The Natural Capital Initiative

Towards no net loss and beyond

Addressing scientific knowledge and environmental information challenges for biodiversity offsetting in the UK

A one day inter-disciplinary workshop
organised by the Natural Capital Initiative

SUMMARY REPORT

FOR POLICY MAKERS

Workshop held on Wednesday 29th September 2010
at Charles Darwin House, London

Natural Capital Initiative (2010) *Addressing scientific knowledge and environmental information challenges for biodiversity offsetting in the UK.* Summary report for policy makers on the second 'Towards no net loss, and beyond' workshop, 29th September, 2010. 24p.

www.naturalcapitalinitiative.org.uk

Contents

The Natural Capital Initiative (NCI)

NCI aims to support the development of UK science, policy and practice aligned with the ecosystem approach; a way of looking at whole ecosystems in decision making and for valuing the goods and services they provide. In relation to this aim, NCI is:

• Providing an independent and inclusive forum for debate;

• Identifying gaps in science, policy and its implementation and facilitating the debate about how to address these gaps;

• Liaising with, and informing, key Government, Research Council and other initiatives, and

• Engaging the public and inspiring the next generation.

NCI is a partnership between the British Ecological Society, the Centre for Ecology and Hydrology and the Society of Biology. NCI is a member of the International Year of Biodiversity UK partnership.

Connect A

The Natural Capital Initiative would like to acknowledge the support of the Natural Environment Research Council to the running of the second and third in the '*Towards no net loss, and beyond*' workshop series, through the Connect A funding scheme.[1] Connect A facilitates and promotes new partnerships between universities and research institutes and public/private sector science users (industry, business, commerce or public sector agencies).

[1] (NE/I529390/1 to CEH (Howard/Hails).

Summary

This report summarises the views and ideas expressed during a workshop to identify and assess the scientific knowledge and environmental information needed to underpin the possible large-scale implementation of biodiversity offsetting in the UK. The event involved 37 participants from a wide range of organisations. It was organised by the Natural Capital Initiative; an independent forum for discussion of policy and practice aligned with the ecosystem approach.

'Biodiversity offsetting' means the delivery of measurable conservation outcomes to compensate for the residual ecological impacts of development. It applies where all means of avoiding impacts, and reducing their severity, have been utilised. Biodiversity offsets can potentially be applied to development in terrestrial, freshwater, coastal or marine environments. They can take the form of 'case by case' (site-specific) offsets, habitat or species banking, or can proceed via *in lieu* fees. Increased biodiversity offsetting could be a contributor to the protection and enhancement of UK biodiversity, especially at sites not already protected by law for their biodiversity value.

Key messages were derived from the workshop:

1. Good quality biodiversity data are needed to underpin the development and operation of biodiversity offsetting in the UK. Whilst the data resource available in the UK is world-leading, there are still limitations which need to be resolved.

2. The biodiversity data which currently exist in the UK are sufficient to support implementation of biodiversity offsetting now. However, these data represent only a starting point, which must be built upon if offsetting is to deliver positively for biodiversity.

3. A comprehensive assessment of data sources should be undertaken to ascertain what data exist to inform offset development, with identification of significant gaps in availability.

4. Biodiversity data must be standardised, to enable sharing between stakeholders involved in the design and development of offset sites.

5. Biodiversity offsetting has the potential to contribute to the climate resilience of the landscape in the UK.

6. The location of biodiversity offsets should be planned strategically in order to improve ecological networks and enhance the connectivity of landscapes.

7. To design effective offsets for the residual impacts of development on a site, it is necessary to understand what aspects of biodiversity need to be offset.

8. Ecological restoration projects can be very successful. There are, however, limitations to how far ecological restoration can offset the residual impacts of development on biodiversity.

9. Simple principles of ecological restoration can guide the design of biodiversity offsetting schemes.

10. Sharing practical experiences and understanding will assist in the most effective and resource-efficient creation of offset sites.

Each of the key messages is described on Pages 10 to 15. These are not listed in any order of priority.

Introduction

This report

This report has been prepared by the Natural Capital Initiative (NCI) as a summary of the views and ideas expressed by participants at our workshop on 29th September 2010, to identify and assess the scientific knowledge and environmental information required to support the possible large scale use of biodiversity offsetting in the UK, and to explore how gaps in this support may be filled. The event involved 37 participants from 29 organisations with interest in the increased use of biodiversity offsetting across the UK, or involved in ecological research which will inform offset creation.

The NCI is an independent forum. Therefore, omission or inclusion of a view or idea in this summary report should not be used to infer any judgement on its value, or any position of the NCI. The views and ideas expressed are not necessarily those of all individuals or organisations present at the workshop.

This report has been prepared to assist policy makers evaluating the topic, as well as those organisations that may wish to initiate or fund the development of scientific knowledge or environmental data to underpin greater use of biodiversity offsetting in the UK.

Information and views about the increased use of biodiversity offsetting in the UK have been given in a variety of other forums. It is important that these are taken into account when assessing the potential contribution of biodiversity offsetting mechanisms toward biodiversity goals. A list of literature that may be useful in informing thinking about biodiversity offsetting in the UK is available on the NCI website.[2]

Biodiversity offsetting

Biodiversity offsetting is an approach to the provision of compensation for the ecological impacts of development in cases where avoidance of impacts, or reduction in their severity, is not possible.[3] It has been defined as follows:

> *Measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from development plans or projects after appropriate prevention and mitigation measures have been taken*.
>
> Source: Business and Biodiversity Offsets Programme.

Biodiversity offsets can take the form of 'case by case' (site-specific) offsets, habitat or species banking, or can proceed via *in lieu* fees. They can potentially be applied to development governed by the planning system in terrestrial, freshwater, coastal or marine environments, for which there is the potential for biodiversity loss.

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[2] http://www.naturalcapitalinitiative.org.uk/

[3] The 'mitigation hierarchy' still applies – see DCLG (2006) *Environmental Impact Assessment: A guide to good practice and procedures. A consultation paper.* 90p.

Biodiversity offsetting may also be applied to compensate for accidental damage to biodiversity (i.e. after it has occurred). This includes actions that may be required due to the Environmental Liability Directive (2004/35/EC).

Biodiversity offsetting has been applied in the UK for a number of years on a site-specific basis in relation to developments such as major ports, housing, quarrying and coastal realignment projects. Under the Habitats Directive (92/43/EEC), development that cannot avoid an adverse affect on sites designated for their international conservation importance requires compensatory measures. For other sites (representing the vast majority of land development in the UK) offsetting is encouraged by public policy but not required in law. The European Environmental Impact Assessment Directive (85/337/EEC) states that developers should: "*where possible offset any significant adverse effects on the environment*".[4] The Strategic Environmental Assessment Directive (2001/42/EC) contains a similar instruction.

The 2010 Draft Defra Structural Reform Plan includes a commitment to "*assess the scope for actions to offset the impact of development on biodiversity*".[5] Public policy surrounding biodiversity offsetting developed by previous Governments is reviewed in the Defra Scoping Study on the Design and Use of Biodiversity Offsets in England.[6]

Scientific knowledge and environmental information challenges

In determining the scope of this workshop, the Natural Capital Initiative Secretariat had regard to the issues raised by participants in the first workshop in the '*Towards no net loss, and beyond'* series. These issues, together with discussions with individuals from relevant sectors with an interest in the topic, yielded the following four areas to act as a focus for workshop discussions:

a. *The implications of environmental change for the longevity of offset credits.*

Much work has been undertaken to measure, evaluate and predict the changes in ecological systems which have resulted or may result from climatic change. Given the challenge of ensuring that biodiversity offsets remain effective long beyond their creation, the direct and indirect effects of climate change on ecosystems should be an important consideration.

b. *Opportunities and constraints of restoration ecology for the generation of credits*

Habitat restoration and creation are the primary methods by which to deliver new habitat to offset the residual impacts of development on biodiversity. Identifying the successes and failures from existing experience is crucial. Alongside this, the limitations of restoration and

[4] Council Directive of 27th June 1985 on the Assessment of the Effects of Certain Public and Private Projects on the Environment. 85/337/EEC. .
[5] Defra (2010) Draft Structural Reform Plan. Published 16th July 2010.
[6] Treweek, J. *et al*. (2009) *Scoping Study on the Design and Use of Biodiversity Offsets in England.* Final Report to Defra (Contract NE 0801). 131p.

creation techniques must be recognised in order to establish which habitats are appropriate for inclusion in and exclusion from, offsetting schemes.

c. Data needs and provision

Biodiversity offsetting involves the delivery of *measureable* conservation outcomes. Good-quality, up-to-date biodiversity information, collected with scientific rigour, is therefore required to underpin offsetting design and implementation.[7] These data may need to be used by a wide range of organisations involved in delivering offsetting. Measures to increase the use of biodiversity offsetting might have the added benefit of bringing about the improved integration of existing biodiversity data so as to assist in the achievement of wider biodiversity goals.

d. The contribution of offsetting towards biodiversity and landscape goals

Sites of biodiversity value do not function in isolation but as components in an ecological network.[8] One of the advantages put forward for habitat banking, a mechanism for delivering biodiversity offsets, is that it provides an opportunity for the consolidation of ecological restoration into areas of higher overall nature conservation value.[9] There is therefore a need to consider how biodiversity offsetting could contribute to local, regional and national biodiversity goals, and compliment the delivery of functional landscapes.

'Towards no net loss, and beyond' workshop series

This series of workshops was organised by the NCI to address some of the biggest cross-cutting challenges for the potential large scale implementation of biodiversity offsetting in the UK.

1. Practical challenges for the further implementation of biodiversity offsetting (22nd June, 2010). *The summary report of this workshop, written primarily to inform policy-makers, is available from the NCI website.*[10]

2. Addressing scientific and environmental information challenges for biodiversity offsetting in the UK (29th September, 2010);

3. Designing a system to offset for the residual impacts of terrestrial development on ecosystem service provision (7th December, 2010).

[7] Natural Capital Initiative (2010) *Addressing practical challenges for biodiversity offsetting in the UK*. Summary report for policy makers on the first 'Towards no net loss, and beyond' workshop, 22nd June, 2010. 19p . Recommendation 9 (page 8 of 19).
[8] Lawton, J.H.*et al* (2010) *Making Space for Nature: a review of England's wildlife sites and ecological network*. Report to Defra. 107p.
[9] Briggs, B.D.J., Hill, D.A., and Gillespie, R. (2009) Habitat banking – how it could work in the UK, *Journal for Nature Conservation*, **17**: 112-122.
[10] See 7.

These workshops are intended as a contribution to these challenges by bringing together individuals with a broad range of expertise and perspectives.

Workshop 2 – addressing scientific and environmental information challenges

The aim of this workshop was:

> *To identify and assess the scientific knowledge and environmental information required to underpin the effective large scale use of biodiversity offsetting in the UK.*

The workshop programme and a list of participants are provided in **Annexes A** and **B** of this report.

Design and structure of the workshop

The NCI approached published expert authors and representatives of public bodies (central government and local authorities), research institutions, business and advocacy groups, outlining the aims of the planned workshop, with an invitation to participate. We aimed for a balance of different types of organisation, perspective and expertise to be present at the event. A briefing document was sent to all participants, summarising the concept of biodiversity offsetting, current literature and key issues.

The workshop was conducted under the Chatham House Rule. Short briefing presentations (summarised in **Annex C**) set the context for group discussion of questions (**Annex D**). Participants were assigned to groups to ensure balanced representation of different types of organisation and areas of expertise. Each group was led by a chairperson, assisted by a facilitator, and discussions were recorded by a scribe. Professor Ken Norris of the Centre for Agri-Environmental Research at the University of Reading chaired the plenary sessions. The notes of both plenary and discussion group sessions informed production of this report.

The following key messages are not listed in any order of priority.

Key messages

1. **Good quality biodiversity data are needed to underpin the development and operation of biodiversity offsetting in the UK. Whilst the data resource available in the UK is world-leading, there are still limitations which need to be resolved.**

a. The provision of information on the quality of biodiversity data records is important in ensuring that data are used appropriately to inform decisions on biodiversity offsetting. This includes the date on which a record was produced, spatial information on where the data were collected and whether the record was captured by an amateur naturalist or qualified ecologist.

b. Data are available through multiple sources in the UK.[11] These data are essential to underpin biodiversity offset creation and assessment. These systems have been designed with different objectives and use a range of different parameters for classification, making comparison between them difficult.

c. The abundance of species is rarely recorded, for example in the National Biodiversity Network (NBN).[12] In assessing impact, or potential offset, sites this limitation should be considered as this may create a false impression of species abundance on the site.

2. The biodiversity data which currently exist in the UK are sufficient to support implementation of biodiversity offsetting now. However, these data represent only a starting point, which must be built upon if offsetting is to deliver positively for biodiversity.

a. Data which currently exist in the UK are sufficient to allow the development of a biodiversity offsetting system now. The data which exist must be augmented as the scheme develops through time, to improve this resource. Mapping habitats strategically across the UK would be desirable to inform the development of biodiversity offsetting.

b. The ecological community needs to agree upon a standard classification for habitats, which those involved in offsetting delivery can follow when carrying out surveys of offset and impact site. Through gathering these data in a reactive fashion information about the UK's habitats can be built up.

c. Building up a baseline habitat map of the UK will allow relatively simple assessment of the impact site, along with details of potential offset sites. A baseline habitat map could be complimented by climate change scenarios (Key Message 5) and restoration opportunity maps (Key Message 6) to ensure well-planned and targeted offsets.

3. A comprehensive assessment of data sources should be undertaken to ascertain what data exist to inform the design of biodiversity offsetting schemes and individual offsets, with identification of significant gaps in availability.

a. Information on biodiversity present at an impact site may be collected by ecological consultants through assessment methods such as the BRE Environmental

[11] Sources of biodiversity data include Local Environmental/Biological Records Centres, Wildlife Trusts, other conservation organisations and Natural History Societies. The National Biodiversity Network (NBN) Gateway aims to provide a single point of access to these biodiversity data in the UK. Data are also collected under numerous classifications, including Phase 1 Habitat Classifications, the National Vegetation Classification and through Common Standards Monitoring, Environmental Impact Assessment and the BRE Environmental Assessment Method.

[12] For example, the abundance of the Lizard Orchid in England increased between 1990 and 1935 and then declined dramatically. Such fluctuations are common to many orchids, and other species. At the time of sampling it may not be clear whether a species has been captured during a peak or a trough in abundance. Records on the Lizard Orchid haven't been added to the NBN since 2000, indicating that NBN records are not necessarily up to date, even given efforts to maintain this resource.

Assessment Method (BREEAM) and Environmental Impact Assessment. Data gathered on a case-by-case basis could fill some of the gaps which currently exist in data availability.

4. Biodiversity data must be standardised, to enable sharing between stakeholders involved in the design and development of offset sites.

a. The BICCO-Net online collaborative project could provide a model. Agreed metrics and scales for data collection are needed, in order to allow consolidation and the integration of habitat, climate and restoration opportunity maps.

b. Data provision is vital for offset success but is not cost neutral. Funding does not necessarily need to come from Government. Developers and researchers could form partnerships for the delivery of data, with a proportion of the funds set aside by developers to finance offsets used to pay for data collection and monitoring. Data gathering will improve the effectiveness of the offset and so maximise the return on a developer's investment.

c. Stakeholders involved in the design of biodiversity offset schemes, including ecological researchers and ecological consultants, should have easy access to the full range of data which are available.[11]

5. Biodiversity offsetting has the potential to contribute to the climate resilience of the landscape in the UK.

a. Biodiversity offsetting could provide opportunities for better adapting the landscape of the UK to the direct and indirect impacts of climate change, for example by creating or enhancing ecological networks to allow species to shift their ranges and distribution as the climate alters.

b. Biodiversity offsetting offers a potential funding source for climate change adaptation.

c. Medium to long-term climate projections should be used to build resilience to climate change into the core design of biodiversity offsetting schemes, in line with the goal of safeguarding offset sites in perpetuity.

d. Maps of future climatic conditions[13] should be compared with maps showing areas where high levels of built development are likely, and maps showing where there may be opportunities to restore degraded habitats. This will identify sites most suitable for offset creation.

[13] As generated for example by the UK Climate Impacts Programme.

e. The way in which species may respond to a changing climate is a further important consideration in the design of biodiversity offsetting schemes. If individual species (or groups of species) at the site of a development impact are projected to be less successful at an offset site due to climate change, alternative species might be used for the offset. Ecologists should develop a framework within which to assess these 'like for unlike' trade-offs and tools for assessing the 'equivalent value' of species.

f. Habitats may alter due to a changing climate but may still be valuable in terms of biodiversity. Biodiversity offsetting schemes will need flexibility to accommodate this. Adequate monitoring will be required through time at individual sites to assess how a habitat is changing.

6. The location of biodiversity offsets should be planned strategically in order to improve ecological networks and enhance the connectivity of landscapes.

a. Investing effort in habitat recreation or restoration at an offsetting site will be likely to lead to benefits for both that site and the function of the surrounding landscape. In particular, it can help to enlarge areas already protected for their biodiversity value and 'buffer' them from disturbance in the surrounding area. Biodiversity offsetting has the potential to increase the heterogeneity of different types of habitat in any one area and, therefore, the strength of ecological networks.[14]

b. National Character Areas (NCAs) could provide one framework within which to consider the location of offset sites. If impact and offset site were to be in the same NCA, species would be linked into the existing landscape structure and semi-natural environment, with a lower risk therefore of these species becoming isolated and their survival less viable.

c. Some aspects of the ecological restoration potential of the UK have been mapped.[15] A larger scale effort is needed to create restoration 'opportunity' maps of the UK, illustrating those areas where there is the potential to create offsets successfully. These will need to take soil type, topography and hydrology into account. (As acknowledged in Key Message 5, these 'opportunity maps' should be overlaid with maps illustrating the likely effects of climate change on the UK).

7. To design effective offsets for the residual impacts of development on biodiversity at a particular site, it is necessary to understand what aspects of biodiversity need to be offset.

[14] An ecological network has been defined as "a suite of high quality sites which collectively contain the diversity and area of habitat that are needed to support species and which have ecological connections between them that enable species, or at least their genes, to move." See Lawton *et al.* (2010) Making Space for Nature. p14.

[15] An example is the RSPB's HEaP project to map the extent of all lowland heaths in Britain and potential areas where this habitat could be restored.

a. An offset site should be situated in the location which will provide the optimum outcome for biodiversity. This should depend on the restoration potential of the site, including proximity to a good quality source habitat, soil type, hydrology and climatic suitability.

b. Understanding the requirements of species and species mixes (assemblages) being offset will affect the scale at which biodiversity offsets are delivered. Particular species may be extremely limited in their ability to disperse through the landscape, requiring the offset site to be created in close proximity to the impact site. Others may require particular habitat only available at a distance. It may therefore be appropriate to create multiple receptor sites to offset for the impact of one development.

c. Consideration should not be limited to biodiversity however but may include social aspects, such as recreational or cultural value. The impact site may have been highly valued for recreation, leisure or access by local communities. It may be appropriate in some cases to compensate for the lost cultural value of an impact site with the creation of an area of publicly accessible green space in close proximity to the development, with biodiversity offsets delivered elsewhere.

8. Ecological restoration projects can be very successful. There are, however, limitations to how far ecological restoration can offset the residual impacts of development on biodiversity.

a. Global analysis shows that the speed and success rates of ecological restoration projects are hugely variable. Chalk grasslands, for example, can take upwards of 60 years to reach a target condition.[16] There are no 'rules' and outcomes are never certain.

b. Restoration success is limited by factors such as seed mix and disturbance intensity. Generalist species (those that do not require highly specific conditions to survive) tend to perform well in restoration projects, compared to specialists, which are often rare species with limited geographic ranges and which may require specific management. The amount of time, effort and money spent on a restoration project is related to the likelihood of success.

c. Ongoing maintenance will be required to ensure desired outcomes are achieved. This, combined with the length of time that it may take for the offset site to reach the target state initially, has implications for the cost that developers may be required to pay for offset creation.

[16] Fagan, K.C., Pywell, R.F., Bullock, J.M., and Marrs, R.H. (2008) Do restored calcareous grasslands on former arable fields resemble ancient targets? The effect of time, methods and environment on outcomes. *Journal of Applied Ecology*, **45**: 1293-1303.

d. Realistic indicators of the success of offsets are needed at five or ten year intervals and beyond. Goals for an offset site should be set on the basis of sound ecological advice.

9. Simple principles of ecological restoration can guide the design of biodiversity offsetting schemes.

a. Habitat restoration or recreation at an offset site will be more likely to succeed if the site is located in close proximity to a good quality habitat, of the same type as the 'target' state for the restoration project. This habitat can act as a source of biological material that may lead to colonisation of the offset site.

b. When an offset site is being considered, the potential for it to be managed so as to reach the desired outcome should be assessed. For example, sites with low fertility soils are more likely to support the desired species assemblages.

c. The science of ecological restoration shows that adaptive management ('learning by doing') must be a fundamental part of the implementation of biodiversity offsetting schemes.

10. Sharing practical experiences and understanding will assist in the most effective and resource-efficient creation of offset sites.

a. Making use of the information currently accessible through the online resource www.conservationevidence.com, or submitting details of case-studies, summaries or interventions to the website, could be an effective way of disseminating best practice, to assist effective offset creation. A 'handbook of good practice' and a resource collating case-study examples of restoration projects could be developed to assist in the sharing of information to inform the design of biodiversity offsets.

Annexes

Annex A – Workshop programme

Session	Start / end	Activity	Speaker
	09:30 – 10:00	*Registration, with coffee and pastries*	
Introduction			
	10:00 – 10:30	Purpose of the day	Bruce Howard (Natural Capital Initiative)
		Chair's introductory remarks	Prof. Ken Norris (University of Reading)
		Introduction to biodiversity offsetting: overview and policy context	Andrew Dodd (RSPB)
		Questions	
Subject introductions			
	10:30 – 11.10	Climate impacts- what are the risks and opportunities for offsetting projects?	Dr Mike Morecroft (Natural England)
		Opportunities and constraints of restoration ecology for the generation of offset credits	Prof. James Bullock (CEH)
	11.10 – 11.30	*Refreshments*	
	11.30 – 12.10	Offsetting what? The adequacy of biological data records	Dr Peter Carey (National Biodiversity Network Trustee)
		The contribution of biodiversity offsetting towards biodiversity and landscape ecology goals	Dr Nicola McHugh (Oxford Brookes University)

Session	Start / end	Activity	Speaker
	12:10 – 12.40	Framing the discussion – discussion of key issues identified in the talks and informing the questions for the challenge groups.	Chair
Lunch	*12.40 – 13:25*	*Poster boards. Comments and views board available for use.*	
Challenge groups			
	13.25 – 15.35 *(inc. 10 minutes to move between groups)*	Discussion groups – four sessions running in parallel, with structured questions *(Each participant to participate in two 60 minute discussions)*	All participants (led by facilitators and Chairperson)
		Group 1: The impacts of environmental change	Dr Pam Berry (University of Oxford)
		Group 2: Restoration ecology	Prof. Rob Marrs (University of Liverpool)
		Group 3: Data needs	Dr Jo Treweek (Treweek Environmental Consultants)
		Group 4: Landscape Delivery	Richard Smithers (IALE UK)
	15.35 – 16.00	*Refreshments*	
Concluding discussion			
	16.00 – 17.10	Plenary feedback – structured report back for 10 minutes, with 5 minutes discussion	Led by Chair
	17.10 – 17.15	Chair's summary and close	Chair

Annex B – List of participants

Julia	Baker	Chris Britton Consultancy / Balfour Beatty
Laura	Bellingan	Natural Capital Initiative / Society of Biology
Pam	Berry	Environmental Change Institute, University of Oxford
Francesca	Booker	Natural Capital Initiative
James	Bullock	NERC Centre for Ecology and Hydrology
Bill	Butcher	WGB Environment
Peter	Carey	National Biodiversity Network
Andrew	Dodd	RSPB
Rob	Gillespie	Environment Bank
Martina	Girvan	WSP Group
Edvard	Glucksman	Oxford University/ POST
Rosie	Hails	NERC Centre for Ecology and Hydrology / Natural Capital
Richard	Handley	Environment Agency
Jim	Harris	Cranfield University & NCI Steering Group
Leanne	Hepburn	University of Essex
Bruce	Howard	Natural Capital Initiative
Matthew	Jackson	Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust
Adrian	Jowitt	Natural England
Frances	Kirwan	Defra
Paul	Leonard	Independent Consultant & NCI Steering Group
Ceri	Margerison	Natural Capital Initiative & British Ecological Society
Rob	Marrs	University of Liverpool
Nicola	McHugh	Oxford Brookes University
Mike	Morecroft	Natural England
Roger	Morris	Bright Angel Coastal Consultants
Adrian	Newton	University of Bournemouth
Ken	Norris	University of Reading
Mike	Oxford	Association of Local Government Ecologists
Cara	Reece	Environment Bank
Tom	Simpson	Department of Communities and Local Government
Richard	Smithers	International Association for Landscape Ecology, UK
Laura	Sutcliffe	Natural Capital Initiative
Amy	Sutcliffe	University of Essex
Helen	Temple	The Biodiversity Consultancy
Jo	Treweek	Treweek Environmental Consultants
Olivia	White	PricewaterhouseCoopers
Linda	Yost	Institute for Ecology and Environmental Management

Annex C – Summary of the introductory and briefing talks, as provided by the speakers

Introduction to Biodiversity Offsetting: overview and policy context

Andrew Dodd, Head of Site Conservation Policy, RSPB

With the failure to halt biodiversity loss at a UK and EU level by 2010, and rolling forward of the target to 2020, there is increased interest in finding additional tools to tackle biodiversity loss. Biodiversity offsets (offsets) are one group of measures being studied closely.

Offsets are actions to compensate for residual, unavoidable harm to biodiversity, typically from built development and land-use change, after all efforts have been made to mitigate damaging impacts. They aim to ensure no net loss of the affected biodiversity and preferably a net gain. The big idea behind offsets is to move habitat compensation from the ad hoc to the mainstream. There are three main types of offset with a part to play:

Type	Approach	Responsibility	Compensation before / after damage
Developer-responsible	Case by case	Developer	After
Banking	Aggregated	3rd party	Before
In lieu-fee	Aggregated	3rd party	After

Designing an offset system poses many challenges if it is to avoid inadvertently causing more biodiversity loss. Some key issues must be addressed and transparent, informed choices made including:

- Biodiversity to be covered
- 'Like for like' compensation or something else?
- Defining 'no net loss' and 'net gain'
- Proximity of compensation to damage
- Who regulates and enforces and do they have the skills and capacity?

A set of clear principles will be needed to test any offset system proposed to make sure it delivers on its promise to help halt biodiversity loss.

Climate Impacts- what are the risks and opportunities for offsetting projects?

Dr Mike Morecroft, Principal Specialist Climate Change, Natural England

The best available models of future climate indicate a number of consistent patterns for the UK including warmer temperatures, drier summers and wetter winters. These changes will have impacts on biodiversity and present a number of risks for offsetting schemes:

- Species may not be viable in current locations;
- Invasive species/ new pests/ diseases;
- Habitats on the coast may be lost;
- Pressure on water resources in the south;
- Pressure to increase agricultural production in some areas.

Biodiversity offsetting is however a potential opportunity to contribute to adaptation to climate change. Some well accepted adaptation measures are:

- Enlarging or buffering existing sites;
- Increase the heterogeneity of sites and landscapes;
- Developing habitat networks;
- Assisting or accepting colonisation of new areas by species whose climatic niche is shifting northwards;
- Enhancing ecosystem function (for example by ensuring the conditions for wetlands are maintained).

There are a number of challenges to be addressed, which include:

- How to evaluate like-for-like;
- How bold to be;
- Managing expectations (sites may change but still be valuable).

There is also a need to monitor and evaluate so that we can learn by experience. There is inherent uncertainty in climate change and its biological impacts and we are unlikely to get everything right at first attempt.

Opportunities and constraints of restoration ecology for the generation of offset credits

Professor James Bullock, NERC Centre for Ecology and Hydrology, Wallingford

Habitat restoration involves a range of activities designed to shift an ecosystem towards a desired target state; from 'passive' approaches such as cessation of damaging activities, to more intensive interventions such as sowing desirable plants, up to large-scale environmental engineering.

Individual projects have successfully achieved the desired biodiversity, especially where the restoration involves intensive interventions, but generally restorations are not wholly successful. A global analysis showed restorations had only 86% of the biodiversity of their targets. There is some evidence that restoration success increases over time as ecological

processes develop and species colonise but it may take many decades for the target to be reached.

A great deal of research is being done into methods to improve restoration success and to speed the process. This has revealed types of constraints that include: (i) inappropriate environmental conditions for the desired species, relating to soil nutrients and pH, water levels, chemical contamination, etc; (ii) lack of desired species through poor colonisation, competition with undesired species, or lack of mutualists such as mycorrhizal fungi; and (iii) inappropriate management. While appropriate interventions will help, it is important to target restoration onto sites which are amenable to conversion to the desired ecosystem, by having both appropriate local conditions and a location which facilitates the colonisation and persistence of desired species.

In summary, while restoration can lead to large biodiversity gains on degraded sites, it will not necessarily lead to 'no net loss' of biodiversity in the context of offsetting.

Offsetting what? The adequacy of biological data records

Dr Peter Carey, Trustee, National Biodiversity Network

In attempting to decide what to offset and where, we need to understand what species and habitats exist in the location to be developed as well as the potential sites where the offsetting will occur. The UK has an unparalleled quantity and quality of biological records on species from most taxonomic groups. Many of these data have required direct consultation with the Biological Records Centres in the past which was not ideal. More recently the National Biodiversity Network (NBN) has provided the NBN Gateway to allow ready access to the data. [17] It must always be remembered that biological records have spatio-temporal variation. Species come and go from particular locations and also vary greatly in abundance. These factors must be considered when using the data for planning or modelling exercises.

Missing from the UK dataset of biological records is a collated set of vegetation/quadrat data and also a detailed habitat map, especially for rare and BAP priority habitats. We do have mapping using many different classifications across the four countries of the UK but these data are not held in one place and are patchy in quality and extent. The reliability of a biodiversity map lessens at larger resolutions. Biodiversity maps therefore need to be treated with caution by users.

There is a need for the data to be collated if we are to model the effects of climate change on the condition and extent of habitats for example, as well as any attempt at offsetting for development.

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[17] The National Biodiversity Network (NBN) is a unique resource which allows researchers to access 55 million species records, stretching back to the nineteenth century.

The contribution of biodiversity offsetting towards biodiversity and landscape ecology goals

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The presentation considered the contribution offsetting could make to improvements in the wider landscape. Improvements at individual offset sites have impacts on the wider landscape, e.g. if site habitat quality improves a larger breeding population or increased foraging activity could be supported, drawing individuals from the surrounding landscape. Offsets may also contribute to improvements in habitat connectivity, linking and strengthening ecological networks.

In planning offsets five issues need to be considered:

1. Clear integration with existing policies and programmes to allow the delivery of existing targets, e.g. Biodiversity Action Plan targets, value for money and a transparent offsetting process.
2. Identification of an appropriate geographic scale based on natural environmental factors, e.g. National Character Areas, which allows offset sites to be well integrated with existing semi-natural areas and protected sites.
3. Linkage between the biodiversity of the impact and offset area is necessary. Using environmental, habitat and species data, spatial targeting could be used to develop such links.
4. An understanding of species requirements and their use of the landscape is required if offsets are to become part of wider ecological networks.
5. Linking offset sites into the wider landscape could result in structural and functional improvements, allowing landscape to adapt and respond to changes in the future.

Annex D – Questions addressed in the Challenge Groups

Consider an overarching goal: to design a system of biodiversity offsetting in the UK which leads to no net loss of biodiversity through development.

To achieve this:

1. What knowledge/ data do we need?
2. Do we have this already? If not, how do we acquire it, given current funding constraints?
3. What are the priorities for immediate action, given that the UK Government is actively considering measures to increase the use of biodiversity offsetting?