

Biodiversity Offsetting



Given growing recognition of the importance of biodiversity, all sectors are looking for ways to mitigate the environmental costs of development activity. Biodiversity offsetting refers to market-based schemes designed to compensate for losses of biodiversity due to development projects. This POSTnote summarises biodiversity offsetting and examines opportunities and risks of offsets within a UK context.

Biodiversity

Biodiversity is the genetic diversity within species, species diversity within ecosystems, and ecosystem diversity across landscapes. It supports ecosystem functions vital for human well-being, such as agricultural crops, timber, medicinal plants and industrial raw materials. Furthermore, the services provided by healthy ecosystems indirectly benefit humans by, for example, purifying air and water, regulating climate, generating atmospheric oxygen and providing recreational opportunities (POSTnote 281).

Human Activity and Biodiversity Loss

Species are currently being lost up to 10,000 times faster than the natural rate of extinction. The major cause of this relatively recent trend is the alteration, fragmentation and destruction of habitats caused by human activities, including agriculture, forestry, transport, industry and housing.¹ The annual economic cost of global biodiversity and ecosystem degradation is currently estimated to be £1.28-2.88 trillion, or around 7.5% of global GDP, and is likely to remain at that level through 2050 unless appropriate action is taken.²

Tackling Biodiversity Loss

Historically, biodiversity loss has been addressed mainly through multilateral conservation agreements as well as domestic protected area legislation (Box 1). Though widely

Overview

- Biodiversity offsetting is a market-based conservation tool that measures negative impacts on biodiversity, replacing the loss through improvements usually nearby.
- Offsets aim to compensate for residual biodiversity loss incurred by development projects by maintaining an equivalent amount of biodiversity elsewhere that would otherwise be lost, or by enhancing biodiversity at an alternate location.
- Several countries currently implement offset law and policy with different levels of regulation and varying success.
- Offsets aim to achieve 'no net loss' or a 'net gain' of biodiversity.
- Offsetting remains largely undervalued, especially with regard to undervalued or as yet unknown biodiversity.

recognised, this strategy has proved unable to stop the persistent and widespread loss and degradation of biodiversity in almost all regions. Participants to the recent intergovernmental meeting of the 193 parties at the Convention on Biological Diversity in Nagoya, Japan, agreed on several measures to reduce the rate of loss of biodiversity by 2020.³ Key to the success of future conservation efforts is recognition of the social and economic values of biodiversity by decision makers - including its contribution to trade, economic activity, food security and poverty reduction - as well as its role in providing fundamental ecosystem services.

Box 1. Protected Areas in the UK

Multiple legislative layers aim to protect biodiversity from being destroyed by development. The highest level of protection in the UK is the EU's Natura 2000 framework, limiting damage to biodiversity within Special Protection Areas (SPAs) and Special Areas of Conservation (SACs). Development in the UK is also restricted at thousands of additional sites including Sites of Special Scientific Interest (SSSIs in England, Scotland, Wales) and Areas of Special Scientific Interest (ASSIs in Northern Ireland). Most of these protected sites were designated before awareness of the major environmental perturbations resulting from climate change, making it a priority to factor in such uncertainties in future protected areas policy (POSTnote 341). Enhancing opportunities for species populations to disperse and adapt to changing conditions requires not only efforts to create buffers, increase the size, condition and connectivity of protected areas, but also the creation landscapes which are more 'permeable' to the dispersal or movement of species (POSTnote 300).

Wider Biodiversity

Limitations to scientific knowledge have led to a selection process whereby most protected areas are primarily based on charismatic species and habitats. The current system of protected areas alone is inadequate in conserving these, and, in addition, data are lacking on the status and trends of habitats, ecosystems and less easily observable species, such as some invertebrate and lower plant groups and microbial communities. However, all natural ecosystems depend on these more common, less charismatic, species to maintain their processes and structures.⁴

What is Biodiversity Offsetting?

Given the growing recognition of the importance of biodiversity to vital ecosystem functions and services that support all aspects of human social and economic development, all sectors are looking for ways to compensate for the environmental costs of human activity. Biodiversity offsets have been proposed as a cost-effective means for sharing this burden.

Biodiversity Markets

Biodiversity markets are being increasingly employed as a means of incorporating the cost of nature conservation into development activities. The basic premise is that, through market-based instruments, the positive and negative impacts on biodiversity can be measured and represented as credits and debits. Thus quantified, they are more easily integrated through cost-benefit analysis into economic decision-making (Box 2).⁵

Box 2. Potential Benefits of Biodiversity Offsetting

Commentators agree that offsetting schemes could potentially benefit conservation but only if they are implemented within an appropriate regulatory framework. Potential benefits include:

- improved clarity for developers
- removal of developer's long-term liability for damage to biodiversity, taken on by a third party organisation (habitat banking)
- places value on nature, introducing incentives for conservation
- increased reliability of long-term conservation projects
- flexibility to 'trade up' and create larger conservation networks
- improved conservation awareness amongst developers
- diversified income streams for landowners
- strengthened conservation partnerships
- enhanced public support for conservation.

Wider Context of the "Mitigation Hierarchy"

The "Mitigation Hierarchy" (Figure 1) is a systematic approach to addressing environmental impact and its potential compensation. This is a stepwise approach first seeking to avoid impacts, then to minimise them, then take on-site measures to rehabilitate or restore biodiversity, before finally offsetting residual, unavoidable impacts. Biodiversity offsets should be considered only for the residual impacts that remain. In implementation of offsets, the minimum objective should be no net loss.

Offsetting Principles

Many countries have enacted laws or introduced policies requiring biodiversity offsets or compensation for certain kinds of impacts. Many are market instruments designed to ensure that development projects result in no net loss of

biodiversity. Though there are many forms of compensation, best practice biodiversity offsets adhere to internationally recognised principles (Box 3).

Box 3. Principles of Biodiversity Offsetting

The Business and Biodiversity Offsets Programme (BBOP),⁶ a partnership between companies, governments, financial institutions and conservation experts, sets out principles underpinning successful offsets. These are important because badly planned offsets could result in a loss of biodiversity by allowing inappropriate development to proceed, or by compensating inadequately.

Offsets should:

- be designed and implemented to result in **no net loss**, or preferably gain, of biodiversity
- achieve **additional** conservation outcomes above and beyond results that would have occurred anyway
- be used only **after** impacts have been avoided, minimised and biodiversity restored on-site
- recognise **limits** to what can be offset (highly irreplaceable or vulnerable biodiversity is hard or impossible to offset)
- be implemented in a **landscape context**, taking into account biological, social, and cultural values
- **involve stakeholders** effectively in design and implementation;
- be designed and implemented in an **equitable** manner
- planned to secure outcomes that last at least as long as the development project's impacts, and preferably in **perpetuity**
- be undertaken in a **transparent** and timely manner, with results communicated to the public
- document the appropriate use of **scientific methodology** and traditional knowledge in offset design.

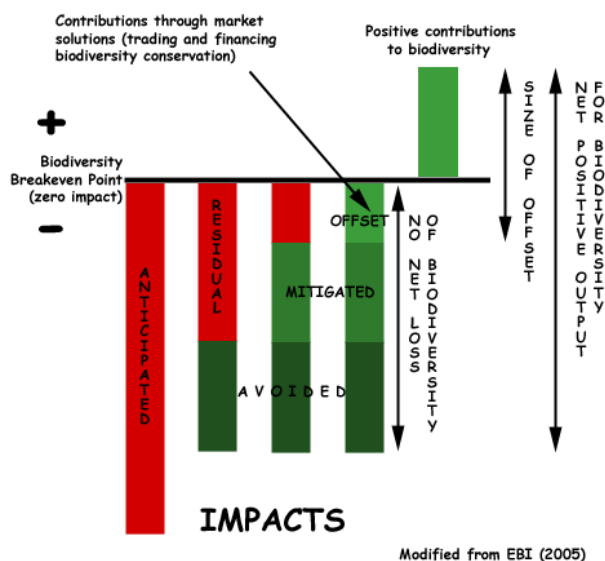


Figure 1. The "Mitigation Hierarchy"

Types of Offsets

The generalised offsetting process involves buyers, sellers, and, in the case of habitat banking, third-party intermediaries.⁷ The buyers are developers requiring land for agriculture, industry, housing or other development projects, whereas the sellers are suppliers of the land to be used as an offset for the property to be developed. A range of third-party organisations, including local government, NGOs, insurers, brokers, traders and technical experts, may facilitate interactions between these two parties. Biodiversity offsetting can be executed in three principal ways:

- The **developer** or its partners (such as an NGO) implement the offset
- The developer pays the **government** the amount needed to implement the offset 'in lieu' of implementation itself
- The developer buys '**credits**' from a landowner or conservation bank sufficient to offset its impacts.

The opportunity to aggregate credits into larger, connected offset areas could be beneficial in the establishment of Ecological Restoration Zones, as recommended in the Lawton Review,⁸ which, by their nature, need to be extensive in order to deliver ecological functions and services.

Box 4. Biodiversity Offsetting Case Studies

United States: In the US, biodiversity offsetting was initially incorporated into compensatory mitigation laws for wetlands in the United States in the 1970s but market-based schemes, relying on a habitat 'bank' to secure the offset, are now used for a wide range of habitats and individual threatened species. Today, the global annual market size in the US is estimated at minimum £1.15-1.86 billion.⁹ The US offsetting strategy is divided into Wetlands and Endangered Species programmes. Wetland or conservation banks may be privately or publicly owned and feature a bank operator allowed to sell habitat or species credits to developers who need to satisfy legal offsetting requirements for compensation.¹⁰ Schemes are controlled by federal policy but implemented regionally in 38 districts of the US Army Corps of Engineers and by offices of the US Fish and Wildlife Services and National Marine Fisheries Service. The system allows buyers and sellers of credits to find each other and agree prices reflecting the cost of land and offset activities. It stimulates third party investment in offset creation as well as standardised units of trading. The market has arisen through strong policy drivers, enforcement, detailed regulation and even an industry association that holds annual conferences (The National Mitigation Banking Association).

Australia: In Australia, offsetting frameworks are encouraged at the federal level under the Environmental Protection and Biodiversity Conservation Act 1999, and reinforced by planning and conservation laws in a number of States and Territories. In 2002, the Victorian government introduced BushBroker®, a system to establish, register and trade native vegetation credits. Under this framework, landowners register their interest in being credit providers. Developers subsequently approach BushBroker® when they need to find an offset. BushBroker® registers all transactions and creates the initial credits by recruiting landowners and conservation bank investors on payment agreement- or land surrender-schemes. In the State of Victoria,¹¹ there is no explicit legislation for habitat banking but offsets are a legal requirement to protect native vegetation¹² as a prerequisite of planning approval. In New South Wales,¹³ a 'biobanking' scheme is regulated by the Department of Environment and Conservation (DEC), allowing developers to voluntarily buy credits to offset the adverse ecological impacts of their development as an alternative to existing threatened species approval schemes.

Operation of Offset Schemes

Existing offset schemes differ according to how they are regulated. However, successful existing strategies, notably in the United States and Australia (Box 4), generally involve an impartial oversight body as well as the various operational actors. Most experts agree that the oversight body is a vital element within the offsetting strategy mechanism.

Offset Size and Quality

In countries where offsetting strategies have been most successful, an important task of the oversight body is to

monitor the size and quality of offsets (credits), making sure they are calculated properly so that offset sites are ecologically similar and deliver an amount of biodiversity adequate to offset the impacts. Regulators also facilitate the transparent calculation of offset needs (debts), so developers know how many credits, of which type, they need. Sellers calculate the cost of their credits by estimating the cost of any land purchase or lease needed, habitat creation/restoration, long-term habitat management, compensation procedures, administrative or transaction costs and returns on investment.

Measuring Success

Assessment of the overall success of implemented schemes would involve making sure the execution and consequences of an offset adhere to offsetting principles, deemed as such by an independent scientific body. These outcomes are more difficult to measure at the level of the individual species. With habitats, measures of success may involve vegetation surveys or comparisons of community structure, species diversity or species richness.

Concerns

Biodiversity offsets are controversial. Critics argue that market-based schemes are not effective conservation strategies. Moreover, it is argued, they can even be counterproductive if implemented hastily or in the absence of a proper legislative and regulatory framework. Other concerns include:

- **Perverse incentives** - lowering the threshold of acceptance of conservation outcomes could inadvertently give developers a 'licence to trash'
- **Additionality** - hard to show that 'maintenance' offsets result in outcomes that wouldn't otherwise happen
- **Leakage** - if not chosen properly, offsets could simply displace impacts that would have happened anyway, for example, if you create a protected area to offset the impacts of a mine, those who were previously harming biodiversity in the area (e.g. illegal timber/poaching) move to another location and have the same impact there
- **Restoration difficulties** - some habitats, like grasslands and heathlands, can be difficult to restore in terms of the time and technical skills required, others, such as ancient woodland, are impossible to recreate within human timescales
- **Definition and valuation of biodiversity** - unlike carbon credits, biodiversity measurements cannot easily be based on a single, quantifiable unit. Defining and quantifying biodiversity losses and gains always involves a subjective element, as at present, measuring every component of biodiversity is not achievable and knowledge of biodiversity is incomplete (e.g. at the microbial and genetic level). Other crucial issues may also be overlooked, such as the effects of habitat fragmentation on dispersal, ecosystem function, and the loss of genetic diversity, as well as social views on the definition and value of biodiversity

- **Species recovery lag-time** - long recovery times of some species may not be achieved within the timeframe of the offset and losses may therefore be irreversible
- **Defining 'enhancement'** - the upkeep of the offset site may include actions that could alter the landscape, compromising long-term viability of other species, so enhancement goals should take into account the health of entire ecosystems
- **Difficulties with management and compliance** - proper enforcement is vital. Experience shows that early offsetting schemes abroad suffered from low rates of compliance, despite agreed conditions by key parties. However, in the US the introduction of new performance standards, allowing for fewer alternative ways to implement offsets, have improved enforcement
- **Equity** - offsetting too far from development sites would mean local communities could lose cultural values associated with the biodiversity, access to green spaces and other ecosystem services.

Policy on Offsetting

Several countries in the EU practise a form of offsetting (Box 5). In England, the Lawton Review highlighted the potential importance of offsets in enhancing and preserving coherent, resilient, ecological networks (POSTnote 300). Offsets also featured in the Conservative Party's 2010 Election Manifesto. Proponents argue that measuring the impact of development on nature, and encouraging developers to take responsibility for their footprint, may be the only way to address biodiversity degradation.¹⁴

Box 5. Offsetting and the European Union

The EU has specific requirements for ecological compensation under the Birds¹⁵ and Habitats¹⁶ Directives, in cases where the integrity of the Natura 2000 network might be compromised. Member States vary in the extent to which they have developed specific laws requiring offsets. Germany has had a system of ecological compensation called the *Eingriffsregelung*, in place since 1976, a framework that is broadly applied to entire ecosystems, their capacity and the resulting natural scenery. The broad coverage of this legislation means it is particularly difficult to evaluate whether offsets are of appropriate quality vis-à-vis conservation goals. In Sweden and France, some offsets are already in place and others are being considered, though these are implemented at the local level.

Regulation

It is vital that offsets are appropriately determined based on predicted losses of biodiversity, requiring rigorous methodology to determine what trade-offs are appropriate or allowable. Furthermore, there must be a strong assurance about delivery, likely requiring an accountability mechanism and funds set aside in every offset transaction to support monitoring and auditing. Most relevant parties in the UK agree that implementing offsets solely on a voluntary basis would not generate enough interest to establish a viable biodiversity market and would lack the rigour necessary to produce the desired 'no net loss' outcome.

Role of Government

Given the necessity of an impartial referee within the offsetting process, one of the main concerns of stakeholders

is the role of government within prospective offsetting frameworks. Local Authority representatives, NGOs or the appropriate government conservation agency (Natural England, Scottish National Heritage, Countryside Council for Wales, Northern Ireland Environment Agency) could potentially carry out regulatory duties. However, the degree of government involvement could vary, but may include the establishment of a general offsetting policy framework, collection and publication of information about biodiversity, setting technical standards, establishment of a framework for long-term ecological monitoring or provision of incentives for developers to adhere to policies.

Introduction of Pilot Schemes

In the UK, offsetting schemes are currently only applied on a site-by-site basis, including as part of a pilot study currently underway at the Thames headwaters. Though details of loss/gain calculations and potential delivery mechanisms have yet to be decided, at least one habitat banking organisation is in place¹⁷ and possible strategies of offset quantification have been published.¹⁸ This is in line with the Lawton Review, which concluded that if a formal offsetting system is to be introduced in the UK, "pilot schemes should be first established to test and refine its operation, to ensure it meets the conditions set out for a safe and effective system."¹⁹

Wider Concerns

Understanding offsetting within the wider context of the mitigation hierarchy, it is clear that avoidance and minimisation need to be given attention equal to that given to compensation or offsetting. Maintaining healthy, viable ecosystems over the long term contributes to human intergenerational well-being. To this end, biodiversity conservation needs to have a large-scale strategic vision, within which biodiversity markets, including carefully constructed and well-managed biodiversity offsetting schemes, may have a role to play.

Endnotes

- ¹ The Global Biodiversity Outlook 3 (UNEP, 2010): <http://qbo3.cbd.int/>
- ² The Economics of Ecosystems and Biodiversity (TEEB) interim report: <http://www.ecosystemmarketplace.com/documents/acrobat/sbdlmr.pdf>
- ³ <http://www.cbd.int/cop10/>
- ⁴ Van der Heijden, M.G.A. *et al.* 2008. *Ecology Letters* 11: 296-310.
- ⁵ <http://www.ecosystemmarketplace.com/documents/acrobat/sbdlmr.pdf>
- ⁶ BBOP: <http://bbop-forest-trends.org/offsets.php>
- ⁷ Burgin, S. 2008. *Biodiversity and Conservation* 17: 807-816.
- ⁸ Lawton, J.H. *et al.* 2010. *Making Space for Nature: a review of England's wildlife sites and ecological network*. Report to Defra.
- ⁹ <http://www.ecosystemmarketplace.com/documents/acrobat/sbdlmr.pdf>
- ¹⁰ DEFRA scoping study NEE0801 (2009)
- ¹¹ <http://www.dse.vic.gov.au>
- ¹² Native Vegetation Regulations under the Planning and Environment Act
- ¹³ The Threatened Species Conservation Amendment (Biodiversity Banking) Bill 2006
- ¹⁴ Information note UNEP/CBD/COP/10/INF/27 by the Executive Secretary, Convention on Biological Diversity, Nagoya, Japan, October, 2010
- ¹⁵ Council Directive 79/409/EEC on the Conservation of Wild Birds
- ¹⁶ Council Directive 92/43/EEC of 21 May 1992 on the Conservation of Natural Habitats and of Wild Fauna and Flora
- ¹⁷ www.environmentbank.com
- ¹⁸ Treweek, J., Butcher, B., Temple, H. 2010. *IEEM In Practice*. September: 29-32.
- ¹⁹ <http://www.defra.gov.uk/environment/biodiversity/documents/201009space-for-nature.pdf>