



The Natural Capital Initiative

Towards no net loss, and beyond

Designing a system to offset for the residual impacts of terrestrial development on ecosystem service provision

*A one day inter-disciplinary workshop,
organised by the [Natural Capital Initiative](#)*

BRIEFING NOTE

To be read by all participants before the event

Tuesday 7th December 2010, 10 am – 5:15 pm
(registration and coffee from 9:30 am)

Charles Darwin House, 12 Roger Street
London, WC1N 2JU

Chairperson: Penny Anderson, President
Institute of Ecology and Environmental Management

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‘Towards no net loss, and beyond’ workshop series

This series of workshops is addressing cross-cutting challenges for the potential large scale use of biodiversity offsetting in the UK by bringing together individuals representing a broad mix of expertise and perspectives.

The first workshop (Workshop One) focused on identifying practical challenges for the further implementation of biodiversity offsetting in the UK and assessing how these could best be resolved. Workshop Two brought together experts from a diverse range of organisations to identify the scientific knowledge and environmental information required to underpin the possible large scale use of biodiversity offsetting in the UK, and to explore how gaps may be filled. A summary report on discussions during Workshop One is available on the [NCI website](#). The report from Workshop Two will be available online from the 1st of December.

Workshop Three, 7th December 2010

The final workshop in the series will assess the potential to offset for the residual impact of development on ecosystem services alongside biodiversity. Residual impacts are those that remain after appropriate prevention and mitigation measures have been taken.

Specific questions to be addressed by the workshop will be:

- To what extent could the use of biodiversity offsetting provide compensation for ecosystem service loss?
- How could optimal systems to offset for ecosystem service provision be designed and implemented?

Workshop participants will be asked to derive actions in the short and long term in response to the issue.

Detailed discussion of the themes of Workshops One and Two (22nd June and 29th September) will be avoided at the event on 7th December. Nevertheless, it is intended that Workshop Three should be informed by the key messages arising from these preceding events. These key messages are recorded in the reports of Workshops One and Two.

Workshop Three will be focused on terrestrial development that currently falls under the [planning systems](#) in force in the UK (including Devolved Government).

Workshop venue and contacts

The workshop will be held on the ground floor of Charles Darwin House, Central London (WC1N 2JU). Click [here](#) for location details. A reception desk will be visible immediately on arrival. The reception desk telephone number is 020 7685 2500.

Your principal contacts are two members of the Secretariat of the Natural Capital Initiative:

- Bruce Howard, NCI Science Policy Liaison
(brwa@ceh.ac.uk, tel. 01491 692426)
- Ceri Margerison, Policy Officer, British Ecological Society
(ceri@britishecologicalsociety.org, tel. 020 7685 2510)

Workshop report

Following the workshop, the NCI Secretariat will prepare a report of 10-15 pages describing the event, the topics discussed and the key messages arising. As with the reports of Workshops One and Two, this will record the breadth of views and perspectives expressed, as well as summarise the key messages to emerge from the discussion. The report will place emphasis on common issues raised by multiple participants.

With the exception of brief summaries of the briefing talks, points made in the report of Workshop Three will not be attributed to individuals or organisations. The report may draw on illustrations or examples used in the presentations or other briefing material, with the permission of the original authors. NCI Secretariat members drafting the report will retain editorial control, aiming to provide a fair reflection of workshop discussions. The report will be written for the attention of all involved in informing the evaluation of policy options, as well as policy-makers. A draft will be sent to all participants for comment.

A list of workshop participants (name and affiliation only) will be included in the report. Anyone not wishing their name to be on this list should contact the organisers by 7th December.

Workshop format

The organisers of the workshop have designed a highly interactive and inter-disciplinary programme. All participants are expected to contribute to the discussions. The briefing talks by individuals are intended to remind participants of the basic issues for consideration and inform group discussion.

All participants must abide by the [Chatham House Rule](#). Following the workshop, views expressed during the day must not be attributed to anyone present at the workshop in a way that suggests that they expressed this view on 7th December. (It is acknowledged that many workshop participants publish their views and perspectives in other forums, and that it might be possible to reference these.)

During the workshop, views and ideas expressed by individual participants must not be taken to be those of their employer, unless they clearly indicate that they wish this to be the case.

Biodiversity offsetting: a summary

Definition and goal

Biodiversity offsetting 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: the [Business and Biodiversity Offsets Programme](#).)

A Defra [Scoping Study on the Design and Use of Biodiversity Offsets in England](#) stated that the goal of offsetting is to “achieve no net loss and preferably a net gain of biodiversity with respect to species composition, habitat structure and ecosystem services.”

Biodiversity offsetting may also be applied to compensate for accidental damage to biodiversity (i.e. after it has occurred), such as actions that may be required due to the [Environmental Liabilities Directive](#). The

main mechanisms for delivering biodiversity offsets are: fees in lieu, habitat banks, and case-by-case offsets.

Current status of biodiversity offsetting in the UK

While there is experience of the implementation of biodiversity offsetting schemes in many countries around the world, including the US, Germany and Australia, it has been applied only on a site-specific basis in the UK.¹ Participants of the NCI 'Towards no net loss, and beyond' workshop series to date have referred to a small number of examples relating to housing, quarrying and coastal realignment projects. There is little available published information on these examples.

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](#). The Conservative Party Manifesto (pre-Coalition) mentioned the introduction of 'conservation credits', perhaps referring to the implementation of a system akin to habitat banking (a mechanism of biodiversity offsetting). The [Defra Business Plan \(8th November 2010\)](#) includes a commitment to "assess the scope for actions to offset the impact of development on biodiversity". [The Environment Bank](#) has made proposals for the implementation of habitat banking (a mechanism for delivering offsets) in the UK (see Briggs *et al.*, 2009).

There is current European-level interest in 'habitat banking' as a mechanism for achieving offsetting- see the recent [report for the European Commission](#) led by eftec and the Institute for European Environmental Policy.

The current status of biodiversity offsetting in the UK planning process

This subject is covered in detail by a [Government Circular](#) and the [Defra Scoping Study](#). Specifically, developments which would adversely affect Internationally Designated Sites are restricted, unless compensatory measures are taken to ensure that [Natura 2000](#) sites are protected. 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 SEA and EIA directives, concerning assessments in the planning process, outline that developers should "where possible offset any adverse effects on the environment". The [Strategic Environmental Impact Assessment Directive](#) contains a similar instruction. This is also mirrored in a [Guide to Good Practice](#), published by the Office of the Deputy Prime Minister, Defra and English Nature (ODPM *et al.*, 2006).

Future policy

The report of the [Lawton Review](#) ('Making Space for Nature', Defra, 2010) considers the challenges and opportunities for biodiversity offsetting in contributing towards ecological goals. It recommends the establishment of pilot projects to test and refine biodiversity offsetting mechanisms. The review is well placed to inform future policy decisions. Future policy may also be informed by any changes to the planning system, including the Coalition Government's [Decentralisation and Localism Bill](#). A key issue is

¹ The BBOP [website](#) provides further details.

whether measures to increase the use of biodiversity offsetting in the UK will be entirely voluntary, or whether some degree of regulation may be involved.

Future development pressure

The [Foresight Land Use Futures Report](#) shows how, over the next 50 years, the UK will see significantly increased pressures on land to deliver multiple benefits for society. It is expected that 39,000 new homes per year are going to be required in the South East of England (Foresight Land Use Futures Project, 2010). Recent trends in planning permission applications suggest that both minor and major infrastructure developments in the UK will increase in the future. It is likely that there will continue to be a significant number of sizeable infrastructure projects, including energy developments, which will entail a major upgrade of the National Grid.² Meanwhile, demand for housing will continue. The Coalition Government's [Decentralisation and Localism Bill](#) will devolve greater power to councils and local authorities to decide where housing is located.

Ecosystem services

Ecosystem services are the benefits provided people obtain from ecosystems. The [Millennium Ecosystem Assessment](#) (Millennium Ecosystem Assessment, 2005a) identified four major categories of services:

- *provisioning* - such as production of food and water.
- *regulating* – such as flood alleviation and carbon storage.
- *cultural /social* - such as spiritual value and recreational access to green spaces.
- *supporting* - such as crop pollination and nutrient cycling.

Around 60% (15 out of 24) of the Earth's ecosystem services are being degraded or used unsustainably (Millennium Ecosystem Assessment, 2005b). A recent report on [The Economics of Ecosystems and Biodiversity \(TEEB\)](#) estimated that the worldwide cost of biodiversity loss (compared to levels in 2000) could reach £500 billion by 2010. The costs of acting to sustain biodiversity and ecosystem services can be significantly lower than the cost of inaction ([TEEB, 2009; for Policy Makers](#)).

Offsetting for ecosystem service provision

Introduction

The [Scoping Study on the Design and Use of Biodiversity Offsets in England](#) Defra (2009) noted that while there is increasing interest in how ecosystem services might be used as a currency for the residual impacts of development (as opposed to measures of biodiversity itself), there is as yet little experience to learn from in this regard. It pointed out that there are trade-offs between the provision of different ecosystem services and biodiversity.

The potential for offsetting for ecosystem service provision as well as measures of biodiversity was recognised by participants of Workshops One and Two of the '*Towards no net loss, and beyond*' series. The [UK National Ecosystem Assessment progress report](#) (Watson and Albon, 2010) suggests that while UK-wide food and timber provisioning reached an all-time high in the last decade, essential supporting

² The [Infrastructure Planning Commission](#) (the functions of which are to be re-allocated under Coalition Government plans) is currently processing applications for 54 major infrastructure projects whilst 268 onshore wind farms are currently within the planning system in the UK, including 85 in England and 113 in Scotland. Plans for high speed rail projects between London and Birmingham were announced by the Government in 2010.

and regulation services (especially nutrient cycling and soil quality) have been degraded. Changes in supporting and regulation service provision have been attributed to the intensification of agriculture, forestry and rapid land use change.

The links between biodiversity and ecosystem services

Despite ongoing scientific uncertainty concerning the mechanisms that link biodiversity to ecosystem processes, there is evidence that many ecosystem services depend upon biodiversity (EASAC, 2009). This includes services such as primary production, nutrient cycling, pollination and recreation. Species composition is often more important (or at least as important) as species richness in maintaining key ecosystem processes and hence ecosystem services.

“Major changes in species composition due to direct introduction or removal of species, or caused indirectly by changing relative abundances via altered resource supply (such as irrigation or eutrophication), can shift the functional trait composition of ecosystems and therefore deeply modify their derived services.” (Millennium Ecosystem Assessment, 2005b)

In high-biodiversity agriculture, increasing species number provides subtle short-term benefits to the ecosystem (such as buffering against potential crop failures). However, there is good evidence to suggest that even minor species loss (including loss of rare species), reduces long-term resilience to physical and biological environmental change.

Developing offsets for the residual impact of development on ecosystem services

The majority of offsetting policies implemented worldwide focus upon biodiversity. There are very few examples which focus on offsetting impacts on ecosystem service provision: in conducting research for this briefing note, the Natural Capital Initiative found only ‘compensatory mitigation’ under the [US Army Corps of Engineers Stream Mitigation and Ecosystem Enhancement Programme](#) as a relevant scheme. It has been suggested however, that practical tools developed to quantify offsetting impacts on features of biodiversity could be extended to encompass impacts on ecosystem services. Most offsets currently in use are based on measures of land area, adjusted for “quality” (condition) or ability of habitat to support particular biodiversity features or resources. A [draft report by BBOP](#) (Crowe and ten Kate, 2010) suggests that a “like-for-like-or-better” policy for biodiversity offsetting could be adapted to include criteria such as ‘equivalence of ecosystem service provision’ per unit area.

A key issue in assessing the scope for offsetting for ecosystem service provision is access to relevant information for those involved in the statutory planning process. Collaboration between local government and the research community has provided tools such as the [Environmental Information System for Planners](#). There remains a challenge of providing environmental information to local planning authorities (and those seeking to inform their decisions) in terms of ecosystem service provision (Harris and Tewdwr-Jones, 2010). In addition, a comprehensive, spatially-explicit assessment of ecosystem services being delivered is needed, to enable planners to evaluate the potential impacts of different planning scenarios.

Restoration of ecosystem services

Ecological restoration is an activity that ideally results in the return of an ecosystem to a target state. A review of 89 restoration projects worldwide (Rey-Benayas *et al.*, 2009) found that biodiversity and ecosystem service provision increased by up to 25% and 44% respectively on restored sites. However,

restoration projects often fail to restore the full range (and quality) of ecosystem service provision found in a 'pristine' or undamaged habitat.

Palmer and Filoso (2009) suggest that restored aquatic ecosystems are particularly unlikely to have all the services of healthy ecosystems, compared to other habitat types. Site selection is especially important, as the success of restoration efforts depends on the context of the habitat within the natural landscape. For example, improvements to minimally degraded lands could offer the most hope for restoring the majority of ecosystem services, whereas attempts to re-create ecosystems offer the least. When compared with degraded ecosystems, restoration efforts *in tropical terrestrial ecosystems* yield the largest increases in ecosystem services and biodiversity on average, but restored wetlands provide the greatest economic benefits (Dodds *et al.*, 2008; Millennium Ecosystem Assessment, 2005b-[Biodiversity Synthesis](#)).

Prioritising ecosystem services for offsetting

Some supporting and regulating ecosystem services could be particularly vulnerable due to future land development. Examples include flood alleviation of land and the capacity of soils to store carbon. The vital nature of these services, together with the fact that they are measurable, could provide the basis for prioritising them in offsetting for the residual impacts of development.

Climate change has significant implications for water resources. Gradual increases in annual evaporation water loss, combined with greater seasonality (unpredictability) of UK rainfall throughout the year are expected (Watson and Albon, 2010). Water regulation services (including groundwater recharge) could therefore be an important criterion in offsetting for the residual impacts of development.

The potential benefit of offsetting for specific ecosystem services varies according to habitat type. For example; mountains, moors and heathlands are highly multi-functional habitats which act as the source for about 70% of UK drinking water and also hold about 40% of the UK's soil carbon (mainly in upland peat soils). These habitats could therefore hold greater capacity to offset for the residual impacts of development on certain ecosystem services. There may, however, be a need to ensure that the offsets for certain ecosystem services (such as recreational access) are situated as close as possible to the site of a development activity. Challenges still remain in terms of identifying actions which protect the optimum suite of ecosystem services.

Assessing the outcomes of ecosystem service offsetting

Integration of ecosystem services concepts into policy and planning, (such as biodiversity offsetting schemes) and decision-making requires concise, relevant information about the benefits provided by ecosystems. The [UK National Ecosystem Assessment](#) should provide a source of relevant UK-specific information.

Accurate metrics (indicators) of key ecosystem attributes underpinning ecosystem service provision (or surrogate measurements which represent the functions supporting a suite of services) are also needed. Surrogate measures keep the measurement task relatively simple and cost effective, but further research is needed to address issues of scale and lack of transparency in their use (Crowe and ten Kate, 2010).

Indicators are useful to monitor losses or gains in ecosystem services resulting from offsetting schemes. Outcomes must be directly measurable at both the site of impact and at any 'offset sites' to determine the success or failure against 'no net loss' policy objectives. A [World Resources Institute \(WRI\) working](#)

[paper](#) (Layke, 2009) suggests that ecosystem service indicators are currently underdeveloped, as are tools to support their application. The WRI is currently developing frameworks, for the use of indicators and metrics which describe the status and trends of biodiversity and ecosystem service provision, plus the benefits they provide.

The [Ecosystem Service Indicators Database \(ESID\)](#) is one resource developed to support policy-makers and natural resource managers in integration of ecosystem services into policy decisions and processes such as Environmental Impact Assessments (EIAs). The online database describes indicators that have been or could be successfully used in ecosystem service approaches to management.

Bibliography and references

Note that inclusion or exclusion of references in the list below does not imply anything about the views expressed in the publications.

A list of references covering the topic of biodiversity offsetting is available on the NCI Website.

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