

# MITIGATION BANKING: SECURING NO NET LOSS TO BIODIVERSITY?

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## Introduction

Environmental advisors and planners are frequently confronted with the issue of ecological mitigation for losses due to development, the uncertainty over whether the proposed compensation is adequate and how the mitigation will function over time. The advantages of acquiring and retaining land in advance for ecological mitigation required by subsequent development has been demonstrated primarily in the USA where the process, termed Mitigation Banking, was pioneered for the conservation of wetlands. It has been in operation for over 15 years and is considered a valid approach in the regulatory framework. Elsewhere it may be termed Conservation Banking, Habitat Banking or Biodiversity Offsets and has been applied in a number of other countries (ten Kate, Bishop & Bayon, 2004).

In the face of continuing pressures on biodiversity in an often a highly fragmented and intensively used landscape in the UK, the argument for some form of mitigation banking becomes compelling as noted for coastal zone management (Crooks & Ledoux 2000). Mitigation Banking offers an alternative, and in our view often a better, means of mitigating and compensating for biodiversity impacts by providing a mechanism to deliver larger-scale habitat creation, enhancement and restoration schemes in association with planned development.

## Mitigation Banking and Biodiversity Offsets: a Brief Explanation

Information on mitigation banking in the USA may be found on a number of websites including the EPA, the Ecosystem Marketplace and Forest Trends, and in the UK at the Business and Biodiversity Organisation.

Essentially, the mitigation bank is established by acquiring land for the creation, or enhancement and management, of habitats or ecosystems for a particular wildlife or environmental resource. The asset is valued in terms of credits and the better the condition of the land in terms of its conservation objectives, the greater the value and the larger the number of credits. Where development results in unavoidable damage to an environmental or wildlife resource the damage can be mitigated by purchase of credits. In the US, where it is demonstrated that appropriate mitigation cannot be achieved at the development site, it is a federal requirement to mitigate by the acquisition of suitable credits. Credits may also be purchased, held, and traded in a process analogous to carbon trading.

Land with environmental and wildlife potential may be acquired by financial institutions, businesses, land-owners or investors and managed to maximise its biodiversity or environmental capital. Credits may then be sold as the land comes into appropriate and stable condition for which the asset was purchased. The purchase of credits does not in any way obviate adherence to existing legislation regarding environmental protection, natural resource or wildlife conservation, but may be used where impacts are deemed to be unavoidable. Along with the reduction in ecological risk that comes to the developer with the acquisition of credits also comes a reduction in financial risk; credits for species or a functioning ecological system can be accurately costed.

The monetary value of the credits is related to the costs of land acquisition, habitat creation and management. Credits for land set aside for mitigation banking can increase in value as the ecosystem develops and populations increase to a stable and self-sustaining level.

While the process of mitigation banking commenced for the protection of wetland ecosystems in the USA, the scheme now encompasses broader habitat and species banks (Bean & Dwyer 2000). In parallel to the conservation success of many of the mitigation banking schemes is the financial success of the institutions administering the banks or providing the ecological and conservation expertise. There are now thought to be around 150 such institutions in the US.

Mitigation banks have inverted conservation values: where wildlife conservation in the development context was formerly regarded as a financial drain and a liability, the mitigation banking system has transformed protected species and habitats into assets with direct monetary, as well as aesthetic, value.

The results of mitigation banking from the US experience appear to be broadly positive as a large number of successful conservation schemes have been achieved. There have been instances, however, where the mitigation measures have been considered inadequate. This has been attributed principally to the lack of regulatory supervision. This highlights the need for effective enforcement and monitoring for any such scheme which might be introduced into the UK.

## **Mitigation Banking: its Application in the UK**

### ***The Legislative and Planning Framework***

The European Community Habitats Directive, enacted in the UK by the 1994 Conservation (Natural Habitats & c) Regulations (Habitats Regulations), requires the protection, at a “favourable conservation status” of habitats and species deemed to be rare or vulnerable at an international level. This principle of no-net-loss applies certainly to the network of EC protected sites but also to qualifying species that may obtain resources, at least occasionally, outside protected sites. Examples of the latter might include birds from a protected estuary or marshland that may also roost or graze outside a SPA or bats from a SAC that forage along adjacent hedgerows. Where developments outside protected sites may affect the interest within, the statutory regulator will require an “appropriate assessment” to be undertaken and, if needed, mitigation (and/or compensation) to ensure no net loss.

Recent UK government guidance to planning authorities in its Planning Policy Statement No. 9 takes this principle further, stating (para. 1.vi) “*Where a planning decision would result in significant harm to biodiversity and geological interests which cannot be prevented or adequately mitigated against, appropriate compensation measures should be sought. If that significant harm cannot be prevented, adequately mitigated against, or compensated for, then planning permission should be refused*”.

The focus is therefore shifting from site-based conservation of habitats and species, to the maintenance of biodiversity and functioning ecosystems. This stems from the 1992 Convention on Biodiversity and is re-emphasised in the Government’s 2005 Sustainable Development Strategy (Ch. 5) which recognises the importance of biodiversity and biogenetic conservation to self-maintaining natural systems and “ecosystem services”. The recently enacted Natural Environment and Rural Communities Act (NERC)2006 requires of all public authorities to “have regard to biodiversity as far as is consistent with the proper exercise of their functions”. The growing awareness and concerns over the effects of climate change is reinforcing the view that ecosystems need to be conserved in a self-sustaining and resilient state such that their viability is maintained.

While the converging policies regarding the conservation of biodiversity and sustainability might be considered fairly straightforward, there remain considerable risks to “no net loss” under the current planning system.

Section 106 “Agreements” of the 1990 Town and Country Planning Act allow the applicant to enter into legally binding agreements to secure mechanisms to offset adverse environmental effects. While this adds power and flexibility to the planning process there are a number of notable disadvantages.

- agreements with the local authority usually predicate that the works or mitigation feature operate at a local level, often adjacent to the development, which may not be an optimal strategy;
- mitigation is often initiated at the same time or even after the development has taken place leading to a temporal loss of ecological resources;
- timescales for ecological succession leading to habitat stability are therefore often too short, and,
- overarching mitigation for combined developments, which may be temporally as well as spatially separated is rarely sought, unless part of an appropriate assessment under Para. 48(1) of the Habitats Regulations.

In addition, there can be a substantial gap between what is promised by developers through planning obligations and what is delivered, due to the inadequacy of subsequent monitoring and enforcement.

## ***Statutory Requirements and Ecological Principles***

### **Like-for-Like Mitigation**

The no-net-loss principle dictates that where mitigation is obtained by means of credits obtained from conservation banks, these credits should have parity with the losses due to development, both in keeping with the scale of loss and the nature of the loss. The financial analogy would be that the credits are of the appropriate currency and monetary value. Thus a pond with protected great crested newts necessarily lost to development would require replacement habitats for that species, chalk grassland re-created in mitigation for losses to development should be of a similar plant community, for example, as defined by the National Vegetation Classification.

### **Critical Natural Capital or Non-replaceable Habitats**

It has been noted above, that conservation banks are limited to those habitats that can be created or manipulated to increase their conservation value in terms of their ecological function, habitats, or particular species of conservation concern. Losses cannot be accepted to habitats that are deemed, in realistic timescales, to be irreplaceable. Such habitats or ecosystems are termed critical natural capital, and thus it would not be possible to obtain or trade in credits for such resources. Examples in the UK of habitats deemed irreplaceable include those that have developed under very long time scales, e.g. ancient woodland or raised mires. Other habitats may be very difficult to replicate because of environmental complexity, e.g. habitat mosaics on complex geology, or intricate relationships between physical and biological factors, e.g. springline communities, hibernation caves for bats.

## **Spatial Relationships between Development Areas and Mitigation Sites**

### Size

The creation of large reserve areas for wildlife are often more successful in producing stable and self sustaining populations of the target species and habitats than small isolated sites. Small populations may be vulnerable to random catastrophic factors such as storms, flooding or drought, or the deleterious effects of inbreeding. Small islands of vegetation may be vulnerable to edge effects from exposure to wind effects or nutrient deposition, or the effects of invasive species from surrounding habitats (e.g. colonisation of tree species into small patches of heath or chalk grassland). Thus small sites can require a disproportionate effort of management in order to maintain their ecological interest and mitigation costs for separate developments can also be higher where administration and management are replicated both spatially and over time in separate commissions for the same target habitat or species.

There is therefore now considerable interest in developing large 'reserves' at a landscape scale, e.g. the various initiatives for the restoration of extensive reedbeds in the Fens, habitats

or biotopes sized to support sustainable populations of key, “flagship” species, e.g. marsh harrier, bittern and otter; animals which require significant areas for feeding or breeding territories. Agri-environment schemes are taking account of landscape-scale delivery of biodiversity.

### Location

It is often appropriate re-create habitats in the same ecological area (e.g. English Nature’s Natural Areas or Joint Character Areas) to obtain the best like-for-like replacement. It may also be necessary to make even finer discriminations based on microclimatic factors or soil types.

There may also be advantages in nearby compensation for housing or employment developments to provide a visible and accessible amenity and a public perception of replacement of valued natural resources.

However, in some cases, the success of mitigation may be compromised by siting the area in close proximity to the development. These would include mitigation areas for species that are sensitive to anthropogenic disturbances such as visual disturbance from walkers, noise, fires, disturbance or predation from domestic pets. The degradation of lowland heaths as an apparent result of proximate housing developments is well documented (Liley & Clarke 2001, Underhill-Day 2005) and has led to the development of local spatial planning policies (English Nature 2005). On-site or adjacent mitigation may also not be appropriate for busy transport corridors where bird communities may be affected by high levels of road noise, road kill, or sensitive plant communities exposed to a decline in air or water quality. In such cases it would be necessary to seek alternative sites well beyond the range of expected impact. Climate change adds a challenging new dimension to this debate. The value of habitat banking is that it provides a mechanism for the delivery of this resource.

### Landscape and Habitat Pattern: Core sites, Green Corridors and Ecological Networks.

The principle of wildlife corridors or landscape “stepping stones” is given a legal basis by the Habitats Regulations and is enshrined in UK Government policy (ODPM 2002) for its dual amenity and nature conservation function. However, it is important to consider the dispersal capacity and behaviour of the wildlife species in question (Dawson 1994). The capacity for wildlife to move along such corridors or negotiate stepping stones is highly species specific (Joly *et al.* 2001, Wood & Pullin 2002, Angold *et al.* 2006). It is becoming evident that such corridors may be of benefit to perhaps a rather limited number of species (News @ Nature.com 2001).

More recently the basic principle of landscape connectivity has been extended to a consideration of ecological networks as a wildlife conservation strategy. The network is defined as a framework of ecological components providing a range of core habitat areas, corridors and buffer zones in order to sustain the set of physical and biological systems necessary for ecosystems and species populations to survive in a human-dominated landscape (Jongman & Pungetti 2004). From this definition, it is clear that ecological networks are more than a mere latticework of linear connections, rather they should comprise broad landscape connections with mosaics of habitats present which may include linear features as well as spatially and ecologically diverse habitat patches. A number of European states are adopting this principle in their regional and national spatial planning strategies, (the Estonia Green Network, Jongman 2003, 2002, Vuilleumers & Prelaz-Droux 2002) but, apart from a local project in Cheshire, the principle has yet to gain prominence in the UK (Hodcroft & Alexander 2004).

The expected impacts of climate change are reinforcing views on the necessity for functional and well planned ecological networks at a regional and national scale so that population movements along latitudinal or altitudinal gradients may be facilitated (Bright 1997, UNEP/DEFRA 2006, IEEM 2006). While it can be envisaged that mitigation banking could supply one of the principal mechanisms for the provision of ecological networks, the extent to which habitats can, or should, be manipulated in order to accommodate the predicted effects of climate change will need careful and detailed consideration based on sound data concerning the species or habitats involved.

## **Timescales for Habitat Development and Ecological Succession**

Where the habitats of the mitigation bank can be created well in advance of its requirement in compensation for losses to development, the uncertainty as to the success of mitigation in the early phases is reduced as the process of ecological succession, and management as needed, render the habitat better suited for its purpose. Timescales for habitat creation vary according to the type of habitat. Ponds may be available for colonisation by protected amphibian or aquatic insect populations within one or two years; species-rich grasslands may take 4-5 years, with appropriate management, to stabilise; mature scrub mosaics or hedges 10-12 years, while woodlands will clearly take many decades to mature. The principle that newly created habitats should be in place in appropriate condition for their compensatory purpose is noted in Paragraph 30 of the UK Government's Circular on Biodiversity and Geological Conservation, but this can be difficult to achieve under the current planning regime.

The important advantages in ensuring that habitats undergo the correct development period are therefore:

- the longer the period of development, the greater the likelihood that some measure of habitat stability is achieved, though this is often reliant on the correct management regime;
- with appropriate monitoring, and remedial action where needed, the risk of failure declines over time,
- the habitat is therefore better able to fulfil its intended biodiversity function; and
- the value of the credits for the habitat increase over time, in keeping with greater stability, habitat quality and the assurance that the habitat will fulfil its objectives,

The ability to produce mature and stable habitats is perhaps the key advantage of the mitigation banking system, as long as the bank is correctly regulated and monitored.

## ***Mitigation for Habitats and Species without Statutory Protection***

For habitats and species without direct statutory protection, there is an increasing emphasis on similar compensation being provided for any losses of biodiversity due to development (PPS9). While the specific wildlife elements comprising biodiversity are not defined in PPS9, species and habitats requiring conservation action are listed under Section 74 of the 2000 CRoW Act, the species and habitats being generally subjects of the UK Biodiversity Action Plans (BAP). This legislation is reinforced by Section 40 of the NERC Act as noted above.

In addition to BAP and Section 74 habitats and species, the Red and Amber lists of bird species (JNCC 2002) and Red Data books point to additional species for conservation action.

While mitigation banks could be developed to permit compensation for BAP species and habitats lost to development, it would clearly be inappropriate for gains within the banks to be counted as progress towards BAP targets for key habitats or species and the development of mitigation banks should not, in any way, reduce the effort to promote the favourable conservation status of these species. Nevertheless, in some cases the presence of core populations within the banks, developed to compensate for losses elsewhere, may make a temporal, local contribution to species recovery outside the banks where favourable habitats exist.

## **Development in Farmland, a Case in Point**

With increasing development on greenfield sites and greenbelt land (Barker 2006) in the UK, pressures continue on communities of the mosaic of farmland habitats, already much depleted by intensive farming. Invariably, the characteristic and declining species associations that depend on the mosaic habitat structure and extensive landscapes remaining in much of farmland Britain are displaced by new housing and roads and replaced by commonplace species of the urban edge and suburban gardens. While adequate green space may be provided with new developments, the characteristic suite of animal and plant species of rural farming landscapes rarely survive in suburban open spaces managed primarily for public use.

The concern over the loss of species characteristic of arable farmland is highlighted in plans within the UK BAPs and summarized in chapter 4 of the Government's Biodiversity Strategy for England (DEFRA 2002a). The techniques required in order to realise these objectives are becoming increasingly well established through the experience of Environmental Stewardship schemes and dedicated research, e.g. Winspear & Davies 2005, Lawson et al 2004, and Tattersall 2000.

As attention is increasingly drawn to the loss to overall biodiversity and the specialist species present on farmland, the statutory conservation agencies and planning authorities are likely, in accordance with the requirements of PPS 9, to seek appropriate mitigation for such losses due to development. The advance acquisition of biodiversity credits in species and habitats characteristic of farmland habitats appears to be increasingly tenable given current concerns over landscape conservation, intensive agriculture, food quality and the rural economy. Moreover, linked to public goods and services, large-scale biodiversity enhancements on farmland, delivered through mitigation banking, could also provide more areas for people to visit, alleviating pressure on vulnerable sites.

## **Whole Landscape Conservation**

By supporting a farming system geared towards conserving declining animal and plant species of increasingly rare farming landscapes, other gains, in addition to enhanced biodiversity, may arise. There is some evidence that extensive and organic farming methods not only produce increasingly sought-after products with a high market value but also support a landscape that offers sustainable production (Bullock et al. 2007) with a higher biodiversity than modern conventional intensive farming (New Scientist 2004), particularly with respect to insect species (Ockinger & Smith 2007) that then sustain declining species such as bats (Wickramasinghe et al 2004) and insectivorous birds. Organic farming is now seen as a viable sector of the UK agriculture industry with acknowledged benefits for sustainability, biodiversity and the rural economy (DEFRA 2002b, 2004) though without farm diversification, the economics can be borderline.

Payments for biodiversity credits held by landowners who conserved the rarer species upon their land could assist in keeping land-owners or tenant farmers and their employees working on the land, thereby assisting the rural economy. Management for sustainable food production and biodiversity often requires a higher level of skilled application whether applied to the management of rotational farming, sound and sympathetic animal husbandry, maintenance of farm woodlands and hedges by coppicing and laying, or the management of flood plains.

Landscapes farmed in part for biodiversity objectives have a higher visual appeal than those under intensive agriculture which often result in rather forbidding and constrained environments for ready public access. Bio-diverse landscapes would have an enhanced high value for public enjoyment and, as stated above, would relieve pressure on the more vulnerable, protected sites, assisting in progress towards government targets for restoring the SSSI network to favourable condition.

The Rural Strategy (DEFRA 2004) presents a government vision of a living, working, protected and vibrant countryside comprising sustainable rural communities where economic, social and environmental issues are all taken into account. A system of mitigation banking applied to whole landscapes could transfer some of this commitment more properly from the public purse, one of the objectives of the Government's sustainable farming strategy (DEFRA 2002b), to the developer where compensation for the loss of farmland biodiversity is required.

The system would benefit extensive landscape initiatives where progress and sustainable management may be limited by the uncertainties and unpredictability of piecemeal funding (Wall 2006). As noted above, such initiatives could also be spatially designed to deliver the ecological networks needed to enable the dispersion of species across the wider landscape, from local, through regional, even to national dimensions, providing one of the pre-requisites for mitigating the effects of climate change.

## ***Delivery of the Mitigation Banking System***

With no formal system in place for a nationwide approach to mitigation banking, the approach at present would rely on partnerships between financial institutions and land management or conservation agencies, with a role in the latter for both the non-governmental and statutory sectors. There is, however, nothing to prevent developers from acquiring additional land and managing this in order to provide for future mitigation needs. However, we believe such acquisition, or establishment of land is more appropriately done through a third party working independently of the developer and relieving him from the specialist work of ecological mitigation design, construction and management. Discussions with developers along these lines suggests that this is also their favoured option should it be feasible to take forward mitigation banking in the near future.

Regulatory supervision, as with the carbon trading scheme administered by the Environment Agency, would be most properly undertaken by the appropriate government conservation agencies Natural England, Scottish Natural Heritage, Countryside Council for Wales and Environment & Heritage Service in Northern Ireland, though it is highly likely, and clearly desirable both for the regulators and the development industry, that these agencies would require that the client or developer seeking mitigation credits should obtain the assistance of professional ecologists for guidance as to the details of the credits sought.

There is a real opportunity to obtain much greater gains for biodiversity, landscape and nature conservation, through the implementation of a mechanism based on mitigation banking which allows funds to be aggregated from a range of development projects in order to implement habitat creation, restoration and enhancement, at large spatial scales. We propose that such a mechanism is enshrined within the planning process in the UK.

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