranium	Pre-site selection, Spatial	Desalination plant was positioned to spatially avoid the nearby IBA – an important area of salt pan habitat and Damara Tern nesting site. The siting of infrastructure during expansion of the project at the coast was also based on landscape level planning. The focus of the Landscape Level Assessment (LLA) of Key Biodiversity Vulnerability and Landuse for the Central Namib is "capturing the key biodiversity patterns and processes that characterise the Central Namib and which underpin the wide range of ecosystem services" upon which the flora and fauna of the area depend. GIS was used to analyse information on species, habitats, protected areas, and current/future land-use (von Hase and Parham, 2012).	Company policy
6	New pipeline, Russia. Sakhalin Energy Investment Company	Extractives	O&G	Spatial, Temporal, Design	Spatial and design avoidance (e.g. horizontal drilling) of key habitats for threatened species (Stellar's sea-eagle, salmon and gray whale). Temporal avoidance of breeding/nesting periods, key migratory times, and feeding months for the same species. Buffer zones were designated around specific nests within which no construction activities could occur during the nesting/fledging period.	Financial – IFC (Legislation and Company policy)
7	Simandou mine, Guinea. Rio Tinto	Extractives	Iron	Spatial, Design	Avoided threatened species and habitat: certain iron ore deposits were not developed and project infrastructure was substantially realigned by locating the rail link on the eastern as opposed to western side of the Simandou mountain range to avoid chimpanzee habitat and maintain connectivity. This demonstrates spatial avoidance of an area of critical habitat as defined by IFC PS6 for a species listed as either critically endangered or endangered on the IUCN Red Listed species (chimpanzees are listed as endangered)	Company policy and Financial – IFC
8	West Heath Quarry, UK. CEMEX	Extractives	Sand and Gravel	Spatial, Design	Spatial avoidance of Lowland Heath habitat within the concession boundary through infrastructure design and location, in order to provide a refuge for translocated reptiles (Habitats directive/UK Listed species). The Lowland Heath habitat was located in an area suitable for sand and gravel extraction.	UK legislation (and company policy)

9	Yemen LNG Project, Yemen.	Extractives	LNG	Spatial, Design	Spatially avoided impacts to a portion of coral reef: re-designed the Materials Offloading Facility to be in between two coral banks; used a rock piled bridge which maintained ocean current flow and reduced the footprint of the infrastructure; re-designed shoreline works to avoid physical damage to corals by moving some of the facilities onshore; buried water outfall pipeline in the seabed to avoid coral damage from increased local sea temperatures.	Legislation and company policy
10	Block Island Wind Farm development, DeepWater Wind, Rhode Island, USA	Energy	Wind	Spatial, Design	Cable routes and wind turbine generators sited to spatially avoid impacts on sensitive benthic communities including eelgrass beds and hard bottom habitats. Onshore facilities were primarily located along existing developed areas to avoid disturbing new areas. Area with the least potential for impacts on avian and bat species was an important selection criterion.	Federal and state legislation
11	Lewis Wind Farm, UK.	Energy	Wind	Spatial, Design	Proponent redesigned wind farm (i.e. reducing turbines from 234 to 181 turbines) and other associated infrastructure in an attempt to avoid impacts to the Lewis Peatlands Special Protection Area (SPA) – an important site for migratory birds and protected under EU law. In spite of these design measures the Scottish Government rejected the proposal (i.e. spatial avoidance) due to the severity of the impacts and availability of alternative siting locations.	UK and EU legislation
12	Nam Theun II, Laos.	Energy	Hydro-power	Spatial	Spatially avoided the placement of infrastructure within important forest corridors (semi-evergreen, evergreen, montane, deciduous dipterocarp) which provide habitat for threatened species such as forest elephant.	NGO pressure, company policy (and Financial – World Bank Group, ADB, EIB)
13	Thames Basin Heaths, UK.	Housing		Spatial	Avoided impacts of housing developments (e.g. increased pressure from human disturbance) on the Thames Basin Heath SPA which is host to various Annex 1 species on the EU Birds Directive. This has been done through the provision of Suitable Alternative Natural Greenspace (SANG).	NGO led initiative, national legislation

14	Pasto Mocoa Road, Colombia.	Infrastructure	Spatial, Design	Spatial alternatives analysis used to identify route option for the new road to factor in length, costs, deforestation, and the number of rivers/streams crossings to try and avoid adverse impacts in the area. The project therefore attempted to avoid degradation of tropical forest habitat by routing the infrastructure corridor away from sensitive habitat (seen to be suitable for species such as jaguar, mountain tapir and spectacled bear) and using specially designed bridges to avoid cutting down trees where possible.	Financial (IDB), legislation, NGO collaboration
15	British American Tobacco, Global.	Agriculture	Spatial	Spatially avoided HCV areas with the assistance of the internally developed Biodiversity Risk and Opportunity Assessment (BROA) tool to identify locations where risks to biodiversity are high, medium or low. For example in Venezuela efforts are being made to avoid removal and/or degradation of natural vegetation through identification of priority habitat features. There is also potential for impact avoidance through preventing the use of potentially invasive non-native trees for restoration or hedgerow planting and instead using fast-growing native varieties.	Company policy (voluntary standards and legislation, NGO partnership)
16	APRIL, Global.	Forestry	Spatial	Globally APRIL currently conserve and protect more than 250,000 hectares of HCV forest inside concession areas. In Indonesia, spatial avoidance of HCV areas was also identified using the HCV Indonesia Toolkit.	Company policy (voluntary standards)
17	Kingfisher, Global.	Forestry	Spatial	Avoid deforestation of natural forest or HCV/HCS assessed forest when sourcing timber through implementation of procurement policies that require sustainably sourced timber. Demonstration of avoidance of deforestation through certification schemes, such as FSC and PEFC.	Company policy (voluntary standards and legislation)

*Drivers listed in brackets were seen to be secondary

5. How to achieve effective avoidance: barriers and recommendations

This section sets out the barriers to adopting successful avoidance strategies and recommendations for overcoming them as identified through case study analysis.

The timely implementation of the mitigation hierarchy can result in positive outcomes for biodiversity and project risk management. To achieve this, a number of enabling factors need to be in place regarding what to avoid, incentives for avoidance, and how to ensure optimal and long-term avoidance of impact, as described in Figure 5.

Enabling factors for effective avoidance

1. **Knowing what to avoid:** Identifying what should be avoided based on a range of stakeholder priorities with access to robust data and considering the environmental, social and economic impacts of different options. This should involve identifying and quantifying any impacts which arise in alternative areas
2. **Incentives for avoidance:** Sufficient incentives must be in place and enforced, where appropriate, for avoidance to take place (e.g. legislation, voluntary standards within financial loan requirements, company policies, and certification or verification schemes)
3. **Ensuring optimal and long term avoidance of impact:** Avoidance measures need to be implemented to maximise the potential for avoiding harm to biodiversity, and ensure that those values are maintained in-perpetuity. The long term maintenance of avoidance measures for a location or type of impact requires strong planning requirements and targets, legislative policy guidance, appropriate company policies, processes and financial mechanisms, transparency and feasibility of avoidance options and where necessary, adaptive management based on sound and effective monitoring.

Figure 5: Enabling factors for effective avoidance

To achieve significant biodiversity gains, sufficient incentives such as institutional requirements are needed to drive the uptake of effective avoidance strategies. At the project scale, it is imperative to identify key stakeholder priorities and biodiversity values (species, habitats, goods, and services) which are informed by a biodiversity baseline survey. These values and priorities should also be used to implement effective avoidance measures throughout the project lifecycle that is inclusive of the project construction, operation and decommissioning phases.

There are some biodiversity values for which any level of impact would be deemed inappropriate and complete avoidance through alternative site selection would then be necessary. These may include World Heritage Sites and Alliance for Zero Extinction sites which can be identified using global data but will also include values that would be identified through on-ground assessments.

In relation to on-site avoidance, it is fundamental to plan for long-term monitoring and evaluation of the effectiveness of implemented mitigation measures. Any actions implemented to avoid biodiversity impacts should also seek to avoid significant adverse socio-economic impacts on vulnerable communities, for example those whose lives and livelihoods depend on biodiversity and ecosystem services. Where environmental and social issues align, stakeholder engagement and consultation should take into consideration approaches to impact avoidance that are acceptable to all stakeholders.

5.1 Barriers

We identify a number of potential barriers which can undermine the successful achievement of impact avoidance. These are listed in Table 9 (Appendix) and organised according to the enabling factors identified in Figure 5. A summary is provided below.

5.1.1 Knowing what to avoid

A key barrier to effective impact avoidance is the difficulty associated with understanding the impacts of operations and prioritising biodiversity values that need to be safeguarded. Biodiversity is complex and holds many, often competing, values for different stakeholder groups. These include values of vulnerability and irreplaceability as well as ecosystem service values such as the provision of food, water and other services such as pollination, carbon sequestration and tourism revenue. There are also challenges related to the availability and access to all relevant data. The lack of landscape level conservation and land use plans that are accepted by national authorities is a key concern in this regard. This is further confounded by complex nature of how impacts can occur, directly, indirectly, and cumulatively that need to be accounted for throughout the project lifecycle.

5.1.2 Incentives for avoidance

The principle drivers for impact avoidance are the requirements set within national legislation. However in many countries this may be lacking, be unclear or un-enforced. For example many countries have laws that prohibit certain large scale developments within protected areas but these have been seen to be bypassed or changed or protected areas have been de-gazetted. High profile examples are the provision of licenses for oil and gas exploration within Virunga National Park, contra protected areas law (Global Witness, 2014) and the proposal to change protected areas law in Brazil to open up strictly protected areas for mining (Ferreira et al., 2014). In Mongolia, the Oyu Tolgoi mine was situated within a river course, despite Mongolian regulations against this[10]. The lack of adequate law enforcement often arises as a result of a lack of inter-ministerial coordination, capacity limitations, weak environmental ministries and departments, and the prioritisation of economic gain over environmental issues.

In the absence of enforced regulation other drivers provide incentives to protect biodiversity. These drivers include corporate policies, third party certification standards, and financial loan requirements for effective impact avoidance through adherence to the mitigation hierarchy. While these non-legislative drivers do apply in some contexts they are not ubiquitous. In addition they are variable in their stated requirements and not all adequately enforced or monitored. The lack of a level playing field provides a major disincentive for responsible operators with respect to their less responsible peers (who may be able to save costs and market cheaper products if they do not consider the environmental impacts of their operations).

[10] Law on Prohibiting Mineral Exploration and Extraction Near Water Sources, Protected Areas and Forests (the "Law with the long name") 2009

5.1.3 Ensuring optimal and long-term avoidance

There are also constraints associated with the ability to implement an effective and permanent avoidance strategy. Although effectiveness and permanence may be separate issues: some measures can be very effective and only be needed in the short term (e.g. temporal avoidance in a particular part of the project), while others could fail because they are not guaranteed in the long term (a problem with spatial avoidance, especially where land tenure is an issue). Much of this relates to companies possessing the appropriate capacity, resources and processes, and the availability of feasible options for avoidance. For example, avoidance strategies can be costly, can depend on innovative engineering, require effective co-ordination between departments, and be constrained by unclear links to the supply chain or project lifecycle. One of the key steps for implementing an effective and feasible avoidance strategy is to start early. However, EIA and ESHIA processes typically occur once a project has been designed limiting the options for impact avoidance.

The long term maintenance of biodiversity values that are to be safeguarded through spatial avoidance is also a key concern. This relates to both the possibility of avoided areas being developed by a separate operator through licenses for areas being reissued, as well as the maintenance of avoided areas by operators as the project progresses or is expanded. Inadequate monitoring and evaluation of the biodiversity that has been avoided is a key challenge to ensuring that it is maintained into the future. The avoidance stage of the mitigation hierarchy requires an adaptive and iterative approach to maximise the potential for avoiding harm to biodiversity. While companies may often satisfy a basic requirement of avoidance, the lack of an adaptive management approach or targets such as NNL or NPI of biodiversity that drive quantification of impacts and link avoidance to the other stages of the mitigation hierarchy are significant barriers to achieving an optimal avoidance of biodiversity.

5.2 Recommendations

In response to the barriers identified in this section and listed in Table 9, there are a suite of recommended actions to be stimulated, adopted and implemented by the range of actors involved, including government agencies, private sector proponents, financing institutions, and civil society/NGOs. Each sector has a role to play, with collaboration and cooperation between actors essential to the successful uptake and implementation of impact avoidance strategies. These are listed separately for each stakeholder group in Tables 4-7 and organised according to the enabling factors identified in Figure 5.

Table 4: Overview of recommended actions for governments split according to the enabling conditions outlined in Figure 5.

Enabling factors	Recommended Actions (Govt)
Knowing what to avoid	
Understand full range of impacts	• Support Landscape Level and Strategic Conservation Planning based on understanding of ecosystem function, national priorities and the goals of the global MEAs. Data should also be available to all land users - particularly implementing authorities • Use available tools (e.g. sensitivity maps, IBAT, TESSA, etc.) to provide spatial data on areas where development must be avoided. See Appendix Table 8 for further details. • Undertake ecosystem services assessment (Natural Capital Accounting) to identify important BES areas and make the data available.
Access to good data	• Implement the objectives and priorities of the global Multi-lateral Environmental Agreements (MEA) and make data available • Require developers to conduct detailed baseline biodiversity and ecosystem services surveys, stakeholder assessments and impact and dependencies assessments prior to license application as well as monitoring throughout the project.
Incentives for avoidance	
Clear legislation and government support	• Legislation which requires avoidance as part of an integrated and complementary legislative framework • Legislation that requires application of the mitigation hierarchy in all development projects, particularly as part of social and environmental management requirements for project licensing and permits – this will be part of EIAs, ESIAs, SEAs and CIAs (cumulative impact assessments), FBI (Forest Baseline Investigation). • Clarity within legislation on areas that need to be avoided based on strong scientific and stakeholder inclusive grounds • Remove subsidies that incentivise development of areas of biodiversity importance
Explicit requirement for impact avoidance in voluntary standards	• Support the implementation of voluntary avoidance strategies through recognising non-legally designated areas of biodiversity importance (e.g. KBA, HCV) • Offer preferred partner status (through Due Diligence processes and demonstration of good governance) to companies adhering to appropriate voluntary standards
Evaluation of competing priorities	• Institute inter-Ministerial cooperation and collaboration to share data and information to reduce potential for conflicting priorities
Optimal and long-term avoidance	
Appropriate company capacity and processes	• Governments can ensure that companies build local technical expertise on biodiversity and related issues, and also provide opportunities through university courses for example
Transparent avoidance strategy	• Require transparent/public and regular reporting on avoidance commitments - may be in the form of a verification process

Early planning and long term management	• Plans should be made for permanent protection of areas under state control
Targets and adaptive management	• Require companies and developers to set and quantify realistic targets and undertake monitoring of progress.

Table 5: Overview of recommended actions for IFIs split according to the enabling conditions outlined in Figure 5.

Enabling condition	Recommended Actions (IFI)
Knowing what to avoid	
Understand full range of impacts	• Standards to require full environmental and social impact assessment
Access to good data	• Funding strategic environmental assessment (SEA) and landscape level planning (LLP) to facilitate the generation of data that will enable impact avoidance and MH application.
Incentives for avoidance	
Clear legislation and government support	• Incentivise governments to develop policies required to support the implementation of the MH • Safeguards attached to public and private loans and grants to stipulate the early application of the MH, in particular the use of strategic environmental assessment, landscape level planning and cumulative impact assessment
Optimal and long term avoidance	
Appropriate company capacity and processes	• Make PS and safeguard guidance available to practitioners and regulators • Require pre-qualification of consultants and implementing partners on the basis of demonstrated experience in the application of MH
Transparent avoidance strategy	• Require transparent and regular reporting on avoidance commitments
Early planning and long term management	• Monitor implementation of avoidance strategies as part of the loan agreement
Targets and adaptive management	• Require demonstration of adaptive management and iterative improvement (e.g. IFC PS)

Table 6: Overview of recommended actions for the corporate sector, split according to the enabling conditions outlined in Figure 5.

Enabling condition	Recommended Actions (Private companies)
Knowing what to avoid	
Understand full range of impacts and their implications	• Take an landscape scale approach and design baseline and impact assessments, considering the impact and dependencies of the project on biodiversity and ecosystem services • Identify stakeholders potentially influenced by proposed projects and undertake stakeholder consultation and issues assessment • Conduct Cost Benefit Analyses factoring in environmental, social and economic impacts through multi-disciplinary teams
Access to good data	• Require pre-qualification of consultants and implementing partners on the basis of demonstrated experience in the application of MH • Consider existing prioritization approaches – KBAs, IBAs, AZEs, HCV, HCS, critical habitat, available tools (e.g. IBAT and TESSA) and guidance (e.g. BBOP, CSBI) • Consider key life cycle events of species of concern in order to implement temporal avoidance (e.g. hibernation, breeding, nesting and foraging) • Carry out baseline surveys and impact assessments using multi-disciplinary teams to identify impacts on biodiversity and ES. Ensure survey results are interpreted and incorporated into the decision making process – rather than just generating lists of species and habitats – for example, use survey results to map areas of highest biodiversity sensitivity, which are suitable for guiding project design decisions
Incentives for avoidance	
Clear legislation and government support	• Implement and adhere to local, national, and international legislation i.e. Builds on EIA, complies with national strategic planning decisions, and honours protected areas • Work with multi-sectoral stakeholders to strengthen institutional, policy and capacity frameworks that will enable implementation of impact avoidance and the mitigation hierarchy
Explicit requirement for impact avoidance in voluntary standards	• Comply with international standards (e.g. IFC, RSPO, FSC) as a means of going beyond national requirements throughout sourcing and sub-contracting policies • Develop internal policy commitments to net positive or no net loss outcomes for biodiversity and uphold the early application of the MH as fundamental framework to achieve this commitment
Evaluation of competing priorities	• Identify avoidance areas that fit with national strategic frameworks, the goals of MEAs and stakeholder values. • Seek NGO and expert consultation

Optimal and long-term avoidance	
Appropriate company capacity and processes	• Carry out avoidance at earliest possible stage across their site network. • Ensure all key staff are made aware of biodiversity values – training, clauses in contractor agreements • Obtain staff with suitable technical skills - biodiversity specialist, GIS Analyst
Transparent avoidance strategy	• Report publicly on environmental, social and economic impacts and decision making • Ongoing dialogue with key stakeholders to communicate avoidance and other impact mitigation activities
Feasibility of avoidance options	• Identify avoidance potential at earliest possible stage and ensure sufficient budget is available for project design and engineering, to enable the greatest possible avoidance of sensitive biodiversity • Use pre-existing routes or already disturbed/degraded habitat where possible • Apply principle of best practical environmental option (BPEO) and pragmatism regarding feasibility of impact avoidance strategies
Early planning and long term management	• Develop plans to ensure permanence of biodiversity values which have been avoided. For example by securing the land tenure of areas avoided.– This may require land stewardship covenants or change in land-use designation and collaboration with local law enforcers
Targets and adaptive management	• Quantify impacts and set targets – work towards NNL or NPI • Set Key Performance Indicators for avoidance targets, monitor progress towards achieving these and adapt management actions to achieve targets • Assess potential for avoidance throughout project lifecycle

Table 7: Overview of recommended actions for NGOs split according to the enabling conditions outlined in Figure 5.

Enabling condition	**Recommended Actions (NGO)**
Knowing what to avoid	
Understand full range of impacts	• Support stakeholders potentially influenced by proposed projects and participate in stakeholder consultation and issues assessment • Contribute to baseline and impact assessments to ensure consideration of ecological patterns and processes at an ecosystem scale to understand the full range of impacts and dependencies • Engage in cross-sectoral initiatives and projects that undertake landscape level assessments, SEA and cumulative impact assessment • Provide governments and companies with information on changing biodiversity conservation priorities

Access to good data	• Provide decision support tools and guidance to ensure avoidance of high priority areas and ecosystem services (e.g. Migratory Soaring Bird sensitivity maps, IBAT, TESSA)
Evaluation of competing priorities	• Use local NGO partners to support companies in the country of operation • Work to align differing stakeholder values to inform appropriate KPIs
Incentives for avoidance	
Clear legislation and government support	• Support strengthening of legislation and policies around MH, in particular the avoidance stage • Communicate benefits of biodiversity and good environmental management • Support government in building capacity to understand and implement the MH
Explicit requirement for impact avoidance in voluntary standards	• Support projects in the use and uptake of voluntary standards where appropriate • Provide additional sources of information beyond legally designated areas (e.g. IBAs in Danger – BirdLife International) • Work with corporates and standard setting organisations to develop standards and internal company policies with strong avoidance requirements for various sectors and commodities and geographies where possible
Optimal and long-term avoidance	
Appropriate company capacity and processes	• Contribute to capacity building programmes with government agencies and the private sector
Transparent avoidance strategy	• Monitor effectiveness of KPIs and lobby where actions are shown to be deficient
Feasibility of avoidance options	• Provide technical assistance to government or private sector when setting targets • Provide case studies to demonstrate feasibility of avoidance options
Early planning and long term management	• Potential for NGOs to assist in management of avoided areas post development or to provide guidance to government/local people
Targets and adaptive management	• Assist companies in setting and meeting impact avoidance targets through the provision of data, metrics and scientific expertise

6. Guidance for effective avoidance

6.1. Knowing what to avoid

A key barrier identified in the previous section was how to decide what aspects of biodiversity within an area should not be impacted, and what data or support is available to make those decisions. Biodiversity holds many different values (biological, social and economic) that will vary based on global, regional, national, and local priorities. The value of species or ecosystems will depend on factors such as vulnerability and irreplaceability that will vary across scales, as well as their functional properties and role in the delivery of ecosystem goods and services.

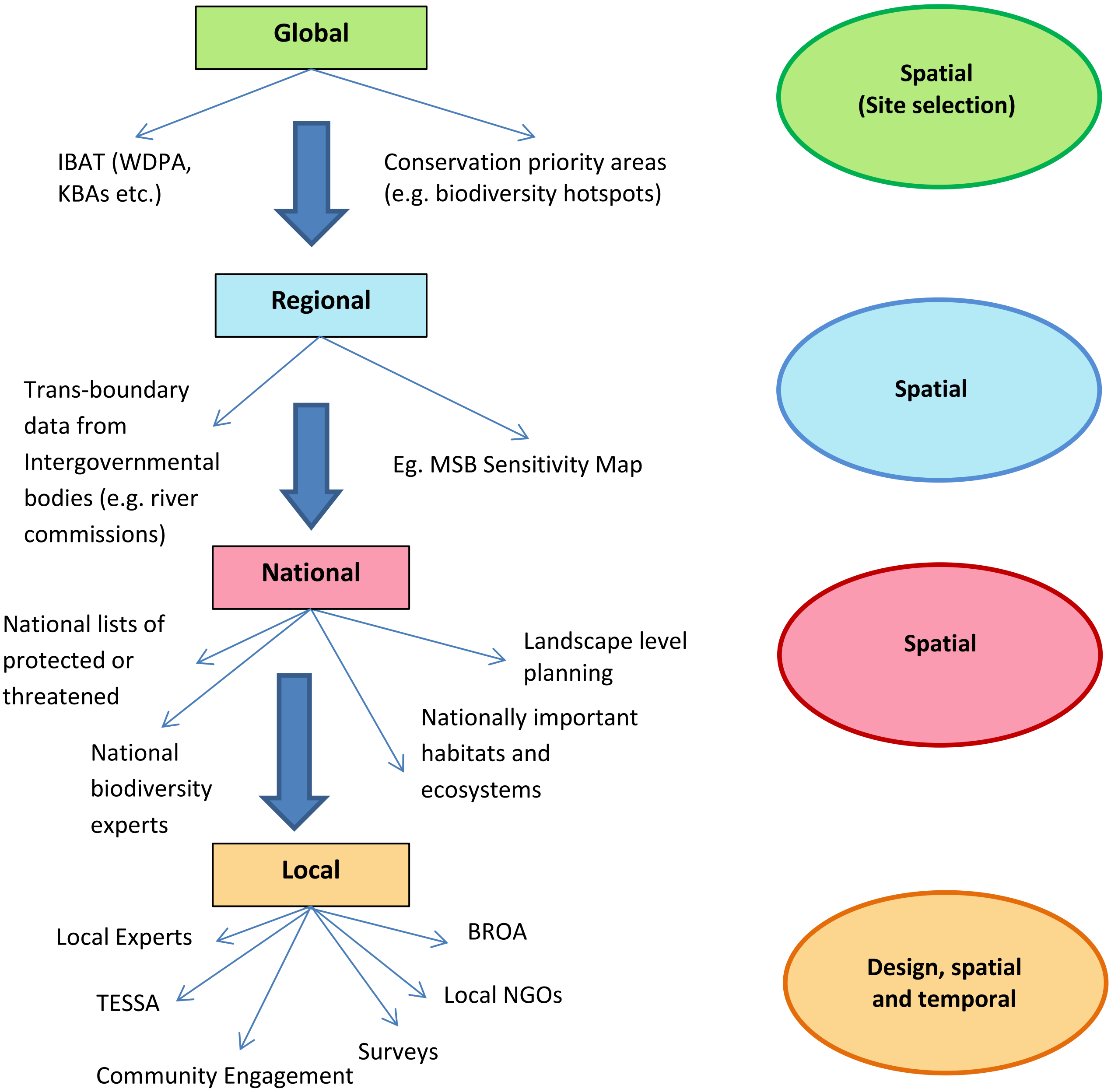


Figure 6: Flow diagram showing some of the tools which could be used in impact avoidance at global, regional, national and local levels of operation.

Figure 6 presents a flow diagram which illustrates the different sources of information that can feed into biodiversity avoidance decisions at different scales from the global level to the local. It also shows what aspect of avoidance (spatial, design or temporal) that the tools are most likely to assist. At the global level, tools based on globally available data can assist corporates with site selection decisions. At a regional level there are often tools and data sources that can assist with understanding issues that traverse national boundaries, such as water courses and migratory birds. At the national level, information related to national priorities, land-use plans and priority species and habitats will be important. Ultimately at the local level, site-based tools, local data and information will inform all aspects of avoidance. (Table 10, Appendix analyses these in more detail).

6.1.1 Global and regional

Protected areas[11] are often at the core of conservation strategies – aiming to maintain both biodiversity and the services which it provides. These sites are nationally designated on the basis of national priorities but a number of them are regionally or internationally recognised including UNESCO World Heritage sites, Ramsar sites, UNESCO Man and Biosphere reserves, and Natura 2000 sites. These areas often feature as key components of any avoidance decision and global data are available through the World Database of Protected Areas.

There have also been a number of global efforts to prioritise areas based on varying degrees of vulnerability and irreplaceability. For example Alliance for Zero Extinction Sites are the remaining refuges for critically endangered species where impacts could be anticipated to lead to global extinction of those species. Key Biodiversity Areas are nationally identified sites of global significance that encompass a number of other globally important sites for other taxa and realms such as Important Bird and Biodiversity Areas (IBAs). In addition to these site level designations there are a number of regional scale priority areas including Biodiversity Hotspots, High Biodiversity Wilderness Areas, and Endemic Bird Areas. These are all defined on the UNEP-WCMC Biodiversity A to Z[12], and the spatial data for many of these designation forms the basis of the Integrated Biodiversity Assessment Tool (IBAT) which has been developed by a partnership of BirdLife International, Conservation International, the IUCN, and UNEP-WCMC. In some cases these data layers can be used to inform site selection, as well as on-site avoidance strategies. This will help to achieve the best outcomes for biodiversity conservation, as well as reducing risk to developers.

It is also important to consider migratory species which traverse countries, continents and even the globe as part of their annual cycle. These species will undoubtedly face different levels of protection and will hold different values in the areas in which they stopover. One tool which has been developed to help corporates, governments, NGOs (amongst other stakeholders) is the Migratory Soaring Bird Mapping tool[13] which provides satellite tracking data, IBA information and provides a sensitivity assessment of the site based on potential risk to migratory birds.

[11] Protected Areas include (but are not limited to): National Parks, Community Conserved Areas, National Reserves, and Wilderness Areas (IUCN).

[12] www.biodiversitya-z.org

[13] tinyurl.com/MSBmap

6.1.2 National:

At a national scale, national priorities and regulatory frameworks should be considered in site selection decisions. National or state governments may develop interactive online mapping tools which align with and act as high-level screening tools for biodiversity issues relevant to regulatory frameworks and policy. For example the Australian federal government has developed the Protected Matters Search Tool which allows the user to identify whether a chosen site may interact with eight conservation issues including World heritage and other protected areas, threatened communities and threatened or migratory species which are outlined in the federal biodiversity conservation legislation (i.e. *Environmental Protection and Biodiversity Conservation Act*). Comprehensive maps of vegetation classes or ecosystems within a landscape may also be made publically available by relevant governments and provides a useful tool for high-level screening and site selection (i.e. Regional ecosystem mapping in Queensland, Australia).

Development activities need to be considered at a scale relevant to the project, other land users and the surrounding landscape. A landscape level assessment (LLA) is a useful approach to identify key biodiversity patterns and ecological processes that characterise a landscape and which are likely to underpin a wide range of ecosystem services that support a region's inhabitants. An understanding of landscape processes is important because biodiversity and ecosystem processes are not evenly distributed across a landscape - just as people, towns and other developments (e.g. mines) tend to be concentrated in some areas and less so in others. A conservation assessment allows us to consider and analyse this variation in a Geographic Information System (GIS) to determine spatial priority areas for conservation and avoidance. The output of an LLA will inform potential avoidance of cumulative impacts from multiple development projects.

Considering biodiversity at this level allows for an assessment of the ecosystem services which an area planned for development might provide both locally and regionally, as well as also allowing for a comparison of different future scenarios under different development alternatives. It would also be beneficial at this scale to utilise Landscape Level Planning where possible in order to avoid the cumulative impacts of multiple development projects from impacting on biodiversity values at a broader scale. National values may also differ from global values, for example if a species is globally threatened, but not within that country, or depending on social/cultural values some species may be prioritised over others.

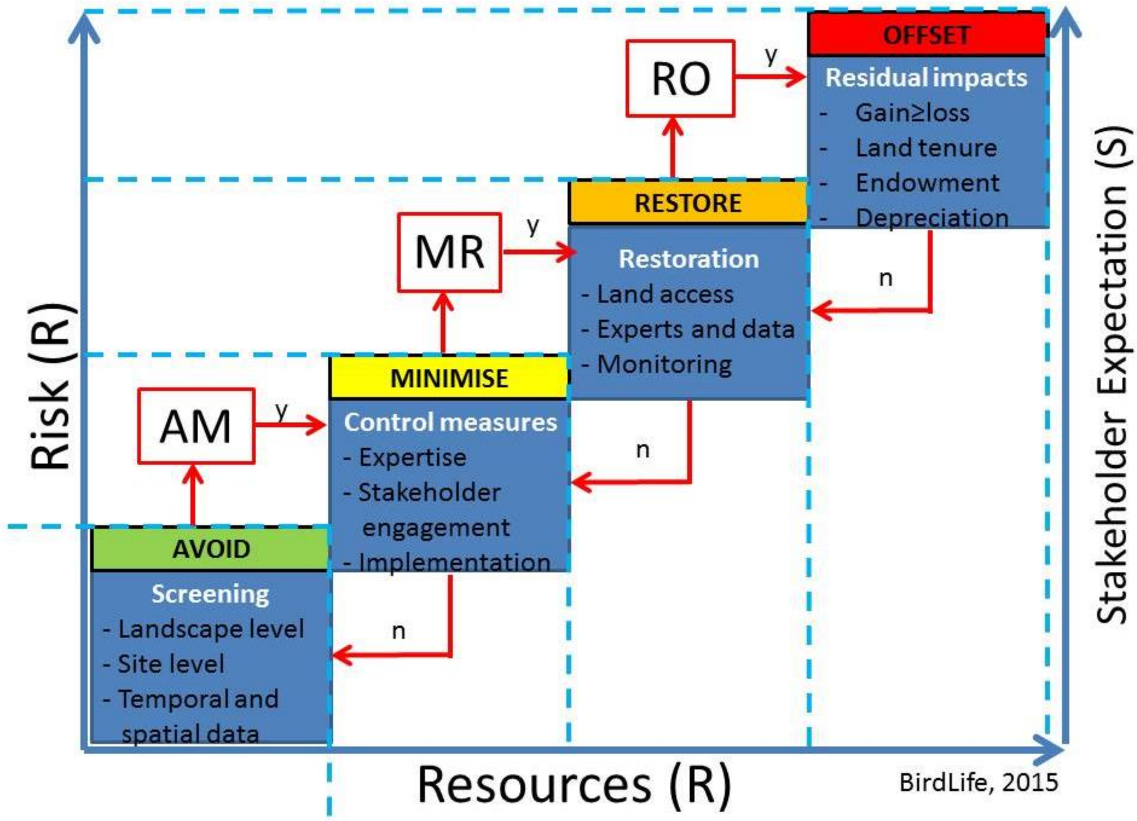
6.1.3 Local:

Finally, at the local level, aspects such as community engagement, local biodiversity values (e.g. provision of water or food resources), the opinions and input of local experts and NGOs who understand the ecology of the area and the best way to communicate that to the company proposing the development and the local people. Survey work will also be important to ensure that the predictions of the global data sets is accurate and to provide more accurate information as to species life-cycles (important for temporal avoidance), and key sites (e.g. breeding vs. feeding grounds, hunting areas for local people).

6.2. Optimal and long-term avoidance

6.2.1. Maximising avoidance potential through application of the mitigation hierarchy

While some level of avoidance of biodiversity impact may commonly form part of any project design, the question remains as to how much avoidance is enough. The integration of it within the mitigation hierarchy with set goals of a NNL or NPI on biodiversity enables the operator to maximise avoidance potential. Of all the stages, avoidance is likely to deliver the greatest conservation gains and maximising this potential is essential to achieving NNL or NPI goals. As illustrated in Figure 7 the later stages of the mitigation hierarchy are likely to be more costly and uncertain, and therefore carry more risk.



<u>Figure 7:</u> Variation in Risk and Stakeholder expectations with increasing resource use, as illustrated through the 4-stage mitigation hierarchy framework (BirdLife, 2015)

Figure 7 illustrates the practical considerations associated with implementing the mitigation hierarchy, specifically that moving from one stage to the next involves increased risk to viable outcomes due to increasing timescales and the inherent risks associated with 'uncertain future scenarios', including depreciation of biodiversity value. Moving through the stages of the mitigation hierarchy also requires (as a general rule) greater resources including financial inputs such as endowment funds for long-term management, technical expertise including to measure loss/gain, and enabling legislation such as the ability to have long-term tenure over offset properties. The slope of the graph, bisecting the four stage boxes, represents Cost – the interaction between the Resources required to achieve these outcomes, the Risk to these outcomes and increasing stakeholder expectations (S) following each stage gate AM, MR, and RO. Cost could therefore increase on a logarithmic scale as a developer progresses through the stages of the mitigation hierarchy.

Correctly applying the mitigation hierarchy requires an iterative process as the operator moves through the stages and the point of moving from one stage to another is known as a stage gate. Each stage gate required specific considerations, and proceeding to the next phase will require an explicit series of steps, for example:

From avoidance to minimisation (AM)

- Do avoidance actions satisfy stakeholder requirements?
- Have all feasible avoidance measures either been implemented or have a specific plan in place?
- What minimisation options exist and how feasible are they?
- Is there sufficient technical capacity and resources to implement these options?
- Comparative cost/feasibility analysis between both phases

From minimisation to restoration (MR)

- Do minimisation actions satisfy stakeholder requirements?
- Have all feasible minimisations measures either been implemented or have a specific plan in place?
- Are there mature, proven examples of the selected restoration methods?
- Are there sufficient technical capacity and resources to implement and monitor restoration actions in the long term?
- Comparative cost/feasibility analysis between both phases

From restoration to offsetting (RO)

- Recognise that there are limits to what can be offset[14]
- Are restoration activities and plans in place and agreeable to stakeholders?
- Is funding available to resource and manage offsets for at least the duration of the impacts they are designed to compensate for?

It must be noted that this process is iterative, and that if a biodiversity value cannot be offset, the developer or practitioner should return to the initial stage of avoidance as part of NNL or NPI commitments. This process is demonstrated in Figure 8 (CSBI, 2015).

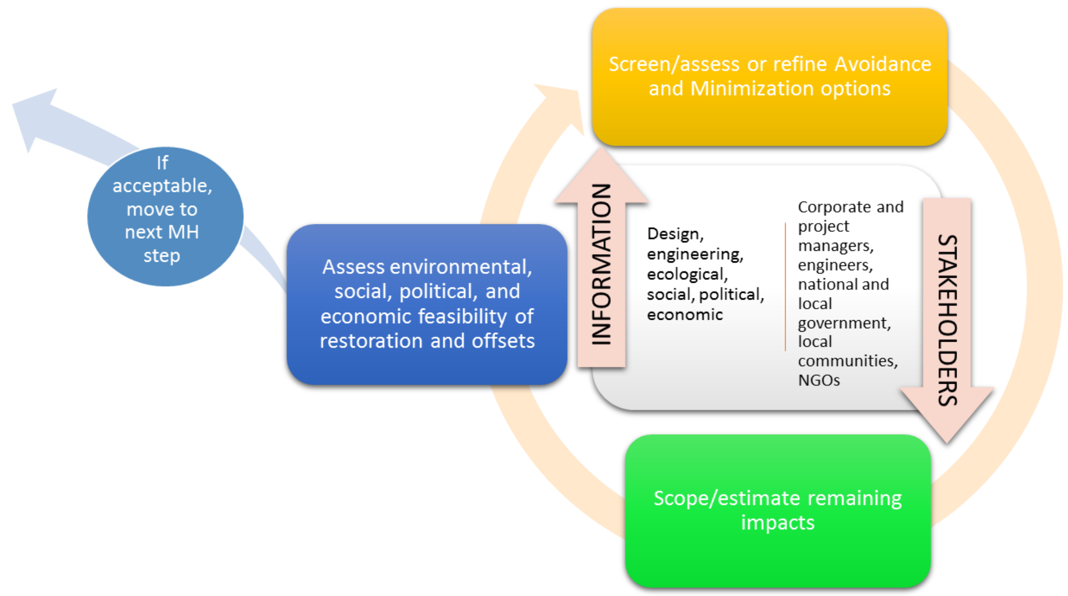


Figure 8: Factors which should be considered before moving on from one stage of the Mitigation Hierarchy to the next.

[14] For example: http://www.forest-trends.org/documents/files/doc_3128.pdf

6.2.2. Long term management of avoided biodiversity values

A further key element of an effective avoidance strategy is the permanence of those areas or values for which impact has been avoided. Typically, this refers to areas of land or sea that have been identified for their high biodiversity value, based on either permanent or temporally present features. This presents a key challenge for operators, depending on the tenure system in place.

For site selection, the issue of permanence is particularly problematic. If avoidance is based on national legislation then all operators will be required to avoid the site helping ensure its long-term maintenance. However when based on corporate commitments, financial or other voluntary standards there is very little to prevent alternative operators and financiers operating or funding operations in these previously 'avoided' locations.

For other forms of spatial, temporal and design avoidance where the company is present there are options to help ensure the permanence of avoided areas. In the case of legislative drivers, operators can support the government through working with local law enforcers and providing financial support. In cases where areas have been identified on the basis of non-regulatory standards there are essentially three options for maintaining the areas as conservation areas, which will depend very much on the local context and tenure systems that will be specific to each country. Broadly speaking the options include: working with national and local government to place the area under state control as a legally protected area; working with local communities and local government to support community or co- management of the area; and placing the area under private ownership either of the company itself or through partnership with NGOs. For example Rio Tinto's ilmenite mine in south-eastern Madagascar, run by QIT Madagascar Minerals is an example of protected area creation based on avoidance as part of the company's commitment to NPI. Within the mining concessions, avoidance zones of high quality littoral forest have been established and officially incorporated into Madagascar's national protected areas network (Temple et al. 2012).

Climate Change:

Recent observed evidence shows that climate change is already having a negative impact on biodiversity (Campbell 2009). Some unique and threatened ecosystems, for example arctic and coral reef systems, are already at risk (IPCC 2014). Future impacts on biodiversity are estimated to be even more significant in the face of expected rising global temperatures and shifting precipitation patterns (IPCC 2014). Potential temperature shifts could occur within decades and range shifts have already been reported for some species (Burrows 2011). Biological differences between species can also make them more vulnerable to climate change. Species with traits such as specialised habitat requirements or those with specific environmental triggers for behaviour are likely to be more vulnerable (Foden et al 2013). Climate change also has the potential to exacerbate other existing biodiversity threats, such as habitat loss (Mantyka-Pringle et al 2012).

Existing and predicted changes in biodiversity patterns in response to climate change are relevant for the design of biodiversity mitigation approaches. Mitigation measures such as avoidance or offsetting could become ineffective if, for example, the range of the species for which the mitigation was designed has shifted. Some species are unlikely to be able to move fast enough in response to climate-induced temperature shifts under some scenarios (IPCC 2014). As a result, there is the potential for mitigation measures to become ineffective if considerations regarding the resilience of biodiversity to climate change are not included in the design.

Conclusion

This report demonstrates that there are a wide range of activities which can be undertaken to avoid the impacts of development on biodiversity. These range from re-routing pipelines to allow for migration and breeding of key species to the use of sampling methods such as environmental DNA (eDNA) to test water samples for endemic or rare species in order to determine if an area or species should be avoided. These avoidance actions will be most effective if considered early in the project lifecycle, however, they are not limited to pre-construction or pre-ESIA and many can continue to be of use throughout the project lifecycle. The avoidance actions documented here have largely been driven by legislation in countries (or regions) which have the capacity and resources for enforcement. In many developing nations, the implementation of avoidance strategies may be more strongly influenced by the safeguards and performance standards of the IFIs, or voluntary standards such as FSC or RSPO.

The implementation of avoidance activities as part of adherence to the whole mitigation hierarchy with set targets for reducing impacts enables operators to achieve optimum and long term avoidance with greater conservation gains and reduced business risk. This includes maximising their avoidance potential, and maintaining those avoided areas in collaboration with stakeholders and national governments. Effective avoidance strategies require a number of enabling factors, including sound science, good baseline data, and a cost benefit analysis which has also considered the socio-economic impacts of avoidance, as well as the 'leakage effects' of impacting a different area of land.

While there are barriers to avoidance – such as lack of capacity within both governments and companies themselves, and a lack of data with which to assess impacts – there is also potential for significant improvement around environmental management in the corporate sector. Decision making regarding impact avoidance can also now be supported through the use of tools such as IBAT, BROA and TESSA, which incorporate data on biodiversity features (e.g. protected areas) and aspects such as ecosystem services into environmental reporting. These tools also help further understanding within the corporate sector of the risks associated with not addressing biodiversity impacts early in the project lifecycle. Governments, NGOs, and IFIs can all support and encourage the adoption of these tools.

Large-scale development and global climate change are placing increasing pressure on biodiversity and it is now of utmost importance for decisions on development to address the existing vulnerability of certain habitats and species and make effective decisions around avoidance. This is imperative to achieving the goals of the global multi-lateral agreements such as the Convention on Migratory Species of Wild Animal, the Convention on Biological Diversity, Ramsar and the Convention on the International Trade of Endangered Species of Wild Fauna and Flora, as well as supporting the continued delivery of a suite of ecosystem services that underpin human well-being. Ultimately, there is a great need to build understanding of best practice avoidance and address the barriers to widespread uptake and effective implementation.

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APPENDIX

List of Interviewees and their affiliations:

Name	Organisation
Ibrahim Al-Thary	Yemen LNG
Zoe Balmforth	FFI
Eduardo Gallo Cajiao	University of Queensland, Australia
Igor Chestin	WWF Russia
Lori Conzo	IFC
Richard Cottle	Ecot Consulting Ltd.
Nick Cotts	Newmont
Dan Eason	Rio Tinto
Ruth Fletcher	UNEP-WCMC
Laura Fox	FFI
Jamie Gordon	WWF UK
Nicky Jenner	FFI
Mark Kelly	CEMEX UK
Alexey Knizhnikov	WWF Russia
Erika Korosi	BHP Billiton
Jamie Lawrence	Kingfisher plc
Steven Lowe	FFI
John Pilgrim	TBC
Edward Pollard	TBC
Sofia Rincon	WWF Colombia
Steve Rusbridge	Rio Tinto
Chris Scholl	First Quantum Minerals Ltd.
Evgeny Shvarts	WWF Russia
Rob Small	FFI
Aedan Smith	RSPB
Tony Whitten	FFI
Chris Wilcox	CSIRO Marine and Atmospheric research
Dick Williams	Wetlands International
Emma Wilson	Independent consultant
Francis Vorhies	Earthmind/IUCN

Methodology

Key informant interviews were carried out to increase understanding beyond that of official documents. Key informant interviews provide informed overview of the main issues and insight which might not be gained from simply reading documents.

The initial contacts were Samir Whitaker and Charlie Butt at BirdLife, as well as the other CCI project partners (Sharron Brooks, UNEP-WCMC; Pippa Howard and Dave Marsh, FFI; Brendan Costelloe, RSPB; and Jessica Smith, CSBI). From there snowballing was used for recommendations and contact information for other individuals. The majority of individuals were from the private and NGO sectors.

The interviews conducted were semi-structured, so a list of topics or potential questions was made before interviews began to provide some consistency for later analysis. The interviews covered background to the project (location, habitat/ecosystem, sector, finance), which led on to more detailed questions regarding implementation of the mitigation hierarchy and how avoidance had been carried out, for what reasons, and to what effect. The interviews were carried out either via phone, Skype, or in person.

Alongside the interviews, and based on respondents information, case study analysis was conducted. Documents, such as EIAs, were obtained either online via company websites or from correspondence with project managers, company representatives or partner organisations. Documents referring to national level legislation were also used to assess the extent to which the mitigation hierarchy, or avoidance and mitigation of environmental impacts generally, was considered and required by law, as opposed to being a voluntary decision by the organisation.

Selection Criteria

Leading experts in the field of offsetting and the mitigation hierarchy from international NGOs including Birdlife International, FFI, and UNEP-WCMC were asked to recommend examples from their own work which they considered to be particularly good examples of where a particular project has shown considerable effort to avoid their impacts on a particular habitat or species. Companies were sought that have the publicly available documentation to demonstrate that they have made considerable effort to avoid impacts to a given species or habitat. In addition to this it was important to ensure a range of sectors (extractives, oil and gas, infrastructure, energy), across a range of habitats, and in countries with varying levels of environmental legislation and capacity to implement that legislation.

Table 8: National and Regional Law and Policy which contributes to the avoidance of biodiversity impacts – a review of selected examples, some of which are based on the locations of case studies.

Country	Law/Policy	Mitigation Hierarchy	Avoidance
United Kingdom[15]	**The National Planning Policy Framework of 2012** defines the national framework of planning policy for England with which administrative authorities issuing building permits must comply.	The mitigation hierarchy is defined as (1) Avoidance, (2) Reduction and (3) Compensation. Offsetting is not mandatory.	Paragraph 118 – When determining planning applications, local planning authorities should aim to conserve and enhance biodiversity by applying the following principles: if significant harm resulting from a development cannot be **avoided (through locating on an alternative site with less harmful impacts)**, adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;
France[16]	France adopted **Decree n° 2011-2019,** on 29 December 2011on EIA , which will help making avoidance, reduction and compensation measures for environment more effective; those measures have to be described in the permit of the project and their monitoring is compulsory.	The mitigation hierarchy is defined as (1) Avoidance, (2) Minimisation and (3) Compensation.	Avoidance is the same definition as BBOP: an **avoidance measure is a measure which modifies a project or a public planification document in order to remove a negative impact that would occur.**
Germany[17]	**The Eingriffsregelung (Impact Mitigation Regulation – IMR)** requires the application of a mitigation hierarchy. This law is mandatory and precautionary, aiming to ensure "no net loss".	The mitigation hierarchy is defined as (1) Avoidance, (2) Compensation and (3) Exemptions.	Under the provisions of Art. 15 (1) of the Federal Nature Conservation Law: The intervening party shall be obligated to **refrain from any avoidable impairment of nature and landscape**. The increased flexibility of IMR implementation does not impair the absolute priority of avoidance and minimisation.

15 From the UK Government Website, Planning Practice Guidance; EU No Net Loss Working Group, **Glossary of the terms used in the Working Group**, (accessed 09/04/2015)
16 No Net Loss Working Group, **Glossary of the terms used in the Working Group**, (accessed 09/04/2015)
17 No Net Loss Working Group, **Glossary of the terms used in the Working Group**, (accessed 09/04/2015)

			This means that given the option between avoidance and minimisation of the impacts on the one hand and compensation on the other, the project proponent must choose avoidance and minimisation of impacts.
EU[18]	**Habitats Directive,** Management of Natura 2000 sites for EU Member States **The EIA Directive** Applies to a wide range of defined public and private projects, which are defined in Annexes I (Mandatory EIA) and II (Discretion of Member States) **SEA Directive** SEA Directive must be prepared or adopted by an authority (at national, regional or local level) and be required by legislative, regulatory or administrative provisions.	**The EIA Directive** defines mitigation as avoid, reduce and, if possible, remedy significant adverse effects.	Habitats Directive Article 6.1 **Avoid damaging activities that could significantly disturb these species or deteriorate the habitats of the protected species or habitat types.** The EIA Directive Should contribute to **avoiding any deterioration in the quality of the environment and any net loss of biodiversity, in accordance with the Union's commitments in the context of the Convention and the objectives and actions of the Union Biodiversity Strategy up to 2020 laid down in the Commission Communication of 3 May 2011 entitled 'Our life insurance, our natural capital: an EU biodiversity strategy to 2020'.**
Australia[19]	**The *Environment Protection and Biodiversity Conservation Act*** *1999* (EPBC Act) is the Australian Government's principal piece of environmental legislation. One of the legislations objectives is to provide a streamlined national environmental assessment and approvals process.	With respect to the different stages of the mitigation hierarchy, the focus of EPBC Act supporting policy and guidance is on offset design and implementation. Avoidance and mitigation measures are described as primary strategies for managing significant impacts. Offsets will not be considered until all	**Avoidance of impacts on protected matters may be achieved through comprehensive planning and suitable site selection**, for example by changing the route of an access road to avoid an endangered ecological community.

[18] European Commission, Environment, (accessed 10/04/2015); IAIA, Mitigation in Impact Assessment, November 2013
[19] Australian Government, Department of the Environment, EPBC Act environmental offsets policy, (accessed 09/04/2015)

		'reasonable' avoidance and mitigation measures are considered, or acceptable reasons are provided as to why avoidance or mitigation of impacts is not reasonably achievable.	
New Zealand[20]	Resource Management Act 1991 (RMA) for sustainable management of natural and physical resources	Case law indicates that there is no hierarchy in these terms. However, policy statements and plans are able to express a hierarchy Under the RMA, Section 5(2)(c) requires adverse effects to be avoided, remedied or mitigated.	
British Columbia (Canada) [21]	**The Policy for Mitigating Impacts on Environmental Values** (Environmental Mitigation Policy) is intended to support the environmental portion of informed, integrated, transparent decision-making in the Province's natural resource sector.	The mitigation hierarchy is defined as (1) Avoidance, (2) Minimization, (3) Restoration and (4) Offsets.	The mitigation hierarchy and the corresponding types of mitigation measures to be applied under this Policy are outlined here, in order of priority. All feasible measures should be considered and applied at one level before moving to the next. **a. avoid impacts on environmental values and associated components.**
Columbia[22][23]	The Resolución 1517 is the national regulation provides for the structured and enforcable protection of biodiversity at a national, regional and local level, taking into account ecosystem representation, rarity, function and context.	Colombian regulation requires the strict application of the mitigation hierarchy. When applying for an environmental license applicants must ensure compliance with prevention (avoidance), minimization and restoration measures as the first stage. Secondly they must	Prevention (avoidance) measures include the identification of any 'areas of exclusion' which must not be subject to intervention, production or transformation activities due to their importance for biodiversity.

[20] http://www.legislation.govt.nz/act/public/1991/0069/latest/DLM231905.html

[21] British Columbia, Ministry of Environment, Environmental Mitigation Policy for British Columbia, (accessed 08/04/2015)

[22] Colombia, Ministry of Environment, https://www.siac.gov.co/documentos/DOC_Portal/DOC_Biodiversidad/291012_Manual_compens_biodiversidad.pdf (accessed 01/06/2015)

[23]Sarimento, M. (2013) Colombia takes lead in Latin American biodiversity offsetting. Article in Ecosystem Marketplace, accessed online 21 May 2014 [http://www.ecosystemmarketplace.com/pages/dynamic/article.page.php?page_id=9856]

Seanz, S., Walschburger, T., León, J. and Gonzalez, J. (2012) Manual to allocate offsets for loss of biodiversity. Partnership Agreement No. 09 de 2008. Ministry of the Environment, and Sustainable Development, The Nature Conservancy, World Wildlife Fund, Conservation International. Republic of Colombia.

		develop offsetting measures for impacts on biodiversity that could not be avoided, restored, minimized or substituted.	
Brazil[24]	National Environmental Policy (6938/1981) on environmental licensing, and National System for Nature Conservation Units (SNUC: 9985/00) on offsets.	Mitigation Hierarchy is not mentioned explicitly in either legal framework. Environmental licensing requires first avoidance, mitigation, then offsets for 'residual impacts' (those that cannot be avoided or mitigated).	Not detailed.

24 https://www.umweltbundesamt.de/sites/default/files/medien/378/publikationen/texte_19_2015_legal_instruments_to_implement_the_objactive_land_degradation_neutral_world.pdf

Table 9: Barriers to the enabling conditions identified through case study analysis and expert discussion

	Enabling factors for effective avoidance	Barriers
Why?	Clear legislation and government support for avoidance	• Lack of adequate landscape level land use planning delineating areas for development, protection, different land uses etc. • Lack of effective policy implementation and poor governance may impair the ability of the local government to enforce avoidance measures. • Failure to place planning or development decisions within the context of strategic impact assessments and landscape level planning may lead to ongoing loss of priority areas for conservation • Focus of policy on offsetting, which may bypass avoidance stage. • Different interpretation of regulation/requirements (see CEMEX case study) • Proposed actions not aligning with government or the military position (see Yemen case study) • Perverse incentives – Subsidies related to production (See Agriculture case study) • The economic benefits of a project can lead to operators and regulators seeking legal loopholes
	Implementable requirements around avoidance in voluntary standards	• Requirements around the mitigation hierarchy are not incorporated in all financial loan requirements. • Voluntary standards do not exist for all high-impacting sectors or commodities and therefore voluntary standards are applied irregularly and inconsistently by proponents from different sectors operating in the same landscape. E.g. ICMM members adhere to a voluntary no-go commitment in WHS whilst an O&G operation in the same landscape would not necessarily adhere to the avoidance of WHS. • Interpretation of requirements e.g. IFC critical habitat – may vary depending on who is doing the assessment and the local context, leading to inconsistent identification of impacts and subsequent avoidance requirements • Inconsistency or commitments and recognition of the risks associated with BES impacts. Voluntary commitments to broad scale avoidance can vary from company to company, sector to sector and is often driven by sector initiatives or certification schemes that are associated with a commodity. This means that one mining company may adhere to no go across all KBAs whilst another may only adhere to avoidance of WHS. A third may only abide by compliance requirements. • Avoidance requirements of many voluntary standards (e.g. HCV or legally designated areas) do not encourage an adaptive, iterative approach to avoidance. For example they do not allow for changes in the condition of a site

		which may arise due to surrounding degradation or climate change. • Proponent may not perceive there is enough reputational risk (or gain) associated with biodiversity impacts to drive the full application of avoidance measures
What?	Understanding impacts	• Impacts can be direct, indirect, cumulative, positive and negative, and have temporal and spatial variance. This creates potential difficulties in quantifying impacts. • Impacts are often composite and complex, with repercussions across social and environmental aspects – thorough baseline assessment and stakeholder engagement is required to ensure the identification of impacts and dependencies across both proponent and stakeholder interests. • There may be limited capacity to ascertain the full implications of impacts to BES across the full product or operational life cycle. This potential lack of understanding might undermine the effectiveness of an avoidance strategy in both space and time.
	Access to robust data	• Lack of data and limited data access – marine environment is particularly data poor (see Wind Farm case study) • Reluctance to conduct detailed surveys because of the costs and time involved in conducting detailed surveys • Reluctance to undertake detailed surveys due to concern that the findings may result in perverse outcomes for the proponent e.g. finding rare, unique or protected species mare delay or even prevent development • Disagreement or lack of consensus around habitat designation (see CEMEX example) • Lack of Landscape level planning preventing optimal avoidance decisions • Lack of local expertise leading to substandard surveys and incomplete information for decision making
	Evaluation of competing priorities	• Different stakeholders (local, national, international) will hold different and often competing values leading to a need to make trade –offs over avoidance decisions, and approaches/ frameworks to achieve this are not readily available • Communication between social and environmental departments, both within companies and within governments is often lacking preventing joined up approach to impact avoidance
	Appropriate company capacity and processes	• High costs of avoidance – companies have a fiduciary duty to shareholders and are therefore profit driven – financial considerations may be perceived to constrain effective avoidance. Additional analysis of the financial implications of applying impact avoidance strategies across the full lifecycle of a development should help to demonstrate the cost and benefits of avoidance • Limited company capacity to influence decisions throughout supply chain • Company confidentiality – non-disclosure agreements can make access to baseline assessments and other relevant environmental data challenging • Speed of commercial transactions and decisions required to secure commercial aspects of a project or operation may prohibit detailed studies necessary to determine the most robust impact avoidance strategy

		• Conflicts in the timeframes dictating the parallel processes of permitting, design and planning, financing and the construction and implementation of a project may result in disjunct between available data and the information required to obtain the best or most optimal impact avoidance strategy • Conflicts in the priorities of different functions responsible for different aspects of a project development may lead to trade-offs and compromises e.g. environmental managers responsible for an avoidance strategy may be challenged by engineers and financial departments wishing to optimise delivery or timeframes of a project. • Challenge of adapting to different scenarios/environments – for example even when dealing with the same species, national level variations may (see marine case study – fisheries bycatch: J-hooks to C-hooks) • SMEs may have inadequate capacity and resources to implement avoidance measures • Inadequate articulation of the business case for managing biodiversity and a consequent limitation in capacity across different functions within a company to understand why biodiversity impacts are a risk to the company. This makes it difficult for consistent and integrated approaches to managing BES and to the adoption of robust BES impact avoidance strategies. • Potential impacts may not all be identified at the outset of a project design phase. Adaptive management will be necessary to ensure inclusion as the project develops, requiring collaboration and engagement within internal and external stakeholders
How?	Transparency of avoidance strategy	• Incomplete communication of planned avoidance strategy • Difficulty in selecting appropriate indicators to monitor and measure achievement of avoidance targets. Expert guidance may be necessary however may not always be accessible • Reporting requirements may not be enforced, • There may be a lack of consequence for companies who have not met the requirements articulated in the avoidance strategy (poor governance and monitoring of implementation) • NGOs and governments may lack the capacity and resources to monitor companies or projects in order to assess whether they have achieved their stated objectives
	Feasible options	• Financial considerations can render the optimal option for biodiversity infeasible. • Inadequate analysis of the cost-benefits and admonition of the risks associated with BES impacts by project proponents – very often the risks of BES impacts are realised too late into the project development cycle and are therefore difficult or impossible to avoid. Therefore the feasibility of options for BES management and impact avoidance is poorly understood due to lack of early investment in the baseline and impact assessment phase. • Costs associated with mitigation or offset of impacts are not equated to the costs of early avoidance strategies • Location of ore or mineral can constrain avoidance potential (See Ambatovy case study) particularly where no-go options are not regulated or recognised through assessment of biodiversity vulnerability and landuse planning • Technical issues associated with geology and design can constrain options for avoidance particularly where no-go

		options are not regulated or recognised through assessment of biodiversity vulnerability and landuse planning
	Early planning and long-term management	• The EIA or ESHIA process, with associated environmental management and mitigation plans, tends to respond to potential project impacts once the project feasibility and design phase has been reached. Whilst alternative options for site location may be dealt with in the EIA/ESHIA, the options for impact avoidance are limited to site or local level. EIA/ESHIA therefore tends to focus on the management and mitigation and not avoidance of impacts. Uncertainty regarding management of avoided areas following completion of a project • Avoided areas may be developed by another operator where landuse planning or other relevant BES conservation legislation and / or management plans for the area are lacking • Land sold or leased for agriculture is sold on the premise that it is used for productive means – if that land is left fallow it may be in breach of contract and sold on for other uses • Land sold and leased for mineral extraction is permitted on the basis of development of mineral resources. If a project does not progress or the proponent cannot secure the land under different land title such as protected area status, the land is vulnerable to development by other proponents (e.g. Rio Tinto in South Africa, Australia and Brazil – they forewent and avoided impacts but set aside the land to biodiversity conservation through the development of national parks under government control) • Situations may change over life-cycle of project –areas of land set aside or previously avoided may be developed
	Targets and adaptive management	• The application of the mitigation hierarchy is an iterative process which requires constant review, monitoring and implementation. This may be challenging to the proponent and responsible authority • Setting NNL or NPI targets to work towards may be seen as unrealistic or unfeasible by the company (ie. the costs outweigh the potential benefits) • Situations may change over life-cycle of project – new areas of land previously avoided may need to be worked but management processes may not allow adaptive management

Table 10: summary of some of the tools available, how they support impact avoidance and a brief overview of positives/negatives of each.

Name	Origin	Aspect of avoidance that it supports	Pro's	Con's
Integrated Biodiversity Assessment Tool (IBAT[25]): • World Database on Protected Areas • Key Biodiversity Areas • IUCN Red List of Threatened Species • Alliance for Zero Extinction Sites • Broad Scale Conservation Priorities: Biodiversity Hotspots, Endemic Bird Areas, High Biodiversity Wilderness Areas	• UNEP-WCMC and IUCN • BirdLife International • IUCN • Conservation International • ALL of the above	Can be used by corporates at the very early stages of project planning. Provides detailed information on a global level that can also be applied nationally on protected areas and species. The tool also allows the user to set points on the map to mark the location of a site. Buffer zones of varying distances can then be set around them. This tool would likely be most useful for spatial avoidance.	• Global coverage -most comprehensive database globally for screening purposes • Detailed but not too complicated • Downloadable report which can be used in decision making • Can be used by any sector	• Must pay to access the data • Marine not covered as well as terrestrial Not all protected areas are included so other sources of information may be necessary
Toolkit for Ecosystem Service Site-based Assessment (TESSA)	BLI, Anglia Ruskin University, RSPB, University of Cambridge, TBA, UNEP-WCMC	Analysis of alternatives – how would ecosystem service provision change under different avoidance scenarios? What does this mean for biodiversity, local livelihoods and wider stakeholders? In depth understanding of the area being impacted.	• Collects primary data on the ground • Allows for ecosystem services to be considered beyond just a particular species or habitat • Integrates biodiversity impacts and societal impacts • Useful for any sector • Free to use	Will likely require resources for data collection and training

[25] https://www.ibatforbusiness.org/login

Migratory Soaring Bird Sensitivity Map	BLI	Provides data regarding migratory soaring birds in the Africa-Eurasia region. Tool has data layers including satellite tracking and IBAs. Users can generate reports on a location which give details of sites or species of importance within the surrounding area. Likely to be useful for both spatial and temporal avoidance.	• Free to use • Output is relatively detailed for the time required • Can be used across a range of sectors e.g. energy, agriculture • Coordinates of project can be input into the tool to generate site specific report	Limited to the Africa-Eurasia region at the moment (though this is due to expand into the Mediterranean).
Biodiversity Risk and Opportunities Assessment (BROA)	TBA, Earthwatch and FFI[26] (with British American Tobacco)	• Identify and assess impacts and dependencies on biodiversity and ecosystem services (BES); and • Prioritise and create Action and Monitoring Plans that address biodiversity risks and opportunities	• Can be used to assess ecosystem services • Useful to be able to prioritise certain areas or actions • Emphasises monitoring – actions and targets to be achieved • Sector specific • Free to use	• May be seen as additional burden on companies • Data availability • Data quality – results depend on the data which is input into the spreadsheet – would be more robust if done in partner with a conservation organisation
Tremarctos Colombia	CI – Colombia (Pasto Mocoa Road)	tremarctos-COLOMBIA can be used to inform the screening process used by extractive and infrastructure projects to assess biodiversity impacts, as well as providing recommendations on what compensation should be undertaken by the project. The tool means that individuals responsible for project infrastructure and mine development have access to	• Can be used very early in the planning stages • Also able to input coordinates of project to generate site specific tailored report assessing sensitivities and risk • Includes marine coverage and potential to assess	• May be seen as additional burden on companies • Data availability for most sensitive areas?

[26] Fauna and Flora International

		information on: the distribution of species and sensitive ecosystems, protected areas, and areas of socio-cultural importance. In addition, the data could be used to perform risk analyses and to analyse impacts to marine resources. It is hoped that outputs from this tool will be used to inform spatial and design avoidance at the preliminary stages of project development.	future climate risk	
Ocean Data Viewer[27]	UNEP-WCMC	Includes marine and coastal habitat data which can be used to understand marine sensitivities Global data set which could be used with regard to spatial (or design) avoidance for development projects involving marine ecosystems.	• Early stage planning • Includes marine data • Can be used to support more detailed assessments • Free to view but access restrictions on data downloads	• Data permission must be sought to download and use the data – commercial use restrictions exist for some data • Global data is unlikely to be as accurate at the site scale as local datasets
Biodiversity A-Z [28]	UNEP-WCMC	Provides clear, concise and relevant information about various topics relating to biodiversity written and reviewed by experts	• Central database for useful definitions from reliable sources • Useful to all sectors	• Potentially lacking in detail
Protected Planet[29]	UNEP-WCMC, IUCN	Online interface for the World Database on Protected Areas (WDPA), a joint project of IUCN and UNEP, and the most comprehensive global database on terrestrial and marine protected areas. Supports understanding of protected areas for spatial avoidance	• Central database for useful definitions from reliable sources • Useful to all sectors	

[27] http://data.unep-wcmc.org/
[28] http://www.biodiversitya-z.org/
[29] http://www.protectedplanet.net/