



# Biodiversity Offsets Technical Study Paper

A report by the IUCN Biodiversity Offsets Technical Study Group



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**Published by:** IUCN, Gland, Switzerland

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**Citation:** IUCN (2014). Biodiversity Offsets Technical Study Paper. Gland, Switzerland: IUCN. 65pp.

**ISBN:** 978-2-8317-1695-4

**Cover photo credit:** ©Deviah Aiama

**Produced by:** IUCN (International Union for Conservation of Nature)

**Available from:** [www.iucn.org/publications](http://www.iucn.org/publications)

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# **Biodiversity Offsets Technical Study Paper**

**A product of the IUCN Biodiversity Offsets Technical Study Group**

# Acknowledgements

IUCN would like to thank those that contributed to the development of this study, especially:

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# Conclusions: How can IUCN support best practice in offsetting?

## 0.1 Communicating best practice in mitigation through a policy on biodiversity offsets

This section summarizes the key elements of offsetting best practice upon which the Technical Study Group believes there is sufficient agreement for IUCN to recommend them to its Members through an offset policy:

- Biodiversity offsets have the potential to provide net gains in biodiversity in the right context, but this has rarely yet been realised in practice (Section 2).
- The high-level principles of offsetting best practice are reasonably well agreed (Section 2).
- The principal reason that offsets fail to achieve No Net Loss or Net Gain appears to be lack of clear policy requirements that offer unambiguous guidance to developers and offset providers, limited capacity for implementation of mitigation, inadequate monitoring and enforcement, and – particularly – insufficient political will to require and enforce best practice in offsetting (Section 2).
- Offsets should be applied within the context of the mitigation hierarchy (Section 3).
- Offsets should be planned within a dynamic landscape context, taking into account cumulative impact scenarios (Section 3).
- Offset systems should aim to achieve at least No Net Loss and preferably a Net Gain for all biodiversity, through addressing – as a minimum – significant residual direct and indirect impacts (Sections 4 and 5).
- In practice, it is necessary to focus specific offsetting measures and measurement of losses and gains on good surrogates of broader biodiversity and on biodiversity of the highest conservation concern (e.g. rare and restricted biodiversity) (Section 4).
- Some – perhaps many – impacts are so significant that they may not be acceptable to society (in which case projects will not be permitted) or cannot be offset, owing to the high risk of failure (Section 4).
- For impacts with a low significance in terms of biodiversity conservation, a simplified approach will be preferable in order to avoid transaction costs that are high relative to the costs of mitigation measures, including offsets (Section 4).
- Societal values concerning biodiversity should be captured within offset goals (Section 5).
- Offset metrics should separately include both surrogacy measures (often habitat-based) and measures for high conservation priority biodiversity that is poorly represented by those surrogates (Section 6).



- Offset metrics should strike a balance between limiting substitution and establishing a currency that is fungible enough to facilitate exchange (Section 6).
- Conservation outcomes from biodiversity offsets should be ‘additional’ (Section 7).
- It is preferable to secure offset outcomes prior to impacts in order to address temporal loss and reduce the risk of offset failure (Section 8).
- The conservation outcomes of offsets should endure at least as long as the impacts are felt (Section 8).
- Public sector developments should abide by the same offset requirements as private sector developments (Section 9).
- It is desirable to allow a level of choice with a variety of options for how offsets can be implemented, but there should be equally exacting standards for all forms of offset implementation (Section 10).
- Shortcomings in monitoring, evaluation and enforcement account for a significant proportion of the cases where mitigation measures, including offsets, have failed to deliver their goals (Section 11).

## **0.2 Using knowledge products to inform offsetting**

The flagship knowledge products mobilized through IUCN (2014) have significant potential to inform: the manner in which the mitigation hierarchy is applied (Section 2); the scope of offset policies (Section 4); the metrics and the exchange rules (e.g. ‘like for like or better’ (Section 6); the offsetting activities that could be considered as additional (Section 7) and the site selection of biodiversity offsets. For example, priorities for measurement during offsetting may be considered to be particularly vulnerable species or ecosystems (in respective Red Lists) or particularly irreplaceable sites (Key Biodiversity Areas). The value of knowledge products in informing offsetting and other development decisions is not discussed in depth here since it has been elaborated recently by IUCN (2014). IUCN could also disseminate, among its Members, knowledge products relevant to offsetting that have not been directly mobilized by initiatives, such as the Business and Biodiversity Offsets Programme (BBOP).

## **0.3 Convening IUCN Members and other stakeholders globally to give guidance on complex issues**

Guidance is particularly necessary on:

- Whether there should be information on the manner in which each of the steps within the mitigation hierarchy should be applied and, if so, what that information should be (Section 3);
- Whether and how to apply a risk-based approach to the mitigation hierarchy (Section 3);

- How to design offsets within dynamic landscapes that are likely to change during offset duration (e.g. owing to change in other threatening processes, such as population growth or climate change) (Section 3);
- Where to place offsets in relation to impacts, in varying contexts, including when and how to use composite offsets (in more than one location), to address all the biodiversity components impacted by an individual project, or aggregated offsets to cluster together offsets for a number of different projects (Section 4);
- The appropriate level of ambition for offset policies (e.g. No Net Loss vs. Net Gain: Section 5);
- Consistency of use and interpretation of terms such as No Net Loss and Net Gain (Section 5);
- Resolving any conflicts between societal values and 'intrinsic values' (Section 5);
- Establishing exchange rules in order to support conservation priorities, while also ensuring that the offset system runs smoothly (Section 6);
- How to determine the additionality of activities within existing protected areas, and averting risks in jurisdictions where government policy or investment should already prevent such risks (Section 7);
- Whether, and if so how, it is possible to demonstrate additionality (Section 7);
- Best practice in determining the baseline risk of loss for averted risk offsets and in quantifying security gains (Section 7);
- Tackling leakage in offset design and implementation (Section 7);
- When offset gains should be made, particularly in the many cases where it is only practical to achieve gains after the relevant impacts (Section 8);
- The appropriate duration of offsets and how to demonstrate secure long-term offset outcomes (or fulfil offset objectives when initial activities have failed) in countries where the land and the property laws do not cater for long-term security of land-use (Section 8);
- The standards needed for implementation (e.g. development and delivery of conservation credits) (Section 10);
- How governments can develop roadmaps for establishing offset systems and market-based approaches to offset implementation (Section 10); and
- Establishing effective monitoring, evaluation and enforcement systems (Section 11).



#### **0.4 Convening IUCN Members and other stakeholders nationally to agree key national or local level issues**

A number of issues identified in this report are context-dependent and thus best resolved through stakeholder/societal engagement at a national or local level. Convening stakeholders in national or local level processes is important, among other reasons, in order to:

- Identify societal values of biodiversity and incorporate them into offset goals in any given context (Section 5);
- Identify the types and priority level of biodiversity and impacts which should, and can feasibly, be included in offsetting systems (Section 4);
- Identify higher thresholds for acceptable significance of impacts (Section 4);
- Identify lower thresholds for acceptable significance of impacts, enabling a simplified system to deliver more efficient conservation outcomes than a sophisticated offset system (Section 4);
- Determine the scope and nature of compensation activities when all a project's impacts are not capable of being offset (Section 4);
- Assess the capacity needed for successful implementation (Section 10);
- Determine the standards needed for implementation (e.g. development and delivery of conservation credits) (Section 10); and
- Determine, based on lessons learned (Section 0.5), the most context-appropriate mechanisms and stakeholder roles and responsibilities for regulating, administering (Section 9) and implementing offsets (Section 10), and monitoring outcomes (Section 11).

#### **0.5 Increasing IUCN Member participation in the offsetting community of practice**

At the level of individual projects, civil society IUCN Members could contribute guidance during the design and implementation of mitigation measures, including biodiversity offsets. They could provide practical guidance and constructive criticism to offset planners and practitioners within a safe learning environment, in order to increase empirical evidence of factors influencing offset failure/success (Section 2).

Governmental IUCN Members could share experiences and lessons learned on:

- Whether there should be information on the manner in which each of the steps within the mitigation hierarchy should be applied, and whether and how to apply a risk-based approach (Section 3);
- How to design offset policies that avoid or manage conflict with provisions in other areas of policy, such as perverse incentives or promotion of projects that bring economic gains, but have negative social and environmental impacts (Section 3);

- How to establish the fundamental function and rules of the system that governs offset design and implementation, such as metrics and exchange rules including ‘trading up’ (Section 6);
- How to design policies that enable biodiversity, carbon, water and development activities to be planned within the same landscape and still ensure additionality (Section 7);
- The relative effectiveness of voluntary and mandatory offset systems (Section 9);
- How to balance the need for clarity and consistency in policy at the national level with locally specific conditions and delegated authority (Section 9);
- How to deal with overlapping and sometimes contradictory requirements from different jurisdictions (Section 9);
- How to set up offset systems that embrace multiple different roles for government (Section 9);
- How to deal with potential conflict of interest between different government functions and ensure probity (Section 9);
- The success and failure of offsets under different forms of implementation (Section 10); and
- The strengths and weaknesses of different approaches taken at the national levels (in running offsets systems) and at the project level (in running individual offsets) to monitoring, evaluation and enforcement (Section 11).

# 1 Context

There is a pressing need to balance conservation and development. Mitigation remains fundamentally important, but current approaches are proving insufficient to reduce serious declines in biodiversity owing to development impacts. This is mainly because biodiversity is usually treated as an externality under the prevailing economic system, and thus not valued during development decisions (for example, avoidance of impacts is rare). Some members of civil society have profound misgivings about the trading of biodiversity losses for offset gains, particularly through market mechanisms such as conservation banking, since they view this as commodification of biodiversity. However, biodiversity offsets offer the potential to retain legislative protection for biodiversity, while not only providing greater economic incentives for developers to follow the mitigation hierarchy but also increasing compensation to a level commensurate with impacts.

Offsets are thus increasingly being integrated into government and lender regulations and policy (ten Kate & Crowe, 2014). Although offsets can lead to enhanced conservation, they can also undermine established approaches to managing biodiversity risk and achieving biodiversity conservation goals (Walker et al., 2009). Input papers to IUCN discuss these and other key issues and definitions in greater detail than is possible in this summary document (ten Kate & Crowe, 2014; Pilgrim & Ekstrom, 2014).

To date, offset implementation has been limited and there is on-going debate on the fundamental issues at the heart of offsetting, including definitions and scope (ten Kate & Crowe 2014). In the absence of well-documented examples of effective implementation, IUCN considers there is a pressing need for authoritative and balanced guidance that can help governments, conservation organizations and companies to reach common ground on the associated risks and opportunities. It is hoped that IUCN's guidance can help them consider how such risks and opportunities should be addressed.

In response, IUCN Members adopted Resolution 110 at the World Conservation Congress in Jeju 2012 (See Annex 2). This Resolution requires the Director General to establish a working group to develop an IUCN general policy on biodiversity offsets. The working group is expected to develop policy recommendations on biodiversity offsets for consideration by the IUCN Council by the end of 2014. Resolution 110 also requests that the Secretariat continue to “contribute to the current state of knowledge about the practical implementation of biodiversity offsets by (a) undertaking project work with partners, IUCN Members and Commissions and (b) the sharing of experiences.”

This technical study paper is the culmination of the first phase of the development of this policy, and was prepared by the IUCN Biodiversity Offsets Technical Study Group, for consideration in the second phase by the wider working group. The Terms of Reference for the Technical Study Group are summarized in Appendix 4.

This paper is founded upon a comprehensive review of issues in biodiversity offsetting, summarized in Appendix 1, and draws largely on input papers prepared for the study group (ten Kate & Crowe, 2014; Pilgrim & Ekstrom, 2014). There is considerable and growing literature in this area, much of which is referenced in the two input papers; however, it should be noted that much of this literature is based upon experiences in a limited number of developed countries. The study group could only assess the degree of agreement among those who have worked on offsets through a review of this literature, and so a similar caveat applies.

Rather than expand on the full set of offsetting issues addressed in the literature, this report refers to that literature and focuses attention on issues prioritized by the technical study group, including: (i) principles that enjoy broad agreement and are important for IUCN's membership to understand; and (ii) unresolved issues that IUCN's membership could address collaboratively.

**To emphasize these priorities, under each of the following 11 main section headings, key issues that are broadly agreed are highlighted in bold italics. Suggested priority areas for further work are outlined as bullet points.**

A number of cross-cutting issues, not addressed in detail elsewhere, are intertwined among these specific issues and include:

**Limited empirical evidence:** This is perhaps the key overarching challenge in providing policy guidance on offsetting, and can best be met by improving documentation, learning from experience (Section 0.5), and improving monitoring and evaluation of future offsets (Section 11).

**Uncertainty:** As well as the novelty of offsets, uncertainty in offset outcomes is increased by the sheer complexity – and thus difficulty – of restoring biodiversity (Curran et al., 2014) or averting impacts on it. There are several ways that uncertainty can be considered in the context of biodiversity offsets. An approach to risk that follows the precautionary principle would often be seen as optimal in the face of uncertainty. However, this might lead to overestimation of impacts, underestimation of mitigation benefits, etc., which would result in higher offset ratios. A risk-spreading approach (Lindenmayer & Franklin, 2002) might see offsets implemented in different areas, using a range of techniques. An adaptive approach might see offsets established, monitored and managed within an adaptive management framework (McDonald-Madden et al., 2010). Moilanen et al., (2009) describe a method for identifying offset scenarios that are robust to uncertain, using the info-gap theory. The risk of an offset not being implemented can be managed using instruments such as bonds, penalties and sanctions (Overton et al., 2013). Establishing or banking biodiversity gains prior to losses will reduce much of the uncertainty inherent in biodiversity offsets (Bekessy et al., 2010).

**Social issues:** A wealth of social issues potentially influence design and implementation of offsetting systems, such as rights and dependence of communities, and resource tenure. Most are not addressed in depth here, since the key principle of equity among stakeholders (Section 2.2) and their participation in planning and decision-making should provide an overarching social safeguard.

Therefore, the key aspect addressed here is ensuring that societal values are incorporated into offset goals (Section 5).

**Language and terminology:** Although there is some consensus on definitions of terms in certain circles, considerable variation still exists – causing significant confusion, which is exacerbated when terms are translated into other languages other than English. Nonetheless, it would be difficult to standardize use of terminology.

## 2 Can offsets provide net benefits or do their risks outweigh their opportunities?

This question is the crux of the offset debate. Some believe that a relatively restricted range of impacts can be offset to achieve No Net Loss, while others feel that outcomes can be achieved for a broader range of impacts. Much of this debate may be due to theory versus practice: In theory, much is possible; in practice, there has been very limited success (Section 2.3). In general, there is agreement that ***biodiversity offsets have the potential to provide net gains in biodiversity in the right context, but this has rarely yet been realized in practice*** although ***the high level principles of offsetting best practice are fairly well agreed***. However, the lack or inappropriate use of offsets has been shown to have resulted in a number of risks and poor outcomes for conservation.

Realistic best practice underneath these high level principles (Section 2.2) depends on the specific context in which they are applied and a combination of technical and institutional choices that are not always well informed or agreed upon. Practical experience so far suggests that, ***principal reasons that offsets fail to achieve No Net Loss or Net Gain appear to be lack of clear policy requirements that offer unambiguous guidance to developers and offset providers, limited capacity for implementation of mitigation, inadequate monitoring and enforcement, and – particularly – insufficient political will to require and enforce best practice in offsetting***.

A suggested priority for further work is:

- Gathering empirical evidence on the principal factors influencing offset failure or success.

### 2.1 What are the main risks and opportunities of biodiversity offsets?

In the right context, and following best practice, biodiversity offsets could provide a valuable opportunity for balancing development with biodiversity conservation by internalizing biodiversity conservation values into development decision-making. Likewise, inappropriate use of offsets carries a number of risks. Most prominent among these are distraction from the effective use of earlier steps in the mitigation hierarchy, or even granting a ‘license to trash’ (e.g. failing to implement the mitigation hierarchy), a privatization of public goods at a cost to current users and dilution of existing legislation. One philosophical challenge with evaluating risks and opportunities of offsets is the baseline against which they should be compared – that is, whether offset activities should be evaluated against a successful No Net Loss/Net Gain outcome for all projects and plans. These include, for example, considering whether mixed success offsets results in the past and the many practical reasons why it is difficult for offsets to achieve No Net Loss/Net Gain), and/or determining whether the assessment of offset risks and opportunities should be made against the very real risk of inaction i.e., ‘business as usual’ resulting in considerable Net Loss. Baselines are discussed further in Section 5.2.



## 2.2 What is best practice guidance (e.g. principles, standards, safeguards) for biodiversity offsets?

There is a fair degree of agreement on the high-level principles of offsetting best practice, as listed for example in the BBOP Principles (2013). These principles are summarized below:

- i. Adherence to the mitigation hierarchy:** A biodiversity offset is a commitment to compensate for significant residual adverse impacts on biodiversity identified after appropriate avoidance, minimization and on-site rehabilitation measures have been taken according to the mitigation hierarchy.
- ii. Limits to what can be offset:** There are situations where residual impacts cannot be fully compensated for by a biodiversity offset because of the irreplaceability or vulnerability of the biodiversity affected.
- iii. Landscape Context:** A biodiversity offset should be designed and implemented in a landscape context to achieve the expected measurable conservation outcomes taking into account available information on the full range of biological, social and cultural values of biodiversity; and, it should support an ecosystem approach.
- iv. No Net Loss:** A biodiversity offset should be designed and implemented to achieve in situ, measurable conservation outcomes that can reasonably be expected to result in No Net Loss and preferably a Net Gain of biodiversity.
- v. Additional conservation outcomes:** A biodiversity offset should achieve conservation outcomes above and beyond results that would have occurred if the offset had not taken place. Offset design and implementation should avoid displacing activities harmful to biodiversity to other locations.
- vi. Stakeholder participation:** In areas affected by the project and by the biodiversity offset, the effective participation of stakeholders should be ensured in decision-making about biodiversity offsets, including their evaluation, selection, design, implementation and monitoring.
- vii. Equity:** A biodiversity offset should be designed and implemented in an equitable manner, which means the sharing among stakeholders of the rights and responsibilities, risks and rewards associated with a project and offset in a fair and balanced way, and respecting legal and customary arrangements. Special consideration should be given to respecting both internationally and nationally recognized rights of indigenous peoples and local communities.
- viii. Long-term outcomes:** The design and implementation of a biodiversity offset should be based on an adaptive management approach, incorporating monitoring and evaluation, with the objective of securing outcomes that last at least as long as the project's impacts, preferably in perpetuity.
- ix. Transparency:** The design and implementation of a biodiversity offset, and communication of its results to the public, should be undertaken in a transparent and timely manner.

**x. Science and traditional knowledge:** The design and implementation of a biodiversity offset should be a documented process informed by sound science, including appropriate consideration of traditional knowledge.

There is less agreement on what is considered “realistic” best practice under these high level principles and whether extra key principles should be added (e.g. avoidance, minimization, restoration and precaution). Much of this study paper focuses on discussion of consensus and gaps in agreement on realistic best practice.

### **2.3 What are the most significant causes of offset failure and success?**

Some evaluations of offset systems, particularly in North America, have shown success in planning and delivery of individual compensatory mitigation projects (BBOP, 2009a; Denisoff & Urban, 2012; Hill et al., 2013). On the other hand, many individual projects do not achieve their mitigation goals and there has been a failure to achieve consistent net gains across the relevant jurisdiction (Hilderbrand et al., 2005; Bean et al., 2008; Gibbons et al., 2009; Maron et al., 2012; Kormos et al., 2014). Some suggest such failures may be inherent in any offset system (Walker et al., 2009). Empirical evidence may currently be too limited to conclusively identify the most common and important causes of offset failure, but there are indications that these include: (a) unclear or ambiguous requirements and guidance for offsets (though increasing complexity of guidance must be balanced against the need for sufficient simplicity and low enough transaction costs to allow trading (Salzman & Ruhl, 2000); (b) lack of monitoring and enforcement (and thus implementation), often driven by lack of political will; and (c) inadequate underlying methods. Some of these offset failures stem from limited knowledge available at the time the systems were established. Knowledge of best practice in offset design and implementation is continuously evolving, and empirical evidence of offsets’ outcomes (in published studies) remains limited.

Key areas for investigation are: (i) whether individual offset projects have delivered No Net Loss/Net Gain, with independent verification against an agreed standard; (ii) whether offset systems create cumulative net gains for biodiversity (e.g. sum of all offset projects), compared with the baseline in question (Section 5.2); and (iii) whether individual offsets have allowed projects with serious impacts on biodiversity to proceed when they would otherwise have been turned down.

## 3 Where do offsets fit with existing practice and policies?

Since biodiversity offsets are a relatively novel concept, they need to be integrated into existing practice and policy. There is agreement that **offsets should be applied within the context of the mitigation hierarchy** and that **offsets should be planned within a dynamic landscape context, taking into account cumulative impact scenarios**. Opinions differ, however, as to how the application of the mitigation hierarchy should take place.

Suggested priorities for further work are provision of guidance on:

- Whether there should be guidance on the manner in which each of the steps within the mitigation hierarchy should be applied and, if so, what that guidance should be;
- Whether and how to apply a risk-based approach to the mitigation hierarchy; and
- How to design offsets within dynamic landscapes that are likely to change during offset duration (e.g. owing to change in other threatening processes such as population growth or climate change).

### 3.1 Where do biodiversity offsets fit into the mitigation hierarchy?

When offsets are applied, there is unanimous agreement that this should be within the context of the mitigation hierarchy (Figure 1). However, some argue that offsets should only be used as a 'last resort' – once prior steps in the mitigation hierarchy have maximized reduction of residual impacts.

Others contend that all steps in the mitigation hierarchy should be considered together as a package to obtain the optimal ecological outcome. There is also a diversity of opinions on precisely how to optimize outcomes, if such an approach is taken (Iguar et al., 2009; Pouzols et al., 2012).

### 3.2 How far should each step of the mitigation hierarchy be taken?

Even proponents of using offsets only as a last resort recognize that each step of the mitigation hierarchy cannot be taken to its ultimate extent; otherwise, very few projects would be undertaken as all impacts would simply be avoided from the outset. In considering how far to take each of the steps of the mitigation hierarchy, there is general agreement that the approach to moving from one step to the next should be 'risk-based'. In other words, where risks are lower because impacts on biodiversity are a lower conservation priority, there should be more flexibility in progressing to the next step; where risks are higher (e.g. impacts on biodiversity are a high conservation priority), each step should be applied with greater rigour before moving to the next.

**Figure 1. Offsets should be applied as part of the mitigation hierarchy**

However, there is no clear evidence yet, nor consensus or guidance, on the best way to take such a risk-based approach in a given context. Indeed, the use of language in this section, with comparative adjectives such as ‘high’, ‘low’, ‘higher’ or ‘greater’ reveals the fundamental challenge inherent in issuing clear guidance in this field. Furthermore, in many countries the evidence base for setting detailed conservation priorities to guide such a risk-based approach is limited (Sections 3.3 and 5.3). In the absence of clear conservation priorities, development decisions are made daily. Some of these attempts to apply the mitigation hierarchy more rigorously may be better, despite the difficulties, than making no such attempts.

**3.3 Where do biodiversity offsets fit in terms of contributing to national biodiversity targets and planning, landscape level planning? How should offsets be integrated with other environmental policies (e.g. carbon sequestration, water provision and poverty alleviation)?**

Biodiversity offsets make the greatest contribution when their outcomes are additional to existing commitments (Section 7), and contribute to achieving biodiversity targets and priorities, such as those set out in international obligations (e.g. Convention on Biological Diversity), National Biodiversity Strategies and Action Plans and more detailed regional plans. With improvements in remote sensing (Hansen et al., 2013) and modelling and scenario development, there is an

increasing ability to conduct landscape-level analysis that supports the application of the mitigation hierarchy (Kiesecker et al., 2010), including offsets-selection (Kiesecker et al., 2009; Pouzols et al., 2012). This analysis includes ecological process in addition to pattern (e.g. Rouget et al., 2003), but also considers dynamic (Bull et al., 2013a), cumulative impact scenarios (Copeland et al., 2009; Evans & Kiesecker, 2014), including the effects of climate change (Lombard et al., 1997; Watson, 2014).

However, to design offsets at a regional and fine scale, developers and their advisers, such as Environmental Impact Assessment (EIA) consultants and conservation NGOs, often want more spatially explicit biodiversity data or agreed bases for prioritizing conservation targets than is readily available. Although this ever-present demand for improved data should never prevent pragmatic regional planning based on available data (e.g. Cowling et al., 2010), it does underline the importance of governments establishing scientifically based conservation goals (which mitigation, including offsets, contribute to) and exchange rules and service areas, as a basis for offset systems.

While society, policy-makers and technical experts would all agree that it is desirable to undertake land-use planning, including at a landscape scale, to locate biodiversity conservation, carbon sequestration, water provisioning, amenity and development activities appropriately, the data, maps, tools and methods of soliciting stakeholders' values are often limited. This is perhaps one of the most significant areas linked to biodiversity offsets on which IUCN Members could make useful progress.

In some cases, existing provisions in other areas of policy (e.g. agriculture or extractive policy) may conflict with planned offset policy. For example, existing policy may provide perverse incentives, allow impacts within protected areas or promote projects that bring economic gains, but have negative social and environmental impacts (Section 9.2). When preparing offset policy, it will be important to resolve these conflicts. Aggregated offsets have the potential to simplify conflict avoidance.

## 4 What should be the scope of offsets policy?

One of the most frequent points of public concern with offset policy design is the scope of the policy, as stakeholders are worried about the exclusion from the policy of certain biodiversity or impacts (e.g. lack of compensation for issues of concern) or about inclusion of certain impacts (those that they see as unacceptable and preferably ‘no go’ impacts, or even those they regard as too trivial to warrant inclusion). There is consensus that **offset systems should aim to achieve at least No Net Loss for all biodiversity, through addressing – as a minimum – significant residual direct and indirect impacts. In practice, it is necessary to focus specific offsetting measures and measurement of losses and gains on good surrogates of broader biodiversity and on biodiversity of highest conservation concern** (e.g. rare and restricted biodiversity, where those proxies are insufficient to represent such biodiversity).

**Some – perhaps many – impacts are so significant that they may not be acceptable to society (in which case projects will not be permitted) or cannot be offset owing to high risks of failure** (owing to ecological, social, political and other practical factors). Offset policy and practice need the methods and data to incorporate an assessment of the chances of success and risk of failure for each offset. At the other end of the scale, while still following all key offset principles (Section 2.2), **for impacts with a low significance in terms of biodiversity conservation, a simplified approach is preferable to avoid transaction costs that are high, relative to the costs of mitigation measures, including offsets.**

Suggested priorities for further work are provision of guidance on:

- Stakeholder/societal engagement when setting the scope of offsetting systems, particularly to identify the types and priority level of biodiversity and significance of impacts which can and should be included;
- Where to place offsets in relation to impacts, in varying contexts – including when and how to use composite offsets (in more than one location) – to address all the biodiversity components impacted by an individual project, or aggregated offsets to cluster together offsets for a number of different projects;
- Stakeholder/societal engagement to identify higher thresholds for acceptable significance of impacts;
- Identification of lower thresholds for significance of impacts, so that a simplified system can deliver more efficient conservation outcomes, rather than a more complex or sophisticated offset system; and
- What should be the scope and nature of compensation activities when all of a project’s impacts are not capable of being offset.



#### **4.1 What should be included?**

There is broad agreement that the concepts of No Net Loss/Net Gain should include all biodiversity. Conversely, in practice, some impacts (e.g. those considered ‘non-significant’) are often excluded from consideration of No Net Loss/Net Gain. However, such exclusion risks leading to ‘death by a thousand cuts’ and definition of a threshold of ‘non-significance’ for impacts are fraught with difficulty. There is broad agreement that offset systems should address both direct and indirect impacts. In practice though, it is not feasible to plan to specifically offset or monitor losses and gains of all types of biodiversity or impacts. Extensive baseline surveys during EIAs are important to increase knowledge of biodiversity and impacts, but surveys alone cannot address the practical difficulty of offsetting or monitoring losses and gains of all biodiversity or impacts. Thus, there is often: (i) prioritization for specific offsetting/measurement of biodiversity of conservation concern (e.g. threatened species and habitats); (ii) prioritization for specific measurement of useful (often habitat-based) surrogates/proxies of broader biodiversity (particularly for undescribed biodiversity); and (iii) exclusion of specific offsetting and measurement of non-significant impacts, since they are lower priorities than high-significance impacts. These three ways of prioritizing which biodiversity and impacts are measured and offset are often mistakenly confused, implying that it is not necessary to consider other biodiversity and impacts in offsetting (as discussed in Regnery et al., 2013 and Pilgrim et al., 2013b).

#### **4.2 Which impacts are offsetable?**

Some impacts are so severe, on such vulnerable or irreplaceable biodiversity, that they may not be acceptable to society or actually cannot be offset (e.g. species extinction). In practice, there are many ecological, social, political and practical factors that lead to the failure of offset impacts (Pilgrim et al., 2013a). To date, many impacts have proven impractical to offset (Section 2.3). For example, there may not be sufficient area of available land of the appropriate type in a suitable location to offset impacts (Gibbons et al., 2009). While there is some guidance on the factors that influence which impacts are capable of being offset (IFC, 2012; Pilgrim et al., 2013a; BBOP 2012d), broad informed stakeholder engagement is necessary to identify practical limits to offsetability in any given context. Stakeholder-identified limits to offsetability could do much to inform ‘no go’ policies (Section 5.3).

#### **4.3 What should happen when government allows non-offsetable impacts?**

Even when impact assessments show that a particular project will have impacts that cannot be offset, governments may determine that there are imperative reasons for overriding public interest for the project to proceed. In such cases (assuming biodiversity offsets are defined to refer to No Net Loss/Net Gain outcomes), there will be impacts that are not capable of being offset. In these circumstances, some compensation (as close as possible to a full offset) is presumably the best outcome. However, there is a lack of detailed guidance as to what should be the scope and nature of compensation activities when all of a project’s impacts are not capable of being offset. For example, “trading up” may be an option (Section 6.2).

## 5 What should be the goal of offsets?

There is broad – though incomplete – agreement that **offsets should be designed to achieve at least No Net Loss** and that **societal values concerning biodiversity should be captured within offset goals**. Certain policies have a Net Gain goal, others require No Net Loss for some types of impact and Net Gain, while some refer to ‘at least No Net Loss and Net Gain where possible’.

Suggested priorities for further work are:

- Facilitating consistency of use and interpretation of terms such as No Net Loss and Net Gain;
- Fostering international discussion and agreement on the appropriate level of ambition for offset policies;
- Providing guidance on stakeholder engagement to identify societal values of biodiversity and incorporate those into offset goals in any given context; and
- Providing guidance on resolving conflicts between societal biodiversity values and ‘intrinsic biodiversity values’.

### 5.1 Is an offset only an offset if it is designed for at least No Net Loss or a Net Gain?

There is broad agreement that offsets should aim to achieve No Net Loss or Net Gain (BBOP, 2012a; NNLWG, 2013a, b). Nevertheless, some are considering offsets with more general goals than No Net Loss, which has also not been the explicit objective of some historical compensation systems (e.g. mitigation, including conservation banking, under the US Endangered Species Act). Many find the terms No Net Loss and Net Gain (and, related, Net Positive Impact) confusing, with some considering Net Gain to be much greater than No Net Loss; while others feel that Net Gain may only be marginally greater than No Net Loss.

### 5.2 How should baselines be defined?

Baselines used to define No Net Loss or Net Gain are rarely made explicit and are potentially the source of misunderstanding between stakeholders. This confusion makes it hard to establish whether the outcome is better for biodiversity than it would have been in the absence of the offsets. There are three possible alternative baselines: (i) existing biodiversity; (ii) the existing trajectory of biodiversity on a site were development not permitted; and (iii) the existing trajectory of biodiversity under a regulatory regime that does not include offsets (Figure 2). In order to increase understanding, baselines should be explicitly defined as part of articulation of No Net Loss or Net Gain objectives, prior to offset implementation.

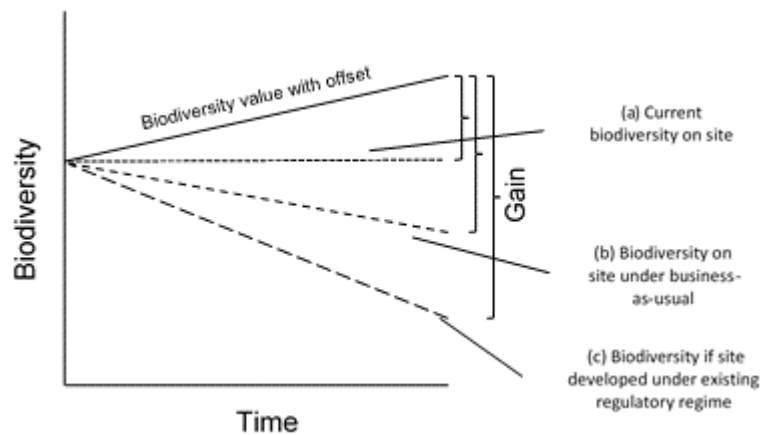


Figure 2. Three possible baselines for calculating the gain generated by a biodiversity offset: (a) the current biodiversity on the site; (b) the biodiversity of the site under a business-as-usual scenario (this could be declining or increasing); and (c) the biodiversity of the site under a regulatory regime based on avoidance and minimization only (e.g. not offsets).

### 5.3 How should societal values be reflected in goals of offset systems?

While there is broad agreement that people's uses and values of biodiversity need to be clearly captured in government policies and plans in order to define offset goals (especially when trading up is allowed), this is often not the case (e.g. National Biodiversity Strategy and Action Plans are generally too coarse to guide offset goals). In addition, there is little agreement as to whether losses and gains of people's socioeconomic - or even cultural - values associated with biodiversity (such as collection of medicinal plants, fishing and recreation) should be compensated in order to show No Net Loss of these values (BBOP, 2009b; Cole, 2010). Also, agreement has not been reached on whether 'No Net Loss' refers only to the existence or so-called intrinsic values of biodiversity. Some offset policies are explicitly targeted at listed habitats and species, with no provision for the livelihood and amenity values that local people derive from biodiversity. In the absence of documentation of such values, there is a lack of agreement on whether or how to proceed with offset planning. Moreover, there is lack of consensus on how to resolve conflicts between differing sets of values ('societal', 'intrinsic', etc.).

With respect to the particular issue of 'no go' areas (within offset systems, this may be at a system-wide level or at a project-level), these need to be determined by societal values, which should be based on broad informed stakeholder engagement, informed by an understanding of what impacts can practically be offset (Section 4.2).

## 6 How should biodiversity be measured and exchanged?

This question essentially addresses the ‘accounting system’ for quantifying the loss and gain of biodiversity that underlies offsets. As such, it is absolutely crucial to the success or failure of an offset system. In this area, there is long experience and a very detailed and technical literature, yet an acknowledgement that there is room for improvement in the metrics and exchange rules that have been used. As a basis, there is growing experience and consensus that ***offset metrics should separately include both surrogacy measures (often habitat-based) and measures for high conservation priority biodiversity that is poorly represented by those surrogates***, but that ***offset metrics should find a balance between limiting substitution and establishing a currency that is fungible enough to facilitate exchange***.

Suggested priorities for further work include documentation of:

- Practical experience and lessons learned from existing offset systems with regard to issues such as exchange rules, including trading up;
- Experience with metrics that are practical to use, yet are good proxies for the structure, composition and function of habitats, and good measures for loss and gain in populations of species which are not adequately accounted for through changes in habitat; and
- Setting of exchange rules in order to support conservation priorities, while also ensuring the offset system runs smoothly.

### 6.1 How complex versus practical should methods for metrics, exchange rules and site selection be?

In any system there is tension between the complex (accurate and precise) and the practical (simple and easy to use/communicate). This tension spans a broad range of key technical components of offsetting systems, including methods, metrics, exchange rules and site selection. With particular regard to metrics (e.g. for habitats, species, spatial issues), a particular point of debate is the extent to which metrics can be aggregated (to cover several components/aspects of biodiversity together, rather than having separate metrics for each).

There are many sound arguments for complexity/disaggregation and similarly for pragmatism/aggregation, but the optimal middle ground has been elusive and is inherently context dependent (Quétier & Lavorel, 2011). Gibbons et al., (In press.) demonstrate that offset ratios can vary substantially where biodiversity attributes are considered separately or conjointly. This is because a metric that aggregates different biodiversity attributes conflates values that vary between these attributes, such as likelihood of success of restoration, restoration time and additionality. However, a disaggregated metric creates as many currencies as there are biodiversity attributes, which becomes increasingly restrictive for trading.

Thus, offset metrics need to be applied in a way that balances perverse effects of substituting different attributes of biodiversity with a currency that is fungible enough to facilitate the creation of a market (Salzman & Ruhl, 2000).

## **6.2 How should exchange rules define like-for-like or trading up?**

There is a strong body of opinion that like-for-like is the best starting point because it better ensures ecological equivalence, but that strict adherence to the principle of like-for-like is not feasible and that 'trading up' (or 'like-for-like or better') may sometimes be appropriate. There is some level of agreement that a 'graduated response' is most appropriate for trading up – e.g. trading up can be acceptable for impacts on lower conservation priority biodiversity (e.g. more common or widespread species), but stricter 'like for like' is important for higher conservation priority biodiversity (e.g. rare or restricted species).

However, there is no consensus on whether/when insistence on like-for-like is suboptimal, or on whether or how (and on what basis) trading up should occur. Further, there is limited science-based conservation prioritization, incorporating societal desires, at the level needed within countries and regions to provide the evidence base for legitimate trading up. One of the least clear areas of offsets is how currencies should be applied when trading up. For example, should societal preferences be accounted for via multipliers within currencies, or within exchange rules?

Within the topic of exchange rules, lies the important question of whether there are limits to what can be traded in terms of declines in quality and area between impact and offset sites (e.g. a gain of two hectares from 0-50% quality might not be a suitable offset for the loss of one hectare of 100% quality). Most exchange rules define not only the kind of biodiversity that can be exchanged, but also set limits on differences in condition or the minimum area of offset commitments. However, while there is broad agreement that area should not be traded in an unlimited way for condition, there has been little sharing of experience or consensus on how such exchange rules should be defined within national systems.

There is need for further discussion on whether, and if so how, multipliers should be used in metrics and exchange rules. Presently, there is considerable disagreement around this issue.

## **6.3 How can good quality and practical metrics be developed?**

Offset programmes effectively create a system for exchanging losses of biodiversity caused by projects with gains of biodiversity caused by offset activities. It is clear that such exchanges cannot be through simple financial metrics. To measure this loss and gain and facilitate exchange, most offset programmes employ metrics that aggregate several biodiversity attributes into a currency (Quétier & Lavorel, 2011).

An approach that has underpinned many systems to date has been to use broad habitat metrics, which usually combine measurement of a range of different attributes of biodiversity serving as surrogates for biodiversity overall to provide an indication of 'quality' for a given type of habitat. These are often known as 'area x

condition metrics'. However, any metrics that combine biodiversity attributes typically permit substitution between some or all of these attributes as biodiversity is traded from impact to offset sites. Substitution can be reduced by setting limits to substitution within the metric, but could only be eliminated if there were separate metrics for a very large number different attributes, which would result in as many currencies as there are biodiversity attributes. Given present limitations on available biodiversity data, resources to measure many different attributes, and the difficulty of finding offsets that precisely match many different currencies, this would likely be too restrictive for the creation of a system that could find suitable offsets and deliver outcomes within reasonable time and budgets.

Therefore, to combine good science with practicality, offset metrics should be developed and applied in a way that balances any potential risks to biodiversity of substitution with having a currency that is fungible enough to facilitate the necessary exchanges. Thus, it seems likely that offsets will have to continue to use habitat level metrics (endeavouring to capture changes in all biodiversity through a number of surrogates) and separate metrics for high conservation priority biodiversity components (e.g. rare or restricted species), where these are poorly represented by those surrogates.

More work and agreement is needed on: (i) how to combine different (e.g. habitat-based and species-based) metrics; (ii) how to identify metrics that provide adequate surrogates for biodiversity but are practical for developers to use; and (iii) whether and how landscape features (connectivity, patch size) should be integrated into metrics, combined into area x condition metrics, or treated separately as part of landscape level planning, including the siting of offsets.



## 7 Which offset actions are ‘additional’?

There is general agreement that **conservation outcomes from biodiversity offsets should be ‘additional’**, which means they would not have resulted without the offsets. There is, however, concern over whether some types of offsets are additional, and there is also a lack of consensus on the level of proof necessary to demonstrate additionality. Many of these issues have parallels in carbon offsetting. The solutions to these issues are policy-centred, and so will often vary slightly owing to varying stakeholder opinions within the context of specific jurisdictions.

Suggested priorities for further work are provision of guidance on:

- How to determine the additionality of activities within existing protected areas, and of averting risks in jurisdictions where arguably government policy or investment should already prevent such risks;
- How to design policies that enable biodiversity, carbon, water and development activities to be planned within the same landscape and still ensure additionality;
- How to tackle leakage in offset design and implementation;
- What is the best practice in determining the baseline risk of loss for averted risk offsets and in quantifying security gains; and
- Whether, and if so how, it is generally possible to demonstrate additionality

### 7.1 How should additionality be demonstrated?

There are several ways that additionality can be demonstrated. One is to determine whether the activities are new, or were already taking place or planned. This can be challenging when long-term funding for ongoing activities is not secure (as is the case with many community/private conservation activities). Another way is to determine whether new activities lie above an existing obligation to undertake certain conservation measures. For instance, in an Australian context, where land managers have certain legal obligations (such as preventing incursion by invasive alien species), Gibbons et al., (2009) to define additionality as any action beyond the statutory duty of care by a land manager (Figure 3). Kollmuss et al., (2008) term this the ‘legal and regulatory additionality test’.

For example, there is limited capacity to implement offsets in many protected areas because the existing duty of care means that many activities intended to improve biodiversity are an existing obligation of managers (see figure below). Stakeholders may have similar expectations that government obligations exist for species recovery plans that are already developed and budgeted. An alternative additionality test used in carbon offsets is a performance standard in which only achievements beyond a pre-defined benchmark are deemed additional (Kollmuss et al., 2008). For example, the historic rate of decline of an ecosystem may be used to calculate a predicted rate of decline into the future. Gains, or averted impacts, above this rate of decline would

be considered additional. Using this latter definition, relatively intact ecosystems with a low rate of historical decline would provide limited opportunities for additionality.

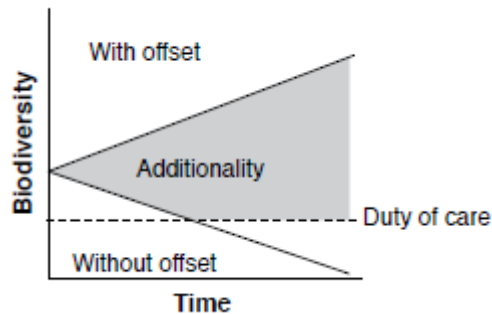


Figure 3. One definition of additionality with respect to offsets is that actions must be beyond the duty of care of the land manager.

## 7.2 Can there be additionality in protected areas?

Creation or expansion of protected areas beyond existing obligations is usually seen as additional. Where governments do not currently have capacity for funding their protected areas, there is some agreement that - in some circumstances - offset activities could take place in existing protected areas until the time when that capacity exists. However, additionality can be undermined by 'cost shifting', or the replacement of recurrent funding for protected areas with funds derived from development offsets. This type of cost-shifting would see the ongoing expansion and management of protected areas becoming increasingly dependent on the ongoing loss of biodiversity from development.

There has been little thinking on the manner in which additionality of offset activities within protected areas could be determined, though key issues are laid out by Pilgrim & Bennun (2014). IUCN protected area classifications currently offer no guidance on the appropriateness or otherwise of offsets in protected areas. Approaches may, for example, be to consider only temporary additionality during the period that developing country governments cannot reasonably be expected to fulfil their core responsibilities (Pilgrim & Bennun, 2014), or to only consider additional activities that are not covered in existing protected area management plans and that entail an additional budget, beyond existing financial commitments. Another might be through commitments to move into a higher IUCN protected area classification (Dudley, 2008). The question arises as to whether such 'upgrades' would need to be beyond commitments such as the 'Aichi targets' agreed by Parties to the Convention on Biological Diversity.

### **7.3 How can policies be designed that enable biodiversity, carbon, water and development activities to be planned within the same landscape and still ensure additionality?**

Integrated, dynamic land-use planning is beneficial (Section 3.3), and including biodiversity, carbon, water and even livelihood gains within the same area can avert harmful land-use change. However, little thought has been given to how policy guidance on how such stacking, bundling or layering of credits could still ensure additionality. Tools available to governments and civil society for such integrated planning are very disparate between jurisdictions.

### **7.4 When are averted risk offsets legitimate and how should security gains be quantified?**

Avoiding likely loss or degradation of areas of high biodiversity conservation priority ('averting risk') has potential to provide the most valuable project 'gain' in biodiversity terms since high conservation priority biodiversity (e.g. rare or restricted habitats) is difficult to restore from a degraded state (Curran et al., 2014). However, offsets based on avoided loss can, by definition, only slow the decline of biodiversity loss: averted risk offsets cannot generate a gain in biodiversity relative to current biodiversity values. Some, therefore, believe that averted risk offsets should only ever represent part of a biodiversity offset programme.

In most jurisdictions there are existing obligations on the part of government or private land managers to prevent some loss of biodiversity. For example, the control of noxious weeds may represent an existing obligation of a land manager, and the protection of some species extends outside protected areas through restrictions applicable to land-users. Further, claiming that a site would have been destroyed under the status quo may be inconsistent with an overarching policy where impacts can only proceed if they achieve No Net Loss or Net Gain. (This is a key critique of averted risk offsets.) There is, however, a lack of agreement on whether and in what circumstances averting risk is additional. More generally, there is a lack of clarity on what constitutes appropriate and sufficient evidence of the baseline risk of loss that would be averted by offset activities (section 5.2.).

A related issue is that there is often agreement that increasing the level of protection of land (for example, from a local forest reserve to a strictly protected national park) represents a gain. However, to date, there has been little international discussion or agreement on the basis for quantifying such gains.

## 8 When should offset gains be made and how long should they last?

The principle of equity in offsetting (Section 2.2) should apply through time as well as among stakeholders. Projects' impacts give rise to certain loss of biodiversity, while biodiversity offset activities can take many years to generate the conservation outcomes needed to offset these impacts and are subject to a level of risk of failure. There is broad agreement that ***it is preferable to secure offset outcomes prior to impacts in order to address temporal loss and reduce the risk of offset failure.*** Similarly, there is broad agreement that ***the conservation outcomes of offsets should endure at least as long as the impacts are felt,*** and some level of agreement that it is preferable for these gains to last in perpetuity.

Suggested priorities for further work are provision of guidance on:

- When offset gains should be made, particularly in the many cases where it is only practical to achieve gains after the relevant impacts; and
- What is the appropriate duration of offsets and how to demonstrate secure long-term offset outcomes (or fulfil offset objectives when initial activities have failed) in countries where the land and property law does not cater for long-term security of land-use.

### 8.1 When should offset gains be made, and what should happen if that is not before impacts?

It is clearly preferable for offset gains to be secured prior to the related impacts taking place, since this reduces temporal loss of biodiversity and minimizes risk of offset failure, as offset activities are established and underway prior to impacts taking place. However, it is challenging to predict what future impacts may need offsetting and, unless there are regulated market-based approaches with economic incentives for conservation banking (or generation and sale of conservation credits) it will rarely be practicable to secure offset gains prior to impacts.

Furthermore, offset rules typically allow conservation credits to be released to the market over a period of 10-20 years, whereas offset gains may take a longer period to accrue (depending on the time needed for restoration or averted risk to improve the conservation status of land), and indeed the offset must endure over the long term. The delay between the loss of biodiversity from an impact and the gain through an offset has, to date, been typically addressed (e.g. in the context of ex-post compensation for accidental damages) through time discounting (Overton et al., 2013; Dunford et al., 2004). However, time discounting essentially compensates delays between loss and gain with the amount of gain, which may not always be an equivalent or like-for-like offset. This issue has similarities with the compensation of habitat quality with habitat area as discussed in Section 6.2. More international sharing of experience on reducing temporal loss, conservation banking and release of conservation credits would be helpful.

## 8.2 How long should offsets last?

It is broadly accepted that the conservation outcomes of biodiversity offsets should endure at least as long as a project's impacts. Where impacts are permanent, offset gains thus need to last in perpetuity. Some offset policies go further, with all offset obligations intended to last 'in perpetuity'. To some degree, this is a choice of policy goal for governments, but it also raises significant questions as to the legal, institutional and financial mechanisms available within a particular country for securing offset activities for the long term.

In legal systems with freehold land tenure, long leases and covenants (also known in some countries as servitudes or easements) which run with the land and pass to successors in title if the land is sold, such commitments for the very long term can be realistic. Similarly, where conservation banking is available, and the associated rules entail adequate budgeting and insurance, this supports long term outcomes. Elsewhere, it will be important to find solutions to ensuring responsibility for offsets is part of the ownership that is passed on when developments are bought or transferred. A particular challenge exists in jurisdictions where resource extraction is a primary goal that often over-rides long-term security of the conservation (including offset) estate.

In the case of individual offsets designed by developers themselves, if developments are at a financial scale for which it is possible to endow a conservation trust fund so that long term offset implementation can be financed from the interest, then long-term outcomes can be achieved. Where trust funds are not appropriate or possible, other mechanisms to guarantee long-term funding will be necessary. However, challenges arise in settings where short-term economic gains from a development fall far short of being able to endow compensation for long-term environmental impacts, some of the legal and financial instruments are missing or where issues related to governance and land-use planning and tenure mean that the reliability of long-term offset commitments is compromised. For example, some jurisdictions have policies that require exploitation of mineral resources (for the national good) over and above designation of land for conservation – such exploitation in existing offsets would severely challenge achievement of offset gains (see also Section 3.4).

## 9 How should offset systems be regulated and administered?

Governments necessarily play a role in regulation and administration of offsets, and it is broadly agreed that ***public sector developments should abide by the same offset requirements as private sector developments***. The role(s) that government should play will depend on context, particularly the capacity of the government to play these roles compared to other stakeholders. Given the context-dependence of regulation and administration of offsets, this section necessarily explores options more than it provides specific recommendations.

Suggested priorities for further work are documenting real-life experience on:

- The relative effectiveness of voluntary and mandatory offset systems;
- How to balance the need for clarity and consistency in policy at the national level with locally specific conditions, delegated authority and multiple tiers of stakeholders;
- How to deal with overlapping and sometimes contradictory requirements from different jurisdictions;
- How to set up offset systems that embrace multiple different roles for government; and
- How to deal with potential conflict of interest between different government functions and ensure probity.

### 9.1 Should offset systems be voluntary or mandatory?

Biodiversity offsets can be required by law and policy or can be voluntary (i.e. undertaken by developers because they see a business case for doing so). There is growing agreement that leaving offsets to the voluntary domain is highly unlikely to make a significant contribution to addressing the cumulative residual loss of biodiversity resulting from projects. So far, the uptake of voluntary offsets has been rare and the offsets themselves are of variable quality. In the absence of regulation, only a minority of developers is likely to see a business case for voluntary offsets, so few will ensure this outcome. Equally, there would be an inadequate business case to motivate individual farmers, communities, conservation banking companies and other organizations to invest in long-term offset activities to provide offsets to meet developers' needs. Both these points suggest that regulation for offsetting (as well as any new measures to strengthen existing mitigation requirements for avoidance, minimization and restoration) will be required.

Any policy and legislation on biodiversity offsets needs to be clear and definitive about the circumstances in which offsets are required, the explicit outcomes desired, and the rules by which the offsets will be specified and measured (i.e. what criteria and indicators). It is important that developers can establish up-front whether they

need to compensate for residual impacts, what this will cost, and what are the options for doing so, in order to integrate the costs into their project budgets.

## **9.2 What level of jurisdiction is best for regulating offsets, and how should overlapping jurisdictions be addressed?**

Offsets can be – and have been – regulated at the local, state, national, or even regional (e.g. European Union) levels. While local authorities need to be able to take land-use planning decisions (including on offsets) within their jurisdictions, and to take local communities' priorities into consideration, national or regional policy can be helpful to establish a level playing field and spread best practice. Thus, there may thus be tension in balancing overlapping and sometimes contradictory requirements, as more than one set of rules (i.e. overlapping provisions at different jurisdictional levels) can cause difficulties, particularly where they introduce contradictions.

## **9.3 What should be the role(s) of government, and how should conflicts of interest between different roles be handled?**

A government can play a number of roles in relation to offsetting, including policy-maker or regulator, provider (e.g. seller of credits), curator and source of authoritative biodiversity data, buyer of offsets, seller of offsets, offset broker, operator of register of credits, standard setter, provider of processes to ensure the permanence of offsets (Section 8), monitor and enforcer (Section 11), or market creator. The role(s) that government should play will depend on context, particularly the capacity of government (Section 10) and availability and ability of other stakeholders to fill these roles. Whatever role(s) government does play, there will be a need to identify and manage conflicts of interest between multiple roles (probity). As with all planning processes, offsets offer an opportunity for corruption. Transparency is likely to be important to managing corruption and to civil society oversight of potential government conflicts of interest.



## 10 What are the best options for offset implementation?

There is broad agreement that ***it is desirable to allow a level of choice with a variety of options for how offsets can be implemented***, in order to allow suitable solutions to meet the varying circumstances in which the need for offsets can arise. Methods of implementation include offsets undertaken by developers themselves (first party offsets) and offsets undertaken by third parties (through in lieu fees, conservation banking or the use of conservation credits). Evidence from early offset systems has shown comparatively poor results with first party offsets. There is also a history of poor results in lieu of fee offsets, since these have often failed to deliver additional conservation outcomes.

This highlights that ***there should be equally exacting standards for all forms of offset implementation*** and adequate monitoring and enforcement, regardless of which organization is implementing the offset. There is some level of agreement that, ideally, conservation banking (whether or not as for-profit investments) is the best form of offset implementation, but certain conditions need to be in place for this to become a possibility (Van Teeffelen et al., 2014).

Suggested priorities for further work are:

- Documenting empirical experience of the success and failure of offsets under different forms of implementation;
- Supporting assessment of the capacity needed for successful offset implementation;
- Providing guidance on the standards needed for implementation (e.g. development and delivery of conservation credits); and
- Providing guidance for governments on how to develop roadmaps for establishment of offset systems and develop market-based approaches to offset implementation.

### 10.1 How should offsets be implemented to optimize both ecological effectiveness and (economic) cost benefit?

Practitioners have observed various strengths and weaknesses of the three most common approaches to the implementation of offsets, namely permittee-led ('first party'), 'in lieu fees' (payments into a fund), and conservation banking (purchase of 'credits' reflecting previously achieved gains). Some considerations relate to the quality and success of their ecological and social outcomes, while others relate to the administrative and economic efficiency of the approaches.

On the ecological and social side, offsets undertaken by developers themselves (or their third party partners) are often 'bespoke' (e.g. created for the specific project and tailored to its circumstances), which could be expected to be beneficial for securing like-for-like conservation outcomes and involve stakeholders. On the other hand,

experience has shown that permittee-led offsets have a very high track record of failure, largely because the standards of performance, monitoring and enforcement have often been lower for this approach than for conservation banks, which tend to be more regulated, and also because some developers are not well versed in fine scale conservation planning, detailed offset design and long-term conservation management (including stakeholder engagement) (Duke & ten Kate, In press; NRC, 2001; Withers, 2012; Quétier et al., 2014).

Discussions with practitioners suggest that in lieu fees have also often failed to perform, for a variety of reasons, including: a lack of high standards being applied to the agencies undertaking them; a lack of enforcement; a 'bottleneck' effect (in which the funds have been retained by government but not disbursed in a timely manner for in situ conservation activities); and because it can be difficult to show additionality when governments take over offset activities (Section 7).

Third party offsets such as conservation banks and the development and sale of conservation credits offer certain ecological advantages, better ecological management by specialists, strategic placement to make the best contribution to conservation goals and minimization of the temporal loss of habitat and populations. In practice, standards for conservation banks and the supply of biodiversity credits, with their associated management agreements and provisions for long-term land tenure, have tended to be higher and better enforced. However, the regulatory capacity needed to administer effective market-based instruments such as conservation banks and biodiversity credits is high and may not exist in all settings. Further, there are concerns about the rules for market-based systems being set to address social values of biodiversity (and access by dependent communities) rather than so-called 'intrinsic values', or rules that evolve to maintain the viability or profitability of business interests in catering to the market once it is established (e.g. relaxing restrictions on exchange rules).

On the economic and administrative side, conservation banks and use of biodiversity credits have economies of scale, reducing offset costs. The fact that high biodiversity values on land become an asset', as opposed to a 'liability', is seen as a benefit by some (since it provides an economic incentive to conserve). Another significant consideration is that most conservation banking and biodiversity credit systems transfer liability for offset delivery from the developer to the offset provider, which is economically attractive to companies. There is evidence that third-party offsets also reduce time of permitting.

All of these apparent advantages can make offset systems run more efficiently and build support by those regulated, provided capacity and political will exists to regulate and administer them properly. However, some members of civil society have profound misgivings about market failure, and, beyond that, about the designation of biodiversity (and thus 'life') into credits that are bought and sold. Further, the relatively limited amount of independent evaluation of conservation banking schemes indicates varying levels of success (Bull et al., 2013b).

## **10.2 What are the necessary legal, institutional and financial tools to implement offsets and what should be done if they are lacking in a country?**

A range of legal, institutional and financial tools can be used to ensure the governance, monitoring and enforcement of offsets (as well as other mitigation measures) for the long term. These include a variety of contracts (including performance management contracts between providers of offsets and government), covenants (sometimes known as servitudes or easements) that commit land to conservation purposes, even if the land is sold to a third party, changes in land-use designation (for instance, from forestry to conservation), insurance, performance bonds and conservation trust funds. These instruments exist and are used in many countries. In jurisdictions where they are absent, policy-makers can either introduce them, or can find alternative mechanisms at their disposal to promote the long-term security of offsets. For instance, leases and contractual provisions can go part way to filling the gap left by the absence of covenants; and conservation trust funds and the associated asset management can be undertaken in a global financial centre offshore from the country concerned. This approach has been used for some conservation trust funds established for trans-boundary protected areas, or for a period of years until the necessary legislation is in place in the relevant country.

## **10.3 How much capacity is needed within different sectors?**

There is no cut-and-dried answer to the kind and level of capacity needed in different sectors to adequately administer mitigation measures including biodiversity offsets. The kinds of skills and capacities needed include: biodiversity policy (interpretation of biodiversity science; assessing biodiversity priorities; protected area planning; policy research; stakeholder consultation; cost-benefit analysis and policy option impact assessment; legal drafting; preparation of guidelines; communications; finance and taxation); land use planning (and marine planning); and EIA and SEA.

High quality, spatially explicit data are not a prerequisite for making local decisions in a landscape and regional context (Cowling et al., 2010). Better data will often, however, result in better decision-making. For example, many species remain to be discovered by science, and can only be identified through intensive survey and taxonomic work. Thus, capacity is also desirable in biodiversity science (including spatial information and modelling), in order to: identify likely areas of endemism for undescribed species where extra caution (or survey) is necessary; establish the basis for like-for-like or trading up criteria including data and maps on type of biodiversity (e.g. vegetation type, habitat type, species type) and relative biodiversity importance; define the vicinity (where the offset can be located e.g. within the same bioregion); set quality or condition requirements; establish the basis for metrics including classification systems (and associated maps and databases) for criteria such as ecological function, definition of priority attributes and benchmarks against which to quantify the condition of each biodiversity type or ecosystem type; list prioritized species for which habitat metrics alone (i.e. changes in condition  $\times$  area of the species' habitat) will not be a good enough proxy for changes in the species' population; research spatial aspects (e.g. patch size, connectivity, etc.) of conservation effectiveness to generate data that can be used in offset metrics.

Capacity on administration and enforcement, information technology and field assessments are also key. Section 11 discusses monitoring, evaluation and enforcement in detail.

There are different opinions as to what to do until such capacity has been built, in national, provincial and local government, and in the researchers, consultants and non-governmental organizations (NGOs) that undertake baseline work and impact assessment for companies. Some believe that a critical mass of capacity is essential before biodiversity offsets can ever safely be attempted. Others contend that significant development projects are proceeding daily, resulting in residual loss of biodiversity. They assert while some capacity may be missing at the national level, it is still worth considering offsets in the context of individual projects since this could deliver outcomes that are better than the status quo and could also help build the necessary national capacity.

#### **10.4 What is the most appropriate roadmap for the design, implementation and improvement of offset systems?**

There is broad agreement (based on experience in a variety of countries) that introduction of an offsetting system by government is a multi-year process (Quétier et al., 2014). There is also broad consensus on some of the key steps in that process, such as initial policy gap analysis, development and evaluation of policy options, use of pilot projects, design and implementation of the offset system, capacity-building (as in Section 10.3), adaptive management, monitoring evaluation and improvement. However, there are gaps on guidance in the development of such a roadmap and how to put it into practice.

# 11 How should monitoring, evaluation and enforcement be implemented?

International experience has shown that ***shortcomings in monitoring, evaluation and enforcement account for a significant proportion of the cases where mitigation measures, including offsets, have failed to achieve their goals.***

Some of these shortcomings may be due to a gap in EIA processes. Proposed mitigation actions rarely result in integration of monitoring of action implementation within environmental management systems. Countries have adopted different approaches to the governance of offsets and thus to the kind of organizations with responsibility for monitoring, evaluation and enforcement.

Suggested priorities for further work are:

- Documentation of strengths and weaknesses of the different approaches taken at national levels (in running offsets systems) and at the project level (in running individual offsets) to monitoring, evaluation and enforcement; and
- Provision of guidance on establishing effective monitoring, evaluation and enforcement systems.

## 11.1 What is the most effective approach to monitoring and enforcement?

A number of different legal obligations define mitigation measures including biodiversity offsets, and a number of different indicators can be selected against which to measure progress, success and failure. These indicators will also require varying sampling strategies and frequency and type of sampling strategy. Depending on these, a range of organizations will be responsible for ensuring compliance.

Legal obligations include: compliance with permitting conditions; contractual obligations between government and developers as well as between government and offset suppliers; covenants, easements and servitudes; and fiduciary duties under trusts. Where these obligations are not met, there needs to be political will to have recourse to legal systems to pursue appropriate legal procedures to enforce compliance (e.g. sanctions, legal actions for breach of contract, etc.). Public registers for implementation of biodiversity offset milestones, and achievements against these milestones, is desirable for transparency (e.g. see [Government of Western Australia Environmental Offsets Register](#)).

Monitoring and evaluating the success of offsets against No Net Loss or Net Gain objectives is challenging, both at the project level and across a jurisdiction. To evaluate No Net Loss or Net Gain properly, sufficient baseline surveys should be undertaken prior to any impacts and any offset; such surveys should be carried out long enough after the impacts are felt and offset activities completed in order to adequately measure the losses and gains that have actually transpired. In addition, unwanted sources of variation associated with sampling error, seasonal and environmental variation also need to be taken into account (Lindenmayer & Likens, 2010). In many circumstances, it is probably unreasonable to expect this capacity to

exist at the project level, and thus, monitoring and evaluation undertaken by a third party at the programme level may be more appropriate.

Monitoring undertaken across multiple sites (sensibly stratified) is more likely to provide sufficient replication across important variables such as management actions and environmental variability, than for individual projects. This would allow useful inferences to be drawn about the overall success of a biodiversity offset programme against No Net Loss or Net Gain objectives. A well-designed monitoring programme that captures this variation will also provide important information about the key features of the offset system that contribute to its successes or failures.

At the programme level (e.g. a national system of biodiversity offsets), some additional indicators, beyond the aggregation of result from project data, may be needed. For instance, supplementary national indicators or global indicators (e.g. fine-scale forest data (Hansen et al., 2013) could help establish to what extent the scope set for a particular national policy on biodiversity offsets is helping to achieve No Net Loss.

The nature of the legal tools used in the offset system will, in part, define the organizations with responsibility for enforcement and ensuring compliance. Government will bear responsibility for enforcing permit conditions (whether at national, provincial or local authority levels); the specific parties to particular contracts (which may involve government in agreement with providers of credits) are privy to those agreements and best placed to enforce them. Trustees bear the responsibility to fulfil their fiduciary duties with trusts. Various publications on biodiversity offsets describe multi-stakeholder groups (including representatives from civil society) that can have a governance role in biodiversity offsets, and public law may grant citizens the right to challenge and review various decisions.

## Appendix 1: Summary of technical and policy issues concerning biodiversity offsets

The following table was prepared by members of the Technical Study Group to lay out some of the principal issues – related to both policy and practice – surrounding the mitigation hierarchy and biodiversity offsets. It is not intended as a comprehensive description of all the issues, but is a tool to identify the priorities to be discussed in the context of IUCN's work in this paper.

Main Issue	Sub-issue or point to be covered & note of whether (as per our ToR) it is 'policy' or 'technical' or both	Main areas of stakeholder convergence	Main unresolved issues
<p><b>Can offsets provide net benefits or do their risks outweigh their opportunities?</b></p>	<ul style="list-style-type: none"> <li>• Policy and technical: What are the main risks and opportunities of biodiversity offsets?</li> </ul>	<ul style="list-style-type: none"> <li>• Consensus that biodiversity offsets could provide a valuable opportunity for improving the balance between development and biodiversity conservation relative to existing planning controls, but only in the right context, following best practice.</li> <li>• Also, however, consensus that inappropriate use of offsets risks granting a 'license to trash', a privatization of public goods at cost to current users, dilution of existing legislation, and a distraction from effective use of the mitigation hierarchy.</li> <li>• There is broad agreement that whether offsets effectively achieve their potential depends on a combination of technical and institutional choices (many covered in this table). It is essential to consider these in the design of national systems for mitigation including offsets, as well as individual projects.</li> </ul>	<ul style="list-style-type: none"> <li>• Risks and opportunities of offsets are often judged in isolation, rather than against the very real risk of doing nothing (i.e. business as usual).</li> </ul>



	<ul style="list-style-type: none"> <li>● Policy: What are the most significant causes of offset failure (and success)?</li> </ul>	<ul style="list-style-type: none"> <li>● Broad agreement that the most common and important causes of offset failure are: (a) unclear or ambiguous requirements and guidance for offsets, including Ministerial discretion to consent non-offsetable impacts; (b) lack of monitoring and enforcement (and thus implementation, since offsets are seen as onerous); and (c) inadequate underlying methods.</li> <li>● Most evaluations of offset systems (North America, Australia, Germany and France) have shown No Net Loss or Net Gain for some individual projects, but no Net Gains across the jurisdiction.</li> </ul>	<ul style="list-style-type: none"> <li>● Still limited empirical evidence (in published studies) of:</li> <li>● Whether individual offset projects have delivered No Net Loss/Net Gain, with independent verification against an agreed standard;</li> <li>● Whether offset systems create cumulative net gains for biodiversity (e.g. sum of all offset projects), compared with the status quo prior to offsets;</li> <li>● Whether individual offsets have allowed projects with serious impacts on biodiversity to proceed when they would otherwise have been turned down; and</li> <li>● Whether some projects that would have been authorized in the absence of offset requirements were abandoned (or located elsewhere – see leakage) because of the cost of offsetting</li> </ul>
	<ul style="list-style-type: none"> <li>● Policy: What is best practice guidance (e.g. principles, standards, safeguards) for biodiversity offsets?</li> </ul>	<ul style="list-style-type: none"> <li>● Fair degree of agreement on the high-level principles (e.g. BBOP Principles).</li> </ul>	<ul style="list-style-type: none"> <li>● Precisely what is realistic best practice underneath these high-level principles.</li> <li>● Whether extra key principles should be added on, e.g. avoidance and minimization and precaution.</li> </ul>
<b>Where do offsets fit with existing practice and policy?</b>	<ul style="list-style-type: none"> <li>● Policy: Where do biodiversity offsets fit into the mitigation hierarchy?</li> </ul>	<ul style="list-style-type: none"> <li>● Unanimous agreement that offsets should be applied in the context of the mitigation hierarchy.</li> </ul>	<ul style="list-style-type: none"> <li>● Lack of consensus on whether offsets should only be considered as a 'last resort' once avoidance/minimization/restoration have been maximized, or whether all the measures can be considered together as a package to get the optimal ecological outcome – and, if so, how?</li> </ul>
	<ul style="list-style-type: none"> <li>● Policy and technical: How far should each step of the mitigation hierarchy be taken?</li> </ul>	<ul style="list-style-type: none"> <li>● General agreement that this should be 'risk-based' – e.g. more flexibility on applying each step where there are lower risks</li> </ul>	<ul style="list-style-type: none"> <li>● Lack of clear, specific guidance on how such a risk-based approach might work in practice.</li> <li>● Varying (though few) approaches to deciding how</li> </ul>

		<p>because impacts are on lower priority biodiversity, and very strict application where there are higher risks.</p>	<p>to step through the mitigation hierarchy – no clear consensus; and</p> <ul style="list-style-type: none"> <li>• Preparation of meaningful guidance on the mitigation hierarchy, since its application is case-specific and it is hard to get beyond generalities in guidance.</li> </ul>
	<ul style="list-style-type: none"> <li>• Policy: Where do biodiversity offsets fit in terms of contributing to national biodiversity targets and planning, landscape level planning? How should offsets be integrated with other environmental policies (e.g. carbon sequestration, water provision, poverty alleviation)?</li> </ul>	<ul style="list-style-type: none"> <li>• Broad agreement that integrated land-use planning is desirable, and that an offset system should ensure that offsets contribute to priority conservation activities.</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of agreement (or agreed methodologies) on multiple benefit offsets (e.g. stacking, bundling, layering), partly because of issues of additionality and like-for-like or better, and partly because of invidious trade-off between different ecosystem services.</li> <li>• Lack of agreement on how to do integrated land-use planning in the absence of comprehensive biodiversity data sets and maps (e.g. NBSAPs are generally too coarse of a filter to guide offset design); and</li> <li>• No guidelines developed (and thus no agreement) on how to avoid cost-shifting in which governments use revenue generated from biodiversity offsets to finance existing obligations such as management of protected areas.</li> </ul>
	<ul style="list-style-type: none"> <li>• Policy: How should offsets planners proceed in the context of conflicting provisions in other aspects of policy (e.g. contradictions between sectorial policies, perverse incentives; little political will to turn down projects that bring GDP but have negative social and environmental impacts;</li> </ul>	<ul style="list-style-type: none"> <li>• Agreement that tackling these issues is important.</li> </ul>	<ul style="list-style-type: none"> <li>• Little agreement on effective ways to tackle these issues (as political will can be lacking).</li> </ul>

	weak policies that allow impacts within protected areas?		
<b>What should the scope of offsets policies be?</b>	<ul style="list-style-type: none"> <li>● Policy: What should be included: <ul style="list-style-type: none"> <li>● ‘Significant’ impacts or all impacts?</li> <li>● All types of biodiversity (inc. process) or just pattern (species, habitats, etc.)?</li> <li>● Terrestrial only, or also marine?</li> <li>● Which kinds of species?</li> <li>● What scale of biodiversity (e.g. species or subspecies)?</li> <li>● What conservation status (e.g. just threatened or all species)?</li> <li>● Impacts on ecosystem services?</li> <li>● The thematic and sectoral scope of environmental regulations such as Environmental Impact Assessment requirements, or a broader scope?</li> <li>● Some sectors (e.g., extractives and infrastructure) or all sectors (including agriculture, fisheries, etc.)?</li> <li>● Direct impacts only or also indirect and cumulative impacts?</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>● Consensus that, at minimum, significant direct impacts by sectors with the greatest contribution to habitat conversion and impacts on threatened (or similar priority) species and habitats should be included within offset systems.</li> </ul>	<ul style="list-style-type: none"> <li>● Beyond the minimum, there are many different approaches in different settings to each of these issues.</li> <li>● A lack of agreement on how best to address multiple cumulative minor impacts on lower priority biodiversity.</li> <li>● Other than the large-scale expansion of agriculture in a manner that will dramatically modify natural habitats, whether and how the mitigation hierarchy and offsets should be applied to renewable resource use through agriculture, forestry and fisheries, which is still debated.</li> </ul>

	<ul style="list-style-type: none"> <li>● If indirect, how far (e.g. supply chains, climate change impacts on biodiversity, etc.)?</li> </ul>		
	<ul style="list-style-type: none"> <li>● Policy and technical: Where should offsets occur spatially in relation to impact sites?</li> </ul>	<ul style="list-style-type: none"> <li>● Consensus that ‘as near as possible’ is a general rule of thumb (in order to ensure like-for-like and to deliver offset benefits to those affected by the project – but that there are legitimate, conflicting objectives.</li> <li>● Also some agreement that better biodiversity outcomes may be secured through offsets that are away from development pressures and spatially planned for patch size, connectivity and long-term durability.</li> </ul>	<ul style="list-style-type: none"> <li>● A lack of clarity/understanding that offsets need to deliver outcomes for different habitats and species affected, as well as potentially different values ascribed by people (so-called ‘intrinsic’, socioeconomic and cultural), and thus that offsets may need to be composites- with activities in more than one location: some close to the impact site (for amenity values and, if possible, for intrinsic values) and some further afield (for rational conservation planning and/or best conservation outcomes).</li> </ul>
	<ul style="list-style-type: none"> <li>● Technical: Which impacts are offsetable?</li> </ul>	<ul style="list-style-type: none"> <li>● Consensus that species extinction is not offsetable and some agreement that other severe impacts on vulnerable and irreplaceable biodiversity are not offsetable. Broad acceptance that among the factors affecting the practical delivery of offsets are the availability of sufficient type, areas and location of appropriate offset sites.</li> </ul>	<ul style="list-style-type: none"> <li>● Disagreement on exactly which impacts are offsetable in practice.</li> <li>● Lack of agreement as to whether the range of impacts on biodiversity that can be offset to achieve No Net Loss is relatively narrow or relatively broad.</li> <li>● Emerging consensus that there are grades of ‘offsetability’ below species extinction.</li> </ul>
	<ul style="list-style-type: none"> <li>● Policy: What should happen when non-offsetable impacts are allowed by government?</li> </ul>	<ul style="list-style-type: none"> <li>● Some agreement that there are some kinds of impacts that society simply shouldn’t allow because they are too severe.</li> <li>● Some agreement that it is possible, up front, to define areas where any or certain impacts on biodiversity should not be allowed (No Go areas).</li> <li>● Some agreement that there are projects</li> </ul>	<ul style="list-style-type: none"> <li>● Very broad disagreement on this.</li> <li>● Disagreement on whether no-go areas can be set as a class (e.g. World Heritage sites), or whether they need to be established on a case-by-case basis.</li> <li>● Unclear whether stakeholders would ever be able to agree specific no-go areas in practice.</li> <li>● Some say non-offsetable impacts means project</li> </ul>

		that would normally be turned down because of the severity of their environmental impact, but should exceptionally be permitted for reasons of overriding public interest (e.g. issues of national security).	no-go. And if there's a 'go' decision, no offset. <ul style="list-style-type: none"> <li>• Some say no point in having idealistic 'non-offsetable' concept, and projects that are consented should simply have 'offsets'.</li> <li>• Some say offsetable impacts should have offsets and those above a certain (non-offsetable threshold) but which go ahead, e.g. for 'overriding reasons of public interest' should have compensation which doesn't claim to be an offset that could achieve No Net Loss, but is as close as possible and maybe even has a 'penalty' element.</li> </ul>
	<ul style="list-style-type: none"> <li>• Policy: Which impacts are too small to merit offsetting?</li> </ul>	<ul style="list-style-type: none"> <li>• Consensus that transaction costs of sophisticated offset methods applied case-by-case are too high for low significance impacts (including very small projects).</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of clarity on where such lower limits lie, e.g. the significance of impacts at which a simplified offset scheme (e.g. over the counter or appropriate in lieu fee) will provide more efficient conservation outcomes than mandating sophisticated, case-by-case offsets.</li> <li>• Lack of clarity on when the transaction costs of showing certain impacts lie below a lower threshold are greater than the costs of delivering an offset through a simplified system.</li> </ul>
<b>What should the goal of offsets be?</b>	<ul style="list-style-type: none"> <li>• Policy: Is an offset only an offset if it is designed for at least No Net Loss or a Net Gain?</li> </ul>	<ul style="list-style-type: none"> <li>• Broad agreement (BBOP, EU No Net Loss Initiative Working Group, etc.) that the answer is 'yes'. IUCN is a member of BBOP, so presumably 'yes'.</li> </ul>	<ul style="list-style-type: none"> <li>• Some alternative views, e.g. some governments like Canada or South Africa) are considering offsets with more general goals than 'No Net Loss' (including 'acceptable loss').</li> </ul>
	<ul style="list-style-type: none"> <li>• Policy: No Net Loss or Net Gain?</li> </ul>	<ul style="list-style-type: none"> <li>• Broad agreement on language of 'at least No Net Loss and preferably a Net Gain'.</li> </ul>	<ul style="list-style-type: none"> <li>• Many people are confused by the two terms.</li> <li>• Some (e.g. IFC) feel there is a very clear distinction between the two concepts, and that Net Gain is considerably more than No Net Loss.</li> <li>• Others feel that Net Gain can be just marginally</li> </ul>

			<p>more than No Net Loss and thus there is not much practical difference between them.</p> <ul style="list-style-type: none"> <li>• Beyond broad agreement on language, a variety of different approaches have been taken by governments, financial institutions, etc.</li> <li>• Lack of consistency in setting of baselines against which to measure loss and gain, including the specification of accepted duty of care.</li> </ul>
	<ul style="list-style-type: none"> <li>• Policy: How should societal desires/values/priorities for biodiversity goals modify pure scientific biodiversity goals?</li> </ul>	<ul style="list-style-type: none"> <li>• Broad agreement that people's uses and values of biodiversity need to be clearly captured in government policies/plans in order to define offset goals (especially when trading up is allowed).</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of agreement on whether/how to proceed with offset planning in the absence of documentation of such values (e.g. NBSAPs are generally too coarse to guide offset design).</li> <li>• Lack of consensus on how to resolve any conflicts between societal values and science (so-called 'intrinsic values').</li> </ul>
<b>How should offset systems be regulated and administered?</b>	<ul style="list-style-type: none"> <li>• Policy: Should offset systems be voluntary or mandatory?</li> </ul>	<ul style="list-style-type: none"> <li>• Growing agreement among governments (judging by increasing number of regulatory offset systems around the world) that offsets will only work if they are mandatory, although some governments (e.g. Japan, UK) are still considering voluntary or partially permissive systems.</li> </ul>	<ul style="list-style-type: none"> <li>• There has been little discussion or experience to know whether partially permissive systems work (these are systems where there is some requirement for offsets but some freedom on whether and how to use them).</li> </ul>
	<ul style="list-style-type: none"> <li>• Policy: What level of jurisdiction is best for regulating offsets (local, state, national, or even regional (EU))? How to deal with overlapping jurisdictions?</li> </ul>	<ul style="list-style-type: none"> <li>• Broad agreement that: <ul style="list-style-type: none"> <li>• Systems that provide a common approach across a jurisdiction help overall planning and consistency;</li> <li>• That local authorities need to be able to take land-use planning decisions (including offsets) within their authority and take local communities' priorities</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Whether international (regional) agreement, particularly on binding offset requirements, is desirable.</li> <li>• How to balance the need for national clarity and consistency with locally specific conditions and delegated authority.</li> <li>• How to deal with overlapping and sometimes contradictory requirements.</li> </ul>

		<p>into consideration;</p> <ul style="list-style-type: none"> <li>• That regional (e.g. EU) policy can be helpful to establish a level playing field and spread best practice.</li> <li>• More than one set of rules (i.e. overlapping provisions – e.g. at national, state and local levels) cause difficulties, particularly where they introduce contradictions.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Policy: What should be the role(s) of government (including policy-maker or regulator, provider, curator and source of authoritative biodiversity data, buyer of offsets, seller of offsets, broker, operator of register of credits, standard setting, provider of processes to ensure the permanence of offsets, monitor and enforcer); How to identify and manage conflicts of interest between these roles (probity); How to create the market?; How should conflicts of interest between these different roles be handled?</li> </ul>	<ul style="list-style-type: none"> <li>• Broad agreement that government needs some role in offset regulation and administration.</li> <li>• Broad agreement that public sector developments (whether run by state agencies or by private companies through government procurement) should abide by the same offset requirements as private sector developers.</li> </ul>	<ul style="list-style-type: none"> <li>• Still comparatively little systematic experience of how to set up offset systems that embrace multiple different roles for government.</li> <li>• Still comparatively little experience of probity rules and how to deal with potential conflict of interest between different government functions.</li> </ul>
<p><b>How should biodiversity be measured, and how should it be exchanged?</b></p>	<ul style="list-style-type: none"> <li>• Policy: How complex (accurate and precise) vs. practical (simple and easy to use/communicate) should things such as methods, metrics, exchange rules and site selection be?</li> </ul>	<ul style="list-style-type: none"> <li>• Consensus that no universal metric exists for biodiversity (unlike greenhouse gases).</li> <li>• Broad agreement that methodologies must be operationally feasible</li> </ul>	<ul style="list-style-type: none"> <li>• There are lots of good arguments for complexity/disaggregation and pragmatism/aggregation – the optimal middle ground has been hard to find, and is context dependent.</li> </ul>



	<ul style="list-style-type: none"> <li>● Technical: To what extent can different metrics (e.g. for habitats, species, spatial issues) be aggregated?</li> </ul>		
	<ul style="list-style-type: none"> <li>● Technical: When trading up, should societal preferences be accounted for via multipliers within currencies or instead within exchange rules?</li> </ul>		<ul style="list-style-type: none"> <li>● One of the least clear areas of offsets is how you apply currencies when trading up.</li> <li>● Consequently, there is no consensus on how trading-up is to be reconciled with 'net gain' outcomes.</li> </ul>
	<ul style="list-style-type: none"> <li>● Policy: Should exchange rules: require like-for-like or trading up?</li> </ul>	<ul style="list-style-type: none"> <li>● There is consensus that like-for-like is the best basis for ecological equivalence, but that 'trading up' may sometimes be appropriate.</li> <li>● There is some level of agreement that a 'graduated response' is most appropriate for trading up – i.e. trading up can be acceptable for impacts on lower conservation priorities biodiversity, but 'like for like' is important for higher conservation priority biodiversity.</li> </ul>	<ul style="list-style-type: none"> <li>● There is no consensus on whether/ when insistence on like-for-like is suboptimal.</li> <li>● There is not consensus on whether, or how (and on what basis), trading up should occur.</li> <li>● There is limited science-based conservation prioritization, incorporating societal desires, at the level needed within countries and regions to provide the evidence base for legitimate trading up.</li> </ul>
	<ul style="list-style-type: none"> <li>● Technical: Should exchange rules include limits to what can be traded in terms of declines in quality and area between impact and offset sites?</li> </ul>	<ul style="list-style-type: none"> <li>● There is consensus that there should be limits to declines in quality and area between impact and offset sites (e.g. two hectares of 50% quality might not be a suitable offset for one hectare of 100% quality).</li> </ul>	<ul style="list-style-type: none"> <li>● There is no consensus on what these limits to exchange should be, or even how they should be defined.</li> </ul>
	<ul style="list-style-type: none"> <li>● Technical: When/how should multipliers be used?</li> </ul>		<ul style="list-style-type: none"> <li>● Discussions and literature (even government guidelines) on the subject confuse and conflate many different issues related to metrics, risk and</li> </ul>

			uncertainty. Further work and agreement are needed.
<b>Which offset actions are 'additional'?</b>	<ul style="list-style-type: none"> <li>• Policy: Can there be additionality in protected areas?</li> </ul>	<ul style="list-style-type: none"> <li>• Agreement that creating/ expanding PAs through offsets can be additional.</li> <li>• Partial agreement that, in some circumstances, at least for some time period until governments have capacity for funding their PAs, offset activities that are clearly additional to existing commitments and activities could take place in existing PAs.</li> </ul>	<ul style="list-style-type: none"> <li>• Considerable ethical controversy over whether governments should always be covering PA costs (and, if so, which costs).</li> <li>• Little agreement or guidance on manner in which acceptability of additionality in PAs could be determined (e.g. activities additional to those in existing PA management plans and additional budget to existing commitments).</li> <li>• Little consideration and agreement on whether the creation of new PAs using offset investment is 'additional' if the government concerned has already assumed policy commitments that imply the extension of the PA system (e.g. the Aichi Targets).</li> <li>• There is little experience of the medium or long term effect of offset policies on the evolution of government commitments towards PAs and other biodiversity actions ('cost-shifting').</li> </ul>
	<ul style="list-style-type: none"> <li>• Policy: How can leakage be avoided?</li> </ul>	<ul style="list-style-type: none"> <li>• Agreement that implementing an offset, but with impacts simply displaced elsewhere, is not additional.</li> </ul>	<ul style="list-style-type: none"> <li>• Little agreement on how to tackle leakage effectively in offset design.</li> </ul>
	<ul style="list-style-type: none"> <li>• Policy: When is there additionality with credit-stacking (e.g. planning carbon/biodiversity/water gains in the same area)?</li> </ul>	<ul style="list-style-type: none"> <li>• Agreement that integrated land-use planning is beneficial, and including biodiversity, carbon, water and even livelihood gains within the same area can avert harmful land-use change.</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of consensus, or even much thinking, on stacking, bundling and layering and the tension in policy between adding value to given areas (by stacking and bundling) versus ensuring additionality.</li> </ul>

	<ul style="list-style-type: none"> <li>• Policy: When are averted risk (loss) offsets legitimate?</li> </ul>	<ul style="list-style-type: none"> <li>• Agreement that avoiding likely degradation of high biodiversity conservation areas is perhaps the most valuable 'gain' in biodiversity terms.</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of agreement on what is appropriate and sufficient evidence of baseline risk of loss that would be averted by offset activities.</li> <li>• Lack of agreement about whether averted risk is legitimate gain in countries given existing policy that should prevent such risks already (e.g. USA, EU and many others).</li> </ul>
	<ul style="list-style-type: none"> <li>• Policy: What level of proof of additionality is necessary?</li> </ul>		<ul style="list-style-type: none"> <li>• Lack of consensus – many think that tight control is essential (because without proven additionality the integrity of the offset concept is lost), but high transaction costs of truly demonstrating additionality may be less efficient than simple rules of thumb.</li> </ul>
<b>When should offsets gains be made and how long should they last?</b>	<ul style="list-style-type: none"> <li>• Policy: When should offset gains be made, and what should happen if that is not before impacts?</li> </ul>	<ul style="list-style-type: none"> <li>• Some agreement that offset gains are best made before impacts (i.e. bio-/habitat-banking) in theory, but that there are considerable problems with doing so in practice.</li> <li>• Some agreement that 'time discounting' can be used to address temporal loss in some circumstances.</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of consensus on how to deal with temporal loss (particularly for so-called 'intrinsic' values) when conservation banks are not possible in practice.</li> <li>• Lack of consistent application of, and guidance on, time discounting.</li> <li>• Lack of agreement on how to reflect the limited capacity of government and other stakeholders to enter into long term commitments that bind their successors.</li> </ul>
	<ul style="list-style-type: none"> <li>• Technical and policy: How long should offsets last?</li> </ul>	<ul style="list-style-type: none"> <li>• Broad agreement that offsets should last 'at least as long as impacts'.</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of consensus on whether offsets should only last as long as the impacts endure, or 'in perpetuity'.</li> <li>• Often inadequate legal/institutional/ financial mechanisms to deliver long-term offsets, both in theory (e.g. little exploration of the potential of insurance) and in practice.</li> <li>• Lack of knowledge and agreement on how to</li> </ul>

			<p>ensure government planning and finance departments maintain offset gains in the long term in the face of development pressures.</p> <ul style="list-style-type: none"> <li>• Few examples of developers actually sufficiently spending or guaranteeing funds now in order to finance offsets into the long term.</li> </ul>
<b>How should uncertainty and risk be dealt with?</b>	<ul style="list-style-type: none"> <li>• Policy: How much uncertainty and risk is society willing to tolerate with offsets?</li> </ul>	<ul style="list-style-type: none"> <li>• Consensus that this needs determining on a system-by-system basis.</li> </ul>	<ul style="list-style-type: none"> <li>• Few attempts yet to explore or determine societal tolerance levels for uncertainty and risk in practice.</li> </ul>
	<ul style="list-style-type: none"> <li>• Technical: How can different types of uncertainty and risk be addressed?</li> </ul>		<ul style="list-style-type: none"> <li>• Substantial lack of agreement over how to deal with different kinds of risk/ uncertainty (e.g. whether offsets will succeed in producing gains versus whether those gains can be sustained). Generic 'solutions' are commonly and inappropriately used.</li> </ul>
<b>What are the best options for offset implementation?</b>	<ul style="list-style-type: none"> <li>• Policy: How should offsets be implemented to optimize both ecological effectiveness and (economic) cost benefit (e.g. permittee responsible, in lieu fees, conservation banking)?</li> </ul>	<ul style="list-style-type: none"> <li>• Broad agreement that, in their first few years at least, offset systems should allow a number of different forms of offset implementation, provided they are all held to the same standard of delivery.</li> <li>• Broad experiences that offsets implemented by developers themselves often fail.</li> <li>• Broad experience that 'in lieu fee' systems fail to deliver.</li> <li>• Broad experience that conservation banking has certain ecological and administrative advantages (offset action can start prior to impacts, can be of scale and in location that delivers priority conservation outcomes, implementation in hands of specialists with</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of shared understanding of analyses of the principal reasons for failure of offset implementation.</li> <li>• Short-term desire by governments and some conservation NGOs for 'in lieu fees' to boost PA budgets and current or planned projects.</li> <li>• Suspicion of conservation banking as 'commodification of nature'.</li> <li>• Perverse incentives in some systems (e.g. different standards and levels of enforcement between different implementation options) promoting poor implementation.</li> </ul>

		legal liability for performance), but requires a more sophisticated administrative and regulatory system within government.	
	<ul style="list-style-type: none"> <li>Policy: What are the necessary legal, institutional and financial tools to implement offsets (e.g. trust funds, covenants, easements) and what to do if they are not available in a country?</li> </ul>	<ul style="list-style-type: none"> <li>Broad agreement that in addition to clear guidelines on offset design (e.g. exchange rules and metrics), clear guidelines on implementation is needed.</li> <li>Broad agreement that offset systems need clear provision for legal, institutional and financial arrangements.</li> </ul>	<ul style="list-style-type: none"> <li>Some jurisdictions lack the land tenure and legal tools (e.g. conservation trust funds) to guarantee long term offset outcomes.</li> <li>Few experiences and little international agreement on how best to implement offsets where some legal and financial tools are missing.</li> <li>Most offset systems are too 'young' for there to be much data on implementation success and failure to analyse.</li> </ul>
	<ul style="list-style-type: none"> <li>Policy: How much capacity is needed within different sectors?</li> </ul>	<ul style="list-style-type: none"> <li>Broad agreement that the successful design and implementation of offsets requires more expertise and human capacity than basic EIA implementation.</li> <li>Broad agreement that capacity on offset design and implementation is lacking, in most central, regional and local government, companies and their consultants, banks with offset loan conditions, NGOs and communities.</li> </ul>	<ul style="list-style-type: none"> <li>Lack of understanding/acknowledgement by governments as to the level of human resource, skill and knowledge needed to design, administer and enforce offset systems.</li> <li>No agreement as to whether offsets should go ahead even when capacity is lacking (because the counterfactual - i.e. project goes ahead without offset - is worse)</li> </ul>
	<ul style="list-style-type: none"> <li>Policy: What is the most appropriate roadmap for the design, implementation and improvement of offset systems?</li> </ul>	<ul style="list-style-type: none"> <li>Broad agreement (based on experience of all existing offset systems) that introduction of an offsetting system by government is a multi-year process.</li> <li>Broad agreement on some of the key steps in that process.</li> </ul>	<ul style="list-style-type: none"> <li>Commonly, governments fail to develop a multi-year 'roadmap' for the development, implementation and evolution of their proposed offset system, so it is likely to run into problems.</li> </ul>

<p><b>How should monitoring and evaluation occur?</b></p>	<ul style="list-style-type: none"> <li>• Policy: What is the most effective approach to monitoring and enforcement?</li> </ul>	<ul style="list-style-type: none"> <li>• Consensus that lack of monitoring and enforcement (with sufficient sanctions) of offsets by governments or independent authorities is a major driver of offset failure.</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of agreement on the optimal organizations to conduct monitoring, and on how to best fund monitoring and enforcement.</li> <li>• Government institutional capacity is often insufficient for monitoring and enforcement.</li> <li>• A lack of clarity on how much monitoring/enforcement is optimal to improve offset success but not impede a functioning offset system.</li> </ul>
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## Appendix 2: Glossary

As noted in Section 1, relevant literature contains several different definitions of the terms used throughout this document. The aim of this glossary is not to determine a unique definition for the terms set out here, but rather to enable the reader to understand how terms are used in this document.

A comparison of a range of different definitions used for some of the key terms (e.g. 'biodiversity offsets', 'compensation', can be found in ten Kate & Crowe, 2014).

### **Additionality**

The need for a compensation measure to provide a new contribution to conservation, additional to any existing values, e.g. the conservation outcomes it delivers would not have occurred without it. Source: McKenney & Kiesecker (2010).

### **Baseline**

A description of existing conditions to provide a starting point (e.g. pre-project condition of biodiversity) against which comparisons can be made (e.g. post-impact condition of biodiversity), allowing the change to be quantified (BBOP, 2012c). See also section 5.2 and Figure 2 of this document.

### **Biodiversity offsets**

Biodiversity offsets are measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development after appropriate prevention and mitigation measures have been taken. The goal of biodiversity offsets is to achieve no net loss and preferably a net gain of biodiversity on the ground with respect to species composition, habitat structure, ecosystem function and people's use and cultural values associated with biodiversity. Source: BBOP (2012a).

### **Bundling (See also 'Stacking')**

Bundling is where a suite of ecosystem services provided by an area (of land/sea) is sold as a single package (e.g. in the form of one credit type) to the same buyer. Thus, one payment occurs for multiple services that cannot be disaggregated (Wunder & Wertz-Kanounnikoff, 2009; Deal et al., 2012).

### **Conservation bank**

A conservation bank (or biodiversity bank) is a parcel of land managed for its conservation values. In exchange for permanently protecting the land, the bank owner is allowed to sell credits to parties who need them to satisfy legal requirements for compensating environmental impacts of development projects. See Carroll et al., 2008. Source: BBOP (2012c).

### **Compensation**

Compensation includes measures to recompense, make good or pay damages for loss of biodiversity caused by a project. In some languages 'compensation' is synonymous with 'offset', but in this paper 'compensation' is a more general term of which biodiversity offsets are just one subset. Compensation may achieve No Net Loss/Net Gain (in which case it is an offset), but in other cases compensation can involve reparation that falls short of achieving No Net Loss (and is, therefore, not an offset). This can be for a variety of reasons,



including that the conservation actions were not planned to achieve No Net Loss; that the residual losses of biodiversity caused by the project and gains achievable by compensation are not quantified; that no mechanism for long term implementation has been established; that it is impossible to offset the impacts (for instance, because they are too severe or pre-impact data are lacking, so it is impossible to know what was lost as a result of the project); or that the compensation is through payment for training, capacity building, research or other outcomes that will not result in measurable conservation outcomes on the ground. Source: BBOP (2012a).

### Currency

Definitions of currency, offset ratios and multipliers vary and are often combined in the literature. In this paper, we consider currencies (or metrics) to be the unitary measures of biodiversity lost, gained or exchanged. These vary from very basic measures such as area, to sophisticated quantitative indices of multiple biodiversity components, which may be variously weighted. Source: Adapted from BBOP (2012c).

### Ecological equivalence

In the context of biodiversity offsets, this term is synonymous with the concept of 'like for like' and refers to areas with highly comparable biodiversity components. This similarity can be observed in terms of species diversity, functional diversity and composition, ecological integrity or condition, landscape context (e.g. connectivity, landscape position, adjacent land uses or condition, patch size, etc.), and ecosystem services (including people's use and cultural values). Source: BBOP (2012c).

### Exchange rules

A set of rules established by policy makers or offset planners to define which components of biodiversity can and cannot be substituted for others in a biodiversity offset, and how such substitutions can occur. These rules may be explicit, or they may be implicit within the definitions adopted from biodiversity offsets and associated requirements, such as 'like for like' and 'trading up'. Source: BBOP (2012c).

### In-lieu fee

In-lieu fee mitigation is an option for the implementation of mitigation, particularly in the USA, in which the project proponents pay a third party, typically a governmental or non-profit natural resources management entity, to provide mitigation instead of implementing project-specific mitigation themselves. Source: State of Washington Department of Ecology (2011).

### Like-for-like or better (See 'Ecological equivalence' and 'Trading up')

### Metrics

A set of measurements that quantifies results. See also 'Currency'.

### Mitigation hierarchy

The mitigation hierarchy comprises:

- a. **Avoidance:** 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. This results in a change to a 'business as usual' approach.

- b. **Minimization:** measures taken to reduce the duration, intensity and / or extent of impacts that cannot be completely avoided, as far as is practically feasible.
- c. **Rehabilitation / restoration:** measures taken to rehabilitate degraded ecosystems or restore cleared ecosystems following exposure to impacts that cannot be completely avoided and / or minimized.
- d. Compensation or **Offset:** These are measures taken to compensate for any residual significant, adverse impacts that cannot be avoided, minimized and /or rehabilitated or restored. Biodiversity offsets are measures to achieve No Net Loss or a Net Gain of biodiversity for at least as long as the project's impacts last. Offsets can take the form of positive management interventions such as restoration of degraded habitat, arrested degradation or averted risk, where there is imminent or projected loss of biodiversity. Measures that address residual impacts but are not quantified to achieve No Net Loss or not secured for the long term are compensation, otherwise known as compensatory mitigation. Source: BBOP (2012a).

### **Mitigation measures**

The full set of activities covering the entire mitigation hierarchy.

### **No Net Loss and a Net Gain**

A target for a development project in which the impacts on biodiversity caused by the project are balanced or outweighed by measures taken to avoid and minimize the project's impacts, to undertake on-site restoration and finally to offset the residual impacts, so that no loss remains. Where the gain exceeds the loss, the term 'Net Gain' may be used instead of No Net Loss. Source: BBOP (2012c).

### **Non-offsetable threshold / Non-offsetable impacts**

This is a level of severity beyond which impacts on biodiversity by a development project may no longer be capable of being offset. For example, it is not possible to offset the global extinction of a species. Levels of irreplaceability and vulnerability of the biodiversity components to be affected by the project, and the degree of uncertainty with respect to severity of impacts and the probability of success of a biodiversity offset, are all likely to be material factors in determining whether impacts on biodiversity can be offset. Source: BBOP (2012c). See also BBOP (2012d) and Pilgrim et al., (2013a).

### **Offset (See Biodiversity offset)**

### **Offsetability (See also non-offsetable)**

The extent to which impacts on biodiversity components are capable of being offset. See non-offsetable threshold. Source: BBOP (2012c). See also BBOP (2012d) and Pilgrim et al., (2013a).

### **Service area**

Derived from a term used in conservation banking in the USA, 'service area' refers to the area within which offsets can be undertaken to compensate for a particular impact. A conservation bank's service area is based on biological criteria of the biodiversity involved and is defined by the government running the conservation banking system. The term has come to be used more generally for areas suitable for offset activities. Source: Adapted from

[http://www.ecosystemmarketplace.com/pages/dynamic/web.page.php?section=biodiversity\\_market&page\\_name=uscon\\_market](http://www.ecosystemmarketplace.com/pages/dynamic/web.page.php?section=biodiversity_market&page_name=uscon_market).

### **Stacking (See also 'Bundling')**

Stacking occurs when a landowner receives more than one payment from an ecosystem service market or payment programme on a single property parcel. Stacking is when separate payments (from different buyers or in different markets) are made for more than one ecosystem service generated on a single area (unit of land/sea). Stacking differs from bundling in that ecosystem services are packaged so that several different credit types are created and sold separately into different markets (Cooley & Olander, 2012).

### **Trading up (or 'like-for-like or better')**

Conserving through an offset components of biodiversity that are a higher conservation priority (e.g. because they are more irreplaceable and vulnerable) than those affected by the development project for which the offset is envisaged. Source: BBOP (2012c).

## Appendix 3: References

- Bean, M., Kihlslinger, R. & Wilkinson, L. (2008). *Design of U.S. Habitat Banking Systems to Support the Conservation of Wildlife Habitat and At-Risk Species*. Washington, DC: The Environmental Law Institute.
- Bekessy, S. A., Wintle, B. A., Lindenmayer, D. B., McCarthy, M. A., Colyvan, M., Burgman, M. A. & Possingham, H. P. (2010). The biodiversity bank cannot be a lending bank. *Conservation Letters* 3: 151–158.
- BBOP (2009a). *Compensatory Conservation Case Studies*. Business and Biodiversity Offsets Programme (BBOP). Forest Trends, Washington, DC. Available from [www.forest-trends.org/biodiversityoffsetprogram/guidelines/non-bbop-case-studies.pdf](http://www.forest-trends.org/biodiversityoffsetprogram/guidelines/non-bbop-case-studies.pdf).
- BBOP (2009b.) *Biodiversity Offset Cost-Benefit Handbook*. Business and Biodiversity Offsets Programme (BBOP). Forest Trends, Washington, DC. Available from [www.forest-trends.org/biodiversityoffsetprogram/guidelines/cbh.pdf](http://www.forest-trends.org/biodiversityoffsetprogram/guidelines/cbh.pdf).
- BBOP (2012a). *Standard on Biodiversity Offsets*. Business and Biodiversity Offsets Programme (BBOP). Forest Trends, Washington, DC. Available from <http://bbop.forest-trends.org/guidelines/Standard.pdf>.
- BBOP (2012b). *Guidance Notes to the Standard on Biodiversity Offsets*. Business and Biodiversity Offsets Programme (BBOP). Forest Trends, Washington, DC. Available from [http://bbop.forest-trends.org/guidelines/Standard\\_Guidance\\_Notes.pdf](http://bbop.forest-trends.org/guidelines/Standard_Guidance_Notes.pdf).
- BBOP (2012c). *Glossary with updates*. Business and Biodiversity Offsets Programme (BBOP). Forest Trends, Washington, DC. Available from [http://bbop.forest-trends.org/guidelines/Updated\\_Glossary](http://bbop.forest-trends.org/guidelines/Updated_Glossary)
- BBOP (2012d). *Resource Paper: Limits to What Can Be Offset*. Business and Biodiversity Offsets Programme (BBOP). Forest Trends, Washington DC. Available from [http://bbop.forest-trends.org/guidelines/Resource\\_Paper\\_Limits.pdf](http://bbop.forest-trends.org/guidelines/Resource_Paper_Limits.pdf).
- BBOP (2013). *Updated Overview on Biodiversity Offsets*. Business and Biodiversity Offsets Programme (BBOP). Forest Trends, Washington, DC. Available from [http://www.forest-trends.org/documents/files/doc\\_3319.pdf](http://www.forest-trends.org/documents/files/doc_3319.pdf).
- Bull, J. W., Suttle, K. B., Singh, N. J. & Milner-Gulland, E. J. (2013a). Conservation when nothing stands still: moving targets and biodiversity offsets. *Frontiers in Ecology and the Environment* 11: 203-210.
- Bull, J. W., Suttle, K. B., Gordon, A., Singh, N. J. & Milner-Gulland, E. (2013b). Biodiversity offsets in theory and practice. *Oryx* 47: 369-380.
- Cole, S. (2010). Wind power compensation is not for the birds: An opinion from an environmental economist. *Restoration Ecology* 19: 147-153.
- Cooley, D. & Olander, L. (2011). Stacking Ecosystem Services Payments Risks and Solutions. Nicholas Institute Working Paper. September 2011. Available from <http://nicholasinstitute.duke.edu/sites/default/files/publications/stacking-ecosystem-services-payments-paper.pdf>.
- Cowling, R. M., Knight, A. T., Privett, S. D. J. & Sharma, G. (2010). Invest in opportunity, not inventory of hotspots. *Conservation Biology* 24: 633–635.

- Curran, M., Hellweg, S., & Beck, J. (2014). Is there any empirical support for biodiversity offset policy? *Ecological Applications*, in press. doi:10.1890/13-0243.1.
- Deal, R.L., Cochran, R. & LaRocco, G. (2012). Bundling of ecosystem services to increase forestland value and enhance sustainable forest management. *Forest Policy and Economics* 17: 69-76.
- Denisoff, C. & Urban, D. (2012). Evaluating the Success of Wetland Mitigation Banks. *National Wetlands Newsletter*.
- Dudley, N. (Ed.) (2008). *Guidelines for applying area management categories*. Gland, Switzerland: IUCN.
- Dunford, R. W., Ginn, T. C. and Desvousges, W. H. (2004). The use of habitat equivalency analysis in natural resource damage assessments. *Ecological Economics* 48: 49-70.
- Duke, G. and ten Kate, K. (In press). *Exploring lessons learned from biodiversity offsetting markets in other countries that could inform appraisal of options for delivering offsets in England. Final report to Defra*. Forest Trends, Washington, DC.
- Gibbons, P., Briggs, S., Ayers, D., Seddon, J., Doyle, S., Cosier, P., McElhinny, C., Pelly, V. & Roberts, K. (2009). An operational method to assess impacts of land clearing on terrestrial biodiversity. *Ecological Indicators* 9: 26-40.
- Gibbons, P., Evans, M. C., Maron, M., Gordon, A., Le Roux, D., von Hase, A., Lindenmayer, D. B. & Possingham, H. P. (In press). When is no net loss feasible? A simple loss-gain metric for biodiversity offsets.
- Hansen, M. C., Potapov, P. V., Moore, R., Hancher, M., Turubanova, S. A., Tyukavina, A., Thau, D., Stehman, S. V., Goetz, S. J. & Loveland, T. R. (2013). High-resolution global maps of 21st-century forest cover change. *Science* 342: 850–853.
- Hilderbrand, R. H., Watts, A. C. & Randle, A. M. (2005). The myths of restoration ecology. *Ecology and Society* 10: 19.
- Hill, T., Kulz, E., Munoz, B. & Dorney, J. R. (2013). Compensatory Stream and Wetland Mitigation in North Carolina: An Evaluation of Regulatory Success. *Environmental Management* 51: 1077-1091.
- IFC (2012). Guidance Note 6. Biodiversity Conservation and Sustainable Management of Natural Resources. January 1, 2012. International Finance Corporation (IFC), Washington, DC. Available from [www.ifc.org/performancestandards](http://www.ifc.org/performancestandards).
- Igual, J. M., Tavecchia, G., Jenouvrier, S., Forero, M. G. & Oro, D. (2009). Buying Years to Extinction: Is Compensatory Mitigation for Marine Bycatch a Sufficient Conservation Measure for Long-Lived Seabirds? *PLoS ONE* 4: e4826.
- IUCN (2001). *IUCN Red List Categories and Criteria Version 3.1*. Gland, Switzerland: IUCN
- IUCN (2014). *Knowledge Products for business. A practical manual to make best use of biodiversity information mobilised through IUCN*. Gland, Switzerland: IUCN.
- ten Kate, K. & Crowe, M. L. A. (2014). *Biodiversity Offsets: Policy options for governments. An input paper for the IUCN Technical Study Group on Biodiversity Offsets*. Gland, Switzerland: IUCN.

- Kiesecker, J.M, Copeland, H., Pocerwicz, A., Nibbelink, N., McKenney, B., Dahlke, J., Holloran, M. & Stroud, D. (2009). A Framework for Implementing Biodiversity Offsets: Selecting Sites and Determining Scale. *BioScience* 59: 77-84.
- Kiesecker, J.M., Copeland, H., Pocerwicz, A. & McKenney, B. (2010). Development by Design: Blending Landscape Level Planning with the Mitigation Hierarchy. *Frontiers in Ecology and the Environment* 8: 261-266.
- Kollmuss, A., Zink, H. & Polycarp, C. (2008). *Making sense of the voluntary carbon market: A comparison of carbon offset standards*. WWF Germany.
- Kormos, R., Kormos, C.F., Humle, T., Lanjouw, A., Rainer, H., Victurine, R., Mittermeier, R.A., Diallo, M.S., Rylands, A.B., Williamson, E.A. (2014). Great Apes and Biodiversity Offset Projects in Africa: The Case for National Offset Strategies. *PLoS ONE*, (In press).
- Lindenmayer, D. B. & Franklin, J. F. (2002). *Conserving forest biodiversity: a comprehensive multiscaled approach*. Washington DC: Island Press.
- Lindenmayer, D. B. & Likens, G. (2010). *Effective Ecological Monitoring*. CSIRO: Collingwood, Australia and London, UK: Earthscan.
- Lombard, A. T., Cowling, R. M., Pressey, R. L. & Mustart, P. J. (1997). Reserve selection in a species-rich and fragmented landscape on the Agulhas Plain, South Africa. *Conservation Biology* 11: 1101–1116.
- Maron, M., Hobbs, R. J., Moilanen, A., Matthews, J. W., Christie, K., Gardner, T. A., Keith, D. A., Lindenmayer, D. B. & McAlpine, C. A. (2012). Faustian bargains? Restoration realities in the context of biodiversity offset policies. *Biological Conservation* 155: 141–148.
- McDonald-Madden, E., Probert, W. J., Hauser, C. E., Runge, M. C., Possingham, H. P., Jones, M. E., Moore, J. L., Rout, T. M., Vesk, P. A. & Wintle, B. A. (2010). Active adaptive conservation of threatened species in the face of uncertainty. *Ecological Applications* 20: 1476–1489.
- McKenney, B A and Kiesecker, J. M. (2010). Policy development for biodiversity offsets: a review of offset frameworks. *Environmental Management* 45: 165–176.
- Moilanen, A., Van Teeffelen, A. J., Ben-Haim, Y. & Ferrier, S. (2009). How much compensation is enough? A framework for incorporating uncertainty and time discounting when calculating offset ratios for impacted habitat. *Restoration Ecology* 17: 470–478.
- NNLWG (2013a). *Scope and Objectives of the No Net Loss Initiative*. European Commission / Working Group on No Net Loss of Ecosystems and their Services, Brussels, July 2013.
- NNLWG (2013b). *EU No Net Loss Working Group Glossary*. European Commission / Working Group on No Net Loss of Ecosystems and their Services, Brussels, July 2013.
- NRC (2001). *Compensating for wetland losses under the Clean Water Act*. National Academy Press, Washington, DC. Available from <http://www.nap.edu/openbook.php?isbn=0309074320>.
- Overton, J. M., Stephens, R. T. & Ferrier, S. (2013). Net present biodiversity value and the design of biodiversity offsets. *Ambio* 42: 100-110.
- Pilgrim, J. D., Brownlie, S., Ekstrom, J. M. M., Gardner, T. A., von Hase, A., Kate, K. ten, Savy, C. E., Stephens, R. T. T., Temple, H. J., Treweek, J., Ussher, G. T. & Ward, G.



- (2013a). A process for assessing the offsetability of biodiversity impacts. *Conservation Letters* 6: 376-384.
- Pilgrim, J. D., Brownlie, S., Ekstrom, J. M., Gardner, T. A., Hase, A., ten Kate, K., Savy, C. E., Stephens, R. T. T., Temple, H. J., Treweek, J. & Ussher, G. T. (2013b). Offsetability is highest for common and widespread biodiversity: response to Regnery et al. *Conservation Letters* 6: 387–388.
- Pilgrim, J. D. & Bennun, L. (2014). Will biodiversity offsets save or sink protected areas? *Conservation Letters* 7: 423–424.
- Pilgrim, J. D. & Ekstrom, J. M. M. (2014). *Technical conditions for positive outcomes from biodiversity offsets. An input paper for the IUCN Technical Study Group on Biodiversity Offsets*. Gland, Switzerland: IUCN.
- Pouzols, F. M., Burgman, M. A. & Moilanen, A. (2012). Methods for allocation of habitat management, maintenance, restoration and offsetting, when conservation actions have uncertain consequences. *Biological Conservation* 153: 41–50.
- Quétier, F. & Lavorel, S. (2011). Assessing ecological equivalence in biodiversity offset schemes: key issues and solutions. *Biological Conservation* 144: 2991–2999.
- Quétier, F., Regnery, B. & Levrel, H. (2014). No net loss of biodiversity or paper offsets? A critical review of the French no net loss policy. *Environmental Science & Policy* 38: 120-131.
- Regnery, B., Couvet, D. & Kerbiriou, C. (2013). Offset measures and development projects: the conservation of protected species under the EU Birds and Habitats Directives. *Conservation Biology* 27: 1335-1343.
- Rouget, M., Cowling, R. M., Pressey, R. L. & Richardson, D. M. (2003). Identifying spatial components of ecological and evolutionary processes for regional conservation planning in the Cape Floristic Region, South Africa. *Diversity and Distributions* 9: 191–210.
- Salzman, J. & Ruhl, J. B. (2000). Currencies and the commodification of environmental law. *Stanford Law Review* 53: 607–694.
- Van Teeffelen, A.J.A., Opdam, P.F.M., Wätzol, F., Hartig, F., Johst, K., Drechsler, M., Vos, C.S., Wissel, S. & Quétier, F. (2014). Ecological and economic conditions and associated institutional challenges for conservation banking in dynamic landscapes. *Landscape & Urban Planning* 130: 64-72.
- State of Washington Department of Ecology (2011). Frequently Asked Questions: Shorelands and Environmental Assistance Program. Available from <https://fortress.wa.gov/ecy/publications/publications/1106008.pdf>
- Walker, S., Brower, A. L., Stephens, R. T. T. & William G. L. (2009). Why bartering biodiversity fails. *Conservation Letters* 2: 149-157.
- Watson, J. E. (2014). Human Responses to Climate Change will Seriously Impact Biodiversity Conservation: It's Time We Start Planning for Them. *Conservation Letters* 7:1-2.
- Withers, J. (2012). *Desk study on the effectiveness of PPS9 in delivering the policy of no net loss. Planning Policy and Biodiversity Offsets. Report on Phase 1 Research*. London: Defra.
- Wunder, S. & Wertz-Kanounnikoff, S. (2009). Payments for Ecosystem Services: A New Way of Conserving Biodiversity in Forests. *Journal of Sustainable Forestry* 28: 576-596.

# Appendix 4: Summary Terms of Reference for IUCN Biodiversity Offsets Technical Study Group

## Background

Biodiversity offsets, and their role within the mitigation hierarchy, have recently emerged as key issues on the agendas of governments, corporations and conservation organizations.

Several international lenders and regulators have already developed or are working on provisions that would require and/or define basic standards for biodiversity offsets and related concepts. Some countries have started integrating biodiversity offsets, no net loss and or net gain requirements into their regulatory frameworks.

Biodiversity offsets and other mechanisms in the mitigation hierarchy have potential to be a driver for enhanced conservation and the establishment of new protected areas of high conservation value. However, the stakes are high with several potential pitfalls – if offsetting gains currency and is translated into corporate, financial and regulatory policy with unresolved but fundamental knowledge gaps, it could undermine established approaches to managing biodiversity risk.

At present, there is lack of agreement about the state of knowledge regarding offset implementation, and on-going debate around fundamental issues that conservation gains from, and the limits to offsetting. There is a pressing need for authoritative, balanced guidance that can help conservation organizations, governments, and companies to reach common ground on the associated risks and opportunities before starting to consider how these risks and opportunities should be addressed.

As a response to these challenges, IUCN Members adopted Resolution 110 at the World Conservation Congress in Jeju 2012 (See Annex 2) which requires the Director General to establish a working group to develop an IUCN general policy on biodiversity offsets. The Working Group is expected to develop policy recommendations on biodiversity offsets, for consideration by IUCN Council by the end of 2014.

Resolution 110 also requests that the Secretariat continues to “contribute to the current state of knowledge about the practical implementation of biodiversity offsets by (a) undertaking project work with partners, IUCN Members and Commissions and (b) the sharing of experiences.”

## Objective

The overall objective of the proposed process is to develop an IUCN Biodiversity Offsets policy based on the best available science and consistent with relevant IUCN resolutions, that can:

- Act as the authoritative basis for any position paper or other statement issued by the Director General concerning biodiversity offsets;
- Ensure a coherent framework within which IUCN Secretariat and Commissions can contribute to the global knowledge base on biodiversity offsets and related issues;
- Guide strategic areas of technical engagement undertaken by IUCN;
- Provide a framework for the development of guidelines that can be used by IUCN Members, government agencies, lenders, and the private sector; and



- Facilitate adaptive policy guidance as more scientific information and practical experience on the ecological social and economic parameters to offsetting, become available.

### **Overview of biodiversity offset policy development process**

It is anticipated that the biodiversity offset policy development process will be implemented in two phases:

#### Phase 1:

- a) Technical Study Group established to do preparatory analytical work investigating unresolved technical and policy issues related to biodiversity offsets. The output of this technical study group is a brief (e.g. 15 page) technical paper that:
  1. Describes the technical and policy issues concerning biodiversity offsets;
  2. Presents and describes areas of general stakeholder convergence; and
  3. Highlights unresolved issues concerning biodiversity offsets and how they might be addressed either technically or politically.

#### Phase 2:

- b) Drawing from the work of the technical study group and under the guidance of Council, establish a Working Group to analyse policy options and propose a draft IUCN biodiversity offset policy to the IUCN Council.

## Appendix 5: Members of IUCN Biodiversity Offsets Technical Study Group

Name & Organization	IUCN constituency	Role in study group
Kerry ten Kate, Forest Trends	NGO Member, Species Survival Commission (SSC)	Joint lead contributor
John Pilgrim, The Biodiversity Consultancy (TBC)	Red List Authority for birds, SSC	Joint lead contributor
Thomas Brooks, IUCN	Secretariat, Commission on Ecosystem Management (CEM), SSC, and World Commission on Protected Areas (WCPA)	Contributor
Phil Gibbons, The Australian National University		Contributor
Jonny Hughes, Chair of Programmes of Policy Committee of IUCN Council	NGO member, IUCN Councillor, CEM	Contributor
Brendan Mackey, Griffith University	IUCN Councillor, Commission on Environmental, Economic and Social Policy (CEESP), World Commission on Environmental Law (WCEL), WCPA	Contributor
Jeff Manuel, South African Biodiversity Institute (SANBI)		Contributor
Bruce McKenney, The Nature Conservancy (TNC)	NGO member	Contributor
Swapan Mehra, Iora Ecological Solutions		Contributor
Fabien Quétier, Biotope Consultancy	CEM	Contributor
James Watson, Wildlife Conservation Society (WCS)	NGO member, SSC - Climate Change Specialist Group	Contributor

### Technical Group Coordination

Steve Edwards, IUCN	Secretariat, WCPA	Technical Group Coordinator/Chair
Rachel Asante-Owusu, IUCN	Secretariat	Technical Group Support
Gerard Bos, IUCN	Secretariat	Technical Group Oversight



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