

Ms Toni Matulick
Committee Secretary
Senate Standing Committee on Environment and Communications

31 May 2013

Dear Ms Matulick

**Re: Inquiry into the Environment Protection and Biodiversity Conservation
Amendment (Great Barrier Reef) Bill 2013: questions taken on notice**

I write to provide answers to the questions taken on notice at the public hearing in
Brisbane on Thursday 23 May 2013. Further detail is at [Attachment A](#).

Question 1:

CHAIR: You may have heard some discussion with previous witnesses on the net benefit test. It seems to me that the net benefit test is one that one environmental group and the QRC and the other business groups have said there is a problem with. Do you see any problem with the proposed net benefit test? ...

Senator MOORE: I would really like to know how long these have been in place. In your written response, it would be good if we could get some idea of how long these kinds of things have been in place and how they are being received, if there has been any review. You did say that this is becoming a more common process, and I would just like to have some indication of over what period

The phrase 'net benefit' appears not to have been commonly used in Australian legislation. However, it has been used in the principal Act, in s 305, continuously since its inception. Section 305 seems not to have attracted any judicial consideration. In the absence of a statutory definition, the phrase when used in clause 24G must be construed as having its ordinary meaning.

As structured, clause 24G first states the general principle to be applied (subcl (1)). It then obliges the Minister to devise and publish a methodology to be applied in giving effect to that general principle (subcl (2)). It further obliges the Minister to apply the published methodology in making decisions, and to publish an explanation of how the methodology was applied in each instance (subcl (4)). As such, the drafting of clause 24G is not inappropriate.

BACKGROUND

History

The task of tracing the history of 'net benefit' has not been an easy one. What is clear is that it has been inextricably linked with biodiversity offsets. An International Union for the Conservation of Nature and Insight Investment report entitled *Biodiversity Offsets: Views, Experience and the Business Case* (2004) references papers on offsets as early as 1971, however the bulk of the references are from this century.

Adoption

In 2010 a study identified 64 offset programs, either active or in development, worldwide. Of these 36 were in North America or Australasia. The study also found the geographical reach of the programs was extensive and increasing in popularity, citing programs in Asia, South America, South Africa and pilot programs in the United Kingdom (Madsen *et al.*, 2010, [Attachment B](#))

Another study found that in 1992–93 and 2001–02 wetlands restored or created in the US grew from 7148 hectares to 56,613 hectares (ten Kate *et al.*, 2004, [Attachment C](#)). By 2008 some 283,000 hectares of land had been protected or restored by a combination of biodiversity offsets and wetland mitigation programs in the US alone and in 2010 it was estimated that existing programs were resulting in the protection or restoration of at least 86,000 hectares of land per year (Madsen *et al.*, 2010).

Definition

The IUCN report provides this definition of 'biodiversity offset':

For the purposes of this report, we define biodiversity offsets as conservation actions intended to compensate for the residual, unavoidable harm to biodiversity caused by development projects, so as to ensure no net loss of biodiversity. Before developers contemplate offsets, they should have first sought to avoid and minimise harm to biodiversity.

Different terminology has been used such as 'no net loss', 'net positive impact' and 'net benefit'. The IUCN report noted that a consistent, globally accepted terminology has yet to emerge. The definition they adopted places 'net benefit' as the goal of biodiversity offsets.

In New South Wales the concept is described as 'net environmental improvement' in their state-wide scheme of 'green offsets' when dealing with development for water and air pollution and for clearing native vegetation. New South Wales Fisheries has a policy of 'no net loss' for developments that damage aquatic habitat.

In 2002 the Victorian Government adopted a policy of achieving a 'net gain' when dealing with native vegetation. The Government's priority for implementing 'net gain' was to avoid clearing. Where flexibility was required to support landholders and limited clearing was permitted, a rigorous process of ensuring achievement of 'net gain' principles was pursued through a strict application of offset requirements.

Limits

Commentators on both 'development' and 'conservation' sides do have some reservations about the offsets approach. A paper published as recently as 2012 identified criticisms of offsetting as numerous and relating to offset design, accounting, governance and compliance. The authors of the paper categorise the limitations on the ability of offsets to achieve a successful outcome as poor measurability (can we define and measure the value we want), uncertainty (do we have any evidence we can actually replace the value) and time lag (how long will it take to replace the value) (Maron *et al.*, 2012, [Attachment D](#)).

Question 2:

Senator Waters: You will no doubt have read section 24G of the bill, which is intended to be reflective of that World Heritage Committee recommendation. Can I get you to turn your mind to whether you think that 24G is a reflection of the sentiments of recommendation 8 or if there are some improvements that need to be made in that respect? ...

CHAIR: Rather than putting Mr Mead in a position where he has got to respond to a detailed question and he does not have the documents before him, maybe that is another issue he could take [on]...notice.

Senator WATERS: Sure. I am happy with that, Mr Mead, if you could just reflect on the World Heritage Committee's statements about net benefit and the context in which they place those comments. I really would welcome any suggestions that you have got to tighten 24G, if your view is that it needs to better reflect what the World Heritage Committee said. Thank you for that response on notice.

Clause 24G is said to be intended to respond to the recommendation numbered 8, which is part of Decision 36 COM 7B.8 of the World Heritage Committee. In so far as the recommendation concerns policies, plans and development proposals, clause 24G is an effective means of implementing it.

A 'net benefit' obligation is most commonly adopted where the biodiversity is of high value, being acutely threatened or otherwise irreplaceable. Given the ongoing management risks facing the Great Barrier Reef World Heritage Area, identified by the World Heritage Committee, the Law Council submits that this test is appropriate when considering any development application that will impact upon the world heritage values of the area.

I also provide for the information of the Committee, the following publications:

Attachment A: Further detail on policy context for offsets and 'net benefit'

Attachment B: B Madsen, N Carroll, K Moore Brands, *State of Biodiversity Markets Report: Offset and Compensation Programs Worldwide* (2010)

Attachment C: K ten Kate, J Bishop and R Bayon, *Biodiversity Offsets: Views, Experience, and the Business Case* (2004)

Attachment D: M Maron *et al*, 'Faustian bargains? Restoration realities in the context of biodiversity offset policies' (2012) 155 *Biological Conservation* 141–148

Attachment E: Australian Government, Department of Sustainability, Environment, Water, Population and Communities, *Environment Protection and Biodiversity Conservation Act 1999: Environmental Offsets Policy* (2012)

Attachment F: Government of Western Australia, Environmental Protection Authority, *Environmental Offsets: Position Statement No. 9* (2006)

Attachment G: Julie Hare, 'Smiling after the earth moved: Success declared in world's biggest habitat relocation', *The Australian* 29 May 2013, 27.

I trust this additional information is of assistance to the inquiry.

Yours faithfully

Shane Mead
Executive Member
Australian Environmental and Planning Law Group
Legal Practice Section, Law Council of Australia

Policy context

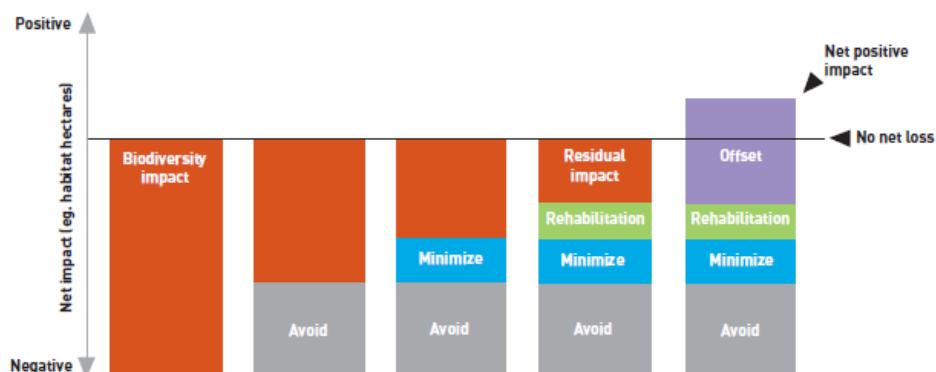
Policy development about 'net gain' and offsets is generally said to have begun with the compensatory mitigation of residual impacts on wetlands in the United States after the avoidance and minimisation of damage. Amendments were made in 1977 to the *Clean Water Act* (33 USC #1344) and in 1990 the US Environmental Protection Agency and Department of the Army entered into a mitigation agreement which is often referred to as an early example of an offset policy, even if not named as such. In 1995 California's Resources Agency and Environmental Protection Agency issued guidelines for conservation banking. The US Department of the Interior followed in 2003.¹

An early reference to offsets in Australia is 1994 at Mount Owen where a development consent allowed the removal of 240ha of the 450ha Ravensworth State Forest provided 45ha of the Southern Remnant was retained and 430ha of new forest was established, of which 120ha was revegetated. In 2003 Xstrata Mount Owen was transferred to Forests NSW to form part of the Ravensworth State Forest. The concept of offsetting was advanced by the minerals industry in NSW in the mid 1990s.²

The mitigation hierarchy recognises that competing demands on natural resources make it difficult to avoid impacts on biodiversity in all circumstances. The hierarchy prioritises responses to loss of biodiversity as follows:

1. Avoid
2. Minimise
3. Rehabilitate and Restore
4. Offset

Figure 1 illustrates the advent of 'net benefit' in the context of biodiversity offsets³:



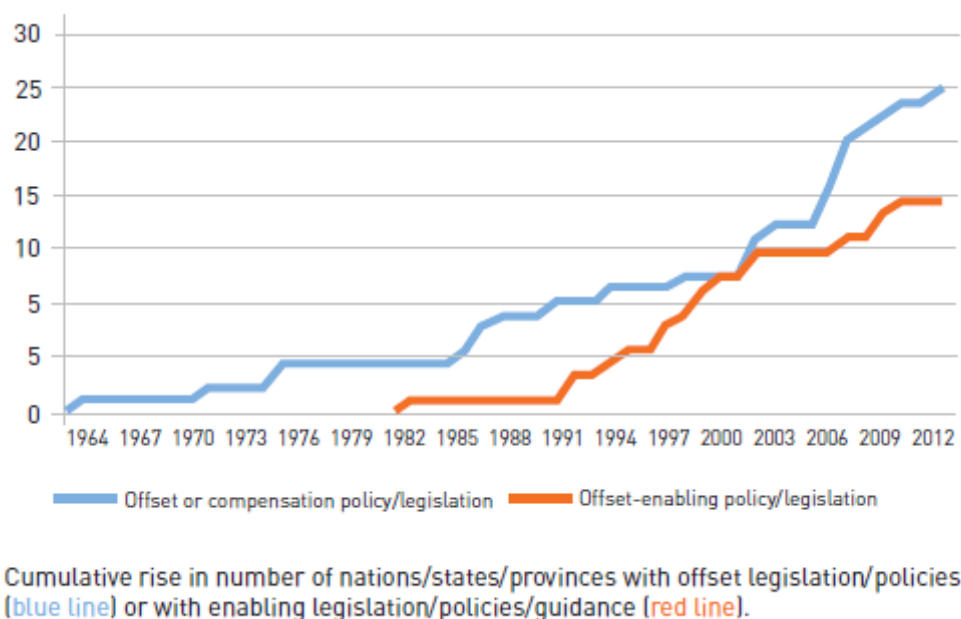
¹ See for example, BA McKenney and JM Kiesecker 'Policy development for biodiversity offsets: a review of offset frameworks', (2010) 45 *Environmental Management* 165–176 <<http://www.cbd.int/financial/doc/tnc-innovative-financial-mechanisms-07-2011-en.pdf>>; M. Christensen, 'Biodiversity offsets – an overview of selected recent developments: New Zealand – where to from here?' <http://cmsdata.iucn.org/downloads/cel10_christensen.pdf>.

² T Peake, 'Biodiversity offsetting in the NSW Minerals Industry – history and future directions', presentation to NSW Minerals Industry Environment and Community Conference, 21–23 October 2012, Novotel Wollongong, Northbeach <http://www.google.com.au/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CC8QFjAA&url=http%3A%2F%2Fwww.nswmin.com.au%2FArticleDocuments%2F316%2FTavis%2520Peake.pdf.aspx&ei=w-OmUdKbCIWziQfQ5YG4CA&usg=AFQjCNEkZ8NFsrAOoOEeFLx6J-PoJuTznw&sig2=v7qdwtr_gKemBCDLhgpiSQ&bvm=bv.47244034,d.aGc&cad=rja>.

³ 'The Mitigation Hierarchy in ICMM' in The Biodiversity Consultancy, *Independent Report on Biodiversity Offsets*, jointly commissioned by ICMM and the International Union for Conservation of Nature (IUCN) <www.icmm.com/biodiversity-offsets> 10.

There are numerous publications which review the establishment, and increasing use, of offsets nationally and internationally.⁴ The International Council on Mining and Metals (ICMM) and the International Union for Conservation of Nature (IUCN) recently released a joint report on biodiversity offsets, aimed at informing both the mining industry and the conservation sector regarding the 'offsets agenda' (the ICMM/IUCN Report).⁵ The ICMM / IUCN report provides a useful overview of legislative provisions either directly providing for offsets, or enabling them in some way. The ICMM / IUCN report provides a useful overview of legislative provisions either directly providing for offsets, or enabling them in some way. **Figure 2** below illustrates the rise in the use of such provisions:

Figure 2: Rise in number of jurisdictions with offset policies



Net benefit

The principal objective of offsetting is often expressed as achieving 'no net loss'. That is, any losses resulting from a proposal will be completely offset to the extent that there is no net change in biodiversity. Importantly, offsetting must be regarded as the last option in the mitigation hierarchy and used only where avoidance, minimisation and on-site restoration are not practicable.

However, the objective of offsetting is increasingly supplemented by the requirement to go beyond 'no net loss' to actually achieve a biodiversity gain. The concept of a 'net benefit' test in a biodiversity context has arisen more recently. The concept of a 'net benefit', also expressed as a 'net gain', 'net positive impact' or 'overall environmental benefit', recognises that in some circumstances it is not sufficient to maintain the existing level of biodiversity – instead, an increase in biodiversity is necessary to secure long-term benefits and improve resilience.

Examples of policies and guidelines seeking to implement 'net benefit' tests include:

⁴ See for example McKenney and Kiesecker above n 1, and M. Christensen, 'Biodiversity Offsets – An Overview of Selected Recent Developments: New Zealand – Where to from here?' <http://cmsdata.iucn.org/downloads/cel10_christensen.pdf>.

⁵ The Biodiversity Consultancy, above n 3.

Jurisdiction	'Net benefit' instrument
International	
Convention on Biological Diversity, decision X/2 (Strategic Plan for Biodiversity 2011–20)	Aichi Target 12: By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained .
International Finance Corporation	<p>The revised <i>Performance Standard 6 on Biodiversity Conservation and Sustainable Management of Living Natural Resources</i>⁶ states that clients 'should seek to avoid impacts on biodiversity and ecosystem services. When avoidance of impacts is not possible, measures to minimize impacts and restore biodiversity and ecosystem services should be implemented.'</p> <p>In addition, it states that: 'For the protection and conservation of biodiversity, the mitigation hierarchy includes biodiversity offsets, which may be considered only after appropriate avoidance, minimization, and restoration measures have been applied. A biodiversity offset should be designed and implemented to achieve measurable conservation outcomes that can reasonably be expected to result in no net loss and preferably a net gain of biodiversity; <u>however, a net gain is required in critical habitats.</u>' (<i>emphasis added</i>)</p>
European Bank for Reconstruction and Development	The 2008 environmental and social policy ⁷ explicitly recognises the mitigation hierarchy, with one of the stated objectives being 'to avoid, minimise and mitigate impacts on biodiversity and offset significant residual impacts, where appropriate, with the aim of achieving no net loss <u>or a net gain of biodiversity</u> '. (<i>emphasis added</i>)
Commonwealth	
Environmental Offsets Policy under the EPBC Act [Attachment E]	<p>The 2012 policy provides that one of the overarching principles applied for determining the suitability of offsets is that they must:</p> <p>'Deliver an overall conservation outcome that improves or maintains the viability of the aspect of the environment that is protected by national environmental law and affected by the proposed action...While the primary consideration in determining suitable offsets is delivering a conservation gain for the impacted protected matter, the delivery of offsets that establish positive social or economic co-benefits is encouraged' (<i>emphasis added</i>).</p>

⁶ International Finance Corporation, *Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources*, www1.ifc.org/wps/wcm/connect/bff0a28049a790d6b835faa8c6a8312a/PS6_English_2012.pdf?MOD=AJPERES

⁷ European Bank for Reconstruction and Development, *Environmental and social policy 2008* www.ebrd.com/downloads/research/policies/2008policy.pdf.

Jurisdiction	'Net benefit' instrument
State governments	
Queensland	<i>Offsets for Net Gain of Koala Habitat in South East Queensland Policy</i> (2010) – policy objective requires offsets to contribute the equivalent of five new koala habitat trees for every non-juvenile koala habitat tree removed.
Victoria	Native Vegetation Management – A Framework for Action (2002) – policy sets an objective of 'reversal, across the entire landscape, of the long term decline in the extent and quality of native vegetation, <u>leading to a net gain.</u> ' The policy is supported by guidelines setting out the methodology for calculating gains. ⁸
Tasmania	Section 19(1AA) of the <i>Forest Practices Act 1985</i> prevents the Forest Practices Authority from certifying a forest practices plan involving the clearance and conversion of a threatened native vegetation community unless satisfied that: (a) the clearance and conversion is justified by exceptional circumstances; (b) the activities authorised by the forest practices plan are <u>likely to have an overall environmental benefit;</u> (c) the clearance and conversion is unlikely to detract substantially from the conservation of the threatened native vegetation community; (d) the clearance and conversion is unlikely to detract substantially from the conservation values in the vicinity of the threatened native vegetation community.
South Australia	Native Vegetation Significant Environmental Benefit Policy: The intent of SEB is, therefore, to not only replace the immediate environmental values lost through clearing, but also to <u>achieve a net gain that contributes to improving the condition of the environment and biodiversity of the region</u> (<i>emphasis added</i>) The SEB policy is also supported by guidelines. ⁹

The Law Council acknowledges concern from both industrial and conservation stakeholders regarding the use of offsets generally, and a net benefit test specifically. There are numerous papers outlining the theoretical limitations of biodiversity offsets and

⁸ Department of Sustainability and Environment, *Native Vegetation Gain Approach – Technical basis for calculating gains through improved native vegetation management and revegetation*, 2006
<www.dse.vic.gov.au/data/assets/pdf_file/0008/97352/NativeVeg_Gain_Approach.pdf>.

⁹ Native Vegetation Council. 2005. *Guidelines For a Native Vegetation Significant Environmental Benefit Policy For the clearance of native vegetation associated with the minerals and petroleum industry*,
<www.pir.sa.gov.au/data/assets/pdf_file/0004/104827/native_veg_policy.pdf>.

very few comprehensively reviewing the biodiversity outcomes achieved.¹⁰ As the ICMM/IUCN report notes:

It is the absence of a solid track record that causes the business community to remain hesitant to invest in offsets due to uncertainty of outcomes. However, some best-practice offset designs have recently emerged that demonstrate solutions based on practical experience.¹¹

¹⁰ See for example, M Maron *et al.*, 'Faustian bargains? Restoration realities in the context of biodiversity offset policies' (2012) 155 *Biological Conservation* 141–148; E Pickett *et al.*, 'Achieving no net loss in habitat offset of a threatened frog required high offset ratio and intensive monitoring', (2013) 157 *Biological Conservation* 156–162. This study presented results of a monitoring program for a large scale habitat offset which led to a doubling in population size of a threatened frog species. The ICMM / IUCN Report also includes a comprehensive reference list of relevant documents.

¹¹ The Biodiversity Consultancy, above n3, 5.



State of Biodiversity Markets Offset and Compensation Programs Worldwide



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State of Biodiversity Markets: Offset and Compensation Programs Worldwide

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Ecosystem Marketplace, a project of the non-profit organization Forest Trends, is a leading source of information on environmental markets and payments for ecosystem services. Our publicly available information sources include annual reports, quantitative market tracking, weekly articles, daily news, and newsletters designed for different payments for environmental services stakeholders. We believe that by providing solid and trustworthy information on prices, regulation, science, and other market-relevant issues, we can help payments for ecosystem services and incentives for reducing pollution become a fundamental part of our economic and environmental systems, helping make the priceless valuable.

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Introduction



To the Readers

As more and more governments and businesses consider market-like instruments as tools for biodiversity footprint management, it is increasingly important to understand what is happening, where, and how those tools work. It is also critical to provide reliable information free to the public to enable all market participants to make more informed decisions, learn from the experiences of others, and ultimately allow stable, equitable and effective conservation markets to develop. To address this compelling need for more and better information we have written this status and trends report on biodiversity markets. Within the broad spectrum of ‘biodiversity markets,’ we aim to provide a succinct answer to the question ‘What is happening in biodiversity offset and compensation programs around the world?’

There are both mature and nascent payment systems for biodiversity compensation around the world. Each one is a bit different and they often go by different names: biodiversity offsets, mitigation banking, conservation banking, habitat credit trading, fish habitat compensation, BioBanking, complementary remediation, conservation certificates, and many more. Some are based on compliance with regulation while others are done voluntarily for ethical, competitive, or pre-compliance reasons. But they are all efforts to reduce biodiversity loss and build the cost of biodiversity impacts into economic decisions through markets or market-like instruments and payments.

Michael Jenkins

President, Forest Trends

While a ‘biodiversity offset’ program may be preferable from an ecological and social standpoint, more flexible and less arduous forms of impact compensation, in which funds are set aside for biodiversity management or valuable biodiversity is protected elsewhere, can be a first step towards better biodiversity footprint management or even eventually a regulated offset system. It is this movement towards better compensatory mitigation and effective payments and markets for mitigation that is of interest to the report.

To meet those ends, this report provides the status and trends of biodiversity offset and compensatory mitigation programs by geographical region. In each section, the report summarizes the total active programs and developing activities, and broad metrics like total known payments and land area protected or restored. In each region, we also analyze the characteristics of offset programs—what drives the program, how offsets are created, who the buyers and sellers are, and what the unit of credit is. Finally, we look at recent developments in nascent and existing programs in the region.

The reliable, consistent and transparent information provided in this report will enable both experienced and new market participants to make more informed decisions and learn from the experience of others; ultimately allowing fair, stable and transparent conservation markets to develop.

Kate Hamilton

Director, Ecosystem Marketplace

List of Acronyms and Abbreviations

ABP	Associated British Ports	IUCN	International Union for the Conservation of Nature
BBOP	Business and Biodiversity Offsets Program	LGA	Ley General del Ambiente (Argentina)
BCC	Biodiversity Conservation Certificates (Malaysia)	LGEEPA	Ley General de Equilibrio Ecológico y Protección al Ambiente (Mexico)
BLM	Bureau of Land Management (US)	LOTs	Large old trees (Australia)
BTAU	Biodiversity Technical Assistance Units	LPNMA	Lei da Política Nacional do Meio Ambiente (Brazil)
CA DFG	California Department of Fish and Game	MHHC	Manitoba Habitat Heritage Corporation
CBD	Convention on Biological Diversity	NEMA	National Environmental Management Act (South Africa)
CONABIO	Comisión Nacional para el Conocimiento y Uso de la Biodiversidad (Mexico)	NGO	Non-governmental organization
CONAFOR	Comisión Nacional Forestal (Mexico)	NMFS	National Marine Fisheries Service (US)
DbD	Development by Design (TNC)	NOAA	National Oceanic and Atmospheric Association (US)
DFO	Department of Fisheries and Oceans (Canada)	NSW	New South Wales (Australia)
EEAA	Egyptian Environmental Affairs Agency	NSW DECCW	NSW Department of Environment, Climate Change and Water
EIA	Environmental Impact Assessment	OEM	Office of Environmental Markets
ELD	Environmental Liability Directive (EU)	PAE	Plan d'Action Environnementale (Madagascar)
ELI	Environmental Law Institute	PEMEX	Petróleos Mexicanos
EM	Ecosystem Marketplace	PES	Payments for Ecosystem Services
EMP	Environmental Management Plan (Mexico)	PRC	People's Republic of China
EPBC	Environmental Protection and Biodiversity Conservation Act (Australia)	PROFEPA	Procuraduría Federal de Protección Ambiental (Mexico)
EPE	Environmental Protection Enactment (Malaysia)	PVP	Property Vegetation Plan (Australia)
ESA	Endangered Species Act	QMM	QIT Madagascar Minerals
ESC	Environmental Services Certificate (Paraguay)	REDD	Reducing Emissions from Deforestation and Degradation
ESIA	Environmental and Social Impact Assessment	RVMC	Regional Vegetation Management Code (Australia)
EU	European Union	SANBI	South African National Biodiversity Institute
EVC	Ecological vegetation class (Australia)	SEB	Significant Environmental Benefit (Australia)
FCA	Fundo de Compensação Ambiental (Brazil)	SEMARNAT	Secretaría de Medio Ambiente y Recursos Naturales (Mexico)
FOIA	Freedom of Information Act (US)	SNUC	Sistema Nacional de Unidades de Conservação (Brazil)
HADD	Harmful alteration, disruption or destruction (Canada)	TNC	The Nature Conservancy
HCT	Habitat credit trading (US)	UCTF	Uganda Conservation Trust Fund
HCV	High Conservation Value	US ACE	US Army Corps of Engineers
ICMBio	Instituto Chico Mendes de Conservação da Biodiversidade (Brazil)	US EPA	US Environmental Protection Agency
IDEA	Instituto de Derecho y Economía Ambiental (Paraguay)	US FWS	US Fish and Wildlife Service
IFC	International Finance Corporation	UWA	Uganda Wildlife Authority
ILF	In-lieu fee	WCS	Wildlife Conservation Society
IMR	Impact Mitigation Regulations (Germany)	WWF	World Wildlife Fund
INE	Instituto Nacional de Ecología (Mexico)		
INFOR	Instituto Forestal (Chile)		
IPBES	Intergovernmental Platform on Biodiversity and Ecosystem Services		
IPCC	Intergovernmental Panel on Climate Change		

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Mapping the World's Biodiversity Markets





General Status Update

Our research finds 39 existing compensatory mitigation programs around the world, ranging from programs with active mitigation banking of biodiversity credits to programs channeling development impact fees to policies that drive one-off offsets. There are another 25 programs in various stages of development or investigation. Within each active offset program, there are numerous individual offset sites, including over 600 mitigation banks worldwide.

The global annual market size is \$1.8-\$2.9 billion at minimum, and likely much more, as 80% of existing programs are not transparent enough to estimate their market size. And the conservation impact of this market includes at least 86,000 hectares of land under some sort of conservation management or permanent legal protection per year.



By the numbers		
Number of active programs:		39
Number of programs in development:		25
Total known regional payments per annum:		US\$1.8 - \$2.9 billion
Land area protected or restored per annum:		>86,000 ha

Executive Summary



Since 2004 the Ecosystem Marketplace's Biodiversity Program has been investigating and reporting on biodiversity markets - markets that can be: hard to define, fragmented, swiftly changing, and opaque. Given these challenges, we wrote this State of the Markets report to provide current and relevant information to help policy makers, practitioners, investors, and other market participants make more informed decisions, learn from the experience of others - and ultimately enable fair, stable, and effective conservation markets to develop.

This report focuses on the spectrum of biodiversity markets that are designed to reduce development impacts to biodiversity, a practice known as **compensatory mitigation**. The spectrum of practices range from rigorous and measurable biodiversity offsets to less direct efforts to compensate for impacts through financial contributions and land protection.

Our research finds 39 existing programs around the world, and another 25 in various stages of development or investigation. The global annual market size is **\$1.8-\$2.9 billion at minimum**, and likely much more, as about 80% of existing programs are not transparent enough to estimate their market size. And the conservation impact of this market includes at least 86,000 hectares of land placed under some sort of conservation management or permanent legal protection each year.

Some countries are in early stages of adoption or investigation of compensatory mitigation, while others have sophisticated and mature systems. But in all regions, compensatory mitigation is developed or developing around

unique economic, political, institutional, and cultural circumstances that give rise to a variety of programs.

In **North America**, biodiversity offset and compensation programs are well-developed, particularly the US wetland and species compensation programs and Canada's fish habitat compensation program. In total there are 14 active programs and 5 in development in North America. The region sees a minimum of \$1.5-\$2.5 billion in compensation payments per annum. This region also hosts the most offset credit banks of any region in the world.

The United States has seven active programs and three in development. Payments total \$1.5-\$2.4 billion annually. Around 700,000 cumulative acres (283,280 hectares) have been restored or protected through US programs. The two largest offsetting programs, wetland and species mitigation, offer three mechanisms for achieving compensation: do it yourself, pay into a fund, or buy a third-party credit. Within this third form of offset credit banking there are 615 active and sold-out banks in the country.

Canada's compensation programs are focused on fish habitat and wetland compensation, driven by a combination of compliance with federal and provincial policies, with varying levels of implementation. Six programs exist in Canada, with one in development. These programs cover five ecosystem/species types and protect around 180 hectares per year. Regional investment totals \$6-\$145 million annually, and there are currently 17 active and sold-out banks.

Offset programs in Mexico are not as developed

as those of its neighbors in North America. Yet, with programs compensating landowners for conserving forest cover and requiring payment for deforestation due to industrial development, Mexico is well on its way to developing a sophisticated program, ensuring a more direct link between development impacts and biodiversity conservation.

Five compensation programs exist in **Central and South America**, with two in development. Most South American countries have developed Environmental Impact Assessment (EIA) laws that address impact mitigation, including Brazil, Argentina, and Chile. However, the majority of Central and South America has not developed biodiversity offset programs. The exception is Brazil, with Colombia and Paraguay in the early stages of development. These programs have varying degrees of enforcement, market infrastructure and institutional capacity.

There are currently no active offset programs in **Africa**, but six are in development. South Africa is the leader in African offset policy development, with a national and two provincial policies in the works. While other countries have developed EIA law and some voluntary offset projects, the majority of the continent has little in the way of offset and compensation program creation.

In **Europe**, biodiversity markets are still a developing idea. Four programs have had offsets implemented, and an additional three programs are in early stages of development. The largest European program, Germany's Impact Mitigation Regulation, has at least 2,600 hectares conserved in compensation pools. Habitat banking has been piloted in France and is under investigation in the United Kingdom and in the European Union.

Four offset programs exist in **Asia**, with another four in early development. Annual payments equal \$390 million and roughly 26,000 hectares are protected or restored annually. Asian offset-like programs come mostly under the

Environmental Impact Assessment, with EIA laws in Japan, South Korea, China, Mongolia, Pakistan, Thailand, Malaysia, Russia and India. The presence of EIAs in the region may lay a framework for biodiversity markets - two offset programs/projects already in existence are located in Malaysia and Saipan. In addition to government-led actions, voluntary and industry initiatives, driven by increasing public criticism, are arising. At least one industry group has been exploring the use of biodiversity offsets in the agricultural industry.

Between **Australia and New Zealand**, there are twelve biodiversity offset programs and five in development; the majority of those are compliance-based State or regional programs implemented at the project level during the planning process, although two programs offer in-lieu fee payment. About \$1.3 million goes to regional payments annually, with 523 habitat hectares restored or preserved each year; there are 42 ecosystem/species credit types in Australia's offset programs.

Overall, our research shows significant activity around the world with many compensatory mitigation programs in early stages of development. The global economic downturn of 2008 may have slowed market growth in regions with developed mitigation systems, but they continue to see credit sales; while regions without developed mitigation laws and markets are showing strong interest.

And while these trends of activity and interest are exciting, perhaps even more important are the many signs that where offset markets exist, regulators, practitioners, and service providers are tackling the challenging and sometimes unpopular issues like quality assurance, accounting, and transparency. These are the fundamental building blocks that will lay the foundation for fair, stable, and effective markets - in both existing and future biodiversity offset programs.

Background, Scope & Methods



In August of last year, scientists lowered themselves into an extinct volcanic crater in the remote Southern Highlands region of Papua New Guinea to discover creatures unknown to the world. This expedition alone yielded the discovery of over 30 species new to science¹ and the final tally for 2009 is nearly 100.² At the same time as scientists are discovering new species on our planet, we are losing biodiversity at up to 1000 times the natural rate³ to make way for roads, urban development, and the raw materials that power our homes and make up the products we buy.

In essence, we are creating a built infrastructure at the expense of our natural infrastructure. This natural infrastructure, made up of species, ecosystems and their processes, has been so vast and has supported human life for so long that its loss was scarcely considered as a cost in the price of development. It has been a public good with no price and no market. But the effect of this undervaluation is now catching up with us. Governments and businesses are increasingly feeling the costs of biodiversity loss, climate change, water scarcity, flooding, disease, and other consequences of failing ecosystem services. Because we can no longer afford to ignore the value of the natural infrastructure provided by biodiversity, society is beginning to incorporate the biodiversity externalities in our economic and policy decision making.

Biodiversity markets are a potentially powerful tool to internalize these traditionally externalized costs. The thinking behind market (or market-like) instruments for biodiversity conservation is that if positive and negative impacts on biodiversity can be measured and

represented as credits and debits, they are more easily integrated as benefits or costs in economic decision-making. For example, if a business has to pay to mitigate its residual impact on a rare animal or plant, it will either choose to develop elsewhere or bear the costs of mitigation. Likewise, if a landowner can gain a profit from protecting or enhancing rare animal or plant habitat, they may provide more habitat than they would have done without compensation.

Many programs, products, and activities have been categorized under the term “biodiversity markets,” admittedly stretching “markets” beyond the economic definition of a place where buyers and sellers regularly meet to exchange goods and services. In the broadest sense, biodiversity markets include any payment for the protection, restoration, or management of biodiversity. Just a small sample includes: biodiversity offsets, conservation easements, certified biodiversity-friendly products and services, bioprospecting, payments for biodiversity management, hunting permits, and eco-tourism.



Drivers of biodiversity markets

Three broad categories of drivers of biodiversity markets are: regulatory compliance, government-mediated payments, and voluntary provisioning.

In a **regulatory compliance** setting, the government sets a limit on the impact to a species or habitat and then allows the market to resolve the cost of offsetting impacts above the limit or ‘cap.’⁴ For example, in the United States (US), the Endangered Species Act limits harm to federally-listed endangered species and requires a mitigation hierarchy: first avoidance, then minimization of harm, and finally mitigation for impacts to species. Mitigation obligations could be fulfilled by purchasing a credit from a private conservation bank that has restored and/or managed or preserved habitat for the species. Through regulation, government creates a demand for biodiversity that government, the private sector, or non-profits can supply. Because the suppliers can sell credits to regulated parties that need to find appropriate mitigation for their impacts, the law thus provides a financial incentive to permanently protect endangered species habitat. Governments may also require mitigation on a case-by-case basis, as regulated by Environmental Impact Assessment (EIA) or other regulations integrated in planning permissions. For example, developers in Tasmania, Australia must present a proposal to offset impacts to threatened species and native vegetation communities during the planning approval process; the regulator reviews and approves or rejects the proposals on a case-by-case basis.

Government-mediated payments can also be a driver of biodiversity goods and services. The government (and/or a non-profit organization) acts as a sole “buyer” when it fulfills public demand for biodiversity goods and services by purchasing land or conservation easements

Definitions

Compensatory Mitigation – the restoration, creation, enhancement, and/or in certain circumstances preservation of natural resources for the purposes of offsetting adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved. For the purposes of this report, compensatory mitigation represents a spectrum of practices that range from rigorous and measurable biodiversity offsets to less direct efforts to compensate for impacts through financial donations and land protection.

Mitigation Hierarchy – avoidance, minimization, rehabilitation / restoration (sometimes termed mitigation), offset. (see Box 1)

One-off offset – ‘do-it-yourself’ offsetting conducted by the developer or a subcontractor. Known as ‘permittee responsible mitigation’ in the United States.

Compensation Fund – a third-party mechanism that collects and administers fees from developers to offset their impacts to biodiversity. The money may go directly towards compensating biodiversity loss, or to more indirect biodiversity-related projects (i.e. funding protected area management, research).

Mitigation Bank (“bank”) – a site, or suite of sites, where resources (e.g., wetlands, streams, habitat, species) are restored, established, enhanced and/or preserved for the purpose of providing compensatory mitigation for impacts. In general, a mitigation bank sells compensatory mitigation credits to developers whose obligation to provide compensatory mitigation is then transferred to the mitigation bank sponsor.

Credit – a unit of measure representing the environmental commodity that is able to be traded (this can be functional or measure of area), based on the environmental activity.

No Net Loss – 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 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.

Like-for-Like – conservation (through the biodiversity offset) of the same type of biodiversity as that affected by the project. Also referred to as in-kind.

Environmental Impact Assessment – a formalized process, including public consultation, in which all relevant environmental consequences of a project are identified and assessed before authorization is given.

Adapted from BBOP, 2009,⁵ Gane, 2009,⁶ US EPA, US ACE 2008⁷

or creating payment programs for biodiversity stewardship activities. For example, a partnership between the non-profit organizations World Wildlife Foundation (WWF) and Fondo Mexicano para la Conservación de la Naturaleza established a Monarch Butterfly Conservation Fund to pay local landowners for butterfly habitat conservation.⁸

And finally, ‘**voluntary**’ markets have a variety of drivers from ethics and philanthropy to profit and consumption motives. Examples include: certified biodiversity-friendly products, donations for biodiversity conservation or research, positive public relations, eco-tourism and recreation, and others. There are also voluntary activities that resemble compliance-based biodiversity offset schemes, but are conducted either in advance of coming regulations (pre-compliance), and/or for various goodwill and business-case reasons.⁹ And while these market activities may be related to biodiversity, it is not necessarily the case that profits will be reinvested in conserving or restoring the biodiversity on which they depend.

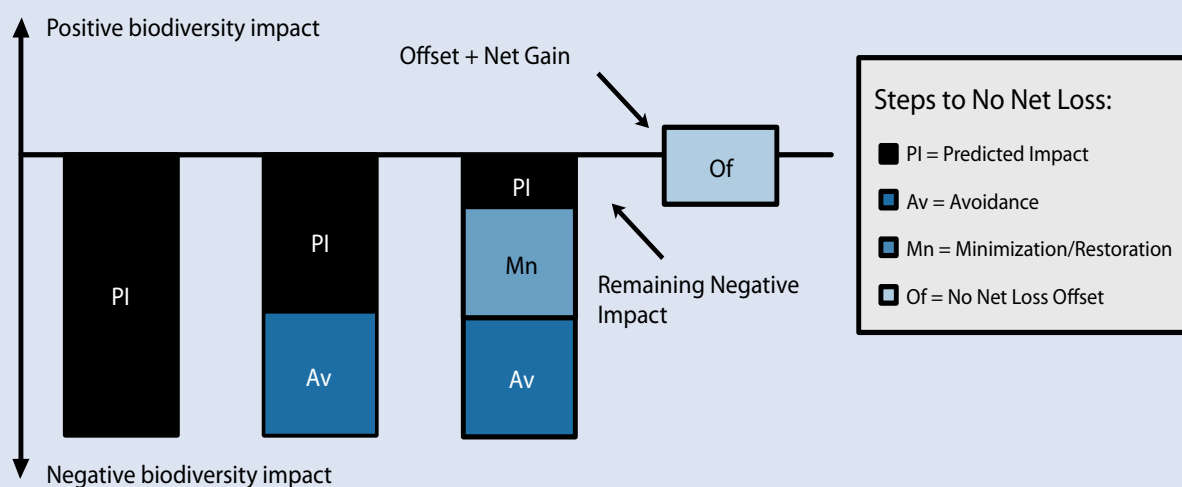
Scope of the Report

While there is a wider range of economic instruments for biodiversity protection, analysis of every type of market-based instrument for biodiversity conservation is beyond the scope of this report. Indeed, a great overview of market-based approaches for biodiversity conservation is the IUCN/Shell report “Building Biodiversity Business.”¹⁰

Instead, this report focuses specifically on programs which are structured around the ‘mitigation hierarchy’ (avoid, minimize and mitigate impacts to biodiversity) (see Box 1). **Compensatory mitigation** is a spectrum of practices that range from rigorous and measurable biodiversity offsets to less direct efforts to compensate for impacts through financial donations and land protection.

The Business and Biodiversity Offsets Programme (BBOP, a sister initiative of Forest Trends) is an international partnership that is developing and trialing best management practices at a portfolio of biodiversity offset pilot sites;

Box 1. The Mitigation Hierarchy*



The mitigation hierarchy, when followed appropriately, provides a tool to ensure that one's biodiversity footprint is minimized.

**Adapted with permission from BBOP, 2009.*



disseminating guidelines, methodologies and ultimately standards for biodiversity offsets; and supporting governments in the development of policy on biodiversity offsets. BBOP's definition of biodiversity offsets demonstrates the rigorous end of the spectrum:

*"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 and ecosystem function and people's use and cultural values associated with biodiversity."*¹¹

While the "biodiversity offset" form of compensatory mitigation that attempts to achieve no net loss is preferable from an ecological and social standpoint, less comprehensive forms of impact compensation, in which funds are set aside for biodiversity management or valuable biodiversity is protected elsewhere, can be a first step towards better biodiversity footprint management or even eventually a regulated offset system.¹² Some of the programs reviewed in this report are: biodiversity offsets, mitigation banking, conservation banking, habitat credit trading, fish habitat compensation, BioBanking, compensation fund programs, conservation

certificates, offsets within an Environmental Impact Assessment framework, and many more.

Further information on the fundamentals of biodiversity offsets is available in the work of BBOP, and Ecosystem Marketplace's (EM) book "Conservation and Biodiversity Banking: A Guide to Setting up and Running Biodiversity Credit Trading Systems."^{13,14} Also, while the report covers US offset programs, more in-depth background can be found in reports by Environmental Law Institute, Electric Power Research Institute, and the Institute for Water Resources of the US Army Corps of Engineers.^{15,16,17,18} And further reading on environmental impact assessment regulations is available in the report "International Approaches to Compensation for Impacts on Biological Diversity."¹⁹

Methodology

Information about the 54 international biodiversity offset programs covered in this report was collected from personal communication with over 60 key contacts in states/provinces, countries, or regions of the world; online research; and published articles and reports. A detailed methodology of information collection for US programs is noted in the Methods Appendix. The 'By the Numbers' figures in each region represent the total number

of programs and metrics for the programs that our research uncovered. Details on ‘By the Numbers’ figures are laid out in the Methods Appendix.

It should be clear that while we’ve striven to make this report as comprehensive as possible in regards to biodiversity offset and compensation activities, we are aware that there may be programs that we have not captured. As well, while we made every attempt to access quantitative figures for each program to give a sense of the scale of the program, many of the offset programs covered either do not track national payment or area figures or could not provide them.

Despite its shortcomings, the report provides the first step towards global transparency of biodiversity compensation programs. We plan to produce follow-up reports to build on the

groundwork established in this report. We hope readers will contribute to future analyses in our attempt to provide much-needed information on existing and developing programs addressing biodiversity loss.

In addition, it should be highlighted that biodiversity offset and compensation programs are tools in addition to, not a replacement for, traditional biodiversity conservation approaches. And it is absolutely critical any compensation activities take place within the framework of a ‘mitigation hierarchy:’ first avoiding any impact to biodiversity, then once unavoidable impacts are determined, impacts should be reduced as much as possible, and then finally, only after impacts have been avoided and minimized should an offset be considered.

Features of Compensatory Mitigation Programs Worldwide			
	Compensation Funds	One-Off Offsets	Mitigation Banking
Driver	Compliance	Compliance or Voluntary	Compliance
Policy Examples	China’s Forest Revegetation Fee; Brazil’s Industrial impact compensation (‘developer’s offsets’)	Offsets under various Environmental Impact Assessment laws	US Compensatory Mitigation (aka wetland mitigation); BioBanking in New South Wales, Australia
Implementation Complexity	Low	Medium	High
Required Market Infrastructure	Low	Low to medium	High
Broad-Scale or Strategic Conservation	Dependent on program design	Less likely	More likely
Ecological Effectiveness	Dependent on design and enforcement	Dependent on design and enforcement	Dependent on design and enforcement
Who supplies the compensation?	Government	The developer	Third-party, government, or the developer
Transparency	Moderately likely	Less likely	More likely

North America



By the numbers	
Number of active programs:	14
Number of programs in development:	5
Total known regional payments per annum:	\$1.5 - \$2.5 billion
Total known land area protected or restored per annum:	> 50,000 hectares
Total known active and sold out banks:	632

General Status Update - North America

Biodiversity offsets and compensation programs are well-developed in North America, particularly with the United States' wetland and species compensation programs and Canada's fish habitat compensation program. This region also hosts the most mitigation banks of any region in the world. Programs are driven by national, state, and/or regional policy.

Each of the three traditional compensation instruments are used in North America:

compensation funds, one-off offsets, and mitigation banking. The US mitigation market (wetland, stream, and species) allows all three, although recent regulation favors credit banking. Canada prefers habitat compensation provided by the developer, perhaps because of lessons learned from the early challenges in the US system. And Mexico currently allows offsetting through compensation funds and developer responsible offsetting, but is beginning to explore mitigation banking.

General Status Update - United States

One of the most striking features of US offset programs is the private actor participation in creating and selling offsets. With the basic ingredients of strong regulatory drivers and legal transference of offset liability, the US has created an environment where entrepreneurs can, and do, create and sell environmental services for profit. This system supports a niche industry which combines expertise in environmental restoration, finance, law, real estate, construction, and knowledge of local market conditions, as the programs only allow trading within areas defined by watershed or habitat boundaries.

By the numbers - United States	
Number of active programs:	7
Number of programs in development:	3
Total known regional payments per annum:	\$1.5 - \$2.4 billion
Known credit types:	168
Total known land area protected or restored per annum:	24,000 acres (700,000 acres cumulatively)
Total known active and sold out banks:	615

Wetland and Species Compensation in the US

The US has two major national offset programs, one directed at wetland and stream ecosystems and the other at endangered species. The US has a long history with offset programs, with wetland mitigation starting in the early 1970s and more sophisticated mitigation credit banking systems emerging in the 1980s and 1990s. Since its emergence in California, endangered species credit banking has become known as conservation banking. Both programs have the greatest amount of wetland or conservation banks in the world. The US is perhaps the most market-like offset program in the world, featuring price signals that indicate to the developers the scarcity of the resource, third-party investment and involvement in offset creation, as well as units of credit standardized enough to allow trading. Despite the advanced level of the US programs, there remains little transparency and accessing information is time consuming and costly.

The US also has considerable institutional infrastructure for biodiversity offsets: strong policy drivers, enforcement, detailed regulations (for compensatory mitigation), industry association (the National Mitigation Banking Association), and an annual conference – the National Mitigation and Ecosystem Banking Conference – and non-profit and academic analyses of the system. Although US wetland and species compensation is driven by federal policy, implementation occurs at a regional level in 38 ‘Districts’ of the US Army Corps of Engineers (for wetland mitigation), in seven regional offices and fifteen field offices of the US Fish and Wildlife Service (US FWS), and the National Marine Fisheries Service (NMFS). One can see a range of differences in the regional interpretation of national regulations. Characteristics that vary across regions include the level of supply from private parties versus

US Terminology

Conservation Bank – the US term for a parcel of land approved by regulators to sell mitigation credits for endangered, threatened or other imperiled species or habitat

In-Lieu Fee (ILF) – a permittee pays a fee into a compensation fund program in lieu of creating their own offset or buying a credit. ILFs are run by government or non-profit organizations which use the funds to undertake offset activities.

Mitigation Banking – a term used colloquially in the US to refer to wetland and stream mitigation banking; in the global setting the term includes the banking of any environmental credit including species, habitat, ecological function or other.

Permittee – the entity (e.g., developer) requesting a permit to impact a wetland, stream, or endangered species.

Permittee-Responsible Mitigation – offset activities that are created by the permittee (e.g., ‘do it yourself’)

Umbrella Bank – a banking instrument sponsored by a single entity to establish and operate a regional banking program with multiple sites.

in-lieu fee programs, methods of measuring impacts and offsets (e.g., area-based with ratios versus functional assessments), and level of enforcement.

Another signature of the US system is the preservation and long-term management of offsets. Offsets must be preserved ‘in perpetuity’ via a conservation easement agreement, which basically restricts the use of land for conservation purposes on the title that is legally tied to the piece of property. In addition, offsets are required to have funding set aside for long-term management.

Other Biodiversity Offsets or Compensation Programs in the US

While wetland and stream mitigation and conservation banking dominate the offset world in the US, there are also several smaller biodiversity offset programs, including: a national Recovery Credit System, Maryland’s

US Programs Not Covered in This Report

Natural Resource Damage Law Compensation

is not covered because compensation occurs after an illegal impact on the environment, which is a philosophically different perspective than a system that uses offsets to comply with the law and careful consideration of alternatives (e.g., avoidance and minimization). As well, compensation required under this law is not specific to an ecosystem or species, but to a general environmental injury.

‘**Grass banking**,’ which provides ranchers with alternative grazing land while they perform restoration, is closer in character to a government-mediated program because it does not include an aspect of measuring an impact and ‘making good’ by offsetting it.¹

The ‘**South Carolina Conservation Bank**’ is essentially a conservation acquisition program financed by a portion of a deed recording fee.¹

i Tynan, personal communication, 2009

Forest Conservation Law, North Carolina’s buffer mitigation program, a voluntary ‘Acres for America’ program run by the retail giant Walmart, and a Bureau of Land Management Offsite Mitigation Policy. Additionally, a new voluntary Habitat Credit Trading (HCT) system is being developed by the US FWS that would work similar to conservation banking system. Finally, two multi-credit watershed-scale markets are developing in the Northwest (Willamette Partnership) and the Chesapeake Bay on the East coast (Bay Bank) that will incorporate species or habitat in their credit accounting. See more on these programs below.

United States - Wetland and Stream Mitigation: Context

Inanutshell, compensatory mitigation in the US is a national wetland and stream offsets program (called ‘compensatory mitigation’) driven by compliance to the Clean Water Act (§404) and the principle of ‘no net loss.’ After following the mitigation hierarchy, applicants filing for permits to drain, fill, or dredge a wetland (or stream) may offset their impact.

Permittees may create their own offsets (called permittee-responsible mitigation), or pay for offsets via third-party mitigation banks or ILF programs. The agency in charge of oversight is the US Army Corps of Engineers (US ACE), who interprets and implements regulations at the regional level (38 ‘Districts’).

Wetland and stream offsets in the US are created via: restoration, enhancement, creation, and preservation;² indirect offsets (e.g., payments to fund research) are not allowed. Offsets must be located within the same watershed (‘service area’) as the impact, usually designated by US Geological Survey Hydrologic Unit Codes (i.e., HUC 0166900 indicates the Lower Rappahannock watershed in northern Virginia).

Previous guidance on compensatory mitigation created differing drivers and standards for the three categories of offset supply (permittee-responsible, mitigation bank, ILF). New regulations (‘new rules’) that came into effect in June of 2008 have a watershed focus and give a preference to larger, landscape-scale offsets created before the impact (versus previous guidance favoring on-site restoration).³ The new rules give a stated preference hierarchy of offsets from mitigation banks (first preference) or ILF programs (second) as opposed to permittee-

The ‘New Rules’ – The 1-Minute Run-Down*	
WHAT’S IN	WHAT’S OUT
Regulations	Guidance
Mitigation banks & newly certified in-lieu fee programs	Permittee-responsible mitigation (it’s down, but not completely out)
Watershed-scale	Practicing random acts of mitigation
Playing-field more level among suppliers of mitigation	Easy approval of ILF/ permittee-responsible mitigation
Streamlined approval process	Ad-hoc approval process

*Adapted with permission from EBX, 2008.⁴

responsible offsets (third). The new rules also provide equivalent standards for all categories of supply credits. Now, anyone creating credits – be it a developer, non-profit, government, or for-profit organization – will have to create most of their credits before they can sell them and will have long-term funding requirements. The new rules have the promise to shake things up in compensatory mitigation, but it may be a bit too soon to tell.

Methodology for US Wetland and Stream Mitigation Data

Three types of data were collected for this section of the report:

1. National-level data on area and type of wetland and stream mitigation, which was collected via a Freedom of Information Act (FOIA) request;⁵
2. Data on mitigation bankingⁱⁱ collected by Ecosystem Marketplace; and
3. Credit price data, which is based on our dataset of 140 price points or ranges, including 33 prices provided anonymously by mitigation bankers.

For more information on data collection methods, see Methods Appendix.

Offset Creation and the Buyer

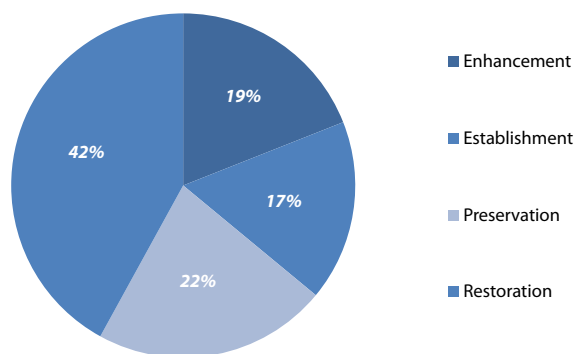
The buyer of an offset under this program is anyone impacting a stream or wetland. The most common buyers are government transportation agencies, residential and commercial developers (which account for about a third of demand), the Department of Defense, extractive industries, and utilities.⁶

National regulations give a preference for restoration and enhancement to reflect the inherent ecological uncertainty of wetland

creation and the ‘no net loss’ policy. This preference should be evidenced by fewer credits for creation and preservation, but data from the US ACE below show a large portion of credits being created by these methods.

While there is this general guidance in national regulations, there is no standard method dictated for determining impact and offset requirements nationwide. Consequently, differing methods have been adopted in different US ACE Districts across the US. Methods range from acre-based, acre-based with ratios, to functionally-based methods.⁷ Thus, a credit may represent acres of restoration in one District and wetland functions in another.

National Breakdown of Method of Credit Creation (2008)



Note: This reflects the breakdown of credits created in permittee-responsible mitigation. ‘Restoration’ refers to both re-establishment and rehabilitation.

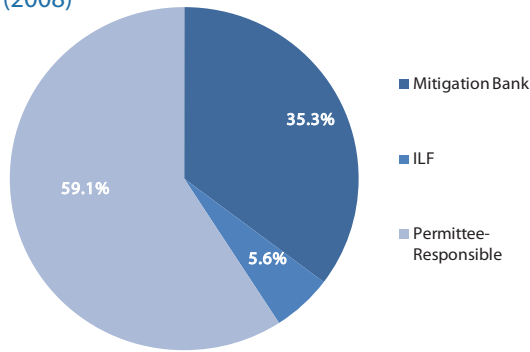
Data Source: US ACE FOIA request for 2008⁸

The Sellers

Because the US system allows third-party development of offsets, wetland mitigation has a wealth of participants involved in creating offsets, including environmental consultants, engineers, and lawyers hired by permittees; private mitigation bankers; non-profit organizations and government agencies running mitigation banks for commercial or their own use; and government and non-profit organizations collecting funds and providing

ⁱ All aggregate bank information presented in this section represents active and sold-out banks unless otherwise noted.

National Breakdown of Suppliers of Credits (2008)



Data Source: US ACE FOIA request for 2008⁹

mitigation. The US divides suppliers into the following categories: mitigation banks, in-lieu fee programs (ILFs), and permittee-responsible mitigation. The divisions are important, because past rules had steered mitigation towards on-site permittee-responsible mitigation and had given more stringent standards to mitigation banks than to ILFs. This resulted in a majority of offsets being created by permittees and the momentum of this trend continues today, with close to 60% of mitigation still coming from permittees. There has been a slight increase in credits from mitigation banks (35.3%, up from 31.4%ⁱⁱ in 2005), and a slight decrease in credits from ILFs (5.6%, down from 8.4%ⁱⁱⁱ in 2005).¹⁰

The Sellers-In-Lieu Fee Programs (ILF)

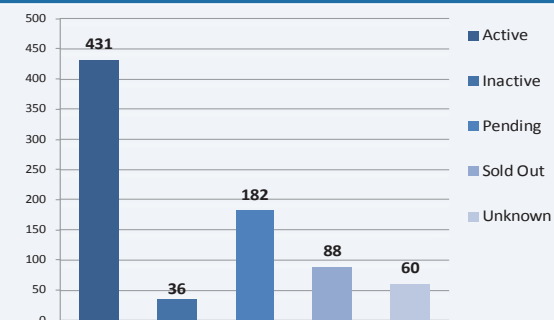
An ILF is set up to consolidate multiple offsets by a government or non-profit organization that can collect fees and use the fees to provide the offset. ILFs require authorization from the US ACE that documents legal, financial, and long-term management details of this type of offset program.¹¹ The new rules also stipulate that most credits be created in advance of credit sales, although rules are somewhat more relaxed for ILFs to allow entities like non-profits to get around the initial hurdle of upfront costs. The Environmental Law Institute (ELI) has conducted the only studies tracking ILF programs in the US and has found 42 approved,

active programs in 2005 (as reported by USACE Districts).¹² Evidence collected by a Government Accountability Office analysis in 2001 indicated that the fees collected by ILFs were not always used to fund on-the-ground offsets in a timely manner, which was one of the main arguments used to raise the standards of ILFs in the 'new rules.'^{13,14}

The Sellers-Mitigation Banks

Wetland mitigation banks have been providing offsets in the US since the early 1980s. Our data collection effort resulted in a database of 797 banks.^{iv} Banks fall into the following status categories: active, inactive,^v sold out, pending, and unknown (see graphic).

Status of US Wetland and Stream Mitigation Banks (2009)



Data Source: Ecosystem Marketplace wetland mitigation database.¹⁵

Wetland and stream banking in the US grew substantially in the mid-1990s, by which time official Federal Banking Guidance had been released (in 1995) and disputes between federal agencies over interpretation of wetland mitigation guidance had been resolved. These events gave mitigation bankers a degree of consistency and confidence for investing and

ii Information in ELI's 2005 report was collected by a different means. Their data represents estimates reported by US ACE Districts.

iii See note above.

iv This report includes individual banks and umbrella banks. Individual bank sites within an umbrella bank were not considered to ensure that there was no double-counting. For more information on methods for wetland mitigation bank data collection, see Methods Appendix.

v "Inactive" includes the following categorizations that we collected from the USA ACE: inactive (21), suspended (7), terminated (1), or failed (1).

creating mitigation banks.¹⁶ The growth of banking in recent years is less clear, as US ACE Districts were unable to verify or update about 40% of our dataset.

The Credit

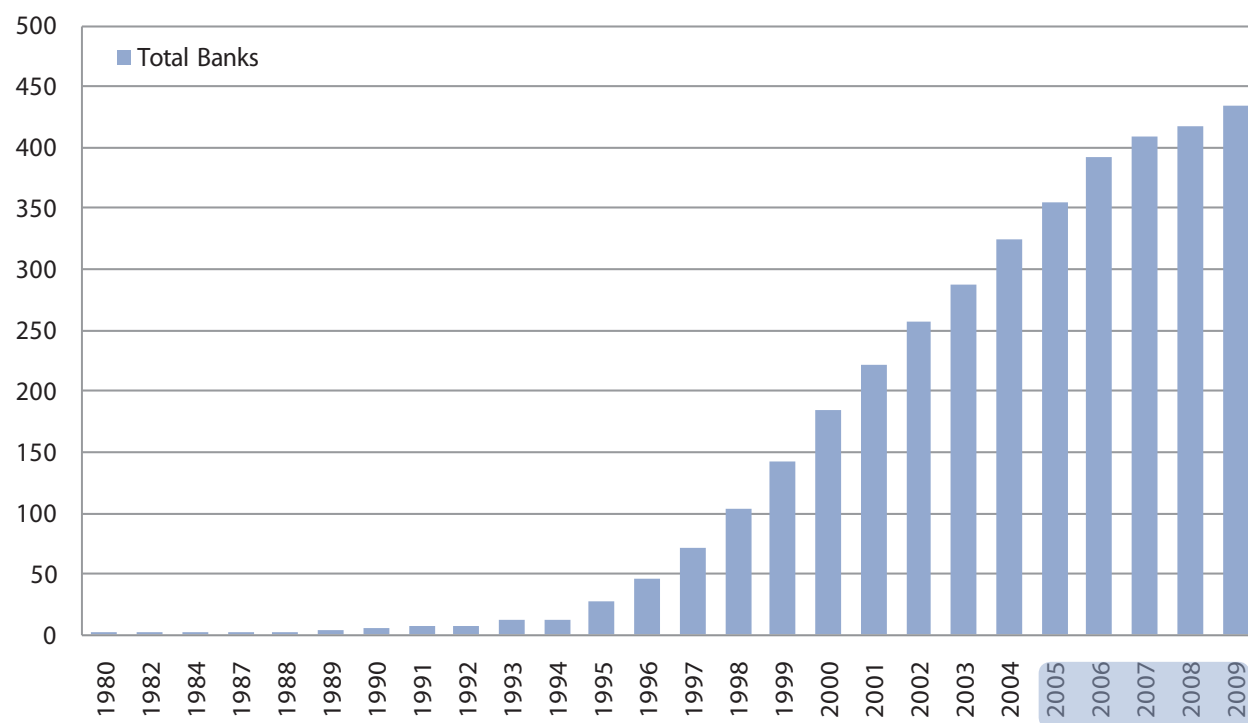
At the most basic level, the types of ecosystems covered in the US wetland mitigation program are wetlands and streams. Each District decides which wetland classification system to use to determine more specific ecosystem types. One of the most common classification systems, Cowardin et al.,¹⁷ identifies the following major types: palustrine (non-tidal wetlands), estuarine, riverine, marine, and lacustrine (lakes). These classifications are further subdivided by the types of species found – non-vegetated, emergent, scrub/shrub, forested, aquatic beds, etc.

We identified twenty-six types of credits in

our research, including the following sample: wetland, stream, tidal wetland, palustrine forested wetland, bottomland hardwoods, riparian willow scrub, riparian buffer, and eelgrass. Some credits are classified by the type of method used to create them: restoration, rehabilitation, creation, preservation.

Credit calculation methods, which are used to measure and quantify credits, are also decided at the regional level. ELI reported that a majority of bank credits are based on: acreage, a functional assessment method, a combination of acreage and functional assessment, or some measure of functionality combined with best professional judgment.¹⁸ The differentiation in methods creates a situation where it is impossible to compare “credits” regionally because there is no standard unit. We know of no effort to provide equivalency calculations that would enable comparison of standardized units nationally.

Rate of Wetland and Stream Mitigation Bank Establishment



Note: Graph represents active and sold-out banks with known date of establishment (there are an additional 77 active and sold-out banks without dates). Shaded data is more uncertain because the most recent information available for about 40% of our dataset was from 2005.¹⁹
Data Source: Ecosystem Marketplace wetland mitigation database.²⁰

Area of Wetland and Stream Mitigation per Annum (2008)

Total area of wetland loss:	18,800 acres
Total area of compensatory wetland mitigation:	24,178 acres
Total linear distance of stream mitigation:	312 miles

Data Source: US ACE FOIA, 2008;²¹ Soderberg, personal communication, 2009.

Total Payment for Wetland and Stream Mitigation per Annum (2008)

Wetlands:	\$1.1 - \$1.8 billion
Streams:	\$240 - \$430 million
TOTAL:	\$1.3 - \$2.2 billion

Data Source: Ecosystem Marketplace wetland mitigation database.²²

Wetland and Stream Credit Pricing

WETLANDS (per credit)

National Range: \$3,000 - \$653,000

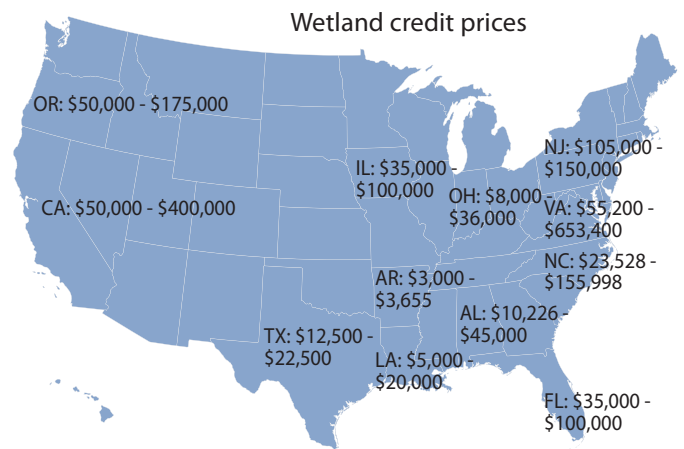
Average: \$74,535*

*Note: If tidal or vernal pool credit prices were included, the average would be \$112,449.

STREAMS (per credit)

National Range: \$15 - \$700

Average: \$260



Wetland and Stream Mitigation Banks

Active banks: 431

Sold-out banks: 88

Pending banks: 182

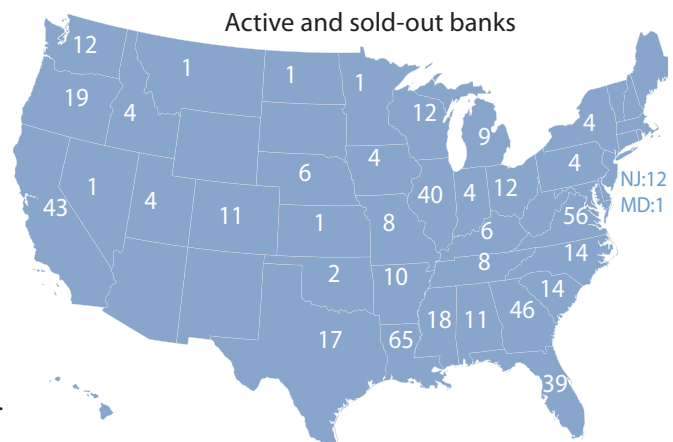
ILF programs: 42

Total known cumulative area of active and sold out banks: 166,051 acres*

Median bank size: 174 acres

Known credit types: 25

*Note: Represents acreage data that we have for 233 banks (of a total of 519 active and sold-out banks).



Data Source: Ecosystem Marketplace wetland mitigation database,²³ ELI, 2005²⁴ (for number of ILF programs)

Scale of the Program

We gained national-level information on compensatory mitigation from a formal Freedom of Information Act (FOIA) Request to the US ACE to find area of wetland loss and area of compensatory mitigation (see table above). Wetland credit prices range from \$3,000 in Arkansas to \$653,000 in Virginia. As noted above, credits in different regions of the US use different metrics - acres, fractions of an acre, or ecosystem function - to calculate credits. Therefore, the price of a credit in one region cannot be compared 'apples to apples' to a credit price in another region. Nevertheless, we present the results of our pricing data collection as 'per credit.' The high end of credit prices in our dataset was predominantly for credits in tidal wetlands. The average price of non-tidal credits is \$74,535. We estimate the total yearly dollar volume to be \$1.3 - \$2.2 billion. Of this total, wetlands account for \$1.1 - \$1.8 billion and streams account for \$240 - \$430 million.

Regional Variations

As seen in the maps and tables on the previous page, the West, Southeast, and Chicago area have the most wetland mitigation banks. Six states have more than 20 banks: CA, FL, GA, IL, LA, and VA. All of these states were 'early adopters' of compensatory mitigation, with at least one bank in 1995. Other interesting characteristics these states have in common are:

- High percentage of coastal area (with the exception of IL),
- States with rapid development²⁵ (with the exception of IL and LA), and
- A less-than-average amount of mitigation coming from ILFs (with the exception of CA).²⁶

Developments

The 'new rules' were supposed to have given a clear advantage to mitigation banks, but 2008 data is not showing this trend yet. As well, a national survey of mitigation bankers recently showed that local offices of the Army Corps of Engineers were unevenly enforcing the 'new rules.'²⁷ For a breakdown of how offsets are being supplied by mitigation banks vs. ILFs vs. permittee-responsible mitigation in each US ACE District, see Methods Appendix. Bankers are prepared to apply pressure to ensure that the US ACE implements the new rules and applies them consistently across the US.²⁸

The downturn in the economy may have put a damper on compensatory mitigation needs, as development and therefore impacts on wetlands slowed.

Transparency of banking may get a boost from a renewed effort to spread the use of the US ACE's RIBITS online bank-tracking portal to more Districts, although the development and adoption of RIBITS has been long in the making. Finally, ELI and the US Environmental Protection Agency are designing a study that will shed light on the ecological performance of mitigation banks.



United States - Conservation Banking (Species)

Impacts to US threatened, endangered, or other imperiled species are regulated by the national Endangered Species Act (ESA) of 1973. Like US wetland and stream mitigation, any impact to endangered species must be permitted and approved by the US FWS or NMFS, and must follow the mitigation hierarchy after which permittees may offset their residual impacts by either developing their own offset, paying into an in-lieu fee fund, or buying a credit from a conservation bank.

Of the three options for offsetting impacts, only conservation banking is tracked at a national scale, so this section covers conservation banking only. While there may be activity within a broader species offset context in the US, we are only able to report on this part of the market.

Conservation banking was modeled after the US wetland mitigation banking system, so there are many similarities between the two programs. However, unlike the wetland mitigation system, species offsets do not have a stated 'no net loss' principle, but rather a species recovery goal.

Like wetland mitigation, conservation banking is regulated by federal agencies – the US FWS and NMFS. Additionally, the California Department of Fish and Game (CA DFG) regulates conservation banking of species listed as threatened or endangered in California. Conservation banking is primarily prominent in California, with more and more activity happening in the US Northwest and Southeast. There are not yet official regulations for conservation banking like wetland and stream mitigation, but agency guidance was created in 2003 to allow public and private conservation banks or in-lieu fee programs.²⁹

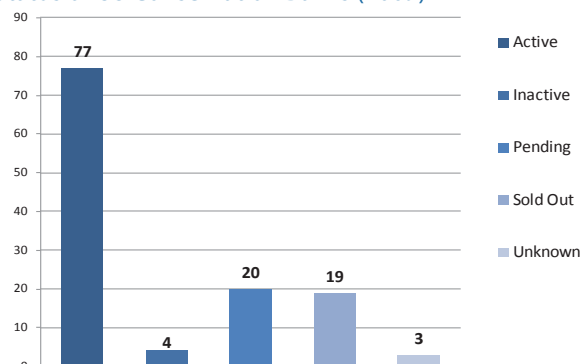
Methodology for Conservation Banking

Data for this section of the report was collected from: Ecosystem Marketplace's www.SpeciesBanking.com project, and our credit price dataset of 51 price points or ranges, including 35 prices provided anonymously by mitigation bankers. National-level data on area of conservation banks or total area of offsets under the ESA is not available from the US FWS (but this information is expected to be available from the US FWS by the end of 2010). For more information on data collection methods, see the Methods Appendix.

Offset Creation and the Buyer

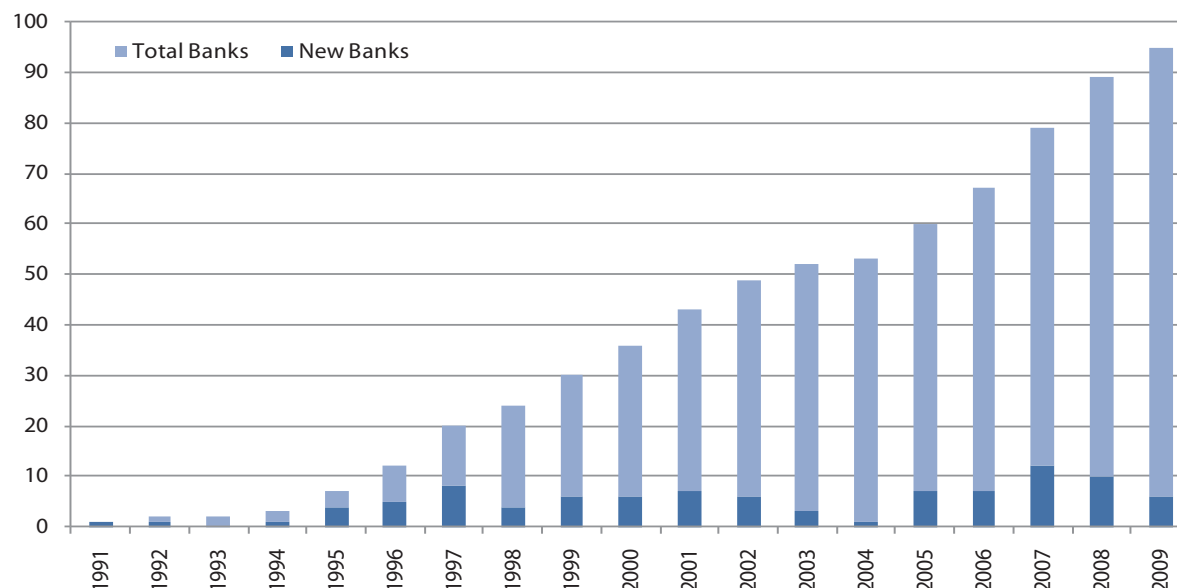
Developers or others with projects that may impact a threatened or endangered species require an authorization (called 'incidental take') under section 7 or 10 of the ESA through consultation with the regulating agency – US FWS or NMFS, depending on which agency has jurisdiction for the species likely to be impacted. If the regulating agency determines the impact can be offset at a conservation bank, the agency then determines the number of credits needed to offset the impact should the permittee choose to offset the impact at a bank. The 'buyers' of species offsets are the same as buyers of wetlands offsets: organizations developing infrastructure projects like roads and bridges, residential and commercial developers, the Department of Defense, extractive industries, and utilities.

Status of US Conservation Banks (2009)



Note: includes one active bank in Saipan
Data Source: SpeciesBanking.com³⁰

Rate of Conservation Bank Establishment



Note: Graph represents active and sold-out banks. Note: From 1991-2001, all but one bank were located in California.
Data Source: SpeciesBanking.com³¹

Species offsets are primarily created through preservation and management of habitat. The US system of conservation banking is based on the idea that if you conserve large enough tracts of high quality habitat, provide habitat connectivity to other preserved sites, and manage the land to support species recovery, the species will persevere and thrive despite a net loss of habitat.³² All conservation bank offsets are created in advance of impacts. Like compensatory mitigation, offsets in the conservation banking system must be permanently protected and include a non-wasting endowment fund for management activities to maintain the species.

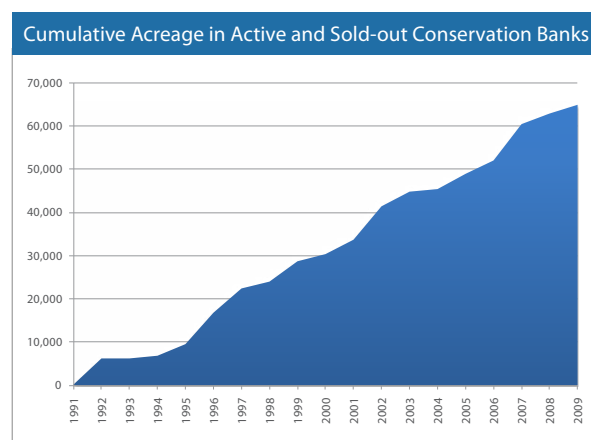
The Sellers

Our research indicates that there are currently 123 total conservation banks^{viii} in the US, 96 of which are active or sold out. There has been a fairly steady growth of conservation banks from the early 1990s to the present.

The Credit

ii Note: This report only considers 'conservation banks' with permanent protection.

The unit of credit is most often an acre of habitat. Occasionally, due to specifics of an organism's ecology the unit may be a breeding pair or combination of habitat and the actual species, or in the case of aquatic species, the unit may be a liner foot of riparian habitat.³³ US FWS guidance does not provide individualized guidance on credit calculation for impacts or credit creation for every endangered species. The first conservation bank to offer credits for a species generally sets a precedent for future banks. When a recovery plan exists for a species (which is true for about 86% of endangered



Data Source: SpeciesBanking.com³⁴

species³⁵), some scientific information may point to how much area would be sufficient to support a species, but the banker has to come to an agreement with the federal or state regulator. There are theoretically over 1,000 methods of credit calculations – one for each threatened or endangered species.

Our research has found 92 species credit types and 51 habitat credit types. Some of the most common credits are: Burke's goldfield, California red-legged frog, California tiger salamander, Coastal California gnatcatcher, coastal sage scrub, Giant garter snake, San Joaquin kit fox,

Sebastopol meadowfoam, Sonoma sunshine, Swainson's hawk, Valley elderberry longhorn beetle, Vernal pool fairy shrimp, Vernal pool habitat, Vernal pool tadpole shrimp, Western burrowing owl.

Impacts must be located within the conservation bank 'service area,' an area approved by the regulating agency at the time the bank is approved, unless otherwise approved by the agency. Service areas are usually defined by recovery plan units for threatened or endangered species, watersheds, or other criteria based on the conservation needs of the species.

Total Payments for Conservation Banking per Annum (2009)

TOTAL

\$200 Million

Note: Figure is only for conservation banking, and not for species compensation through in-lieu fee funds or permittee-responsible mitigation.
Data Source: SpeciesBanking.com³⁶

Conservation Banking Credit Pricing

ACREAGE-BASED CREDIT

National Range:
\$2,500 - \$300,000

Median:
\$15,000

Average:
\$31,683*

*Note: If vernal pool and unit-based credit prices were included, the average would be \$33,027

Species	Credit Price Range	State
Black-capped vireo	\$5,000-\$5,500	TX
Bone Cave Harvestman and Coffin Cave Mold Beetle (per acre in 'moderate impact zone')	\$10,000	TX
Bone Cave Harvestman and Coffin Cave Mold Beetle (fixed price in 'irrevocable impact zone')	\$400,000	TX
Burrowing owl	\$5,000-\$15,000	CA
California red legged frog	\$15,000-\$90,000	CA
California tiger salamander	\$4,500-\$15,000	CA
Chaparral	\$8,000-\$15,000	CA
Coastal sage**	\$15,000-\$25,000	CA
Delhi sands flower-loving fly	\$100,000-\$150,000	CA
Delta smelt/native fisheries	\$100,000-\$150,000	CA
Fairy shrimp	\$150,000-\$300,000	CA
Giant garter snake	\$30,000 - \$45,000	CA
Golden-cheeked warbler	\$2,750-\$7,000	TX
Gopher tortoise (relocation)	\$1,500 - \$3,000	SE US
Gopher tortoise	\$12,000 - \$20,000	SE US
Least vireo breeding pair	\$125,000	CA
Salmonids	\$80,000-\$120,000	CA
Sandhills habitat	\$326,700	CA
San Joaquin kit fox	\$2,500-\$15,000	CA
Swainson's hawk	\$5,000-\$25,000	CA
Utah prairie dog	\$1,836	UT
Valley elderberry longhorn beetle	\$3,500	CA
Vernal pool (preservation)	\$50,000-\$325,000	CA

* Prices are approximate and based on both anonymous and public sources. Prices range widely due to local land value, credit scarcity and demand.

** Non-occupied by the California coastal gnatcatcher.

Conservation Banks

Active banks: 77

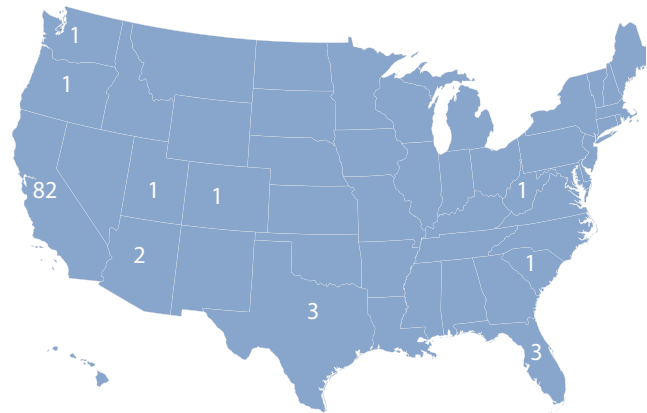
Sold-out banks: 19

Pending banks: 20

Total known cumulative area of active and sold-out banks: 65,078 acres (101,158 acres* total)

Median bank size: 333 acres

Known credit types: 143



Data Source: SpeciesBanking.com³⁷

*Note: Represents acreage data for all but 4 conservation banks.

Scale of the Program

A recent US Government Accountability Office review of endangered species permits³⁸ (Section 7 on consultations) noted that the US FWS does not have a systematic method to track permitted impacts (or ‘take’) of most endangered species. Thus, we cannot address the total area of impact to endangered or threatened species in the US. At the same time, there is not yet centralized tracking of conservation banks by the US FWS, although they have begun to explore the use of a tracking system similar to that of the US Army Corps of Engineers. California’s Department of Fish and Game is required to report on conservation banks every two years, but this report does not include the amount of offsets that have occurred. Our research indicates that there has been a cumulative total of about 65,078 acres conserved in active and sold out conservation banks (or 101,158 acres in banks of all types of status). Habitat protection has grown fairly steadily since 1997.

Pricing and volume of conservation banking is difficult to aggregate because there are many types of credits and credit prices vary both within species and across different species. For example, California red-legged frog credits

ranged from \$15,000 - \$90,000. This is likely due to regional differences in land values and credit demand. Credit prices of all types of species and habitat that we collected ranged from \$1,836 for Utah prairie dog habitat to \$400,000 for impact to Bone Cave Harvestman and Coffin Cave Mold Beetle in an ‘irrevocable impact zone’ (see table).

Despite the wide price ranges, we have estimated a rough figure for the total yearly dollar volume of the conservation banking market at \$200 million. This figure *only* represents estimated annual sales of credits through conservation banks. Using a different methodology, ELI’s 2007 study of spending on habitat conservation under the ESA estimated an annual dollar volume of \$370.3 million, a figure that includes mitigation from conservation banks as well as in-lieu fee programs and permittee-responsible mitigation.³⁹

A sample of 20 banks in Northern California shows a steady increase in sales (number of transactions) from 2005 to 2008 at which point they dropped by nearly 20% in 2009. The volume of credits sold per year also grew robustly (over 100%) from 2005 to 2007, but growth had nearly leveled off by 2009. This stagnation in volume is likely due to the collapse of the housing bubble

and the global financial crisis that began in 2007. Of course, this sample is geographically isolated and shaped by regional trends like market saturation and local economics, but anecdotal evidence supports that these trends are common throughout the country.

Regional Variations

As seen in the map above, California has the overwhelming majority of conservation banks, with a bit of activity in the Northwest, Texas, and the Southeast. Prior to 2002, all but one conservation bank was located in California. We also know of additional banks pending approval in the following states: California (14), Florida (2), Oregon (2), Mississippi (1), and Washington (1). The reason for California's dominance is a strong state law and high number of California-listed species. California was an early adopter of conservation banking, and both state and federal regulators are knowledgeable about conservation banking as a tool for use in permitting. Finally, California has a lot of species listed as endangered or threatened; there are 309 federally-listed species and 61ⁱⁱⁱ state-listed species.⁴⁰ The other states with the nation's

ⁱⁱⁱ This figure excludes species that are both state-listed and federally-listed.

highest amount of listed species are: Hawaii (330), Alabama (117), Florida (115), Texas (94), Tennessee (90), Virginia (65), and North Carolina (64).⁴¹ The number of species alone does not predict conservation banking, however, as other factors come into play, for example: high growth in the state, listed species are present on private land (e.g., Hawaii's endangered species may reside in areas not likely to be developed), and – as already mentioned – regulator comfort with conservation banking.

Developments

Conservation banking may see more growth as use of the tool expands in Oregon and Washington. Conservation banking may also soon be expanding in the East. Two of the major California conservation bankers, Wildlands and Westervelt, have offices in the Southeast. Florida is also a state to watch, as an FWS official noted in a May 2009 presentation that nine banks were in early stages of review. As of January 2010, two of these nine banks had been approved.

On a national scale, there are developments towards more acceptance of conservation banking nationwide. Within the US FWS,

Transparency and Registries

While the US may boast a large estimated volume of sales of wetland and conservation bank credits, figuring out the *exact* volume is not possible at the present time. The US has no centralized source of information on the number and location of wetland and species bank credits (issued or available), credit ownership, or the number of transactions. Although regulators are moving in this direction, the market currently lacks key information, leading to the following **transparency challenges**:

- 1) Difficulty in analyzing, reporting, or simply accessing and providing information on credits;
- 2) Potential of double-selling credits; and
- 3) Market credibility and investments seen as high risk.

As the carbon market evolved, registries were created to track each ton of carbon with unique serial numbers. Registries were a critical infrastructure milestone in the development of the carbon market, and they could play a part in the development of biodiversity markets as well. Ecosystem Marketplace's project SpeciesBanking.com initiative is teaming up with registry provider Markit to develop a **pilot registry for conservation bank credits** in the Sacramento, California region. Markit is working with the US Fish and Wildlife Sacramento field office and local mitigation bankers to create a registry and upload bank and credit data. Over the next year, bankers and regulators will be able to test the tools for new efficiencies in tracking and reporting.



Michael Bean, a leader in conservation incentives, accepted a counselor position with the Assistant Secretary's office where he will advise on endangered species policy.⁴² Additionally, conservation bank coordinators have been informally identified in each of the US FWS regional offices.^{iv} The National Mitigation Banking Association recently published a white paper with recommendations for implementing conservation banking and promoted these recommendations to top US FWS officials in October of 2009.⁴³

Finally, there was some wrangling over changes to the ESA between the last presidential administration and the present one.^{44,45} Because the new administration issued an Executive Order to reverse the changes, conservation banking has not felt a change. There is, however, a requirement that the ESA go through a formal rule-making process, and there is some discussion of expanding a provision in Section 7 to make mitigation a *requirement* rather than a potential requirement as it currently stands.^v

iv White, personal communication, 2009
v Ibid.

US – Other Offset Programs

Recovery Credit System and Habitat Credit Trading System

The recovery credit system gives federal government agencies the flexibility to offset temporary impacts for threatened and endangered species found on federal lands by undertaking short-term or permanent conservation actions on non-federal lands. The goal is to keep species from becoming endangered or threatened by partnering with private landowners to manage and protect species for a specified timeframe. The program is similar in concept to the conservation banking program, but it temporarily offsets temporary impacts and is only an option for federal agencies. Guidance for the program was published in July 2008. There has been one pilot project in Texas at the US Department of Defense site Fort Hood to protect the golden-cheeked warbler and the black-capped vireo. About 1,400 acres were enrolled in the pilot program in 2007.⁴⁶ Critics say the program lacks the accountability of the conservation banking system because the program does not reveal information about the projects because of the concern of privacy of the private landowner partners.^{47,48,49}

Habitat credit trading (HCT) is an umbrella term for all market-based conservation programs approved by the US FWS. HCT guidance, now in development, will describe standards for all new voluntary credit trading programs developed by stakeholder groups for management, restoration, and preservation activities for imperiled species and habitat. While conservation banking or recovery crediting are applicable for most species and habitat types, the US FWS recognizes that new, innovative market-based approaches may have conservation value, particularly for use with species that are not federally listed as threatened or endangered, but are otherwise imperiled. Voluntary HCT programs for these

species and their habitat may preclude future regulatory obligations. There is one pilot project in the Southeast for gopher tortoises spearheaded by the American Family Forest Foundation and the Longleaf Alliance.⁵⁰

Multi-Credit Watershed Markets: Willamette Partnership, Bay Bank

Two multi-credit watershed-scale markets are developing in the US. The Willamette Partnership is leading the development of a multi-credit ecosystem marketplace in the Willamette watershed in Oregon. The project uses a multi-credit approach to foster strategic investment in environmental restoration in the watershed. The Partnership's 'Counting on the Environment' initiative developed a function-based accounting system for multiple credits, with buy-in from the multiple regulators who oversee the trading of those credits. The initiative achieved a major milestone, gaining consensus from stakeholders for a 'General Crediting Protocol' which creates a single process for creating four credit types: salmonid habitat, upland prairie habitat, wetland, and water quality/temperature. The initiative has registered its first multi-credit project and is enrolling more participants to take part in a test-market during a two-year pilot.^{51,52,53}

In the Northeast/Mid-Atlantic region, a program called the Bay Bank (www.thebaybank.org) is being developed to serve as a centralized multi-credit marketplace for the six-state Chesapeake Bay watershed. Bay Bank emphasizes the development of the supply-side of the market, particularly focusing on issues of market access for small landowners. The program builds on existing regulatory- and voluntary-driven markets for carbon sequestration, water quality protection, forest conservation, habitat conservation, and traditional conservation programs. The habitat aspect of the program credits actions that implement State Wildlife Action Plans, with an initial focus on eastern brook trout, early-successional wetlands present in the range



of bog turtle, and ancient sand ridge forests. Bay Bank has partnered with the Willamette Partnership in the crediting initiative mentioned above. The program will test their infrastructure, including an online LandServer tool that identifies market-based opportunities for landowners, via several conservation projects in the spring of 2010.^{54, vi}

Bureau of Land Management Offsite Mitigation Policy and TNC 'Development by Design'

In September of 2008, the US Bureau of Land Management (BLM) issued an instructional memorandum broadening the scope of offsite mitigation in conjunction with BLM oil, gas, geothermal, and energy rights-of-way authorizations. The BLM is an agency that oversees the mineral rights on over 700 million acres of public land, and requires mitigation 'to an acceptable level' that lasts as long as the impact. While the BLM still has a preference to mitigate on-site through avoidance, minimization, remediation, or reduction of impacts over time, off-site mitigation may be allowed on a case-

vi
Sprague, personal communication, 2009

by-case basis.⁵⁵ Off-site mitigation may be appropriate in mitigating impacts from larger developments, like oil and gas fields, roads, pipelines, transmission lines, mining, wind or solar energy development projects, etc.

To support effective implementation of BLM's offsite mitigation policy, the Nature Conservancy (TNC) is working with partners to apply its 'Development by Design' framework at several project sites in the western US. Development by Design is a science-based approach that blends conservation planning with the mitigation hierarchy to address the key challenges of: (a) determining when project impacts should be avoided, and when offsets are appropriate; (b) identifying offsets that deliver ecological equivalence, contribute to landscape-level conservation goals, and are located at an acceptable proximity from the impact site; (c) assessing which offsets can deliver the highest conservation value at the lowest cost and risk; and (d) evaluating the extent to which offsets compensate for project impacts. 'Development by Design' was first applied to guide disbursement of mitigation funds in the Jonah Natural Gas Field in Wyoming. In this area, the BLM approved the development of additional wells in 2006 with the stipulation that the permittee had to set aside an off-site mitigation fund of \$24.5 million.^{56,57} Follow-on pilots in the US West are incorporating the framework earlier in development planning to support proactive thinking about how to avoid siting conflicts with conservation priorities, maintain biodiversity, and determine suitable mitigation responses, including offsets.

State of Maryland Forest Conservation Act

The State of Maryland's Forest Conservation Plan establishes a threshold on forest land and requires either retention on-site, afforestation on-site, afforestation off-site, or a payment to a county compensation fund when development impacts forests. Conserved or afforested areas are permanently conserved in a conservation easement. Off-site forest mitigation banking is authorized in five counties. The law is compliance-driven and comes into play during the development review process.⁵⁸

State of North Carolina's Buffer Mitigation Program

Along with meeting federal regulations on wetlands and streams, developments in specific watersheds in North Carolina impacting riparian buffers must meet mitigation requirements under the state's Riparian Buffer Protection Rule.⁵⁹ Credit banking is allowed under the program.

Wal-Mart's 'Acres for America' Program

The retail giant Wal-Mart voluntarily introduced a program to permanently protect an acre for every acre of land developed for its stores. Although the program is offset in nature, the impact is not measured, and there is no specific intention to match the offset with the type or quality of habitat impacted by development. Wal-Mart uses a competitive grant process to distribute funds to non-profit and government organizations to make the conservation take place. Wal-Mart pledged \$35 million for land acquisition to offset the store footprint for all of its development from 2005-2015 and had conserved a total of 412,000 acres in the US as of 2009.⁶⁰

Canada

Canada’s compensation programs are directed at fish habitat and wetland compensation. Compensation for ‘harmful alteration, disruption or destruction’ of fish habitat is driven by compliance with the Fisheries Act and is implemented across the country. Wetland compensation, however, is driven by a mosaic of national and provincial policy with varying levels of implementation.

By the numbers - Canada	
Number of active programs:	6
Number of programs in development:	1
Total known regional payments per annum:	CAN\$7 - \$150 million
Known credit types:	5
Total known land area protected or restored per annum:	180 hectares
Total known active and sold out banks:	17

Canada does not allow monetary payments for fulfillment of compensation obligations, so compensation must be provided by the project proponent (although there are exceptions^{vii}). There are no private habitat banks, but there are seventeen banks used by the government department of transportation, and harbor or port agencies to consolidate fish habitat compensation requirements. The buyers of fish habitat and wetland compensation are predominantly from urban and industrial development, roads and highways, harbors and marinas, forestry, agriculture, hydropower, and extractive industries.

vii The exceptions we found were: use of ‘fish habitat enhancement funds’ (Quigley and Harper 2005), a BC Port Authority providing compensation via habitat banks for its tenants, two government agencies in Nova Scotia partnering in habitat banks which would provide compensation for both agencies, and a crown corporation being compensated for the costs of restoration by a road-building agency in Manitoba.

Fish Habitat Banks in Canada

Nova Scotia: Ten habitat banks were created by Nova Scotia’s Department of Transportation and Public Works for their own use. Two of these banks, Cheverie Creek Habitat Bank (Halifax, NS) and St. Francis Harbour Bank were created in partnership with another government entity needing compensation, the DFO’s Small Crafts and Harbours Branch. The banks have restored or will restore over 62 hectares.

Quebec: There are two habitat banks in the Montreal area in Quebec: Graise River Habitat Bank and the Ouareau River Habitat Bank.

Manitoba: In Manitoba, there is a Pipestone Creek Habitat Bank. Manitoba Hydro and DFO are investigating the feasibility of using habitat banking as a compensation tool for hydropower generation projects.

Alberta: In Alberta, the Yarrow Creek Habitat Bank was established in a joint initiative between Shell Oil, DFO, and Alberta Sustainable Resource Development, Fish and Wildlife Division.

British Columbia: Three more habitat banks are located in the Vancouver area: North Fraser Harbour Habitat Bank (partnership between Port Metro Vancouver and DFO), North Fraser Harbour Commission’s Burnaby Habitat Bank (partnership between the City of Burnaby and DFO), and the Timberland Basin Habitat Bank (privately owned by Vancouver Fraser Port Authority). The Vancouver Airport Authority and Richmond Airport Vancouver rapid transit line purchased fish habitat credits at a cost of CAN\$150 per square meter.

Data Sources: TAC, 2006 ; Koster, pers comm, 2009 ; DFO, 2005 ; DFO, 1993 ; Vivek et al., 2009 .

Fish Habitat (‘HADD’) Compensation

At the national level, the Fisheries Act and the 1986 Policy for the Management of Fish Habitat require compensation for impacts to fish habitat, or more specifically ‘harmful alteration, disruption, or destruction’ (HADD) of fish habitat. Fish habitat compensation is regulated by the Department of Fisheries and Oceans’ (DFO) Fish Habitat Management Branch.⁶¹ The Fisheries Act includes the principle of no net loss (of the productive capacity of fish habitats), and authorization for impacts to fish habitat require

Fish Habitat Compensation Metrics*

Estimated area of fish habitat compensation per annum: 1,836 hectares

Estimated national investment in fish compensation per annum: CAN\$7 - \$156 million

*Note: See Methods Appendix for information on figure calculation.
Data Source: Quigley and Harper, 2006 ; DFO, 2008 ; OAG, 2009 ; Quigley and Harper, 2005 ; Pett, pers comm, 2009 .

a permit. In applying for a permit, the applicant must show adherence to a mitigation hierarchy by 'relocation, redesign, and mitigation' and then compensation of net residual loss.⁶² Impacts on fish habitat arise from: urban and industrial development, roads and highways, harbors and marinas, forestry, agriculture, hydropower, and extractive industries.

In addition to a mitigation hierarchy, the guidance for habitat compensation in Canada provides a 'Hierarchy of Compensation Options,' with the following method and placement of compensation listed in order of preference:

1. Create or increase the productive capacity of like-for-like habitat in the same ecological unit;
2. Create or increase the productive capacity of unlike habitat in the same ecological unit;
3. Create or increase the productive capacity of habitat in a different ecological unit;
4. As a last resort, use artificial production techniques to maintain a stock of fish, deferred compensation, or restoration of chemically contaminated sites.⁶³

Cudmore-Vokey et al.⁶⁴ found that the first and third options were used the most (roughly 50% and 25%, respectively). Although the Practitioners' Guide provides the compensation hierarchy noted above, the guidance does not suggest what activities could create the compensation (i.e., what activities create or increase the productive capacity). A sample

of compensation activities includes: replacing or upgrading culverts, breaching a dyke, establishing restrictive covenants, and offering compensation through habitat enhancement funds.^{65,66} Guidance clearly states that cash in lieu of compensation is not acceptable.⁶⁷

An audit by Canada's Auditor General in 2009 reported that the policy on fish habitat compensation provides little guidance to regulators as to how to calculate impact and compensation; there is "no national guidance on what compensation ratio to use under various habitat conditions or how to calculate habitat negatively affected."⁶⁸ As a result, fish habitat compensation also suffers from regional differences in calculations and compensation ratios which makes accurate compensation difficult if not impossible.



Although like-for-like habitat compensation is stipulated in the policy, there is no mention of particular types of habitat. In our research, we found mention of seven major ‘habitat types’: salt marsh, high salt marsh and floodplain, tidal river, riverine, freshwater streams, lakes, intertidal and subtidal habitat. We also found mention of a number of further classifications: rearing, spawning, in-channel, off-channel, intertidal channel, intertidal marsh, intertidal mudflat, intertidal rocky, subtidal mudflat, subtidal rocky, lacustrine, estuarine, marine, riparian.⁶⁹

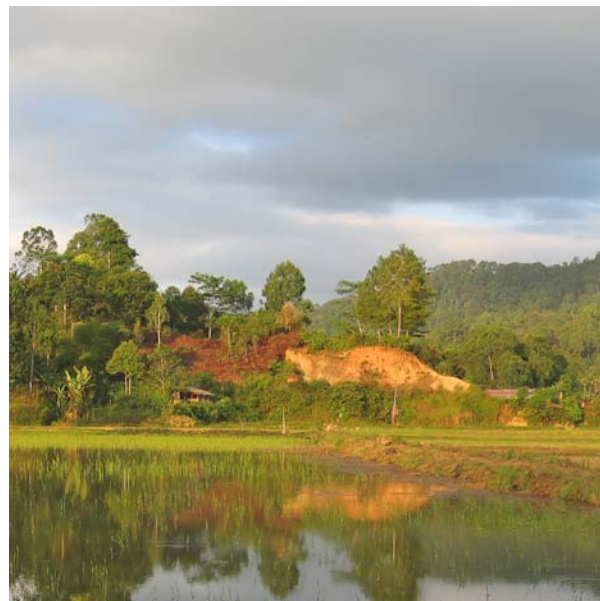
There is also mention of ‘ecological units’ within which compensation can occur, for example: Atlantic coast, Bay of Fundy, and Gulf of St. Lawrence.⁷⁰ DFO also identifies habitat as critical, important, or marginal.⁷¹

Because the guidelines state that compensation cannot be purchased, the supplier of the offset is the permit applicant. Compensation can be consolidated in habitat banks, although the policy requires that applicants must explore all on-site compensation options before being allowed to consider a habitat bank. Our research uncovered 17 fish habitat offset banks in Canada, primarily created by government agencies for their own use (see above).

Research did not uncover national figures on the scale of habitat compensation in Canada. We did, however, find elements of area and price from published sources that we used in ‘back-of-the-envelope’ calculations to determine the metrics above.

Wetland Compensation

Unlike Canada’s fish habitat compensation, wetland compensation in Canada is not regulated by one centralized agency. Instead, a mosaic of national and provincial law and policy exists with no standardized approach or centralized transparency.⁷² On the whole, Canadian



compensation policies have been informed by the faults of its neighbor, with critics pointing to the US system’s ineffectiveness in meeting no net loss goals. Wetland banking is not practiced in Canada, but the authors of a recent review of wetland mitigation policy recommend the use of banks or in-lieu-fee programs to consolidate compensation requirements.⁷³

Because of this fragmented implementation of wetland offset requirements, we touch on the national or provincial policies that most closely resemble an offset approach (i.e., policies with a mitigation hierarchy and some kind of compensation calculation guidelines). For a comprehensive review of all Canadian wetland mitigation policies, see the excellent *Wetlands Ecology and Management* article by Rubec and Hanson.⁷⁴

While the 1991 **Federal Policy** on Wetland Conservation includes a mitigation hierarchy of avoidance, minimization, and compensation, it does not include a clear set of calculations to determine compensation required, so the large projects regulated by this policy are reviewed on a case-by-case basis by the regulatory agency – the Canadian Wildlife Service of Environment Canada.

Alberta has a 2007 Provincial Wetland Restoration/Compensation Guide that provides guidance on the permit process, mitigation hierarchy, and compensation process under the 2000 Water Act. Although the Guide was developed in 2005 (and revised in 2007), it has been used in practice for longer. Compensation occurs through restoration of degraded wetlands.

New Brunswick's Wetlands Conservation policy of 2002 commits to no loss of 'provincially significant wetland habitat' and no net loss of wetland functions of all other wetlands greater than one hectare. The policy also includes a mitigation hierarchy of avoid, minimize, and mitigate.

Prince Edward Island has a policy that includes both 'no net loss' and a mitigation hierarchy in its 2003 Wetland Conservation Policy for Prince Edward Island. The policy also includes guidelines for how to compensate.

Nova Scotia's Operational Bulletin Respecting Alteration of Wetlands guides regulators making decisions on proposed impacts to wetlands under the 2007 Environment Act. The Bulletin uses the mitigation hierarchy and gives preference to restoration and enhancement projects to create compensation. Mitigation via creation or preservation of wetlands is allowed if used in conjunction with another mechanism.

Manitoba's Infrastructure and Transportation agency is party to an agreement with crown corporation Manitoba Habitat Heritage Corporation (MHHC) to source compensation needs through MHHC. When roads impact a North America Waterfowl Management Plan area, the transportation agency compensates MHHC with funds to restore or rehabilitate wetlands and place a conservation easement on the land.^{viii,75}

viii Chullick, personal communication, 2009.



Developments in Canada

The national fish habitat compensation program in Canada suffers from a lack of detailed guidance and a lack of staff time allocated to enforcement and compliance monitoring.^{76,77} Overall, the program has been criticized for not being able to achieve its goal of 'no net loss;' in a field audit of 52 HADD compensation projects, 86% of authorized permits had larger impacts and/or smaller compensation than authorized.^{78,79} Canada's Office of Auditor General found that only about a quarter of authorized impacts had compensation plans (2009). In response to the 2009 audit, DFO has accepted recommendations from the Auditor's office, including taking measures to implement a "quality assurance system to verify that documentation standards are being applied consistently by staff."⁸⁰ **National guidance for wetland compensation** practitioners is in the works, but is only in very early stages of development. Implementation may not be seen for another two to three years.^{ix}

One new program on the horizon is **British Columbia's** "wetland mitigation and compensation strategy that supports no net loss (and where appropriate, net gain) of wetlands where wetland losses from development have resulted in impaired watershed hydrology."⁸¹

ix Hanson, personal communication, 2009.

Mexico

Mexico has a very complex institutional and regulatory framework for biodiversity compensation. At the national level, the General Law of Ecological Equilibrium and Protection of the Environment (Ley General de Equilibrio Ecológico y Protección al Ambiente, LGEEPA) establishes the need for Environmental Impact Assessment (EIA), and the Secretary of Environment and Natural Resources (Secretaría de Medio Ambiente y Recursos Naturales, SEMARNAT) implements this law and determines if an EIA is required for any given development project. If an EIA is required, an Environmental Management Plan (EMP) is issued, consisting of separate mitigation, compensation and follow-up measures for development activities, and distinguishing on-site and off-site actions.⁸²

The current system allows a project developer the choice of creating the offset themselves or paying into a compensation fund managed by the National Forestry Commission (Comisión Nacional Forestal, CONAFOR). An example of a developer-implemented offset is the Mexican petroleum company's (PEMEX) Jaguarundi project, in which they aggregated their required offsets into a single 961 hectare tract of tropical rainforest near their refineries.⁸³

If the developer chooses to pay into the CONAFOR fund, Mexican legislation requires a compensation ratio greater than 1:1; CONAFOR is responsible for setting that ratio. CONAFOR then uses the resulting funds to complete reforestation activities on behalf of the developer.⁸⁴ The compensation amount per hectare is calculated using the average costs of reforestation activities (not including the cost of purchasing the land) instead of using estimates of the value of the environmental service affected.^x What the current system does not make transparent is if the reforestation activities linked to compensation are successful or not,

and if their location and timing truly compensate for the environmental services lost. In addition, CONAFOR has several programs in place related to reforestation that are not easily (or at all) separated, and thus cannot be evaluated for effectiveness by the developers, public or civil society organizations involved. In order to help solve part of this problem, the Instituto Nacional Ecología (INE) is preparing an initiative for SEMARNAT to develop a system of banking and trading biodiversity offset credits.^{xi}

Another important source of compensation in Mexico results from damages to biodiversity due to accidents or regulation violations. Compensation paid either in kind or in cash, is overseen by the Federal Environmental Attorney (Procuraduría Federal de Protección Ambiental, PROFEPA). An agreement between PROFEPA and the National Commission for the Knowledge and Use of Biodiversity (Comisión Nacional para el Conocimiento y Uso de la Biodiversidad, CONABIO) launched an offset-like program (the Program for Environmental Restoration and Compensation, Programa de Restauración y Compensación Ambiental) that aims to compensate for regulation violations and accidents through the planned restoration or recovery of ecosystems and natural resources on site, and then if that is not possible, avoiding or mitigating damage elsewhere.⁸⁵

x Muñoz, personal communication, 2009.

xi Ibid. 2010.

Central & South America



By the numbers

Number of active programs:	5
Number of programs in development:	2

General Status Update

Most countries in Latin America have existing Environmental Impact Assessment (EIA) laws that address impact mitigation and many also feature examples of voluntary compensation schemes. A majority of the programs tend towards government compensation rather than a market-based system for offsetting impacts to biodiversity. Only a few countries are developing offset programs, but the existing programs are laying a foundation for a future where we may see more market-like mechanisms (e.g., Colombia).

Existing Programs - Brazil

Home to such biologically diverse areas as the Amazon, Cerrado, and Atlantic Forest, Brazil is a party to the Convention on Biological Diversity and has a long history of enacting legislation for maintaining biodiversity. The basis for Brazil's environmental policy is the National Environmental Policy Act (Lei da Política Nacional do Meio Ambiente, LPNMA) and the National Biodiversity Policy;¹ the latter applies specifically to environmental compensation² and the "no net loss" principle applies. In some cases, specific legislation against cutting native vegetation has been enacted, such as the Lei da Mata Atlântica, particular to the Atlantic Forest.³

EIAs and environmental impact studies are conducted in order for development projects

to obtain an environmental license; the EIA stipulates that the mitigation hierarchy be followed, and offsets are seen as a last resort.⁴ In Brazil, mitigation usually takes the form of indirect compensation through taxation.

Brazil's laws present two types of offset-like mechanisms to help compensate for negative environmental impacts, relating to: (i) projects complying with the Forest Code, and (ii) industrial development.

Forest Code offsets

The Brazilian Forestry Code (Codigo Florestal, enacted 1965) stipulates that landowners must keep a certain percentage of natural vegetation on their land, depending on the region (80% Amazon, 35% Cerrado Savannah, 20% all other areas).⁵ In areas where deforestation and vegetation clearance will exceed the legal quota, compliance with the law can still be met in part through off-site conservation.⁶ Landowners that are unable to meet the minimum requirement of native vegetation on their own land can compensate another landowner (theoretically within the same watershed) to retain more than the minimum percentage of native vegetation cover. These Forest Code offsets have the potential to evolve into a formal bank, which is under discussion at the state level.⁷ In one of a number of pilot projects, The Nature Conservancy has helped facilitate farmers in

the municipality of Lucas do Rio Verde, Mato Grosso, to achieve legal compliance through the purchase of 91,000 hectares of retained forest land to compensate for past deforestation.⁸

Despite the potentially promising opportunities presented by these offset mechanisms, Fearnside (2000) notes that Brazil faces considerable law enforcement and implementation problems to ensure that they are effective and do not lead to perverse outcomes.⁹ These problems include difficulties in regulation and monitoring of offset areas, a lack of clear guidelines as to what determines an “ecological equivalence” in selecting appropriate candidate offsets, and the lack of a single approved authority in each state to judge the merit of individual cases.

Industrial impact compensation (developer’s offsets)

Industrial impact compensation, also known as **developer’s offsets**, is mandated by the National Protected Areas System Law (9985/00), which originally required that a maximum of 0.5% of the capital costs of the development go to the Protected Areas System (Sistema Nacional de Unidades de Conservação, SNUC) through the Environmental Compensation Fund (Fundo de Compensação Ambiental, FCA). The Environmental Compensation Fund is to be used solely for protection of existing protected areas (categories I and II according to the IUCN), unless a protected area itself is directly affected by the development work.^{10,11} The program, therefore, does not fund additional land conservation. Some examples of the application of funds include: solving land tenure issues, revising or implementing management plans, purchase of goods and services related to managing and monitoring the protected area and research necessary for creating and managing the protected area and its buffer zone.

Another aspect of the program that diverges

from a prototypical offset scheme is that there are no criteria available for determining compensation nor the application of funds paid by the developers, even though funds are usually paid. Furthermore, a number of administrative bottlenecks exist that make it difficult for moneys paid by developers to be efficiently spent on priority activities for protected areas.

There is some movement to reform the program, but effort has been focused on changing the fee rather than making a more direct link between impacts and compensation. The Environmental Compensation Fund (Fund) is currently being reviewed and reformatted by the federal government to improve its design. The previous system of a fixed minimum amount (0.5% of total development costs) for industrial impact compensation has been declared illegal by the Supreme Court. A new decree was published in May 2009 ruling that a *maximum* of 0.5% will be paid for impact compensation.¹² This Supreme Court ruling has put much of the program into legal limbo.ⁱ

The Chico Mendes Institute for Biodiversity Conservation (Instituto Chico Mendes de Conservação da Biodiversidade, ICMBio) reported that from 2000 to 2008 the Fund equaled approximately R\$500 million (US\$214 millionⁱⁱ) from 300 compensation requests.¹³ However, of this R\$500 million, almost R\$209 million are waiting for the Supreme Court decision to determine whether past amounts will need to be re-assessed based on the new formula for calculating payment amounts.ⁱⁱⁱ Only about R\$143 million (US\$61 million) is deposited and available for use in protected areas, and R\$49.5 million (US\$21.2 million) of the compensation has been executed.

i Lerda, personal communication, 2009.

ii US figures are converted to 2008 dollars.

iii Lerda, personal communication, 2009.

Existing Programs - Colombia

Environmental compensation is practiced at a national level through the national environmental legislation, *Decreto 1753*, which called for environmental licensing.^{iv} To obtain an environmental license from the Ministry of Environment or local environmental authority (Corporaciones), any new development project must offset their impacts based on a simple calculation of trees per hectare that the project will affect in that particular ecosystem.^{iv} The developer is then required to compensate via reforestation close to the project site. Alternatively, the developer may pay into a reforestation fund. There currently is no credit banking system, so the developer usually works with local farmers to plant trees or restore habitats. There is no detailed guidance on the types of trees required for reforestation (they could be exotic, invasive species). Guidance on monitoring is also lacking, so there is no proof that trees are actually planted.

The Nature Conservancy (TNC), Conservation International and WWF are working with the Colombian Ministry of Environment to apply TNC's 'Development by Design' (DbD) framework. The DbD approach will identify development impact and determine appropriate offsets with ecological equivalence. The scheme will also determine where the offsets might be sited to deliver rigorous and robust biodiversity benefits. TNC is implementing the **DbD approach to offset impacts** of coal mining in the Cesar region in Colombia.¹⁵

Existing Programs - Paraguay

Paraguay has a few different ways in which compensation can be made for impacts to biodiversity. The **Paraguayan Constitution** states that "Any damage to the environment will entail the obligation to restore and pay for



damages," but currently this mandate is mainly enforced by criminal law (and is therefore neither strategic nor voluntary); thus there is no positive incentive for compensation. The mitigation hierarchy is recognized in Paraguay, but in practice, there is little attention to avoiding and minimizing damages. Additionally, enforcement is a challenge – damages are more often punished instead of being strategically resolved through environmental planning and compensation. The Environmental Crime Area of the Public Prosecutor's office gathered approximately US\$80,000 in 2008 from developer compensation for environmental damage.^v

The Instituto de Derecho y Economía Ambiental (IDEA), has created a Conservation Trust whereby project developers can pay into a fund to compensate for damages as required by the Paraguay Constitution.^{vi} The money is used for conservation purposes on priority areas (land acquisition, drafting of management plans, park ranger salaries, etc.). IDEA works with fiduciary Financiera Atlas S.A.E.C.A to manage the trust and has set aside two areas in the Pantanal, totaling 3,096 hectares, with the resulting funds. Enforcement is guaranteed by Law 921/96.

Additionally, a recent law¹⁶ (PES Law 3001/06) provides a mechanism for compensation for environmental damage. Similar to Brazil's Forest Code, Paraguay's **Forestry Law** (422/73)

iv
Gonzalez, personal communication, 2010.

v
del Mar Zavala, personal communication, 2009.
vi
Ibid.

requires 25% of land be maintained in natural forest for private landowners.¹⁷ If 25% is not met, damage must be compensated through reforestation, by purchasing Environmental Services Certificates (ESCs) provided by landowners exceeding the 25% minimum forest cover required.^{vii} Owners of large impact projects must also invest 1% of their total project budget in ESCs as compensation. In the future, the market will decide the prices of ESCs, as it is not set by government and is not a tax system.

In reality, however, the law is only infrequently applied, and some forests have been cleared almost entirely. WWF has been working in Paraguay on the development of a Tradable Development Rights Mechanism, used in the past to adapt market-based tradable permit systems to conservation, to help enforce the Forest Law. So far 8,435 hectares of land have been restored under the pilot program and as of November 2008, almost 25% of the farms in one pilot region have signed up to comply with the law.¹⁸

Developments

While the above countries have a more concrete system of compensatory conservation schemes, other Latin American countries are beginning to develop their own programs that have the potential to turn into offset-like regulation.

Argentina has a short history of environmental compensation laws through their Civil Code (Article 1083) and EIA, but there is very little enforcement and regulation. Their EIA law (no. 25,675, written in 2002), the **Environmental Framework Law** (Ley General del Ambiente, LGA), defines the standards and implementation practices for development projects that will impact biodiversity, although it does not clearly call for offsets for those impacts.¹⁹ Developers must only submit an Environmental Impact Study, which is then rejected or approved. If

the project is approved, and it has been shown that restoration for environmental impacts is not possible, the project must pay into the Environmental Compensation Fund (Fondo de Compensación Ambiental) which is used to compensate for and prevent future losses to biodiversity (i.e. establishing protected areas). The practical operation of this fund, however, is unknown.

An adaptation to the mitigation hierarchy is followed under the LGA (minimize, prevent and mitigate, then restore), but real application is absent. One example cites a compensation ratio of 5:1 (five trees planted for every one cut down), but there is not a consistent ratio across the board, and compensation in practice is difficult to find.²⁰

Chile's EIA law explicitly requires avoidance, minimization, reparation and compensation, along with preventive measures.²¹ At least one voluntary offset example exists in the mining industry, and Instituto Forestal (INFOR) is researching compensatory conservation.

Venezuela's Brisas Gold and Copper Project in the Orinoco Basin is a voluntary compensatory conservation project creating and expanding a protected buffer zone adjacent to a national park, planting trees, creating agroforestry and ecotourism projects, and establishing a biological reserve station.²²

Costa Rica and **Panama** both have Payments for Environmental Services strategies related to the reduction or avoidance of adverse biodiversity impacts that could lay the groundwork for future offset programs.

The UNDP is currently conducting a study assessing the outlook for habitat banking and wetland mitigation in Latin America and the Caribbean, hoping to identify those areas with the most potential. It is focusing on nine case study countries including Panama, Chile, Peru, Costa Rica and Mexico.²³

vii del Mar Zavala, personal communication, 2009.



By the numbers	
Number of active programs:	0
Number of programs in development:	6

General Status Update

While there have been cases of oil and mining companies voluntarily compensating for impacts to biodiversity in Africa (Ghana, Guinea, Madagascar and South Africaⁱ), there are few examples of biodiversity offset or compensation programs. Our research identified only one country with provincial guidelines developed, but these have not been officially adopted by the government as of yet. This chapter will therefore shed light on what has been happening so far to lay the groundwork for biodiversity offset programs in Africa, including developments in EIA law, national biodiversity laws, and voluntary programs.

ⁱ For more information on these projects see: Business and Biodiversity Offsets Programme (BBOP), 2009, Compensatory Conservation Case Studies, available at www.forest-trends.org/biodiversityoffsetprogram/guidelines/non-bbop-case-studies.pdf.



There are a few factors that hinder biodiversity market development in Africa. These include the fact that there are financial barriers, political instability, and disagreements within the conservation community on how and if biodiversity markets should be structured.¹ However, there are opportunities in the greater attention on, concern for, and scrutiny of the link between business and biodiversity. In addition, countries are creating new regulations that leave space for economic instruments like biodiversity offsets.

Developments - South Africa

South Africa is at the forefront of biodiversity offsetting in Africa. Its history stems from the Environmental Impact Assessment (EIA) regulations promulgated by the National Environmental Management Act 107 of 1998 (NEMA). The national environmental principles contained in Section 2 of this Act specify that significant negative impacts on biodiversity must be avoided and, if they cannot altogether be avoided, must be minimized and remedied. There is currently no explicit legal definition of what “remedy” means in the context of the Act. However, in practice it is interpreted as the need to compensate for any residual negative impacts on biodiversity after efforts to minimize these impacts have been taken into account, through the use of offsets.ⁱⁱ

ⁱⁱ Brownlie, personal communication, 2009.

Although offsetting is still an emerging practice, draft guidelines have been prepared in two provinces, and a national offsets framework policy is currently being drafted. In the province of [Western Cape](#), a [Provincial Guideline on Biodiversity Offsets](#)² was first drafted in 2007. [Draft biodiversity offset guidelines](#) are just being developed in [KwaZulu-Natal](#), and offset measures are additionally required in the province's draft Biodiversity Conservation Management Bill (2009).ⁱⁱⁱ

The approach to biodiversity offsets in *both* the Western Cape and KwaZulu-Natal provinces draws on scientifically defensible conservation targets for different biotopes (using vegetation types as surrogates) to calculate a 'basic offset ratio;' i.e., the number of hectares of that biotope that would need to be secured for conservation purposes for each hectare of biotope residually impacted, in order to ensure that conservation targets would be met in the long term.³ Both provincial guidelines stipulate like-for-like offsets and focus on habitat provision in preference to fees paid into a dedicated biodiversity offsets fund. 'Trading up' to secure habitat of a greater conservation priority may be allowed in some cases where deemed appropriate by the conservation agency. Where it is impracticable to secure 'on the ground' habitat, however, the guidelines specify that developers must contribute up-front costs equivalent to acquiring and managing physical habitat for at least the duration of residual negative impacts on biodiversity. This money is to go into a dedicated biodiversity offsets fund managed either by a government conservation agency or by an accredited Public Benefit Organization.

Draft guidelines in both the Western Cape and KwaZulu-Natal provinces are awaiting formal adoption by their provincial governments; the timing of their adoption depends in part on

.....
iii Ibid.

ensuring that they are aligned with the content of the national offsets policy framework currently being drafted.^{iv} Development of the [national biodiversity offsets policy](#) was required by the 2009 National Biodiversity Framework, set to be in place by 2012.

There are several other programs in South Africa that will provide references for future biodiversity offset schemes in the country, whether at a national or provincial level. For example, the Grasslands Programme of the South African National Biodiversity Institute (SANBI) is currently developing a wetland mitigation banking program with a pilot project set to begin in the coalfield area of the Mpumalanga province.⁴ South Africa also has a voluntary program in which landowners can, in exchange for management support, legally reserve their land for conservation purposes. A future offset scheme could modify this current voluntary program to allow landowners to develop biodiversity credits and sell them to developers requiring biodiversity offsets.^v

In addition, there are several voluntary offset projects in South Africa, including:

- The Anglo American platinum mine in Potgietersrust, a BBOP pilot project offsetting impacts on 2,262 hectares by protecting, managing, rehabilitating, and restocking with wildlife 5,398 hectares of land;⁵
- Compensatory conservation in Western Cape Province (the Mount Royal Golf Estate) and KwaZulu-Natal Province (Pulp United Pulp Mill);⁶ and
- A planned Ingula Resource Reserve, a 10,000 hectare biodiversity offset of a hydropower project in the province of Free State.⁷

.....
iv Ibid.
v Ibid.

Developments - Uganda

Uganda is in the early stages of developing offsets. The country's EIA law provides a supporting framework for compensation schemes, and a few pilot projects are in the works.⁸ The Uganda Wildlife Authority (UWA) is in the early stage of developing a [biodiversity offset policy](#), although the Department of Energy has reservations regarding the financing of the scheme in as far as it involves oil companies.^{vi} The UWA is also investigating voluntary offsets with oil companies (particularly Tullow Oil) with an aim to catalyze national law for compliance-based offsets in the future.⁹ Current pilot projects include efforts by the Wildlife Conservation Society (WCS) to protect fisheries as a potential site for a voluntary offset by offshore oil drilling companies¹⁰ and a voluntary compensatory conservation project for the Bujagali hydropower plant on the Victorian Nile.¹¹

vi Prinsloo, personal communication, 2009.



A potential future development is to channel payments for biodiversity offsets through the Uganda Conservation Trust Fund (UCTF), which has been proposed by a coalition of government, NGOs, and civil society organizations and would be run independently of the government. This fund would not be exclusively for biodiversity compensation; it is envisioned as a sustainable financial mechanism for protected areas in Uganda. The UWA and WCS are spearheading the effort to create the UCTF; so far about \$95,500 have been raised for the project.

Developments - Madagascar

Madagascar, with high levels of endemism and biodiversity, has a long history of efforts to conserve its unique biomes. EIA regulations play an important role in Madagascar, providing guidelines for major projects and requiring the hierarchy of avoidance, minimization, and restoration, although there is no law requiring offsets for residual impacts to biodiversity.^{vii}

The Environmental Action Plan (Plan d'Action Environnementale, PAE) was established in 1992 to address the threats to its biological resources. Within the PAE, Madagascar aims to develop a [biodiversity offset policy](#) for mining and logging companies along with other incentives for environmental protection.^{viii}

Although there is no national offset program, some voluntary projects have taken place, laying the groundwork for a future scheme. Two mining companies, Ambatovy and Rio Tinto, are currently creating biodiversity offsets for their projects on a voluntary basis in Madagascar. The first, the Ambatovy nickel mining project, is a BBOP pilot project hoping to produce net positive conservation outcomes by establishing a corridor between the existing Ankeniheny-Zahamena Corridor and the forest surrounding

vii Randrianarisoa, personal communication, 2009.

viii Ibid.

the mine area, supporting the management plan for the Torotorofotsy Ramsar wetland ecosystem, expanding reforestation activities along the pipeline it will build and planning to replace forest that was removed on the mine footprint after closure of the mine.¹² QIT Madagascar Minerals (QMM), a subsidiary of Rio Tinto, has produced offsets for its three ilmenite mines (1,217 hectares) located in rare littoral forest containing threatened and endemic species.¹³ The offsets will attempt to compensate for opportunity costs of local community impacts and claims a net gain of 5,095 hectares.

Developments - Other Countries

In addition to the details presented above, other African countries may see offset development in the near future. Like South Africa, the future of **Ghana's** biodiversity offsets are based in the Environmental Impact Statement, which commits projects to avoid, mitigate, and compensate for impacts. However, Ghana is much less advanced than South Africa in developing offsets. The country has at least one voluntary program proposed as a BBOP offset pilot project for the Akyem gold mine in Birim North District of the Eastern Region. Newmont Ghana Gold Ltd. intends to offset its footprint in this moist semi-deciduous forest and achieve no net loss of biodiversity. Potential offset sites and appropriate conservation activities are being determined.¹⁴

Although **Guinea** has no formal biodiversity offset policy, the country has at least one voluntary offset program, the Rio Tinto Simandou project. Because the project area is within an internationally recognized biodiversity hotspot, the mine developers are working with the Guinea Government and the International Finance Corporation (IFC) to achieve a “net positive impact” on biodiversity. The project has implemented baseline studies in order to assess

the biodiversity values of the region and identify which of those are most important to local communities, governments, and conservation organizations (they have been supported by BirdLife International, Conservation International, Earthwatch Institute, Fauna & Flora International, and Royal Botanic Gardens, Kew).¹⁵

The World Wildlife Fund (WWF) is exploring the prospect of biodiversity offsets, including a potential offset in **Mozambique** and “indirect” offsets, piloted by WWF-Netherlands, with Dutch companies.¹⁶

Current **Egyptian** laws have laid a framework for future biodiversity offset schemes through the Law for the Environment (Law 4/1994), and EIA/ESIA (Environmental and Social Impact Assessment). The Law for the Environment considers impacts from development projects and compensation issues within the mitigation hierarchy under an EIA; before a permit is issued, development projects and existing establishment expansion must submit to an EIA. The Environment Protection Fund (EPF) is a government-controlled fund financed in part by fines from environmental damage. The EPF is used for work conducted by the country's Environmental Affairs Agency (EEAA) including funding nature reserves. Although over 12,000 EIAs are conducted annually, current policies allow development to occasionally take priority, weakening opportunities for compliance-driven biodiversity compensation.¹⁷



By the numbers

Number of active programs:	4
Number of programs in development:	3
Total known area protected or restored per annum:	> 2,600 hectares
Total known active and sold out banks:	1

General Status Update

Biodiversity markets are still a developing idea in Europe. Only one country, Germany, has a well-developed formal system for compensating for damage to biodiversity, and this is largely run by the public sector, although it is developing more market features and involving private operators. Elsewhere in Europe activity is limited to some specific offset requirements either for protected areas, or under planning laws. However, offsets have been undertaken through commercial contracts, and interest in using market-based instruments for biodiversity compensation is growing. There are some case-by-case offsets in countries such as the UK and Sweden, and a pilot habitat banking experiment in France. Detailed policy research has been undertaken for the UK Government, and a study for the European Commission looking at the application of habitat banking across the European Union (EU) is due to report.

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Existing Programs

In 2001 the EU Heads of State and Government undertook to halt the decline of biodiversity in the EU by 2010 and to restore habitats and natural systems. However, biodiversity continues to decline in the EU and it is clear that the 2010 target will not be met.^{1,2} There is currently some regulation requiring compensation of biodiversity impacts in the EU, but its application in individual Member States is varied.

EU Habitats and Birds Directives, and Environmental Liability Directive

A network of protected sites (Natura 2000 sites) has been established under the Habitats (1992/43/EEC) and Birds (1979/409/EEC) Directives. Impacts in these protected areas are strictly regulated. However, should development that damages them be deemed to have overriding public interest, it can be allowed only with strict like-for-like compensation of loss. The implementation of these Directives in some countries also requires compensation for damage to habitats of threatened species. One example of such compensation is restoration of grassland habitat completed to compensate for impacts from wind farm development in Italy.³

The more recent Environmental Liability



Directive (ELD; 2004/35/EC) harmonizes previous liability regimes and implements the polluter pays principal: making the parties responsible for environmental damage financially responsible for preventing and remediating that damage. The equivalency requirements under the ELD are not limited to strictly like-for-like.

European Country-Level Programs

Beyond EU-level legislation, efforts for the protection of biodiversity among Member States are limited. There are regulations which have a purpose to identify and compensate for damage to the environment (e.g. Environmental Impact Assessment), but they do not contain specific provisions requiring compensation. Instead they contain ambiguous language (e.g. “have regard for”) or enabling clauses, and as a result compensation is not usually required by authorities or undertaken in practice. The main reason for such limited activity is that laws and regulations do not stimulate demand for compensation actions, due to:

- The limited conditions under which impact is allowed and the strict like-for-like requirements of the Habitats Directive;
- Limited enforcement of most national compensation regulations (including slow

transposition and limited enforcement of the ELD into national laws);

- Varying levels of protection and enforcement (e.g. through impact assessments and planning processes) in different parts of the EU for biodiversity that is not strictly protected by EU legislation; and
- Low levels of voluntary activity.

Nonetheless, current developments in Europe indicate that the region could be poised to make greater use of offsets and habitat banking. Interest in habitat banking is growing in Europe as evidenced by changes to the German compensation system, and pilot projects exploring its role, such as in France. Research in the UK and for the European Commission has examined adapting offsets and habitat banking (respectively) to the land management situation in the EU. Additionally, private enterprises for habitat banking are starting to appear.

The review below starts with the main example of compensation requirements, in Germany. Experiences with compensation in other countries that are relevant to the development of biodiversity markets are also summarized.

Germany – Impact Mitigation Regulations (Eingriffsregelung)

The 1976 Federal Nature Conservation Act in Germany introduced the Impact Mitigation Regulations (IMR).ⁱ This law is mandatory and precautionary, aiming to ensure “no net loss” by avoiding any damage, and restoration and replacement compensation for residual unavoidable impacts. It covers all natural assets under the German Federal Nature Conservation Act, including projects at the levels of both urban planning and sectoral planning. The IMR has strict additionality requirements and is regulated

ⁱ For a review of the program, see Chapter 3 in Darbi, M.; Ohlenburg, H.; Herberg, a.; Wende, W.; Skambracks, D.; Herbert, M.; (2009) International Approaches to Compensation for Impacts on Biological Diversity. Final Report. Accessed online in August 2009 at: http://www.forest-trends.org/documents/files/doc_522.pdf

by public (state) nature conservation agencies. It was integrated with Federal Building and Spatial Planning regulations in the 1990s, which introduced greater market-style flexibility, and this is continuing through current reforms.

Increased flexibility led to the use of compensation pools, collectively providing compensation areas and measures. Compensation is undertaken as a result of damage identified in planning (and other) processes, and is generally organised through state planning authorities. Development of these within German states has established the basis for dedicated private providers of compensation services. At present, the control of the compensation process via the state means it is not a fully functioning market, and as a result the volume of the market is unknown. However, data from the state register in Bavaria (one of 16 German states, but accounting for 20% of the land area) identify over 1,000 new sites in the six months to September 2009 resulting from the German Impact Mitigation Regulation. Compensation sites in Bavaria conserve an average of about 2,600 hectares per year (for 2008-2009)ⁱⁱ.

The compensation pools approach has brought a number of advantages, overcoming obstacles to IMR implementation,^{4,5} but also introduced various risks and problems:

- Compensation not secure in perpetuity;
- Long-term monitoring required;
- Land availability constraints;
- Loose spatial and functional equivalence between debit and credit;
- Wide variety of methods used to assess equivalence;
- Disputed evidence on additionality; and
- Targets for different habitat types not always established.

Reforms to the Nature Conservation Law are planned which intend to standardize the use of compensation measures, the reconnection of habitats, long term management and maintenance, and the level and calculation of compensation payments. Reforms will also weaken the distinction in the mitigation hierarchy between in-kind and on-site restoration and compensation (out-of-kind and off-site). Finally, reforms intend to provide state level regulation of the storage of 'credits' in compensation pools, trading of credits, and their long-term management. These reforms, and the recent involvement of private agents in the compensation pools process, suggest that biodiversity compensation practices in Germany may develop into more market-based systems in the near future.

United Kingdom

There is extensive experience in the UK of determining compensation requirements under the EU Habitats Directive. Examples in the UK that reflect features of a more developed biodiversity offsets program (see 'Developments' below) include several schemes compensating for loss of inter-tidal habitats in relation to Port developments and flood protection works. Several of the credit sites are managed by a large biodiversity NGO, the Royal Society for the Protection of Birds, which has extensive experience of habitat creation and management. Their compensation deals to date have typically involved selling a small part of a large biodiversity enhancement project, the majority of which they manage to deliver net biodiversity gain.

Some innovative actions are emerging in relation to these compensation activities in the UK. For example, at Alkborough in the East coast of England, Associated British Ports (ABP, a major port operator in the UK) have sold 25 hectares of land it owned within what is now a larger habitat

ii
Ohlenburg, personal communication, 2010

creation site to the Environment Agency,ⁱⁱⁱ in what can be described as an option contract. In exchange, ABP will be able to secure a credit of 25 hectares of intertidal habitat, with the exact nature of the credit (i.e. the exact area within the larger site) being flexible in order to deliver the specific equivalency to the debit (expected from forthcoming developments at its nearby port of Goole), as required under the Habitats Directive.

Development plans for coastal industries such as ports mean that operators in the UK are investigating purchases of land to hold in reserve for further compensation actions in the future. In this sense, they are beginning to operate land 'banks' within their development strategies. A current limitation on this approach is uncertainty over the geographical range across which compensation can be delivered.

Sweden

The concept of environmental offsets has been discussed in Sweden since the middle of the 1990s, but the country's Environmental Code incorporates offsets that are mandatory in only a few cases. Legal regulations that provide for offsets attached to different permits, approvals and exemptions granted are not used extensively by the licensing authorities, even though some compensation measures for road building are undertaken by the Swedish Roads Administration.⁶ With the exception of certain nature reserves including Natura 2000 areas, Sweden presently does not have strong legally binding requirements for environmental offsets. There have been several voluntary attempts in Swedish municipalities to implement environmental offsets in urban development planning (Gothenburg, for example).⁷ To date, there have been no proposals for the implementation of banking or compensation pool schemes in Sweden.

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ⁱⁱⁱ The Environment Agency for England and Wales, an implementation agency of Defra.

Developments

United Kingdom

There has been recent research conducted by the UK Government on **biodiversity offsets**,⁸ which is also attracting interest from the main opposition political party.⁹ Therefore significant developments of biodiversity markets in the UK are a realistic short term prospect.

France

France has had an environmental protection law on the books since 1976 (Loi n° 76-629 du 10/07/76 relative à la protection de la nature) which requires avoidance, minimization, and compensation of impacts to the environment. The law, however, had not catalyzed offset activities until 2009. In May of last year, CDC Biodiversité (a subsidiary of the French financial institution Caisse des Dépôts et Consignations) launched the first **biodiversity bank** in France, and intends to sell biodiversity credits in advance of impacts from development.^{10,11} The site is comprised of 357 hectares of abandoned orchards near Saint Martin de Crau in the south of France, which will be restored to semi-arid steppe.

Switzerland and the Netherlands

While **Switzerland**¹² and **the Netherlands**¹³ have laws enabling compensation, we were unable to find information details of the programs or information to indicate the scale of activity in the programs.

Eastern Europe

Biodiversity markets are poorly developed in Eastern Europe, and the limitations to compensation drivers in Europe described above are prevalent here. A variety of different land use and economic conditions across the EU, in particular in newer Member States in Eastern Europe, may inhibit the

development of biodiversity markets. There are, however, examples^{iv} of experience relevant to biodiversity markets indicating some very early developments:

- In **Poland**, two national funds,^{v,vi} support biodiversity projects (but mainly targeting infrastructure, e.g. water management).
- Fieldfare,¹⁴ a company that invests in habitat creation by a private enterprise in **Romania**, **Bulgaria** and **Ukraine**.
- Biodiversity Technical Assistance Units (BTAU)¹⁵ have been developing a business-biodiversity banking framework in **Poland**, **Hungary** and **Bulgaria** for several years. BTAUs provide a pool for expertise from within public, private and third sectors to assess and evaluate biodiversity impacts. The expertise is engaged as needed for projects through standing contracts for call-off work. They can thus supply monitoring skills for biodiversity projects. They also have access to relevant information (e.g. species population trends) necessary to put project impacts in context.

Overall biodiversity markets are not an immediate prospect in much of Eastern Europe, but there are several factors that suggest they are a realistic future prospect:

- The polluter pays principle is widely accepted;
- The legal and institutional capabilities required for offsets exist in many countries;
- There is generally sufficient data available on biodiversity distributions and targets;

iv Based on information gratefully received from: Zbig Karpowicz, European Country Programmes, Royal Society for the Protection of Birds (RSPB); Mark Hughes, European Bank for Reconstruction and Development; Lars Lachmann, Polish Society for the Protection of Birds /RSPB; Paul Goriup, Fieldfare.

v The National Ecofund, established through a debt for nature swap in the 1990s, totalling several \$100m, www.ekofundusz.org.pl/us/ecoact.htm

vi Polish National Fund for Environment Protection & Water Management (NFOSIGW) which hypothecates fees and fines from industry to finance environmental measures www.nfosigw.gov.pl



- The skills (in public or private sectors) to undertake biodiversity enhancements, and manage and monitor these are available (although may be limited in scale); and
- There has been hypothecation^{vii} of public funds into compensation actions (e.g. in Poland).

European Union

Research has been undertaken for the European Commission during 2009 to examine the potential use of **habitat banking**^{viii} in the **European Union** (EU) as an economic instrument for biodiversity protection.^{ix}

After comparing habitat banking to other market-based instruments, the research conducted for the European Commission concluded that habitat banking could offer a useful additional instrument to help biodiversity policy move towards a 'no net loss' objective.

vii "Allocation of public funds raised from sources of environmental damage"

viii The research defined habitat banking as "a market for the supply of biodiversity credits and demand for those credits to offset damage to biodiversity (debts). Credits can be produced in advance of, and without ex-ante links to, the debits they compensate for, and stored over time".

ix Led by Economics for the Environment Consultancy (eftec) and the Institute for the European Environmental Policy (IEEP). The resulting reports are expected to be published on the European Commission's website.

Habitat banking is an attractive option for the EU because while the most threatened biodiversity is already strictly protected, biodiversity loss continues, often through low-level, cumulatively-significant impacts. Offsets consolidated in habitat banks could align with land-use planning at a strategic level to optimize the type and location of offset measures within EU constraints of limited land available.

Three potential types of compensation systems were proposed in the research conducted for the European Commission:

- Option 1: Providing a supply of habitat/species (credits) which may, in specific circumstances, be used to compensate for adverse impacts on Natura 2000 sites.
- Option 2: Enabling, through impact assessments and planning regulations, a system of compensation for significant adverse residual impacts on other important biodiversity in Europe, in particular effects on species populations and their habitats outside Natura 2000 sites.
- Option 3: Providing a mechanism for offsetting cumulative impacts on biodiversity (other than that covered in options 1 and 2, and thus likely to be less endangered) that are minor when considered in isolation, but which are cumulatively a significant factor in ongoing biodiversity decline and loss in the EU and mostly not compensated for at present. This would represent a new compensation obligation for biodiversity damage, covering biodiversity impacts that do not qualify under options 1 and 2 above because a) the biodiversity is not endangered enough (i.e. widespread and common species), or b) the impacts are not significant enough.

Option 1 could occur under current laws, but would likely need additional guidance (e.g.

on Habitats Directive Article 6(4)). For options 2 and 3 to be effective, there would need to be additional laws and/or regulations, guidance, or monitoring capacity to create the obligation to compensate for unavoidable residual damage to biodiversity, and therefore an incentive to purchase credits.

The potential for habitat banking in the EU is limited at present as the demand for credit will be low due to the limited scope of current compensation requirements for damage to biodiversity in relevant supporting laws. If the current requirements are strengthened or new requirements are created in line with objectives for no net loss of biodiversity, then a viable habitat banking market could be developed in the EU.



By the numbers

Number of active programs:	4
Number of programs in development:	4
Total known regional payments per annum:	> US\$390 million
Total known area protected or restored per annum:	> 26,000 hectares
Total known active and sold-out banks:	2

General Status Update

At present, the majority of offset-like programs in Asia fall within the category of Environmental Impact Assessment (EIA). Countries with EIA laws or policies are: China, India, Japan, Malaysia, Mongolia, Pakistan, Russia, South Korea, and Thailand.ⁱ There are two examples of offset programs that our research uncovered: China's Forest Vegetation Restoration Fee and Saipan's Upland Mitigation Bank (see below). The region's EIA policies may lay a framework for biodiversity markets by requiring adverse environmental impacts to be mitigated, but so far no third-party mitigation systems are known to be operating in Asia. Our research found mention of a 2001 municipal compensatory mitigation ordinance in the Japanese city of Shiki requiring re-vegetation on a one-to-one basis for impacts from public projects, but information on the current status of the program is not available.² We also found information on two individual compensatory conservation projects: a Biodiversity Conservation Area of 393,618 hectares established in Laos to compensate for impacts from development of a hydropower facility, and the Sary-Chat Ertash Zapovednik nature reserve created in Krygystan in part to mitigate the effects of an open pit gold mine.³

i McKenney, personal communication, 2009.

Beyond government-led actions, voluntary and industry initiatives are arising in Asia, driven primarily by increasing public criticism of the environmental and social impacts of extractive and agribusiness industries. The Roundtable for Sustainable Palm Oil, an industry group, has been exploring the use of biodiversity offsets to allow plantations established between November 2005 and November 2007 to meet the criteria of the Roundtable on Sustainable Palm Oil certification program, even where the High Conservation Values (HCVs) of the land's pre-plantation condition are unknown.ⁱⁱ

ii Desilets, personal communication, 2009



Existing Programs

China's Forest Vegetation Restoration Fee

While China has a multitude of 'eco-compensation' schemes, the majority of schemes fall under the category of government-mediated payments for ecosystem services.⁴ Many of the programs are focused on water quality and flood mitigation services rather than biodiversity. The one program with a biodiversity compensation focus is the Forest Vegetation Restoration Fee, a national regulatory program that requires developers impacting lands zoned for forestry to avoid, minimize, and then pay a Forest Vegetation Restoration Fee. The program has its basis in the Forest Law of the PRC (1998), with details provided in the 2002 Forest Vegetation Restoration Fee Levy, Use and Management Provisional Measures. The funds from the fee are used by the government for tree-planting and forest restoration activities at a minimum ratio of one square meter mitigated for every square meter impacted. An interesting aspect of this program is that the categories of forest that must be compensated and the fee specified for each are not ecosystem-based, but rather are based on the forest-use zoning. For example, there are differing fees for impacts to 'economic forestland', 'non-mature plantation forests', and 'national key protected forestland'. It is unknown whether the fee collected must be used to offset with a 'like' category of forest. The program collected a total of RMB 8.044 billion from 2003-2005, or around RMB 2.7 billion annually (about US\$393 million).⁵ To our knowledge, this program does not attempt to account for the ecological quality of the forest.

Saipan's Upland Mitigation Bank

Saipan, part of the US Commonwealth of the Northern Mariana Islands, is the location of the Saipan Upland Mitigation Bank. The bank sets a precedent as the first mitigation bank in the

region and follows the US mitigation banking system. Established in 1998 to protect the habitat of the Nightingale Reed-Warbler, a bird on the Endangered Species List since 1970, the bank's surrounding areas are under pressure from homestead development. The bank has 418.9 hectares under protection, with a proposed expansion of 62.4 hectares.^{6,7}



Voluntary Malua BioBank

In 2008, the government of Sabah, Malaysia teamed up with the Eco Products Fund, a private equity investment vehicle jointly managed by New Forests Inc. and Equator Environmental, LLC, to invest up to US\$10 million in the restoration and maintenance of 34,000 hectares of rainforest in a project called the Malua BioBank. The project sells "biodiversity conservation certificates" (BCCs) for the biodiversity benefits of 100 square meter plots of restoration as well as for the maintenance of the habitat for at least 50 years. The project is unique for enabling the long-term (and potentially permanent) protection of biodiversity via a voluntary purchase. Additionally, the project provides transparency through a third-party registry.⁸ Early buyers have included businesses and non-profits from a range of industries, such as tourism, timber, and palm oil. The Malua BioBank is offering

to link the conservation credits to companies' specific products or supply chains, and the BioBank is also starting to develop biodiversity offset products where a company is seeking to quantify and offset measurable conservation impacts.^{9,10}

Developments

While there are only two known government-based offset programs in Asia, there are very early indications that offset programs or policies may be developing in **Indonesia**, **Malaysia**, **Vietnam**, **Mongolia**, and possibly Taiwan and South Korea.

Developing offsets programs in **Indonesia** are strongly focused on carbon, particularly Reducing Emissions from Deforestation and Degradation (REDD). However, with deforestation from the forestry and oil palm industries affecting charismatic animals like the orangutan, some non-profit, government, and multilateral organizations have identified an opportunity to use offsets with a specific focus on biodiversity.^{11,12} In addition, Indonesia's 'ecosystem restoration' license, which allows license-holders to restore previously logged forest concessions and develop carbon or REDD credits, could form the basis for future biodiversity offset projects.

In the **Malaysian state of Sabah**, there has been recent interest in implementing a third-party mitigation system that could include habitat and biodiversity compensatory mitigation. Such a program could be based on the Environmental Protection Enactment (EPE) of 2002, which includes the first steps towards creating a habitat mitigation banking market by requiring mitigation for environmental impacts. To date, there is no approval process for or a clear pathway to utilize third-party mitigation to fulfill the environmental requirements of the EPE.

Vietnam passed a biodiversity law that went into effect July 1, 2009 that covers Compensation for Damage to Biodiversity (article 75) and stipulates that damage payments or compensation will be required and "reinvested in biodiversity conservation and sustainable development."¹³ Details of the implementation of Vietnam's Biodiversity Law will be spelled out in a forthcoming decree – expected sometime in 2010.

Mongolia's government has shown interest in biodiversity offsets, particularly around future developments in oil, gas, and mining. The Nature Conservancy has been working with the government on the 'Development by Design' approach to prioritize areas suitable for offsets. The approach will be tested in Eastern Steppe Region.ⁱⁱⁱ

Finally, we have seen dated references to political proponents of 'no net loss' of wetlands and wetland banking in **South Korea** (prior to 2008) and **Taiwan** (in 2007), but it is unknown whether activity has moved beyond the investigation stage.^{14,15}

iii
McKenney, personal communication, 2009.

Australia & New Zealand



By the numbers	
Number of active programs:	12
Number of programs in development:	5
Known credit types:	42
Total known active and sold out banks:	3

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General Status Update

Australia does some of the most advanced research and design on market-like mechanisms for biodiversity conservation in the world. The region has a rich history of experimentation with biodiversity offsets, payments, and pilot projects. A number of factors make this country fertile ground for biodiversity markets: a general acceptance of market-like instruments for conservation, highly unique and endangered biodiversity, and great biological data and research capacity (i.e. CSIRO's Ecosystem Services Project and Markets for Ecosystem Services¹). Although, there seems to be little coordination between programs, making it a challenge to monitor how this part of the world is developing.

Australia and New Zealand have twelve biodiversity offsets programs and five in development. All but one of the Australian programs are state or regional programs. At this point, all of the Australian and New Zealand offsets are compliance-based with most offsets determined on a case-by-case basis during the planning process.

The 'buyers' of offsets are: urban residential and commercial developers, road-building agencies, water infrastructure (dams and pipelines), extractive industries, energy companies, and agricultural landowners. The providers of offsets are the development proponent, landowners, and the government.

Market data like area, price, or transactions of offsets were difficult to track. Most programs could not provide this information, and some programs admittedly did not track this information. One notable exception was the BushBroker program – which tracks transactions, average prices, and price ranges (see below in the BushBroker section). Another exception is the BioBanking program, which will make all trades and offers of offsets available on their website. As of this writing, however, information is not available as trades have not yet occurred.

There is a considerable lack of private sector involvement in current market-based instruments in Australia and New Zealand. While many of the policies and programs allow third-party involvement there are disincentives to do so. For example, the BioBanking program requires that the BioBanking Trust Fund be

paid before the landowner. The lack of legal severance from liability is also a barrier to private sector involvement (with the exception of BioBanking). A developer needing an offset has the responsibility that the offset occurs and is managed according to requirements whether or not the developer creates its own offset or purchases an offset from a third party.

A number of legal issues arise with regard to offset programs in Australia. First, most offsets are permanently protected, but without sufficient funds for long-term management. This is a significant issue in a country where invasive pests which must be actively managed are a major threat to native species. Second, the majority of rural land in Australia is 'leasehold land', where permanent protection cannot occur. Third, there is a possibility that offsets may not provide additional environmental gains over what is already occurring on the land or what may be occurring due to competing incentive programs (e.g., double-counting). Finally, some of the mining legislation in Australia has the power to override all other legislation, which erodes the power of compliance-based programs to require offsets.

Existing Programs - Victoria

BushBroker and Native Vegetation Offsets

BushBroker is a program to facilitate native vegetation offsets in the State of Victoria. The program is compliance-driven as permits are required to clear native vegetation. Victoria's 2002 *Native Vegetation Management Framework: A Framework for Action* policy sets a 'net gain' objective and provides the framework for offsets. In 2006, the BushBroker program was initiated to help those clearing native vegetation find offsets.²

The BushBroker program works primarily on the supply-side, identifying landowners willing

'Habitat Hectares'

Habitat Hectares is a term frequently used in Victoria. It refers to units of measurement that takes into account the area affected and the quality or condition of the biodiversity impacted (determined by the quantities of a number of chosen attributes related to the structure, composition and function of that habitat).³

to preserve and manage native vegetation. A government representative of the BushBroker program then assesses the site and determines the number and type of credits available. Both credits created and needed from development impacts are assessed using the same 'habitat hectares' methodology. Credits are created through conservation gains from management actions, protection, maintenance of quality, and improvement. The BushBroker website notes that potential buyers of credits would be able to search for credits on the Native Vegetation Credit Registry. However, in practice this is not a publicly accessible online database.¹

While a mitigation hierarchy of avoidance and minimization (before offsets) is required in the Native Vegetation Regulations under the Planning and Environment Act of 1987, much of the detail of the demand-side of biodiversity offsets in Victoria is laid out in the 2002 *Native Vegetation Management* policy. The Framework details impacts that must be offset (and which impacts must or should be avoided), 'like-for-like' conditions, and requirements for the proximity of offset relative to the impact site. Neither impacts nor offsets are allowed in areas of 'very high' conservation significance except in 'exceptional circumstances.' Clearing in 'high' or 'medium' areas of conservation significance is generally not permitted, but some clearing may be permitted in areas of 'low' conservation significance.⁴

i Juniper, personal communication, 2010

The credit traded can be defined by three possible units: vegetation or habitat; 'large old trees' (LOTs); and 'new recruits' (i.e., tree planting). The first of these credit types, offsetting of vegetation or habitat, is based on area and site-quality measured by the 'habitat hectares' methodology (see box above). These credit types are based on ecological vegetation classes (EVCs) within Victoria's 28 bioregions, accounting for 2,500 possible types of EVC credits. However, due to the location of development and associated impacts, only 50-100 EVC credits are used in practice. To date, BushBroker has worked well to match buyers with sellers of offsets, despite the large number of credit types that could be required for impacts.ⁱⁱ A sample of 'wanted' EVCs listed on the BushBroker website are: Plains Grassy Woodland, Damp Heathy Woodland, Banksia Woodland, and Stony Knoll Shrubland.⁵

Credit demand generally comes from road building, housing development, water supply pipeline development, and landholder vegetation clearance. Demand has been modest, with vegetation clearing applications only totaling a few hundred hectares of land annually. However, planned expansion of Melbourne is expected to impact 5,200 hectares of native vegetation and the Victorian government is proposing a new reserve of over 10,000 hectares that will provide credits through BushBroker over the next decade.ⁱⁱⁱ In effect the government will be creating a consolidated bank of credits.

Offset supply has generally been from agricultural landowners, but in limited circumstances the government accepts payments in lieu of offsets with money used to purchase credits. To date, there are three active and sold-out banks and there may be an additional two to three banks that will be developed over the next year or so:^{iv}

- One active bank for scattered trees (about 20,000 plants),
- One sold-out bank to offset scattered trees (6,000 plants), and
- One bank in operation selling credits of habitat hectares (130 hectares) and LOTs.

The Victorian government will increase their role as a broker in the BushBroker program by providing online tools, hands-on outreach and facilitation with landowners. The government is also planning to facilitate the creation of banks in bioregions with sufficient credit demand. Additionally, a trial auction will be held to generate competition for new credit supply in banks.⁶

While landowners in Victoria have the ability to sell offsets to developers within the BushBroker program, there are other financial incentive programs for native vegetation protection and management in Victoria that have become



ii Crowe, personal communication, 2009

iii Ibid.

iv Ibid.

popular. BushTender and PlainsTender have four- or five-year agreements (versus the permanent protection required by BushBroker) and have delivered more financial incentives and hence more hectares protected or improved than BushBroker. Currently, BushTender has delivered 17,000 hectares, PlainsTender 5,000 hectares, while BushBroker has delivered 700 hectares.^v

v Ibid.

BushBroker Data

The BushBroker program, which measures the success of its brokering services by transactions, tracked 35 offset transactions in 2007/2008 and 63 in 2008/2009. In BushBroker, there is a current assessed stock of about 2,750 hectares (or 600 habitathectarescredits) of supply available within BushBroker, with more than twice this amount listed as unassessed 'expressions of interest.' Other metrics tracked by the BushBroker program are summarized below.

BushBroker Data				
Total habitat hectares of offsets: 522.75 (cumulative, from May 2006 - November 2009)				
Estimated dollar volume of offsets (for 2008/2009): AUS\$1,406,915				
Estimated dollar volume of offsets (cumulative, from May 2006 - November 2009): AUS\$11,358,720				
Transactions				
2007/2008*		2008/2009*		
35 offset transactions		63 offset transactions		
49.2 habitat hectares		11.23 habitat hectares		
264 'large old trees'		166 'large old trees'		
6,959 'new recruits'		13,140 'new recruits'		
Credit pricing for habitat hectares alone or habitat hectares + Large Old Trees (LOTs) between May 2006 -November 2009**				
Bioregion	Average price per habitat hectare***	Habitat hectare price range****	Total number of habitat hectares	Estimated AUS\$ volume of offsets
Goldfields	\$39,000	\$17,000 - \$86,000	35.8	\$1,396,200
Victorian Volcanic Plain	\$167,000	\$36,000 - \$293,000	49.28	\$8,229,760
Gippsland Plain	\$156,000	\$85,000 - \$250,000	4.91	\$765,960
Other bioregions	\$80,000	\$16,000 - \$157,000	6.76	\$540,800
Credit pricing for LOT credits between May 2006 - November 2009**				
Bioregion	Average price per habitat hectare***	Habitat hectare price range****	Total number of habitat hectares	Estimated AUS\$ volume of offsets
All bioregions	\$1,000	\$300 - \$2,900	426	\$426,000

* Note: Variation in habitat hectare figures between 2007/2008 and 2008/2009 reflects some pent-up demand in 2007/2008 and delays in signing contracts for trades that were agreed in 2008/2009 but will be attributed to 2009/2010.

**Note: Adapted from VIC DSE, 2009. Prices are negotiated between landowners and permit holders and are inclusive of costs of a 10-year management agreement and permanent protection. Prices may be solely for habitat hectares or habitat hectares + Large Old Trees

***Average of total agreements.

****Price range of 80% of agreements

Data Sources: Crowe, personal communication, 2009; VIC DSE, 2009⁷

Existing Programs - New South Wales

In New South Wales (NSW) approval authorities have increasingly sought offsets over the last 20 years where projects would have significant effects on biodiversity values. Traditionally the size, type, and location of NSW offsets were negotiated with approval by authorities on a case-by-case basis. Negotiation on biodiversity offsets is still frequent within NSW, but there are increasing regulations and offset schemes. These range from the local to the state level. A number of local authorities, such as Liverpool City Council, have now introduced offset policies.^{vi}

BioBanking

The New South Wales (NSW) Biodiversity Offsets and Banking Scheme (BioBanking) is a state program driven by regulatory requirements to offset impacts from urban development. As the name implies, the BioBanking program allows offset activities to occur in a 'biobank' site by third parties or by those needing credits themselves. The program calls itself a biodiversity credit market because the scheme creates: 1) a demand for credits; 2) a financial incentive to create credits; and 3) a 'trading floor' (public registry) for buyers and sellers to find one another. The BioBanking program also has an associated Assessment Methodology, Credit Calculator, and Trust Fund.^{8,9}

The BioBanking program was born in 2007 from several pieces of legislation: the Environmental Planning and Assessment Act of 1979 (NSW), the Threatened Species Conservation Act of 1995 (NSW), and the Threatened Species Conservation (Biodiversity Banking) Regulation of 2008 (NSW). Up until the fall of 2009, the program has existed as a pilot program, testing the BioBanking Assessment Methodology and process. As BioBanking has only been officially

'live' since the fall of 2009, no trades have occurred but there are six BioBank sites in the application process.^{vii} Cost and price points are not yet available.

Developers can voluntarily use the BioBanking program to minimize and offset biodiversity impacts. To participate in the program, development projects must meet an 'improve-or-maintain' test that requires adherence to a mitigation hierarchy (avoid, minimize, offset), and then determines the project's impact on biodiversity. Impacts and required offsets are calculated with the BioBanking Assessment Methodology and its associated Credit Calculator software. Credits are created through protection and management (i.e., managing grazing, fire, weeds, and human disturbance) of ecological communities, threatened species, and habitat corridors. BioBanking requires a 'like-for-like' trade of credits associated with a complex number of ecosystem and species types related to 50-100 vegetation types and over 1,000 threatened species in 13 bioregions.^{10,11}

A search of the BioBanking registry 'expressions of interest' for the creation of BioBank sites yielded 15 potentially available credit types, including the following sample:^{viii} dry sclerophyll forests (shrub/grass); grassy woodlands; semi-arid woodlands (shrubby); wet sclerophyll forests (grassy).¹²

The pilot BioBanking program was set up with a public registry of available and retired credits.¹⁴ The only aspect of the registry with available information at the time of publication is the 'expressions of interest.' Experience during the pilot showed that the intended 'trading floor' – the listing of available credits – was not actually used. Instead, developers lined up the offsets

vii Nicholson, personal communication, 2009

viii Note: these credit types are a broad aggregation of all the ecosystem types that exist within them. For example, 'grassy woodlands' might encompass: white pine narrow-leaved ironbark shrubby and grassy open forest; pilliga box/poplar box/white cypress pine grassy open woodland on alluvial soils; grassy white box woodland; or other ecosystem types.¹³ See Methods Appendix for full list of credit types.

vi Ward, personal communication, 2010



themselves. Early experience in BioBanking has shown that high upfront costs (of AUD \$50,000 - \$60,000) may damper speculative offset development by landowners. Payments to landholders for management of offset sites are centralized through a government-managed BioBanking Trust Fund, which distributes annual payments to BioBank owners for management of the BioBank site. Landholders can charge those purchasing credits any agreed sum, but will only receive funds after the Trust Fund is paid (note that these monies or 'profits' are separate from the management funds deposited in the Trust Fund).

So far, the players in the BioBanking market are the regulator (NSW Department of Environment, Climate Change and Water, or DECCW), the buyers (developers, transportation, wind farms, and extractive industry), consultants accredited to conduct BioBanking assessments of sites, and offset brokers (e.g. Eco Logical Australia). A shift in energy policy may result in a much larger demand from wind farm development. Also NSW DECCW is considering a catchment-wide offset development strategy and sees themselves in the role of broker. As noted before, developers have been supplying their own offsets so far, but landowners could also supply offsets.

Property Vegetation Plan Offsets

While BioBanking applies to offsets for development, agricultural clearing is regulated

under NSW's Native Vegetation Act of 2003, and includes an offset scheme through the Property Vegetation Plan (PVP) process. The PVP scheme was the fore-runner to Biobanking, but the scheme applies mainly to agriculture and offsets are normally created on the landowner's land.^{ix} Because offsets within this program are 'internal' trades, there are no purchase values available. NSW DECCW keeps a register¹⁵ of the area of land cleared and offset, amongst other information. From 2005 through the end of 2009, there have been 421 PVPs approved, with 8,865 hectares of cleared or thinned land and 25,564 hectares of offset (in 2009, there were 1,983 hectares of cleared or thinned land and 7,341 hectares of offset).

Existing Programs - South Australia

Native Vegetation and Scattered Tree Offsets

South Australia features a Native Vegetation and Scattered Tree Offsets program driven by requirements in the Native Vegetation Act of 1991 and the Native Vegetation Regulations of 2003. The former requires a permit for native vegetation clearing, and the latter requires offsets, called a 'significant environmental benefit' (SEB), after a mitigation hierarchy is followed.¹⁶

When a development impacts native vegetation or scattered trees, offsets can be provided either on-site by the developer or by a payment to a government fund (Native Vegetation Fund), which then creates the offset. The offset occurs either on the property or in the same Natural Resource Management Region (with 8 regions in the state) and is created by managing, restoring, or re-vegetating areas of native vegetation. The greatest demand-driver for offsets in the region is mining, with landowners, state government, and extractive industries supplying the offsets.

^{ix} Ward, personal communication, 2010.

The program encourages ‘like-for-like’ or ‘like-for-better’ offsets. The unit of credit is based on either area or individual ‘scattered trees’ using a simple ratio system (from 2:1 to 10:1, depending on the quality of vegetation being cleared). There are three sets of guidelines for offsets for: 1) mining (which is generally applied to all broad-acre impacts), 2) clearance of scattered trees, and 3) less formal guidelines for clearing of native vegetation for individual house sites.¹⁷

South Australia is in the middle of changing legislation of the program to give preference to locating offsets in priority areas. The state is also investigating developing a new credit quantification system as well as a monitoring and evaluation framework for the offsets program. The state has one unique offset project that has allowed a tourism operation company to pay a levy to the government over a ten-year period instead of using a one-time offset. The levy is expected to bring in around AUS\$50,000 annually, with funds directed for use in biodiversity offsetting.^x

Another program being termed ‘biodiversity trading’ is the Drainage Levy-Biodiversity Conservation trading program (aka USE Project Levy/Biodiversity Offset Scheme), although the program does not require an offset for an impact to biodiversity, but rather promotes the protection and management of biodiversity as an alternative to paying a levy for drainage services. The South Australian Farmer’s Federation runs the levy offset program and conducts the assessments.^{18,19}

Existing Programs - Queensland

Queensland wins the prize for the most offset policies. There are currently three specific-issue offset programs running in Queensland: vegetation offsets, marine fish habitat offsets, and koala habitat offsets. There is also an

x Dendy, personal communication, 2010.

overarching environmental offsets policy to guide the implementation of the specific-issue offset programs, a draft biodiversity offset policy (on hold as the state government goes through an election cycle), and a draft waste water discharge offsets policy that amounts to a water trading program.²⁰ None of the Queensland programs had information available to indicate scale.

One interesting aspect of Queensland is that approximately seventy percent of the land is leasehold – meaning it is owned by the government and leased out for periods of 10-30 years, making ‘in perpetuity’ conservation associated with offsets virtually impossible in a great portion of the state. Currently the driver for all the policies in Queensland is urban development (particularly in the southeast), followed by water infrastructure (dams and supply pipelines) and coal mining.

Environmental Offsets Framework Policy

The Queensland Government Environmental Offsets Policy of 2008 does not implement a particular offset requirement, but establishes an overarching framework for a specific-issue offset policy development and implementation. The policy stipulates that a loose mitigation hierarchy (avoid and, if not possible, then minimize impacts) should be incorporated into all offsets.^{21,22}

Vegetation Management Offsets

The Vegetation Management Offsets policy (amended September 2007) was enacted to “maintain the current extent” of native vegetation.^{23,24} After following a mitigation hierarchy, the policy allows offsets to compensate for clearing native vegetation and includes a standard method for determining ecological equivalence of offsets and a standard set of offset options. The Vegetation Management Act of 1999 regulates the clearing of vegetation over

all land tenures in Queensland. Development applications that require vegetation clearing are assessed against a Regional Vegetation Management Code (RVMC). Offsets can be used to meet some of the performance requirements under the RVMC.²⁵

Applicants for native vegetation clearance may create their own offsets within a 20-km radius of the impacted vegetation. Financial donations to a compensation fund are not allowed. Impacts are measured by the area cleared and offsets are required at ratios of 1:1 to 4:1 (offset to impact). Vegetation Management Offsets are created by maintenance and protection of particular ecosystem types. Offset option guidelines are provided in table format, focusing on the differing ratios of offset to impact and 'ecological equivalence.' The offset must consider characteristics like: comparable vegetation (community attributes and condition), area, location, strategic position, regaining remnant status, and landscape context attributes.

Ecosystems are categorized by their status, 'endangered' (less than 10% of the ecosystem remaining), 'of-concern' (10-30% remaining), 'essential habitat' (vegetation in which a species that is endangered, vulnerable, rare, or near threatened has been known to occur), vegetation associated with wetlands, vegetation associated with watercourses and ecosystems at risk of falling below critical cut-offs. As of March 2009, there have been 62 native vegetation offsets required, but only eight have been finalized.²⁶ No figures are available as to the area of the offsets.

Marine Fish Habitat Offsets

The first offset policy implemented in Queensland, the marine fish habitat offsets program, is driven by compliance for impacts to activities causing fish habitat loss under the 2002 policy Mitigation and Compensation

for Activities and Works causing Marine Fish Habitat Loss FHMOP 005. The policy covers impacts on mangroves which essentially affects all coastal development in the state. It also contains a 'no net loss' statement and requires permit applicants to follow the mitigation hierarchy before offsetting the loss of fish habitat.²⁷

Direct offsets are preferred; however, the regulator (the Department of Primary Industries and Fisheries) does accept an 'offset amount' in lieu of the direct offset. Direct offsets are created through enhancement, restoration, rehabilitation, or creation of fish habitat, or the exchange or securing of fish habitat in certain circumstances. Indirect offsets include applied research and education, training, or extension related to fish habitats.²⁸



The policy includes mention of 'like-for-like' in terms of habitat types (mangrove, seagrass, saltcouch, and bare areas), habitat status, and habitat functions. There is a fish habitat impact/offset metric in development which will be based on a field assessment of fish habitat condition and the area of disturbance/gain at the impact site and offset site.^{xi}

xi Dixon, personal communication, 2009

Koala Offsets

Queensland's Koala Offsets program is driven by compliance for impacts to koalas and koala habitat under the *Nature Conservation (Koala) Conservation Plan of 2006 and Management Program 2006-2016, Policy 2: Offsets for Net Benefit to Koalas and Koala Habitat*,^{29,30} enforced by the Nature Conservation Agreement of 1992. Activities which result in habitat loss in Koala Conservation Areas and Koala Sustainability Areas must be offset by activities such as planting of cleared habitat or securing vegetated habitat that is under threat from development.³¹ The policy allows indirect offsets like projects to reduce vehicle mortality on koalas. Fees to a compensation fund, however, are not allowed. The policy requires a net benefit to koala habitat, with offset ratios of greater than 5:1.

Existing Programs - Western Australia

The State of Western Australia has a policy and guidance for environmental offsets: *Guidance for the Assessment of Environmental Factor: Environmental Offsets – Biodiversity Guidance Statement No. 19 and Environmental Offsets Position Statement No. 9*.^{32,33} A project proponent proposes a biodiversity offsets package during the Environmental Impact Assessment process when projects impact 'high' or 'critical' value biodiversity assets. Offsets can only be considered after following a mitigation hierarchy of avoidance, minimization, rectification, and reduction. The Environmental Protection Authority reviews the 'significance' of the impact, the extent and type of offset required on a case-by-case basis; there are no standard

Some Comparative Notes on Australia's Programs

- BioBanking is the only program that requires offset activities in advance of impacts.
- All programs have at least a like-for-like preference, but the specificity of the species or ecosystem types varies by program.
- Most offsets within Australia are not converted to credits that can be traded. Some of the more definable units of trade include: ecosystem credits and threatened species credits (BioBanking); habitat hectares of ecological vegetation classes (BushBroker); 'large old trees' (BushBroker); hectares of koala habitat (Queensland); and hectares of regional ecosystems (Queensland).
- Many of the programs have loose metrics for determining impact and offset activities and generally review offsets on a case-by-case basis. Only the BioBanking (New South Wales), BushBroker (Victoria), and Native Vegetation and Scattered Tree Offsets (South Australia) have more specific impact and offset calculation methods.
- All programs also have a preference for offset activities implemented in the same area (i.e., bioregion or river catchment) as the impact.
- Two programs offer the option of paying a government entity in lieu of providing a direct offset (South Australia's Native Vegetation and Scattered Tree Offsets program and Queensland's marine fish habitat offsets).
- Government agencies act as brokers in the BioBanking, BushBroker, South Australian Native Vegetation and Scattered Tree Offsets program, Queensland's multiple offsets programs (via the new ecoFundQ initiative), and possibly other programs in a more informal capacity. Consultants may also act as formal or informal brokers, although our research only identified two – Eco Logical and EarthTrade (for BioBanking and Queensland offsets respectively).

metrics for calculating impacts and determining offsets. Priority is given for offsets in the context of 'like-for-like' or 'like-for-better', but indirect ('contributing') offsets are allowed. The policy goal is a 'net environmental benefit.' The 2008 guidance document states that offsets must be publicly registered, but to date, a registry has not been implemented.

Existing Programs - Tasmania

Development proposals in Tasmania require a 'natural values assessment' as part of the planning approval process. Developers present biodiversity offset proposals for impacts to threatened species and native vegetation communities to the regulator (the Department of Primary Industries, Parks, Water and Environment) for approval. Offsets are determined on a case-by-case approach, as there is no standard method for calculating impact and determining offsets. Developers are required to follow the mitigation hierarchy. The offset can be created via conservation measures or management activities, some examples of which are: improved conservation status of a site, management actions, restoration or revegetation, and research or surveys. Direct offsets are preferred, but indirect offsets may be allowed. At one point, payments to the regulator were allowed, but this practice is no longer preferred.^{34,35}

Offsets are also negotiated under different guidance specific to dam construction and forest clearing proposals. Also in Tasmania, Kingborough Council (local government) has been using offsets through the development application process for several years in an informal manner. Offsets are negotiated on a case-by-case basis. The Council has a draft biodiversity offset policy in place and is developing a new metric and implementation framework for the policy. As of 2008, there were 15 offset negotiations underway.³⁶



Existing Programs - New Zealand

The Resource Management Act of 1991 (NZ) and the Conservation Act of 1987 (NZ) implicitly suggest that biodiversity compensation may be required on private land and public land (respectively).³⁷ However, in practice the mitigation hierarchy of 'avoid, then remedy, then mitigate' has been described as being implemented in parallel: 'avoid OR remedy OR mitigate.'^{xii} There is concern in New Zealand that the current form of offsets may be used as a means to leverage development projects that would not otherwise be allowed.³⁸ To counter this threat, the Department of Conservation is leading a cross-department research program to both explore barriers to implementation of biodiversity offsets in New Zealand and to pilot offset measurement and accounting methods. As well, case law is moving in the direction of biodiversity compensation but rigorous offsets have yet to emerge, with one exception: a BBOP pilot project, Solid Energy New Zealand's Strongman Coalmine, includes measurement of impact and offset.

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Stephens, personal communication, 2009

Developments

Commonwealth Government

The Australia Federal government under the Environmental Protection and Biodiversity Conservation Act (EPBC) of 1999 released a draft policy statement and a discussion paper for the use of environmental offsets in November 2007.³⁹ Offsets can be used to meet the ‘maintain or enhance’ requirement under the EPBC, and it is proposed that they will be considered on a case-by-case basis, taking into consideration the scale and intensity of the impact. The offsets should be ‘like-for-like’ and be in the general vicinity of the development site.^{40,41} To date there has been no further public progress of this policy.

Queensland

Queensland is developing a ‘specific-issue’ **biodiversity offsets policy** under the Environmental Offsets framework.⁴² A consultation draft was made available in December of 2008, with a public comment period extending until March 2009. However, the final policy was postponed due to a state government election. After the March election, several government departments were amalgamated and the newly combined agency – the Department of Environment and Resource Management – will be releasing a new proposal for a State biodiversity offsets policy.^{xiii}

Further, Queensland local government authorities are also implementing their own local **offset policies in the planning process** in addition to the state government policies, such as the South East Queensland Regional Plan 2009 – 2013 and the South East Queensland Natural Resource Management Plan 2009 – 2013.⁴³ As the plans have only recently been released, the details of the new ‘offset’ programs are not yet known.

Another aspect of offset programs in Queensland is **ecoFundQ** – an initiative that is focusing on establishing an environmental offset market. ecoFundQ is a project of the Queensland Government that aims to find and secure offsets for Queensland government agencies (a broker), but with a broader aim of working on environmental offsets’ supply-side infrastructure. The initiative was launched in March of 2008 with initial work focusing on voluntary carbon offsets, but language suggests the program intends to be used for multiple environmental offsets.⁴⁴

Northern Territory

There is no biodiversity offset program in Northern Territory but within the recent draft **Darwin Harbour Regional Management Strategic Framework 2009-2013**, there may be a role for offsets. The draft plan states that economic development should not impose a net negative environmental impact and mentions offsets as a means of minimizing unavoidable impact. At this point offsets are in a very early stage of development.⁴⁵

New Zealand

In the **Waikato region**, there is interest in **biodiversity offsets**, and the concept is being advanced in a review of the Regional Policy Statement. The region will adopt the principles of avoiding or mitigating before offsetting, and it will reserve the right to reject offsets in areas of high significance.^{xiv}

xiii Gane, personal communication, 2009

xiv Bosak, personal communication, 2009



Introduction

There was a day when a farmer sitting in his kitchen selling corn futures on an electronic trading platform would have sounded as futuristic as Buck Rogers, but as we all know, that scene is relatively commonplace these days. Biodiversity markets are on that same trajectory from futuristic to unremarkable. Already governments and industry are increasingly looking toward market-like systems for biodiversity compensation and offsetting to better manage and minimize their impacts on biodiversity.

Our research finds 39 existing programs around the world, and another 25 in various stages of development or investigation. The global market size is \$1.8-\$2.9 billion at minimum, and likely more, as 80% of existing programs are not transparent enough to estimate their market size. And the conservation impact of this market includes at least 86,000 hectares per annum of land under some sort of conservation management or permanent legal protection.

While these numbers are encouraging, perhaps even more important are the many signs that the industry is tackling the critical and sometimes unpopular issues that surround these markets: quality assurance, accounting, transparency; all issues that will allow a fair, stable, and effective market to form, one that may be as ordinary as commodity futures are today.

Global Activity and Interest

Despite the global economic downturn that buffeted world markets in 2008, we are still seeing steady activity and strong interest in biodiversity markets. Regions with developed mitigation systems are not experiencing much market growth, but continue to see credit sales, perhaps because of the consistent mitigation needs of government and public infrastructure development. In regions without developed mitigation laws and markets, there is strong interest.

At the global scale, institutions are exploring market-like mechanisms to reduce biodiversity loss. In preparation for the Convention on Biological Diversity's 10th Conference of the Parties this year in Nagoya, Japan, workshops are being held to consider how biodiversity offsets and innovative financial mechanisms might fit into the Convention. There is a recently formed Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES)¹ to consider strategies to strengthen the science-policy interface for biodiversity and ecosystem services, much the way the IPCC (Intergovernmental Panel on Climate Change) supported policy development on climate change and carbon markets.

At the regional scale, we're also seeing interest in developing and improving biodiversity offset policy. Research has been undertaken for the European Commission during 2009 to examine the potential use of habitat banking in the European Union (EU) as an economic instrument for biodiversity protection. The United Nations Development Program is

leading an investigation into the potential for biodiversity mitigation markets in Latin America and the Caribbean. The United Kingdom is researching the potential of habitat banking to improve biodiversity protection. And in the US, the Environmental Protection Agency (EPA) and the US Army Corps of Engineers (USACE) have begun implementing 2008 regulations to improve the functioning of the mitigation markets in the US.

Quality Concerns and Strategic Planning

All the activity and interest in biodiversity markets has led to greater scrutiny of market design, practice, and outcomes. And rightly so. Markets are complex tools and only as beneficent as those who wield them... as we learned recently from Wall Street and the financial markets.

We are seeing NGOs and governments alike taking steps to ensure a strategic and landscape-scale approach to biodiversity offsets and compensation. Efforts in North America include the Environmental Law Institute's and The Nature Conservancy's recommendations for strategic placement of wetland and endangered species mitigation.² In countries like Mongolia and Colombia, TNC is beginning to implement its Development by Design landscape planning methodology.³ And in Australia, New South Wales is considering a catchment-wide offset development strategy for their BioBanking program,⁴ while South Australia is in the middle of changing legislation of the program to give preference to offsets in priority areas.ⁱ

Ensuring that compensation efforts contribute to broader landscape-level planning goals may be considered a best practice principle for biodiversity offsets. One initiative in

ⁱ Tim Dendy, personal communication, 2009



particular has been developing, testing and disseminating best practice on biodiversity offsets since 2004. The Business and Biodiversity Offsets Programme (BBOP, a sister initiative to Ecosystem Marketplace) is an international partnership of more than 40 leading conservation and civil society organizations, companies, governments and financial institutions. BBOP's work is based on on-the-ground experiences on biodiversity offset design with pilot projects around the world. At the completion of its first phase of work in 2009, the BBOP partners unanimously agreed to a set of biodiversity offset best practice principles and published a toolkit with methodologies for biodiversity offset design and implementation. The complete toolkit can be found at <http://bbop.forest-trends.org/guidelines/>.

Over the next several years, BBOP aims to make biodiversity offsets a more routine aspect of public and private infrastructure development projects. To do this it will involve more partners developing more pilot projects in order to improve offset design and implementation guidelines based on broader practical experience. BBOP will support a handful of governments at the national and state levels to develop policy frameworks that incorporate no net loss. A training and capacity-building program will help ensure there are enough professionals to support

companies as they design and implement high quality biodiversity offsets. BBOP is also developing tools to provide assurance that biodiversity offset projects are adhering to best practice principles, and eventually hopes to establish internationally agreed standards for biodiversity offsets.

Metrics and Accounting

In addition to efforts to improve compensation and offset strategy, the very units and systems we use to calculate ecological performance and success are under review. In New Zealand, there is an initiative to develop a measurement system based on susceptibility to loss.ⁱⁱ Similarly, Mandel et al. from Cornell University recently proposed a market for derivatives based on species decline or extinction risk. The derivatives market would provide a financial incentive to keep species from getting close to extinction and decrease the high costs of last-minute recovery for those that do.⁵ And finally, we've heard of the first example of an adaptive management financial security for a mitigation bank in the US. If a regulator finds new evidence that changes the habitat or restoration necessary for a species from what was originally agreed upon in the conservation banking agreement, the adaptive management security would provide finances for additional measures.ⁱⁱⁱ

It is also becoming apparent that we must soon deal with multiple ecosystem service credits and the issue of stacking credits. We are beginning to see conflicts arise because of ambiguity and lack of consensus in this area of credit accounting. In the US, a new office called the Office of Environmental Markets has been created to provide technical guidance and develop methods of measurement for all ecosystem services in the US. In an effort

ii Stephens, personal communication, 2009
iii Monaghan, personal communication, 2009

to gain some clarity on stacking in the US a coalition of organizations, including Electric Power Research Institute and World Resources Institute, has just launched a national survey to compile protocols, case studies, and opinions on credit stacking. There are also several scalable methods being developed in the US to calculate credits for multiple ecosystem credit types, including the Willamette Partnership's multiple credit accounting system, a related Defenders of Wildlife's Habitat/Biodiversity Metric Project, and the Northwest Habitat Institute's HAB Accounting and Appraisal System.^{iv}

Infrastructure and Capacity

In response to accounting challenges and economic and environmental opportunities, a number of efforts to bring transparency, credibility, and access to the markets are developing. Publications such as this one and those of groups like the Environmental Law Institute and World Resources Institute aim to provide information and understanding of the markets. However there is still much to be done. In almost all cases, basic information is fragmented and requires collection and analysis. SpeciesBanking.com, for example, is the first comprehensive information clearinghouse for an industry that is more than 15 years old. Like in all markets, increased transparency will inform decision making, improve accountability, and raise investor confidence.

Information tracking systems and credit registries are being adopted by regulators and industry alike to ensure better accounting of credits - and ultimately the credibility of the products and marketplace. Markit Environmental Registry (formerly TZ1) has launched an integrated multi-credit registry that serves multiple programs, including: the

iv Vickerman, personal communication, 2010, O'Neill, personal communication, 2010

Malua BioBank, the Willamette Partnership's multi-credit marketplace, the Bay Bank, and will soon add a pilot registry for conservation banks in the Sacramento area in California. On a national scale, the expansion of the USACE's tracking system RIBITS promises administrative efficiencies and greater transparency for both regulators and practitioners. While on the other side of the globe, the Australian states of New South Wales, Victoria, and Queensland also have tracking systems in place or in development.^{6,7} Together these and other initiatives are forming the institutional infrastructure and capacity for effective and efficient biodiversity markets.

The Days Ahead

While the day that a farmer gives up the tractor to become an eco-day trader may not be around the corner, we are encouraged by the ideas, institutions, and tools under development around the world to provide any land steward a compelling financial incentive to restore or preserve biodiversity on their property.

We look forward to seeing what the future holds and hope that 2010, the International Year of Biodiversity, is an auspicious start.

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Biodiversity offsets:



Views, experience, and the business case

Executive Summary

The Executive Summary of this report is available at:
http://www.insightinvestment.com/Documents/responsibility/Executive_Summary_Biodiversity_Offsets_Report.pdf, and from IUCN at:
<http://biodiversityeconomics.org/offsets/execsum.htm>

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The report is based primarily on interviews and discussions with the individuals listed in Appendix 1 (see page 88) and the authors are extremely grateful to them for the information, views and insights that they shared and for their comments on the draft report. Interviewees were speaking in their personal capacity and their views may not be the official policy of the organisations for which they work. Many other individuals have kindly contributed information on particular boxes and information included in the report and the authors would like to thank them as well. The authors have made their best efforts to ensure the accuracy of the information contained in this report and apologise for any inadvertent errors.

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1 Introduction

Biodiversity¹ offsets are conservation² activities intended to compensate for the residual, unavoidable harm to biodiversity caused by development projects. Recent experience with regulatory regimes, such as wetland and conservation banking in the USA, tradable forest conservation obligations in Brazil and habitat compensation requirements in Australia, Canada and the EU, has been supplemented by growing interest in the potential of voluntary biodiversity offsets. This experience suggests that biodiversity offsets may be of value to business, government, local communities and conservation groups alike. For example:

Benefits to business: Biodiversity offsets can strengthen companies' license to operate by encouraging regulators to grant permission for new operations and by securing the support of local communities and non-governmental organisations. For companies, investment in biodiversity offsets can provide a cost effective means to demonstrate that society should continue to trust them with access to the land and sea needed for their operations.

Benefits to government: Biodiversity offsets offer regulators a mechanism to encourage companies to make significant contributions to conservation, in many cases without the need for new legislation and at less cost than alternative policies. Offsets can also help to ensure that development projects intended to meet growing demand for energy, minerals, metals, crops and transport are planned in the context of sustainable development, and accompanied by counterbalancing measures to secure the conservation of ecosystems and species affected by development.

Benefits to conservation groups: Conservation organisations can use and influence biodiversity offsets to secure more and better conservation and obtain additional funding for conservation, for instance, to establish properly financed ecological corridors or strengthen networks of protected areas. Offsets could also help ensure that national or regional conservation priorities are integrated into business planning.

Benefits to communities: Local communities can use biodiversity offsets to ensure functioning and productive ecosystems during and after development projects, not only with properly rehabilitated project sites, but with additional conservation outcomes outside the project's borders, to support livelihoods and amenity.

While the benefits of biodiversity offsets are potentially large, several significant hurdles need to be overcome to realise them. Chief among obstacles is the need for a shared vision of the meaning and standards required of offsets among companies, governments, communities and conservation NGOs. In addition, there is a need to secure consent and build trust among key stakeholders for the approach, to strengthen the business case needed to motivate companies and to establish the policy frameworks to underpin offsets. Some question the benefit of offsets to conservation and to business. Their views need to be taken seriously and they

¹ Biological diversity – or “biodiversity” for short – is a general term for the diversity of genes, species and ecosystems that constitute life on earth. It is defined in Article 2 of the Convention on Biological Diversity as “the variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.”

² According to Article 2 of the Convention on Biological Diversity, “In-situ conservation means the conservation of ecosystems and natural habitats and the maintenance and recovery of viable populations of species in their natural surroundings and, in the case of domesticated or cultivated species, in the surroundings where they have developed their distinctive properties.” The range of conservation activities that might be involved in a biodiversity offset is described in chapter 6.5 of this report.

should be involved in discussions on whether and how biodiversity offsets should be conducted.

This report is a joint effort by Insight Investment and IUCN-The World Conservation Union; both of which have an interest in exploring biodiversity offsets.

Insight Investment is a fund management company based in the City of London managing approximately £75 billion of assets (as at 30 September 2004) on behalf of some 300 institutional investors and millions of retail customers of the HBOS group. Insight has both a financial interest and a moral responsibility to engage with companies in which it is invested to encourage them to adopt high standards on, and manage risks related to, key social, environmental and ethical issues, of which biodiversity is one.

IUCN is a union of 77 nation states, 114 government agencies and over 800 non-governmental organisations dedicated to the vision of “a just world that values and conserves nature”. IUCN seeks to influence, encourage and assist societies throughout the world to conserve the integrity and diversity of nature and to ensure that any use of natural resources is equitable and ecologically sustainable. As part of this effort, IUCN encourages dialogue with industry and debate among its membership to clarify the concepts and practices on issues such as biodiversity offsets.

The authors’ aim in conducting the interviews with companies, regulators and biodiversity experts that form the basis of this report was to explore the potential and limitations of biodiversity offsets: to consider the concepts involved, such as “net benefit” and “no net loss”, as well as why, where, when and by whom biodiversity offsets might be used, and what issues remain to be resolved.

In the report, we discuss these issues and draw preliminary conclusions regarding the potential and limitations of biodiversity offsets, and what steps are needed to develop the approach further.

1.1 Methodology

This report contains a synthesis and interpretation of a series of semi-structured interviews about biodiversity offsets conducted by the authors with 37 interviewees from around the world between March and August, 2004. The authors have also drawn on shorter discussions with some 20 other people. The report does *not* pretend to offer new empirical findings from the analysis of specific biodiversity offsets, nor to establish the balance of opinion in society for and against offsets. Nevertheless, many of the people interviewed for this research have carried out such analysis in the past, and the views expressed here are informed by their practical experience of designing, implementing or evaluating biodiversity offsets in a range of contexts.

The main steps involved in carrying out this research were:

- Agree Terms of Reference
- Develop questions and guidelines for conducting interviews
- Identify interviewees (listed in Appendix 1)
- Conduct interviews including follow-up with additional interviewees identified in the course of the interviews
- Supplement interview data with selective review of literature

- Analysis of interview notes
- Synthesis of results and drafting of report
- Peer review

1.2 Structure of the report

This report comprises eight chapters. Following this introduction, chapter 2 reviews the different ways that people define biodiversity offsets, including the role of offsets in the environmental mitigation hierarchy and their relevance to wider aspirations for sustainable development. The report continues, in chapters 3, 4 and 5, to examine the reasons why different stakeholder groups are motivated to undertake biodiversity offsets. Chapters 6 and 7 explore the challenges of implementing offsets, including technical issues as well as consideration of who needs to be involved. Finally, chapter 8 offers brief conclusions and describes the next steps required to move forward, including activities planned by Insight Investment and IUCN.

2 What is a biodiversity offset?

Our interviews revealed a number of interpretations of the term “biodiversity offset”, partly because “offset” is a particular mechanism in other contexts such as carbon trading and perhaps because terms such as “mitigation” have different meanings in Europe and North America. Compared with other forms of offsets, the limited experience with the relatively new concept of biodiversity offsets has grown in different contexts around the world with little co-ordination, comparative analysis or international debate, so a consistent, globally accepted terminology has yet to emerge.

This chapter will look at the different interpretations of the terms “biodiversity offset”, “mitigation” and “no net loss” and “net benefit”, touch briefly on their use in regulatory regimes around the world, and conclude (see Box 2 on page 13) by setting out the definition of biodiversity offsets that we will use for the purpose of this report.

■ *Offset or mitigate?*

In some contexts – particularly in Europe – the term “mitigate” means to minimise harm or to make it less severe, whereas in the US, it is often used to refer to activities designed to compensate for unavoidable environmental damage. In the US, therefore, it is generally interchangeable with, and often preferred to, the term “offset”. The relationship between offset and the linked issues of “no net loss” and “net benefit” is described below.

■ *Offset and the environmental mitigation hierarchy*

Definitions of biodiversity offsets are often couched in terms of existing principles of environmental management. Sachin Kapila of Shell, for instance, describes offsets as a complement to (and not a substitute for) the traditional environmental impact mitigation hierarchy of “avoid, minimise, mitigate.” Although different meanings are ascribed to the terms used here, we understand “minimise” in this context to mean designing a project in such a way as to reduce harm, and “mitigate” to mean alleviating the residual harm, to the extent possible. “Offset” is thus interpreted as an activity to compensate for residual, unavoidable harm.

Similarly, Chris Spray of Northumbrian Water notes that the first priority is to minimise environmental damage. He describes offsets as a supplementary means to address the residual environmental impact of projects. Understood as firmly within the context of this mitigation hierarchy, biodiversity offsets cannot be used to reduce a developer’s obligation to avoid, minimise and mitigate harm.

Moreover, biodiversity offsets are not appropriate in circumstances where development should not proceed in the first place. More detailed consideration of the controversial issue of “no go” criteria is beyond the scope of this report. However, it is an issue on which further dialogue between conservation groups, government and companies is urgently needed.

■ *Offset or compensate?*

The term “offset” is often used interchangeably with “compensate”. “Compensation” itself has several meanings, however. It can mean financial payment for damage, often associated with legal liability and damages, or it can mean activity designed to counteract harm. As this report concerns agreed activities designed to counteract the harm to biodiversity caused by development activities, and does not focus on judgements and payments, whether voluntary

or associated with legal liabilities, we use the term “compensate” in the sense of concrete conservation actions rather than the simple transfer of funds. We also recognise, however, that the actions involved in a biodiversity offset may be conducted by organisations or individuals who are paid to do so.

■ *Onsite or offsite?*

Does “offset” refer to conservation activity undertaken on the development site itself, or elsewhere? “Offset” can be distinguished from “set-aside” or “rehabilitation”, which refer to avoidance and mitigation, respectively. In general, the term “offset” is understood to refer to conservation activity that takes place outside the geographic boundaries of a development site in order to compensate for unavoidable harm, in addition to any mitigation or rehabilitation that may take place on that site. However, some developers may own large plots of land and in some circumstances, it could be appropriate for biodiversity offsets to be undertaken on land that would not otherwise be conserved within a plot, as a way of offsetting development activity on another part of the plot. These and other issues relating to the most appropriate location of biodiversity offsets are discussed in chapter 6.3.

■ *The value of biodiversity and conservation in the context of sustainable development*

The principle of compensating residual damage to natural habitat implies that biodiversity is valuable and needs to be conserved, a proposition we take for granted in this report. The need for conservation was re-emphasised by the world’s heads of state in their commitment at the World Summit on Sustainable Development in Johannesburg in 2002 to the “achievement by 2010 of a significant reduction in the current rate of loss of biological diversity”.³ It is also enshrined in several international treaties such as the Convention on Biological Diversity and in national law and policy around the world.⁴

It is well known that biodiversity loss results mainly from habitat conversion and disturbance, often caused by activities associated with economic development.⁵ However, just as the international community supports the conservation of biodiversity, international law and policy equally allude to the need for sustainable development and poverty alleviation. This implies that further conversion and disturbance of natural habitat is probably inevitable, due to population growth and economic development. Still, while habitat loss cannot be avoided entirely, the effects of development on biodiversity may be offset through the mitigation hierarchy as well as compensating efforts to protect, restore and enhance natural ecosystems.

Many of those interviewed for this study appealed to broader principles and the context of sustainable development as they spoke of biodiversity offsets. They referred to the notion of a “social contract” between business and society, according to which companies are allowed to operate in sensitive areas if they can demonstrate a commitment to “best practice” including

³ United Nations, 2002. Page 39, paragraph 44.

⁴ One hundred and eighty-seven countries and the European Union have ratified the Convention on Biological Diversity. At the Johannesburg World Summit in August 2002, biodiversity was identified as one of five key issues and a global target was set of significantly reducing its loss by 2010. See http://www.unep-wcmc.org/gbc/press_release.htm. For treaties related to biological diversity, see <http://www.biodiv.org/convention/partners-websites.asp>.

⁵ Biodiversity is generally considered to be declining worldwide, due to loss of habitat, pollution, the spread of invasive alien or “exotic” species, and adoption of an increasingly narrow range of crop and animal varieties for human use (see: IUCN, 2000, Biodiversity is life, <http://www.iucn.org/bil/bioloss.html>; SCBD, 2000, <http://www.biodiv.org/doc/publications/cbd-sustain-en.pdf>; IUCN, 2002, Red List, Major threats, http://www.redlist.org/info/major_threats.html; Global Biodiversity Outlook, Chapter 1, Status and Trends of Global Biodiversity, <http://www.biodiv.org/gbo/chap-01/chap-01.asp>).

the concept of “no net loss” and the need to find “win-win” solutions that can provide net benefits for biodiversity and people.

▪ *No net loss (or net positive impact)*

What is the goal of biodiversity offsets? How much conservation is enough? The principle of offsetting unavoidable harm naturally raises questions about the desired outcome of the compensatory conservation measures, discussed briefly here, as well as questions about measurement and equivalence, discussed in chapter 6.

The aim of biodiversity offsets is described in some legal systems and expressed by many of our interviewees as “no net loss”. Sometimes, this principle is enshrined in law, as discussed in chapter 4.2. Sometimes, it is voluntarily adopted by companies, as chapter 5.3 shows. An example of the former is the policy of “no net loss” of wetlands formalised by the US federal government in an attempt to reconcile the requirements of the Clean Water Act with continuing pressures to drain and fill wetlands for economic uses (see chapter 4.2).

Box 1: No net loss in Uganda

According to Alice Ruhweza of Uganda’s National Environment Management Authority, NEMA sees biodiversity offsets as a means of ensuring “no net loss” of habitat, while until recently, development projects in the country resulted in loss of biodiversity. Projects were established in sensitive wetlands or other gazetted areas but little was done to address impacts on biodiversity. In such cases, even when mitigation measures were included in the project agreements, Environmental Impact Assessment Condition of Approval Certificates and the Environmental Compliance Agreements between government and the developer, the relevant clauses did not explicitly require the purchase of land or support for a protected area as a form of compensation. (See section 4.3.1 of this report.) As she explains, “Today, for the first time, NEMA is more actively pursuing alternative restoration measures than the traditional on-site mitigation of the past. NEMA is basically saying that you can't have a project without trying to do compensation. Now, when NEMA gives out concessions, there are conditions. For example, telling developers that they need to buy land and plant trees or gazette land as a Protected Area or take some other action to compensate for the damage caused to biodiversity by the development project. That's the new part. NGOs involved in environmental advocacy have also played a huge role in raising awareness of the dangers of unquestioning commitment to huge projects, without taking into consideration the effects on the environment or setting up adequate alternative restoration or compensation measures.”

The precise meaning of “no net loss” in the context of American wetlands continues to be a subject of considerable scientific effort and some legal dispute. The effectiveness of the system to deliver “no net loss” has been broadly questioned (National Research Council, 2001). Indeed, some observers have argued that, far from ensuring “no net loss” of wetlands, the system may have unintentionally led to the destruction of some important wetlands. These criticisms are considered later in the report (see chapters 3 and 4.2). While the implementation of “no net loss” will inevitably be complex, the concept is intuitively simple. In the context of US law governing wetlands, it implies that development can proceed only if a total “amount” of wetland habitat is maintained. What results is a form of “cap-and-trade” system for wetland acreage.

“The no-net-loss approach is a good one. It can be challenging, but is more widely applicable to more companies than first meets the eye. It is a good goal to aim for.”

Leah Haygood, Environmental Consultant and former employee of Waste Management.

Some companies and many conservation groups aim to achieve a net positive outcome, in terms of biodiversity quality, rather than simply restoring the *status quo ante*. In this context, offsets may be seen as a means to achieve net improvements to biodiversity quantity and quality, going beyond the notion of no net loss. For instance, BP’s CEO has committed to having “a real, measurable and positive impact on the biodiversity of the world” and in the realm of public policy President George W. Bush recently advocated moving from a “no net loss” approach to wetland conservation, to one based on “net gain” of wetlands (Coyne, 2004).

Before assuming that offsets can indeed achieve a net positive impact, it is important to note that many conservation organisations and scientists have argued that wetland banking and trading in the US has not resulted in “no net loss” of wetlands, and that, far from net gain, wetlands are still being lost. They are therefore sceptical about the likelihood of success of President Bush’s “net gain” policy (Julie Sibbing, personal communication).

With respect to whether the goal for offsets should be “no net loss” or “net gain”, Robert Goodland’s sourcebook for the World Bank’s Extractive Industry Review supports the proposition that any compensation for biodiversity loss should leave the environment “better off” than before the project. This implies “informed agreement of stakeholders that the proposed offset is more extensive in area, greater in environmental value (less disturbed, less damaged, more biodiversity, greater environmental service value), and under a more secure level of protection, such as by financing in perpetuity” (Goodland, 2003). The Energy and Biodiversity Initiative also discussed positive contributions to biodiversity beyond the “minimum requirement” of biodiversity offsets (EBI, 2003).

■ *Biodiversity offsets compared with carbon and other offsets*

Many interviewees associated the term “offset” with “carbon offsets”, since the term has been used widely in the context of greenhouse gas trading and negotiations to reduce emissions of carbon dioxide. Davis (2000) and others point out, “The term ‘carbon offsets’, though often used as a term of art, has no uniformly accepted meaning.” However, offsets used in the context of carbon trading are usually taken to refer to mechanisms “by which the impact of emitting a ton of CO₂ can be negated or diminished by avoiding the release of a ton elsewhere, or absorbing a ton of CO₂ from the air that otherwise would have remained in the atmosphere” (Janson-Smith, personal communication). Although there are similarities between carbon and biodiversity offsets in their conception and intent – equal and opposite activity to address harm – there are many differences. Greenhouse gases are a more uniform (and therefore internationally tradable) commodity than biodiversity (see chapter 6.1). Carbon offsets are also part of an intergovernmental framework, whereas biodiversity offsets are generally implemented domestically and voluntarily (see chapter 6.3).

Beyond carbon, there are also a number of other contexts in which the concept of offsets has been put to use. For instance, one of the first emissions trading regimes to be instituted at the

national level was the sulphur dioxide (SO₂) trading scheme in the US. As with carbon, this is a cap-and-trade scheme that sets limits on emissions and requires those who emit more than their share to buy allowances from those who emit less.⁶ Similarly, a number of water pollution trading regimes are emerging around the world.⁷ These, too, use concepts similar to those involved in biodiversity offsets, but their number and variety place them beyond the scope of this report.

Box 2: The definition of “biodiversity offset”

For the purposes of this report, we define biodiversity offsets as conservation actions intended to compensate for the residual, unavoidable harm to biodiversity caused by development projects, so as to ensure no net loss of biodiversity. Before developers contemplate offsets, they should have first sought to avoid and minimise harm to biodiversity.

⁶ For more information on the US SO₂ market see <http://www.epa.gov/airmarkets/arp/>.

⁷ See <http://www.ecosystemmarketplace.com/news/article.feat.020.php>.

3 Why biodiversity offsets? The conservation case

Having understood offsets as activities designed to compensate or counteract any unavoidable harm to biodiversity that may result from development activities, the question then becomes: what benefits might biodiversity offsets deliver, particularly for conservation? Companies, governments, NGOs and communities may envisage a number of different reasons for undertaking biodiversity offsets. In this chapter, we will explore the strongest arguments that our interviewees made in favour of the conservation potential of biodiversity offsets and outline some of the associated risks or arguments against them. In addition to these arguments, which focus mainly on advantages for conservation, a number of benefits for companies – the business case for biodiversity offsets – are discussed in chapter 5.

3.1 More conservation

If we accept that some development activity will and should take place within the context of sustainable development, that government regulates on behalf of society whether, when and how this should happen, and that it is often the private sector that undertakes this development work, the question then arises as to how to minimise the social and environmental damage to which development activities give rise and to optimise the conservation outcomes.

Interest in biodiversity offsets is sometimes spurred by their potential to trigger more and better conservation outcomes than would otherwise arise when development projects take place. Alice Ruhweza describes how, in the past, development projects sometimes went ahead in Uganda in wetlands and gazetted areas without any specific restoration or compensation measures (see Box 1). Now, Uganda's National Environment Management Authority is requiring developers to go beyond basic environmental compliance clauses in concession agreements and is granting concessions for development projects subject to conditions requiring compensatory conservation activities. "Offsets can deliver biodiversity conservation that simply didn't take place in the past", she says.

Rich Mogensen, Director at Earthmark, and Jason Coccia, Mitigation Program Manager at the Conservation Fund, a US-based environmental non-profit, point out that –in the US at least– law that requires mitigation (or offsets) has led to the creation of thousands of acres of wetlands and protected sites and considerable biodiversity protection, that would not have existed had the law not required developers to offset their impacts on wetlands in this way. Jessica Fox, a researcher at the Electric Power Research Institute (EPRI) in California, has conducted a study on the overall impact of conservation banking across the US.⁸ "What we found," she says, "is that there are about 40,000 acres [a little over 16,000 hectares] of conservation banks across the US." Her research also indicates that 75% or more of this land area would likely have been developed if it had not been for conservation banking. "In many cases," she points out; "the developer has actually become the conservation banker." In addition, legislation may require offsetting activities to be larger in scale than the areas

⁸ The term "banking" is used in the US to refer to the way offsets are created and approved prior to development. The resulting conservation benefits are "banked" with the regulator and later sold as mitigation credits to future development projects. One of the aims of banking is to avoid any temporal loss of ecosystem benefits (see section 6.4).

damaged by development. Laws on wetland mitigation in the USA (see section 4.2.1 below), for instance, often state that developers who damage one acre of wetlands need to protect or restore a multiple of that area of similar wetlands (sometimes as much as three acres protected for every one acre destroyed).

While biodiversity offsets do offer the prospect of achieving more conservation outcomes than typical with development projects hitherto, they are no panacea and the argument that they can produce more conservation results masks a number of assumptions. There is considerable debate within the US, for example, as to whether development in certain wetlands should have been allowed at all and whether the mitigation has genuinely offset the impacts of developments in them.

Some observers have argued that, in practice, wetland mitigation in the US has come nowhere near achieving the goal of “no net loss”. For instance, Julie Sibbing, of the National Wildlife Federation in the US, states that figures which show a gain of three acres of wetlands for every acre destroyed are “wholly misleading”. She points out that the database on which some of these figures are based “includes in the ‘mitigated’ column, not just wetlands restoration and creation but even acres of wetlands [destruction] avoided by projects, preservation of existing wetlands and preservation of upland buffers around wetlands.” She believes that, as a result, the database does not adequately match an acre of wetland destroyed with an equal acre of wetland created. Additionally, she claims that “the Corps [the US Army Corps of Engineers, which oversees the development of wetlands in the US] does not even keep meaningful figures on mitigation that enable one to tell if they are achieving a real “no net loss”, although they are bringing a new database online this year that may begin to allow them to do this.” Sibbing also cites an article (Turner et al, 2001) which, she feels, shows that “America’s top wetland restoration scientists believe that about 80% of the wetlands built for mitigation in this country [the US] do not succeed in becoming fully functional.”

The significance of the contribution made by conservation banking in the US can also be questioned. The additional area of 40,000 acres conserved by conservation banking in the US is very modest, when compared to the overall area affected by development. In other countries, too, the question arises as to whether paying more attention to biodiversity conservation by building biodiversity offsets into the project approval process –as is now customary in Uganda– will indeed lead to genuine conservation outcomes greater than those achieved by normal environmental impact assessment processes in the past. After all, concession agreements in countries such as Uganda have contained environmental clauses for decades and these may not have achieved adequate results for biodiversity conservation for a range of reasons. For instance, biodiversity as a specific sustainable development issue may have been overlooked compared to other “environmental” issues such as emissions to air and water. Or environmental requirements may not have been specific about the intended biodiversity results and public and private sector representatives may not have had sufficient skills in the field of biodiversity to do it justice. Or companies may not have placed sufficient emphasis on ensuring biodiversity outcomes and governments may not have enforced legislation and environmental clauses in concession agreements. In addition, monitoring and follow-up has often been inadequate. Even if biodiversity conservation measures generally or offsets specifically were stipulated, structures have rarely been put in place to check whether such provisions were implemented.

Clearly, biodiversity offsets will only achieve results for conservation if they are adequately designed, implemented and enforced.

3.2 Better conservation

Another common argument for offsets is that they help conserve areas of higher biodiversity value than those being lost. For instance, if a company wants to develop an area of relatively minor biodiversity value, the offset it undertakes could create or protect an area of greater biodiversity value. Whether this can be achieved in practice will depend, among other things, on how flexibly offsets are interpreted and on whether all relevant stakeholders agree that what is being gained is of equal or greater value than what is lost.

One observer with experience in conservation and mitigation banking in the US says that offsets can, and often do, create opportunities for “trading small blocks of degraded ecosystems for large chunks of functioning ecosystems.” With the wetland mitigation laws in the US, and with the conservation banking that takes place there, others believe that these sorts of biodiversity “trade-ups” are happening all the time. Michael Bean, a senior attorney at Environmental Defense, a US-based conservation non-profit, explains that he has seen at first hand how the judicious use of biodiversity offsets can help achieve better conservation, at least as concerns one endangered bird species: the red cockaded woodpecker. In order to thrive, he explains, these birds need specific types of habitat: 70-80 year old pine trees that are regularly ravaged by fire to clear out the under-story, and between 75 and 150 acres of land on which to feed. Currently, red-cockaded woodpeckers survive in a few large populations in the southeast of the US together with a large number of smaller, more fragmented populations on very degraded habitats. Over time, these small, isolated populations are unlikely to survive. Faced with this threat, coalitions of private companies, independent landowners, the government and conservation groups have used offsets to trade smaller, unmanaged habitat for larger, managed habitat that can support larger bird populations. Similarly, wetland mitigation banks often sell credits to numerous customers, some of whom may be harming relatively small areas, enabling the banks to create larger, consolidated conservation areas, rather than large numbers of highly fragmented, isolated habitats that may not be able to ensure long-lasting conservation results.

The geographic flexibility offered by offsets could also enable conservation efforts to be focused on areas where long-term conservation benefits are more likely. There are cases where a restored mine site, for instance, appears as a small oasis in highly degraded surrounding area. A specialist in the area argues that “protecting 2 acres of wetland surrounded by highways has very little ecological value.” Involving local communities and biodiversity experts in a dialogue with the company and government at the outset of the project could foster agreement on the best use of the money. According to Geoff Burton of Environment Australia, “the concept of offset is invaluable because it allows the community to achieve the best possible biodiversity outcome.”

A number of interviewees highlighted the opportunity for biodiversity offsets to contribute to ecological corridors as a significant factor in achieving better conservation. “A lot of people are talking about conservation corridors,” observed Chris Herlugson from BP, and this was borne out from other interviews. “In Mexico, we intend to target projects in biological corridors”, said José Carlos Fernandez. In the less biologically diverse environment of the UK, Northumbrian Water is looking for the best conservation opportunities, and is guided by government and NGO strategy. “In the UK, there is not much land that remains unaffected by development,” explains Chris Spray. “Our biggest advantage is that we have the opportunity to create ecosystems that are more biologically diverse than the heavily modified land where we operate. We can see the national priorities in the UK Biodiversity Strategy and the accompanying suite of habitat and species action plans. We talk to government to establish the best options to focus on the most useful conservation outcomes”.

Biodiversity offsets could also contribute to better conservation by extending the kind of conservation activities companies undertake from the realm of good management on their own plot to contributing to biodiversity conservation outside it. They could raise the threshold so that companies' conservation activities go beyond on-site restoration, to compensate for the residual damage caused by companies that remains after their basic mitigation activities.

For the argument of better conservation to be sound, a number of things are necessary. The policy framework must be sufficiently flexible to enable offsets to result in additional, prioritised conservation. In this regard, some legal requirements, such as the Habitats Directive in the EU, have been criticised for offering relatively little room for flexibility and requiring developers to recreate exactly the same habitat as that destroyed. (See Box 3) Others, such as the UK law on Sites of Special Scientific Interest (SSSIs), allow more room for flexibility and the possibility that conservation budgets are spent to best effect.

It must also be clear that the priority biodiversity to be conserved would indeed have been lost otherwise (as discussed in chapter 6.5 on "additionality"), and of course society must deem the loss of the "less valuable" biodiversity acceptable as part of the compromise inherent in sustainable development. NWF's Julie Sibbing adds that, while preserving existing, intact ecosystems as mitigation may lead to some areas being protected, it does have pitfalls. These, she says, include: (1) the fact that this, in the end, does not support "no net loss" goals; (2) that it "may be used as an excuse to allow development of areas that could be avoided"; and (3) that governments may simply "use mitigation money to replace funds they would have otherwise spent on acquisition of key properties for biodiversity".

Box 3: Ten newts and their £250,000 pond

Great crested newts are protected under the EU Habitats Directive, although they are fairly common in many reconstructed water ecosystems. In the UK, companies could be fined up to £5000 per newt lost through development. When Northumbrian Water was upgrading its water treatment works in Darlington, it found that 10 great crested newts, which had not been present on the site before the waterworks were built, had moved into the concrete lagoons the company used to settle and drain sludge. In order to meet its legal obligations, Northumbrian Water built the newts an adjoining pond and, two years later, when this new ecosystem was ready, hired someone to collect each newt and transfer them to the new pond. The newts are now breeding happily in the new pond. The exercise cost the company £250,000. As Chris Spray, formerly Environmental Director at the company explains, "If I were to ask conservationists how they would like to spend £250,000 for biodiversity conservation, they would not say "on 10 newts". Conservationists would have had other priorities."

Finally, there must be a basis for establishing that biodiversity in one place is truly of higher value than in another, thus ensuring that the sacrifice results in net gain. In other words, there needs to be agreement on the basis for valuing biodiversity and clarity on conservation priorities. Some countries establish their conservation priorities in National Biodiversity Strategies and Action Plans, but in others, the situation is less clear. Conservation organisations with expertise in the field do not always agree, so it can be difficult for companies to find consistent advice on conservation priorities.

In fact, offset discussions can sometimes stimulate debate on conservation priorities, involving key stakeholders and can even help to rationalise conservation efforts. One of our interviewees who has explored these issues over many years argued that society at large needs to engage

in some discussion of what it wants conserved and at what cost. He added that if such discussions were held, “there could be cases when people are willing to say ‘These sites are doomed. Let’s protect somewhere else.’” The issues of conservation prioritisation and equivalence are discussed further in chapter 6.

3.3 Cost effective conservation

In addition to more or better conservation, offsets could help make the best possible use of money spent for conservation. For instance, some development projects already require on-site restoration activities. It is fairly common for a concession agreement between a government authority and an extractive company to contain a clause that obliges the company to restore and rehabilitate the land disturbed to a status as close as possible to that prior to the development. Indeed, a significant budget is often set aside by companies at the start of extractive projects to cover these restoration obligations when the activities cease. But the cost of restoring the ecology of the disturbed area to a “less than perfect” state, one that nonetheless delivers functioning ecosystem services and a landscape and species mixture similar to the pre-project state, is often considerably less than the investment needed to re-establish, on a species-by-species basis, a site that is, to all intents and purposes, indistinguishable from the original. This begs the question of whether society would prefer this money to be spent in aiming for “perfection” in the area disturbed, or whether it would rather see that budget used to protect more biodiversity or biodiversity of higher conservation value.

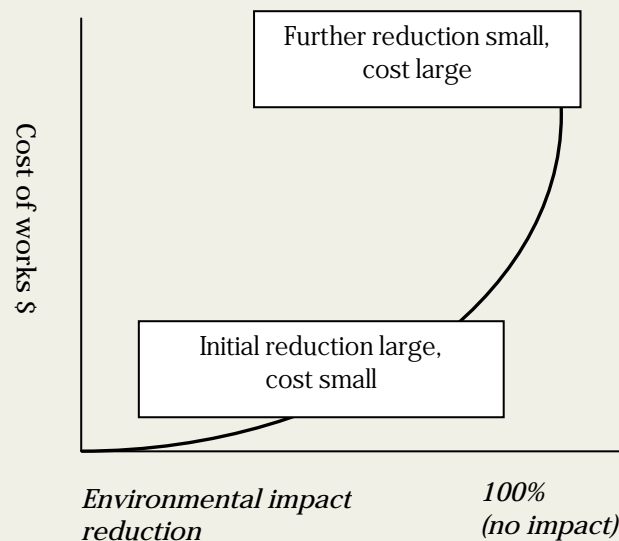
Defining the optimum conservation outcome may involve a review of the emphasis put on each stage of the mitigation hierarchy. As Geoff Burton of Environment Australia explains, “There is a trade-off between remediation obligations and the best biodiversity outcomes. You need a balance. It is important to ensure that, when a company has finished its activities, there are no lasting environmental effects. The purists feel remediation should be done down to the third decimal point, but I think we should optimise the results in the context of the surrounding landscape. What is the opportunity cost of sticking to 100% remediation on-site?” David Richards of Rio Tinto concurs. “Does the conservation community really want a company to chase the last decrement of restoration at the site if some of that money could be better spent on really significant conservation outcomes not a million miles outside the site?”

Under the Clean Water Act, US developers are obliged to offset any unavoidable damage they cause to wetlands. The opportunity cost of forgoing development in order to save or create wetlands varies enormously. It is considerably higher in an area where there is already development and strong pressure for further development than in comparative wilderness areas. Consequently, a market has arisen in which developers can seek to fulfil their offsetting obligations in the least expensive manner possible. Often this takes the form of buying “wetlands credits” from “wetlands mitigation banks”. (See chapter 4.2.)

A similar dynamic has developed in Brazil, where developers must set-aside a proportion of their land for conservation activities. This is inconvenient for certain planned land-uses where land values are high, so some developers have preferred to pay other landowners to conserve more than their share on another plot, enabling them to develop their entire plot. The area conserved may have at least as high biodiversity value but lower real estate value, being of less development potential. (See chapter 4.2.)

Box 4: Cost-effectiveness arguments in New South Wales

In its public consultation paper, “Green offsets for sustainable development”, the State of New South Wales government explains that “offsets can often achieve environmental improvements at lower costs than regulation alone. They allow resources to be used where they can achieve the greatest environmental improvement.... The cost of reducing environmental impact increases dramatically as we approach zero additional impact. The law of diminishing returns is at work. At some point, the cost of further on-site impact mitigation is greater than the value provided to the environment. Stricter controls can increase the cost of development dramatically but may only provide limited gains for the environment. However, worthwhile environmental gains can be made if the resources used for mitigation (or a fraction of them) are used to reduce environmental impact at other sources. That is, once all economically feasible on-site measures have been used to reduce environmental impact, further cost-effective impact reduction is still possible using offsets.”



Source: New South Wales Government, 2002.

There may be tensions between the interests of business and conservationists on cost-effectiveness. Saving money may be a key motivating factor for businesses, while some conservation organisations may want to ensure that companies dedicate all the money they are obliged to contribute to meet their on-site rehabilitation obligations. A solution to this apparent conflict may lie in conservationists agreeing to concede a marginal saving on the part of companies in order to secure more valuable conservation activities than on-site rehabilitation alone. And the business case for companies extends well beyond cost cutting. Some companies may be content to see the full sum they would commit for rehabilitation spent in the most effective way for conservation, even without cost savings. Another issue that must be faced when examining the potential cost-saving advantage of offsets is the fact that this argument often involves some trade-off between the standard (and thus cost) of rehabilitation and investment in offset. This weakens the mitigation hierarchy argument made earlier and, if taken too far, could lead to the perception of offsets as a “license to trash”.

Finally, there is a risk that companies may consider certain habitats to be particularly difficult and thus costly to offset, leading to a temptation to focus instead on less complex ecosystems that may be cheaper to conserve. This highlights the importance of considering the principle and basis of ecological equivalence; an issue we discuss in section 6.1.2.

3.4 Giving value to conservation: creating value for undeveloped land

Another benefit of offsets is their potential to address a negative and unintended consequence of conservation legislation. For instance, by making it illegal to harm endangered species, one effect of laws such as the Endangered Species Act in the US and similar legislation in Europe and elsewhere, has, from the perspective of some landowners, been to turn endangered species and biodiversity into potential financial liabilities. In these circumstances, the moment an endangered species (or protected biodiversity) is discovered on someone's land, their development options, and thus the value of their land, becomes limited. They may no longer be able to build houses, golf courses, or anything else on that land without satisfying processes that some consider cumbersome and expensive for securing the necessary permits from government agencies, and occasionally these permits are denied. In the US "perverse incentives" of this kind may have led to cases of landowners killing endangered species on their land before government agencies knew they were there. Others cite cases of landowners intentionally burning forests on their land for fear of attracting protected species. Conversely, the ability to sell endangered biodiversity as offsets gives it a value. The creation of a market for biodiversity offsets –as in the US– can turn a potential environmental liability into a financial asset that can be sold.

Additionally, biodiversity offsets might offer a mechanism for increasing the value of land under conservation. Candace Skarlatos, Senior Vice President of Environmental Initiatives at Bank of America, believes that conservation banking can offer an innovative way for society to put a value on conservation. "Every time that we look at a possible development", she says, "we need to decide whether to develop and mitigate or not to develop on that land. And if we decide not to develop, the landowner may need to be compensated for forgone development, depending on the circumstances." She believes that conservation banking and the sort of offsetting systems that exist in California can be a way of giving real value to biodiversity and conservation. "And," she adds, "the bottom line is that if it has a value it will be taken care of." An added benefit, she says, is that the offsetting approach can "create new business opportunities as developers out-source mitigation and thus create new companies." Skarlatos points out that, as with all real estate, land value will fluctuate based on demand and supply in the market. Conservation banks work best, she believes, when data is available to show the varying ecological values of different plots of land; when the developer can obtain credits from any of the approved conservation banks; and when, once the details of the conservation banking system have been established, the market is allowed to operate freely without interference.

The potential advantage of offsets in terms of increased value of land, like the other potential advantages, however, is subject to a number of caveats and risks. There are doubts about whether the economic benefits of forgoing development and conserving biodiversity would match the economic gains of developing the land. This problem is partly met, in the US, by a strict regulatory framework that prohibits the development of land without offsetting activity, thus making the economic exploitation of such land illegal. The opportunity cost for landowners to offer land for purely voluntary biodiversity offsets may not be acceptable, however. Second, in order for land to gain value from conservation and thus to create an economic incentive for landowners to offer it as an offset, there would need to be sufficient demand for biodiversity offsets. Another set of concerns surrounds the ability of markets to work for conservation and problems of market failure. While the issue of market failure lies beyond the scope of this report, it has been addressed in related literature. See, for example, Baumol and Oates (1988).

4 Why biodiversity offsets? The regulatory case

The preceding chapter discussed a number of potential advantages – mostly in terms of conservation outcomes – of biodiversity offsets; advantages which would only materialise if a number of pre-requisites were met and risks addressed.

This chapter will provide an overview of the development of policy related to biodiversity offsets over the last couple of decades, and then discuss one of the two key motivations for developers to undertake biodiversity offsets: legal compliance. In a few countries, there are legal requirements to offset while in many others, the law does not explicitly require biodiversity offsets, but facilitates them by providing a conducive policy framework. (The second main motivation is the business case for companies to undertake offsets on a purely voluntary basis and this is discussed in chapter 5.) Section 4.4 ends with some observations about the relative advantages and disadvantages of mandatory and voluntary policy frameworks for biodiversity offsets.

4.1 The policy context for biodiversity offsets

The idea of compensating for environmental damage has been around for a long time. (See, for example, Barbier et al. 1990.) Moreover, compensation forms the basis of one of the most well established instruments of environmental policy, namely tradable rights (Baumol and Oates 1971, 1988; Montgomery 1972; Tietenberg 1980). The rationale for both compensating projects and tradable rights is that by allowing firms to provide compensation for activities that damage the environment, or transfer their environmental obligations to third parties, it is possible to reduce the costs of achieving a given environmental target very significantly.

Tradable rights or tradable permits have been used successfully around the world, including for the control of industrial pollution as well as for the management of water resources and fisheries (OECD 1999; Stavins 2003; Tietenberg 2002; US EPA 2001). A similar approach is currently in use or under discussion in some countries to limit the loss of natural habitat due to land use change (Chomitz et al. 2003; Gardner 2003; Johnston and Madison 1997; Landell-Mills and Porras 2002; Pagiola et al. 2002; Weber 2003). Under the rubric of tradable development rights, compensatory mitigation or biodiversity offsets, the latter experience further suggests that significant financial resources can be generated from land developers for biodiversity conservation, while limiting habitat losses within a region. The use of tradable development rights or offsets to finance biodiversity conservation at an international level remains undeveloped, although there have been proposals along these lines (Cervigni 1993; Graßl et al. 2002; Panayotou 1994; Swanson 1995).

Policy guidance and practical experience of biodiversity offsets has emerged in different ways and in many different places around the world. Only recently have people begun to compare and contrast policies and experience across sectors and regions (Johnston and Madison 1997; NRC 2001; Wilkinson and Kennedy 2002). While the scale and scope of biodiversity offsets is difficult to ascertain, it seems clear that various forms of offset are being used in an increasing number of countries and sectors. This includes both mandatory offsets (i.e. those required by legislation) and voluntary ones. Legal precedents and triggers for biodiversity offsets are described in the following pages and a comparison of mandatory and voluntary approaches is provided in section 4.4.

4.2 Law requiring offsets

Legal provisions in a number of countries, outlined in Box 5, require the re-creation of habitats or *in situ* conservation to compensate for the damage to be caused by development activities.

Box 5: Legal requirements for biodiversity offsets and compensatory conservation activities

- *Wetland Banking in the US*
under the Clean Water Act 1972 Chapter 404(b)(1) and the US Army Corps of Engineers regulations (33 CFR 320.4(r))
(See Boxes 6 & 7)
- *Conservation Banking in the US*
under the Endangered Species Act 1973 and the Guidance on Establishment, Use and Operations of Conservation Banks (<http://endangered.fws.gov/policies/conservation-banking.pdf>)
(See Box 9)
- *Habitats and Birds Directives and implementing regulations in the EU*
under Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora and Council Directive 79/409/EEC
(See Box 3)
- *Offsets in Brazil under the Forest Regulation and National System of Conservation Units*
under Lei N° 4771 of 1965; Lei N° 14.247 of 22/7/2002, Lei N° 9.985 of 18/7/2000, Decreto N°. 4.340 of 22/8/2002
- *Federal Law for the Protection of Nature and Landscape in Switzerland*
- *Offsets in Australia*
(see Box 12 in chapter 4.3)
- *No net loss of fisheries habitat in Canada under the Fisheries Act*
under R.S. 1985, c. F-14, Policy for the Management of Fish Habitat (1986), and the Habitat Conservation and Protection Guidelines, Second Edition (1998)
(See especially Subchapter 35(l) and Subchapter 35(2) of the Fisheries Act)

4.2.1 Wetland Banking in the US

Under the US Clean Water Act 1972 Chapter 404(b)(1) and the US Army Corps of Engineers regulations (33 CFR 320.4(r)), developers whose plans call for damage to wetlands need to obtain permits from the US Army Corps of Engineers. In granting these “wetland permits” the Corps follows a sequencing approach: First, developers must prove that the damage to the wetlands is “unavoidable”. If this is done, they must then seek to minimise any adverse impacts on those wetlands that cannot reasonably be avoided. Finally, they must provide “compensatory mitigation” (which is the closest analogue for the term “offset” in the US) for unavoidable adverse impacts that remain after all minimisation measures have been exercised.

A developer that has convinced the Corps that no reasonable alternative exists to the development of a wetland, and that the design minimises harm, must demonstrate that other wetlands, of “similar functions and values”, and in a specified “service area” (determined by the Army Corps of Engineers), have been “protected, enhanced, or restored” to compensate for those that will be damaged (compensatory mitigation). (See Salzman & Ruhl, 2002; Bayon, 2002; Bayon, 2004.) In theory, for every hectare of wetland destroyed, a hectare (and usually more) of comparable wetland must be restored or recreated within the defined “service area”.

The law and its attendant regulations further state that developers can fulfil their “compensatory mitigation” obligations themselves (usually at or near the development site), or they can pay third parties to do this in their stead. If they decide to pay someone else to do the work, they have several options: (1) They can buy “wetland credits” from a mitigation bank, a (usually) for-profit entity that “creates, enhances, or restores” a wetland and then is allowed by the Corps to sell credits for these wetlands –measured in acres– to needy developers; or (2) they can pay fees established by the Corps to public entities or private not-for-profit organisations that, in agreement with the Corps, use the money to “protect, enhance, or restore” wetlands (these are known as “in-lieu-fee” arrangements); or (3) They can pay a third party that is neither a mitigation bank nor an in-lieu fee provider to undertake the mitigation (these are referred to as “ad-hoc” arrangements). (See Bayon, 2004.)

Box 6: Growth of wetland mitigation banking in the USA

	<i>1992/93</i>	<i>2001/02</i>
Approved banks	46	219
Wetlands restored	17,664 acres	139,896 acres
Participating states	18	40
Size of banks (% > 100 acres)	35%	57%
Private commercial banks	1	135

Source: Wilkinson and Kennedy (2002).

In the US, these laws have led to the creation of a whole new industry, with dozens of new businesses making a living by fulfilling the wetland mitigation obligations of developers. Indeed, recent studies show that wetland mitigation banking in particular has grown rapidly over the last decade (see Box 6). As we discussed in section 3.1, it is important to note that some organisations question these figures. There are many critics of wetlands trading and mitigation banking in the US. They believe that, not only has the policy failed to achieve its “no net loss” goal, but that it may be hiding a continued loss of these important ecosystems. NWF’s Julie Sibbing, for instance, points out that, while the US Clean Water Act requires developers to seek to “avoid and minimise” damage to wetlands before considering offsets, in practice “this is simply not happening and nor do I think it ever really will”. She also says that many wetlands regulators in the US will “readily admit that they allow wetlands to be destroyed that could have been avoided because they feel it is just easier to require mitigation than to say ‘no’.” In support of this, she states that, “currently, 99.9% of permits to fill wetlands are granted, proving that avoidance is not being applied. Yet all those wetlands are being destroyed with only 20% of the mitigation succeeding. How,” she asks, “is this a win for the environment?”

In terms of mitigation banks, Sibbing argues that “wetland mitigation banks have yet to be evaluated for ecological success, but there is absolutely no reason to think that they are any more successful ecologically than project-specific wetlands mitigation. They are typically providing different wetland types and are far from the impact project, making the chance that they are successfully compensating for project impacts extremely remote.” She is, however, quick to point out that her organisation, the National Wildlife Federation, “certainly does not oppose all offsets”, but rather believes it is important to recognise their many pitfalls.

Box 7: The Inland Sea Shorebird Reserve: a wetland offset to mitigate on-site habitat losses associated with Rio Tinto's Kennecott Utah Copper mine

Kennecott Utah Copper mine, a wholly owned subsidiary of Rio Tinto Plc, is North America's largest copper mine. Until the mid-1990s, Kennecott focused its efforts on producing copper, molybdenum, gold and silver from the Bingham Canyon Mine that lies 28 miles southwest of Salt Lake City, Utah. But at that point, the company needed additional storage capacity for “tailings” wastes: sand-sized mineral particles that are an uneconomical by-product from the milling of copper ores. After exploring a number of options, the company purchased an area of degraded salt pans and industrial land adjacent to its main tailings impoundment along the south shore of the Great Salt Lake. However, this property contained designated wetland habitat and, as described in Box 7, Kennecott was required by U.S. law to offset, or mitigate, the loss of wetlands by creation of an agreed number and value of habitat units. In the event, Kennecott Utah Copper Corporation went beyond its regulatory obligations to create a 2,500-acre (1,011-hectare) shorebird and waterfowl refuge.

A wetland mitigation plan was developed in coordination with a Technical Advisory Committee (TAC), comprising representatives from the Utah Division of Wildlife Resources, U.S. Fish and Wildlife Service, Environmental Protection Agency, the Nature Conservancy, National Audubon Society and the US Army Corps of Engineers. The plan established Kennecott's obligations for mitigation construction, operation, maintenance and monitoring. The TAC felt Habitat Evaluation Procedures (a modelling system developed by US Fish and Wildlife Service) would provide the basis for replacement of habitat function and value to wildlife. HEP results in Habitat Units (HU) as the currency for project/mitigation exchange. A one-to-one HU ratio was determined to be adequate for this site.

The mitigation plan was based upon providing similar or enhanced wetland habitats as compensation for impacts to wetlands covered by the Clean Water Act on the tailings impoundment project site. Nesting and migratory shorebirds and waterfowl were identified as the key elements requiring mitigation due to the project site's proximity to Great Salt Lake, which is part of the Western Hemispheric Shorebird Reserve Network.

Although 1,055 acres (427 hectare) of wetlands were impacted by the project and the regulator had settled on a one-to-one ratio, Kennecott decided on a larger voluntary offset, aiming to enhance and restore a landscape within which the wetlands would be more likely to succeed in conservation terms. The company initially identified and purchased 2,500 acres (1,011 hectares) for the wetlands mitigation less than a kilometre from the project site. The site's suitability was based upon the criteria of sufficient acreage, geographical and ecological similarity to the impacted area, water availability to sustain aquatic communities and adequacy of food support.

Construction of the wetland mitigation site started in May 1996 and was completed in January 1997. Water flowed into the mitigation site in February 1997 and the property officially became referred to as the Inland Sea Shorebird Reserve (ISSR). More than 100 species, including avocets, egrets, curlews, cinnamon teal and snowy plovers, a species that is becoming scarce, now use the wetlands that inundate a landscape that was formerly used for grazing and salt evaporation ponds. Results from a five-year monitoring against baseline data indicate that the mitigation plan has increased wildlife values substantially. Bird surveys point to a 1,000-fold increase in bird use over the baseline numbers for the same site.

In 1997, because of the initial success, the site was expanded from 2,500 acres (1,011 hectares) to more than 3,600 acres (1,460 hectares) and four ponds were added that will remain as a bird reserve in perpetuity as well as act as a wetland mitigation bank for impacts from other projects affecting wetlands in the same watershed. In 2004, Great Salt Lake-Gilbert Bay was identified as an Important Bird Area for National Audubon where the ISSR is a significant contribution to bird use. In the long-term, the company plans to hand the site over to National Audubon to become part of its large bird reserve and eight-mile (14-kilometre) contiguous shoreline habitat.

Sources: <http://biodiversityeconomics.org/business/handbook/hand-01-30.htm>, <http://www.audubon.org/bird/iba/utah/> and http://www.kennecott.com/library_reports_rpt7.htm; <http://www.manomet.org/WHSRN/viewsite.php?id=36>; and personal communication with Ann Neville Senior Environmental Specialist Kennecott Utah Copper Corporation and David Richards, Principal Advisor, Environment, Rio Tinto, August 2004.

4.2.2 Conservation Banking in the US, under the Endangered Species Act

Also in the US, at the level of species, a similar process is evolving as a result of certain provisions of the 1973 Endangered Species Act (ESA).

Under the ESA, it is illegal to undertake any development activity that will “take” (i.e., harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct) a species listed as endangered or threatened under the ESA, without first obtaining “incidental take authorization” through section 7 or 10 of the ESA from the Fish and Wildlife Service (FWS) or the National Marine Fisheries Service (NMFS). Section 10 of the ESA requires the landowner to prepare a Habitat Conservation Plan that, among other things, must “minimize and mitigate the impacts” of the activity to receive an incidental take permit. Many of these project applicants seeking “take” through both section 7 and section 10, propose to mitigate the impacts of their activities through what are essentially biodiversity offsets. (Personal communication, Deblyn Mead, USFWS.)

Within this context, the system in the US allows developers that damage an endangered species to mitigate that damage by buying species-specific credits from what have become known as “conservation banks”. Like the wetland mitigation banks discussed above, conservation banks are essentially private (usually for-profit) entities that protect specific species with a view to selling species mitigation credits to needy developers in the future. These two have become profitable businesses.

Jessica Fox, a researcher at the Electric Power Research Institute (EPRI) in the US, estimates that there are now about 40,000 acres-worth (16,000 hectares) of conservation banks in the US, most of them in California, where enforcement of the ESA has been especially rigorous. What’s more, at the level of private businesses, many companies – including industry giants such as International Paper – are looking at how they can take advantage of these laws to make development possible at the same time that they create their own conservation banks. (See Box 8 on the potential benefits of conservation banks and Box 9 on International Paper and the Red Cockaded Woodpecker.)

Box 8: Potential benefits of conservation banks

Summarising many of the potential benefits of conservation banks (benefits that could apply to other forms of biodiversity offsets), Bauer, Fox, and Bean (2004) write that "Conservation banking has a number of potential advantages over traditional approaches to mitigation. By completing necessary mitigation prior to project impacts, banking assures that the mitigation is done and done properly. Further, in theory, banking allows mitigation on a larger scale, providing advance mitigation at a single large site for multiple future projects that would otherwise be mitigated at several smaller sites. In addition, banking creates the opportunity for some landowners to turn endangered species on their property, or restorable habitat for such species, into assets. That turns on its head the conventional wisdom of many landowners that endangered species are a liability to be avoided because of the land use restrictions that can accompany them. Finally, since the number of credits that some banks earn is a function of how successfully species or habitats are restored, bankers have a compelling economic incentive to do the best restoration job possible."

Box 9: International Paper and the Red-Cockaded Woodpecker

In the United States, the red-cockaded woodpecker (*Picoides borealis*) is listed as an endangered species under the federal Endangered Species Act. This means that any activities that might harm the birds are strictly regulated. If you are an environmentalist, this is a good thing. If you are a developer, on the other hand, this can be a problem. As a result of the bird's protected status, there are limited development options for any land blessed with woodpeckers, so they are something of a liability for landowners.

Without large stands of old-growth pine forest that is regularly cleared of understorey by fires, the woodpeckers do not multiply and may eventually disappear. Before the use of offsets, this dynamic was bad news for the woodpeckers. If you were a landowner with no woodpeckers but with good potential habitat for the birds, you had an incentive to get rid of that habitat as soon as possible before any troublesome birds arrived on your land. If, on the other hand, you already had woodpeckers on your land, your incentive was to leave the land alone, try to prevent fires and wait for the habitat to become unsuitable and the birds' numbers to dwindle. Finally, if there were woodpeckers on your land that nobody knew about, there was a strong financial incentive for you to get rid of the birds before anyone found out they were there. "The incentives and disincentives", says Michael Bean, a Senior Attorney at Environmental Defense, "were really skewed."

To address these perverse incentives, the US Fish and Wildlife Service set up a programme known as "Safe Harbour". This programme allowed landowners to work with the US government to determine the extent of endangered species on their land, to establish a Habitat Conservation Plan (HCP), and to reach an agreement with the government that would limit their liabilities as a result of endangered species to an established baseline. The Safe Harbour rules also set the stage for the creation and use of offsets and mitigation. Landowners who increase the number of woodpeckers on their land beyond their baseline can obtain credits that the government has decided can be sold or transferred to others falling below their baseline. What was once a potential liability had now become a potential asset.

In 1998, International Paper (IP), one of the world's largest pulp and paper companies and one of the largest private landholders in the US, took advantage of the Safe Harbour legislation and completed a Habitat Conservation Plan for red-cockaded woodpeckers on the company's land. They found that IP's timberlands across five states in the US Southeast were inhabited by 18 red-cockaded woodpecker (RCW) clusters (the common term used to measure the bird's populations since it nests in family groups). These populations were sometimes located in small, degraded and fragmented forests, making their long-term survival questionable. Through discussions with the US Fish and Wildlife Service, Environmental Defense and others, IP realised that it might be able to take advantage of

offsets to manage its woodpecker problems. If the company could somehow aggregate its 18 groups of woodpeckers onto one plot of land, it could free up some of its other woodpecker-inhabited lands for development. But moving woodpeckers is not an easy proposition (many birds don't survive the voyage or simply fly away once they have been re-settled) so IP decided that the best way to achieve its goals was to breed woodpeckers in a new location and use the new birds to offset any harm that might befall the other woodpeckers on its lands. IP therefore decided to look around for a suitable place to set up a "woodpecker conservation bank". It found the perfect spot in the Southlands Forest Preserve, southwest Georgia.

The Southlands Forest Preserve site comprises 5,300 acres of suitable woodpecker habitat, with large stands of 70-90-year-old longleaf pines and a relatively sparse under story that is kept clear by regular managed fires. The company has also built nesting cavities for woodpeckers and transplanted woodpeckers from government-owned nature reserves in Georgia and Florida. According to Environmental Defense, "The plan will benefit the woodpecker by proactively managing for a single large, viable RCW population at Southlands, and conserving the largest contiguous block of longleaf pine in the company's land base. Such expanses are increasingly uncommon: only about 3 million acres remain of the longleaf pine ecosystem that once covered 74-92 million acres across the southern coastal plain. IP's conservation bank also addresses another critical need of the RCW and the longleaf ecosystem: the survival of both requires active management by landowners in the form of prescribed fire or other means of hardwood control. Without some replacement for the wildfires that once swept the Southeast, the longleaf forest becomes overgrown and the woodpeckers abandon it."

In 1998, when IP began turning Southlands into a woodpecker conservation bank, there were only three birds on the property, all of them male and doomed to extinction. By the beginning of 2003, the number of woodpeckers on the property had increased to 42, in 11 viable "clusters". And in July 2001, the National Audubon Society's Atlanta chapter designated Southlands as an Important Bird Area, making IP the first industrial landowner in Georgia to be so recognised.

Since IP had 18 woodpecker clusters on company land before 1996, IP's target for Southlands is to have at least 18 clusters on the preserve. When this happens, it will be able to offset any damage that might be done to the other woodpeckers on its timberlands across the US Southeast. In fact, it has already used existing clusters at Southlands to offset damage it is causing to woodpeckers on some of its other lands. But beyond its legal responsibilities for offsetting, IP hopes one day to have more than 18 groups at Southlands. It believes the reserve can hold as many as 30 viable woodpecker clusters. If and when that happens, IP will be able to sell as many as 12 excess woodpecker credits to other individuals or companies. As woodpecker credits can be worth from US \$150,000 to US \$250,000 each, the red-cockaded woodpeckers at Southlands could generate from US \$1.8 million to US \$3 million dollars for IP. On top of that figure could be added the financial benefits the company will receive from its ability to develop its original sites where woodpeckers were found. A bird that was once considered a financial liability is now perceived as an opportunity.

Box 10: Conservation Banking in California

Conservation banking in the US was born in the early 1990's, when the state of California became concerned with the fate of one particular songbird, the coastal California gnatcatcher. Because of increased development on the bird's preferred habitat, coastal sage scrub, it was shortly to be placed on the state's endangered species list. Developers, meanwhile, were concerned that if this happened, their activities and a real estate boom would be curtailed, particularly around San Diego County, where coastal sage scrub is common. Environmentalists, on the other hand, were concerned that unless gnatcatchers were protected by conservation of the dwindling remnants of their habitat, the bird would disappear.

The State of California decided that the solution was to protect those areas of coastal sage scrub that, because of their size, location and ecology were particularly valuable for the gnatcatcher. The problem then became how to finance the acquisition of such land on the State's very limited budget, which would not stretch to cover all the areas identified as crucial. At the same time, local governments were prohibited by a state-wide provision from raising property taxes to pay for this sort of initiative. Californians needed to find creative ways of financing the conservation of gnatcatcher habitat.

In 1993, a number of coinciding events led to the innovation of conservation banking. The gnatcatcher was added to the state's endangered species list at the same time that Bank of America - one of the world's largest banks - foreclosed on a 263-acre site in San Diego County known as the "Carlsbad Highlands". This property was important habitat for the gnatcatcher and the bank found that its development options for the site (and therefore its ability to sell the land) were limited. If it wanted to build on the land, it would have to pay large sums to mitigate its damage to gnatcatchers. The return would not necessarily cover the bank's costs. So Bank of America decided to look for other ways of obtaining value from its land. Also at this time, the California Department of Transportation (CalTrans) found that it, too, had a problem with gnatcatchers. It was building a highway on prime gnatcatcher habitat and, given the bird's new endangered status, the agency was obliged to mitigate the damage its project might cause. The stage was set for a deal.

CalTrans agreed to pay Bank of America an undisclosed sum to put a conservation easement (so that the area would never be developed) on 83 acres of its property, in return for a number of gnatcatcher mitigation credits. By 1995, the Carlsbad Highlands became the state's first conservation bank. It has since sold all of its available mitigation credits (about 180) at between US\$10,000 and US\$15,000 a piece. Today, in San Diego County, similar mitigation credits sell for upwards of US\$25,000 each.

Since the creation of the Carlsbad Highlands Conservation Bank, Californians have created more than 40 conservation banks on a wide variety of species and habitats. There are even multi-million dollar businesses (for instance, a company called Wildlands Inc.) that specialise in the creation of conservation banks and the sale of mitigation credits.

Bank of America is happy with the outcome of this process. Candace Skarlatos, senior Vice President for Environmental Initiatives at Bank of America, says that, for the Bank, the experience was "a good one". They were finally able to re-coup the money they had lent to the original owners of the Carlsbad Highlands.

4.2.3 Habitats and Birds Directives and implementing regulations in the EU

(See Boxes 3 and 21)

Sources: Personal communication with James Marsden, John Finnie & David Harrison, English Nature, July-September 2004

The EC Habitats Directive requires EU Member States to introduce a range of measures, including protection of 623 species and 169 habitats listed in Annex I and II respectively, by means of an ecologically coherent network of "Sites of Community Importance" (SCIs) to be designated as "Special Areas of Conservation" (SACs). Together with Special Protection Areas (SPA) classified under the Birds Directive, these sites make up the Natura 2000 network of European sites. Following amendments to the EC Birds Directive, the provisions described below apply to SPAs as well as to SACs.

Where a developer wants to undertake an activity which may affect a Natura 2000 site, whether it is to be undertaken within or outside the site, the consenting authority, which, in the UK may be the local planning authority or, for important or controversial decisions, the Secretary of State, must decide whether the project "either alone or in combination with others" (thus allowing cumulative effect to be taken into consideration) is likely to have a "significant effect" on the Natura 2000 site. If so, a more detailed "appropriate assessment" is undertaken on the

implications for conservation of the features of European importance on the site. The consenting authority may agree to the plan only if it can ascertain that the development will not lead to “adverse effects on the integrity of the site”.

Where there will be no such adverse effect, the requirements of the Habitats Directive are satisfied, and the issue becomes one of national planning and conservation law. Permission for the project may yet be rejected on landscape grounds or for reasons unconnected to conservation. As described in Box 11, planning authorities and companies may agree biodiversity offsets as a form of “planning gain”.

Where the authority is unable to establish that the proposed development will not have an adverse effect on the integrity of the site, it must consider whether the project could be changed – for instance, through relocation, use of different materials or seasonal restrictions, so as to avoid adversely affecting the integrity of the site. The developer may also be able to show that, while the project site will be harmed, it will offset the harm by positive conservation measures elsewhere within the Natura 2000 site, so that it is possible to conclude that its integrity will not be adversely affected or there is a net positive effect. In this case, the Habitats Directive is satisfied.

However, if the developer cannot change its project through mitigation or an offset within the Natura 2000 site itself, thus avoiding an “adverse effects on the integrity of the site”, the project may proceed only in the (extremely rare) circumstances that there were no alternatives available and “imperative reasons of overriding public interest” why it should do so. In such cases, another form of offset is required by the Habitats Directive. In the UK, this inevitably involves a decision of the Secretary of State, who must secure compensatory measures to replace the habitat affected. The government expects the developer to bear the costs of these measures. The aim of the compensatory conservation measures is “to ensure that the overall coherence of the Natura 2000 is protected”.

The Directive is not explicit that the replacement habitat must be as near to the site from which the habitat is lost as possible or that it should be exactly the same in all respects as that lost. It does state that the measures must “ensure that the overall coherence of Natura 2000 is protected”. It would appear to be easier to satisfy this requirement if the replacement habitat is of the same type, equivalent in quality and quantity and as near as possible to the damaged site (coherence being judged not just by extent but by distribution). In the case of location, if it is not possible to find or secure a suitable location for the recreation of the habitat required in the immediate vicinity, there is nothing in the Directive to prevent those concerned from widening the search further, presumably even to other EU countries, subject to the “coherence” point. With respect to the similarity of the replacement habitat, the Directive does not appear to leave much scope in “ensuring overall coherence” for replacing ancient woodland with saltmarsh, for example.

4.2.4 Offsets in Brazil under the Forest Regulation and National System of Conservation Units

(Sources: Lei No 4771 of 1965; Lei No 14.247 of 22/7/2002, Lei No 9.985 of 18/7/2000, Decreto No. 4.340 of 22/8/2002, Brazil's First national report for the Convention on Biological Diversity <http://www.mma.gov.br/biodiversidade/doc/> and personal communication, Juliana Rudich Rehfeld, Anglo American, Brazil)

Two Brazilian laws are particularly relevant to biodiversity offsets: trade in forest set-asides and industry contribution of a share of investment budgets to government, to support Conservation Units.

Trade in forest set-asides

The Brazilian Forest Code of 1965 (Law 4771) requires at least 20% of the native vegetation on each property larger than 50 hectares in the eastern, central-west and southern regions to be set aside and preserved as a Legal Forest Reserve, where only sustainable forestry practices are permitted. The law classed forests in the north and northern central-west (Amazonia) as “primitive”, where at least 50% (increased to 80% in 1996) of natural vegetation must be preserved in this way. The vegetation conserved must be representative of the area.

In the areas where the 20% rule applies, if a landowner does not wish to set aside the relevant proportion of the land within the property, the owner must buy similar land in the neighbourhood. If this offset area is outside the original “microregion” or “hydrographic basin”, the area that the landowner must acquire increases (in the first category of regions) to 30%. Detailed provisions at the state level encourage landowners in these cases to establish vegetation corridors.

Industry contribution to Conservation Units

A system of national and state laws, referred to as the “National System of Conservation Units” (SNUC) states that, where the competent environmental authority licensing a project proposed by an enterprise considers that the enterprise will have a significant environmental impact, the enterprise must compensate for the impacts of the project by supporting the SNUC. Enterprises must pay “no less than 0.5%” of the total anticipated investment costs. The exact sum will be fixed by the competent environmental authority, based on the degree of environmental impact the development project will cause. Case-by-case negotiations have discussed 2-3% of investments, and in rainforest areas, this proportion may be above 6%. The sum will be used at whichever Conservation Units within the category “Units of Complete Protection” the authority decides.

At the national level in Brazil, there are 45 million hectares of Conservation Units, in 31 Federal Environmental Protection Areas, 25 extractive reserves, 25 biological reserves, 29 ecological reserves, 60 National Forests, 19 Areas of Relevant Ecological Interest, 51 National Parks and 364 Special Reserves of Natural Patrimony (on private land) and 22 million hectares more of land in various kinds of Conservation Units at the State level.

Within the Goiás State law, for example, which establishes a State System of Conservation Units (SEUC), a “Unit of Conservation” (UC) is defined as land and its environmental resources, including water, legally instituted by the State with the objectives of conservation under a special administrative regime. UCs are of two kinds, various categories of “Units of Complete Protection” (including ecological stations and state parks, national monuments and forest refuges), are subject to various conditions and restrictions established in each UC’s management plan; and other categories of “Units of Sustainable Use”. The objectives of the State system include establishing criteria and rules for the creation, implementation and management of State UCs. The SEUC will be organised by rules that secure representative samples of ecologically significant different populations, habitats and ecosystems of state territory to safeguard the biological patrimony. Society is to be involved in policy development on UCs, with local populations and stakeholders and interested sectors of society involved in the implementation of UCs. The SEUC will seek the support and cooperation of NGOs and private organisations and individuals to develop studies, research, environmental education, ecotourism, monitoring and maintenance and other activities associated with managing UCs. Local communities and private organisations are encouraged to establish and run UCs within the state system. The State will seek to protect large areas of land by integrating together UCs of different categories that are nearby or contiguous and their respective buffer zones and ecological corridors, integrating different conservation activities with sustainable use of

natural resources, restoration and recuperation of ecosystem services and respecting property rights. When appropriate, ecological corridors will be established.

4.2.5 Federal Law for the Protection of Nature and Landscape in Switzerland

Sources: www.admin.ch/ch/f/rs/451/a18.html) and personal communication, Raymond Lebeau, Head of the Ecological Compensation chapter, Swiss Agency for Environment, Forests and Landscape, September 2004.

This law mandates “reconstitution” or “replacement” of protected biotopes where impacts are unavoidable. Article 18 concerns the protection of animal and plant species and provides that, if, having taking all factors into consideration, it is impossible to avoid harm to protected biotopes, the author of the harm must take special measures to assure the best protection possible, its reconstitution, or, if this is not possible, “adequate replacement”.

4.2.6 No net loss of fisheries habitat in Canada under the Fisheries Act

Source: http://www.dfo-mpo.gc.ca/canwaters-eauxcan/infocentre/guidelines-conseils/guides/fhmcons/fishac_e.asp

The Canadian Fisheries Act (1985) and associated policy guidelines prohibit the destruction of fish habitat, including spawning grounds and nursery, rearing, food supply and migration areas on which fish depend, directly or indirectly. However, the Act also recognises that harm to fish habitat cannot always be avoided or mitigated. Based on the principle of no net loss, the Canadian government has developed guidelines to allow development to take place while conserving and protecting fish habitat. These guidelines include the legal requirement for developers to specify mitigation and/or compensation measures proposed to alleviate potential impacts, and/or to compensate for any loss in the capacity of habitat to produce fish. A hierarchy of preferred options has been identified which includes (in descending order of preference):

- relocation - physically moving a project, or part of a project, to eliminate adverse impacts on fish habitat;
- redesign - so that a project no longer has negative impacts on fish habitat;
- mitigation - where relocation and redesign are not possible; and
- compensation - replacing damaged habitat with newly created habitat or improving the productive capacity of some other natural habit.

“Compensation” is the least preferred option. Moreover, there is a hierarchy of compensation options, which include (again, in descending order of preference):

- create similar habitat at or near the development site within the same ecological unit;
- create similar habitat in a different ecological unit that supports the same stock or species;
- increase the productive capacity of existing habitat at or near the development site and within the same ecological unit;
- increase the productive capacity of a different ecological unit that supports the same stock or species; and
- increase the productive capacity of existing habitat for a different stock or a different species of fish either on or off site.

4.3 Facilitating law and policy that can trigger negotiations on offsets

In addition to regulations that specifically require offsets, other laws and policy can trigger negotiations between developers and regulators that lead to compensatory conservation activities. This section will start by exploring how biodiversity offsets can arise from discussions associated with environmental impact assessments, planning law and negotiation of the terms and conditions in concession agreements between developers and host governments. It will then describe the likely scenario that policy-makers may draw on a range of enabling legal provisions to bring about biodiversity offsets. We illustrate this point with the example of Australia.

4.3.1 Environmental Impact Assessments

Many of our interviewees felt that Environmental Impact Assessments (EIA) provide ample room for negotiation of biodiversity offsets. As José Carlos Fernandez of the National Ecology Institute in Mexico explains, “EIA gives you lots of room to manoeuvre. It is generally used to negotiate compensation with developers in Mexico.”

In Uganda, there is a similar situation. The Investment Code requires all developers to carry out an EIA on proposed projects. The Uganda Investment Authority (UIA) puts developers in touch with registered practitioners who carry out the EIA and send it to the National Environment Management Authority (NEMA) for approval. NEMA and other relevant lead agencies review the report and decide whether or not to approve the project. Upon approval, the developer receives an EIA Certificate of Approval accompanied by an Environmental Compliance Agreement that stipulates the conditions of approval. According to Alice Ruhweza, “These are used to require on-site remediation. Now we require developers also to offset the harm that they cannot avoid by on-site remediation through off-site conservation measures. You don’t necessarily need a special law on offset. The policy framework for biodiversity offsets is there.”

From companies’ perspective, the detailed site environmental management plan is generally linked to issues that arise during the EIA. As Steven de Bie of Shell explains, “the rehabilitation activities that Shell undertakes depend on what was found in the EIA. That’s a good time to establish which compensation activities would work best.”

While there was general agreement that EIA can stimulate biodiversity offsets, several interviewees suggested that some basic conditions need to be in place for EIA to work as a trigger. They felt that supplementary guidelines would be helpful and raised some caveats. Firstly, the EIA system itself needs to be robust and transparent, so that biodiversity offset negotiations take place, and so that offsets are not seen as attempts to “buy-off” officials. Secondly, it would help for policy guidance to be available to provide a clear basis for offsets. This would not only clarify to regulators and companies what was expected of them, but also, as José Carlos Fernandez put it, “embed the concept in their thinking and make it real”.

Additionally, it was pointed out that EIAs are conducted on a timescale that frequently does not synchronise with the biodiversity being studied. For instance, it may take more than a year to understand potential seasonal impacts and to consider which aspects of a site’s biodiversity are priorities for conservation efforts. By contrast, EIAs are often completed within a period of six to nine months. Finally, some conservation organisations have expressed concerns that, since EIAs are usually paid for and approved by the companies causing the environmental damage, they may underestimate the damage caused or the offsets needed to compensate for said damage.

4.3.2 Planning law

In many countries, the planning process, with its formal system of applications and enquiries, offers another potential trigger for dialogue on biodiversity offsets between developers and regulators. Indeed, environmental and social conditions are often required as a condition for planning approval, or as a form of “planning gain”. For instance, in the UK, section 106 of the Town and Country Planning Act has often been used by authorities to require developers to undertake compensatory conservation activities. (See Box 11).

Just as with EIAs, however, certain underlying conditions may be needed for this trigger to work. As one interviewee put it, “any weaknesses in the underlying systems would make a credible system of biodiversity offsets difficult”.

Box 11: Using chapter 106 for biodiversity offsets in the UK

A lake in perpetuity and £1m saved

Northumbrian Water wished to develop a new sewage treatment works for Newcastle on land that was not protected, but was of recognised conservation value, even though it was subsequently found to be contaminated with asbestos. In its planning application, the company showed survey works and proposed to create a wetland, including a 200m long lake with a bird hide and access arrangements enabling bird species to be monitored. It also planned to cap the asbestos with the clay that was excavated for the sewage works. Under chapter 106 of the Town and Country Planning Act, the planning authority wrote the creation of the lake into the planning permission, and has a seat on the management committee in perpetuity. The additional costs to the company of building the lake and bearing the costs for its maintenance in perpetuity were covered under the operational budget and were not particularly significant relative to the costs of the project as a whole. Indeed, the use of the clay to cap the asbestos saved the company over UK£1m, as it was not necessary to remove and dispose of 14,000 lorry loads of clay from the site.

Voles and grouse in the Pennines

Chapter 106 discussions have also led to off-site conservation measures. In the Pennines, Northumbrian Water hoped to build a water treatment works on land within one of the UK ‘s designated “Areas of Outstanding Natural Beauty” (AONB). English Nature, as the statutory compensation body, recognised that the conservation benefits that could be generated on-site were limited, so the parties agreed to conservation measures including the recreation of habitat for water voles on-site, and a £50,000 offset for the conservation of black grouse in the Pennines. English Nature were able to satisfy the authorities that the entire package being offered by the company merited planning permission, when this is rarely allowed in AONBs.

4.3.3 Concession agreements

In many countries, laws related to mining, energy and utilities require developers in these and other industry sectors to obtain permits and licenses from particular government departments. Going by a range of different names, “concession agreements”, “host government agreements” and “production sharing agreements” are contracts between governments and developers that predominantly address the scale of the operations and the financial benefits for the government, but that often address applicable environmental laws and standards. Biodiversity offsets can form part of such agreements. In many jurisdictions, mining concession agreements between host governments and companies require rehabilitation of mine sites to an ecological status close to that before the concession was granted. In some cases, companies agree to undertake conservation activities to offset or

compensate for the difference between the best possible rehabilitation and the pre-mine state (i.e. to offset any environmental damage that cannot be avoided, minimised and remediated). In other cases, companies have proposed to host country governments that funds earmarked for rehabilitating the mine-site to a 'pristine' state would better be dedicated to conservation of a larger area around the mine (e.g. supporting a national park), combined with less adequate but less stringent rehabilitation of the mine site itself. Similar agreements can (and have) been struck with companies extracting oil, gas, and timber. (See ten Kate, 2003.)

4.3.4 Policy that builds on a number of legal provisions

Policy-makers wishing to promote biodiversity offsets may not need to restrict themselves to just one policy or regulatory trigger for offset negotiations. Indeed, governments that wish to encourage developers to conduct biodiversity offsets without introducing a specific piece of legislation may draw on a range of legal and policy provisions, embracing environmental impact assessments, planning law, the law concerning concessions and conservation law. Box 12 describes how different Australian states are using this approach to promote biodiversity offsets. In Uganda, the National Environment Management Authority is using not only law and policy on investment and environmental impact assessment to promote biodiversity offsets (see section 4.3.1), but also provisions relating to the management and conservation of wetlands, land-use planning and protection of natural heritage sites within Uganda's 1995 National Environment Act (Ruhweza, personal communication).

Box 12: Summary of some recent policy on offsets in Australia

Commonwealth law

Various pieces of legislation in Australia (including the Commonwealth Environmental Protection and Biodiversity Conservation Act 1999) that make provision for approval of activities that will result in damage to biodiversity (such as the clearing of vegetation or taking of specific species of fauna and flora) include conditions that relate to making good that damage which could be used as the basis for establishing biodiversity offsets.

New South Wales

A State-wide scheme of "Green offsets" to ensure net environmental improvement as a result of development for water and air pollution and for clearing native vegetation (taking into consideration the Native Vegetation Conservation Act 1997). In addition, the National Parks and Wildlife Service has been working with Planning-NSW to offset the impact of major government infrastructure projects such as highway and railway construction. And the NSW Fisheries has a policy of "no net loss" for developments that damage aquatic habitat. (See Box 13).

Victoria

Victoria's Minister for Environment and Conservation, Sherryl Garbutt MP, explains "We have adopted the policy of achieving a Net Gain in extent and quality of native vegetation" (Victorian Government, 2002). She goes on to explain that "a priority for implementing Net Gain is to avoid clearing. Where flexibility is required to support landholders as they move towards more sustainable land use and limited clearing is permitted, a rigorous process of ensuring achievement of the Net Gain principles must be pursued through strict application of the offset requirements." (See Box 22).

Western Australia

The recently amended Environmental Protection Act, relating to the clearing of native vegetation, makes specific reference to environmental offsets. Section 51H (1) states that "A clearing permit may be granted subject to such conditions as the CEO considers to be necessary or convenient for the purposes of preventing, controlling, abating or mitigating environmental harm or offsetting the loss of the cleared vegetation." The holder of a clearing permit may be required to take specific measures to "establish and maintain vegetation on land other than land cleared under the permit in order to offset the loss of the

cleared vegetation, or make monetary contributions to a fund maintained for the purpose of establishing or maintaining vegetation” (section 51 I (2)(b)). In July 2004, Western Australia released a Preliminary Position Statement (no.9) on Environmental Offsets, to provide advice to stakeholders about the intent and appropriate use of environmental offsets.

Southern Australia

The Native Vegetation Act 1991 states that the Native Vegetation Council (NVC) established by the Act may impose conditions when consenting to native vegetation clearance. If native vegetation is cleared, then a “set-aside” formula of 10 hectares for every hectare cleared is applied. The NVC may also grant consent and impose conditions in some circumstances only if it is “satisfied that the environmental benefits that will be provided by the vegetation significantly outweigh the environmental benefits provided by the vegetation to be cleared” (chapter 29(11)). In addition, the NVC has adopted a general policy that any consent given will be accompanied by conditions requiring action to significantly offset the effects of clearance. A “Point Scoring System” is applied to clearing assessments of scattered trees in order to establish the set-aside formula. (See Baird, 2003.)

Sources: www.dlwc.nsw.gov.au/acre/salinity/offsets.html; www.epa.nsw.gov.au/licensing/; www.epa.nsw.gov.au/air/actionforair/index.htm; www.dlwc.nsw.gov.au/care/water/sharing/; www.dlwc.nsw.gov.au/care/es_scheme.html; www.npws.nsw.gov.au/wildlife/biodiversity_defn.html; www.planning.nsw.gov.au/; http://www.epa.wa.gov.au/docs/1863_Offsets%20PS9.pdf;

New South Wales Government, 2002; New South Wales Government, 2001; Victorian Government, 2002; McCarthy et al, 2004; Parkes et al, 2004; http://www.calm.wa.gov.au/biocon_act_pubsubs_summary.pdf

Personal communication with Ken Atkins, Department of Conservation and Land Management, Western Australia, Marc Carter, Department of the Environment and Heritage, Australia and Tony Baird, Western Power, Australia

Box 13: Principles for Green Offsets in New South Wales

Australia’s New South Wales government aims to harness market forces through economic instruments to promote sustainable development in the state. In 2002, the state government produced an information paper on “Green Offsets”, and introduced the first five Green Offset initiatives in the same year. Green offsets for water and air pollution and for clearing native vegetation are defined as “an action taken outside a development site (but near to it) that reduces pollution or environmental impacts. The developers either take the action themselves or pay for others to do it on their behalf”. The aim of the scheme is to ensure that there is a net environmental improvement as a result of development. Several criteria are described for Green Offsets:

Principles of offsets:

- Environmental impacts must be avoided first by using all cost-effective prevention and mitigation measures. Offsets are then only used to address remaining environmental impacts.
- All standard regulatory requirements must still be met.
- Offsets must never reward ongoing poor environmental performance.
- Offsets will complement other government programmes.
- Offsets must result in a net environmental improvement.

Offsets must be:

- Enduring – they must offset the impact of the development for the period that the impact occurs.
- Quantifiable – the impacts and benefits must be reliably estimated.

- Targeted – they must offset the impacts on a “like for like or better” basis.
- Located appropriately – they must offset the impact in the same area.
- Supplementary – beyond existing requirements and not already being funded under another scheme.
- Enforceable – through development consent conditions, licence conditions, covenants or a contract.

4.4 Mandatory or voluntary systems?

Our interviews revealed a range of views as to the viability of voluntary biodiversity offsets and the respective advantages and disadvantages of mandatory and voluntary policy frameworks.

Regulatory frameworks such as the Clean Water Act and the Endangered Species Act in the US are powerful incentives for offsetting behaviour and they have certain key advantages – as well as a few disadvantages – over a more voluntary approach to biodiversity offsets. The purported advantage of such laws is that developers are clear about the nature, scope, and sometimes even the cost, of their obligations. Likewise, developers and businesses know that these laws apply equally to all businesses and competitors, so that engaging in offsets need not put them at a competitive disadvantage. However, the prescriptive nature of some laws limits flexibility and may remove the chance for the parties involved to design offsets that are most beneficial for biodiversity. (See Box 3).

Several interviewees pointed out that a legal requirement for biodiversity offsets exist in so few countries that “the voluntary approach means [the company] can make a contribution with respect to a much larger area, in terms of hectares”, as Chris Herlugson of BP put it.

However, the US interviewees were almost unanimous in their scepticism that biodiversity offsets would work on a voluntary basis. Several felt that regulatory intervention was needed to trigger conservation banking and create a market. As Doug Lashley of Greenvest put it, “People stop at intersections only if there is a stop sign”. Bob Brumbaugh, of the Army Corps of Engineers, expands the point: “The system is predicated on demand. And that is only there because of government regulation”. David Brand of Hancock Natural Resources in Australia concurs. “In these areas, change will not happen voluntarily. It will be driven by government regulation. If there is no regulation, then there is no incentive to buy offsets”. Furthermore, clarity on policy helps create markets, as the wetlands example shows. Another knowledgeable observer explains that “on wetlands, there are federal laws, but in other areas, the legal regime is diffuse and not co-ordinated, with a bifurcation between federal and state governments. California has well-defined laws that create the infrastructure for species banking. Therefore it has fifty endangered species/habitat banks while the rest of country has ten.” Robert Bonnie of Environmental Defense spoke for several interviewees who felt that regulation was needed to create markets. “A lot of the voluntary mitigation is actually anticipating forthcoming regulatory regime. There are specific examples of this in carbon offset projects (e.g. those done in Mississippi by Entergy and AEP). Without any risk of future regulation, most of these would probably not have happened.”

Additionally, US interviewees felt that without regulation to back it up, offsetting activity is likely to be fickle, and the first thing to go in hard times. As Richard Herd, a consultant who used to work for Allegheny Power, explained, “When we were all making money, there was room for all of this [conservation]. Now, there is not. It is ‘back to basics’: survival. There is a dramatic difference between legal offsets and voluntary conservation. One is driven by regulation and to save money. The other is generally driven by Public Relations.” In the US, he

concludes, doing offsets has required having proper regulation, but, adds that “there may be a cultural difference [on this] between the US and Europe.”

A cultural difference may indeed explain the noticeable difference in approach between the US and other interviewees, who were generally more ready than their US counterparts to voice the business case for voluntary biodiversity offsets.

However, another explanation may be found in their areas of experience and thus vision for how biodiversity offsets might work in the future. Most of the US interviewees were representatives from companies involved in conservation banking, wetlands trading and carbon offsets, or regulators who have established and administer these systems. Their picture is one of “buying and selling offsets” and a formal system of trading at the state, federal or even international levels. They tend to view regulatory systems as linked to profit and voluntary initiatives as not-for-profit and linked to public relations. The interviewees from other parts of the world were mostly of two kinds. Some were policy-makers in jurisdictions without formal conservation or wetland banking and trading systems. Others were from multinational companies, whose operations have an impact on biodiversity and for whom license to operate – both formal concessions from governments and social license from communities – are key to business success. Their view of biodiversity offsets is that best practice on biodiversity – possibly including offsets, whether mandatory or voluntary – is important to access land, maintain reputation and operate efficiently, with motivated staff, shareholders satisfied that the business model is viable in the long term, and the avoidance of interference and disruption from NGOs and local communities.

5 Why biodiversity offsets? The business case

Chapter 2 outlined biodiversity offsets as activities designed to compensate for unavoidable harm to biodiversity that may result from development activities. Chapter 3 described some potential advantages of biodiversity offsets. Chapter 4 examined one of the two main motivations or triggers for organisations to undertake biodiversity offsetting activities: regulations that mandate offsets and law that facilitates but does not require them.

In the absence of a legal requirement to do so, what is the motivation for a company voluntarily to choose to offset its unavoidable impacts on biodiversity? After all, undertaking offsetting activities will involve time and money. In the absence of specific legislation, this cost may not be borne by companies who do not see the business case for getting involved. Volunteer companies could arguably find themselves at a potential competitive disadvantage. In addition, companies that undertake biodiversity offsets on a voluntary basis expose themselves to the difficulty of reaching agreement on a complex and novel issue and to the reputational risks associated with failure.

This chapter will explore the various components that make up this “business case” for biodiversity offsets and some of the barriers that prevent them from doing so more frequently. It also provides examples of current practice in this field by a variety of companies.

5.1 The business case

Companies may be motivated to offset the harm they cause to biodiversity on a purely voluntary basis, simply because it is good for business.

5.1.1 License to operate, reputational risk, and regulatory goodwill

The first component of the business case for biodiversity offsets is that they can contribute to a company’s license to operate, to regulatory goodwill, and to the company’s reputation.

Core to the success of any company that needs access to land – whether for extraction, to lay cables, farm or construct roads or buildings – is the need to gain permission from relevant authorities to conduct business. Additionally, they need consent from local communities that they will not disrupt the company’s activities and, sometimes, that they will be willing customers of the facilities in the future. As one BP spokesperson put it, “Whatever we do – whether it is something initiated at the local or corporate level – will impact our reputation in some way. Reputation is definitely related to strategic issues. The whole perception of what we are and how we do things is related to the success of the company. That’s the business we are in. We have to have access to exploration areas, access to people and access to markets. Reputation is a key issue”.

Steve Botts, a representative of Antamina, a multi-stakeholder mining project in Peru, expressed the same thought: “Reputation is important for new mining projects, to get state concessions. If you don’t have a good reputation, you won’t get concessions. You won’t get a foot in the door.”

*“We have to have access to exploration areas, access to people
and access to markets... Reputation is a key issue.”*

Chris Herlugson, BP

But the issue goes beyond reputation. Botts explains that one of the primary drivers for his company to engage in offsets is maintaining his company's social license to operate. “We need to keep stakeholders satisfied that they are deriving benefits,” he says, “or they could revoke our social license. They could write letters, stop work, or encourage NGOs to make negative publicity against us.”

Linked to the issue of building trust and enhancing a company's reputation to facilitate future business is the whole concept of regulatory goodwill. Many interviewees noted that an important benefit of voluntarily undertaking conservation measures such as biodiversity offsets is that it builds trust with regulators and, in the long-run, helps the companies obtain permits more speedily. Steve Botts from Antamina explains: “If we do things right, this open doors elsewhere. The most important driver for us is to build relationships with countries. We want to show them we have a track record on the environment [in order to help secure future concessions].”

Northumbrian Water described how it built trust by showing good practice over time, working with the National Parks and the Broads Authority for several years. It is soon to sign a Memorandum of Understanding with English Nature on biodiversity conservation. As Chris Spray puts it, “We have a good relationship with the regulators and they know we'll treat these issues seriously.”

Rich Mogensen of Earthmark in the US has had a similar experience. “Regulatory goodwill,” he says, “is an important factor [driving good environmental behaviour and offsets]. If we do good work and are perceived to be doing things right, we will have an easier time getting permits next time.” Leah Haygood, a consultant who used to work on these issues for Waste Management in the US, says that best practice on conservation improved Waste Management's relations with regulators and helped them obtain the necessary permits. “It helped demonstrate to regulators that we did more than just minimum compliance. Obviously, we could never get permit writers to say this explicitly, but we received feedback from managers that our policy was very helpful in demonstrating goodwill [and in helping to secure future permits].”

All this adds up to huge potential savings for the companies concerned. By avoiding costly delays and legal expenses, and by speeding up the permit negotiation process, the companies save both time and money. For instance, if the regulator, conservation agencies and NGOs are familiar with a company's good practice, public enquiries can be concluded far faster than if evidence is contested and the company's reputation is in doubt. “It is much cheaper if the authorities say ‘we will work with you’, rather than fighting you tooth and nail”, says Chris Spray. The same goes for NGOs, local communities, and other stakeholders.

5.1.2 Access to capital

In addition to generating trust and increasing “regulatory goodwill”, offsets (coupled with a good track record on environmental issues) may also help companies gain access to the capital they need to finance their projects. In today’s world, where the World Bank, the IFC, the export credit agencies, and even a wide array of private banks (see box 14 on the Equator Principles) all pay attention to environmental issues when making financing decisions, a strong environmental track record can sometimes help in getting a loan in the quickest, easiest, and cheapest way possible.

Antamina’s Botts puts it another way: In the future, he says, those companies with the best technologies –and in this he includes social and environmental technologies– are the ones that will get the concessions and the financing. “I have no doubt,” he says, “that there will be a competitive advantage for companies in looking at these issues. When looking for financing,” he adds, “it is important to show the financiers what capabilities your company has to make the project happen.” A key part of this, he explains, is showing that the company has the ability to manage social and environmental issues. To back up his point, he cites the case of Camisea, a large natural gas project in Peru, where, he says, one of the major financiers, the US Export-Import Bank (US Ex-Im), is believed to have left the project in part for environmental reasons.

Box 14: The Equator Principles

The Equator Principles (“an industry approach for financial institutions in determining, assessing and managing environmental & social risk in project financing”) were drafted by ABN Amro, Barclays, Citigroup and WestLB in collaboration with the International Finance Corporation, the private-sector arm of the World Bank. Six other banks - Royal Bank of Scotland, Credit Lyonnais, Credit Suisse First Boston, Westpac, Rabobank and HVB - also adopted the principles in June 2003. In 2002, these ten banks together underwrote \$14.5bn in project finance. By August 2004, 27 financial institutions in over 14 countries have adopted the principles.

Banks that adopt the principles, which apply to projects with a total capital cost of \$50 million or more, undertake to review carefully all proposals for which customers request project financing and will not provide loans directly to projects where the borrower will not or is unable to comply with the principles’ environmental and social policies and processes.

Projects are assessed according to categories of risk. For projects which fall into categories A and B according to IFC guidelines for environmental and social screening criteria, the borrower must have completed an Environmental Assessment (EA), addressing to the lender’s satisfaction key environmental and social issues identified during the categorisation process. Among many such issues that must be addressed is “the protection of human health, cultural properties, and biodiversity, including endangered species and sensitive ecosystems”. The EA must have taken into account the applicable IFC Safeguard Policies (see Box 15). For all Category A projects, and when the lender considers appropriate for Category B projects, the borrower or a third party expert must have prepared an Environmental Management Plan (EMP) which draws on the conclusions of the EA, and this plan must address mitigation, action plans, monitoring, management of risk and schedules. The borrower covenants to comply with the EMP in the construction and operation of the project, provide regular reports on compliance and, where justified, decommission the facilities in accordance with an agreed Decommissioning Plan.

In circumstances where a borrower is not in compliance with its environmental and social covenants, such that any debt financing would be in default, the lender will engage the borrower to seek solutions to bring it back into compliance with its covenants.

Sources: <http://www.equator-principles.com/>; Demetri, 2003

He also believes that the Equator Principles (see Box 14) will only enhance this dynamic. “The Equator principles will play a big role,” he explains. “Companies will be forced to pay attention [to social and environmental issues], and these things will make a difference.” On the flip side, he adds, “If we do things right, we can use projects like Antamina to open doors for us elsewhere; as an example of how things can be done well.”

Box 15: IFC and offsets: From Safeguard Policies to Performance Standards

In order to ensure that projects financed by the International Finance Corporation (IFC, the private sector arm of the World Bank) are socially and environmentally appropriate, the IFC has established Safeguard Policies that, among other things, provide the framework under which to minimise and mitigate a project’s environmental and social risks. Based largely on the World Bank’s operational policies, IFC adopted the Safeguard Policies in 1998 to manage social and environmental issues surrounding private sector businesses in emerging markets.

In 2001, IFC management requested a review of the Safeguard Policies and they are currently being updated. The aim is for the policies to state clearly the IFC’s minimum requirements applicable to all IFC projects and to make sure that the policies are streamlined and easy to use. As a result, the current proposal is to move away from safeguard policies and focus instead on performance standards. Gaps in the scope of the existing safeguards are to be addressed and the revised standards are to emphasize private sector considerations while ensuring compatibility with World Bank policies. A draft of the proposed performance standards was made available in August of 2004 for public consultation prior to revision and submission.

The 10 original Safeguard Policies and the 9 proposed Performance Standards are as follows:

<i>1998 Safeguard Policies (10)</i>	<i>2004 draft Performance Standards (9)</i>
Environmental Assessment (OP 4.01, October 1998)	1. Social and Environmental Assessment
Natural Habitats (OP 4.04, November 1998)	6. Conservation of Biological Diversity and Sustainable Natural Resource
Pest Management (OP 4.09, November 1998)	
Forestry (OP 4.36, November 1998)	
Safety of Dams (OP 4.37, September 1996)	
International Waterways (OP 7.50, November 1998)	
Indigenous Peoples (OD 4.20, September 1991)	7. Indigenous Peoples and Natural Resource Dependent Communities
Involuntary Resettlement (OD 4.30, 8. Cultural Heritage June 1990)	5. Land Acquisition and Involuntary Resettlement
Cultural Property (OPN 11.03, September 1986)	8. Cultural Heritage
Child and Forced Labour Policy Statement (March 1998)	2. Labour and Working Conditions
	3. Pollution Prevention and Abatement
	4. Community Health and Safety
	9. Social and Environmental Management System

Provisions on project design and implementation in the 1998 Operational Policy on Natural Habitats include the following: “Wherever feasible, IFC financed projects are sited on lands already converted (excluding any lands that in IFC’s opinion were converted in anticipation of the project.) IFC does not support projects involving the significant conversion of natural habitats unless there are no feasible alternatives for the project and its siting, and comprehensive analysis demonstrates that overall benefits from the project substantially outweigh the environmental costs. If the environmental assessment indicates that a project would significantly convert or degrade natural habitats, the project includes mitigation measures acceptable to IFC. Such mitigation measures include, as appropriate, minimizing habitat loss (e.g. strategic habitat retention and post-development restoration) and establishing and maintaining an ecologically similar protected area. IFC accepts other forms of mitigation measures only when they are technically justified.”

The Annex on definitions notes that “appropriate conservation and mitigation measures remove or reduce adverse impacts on natural habitats or their functions, keeping such impacts within socially defined limits of acceptable environmental change. Specific measures depend on the ecological characteristics of the given site. They may include full site protection through project redesign; strategic habitat retention; restricted conversion or modification; reintroduction of species; mitigation measures to minimize the ecological damage; post-development restoration works; restoration of degraded habitats; and contiguity. Such measures should always include provision for monitoring and evaluation to provide feedback on conservation outcomes and to provide guidance for developing or refining appropriate corrective actions.”

The proposed “Performance Standard 6 - Conservation of Biological Diversity and Sustainable Natural Resource Management” explains that “This Performance Standard is designed to ensure that clients avoid or mitigate adverse impacts to biodiversity and natural resources throughout the life of the project and identify opportunities to protect and conserve biodiversity.” A “Requirement” on Natural Habitats states that “The client will not significantly convert or degrade natural habitats unless: there are no technically and economically feasible alternatives; the overall benefits of the project substantially outweigh the social and environmental costs; and any conversion is appropriately mitigated.” Interviews with IFC officials indicate that they understand “mitigation” to include offsets and other compensatory measures. A further requirement relates to critical habitats and other ecosystems. This states that the client will not (i) significantly convert or degrade critical natural habitats, including (a) legally protected areas; (b) areas officially proposed for protection; and (c) areas of known high conservation value; (ii) reduce populations of any recognised critically endangered or endangered species, or (iii) significantly reduce the ecological services provided by an ecosystem. Any lesser or non-significant impacts on critical natural habitats, ecosystems or other recognized threatened or near-threatened species, must be appropriately mitigated. In circumstances where the proposed project is located in a legally protected area, clients will, in addition to these requirements, “ensure that the proposed project use of the area is consistent with the national management or use criteria; consult protected area sponsors, local communities and key stakeholders on the proposed project; and implement programs designed to achieve net conservation improvement for the protected area as compared to the without-project scenario.”

Clearly, the IFC views offsets as a fundamental part of the way it does business.

Source: <http://www.ifc.org/ifcext/policyreview.nsf/content/home>

5.1.3 Lower costs of compliance

While many of the people interviewed cited increased trust, enhanced reputation and regulatory goodwill as the key components of the business case for offsets, there are other important factors that deserve mention. Foremost among these is the issue of the cost of compliance with environmental regulations. Depending on how offsets are established, managed and regulated, it may be possible to meet regulatory requirements for biodiversity

protection by offsetting damage in areas where real estate values are high but conservation values comparatively low. In some cases, this could help conserve unprotected areas where the opportunity cost of forgoing development is comparatively low.

This can work as follows: by giving companies some level of choice as to how they can meet their regulatory obligations vis-à-vis biodiversity, offsets could help them find the cheapest possible means of achieving (or even going beyond) a set biodiversity target. For instance, instead of re-introducing species lost as a result of a mining project in one particular location (which might be prohibitively expensive and stand little chance of long-term conservation success), a mining company could help protect the same number of individuals of the species or the same area of habitat (or indeed a multiple of the number of individuals of the species or several times the area) somewhere else where that protection might be much cheaper. This would not only reduce the cost of compliance for the company, but, if done correctly, could also maximise the biodiversity benefit obtained by the company's compliance.

Box 16: EBX: Making a Business out of Offsets

In the US, legislation requiring offsets for damage to wetlands and to endangered species has led to the creation of a number of new businesses. Some of these create wetland or species mitigation banks, some broker deals, some provide scientific advice and some do all of the above. The largest of these businesses have now become multi-million dollar service providers. One such is the Environmental Banc and Exchange, better known as EBX.

EBX was founded in 1998 with the goal of “using capital market mechanisms to achieve both meaningful environmental benefits and attractive economic returns for its shareholders.” To do this, the company operates through three distinct business units. According to George Kelly, a Principal at EBX, what is common to all of these units is “the creative use of capital market techniques to achieve meaningful environmental benefits.” The units are:

1. The Environmental Asset Management Division, which helps property owners to unlock the value of their property by “identifying, assessing and managing a very broad range of environmental assets.” These assets include wetland mitigation and other offset potentials;
2. The Resource Mitigation Division which “develops and manages wetland, stream, forest and habitat mitigation projects; water resource projects; renewable energy projects; and brownfield re-development projects, both for its own accounts and in partnership with landowners”; and
3. The Environmental Investment Banking Division which “invests in environmental technologies and projects and provides advisory services and management resources to companies” on environmental, offset and other issues.

After being created in 1998, EBX obtained its first major contract – a US\$7 million dollar, full-service wetland mitigation contract with the North Carolina Department of Transportation – in 2000. In 2002, that contract was increased to US\$11 million. By 2002, the company had become profitable, and by the end of 2004 it was projecting revenues of US\$5.7 million, net income of US\$0.5 million, and a contract backlog of US\$19 million. To date, the company has entered into contracts for US\$37 million, comprising 1,900 acres of wetland mitigation (essentially offsets) and 115,000 linear feet of stream restoration.

EBX, like several of its peers, such as Wildlands Inc., Greenvest and Land and Water Resources Inc., is occupying a new market niche based on offsets in the USA.

5.1.4 New market opportunities

Beyond cost-effective regulatory compliance, the use of offsets can also create new market opportunities for companies. For example, if a market for biodiversity offsets develops, landowners may find that land which was previously considered useless, or at least not very

financially productive, can now generate income through the sale of offsets and/or other long-term conservation measures. This, at least, has been the case through the use of conservation banking and wetlands mitigation in the US (see Box 9).

Dale Heydlauff, Senior Vice President for Environmental Affairs at American Electric Power (AEP), one of the largest utilities in the US, says that as a result of wetland mitigation banking, companies such as his with large land holdings have found that they have a business opportunity and a core capacity in a variety of new and emerging businesses.

5.1.5 First mover competitive advantage and the power to influence regulation

The use of offsets may also give a company that moves quickly a “first mover advantage”, as other, more reactive, companies find themselves dealing with high entry costs, unforeseen regulatory hurdles and fully developed and complex regulatory regimes.

Indeed, part of this “first mover advantage” comes from the very ability of early entrants to influence the emerging regulatory regime. Several interviewees felt experience with voluntary offsets would help them shape policy, and possibly legislation, in the future. Dave Richards of Rio Tinto says that his company “can gain experience and develop best practice fast in an evolutionary process, so that when regulation catches up, there are examples and case studies - and probably horror stories - to use to guide us in making choices.”

Chris Spray, of Northumbrian Water, pointed to an example where this had already happened. The company piloted the use of the government’s internet-based Biodiversity Action Reporting system, which is to be launched in 2004. AEP’s Heydlauff, meanwhile, explained that his company has become increasingly involved in carbon trading “partly because we want to inform the public policy debate [on greenhouse gas trading].” A similar dynamic may be developing on biodiversity offsets.

5.1.6 Clean break

Companies are regularly involved in mergers and acquisitions at the group level and may wish to dispose of particular assets and liabilities. As discrete, agreed packages, with project budgets paid up-front to cover implementation by third parties such as NGOs, biodiversity offsets may help companies hand over assets more cleanly. “They would offer a clean solution from which you can walk away, knowing the project and money are in place, implementation is underway, and the stakeholders are happy with the outcome,” says Chris Spray.

Experience with mitigation banking in the US has shown that developers often prefer to use conservation banks rather than conducting their own conservation activities, as this allows them to cleanly transfer liability to another, more specialised entity. John Ryan, the President of Land and Water Resources Inc., a US-based wetland mitigation bank, says that one reason that developers in the US like going to wetland banks such as his is that they transfer over a regulatory requirement – a liability – and then they can get on with doing what they do best. “They like the fact,” he says, “that they can just sign a cheque and know that their wetlands responsibilities will be taken care of, and done right. They have no liability and this is no longer one of their worries.” He also adds that it makes transferring the land that much cleaner and easier.

5.1.7 Employee satisfaction and retention

For several interviewees, a significant advantage of their companies' conservation activities and policies on biodiversity is the pride, satisfaction and allegiance to the company this engenders with employees. AEP's Heydlauff says that his company's employees love the fact that AEP is undertaking conservation projects and that they are concerned with issues of climate change and biodiversity. "Their feedback on all of this has been terrific," he says.

5.2 Barriers to more voluntary offsets

In chapter 3 we described the conservation benefits and above we have described the business and conservation benefits that could motivate companies, communities, NGOs and governments to establish biodiversity offsets. But, as with most business decisions, every potential reward carries with it some level of risk. Biodiversity offsets are no exception. This chapter will explore some of these risks, including: the risk that voluntary offset efforts will be unappreciated given the high levels of suspicion of companies' motives; the increased scrutiny that involvement in innovative projects of this kind is likely to generate; the risk of offset projects failing to meet their objectives; and a range of other potential liabilities.

5.2.1 Suspicion of companies' and governments' motivations

Among our interviewees, representatives from both companies and governments described how they have forgone opportunities to undertake biodiversity offsets for fear of criticism. As one policy-maker said, "I remember a case coming up in public debate. The extent and cost of the remediation by the company raised in the minds of government representatives whether it was the best thing to require the company to spend all that money for relatively limited biodiversity outcomes. Still, there was a lack of enthusiasm for flexibility at the time because of the objection anticipated from NGOs. They thought the NGOs would say that the focus should be on the quality of remediation and that offsets would be perceived as a ploy to get out of this."

As Geoff Burton puts it, "In an environment where there is distrust, the focus tends to be on making sure the company is seen to be fixing the damage it is doing, rather than on doing something genuinely more beneficial to biodiversity but which seems to involve some degree of false altruism." For this reason, many companies interviewed felt biodiversity offsets could only proceed as a powerful tool for conservation if the concept generated support from the conservation community, scientists and –most critically– local communities. "There's not much point in biodiversity offsets unless they are seen as credible and have the support of key stakeholders," says Ian Wood of BHP-Billiton. "If local stakeholders don't care and flatly want the original ground to be protected totally, there will be no room for the flexibility offset implies." This implies that some of the potential benefits of offsets may likewise be lost.

Many of our interviewees indicated that companies are ready to move forward with biodiversity offsets, provided they can have a reasonable level of confidence that they won't be shot down by too many critics for making the effort.

Public suspicion is not confined to companies. In some cases, there is a mistrust of government. Ismid Hadad of the Indonesia environmental NGO, Kehati, believes that public mistrust and suspicion in some resource-rich developing countries is related to the

fundamental problem of poor governance. In countries where there has been poor public and corporate governance, the lack of transparency, participation and accountability in the management of natural resources means that the public may not trust government and corporations in sectors such as forestry or mining. Hadad believes that good governance needs to be a pre-condition before concepts such as biodiversity offsets can be introduced in such countries, otherwise “only those who hold power and money will ultimately benefit from biodiversity offsets, while the poor public and the environment will remain losers”.

Some steps that could be taken to address these issues are described in chapter 8, below.

5.2.2 Increased Scrutiny

Linked to the issue of distrust, companies may not relish the additional scrutiny they are likely to attract as NGOs, the public and the media, begin to pay close attention to experimental and leadership projects such as biodiversity offsets. Why bother, they ask themselves, attracting more attention and criticism than strictly necessary by volunteering for involvement in a potentially controversial exercise when no one is forcing you to do so? Not only may such projects attract attention from those outside, but partnerships with NGOs, communities and government inevitably mean that these potential critics are on the inside, gaining an insight into the company’s goals, policies and practices. They may be stern judges of what they see.

Gone are the days when criticism arising from problems at a particular site could be contained. Rapid communication and global networks of organisations now mean that an incident in some remote location soon attracts attention all round the world. Such was the case of the OCP oil pipeline in Ecuador and the Chad-Cameroon pipeline mentioned below. (see boxes 17 and 18).

Box 17: The Chad-Cameroon pipeline

A 1,070 km (660 miles) pipeline from oil wells in landlocked Chad to the ports of Cameroon inspired a heated environmental controversy that has led to some interesting lessons in terms of offsets.

In order to mitigate the possible environmental damages of the US\$3.5 billion dollar project, particularly in Cameroon (where most of the pipeline was constructed), the project partners (ExxonMobil, Petronas, and Chevron), together with the World Bank, created an environmental foundation (known as the Foundation for Environment and Development in Cameroon, or FEDEC), two new national parks, and an “Indigenous Peoples Plan” to “provide long-term benefits to the Pygmy population that is affected by the project.” These three initiatives will be funded through a US\$3.5 million contribution from the Cameroon Oil Transport Corporation (COTCO), the joint venture created by the three companies and the government of Cameroon to construct and manage the operations of the pipeline and oil-loading facilities in that country. Of this money, US\$600,000 will go to the Indigenous Peoples Plan and related activities, US\$1.4 million for the creation and management of a national park in the Campo Reserve near Cameroon’s Atlantic Littoral forest area, and US\$1.5 million for the creation and management of a new national park in the Mbam Djerem area to the west of the Deng Deng forest.

The projects were designed to address the two main criticisms of the pipeline in mind: its contribution to environmental damage, particularly in Cameroon’s Atlantic Littoral forest; and the significant social impacts on the indigenous peoples of Cameroon, particularly the Bagyeli/Bakola people.

Acknowledging that the various funds and national parks were a form of compensation for the environmental and social damage caused by the pipeline, the World Bank web site related to the Chad-Cameroon project explicitly states: “A wide range of steps has been taken to minimize the social and environmental risks of pipeline construction and operation. In consultation with engineers, environmental experts and local people, the pipeline route was

altered to protect biodiversity, human settlements, indigenous peoples, and cultural heritage. The pipeline will be buried, rather than above-ground, and mainly follow existing infrastructure. Only a small area of tropical forest in Cameroon will be affected. To compensate for this, two large new national parks have been created in Cameroon.” There may not be a one-for-one calculation of damage caused and benefits created, but the concept of compensation for residual damage is clearly embedded in the design of this project.

World Bank Economist Robert Goodland felt the offsets undertaken to compensate for damage caused by the pipeline were more than sufficient (Goodland, 2003). He notes that the national parks created as a result of the pipeline were many times the size of the area it impacted. He writes: “The Presidentially decreed National Parks exceed 4000 sq. kms of essentially intact ecosystem, while the converted areas total less than 100 sq.kms, mainly following existing roads, hence disturbed.” He does, however, add a caveat: “In practice,” he says, “there have already been difficulties.” He notes that “A new road was fast constructed inside the main offset, namely the Campo-Ma’an National Park, contrary to agreements” and explains that there have been numerous other problems with the offsets and the project as a whole. Still, he concludes, “The important lesson is that even when best practice is sought, much can go wrong while new methodologies are being tested.”

From the point of view of the three companies, it is interesting to consider why COTCO agreed to contribute US\$3.5 million to the foundation. According to an article in Fortune magazine (April 15, 2002), “While Exxon hasn’t exactly gotten religion, it has gotten wise to the perils of what Harvard Business School professor Debora Spar has dubbed the ‘spotlight phenomenon.’ Using the Internet and mass media as cudgels, nongovernmental organizations (NGOs) such as Greenpeace, Human Rights Watch, and Friends of the Earth have grown increasingly adept at singling out multinationals for their misdeeds. And oil companies offer a particularly ripe target. They are big, which NGOs readily translate as ‘bad.’ They have highly visible brands, making them vulnerable to boycotts at the pump. They cannot choose where oil deposits are located, meaning they increasingly operate in countries with unsavory rulers, sensitive environments, and impoverished populations... Though the financial toll of these reputational assaults is hard to calculate, says Spar, it’s clearly no longer just a moral issue—it’s a bottom-line issue.”

If this analysis is correct, oil companies in particular may come to find that biodiversity offsets are an important tool in their environmental management arsenal.

Box 18: The Heavy Crude Pipeline (OCP) in Ecuador

In August of 2003, a consortium of oil and construction companies from around the world put the finishing touches to a 500-km oil pipeline stretching across Ecuador. Known as the Heavy Crude Pipeline (or, in Spanish, as Oleoducto de Crudos Pesados, OCP), the pipeline traverses the country from the Amazon rainforest in the east to the Pacific Ocean ports in the west. Although the consortium didn’t specifically seek to offset the damage it caused to the Ecuadorian environment, it took some interesting steps that were intended to serve as unofficial compensation for its environmental impact.

In addition to re-foresting the areas that were cleared to lay the pipeline, the consortium (comprising ENCANA, ENI, Repsol-YPF, Perenco, Occidental Petroleum, Perez Company and Techint) agreed to put US\$16.9 million dollars into an Ecuadorian environmental trust fund (known as Ecofondo) intended to finance environmental projects in the areas through which the pipeline passes. There have been major campaigns against the construction of the OCP in the US, Europe and Ecuador and some environmental NGOs were adamant that the projects should not be seen as mitigation or compensation for environmental damage. From the perspective of the consortium, the fund is intended to address some of the negative environmental publicity that the project has caused.

According to Yolanda Kakabadse, the President of IUCN and former Minister of Environment of Ecuador who brokered the negotiations surrounding Ecofondo, the idea was first proposed by OCP Ecuador (the Ecuadorian management company set up by the OCP

consortium) in 2001, largely as a result of the environmental controversy surrounding the project. “The first mention of this fund,” she says, “came in the environmental license granted to OCP by the government of Ecuador, but it was put in there at the request of OCP. It is the first time that Ecuador has required such a fund to be created when granting a license to an infrastructure project.”

“Initially,” says Kakabadse, “the company intended to give something like US\$1 or US\$2 million dollars for the fund, but very quickly it became clear that given the size of the OCP project [estimated at US\$1.4 billion], this was not sufficient.”

“The negotiation for EcoFondo,” says Reyna Oleas, a consultant who also was involved in the process, “took nearly two years and had two stages. First the NGOs got together to discuss the idea and to agree on what it is they wanted. Then the NGOs negotiated with OCP over the creation of the fund.” Finally, she explains, in September of 2003, the NGOs and OCP reached agreement on the size and nature of the trust fund: It would contain US\$16.9 million dollars, US\$10 million of which would be provided by Encana over ten years, and US\$6.9 million of which would be provided by the rest of the OCP consortium. It was also expected that the NGOs would raise money to contribute to the fund. The money would be used to finance conservation projects in areas surrounding the pipeline, while a small percentage would be set aside to address an agreed environmental issue of national importance to Ecuador. The money would be administered by National Environmental Fund (Fondo Ambiental Nacional) of Ecuador, a non-profit trust fund already established in Ecuador, and would not be used to pay for operating costs of the organizations submitting project proposals. When this report went to press, the agreement for the fund had been signed, but the money had not yet been transferred to an EcoFondo account.

Oleas is quick to point out, however, that the creation of this Eco-fondo was explicitly not about mitigation or offsets. “In the negotiations,” she says, “the NGOs were adamant about two key points: first, that the creation of this fund would in no way release OCP from its environmental liabilities – that it couldn’t just wash its hands of any environmental problems caused by the pipeline – and, second, that agreement on the fund would in no way force the NGOs to take OCP’s side if problems arose.” She adds that the concept of offsets and mitigation did not come up in the negotiations and she feels that, had it come up, it would have been soundly rejected by the NGOs. Kakabadse agrees. She says: “There was a strong feeling that the fund shouldn’t be seen as compensation for damage and that any compensation should come out of the ordinary budget for the project... The NGOs wanted this fund to be a way for the companies involved to put back into Ecuador some of the wealth generated by the pipeline.” Which goes to show that the environmental community does not always support the concept of offsets.

Why did the consortium agree to the fund? Kakabadse and Oleas believe there were two basic reasons. The concept of the fund was embedded in the document granting OCP a license to build its pipeline and, more importantly, the parties needed to strengthen their environmental image and thought the fund would help. So, even though the fund was explicitly not designed as a biodiversity offset, there are similarities in the business case. It is intended to boost the companies’ environmental image and thus support their license to operate.

5.2.3 Unfulfilled promise

Another risk that companies face is that, after investing much time and energy on offsets, these will not generate the conservation outcomes and associated good public relations or reputational benefits they hoped for. This risk, however, can be minimised by paying close attention to the offset design issues highlighted in chapter 4 and particularly to the process of engagement with stakeholders (chapter 7).

Beyond the risk that expected rewards won’t accrue, is the risk that relevant stakeholders begin to feel that the project is not achieving its goals or that one or more of the collaborators are not meeting their commitments. Again, this argues for careful planning and discussion of goals and motivations up front.

Box 19: One approach to enforcement

In Australia, the New South Wales Fisheries department has a policy of “no net loss” for developments that damage aquatic habitat. Developers can compensate for damage by transplanting seagrass or constructing fishways, or making payments into a Conservation Trust Fund used for strategic rehabilitation projects throughout NSW waters. As an incentive to developers to make good their commitments to offset, a monetary bond may be required as insurance against the offset action failing. For example, up to Aus \$250,000 is charged per hectare for seagrass and habitat compensation is calculated on a 2:1 basis for vulnerable habitats. Consent conditions require an annual progress report for the offset action.

See http://www.fisheries.nsw.gov.au/conservation/policies/policy_guide_content.htm and New South Wales Government, 2002

5.2.4 Legal liabilities and new responsibilities

Several of our interviewees said they had asked themselves “If you design or implement a biodiversity offset can that raise unforeseen legal liabilities?”. If so, do companies and their partners wish to incur these additional responsibilities? Shell illustrated the kind of considerations that a company will need to make. In Indonesia, one employee explained, Shell has a project whose primary objective is to sequester carbon dioxide. It happens that the area where the carbon is being sequestered is home to the orang-utang, a globally endangered species. This raises the question of whether or not Shell would be liable if the population of orang-utangs on the land suffered, for whatever reason, and if the species became even more endangered?

Another example given by an interviewee was a scenario where baseline studies for an offset – either on the land affected or on the site of the offset – turned up a hitherto unknown but highly endangered and economically valuable species or habitat. Would the company be expected to pay for the conservation costs associated with conservation? What are the responsibilities? Or what if a member of the local community was injured by an animal or falling tree on the site of an offset? Who, if anyone, should assume these new risks and liabilities?

5.3 Implementation of biodiversity offsets by companies

Some companies have weighed up the potential advantages and disadvantages and reached the conclusion that there is a strong business case for biodiversity offsets. Our research has revealed a modest, but growing, number of corporate initiatives to offset unavoidable harm to biodiversity on a voluntary basis. In most cases –with the most notable exception being wetland and conservation banking in the US– these activities are still conducted on an *ad hoc* basis, driven by the business case or personal enthusiasm of particular members of staff at the site level. Increasingly, they are linked to implementation of the company’s environment or sustainable development policy. This chapter explores corporate policies that could relate to biodiversity offsets and some aspects of practical experience of implementing offsets at the site level.

5.3.1 Signals of industry interest in biodiversity offsets

As far as we are aware, there have been no studies assessing the number and extent of voluntary biodiversity offsets. We were only able to conduct 37 interviews and collect anecdotal information, so it is impossible for us to quantify the growing interest in biodiversity offsets on the part of companies. Interviewees indicated in qualitative terms that governments and companies are increasingly using biodiversity offsets as a way of redressing the damage caused to biodiversity by corporate activities. In addition to the specific examples of biodiversity offsets described in this report, two groups of companies, one in the oil and gas sector, the other in mining and metals, have been exploring the concept.

The Energy and Biodiversity Initiative, a collaborative project involving BP, Chevron Texaco, Shell and Statoil, as well as Conservation International, Fauna and Flora International, The Nature Conservancy, The Smithsonian Institute and IUCN, recently released a report that discusses biodiversity offsets, among many other issues. (See <http://www.theebi.org/>.)

According to EBI: “The objective of an offset is that, by the end of a project, the status of biodiversity at a particular site is comparatively the same as before the project began. Use of offsets for this purpose should be the minimum standard by which all companies operate. If, after all measures are taken to mitigate impacts, there will still be a net loss of biodiversity, compensation in the form of offsets may be used to bridge the gap.”

In the mining sector, a meeting of IUCN and the International Council on Mining and Metals (ICMM), held in Switzerland in 2003, discussed the principles of “net biodiversity gain” and “no net loss of biodiversity”. One of the recommendations in the draft report of the meeting states that: “Offsets may present an option for addressing impacts which cannot be avoided, minimised or mitigated, but the process for deciding what constitutes appropriate offsets needs clarification.” ICMM is now producing a “White Paper” which examines the mining industry’s contribution to conservation. A review of the appropriateness and nature of offset use will be part of this. (Personal communication, Annelisa Grigg, September 2004)

5.3.2 Corporate policies

As Box 20 shows, a number of companies from a variety of sectors have made public commitments to environmentally sustainable development in general and to the conservation of biodiversity in particular. The question is, should these be regarded as purely aspirational statements that some might dismiss as “greenwash”, or are they backed up by clear strategies, targets and routine implementation at the site level?

Our interviews suggest that, to date, companies have regarded these policies as aspirational in nature, and have generally not asked, “How can we quantify this commitment and measure whether we are meeting it?”. However, there is a clear trend among leading companies to measure their impacts on biodiversity and to seek to demonstrate how their operations result in “no net loss”, or even a “positive impact” on biodiversity. This chapter will explore companies’ attitudes to these corporate commitments to date and the evolution of a new “offset mindset”.

■ *The case until now: purely aspirational goals*

A comment by a representative of BHP Billiton nicely illustrates the kind of questions companies ask themselves. “What, if anything,” he asks, “are the implications of policies of zero harm, such as those of BP and BHP Billiton? How are they interpreted and operationalised? Those are good questions and we are having lots of discussions internally on them.” He adds that, “‘Minimising harm’ is too general; it sounds as though you can do whatever you like. If you go for zero harm through mitigation, that sets a clear goal you want

to achieve. You may never get there, but the fundamental objective is to continue to look for opportunities to get as close as possible.”

In addition to being mostly aspirational in nature, biodiversity offset experience to date has rarely linked the scale of the impact to the scale of the conservation measures undertaken. BP explains: “Typically, a business unit would put together a plan with NGOs to carry out some conservation work. Usually, this was not linked to the impact of a particular project. We didn’t get into ‘we have a one acre footprint here, so we’ll offset with 2 acres there’. For example, in Spain, our retail and marketing business identified lynx conservation as a priority we should be involved in. We supported and promoted the conservation activities. There were business benefits for us: sales promotions, customer loyalty and enhanced reputation; benefits for the conservation organisations involved – Fundación Doñana, Estación Biológica de Doñana and the Global Nature Fund – through support for their work and for a book on the lynx by WWF; and definitely benefits for the lynx, in terms of habitat protection.”

Box 20: Examples of voluntary corporate commitments related to offset

<i>Type of commitment, from most to least rigorous:</i>	<i>Illustrative company policy statements, from their websites and publicly available documents such as Annual Reports and Environmental or Corporate Social Responsibility Reports:</i>
<i>Net positive effect</i>	<ul style="list-style-type: none"> BP CEO: ‘We can have a real, measurable and positive impact on the biodiversity of the world. That is a high aspiration - but, like our other aspirations, we’re determined to show that we can deliver’. Rio Tinto: ‘net positive effect’
<i>‘No harm’</i>	<ul style="list-style-type: none"> BP: ‘Our goals are simply stated no accidents, no harm to people, and no damage to the environment.’ BHP Billiton: ‘Zero harm to people and the environment — our goal’
<i>‘No net loss’</i>	<ul style="list-style-type: none"> Waste Management: “The Company is committed to the conservation of nature. We will implement a policy of “no net loss” of wetlands or other biological diversity on the Company’s property.” (This policy was revoked after 1998 when the company’s ownership changed.)
<i>Offset</i>	<ul style="list-style-type: none"> Rio Tinto: ‘investigating options to offset any unavoidable adverse effects in project areas by conservation actions elsewhere.’ Rio Tinto: ‘Wherever possible we prevent, otherwise minimise, mitigate and remediate, harmful effects of the Group’s Operations on the environment’.
<i>Positive contribution to biodiversity conservation</i>	<ul style="list-style-type: none"> United Utilities: ‘As far as possible, we manage our 142,000 acres of catchment land in such a way as to produce a positive ecological impact, allow access for recreation and protect raw water quality’. Northumbrian Water: ‘[Essex and Suffolk Water is] committed to enhancing biodiversity in our region . . .and minimising the direct and indirect impact of our operational activities.’ RMC: ‘conserve and create habitats that support a diversity of plants and wildlife before, during and after our operations’. Shell: part of the company’s approach on biodiversity is to make a “positive contribution to conservation”.
<i>Maintaining ecosystems</i>	<ul style="list-style-type: none"> Shell: ‘Protect the environment’; ‘maintain ecosystems’.

In a similar fashion, other companies have indicated that they tend to design projects to compensate for their footprint, but that neither impact nor offset was ever really quantified. For instance, when Shell was designing its potential project in Camisea, Peru (a project which did not go ahead), the company was not looking for strict one-for-one offsets. Sachin Kapila explains it in this way: “We were looking for conservation opportunities either along the pipeline or in another area. We were not aiming for absolute like-for-like or absolute offset.” The same has been true for Rio Tinto, as Stuart Anstee explains: “What has been happening is that individual operations have been involved in conservation activities based on regional needs, but not with the mindset to balance the equation of impact and benefit.”

Steve Botts of Antamina, goes further. He explains that “It is hard to see impacts and offsets as a purely mathematical relationship.” He says that Antamina hasn’t really talked about direct offsets simply because “the term is just not part of our vocabulary yet.” He emphasises, however, that it is a useful concept, one that his company is likely to use more in the future.

In the case of the controversial OCP pipeline in Ecuador (see Box 18), NGOs argued against any quantitative relationship between impact and conservation measures supported by the company, concerned that “offsets” could be perceived as reducing the company’s responsibility to minimise the impact caused by the pipeline.

■ *Ad hoc contributions by charismatic individuals*

Hitherto, voluntary biodiversity conservation projects have largely been *ad hoc*, driven by “individual personal passions”, as Kathryn Shanks of BP explains. “A lot of it is because somebody locally got excited. It might be one to two people. There was a wonderful Malay lady who got a turtle project going almost single-handed. In another huge project, employees in Trinidad turned a scrap yard into a nature reserve and educational centre.” Sachin Kapila of Shell describes two triggers for companies’ conservation activities: personal enthusiasm or case-by-case risk management: “Either there are individual champions, or there’s a real business risk that you need to manage, in our case through our early warning system and then the EIA process to identify risks. We can then turn risks to opportunities by designing conservation projects.”

■ *Moves towards the offset mindset: demonstrating net positive effect and transcending environment/development trade-offs*

Increasingly, companies are looking to link conservation activities more closely to impact and exploring how they can demonstrate a net positive effect from their operations. “The Shell Biodiversity Standard is designed to minimise impact and make a positive contribution. It already supports a loose form of offset and now we’re looking more specifically at what ‘positive contribution’ means”, says Sachin Kapila.

“We need to get more innovative about a whole lot of things. We need to give biodiversity offsets and delivery of aspirational policies such as ‘no harm’ more thought.”

Ian Wood, BHP

Likewise, in April 2000, Lord John Browne, CEO of BP, said “We can have a real, measurable and positive impact on the biodiversity of the world. That is a high aspiration - but, like our other aspirations, we're determined to show that we can deliver”. That statement has set the tone for the company's current thinking on biodiversity. Moving on from the its top-down corporate policy of “no damage”, “we are now looking much more locally”, says Kathryn Shanks. “The ‘no damage’ policy and minimising impact was a good start. Now we need to look on a site-by-site basis to review the benefits and impacts of having a plant in a particular location. We are starting to think more about specific impacts and how we actually make measurable progress towards ‘no damage’. Can we quantify the benefits to people or to biodiversity or to the environment of our activities? What can the company do to create a positive benefit as well as to develop the particular project? You can't have oil and gas reserves without a certain level of impact. Our challenge now is to transcend the trade-off between the benefits of development and energy use, on the one hand, and environmental considerations, on the other. We want to go beyond that to deliver benefits to the environment.”

“Everyone's familiar with the nature of trade-offs. Traditionally, these operated by comparing, for example, job creation with environmental impact. The difference with biodiversity offsets is that the comparison is made between impacts and benefits within the same sphere: like for like. There are likely to be significant social and economic development benefits from mining projects, but we don't propose to claim these as offsets for unavoidable biodiversity impacts. Rather, we aim to demonstrate a net positive effect on biodiversity, in addition to the socio-economic development benefits.”

Dave Richards, Rio Tinto

Just as BP speaks of “transcending trade-offs”, so Rio Tinto also described an evolution in the company's thinking, away from the old assumption that damage to biodiversity could be “traded” for the development benefits of projects, towards a contemporary expectation that there will be biodiversity as well as economic benefits.

Dave Richards explains the context for this work. “If there's a mine, it's going to have some biodiversity impact. People across the Rio Tinto Group recognise the value of putting conservation activities in place to offset the damage we can't avoid. We refer in our corporate biodiversity guidance to how we want our businesses to approach biodiversity offset. The biodiversity strategy teams, including both an internal group and an external advisory panel, translated this into a position statement and principles, and these include a commitment to net positive effect on biodiversity through our activities. In making that statement, we started

talking about offsets. We need to do something creative to offset our impacts on biodiversity.” His colleague Stuart Anstee describes the company’s move towards a more quantified approach. “Conservation activity based on regional needs but without the mindset to balance the impact/benefit equation was the right thing at the right time. Now we are formalising the process and moving it on. The commitment to net positive effect on biodiversity needs offsets to deliver it. We have got to review the negatives and positives and convince people there is a net benefit.”

Some companies are reviewing their policies to include clearer statements about offset or developing internal guidance on the topic. Some intend to experiment with biodiversity offset projects and learn from these to develop and apply best practice. “There’s a level of understanding of the issues now and creative ideas for programmes are starting to mushroom. There won’t be one size that fits all. We need to try things out and learn what works well from the best programmes,” says Dave Richards.

It became apparent in the interviews that companies do not yet have methodologies to quantify the biodiversity impact of their operations and the biodiversity benefits of proposed offset projects, and that they hope for collaboration from NGOs, governments and experts on this. “We don’t yet have a suggested mechanism for doing the ‘net positive effect’ sum,” says Dave Richards. “Offset is a principle we want to embrace and use,” agrees Stuart Anstee, “but the mechanics and the framework are still lacking: the basis for comparing one site with another and determining a net benefit”. Similarly, Lord Browne’s challenge to deliver measurable and positive results for biodiversity was directed to BP’s individual businesses “to make the determination as to what is appropriate”, says Kathryn Shanks. “Our activities are tailored to the actual site and operation. One size will not fit all.”

6 How to offset: technical Issues

As we have seen in chapters 2-4, with the appropriate policy framework and willing participants, biodiversity offsets appear to offer both conservation and business benefits. However, to achieve this win-win scenario, many tricky issues and risks need to be properly addressed. If offsets are poorly thought through or attempted without adequate participation, expertise or commitment by the companies, governments and communities involved, they could fail to achieve conservation outcomes, business benefits will not materialise and those involved will be exposed to the risk of reputational damage. For this reason, the approach to designing offsets and the basis for doing so are extremely important. This chapter discusses a number of features of offsets: the challenge of measuring the impact of developments; of establishing “no net loss”; the potential goals (which may conflict) of ecological equivalence and optimising conservation benefits; the location of offsetting activities; their duration; the kind of activities that “count” as offsetting conservation activities; and some issues related to cost-effectiveness. Chapter 7 goes on to explore who decides the answer to these questions during the design of offsets, who implements them and who evaluates their success.

6.1 Measuring impacts and establishing “no net loss”

One of the many challenges of implementing biodiversity offsets is determining the type and scale of compensation required. How do you determine “no net loss”? To do so demands clarity not just about the impacts of land use on biodiversity, but also some measure (or “currency”) for the impact and for countervailing conservation activities.

Measuring the impacts of land use change on biodiversity is a far more daunting task than measuring certain other environmental impacts. For example, Kathryn Shanks of BP notes that her company knows with some degree of accuracy the extent of the carbon dioxide (CO₂) emissions they are responsible for, both directly, in terms of the company’s industrial and other operations, and indirectly, in terms of emissions associated with the use of their products. Also, one tonne of CO₂ emitted is equivalent to another tonne sequestered. The same does not apply to biodiversity.

One researcher we interviewed contrasted biodiversity offset schemes with the well-developed market for SO₂ (sulphur dioxide air pollution) emission allowances. Whereas an SO₂ emission allowance is “a uniform, well-defined commodity that is tradable across the country,” the same does not apply to wetland or conservation banking, where “what you have is service territories where trading can happen, which may be big or small.” He added that while SO₂ allowances can be traded without additional regulatory review, every wetland or endangered species offset requires detailed review by the environmental regulator, adding significantly to transaction costs. Finally, he concluded that “wetlands and endangered species will never really be ... as commoditized [as SO₂]. The reality is one wetland is not the same as another.”

Not all hectares are created equal. Given our imperfect knowledge of biodiversity and its complexity, it is difficult to measure impacts on biodiversity, to attribute them to individual development projects among many contributing factors and to measure the response of ecosystems to conservation measures.

This section will explore two issues: What do you need to measure? And what is the currency for biodiversity offsets?

6.1.1 Measuring impacts

As noted by Chris Spray of Northumbrian Water, there is a need for high quality ecological data before one can begin to consider the viability of an offset. Simply carrying out a baseline species inventory in a potential development site can cost more than £250,000 (over US\$400,000). Moreover, one may also need to undertake behavioural studies of how a particular site is used by different species, in order to assess what functions need to be replaced by an offset. Quantifying ecosystem services, the impacts on these of industrial activities and the response of “offset” ecosystems to positive conservation activities is even more complex.

Alice Ruhweza of Uganda’s National Environment Management Authority points out that one major complication is the fact that many of the impacts of land-use change are indirect. For example, a large development project can attract immigrants to an area; they in turn may undertake further changes in land use, resulting in negative impacts on local biodiversity outside the boundaries of the project site and beyond the control of the project implementers. A company is not wholly responsible for these indirect impacts, but companies increasingly acknowledge that they share responsibility with government. (See EBI, 2003.) Indirect impacts will need to be taken into consideration in assessing the impact to be offset. An example of how this has been done can be found in BP’s gas production facility in Tangguh, Indonesia. In this case, simply offsetting the direct impacts of the facility was considered insufficient, due to the high risk of environmental damage posed by people moving to the area (including company employees, their families and others attracted by the increased economic activity). Hence BP and its project partners are undertaking a broader programme of land use planning and environmental training in an attempt to address threats to biodiversity outside the project site.

Box 21: NAM Protocol for determining the extent of biodiversity compensation

The Dutch company NAM, part of the Shell family, has a policy of avoiding harm to the environment to the extent possible. To translate this into practical guidelines concerning biodiversity, NAM has prepared a protocol that applies to every activity that places new demands on species and habitats. Its intended objective is “prevention of a negative impact on biodiversity, or aiming for an average neutral or positive result. The assessment should be carried out at the local level.”

The protocol sets out a methodology providing a basis for calculating the extent of harm to biodiversity on the development site and for determining the correct form of compensation. It consists of a chain of choices to be made in any individual setting, which are described in the Environmental Impact Report (i.e. NAM’s internal EIA Report, as opposed to the final, official EIA) and which involve mitigating measures such as avoiding work in certain seasons and determining restrictions to lighting, transport and noise. The protocol focuses on “compensation of remaining loss of ecological values”. “The rule of thumb”, it explains, is that “that part of the activity is compensated that can be shown to cause an actual disruption which cannot be removed through mitigation. It is preferable that compensation is carried out locally. This would be the fairest for the involved parties (social component) and is in accordance with the requirements of the Habitat and Birds Directives.”

Its principles are:

- First mitigation, and only then compensation.
- Only what is actually disrupted is compensated.
- Compensation is sought in the direct vicinity.
- Use is made of existing structures and “management contracts” on a voluntary basis.
- Anticipation allows compensation in advance.

The protocol lays out the basis for calculating the harm caused to biodiversity through the use of space and emissions of light and noise:

- Physical use of space: calculation of the area involving elements foreign to the landscape, including the area within the company's fence, the entrance road and buffer area.
- Noise: combination of area within the noise contour and decibel level conversions for permanent and temporary installations in woodland, meadow and salt marsh areas.
- Lighting: basis for calculating the habitat area to be compensated, using the value corresponding to the physical area of the installation and buffer zone, the value related to noise disruption around the installation and of lighting permanently on during the breeding season and the value linked to the entrance route. Compensation takes place during the life of the installation.

The protocol refers NAM staff to existing management systems for determining the correct form and package of compensation (as described on the website of LNV (Agriculture, Nature and Food Chain Quality: www.minlnv.nl)). For compensation, "an equivalent area of land is sought for which a management contract is arranged on a voluntary basis, in accordance with the conditions that are also employed by LNV. In general terms this comes to a compensation of approx. 250 euros per year per ha (e.g. meadow bird grassland rich in species) for which particular – well described – efforts must be made. An average location therefore comes to 2 – 6 hectares and drilling operations to over 30 hectares".

The protocol suggests that the arrangements should be made in consultation with associations of farmers, landowners and land-users that are directly involved or with working groups at the time the activities are established. It recommends that the arrangements should be checked by local environmental groups with local farmers and that the users of the land surrounding the installation would need to be willing to participate on a voluntary basis.

Compensation that extends beyond the calculations described here would fall under a sponsorship and donations policy, for which there is a separate corporate policy.

Source: Pers.communication, Sachin Kapila and Steven de Bie, Shell.

6.1.2 Establishing equivalence for offsets

Even where both the direct and the indirect impacts of a project on biodiversity can be identified, there remains the thorny question of whether development is appropriate (and thus the question of an offset legitimately arises – see chapter 2), and, if it is, then of determining an appropriate offset. Perhaps the fundamental challenge of biodiversity offsets is establishing the basis for determining "no net loss" when no two hectares are ecologically identical. This chapter will look at two contrasting methodologies: establishing ecological proxies as currency to determine equivalence (the main method used to design offsets); and economic valuation (which has largely been used retrospectively in other contexts to assess liability for damage to ecosystems, but which could offer useful tools for offset design).

▪ *Ecological proxies*

As Salzman & Ruhl (2002) put it, "whether we can confidently trade x for y depends on what we are trying to maximise and our standard of measurement, both of which turn on the currency of exchange. Put simply, unless the currency captures what we care about, we can end up trading the wrong things." They point out that this begs the questions of what the relevant values are, how we measure them and how we reflect them in a conveniently traded currency. The two main types of currency "traded" to date are hectares and habitat functions. Since "not all hectares are created equal", the currency of one hectare conserved as an offset for one hectare harmed through development is the most crude of currencies. Habitat or

ecosystem functions are barely less crude. The authors note that, in the context of s.404 wetland permits, the US Corps of Engineers has given its local field offices wide discretion in selecting the method of wetland accounting. Roughly 40 different assessment methods have been developed, categorised as:

- indices derived from easily observed characteristics that serve as surrogate indicators of ecological functions (e.g. percentage cover of aquatic vegetation);
- narrow systems that measure particular wetland services such as wildlife habitat (e.g. percentage duck habitat); and
- broader systems covering a range of wetland functions covering a number of observable characteristics.

Salzman & Ruhl note that explicit measures of service values remain beyond the reach of virtually all assessment methods in use and that assessment methods have advanced little from the beginning of the wetland banking programme some twenty years ago. Crude currencies such as hectares and habitat function fail to capture complex differences in wetlands. One result has been that mitigation banking programs are reluctant to stray far from strict, in-kind policies. They believe this problem will be endemic to habitat trading programmes in general, until ecologists can deliver cheaply calculated, refined currency for habitat values. They say even the most developed habitat assessment methods are ill prepared to produce reliable, inexpensive and ready measurements of a habitat's environmental and service values. "These measurements require far more money and time to produce on a site-specific basis than developers, habitat bankers and the government seem prepared to allocate."

Box 22: Habitat Hectares as the basis for the State of Victoria's "Net Gain Principle"

In order to implement the Net Gain principle, the Victorian State Government has developed an approach that assesses both the quantity and quality of vegetation. Vegetation/habitat quality is assessed based on a simple equation based on two primary determinants: inherent site conditions and viability of the patch of vegetation in the landscape context. This statewide, standardised approach estimates vegetation/habitat quality on a scale from zero (complete loss) to one (complete retention of natural quality as described by benchmark characteristics)(see Parkes et al 2002). The quality measure is combined with a measure of area to create a measure for the offsets called "Habitat hectares" (habitat score x area). The number of Habitat hectares needed for a given offset depends upon the conservation significance of the area to be affected. The habitat hectares approach is an explicit, quantitative method for assessing the quality of vegetation by adding scores that are assigned to 10 habitat attributes. The government has prepared a table describing circumstances in which clearing is or is not permitted, the Habitat Hectares required, guidance on "Like-for-like", the location of the offset and timing within which offsets must be initiated. (see Victorian Government, 2002, Appendix 4)

Source: Victorian Government, 2002.

Several of our interviewees reflected these challenges and described how it is easier to be satisfied of equivalence if the offset is conducted in a similar ecosystem to that damaged. A common, if rather crude, method used to ensure that an offset is adequate compensation for the habitat lost in development, is to select habitat that is ecologically similar and to conserve an area of the same size or a multiple of the area damaged. Baselines studies may help establish the similarity of the ecosystems, but, fundamentally, area is being used as proxy for

biodiversity. This can be the case even where the legal framework specifies a particular species to be conserved and “offset”.

For instance, in the US, wetland and conservation banking programmes typically use the area of a particular type of habitat as a proxy for particular endangered species or ecological functions and services that environmental regulators seek to conserve. As one interviewee put it, in the US, “we don’t trade species; we trade habitats”.

In many existing biodiversity offset programmes in the US, there is a strong preference for any habitat lost to development to be offset through restoration or rehabilitation of similar habitat as close as possible to the impact site. As noted by Robert Bonnie of the US conservation group, Environmental Defense, such “like-for-like” offsets are “easier for the public to understand and for conservationists to measure.” Bonnie’s colleague Michael Bean agrees. Whereas like-for-like offsets are readily understood by the public, “the more dissimilar the resource being protected ... to the resource being damaged, the more explaining that will be necessary.” Moreover, even relatively straight-forward offsets, involving like-for-like compensation, entail substantial scientific inputs and sometimes third party validation to ensure their credibility. The efforts involved with dissimilar ecosystems could make any assessment of no net loss extremely difficult, if not meaningless.

“We need compensation that clearly relates to impact to ensure that habitat function and species are truly preserved. Trading should be like-for-like. This is our priority but it is not always possible.”

Tina Bartlett of California Department of Fish and Game

Even if an offset is conducted in a similar ecosystem to that affected by development, the development may affect relatively “mature” habitat, while offsets may involve rehabilitating or restoring habitat on comparatively degraded lands. In such scenarios, more biodiversity will be lost per hectare in the site developed than conserved in the site offset, so many offset programmes seek to ensure that the offset area is larger or ecologically “richer” than the area lost to development. Acknowledging that area is a very crude proxy for biodiversity, even in similar ecosystems, multiples are commonly used to ensure a sufficient margin to say with confidence that the offsetting activities more than compensate for the losses on the area developed. This approach has been used in the US wetlands system to allow a “margin of safety” (Salzman & Ruhl (2002); Bishop (2003)). But, as described in chapter 3, critics of the US wetlands trading system, such as NWF’s Julie Sibbing, argue that these targets and multipliers are, in practice, not being met.

In mandatory offset programmes the ratio of offset to damaged area is often prescribed, but in voluntary schemes the ratio used (if any) is subject to negotiation and varies on a case-by-case basis. As noted by Bob Watson and Habiba Gitay of the World Bank, “what is a fair offset is part of the negotiation. [Nevertheless,] people normally go for a much bigger offset than the original area damaged.” Chris Herlugson of BP describes ratios of 1.5:1 or 2:1 as fairly typical, but adds that there are no “hard and fast rules.” In most cases the resulting offset is whatever is considered by all concerned to be “most appropriate for the conditions.” In Mexico,

according to José Carlos Fernandez, the ratio is varied depending on the proximity of the offset to the damaged site. Thus, for example, if the offset takes place on adjacent land the ratio may be one-to-one, whereas for a more distant offset a ratio of 2:1 or higher may be required.

“Experience suggests that having the geographical area of the offset project be a small multiple of the size of the area originally developed or degraded helps overcome any residual doubts that the offset is an adequate compensation for the original damage. A useful approach to dealing with uncertainty is [thus] to take a simple multiple of the area damaged.”

Geoff Burton, Environment Australia

However scientific the basis for assessing the biodiversity affected and offset, there is likely to be a strong subjective element involved. This highlights the importance of the question of who decides what is a satisfactory offset, which is the subject of Chapter 7. As Dave Richards of Rio Tinto puts it, “Given the problems of measuring and quantifying biodiversity, we’re going to have to start by making the case for net positive benefit through being transparent. At present, we can’t prove in factual measures that it’s a net positive benefit, because the methods are not yet accepted and proven. Initially, we expect to base our reporting on what we believe is reasonable, and we will involve our external partners in that process”, he says. “If it is not patently fair, people will take against it.”

■ *Economic valuation*

While most existing biodiversity offset initiatives aim to achieve ecological equivalence, as described above, few make any effort to determine the economic value of habitat gained or lost. The application of economic valuation methods to biodiversity offsets remains relatively undeveloped. As noted by Sachin Kapila of Shell, “there’s lots of debate going on [but] few, if any, are looking at value.”

Given the challenges of establishing an ecological currency for biodiversity offsets, and the strong subjective element of people’s preferences for conservation of different habitats, an alternative approach is to use a monetary currency. Economic valuation techniques can be used to assess people’s preferences for different types of habitat in different locations, and thus help determine what type of offset will compensate for the loss of welfare that people feel when existing natural habitat is damaged due to development.

Recent legal precedents in North America suggest that economic valuation may become more widely used as a means of determining appropriate compensation for environmental losses. In the case of the Exxon Valdez oil spill, for instance, US courts accepted the use of valuation methods to estimate environmental damage claims, including non-use or “existence” values held by people who were not directly affected by the spill. More recently, in 2003, the National Ecology Institute organised a seminar for members of the US and Mexican Supreme Courts to share experiences on environmental fines (e.g. for failure to comply with environmental

regulations) and compensation (e.g. valuing claims against companies for environmental damages).

A weakness of economic valuation is that most methods generate piecemeal estimates of specific values (e.g. recreation, landscape, existence value), rather than a holistic view of an entire ecosystem. Moreover, economists continue to debate the validity of valuation methods, undermining public confidence in their findings. According to José Carlos Fernandez, until economic valuation becomes routine and reliable, the courts and others will continue to rely on existing methods such as habitat equivalence and multiples.

6.2 Optimising conservation benefits

While offsets involving land similar and close to that developed may be preferred because they are easier to judge and measure, in some cases it is neither possible nor appropriate to seek perfect ecological equivalence. As noted by Geoff Burton of Environment Australia, it is often “best to aim for conservation of complex systems [rather than] direct equivalence.” He gives the example of a mine site where the original ecosystem was “relatively sparse,” in terms of species diversity. While the proposed offset was not identical, the potential increase in species richness that would result from remediation efforts was judged more important than achieving ecological equivalence. He adds, however, that direct equivalence may be appropriate where unique habitats or endangered species are concerned.

The question of what constitutes an appropriate offset is a subject of much debate in the US. Referring to a recent report on wetland banking by the National Academy of Sciences, Palmer Hough of US Environmental Protection Agency (EPA) notes that the preference for ecological similarity and offsets close to the site damaged within the same ecosystem “may be contradictory to a watershed or ecosystem approach.” Bob Brumbaugh of US Army Corps of Engineers agrees and adds that focussing strictly on mitigation of similar ecosystems close to the site damaged has been problematic in the US. He suggests that we should try to imagine “what would the watershed want?” In many cases, he adds, environmental goods and services “could be better provided by going off-site or out-of-kind”.

Rich Mogensen of Earthmark describes more acceptance of out-of-kind mitigation, focused less on strict ecological equivalence in the US, based on growing recognition that a more flexible approach could achieve more effective conservation. Thus, for example, instead of “creating the same kind of wetlands somewhere else”, there may be cases where “restoring water flow upstream could do more for the environment and the watershed.”

Another interviewee argued that while ecological equivalence of an offset is to be favoured, allowing a degree more flexibility enables small, isolated blocks of degraded ecosystem to be exchanged for much larger chunks of functioning ecosystems, with far greater conservation benefits. Jason Coccia of the US-based Conservation Fund agrees that what is important is “to create greater biodiversity value and, if possible, enhance it.”

Michael Bean argues that in either case, whether an offset attempts to provide an equivalent ecosystem or something completely different, “the key issue is clearly expressing the link between what is being offset and what is being lost.” Looking further ahead, David Brand suggests that out-of-kind offsets could become routine “when markets [for biodiversity] are liquid and deep.”

However, arguments in favour of departures from ecological equivalence in order to prefer the conservation of other, more worthwhile conservation targets rest on such conservation priorities having been identified and agreed. As Chris Spray of Northumbrian Water notes,

there is all too often a lack of consensus and clarity about conservation priorities within the environmental community, which makes it difficult to determine an appropriate offset. Northumbrian Water has been able to refer to UK government priorities, set out in the UK Biodiversity Strategy, but such clear prioritisation may be lacking in other countries.

6.3 Location

The issue of where conservation activities to offset unavoidable harm should take place is linked to consideration of the kind of ecosystems and species to be conserved (see sections 6.1 and 6.2), but also raises some additional questions. If the goal of offset is to conserve equivalent biodiversity to that damaged by the development, the location of the offsetting activity is likely to be influenced by where similar ecosystems that could be conserved may be found. But if suitable ecosystems occur in many locations, or if the objective of the offset is defined more in terms of conservation priorities and values than specific ecological equivalence to the site affected, questions will arise as to how close to the site of impact the offsetting activities should be conducted. In the end, issues such as fairness, social license to operate and the sense of ownership by local communities needed to guarantee conservation results are just as likely to shape an acceptable outcome as the ecological value of the site.

This section will discuss factors other than ecological equivalence that might affect the selection of areas to be conserved through biodiversity offsets. It will address arguments for implementing offsets as locally as possible to the site impacted; arguments for more flexibility allowing offsetting activities to be conducted further afield in order to meet conservation priorities; questions as to whether companies should ensure “no net loss” at the site- or corporate- level; and whether there would be advantages in an internationally tradable system of offsets or conservation credits, analogous to the international trade in carbon credits.

6.3.1 Proximity to the site affected

The majority of interviewees argued for implementing offsets as locally as possible to the site impacted, principally because they felt that public acceptance would be more likely when local communities can see benefits. As Geoff Burton of Environment Australia put it, “To achieve the community support on which the whole thing stands or falls, it is best to have sufficient propinquity between the site of the offset and the mining site, so people can feel there is a clear connection. The further away the offset is from the original site, the more tenuous is the connection and the less support there would be from the community - whether you're speaking of the 'community' at the local, regional or state level. If the offset were in an adjacent wetland, that would be OK, but if it were outside state territory, there would be little ownership by the local community and their representatives, local govt and stakeholders. Ian Wood, from BHP-Billiton agrees. “A tonne of carbon is the same anywhere in the world and people don't care where it came from, but so many conservation issues are local that the offset needs to be seen in the local context. People would not be happy if their local protected area was impacted and the conservation benefit was way away in Malaysia.”

Chris Spray of Northumbrian Water adds that “You could get the reverse of ‘NIMBY’ [‘Not-in-my-backyard’] if locals lose out. It wouldn't do to say ‘you're ruining this patch but mending one far away’. I suspect what is needed is a short distance between the impacted and the offset sites, so locals benefit.” Alice Ruhweza from Uganda's National Environment Management Authority says that in Uganda “Local people have to see the benefit of the offset. In some circumstances, they can also manage the offset project.” Chris Herlugson explains

that BP has had the same experience. “You’re looking at what’s appropriate in your area or region. We feel our mitigation projects should be where the impact occurs.”

As well as the advantage of securing the consent and motivation of local communities, decentralisation of government – and thus the likelihood of having to deal with different government authorities in the area affected and the area where the offset takes place – offers another reason for considering offsets close to the site impacted. Alice Ruhweza described how Uganda has decentralised environmental management to the district level, and thus how it would be more manageable to arrange offsets within this level of jurisdiction.

Again, this will have to be dealt with on a case-by-case basis, since there are instances where an ecosystem being damaged provides benefits and services to people and environments thousands of miles away. Rick Herd, a consultant who used to work on these issues for Allegheny Power, a major US utility, says determining the scale and level of work is an “age old problem.” He argues that, to a large extent, it needs to depend on the level of impact. He gives the example of river pollution, where he says certain pollutants such as iron and aluminium have limited impacts, and therefore can be offset locally at the level of rivers and watersheds, whereas other forms of damage – for instance nutrient pollution – have wider impacts and therefore have to be considered at a much broader scale. By way of example he notes, “Nutrient pollution in West Virginia has an impact all the way down to the Gulf of Mexico. So offsetting is more difficult.”

6.3.2 The bigger picture: offsets further afield

Despite the inherent appeal of establishing the offset close to the area damaged, as was suggested earlier, there are arguments for allowing offsetting activities to be conducted further afield in order to focus on conservation priorities. There may be other, more valuable and critically endangered ecosystems and species that need to be protected elsewhere. At the same time, resources may be scarce and the investment in conservation generated by offsets may be an important (or even the only) mechanism for securing their future. Or, the development project may occur in an ecosystem that is of comparatively low biodiversity value. In all these cases, it may make more sense for the offsetting activities – and financial resources – to be focused on securing a more representative national or regional system of conservation areas, even if these are distant from the site damaged.

It is important to take account of wider national and regional priorities and broader ecoregional considerations. Candace Skarlatos of Bank of America believes that what is needed is landscape-level planning that involves all stakeholders in determining conservation priorities. “We need more studies on what needs to be protected,” she explains. “It is pointless conserving small plots that will fail when development happens all around them. We must look at how protection fits into the overall system. When we are starting the process, we need to know where we can go ahead and build and where, regionally, we shouldn’t build at all.”

According to Bob Brumbaugh of the US Army Corps of Engineers, “We need a structured approach to prioritising conservation, with logic involving watershed, ecosystem and landscape perspectives”. David Brand of Hancock Natural Resources Group agrees that broader spatial planning is the trend for the future. “In the longer term,” he says, “I would like to see a more regional, ecosystemic approach, where ecosystems are treated as pools of biodiversity. If you create, protect, develop, or enhance them, then you get credit; if you destroy them, that’s a debit.”

Some policy-makers who are well aware of the need to deliver benefits to local stakeholders are already thinking of how to reconcile these needs with such ecoregional considerations.

“We are talking about how to break through the distance barrier,” says José Carlos Fernandez. “From the public opinion perspective, distance matters. The closer the offsetting activity, the easier is public acceptance. The worry is that the most effective conservation may not have any benefits to the local community. So maybe we need to think of a limit, a top percentage, of offsets that can be bought elsewhere. Secondly, we need to be aware that some things are simply not ‘offsetable’ or tradable. We should think about a critical threshold. You need to qualify which type of damage is ‘offsetable’ and which is not. For instance, if a project involves harm to endemic species or very rare ecosystems, development may not be appropriate. If development can safely go ahead, you should ensure that the offset supports the conservation of those same species and ecosystems. If you are talking about more standard ecosystems, it may be fine to conserve something different instead.”

Within the aim of securing the maximum conservation value through the offsetting activities, there is a range of options, from offsets that conserve whichever area is top of a country’s conservation priorities (even ecosystems completely dissimilar to those damaged and very distant from the development), to offsets that protect ecosystems similar to those damaged, but which may not be on the doorstep of the development project.

At one extreme, the pure logic of focussing offset activities on the country’s conservation priorities suggests that the offsetting activities could be decoupled altogether from the nature of the ecosystem affected by development, and focus on dissimilar ecosystems, anywhere in the country. As argued by Geoff Burton of Environment Australia, “The biodiversity outcome is more important than ensuring equivalence of the actual ecosystem damaged or the conservation of the immediate habitat, provided the ecosystem functions and visual aspect of the development site were properly restored.”

Box 23: Brazilian “Units of Conservation”

The Brazilian National System of Conservation Units described in Box 23 converts the damage inflicted by the development project, based on the scale of the investment, into “units” to be spent on conservation by the government anywhere within the jurisdiction concerned, while aiming to achieve the optimum conservation results. The system is administered at the federal level by IBAMA, but IBAMA delegates the function to state agencies. Most of the Conservation Units created through offsets to compensate for private investment fall under state jurisdiction, so are created within the state’s boundary. However, where a project lies on a state or national boundary, IBAMA may create Conservation Units in any of the States involved.

Source: personal communication, Juliana Rehfeld, Anglo American Brazil.

6.3.3 International trade

Could there be conservation and economic arguments that support an internationally tradable system of biodiversity offsets or conservation credits, analogous to the international trade in carbon credits?

Several of our interviewees have been involved in international carbon markets, but few felt it was credible to suggest that an international market in biodiversity credits would develop, certainly not in the short- to medium-term. In their view, this was mostly because the political will for offsets would rest on national and even local stakeholders deriving palpable benefits from the offsetting activities. “I don't get any sense that the stakeholders we work with would support a system that traded conservation in Indonesia for damage in Ireland”, says Ian Wood of BHP-Billiton.

In addition, the further afield the offset is from the site damaged, the harder it is to establish ecological equivalence and demonstrate “no net loss”. As David Brand, of Hancock Natural Resources Group explains, “You can't trade jaguars for tigers.” Brand, however, does believe that eventually, “when markets are liquid and deep” such trades might be possible, but that they will take the form of financial transactions, and that such a system is “far in the future”.

Despite this, some companies are looking forward to the possibility of savings that could be made in the future by banking conservation credits or trading them internationally. “If biodiversity offsets emerge as a market mechanism,” says Sachin Kapila of Shell, “it may be interesting to see how we could be more cost-efficient through banking conservation activities, getting credits and trading them. Perhaps biodiversity credits could be purchased from developing countries, where conservation activities may be more cost effective than in developed areas where most of the biodiversity has already gone.”

Kapila, however, cautions that such a system will be difficult to achieve. “You'd need any international system to be very transparent at the local level and very participatory,” he says. “You will probably need a central clearing mechanism to support international trade: a sort of central bank clearing-house that traded in credits that were market instruments, just like others. I do believe one day we will be able to trade biodiversity offsets. It just needs very clever leaders. Give it five or ten years.”

6.3.4 Should “no net loss” for companies be at the site or corporate level?

Another important issue that will affect the location and scale of offsetting activities is whether “no net loss” is to be calculated at the site or corporate level. Dave Richards of Rio Tinto explains the dilemma. “We've been discussing whether to offset on a case-by-case basis, or on the basis of ensuring a net positive contribution for the Group as a whole. If we say we are going to have a net positive effect, we could add up our 100 or so operations in 24 countries and add in our corporate biodiversity programmes. There would be a difference between this approach and the result if we said we would make a net positive effect at a smaller scale – at a national level or even site or regional level. We've come to the conclusion that people will increasingly expect us to demonstrate a net positive effect on the ground, and to be accounting at a lower level than the global level.” Martin Hollands of Fauna and Flora International concurs. “I agree there is probably a legitimate ethical case for “no net loss” at the group level, but that alone isn't what stakeholders such as communities or regulators are going to find acceptable. So, for business, the tactic has to be to show “no net loss” at the local level as well as at the group level.

If, then, the principle of offsets should apply at business unit rather than corporate level, does that mean that companies should offset the biodiversity impact of each and every operation? BP argues for room to ensure that “no net loss” is calculated at a more macro level. In the conclusions chapter, we suggest a two-part strategy for companies; offsetting at the business unit to demonstrate no net loss at sites of high biodiversity value (and thus business risk) and making broader contributions at the group level to conservation for the cumulative impact of the rest of the company’s operations on biodiversity.

6.4 Timelines

When designing biodiversity offsets it is important to pay attention to two main issues of timing. One relates to the duration of the offsetting project and the other to when the damage is done compared to when the offsetting activities take place.

6.4.1 Duration of offsetting obligations

While many environmental organisations argue that the offsetting projects should be implemented “in perpetuity”, in practice this can often be very difficult to achieve. As one observer put it, “perpetuity is an awfully long time.”

Bob Brumbaugh, of the US Army Corps of Engineers argues that the duration of the offsetting project should relate closely to the duration of the expected impact. “In some cases,” he says, “permanence doesn’t make sense. Sometimes impacts aren’t permanent; they disappear. Still, in no case should the mitigation last less than the expected impacts.” He believes that focusing too doggedly on getting offsets to last “in perpetuity” may in the long run be counter-productive. He says he would rather mimic natural systems and focus on the sustainability of the offset. Having said that, he recognises that terms like “in perpetuity” are easy to understand and that they satisfy government representatives and other stakeholders that make the offsets (and the behaviours being offset) possible.

Along similar lines, José Carlos Fernandez of Mexico’s National Ecology Institute adds that impact assessment, as an input to the design of offsets, needs to account for the duration and reversibility of ecological damage. For example, “where something is irreversibly transformed so that it is economically and physically irreversible,” it may be appropriate to create an offset in the form of a permanent nature reserve with sufficient funds held in trust to ensure management in perpetuity. In other situations, the damage from development may be long lasting but reversible, in which case an offset might aim to replace the loss of ecological services during the period of restoration or recovery. A third category of offset, for relatively low-priority sites, could involve little more than charging the developer the full cost of clean up and rehabilitation.

In the US, there are some interesting examples of how companies attempt to deal with the duration and viability of offsets. For instance, conservation banks in California require not only that the development rights to the land be set aside in perpetuity in the form of conservation easements held by qualified non-profit organisations or one of the regulating resource agencies, but also that financial mechanisms (e.g. trust funds and endowments) be created that can help finance the management of these areas in perpetuity. Tina Bartlett, who is the Conservation Banking Co-ordinator at the California Department of Fish and Game, acknowledges that these sorts of financial and legal requirements are necessary to ensure permanence and longevity, while they may involve some practical difficulties.

In addition to helping ensure that any damage is well and truly offset, mechanisms such as easements and trust funds may also help appease stakeholders, thus allowing the project to go ahead and limiting some of the reputational risks associated with projects that damage biodiversity. In fact, according to Burton and others, when designing offsets, it is important to bear in mind not just how long the damage to biodiversity might last, but also the duration of the benefits the company can accrue from the offsets. “The greatest value to a company [of an offset],” says Burton, “is if the offset’s benefits (through visibility of actions, etc.) continue after the company ceases mining. In other words, the duration of the harmful project is less relevant [than the duration of the offset’s reputational benefits].”

The issue of legal liability and the public perception of corporate responsibility (which can often outlast it) are also important when considering the duration of offset projects. In the US, for instance, legal liability for damaging a wetland can be passed on to a wetlands mitigation bank. In fact, this transfer of liability is one of the biggest selling points for mitigation banks (see section 5.1.6 above).

While legal liabilities can sometimes be transferred or sold, reputational liabilities are often harder to shift. One company told a powerful anecdote that argues strongly in favour of ensuring that liabilities and long-term projects like biodiversity offsets are fully funded and properly transferred if certain interests are sold. The company concerned owned a refinery which had designated an area onsite for the disposal of heavy oil. Before the site was due for remediation, the company sold the refinery and passed on the obligations to clean up the heavy oil to the government of the country concerned, which in turn hired a national oil company to conduct the remediation. In the event, the remediation was not carried out. Although the original company had sold the site and the obligation to remediate, it was still blamed for the damage. “We paid for it in the reputational sense”, the company representative said. “And we may still come away suffering.”

The moral of this story is that while legal liabilities may have limited lifespans, reputational liabilities can last much longer. Companies need to bear this in mind when designing biodiversity offsets and ensure that these are properly administered and funded to deliver the results planned over the lifetime of the project, which may well outlive the company’s direct control.

6.4.2 Should offsets be implemented in anticipation of development projects?

Some argue that damage to biodiversity should only take place once the offsetting activities are operational and have proven themselves, so there is no net loss at any period of time, and the risk of the project failing to deliver the desired conservation outcomes is reduced. In the US, this is the standard against which wetlands mitigation banks are judged. By law, mitigation banks cannot get their credits approved –and therefore cannot sell credits to developers– until and unless the wetland they are purchasing as an offset has already been restored or protected.

While this imposes substantial up-front costs for mitigation bankers (and saddles them with many of the risks inherent in creating a mitigation bank), NGOs and others have argued that having the offsetting project operational before the damage is done is essential to the viability of the model. One study (National Research Council, 2001) found that “Compensatory mitigation should be in place concurrent with, and preferably before, permitted activity.” This, they argued, would give the greatest assurances that what was being damaged was effectively offset.

However, biodiversity offsets cover a far broader range of ecosystems and locations than wetlands in the US, and they are intended to offset the unavoidable harm in the specific context of each development project, tailored to the particular case and designed with the involvement of the communities who will be affected by the development project. The appropriate offset and the relevant stakeholders are likely to be foreseeable only when the project itself is being designed, so that the anticipatory approach adopted in the case of US wetlands is unlikely to work for all biodiversity offsets.

6.5 What kind of activities count as legitimate “offsets”?

Biodiversity offsets are usually defined in terms of ecological equivalence and “no-net-loss” of habitat, as described above. In addition to the challenge of measuring the impacts on the site affected and the equivalence or superior conservation value of the site proposed for the offset, two other questions go to the heart of whether activities can be regarded as offsets that result in no net loss. One is whether the offsetting activity represents a genuinely new contribution to conservation or whether the project would have taken place anyway: an issue sometimes referred to as “additionality”. The other question is whether broader activities relevant to conservation, such as taxonomy or capacity-building “count” as biodiversity offsets, or whether *in situ* conservation of biodiversity alone will satisfy the “no net loss” approach. This chapter will explore each issue in turn.

6.5.1 Additionality

What counts as equal and opposite conservation activity to the negative impacts caused to habitats by development projects? Do the offsetting projects or activities truly add value? Are they new and additional or would the projects have taken place anyway, with or without the biodiversity offsets? A range of possibilities exists for activities that create additional conservation benefits. Three examples are as follows:

- **Foregone losses:** Ensuring the future conservation of an area which would itself otherwise have been degraded through development. In the field of carbon offsets, “avoided deforestation” is currently not credited for carbon sequestration under the Kyoto protocol. Some Parties to the treaty were concerned about the problems of proving that the habitat would indeed have been lost and some found it unpalatable to be in a position where supposedly doomed habitats could effectively be ransomed. However, the importance of finding a biodiversity offset that makes the most significant contribution to conservation was stressed by many of our interviewees. If all the stakeholders in a given case could satisfy themselves that a given area was of conservation value and was truly under threat, conserving it through a biodiversity offset may be a viable option.
- **Meeting the costs of existing conservation:** This could entail contributing funds to support conservation work on protected areas, which may nonetheless be threatened by lack of resources. If an area has already been designated as protected, could contributions to its conservation count as a biodiversity offset? The resulting conservation would not be additional in the sense of contributing a new piece of habitat for conservation. But in many countries, the protected area systems are significantly underfunded to such a degree that the long-term viability of the area is genuinely threatened. A common example is where illegal logging is making incursions into protected area, but the authorities have insufficient financial resources to enforce the

security of the park. It may be argued that financial contributions to park budgets in such a context could create additional conservation outcomes in an area that the country has already deemed a conservation priority.

Our interviewees pointed out that the more that a company can prove that the conservation project it is undertaking is “new and additional”, the better. Both Bob Watson and Habiba Gitay of the World Bank have noted that a project can only be considered an offset if the area conserved was potentially under threat. “You have to be confident,” says Ian Wood of BHP Billiton, “that, if the offset had not been done, the area would have been trashed. Otherwise it is not ‘no net loss.’”

Having said that, a number of the companies interviewed expressed some concern about a rigid interpretation of the principle of additionality. They asked whether, in the interests of conservation, it might not be better in some instances for offsets to provide “new and additional” support to existing conservation activities. Should the concept of “new and additional,” they asked, only apply to the areas being conserved, or might it, in some cases, apply to the support and resources being provided? After all, they argued, existing projects may have a higher likelihood of success (and presumably already have some level of community/government support) than projects that have to be started from scratch.

Geoff Burton of Environment Australia pointed out that, in some cases, there might be a slight tension between gaining community support for an offset project and ensuring that the project accomplishes something “new and additional” for biodiversity. “From a practical point of view,” he says, “if you buy into something with existing community support, it is better than a new project for which you have to build support anew. But that raises the question ‘is that OK for biodiversity’? There may be tension between capitalising on existing community support for a project and providing additionality for biodiversity.” What’s more, Burton believes that public affairs staff within companies may well prefer to buy into existing conservation projects, which may be seen as more credible than new ones.

In the end, as with so many of the issues surrounding biodiversity offsets, the people interviewed concluded that the issue of additionality could only be resolved on a case-by-case basis. In some cases, support for existing projects might accomplish more for biodiversity than creating new projects, while in other cases, creating new projects would appear to make more sense.

6.5.2 Conservation or capacity building?

Offsets generally take the form of investments in habitat restoration or conservation, even if it is far removed from the site of development impacts. But what about other forms of compensation? There may be situations where local stakeholders give higher priority to investments in building the capacity of conservation agencies, or environmental education, than to restoration or conservation of natural habitat. Going even further “out of kind”, some communities and governments may prefer compensation for environmental damages in the form of investments that have nothing whatsoever to do with conservation, such as improved public services or local economic development.

As chapter 7 will discuss, the challenge of achieving a viable biodiversity offset is to reconcile the different (and sometimes conflicting) priorities of different stakeholders, while taking account of local opportunities and constraints. Chris Herlugson of BP notes that in some countries it may not be feasible to provide an offset by designating new and additional protected area or demarcating land for conservation purposes. In such cases, other types of investments may be the best or only option for offsetting environmental damage. He cites examples such as support for environmental research, capacity building, environmental

education, training and awareness raising. Chris' colleague Kathryn Shanks describes such a situation in Indonesia, where BP worked with others to identify the root causes of biodiversity loss and design an appropriate response. They concluded that the physical "footprint" of BP's gas facility was a less significant threat to biodiversity than the lack of conservation capacity in the area, prompting the company to invest in an environmental training centre that had been abandoned due to lack of support. (BP also provided a more conventional offset in the form of ecosystem restoration.)

Dave Richards of Rio Tinto likewise asks whether biodiversity offsets must always be limited to land or habitat "swaps." Citing the example of a World Heritage Site that is at risk, he suggests that the presence of a large mine next door may be less of a threat than the lack of management planning and capacity. In such cases, "would it not be better, instead of always securing bits of land, to look at where the greatest difference can be made, for example by building capacity to manage conservation sites that are under threat."

Sachin Kapila of Shell notes that out-of-kind offsets could also provide opportunities for activities that have little or no direct impact on biodiversity. "What are the opportunities," he asks, "to look at supply chain issues in retail petrol stations?" In his view, companies should be able to choose from a range of options to deliver offsets, depending on the type of operation concerned. In the case of a pipeline, for example, a direct "habitat for habitat" approach may be appropriate. In other cases, offsets might take the form of support for conservation more generally, including policy changes, awareness raising, research and capacity building. Kapila acknowledges, however, that it will not be easy to show how such activities offset environmental damage.

It is likely that capacity-building will be important to secure the success of biodiversity offsets. Some interviewees felt it would be necessary to build the capacity of some stakeholders to engage in offsetting negotiations. As one put it, "We pay for some of our NGOs to get advice because we want them to be able to have a logical conversation with us. In a lot of cases, it would be very advantageous to us to build stakeholders' capacity to engage in discussion, particularly in least developed countries."

According to this argument, capacity-building is vital for companies to secure license to operate, but it should be seen as a separate activity from the conservation involved in biodiversity offsets. Several referred to the "cynicism" stakeholders and observers would feel if companies presented training and scientific research in lieu of damaged ecosystems. As one interviewee put it, "local people would not be willing to trade habitat for education. Education is not always a direct conservation benefit". Martin Hollands of Fauna and Flora International adds, "It is great in principle to say 'we wish to balance negative impacts on habitat with investment in the development of capacity for conservation'. But how do you quantify the impact of that? You would need a very strong case to demonstrate the impact of capacity-building measures in terms of solid conservation outcomes."

According to José Carlos Fernandez of Mexico's National Ecology Institute, "I don't think broader concepts for what counts as offset are appealing. It is difficult to argue that you are compensating for irreversible loss of habitat by having a few workshops! If you could show the work was credibly related to lowering threats of further irreversible dangers, just possibly you might have an argument. Or you could enter into an agreement with the local community for alternative development opportunities by contracting the community to carry out the conservation. It's a question of credibility."

Chris Spray of Northumbrian Water suggests that one solution might be to invest a percentage of the budget for the offset activities into capacity-building to secure the long-term success of the offsetting conservation activities.

6.5.3 Conservation or development?

An extension of the issue of what range of conservation-related activities would satisfy stakeholders as a biodiversity offset is the question as to whether pure economic and development benefits represent satisfactory compensation for biodiversity losses. Hitherto, economic benefits such as employment opportunities and contribution to GDP were regarded as adequate trade-offs for the environmental impacts. At the level of sustainable development strategy, it falls to government to determine major issues of policy such as this. However, companies may have to tackle these issues at the site level when they are raised during stakeholder consultations. One company described an experience with one of its operations in Brazil, when a Town Mayor felt the company need not bother with conservation benefits for the project, but should focus instead on community development. As our interviewees suggest (see chapter 5.3.2), companies increasingly believe a development project should deliver both environmental and developmental benefits, rather than trading one off against the other. Several interviewees described the benefits of dialogue with government in order to reach a conclusion on some of the value judgements inevitably involved in these decisions. As Chris Spray of Northumbrian Water puts it, “We have no way of saying if a Site of Special Scientific Interest is more important than a village shop. Hence we need to accept that there will always be an element of value judgement.”

7 How to offset: stakeholder issues

Chapter 6 explored a number of the components of biodiversity offsets that deserve careful consideration if they are to deliver both conservation and business benefits, such as: Where should the offsetting activities take place? How long should they last? And what kind of conservation activities provide a satisfactory offset that adequately compensates for the impacts of development projects? This chapter turns to perhaps the most important question of all: Who decides? People often value natural habitat differently, depending on their personal circumstances as well as the characteristics of the habitat in question. If the design, implementation and evaluation of offsets are carried out without adequate participation, expertise or commitment by the companies, governments and communities involved, they could fail to achieve conservation outcomes, business benefits will not materialise and stakeholders and observers may well criticise the outcome. This chapter explores who is involved in the design of offsets, who implements them and who evaluates their success.

7.1 Who is involved in designing an offset and who decides whether it is acceptable?

Just as fundamental to offset as issues of currency and location is the question of who determines what is fair and acceptable. During our interviews, it was evident that government is seen as a key – if not the determinant – partner in the decision, even if the offset is a purely voluntary initiative. Several company representatives pointed out that corporations are not biodiversity experts and should not be the ones to decide whether a biodiversity offset is acceptable and whether it is appropriately conceived. BP spoke for many, saying “it is very difficult for a company, even one as big as BP, to decide what space should you invest in to conserve biodiversity for the long term. We need a lot of help to make long term decisions for the right outcome. We try and participate in a process to work with regulators and conservation organisations to see how we can contribute what’s appropriate.” Many interviewees stressed how helpful it is when government makes its priorities for the conservation of biodiversity clear through law or policy, such as national biodiversity strategies and action plans, and also through involvement in case-by-case negotiations. “Biodiversity is a useful paradigm for business in the UK, as the UK has biodiversity targets and costed programmes with agreed measures of success: something the conservation movement never had before,” says Chris Spray of Northumbrian Water. “We can work within that. Business does not need to answer the question: “What is the conservation priority here?” We can use the government’s priorities. We simply accept that conserving the Gurney’s Pitta is key, if that is what the authorities and experts tell us.”

“The absolute ideal would be if there was agreement by the governments within a region on conservation priorities and how impacts should be offset, and a transparent process and sound scientific basis for designing offsets was established. Local governments would have established a mechanism to decide these priorities. And, ideally, there would be agreement in the conservation world on how to manage an area for prioritised conservation outcomes, with zoning, as appropriate, for development. A regional plan would be developed transparently, based on a democratic process and informed consent, in consultation with local and indigenous communities, central and local government and with business. Several companies working within the same area would participate together. Funding would be secured for 20 – 30 years to ensure the long-term conservation of the region. That would be a constructive

programme. Without a scientific basis or transparent process, you just get into tit-for-tat arguments about whether a multiple of 1.5 or 2 times the damaged area is appropriate,” says Kathryn Shanks of BP.

Several interviewees referred to “increasing frustration that the conservation community can’t decide what to do, where, when and why”. They made a strong plea for a more planned and united input from the conservation community, which could help by communicating a clearer and shared vision on conservation priorities. They described a growing tendency for companies to turn to environmental or conservation groups to help in these areas and to participate in planning projects such as biodiversity offsets.

Our impression from the interviews is that some companies seeking to move forward on this issue are not finding the clarity and support from governments and the conservation community that they feel is needed to make biodiversity offsets work. As David Richards of Rio Tinto put it, “We’re willing and committed to biodiversity offsets, but at the moment we don’t see much agreement in conservation policy and science about how to go about this. There is a lot of uncertainty about whether offsets are an acceptable device and how they should be constructed. This is true right down to how you quantify the minus and plus parts of what’s essentially a sum so that you can demonstrate a net positive effect. More progress on these aspects is needed in the conservation community.” Martin Hollands, from the conservation NGO community, acknowledges this. “We NGOs are already being strongly challenged by the major donors on biodiversity to quantify our impact on conservation. Companies are now throwing down another challenge. How to develop methodologies on measuring and balancing, as the basis for designing biodiversity offsets.”

A further challenge is that it will not always be easy to reach consensus among the parties involved on what is the most appropriate biodiversity offset project. Just as with any other multistakeholder discussion, those involved may hold strongly opposing views. In some cases, government will be the ultimate arbiter, as it grants the permissions and licenses for development projects. However, particularly in the case of voluntary offsets, a company would be unlikely to proceed unless it felt the project was workable and enjoyed sufficient support to succeed. This may depend on the capacity and level of involvement of local communities and NGOs.

7.2 Who implements a biodiversity offset?

Government, local communities, NGOs and the companies planning a commercial development may agree on a biodiversity offset project, but who is to carry it out? Should the company maintain sole responsibility or residual involvement in implementation, or should government, local communities or a third party such as an NGO be responsible for conducting the conservation activities involved?

Just as companies are not best qualified to design a biodiversity offset project, they may not be the most appropriate organisations to implement conservation activities in the field beyond their own fence. Most interviewees were comfortable with the idea of the implementation being outsourced to a third party organisation with appropriate interest and qualifications in conservation.

Several companies have experience of agreements with individuals and conservation groups to undertake conservation activities. For instance, Northumbrian Water has six environmental partnerships where independent third parties based in conservation organisations work on conservation projects on the company’s reservoirs. The institutional affiliation of the person

concerned is the conservation organisation, but the company pays for their time on the project. This can help both parties. The company gains expertise and someone with the time and motivation to implement good conservation activities. The company also benefits from additional leverage, as the conservation organisations can often obtain matched funding from foundations or other sources that increase the scale and impact of the conservation work. The conservation organisation can carry out more conservation activities and generates a new source of funding. In one example that Chris Spray gives, “We gave land to the local Wildlife Trust to work on a UK Biodiversity Action Plan key habitat and together developed 7 acres of reed beds and 11 acres of wetlands. We invested a further £50,000 and our partners were able to raise a further £400,000, including from the heritage lottery fund. For the land and the modest sum, we and our partners were able to generate a considerable sum for conservation and phenomenal PR.”

Local communities have implemented long-term conservation projects with success in some areas, although this may depend on their experience. According to José Carlos Fernandez, such agreements have only worked with a few communities historically. In Oaxaca, communities in the North are already involved in selling carbon offsets, provide FSC certified wood, sell organic coffee and have designed their own bioprospecting project. He believes that, if you were to attempt to find local groups to implement offsets in less well-organised communities elsewhere, particularly in a conflict region or somewhere with no track record of meeting contractual obligations, there is a heavy risk that the project’s objectives would not be met consistently.

When deciding who should take on conservation duties, BP says “talk to the experts”. In common with many other companies, BP works with The Nature Conservancy, Conservation International, Fauna and Flora International, WWF and many other local partners around the world, ranging from local environmental NGOs and schools to local government and other public agencies and institutions.

“Delegation” or outsourcing the conservation implementation to a third party is the basis of the wetland banking system in the US, where several benefits have arisen from this approach. Certain organisations are involved in many mitigation projects, leading to consolidation of the areas protected. This can support the effectiveness of conservation outcomes and make it easier to monitor the results. The group of “experts” in mitigation that has emerged can help new projects succeed, by drawing on the experience of having run similar ones in the past.

Despite these potential benefits of outsourcing biodiversity offsets, companies may wish to maintain some involvement in the conservation implementation activities. They may feel there is more to gain from a closer, working relationship with NGO and community partners and may be better able to influence the outcomes.

7.3 National systems to define and administer biodiversity offsets

Governments with policy requiring or supporting offsets will generally establish an institutional framework for considering offset project proposals, applying guidelines to aim for consistency and building experience on factors that contribute to the success of offset design and implementation. In the highly regulated context of the UK, for instance, the Secretary of State for the Environment is responsible for developing regulations, guidelines and for implementing the compensatory component of the Habitats and Birds Directives.

In Uganda, where a range of law provides the framework for biodiversity offsets (see chapter 4.3), a Technical Committee is preparing a broad policy framework on various issues including biodiversity conservation and carbon offsets. The committee involves representatives from the National Environment Management Authority and from other government departments and agencies, including the fisheries department. NEMA is working in partnership with Makerere University's Institute of Environment and Natural Resources to build a database showing the national distribution of biodiversity. The objectives are to accumulate quantitative and qualitative data on the location, use and distribution of various groups of fauna and flora in Uganda, so that the impact of development projects and offsetting conservation activities can be prioritised.

7.4 Who judges success?

A biodiversity offset project is likely to be judged both formally and informally. Formally, the undertakings made by the company involved may be audited by government for compliance with permits and licenses, and by parties to the offset activities for consistency with the agreement defining the project. Companies may audit biodiversity offset projects just as with other aspects of corporate policy, strategy and management. They may do so internally, through audit and assurance processes, or, preferably, externally, through independent monitoring and verification. Some of the companies interviewed were explicit that they do not wish to take responsibility for certifying and authenticating biodiversity offsets. "This needs to be done by an independent clearing house. Companies can't take that on board themselves," says Sachin Kapila of Shell. Michael Bean of Environmental Defense agrees. He argues that "independent external third party verification will ultimately be very important to ensure the environmental benefits. You can't use your own stable of experts. Independent verification could help assuage fears of greenwashing."

In addition to regulatory and contractual compliance checks and corporate auditing and verification, biodiversity offsets are likely to attract interest and be judged by local communities, NGOs and the media. These reasons simply add to the inevitable desire on the part of project participants to monitor and evaluate how successful the project is in achieving its goals. "People will want to form clear objectives and indicators for success so they can return later and say 'did it work?' And get an answer," says Geoff Burton of Environment Australia.

Several companies that Insight has interviewed for other biodiversity projects have described how difficult it is for them to find individuals from the usual auditing and verification organisations who are sufficiently competent on biodiversity to audit this aspect of their policies and activities (Grigg and ten Kate, 2004). In these circumstances, NGOs involved in a biodiversity offset project may be able to help. Independent third party organisations with specific biodiversity expertise may also offer verification as a service. "The local Wildlife Trust was involved in gauging whether our biodiversity projects were successful," says Chris Spray of Northumbrian Water.

Experience with wetlands mitigation and conservation banking in the US offers some insights into monitoring and evaluation that may help those designing biodiversity offsets in the future. Palmer Hough of the US Environmental Protection Agency (EPA) looks back at the US experience and feels that a shortcoming has been a lack of adequate funding to monitor and follow-up on mitigation projects. Tina Bartlett from the California Department of Fish and Game agrees. "We can always do better. We are trying to achieve 'no net loss' and the full mitigation standards of California. To do this, we are developing a mitigation banking database to track impact and compensation. Currently, we must rely on existing information and on reporting by bank operators. In the near future, we must refine the baseline monitoring

information and success criteria on both the impacting side and the mitigating side. It would be helpful for public and NGOs to get involved to make it better.”

The design of SMART⁹ targets and key performance indicators for biodiversity offset projects raises the abiding challenge for people working on biodiversity: establishing measurable and meaningful indicators of conservation outcomes, rather than just procedures followed. Given the scant knowledge of biodiversity, the lack of baseline data and the expense of gathering it, it is particularly difficult to measure rates of change in biodiversity and establish to what they are attributable. As Michael Bean of Environmental Defense explains, “One difficulty will be establishing metrics to evaluate results. It is useful to be systematic about this and important to clearly articulate the goal and then establish a metric for it.” Difficult as it this is, it will be very important for participants in biodiversity offset projects to clarify early in the design phase what exactly are the project’s objectives, and then to design and refine indicators of performance.

⁹ Specific, Measurable, Achievable, Relevant and Time-bound.

8 Conclusions

8.1 Views on offset

8.1.1 Growing momentum and interest in biodiversity offsets

Our evidence, while based on only 37 interviews, suggests that the use of biodiversity offsets as part of development projects is increasingly accepted as best practice by governments, companies and NGOs. At the same time, the number of biodiversity offset projects is growing. On the governmental side, authorities are investigating how they can use existing legal frameworks or introduce new policy to facilitate the negotiation of biodiversity offsets as part of existing project approval processes. Meanwhile, a number of companies are developing technical expertise, building institutional support and making the business case for voluntary offsets. They are moving towards quantified approaches that can demonstrate “no net loss” or even “net benefit” to biodiversity, experimenting with implementation of biodiversity offsets, and calling for help in designing methodologies to assess both sides of the offset equation: their impact and actions to benefit to biodiversity. Leadership groups of companies such as the International Council of Mining and Metals (ICMM) and multi-stakeholder partnerships such as the Energy and Biodiversity Initiative (EBI), to name but two, have also been working on the issue.

Conversations with our interviewees revealed a range of interpretations and opinions on the new and rapidly evolving practice of biodiversity offsets, but the large majority of our interviewees voiced the opinion that, in the appropriate context, offsets have much to offer and should be further explored. As Geoff Burton of Environment Australia put it, “The concept of offset is invaluable because it allows the community to achieve the best possible biodiversity outcome.” Sachin Kapila from Shell adds that “We would miss out by seeing biodiversity offset just as risk management. It’s an opportunity”.

Box 24: Some company views on the prognosis for biodiversity offsets

“My feeling is that offsets are a very logical approach and I’ve spoken to people in conservation groups who are very positive about it, although they acknowledge that politically the concept may be difficult to sell to some in their constituency. The concept has obvious potential for win-win outcomes.” (Ian Wood, BHP Billiton)

“I think biodiversity offsets are exciting and should be explored. I see a time when offsets just become a market mechanism. I believe one day we will be able to trade biodiversity offsets. It just needs clever leaders. Give it 5 or 10 years.” (Sachin Kapila, Shell)

“Both ecosystem services and biodiversity offsets are growing areas. We need to keep close and contribute to what evolves over the next couple of years.” (David Richard, Rio Tinto)

Despite this growing interest, we recognise that, in some circumstances, development projects are simply not appropriate and should not go ahead, so the whole question of offsets should not arise.

In addition, any attempt to undertake biodiversity offsets in settings where there are serious failures of public and corporate governance and a lack of transparency, participation and accountability in the management of natural resources will almost inevitably fail. Basic practices by states related to the rule of law, compliance and enforcement and by corporations related to governance and probity, are a pre-requisite for biodiversity offsets, as they are for other approaches to sustainable development.

8.1.2 Possible advantages of biodiversity offsets

Interviewees identified a number of benefits that can result from the use of offsets. These include:

For organisations devoted to the conservation of biodiversity:

- The possibility of more *in situ* conservation activity than would occur if developers were not encouraged to offset their impacts on biodiversity;
- A way to ensure better conservation outcomes by offsetting degradation of natural habitat of relatively low biodiversity value for conservation or restoration of high biodiversity value habitat (e.g. focusing on ecological corridors and priority sites) and by trading small, highly compromised sites for larger areas of habitat where conservation outcomes are more secure;
- A mechanism to integrate conservation into development planning at a time of growing pressure for resource development; to internalise environmental “externalities”; and to integrate biodiversity conservation into the investment plans of companies;
- The possibility that offsets will give greater economic value to biodiversity, natural habitat and the restoration of degraded ecosystems; and
- A significant new source of finance for biodiversity conservation.

For companies, developers and investors:

- The ability to undertake projects that might not otherwise be possible;
- Better relationships with local communities, government regulators, environmental groups and other important stakeholders;
- An enhanced reputation and therefore “social license to operate”;
- Increased “regulatory goodwill” which could lead to faster permitting;
- Easier access to capital and associated competitive advantages;
- A practical tool for managing social and environmental risks and liabilities;
- The possibility of influencing emerging environmental regulation and policy;
- Reduced costs of compliance with environmental regulations;
- “First mover” advantage for innovative companies; and
- Strategic opportunities in the new markets and businesses that emerge as biodiversity offsets become more widespread.

For communities affected by development projects:

- A means to ensure that developers leave a legacy not only of properly rehabilitated project sites, but also additional conservation benefits in the surrounding area; a legacy that could support livelihoods and amenity values;
- The opportunity to negotiate optimal environmental, economic and social outcomes at a community or landscape scale; and
- A means to identify pre-project biodiversity and ecosystem benefits and to ensure that important ecosystems remain functioning and productive both during and after development projects.

For environmental regulators and policy makers:

- A mechanism to encourage companies to make increased contributions to biodiversity conservation, without necessarily requiring elaborate new rules;
- A means to ensure that development projects required to meet the growing demand for energy, minerals, food, fibre and transport are nonetheless planned in the context of sustainable development; and
- Better balancing of the costs and benefits of biodiversity conservation and economic development.

8.1.3 Associated risks

Despite the potential advantages of biodiversity offsets identified by many of our interviewees, this report has shown that they offer no panacea or simple solution for the many biodiversity issues associated with development. Indeed, biodiversity offsets are only likely to succeed in a conducive policy atmosphere, if they meet the needs of all the key stakeholders who should be involved in their design. Designing a biodiversity offset requires the resolution of a number of complex challenges against a background of incomplete information.

Even when properly designed, offsets are likely to be controversial and the subject of disagreement. For instance, some conservation organisations oppose the entire concept of offsets, preferring to lobby for an outright ban on habitat conversion (NCC, 2001; PENG0, 2002). Others are less critical of the concept of offsets in theory, but feel that the way they are being put into practice leaves much to be desired. Conversely, some developers oppose biodiversity offsets on the grounds that such compensation will cost more than they can bear (Property Council of Australia, 2002). The public, meanwhile, may be sceptical that offsets deliver true net benefits. And local communities may not feel that they stand to gain, particularly if the conservation activities are not undertaken very close to the original development, or if companies trade off conservation benefits against socio-economic ones, rather than delivering both.

There is a risk that the mechanism could be perceived as a “license to trash” for companies. And any strong backlash could stifle interest in exploring voluntary offsets, particularly on the part of companies, as it would counter one of the strongest elements of the business case (i.e. reputational advantages and license to operate).

In some circumstances, such as where the damage to biodiversity is irreversible or occurs on unique sites of global significance, many people would agree that development is simply not appropriate, so the whole question of offsets should not arise. This perspective is reflected, for example, in a 2002 IUCN recommendation calling on states to prohibit mining in protected areas management categories I to IV and to strictly limit mining in protected areas falling in

categories V and VI.¹⁰ If governments and companies nonetheless go ahead with development in such cases, the public is unlikely to perceive the outcome as acceptable, even there is an attempt to offset the harm caused to biodiversity. Offsets in such circumstances would be likely to undermine public acceptability of the concept in general.

Together, these risks point to the need for credible and transparent standards, methodologies and guidelines for biodiversity offsets, if the approach is to be adopted more widely.

8.1.4 Lack of clear vision

Despite the growing interest in biodiversity offsets, a number of obstacles currently hamper progress. First, our research has shown that the different terminology and contexts for “biodiversity offsets” and the lack of a shared vocabulary on the subject hinders dialogue and the pooling of experience and expertise. Additionally, there is little regulatory requirement for biodiversity offsets around the world and no intergovernmental discussion of the issue (with some notable exceptions discussed in chapter 4.2). This means that most experience world-wide has emerged *ad hoc*, from mitigation banking in the USA or from environmental impact assessments and planning processes, as well as the voluntary enthusiasm of particular individuals. In short, experience is developing from the bottom-up, with little exchange of information and no co-ordination. Likewise, not much is known of existing practice and current experiments with biodiversity offsets. Indeed, this is among the first studies on the subject of which we are aware. Although several leading companies have recently announced commitments related to “net positive effect” on biodiversity, none has published a clear strategy on how it intends to accomplish this.

All this suggests that biodiversity offsets are at a turning point: There may be considerable interest and growing practical experience, but there is insufficient dialogue. There appears to be broad acknowledgement of the need to test the political acceptability of the approach, but there is a need to develop guidelines and tools to help those involved to clarify their objectives and demonstrate their success or failure. Against this background, we offer some initial conclusions, based on our interviews and research.

8.2 Key conclusions

8.2.1 The meaning of biodiversity offsets and the mitigation hierarchy

Our first conclusion is that any discussion of biodiversity offsets needs to clarify the participants’ understanding of the concept at the outset. The use of offset vocabulary varies around the world, as does the assumption as to the context within which offsetting activities take place. For instance, in the US, the term “mitigate” (or “compensatory mitigation”) is often preferred to “offset”. This refers to activities designed to compensate for unavoidable environmental damage, generally in the context of a regulatory framework that mandates offsetting activities and that has created a market in which biodiversity and wetland credits can be traded. In Europe the term “mitigate” means to minimise harm or to make it less severe, so offset is seen as a distinct activity that compensates for unavoidable harm once this mitigation has taken place. In addition to complying with regulations that require offsets in some

¹⁰ World Conservation Congress 2002 REC No. 082 “Protection and conservation of biological diversity of protected areas from the negative impacts of mining and exploration.”

contexts, European companies (like their North American counterparts) sometimes carry out biodiversity offsets in their operations around the world on a voluntary basis, motivated by the business case for doing so.

To clarify the concept that forms the basis for our research, in this report we have defined biodiversity offsets as conservation activities conducted to compensate for the residual harm to biodiversity caused by development projects in such a way as to ensure no net loss of biodiversity. We strongly emphasise, however, that before reaching this point, projects must have first sought to avoid and minimise such harm.

In other words, for us, integral to the concept of biodiversity offsets is their proper placement within the “mitigation hierarchy”: developers should first seek to avoid, minimise and mitigate the harm their projects cause to biodiversity (where “minimise” means to design a project in such a way as to reduce harm, and “mitigate” means to alleviate the residual harm, to the extent possible). Only then should they offset the residual, unavoidable impact of the project on biodiversity. We believe that offsets, if they are firmly anchored within the context of this mitigation hierarchy, do not provide a “license to trash” the environment.

Moreover, biodiversity offsets are no substitute for forgoing development projects that should not have taken place in the first place. Finally, companies, industry associations and commentators such as Goodland (2003) are increasingly suggesting that the appropriate goal for offsets is to go beyond “no net loss” and seek to achieve “net benefit”.

8.2.2 The Offset Spectrum

One interesting observation from our work is that offsets fall within a very broad spectrum that ranges from one-off voluntary offsets designed to compensate for the residual damage of one particular project, through more regular voluntary offsets that are required by company policy, all the way to legally mandated compulsory offsets that could eventually be part of an emerging market in tradable “offset credits”. And there are other hybrid approaches in between these various points on the spectrum.

At one end of the spectrum, law and policy in the US, Europe, Brazil and elsewhere require offsetting activities for damage caused by development projects to certain watersheds, species and ecosystems. And in many other countries, legal processes for environmental impact assessment, planning and negotiation of the terms and conditions of concession agreements offer the context for discussions between regulators and companies to establish biodiversity offsets. Similarly, companies seeking to raise capital for development projects are likely to face requirements to establish mitigation measures – some of which include off-site biodiversity offsets – in loan agreements from the IFC, and, since the advent of the Equator Principles, from a number of private banks.

It is important to note that all parts of this spectrum have their advantages and disadvantages. Some of these are explored in chapter 4.4. US interviewees were almost unanimous in their scepticism that biodiversity offsets would achieve the necessary scale and effectiveness in the long-term if they were only conducted on a voluntary basis. Regulatory regimes, they argued, create legal certainty, clarify the expectations of companies on the design of biodiversity offsets, help ensure a level playing-field, and may help establish new markets.

On the other hand, several interviewees pointed out that specific legal requirements for biodiversity offsets exist in so few countries that the voluntary approach would lead to a far greater contribution to global conservation than if developers were to wait for mandatory requirements. Furthermore, existing regulatory regimes that require offsets are sometimes too prescriptive to allow for flexibility in the design of offsets in such a way as to ensure that

they make the best contribution to conservation. Voluntary approaches sometimes give room for more flexibility and creativity.

As with so many other things in this report, the right place in the spectrum will vary case by case, depending on a number of variables such as a country's legal context, the nature of real-estate markets, and even the specific circumstances of a given project. In other words, where offsets should fall in this spectrum can only make sense when judged on a case-by-case basis.

We recognise that, while there may be benefits to legally mandated and tradable offsets (such as those that are emerging in the USA), these will probably not be feasible in the short to medium-term in most of the countries that hold the majority of the world's biodiversity. For this reason, we believe that, among offsets, those that are voluntary (preferably those called for by clear company policies) and those that emerge from concession agreements or as result of existing regulation (e.g. EIA laws) will have a particularly important role to play in conserving a large part of the world's biological resources.

8.2.3 Flexibility

Regardless of where offsets fall on the voluntary-to-mandatory spectrum, Leah Haygood – an environmental consultant who has worked on mitigation for Waste Management and other companies – voiced the view of many when she said that what is important is not to seek an unrealistic “one-size-fits-all” solution, but rather to develop a process that “will allow you to come up with site-specific solutions”. Many other interviewees likewise stressed the importance of flexibility and case-by-case, site-specific responses to biodiversity impact as a pre-requisite for appropriate offsets. The ground-rules for biodiversity offsets, many argued, need to be sufficiently flexible to allow site-specific solutions that find the best results and ensure that the relevant stakeholders are involved and satisfied.

Notwithstanding the need for flexibility and a process-based approach, it is still possible to elicit some basic principles that we suggest could be applied in individual cases. Several of these principles interact and some may conflict so as to require a degree of trade-off. Drawing on the interviews and other sources, we arrive at the following general conclusions about designing offsets to achieve no net loss or net benefit to biodiversity:

- ***Measuring “no net loss” is a challenge but not an insuperable barrier:*** Limits to the current knowledge of biodiversity and its complexity mean that it is extremely difficult to establish a “currency” to measure both loss of biodiversity caused at a development site and the conservation that is needed to offset it elsewhere, so as to be confident that there is “no net loss”. Much more work is needed in this area to develop socially acceptable and workable methodologies to measure both biodiversity loss and gain. Developing such a “currency” may be a challenge, but some ecologists have indicated that it should be possible to identify measures that give a reliable indicator for no net loss. Such approaches can also help show when a net benefit has been achieved.
- ***Ecological equivalence and conservation priorities need to be balanced:*** Given the difficulties inherent in measuring biodiversity, establishing equivalence between the affected and offset sites –sometimes referred to as trading “like for like”– appears to be a good basis for ensuring no net loss of biodiversity. However, this bias toward equivalence should be tempered with sufficient flexibility to allow offsets to focus on agreed conservation priorities, whether informed by national strategies and international expertise or by local needs. There is, nonetheless, an important caveat: the more the biodiversity involved in the offset differs from that affected by the development project, the harder it is likely to be to demonstrate “no net loss” and to secure stakeholder buy-in.

- *Local benefits and conservation priorities need to be balanced:* In order to meet the needs of local stakeholders, offsets are normally implemented at a location that is sufficiently close to those who are most affected, so that they can, in turn, benefit from their outcome. In some cases, however, flexibility may be needed to allow for the selection of locations that will make a greater contribution to biodiversity conservation, even if that means conducting offsets further afield. In such cases, the consent of local people is essential.
- *Offsets should demonstrate real in situ conservation outcomes:* While financial support for taxonomic and other research and for capacity-building and training can make an important contribution to biodiversity, the conservation outcomes of activities such as training are often hard to demonstrate. And when it comes to biodiversity offsets, these mechanisms are only likely to deliver the business benefits of risk management and license to operate if they can demonstrate practical conservation outcomes in the field.
- *Successful offsets require agreement among stakeholders:* As expanded below, the most fundamental determinant of the design of biodiversity offsets must be the satisfaction of key stakeholders such as local communities, government authorities and the companies involved.

8.2.4 Depends on stakeholders

The successful design and implementation of biodiversity offsets depends on satisfying key stakeholders including local communities, government authorities, environmental groups and the companies involved in a development project. The support of local communities is of prime importance. They may, for instance, reject a project that contributes to the country's top conservation priority if they do not see any obvious benefits given the distant location of the offsetting project. Or they may reject a project next door to the development site if it is of no conservation value. Ideally, the stakeholders will, together, weigh up the various factors discussed in this report in order to select offset activities that optimise and balance a mixture of considerations. In practice, it is not always easy to identify who has a legitimate place at the table. Dialogue can be time consuming and expensive and stakeholders are not always able to reach consensus. Notwithstanding these challenges, stakeholder involvement is vital.

8.2.5 Offsets benefit from clear priorities

Offsets, at their heart, involve a trade-off. They are predicated on the notion that biodiversity in one place may be damaged (or even destroyed) in return for biodiversity protected and conserved elsewhere. In order to make such trade-offs, however, it is essential to reach broad agreement on conservation priorities; to assign values that allow a determination of what can be damaged, what needs to be protected; and what can be traded for what.

Given this fundamental nature of offsets, interviewees, time and again, stressed the need for those designing specific offset projects to inform themselves of the priorities for conservation in the country concerned; and to plan offsets with a view to making contributions at the ecosystemic, landscape or ecoregional levels. Familiarity with national biodiversity strategies and action plans and contact with relevant authorities and experts can help make offsets more successful. Companies interviewed frequently stated that they would like guidance on conservation priorities and described lack of clarity on this as a significant constraint in the use of offsets.

8.2.6 Further work is needed

Many interviewees identified the need for further work to articulate the concepts involved in biodiversity offsets and to develop guidelines and methodologies, particularly on the issue of “currency”: the basis for measuring the loss of biodiversity caused at a development site and the conservation outcomes needed to offset it elsewhere. Some specific areas where further work is called for are described in the following section.

8.3 What is needed for better biodiversity offsets?

Our interviewees identified a number of issues that need to be resolved if biodiversity offsets are to be used more widely. These include the need to:

8.3.1 Encourage more dialogue and develop a shared vocabulary

Biodiversity offsets raise many scientific, social, political, legal and economic questions, to which there are no easy answers. More open and informed debate is needed to develop a shared vocabulary on biodiversity offsets and to explore its various aspects. Dialogue is also needed to articulate the concept, to share information and experience and to assess its political, scientific and commercial feasibility. This would help to address the evident suspicion and distrust among some stakeholders that could become a barrier to further development of the approach. The debate should involve those who are sceptical about biodiversity offsets, and those who have simply not given it much thought, as well as the more ardent supporters of offsets.

8.3.2 Ensure all stakeholders play their part

If they are to succeed, biodiversity offsets will need support from companies, governments, NGOs and local communities; first in exploring the general approach of “no net loss”, and then in the design of specific offset projects. It has become clear through our research and interviews that, for any significant progress to be made on the issue, certain steps on the part of each of the main stakeholder groups are needed. Some of these steps are outlined below:

For Companies

For companies, biodiversity represents both a business risk and an opportunity (Grigg and ten Kate, 2004). Biodiversity offsets are but one tool they can use to manage this risk and capitalise on the opportunity. In doing so, companies should:

- Clarify to external audiences and to staff and contractors their policy commitment on biodiversity, including reference to the mitigation hierarchy and to biodiversity offsets.
- Communicate a clear strategy for how they plan to implement their policy commitments, preferably including specific, time-bound targets. As part of this strategy, companies should set out how they propose to achieve any commitments to “no net loss” or “positive impacts on biodiversity”. We recommend that this aspect should comprise two main elements: (a) biodiversity offsets to be a routine part of project design for new projects in areas of high biodiversity value, where permitted by local authorities; and (b) group-level

contributions to conservation. The latter might include capacity-building and research and would have the broad aim of offsetting the cumulative effect of the company's other impacts on biodiversity, for instance in urban or other sites of lower biodiversity value.

- Communicate their experience of designing and implementing biodiversity offsets.
- Look for opportunities to participate in pilot projects to design and implement biodiversity offsets, working in collaboration with representatives from local communities and government and drawing on appropriate expertise.
- Work with NGOs and other experts to develop guidelines and methodologies and consistent and transparent indicators for achieving “no net loss” that can satisfy the needs of stakeholders and be workable in practice.
- Encourage governments, communities, NGOs and others to identify clear biodiversity, ecosystemic, and other conservation priorities needed to make offsets possible.

Governments

As described above, biodiversity offsets may be used in a variety of policy contexts, from the highly prescriptive regulatory regime of the US Clean Water Act to the more basic setting of environmental and planning law found in many parts of the world. Governments seeking to test or encourage biodiversity offsets should:

- Provide an enabling policy framework. This will not necessarily require the introduction of new law mandating biodiversity offsets. On the other hand, offsets are unlikely to succeed without effective law and policy on conservation; environmental impact assessment and mitigation; land use planning and zoning; conditions for extractive and other industrial developments with biodiversity impacts; and clear national sustainable development goals and priorities with associated national biodiversity strategies and action plans.
- Communicate clearly their national and local conservation priorities.
- Collaborate with other stakeholders to develop guidelines on best practice on biodiversity offsets.
- Engage, where appropriate, at the national or local level, in site-specific negotiations on the most appropriate design for biodiversity offsets.
- Work with other government parties to the Convention on Biological Diversity to discuss biodiversity offsets under the auspices of the CBD under a suitable agenda item, such as implementation of Article 11 (Economic incentives) or as part of an endeavour to engage the business community in securing the objectives of the treaty.

NGOs & conservation experts

Many of our interviewees stressed the important role that conservation groups and experts in the natural and social sciences and in law and economics can play in developing the concept of biodiversity offsets, including the design of ground-rules and methodologies needed to move forward. For companies, the support of members of the NGO community is critical to their motivation to implement biodiversity offsets voluntarily. Several company representatives interviewed for this report posed a specific challenge to NGOs to co-ordinate their views and engage in discussions with government and companies to prioritise conservation efforts. NGOs and conservation experts prepared to engage constructively in this debate should:

- Foster and contribute to dialogue on biodiversity offsets to explore their potential advantages and disadvantages.

- Contribute their expertise and engage with other members of the NGO and expert community to agree and communicate conservation priorities.
- Contribute technical expertise and work with companies and governments to develop transparent guidelines and methodologies, as well as consistent and transparent measures and indicators for achieving “no net loss” of biodiversity that will satisfy the needs of stakeholders and be workable in practice.
- Help to build the capacity of companies, governments and communities to discuss conservation priorities and to engage in fair and transparent discussions on offsets, both generally and in specific cases.
- Help to monitor and evaluate biodiversity offset projects.

Communities

Communities affected by development projects are often those who stand to lose or gain the most from biodiversity offsets. Their involvement is crucial. Communities interested in this approach should:

- At the political level, signal interest in biodiversity offsets to governments and companies. Fear that communities will not accept offsets is one of the greatest barriers to their use.
- When biodiversity offsets are planned at the project level, engage with government, companies and seek independent expert advice. This would help all concerned to select and design biodiversity offsets that ensure the original site is sufficiently rehabilitated while the offset project delivers the appropriate mixture of local benefits and contribution to biodiversity priorities.

8.3.3 Gain more practical experience with offsets

Perhaps the most effective way to address the many doubts that surround biodiversity offsets would be to point to projects on the ground that demonstrably improve the status of biodiversity. Practical experience, for instance through pilot projects and case studies documenting the design, implementation and evaluation of biodiversity offsets, is an essential input to the debate, as well as the development of guidelines and methodologies. As Geoff Burton of Environment Australia puts it, “If you can show the biodiversity outcome for both on-site remediation and off-site conservation is better than if the site had not been disturbed in the first place, the biodiversity offset cannot be criticised.” To achieve this, one needs well-designed and adequately-funded projects that involve all appropriate stakeholders, that establish clear and transparent goals, and that have agreed and measurable indicators of success. Published case studies describing the practical experience of biodiversity offsets and communicating the results of the projects against their goals, targets and agreed performance indicators would help enormously. No such pilot projects have yet been established, although a project to do so is described below. Nor are there many clear and comprehensive case studies on specific projects to offset biodiversity damage, with a few notable exceptions, particularly for projects related to wetland mitigation in the US.

8.4 Next steps for Insight and IUCN

Insight Investment plans to use this report as the basis for engagement with companies in which it is invested, to encourage them to address the business risks associated with biodiversity to which they are exposed. Insight also aims to contribute to discussions on biodiversity offsets taking place in groups such as the Energy and Biodiversity Initiative and the International Council on Mining and Metals.

Insight Investment is collaborating with Forest Trends on a programme to establish a number of pilot biodiversity offset projects around the world.

The authors plan to present this report and discuss the issues involved at the IUCN World Conservation Forum in Bangkok in November 2004. This and other venues will be used to explore the concept of biodiversity offsets by promoting dialogue with industry and debate among the conservation community. It is hoped that further stakeholder dialogue will help to clarify the concepts and practices involved and to develop appropriate policy frameworks and practical guidelines for equitable, sustainable and cost-effective biodiversity offsets.

Appendix 1: Interviewees and other informants

Interviewees: Private Sector

1. Stuart Anstee, Rio Tinto
2. Steven de Bie, Shell
3. Steve Botts, Antamina
4. David Brand, Hancock Natural Resources Group
5. Jessica Fox, Electric Power Research Institute
6. Chris Herlugson, BP
7. Dale Heydlauff, American Electric Power
8. Leah Haygood, Consultant
9. Rick Herd, Consultant
10. Kathryn Shanks, BP
11. Sachin Kapila, Shell
12. Doug Lashley, Greenvest
13. Rich Mogensen, Earth Mark Companies
14. Bradley Raffle, Baker Botts LLP
15. David Richards, Rio Tinto
16. Candace Skarlatos, Bank of America
17. Chris Spray, Northumbrian Water (now of the Scottish Environment Protection Agency)
18. Ian Wood, BHP Billiton
19. One interviewee preferred to remain anonymous

Interviewees: Government & Intergovernmental Organisations

20. Tina Bartlett, California Department of Fish and Game, USA
21. Robert Brumbaugh, U.S. Army Corps of Engineers, Institute for Water Resources, USA
22. Geoff Burton, Environment Australia
23. José Carlos Fernández, National Ecology Institute, Mexico
24. Habiba Gitay, Millenium Ecosystem Assessment
25. Palmer Hough, Environmental Protection Agency, USA
26. Deblyn Mead, U.S. Fish and Wildlife Service, USA
27. Alice Ruhweza, National Environment Management Authority, Uganda
28. Bob Watson, World Bank

Interviewees: NGOs and Academic Organisations

29. Andrew Balmford, Department of Zoology, University of Cambridge
30. Michael Bean, Environmental Defense
31. Robert Bonnie, Environmental Defense
32. Assheton Carter, Conservation International
33. Jason Coccia, Conservation Fund
34. Ismid Hadad, Kehati, Indonesia
35. Martin Hollands, Fauna and Flora International
36. Dick Rice, Conservation International
37. Julie Sibbing, National Wildlife Federation

*Other informants**

* These individuals contributed information on particular boxes and issues included in the report, but did not necessarily discuss the range of topics described in Appendix 2.

Lidia Ahmad, BP Berau Ltd
Ken Atkins, Department of Conservation and Land Management, Western Australia
Tony Baird, Western Power, Australia
Marc Carter, Department of the Environment and Heritage, Australia
Jocelyn Davies, Adelaide University, Australia
Ann DeVoy, Environmental Law Programme, IUCN
John Finnie, English Nature
Annelisa Grigg, Fauna and Flora International
Ted Gullison, ParksWatch
David Harrison, English Nature
Toby Janson-Smith, independent consultant
Yolanda Kakabadse, President, IUCN
George Kelly, Environmental Banc and Exchange (EBX)
James Marsden, English Nature
Craig Mackenzie, Insight Investment
Krystal Maze, South African National Biodiversity Institute
Ann Neville, Kennecott Utah Copper Corporation
Geoff Nickolds, Severn Trent
Reyna Oleas, independent consultant
Stuart Pudney, Northumbrian Water
Juliana Rehfeld, Anglo American Brazil
John Scanlon, Environmental Law Programme, IUCN
Phil Tanner, Anglo American
Sophie Williams, Shell

Appendix 2: Issues discussed during the interviews

One of the main sources of information for this report was a series of semi-structured interviews with knowledgeable individuals who have worked on issues related to biodiversity offsets. A general list of questions – rather than a formal questionnaire – was prepared as the basis for the interviews. Each interview followed a slightly different course, according to the experience and interests of the interviewee, as well as the time available. The interviews were guided by the following questions and issues:

What do you understand offset to mean?

- Discussion of concepts such as: offset, no net loss, net positive effect, 'replacement' of what is lost
- Distinction between biodiversity offsets and positive conservation measures
- Distinction between biodiversity offsets and mitigation
- Scope of activities that could legitimately be covered by biodiversity offsets other than on the ground conservation measures, e.g. taxonomic studies, capacity-building of institutions

What is your experience with offset?

- How the organisation has dealt with unavoidable environmental damage
- Experience of the organisation with compensatory offsets and nature of social and environmental impact involved
- Nature of any specific organisational policy on offsets
- Any reference made by the organisation to offsets and related issues in publicly available documents, including any standard approaches, guidelines etc
- Discussion of the perceived risks and rewards of biodiversity offsets
- How interviewee has set about negotiating offsets and with whom

Can you give us specific examples of biodiversity offsets?

- Discussion of what was offset, where, when, how and by whom
- Indication of the cost of the offset and how it compares to other remediation and conservation investments

What is the motivation to conduct biodiversity offsets?

- Whether (and, if so, what kind of) regulatory framework is needed for offsets to work or whether there is enough motivation to offset on a purely voluntary basis
- Whether the organisation would engage in offsets only where required to do so by law (if so, which law?) or also voluntarily
- In the case of voluntary offsets, discussion of motivation, including various components of the business case

What would be needed to make offsets work?

- Discussion of whether the concept and approach is useful
- Discussion of the perceived main challenges and opportunities
- Discussion of methodologies for establishing equivalence of biodiversity gains and losses
- Discussion of timelines and whether and how permanence of conservation outcomes could be ensured
- Whether and how issues of lack of confidence concerning the concept and lack of trust of stakeholders could be overcome
- What would be needed to make progress with biodiversity offsets
- What would be needed to help the interviewee with his/her work in this area

Where should the offsetting conservation activities take place?

- Discussion of the range of possibilities from local to internationally traded offsets
- Factors that would affect the decision on location of biodiversity offsets

How should the offsetting conservation activities take place?

- The range of options, including through the organisation's own projects, through partnerships and through contractors/third parties

Who else should we talk to about offsets?

- Request for additional useful contacts

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Faustian bargains? Restoration realities in the context of biodiversity offset policies

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ABSTRACT

The science and practice of ecological restoration are increasingly being called upon to compensate for the loss of biodiversity values caused by development projects. Biodiversity offsetting—compensating for losses of biodiversity at an impact site by generating ecologically equivalent gains elsewhere—therefore places substantial faith in the ability of restoration to recover lost biodiversity. Furthermore, the increase in offset-led restoration multiplies the consequences of failure to restore, since the promise of effective restoration may increase the chance that damage to biodiversity is permitted. But what evidence exists that restoration science and practice can reliably, or even feasibly, achieve the goal of ‘no net loss’ of biodiversity, and under what circumstances are successes and failures more likely? Using recent reviews of the restoration ecology literature, we examine the effectiveness of restoration as an approach for offsetting biodiversity loss, and conclude that many of the expectations set by current offset policy for ecological restoration remain unsupported by evidence. We introduce a conceptual model that illustrates three factors that limit the technical success of offsets: time lags, uncertainty and measurability of the value being offset. These factors can be managed to some extent through sound offset policy design that incorporates active adaptive management, time discounting, explicit accounting for uncertainty, and biodiversity banking. Nevertheless, the domain within which restoration can deliver ‘no net loss’ offsets remains small. A narrowing of the gap between the expectations set by offset policies and the practice of offsetting is urgently required and we urge the development of stronger links between restoration ecologists and those who make policies that are reliant upon restoration science.

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1. Introduction

As the world's population passes seven billion, escalating conflicts between development and environmental conservation continue to diminish the Earth's stocks of natural capital. Projections suggest another 200 million to 1 billion hectares of terrestrial remnant vegetation will be converted for human land uses by 2050 (Millennium Ecosystem Assessment, 2005; Tilman et al., 2011). Biodiversity offsets (sometimes termed compensatory mitigation) are increasingly being used in an attempt to reduce this fundamental conflict between development (e.g. for mining, agriculture and

urban development) and conservation (ten Kate et al., 2004; Kiesecker et al., 2009; McKenney and Kiesecker, 2010; Suding, 2011).

For the purposes of this paper, we define ‘biodiversity offsetting’ as compensating for losses of biodiversity components at an impact site by generating (or attempting to generate) ecologically equivalent gains, or ‘credits’, elsewhere (i.e. an offset site) (see Table 1 for definitions). As such, we consider only ‘direct’ offsets, rather than approaches to compensating for losses using indirect means, such as financial contributions not directly tied to generating ecologically equivalent biodiversity credits. Although some actions commonly referred to as ‘biodiversity offsets’ may not require demonstration of ecological equivalence of losses and gains, such equivalence is increasingly considered a fundamental aspect of the definition of a biodiversity offset (Business and Biodiversity Offsets Program, 2012).

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Table 1
Definition of terms as used in this review.

Term	Definition
Biodiversity offsetting	The process of compensating for losses of biodiversity values at an impact site by generating ecologically equivalent gains, or 'credits', elsewhere (i.e. an offset site)
Biodiversity value	The aspect of biodiversity affected by the development or activity at the impact site, or generated at the offset site (e.g. a threatened species, a set of ecological functions, or a particular ecosystem type); often captured in a metric which combines information about condition and status
Biodiversity credit	A unit of a specified biodiversity value generated at an offset site to compensate for units of biodiversity lost at an impact site
Ecological equivalence	When the types of biodiversity values lost and gained are the same in nature and magnitude
Impact site	The site at which biodiversity values are lost or damaged
Offset site	The site at which additional biodiversity credits are generated through protection and/or restoration
Restoration	Activities aimed at increasing biodiversity values at a site, such as pest or weed control, management of regrowth vegetation, replanting of particular species, or implementation of a particular fire regime

Biodiversity offsets can be achieved in two main ways: (1) via averted loss from ongoing or anticipated impacts (e.g. avoided deforestation or degradation) at a site through the removal of threatening processes and (2) by enhancement of a degraded site through restoration and rehabilitation ('restoration offsets'). Averted loss can only generate 'gains' compared to a baseline of ongoing decline; restoration offsets are necessary if a cessation or reversal of biodiversity decline is to be achieved. In this review, we focus on restoration offsets and their potential to achieve genuine compensation for biodiversity losses.

A large range of restoration approaches is invoked in the context of offsets, including species, community and ecosystem-level interventions that vary from translocations of single taxa to multi-species introductions, ecosystem repair and generation of new ecosystems through revegetation (e.g. Harper and Quigley, 2005; Department of Sustainability and Environment, 2006; Gibbons and Lindenmayer, 2007). Biodiversity offsetting thus often relies heavily on restoration actions to generate biodiversity credits (to offset specific biodiversity losses or to trade for future losses, depending on the particular offset framework). Therefore, in many parts of the world, offset policies have become a significant driver of ecological restoration work (ten Kate et al., 2004; Robertson and Hayden, 2008; Palmer and Filoso, 2009).

Biodiversity offsetting may be conducted within a voluntary framework, with requirements negotiated between stakeholders, or within a statutory framework that is mandated by regional or national environmental legislation. Objectives vary among projects, but an increasingly cited goal is to achieve 'no net loss' or 'net gain' of biodiversity. Indeed, to avoid ambiguity and try and limit abuse of the term, the Business and Biodiversity Offsets Program (BBOP – <http://bbop.forest-trends.org/>) considers no net loss as central to the definition of a biodiversity offset. The currency used to measure biodiversity losses and gains also varies, but may include particular ecological functions, size or viability of threatened species populations, and the extent and/or 'quality' of vegetation associations and habitat types. Commonly, an index based on a set of biodiversity attributes is used (e.g. the Habitat Hectares approach of Parkes et al., 2003). Usually, but not always, there is a requirement or preference for ecological equivalence—i.e., that gains must comprise the same type of biodiversity attributes that are lost (also called 'in kind' or 'like-for-like' offsets).

Such ambitious policy objectives as no net loss or net gain are often underpinned by the implicit belief that restoration ecologists and practitioners are, in general, able to restore or recreate ecosystems that contain equivalent biodiversity values to those that are lost. Yet restoration ecology is a relatively young and inexperienced discipline with a still-embryonic and patchy evidence base. Furthermore, given the complexity and variability of natural systems, the ecological community is increasingly recognizing that recreating or restoring ecosystems to some specified former state is often unlikely to be feasible (Hobbs et al., 2011), especially within

reasonable time-frames. Thus, many current biodiversity offset approaches and expectations potentially push the limits of both scientific knowledge and practical feasibility (Stokstad, 2008; Palmer and Filoso, 2009; Hobbs et al., 2011).

In this paper we ask: to what extent are the demands that biodiversity offset policies make of restoration ecology realistic and feasible, given the state of current science? First, we briefly review recent growth in biodiversity offset-led restoration and its implications for restoration practice. Second, we examine the effectiveness of established biodiversity offset programs and review the current limits of restoration science. We then introduce a simple classification of the main sources of risk of failure in offsets from a restoration science perspective, and identify the types of biodiversity values for which offsetting may be: (a) feasible and low-risk, (b) higher risk and requiring of careful management, and (c) essentially unfeasible and inappropriate. Finally, we discuss potential responses to each of the risk factors, thereby helping to identify the domain in which restoration offsets may be effective mitigation tools.

2. The rapid expansion of offset-led restoration

The number and influence of biodiversity offset programs are growing rapidly. Madsen et al. (2010) identified 39 active biodiversity offset programs (i.e., comprising frameworks governing suites of individual offset projects) worldwide and 25 in some stage of development. The geographic reach of such programs is extensive. The regions that have most actively embraced biodiversity offsetting to date are North America and Australasia (with a combined total of 36 programs active or in development), although biodiversity offsetting is increasing in popularity elsewhere (Madsen et al., 2010). There are four active offset programs in Asia, (and another four in early development) resulting in the protection or restoration of approximately 26,000 hectares annually (Madsen et al., 2010). Many countries in South America have biodiversity offset-type programs at different stages of development, including the National Biodiversity Policy in Brazil, and 'Decreto 1753' in Colombia, both of which include legislation outlining environmental mitigation principles (Madsen et al., 2010). South Africa has three offset policies being formulated, and although Europe has few programs in place, several are currently being piloted (including in the United Kingdom; DEFRA, 2011; Madsen et al., 2010). In addition to these government-mandated approaches, many companies undertake voluntary mitigation, particularly when operating in countries with limited legal protection for biodiversity (e.g. Tinto, 2004; Darbi et al., 2009; Newmont Golden Ridge Limited, 2009).

The proliferation of biodiversity offset programs and projects is driving a rapidly-growing demand for ecological restoration and management of newly-protected areas. Biodiversity offsetting under existing programs (encompassing a variety of definitions) is currently estimated to result in the protection or restoration of

at least 86,000 hectares of land per year (Madsen et al., 2010). Between 1992/93 and 2001/02, the extent of wetlands restored or created in the US grew from 7148 hectares to 56,613 hectares (ten Kate et al., 2004). Combined, biodiversity offsets and wetland mitigation programs in the US alone have resulted in over 283,000 hectares of land protected or restored to 2008 (Madsen et al., 2010). Biodiversity offset activity is likely to continue to increase, in line with ongoing global development and economic growth (International Finance Corporation, 2006; Kiesecker et al., 2009). This growth in demand for biodiversity offsets is likely to be accompanied by an increase in financial resources available for restoration work.

3. Ecological effectiveness of biodiversity offsets

Wetland mitigation in the United States, which emerged in the 1970s and 1980s in response to Section 404 of the Clean Water Act (Hough and Robertson, 2009), is the policy for which most monitoring and evaluation data exist. Although not generally termed a 'biodiversity offset' approach, wetland mitigation nevertheless fits our broad definition (Table 1), as it aims to achieve no net loss of wetland values (including elements of biodiversity) and functions by generating wetland 'credits' through creation and restoration of wetland ecosystems (Corps and EPA, 2008).

Evaluating the effectiveness of wetland offsets is not straightforward. Offset sites are required to meet a set of performance criteria, usually established on a case-by-case basis and often based on local vegetation characteristics. However, these vegetation-based criteria have been criticized as vague and inadequate for ensuring that offset sites provide a genuine replacement for ecosystem functions lost when natural wetlands are destroyed (NRC, 2001). In response, federal regulatory agencies recently established a mitigation rule specifically requiring wetland mitigation projects to compensate for lost ecological functions (Corps and EPA, 2008), but it is not clear how this will be achieved in practice (Ruhl et al., 2009). An assortment of methods for rapid assessment of wetland functions has been developed and tested (Fennessy et al., 2007), but in the absence of an accepted method, losses and gains are primarily accounted for in terms of area of wetland and associated vegetation (Robertson, 2004).

Evidence from restored wetlands suggests that some ecosystem functions may take at least several decades to recover to a pre-disturbance state (Zedler and Callaway, 1999; BenDor, 2009). Some ecological indicators, including plant biomass and species richness, often recover rapidly in restored wetlands, but other important indicators, including species composition, soil physical and chemical properties, and ecosystem functions such as nutrient cycling, take much longer to be restored (e.g. Craft et al., 2003; Ballantine and Schneider, 2009; Gutrich et al., 2009; Hossler and Bouchard, 2010). For example, Hossler et al., (2011) found that, despite having similar vegetation and hydrology, restored and created wetlands stored significantly less C in soil and litter and had lower rates of denitrification than natural wetlands. In general, it cannot be assumed that restoration efforts will successfully return a degraded area to a state which is comparable or equivalent to the reference condition (Matthews and Spyreas, 2010). Mitigation wetlands are typically monitored on-site for three to five years after establishment (NRC, 2001). Therefore, many of the problems associated with wetland mitigation go undetected because they occur beyond the temporal scale of monitoring.

These challenges to successful wetland mitigation are similar to those faced by other types of environmental offsets. For example, Quigley and Harper (2006) found that at least 63% of projects designed to offset fish habitat loss in Canada failed to achieve the stated target of no net loss. This was because even when projects were fully compliant with legal practice standards, the restored systems

remained functionally impoverished. Bernhardt and Palmer (2011) reviewed offset measures needed to compensate for the loss of over 1 million hectares of forest and 2000 km of streambed following extensive mining operations in the Appalachian Mountains, USA. They suggest that although the required stream reconstruction works may generate stable channels, there was no evidence that any of the approaches considered could replicate the ecological functions, such as maintenance of water quality, provided by the natural streams.

The lack of positive evaluations of ecological outcomes from biodiversity offset programs suggests that the approach deserves considerable further scrutiny. Are best practice techniques for restoration not being appropriately followed? Or are biodiversity offsets being used in situations where we simply lack the ability to restore the values in question?

4. Evidence from restoration science to date: what can we actually achieve?

Restoration activities have become a major part of ongoing efforts to better manage ecosystems and repair damage caused by past mismanagement and degradation (Hobbs and Harris, 2001; Hobbs and Cramer, 2008). However, there is ongoing debate about whether restoration can deliver successful outcomes given the current state of the science and practice (Hobbs et al., 2011). Part of this debate relates to how success is defined and hence the types of goals and outcomes expected from restoration projects (Hobbs, 2007). Success can be defined in many ways (Ruiz-Jaen and Aide, 2005), and because success or failure are hardly ever black and white concepts, restoration projects may succeed in achieving some goals but not others (Zedler, 2007). In addition, it is relatively difficult to obtain a clear picture of the frequency of success versus failure in projects from the growing body of literature on restoration because of limited monitoring and reporting (Bernhardt et al., 2005), under-reporting of failed projects (Hobbs, 2009) and the lack of robust evaluation frameworks for measuring success against ecological criteria (Gardner, 2010; Lindenmayer and Likens, 2010).

Suding (2011) recently reviewed successes and failures in restoration work in a variety of ecosystems worldwide and found that the level of success is highly dependent on geographic and historical context. Where restoration was being used to help the recovery of a degraded system, between a third and a half of projects reviewed were successful. However, where restoration aimed to generate new habitat, as is often the case with biodiversity offsets, success rates were lower still. Suding (2011) concluded that "...although restoration is often possible and results in net positive benefits, it often does not go as well as planned. The inability to meet set criteria in many projects occurs at a high enough frequency to bring into question our ability to set realistic goals and our confidence in meeting these goals".

In a survey of 87 restoration projects across a variety of terrestrial and aquatic ecosystem types and geographic locations globally, Lockwood and Pimm (1999) concluded that 17 were unsuccessful, 53 were partially successful and only 17 (20%) could be considered completely successful. They also examined the types of goals set for the restoration projects and categorized these goals as relating to functional attributes or structural and compositional attributes. Across all projects, goals relating to functional attributes were met in 61% of projects, partial return of structure/composition occurred in 66%, and full return of structure and species composition occurred in only 6%.

A more recent study by Rey Benayas et al. (2009) examined 89 published assessments of restoration projects, including examples from all inhabited continents. They considered each project's relative success in improving either biodiversity or ecosystem services

both in comparison to the previous degraded state and in comparison to a reference system (representing the desired end point of the restoration). On average, restoration projects led to an improvement over the degraded situation in both biodiversity and ecosystem services, but did not approach the reference level for either.

Achieving different types of goals can often be a question of timescale. As such, it may be feasible to achieve some goals related to the recovery of some specific ecological functions more quickly than for goals related to the recovery of species composition. For instance, in a study of floodplain meadows in Europe, Woodcock et al. (2011) found that colonization by the majority of species that characterize the target habitat may take over 150 years, whereas functional trait structure can re-establish in less than half that time. They concluded that the time-scale needed to recreate grasslands calls into question the benefits of biodiversity offset approaches that allow grasslands to be lost to development under the presumption that their values can be recreated by restoration at other sites.

When habitat is re-created on a highly degraded site through revegetation, the revegetated site rarely resembles the target ecosystem. For example, Buckney and Morrison (1995) evaluated the success of revegetation treatments on mined Australian coastal sand plains. They showed that revegetated areas were on a trajectory toward development of a new ecological community that differed significantly in species composition from pre-mining vegetation and adjacent un-mined vegetation. Wilkins et al. (2003) and Lomov et al. (2009) analysed restoration trajectories of plants and invertebrates in restoration plantings on abandoned agricultural land, and came to the same conclusion. Similarly, Lindenmayer et al. (2012) found that replanted vegetation in agricultural areas of southern New South Wales supported a fundamentally different bird assemblage compared to old growth temperate woodlands and natural regrowth woodland. Similar results were found from work on reptiles in the same temperate woodland system (Cunningham et al., 2007; Michael et al., 2011). Indeed, after 10 years of detailed empirical work, it remained far from clear whether the recovery trajectory of restored areas would eventually lead to a reasonable level of congruence between the faunal assemblages of revegetation and original vegetation.

Achieving restoration success is also particularly challenging in situations that continue to be subject to external degrading influences, such as where permanent landscape changes such as urbanisation or agricultural intensification have occurred. For example, Stranko et al. (2012) examined the effectiveness of stream restoration in urban areas, and concluded that restoration activities were unable to improve any of the eight biodiversity indices they examined (Stranko et al., 2012). They concluded that the impacts of urbanisation on stream ecology were probably irreversible, and so the potential for biodiversity gains through restoration of degraded urban streams was limited.

From these studies and the restoration ecology literature in general, it is clear that some types of restoration are more likely to be successful than others. Recovery rates of different ecosystem types vary greatly, with or without restoration interventions (Holl and Aide, 2011; Jones and Schmitz, 2009). The type, extent, frequency and intensity of disturbance to which the system is exposed are important determinants of both the degree of intervention necessary and the likelihood of success. Hence, for instance, a cleared site where the biotic components are completely removed and the abiotic environment is significantly altered requires much greater levels of restoration input than an area that has been overgrazed, but is otherwise intact. Similarly, where particular biotic elements are missing, it may be relatively easy to reinstate these by controlling the factors leading to their demise. Relatively good success rates are possible for activities such as:

(1) predator control, particularly in defined areas/islands (e.g. Moorhouse et al., 2003); (2) provision of specific resources for individual species (e.g. Gonzalez et al., 2006; Woodward et al., 2008); and (3) restoring native plant diversity and/or structural complexity by grazing removal in some systems (e.g. Pettit and Froend, 2001).

In contrast, success is less frequent for activities such as: (1) recreating a particular plant community or ecosystem type from a highly degraded state (Wilkins et al., 2003); (2) replacing 'full' floristic diversity (Munro et al., 2009) or restoring grassland in nutrient-enriched sites (Prober et al., 2002); and (3) restoring 'late successional' assemblages or 'old-growth' type habitat or habitat elements (Vesk et al., 2008; Lindenmayer and Wood, 2010; Maron et al., 2010). Legacies of past disturbance, multiple post-disturbance pathways, climate variability, and spatial and temporal variability all make achieving predictable restoration outcomes difficult (Mori, 2011), particularly where the restoration target is a complex biotic assemblage.

5. Limits to biodiversity offset effectiveness

The criticisms levelled at biodiversity offsetting are numerous, and relate to offset design, accounting, governance and compliance (Harper and Quigley, 2005; Gibbons and Lindenmayer, 2007; Walker et al., 2009; Bekessy et al., 2010). Here, we focus on the technical realities of restoration ecology as they affect the probability of offset success. We propose that the main factors limiting the ability of ecological restoration to achieve a successful offset are captured by the broad categories of poor measurability, uncertainty and time lags (Fig. 1).

5.1. Poor measurability

A fundamental problem in offsetting is the often poor definition and measurability of the value(s) to be offset (Walker et al., 2009; Bekessy et al., 2010; Quétier and Lavorel, 2011). Without being

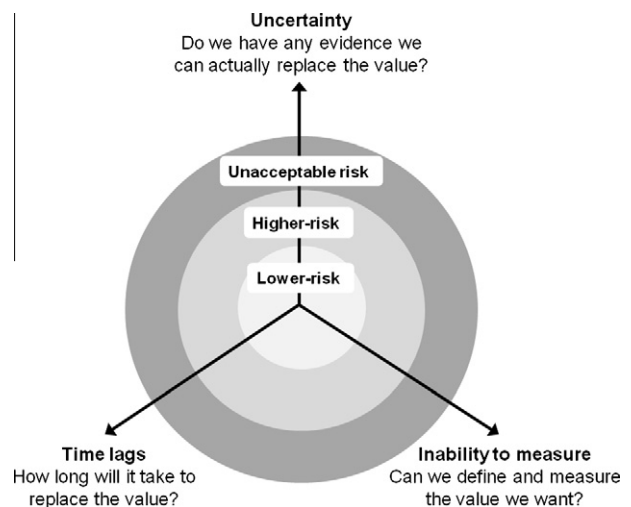


Fig. 1. Conceptual diagram representing three main factors (axes) that limit the technical effectiveness of biodiversity offsets. Axes represent: increasing uncertainty to restore; increasingly long expected time lags; and decreasing ability to define and measure the biodiversity value to be offset. As a proposed biodiversity offset moves along any one of these axes from the centre, it shifts from a domain within which there can be reasonable confidence in its success, through a domain in which offsetting entails a higher risk of failure and should trigger risk management responses, and finally to the range of values for which a successful offset outcome is highly unlikely, thus rendering offsetting inappropriate as a response to potential loss of that value. A given offset proposal may rank differently on each of the three axes.

able to define precisely (and then quantify) the values used in biodiversity loss–gain calculations, restoration efforts cannot be targeted and evaluated effectively (Bernhardt et al., 2005). Even when a precise identification of the value/s to be offset is available, it may not be possible to measure or monitor them accurately. These challenges of appropriate definition stem both from the inherent variability and complexity of the ecosystems being traded, but also from a lack of clarity around what biodiversity components we value the most.

In some cases, the biodiversity values can be defined precisely, quantified well, and often measured (or at least estimated) accurately (Fig. 1): for example, the number of individuals of a threatened species at a site. However, as the goal becomes more sophisticated (e.g., population viability of a threatened species) or aims to encompass more elements of an ecosystem (e.g., a plant community, or a set of ecological functions), measurability becomes more problematic. Increasingly, simplified metrics encapsulating multiple values are being used as offset currency (e.g. Parkes et al., 2003; Gibbons et al., 2009), but these necessarily increase the risk of offsets failing to meet the ‘like for like’ criteria because losses or gains in individual components can be masked within the single value of the metric, or because the metric itself does not include important values, such as ecosystem function (Palmer, 2009).

5.2. Uncertainty in restoration outcomes

One of the most common criticisms levelled at biodiversity offsets is that they exchange certain losses for uncertain gains. Understanding the effectiveness of a restoration project, and the timescale over which expected benefits will be accrued, is fraught with uncertainty.

Uncertainty of outcomes is particularly high when an offset depends upon the restoration of significantly modified sites (Hilderbrand et al., 2005). Relative uncertainty may be lower where the offset involves the removal of a threatening or degrading process, such as the control of an invasive species (Hilderbrand et al., 2005). For example, local populations of *Callaeas cinerea wilsoni*, a New Zealand bird, recovered within three years of the commencement of management to control mammalian pests (Innes et al., 1999). The identification of predation as a factor limiting a species’ population size may therefore allow reasonably high confidence in offsets involving pest management. However, if the goal is to restore a degraded woodland plant community to something structurally and compositionally similar to a reference site, then success is far less certain (Wilkins et al., 2003). Uncertainty in outcomes can be further exacerbated by the potential for interaction effects from background climate variability and environmental change (Harris et al., 2006). The less certain we are that we possess the knowledge and technical ability to restore a biodiversity value, the less appropriate is offsetting as a response to potential loss of the value (Fig. 1).

5.3. Time lags

Even if an offset goal is measurable and the uncertainty of it being achieved is low, there are often unavoidable time lags before the goal is realized (Zedler, 1996; Hilderbrand et al., 2005; Morris et al., 2006). Offsets should account for these time-lags, because it is not considered fair to compensate immediate loss by hypothetical equal gains in the distant future (Norton, 2009; Moilanen et al., 2009; Quétier and Lavorel, 2011). In some cases, a restoration action may have an almost immediate effect—for example, a species may be known to use artificial nest hollows as readily as natural ones, and so the hollows can be provided as soon as the natural ones are lost. By contrast, replanting seedling feed trees for a species to compensate for the loss of mature feed trees has a relatively

high probability of success but may only be achieved after many decades (Maron et al., 2010). In such circumstances, interim supplementation of the affected resource may be an important component of an offset, although the temporal deficit may be impossible to compensate (Moilanen et al., 2009). Long time-lags may also result in severe resource bottlenecks, during which a target species or community suffers increased vulnerability to other threats. When time-lags are unacceptably long, even high confidence in the ability to restore a value eventually does not reduce risk to an acceptable level (Fig. 1).

6. Improving risk management in biodiversity offsetting

Given the challenges to effective use of biodiversity offsets, the domain within which offsetting is an appropriate response to threats to biodiversity values is limited. Nevertheless, there are ways in which risks to offset success can be better managed. Below, we briefly explore how these approaches can help to manage the technical challenges of poor measurability, uncertainty and time lags.

6.1. Responses to poor measurability

Improving measurability requires the development of better habitat metrics, biodiversity indicators and surrogates. Objectives should be clear in terms of which biodiversity values an offset should target, and metrics and monitoring programs designed accordingly (Bekessy et al., 2010). Ideally, multiple aspects of the value to be offset should be measured and monitored to provide a more informative record of offset performance. However, despite increased research attention, fundamental problems remain, such as how to quantify the contribution of candidate offset sites to wider landscape connectivity or regional-scale ecological processes. The more difficult it is to define and/or measure the biodiversity value targeted, the less we can claim to know about the success of restoration attempts.

6.2. Responses to uncertainty

Multipliers are commonly proposed as a way of dealing with uncertainty in outcomes at an offset site (Dunford et al., 2004; Bruggeman et al., 2005). A multiplier should be scaled to the degree of uncertainty in the effectiveness of the offset activity. Yet this is rarely done in offset policies. Where multipliers are used, they are often intended to reflect conservation significance of the biodiversity values in question, and the justification for their value is often unclear. Moilanen et al. (2009) investigated what they call a “fair offset ratio”—the level at which a multiplier provides a robust guarantee of a favourable outcome. Simulation analyses revealed that a comprehensive accounting of uncertainty can result in very large multipliers, which in many cases would be politically and economically unacceptable. Moreover, in a practical setting, such a quantitative assessment of uncertainty is often impossible given the lack of information about the ecology of the biodiversity values in question and the effectiveness of potential interventions.

One response to this challenge of uncertainty is to invest efforts not in active restoration, but in averting further losses (through improved protection) of existing yet threatened areas that can then be used as (averted loss) offset credits. Although this strategy has the advantage of not relying on a highly uncertain ability to re-create biodiversity values, there are limited circumstances under which averted loss can be considered to represent true additionality (particularly in nations with well-developed biodiversity protection controls), and estimates of this additionality are themselves subject to significant uncertainty (Gibbons and Lindenmayer, 2007). This is because the approach

relies on accurate estimation of the probability of loss of biodiversity values at the offset site in the absence of the additional protection (Maron et al., 2010). It therefore implies acceptance of a baseline of continuing biodiversity decline under current policy settings. Even if these requirements are met, the use of averted loss as an offset can introduce a conundrum. Offset policies frequently permit the ‘protection’ of a site as an averted loss offset, even if loss of the offset site itself would have had to be offset. This is one of several concerns over the current use of averted loss credits in offsetting.

A commitment to active adaptive management (McKenney and Kiesecker, 2010; Gardner, 2010) can help to resolve uncertainties in achieving restoration offset goals. This involves setting dual objectives for both restoration and learning at the outset of restoration offset projects. Key elements of this approach include experimental design to compare alternative strategies, monitoring to compare their relative merits and adjustment of strategies based on new knowledge that emerges from the restoration experiment (Keith et al., 2011). Without such comparative experimentation, opportunities for learning are limited and uncertainty about outcomes may not be reduced (Walters and Holling, 1990). Simultaneous exploration of multiple restoration options also spreads the risk of failure more widely than if all resources were channelled into a single option. Unfortunately, most restoration projects simply implement current best practice (a single management option), are often spatially unreplicated, and outcomes are monitored until failure or more fashionable options emerge. Although optimal experimental designs may not often be feasible in an offsetting context, imaginative synthesis across restoration projects can generate robust designs that reduce future uncertainties about restoration success (Keith et al., 2011).

Because offset policies raise the stakes involved in restoration projects, there is a clear need for greater investment in restoration ecology research. Already several offset policies specify options for contributing financially to relevant research. In cases where knowledge is too limited to implement an offset with confidence, it may be argued that the financial burden of generating the required knowledge should fall to the proponents of the development project that triggers the offset. However, it cannot be argued that this contribution, in itself, constitutes an offset—it is merely a necessary step enabling an offset. Restoration ecologists, too, must engage more constructively and effectively with policy makers to ensure that the questions being tackled are those most likely to be useful to the biodiversity markets of the future.

6.3. Responses to time lags

Several authors have promoted the idea that ‘biodiversity banks’ of already-accrued credits (whether through restoration or averted risk) should be generated before biodiversity values are lost (e.g. Bekessy et al., 2010). In theory, such an approach could eliminate the problems associated with long time lags in restoration and uncertainty of offset outcomes. One criticism of this approach, however, relates to the problem of accurately measuring additionality. In countries such as Australia, for example, much restoration activity or land management above ‘duty of care’ is already done on a voluntary basis by individual landholders and community groups. If changes to offset policies mean that voluntary restoration activities are now considered to have generated saleable biodiversity credits, this is likely to present a difficult-to-resist temptation: to take the opportunity to sell the credits generated, despite the fact that such credits can then be used to trade for biodiversity destruction elsewhere. Thus, if restoration actions that would have been done outside of biodiversity markets are now used generate biodiversity credits for offsetting, genuine additionality will be eroded.

An alternate solution to banking of credits, likely to be more workable in situations which necessarily involve time lags and uncertainty, is to require the proponents of the development activity to purchase insurance that covers the risk of offset failure. Any such approach relies on the biodiversity values to be traded being clearly defined and measurable, and raises the problem of how premiums might be used to deliver required outcomes in the instance of failure. If restoration happens with a time delay and failure thus also only becomes apparent after a time delay, there will be counterparty risk about the ability of the insurance provider to make good on the insurance. Nevertheless, the development of an insurance market for biodiversity would increase pressure for clarity around policy requirements and would introduce additional incentives to avoid high-risk trades.

Finally, time discounting is an easily (but often poorly) implemented method originating from economics that can be used to value future gains in present-time units, as well as account for risk (Carpenter et al., 2007). For example, habitat equivalency analysis, an approach used to quantify ecological losses and gains, includes time discounting as an option (Dunford et al., 2004; Bruggeman et al., 2005). Implementation of time discounting requires robust estimates of the ecological time lags. These may be obtained either by observation and projection from existing time series or by mechanistic modelling based on an understanding of the processes involved. The influence of time discounting on the fair offset ratio (the ratio of the quantum of offset activity to the quantum of initial impact that results in a fair trade of biodiversity) may be very large (Moilanen et al., 2009). In fact, if the development of biodiversity value is very slow, it is questionable whether the value should be considered restorable at all in an ecological sense (Morris et al., 2006).

7. Conclusion

Confidence in the ability of restoration to deliver genuine biodiversity offsets is undermined by the problems of defining and measuring the biodiversity values that are lost and gained, considerable uncertainty surrounding the effectiveness of restoration techniques, and long time-lags. The increasingly broad application of offsetting, often with limited scientific support, is therefore of concern (Palmer and Filoso, 2009). We recommend that restoration be used to deliver biodiversity offsets only when: (1) the impacted biodiversity and ecosystem values can be explicitly defined and measured; (2) there is an existing and sound evidence base that restoration of the values in question is feasible; and (3) time lags and uncertainties involved are explicitly accounted for in a loss-gain calculation, and any time lags do not pose an interim threat to the persistence of the biodiversity value in question. A plea for policy makers to operate within the domain of scientifically realistic options is hardly new. Nevertheless, the rapidly-increasing reach of biodiversity offsetting into many areas of environmental policy—including threatened species protection, environmental impact assessment and protected area investment—makes closer collaboration between policy makers and restoration scientists and practitioners an urgent priority (Palmer, 2009).

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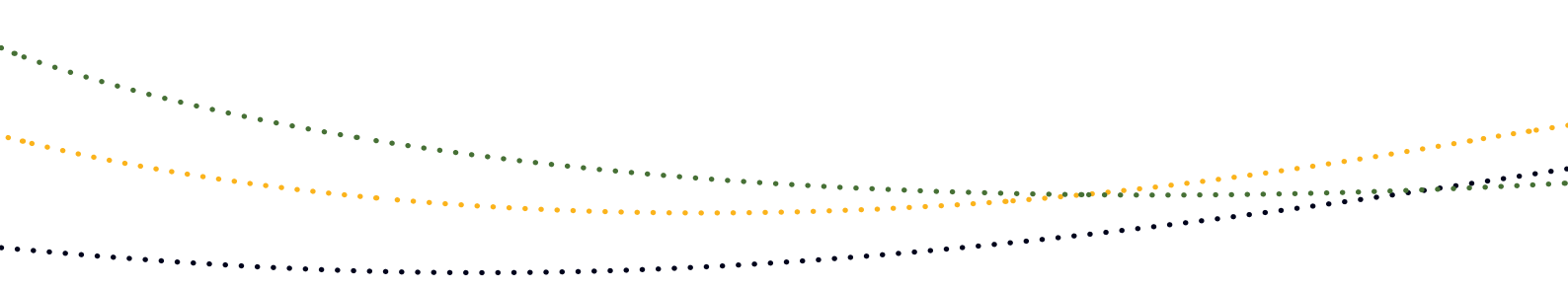
Australian Government

Department of Sustainability, Environment,
Water, Population and Communities



Environment Protection and Biodiversity Conservation Act 1999 **Environmental Offsets Policy**

October 2012



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1. EPBC ACT ENVIRONMENTAL OFFSETS POLICY

Introduction

This policy outlines the Australian Government's approach to the use of environmental offsets ('offsets') under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). It replaces the draft policy statement *Use of environmental offsets under the EPBC Act (2007)*.

Offsets are defined as measures that compensate for the residual adverse impacts of an action on the environment. Where appropriate, offsets are considered during the assessment phase of an environmental impact assessment under the EPBC Act, as outlined in Section 5 of this document. This policy provides transparency around how the suitability of offsets is determined. The suitability of a proposed offset is considered as part of the decision as to whether or not to approve a proposed action under the EPBC Act.

There are different ways to achieve good environmental outcomes. This policy provides flexibility in delivering those outcomes. For example, the enduring protection and management of a threatened species' habitat can be achieved through a variety of methods, including through conservation land management by rural landholders, or in partnerships with

Indigenous communities. The policy is intended to provide a transparent framework to give greater certainty for businesses and others considering actions that may potentially be subject to an offset requirement, while also promoting consistency and providing robust, positive environmental outcomes.

The *Offsets assessment guide*, which accompanies this policy, has been developed in order to give effect to the requirements of this policy, utilising a balance sheet approach to measure impacts and offsets. It applies where the impacted protected matter is a threatened species or ecological community. The *Offsets assessment guide* is a tool that has been developed for expert users in the department to assess the suitability of offset proposals. The guide is also available to proponents to assist with planning for future development proposals and estimating future offset requirements.

A technical review of the policy and guide will be undertaken one year after they come into effect. Subsequent reviews will be undertaken every five years. The use of offsets is a developing policy area, and this policy incorporates current international best practice.

This policy was finalised on 20 September 2012, and applies to any new referrals and variations to approval conditions from 2 October 2012. It also applies to any projects currently under assessment for which a proposed decision has not yet been made.



2. SCOPE OF THIS POLICY

The EPBC Act is the Australian Government's principal piece of environmental legislation. It is designed to protect national environmental assets, known as matters of national environmental significance, and other protected matters. If a proposed development or other action ('proposed action') is likely to have a significant impact upon a protected matter then it must be referred for assessment under the EPBC Act. Proposed actions may range from a housing development, an offshore gas project, a mining project, to the construction of a road. Further information on the EPBC Act can be found at www.environment.gov.au/epbc/index.html.

This policy relates to all matters protected under the EPBC Act ('protected matters'). These are:

- world heritage properties
- national heritage places
- wetlands of international importance (listed under the Ramsar Convention)
- listed threatened species and ecological communities
- migratory species protected under international agreements
- Commonwealth marine areas
- the Great Barrier Reef Marine Park
- the environment, where nuclear actions are involved;
- the environment, where actions proposed are on, or will affect Commonwealth land and the environment,

- the environment, where Commonwealth agencies are proposing to take an action.

The policy applies to offsetting requirements in terrestrial and aquatic (including marine) environments.

The policy applies to both project-by-project assessments and approvals under Parts 8 and 9 of the EPBC Act and to strategic assessments under Part 10 of the EPBC Act. Proposed new strategic assessments may consider alternative metrics other than the *Offset assessment guide* (e.g. if a jurisdiction has developed a metric tailored to their needs) provided the principles of this policy are met. This will be considered on a case by case basis.

2.1 Application of the policy to heritage values

The use of offsets to compensate for adverse impacts to heritage values is appropriate in some circumstances. In cases where offsetting of adverse impacts on heritage values is considered possible and appropriate, the principles of this policy apply with regard to determining what constitutes a suitable offset. Offsets for impacts on heritage values should improve the integrity and resilience of the heritage values of the property involved. This may include offsets in areas adjacent to the property. For further information, please contact the department (contact details are at section 10).



3. AIMS OF THE POLICY AND OVERARCHING OFFSET REQUIREMENTS

The *EPBC Act environmental offsets policy* has five key aims, to:

1. ensure the efficient, effective, timely, transparent, proportionate, scientifically robust and reasonable use of offsets under the EPBC Act
2. provide proponents, the community and other stakeholders with greater certainty and guidance on how offsets are determined and when they may be considered under the EPBC Act
3. deliver improved environmental outcomes by consistently applying the policy
4. outline the appropriate nature and scale of offsets and how they are determined
5. provide guidance on acceptable delivery mechanisms for offsets.

Box 1 provides the overarching principles that are applied in determining the suitability of offsets.

Box 1: Offset Principles

Suitable offsets must:

1. deliver an overall conservation outcome that improves or maintains the viability of the aspect of the environment that is protected by national environment law and affected by the proposed action
2. be built around direct offsets but may include other compensatory measures

3. be in proportion to the level of statutory protection that applies to the protected matter
4. be of a size and scale proportionate to the residual impacts on the protected matter
5. effectively account for and manage the risks of the offset not succeeding
6. be additional to what is already required, determined by law or planning regulations or agreed to under other schemes or programs (this does not preclude the recognition of state or territory offsets that may be suitable as offsets under the EPBC Act for the same action, see section 7.6)
7. be efficient, effective, timely, transparent, scientifically robust and reasonable
8. have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced.

In assessing the suitability of an offset, government decision-making will be:

9. informed by scientifically robust information and incorporate the precautionary principle in the absence of scientific certainty
10. conducted in a consistent and transparent manner.



4. WHAT ARE ENVIRONMENTAL OFFSETS?

The term 'environmental offsets' refers to measures that compensate for the residual adverse impacts of an action on the environment. Offsets provide environmental benefits to counterbalance the impacts that remain after avoidance and mitigation measures. These remaining, unavoidable impacts are termed 'residual impacts'. For assessments under the EPBC Act, offsets are only required if residual impacts are significant.¹

Offsets can help to achieve long-term environmental outcomes for matters protected under the EPBC Act, while providing flexibility for proponents seeking to undertake an action that will have residual impacts on those protected matters.

Offsets do not mean proposals with unacceptable impacts will be approved. They simply provide an additional tool that can be used during the environmental impact assessment process.

4.1 How are offsets different to avoidance and mitigation measures?

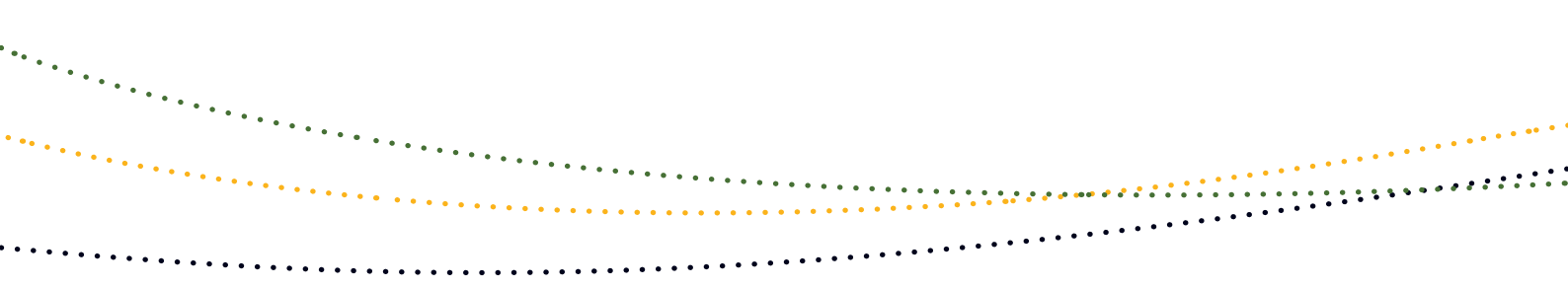
Avoidance and mitigation measures are the primary strategies for managing the potential significant impact of a proposed action. They directly reduce the scale and intensity of the potential impacts of a proposed action. Offsets do not reduce the likely impacts of a proposed action, but instead compensate for any residual significant impact.

Avoidance of impacts on protected matters may be achieved through comprehensive planning and suitable site selection, for example by changing the route of an access road to avoid an endangered ecological community.

After all reasonable avoidance measures have been put in place, mitigation of any remaining significant impact must be undertaken, for example putting in place measures to reduce sediment runoff from a development site that may otherwise affect a threatened fish species.

Avoidance and mitigation measures can reduce and, in some cases, remove the need for offsets if the residual impact is not significant. Offsets will not be considered until all reasonable avoidance and mitigation measures are considered, or acceptable reasons are provided as to why avoidance or mitigation of impacts is not reasonably achievable.

¹ As defined in Significant impact guidelines 1.1 – matters of national environmental significance and Significant impact guidelines 1.2 – actions on, or impacting upon, Commonwealth land and actions by Commonwealth agencies, available at www.environment.gov.au/epbc/guidelines-policies.html.



In proposing avoidance, mitigation and offset measures, the proponent must provide clear information about the scale and intensity of impacts of the proposed action and the on-ground benefits to be gained through each of these measures.

4.2 Types of offsets

An offsets package is a suite of actions that a proponent undertakes in order to compensate for the residual significant impact of a project. It can comprise a combination of *direct offsets* and *other compensatory measures*. Offsets should align with conservation priorities for the impacted protected matter and be tailored specifically to the attribute of the protected matter that is impacted in order to deliver a conservation gain. For instance, if the proposed action is likely to have impacts on foraging habitat for a particular protected matter, then the offset should create, improve, protect and/or manage foraging habitat.

Offsets should compensate for an impact for the full duration of the impact. Offsets that deliver an outcome prior to the impact commencing are encouraged, as they minimise effects on the protected matter resulting from offset time delays (see section 4.2.3 Advanced offsets).

Offsets that deliver social, economic and/or environmental co-benefits are encouraged (See Box 2).

4.2.1 Direct offsets

Direct offsets are those actions that provide a measurable conservation gain for an impacted protected matter.

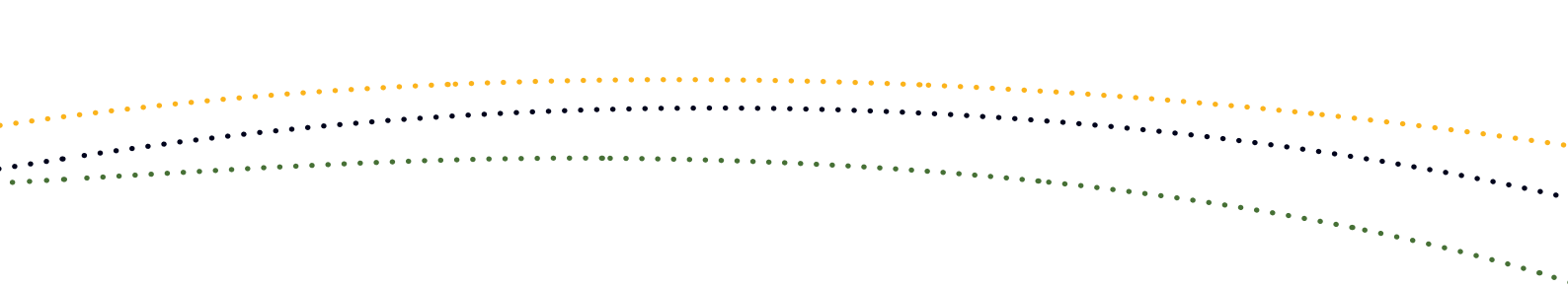
Direct offsets are an essential component of a suitable offsets package. A minimum of 90 per cent of the offset requirements for any given impact must be met through direct offsets.

Deviation from the 90 per cent direct offset requirement will only be considered where:

- it can be demonstrated that a greater benefit to the protected matter is likely to be achieved through increasing the proportion of other compensatory measures in an offsets package or;
- scientific uncertainty is so high that it isn't possible to determine a direct offset that is likely to benefit the protected matter. For example, this can be the case in some poorly understood ecosystems in the Commonwealth marine environment

Conservation gain is the benefit that a direct offset delivers to the protected matter, which maintains or increases its viability or reduces any threats of damage, destruction or extinction. A conservation gain may be achieved by:

- improving existing habitat for the protected matter
- creating new habitat for the protected matter
- reducing threats to the protected matter
- increasing the values of a heritage place, and/or
- averting the loss of a protected matter or its habitat that is under threat.



Conservation gain in the marine environment may include improving protection of important protected species habitat, such as sea grass, or by addressing pressures on the protected matter or its habitat, such as removing derelict fishing nets and other marine debris.

Averting the loss of a protected matter or its habitat is considered to deliver a conservation gain where there is an immediate threat of destruction or degradation, and the risk of loss of that particular site is averted by securing its future for conservation purposes (for example through a conservation covenant on the title of the land). In the *Offsets assessment guide*, considering future risks to a specific site in order to quantify averted loss is undertaken over either a 20 year time-frame or for the duration of the offset, whichever is the shorter period.

4.2.2 Other compensatory measures

Other compensatory measures are those actions that do not directly offset the impacts on the protected matter, but are anticipated to lead to benefits for the impacted protected matter, for example funding for research or educational programs. Requirements for other compensatory measures are outlined at Appendix A.

Other compensatory measures should relate to the impacted aspect of the protected matter. For example, research into effective re-vegetation techniques for a particular ecological community may be an appropriate component of an offsets package for an action that involves clearing of that ecological community.

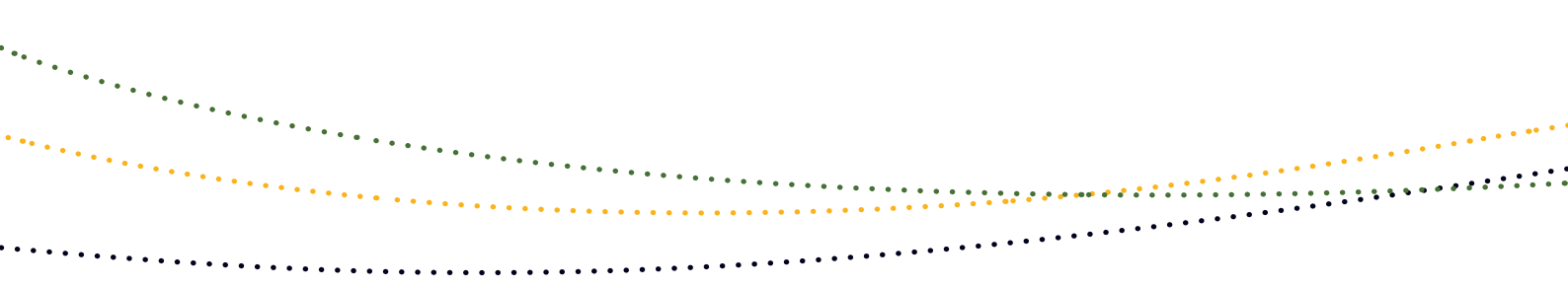
4.2.3 Advanced offsets

Advanced environmental offsets are a supply of offsets for potential future use, transfer or sale. An example of an advanced offset is protection or improvement of habitat for the conservation of a protected matter before an impact is undertaken. Advanced offsets are encouraged where practical, given that they provide a means to better manage the risks associated with the time delay in realising the conservation gain for a protected matter. The *Offsets assessment guide* places higher value on offsets that deliver a conservation gain in a shorter time period. This can reduce overall offset requirements.

Proponents or offset providers looking to establish advanced offsets should discuss these with the department at the earliest possible opportunity. Proponents should monitor and record baseline data associated with the establishment of the offset and improvements over time.

The department will consider advanced offsets that deliver a conservation gain after the commencement of the EPBC Act, on 16 July 2000.

Advanced offsets must satisfy all requirements in this policy, including those relating to offsets being additional to other legislation and schemes, as outlined in section 7.6. It is important to note that advanced offsets do not in any way prejudice the outcome of any future assessment of an action. That is, while planning advanced offsets may result in lower overall offset requirements, it does not influence whether or not an action referred under the EPBC Act will be determined as acceptable.



Box 2: Delivering social, economic and/or environmental co-benefits

While the primary consideration in determining suitable offsets is delivering a conservation gain for the impacted protected matter, the delivery of offsets that establish positive social or economic co-benefits is encouraged.

Social and economic or environmental co-benefits may be delivered where an offset aligns with broader strategic environmental objectives such as those outlined in the National Wildlife Corridors Plan, the Indigenous health strategy Closing the gap, or policies that enhance the environment of regional Australia.

For example:

- an offset contributing to an area recognised as important to increasing landscape connectivity, above and beyond what is required by the impacted protected matter
- an offset that employs local Indigenous rangers to undertake management actions
- an offset delivered by paying rural landholders to protect and manage land for conservation purposes.



5. THE ROLE OF OFFSETS IN ENVIRONMENTAL IMPACT ASSESSMENT UNDER THE EPBC ACT

Figure 1 shows the role of offsets within the broader environmental impact assessment process under the EPBC Act.

5.1 Referral stage

The referral stage, under Part 7 of the EPBC Act, is the initial screening stage of the environmental impact assessment process. Referrals are used to determine whether significant adverse impacts on protected matters are likely to occur and to make a formal decision on whether a proposed action requires full assessment under the EPBC Act. If the Minister or the Minister's delegate (the decision maker) decides the proposed action is a 'Controlled Action', it requires full assessment under Part 9 of the EPBC Act. If significant impacts on protected matters are determined to be unlikely then the action may be declared 'Not a Controlled Action' and can proceed. The offsets policy does not apply to actions that have been declared as 'Not a Controlled Action'.

The EPBC Act does not allow for any beneficial impacts, such as offsets, to be considered at the referral stage.

5.2 Assessment stage

In order to determine if an offset is necessary, the impacts of a proposed action need to be fully understood. At the assessment stage the decision maker considers the following issues in detail:

- **What is the nature of the likely impacts on protected matters?** – which protected matters are likely to be impacted by the action? What is the scale and size of impacts? What are the risks to the viability of protected matters arising from the action? Will impacts on protected matters be permanent or temporary?
- **Can impacts on protected matters be avoided?** – can the proposed action be redesigned to avoid impacting protected matters? What alternatives have been considered? Have environmental considerations been factored into the project's design?
- **Can impacts on protected matters be mitigated?** – what actions can take place that will reduce the impacts arising from the proposed action? For example, developing environmental management plans, implementing erosion control measures, fencing off environmentally sensitive areas etc.

- **Are the residual impacts likely to be significant?** – what are the residual impacts on protected matters that are still likely to occur after the proposed activities to avoid and mitigate all impacts are taken into account? E.g. will the proposed action only slightly disturb an area of potential habitat for a threatened species or will it destroy an area of habitat known to be used by a threatened species?
- **Are offsets a suitable approach?** – are offsets needed to help compensate for residual impacts on the protected matter and are they feasible?

It is important to note that offsets are not required for all approvals under the EPBC Act. Offsets are not required where the impacts of a proposed action are not thought to be significant or could reasonably be avoided or mitigated.

If an offset is appropriate, then the proponent should discuss offset options with the department and submit an offsets proposal. This proposal should describe the offset and demonstrate how it will provide an appropriate benefit to compensate for any residual impact on the protected matter. The department will then assess this proposal against the policy and – where the impacted protected matter is a threatened species or ecological community – the *Offsets assessment guide*. If the proposed offset is not considered to be suitable, the department will discuss this finding with the proponent and provide them with an opportunity to submit a revised proposal.

5.3 Decision stage

Following assessment, the decision maker considers the offset proposal in deciding whether the proposed action should be approved. In some cases, a suitable offset may not be proposed or available and a decision on the overall acceptability of the project will need to be made.

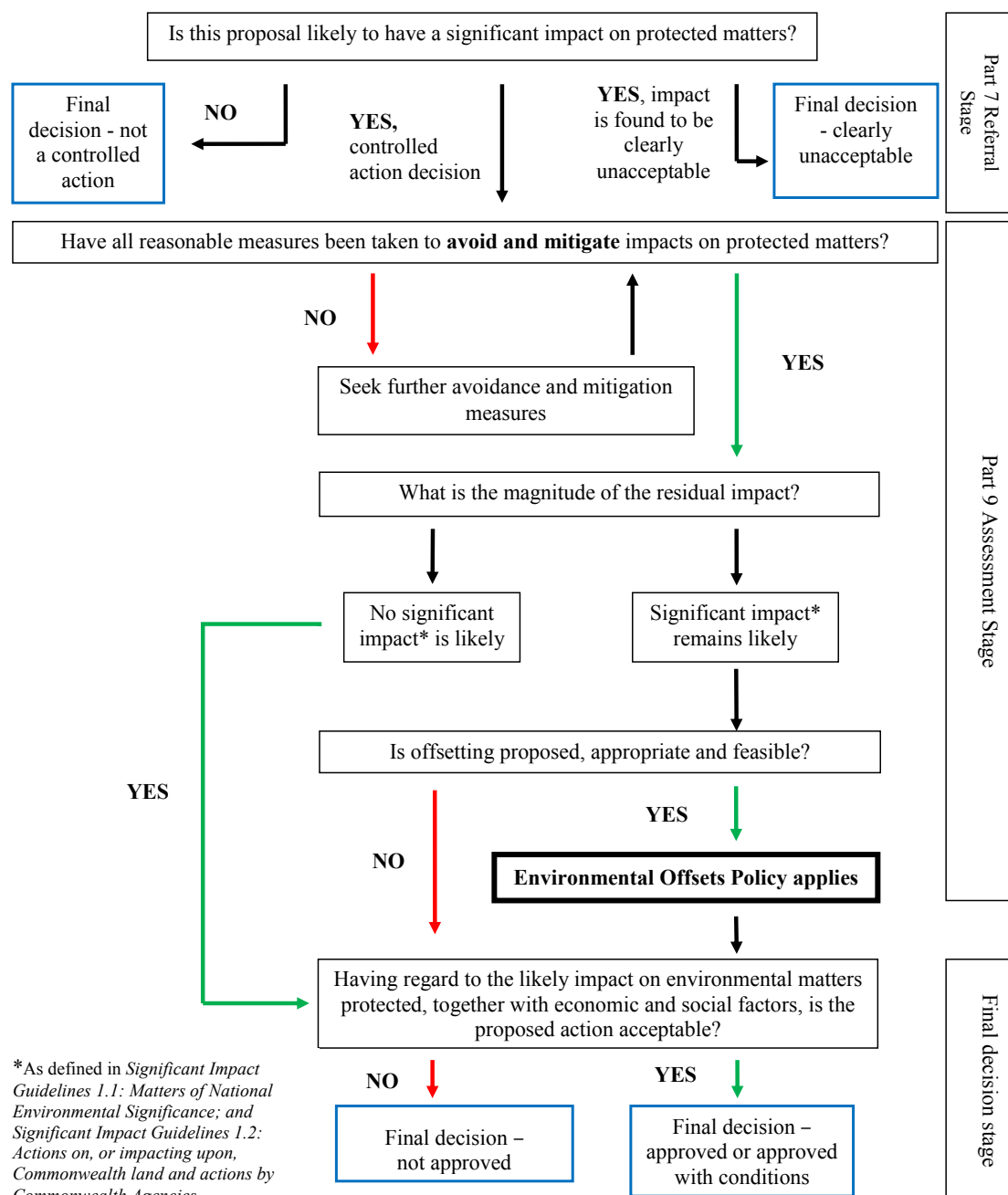
The offset proposal is one of many considerations that are weighed at the decision stage in determining the overall acceptability of the proposed action, including economic and social matters. These considerations are outlined in the EPBC Act in Sections 136–140A.

Offset requirements are included as a condition of approval under section 134 of the EPBC Act.

5.4 Post-approval stage

If an approval has been granted that incorporates offsets into the conditions of approval, the proponent is responsible for ensuring that the offsets are delivered in accordance with the approved conditions. The department has an active monitoring and audit program to ensure that conditions of approval are implemented. Where a proponent becomes aware that they may not be able to fulfil a condition of approval, they should approach the department in the first instance to discuss the matter and see what options are available to remedy the situation. Breaches of approval conditions, including those relating to offsets, can incur significant penalties. Further information on the department's *EPBC Act Compliance and Enforcement Policy* is available at www.environment.gov.au/epbc/publications/index.html.

Figure 1 – The role of offsets within the broader environmental impact assessment process.



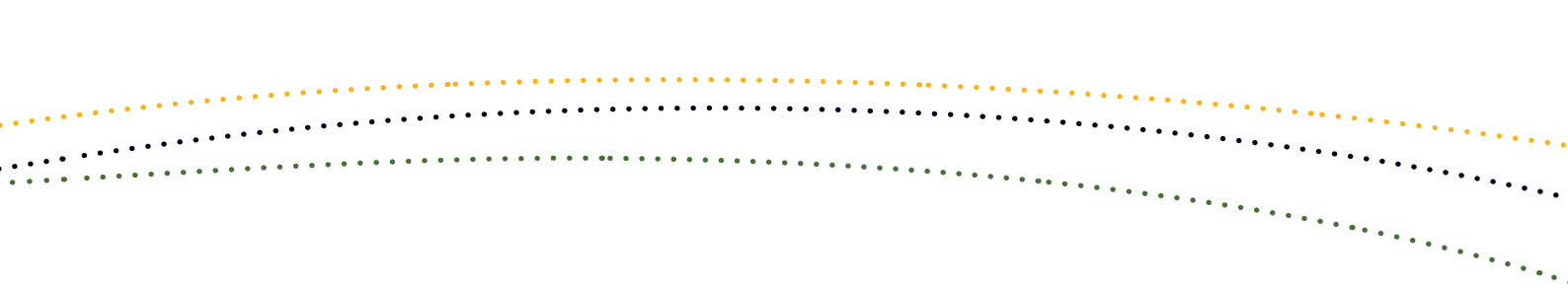


6. PLANNING AN OFFSET PROPOSAL

An appropriate offsets package should be developed by proponents in consultation with the department. There are two key types of information utilised in planning an offset proposal – determining what types of activities would be appropriate as offsets for a given impact, and determining the specific size and scope of an offsets package.

In determining the appropriateness of the offset activities proposed, the department will consult the relevant Commonwealth approved recovery plan, threat abatement plan, conservation advice, ecological character description, management plan and/or listing document. Where Commonwealth approved guidance documents are not available or are insufficient in detail, the department will review additional information sources such as state and territory management plans or peer-reviewed scientific literature to inform priority offset activities.

If the department is satisfied that the offset activities are suitable, the department will consider whether appropriateness of the magnitude and composition of the proposed offset package in detail on a case-by-case basis. There are a range of considerations taken into account at both the impact site and the proposed offset site as discussed in sections 7 and 8. Proponents should include detailed information pertaining to these considerations in their offsets proposal. The *Offsets assessment guide* will be used by the department at this stage if the impacted protected matter is a threatened species or ecological community.



Matters to be considered at the impact site include the:

- presence and conservation status of protected matters likely to be impacted by the proposed action
- specific attributes of the protected matter being impacted at a site, for example: the type of threatened species or ecological community habitat, the quality of habitat, population attributes such as recruitment or mortality, landscape attributes such as habitat connectivity, or heritage values
- scale and nature of the impacts of the proposed action – including direct and indirect impacts
- duration of the impact (not of the action).

Matters to be considered at the offset site include the:

- extent to which the proposed offset actions correlate to, and adequately compensate for, the impacts on the attributes for the protected matter
- conservation gain to be achieved by the offset. This may be through positive management activities that improve the viability of the protected matter or averting the future loss, degradation or damage of the protected matter

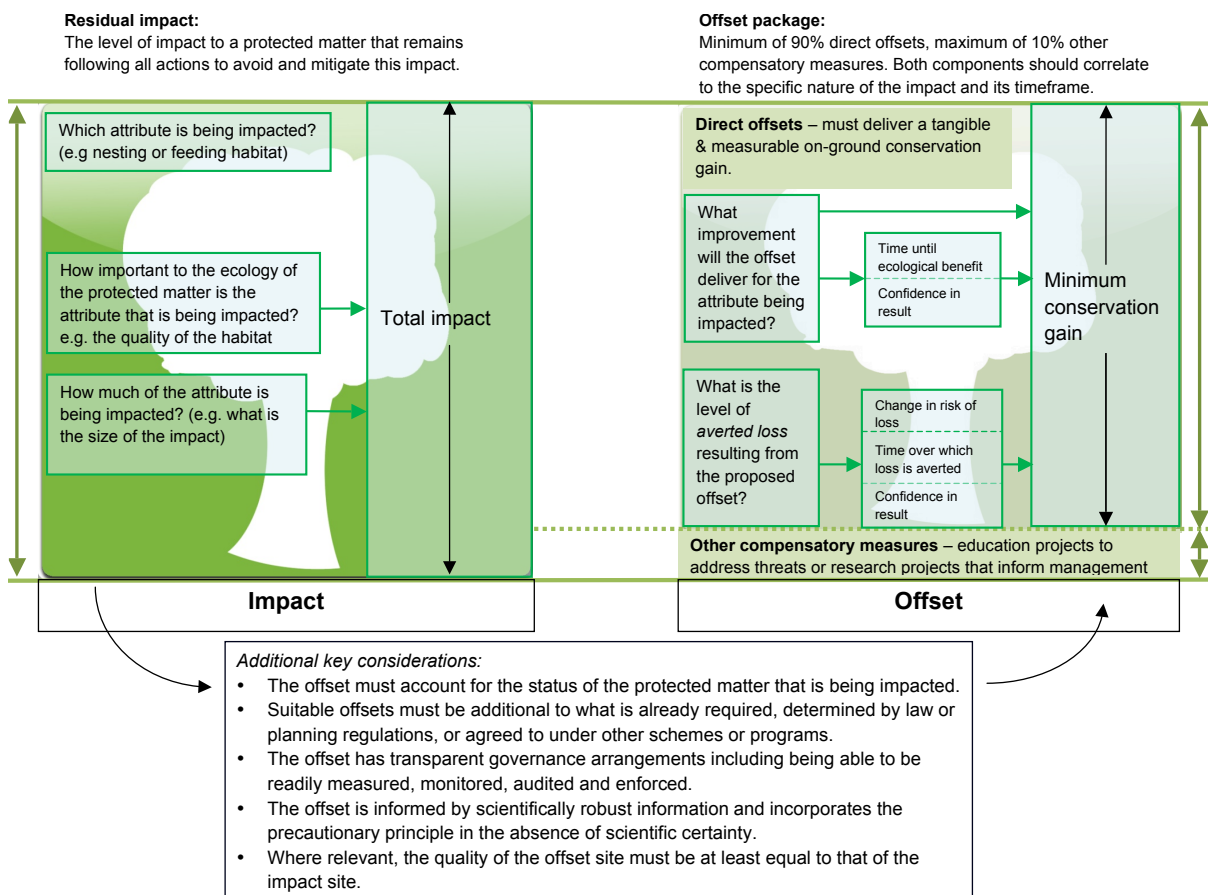
- current land tenure of the offset and the proposed method of securing and managing the offset for the life of the impact
- time it will take to achieve the proposed conservation gain
- level of certainty that the proposed offset will be successful. In the case of uncertainty, such as using a previously untested conservation technique, a greater variety and/or quantity of offsets may be required to minimise risk
- suitability of the location of the offset site. In most cases this will be as close to the impact site as possible. However, if it can be shown that a greater conservation benefit for the impacted protected matter can be achieved by providing an offset further away, then this will be considered.

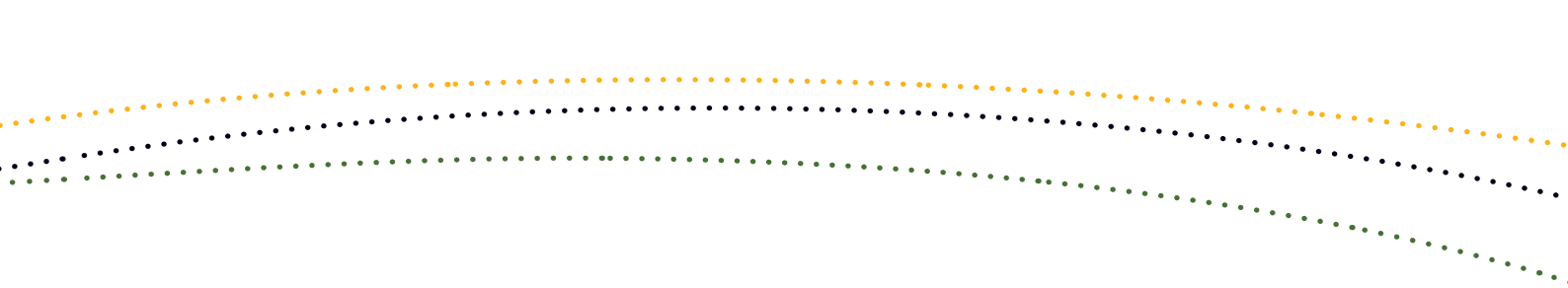
7. OFFSET REQUIREMENTS

Suitable offsets are determined by applying the requirements outlined in Box 1, and as illustrated by Figure 2.

The *Offsets assessment guide* gives effect to these requirements and provides a decision-making framework for the department to consider the appropriateness and adequacy of proposed offsets for listed threatened species and ecological communities.

Figure 2 – Determining suitable offsets under the EPBC Act





7.1 Suitable offsets must deliver an overall conservation outcome that improves or maintains the viability of the protected matter

Offsets must directly contribute to the ongoing viability of the protected matter impacted by the proposed action, and deliver an overall conservation outcome that *improves or maintains* the viability of the protected matter as compared to what is likely to have occurred under the status quo, that is if neither the action nor the offset had taken place.

Offsets should be tailored specifically to the attribute of the protected matter that is impacted in order to deliver a conservation gain. For example, if the impact is the removal of foraging habitat for a listed threatened bird species, then an appropriate offset would be creating new similar habitat through re-vegetation works, improving the quality of existing foraging habitat for the species, and/or protecting existing foraging habitat through putting a conservation covenant on the title of the land. If an impact decreases the nesting success of a listed threatened turtle species due to light pollution, then an appropriate offset may be increasing the birth rate of that same species in a nearby location through threat abatement activities such as reducing feral pig predation on turtle nests.

In some circumstances it may be possible to demonstrate that a better conservation outcome can be achieved for the protected matter by deviating from this rule. If this is the case then the decision-maker may consider this. For instance, in the first example above, if the limiting attribute to the viability of the protected matter in a particular area is not foraging habitat, but nesting habitat, then an offset that produces more nesting habitat may be considered satisfactory for an impact on foraging habitat.

For heritage values, offsetting for the same or similar values in the same property or adjacent to it may be suitable where it can be demonstrated that such an activity will improve the overall integrity and resilience of the property.

In no instances will trading offsets across different protected matters be considered as a suitable offset. That is, where an action impacts on a specific threatened or migratory species, ecological community, Ramsar wetland or heritage property, any offset must relate to that same specific matter which is impacted.

When the protected matter is the whole of the environment (nuclear actions, proposals involving the Commonwealth, actions that affect Commonwealth areas and the Great Barrier Reef Marine Park), offsets must be targeted to the aspect of the environment that is being impacted so as to directly compensate for the impact. For example, where an action has a residual impact that involves the clearing of native vegetation or the degradation of water quality, an offset proposal would need to adequately compensate for these specific residual impacts.

For impacts on habitat for threatened species, migratory species and threatened ecological communities, any direct offset must meet, as a minimum, the quality of the habitat at the impact site. Where a proposed offset site has a lower habitat quality than that of the impact site, the offset must be managed and resourced over a defined period of time so that its habitat quality is improved to meet the quality of habitat originally impacted. Supporting and/or recreating non-endemic vegetation or ecosystems would not be considered a suitable offset.



7.2 Suitable offsets must be built around direct offsets but may include other compensatory measures

Offsets must be built around direct offsets, which should form a minimum of 90 per cent of the total offset requirement. Most proponents will be able to provide a direct offset that will satisfy 100 per cent of the offset requirement. However, other compensatory measures may satisfy up to a maximum of 10 per cent of the total offset requirement.

The circumstances in which deviation from the 90 per cent direct offset requirement may be considered are outlined in section 4.2.1.

Where possible, an offset should address key priority actions outlined for the impacted protected matter in any approved recovery plans, threat abatement plan, conservation advice, ecological character description or approved Commonwealth management plan. Higher priority actions are preferred to lower priority actions. Appendix A outlines what other compensatory measures are considered suitable.

7.2.1 Tenure for direct offsets

For direct offsets, the securing of existing unprotected habitat as an offset only provides a conservation gain if that habitat was under some level of threat of being destroyed or degraded, and as a result of offsetting will instead be protected in an enduring way and actively managed to maintain or improve the viability of the protected matter. In these cases, the tenure of the offset should be secured for at least the same duration as the impact on the protected matter arising from the action, not necessarily the action itself.

As a general guide, the best legal mechanisms for protecting land are intended to be permanent (lasting forever) and are secure (that is, they are difficult to change or alter). These two elements are important because they mean that land set aside as an offset will continue to provide a secure benefit to the impacted protected matter.

Legal mechanisms, such as conservation covenants, exist in each state and territory to enable the protection of land that is set aside for environmental purposes on a permanent or long-term basis. Suitable mechanisms for a particular offset must be built around the principles outlined in Box 3.

In addition to state and territory legal mechanisms for securing offsets, there is also provision under Part 14 of the EPBC Act for the Minister to enter into a conservation agreement with a third party for the conservation of a protected matter. An EPBC Act conservation agreement is a flexible instrument that can be used for implementing a range of management activities to benefit a protected matter, such as fencing off important habitat areas, undertaking weed and feral animal control or the establishment of compensatory habitat. They can also require a landholder to refrain from, control or refuse to permit, activities that may adversely affect the species, ecological communities, habitats or potential habitats covered by the agreement.

Marine areas are predominantly managed by state, territory and/or Commonwealth government agencies. In determining appropriate offset packages in marine environments, proponents should engage with the relevant governing jurisdiction to identify suitable areas of habitat that may be protected and/or improved to achieve a conservation gain. This could include removing pressures, such as dredging, on habitat for a protected matter.



Box 3: Suitable Offset Mechanisms

Offsets on public lands

- should be legally secured for conservation purposes for at least the duration of the impact
- should be statutorily defined and resourced
- any change in management status should require Ministerial or statutory approval.

Offsets on private lands

- should be legally secured for conservation purposes for at least the duration of the impact
- the securing scheme should actively monitor for compliance, with covenant requirements enforced
- any change in legal status should require Ministerial or statutory approval.

Offsets on Indigenous owned lands

- should have customary law protection with Traditional Owners holding a non-transferable interest in the land with a commitment to its long-term protective management
- should include a commitment from Traditional Owners to accept and manage the offset.

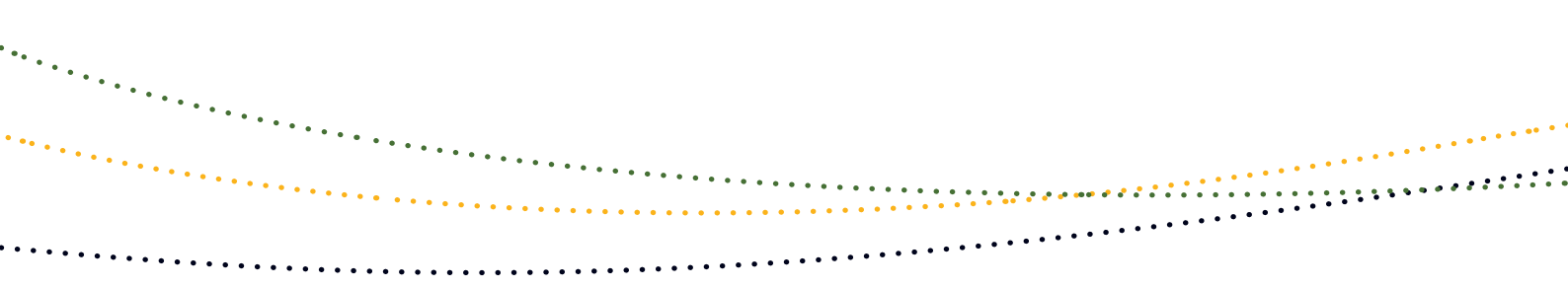
Offsets in the marine environment

- should be implemented for the duration of the impact
- should be developed in consultation with governing jurisdiction(s).

In some situations there may be difficulties in permanently securing a site for conservation purposes due to the existing tenure of the land. Such situations will be considered by the department on a case-by-case basis. However, where the security of an offset is diminished, the risk to any protected matters, and subsequently the magnitude of offsets required, will increase. Further discussion of the relationship between risk to the protected matter and the scale of a suitable offset is at section 7.5.

7.2.2 Impacting on existing EPBC Act offsets

Where a proposed action is likely to impact on an existing EPBC Act offset, the person proposing to take the action should refer it to the department to determine whether or not it will require further assessment under the EPBC Act. There is an increased likelihood of significant impacts arising from actions on an existing offset site due to the nature of such sites containing and/or supporting protected matters. Where such actions are determined to be controlled actions, irrespective of the ownership or tenure of the impacted offset, the person proposing to take the action must develop an offsets package to compensate for both the impact of the proposed action, as well as the original action for which the offset was a condition of approval. The subsequent offset conditions would not amount to a variation of the original conditions of approval or excuse non-compliance with those conditions.



7.3 Suitable offsets must be in proportion to the level of statutory protection that applies to the protected matter

Due to the higher risk involved with protected matters of greater conservation status, the offsets required for those protected matters with higher conservation status must be greater than those with a lower status. For listed threatened species and ecological communities, this is calculated in the *Offsets assessment guide* by using International Union for Conservation of Nature data on the probability of annual extinction for different categories of threatened species.

Information regarding the conservation status of threatened species and ecological communities is held in the department's Species Profile and Threats Database which can be found at www.environment.gov.au/cgi-bin/sprat/public/sprat.pl.

Further information on other matters protected by the EPBC Act can be found at www.environment.gov.au/epbc/protect/index.html.

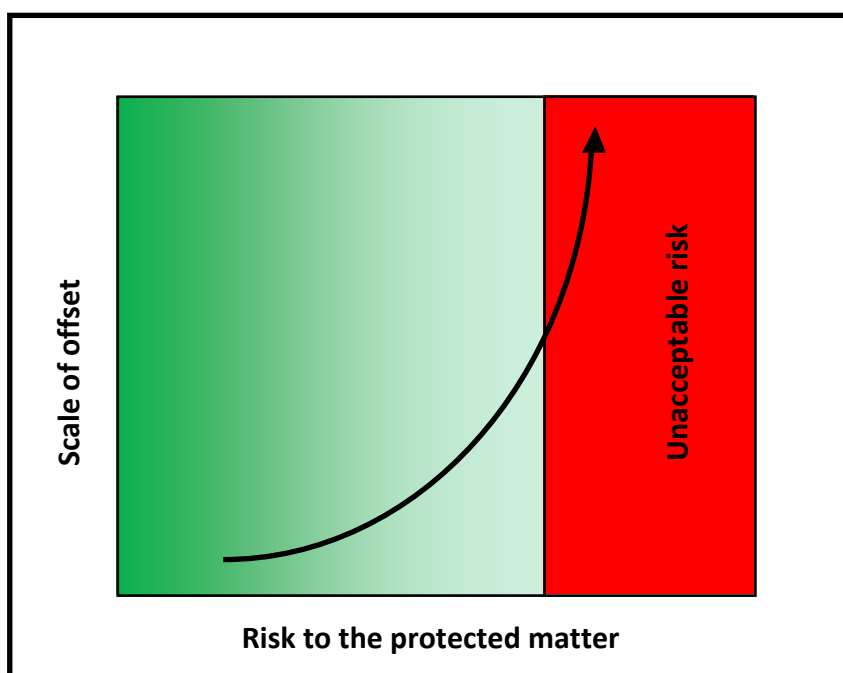
7.4 Suitable offsets must be of a size and scale proportionate to the residual impacts on the protected matter

Offsets must be proportionate to the size and scale of the residual impacts arising from the action so as to deliver a conservation gain that adequately compensates for the impacted matter. The size and scale of an offset required for each impact is determined by taking account of a number of different considerations that are discussed in this policy, including the:

- level of statutory protection that applies to the protected matter
- specific attributes of the protected matter, or its habitat, being impacted
- quality or importance of the attributes being impacted with regard to the protected matter's ongoing viability
- permanent or temporary nature of the residual impacts
- level of threat (risk of loss) that a proposed offset site is under
- time it will take an offset to yield a conservation gain for the protected matter
- risk of the conservation gain not being realised.

As the time it takes for an offset to deliver an ecological benefit increases, so do the risks to the protected matter. The relationship between risk and scale is represented in Figure 3.

Figure 3 – Relationship between scale of offset requirements and risk



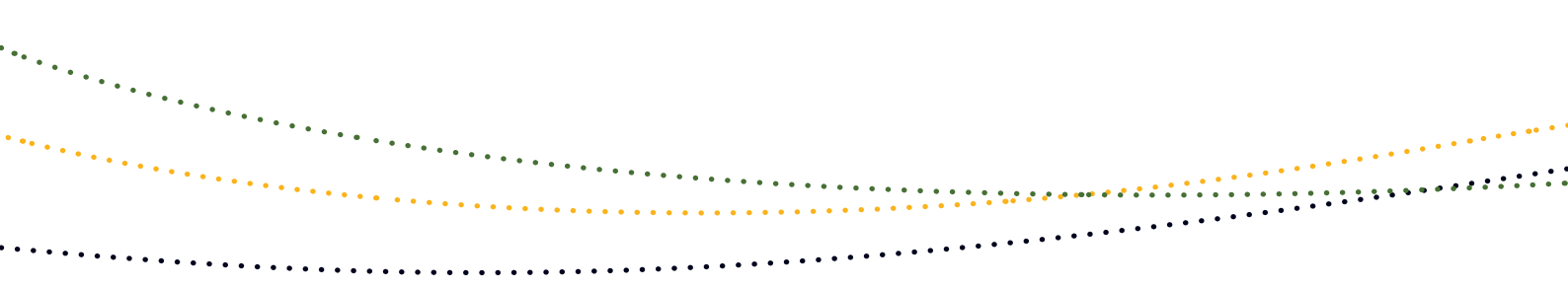
7.5 Suitable offsets must effectively account for and manage the risks of the offset not succeeding

The use of offsets as a compensatory measure through the assessment and approval process involves two levels of risk. The first, and highest, level of risk is that the impact on the protected matter will be too great and that an offset will not be able to compensate for the impact. This risk is addressed through the assessment process.

The second level of risk relates to whether individual offsets are likely to be successful in compensating for the residual impacts of a particular action over a period of time. It is this risk that is considered in determining a suitable offset and has direct

bearing on the scale of the offset required. The magnitude of a suitable offset will increase proportionately to the risk posed to the protected matter by the proposed action. The relationship between risk and the scale of offset required is demonstrated in Figure 3 above.

In general terms, direct offsets present a lower risk than other compensatory measures, as they are more likely to result in a conservation gain for a protected matter. The advanced delivery of offsets (that is, those that are in place before the proposed action takes place) also reduce the risk profile of an offset through providing a conservation gain at an earlier point in time (see section 4.2.3 relating to advanced offsets).



Because of these uncertainties, a risk based approach incorporating the precautionary principle is taken when determining whether offsets are a suitable option and whether they can compensate for the residual impacts on a case by case basis. Specifically, risk is taken into account when considering:

- What is the residual impact?
- What type of offset should be provided?
- What size should the proposed offset be?
- Where should the proposed offset be located?

There is also the risk that offsets may result in perverse outcomes, either for the environment as a whole or for other aspects of the community, for instance social and economic factors. To avoid these outcomes, analysis of the possible perverse outcomes will form part of the decision making process in deciding the suitability of an offset package.

7.6 Suitable offsets must be additional to what is already required, determined by law or planning regulations, or agreed to under other schemes or programs

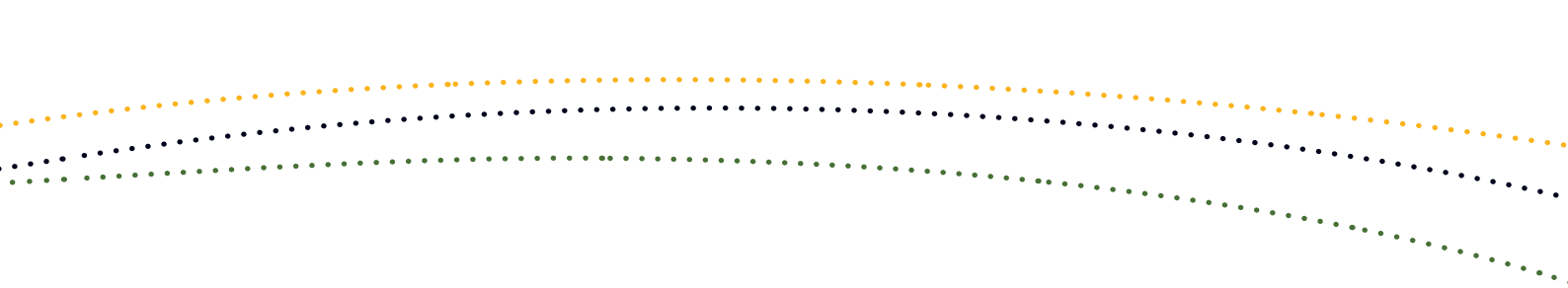
Offsets must deliver a conservation gain for the impacted protected matter, and that conservation gain must be new, or additional to what is already required by a duty of care or to any environmental planning laws at any level of government. It is important to note however that this does not preclude the recognition of state or territory offsets that may be suitable as offsets under the EPBC Act for the same action (see section 7.6.1).

This requirement would, however, generally prohibit using a piece of land already set aside in the conservation estate or using a site that is already unable to be built upon due to zoning laws (a foreshore reserve for instance) as an offset for a proposed action.

Environmental offsets must also be additional to what has been paid for under other schemes or programs on a *pro rata* basis. For instance, if a landholder is receiving stewardship funding from a program such as *Caring for our Country*, then the conservation gain achieved through fulfilling the program's contract is not eligible to be used as an offset. Similarly, the conservation gain achieved while participating in another scheme (such as the *Carbon Farming Initiative*), would also not be eligible for use as an offset.

However, if the proposed offset is for further activities that achieve additional conservation gain on the same piece of land, then those additional activities may be eligible for use as offsets. For example, if a piece of land is being used as an offset to preserve and manage that land for the protected matter, then it may be permissible to use that piece of land to offset another proposed action where:

- there are no perverse outcomes
e.g. there is no conflict between the management of the two offsets, such as the need for conflicting fire regimes; and
- synergies are produced e.g. releasing and actively managing captive bred animals (offset 2) into an already protected and managed area for the same species (offset 1) may increase the survival rate of the released animals and increase the viability of the existing population.



Whether or not an offset is considered to be additional will be assessed on a case by case basis. Where a proponent or offset provider seeks to secure an advanced offset, it must sufficiently document the establishment of that offset, including relevant baseline data, to demonstrate to the department that it is additional.

7.6.1 Links with state and territory approval processes

All of the states and territories have laws that protect the environment. The majority of proposed actions that need approval under the EPBC Act also require environmental approval from the relevant state or territory government before they can proceed.

It is important to note that while there are many similarities between the environmental laws of the states and territories and the EPBC Act, they also differ in a fundamental way. The EPBC Act focuses on protecting matters of national environmental significance and only protects the broader environment in certain circumstances. State and territory laws on the other hand usually protect the environment as a whole (for example air quality, noise pollution, water quality, biodiversity, and heritage values). These differing legislative objectives result in different assessment processes and can result in different offset requirements.

As a consequence, some proponents may need to provide offsets under both state or territory laws and the EPBC Act for the same action. A state or territory offset will count toward an offset under the EPBC Act to the extent that it compensates for the residual impact to the protected matter identified under the EPBC Act.

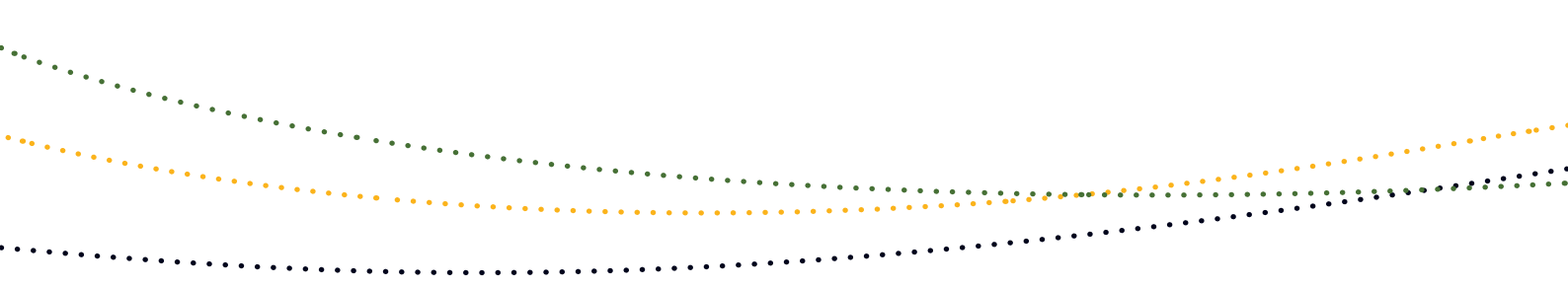
Making an early referral provides an opportunity to align the impact assessment processes of the relevant state or territory with the EPBC Act to the extent that this is possible.

7.7 Suitable offsets must be efficient, effective, timely, transparent, scientifically robust and reasonable

Efficient and effective offsets are those that maintain or improve the viability of a protected matter through the sound allocation of resources. For example, where it is possible under this policy, the Australian Government will work with states and territories to align offset requirements. This alignment will deliver efficient and streamlined assessment processes for project proponents and effective environmental outcomes.

Offsets must also be timely. That is, an offset should be implemented either before, or at the same point in time as, the impact arising from the action. This timing is distinct from the time it will take an offset to yield a conservation gain for the protected matter, which may be a point in the future.

Offsets must be based on both scientifically robust and transparent information that sufficiently analyses and documents the benefit to a protected matter's ecological function or values. This includes undertaking desktop modelling of offset benefits and conducting relevant field work as appropriate.



7.8 Suitable offsets must have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced

Offsets must be delivered within appropriate and transparent governance arrangements. Proponents, or their contractors, must report on the success of the offsets so that conditions of approval can be varied if the offsets are not delivering the desired outcome.

Offset proposals will need to include clearly articulated measures of success that are linked to the purpose of the offsets and provide clear benchmarks about their success or failure. Annual reports will be required by the department and, where possible, will be made publicly available.

Performance of offsets will be reviewed as part of the monitoring, compliance and audit program for all proposals considered under the EPBC Act. All offsets will be registered and details, such as spatial information (for example GPS data), information on the relevant protected matters and the ongoing management actions required will be recorded. This information will be made publicly available on the department's website where it is appropriate to do so. This registration process will ensure that land that is proposed as an offset is available and suitable for use as an offset in each particular case, allow strategic planning, and streamline processes with state and territory requirements and schemes.

Establishment costs of offsets required as a condition of approval under the EPBC Act must be borne by the proponent and the offset must be designed in a way that is able to be measured, monitored, audited and enforced. The department will not be responsible for the costs of establishing an offset, or any costs associated with the ongoing management of an offset.

Where a proponent elects to have a third party manage or establish an offset area or program, the proponent must make contractual arrangements with the third party to deliver the offset in accordance with their approval conditions.

In determining the success of an offset, proponents will be required to report data that allows for the performance of an offset to be evaluated. Obtaining such data is part of the ongoing management of an offset and the cost therefore lies with the proponent. Conditions will require that data be made readily available to the department and in a format that can be easily integrated into a departmental database.



8. GOVERNMENT DECISION-MAKING RELATING TO OFFSETS

8.1 Decisions will be informed by scientifically robust information

In keeping with the broader environmental impact assessment process under the EPBC Act, the determination of offsets is based on the best available scientific data and evidence. Key sources for determining offset priorities include the relevant Commonwealth approved recovery plan, threat abatement plan, conservation advice, ecological character description, management plan or listing document. Where Commonwealth approved guidance documents are not available or are insufficient in detail, the department will review additional information sources such as state and territory management plans or peer reviewed scientific literature to inform priority offset activities. Data that informs the specific nature and scale of a particular offsets package may include consulting scientists, scientific literature, and data collected by both the department and proponents.

8.2 Conducted in a consistent and transparent manner

The *Offsets assessment guide* (the guide) was designed for the department's use to assist in the determination of suitable offsets for threatened species and ecological communities, based on the nature and extent of the impacts likely to occur at the

proposed impact site. The guide helps ensure that the process of determining suitable offsets is consistent across industries and geographical locations. It will increase the transparency of the process because the impacts and offsets are explicitly detailed and calculated.

Although specifically designed for the use of the department, the guide is a public document and as such can be used by proponents to consider offset requirements early in their project planning. It is at the decision maker's discretion to determine how a proposed action and offset proposal is evaluated and how the figures and scores are assigned. The guide provides flexibility to ensure that the most efficient offsets can be determined, while ensuring that offsets improve or maintain the viability of the impacted protected matter. Although informed by the policy, it is important to note that the guide is within the broader context of the policy. Potential offsets generated by the guide may be modified to better conform to the policy. Further, the policy sits beneath, and must conform to, the EPBC Act.

For protected matters not covered by the guide, the department will determine the suitability of any offset proposals based on the principles outlined within this policy and in consultation with project proponents.



9. OFFSET DELIVERY OPTIONS

Offsets can be delivered by a range of mechanisms, including market-based mechanisms and contracting third party providers. Regardless of the offset delivery mechanism, project proponents remain responsible for ensuring that their conditions of approval are met.

9.1 Use of market-based mechanisms to deliver offsets

A well-functioning market for biodiversity offsets creates a clear system through which offsets can be traded by specifying the boundaries and conditions of the market and bringing together potential buyers and sellers. It is anticipated that the financial incentives that are subsequently attained will lead to a greater availability of offsets at any given time by encouraging private sector investment in the protection and restoration of biodiversity. For example, rural landholders may wish to diversify their income streams by investing in conservation activities that benefit specific threatened species with a view to providing these as offsets. Further discussion of the provision of offsets by third parties is at section 9.2.

There are various market-based tools that can be utilised for the delivery of offsets, from land brokering services through to biodiversity banking schemes, whereby credits are generated through conservation activities on a property and subsequently traded within a market framework.

Use of market-based mechanisms for delivering offsets is supported as a means of determining the conservation value of both the proposed action site and the proposed offset, where such mechanisms are based on reproducible and scientifically robust information.

In utilising biodiversity banking schemes, proponents should discuss their plans with the department in order to ensure that the offset delivered through such a scheme will satisfy the requirements of this policy and, in the case of threatened species and ecological communities, the *Offsets assessment guide*.

Two state governments have developed biodiversity banking schemes, BushBroker in Victoria and BioBanking in NSW. Proponents should engage with the department early in the assessment process where they wish to utilise state and territory schemes to allow for streamlining of processes between the different jurisdictions.



9.2 Use of third parties to deliver offsets

Suitable third parties can be used to deliver offsets. In many cases, enhanced environmental, social and economic outcomes can be achieved through the use of third party offset providers such as rural landholders, private conservation organisations, and Indigenous corporations. Contracts with third parties to manage an offset may be through a biodiversity banking scheme, however the use of a third party to deliver an offset must be approved by the decision maker. In all cases, the decision maker must be satisfied that appropriate mechanisms are in place to ensure the successful delivery of the offset and that the offset will meet the compliance requirements of any conditions of approval.



10. FURTHER INFORMATION

EPBC Act policy statements are the department's public policy documents which provide guidance on the practical application of EPBC Act. The policy statements include:

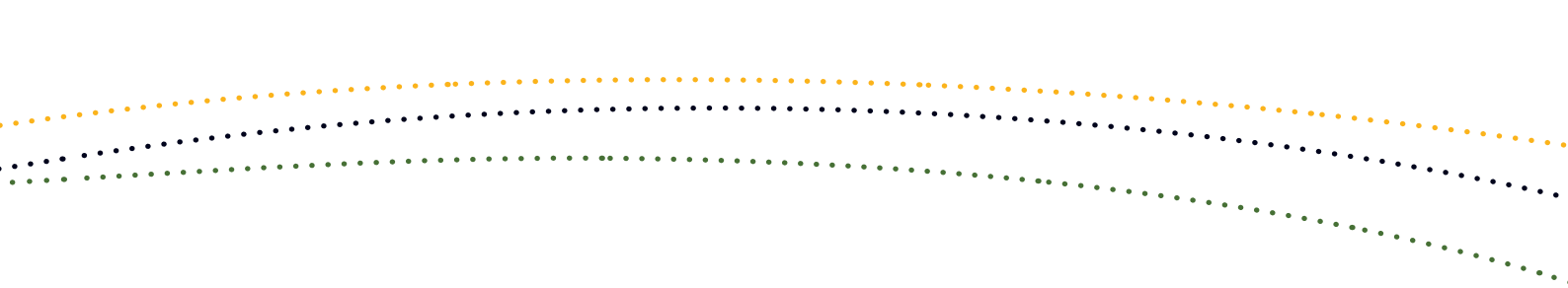
- significant impact guidelines
- EPBC Act practices and procedures
- industry guidelines
- information on listed ecological communities
- significant impact or referral guidelines for nationally listed species
- regional guidelines
- survey guidelines for nationally threatened species.

These are available on the department's website at: <http://www.environment.gov.au/epbc/guidelines-policies.html>

Conservation advices and recovery plans are available at:

<http://www.environment.gov.au/cgi-bin/sprat/public/conservationadvice.pl?proc=main>

For further general information about the EPBC Act, including information about the referral, assessment and approval processes, please contact the Department of Sustainability, Environment, Water, Populations and Communities Community Information Unit on 1800 803 772, or access the EPBC Act website at: www.environment.gov.au/epbc



Appendix A: Criteria for research and educational programs

A suitable research or education program must:

1. endeavour to improve the viability of the impacted protected matter, for example
 - signage in key areas to educate the public regarding the risks to a threatened animal, or
 - research into effective re-vegetation techniques for a threatened ecological community
2. be targeted toward key research/ education activities as identified in the relevant Commonwealth approved recovery plan, threat abatement plan, conservation advice, ecological character description, management plan or listing document. Where Commonwealth approved guidance documents are not available or are insufficient in detail, the department will consider additional information sources such as state and territory management plans or peer reviewed scientific literature to inform priority offset activities
3. be undertaken in a transparent, scientifically robust and timely manner
4. be undertaken by a suitably qualified individual or organisation in a manner approved by the department
5. consider best practice research approaches.

The proponent is required to:

1. select an institutional or individual host (for the purpose of executing the program) through an internationally available open tender process or provide evidence that the program can be successfully undertaken in-house. The department will not be responsible for processing tenders. Where appropriate, the tender should complement an existing research institution's (e.g. National Environmental Research Program Hub) work program as it relates to the matter of national environmental significance. This will be the responsibility of the proponent; however, the department will require that proponents follow the department's guidelines
2. provide updates on progress and key findings to the department through periodic reporting
3. ensure that funds are managed appropriately and that auditable financial records are kept and maintained
4. apply a 'no-surprises' policy to the publication, whereby research publications and outputs are provided to the department at least 5 working days before release.



Research programs:

1. will be tailored to at least a postgraduate education level; however, there will be scope to engage other educational levels in educational programs (see below)
2. will present findings that can be peer-reviewed
3. will publish findings in an internationally recognised peer-reviewed scientific journal or be of a standard that would be acceptable for publication in such a journal. Publications should be submitted to free open access journals. Data and information collected should have creative commons licensing and be free and accessible
4. research outputs should inform future management decisions on the protected matter and, where possible, be readily applicable to other similar matters (species groupings etc).

Educational programs:

1. will be likely to vary in scope, mode of delivery and duration according to the target audience and the protected matter, (for instance, school or community programs, signage or printed materials)
2. should seek to attain measurable outcomes. Note that it may be difficult to ascertain the scope of influence of educational programs as it can be difficult to link education activities to behavioural change and subsequent improvement in the viability of the protected matter
3. should be targeted toward behavioural change and subsequent improvement in the viability of the protected matter.

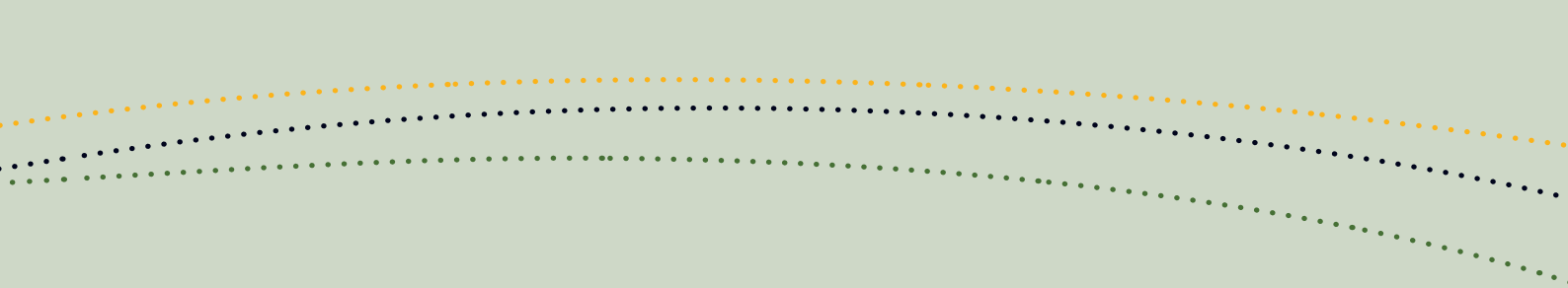


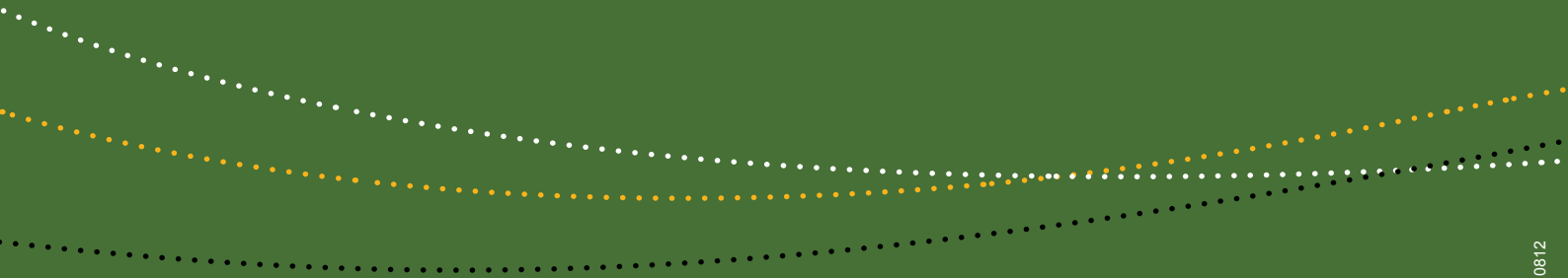
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ENVIRONMENTAL OFFSETS



Position Statement No. 9



January 2006



Environmental Protection Authority

Environmental Offsets

Position Statement No. 9

January 2006



Environmental Protection Authority



FOREWORD

Environmental offsets aim to ensure that significant and unavoidable adverse environmental impacts are counterbalanced by a positive environmental gain, with an aspirational goal of achieving a 'net environmental benefit'. In view of the State's recent alignment with the sustainability philosophy, it has potential to be a useful management tool – enabling development to occur, but not at the total expense of the environment. It is important to recognize that environmental offsets represent a 'last line of defense' for the environment, only being used when all other options to avoid and mitigate environmental impacts have been considered and exhausted.



This final Position Statement sets out the EPA's views on environmental offsets. The EPA considers that environmental offsets should be included, where appropriate, as part of approvals for environmentally acceptable projects to maintain and wherever possible enhance the State's environment. To this end, this Position Statement establishes a purpose, scope and principles for environmental offsets that the EPA will consider in future advice and recommendations. I anticipate that this Position Statement will provide the basis for developing a whole of government policy on environmental offsets. The EPA does not propose that this Position Statement be retrospective in its application.

The EPA is also currently preparing a Guidance Statement on environmental offsets which will be tailored directly to the environmental impact assessment process for development proposals.

The EPA wishes to thank those persons who, and organization which, commented on both versions of the Preliminary Position Statement. It has been substantially amended in response and is a much better document as a consequence.

A handwritten signature in dark ink, appearing to read 'W. J. Cox'.


Walter Cox
Chairman
Environmental Protection Authority

5 January 2006



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1. INTRODUCTION

1.1 Background

In recent decades, there have been several attempts at developing and using environmental offsets as an environmental management tool in Western Australia (WA). For example, in the 1980s and 1990s government agencies attempted to counter adverse environmental impacts to Swan Coastal Plain wetlands by creating, conserving or enhancing wetlands elsewhere.

In more recent years the focus has evolved to using offsets in a broader environmental management context, that is for counterbalancing waste emissions and impacts to conservation reserves, native vegetation, wetlands, habitat and biodiversity. Sustainability has also recently become a key philosophy endorsed by the State and methods are being developed to help achieve this (Government of WA, 2003a). Environmental offsets are one tool being used in this context, providing alternative beneficial environmental outcomes in situations where social and economic growth is sought at some detriment to the environment.

The Environmental Protection Authority (EPA) currently recognises that various offset policies and approaches are being developed and used without common overarching principles and acknowledges that there is the potential for inconsistent messages to be given. In addition, there is some concern from the community about what offsets should and shouldn't be.

The EPA is also concerned about perceptions that negotiated offset and compensation packages are being used to make otherwise 'unacceptable' adverse environmental impacts 'acceptable' within government. It is aware that some environmental offsets, proposed in the guise of sustainability tools, are sometimes over-riding the protection and conservation of our State's most valuable environmental assets. Over time, the cumulative effects of this type of decision-making would contribute to a gradual decline in both the quality and quantity of the State's priority environmental assets. The EPA is of the view that this approach is neither sustainable nor focused on protecting the environment. It is also aware there may be equity issues that need to be addressed by government. The challenge now is to find the means of doing so effectively.

Previous EPA policy has provided the context for using environmental offsets in various applications. One approach currently being used for Environmental Impact Assessment (EIA) is the 'net conservation benefit' approach, having been developed by conservation agencies in collaboration with the EPA (EPA Bulletin 1101, 2003). This approach focuses on offsetting the clearing of conservation estate land with the addition of another area of suitable land into the conservation estate. This approach also extended to making contributions towards environmental research, management and other environmentally beneficial activities.

The EPA has also published a draft policy framework on wetland banking. This document was released for public comment in 2001 (EPA, 2001a). It proposed the development of a wetland credit-trading scheme, regulated through a 'bank', which would issue credits for wetland improvements and debits for wetland degradation. A summary of public comments on this document has been provided in the first version of

this Preliminary Position Statement. Many of the issues identified in this document's public consultation phase were used in the development of this Position Statement.

General EPA offsets policy direction has also previously been provided for native vegetation and wetlands outside of the conservation estate (EPA, 2000; EPA, 2001b), marine benthic habitats where substantial cumulative losses have already occurred (EPA, 2003a) and in general circumstances where 'best practices' are considered inappropriate or inadequate (EPA, 2003b).

State Government agencies have also been developing various offset policies. The Department of Environment (DoE) is preparing a native vegetation offset policy for clearing of native vegetation regulated under the *Environmental Protection Act 1986*. In addition, the Department of Conservation and Land Management (CALM) in consultation with the Conservation Commission has been developing a 'conservation offsets' policy with respect to offsetting adverse impacts to conservation reserves, State forest, threatened flora, fauna and ecological communities. Public consultation is being undertaken on this policy approach as part of the proposed Biodiversity Conservation Act. The Department of Planning and Infrastructure (DPI) is developing an offsets and mitigation policy for impacts to 'Bush Forever' native vegetation sites.

In view of the afore-mentioned issues, the EPA is developing this Position Statement to provide overarching guidance and to establish a consistent policy approach on the matter. This position statement provides some clarification on the options for industry, developers, environmental consultants, specialist scientists and community groups who may be involved in developing or reviewing options for environmental offsets.

Where a proponent for a development is subject to the environmental impact assessment and approval process, and environmental offsets are properly part of those considerations, the EPA expects proponents to put forward commitments for offsets as part of their proposal.

1.2 Why offsets are important

Conservation of the environment is always desirable. However, in a growing society and economy this is not always achievable. Where environmental impacts must occur, environmental offsets represent the 'last line of defence' for the environment. They aim to ensure that any adverse impacts are counterbalanced by an environmental gain somewhere else, so there are no adverse environmental impacts as a result.

Historically, adverse environmental impacts were regarded as an acceptable consequence of economic and social growth. However, it is now well recognised this past thinking was unsustainable. As a consequence, the State is now dealing with significant environmental problems that threaten the condition of the State's environment and also its social and economic integrity. For example, past clearing of native vegetation in the wheat belt has contributed to the current threat of land and water salinisation, which in turn, is contributing to loss of biodiversity, loss of potable water supplies, destabilization of rural communities and reduced primary agricultural production.

Sustainability tools are needed to ensure the protection and *improvement* of the environment whilst allowing for economic and social growth. Environmental offsets are one management tool that has the potential to help achieve sustainable outcomes, as identified in the State Sustainability Strategy (Government of Western Australia, 2003a).

Other similar management tools include credit trading schemes and wetland/bushland banking.

Environmental offsets as a basic concept is well established nationally, having been incorporated into government policies for native vegetation, carbon trading and forestry. Western Australia is also a signatory to national agreements that employ the offset concept. Of particular significance is the National Objectives and Targets for Biodiversity Conservation (Environment Australia, 2001b) which aims to reduce the national net rate of land clearing to zero. The offsets concept has also been integrated into the National and State Greenhouse Strategies through vegetation carbon offsets and carbon credit trading schemes (Commonwealth of Australia, 1998; Government of Western Australia, 2003b); being similar in nature to schemes adopted internationally under the Kyoto Protocol.

Despite global strengthening of environmental policy and regulation, many key aspects of environmental health continue to degrade (Government of Western Australia, 1998; Commonwealth of Australia, 2001; UNEP, 2002). By itself, strict environmental policy and regulation can be a resource and time consuming activity for both regulators and proponents. However, by using environmental offsets as a complementary activity, it may allow a more flexible approach where some minor impacts may be considered if there is an overall net benefit for the environment. This approach may be particularly relevant where there is a minor environmental benefit to be gained by reducing emissions a small amount (beyond that which can be achieved through best available technology) at a large cost to the proponent. In these circumstances, the proponent may use offsets to achieve a greater environmental benefit somewhere else at a much-reduced cost (NSW EPA, 2002). Notwithstanding the above, it is widely recognised that regulatory tools and enforcement still have a very important role to ensure the environment remains protected in the long term.

Emissions appear to be the clearest or easiest application for environmental offsets. This can be attributed, in part, to established methods for quantifying, comparing and assessing pollutants being discharged to the environment. Many examples are available from around the world that show how emission offsets (in particular greenhouse gas emissions and nutrient emissions) can produce positive environmental outcomes, and in some instances, a truly sustainable outcome (for example, US EPA 2002, Climate Trust, World Resources Institute, 2000; EPA Bulletin 945 1999).

In addition to their obvious connection with point source pollution, offsets may also prove to be a remedy for the management of diffuse pollutant sources that have historically proven to be a large and onerous task for government to manage alone. Diffuse pollution offsets may utilise the creation of plantations or re-establishment of ecosystems to act as diffuse pollutant (carbon and other nutrients) sinks (NSW EPA 2002; O'Sullivan, 2002).

Another potential benefit of offsets is their ability to utilise market forces in environmental protection. The incorporation of offsets into programs or schemes (such as wetland banking, credit trading or other market-based incentives) can allow the marketplace to become actively involved in environmental protection and enhancement. Companies can be formed with the sole purpose of generating environmental improvements (via ecosystem restoration, rehabilitation and re-establishment projects) knowing that these improvements can then be on-sold at market price to other companies

wanting to offset environmental impacts. In this way, proactive environmental improvements can be undertaken before impacts occur. Integrating environmental protection into the marketplace represents a further step towards achieving sustainability and a great deal of research is currently being undertaken throughout Australia on this matter (James, 1997; Van Bueren, 2001; Murtough et. al., 2002; Binning et. al., 2002; Robinson and Ryan, 2002; Godden and Vernon, 2003; amongst others).

While environmental offsets can offer a tool for a sustainable approach to environmental protection, the concept is not without its limitations. Long-term studies of environmental offset schemes overseas have shown that implementing offset projects without sufficient data, research, information, available resources, regulation and commitment will only result in a *net loss* of environmental assets and values – the opposite desired effect of environmental offsets (Brown and Lant, 1999; Committee of Mitigating Wetland Losses, 2001; Ambrose, 2000; Johnson et. al., 2002). This has been shown to be especially true for offsets related to natural ecosystems, especially wetlands and complex vegetation types. Therefore it is imperative to ensure that offset-related policies, programs and projects are robustly coordinated, monitored, managed, evaluated and enforced to ensure the environmental offset contributes to successful, long-term environmental outcomes.

In addition, there have been general concerns that the whole offsets concept adopts a ‘reactive’ approach. That is, offsets depend on an adverse environmental impact happening for an environmental improvement to occur. There have also been suggestions that some offset programs in other Australian States have been too narrowly focussed and failed to address broader ecosystem benefits of the impacted ecosystem (Gillespie, 2000; NCC of NSW, 2001; Environment Victoria, 2000).


Offsets may also be perceived as suggesting that all environmental assets are ‘up for grabs’. This perception highlights an important point. There must be clear and unambiguous delineation about the role and use of offsets as an environmental impact management tool, and *not* as a project approval negotiation tool. It emphasises the need to reaffirm the mitigation sequence for environmental impact management and to reaffirm the conservation and protection of ‘critical assets’ that represent our State’s most important environmental assets.

The apparent limitations of environmental offsets highlight the need for the EPA to establish strong principles based on a foundation of environmental protection. It also highlights the need for the State to reaffirm its position on ‘critical assets’ – to provide a scope for the intended use of environmental offsets. It must also be reinforced that offsets are only one tool in the suite of environmental management instruments and that they must be used in conjunction with proactive tools (such as use of best practices and incentives), so as to promote the conservation of the environment first and foremost.

1.3 Offsets go beyond normal environmental management responsibilities

Offsets are not a substitute for normal environmental management responsibilities. These are required as part of normal environmental approvals processes under the Environmental Protection Act 1986.

Offsets are in addition to these and are about maintaining and preferably improving environmental quality. However, different parts of the environment under consideration may require different approaches albeit based upon the common principles. For example, for addressing offsets for emissions to, and loss of benthic habitat in, the marine



environment maintenance of ecological functions should be the focus with ecological linkages and flows important at the ‘bay’ scale rather than the ‘landscape’ scale. Creation of suitable habitat for mangroves and algal mats to colonise to directly offset losses elsewhere would be an example.

Finally, there can be wider potential benefits of offsets (ten Kate et. al. (2004)) which can include: a ‘social license to operate’ for proponents (i.e. community support or no community opposition), the possibility for proponents to influence emerging environmental regulation and policy, reduced cost of compliance with environmental regulation and easier access to capital with associated competitive advantage.

2. PURPOSE

The purpose of this Position Statement is to provide the community, government agencies, industry, developers, consultants, business and other key stakeholders with overarching advice about the intent and appropriate use of environmental offsets.

The EPA considers the purpose, scope and principles in this Position Statement to be important and these will help guide the EPA in future decision-making and in its advice. It must also be reinforced that the EPA's environmental offsets policy position in no way affects the legitimacy of other policy positions related to conservation and environmental protection. The EPA holds the view that environmental offsets should not be considered in isolation, but rather as part of an integrated framework for improved management of the environment that includes regulatory and behavioral incentive programs.

NET ENVIRONMENTAL BENEFIT GOAL

The EPA is of the opinion that environmental offsets should be used with an aspirational goal of achieving a '*net environmental benefit*'. This policy position recognises that the environment has been significantly compromised in the past and that halting and reversing the decline of the environment is now a priority (Figure 1).

Achieving a '*net environmental benefit*' goal means that each offset proposal should address direct and contributing offsets to meet the offset principles in this Position Statement.

Direct offsets are at least one activity selected to help counterbalance the environmental impact, with the aim of achieving no environmental difference, e.g. restoration (offsite*), rehabilitation (offsite*), re-establishment, sequestration. However, direct offsets may not be possible to achieve in every circumstance. Where native vegetation is outside the conservation estate and is subject to threatening processes, its acquisition and inclusion into the conservation estate may be considered a direct offset for the purposes of this Position Statement because of its security of tenure, purpose and management.

Contributing offsets = selected complementary activities (as necessary) which, with the direct offset, meet the offset principles (see Section 3); e.g. protection mechanisms; management; education; research; removal of threats; or other activities having a proven environmental benefit; or contributions to an approved 'bank', credit trading scheme or trust fund (as deemed appropriate by the EPA).

(* 'Offsite' carries the implication that offsets are not substitutable for normal environmental management requirements but in addition to these. That is, restoration and rehabilitation of land directly affected by a development are considered normal environmental management requirements.)

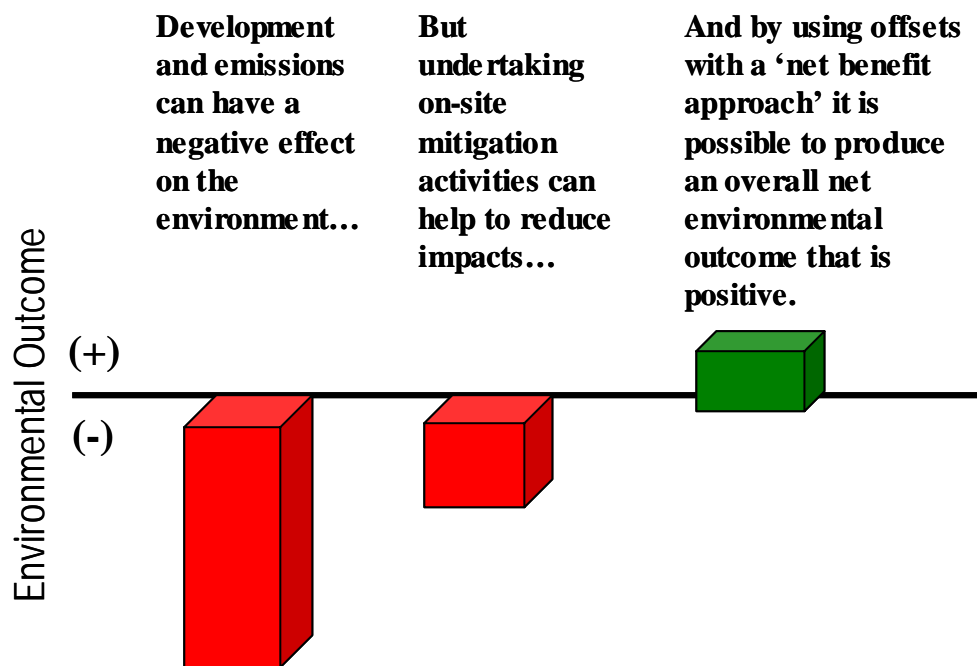


Figure 1: The purpose of a 'net environmental benefit' goal is to achieve a positive environmental outcome from new development or emissions. Adapted from NSW EPA (2002).

3. PRINCIPLES

In its advice and decision making the EPA has regard for a number of environmental principles from s.4A of the *Environmental Protection Act (1986)*, including:

- The precautionary principle
- The principle of intergenerational equity
- The principle of the conservation of biological diversity and ecological integrity
- Principles relating to improved valuation, pricing and incentive mechanisms; and
- The principle of waste minimisation

With reference to environmental offsets, the policies, decisions and advice of the EPA will be guided by the following principles, in accordance with the purpose and scope:

A. Environmental offsets should only be considered after all other reasonable attempts to mitigate adverse impacts have been exhausted.

- On-site adverse environmental impacts must first be addressed using the mitigation sequence (i.e. avoidance, minimise, rectify, reduce, offset in that order – refer Figure 2). Protection and conservation of existing critical environmental assets will always remain a priority above the use of environmental offsets. Offsets are then used to address any significant residual environmental impacts following mitigation considerations. The risk of residual environmental impacts being significant should be addressed early in development planning.
- Proponents wanting to undertake environmental offsets must provide a statement of reasoning to explain what mitigation will occur and why other mitigation options have not been selected to demonstrate that the ‘impact mitigation sequence’ has been fully considered and to provide justification for the environmental offset to be accepted.

B. An environmental offset package should address both direct offsets and contributing offsets.

- Direct offsets counterbalance the adverse environmental impact directly, with the aim of achieving no environmental difference (i.e. no net loss) and aspirationally, a net benefit. An understanding of an appropriate direct offset activity will require research, investigations and a debate of findings with key stakeholders.
 - When relevant to ecosystems, direct offset options may include restoration or rehabilitation of existing degraded ecosystems, re-establishing desirable ecosystems (e.g. re-establishing biodiversity corridors or specific ecosystems in areas of low representation) or implementation of agreed recovery plans for species. Where native vegetation is outside the conservation estate and is subject to threatening processes, its acquisition and inclusion into the conservation estate may be considered a direct offset for the purposes of this Position Statement because of its security of tenure, purpose and management.
 - When relevant to emissions, direct offsets include sequestration activities that permanently remove or ‘lock up’ a pollutant from the environment

(such as establishing new ecosystems, deep well injection and capping, or removing or capturing pollutants from the environment via other approved methods).

For greenhouse gas emissions, the EPA is mindful that there is no agreed international or national position yet regarding the addressing of offsetting of such emissions under the United Nations' Framework Convention on Climate Change. The position in Western Australia, as contained in the Western Australian Greenhouse Strategy (2004), is to promote market-based abatement solutions, to establish a registry for certifying and documenting carbon credit sequestration and to support international and national emissions trading and abatement models. Until these are in place the EPA will continue to ask proponents to address the mitigation of greenhouse gas emissions for levels above a best practicable technology benchmark. The EPA expects that its approach will be subsumed by WA's inclusion in a national approach in the future.

- Contributing offset activities should be considered as part of a combined approach with direct offset activities.
- Contributing offsets can in some cases be preferable because for example, they would lead to a better environmental outcome or direct offsets are not possible. The relative priority of different forms of offsets for biodiversity will vary according to circumstances
 - When relevant to ecosystems, contributing offset options may include conservation activities (covenanting), protection (such as fencing, buffering, or bunding), new research, education, removing threats, or on-going management activities (such as monitoring, maintenance, preparing management plans, evaluation, reporting, etc.). These may be more secure in the long term than, for example, rehabilitation on private property.
 - When relevant to emissions, contributing offsets may include going beyond Best Practicable Measures (as defined in EPA Guidance Statement 55 (Environmental Protection Authority, 2003b), assisting other industries with resource-efficient practices, new research, education or on-going management activities.
 - Where a proponent is unable to undertake restoration, rehabilitation, re-establishment or sequestration activities, they may consider the use of 'banking' or 'credit-trading schemes' to purchase equivalent environmental credits (improvements) to offset their adverse environmental impacts. As an alternative to banking, an appropriate financial amount could be contributed to a statutory trust fund with the sole purpose of being used for an environmental improvement activity.
- Successful integration and application of offset activities should aim to produce a 'net environmental benefit' outcome.

C. Environmental offsets should ideally be ‘like for like or better’.

- ‘Like for like’ ensures that the offset activity counterbalances the same type of impacted ecosystem or emission.
 - When relevant to ecosystems, ‘like for like’ applies to environmental values, vegetation, habitat, species, ecosystem, landscape, hydrology, and physical area. The principle aims to avoid comparable threatened ecosystems, flora and fauna species from being systematically degraded over time through individual and cumulative impacts. Ideally the receiving offset site should be located in the same local vicinity, so as to ensure the offset effect is expressed within the same area of impact. This ensures that offsets are not diluted or concentrated within a specific geographical area or bioregion.
 - When relevant to emissions, ‘like for like’ applies to both the chemical and quantity of emissions. The chemical being offset should be the same as the chemical being emitted. For example, phosphate waste discharge should be offset with phosphate sequestration methods. It is worth noting that offsets should not extend to chemicals that are hazardous to the environment or human health (i.e. toxic or synthetic chemicals such as plastics, pesticides, heavy metals, etc). With reference to quantity of emissions, ‘like for like’ refers to sequestering the equivalent mass or volume of the chemical that is being discharged to the environment. The EPA acknowledges that ‘like for like’ and ‘like for like or better’ for greenhouse gases should be approached in most cases on a CO₂ equivalent basis if the greenhouse gas emitted is other than CO₂.
- ‘Like for like or better’ refers to not only achieving ‘like for like’ but aiming for improvements beyond what is required for ‘like for like’. This may refer to either an enhancement in either the quality or quantity aspects of the offset activity while still considering ‘like for like’ requirements.
 - Where relevant to ecosystems, to achieve ‘like for like or better’ an offset resource from a lower quality asset which is the subject of the impact may be substituted for a higher quality asset in order to obtain an improved environmental outcome.
 - Where relevant to emissions, ‘like for like or better’ may consist of a greater amount of pollutant being sequestered than what is required under ‘like for like’ and ‘offset ratio’ requirements (see Principle D). ‘Like for like or better’ may also refer to achieving ecosystem improvements *at the same time* as achieving emission offsets. For example, re-establishment of a desirable ecosystem would meet offset requirements for both emissions *and* ecosystems. However, establishing a plantation or nutrient-stripping pond would meet only emission offset requirements.
- Where ‘like for like or better’ principles cannot be achieved due to limited availability of comparable ecosystems in the local vicinity, it must be ascertained if the ecosystem to be impacted is special to the bioregion. This may require relevant government environmental agencies to reassess whether this particular

ecosystem type is a ‘critical asset’. Under this scenario, other more suitable offset sites may be recommended to the proponent by the relevant environmental agencies.

D. Positive environmental offset ratios should apply where risk of failure is apparent.

- Positive offset ratios should be used where there is a reasonable risk that the offset will not fully succeed over the long term. That is, the size of the offset to impact ratio should be larger than 1:1 and be *proportional* to both the importance of the environmental asset being impacted, and the likelihood that the offset is unlikely to achieve a ‘net environmental benefit’ outcome. Offset ratios should be based on past findings, success rates, current research or other similar projects being undertaken. Risk of failure could be reduced through, for example, putting offsets in more than one location.
 - When relevant to ecosystems, offset ratios should apply to environmental values, vegetation, habitat, species, ecosystem, landscape, and hydrology, in addition to physical area. The principle prevents complex ecosystems or unique species (that are difficult to restore, rehabilitate or reestablish) from being systematically degraded over time, particularly through cumulative impacts.
 - When relevant to emissions, offset ratios should apply to the quantity of the pollutant being discharged. The ratio should consider if pollutant emissions or offset outcomes (i.e. sequestration or net uptake) are expected to fluctuate significantly over time. Ratios should be weighted to accommodate periods of higher-than-expected emissions, or where an offset activity’s sequestration rate is likely to deteriorate over time.

In this regard, the issues associated with predicting and measuring environmental impacts – especially on biodiversity loss – should not be underestimated. Addressing these issues through offsets can lead to collateral benefits to improve the environmental impact process.

E. Environmental offsets must entail a robust and consistent assessment process.

- A robust, consistent and transparent assessment process will help to ensure that environmental offsets provide an equitable environmental outcome.
- Proponents proposing to cause or allow significant adverse environmental impacts must demonstrate adequate knowledge of the environmental values of the impact site and the proposed offset site(s). After acquiring this adequate knowledge, proponents must demonstrate how their proposed offset package will result in a ‘net environmental benefit’ outcome. If adequate information is lacking in any of these areas, the project proposal will be considered in the context of the ‘precautionary principle’.
- Assessments of both the impact and offset sites should include factors that are commonly identified through the Environmental Impact Assessment process.

- The EPA expects that those involved in the impact assessment or development of environmental offset proposals should have appropriate qualifications and experience to ensure reasonable standards are maintained.

F. Environmental offsets must meet all statutory requirements.

- Environmental offsets must meet all planning, statutory and regulatory requirements prior to further consideration.
- Negotiation of offset conditions should not be used to approve projects where they have been previously restricted by the abovementioned requirements.


G. Environmental offsets must be clearly defined, transparent and enforceable.

- Offsets must clearly define the environmental impact(s) it is intended for. Should the project be modified and cause further additional impacts beyond the original impact, this will require the project to be reassessed for additional environmental offsets.
- Actual offset activities being undertaken should be fully documented by the proponent. Environmental offsets must be based on open and accountable administration. The general public should be able to see that offset principles have been put into practice and that offset goals are being achieved.
- If the offset depends upon another party or parties (other than the proponent) for implementation then agreement should be reached before proposing the offset.

Implementation of offset activities should be legally secure and enforceable and, subject to compliance auditing as well as enforcement activities when breaches are apparent.

H. Environmental offset must ensure a long lasting benefit.

- Environmental offsets must be undertaken on the understanding that the activities and outcomes must be long-term. The probability of success (or otherwise) is an important consideration in the choice of offsets. Offset projects should demonstrate security of purpose, security of tenure and security of management. The costs of enduring management and maintenance form part of the offset and should be factored in. Where it is proposed to transfer enduring management responsibility from the proponent to another party or parties, agreed completion criteria may be relevant.
 - When relevant to ecosystems, the offset site should be legally protected with covenants or conservation agreements or transferred into the conservation estate to ensure that the positive environmental benefit is long lasting. Legal agreements may be required in some instances to identify responsibilities and to ensure the on-going management and maintenance of the offset site over an ecologically meaningful timeframe (perhaps decades).

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- When relevant to emissions, the offset activity should last for *at least* the duration of the emissions or environmental impact (whichever occurs for the longer duration). Legal agreements may be required to secure on-going management and maintenance over this timeframe.
 - Where environmental improvements are purchased from a ‘bank’, credit trading scheme, or contributions made to an appropriate trust fund, it must be clearly demonstrated that the organization responsible for undertaking the environmental improvement activity is also demonstrating security of tenure and management.

4. SCOPE

The scope of this Position Statement applies to all environmental issues, matters and advice for which the EPA has jurisdiction (recognising that some government agencies have responsibilities which involve offsets for activities on which the EPA does not provide advice)

Ecosystems and Emissions

This Position Statement is relevant to all new proposals for significant adverse impacts to ecosystems and for emissions to the environment.

The EPA on the advice of relevant government agencies will determine whether adverse residual impacts are significant or not. (Residue impacts are those which cannot be avoided, minimised, rectified or reduced such that they be no longer significant.)

The EPA encourages industry, developers, consultants, specialist scientists and community groups to consider options for environmental offsets in the early phases of a proposed project and, where reasonable and practicable, in consultation with the wider community.

Critical Assets

‘Critical assets’ represent the most important environmental assets in the State that must be fully protected and conserved for:

- the State to fulfill its statutory and policy requirements;
- the State to remain sustainable in the longer term; and,
- the EPA to comply with its general principles for advice and decision making (see Section 3 on Principles).

Therefore, when the issue is before the EPA, there is a presumption against recommending approval for proposals that are likely to have significant adverse impacts to ‘critical assets’. The EPA does not consider it appropriate to validate or endorse the use of environmental offsets where projects are predicted to have significant adverse impacts to the following:

i) Public Conservation Reserve System

- Nature reserves, national parks, conservation parks, regional parks, marine parks, marine nature reserves and marine management areas.
[Established in accordance with Conservation and Land Management Act 1984 and Land Administration Act 1997 and having regard for policies such as ‘New Horizons’.]

ii) Native Vegetation

- Where adverse impacts to native vegetation are seriously at variance to the principles to protect native vegetation listed under Schedule 5 of the *Environmental Protection Act 1986* or associated Regulations where:
 - “a) It comprises a high level of biological diversity;
 - b) It comprises the whole or part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia;

- c) It includes, or is necessary for the continued existence of, rare flora;
- d) It comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community;
- e) It is significant as a remnant of native vegetation in an area that has been extensively cleared;
- f) It is growing in, or in association with, an environment associated with a watercourse or wetland;
- g) The clearing of the vegetation is likely to cause appreciable land degradation;
- h) The clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area;
- i) The clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water;
- j) The clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.”

(note: native vegetation includes marine habitats. Also, permitting processes for vegetation clearing on a merits basis are managed by the Department of Environment under Part V Division 2 of the Environmental Protection Act 1986. ss.51H(1) and 51I(2)(b) provides for specific powers to address offsets.)

- Where adverse impacts to a native terrestrial vegetation complex would result in a 30% or less representation of the pre-clearing extent of that vegetation complex in a bioregion (noting however that this threshold has been exceeded in some areas).
[*National Objectives and Targets for Biodiversity Conservation 2001-2005, EPA Position Statement 2*]
- Where adverse impacts to a native vegetation complex in constrained areas (i.e. areas of urban development in cities and major towns) on the Swan Coastal Plain would result in a 10% or less representation of the pre-clearing extent of that native vegetation complex.
[*for example Bush Forever 2000; Greater Bunbury Region Scheme, Peel Region Scheme*]
- Bush Forever reserves (not including those areas subject to negotiated planning solutions or complementary mechanisms and for which agreement has been reached that such areas fall outside the conservation requirements) having regard for the Western Australian Planning Commission’s Statement of Planning Policy No. 2.8 ‘Bushland Policy for the Perth Metropolitan Region (Draft)’.
[*Bush Forever 2000*]

iii) **Biodiversity**

- Declared Rare Flora (DRF) - that significantly impacts local populations.
[*listed pursuant to Wildlife Conservation Act 1950*]
- Declared Threatened Fauna - that significantly impacts local populations.
[*listed pursuant to Wildlife Conservation Act 1950*]
- Having regard for Threatened Ecological Communities (TEC) - which fits in any of the following categories: presumed totally destroyed, critically endangered, endangered, vulnerable or data deficient (where it would not be unreasonable to assume the TEC would fit into one of the other listed categories).

[as defined by English and Blyth, 1999, and identified by Department of Conservation and Land Management or approved pursuant to the Commonwealth Environment Protection and Biodiversity Conservation Act 1999]

- Having regard for the Priority Species List prepared by the Department of Conservation and Land Management.
[as identified by Department of Conservation and Land Management]

[in accordance with Environmental Protection Act 1986, Conservation and Land Management Act 1984, and with EPA Position Statements 2 and 3]

iv) Wetlands

- Ramsar Wetlands core conservation areas (as defined in the statement of values for nomination)
- A wetland listed in the 'A Directory of Important Wetlands in Australia', 3rd edition and more recent additions as contained in the Australian Wetlands Database at <http://www.deh.gov.au/water/wetlands/database/index.html>.
[Environment Australia, 2001a]
- Environmental Protection Policy (EPP) wetlands.
- Conservation Category Wetlands (CCW)
Conservation category wetlands not included in an Environmental Protection Policy may be viewed in the context of whether they have a reasonable chance of medium to long term survival of their environmental values although the underlying presumption is that they would normally be considered a critical asset
[as identified by Department of Environment and Department of Conservation and Land Management]

[in accordance with Environmental Protection Act 1986, Conservation and Land Management Act 1984 and with EPA Position Statement 4]

v) Rivers

- Wild and Scenic Rivers.
[as identified under the Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth) and the Department of Environment]

vi) Landscape

- Where an important landscape, natural feature or environmental icon will be irreversibly impacted or destroyed. Such landscape features may be identified through planning instruments, systematic reviews of conservation reserves or the like.
[as accepted by the Environmental Protection Authority]

vii) Environments sensitive to Emissions / Discharges

- In areas where new or an addition to existing emissions present a significant risk to human health or the environment.
- In areas where new or an addition to existing emissions exceed a prescribed environmental or health standard.
- Where emissions contribute to a global environmental problem such as ozone depletion.

[in accordance with Environmental Protection Act 1986, Health Act 1911]

viii) Ecosystems vulnerable to threats

- Where the introduction of a key threatening organism, process or activity threatens, or has potential to threaten, the survival, abundance or evolutionary development of an indigenous species or ecological community as identified for ‘biodiversity critical assets’.

ix) Heritage

- Identified places of State, National or World Heritage significance (where potential impacts could compromise identified values) within the scope of the Environmental Protection Act 1986.
[as identified by the Environment Protection and Biodiversity Conservation Act 1999 (Cwth), Heritage of Western Australia Act, 1990]
- Places of Indigenous Heritage of high importance.
[as provided for by the Aboriginal Heritage Act 1972]

Government decision framework

In some instances, significant adverse impacts to ‘critical assets’ may be approved by State Government Ministers to provide an essential community service (such as electricity, water, gas and transport infrastructure), public benefit, or to allow strategic social or economic development to occur.

Under these circumstances, the EPA’s advice is that approval of any such project of this nature should be made conditional on the:

- Consideration or demonstration (to the maximum extent possible) of on-site impact mitigation; and
- Development and implementation of an acceptable, comprehensive offsets package for significant, residual adverse impacts.

5. IMPLEMENTATION

The purpose, scope and principles outlined in this Position Statement provide overarching guidance and direction on the issue from the EPA's perspective. Government agencies, local authorities, and relevant business and industry groups are encouraged to develop environmental offset policies and implementation guidelines that are consistent with this Position Statement.

WHEN AND HOW SHOULD ENVIRONMENTAL OFFSETS BE APPROVED?

The following are key questions about the application of environmental offsets. They are dealt with in more detail in the companion paper to this Position Statement viz. the EPA's Guidance Statement on Environmental Offsets. (in preparation).

Test 1 – are these proposed new activities, extensions or enhancements to existing activity, or existing activities requiring renewal of State government environmental approvals likely to have significant environmental impacts?

Test 2 – before offsets are considered, are potential environmental impacts demonstrably addressed following the hierarchy:

- avoid
- minimise (limit magnitude)
- rectify (restore, repair)
- reduce (over time) ?

Test 3 – are residual environmental impacts expected to have a significant adverse impact on critical or high value assets?

Test 4 – do residual environmental impacts remain significant but not so significant that the activity is likely to be found environmentally unacceptable (including in a cumulative impacts context)?

Test 5 – can significant residual environmental impacts be offset directly (including 'like for like or better')?

Test 6 – if such impacts cannot be fully or partially offset directly what contributing offsets could be reasonably proposed and implemented?

Test 7 – does the offsets package (direct and contributing) achieve the aspirational goal of 'net environmental benefit'? Are positive offsets ratios relevant?

Test 8 – is the offsets package robust and likely to provide a long-lasting benefit?

Test 9 – have the costs of enduring management and maintenance been included?

Test 10 – is the commitment to an offsets package clearly defined, transparent, implementable, enforceable and auditable?

DECISION-MAKING PROCESS

Figure 2 provides a summary of the decision-making process for using environmental offsets. Key features of the flowchart are outlined as follows.

First triangle: Environmental Assets

The following environmental asset types affect how project proposals and related offset activities are assessed.

- Critical Assets: represent the State's most important environmental assets that must be fully protected and conserved (as defined in Section 4). Significant adverse impacts to these assets should be avoided at all costs. Therefore, the EPA in providing its advice will adopt a presumption against approval of project proposals where significant adverse impacts affect 'critical assets'. However, where projects have been approved by the State Government (see Section 4) approval should be conditional on the:
 - consideration or demonstration (to the maximum extent possible) of on-site impact mitigation; and
 - development and implementation of an acceptable offsets package for significant, residual adverse impacts.

In these special circumstances, the project proponent should develop an environmental offset package using advice from relevant environmental government agencies and applying the principles identified in this Position Statement.

- High Value Assets: represents those environmental assets that are in good to excellent condition, are considered valuable by the community and / or government, but are not identified as 'critical assets'. Project proposals and offset activities for these assets may be referred to and assessed by the EPA on a case-by-case basis, but are otherwise considered by relevant environmental government agencies. EPA's Guidance Statement 33 'Environmental Guidance for Planning and Development' (Draft) (June 2005) is a useful resource when considering the suite of pertinent environmental assets.
- Low to Medium Value Assets: represents those assets that are less than good to excellent condition as recognised by government agencies and / or community. Offset activities do not need to be addressed through EPA's processes but will be dealt with by relevant government agencies. As a guide for plant communities, see Keighery (1994).

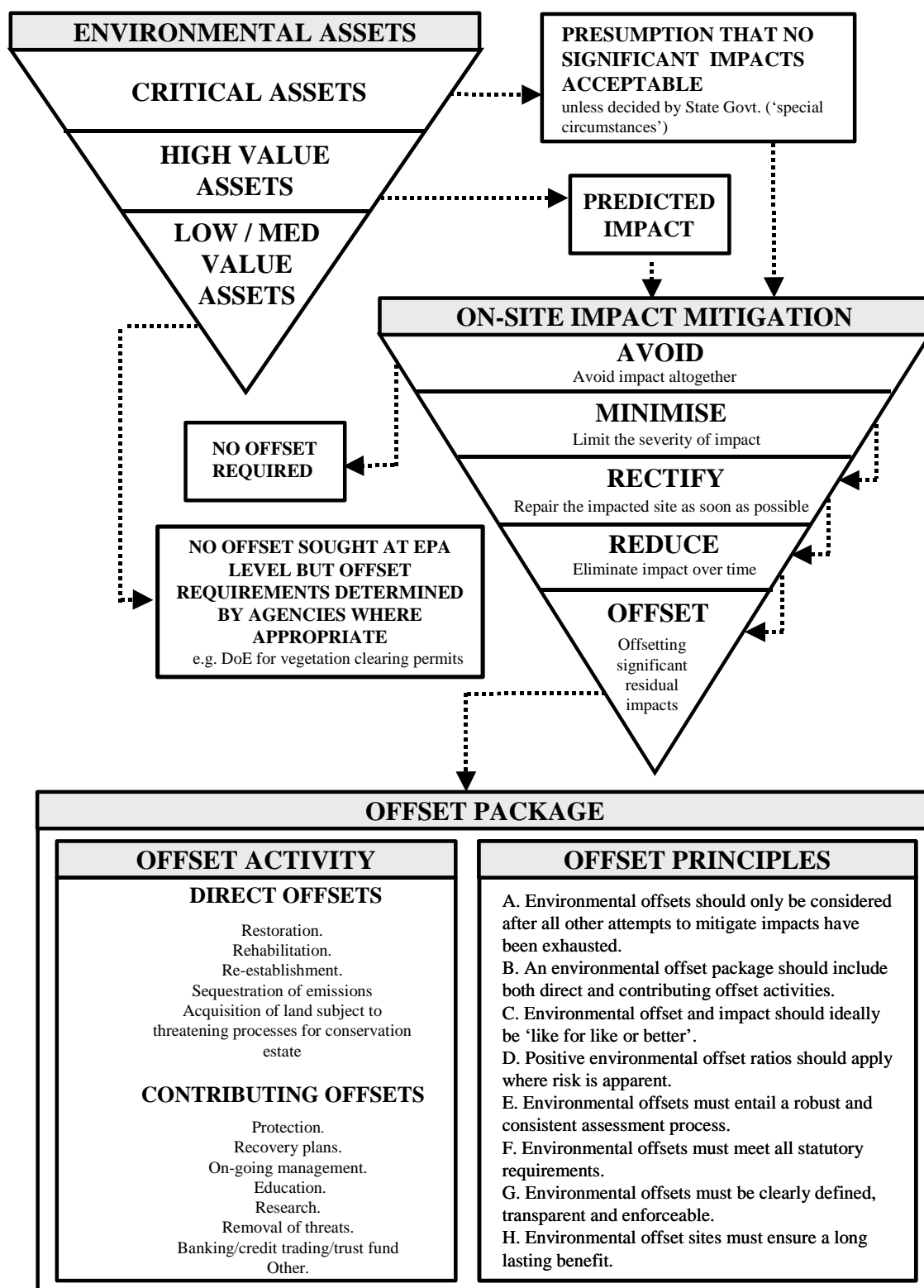


Figure 2: Decision framework for the use of environmental offsets

Second triangle: On-site Impact Mitigation

These five steps represent the sequence of considerations designed to help manage on-site environmental adverse impacts (in order of preference).

- Avoidance: significant adverse impacts to the environment are avoided through selection of a practicable alternative. If *all* environmental impacts are avoided then no offset activities are required.
- Minimisation: if adverse impacts are not avoidable, all appropriate and practicable steps should be taken to minimise adverse impacts.
- Rectification: where adverse impacts can't be minimised, all appropriate and practicable steps should be taken to repair, rehabilitate or restore the impacted site as soon as possible.
- Reduction: where adverse impacts can not be rectified as soon as possible, all appropriate and practicable steps should be taken to reduce or eliminate the impact over time by preservation and maintenance operations during the life of the action and through the philosophy of continuous improvement
- Offsets: where significant residual adverse environmental impacts are still apparent after following the above mitigation sequence, then an environmental offset package may be used to achieve an aspirational 'net environmental benefit' outcome.

Box: Offset Package

An environmental offset package may be considered where adverse residual environmental impacts are significant, but not significant enough to make the project unacceptable.

To achieve a 'net environmental benefit' goal, the environmental offset package should address both direct offsets and contributing offsets.

Various types of offset activities are as follows.

- Direct Offsets: these ameliorative actions would generally occur away from the impact site and are designed to counterbalance the adverse environmental impact, with the aim of achieving no environmental difference (ie. no net loss). As a minimum, one direct offset activity should be considered from the following list of activities:
 - Restoration: has the goal of improving an existing ecosystem to near pre-impact condition. This includes restoring natural or historic functions, appearance and other characteristics. Restoration of existing ecosystems, while recognised as difficult, is a highly desirable offset because it results in a more fully functioning ecosystem. It is also more likely to succeed given existing hydrology and soils are conducive to maintenance of ecosystem functions. Restoration is time dependent.

- Rehabilitation: has the goal of improving and re-instating some of the functions of an existing high value asset (where appropriate, a critical asset), but impacted, ecosystem. Examples may include increasing native vegetation, enhancing habitat value, weed or feral fauna eradication, and/or establishing buffers. Rehabilitation of an existing ecosystem to produce an environmental benefit must outweigh the loss of the impacted ecosystem. When used as a sole direct offset activity, it may require the enhancement of several ecosystems or a much larger area than that lost from the impact. Rehabilitation is time dependent. Rehabilitation (and re-establishment) extends to recovery plans for directly affected species.
- Re-establishment: has the goal of re-establishing a functioning ecosystem with strategic environmental benefit. While restoration and enhancement of existing ecosystems is preferred, re-establishment may be beneficial in some instances. For example, forming a biodiversity corridor between two important ecosystems, or re-establishing ecosystems in areas of low representation. Re-establishment too is time dependent.
- Sequestration: specific to offsetting pollutant emissions, it has the goal of permanently removing or ‘locking up’ pollutants in the environment. This may be linked to activities associated with restoration, rehabilitation or re-establishment, or the use of banking or credit trading mechanisms, deep well injection and capping, soil amendment, or using other sequestration methods
- Acquiring Land for conservation: consists of purchasing the offset and transferring the land title into the conservation estate. Alternatively, establishing covenants with an approved organisation or establishing legal tenure agreements are other related activities. Land acquisition for conservation is considered a direct offset for the purposes of this Position statement if the land is subject to threatening processes because it has proven to be an important and valuable contributing offset measure by offering security of tenure, purpose and management in perpetuity

In some situations where adverse impacts to low, medium or high value environmental assets occurs, the environmental benefits of acquiring a ‘critical asset’ for conservation may greatly outweigh the overall environmental loss - in which case conservation through a combination of land acquisition, protection and on-going management may be considered a viable offsets package. It must be noted that this exception does *not* extend to adverse impacts to ‘critical assets’ (i.e. adverse impacts to one ‘critical asset’ should not be offset by conservation of another ‘critical asset’).

- Contributing Offsets: Contributing offset activities should be selected as necessary to meet the principles of this Position Statement. These activities may include:

- Protection: protecting the environment from threats or harm is achieved by using barriers or buffers, thereby reducing the risk of damage to, or pollution of, the offset site. For example fencing of valuable ecosystems.
- Removal of threats: undertaking initiatives that remove a threat(s) from the direct offset site thereby preventing it from being potentially damaged in the future. Examples might include eradication of feral animals, or exotic flora, removing pollutants, removing livestock, controlling the spread of diseases such as ‘dieback’, etc.
- Management: management of ecosystems is achieved by undertaking day-to-day activities that benefit the direct offset site. For example contributing to an environmental management plan for critical assets.
- Banking, Credit Trading or Trust Fund: where a proponent is unable to undertake restoration, rehabilitation, re-establishment or sequestration activities, they may consider the use of approved ‘banks’ or ‘credit-trading schemes’ to purchase environmental credits (improvements) to offset their adverse environmental impacts. Alternatively, an appropriate financial amount should be contributed to a statutory trust fund with the sole purpose of being used for a strategic environmental improvement activity. Unless banks, credit trading schemes, and trust funds are already in operation, contributions to these types of schemes will require methodologies to be developed that fully (financially) cost the adverse impacts to environmental assets, values and ecosystem services. These methodologies may take time to develop and will require endorsement by the EPA.
- Education: sustained education of community, business and industry about environmental issues related to the direct offset site or activity, or educating other industries or businesses of best practices to remedy poor environmental practices or behaviours.
- Research: investigating new technologies or innovative ideas to better address environmental issues or improve best practice associated with the direct offset activity. This also includes the necessary investigative work required for environmental assessments of impact and offset sites where current data or information is lacking.
- Other: the EPA encourages the development of innovative approaches aimed at improving environmental outcomes.

HYPOTHETICAL OFFSET CASE EXAMPLES

Example A: Wetland offset package

Despite best attempts to conserve a high value (but not critical asset) wetland, approval is given by Government for it to be lost due to strategic development. The proponent has documented all attempts at on-site impact mitigation, but is unable to mitigate all significant adverse impacts. The developer proposes an offset package which consists of finding a wetland in the local vicinity that has similar wetland attributes, functions and values as the wetland that will be impacted. After an extensive assessment process, working in collaboration with environmental government agencies, a suitable offsite wetland is found. The selected offsite wetland is in good condition; although it is showing some signs of degradation from the invasion of aquatic and terrestrial weeds, the presence of foxes, and the loss of under-storey species from the vegetation. The proposed offset activities include a combination of wetland rehabilitation works (direct offset), and a large cleared area on the wetland boundary will be replanted with local endemic species to provide an additional buffer area (direct offset). The proponent will ensure the removal of weeds and feral fox threats, and allocate funds for on-going long term management including monitoring and evaluation (contributing offsets). The whole wetland area will then be fenced from adjoining recreational space (contributing offset). The land will be purchased and placed into the conservation estate for long-term security (contributing offset). The developers will erect signage at the offset site and post quarterly updates and photos of their offset wetland's progress on their Internet site to show the community the progress of their offset wetland (contributing offset). The combination of the proponent's direct and contributing offset activities will contribute to a 'net environmental benefit' outcome.

Example B: Nutrient offset package

A large horticultural business wishes to expand operations and potentially increase nutrient waste discharge emissions to the nearby creek. Despite the company consistently demonstrating the use of best practice/technology, they are unable to mitigate any further discharges without a huge additional cost. The company proposes a nutrient offset package. After a robust assessment, with guidance from relevant authorities, an appropriate number of nitrogen (N), phosphorus (P) and carbon (C) units are calculated. The company agrees to offset these units by the purchasing and covenanting of a mature, re-established bushland area in the catchment (contributing offset) from an environmental credit-trading company (doing this meets the C, N and P offset requirements and has a bonus ecosystem offset). In addition, the company also commits to undertaking a collaborative research project with a local university looking at innovative ways for the business to further reduce their nutrient waste emissions (contributing offset), as well as options for removing nutrient emissions to the water body from other sources (e.g. intensive animal husbandry) (direct offset if implemented). The results of the research would be made publicly available on completion of the project. The combination of the proponent's offset activities will contribute to a 'net environmental benefit' outcome.

Although these hypothetical case examples do not provide quantitative details that will be necessary to develop an actual offset activity, the examples still provide an indication of how environmental offsets can be developed to meet the requirements of this Position Statement.

POLICY APPROACHES FOR IMPLEMENTATION

The EPA recognises that, for this environmental offsets approach to be implemented successfully, it must work in partnership with, and have the support of, government agencies. The EPA will use Part II, Section 17(3)(d) of the EP Act (1986) to implement the environmental offsets approach as outlined in this Position Statement. This part of the Act empowers the EPA to develop policy positions on particular aspects of the environment as follows:

s.17(3) ...the Authority, if it considers it appropriate or is requested to do so by the Minister, may -

(d) consider and make proposals as to the policy to be followed in the State with regard to environmental matters.

This tool would allow a state-wide environmental policy to be developed for environmental offsets. The EPA would develop the first stages of this policy as advice to the Minister for the Environment. State Government could then consider adopting the policy as whole-of-government policy. Such policies can provide definitive, whole-of-Government direction to government agencies, industry and community within existing statutory and regulatory frameworks. This is advantageous for dealing with major environmental issues that cross regional, sectoral and jurisdictional boundaries, as commonly occurs with issues associated with environmental offsets. It would be useful for State Government to adopt such a policy approach to ensure a consistent and unified system towards addressing environmental offsets.

It may be necessary to establish a repository of offset commitments to avoid double counting and to provide the basis of auditing success and compliance

The EPA sees that the responsibility for putting forward an offsets package and committing to and funding its implementation rests with the proponent of activities which could have a significant effect on the environment. The offsets package, in the context of a proponent seeking an approval from State government, is a tool to assist in the prevention, control and abatement of pollution and environmental harm and for the conservation, preservation, protection, enhancement and management of the environment. The EPA will take account of any offsets package put forward by proponents in advising Government on the environmental acceptability or otherwise of such activities.

6. GLOSSARY

Banking: banking, in an environmental context, refers to a system whereby credits are generated for undertaking environmental improvements (such as sequestration, restoration, rehabilitation and re-establishment activities). The credits can be later withdrawn (purchased) from the 'bank' to offset authorized adverse environmental impacts. The bank provides a centralized, cumulative record of credits (environmental improvements) and debits (adverse environmental impacts) within a standardized accounting framework and a goal of ensuring a neutral or positive balance as well as an audit function

Biodiversity: the variety of life forms, the different plants, animals and micro-organisms, the genes they contain and the ecosystems they form. Biodiversity, or biological diversity, is usually considered at three levels: genetic diversity, species diversity and ecosystem diversity (Commonwealth of Australia, 1996).

Bioregion: represents an area with common ecological characteristics, including climate, geomorphology, landforms, lithology and characteristic flora and fauna.

Conservation: the positive, embracing, preservation, maintenance, sustainable utilisation, restoration and enhancement of the natural environment.

Covenant: is a voluntary, flexible agreement between a landholder and a recognised body to protect natural assets. It is attached to the landholder's land title and, if permanent, can prevent future owners from clearing or damaging natural assets on that land.

Credit trading: a market-based process of buying and selling credits (environmental improvements) and debits (environmental impacts).

Critical assets: represents the most important environmental assets in the State that must be fully protected and conserved for the State to meet its statutory requirements and to remain sustainable in the longer term.

Ecosystem: a defined community of organisms, their interactions, and their physical surroundings.

Environmental impact: represents an effect on the environment that leads to changes in its condition. Depending on the nature of the activity causing the impact, it may have either beneficial or adverse environmental outcomes.

Environmental harm: means direct or indirect harm resulting from the removal or damage to native flora or fauna, habitat, or environmental values. (see *Environmental Protection Act 1986*)

Environmental offset: (Synonyms: 'trade-offs', 'set-off', 'counterbalance')

Environmental offsets are commonly referred to environmentally beneficial activities undertaken to counterbalance an adverse environmental impact, aspiring to achieve 'no net environmental loss' or a 'net environmental benefit' outcome. This Position Statement discusses offsets in terms of:

Direct Offsets

A direct environmental offset is any environmentally beneficial activity undertaken to counterbalance an adverse environmental impact or harm, with the goal of achieving 'no net loss' and preferably a 'net environmental benefit'. Examples may include ameliorative actions including ecosystem restoration, rehabilitation or re-establishment activities or pollutant sequestration.

Contributing Offsets

A contributing environmental offset is any environmentally beneficial activity undertaken to complement and enhance the direct offset activity. Contributing offset activities do *not* assist in a 'no net loss' outcome, but instead add materially to environmental knowledge, research, management, protection, etc. It may also extend to forms of banking, credit trading and use of trust funds (where established) where adverse impacts can be offset through the purchase of environmental improvements elsewhere.

The terms 'direct' and 'contributing' reflect a sequence of approach, rather than a ranking of importance.

Environmental value: are particular values or uses of the environment that are important for a healthy ecosystem or for public benefit, welfare, safety or health and which requires protection from the effects of pollution and harm. (ANZECC and ARMCANZ, 2000; see *Environmental Protection Act 1986*).

Incentives: something that induces or encourages people to act on a particular matter.

Intergenerational equity: the principle that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations (Commonwealth of Australia, 1992).

Mitigation: Mitigation, in an environmental context, refers to a sequence of considerations designed to help manage adverse environmental impacts, which includes (in order of preference):

1. Avoidance – avoiding the adverse environmental impact all together;
2. Minimisation – limiting the degree or magnitude of the adverse impact;
3. Rectification – repairing, rehabilitating or restoring the impacted site as soon as possible;
4. Reduction – gradually eliminating the adverse impact over time by preservation and maintenance operations during the life of the action.; and,
5. Offsets – undertaking such activities that counterbalance an adverse, residual environmental impact.

Adapted from EPA (2001a). A similar approach is used by US EPA (1990).

'No net loss' concept : (Synonyms: 'zero net impact', 'no net difference')

The 'no net loss' concept aims to ensure that environmental loss is balanced by an environmental gain, so that there is no overall significant environmental difference. It

refers to no overall loss of the total extent, quality, ecological integrity and security of environmental assets and their values.

‘Net benefit’ concept: (Synonyms: ‘net gain’, ‘net improvement’)

The ‘net benefit’ concept aims to ensure more environmental gains occur compared to environmental losses. It refers to an overall improvement in the total extent, quality, ecological integrity and security of environmental assets and their values. The concept is subject to cumulative gains and losses within a specific area, region or project.

Offsets: see environmental offsets

Precautionary principle: where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:

- i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and
- ii) an assessment of the risk-weighted consequences of various options.

(s.4A, Environmental Protection Act 1986)

Sustainability: is meeting the needs of current and future generations through an integration of environmental protection, social advancement and economic prosperity. (Government of Western Australia, 2003)

Wetland banking: see ‘banking’.

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SUCCESS DECLARED IN WORLD'S BIGGEST HABITAT RELOCATION

Smiling after the earth moved

JULIE HARE
HIGHER EDUCATION EDITOR

THIRTEEN years, 15ha, \$6 million and untold meetings later, Alison Shapcott can finally put hand on heart and say it worked.

The large patch of bush that was painstakingly dug up one 4m block by 4m block — 30,000 of them — and moved to an old sugarcane site on the University of Sunshine Coast 5km away has been deemed a success.

The vegetation is lush, rare frog and reptile species have established populations, birds are nesting and mammals, including kangaroos, defy early attempts to keep them out.

Shapcott, a USC plant ecologist who oversaw the operation, says it is testament to careful planning, step-by-step performance criteria for individual species and a three-way partnership between developer, university and local council.

"We worked together, every step of the way," she says.

The project is thought to be the biggest habitat translocation in the world and is certainly one of the most successful, largely because of an innovative idea to dig deep enough to pick up the entire root system. Civil contractors devised a creative solution to the puzzle of moving vegetation, and frog and reptile species, says Marc Wilkinson, state manager for planning and design with property developer Stockland, which has built a housing estate on the original site.

Purpose-made shovels took half a metre of soil so as not to interfere with root systems, then sliced 4m by 4m squares, loaded them on to low flatbed trucks and drove them to the new site. Each was then placed on bare earth and left to re-establish itself. Five years on, the habitat has not just bounced back but thrived. "The irony is



TERRY WALSH

Moving a natural habitat successfully is no mean feat, as Alison Shapcott and her team discovered when they moved 15ha

the vegetation is now so lush, the researchers intend to burn parcels of it to mimic normal fire seasons," Wilkinson says.

The habitat, which had been on an island stranded between busy roads, now abutts the Mooloolah River National Park. It's become a

living laboratory with PhD and honours students undertaking research into rare plant species.

"Everyone was very nervous through the whole translocation," Shapcott says. "We had a range of back-up plans to manually replace any species that didn't survive the

journey, but we haven't needed them."

Wilkinson says the project offered Stockland the opportunity to interact with university researchers, mixing their practical ideas with theory and groundbreaking ideas to great success.

The developers are seeking to emulate the experience elsewhere.

"When you do a big project like this, you think it's going to end at some point," Shapcott says.

"But now it's handed back to the university it just keeps going. It's a wonderful resource."

Vagaries of student demand lead to 'mediocrity' in research

Local universities lack research clout because



Fear of 'optional' AQF

DOCTORATES requiring no research, a six-month masters and universities conferring degrees with misleading titles as they compete for market share.

This could be the result if the Australian Qualification Frame-

universities, which argued that self-accrediting institutions had to be free to innovate within their course offerings.

And the University of Melbourne led a campaign to have graduate-entry masters pro-

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Amongst many other key areas of excellence, Victoria University draws on the distinctive nature of Wellington as the seat of government and the creative centre of New Zealand. The new Vice-Chancellor will be responsible for developing, clearly communicating and implementing an inspiring vision and direction for the University. The successful candidate will also have an innovative and entrepreneurial approach, sound political acumen, a passion for excellence and a collegial style, combined with the energy and resilience for this demanding role.

As Victoria University is a world leader in a number of areas of scholarship and research, the new Vice-Chancellor will have a deep understanding of tertiary education and of the context of the sector in New Zealand. This will combine with a genuine commitment to the mission and values of Victoria, including its responsibilities under the Treaty of Waitangi.

A visionary, bold in their thinking and insight, the ideal candidate will have a clear understanding of the nature and challenges of leading a complex, multi-disciplinary organisation with motivated academic and general staff. They will have strong business and financial acumen, with the ability to lead and encourage creative responses in a constrained economic environment and to