‘Balancing Biodiversity’:
A Global Instrument for Meeting the 2010 Biodiversity Target

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ABSTRACT

Radically heightened extinction rates over the past 50 years have prompted the Convention on Biological Diversity to adopt the '2010 biodiversity target,' which aims to significantly reduce global biodiversity loss by 2010. Despite the establishment of this ambitious goal, few policies have proven to be able to ensure its achievement. This paper explores the potential for biodiversity conservation policies to be developed on a global scale, with special emphasis on incentive-based instruments to curb biodiversity loss. By far, the primary cause of biodiversity loss is habitat destruction resulting from land-use change. Land-use change, however, occurs over a variety of spatial scales, making it difficult to utilise incentives in order to target the major actors engaging in land-use change activities. Specifically, land-use change is driven globally by international developers selling products for export, as well as locally by actors altering land to meet subsistence needs. In light of these two groups, the paper discusses the need for a two-pronged incentive system, which creates incentives for both international actors engaging in high-return development activities, particularly those from the private sector, and local actors engaging in lower-return subsistence activities. It then examines the potential for creating this two-prong incentive structure through the development of a global system of biodiversity offsets, referred to as 'balancing biodiversity'. The paper concludes by establishing rudimentary guidelines for the implementation of such a system with the hope of initiating discussion over global instruments for meeting the 2010 target.

Keywords: Biodiversity Conservation, Economic Incentives, Biodiversity Offsets, Convention on Biological Diversity

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I. Introduction

The world is experiencing the 'sixth mass extinction' period since the beginning of life on Earth (Wilson, 1992; Novacek and Cleland, 2001). In just the past few decades, extinction rates have grown to becomefrom 100 to 1,000 times faster than historic averages (Pimm and Brooks, 2000). The Convention on Biological Diversity (CBD)[4] is the most promising global framework through which this extinction crisis can be seriously addressed at the international level.[5]Although the CBD has been one of the fastest implemented multilateral environmental agreements (MEAs) – signed and ratified in just over a year – it has also experienced significant difficulty in meeting its objective of global biodiversity conservation. Since the Convention's ratification, global extinction rates have increased rather than slowed or stabilized, with future acceleration expected as a result of intensifying global developmentpatterns and increasing human population (Pimm and Raven, 2000; Schmandt and Ward, 2000; Chase, 2002).

The urgent need to protect the world's remaining biodiversity reserves has been stated and restated by policy makers and academics alike, with less attention given to developing practical instruments for actually achieving this objective.[6]In 2002, the CBD

[4] Adopted shortly after the 1992 Earth Summit in Rio de Janeiro, the three main objectives of the CBD are (i) defining and applying incentives for the conservation of biological diversity, (ii) favouring the instruments and actions that promote the sustainable use of biodiversity and (iii) implementing tools and mechanisms to enable the access to biological resources and the fair and equitable sharing of the benefits arousing from their utilization (see http://www.cbd.int/convention/convention.shtml).

[5] Other international treaties address specific aspects of biodiversity loss (e.g. the Convention on International Trade in Endangered Species of Wild Flora and Fauna – CITES – and the Convention on Wetlands of International Importance – the Ramsar Convention) and therefore lack the generality to tackle the phenomenon of biodiversity loss as a whole.

[6] The Millennium Ecosystem Assessment (MA) provides the most clear indication that biodiversity loss poses a substantial threat to current development efforts and the well-being of future generations (Duraiappah and Naeem, 2005). This report concludes that biodiversity contributes directly and indirectly

adopted the '2010 biodiversity target', which aims to significantly reduce global biodiversity loss by 2010.[7]This target has been agreed upon by representatives of 190 nations. Similarly, in 2001, the European Union committed itself to halting the loss of biodiversity by 2010 (EU, 2001). These ambitious objectives require equally ambitious actions. The policy choice to preserve the world's existing stocks of biodiversity has already been made; the pertinent question at this juncture is not *what* needs to be done, but *how* it is now going to be achieved.

Designing policies to conserve biodiversity can be a daunting task due to both the complexity of the causes of biodiversity loss and the lack of financial and political capacity needed to address these causes (Wood et al., 2000). To date, biodiversity conservation has been predominantly pursued through the national designation of protected areas. While some protected areas have succeeded in conserving biodiversity over the land they encompass, they are 'on the whole too few, too small and too threatened to be relied upon as the sole instrument for conserving biodiversity' (Kiss, 2002, p. 3).[8] The main limitation of government protected areas is their over-reliance on public sector and non-profit finance for creation and maintenance. National and multilateral donors, governments, and international NGOs and foundations all have played a major role in establishing and

to human well-being through a number of pathways and that unprecedented efforts must be assumed in order to curb the current rate of loss.

[7] See http://www.cbd.int/2010-target/default.asp.

[8] Approximately 13% of land globally is designated 'protected' (IUCN Categories I-V – wilderness areas, national parks, national monuments, or wildlife refuges; IUCN, 2005). Although this totals to an area larger than China, most conservationists nonetheless agree that successful biodiversity conservation requires the protection of biodiversity outside of protected areas (see for example, Daily et al. 2001, Rosenzweig 2003, Polasky et al. 2005).

maintaining the world's protected areas. Conversely, private engagement in biodiversity conservation remains limited.[9]

Attempts to integrate the private sector into biodiversity conservation initiatives have thus far been segmented and insufficient (see CBD, 2005a; CBD, 2005b; Chatham House, 2006). Indeed, COP 8 of the CBD highlights that the private sector is 'arguably the least engaged of all stakeholders in the implementation of the Convention,' despite its potential to make a 'significant contribution towards the 2010 target' (decision VIII/17). COP 8 further recognises the under-exploited potential of incentive-based mechanisms for achieving conservation goals (decision VIII/25 and VIII/26). The stark contrast between rampant biodiversity loss and international mandates to stabilise global biodiversity reserves indicates that, in order to achieve compliance with policy objectives, policy makers need to mobilise enough resources to address biodiversity loss now. An incentive-based strategy for conserving biodiversity would allow for direct incorporation of much-needed, but under-utilised, private sector resources.The development of a new incentive-based,global strategy for financing biodiversity conservation through private actors in the global 'North' – where the vast majority of the world's wealth resides – is essential to meeting the 2010 target.

The objective of this paper is to explore the potential incentive-based instruments provide for mobilising private sector capital to finance policy goals. The following discussion demonstrates how international approaches to directing private financing towards biodiversity conservation need to be pioneered if globally

[9] There are some notable exceptions, such as the Monteverde Cloud Forest Reserve in Costa Rica, which is a private, non-profit reserve administered by the Tropical Science Centre.

agreed upon biodiversity conservation targets are to be achieved. In this light, the authors explore biodiversity offsets as a potential incentive mechanism for integrating the private sector into conservation efforts at the global level.

Given the controversies surrounding biodiversity offsetting and its thus-far fragmented implementation, however, a new formulation has been developed whereby all internationally-driven biodiversity loss is compensated for by protecting an amount of biodiversity equal to what is destroyed – or – 'balancing biodiversity'.This instrument requires that those international actors contributing to biodiversity loss through land-use change compensate for the residual impacts by protecting a commensurate amount of biodiversity elsewhere. Accordingly, 'balancing biodiversity' offsets unavoidable impacts to biodiversity resulting from the full range of internationally-driven land-use change activities – agro-forestry, agriculture, meat production, mining, etc. – thereby offsetting the residual biodiversity 'footprint' of global demand for these commodities. This paper outlines the rudiments of this mechanism and critically assesses the potential of 'balancing biodiversity' to provide an effective global mechanism for contributing to the 2010 target. Analysis and conclusions within this paper are drawn from a thorough investigation of the literature on biodiversity offsets and offsetting more generally as well as a review of past, current, and proposed offset projects and markets.

II. Biodiversity Loss and the Need for Global Incentive-Based Measures

Biodiversity loss iscaused by a number of factors including: land-use change, invasive species, overexploitation, pollution and climate change. Of these factors, land-use change, in the form of habitat destruction, is by far the most influential

(Hardner and Rice, 2002). If the 2010 biodiversity target is to be met, it is therefore critical to address the factors that drive land-use change specifically.

Targeting land-use change in order to slow biodiversity loss, however, is extremely difficult. Habitats are altered by international, national, and local actors for a number of diverse motivations (Stedman-Edwards, 1997; Angelsen and Kaimowitz, 1999; Lambin et al., 2001; Geist and Lambin, 2001; Hardner and Rice, 2002). In order to effectively address biodiversity loss, we need to examine the 'broader context' in which these processes function (Wood et al., 2000, p. 79).

Kiss (2002) elaborates on this argument insightfully. Acknowledging that attributing biodiversity loss to only (or even primarily) over-population and poverty is 'overly simplistic', Kiss (2002) maintains that 'the fundamental cause of biodiversity loss worldwide is that those in a position to preserve it lack sufficient incentives to do so' (Kiss, 2002, p. 2). Thus, according to Kiss and a number of other conservationists, an effective approach to halting biodiversity loss requires an incentive-based approach that operates at the global level in order to address the multiple factors driving this phenomenon.

A. Incentive-based Instruments as One Policy Option

Private activities can have either harmful or beneficial environmental effects that are not fully captured by the actors profiting from these activities (for example, deforestation has deleterious effects on water quality, climate regulation, and biodiversity, while, conversely, conservation activities can have potentially positive effects on the same goods). Depending on their impact on social welfare, these residual effects are

considered either negative or positive 'externalities.'[10] Activities affecting environmental services[11] typically involve a number of externalities because the provision of these services is not often controlled through markets. Consequently, environmental services are 'not supplied in sufficient quantities by individuals acting in their self-interest'(Ferraro and Kiss, 2002). Incentive-based instruments[12] attempt to account for these externalities: they increase the provision of environmental services by discouraging environmentally harmful behavior, encouraging environmentally beneficial behavior, or both (Jenkinset al. 2004).Incentives can be created through a number of instruments, such as the creation and refinement of property rights, market creation and enhancement, environmental charges, fiscal instruments (taxes, tax exemptions, and subsidies) and liability systems (UNEP, 2004).

Incentive-based instruments have become an increasingly popular form of achieving environmental objectives (Rosales, 2006).[13] Incentive measures – in conjunction with mandatory targets – are often favoured by policy makers, local communities, financial institutions, and the private sector because of their potential to achieve policy goals at the lowest cost and with greater flexibility. In a world of poorly-allocated or scarce resources, the ability to pursue policy objectives as

[10] See Baumal and Oates (1988) for a discussion of externalities and public goods.
[11] Environmental or ecosystem services can be defined as the many natural processes by which ecosystems, and the species that make them up, sustain and fulfil human life (Daily, 1997). Under a more current definition, ecosystem services are defined simply as the benefits people obtain from ecosystems (Millennium Assessment, 2005). These benefits include provisioning services such as food, water, timber, and fibre; regulating services that affect climate, floods, disease, wastes, and water quality; cultural services that provide recreational, aesthetic, and spiritual benefits; and supporting services such as soil formation, photosynthesis, and nutrient cycling.
[12] In this paper, incentive-based instruments are defined synonymously with economic instruments. Economic instruments are '[i]nstruments that affect estimates of costs and benefits of alternative actions open to economic agents. Economic instruments, in contrast to direct regulations, thus allow agents the freedom to respond to certain stimuli in a way they themselves think most beneficial' (OECD, 1994, p. 17).
[13] The idea that incentives are crucial to conservation, however, is not new. Since at least the 1930s, environmentalists have claimed that '[c]onservation will ultimately boil down to rewarding the private landowner who conserves the public interest' (Leopold, 1991, originally published 1934).

efficiently as possible is imperative for ensuring effective natural resource management.

Conservation is no exception. Incentive-based instruments encourage conservation to be financed through new actors – most typically the private sector – at a lower cost than command and control instruments. Additionally, the economic benefits rewarded for conservation activities through incentive-based instruments increase the profitability of conservation as a land-use activity. Incentives therefore have the potential to bring land management for conservation in closer competition with more destructive management activities such as mining and agriculture. This competition will most likely engender the beneficial side effect of increased land prices in those areas where conservation is an economically viable alternative. Facing higher land prices, developers will opt for more area-intensive production that minimises harm to biodiversity. For example, if farmers in Sub-Saharan Africa – where land is cheap and the technology for more concentrated agricultural production has not yet been widely adopted – experience an increase in the price of land due to competition with conservation activities, they will consequently have a greater incentive to conserve land by adopting these more intensive agricultural technologies. Thus, providing economic incentives for conservation not only directly promotes conservation, but also drives up the price of land by encouraging more area-intensive development practices that further minimise biodiversity loss by concentrating development within smaller regions.

The Convention's COP (and other subsidiary bodies) has considered the use of incentive-based instruments extensively (see decisionIII/18, decision IV/10, and decision IV/15). Specifically, the CBD has required Parties to 'adopt economically and socially

sound measures that act as incentives for the conservation and sustainable use of components of biological diversity' (Article 11). Decision VI/15, adopted at COP 6, underlines the importance of incentive measures in reaching the Convention's objectives, especially in regard to the sustainable use of biological diversity, and in removing negative impacts on biodiversity. More recently, COP 8 decisions emphasise both private sector engagement (decision VIII/17) and incentive-based mechanisms with which to achieve this (decision VIII/25 and VIII/26). Additionally, an in-depth review of incentive measures (in accordance with the multi-year work programme adopted under decision VII/31) is currently underway to be discussed COP 9. The use of incentive-based instruments to implement the Convention and pursue conservation goals more generally appears to be an accelerating trend.

B. The Need for International Mechanisms

The CBD's COP 7 has established the mandate for exploring economic incentives for biodiversity conservation (decision VII/31); while at the same time, numerous actors have highlighted the merits of using incentives as a tool for conservation (see for example, Wood, 2000; Kiss, 2002; UNEP, 2004; Langpap, 2006; Goldman et al., 2007). Nonetheless, few practical incentive-based instruments for tackling biodiversity loss at the appropriate scale have been put forward.

The overarching problem with incentive-based instruments for biodiversity conservation to date is that they have been too limited to significantly slow the rate of biodiversity loss. Specifically, they fail to address the various drivers of biodiversity loss at the scales over which they operate. As stated, the primary driver of biodiversity loss is the destruction of natural habitat through land-use change.

Incentives for biodiversity conservation must therefore target as many of those actors engaging in biodiversity-destructive land-use change activities as possible.

The complexity of the phenomenon of land-use change and the forces driving it prohibit a definitive classification of all the participating actors. As such, some simplification – but hopefully not oversimplification – is required for developing incentive-based policy. A simplified dichotomy characterizing the drivers of land-use change allows two major contributors of this phenomenon to be identified:

- **The first group is composed of local, national, and international actors developing land for the production of goods intended for export.** This group is driven by the global demand for timber, meat, produce, minerals, oil, and other high-impact commodities; they deliver these good for relatively high returns on international markets (McGrath, 1997; Lambin et al., 2001). Thus while actors engaging in this form of land-use change may operate at the national or international level (primarily national or international corporations), they do so largely as a result of international demand for high-impact goods.
- **The second group is composed of local actors instigated by poverty and overpopulation to engage in low-return land-use change activities, such as slash and burn agriculture, wood collection, and grazing on unsuitable lands** (Mather and Needle, 2000). This group discounts the future environmental impacts of their actions heavily, and as a result, engages in low, but immediate, return

activities (see Pender, 1996; Holden et al., 1998; and Perrings and Stern, 2000). The pervasive existence of this group of actors is evidenced by the fact that 20% of all croplands have been abandoned (Ramankutty and Foley, 1999) and 71% of tropical forests cleared have become 'permanent pasture' – nominally productive grazing land (Pimm, 2001).

These two groups driving land-use change require very different incentives for conservation. Export-oriented producers face much higher opportunity costs[14] than subsistence-driven locals. The realisation of the 2010 biodiversity target is contingent on the development of a global instrument for biodiversity conservation that simultaneously addresses these two major drivers of biodiversity loss, despite their vastly different circumstances. To be effective, incentive-based approaches to conserving biodiversity must target both of these drivers of biodiversity loss. This suggests that incentive mechanisms must operate at the global level through a two-pronged approach if they are to successfully modify the behaviour of those actors driving extinction.

III. Biodiversity Offsets: A Two-Pronged Approach to Conserving Biodiversity?

Incentives typically target one group of actors, either encouraging or discouraging their behaviour depending on whether it has environmentally helpful or harmful effects. As the previous section suggests, such one-dimensional targeting cannot

[14] Opportunity cost refers to the revenue lost from the most-valued forgone action. Thus, the opportunity cost of conservation is equal to the potential revenue secured through the most valuable forgone management option. In the case of land used to cultivate export commodities, the opportunity cost of conservation is equal to the profits forgone from the export activity that would have otherwise occurred. In the case of land used for subsistence, the opportunity cost of conservation is the forgone market value of those subsistence goods that would have otherwise been utilised.

adequately address the multiple spatial scales over which biodiversity loss occurs. Instead, incentives for biodiversity conservation must target actors at both the global and local level.

Biodiversity offsets, unlike other incentive-based instruments, have the potential to create incentives for conservation at multiple levels. First, offset requirements discourage activities that reduce biodiversity by increasing the cost of development: developers must pay an additional fee for their activities in the form of compensation for residual biodiversity loss. This additional 'cost' – the compensation requirement – is then used to finance conservation elsewhere, creating a demand for conservation land and therefore a positive incentive for other private actors engaging in less lucrative, but equally destructive, activities to instead conserve. The establishment of a framework through which developers can compensate for impacts to biodiversity, therefore, not only provides an incentive for developers to finance biodiversity conservation, but at the same time it also creates a demand for conservation land. By increasing the demand for conservation, offsets provide an additional incentive to 'manage' land for conservation as opposed to more biodiversity-destructive economic activities. Thus, biodiversity offsets are unique among incentive based instruments in that they have the potential to simultaneously address the two major drivers of extinction mentioned above – internationally-driven development and locally-driven ecosystem degradation.

Although biodiversity offsets have the potential to assume this two-pronged approach, it is unclear whether or not they have effectively utilised this potential in practice. In fact, the issue of offsetting is so polemical that it is unclear whether or not they effectively create any incentives for conservation at all. Moreover, there are a

number of ways in which offsets may be implemented, each providing a different incentive structure. Formulating an approach to offsets that effectively establishes incentives at multiple scales requires an examination of the basic theory behind biodiversity offsets and their implementation.

A. Biodiversity Offsets: The Basics

Biodiversity offsets are most commonly defined as 'conservation actions intended to compensate for the residual, unavoidable harm to biodiversity caused by development projects' (Ten Kate et al., 2004, p. 13). Offsetting is the last step on the 'mitigation hierarchy' – avoid, minimise, mitigate, offset – employed by many land developers (Ten Kate et al., 2004).Offsets to compensate for the residual negative impacts on biodiversity are therefore the 'lastresort' in the mitigation hierarchy. But even before this mitigation hierarchy is pursued, development projects must first undergo a 'go' or 'no-go' evaluation. 'No-go' areas, defined as an area with 'habitats or species of such importance that they should be avoided because any impact is unacceptable' (Blundell and Burkey, 2006, p. 2), are unsuitable for development regardless of the degree of offsetting. Offsetting is therefore only acceptable after all possible project damage is either avoided or minimised and it has been established that the development will not occur in a 'no-go' area (Ten Kate et al., 2004).

Biodiversity offsets are intended to reconcile the unavoidable tension between development and conservation goals. By offsetting unpreventable impacts to biodiversity, development can be pursued without interfering with conservation objectives and possibly even contributing to them. Through offsetting, development projects can ensure 'no net loss' to biodiversity, 'maintain and enhance' biodiversity, or

achieve a 'net gain' to biodiversity (Pollution Probe, 2004). Offsets are especially conducive to meeting biodiversity conservation objectives because of the emphasis the CBD places on supporting sustainable development while conserving biodiversity (Diaz, 2006).

Biodiversity offset initiatives have been developed in a number of regions around the world (e.g. the US, Australia, South Africa, etc.) and have grown to assume widely different forms. The most rudimentary form of biodiversity offsetting takes place on a project by project basis and requires on-site mitigation of development impacts to biodiversity (Table 1a). An example of on-site offsetting is the creation of a buffer zone within a project area to enhance or sustain biodiversity. On-site offsetting strategies are notorious for high expenses resulting from the high opportunity cost of on-site conservation. As the concept of offsetting has progressed, off-site mitigation has emerged as a preferable form of offsetting.

Off-site offsetting (Table 1b, 1c) secures conservation at a lower cost by allowing biodiversity conservation on land with a lower opportunity cost, but equal or greater biodiversity value. Under this scenario, biodiversity loss within the project area is offset by the protection of an equivalent or greater amount of biodiversity at another off-site location. Depending on the stipulations of the offset regime, this off-site location may be 'in-kind' – referring to an offset that provides the same type of biodiversity as that which is destroyed by protecting land within the same ecosystem – or in some situations, 'out-of-kind' – referring to an offset that protects land within a different ecosystem, thereby providing a different type of biodiversity.[15] While there are obvious dangers in allowing

[15] While the definition of in-kind and out-of-kind varies depending on the offset scheme in question, the US wetland mitigation banking scheme provides representative definitions. 'In-kind' mitigation is defined as

out-of-kind offsets without question, the flexibility this type of offset provides may sometimes allow for the delivery of higher-quality offsets.[16]

Off-site offsetting also introduces the opportunity for a third party to implement and maintain the offsets on behalf of the developer in exchange for financial compensation. The existence of a third party may add credibility to the offsets and a potential mechanism for standardising the practice. In these offset schemes, offsets purchased under one project are non-transferable. This means there is no market through which developers can purchase and sell biodiversity offsets at a clearly defined market price. Instead, offsets are purchased and implemented separately for each project at a project-specific price and cannot be traded amongst developers.

Under a more developed system of offsetting, such as conservation and wetland mitigation banking in the United States and biodiversity banking in New South Wales, offsets can be traded through a standardized market (Table 1d). This form of banking and marketising offsets as conservation 'credits'[17] has a number of benefits that 'project by project' offsetting without banking fails to secure. The development of a market for biodiversity offsets greatly reduces transaction costs associated with finding an offset provider capable of offsetting the specific amount and negotiating a contract. It allows biodiversity conservation initiatives to be pursued independent of a specific development project. Actors from the private or public sector can invest in biodiversity conservation as a marketable good with a market price without having a pre-determined development

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'the same physical and functional type as the impact area', while 'out-of-kind' mitigation is defined as 'a different physical and functional type as the project area' (US EPA, 2004).

[16] Ten Kate et al. (2004) report that a lot of their survey respondents highlight the importance of out-of-kind offsets for the flexibility they provide. One US Army Corps Of Engineers member notes that in many cases, environmental goods and services 'could be better provided by going off-site or out-of-kind' (p. 61).

[17] Offsets in many banking systems are defined as 'credits', indicating that they are fungible and can be bought and sold.

project to offset or having to ensure that their conservation efforts perfectly offset just one project. In other words, biodiversity offsetting becomes an entrepreneurial activity. On top of this, the marketisation of biodiversity offsets allows for the pooling of resources and conservation of larger tracts of land. Under a marketised system, offsetting happens before or concurrent with development, developers pay a fixed cost for the offsets, and liability falls with the offset provider. Nonetheless, although offset banking provides a unique opportunity to gain access to more funds for conservation purposes, it would only be made possible with the necessary political capacity and commitment for the development of such markets, which in many regions would not be the norm.

Table 1. Types of Offsetting

Type of Offsetting	Description	Examples
a. On-site	Developer offsets impacts to biodiversity by protecting and enhancing biodiversity at another part of the development site	The Brazilian Forest Code (1965) and the earliest versions of the US Clean Water Act (1972) and US Endangered Species Act (1973) had provisions that required this form of offsetting.
b. Off-site, in-kind	Impacts to biodiversity are offset by protecting and enhancing biodiversity at another off-site location with the same type of biodiversity.	Many pieces of legislation allow development projects to be pursued only if unavoidable impacts are offset at anther in- or out-of-kind location. Examples include Australia's Native Vegetation Act (2003) and South Africa's National Biodiversity Strategy and Action Plan (2005).
c. Off-site, out-of-kind	Impacts to biodiversity are offset by protecting and enhancing biodiversity at another off-site location with a potentially different type of biodiversity.	
d. Banking	Developer offsets adverse impacts to biodiversity by purchasing offsets through an established market.	US wetland mitigation banking, US conservation banking, NSW biodiversity banking.

B. 'Balancing Biodiversity': An Opportunity to Scale-Up Offsets to the Global Level?

Offsetting efforts to date, whether on-site, off-site, or banking, have maintained either a local or a national structure. This spatial limitation has severely limited the efficacy of

this policy instrument. Despite localised successes, biodiversity offset schemes have remained limited, uncoordinated, and unable to assume the scale necessary to mobilise large amounts of finance for conservation.[18]As discussed above, incentive-based instruments need to be global in scope in order to effectively target the major drivers of biodiversity loss. Scaling up offsets to an international level – a mechanism referred to in this paper as 'balancing biodiversity' – may therefore account for some of the deficiencies inherent in more localised offsetting schemes.

Offsetting impacts from only a small percentage of development projects, while the vast majority of land-use change continues without compensation, is clearly no way to curb biodiversity loss. Yet, even halting *all* biodiversity loss resulting from internationally-driven land-use change will still not ensure that the 2010 target is met. Land-use change resulting from local pressure for subsistence and income will still play a significant role in destroying biodiversity (see Section II.B).Thus, an incentive-based instrument for biodiversity conservation must target drivers of biodiversity loss at both the local and global level. Limitations acknowledged, biodiversity offsets have the potential to create this two-pronged incentive instrument, but only if instituted on a large scale. And this is precisely what 'balancing biodiversity' proposes.

The development of offset 'banking' schemes has indicated the potential for extrapolating individual offset projects to a larger scale. With adjustments, and under a global system that offsets total internationally-driven impacts to biodiversity, these models can be further extrapolated to the international level. Indeed, the recent explosion

[18] Although there are a number of programmes that are now attempting to coordinate offsetting on a larger scale, the Business and Biodiversity Offset Programme (BBOP) being one of the most prominent.

of global carbon markets as well as carbon forestry offsets provides powerful evidence that the conservation potential of offsetting at the international level is huge. Moreover, the offsetting infrastructure developed through carbon markets and the lessons learned from carbon forestry pilot projects together can serve to inform potential international biodiversity offset regimes.

Similar to biodiversity offset schemes that require project-level compensation for unavoidable biodiversity loss, 'balancing biodiversity' standardises such an offsetting procedure at the international level. This mechanism can therefore be conceptualised as a global mechanism that discourages biodiversity loss resulting from internationally-driven land-use change by requiring all residual biodiversity loss from development by international actors to be offset through commensurate conservation elsewhere. International actors would be considered those actors engaging in extensive land-use change activities in order to sell products with significant biodiversity impacts (e.g., wood, beef, oil, minerals, etc.) on international markets. Such actors would be obligated to offset the impacts to biodiversity resulting from their production processes (i.e., land-use change) by protecting a commensurate amount of biodiversity at another location. In this way, 'balancing biodiversity' offsets the global biodiversity 'footprint' caused by international demand for high-impact commodities.

By requiring internationally-driven land developers to compensate for their residual impacts, 'balancing biodiversity' discourages biodiversity-detrimental activities while at the same time generating finance for biodiversity conservation. Through the offset requirement, 'balancing biodiversity' creates a global demand for

conservation land. By increasing the demand for conservation land, offsets bring land use for 'nature' in closer competition with land use for agriculture and other forms of economic development. In the presence of this emerging demand, lower-return land-use change activities should shift from exploitation to conservation.[19] Thus, under a system of internationally instituted biodiversity offsets, international developers that are involved in high-impact land-use change activities – internationally-driven mining and meat and wood production – are taxed for their development activities through a requirement to compensate for all unavoidable impacts to biodiversity; while, at the same time, lower opportunity cost land-use change activities – slash and burn agriculture and grazing on unsuitable lands – have an incentive to switch from low-return, high-impact activities to conservation.

Globally instituted biodiversity offsets therefore, provide a means to address both high-return, internationally-driven and lower-return, locally-driven biodiversity loss by discouraging the former while simultaneously creating incentives for conservation for the latter.[20] In this way, compensating for biodiversity loss from land use change on a global level can address the major causes of biodiversity loss at the true scale over which they operate.

There are further benefits to approaching biodiversity offsetting through a global framework in terms of coordination, standardisation, and legitimacy. Localised offsetting projects are often implemented on a case-by-case basis and tend

[19] This is especially likely considering recent articles demonstrating the responsiveness of local people to market opportunities (see for example, Ruiz-Perez et al., 2004).

[20] Land protected to offset development impacts does not necessarily need to have a *very* low opportunity cost, the opportunity cost must simply be lower than that of the land being developed. Accordingly, land with a range of opportunity costs – and ecosystem functions – may be protected.

to utilise ad-hoc guidelines that are not required to comply with any externally imposed standards. This lack of consistency may compromise both environmental and economic outcomes and has been a prime motivation for the development of biodiversity banking schemes throughout the world.[21] Banking schemes, however, are only applicable on a national or sub-national level, primarily in the developed world (see Table 1d). Thus, the most biodiversity-destructive activities – land-use change in the tropics – are excluded from both the requirement of compensation and the resultant demand for conservation land it creates.

Biodiversity offsets, in their current form, cannot provide a significant contribution to achieving the 2010 biodiversity target. Biodiversity offsetting will only provide incentives great enough to significantly alter the decision-making of the major actors driving biodiversity loss if such a procedure is implemented on the scale over which these actors operate. 'Balancing biodiversity' internationally therefore appears to be a promising modification to more localised offset schemes and a potential mechanism for achieving the 2010 biodiversity target (see Box 1 for a more in-depth examination of how 'balancing biodiversity may begin to be implemented, along with an example).

Nonetheless, it is difficult to justify an extrapolation of biodiversity offsetting to the international level when it has been so controversial even at its current small scale. Any proposal for implementing offsets internationally must be highly aware of the controversy surrounding this procedure in an attempt to establish some sort of reconciliation between opposing sides. The following section closely examines

[21] For example, inefficiencies created by offsetting on a case-by-case basis were cited as a major reason for developing biodiversity banking in New South Whales (DEC, 2005).

the controversy over offsetting, thereby providing the basis for recommending rudimentary guidelines that will hopefully begin to provide an at least partial reconciliation of the arguments for and against biodiversity offsetting.

Box 1: How to Begin Balancing Biodiversity

A global system such as 'balancing biodiversity' that requires international developers to offset residual impacts to biodiversity may seem like a compelling way to curb biodiversity loss, but actually implementing such a system will be institutionally challenging at best. Luckily, voluntary offsets already exist and provide a useful model for extrapolation to a global, mandatory scheme. Indeed, voluntary (and local/national mandatory) biodiversity offsets are already happening and will continue to occur without first having to complete the time-consuming ratification process characteristic of any mandatory international agreement. While such an agreement is indeed the end goal, much momentum can be gained through the global institutionalisation of voluntary offsets, allowing for a swifter transition to their mandatory implementation.

For example, the mining industry has already demonstrated a keen interest in offsetting their residual impacts to biodiversity (see IUCN and ICMM, 2003; ICMM, 2005a; ICMM, 2005b). By first utilising the readiness of such corporations to participate in voluntary offset initiatives, a group of willing participants can be established, pilot projects can be implemented, and eventually enough experimentation can be completed and enough knowledge gained to allow for the creation of an international protocol requiring such a procedure. The specifics of this protocol will have to be painstakingly established. The remainder of this Box outlines a potential general format such a protocol may follow.

An international protocol for balancing biodiversity must first identify all 'high-impact' international developers (such as mining, agroforestry, ranching, and agricultural companies) and require that any new projects initiated by these actors undergo a biodiversity impact assessment, which outlines impacts to biodiversity, planned mitigation techniques, and finally, an assessment of all unavoidable impacts to biodiversity resultant from the project. Unavoidable impacts should be categorised in terms of number of hectares and type of ecosystem adversely affected by the project and must be verified by an independent auditor. Having established the residual impact of the project, biodiversity loss compensation must be arranged. Effectively, compensation would be achieved by the impacting company financing the protection of a commensurate amount of threatened land comprising the same ecosystem type. In practice, this could be accomplished a number of ways. Most typically, the company would either contract a third party to establish a protected area through land purchase or purchase land already offered for protection by a third party through an established market. Again, the biodiversity protection provided by this newly protected land must be independently audited. Having completed this process, a company may proceed with its development activities, subject to periodic auditing.

IV. Biodiversity Offsets: The Controversy

Environmentalists and policy makers alike have responded to biodiversity offsetting with both advocacy and outright attack, with traditionally little dialogue between the two sides.[22] Critics[23] group offsetting with other market-based strategies, deeming these approaches 'green washing'[24] business as usual and a surrender of environmentalism to the global neoliberal agenda. Alternatively, advocates[25] see offsetting as an opportunity to reconcile conservation and development by finally engaging the private sector and civil society in the conservation agenda. More recently, however, attempts have been made to bridge the gap between critics and advocates.[26] The reality is that biodiversity loss resulting from land use change caused by mining, forestry, agriculture, and development is occurring and will most likely continue to occur with or without offsetting the adverse impacts. Each year between 2,000 and 15,000 species are lost, mostly as a result of these activities (Pimm et al., 1995).[27] While abolishing land-use change activities is both politically unfeasible and developmentally unrealistic, measures should nonetheless be taken to prevent land-use change from continuing to drive the

[22] Rosales (2006) does in fact provide an interesting reconciliation of the two sides, maintaining that cap and trade instruments – to which offsetting is closely related – can address biodiversity loss only if caps are set according to scientifically-determined environmental thresholds. He continues to advocate a more intimate exchange of information between professional organisations, academia, and policy-makers in order to determine appropriate thresholds and corresponding caps on economic activity.
[23] See Lovera (2006).
[24] This term arose after the Earth summit in Rio and is used to refer to the activity of giving a positive public image to environmentally unsound practices.
[25] See The Biodiversity Neutral Initiative (www.biodiversityneutralinitiative.org), and the Energy and Biodiversity Initiative (www.theebi.org).
[26] For example, the Business and Biodiversity Offset Program (BBOP) is a partnership between business, government, and conservation experts created to explore the potential of biodiversity offsets as a conservation mechanism (see http://www.foresttrends.org/biodiversityoffsetprogram/).
[27] This is a conservative estimate. Ehrlich and Wilson (1991) estimate a loss of between 27,000 and 55,000 species annually. Much of this variation is a result of the discrepancy over the total number of species worldwide.

current rate of biodiversity loss.This section highlights the major arguments for and against the use of offsets to achieve biodiversity conservation goals.

A. For

The most compelling argument for biodiversity offsets is a purely economic argument for offsets generally based on their cost-effectiveness. A cost-effective outcome is when a certain goal is achieved at the least possible cost. Flexible mechanisms such as cap-and-trade systems and offsetting allow for a cost-effective environmental outcome by allowing for flexibility in meeting environmental objectives by incorporating costs into environmental decisions. For example, Carlson et al. (2000) estimate that the US policy to reduce sulphur dioxide emissions by using allowance trading may save $700–800 million per year compared to a uniform emission standard. In a world of financial scarcity – especially in conservation funding – achieving cost-effective solutions to conservation dilemmas is of the utmost importance. Considering only benefits to biodiversity while ignoring costs results in inefficient use of scarce resources (Ando et al., 1998; Balmford et al., 2000; Naidoo et al., 2006).

Offsetting impacts by conserving biodiversity, as a cost-effective conservation strategy, maintains or increases current levels of biodiversity at the lowest possible cost. This is because the cost of biodiversity conservation depends greatly on the opportunity cost of preserving the area in which it is located.[28]The price of land often varies by orders of magnitude across different potential conservation sites of equal benefit to biodiversity (e.g., Ando et al., 1998; Polasky et al., 2001). Taking costs into

[28] As discussed in Section II.B, land used to produce exported commodities like beef, oil, and timber typically have a much higher opportunity cost than land used for local subsistence.

consideration, therefore,greatly alters conservation outcomes, as lower cost sites with equal or greater conservation potential will be prioritised. In fact, achieving a cost-effective outcome is often more dependenton differences in costs than in benefits (Ferraro, 2003). In addition, estimating the cost of conservation is often easier than estimating its benefits (Naidoo et al., 2006; Wilson et al., 2007). Offsetting allows flexibility when determining which lands will be protected for biodiversity. This flexibility allows those areas with high biodiversity and low cost to be prioritised over areas with a higher cost of conservation, securing an overall equal or greater conservation of biodiversity at a lower cost.

Recent literature emphasizes the need for incorporating cost estimates into conservation decisions (Murdoch, 2007). Analysing conservation in Africa, Moore et al. (2004) found as much as a 66% gain in species coverage when costs were included versus when they were not. At the global level, Balmford et al. (2000) found that up to twice as many species could be conserved forthe same budget when costs were included in the analysis.[29] By taking cost into account, offsetting resicual impacts by conserving biodiversity at another location can allow for more and potentially better conservation for the same price.

Not only do biodiversity offsets have the potential to allocate finances spent on biodiversity conservation more effectively, they also have the potential to actually increase the total amount of financing designated for biodiversity conservation and the range of actors contributing to it. Specifically, biodiversity offsets have the potential to

[29] See Naidoo et al. (2006) for a review of this literature.

finally incorporate the private sector, and civil society more generally, into conservation efforts.

The business case for biodiversity conservation more generally, and biodiversity offsets in specific, has been documented a number of times (see TenKate et al., 2004; VBDO and CREM, 2005; Mulder, 2007). To summarise the business case for offsets, there are three basic motivations for businesses to offset their impacts to biodiversity. First, demonstrating environmental and social consciousness by maintaining 'no net loss' or 'net gains' to biodiversity enhances companies' license to operate and their opportunity to grow by appeasing the stakeholders who have control over these processes. This is particularly important when consent from governments, local communities, financial institutions and other stakeholders has in many cases become a prerequisite to operate on a long-term basis. Participation in biodiversity offsetting activities, therefore, increases companies' chances of attaining a license to operate by appealing to government and local communities. Moreover, investors increasingly demand companies to take responsibility for any (in)direct impact on biodiversity resulting from activities in the production chain (VBDO and CREM, 2005). By allowing companies to compensate for their adverse impacts, biodiversity offsets may be viewed favourably by financial institutions, therefore enabling a company to secure new investment.[30] In other words, a good environmental track record helps a company to secure a loan the 'cheapest, easiest and fastest way possible' (Ten Kate et al., 2004, p. 39).

[30] The Equator Principles, "an industry approach for financial institutions in determining, assessing and managing environmental and social risk in project financing," demonstrate this tendency. The 27 financial institutions in 14 countries that have adopted these environmental and social principles will refuse loans to non-compliant companies (see http://www.equator-principles.com/).

Second, participation in biodiversity offset initiatives may allow companies to gain a competitive advantage within their current market and potentially enter new markets. Consumer demand for corporate social responsibility is becoming increasingly ubiquitous. Purchasers generally prefer sustainably produced products offered by companies with a positive environmental image.[31] Additionally, biodiversity offsetting may allow companies to pioneer new market opportunities, such as certification and niche markets for environmentally friendly products. Undertaking offset initiatives may go a long way as a marketing tool, increasing companies' competitive advantage within current markets and allowing companies to enter new, often times more profitable, niche markets.

Finally, incorporating biodiversity offsets as routine practice can enable companies to pre-empt future regulations, giving these companies a 'first-mover advantage'[32] and an opportunity to influence future policies (Ten Kate et al., 2004). As with the implementation of any offsetting activity, there is a large learning curve. Gaining a head start in tackling the major implementation issues will leave pro-active companies at a significant advantage when offsetting becomes a more routine policy. The carbon offset mechanism offers evidence of the significant first-mover advantage early-acting companies may receive. The first movers in the carbon market are enjoying both enhanced public image and, as regulations develop, a significant competitive advantage over more reactive companies. Moreover, those

[31] One BP representative reiterates this nicely: "[W]e have to have access to exploration areas, access to people and access to markets. Reputation is a key issue" (TenKate et al., 2004, p. 38).
[32] 'First mover advantage' is the advantage gained by the initial occupant of a market segment (Lieberman, 1988). In this circumstance, a first mover advantage exists because there is a learning curve in offset implementation and a likelihood of future offset requirements.

first to act in terms of piloting offset initiatives further enjoy the opportunity to actually influence the policies that may later develop. The lessons learned from pilot activities and the experiences of those companies involved will certainly be considered as regulatory frameworks in different countries – and possibly even internationally – develop. Thus, to summarise the business case, biodiversity offsets can help a company attain license to operate by appeasing governments and communities, secure investment to sustain corporate growth by appealing to increasingly socially and environmentally conscious financial institutions, attract consumers by offering more sustainable, environmentally friendly products, and pre-empt and possibly influence policy through a first-mover advantage.

The reality of the business case for biodiversity offsets is confirmed by growing corporate interest. The extractive industries have been foremost to demonstrate a significant interest in mechanisms for offsetting biodiversity. The International Council on Mining and Metals (ICMM) has recently produced a number of paper exploring the potential for enhancing biodiversity conservation through biodiversity offsets (IUCN and ICMM, 2003; ICMM, 2005a; ICMM, 2005b). Indeed, there are already a number of industry-led biodiversity offset initiatives planned and implemented[33]. Biodiversity offsets clearly provide an unparalleled opportunity for engaging the actors with the most direct impact on biodiversity loss.

The benefits of biodiversity offsets, however, extend beyond increased finance for biodiversity conservation through business. By creating a demand for biodiversity-rich

[33] For example: the Shell Biodiversity Standard, which contains offsetting mechanisms (http://www.ecologie.gouv.fr/IMG/pdf/Session4-Shell.pdf); the International Petroleum Industry Environmental Conservation Association (http://www.ipieca.org/activities/biodiversity/bio_about.php); and the Energy and Biodiversity Initiative (www.theebi.org).

ecosystems, the implementation of offset schemes gives conservation land a market value. Under a biodiversity offsets regime, wilderness that once was only valued for its production capabilities in terms of development now can be valued in terms of its conservation potential alone. As a result, biodiversity offsets engage not only the business portion of the private sector, but also landowners – the 'providers' of biodiversity conservation. Conservation banking in the United States clearly demonstrates the benefits offsetting brings to landowners (see for example, Bonnie 1999; Bean and Dwyer2000; Heal 2000; Bayon 2002;Wilcoveand Lee 2004; Fox and Nino-Murcia, 2005). Offsets allow landowners to 'transform' non-profitable, undeveloped land into a financial asset (Fox and Nino-Murcia, 2005, p. 997). Biodiversity offsets therefore engage both the 'polluters' and 'providers' of biodiversity, and in doing so, provide a mechanism for all actors within the private sector to participate in biodiversity conservation.

By actually integrating the private sector into conservation activities, rather than pursuing conservation in isolation of and in opposition to private sector activity, biodiversity offsets can provide an opportunity to reconcile biodiversity conservation and development objectives. Indeed, the concept of offsets 'demonstrate[s] that conservation and economic growth are not always mutually exclusive' (Fox and Nino-Murcia, 2005, p. 997). At the same time, there are a number of arguments against the use of biodiversity offsets that require examination.

B. Against

Having assessed the positive aspects of how biodiversity offsetting can be used as an economic instrument to encourage better quality, and perhaps increased biodiversity

conservation alongside high-impact development projects, it is important to also consider the potential flaws in the approach. Indeed, as with the argument for offsets, there are several strands to the argument against the use of biodiversity offsetting. This section divides these arguments into two categories: (i) arguments against the concept of offsetting generally and (ii) arguments against the current implementation practices of biodiversity offsets. Those arguments opposing the use of offsetting in many cases maintain that no matter how precise and refined implementation may become, the inherent nature of the offsetting strategy is incompatible with successfully achieving conservation goals. In contrast, arguments highlighting the inadequacies of current offsetting guidelines, methodologies, and restrictive socio-political contexts target their criticisms at the more practical aspects of turning offset theory into practice.

The practice of offsetting can be conceptualised as a market-based conservation strategy that imposes 'market relations on uncapitalised environmental phenomena' by assigning them a dollar value (Robertson, 2004, p. 365). This is achieved through an'ecosystem approach', which views biodiversity in terms of the potential ecosystem servicesit provides (VBDO & CREM, 2005), and prices it accordingly. Many critics argue against this commodification of nature as inherently problematic (Benton, 1992; Peet and Watts, 1996; Low and Gleeson, 1998; Walker, 2001 Adams, 2002). Nature commodification – and commodification generally – is symptomatic of the tendency of capital to dominate the disparate fields in which it comes in contact – such as the environment – and re-articulate them through the development of new neoliberal institutions that support their commodification and marketing – such as offset regimes (Peck and Tickell, 2002; Robertson, 2004). Capitalism has therefore contributed to the

creation of an 'imagined consensus on the need to price nature' (Robertson, 2004, p. 365).[34] The argument criticizing offsetting as anotherway of neoliberalising environmental policy which expands the perverse domain of capital goes far beyond the realm of policy into social theory, and is therefore outside the scope of this paper.

For the purposes of this paper, we emphasise the argument that market based approachesto conservation, if not carefully monitored and controlled, can lead to increased privatization of natural resources and the cornering of the market, usually by Trans National Corporations (Hill, 2007). Such an occurrence is thought to not only benefit a small sector of society, but also have disastrous effects on the global environment (Miller, 1995; Hartwick andPeet, 2003).

Aside from Marxist critiques of nature commodification, some critics highlight the fact that offsetting does not provide solutions to the root causes of biodiversity loss – overproduction and consumption in the global north and poverty in the global south – but merely bandages these drivers with unsustainable mitigation techniques. Many of these critics refer to offsetting as a 'technical fix' to an inherently un-technical problem (Friends of the Earth, 2005; Lovera, 2006). Instead of offsetting, environmental efforts should focus on more fundamental changes in world production and consumption processes. At the same time, other offset and market-environmentalist sceptics prefer to focus on developing poverty-reduction strategies as well as to emphasise the more ecocentric and technocentric side of sustainable development (Hill, 2007). Both groups identify offsetting as another form of 'green washing' business as usual that fails to properly address the systematic causes of deforestation.

[34] Robertson (2004) demonstrates this consensus through a quote from Costanza et al. (1997): 'Although ecosystem valuation is certainly difficult and fraught with uncertainties, one choice we do not have is whether or not to do it' (p. 255).

Other critics acknowledge that fundamental changes in the capitalist world system in order to address commodification, overproduction and consumption, and global poverty, are unlikely to occur by 2010, or perhaps even 50 years after that target date, when species extinction rates are projected to peak and well over 300,000 species will be irreversibly lost (Pimm and Raven, 2002). While these critics are open to other more timely solutions, one of the key reasons they reject offsetting is because of the practical constraints involved with its establishment. Offsetting for biodiversity impacts presents a number of technical problems in terms of quantifying biodiversity, locating offsets, and ensuring additionality. These issues are compounded by more fundamental problems in terms of institutional capacity for enforcement and monitoring.

Difficulties with ensuring 'like' for 'like' in terms of the area damaged and the area conserved to offset damages are often cited as impermissibly great (Robertson, 2000; Robertson, 2004; Friends of the Earth, 2005). Ensuring 'like' for 'like' requires measuring and quantifying biodiversity, determining an appropriate geological scale over which offsets can be located, and determining an appropriate time scale over which the offsetting conservation activity can be completed. Of these obstacles, the quantification of biodiversity appears to be the greatest. Markets for biodiversity conservation are distinct from markets in more easily quantifiable environmental goods such as pollution abatement, carbon sequestration, and total fish count. This is due to the fact that biodiversity is a complex phenomenon with a number of different levels – genetic diversity, species diversity, and ecosystem diversity – any of which could be targeted for

conservation[35]. Such complexities can seriously complicate the implementation of biodiversity offsets.

Biodiversity quantification can be based on measurements as simple as area of specified ecosystem or habitat (as in US conservation banking), area of an ecosystem multiplied by a species-richness index (as in the proposed South African biodiversity bank), or a complex algorithm that translates site characteristics into ecosystem functions (as in US wetland mitigation banking). Robertson (2004) highlights the problem inherent in choosing an appropriate quantification scheme: the more specifically ecosystems are categorised to match ecology, the more barriers to trade these ecological differences erect. A quantification system based purely on hectares creates few barriers to trade, while, on the other hand, incorporating greater ecological distinction over a smaller geological scale greatly restricts opportunities for trade to the detriment of the market. 'While systems of measuring ecosystem commodities must be functional for capital (they must define a commodity that is alienable, fungible and mobile),' Robertson notes,'they must also be grounded the naturalized authority of scientific disciplines that are not entirely answerable to the banking industry' (p. 369). The more specifically ecosystems are categorised and the more stringent the requirement for matching ecosystems is set, the harder it is to develop a functioning market for that specific ecosystem. If requirements for offsetting are so specific that the impacted area must be offset by protection of an equal area containing the exact species composition of the original, a market for ecosystems with this exact specific species composition will never

[35] Salzman and Ruhl (2002) note the complexity involved in measuring biodiversity, particularly when defining ecosystem roles.

develop.[36] Within ecosystems, species compositions differ greatly; securing identical compensation will never be possible, and the more you strive for uniformity, the harder it is to establish a market compensation. This inherent tension makes sceptics question whether 'like' for 'like' can ever be ensured through a market mechanism.[37]

Even though the standardisation of offset practices – such as biodiversity quantification, geographic and time scale requirements, and baseline measuring techniques – may go a long way in legitimising biodiversity offset schemes, institutional deficiencies may ultimately prohibit the monitoring necessary to ensure compliance with these standards. Additionally, the implementation of offset requirements in some regions and not others may encourage a shift in development activities away from regions that require offsets to those that do not.[38] Moreover, unclear institutional perspectives in particular can cause a multitude of implementation dilemmas especially when there are conflicts of interest amongst collaborating parties (e.g., a lack of agreement on conservation priorities making it difficult to determine which activity would provide the greatest conservation benefit; ICMM, 2005b). This situation is further complicated by the fact that in many countries, particularly in low income nations, there is a lack of local and national expertise needed to gather baseline data (e.g. background biodiversity change) that would aid the understanding of how an

[36] Robertson (2004) quotes one EPA official summarising the problem with wetland mitigation banking: 'the slippery slope that bankers have started down may lead, ad absurdum, to a market in habitat for middle-aged blue herons who don't like shrimp, or something' (p. 368).
[37] For example, Robertson (2004) maintains that 'these requirements seem to guarantee an inconcludable dynamic of contradictory, and perhaps cyclic, impulses in any attempt to constitute markets in ecosystem services' (p. 369).
[38] This phenomenon is referred to as a 'race to the bottom' and its theoretical and empirical verification is highly controversial (see for example, World Bank, 2001 and Larsson, 2001).

offset would function (The Energy and Biodiversity Initiative, ND; Ferraro and Pattanayak, 2006).

This second group of problems – comprised of those arguments demonstrating the practical limitations and resultant inconsistencies in implementation – may or may not be surmountable. Some critics argue that these issues act as a 'bellwether' predicting the ultimate infeasibility of neoliberal environmental governance (Robertson, 2004, p. 361). More optimistic critics – in addition to many advocates – acknowledge that these issues must be seriously addressed if offsetting is even going to be considered as a tool for reducing biodiversity loss.

There are strong arguments both for and against biodiversity offsetting, and breaking this impasse is crucial to establishing a legitimate international offset scheme such as 'balancing biodiversity'. In order for 'balancing biodiversity' to provide a plausible incentive mechanism for biodiversity conservation, the features of this scheme must acknowledge and attempt to address the arguments against offsets, without compromising and perhaps even strengthening the arguments for offsets. The following section outlines basic guidelines for 'balancing biodiversity' that may help to achieve this reconciliation.

V. Guidelines for 'Balancing Biodiversity' at the Global Level

Offsetting as a mechanism to reach the ambitious 2010 biodiversity target can only be effective at the global scale, through a strategy that targets the major international drivers of biodiversity loss caused by land-use change. This type of 'balancing biodiversity' offsets the global biodiversity 'footprint' inflicted by international demand for high-impact commodities such as wood, meat, minerals, and produce, and in the process,

creates incentives for regional and local conservation activities that provide offsets. Yet the controversy surrounding biodiversity offsets, discussed in the previous section, greatly hinders the implementation of such a global offsetting program. Despite its potential benefits, the concept of 'balancing biodiversity' globally evokes a long list of practical issues that deeply obstruct the implementation of such an international scheme. Indeed, the implementation of a global system that requires international actors pursuing high-impact development activities to offset their adverse impacts may face obstacles that are impermissibly great. This section explores how a global biodiversity offset scheme may potentially reconcile the pros and cons highlighted in the previous section. It offers a potential set of guidelines for the 'balancing biodiversity' mechanism. The authors establish these guidelines with the hope of conveying rudimentary policy options for instituting biodiversity offsets at the global level in order to elicit discussion over the potential of this mechanism to contribute to the 2010 biodiversity target and beyond.

Six key assessment criteria (Converyet al., 2003) are used to structure the following discussion of potential guidelines for 'balancing biodiversity' at the global level:

1. ***Environmental Effectiveness:***What measures maximise net gains to biodiversity?
2. ***Economic (Static) Efficiency:***What measures deliver biodiversity benefits at the lowest possible cost?
3. ***Economic (Dynamic) Efficiency:***What role can offsetting play in providing continued incentives for conservation and disincentives for biodiversity-destructive activities?

4. ***Administrative Feasibility and Transactions Costs:***Is offsetting administratively feasible, and at what cost?
5. ***Political Viability:***What implementations of offsetting are politically viable?
6. ***Equity:***How can offsetting ensure equitable conservation and development outcomes?

A. Ensuring environmental effectiveness without compromising static and dynamic efficiency

Section IV.B describes an inherent tension between achieving environmental effectiveness and economic efficiency. Biodiversity units – the amount of biodiversity impacted and the amount protected – must be defined generally enough to be easily equated and exchanged (this area impacted for that area protected), but must also be defined specifically enough so that 'like' is indeed being replaced with 'like'.

In order to ensure ecological 'likeness' as well as an efficient market – if this is indeed possible – an appropriate range of variability in which ecosystems may still be considered 'like' must be designated. For example, in order for one ecosystem to qualify to offset another, it must have a certain percentage of its species shared with the area that will be impacted. It must then be determined exactly what area of that ecosystem must be protected to ensure 'no net loss' of biodiversity. The proposed biodiversity offset system in the Western Cape of South Africa provides an interesting option for making this determination (Brownlie et al., 2007).[39] The system is intended to be an area-based system of compensation that multiplies measures of residual biodiversity losses by a

[39] 'Biodiversity offsets are interpreted as the first step in producing a system where the principle of compensation for significant impacts on biodiversity and/or ecosystem services is integrated into a market for biodiversity conservation.'

basic offset ratio based on the conservation status of the affected ecosystem.[40]Thus, more threatened ecosystems must be compensated for by the protection of a much greater area of land than less threatened ecosystems. This system allows offset sites to be prioritised according to threat and would ideally prevent a 'race to the bottom' in which countries offer cheap offsets in the form of undesirable or remote, unthreatened land.

Establishing offset requirements through ecosystem classification and ratios, as described above, may go a long way in ensuring the environmental effectiveness of offsets while at the same time maintaining economic efficiency. Ultimately, however, requirements may not be able to fully prevent the 'green washing' that so many offset critics fear. One option for minimising the possibility of green washing is the use of independent third parties – most likely non-governmental organisations (NGOs) – to implement the offsetting conservation activities. NGOs may act as executive organisations by determining residual impacts, establishing appropriate conservation areas to offset these impacts, and implementing conservation activities. They may also act only as intermediary organisations by monitoring conservation activities. Under either scenario, an independent auditor will be crucial for ensuring that offset requirements have been met.

Lastly, in order to ensure economic efficiency over time (dynamic efficiency), offsetting must create an incentive structure that encourages future conservation behaviour and eliminates perverse incentives promoting environmentally destructive behaviour. Creating long-term incentives for conservation depends on an efficient and dependable market that gives conservation land a reliable market value. Even if markets

[40] Under this system they would employ a 30:1 ratio for 'critically endangered' ecosystems, where offsetting would be appropriate only in exceptional circumstances; a 20:1 ratio for 'endangered' ecosystems; a 10:1 ratio for 'vulnerable' ecosystems; and no offset for 'least threatened' ecosystems.

for conservation remain imperfect, simply the existence of the offsetting requirement will still provide a disincentive for biodiversity destructive behaviour, given that this requirement is consistent and predictable.

Thus, in order to ensure economic efficiency in the long term, offsetting requirements must, above all, be implemented in a consistent and predictable manner. The Supreme Court Decision *Solid Waste Agency of Cook County v. US Army Corps of Engineers* (*SWANCC*)for US wetland mitigation banking provides an insightful example of how inconsistency in implementation can hinder the effective functioning of markets and long-term efficiency of offsetting. This ruling excluded an entire class of wetlands ('isolated wetlands') from the mitigation requirement, thereby putting a number of banks out of business. Robertson (2004) writes that as a result of *SWANCC*, '[a]cross the country, bankers in landscapes full of isolates wetlands (like Chicago) found that their prospective market had dried up' (p. 370). In order to prevent such a disaster, 'balancing biodiversity' must establish a clear, consensual set of rules for offsetting and consistently maintain these rules across countries and over time.

B. Minimising the administrative, transaction, and political costs of offsetting

One of the major arguments against offsetting emphasises the institutional capacity required for monitoring offset requirements and contrasts this sharply with the notorious lack of capacity in many developing countries (see Section IV.B). As a result of this disparity, the administrative and transaction costs of ensuring compliance may make offsetting schemes infeasible. Administrative costs are compounded when property rights are unclear or land is owned communally, either of which may often be the norm in developing countries. Even if property rights are clearly assigned, land may be divided

among a large number of small-scale landowners, in which case transaction costs may be impermissibly high.

One way of circumventing large administrative and transaction costs is to place the burden of proof on business and not government. As is currently standard procedure with the Kyoto Protocol's Clean Development Mechanism (CDM), offsets generated at the project level must be certified by an independent auditor. Biodiversity offsets generated through conservation activities should also be independently verified in addition to the estimated residual impact to biodiversity that requires offsetting. If the impacts are certified as well as the conservation activities offsetting these impacts, governments would only have to confirm that these certifications have been completed.

Certification standards would also greatly minimise transaction costs when it comes to trading offsets. Under the CDM, any certified offset (Certified Emission Reduction, CER) may be universally traded for any polluter to purchase. This will obviously not be the case under a system of biodiversity offsets, as conservation activities in one ecosystem will only be transferrable within similar ecosystems. Nonetheless, properly certifying which ecosystem is being impacted and which ecosystems may be protected in order to compensate for that impact can streamline trading and minimise transaction costs.

Placing the cost of certification on developers may, however, make establishing offset requirements politically infeasible. Development activities generating commodities for export constitute a primary source of foreign exchange for developing countries. Many countries may oppose placing costly offset requirements on land-use change activities for fear of deterring this form of investment. More importantly,

domestic corporations that would be subject to the offset requirement may have a strong lobby within their country's government. If this is the case, enacting offset requirements would be a very politically risk manoeuvre. Thus, while establishing uniform offset requirements in all countries would create a 'level playing field', thereby eliminating offset requirements as a factor in determining place of investment, the political costs involved in setting such offset requirements may not permit their uniform establishment. For this reason, it seems more appropriate to begin with a voluntary regime in those countries where offsetting is not so politically risky and attempt to expand from that base. As offsetting becomes more widespread and standardised, the political barriers may lessen. Additionally, countries in which mainly international corporations drive land-use change may receive a development dividend as a result of establishing an offset requirement. The procedure of offsetting transfers the cost of offsets borne by international actors into finance available for local conservation activities. Incorporating aspects of sustainable development into conservation activities may prove to be politically, as well as developmentally, rewarding.

C. Making offsets equitable

Ensuring that offsets provide a development dividend – indeed ensuring that offsets are feasible at all – requires an implementation strategy that engages all stakeholders in order to deliver an equitable conservation and development outcome. The failure of forest carbon projects to properly engage all stakeholders, especially the local actors living near and depending on designated conservation areas, has been a major point of contention (see for example, Kill, 2001; IIED, 2006; Griffiths, 2007). An international system of

biodiversity offsetting, in which impacts are offset entirely through conservation activities, must be especially aware of local involvement.

Ideally, local stakeholders must be present and active participants at all stages of the offsetting process: identifying offset areas, creating conservation programmes, and implementing conservation activities. This feature is the main key to ensuring that biodiversity offsets not only discourage high-impact international land-use change activities, but also create incentives for local conservation as the market value for conservation is brought in closer competition with the market value for more environmentally harmful land-use activities. However, consistent local involvement comes at a cost in terms of greatly increasing offset transaction costs. The cost-effectiveness that makes offsetting so desirable as an incentive instrument could easily be dwarfed by the large transaction costs required to ensure local engagement throughout the offsetting process. This is especially likely in light of the fact that most offsetting attempts to date in the developing world have not involved locals to a satisfactory degree (again, see Kill, 2001; IIED, 2006; Griffiths, 2007). Thus, there is no sufficient model to follow for properly engaging local stakeholders throughout the offset procedure. Accordingly, proper stakeholder engagement requires major methodological developments through piloting and other experimentation. In order for balancing biodiversity to be feasible, offsetting procedure not only must consistently involve local stakeholders, but also it must do so in such a way that the transaction costs of this involvement do not outweigh the benefits offsetting offers in terms of cost effectiveness. Indeed, developing least cost methodologies for engaging local stakeholders may be the largest obstruction to instituting biodiversity offsets globally.

One potential, albeit highly controversial, opportunity for minimising the cost of local involvement is by exploiting joint gains that may result from combining biodiversity conservation with less destructive development activities, such as ecotourism, shade-grown coffee and other extensive farming and ranching practices. The potential for realising complementarities between conservation and development objectives has been both lauded (see for example Oviedo and Maffi, 2000) and criticised (see for example, Chapan, 2004) by many (see Hughes and Flintan, 2001 for an early review). I do not attempt to reconcile this historic debate here; simply, I stress that the opportunity to synthesise sustainable development activities alongside conservation may indeed prove to be a key factor in ensuring offset equity.

Another option for minimising the costs of ensuring equity through local stakeholder involvement is the partnering of larger, international NGOs with local NGOs that are more proximate to conservation areas. While international NGOs can provide guidance in terms of general procedures and practices, local NGOs may manage on-the-ground operations. International NGOs may also cooperate with local government and community organisations through a similar format. Continued experience with both biodiversity and carbon offset projects will hopefully provide valuable information on how offsetting efforts can involve all relevant stakeholders.

This section has only begun to introduce the long list of questions and concerns that will have to be addressed before pursuing any global strategy for biodiversity conservation. The discussion demonstrates that offsetting unavoidable impacts to

biodiversity, *if instituted properly,* may provide an economically efficient, environmentally effective, and politically feasible way to halt substantial losses in the world's biodiversity caused by land-use change.

VI. Conclusions

In 2002, policymakers around the world responded to the current rate of extinction with the honourable and ambitious goal of significantly reducing biodiversity loss by 2010. Five years later, as extinction rates continue to grow, the world has yet to see equally ambitious policies developed in response to this goal. With three years left before the target date is met, it appears time for aspirant proposals of a global magnitude to be considered.

Addressing biodiversity loss cannot be achieved by the public sector alone. The number one threat to biodiversity – land-use change – is a complex phenomenon deeply engrained in development activities pursued by the private and public sector at the global and local level. Limited public sector financing and capacity make incentives, coupled with mandatory targets, a preferred approach to biodiversity conservation. Incentive mechanisms not only have the power to achieve desired conservation outcomes at a lower cost, but also to engage actors previously isolated from conservation efforts – primarily the private sector – thereby generating much-needed additional finance for conservation activities.

Among incentive-based mechanisms, offsets appear to be a favourable strategy. Offsets discourage high-impact development activities, while at the same time generating finance for conservation activities and a clear demand for conservation land. With this demand, land-use for conservation is brought into closer competition with land-use for

development, allowing conservation to become a financially savvy investment instead of just a philanthropic chore. Biodiversity offsetting thus far, however, has been fettered by its limited scale and fragmented implementation. 'Balancing biodiversity' – or the application of a global system of compensation that offsets the residual global biodiversity 'footprint' created by international demand for high-impact commodities such as timber, meat, minerals, and agricultural goods – has the potential to address some of the limitations that plague biodiversity offsetting on a smaller scale.

The current controversy over the use of any form of offsetting to achieve conservation objectives, however, makes the establishment of a global system infeasible at this time. The potential for any form of biodiversity offsetting to be used as a mechanism to significantly contribute to the 2010 objectives requires a reconciliation of the arguments for and against this mechanism. This discussion has hopefully shed light on whether or not such a reconciliation is at all possible and, if so, the potential features of a global mechanism that could achieve it.

A key observation arising from this discussion is that a global offset mechanism such as 'balancing biodiversity' may assume many forms – some more favoured by the environmental community, some more favoured by business, and some more favoured by government. Consequently, there are a number of tensions that must be navigated and reconciled in order to ensure the environmental effectiveness, economic efficiency, political viability, and equity of offsetting. Despite these obstructions, the potential environmental benefits offsetting provides, and the substantial interest already demonstrated by the business community,

justify a deeper consideration of global offset mechanisms for achieving the 2010 objectives.

VII. References

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