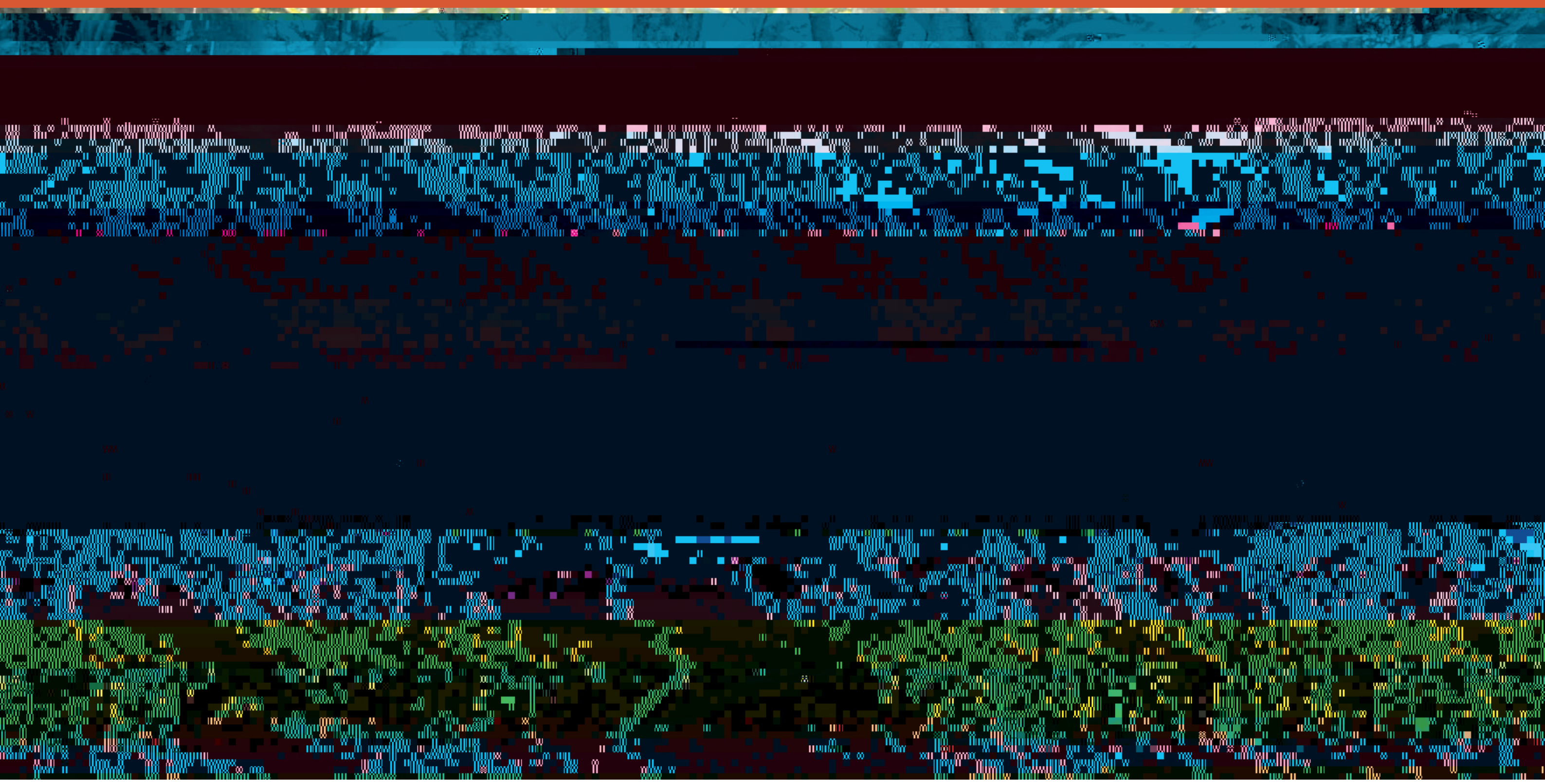
Report

Independent report on biodiversity offsets

Environmental Stewardship
January 2013



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ICMM IUCN (2012) Independent report on biodiversity offsets. Prepared by The Biodiversity Consultancy. Available at: www.icmm.com/biodiversity-offsets

The International Council on Mining and Metals (ICMM) and the International Union for Conservation of Nature (IUCN) have jointly commissioned this report on biodiversity offsets. This report seeks to inform the mining industry and the conservation sector of the offsets agenda. The report was prepared by The Biodiversity Consultancy (TBC). ICMM and IUCN are grateful to them for this piece of work.

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Swamp forest along the shores of Lake St Lucia, South Africa.

EXECUTIVE SUMMARY

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1 DEFINING OFFSETS IN ENVIRONMENTAL STEWARDSHIP

OFFSETS COMPARED WITH OTHER FORMS OF ENVIRONMENTAL STEWARDSHIP

Biodiversity offsets are one of a number of environmental stewardship approaches, including traditional philanthropy, and other kinds of positive environmental contributions and compensation actions. Offsets differ from these other approaches in being more explicitly linked to project impacts.

Non-technical risks such as biodiversity, ecosystem services and local community/stakeholder issues are increasingly important to mine managers, and the potential costs of delays due to such risks are very large. Corporate environmental stewardship comprises all activities available to manage environmental risk. In addition to biodiversity offsets, the following types of stewardship are considered here, to facilitate comparison with the potential added value of biodiversity offsets:

1. **Traditional philanthropy.** For example, funding support to environmental organizations with no identified link with the impacts or operations of a company.
2. **Positive environmental contributions.** For example education, training and research. These actions have been called "indirect offsets" by the Australian Government and "Additional Conservation Actions" by Rio Tinto. For example, offset investments approved by state governments in Australia include capacity building and research. The effects of such investments are not measurable as quantitative biodiversity outcomes.
3. **Compensation actions linked to the impacts of a development but not commensurate with the type and scale of impacts.** These could be as loosely linked as those of Walmart's "Acres for America"[3] or Enbridge's "Acre for an Acre"[4] programs. These are not No Net Loss biodiversity offset programs, and are quantified in nothing more than hectares of land rather than in terms of biodiversity value of the land.

Biodiversity offsets can offer several advantages over these three forms of stewardship. First, their quantitative nature makes them generally more transparent and possibly less open to criticism such as "greenwash". Second, they may be the preferred form of risk management by regulators and lenders. Third, offsets have less risk of "political capture" by interest groups by virtue of their more structured nature – for example, a politician may champion an investment in a particular national park, but a Fsd[earch. The eps b–clude
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3 http://www.walmartstores.com/Sustainability/5127.aspx
4 http://www.enbridge.com/AboutEnbridge/CorporateSocialResponsibility/NeutralFootprint/AcreForAnAcre.aspx
5 http://www.environment.gov.au/epbc/publications/environmental-offsets-policy.html
6 http://www.dmp.wa.gov.au/documents/FINAL_Env_Offsets_Policy_for_release_by_Minister_generic_government.pdf
7 http://www.daff.qld.gov.au/documents/Fisheries_Habitats/FHMOP001-Fish-Hab-Manage.pdf

Figure 3: The mitigation hierarchy

2 NEW BUSINESS DRIVERS FOR BIODIVERSITY OFFSETS

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3 OFFSET PRINCIPLES

OFFSET PRINCIPLES

TYPE OF JUSTIFICATION	EXAMPLES	CITATIONS WHERE USED

OFFSET PRINCIPLES

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4 A FRAMEWORK FOR MEASUREMENT

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A FRAMEWORK FOR MEASUREMENT

THE FRAMEWORK IN THEORY

There are four principal steps required to ensure the correct types and amounts of biodiversity are taken into account in an offset exchange:

1. Prioritize and select the biodiversity features to include in the offset calculation at the impact and offset sites.
2. Select methods to collect data on the amounts of each feature in the field: measure the quantities of these biodiversity features directly (eg surface area of an ecosystem, abundance of a rare species) or, more commonly, through a surrogate or indicator of the biodiversity of interest (eg habitat area and quality as indicators of a species' abundance).
3. Convert the measures/counts/metrics into a fungible currency or currencies (ie to facilitate trade or exchange). Convert these counts and measures into one or more currencies to allow comparison of biodiversity losses and gains. Some of the most popular currencies for biodiversity offsets are Extent x Condition currencies, ie the multiplication of the surface area (or length, for streams; or volume, for marine) by the condition (quality) of the ecosystem or habitat.
4. Decide on adjustments needed for a fair exchange (eg No Net Loss): issues such as ratios, uncertainty, time lags, etc are tackled in this stage. These are core issues in the debate on No Net Loss. Step 4 has been the most extensively discussed and debated in the literature and in offset forums. Developers need only know that either the regulator will have decided these rules of exchange, or consultants and stakeholder engagement will be required to define these rules in a voluntary system, using global best-practice guidance on No Net Loss.

STEP 1: PRIORITIZE THE BIODIVERSITY FEATURES TO INCLUDE

What types of biodiversity should be included in the offset calculation? The term biodiversity covers a wide range from ecosystem and habitat diversity to intra-specific genetic diversity. However, it is impossible and impractical to measure everything. Scientifically defensible approximations and surrogates are required. Furthermore, different stakeholders attach differing values for the same biodiversity feature. For example, a forest may be important to NGOs for conservation of rare species, whereas it is important to local people for hunting resources. Global stakeholders might favour primates and rainforests, while national stakeholders favour fisheries, and local stakeholders favour a totem bird species. Stakeholder input is essential to define the scope of offsets.

An appropriate method to identify and prioritize stakeholder values is a biodiversity values matrix (Table 3). This matrix divides biodiversity into species, habitat/site and ecosystem components. The value of these components is considered for biodiversity itself, and as ecosystem services. This is an effective way of completing Step 1 of Figure 6: assessing the types of biodiversity relevant to different stakeholders.

Irreplaceability and vulnerability are central tenets by which levels of conservation concern can be judged (Margules and Pressey 2000; Wilson *et al* 2005; Brooks *et al* 2006). Irreplaceability is the degree of geographic/spatial rarity of a biodiversity feature; a locally endemic species has high irreplaceability. Vulnerability 0 0 10 494.2287 318.ulner2G(ighser bia8.ulner)10(2C able A biodiversity values matrix as used in biodiversity management and offset design

	SPECIES	HABITATS AND SITES	ECOSYSTEM PROCESSES
Biodiversity	Irreplaceability and vulnerability of species International nion for onservation of ature (I ed ist species	Irreplaceability and vulnerability of habitats lso prime /e emplary habitats	Ecosystem health and functionin Evolutionary diversification
Ecosystem services	ood fibre fuel mainly provisionin services enetic resources totem/cultural species	untin atherin and fishin sites and landscapes ultural services and culturally valued landscapes and sites such as sacred roves recreation areas Includes many cultural values	ar e scale ecosystem services re ulatin and supportin air quality climate re ulation ater purification

biodiversity values matri as used in biodiversity mana ement and offset desi n olumns are ma or components of biodiversity ro s are the biodiversity itself (sometimes called intrinsic values and the ecosystem services derived from the biodiversity (hich can be further divided into economic and cultural values dapted from Ekstrom and nstee ((a

t this sta e a developer ill have identified both biodiversity and ecosystem service values of relevance to the operation strate ic assessment is required to decide on the risk miti ation approach for these values ome mi ht be appropriate for biodiversity offsets and therefore require offset accountin thers may be better tackled throu h other forms of environmental pro ram and stakeholder involvement In particular careful consideration should be iven to hether ecosystem services ill form part of the biodiversity offset or ill require a separate land based offset or hether they ill be compensated for in alternative ays or simplicity in terminolo y this section is ritten from the perspective of the first ro of able coverin biodiversity itself o ever the same broad approach also is applicable for ecosystem services

STEP 2: SELECT METHODS TO COLLECT DATA ON AMOUNTS OF EACH FEATURE IN THE FIELD

Step 1 m e e te t ee e e t pe e t e p t e t e t e : p t H e me e t e m t e e t e F t e met : e mp e e t e e t e t e t e p t m e t ee e t e T e pp p te met e e t e e t me e t t e e m t e e t e t e In re ulatory re imes re ulators may prescribe e actly hat methods should be used other ise (and in voluntary or systems suitable methods should be selected ith appropriate e pert input he resultin data ill be used to construct a currency in tep In some re ulatory offset system the requirements of this currency ill drive methods for this data collection (abitat ectares requires measurement of about ve etation attributes

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5 OFFSET IMPLEMENTATION

GO TO SECTION ► 1 DEFINING OFFSETS IN ENVIRONMENTAL STEWARDSHIP 2 NEW BUSINESS DRIVERS FOR BIODIVERSITY OFFSETS 3 OFFSET PRINCIPLES 4 A FRAMEWORK FOR MEASUREMENT 5 OFFSET IMPLEMENTATION 6 INTERPLAY OF BIODIVERSITY OFFSETS AND ECOSYSTEM SERVICES 7 NEXT STEPS A ANNEXES

IMPLEMENTATION OPTIONS WITHIN REGULATORY REGIMES

Many countries have legislation, guidelines and methods for offset design and delivery.[31] In a regulatory market, many options are provided by different offset suppliers such as entrepreneurs and businesses, land trusts and NGOs. Some of the best-known options available for developers are government-administered conservation banks and tradeable offset credit systems, species conservation banks and custom-built offsets by authorized agencies (Table 4). In addition, regulations in some countries allow for types of in lieu fees and payments to central government conservation funds (eg Brazilian development tax of 0.5 per cent capex, US wetlands mitigation and the Queensland Government[32]). However, these fall outside a No Net Loss definition of biodiversity offsets.

Regulatory biodiversity offsets can be planned and implemented either:

- using a set of guidelines and principles provided by the regulator (where offsets need to be designed and implemented on a case-by-case basis). Examples include most Australian states, Western Cape and Kwazulu Natal Provinces of South Africa and Canadian fish habitat compensation, or,
- using a market-based mechanism (where credits are available for sale off the shelf). Offsets can be put in place by the government, the developer or by entrepreneurs (private sector conservation banks) whose existence has been facilitated by the regulator. Examples include BushBroker scheme of Victoria State,[33] biobanking of New South Wales,[34] wetland and species banking in the US, some fish habitat compensation within Canada and species conservation banking.[35]

Table 4: **Examples of regulatory offset options**

TYPE OF OFFSET	EXAMPLES
Private conservation banks	Clean Water Act Compensatory Mitigation ("wetland banking", US); Corporation of the Society of the Missionaries of the Sacred Heart BioBank (New South Wales, Australia); Endangered Species Program Conservation Banks (US); Environmental Offsets Policy (Western Australia)
Government conservation banks	BushBroker (Victoria, Australia); biobanking (New South Wales, Australia)
Contracts with private organizations	Some Clean Water Act Compensatory Mitigation ("wetland banking", US)
Partnerships or contracts with non-profit organizations (eg with conservation NGOs)	Some Australian mining companies are considering partnerships with existing NGOs to deliver their offset commitments
DIY offsets by developers	BushBroker (Victoria, Australia); Environmental Offsets Policy (Western Australia); Fish Habitat "HADD" Compensation Banks (Canada)
In lieu fees	Clean Water Act Compensatory Mitigation ("wetland banking", US); Environmental Offsets Policy (Western Australia)

Note that in some cases there are several options within a single regulatory offset system. For example, under US wetlands mitigation, there are options (dependent on certain conditions) for in lieu fee arrangements, DIY offsets by developers themselves, private contracts and (most commonly) purchase of credits from wetland mitigation banks.

31 Yet arguably few or none of these have a good record of implementation success (Darbi *et al* 2009; Treweek 2009).
32 http://www.ehp.qld.gov.au/management/environmental-offsets/pdf/biodiversity-offset-policy.pdf
33 http://www.dse.vic.gov.au/conservation-and-environment/biodiversity/rural-landscapes/bushbroker
34 http://www.environment.nsw.gov.au/biobanking/
35 http://www.fws.gov/endangered/landowners/conservation-banking.html

OFFSET IMPLEMENTATION

Corporate offset policies and design methods are emerging that are sufficiently detailed yet broad enough to take into account the majority of government offset policy requirements. A key lesson is that it is necessary to base a corporate offset approach on principles, and allow flexibility in methods to suit local circumstances. Unnecessary conflict between government and business approaches can be avoided. Some mining companies in Australia are leading such approaches.

CASE STUDY

Biobanking in New South Wales

Biobanking was described by the 2006 New South Wales environment minister[36] as comprising the following components:

- establishing a biobank site on land via an agreement voluntarily entered into between the minister for the environment and the landowner
- creating biodiversity credits where the landowner agrees to undertake positive environmental management and/or rehabilitation actions to improve biodiversity values on the biobank site
- allowing such credits to be traded, once they are created and registered, thus enabling the credits to be used to offset a biodiversity impact on another site, caused by urban development
- establishing a transparent assessment methodology to ensure that the overall operation of the scheme results in the maintenance of or an improvement in biodiversity values.

The biobanking approach facilitates strategic landscape benefits (eg connectivity) more easily than through individual separate offsets. Such areas can maximize retention or enhancement of the most threatened vegetation types or facilitate linkages between existing remnants.

36 Quoted in Fitzroy Basin Association (2008).
37 http://www.dse.vic.gov.au/land-management/land/native-vegetation-home/native-vegetation-credit-registerv la Tw 3.2 w9WJ0 34(ET0 0.7 1 0 kuc 0 036)Tc9 47.373230634764 67

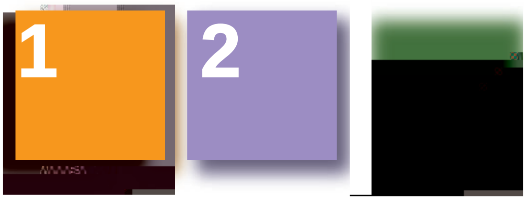
Options within the voluntary market are, however, growing rapidly (Table 5). This is certainly not the main constraint on offset success for any serious developer. The BBOP biodiversity offset implementation handbook[38]

IMPLEMENTATION FOR FINANCIAL AND LEGAL SUSTAINABILITY

In practice, biodiversity offsets often involve changes in land management or land use, such as conservation easements, improved conservation management, ecological restoration, or control of hunting or invasive species. These practices are already widely implemented by government and non-government conservation organizations, particularly in protected area management. Opportunity exists for collaboration between ICMM members and some of these organizations. Offsets can be seen as quantified and verified versions of typical conservation management of land.

Offset implementation is likely to be needed over long timeframes. McKenney and Kiesecker (2010) review offset legislation (in the European Union, the US, Brazil and Australia) and find permanence a key requirement in policy, and a major failure in practice. Two main types of solution have been proposed:

- Long-term financing mechanisms (eg trust funds): Funding offset management through a mechanism that provides annual funding in perpetuity, such as



6 INTERPLAY OF BIODIVERSITY OFFSETS AND ECOSYSTEM SERVICES

INTERPLAY OF BIODIVERSITY OFFSETS AND ECOSYSTEM SERVICES

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Biodiversity offsets that also deliver ecosystem services

In some cases biodiversity offsets may be sufficient compensation for impacted ecosystem services: ecosystem services can sometimes be extra to biodiversity offsets even if they are not the principal driver for their design. Erosion control, water purification or provision of forest products are common examples. This is because most ecosystem goods and services are natural inherent ecosystem processes and functions (such as water purification, pollination, erosion control) that society makes use of.

In other cases, dedicated expertise and specific offset actions (such as watercourse management, enrichment planting for pollinators) may be required to enhance the ecosystem services provided by a biodiversity offset. These actions will have been identified through an appropriately comprehensive biodiversity values and risk assessment in the offset design phase.

Tsitongambarika forest, Madagascar

Rio Tinto is investing in Tsitongambarika forest as a biodiversity offset designed specifically for biodiversity losses predicted for its QMM Ilmenite mining operations. The role of Tsitongambarika forest as a biodiversity offset is quantitatively mapped out in a recent IUCN–Rio Tinto report (Temple *et al* 2012). In parallel, the mining company recognized that a range of ecosystem services would potentially also be provided by the biodiversity offset – for local communities, national government and indeed global stakeholders in the case of forest carbon emission abatement. An economic valuation of the ecosystem services of the entire forest (larger than the proposed offset site) was undertaken by IUCN (Olsen *et al* 2011),[58] which calculated that the ecosystem benefits include wildlife habitat (US$2.9 million), hydrological regulation (US$470,000) and carbon storage (US$26.8 million). Potential ecotourism benefits (US$2.5 million) were excluded from the analysis due to uncertainties in tourism revenues. The study found that there were significant net economic benefits associated with for

58 http://data.iucn.org/dbtw-wpd/edocs/2011-062.pdf
59 http://www.daff.qld.gov.au/documents/Fisheries_Habitats/Marine-Fish-Habitat-Offset-Policy-12.pdf

INTERPLAY OF BIODIVERSITY OFFSETS AND ECOSYSTEM SERVICES

- **The spatial scale of some ecosystem services means that offsets may not be the most suitable mitigation option.** Some ecosystem services are relevant on such a broad spatial scale (eg a continental climate) that mining presents little risk to their functioning and they emerge from risk assessment as not requiring mitigation. Or conversely, some ecosystem services (often provisioning and cultural services) are so localized and site-specific that they are effectively irreplaceable and therefore mining can have a very great impact. Spirit sites are an example. In these latter cases, the primary measures are mitigation and direct compensation.
- **Alternative methods exist, which may be more appropriate than offsets.** Many ecosystem service impacts have traditionally been mitigated with existing tools such as engineering (erosion control, sedimentation ponds and culverts) and natural resource/community development approaches. There is a pre-existing set of methods for managing and compensating for natural resource impacts on local communities in separate professional domains.

MEASURING LOSSES AND GAINS

Two types of currency are most commonly used for measuring ecosystem services:

- **economic valuation** (dollar values), such as financial compensation for forest livelihood impacts
- **measures of the loss and gain of the service over time,** such as months of lost access to a fishery, or months of impaired water purification functions of a forest.

These two currencies can both be used and can usefully inform each other; they are not mutually exclusive.

Economic valuation

Economic valuation converts losses and gains into dollar values. The disadvantage is that financial currencies will never adequately represent the various ways biodiversity is valued, but the advantage lies in fungibility (exchangeability). Currently, very few of the new regulatory, voluntary and PS6-driven offset approaches use economic valuation as the primary method to calculate biodiversity offsets.

Economic valuation for compensation is commonly used in regulatory regimes (eg fines for pollution

The loss and gain can be measured in ways relevant to the resource in question such as area, area x condition, fish biomass, volumes of timber or in terms of ecological flows such as river discharge.[60] In Figure 7, the ecosystem service loss over time is represented as the area under the curve and increases into the future. An example would be the loss of access to 10,000kg of fish biomass from a fishery each day, increasing cumulatively as an economic loss over time. To handle this, Habitat Equivalency Analysis uses a metric known as service-acre-years (SAYs). In practice, this metric is in fact discounted due to the lower economic value of resources into the future (eg of 10,000kg of fish) – known as discounted service-acre-years (DSAYs; DARRP 1995, revised 2006).

Where ecosystem service impacts are temporary, offset gains can be temporary. For example, fish and firewood can be provided for the period of time that the fishery or a forest is closed to access, or financial compensation can be given. Where ecosystem service impacts are permanent, the offsets may need to be permanent.

60 These are the “counts and measures” of Step 2 in Figure 6.

7 NEXT STEPS

NEXT STEPS

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Despite significant advances in policy and theory, there is still some uncertainty over what constitutes a valid biodiversity offset. Design and implementation of real world offsets – in particular, voluntary offsets – have been little documented. Sufficiently detailed guidance and methods exist, but the mining industry lacks a simple how-to manual for managers, backed by source references for technical staff and consultants.

The BBOP offset case studies (BBOP 2009b) were some of the first to be published on implementation. Further offset documentation is now emerging, such as the Oyu Tolgoi Performance Standard 6 Biodiversity Appendices to the SEIA,[61] Inmet's Cobre Panama project (Annex 7) and the IUCN–Rio Tinto QMM Net Positive Impact study (Temple *et al* 2012; Annex 5). The lack of documented, demonstrablrrndic

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8. LEARN FROM THE FAILURE OF MANY REGULATORY OFFSET POLICIES

Offset policies, even with plentiful regulation and technical guidance, have often failed to deliver their stated objectives. Indeed, some policies have failed to produce valuable conservation outcomes at all (Darbi *et al* 2009; Burgin 2010), making some observers suspect that offsets are nothing but symbolic (Walker *et al* 2009). This is not due to a lack of laws, regulations, toolkits, theory or methods, but the lack of a track record in implementation and monitoring. ICMM and the conservation community could work together to help address these challenges.

9. INCREASE UNDERSTANDING BETWEEN THE TWO SECTORS

Many of the implementation challenges of biodiversity offsets are no different to those of biodiversity conservation more generally, for example insufficient stakeholder participation, unsustainable financing, lack of adaptive management and political constraints such as corruption. ICMM and the conservation community have the potential to work together on particular projects to create pragmatic solutions to some of these issues. Conservation organizations and the science sector could become more aware of the needs of the industry project life cycle in order to understand the opportunities and constraints faced by industry. Likewise, industry could explore the expertise (eg biodiversity accounting, offset design, protected area management) that is available outside the mainstream large consultancy sector.

A ANNEXES

ANNEXES

ANNEX 1

State of biodiversity offsets: global progress since 2005

In 2005, ICMM published a proposition paper and a briefing paper (ICMM 2005a, b) on biodiversity offsets, and listed several issues as offset barriers and uncertainties. Since then there have been significant advances in policy and theory, and some field examples of best-practice offset design are emerging.

Regulatory offset requirements have become more stringent in many countries, and options for offsets in regulatory systems are clearer, with offset markets having increased. Many examples exist of offsets in regulated regimes (mainly in North America and Australia). For voluntary offsets and those driven by financial lending requirements, significant consensus has emerged around high-level principles, but the details of what these mean in practice remain open to question. This is partly because different situations require different approaches, so there is no single "right" way of conducting offsets. Robust examples of offset design and implementation in voluntary regimes (mainly non-OECD countries) are emerging, but progress has been slow in agreeing to pragmatic and scientifically defensible approaches in the voluntary offset context. IFC Performance Standard 6 and other financial lending requirements are driving a step change in the quality of mitigation and offset design[63] for No Net Loss. Despite the wealth of offsets guidance and literature, the mining sector needs a how-to manual for offset design and implementation.

There has been seven years' progress on the five key offset issues identified by ICMM in 2005. As a brief summary of some complex issues, this section assumes some prior knowledge of biodiversity offsetting; many of these issues are explained and discussed in greater detail in this report.

1. Establishing appropriate baselines and measuring impacts that include background biodiversity change

Significant progress has been made in establishing baselines and measuring impacts (including metrics and indicators). Generic guidance is available on use of metrics and indicators that can be applied to offsets,
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4. Who to involve in offsets decision making, and who ultimately decides and what role government plays

This issue has received comparatively little attention in the literature. In practice, there are several useful case studies (Obermeyer *et al* 2011; BBOP 2012b; TBC & FFI 2012; Temple *et al* 2012) that illustrate the challenges. Where offsets are regulated, these questions are answered by government-defined rules, guidance and consultation processes. For voluntary offsets, these questions have to be answered case by case. Alignment with government plans and processes has the potential to increase the political expediency of a voluntary offset program (see Simandou project

In addition to the above five biological criteria, Paragraph 57 of the official PS6 Guidance Note[66] identifies many legally protected areas and internationally recognized areas as critical habitat:

- IUCN Category I and II protected areas
- Ramsar sites
- World Heritage Sites
- most Key Biodiversity Areas (including Important Bird Areas, Important Plant Areas, Alliance for Zero Extinction sites, etc)
- and in some cases, IUCN Category III and IV protected areas.

Critical habitat takes into account both global and national priorities and builds on the conservation principles of vulnerability (threat) and irreplaceability (rarity/restricted distribution). It is recognized that not all critical habitat is equal: there are grades of critical habitat of varying importance. The IFC distinguishes two main grades:

- Tier 1 critical habitat, of highest importance, in which development is very difficult to implement and offsets are generally not feasible except in exceptional circumstances
- Tier 2 critical habitat, of high importance, in which offsets may be possible and development may be permitted under some circumstances.

ANNEX 3
Offset principles

Business and Biodiversity Offsets Programme (BBOP) principles[67]

1. Adherence to the mitigation hierarchy: A biodiversity offset is a commitment to compensate for significant residual adverse impacts on biodiversity identified after appropriate avoidance, minimisation and on-site rehabilitation measures have been taken according to the mitigation hierarchy.

2. 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.

3. 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 supporting an ecosystem approach.

4. 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.

5. 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.

6. Stakeholder participation: In areas affected by the [development] 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.

66 www.ifc.org/performancestandards
67 Eg see p 10 of BBOP 2012b: http://www.forest-trends.org/documents/files/doc_3101.pdf

7. 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 [development] project and offset in a fair and balanced way, respecting legal and customary arrangements. Special consideration should be given to respecting both internationally and nationally recognised rights of indigenous peoples and local communities.

8. 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 [development] project's impacts and preferably in perpetuity.

9. 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.

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

New South Wales Government offset principles (New South Wales Government 2011)

The New South Wales, Australia, Government has set these principles for the design of biodiversity offsets:

1. Impacts must be avoided first by using prevention and mitigation measures
2. All regulatory requirements must be met
3. Offsets must never reward ongoing poor performance
4. Offsets will complement other government programs
5. Offsets must be underpinned by sound ecological principles
6. Offsets should aim to result in a net improvement in biodiversity over time
7. Offsets must be enduring – they must offset the impact of the development for the period that the impact occurs
8. Offsets should be agreed prior to the impact occurring
9. Offsets must be quantifiable – the impacts and benefits must be reliably estimated
10. Offsets must be targeted
11. Offsets must be located appropriately
12. Offsets must be supplementary
13. Offsets and their actions must be enforceable through development consent conditions, licence conditions, conservation agreements or a contract.

ANNEX 4

Ensuring equivalency of gains and losses in offset design

Equivalency in time

To be fully equivalent, offset gains need to be realized within an appropriate timescale for both stakeholders and the biodiversity concerned. For example, an offset proven equivalent in type and size will still not be considered to effectively compensate for losses if it only achieves its goals in 100 years' time (Ekstrom 2005; BBOP 2009a) – an existing forest is obviously worth more to stakeholders than a forest promised at some point in the distant future. Temporary loss of ecosystem services (eg loss of access to hunting or fishing areas, or loss of forest products such as timber and firewood), even for a short period of time, may represent a critical loss to the livelihoods and economy of a community or region.

In addition to human time preference, there are ecological reasons for negative effects of temporary biodiversity loss (often called temporal loss). Where the biodiversity in question performs an important ecological function, such as an ecological corridor of importanc

ANNEX 5
Case study

Rio Tinto QMM Madagascar – the loss–gain framework in practice

In a joint publication of IUCN and Rio Tinto, Temple *et al*

Figure 8

Cumulative Rio Tinto QMM biodiversity accounting across the whole mitigation hierarchy (avoidance, restoration, and offsets) compared with losses (Grey) from 2004 to 2065. Red = avoidance; Orange = improved management of avoidance zones to increase their quality; Pale Green = gains for post-mining

ANNEXES

Some solutions to uncertainty and risk in offset design[71]

Lessons learned from this undertaking relate to the appropriate scaling of biodiversity offsets. In all cases,

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