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Biodiversity offsets: adding to the conservation estate, or ‘no net loss’?

Susie Brownlie and Mark Botha

The Western Cape province of South Africa contains globally unique biodiversity, to which pressure for economic growth and development poses a significant threat. Legal and planning frameworks support biodiversity conservation and biodiversity offsets. Biodiversity plans at different scales provide a clear indication of spatial priorities for conservation. In this context, a draft guideline for biodiversity offsets in the Western Cape has been developed (DEA&DP, 2007) which introduces biodiversity offsets as an integral part of the regulatory environmental impact assessment and development authorization process. The approach focuses on area- and monetary-based compensation to secure and manage priority areas in the long term. The emphasis is on adding priority habitats to the conservation estate, rather than on achieving ‘no net loss’ in the strictest sense. This paper explains how the context of the Western Cape has shaped its approach to biodiversity offsets: the political, socioeconomic and institutional characteristics are as important in designing a guideline for offsets as biodiversity considerations. The paper notes key challenges facing the province in implementing the guideline.

Keywords: biodiversity offsets, no net loss, biodiversity conservation

BIODIVERSITY OFFSETS ARE DEFINED as ‘conservation actions intended to compensate for the residual, unavoidable harm to biodiversity caused by development projects, so as to ensure no net loss of biodiversity’ (ten Kate *et al.*, 2004). They are receiving increasing attention from environmental groups, industries and governments as a way of balancing the competing demands of development and conservation. Offsets are seen by environmental groups as a way to conserve natural habitat, and by companies as a means to secure and maintain licence to operate.

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The role of the Western Cape Department of Environmental Affairs and Development Planning, South Africa, in commissioning the development of a guideline on biodiversity offsets for the province, and stimulating discussion on the topic, is gratefully acknowledged. In addition, the work being undertaken by the Business and Biodiversity Offsets Program has catalysed many of the ideas presented in this paper.

Biodiversity offsets may be legally required and considered during environmental impact assessment (EIA) or planning processes, negotiated in concession agreements between governments and developers, and/or implemented on a voluntary basis by developers.

The Western Cape

The characteristics of the Western Cape province effectively define the opportunities and constraints to introducing new policy initiatives such as biodiversity offsets.

South Africa is a developing country where the need for socioeconomic upliftment of a large, relatively poor population is urgent. It is home to about 4.5 million people, 28% of whom live in poverty. Agriculture is seen as a priority sector for realizing economic growth and land reform targets, and mining is likely to expand. About 48,000 migrants enter the province every year (DEA&DP, 2005), increasing the pressure on natural resources.

The province contains significant elements of two global biodiversity hotspots: the Cape Floristic Region and the Succulent Karoo. Approximately 70% of the country's critically endangered vegetation types and threatened species occur here, and 73% of vegetation units found here are endemic to the province (Le Roux *et al.*, 2007). Very few threatened vegetation types are adequately conserved (Driver *et al.*, 2005).

The province's biodiversity presents a huge challenge for land-use planning and decision-making: existing protected areas do not include a representative sample of species and habitats, or make adequate provision for key ecological and evolutionary processes (Rouget *et al.*, 2003). In addition, the development and spread of alien invasive plants are rapidly converting and fragmenting remaining natural areas. Although the removal of alien invasive species on private property is required by existing law, there is little enforcement of this requirement. To exacerbate the situation, restoration and/or re-creation of most of the semi-arid and arid ecosystems of the Western Cape is widely regarded as impracticable: restoration efforts are often prohibitively expensive, seldom lead to levels of biodiversity approaching those in pre-disturbance habitat in the medium term (e.g. Holmes, 2001), and these ecosystems may take centuries to recover (De Villiers *et al.*, 2005).

Many laws, policies, plans and guidelines at both national and provincial level aim to achieve long-term development benefits without compromising the natural environment. The conservation of biodiversity and ecological integrity is required in terms of, among others, the Constitution, the National Environmental Management Act 107 of 1998 (NEMA), and the National Environmental Management Biodiversity Act 10 of 2004 ('the Biodiversity Act'). Regulatory EIA provides some control over biodiversity impacts, although illegal developments do slip through the net. The Biodiversity Act provides for the listing of threatened ecosystems and species; processes threatening those ecosystems or species will require EIA.

South Africa has invested considerable effort in developing biodiversity plans at different spatial scales, from national (Driver *et al.*, 2005) to local. These plans determine the conservation status of ecosystems, set defensible conservation targets, and identify priority areas for conservation of biodiversity pattern, and ecological and evolutionary processes (e.g. Driver *et al.*, 2003). The Western Cape is known for its wide range of biodiversity planning initiatives and products, from broad-scale (e.g. Cape Floristic Region: CAPE, Succulent Karoo Ecosystem Programme, Subtropical Thicket Ecosystem Project) to fine-scale (e.g. Cape Lowlands Renosterveld Project, City of Cape Town's biodiversity network, amongst others), as well as regional biodiversity corridor initiatives (e.g. Greater Cederberg Biodiversity Corridor initiative, Gouritz Initiative).

Despite initiatives to mainstream biodiversity in land use planning (e.g. Driver *et al.*, 2003) and impact assessment (e.g. Brownlie, 2005), constraints in capacity at all levels of government are a major obstacle to integrating environmental sustainability into sectoral activities (DEA&DP, 2005). There is thus a high risk of losing biodiversity in priority areas. Biodiversity tends to play a subordinate role in decision-making and is traded off for short-term socioeconomic benefit. Decision-making is inconsistent in its treatment of biodiversity, and EIA consultants often fail to address biodiversity issues adequately (Brownlie *et al.*, 2006). The agency responsible for biodiversity conservation in the Western Cape is under-capacitated and not in a position to acquire or manage additional priority areas for conservation without an increase in funding.

Approach to developing a guideline for biodiversity offsets in the Western Cape

Biodiversity offsets are supported at national level through the NEMA principles, which include the need to 'avoid, or minimize and remedy' the disturbance of ecosystems and loss of biological diversity, and for those responsible for harming the environment to pay to remedy that harm. The National Biodiversity Strategy Action Plan (NBSAP) explicitly recognizes the need for biodiversity offsets (DEAT, 2005). At a provincial level, the Western Cape Provincial Spatial Development Framework, approved by the Provincial Cabinet in 2005, creates a policy framework for biodiversity offsets to curb the continual erosion of biodiversity.

An approach to introducing biodiversity offsets must take into account the prevailing political, socioeconomic and institutional context if it is to be effective. In the Western Cape context, therefore, it is important that the approach caters for the full spectrum of development types at different scales: small, poorly resourced developments can do as much damage to priority habitat fragments as large ones. The approach must be simple to understand and explicit for all interested and affected parties, principally developers, implementing authorities and EIA consultants. The requirements for biodiversity offsets should be reasonable in terms of the developer's investment of resources in investigating and implementing offsets, and should not unduly delay project authorization.

The 'no net loss' objective for biodiversity is unlikely to be realistic in South Africa, a developing country. There will at least be loss of biodiversity at genetic levels through ongoing reduction in the size of populations owing to the cumulative effects of habitat conversion deemed acceptable by decision-makers. In addition, the restoration or re-creation of habitat is not considered as a feasible or reliable option for offsets in the Western Cape: the biota is ill suited and the risk of failure too high. In view of the

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global significance of this province's biodiversity, offsets must be seen strictly as a 'last resort' form of mitigation once all other options have been shown to be exhausted. Clear 'bottom lines' where biodiversity offsets should not be considered in view of potentially irreplaceable loss of threatened species or ecosystems must be made explicit: a precautionary approach in this respect should be adopted.

The development of biodiversity plans in the Western Cape in recent years and the setting of targets for biodiversity conservation provide an explicit and scientifically defensible framework on which to focus offset efforts: there is an urgent need to protect and manage those priority areas for biodiversity conservation identified in biodiversity plans that are located outside of the existing protected area network on private land.

The Western Cape's draft guideline

The draft biodiversity offsets guideline (DEA&DP, 2007) responds to the current socioeconomic context and biodiversity conservation priorities in the Western Cape. The guideline is not seen as static, but provides a framework that will have to be modified to respond to a changing context over time. The objective of biodiversity offsets, through the development authorization and associated EIA process, is to ensure that residual impacts on biodiversity and ecosystem services of moderate to high significance are compensated in such a way that:

1. The cumulative impact of development does not cause any ecosystem to become more threatened than 'endangered'¹ or the conservation status of species and 'special habitats'² to decline;
2. Conservation efforts are focused in areas identified as priorities for biodiversity conservation;
3. Ecosystem services on which local or vulnerable human communities – or society as a whole – are dependent for livelihoods, health and/or safety, are safeguarded.

The proposed biodiversity offset system is underpinned by an explicit set of principles. Offsets would only be considered as a 'last resort' in the mitigation hierarchy. They would not be considered for residual impacts on critically endangered ecosystems, ecosystems containing irreplaceable biodiversity, or irreplaceable ecosystem services. Offsets would not be required for residual impacts of low significance on 'least threatened' ecosystems.

The system is based on area-based compensation in the form of 'like for like' habitat located either on the development site or off-site but in close proximity.

Offsets may need to comprise either a single or composite areas to compensate fully for residual biodiversity impacts. They are calculated by multiplying the residual area of affected habitat by a basic offset ratio linked to the national conservation status of the affected ecosystem (Driver *et al.*, 2005), as shown in Figure 1, namely a 30:1 ratio for 'critically endangered' ecosystems (to be considered in exceptional circumstances only), a 20:1 ratio for 'endangered' ecosystems, and a 5:1 ratio for 'vulnerable' ecosystems. This ratio aims to take into account the background rate of loss of the nation's ecosystems. Importantly, it also aims to build in a 'safety margin' in the light of data deficiencies or inaccuracies in impact assessment, levels of illegal conversion of indigenous natural systems, time lags in obtaining and interpreting data on land cover and ecosystem status, the relatively 'area-hungry' needs of ecological

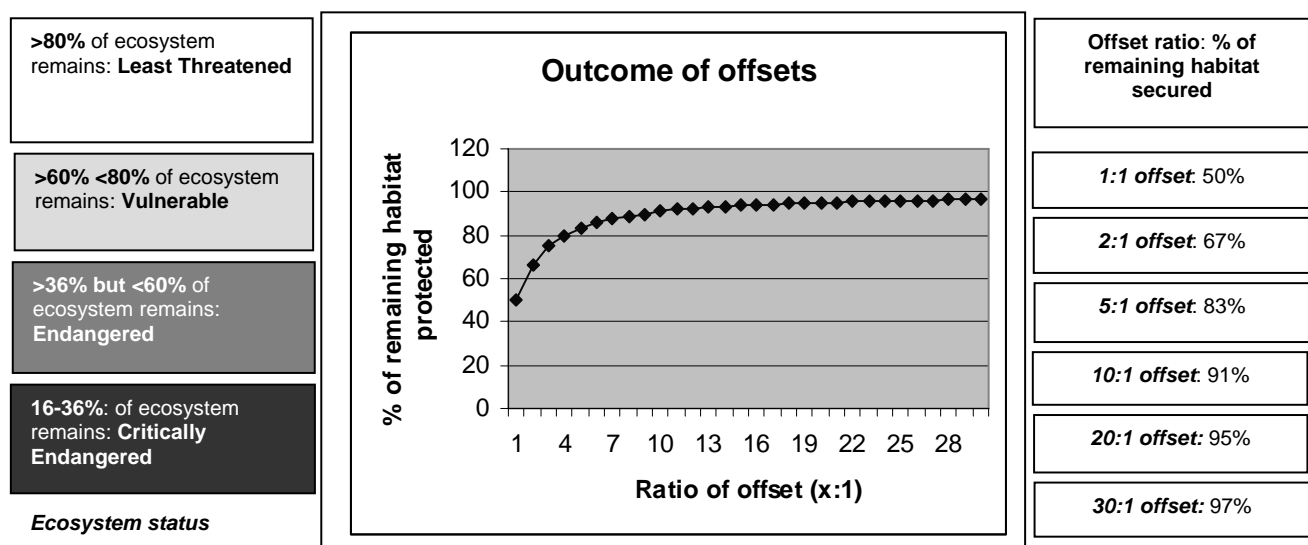


Figure 1. Basic ratio of offset linked to ecosystem status⁴

processes underpinning pattern, and inherent uncertainties regarding the response of ecosystems to climate change.

The area indicated by using the basic offset ratio is then adjusted by a range of context-specific considerations, namely the condition of the affected habitat and the significance of residual impacts on threatened species, special habitats, important ecological corridors or process areas, and on biodiversity underpinning ecosystem services with socio-economic value.

Offsets should preferably be located in an 'offset receiving area', namely a priority area for conservation identified in regional or local biodiversity plans³ or by the provincial conservation agency as being targeted for the expansion of protected areas, for consolidating important fragments of threatened habitat, and/or irreplaceable for meeting conservation targets. As far as possible, offset sites should be connected to other formally protected sites and make a positive contribution to securing, protecting and/or linking biodiversity priority areas, and/or consolidating ecological corridors in the landscape.

Suitable 'like for like' habitat could either be donated to a statutory conservation authority or an accredited Public Benefit Organization, or could be the subject of a formal conservation servitude drawn up between the State and the landowner. In every case, funds for management of the offset would be required. In some instances monetary compensation may be appropriate, rather than physical habitat, in the form of financial contributions commensurate with the costs of securing a suitable offset. The money would be given to an accredited conservation fund to acquire and manage priority habitat for biodiversity, and/or to expand or manage public protected areas.

In evaluating an offset proposal submitted as part of the development authorization process, decision-makers, in close consultation with the provincial biodiversity conservation agency, must satisfy themselves that the offset would compensate fully for the residual negative impacts on biodiversity and ecosystem services; be functionally viable in the long term; be acceptable to the main affected parties; and be implemented successfully and effectively with minimal risks of failure. If satisfied, they must ensure that the conditions of authorization are sufficiently explicit to enable enforcement and auditing of the offset's implementation.

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Discussion

Biodiversity conservation is embraced by most countries. However, there is a pressing need for poverty reduction and development in developing countries such as South Africa. Some further conversion of natural habitat, the main cause of biodiversity loss, with associated loss of genetic variability, is thus seen to be inevitable.

Most countries or states that have introduced biodiversity offsets stipulate either a 'no net loss' or a 'net gain' outcome of implementing offsets. However, the explicit interpretation of these terms is generally lacking.

- 'No net loss' could be taken in its strictest sense to mean no net loss of biological diversity from genetic to ecosystem levels. Alternatively, it could mean that the total amount of natural habitat must be maintained, and that biodiversity gains must at least be equal to any losses resulting from clearing or other forms of degradation of native vegetation (e.g. DEC, 2006). One could also view 'no net loss' in relation to formal targets or goals for biodiversity conservation in a particular country or area. Clearly, the scale at which 'no net loss' is measured affects its interpretation, as noted by Huggett (1998), who states that if the 'no net loss' policy is to work, the geographic scale on which alternatives are considered may need to be increased.
- For some extractive industries a net gain is the specified outcome, namely to establish a process to protect and manage biodiversity 'over and above that lost' (e.g. DWLBC, 2005, for the minerals and petroleum industry). Some authorities, e.g. EPA, Government of Western Australia (2006), are of the opinion that offsets should be used with an aspirational goal of achieving a 'net environmental benefit'.

In considering a regulated approach to be applied across different sectors and scales of development in a predictable and consistent manner, a 'net gain' outcome is difficult to define for the Western Cape, and unrealistic in a developing country context. Rather, an approach is sought that strives to ensure that representative areas of ecosystems and associated species, and biodiversity underpinning important ecosystem services, are secured for public protection in perpetuity. This approach requires reliable information on the status of ecosystems and species, and explicit conservation targets as well as defensible spatial conservation plans. The priorities reflected in the biodiversity plans of the Western Cape indicate 'offset receiving areas'. The approach thus echoes in part the approach taken in developing a draft Regional Conservation Plan for the Lower Hunter Valley, Australia (DEC, 2006): this plan indicates where new reserves are to be established, and identifies regional conservation priorities that should be the focus for future offsets.

In the absence of an overarching biodiversity conservation plan with clear priorities and targets, it could be argued that repeated biodiversity offsets, for which developers would be responsible for at most the life of a proposed development, could result in a game of 'offset dominoes': the cumulative risks and uncertainties associated with repeated undertakings to restore, create or enhance habitat resulting not only in insidious loss and fragmentation of biodiversity over time, but also in foregone opportunities to secure priority habitat as part of the conservation estate in perpetuity. According to Bekessy *et al.* (in press), trading schemes that allow vegetation clearance to be offset by protection of existing ecological assets will result in a net loss of habitat. Whereas this would indeed be the case on a project-by-project basis, the overall advantages of securing priority habitat for the conservation estate, and enabling biodiversity conservation targets to be met, are significant.

The ratio-based approach in the Western Cape has a number of merits, namely:

- It is relatively uncomplicated;
- It explicitly relates the size of offset to the conservation status of the impacted ecosystem;
- It sends a clear signal to developers to avoid priority biodiversity areas;
- It should significantly reduce further loss of threatened ecosystems and species;
- It introduces clear, fair (i.e. applied to all) and consistent expectations from government of developers with regard to providing biodiversity offsets and enables predictability in decision-making.

The main challenges to implementing the system of biodiversity offsets are:

1. To update the conservation status of ecosystems by monitoring conversion of ecosystems on a regular basis, to ensure that the offset ratios keep pace with the changing situation on the ground.
2. Monetary compensation increases the work of institutions and organizations responsible for biodiversity conservation in the Western Cape. Depending on their capacity, the added work may be problematic.
3. Perceptions of vested interest between different government departments and the conservation agency which could stand to benefit from an expanded land holding and/or financial benefits through receiving funds for the conservation management of offsets.
4. Ring-fencing and auditing performance of offset funding.

Notes

1. The Biodiversity Act makes provision for listing threatened ecosystems; listing is expected in 2008. Red Data Books/Red

Lists indicate threatened species, and the National Spatial Biodiversity Assessment lists threatened ecosystems.

2. Referred to in NBSAP, defined in some fine-scale biodiversity plans, or identified by the provincial conservation agency – 'special habitats' capture elements of significant biodiversity that would not be covered by coarser indicators such as threatened ecosystems. Could include habitat for migratory species, for life-stages of important species or locally rare or range-restricted species.
3. The range of biodiversity plans for the Western Cape can be viewed at the South African National Biodiversity Institute's website: <http://bgis.sanbi.org>.
4. The thresholds and categories used to determine and describe ecosystem status are currently being revised by the South African National Biodiversity Institute. The outcome of this process may result in minor changes to the basic offset ratios.

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