



BIODIVERSITY NET GAIN –

A new role for infrastructure and
development in improving Britain's
wildlife.



WSP

**PARSONS
BRINCKERHOFF**

ACKNOWLEDGEMENTS

We'd like to thank all participants in this study for their support and enthusiasm in preparing this white paper. We'd like to offer special thanks to the following

Nick White	Natural England
Joe Bull	Academic & Founder of Wild Business
Nick Crouch	Nottinghamshire County Council
David Lowe	Warwickshire County Council
Jonny Miller	Teignbridge District Council
Louise Martland	Environment Bank
Emmanuel Deschamps	Network Rail
Julien Sclater	Natural England
Matthew Jackson	Berkshire, Buckinghamshire & Oxfordshire Wildlife Trust
Victoria Griffiths	PhD Student, University of Oxford
EJ Milner-Gulland	Professor, University of Oxford
Neil Riddle	Forestry Commission
Claire Wansbury	Atkins
Julia Baker	Balfour Beatty
Adriaan Bekker	Network Rail
Adam White	Network Rail
Mark Iley	Essex Wildlife Trust
Helen Wickham	Berkeley Group

CONTENTS

EXECUTIVE SUMMARY	5
IT MATTERS THAT BRITAIN'S BIODIVERSITY IS DECLINING	7
HOW DEVELOPMENT CAN ENHANCE RATHER THAN ENDANGER BIODIVERSITY	8
THE UK'S TAKEN SOME STEPS TO IMPLEMENT NET GAIN PRINCIPLES	14
CASE STUDY: EAST WEST RAIL	18
OTHER COUNTRIES PROVIDE VALUABLE LESSONS	20
PRACTICAL RECOMMENDATIONS TO MAKE A BIODIVERSITY STEP CHANGE	24
APPENDICES	27



EXECUTIVE SUMMARY

A COMMITMENT THAT NEW DEVELOPMENTS SHOULD ENHANCE, RATHER THAN DESTROY, NATURE IS NECESSARY IF THE UK IS TO MEET ITS GOAL OF REVERSING LONG TERM BIODIVERSITY LOSS BY 2020.

Biodiversity concerns the variety of our wildlife, yet in the UK in spite of existing nature protection policies and laws that give protection to conservation priority species, the UK's wildlife continues to decline. The most recent wildlife statistics show that 40% of the UK's most important habitats and 30% of our rarest species are declining with at least eight becoming extinct since 2002. This matters because nature provides huge value to the UK's economy and wellbeing as healthy ecosystems offer free, natural services, which can often be taken for granted. Meanwhile the ecological impact of new developments continues to be one of the main arguments against new infrastructure.

Britain needs new ways to protect nature while also delivering economic growth, new infrastructure and resilience for the future. Adopting a principle of 'biodiversity net gain' is a key opportunity. Net gain focuses on avoiding the impact first of all,

then following through a hierarchy of minimising, restoring and, as a last option, creating new habitat elsewhere.

Biodiversity net gain's time has come. The concept has already been adopted by major UK infrastructure companies such as Network Rail and Highways England and by private developers such as Berkeley Group with the UK government having done much of the groundwork. Other countries such as Germany, USA and Australia have followed net gain principles for up to 40 years.

In this report we draw on findings from this international experience, from interviews with biodiversity experts across the UK, from our experience, and from published literature. We make six practical recommendations to put biodiversity net gain at the heart of UK development:

1. **Biodiversity net gain and the use of the DEFRA metric could be an obligatory part of the National Planning Policy Framework.**
2. **Biodiversity net gain could be incorporated into DEFRA's forthcoming 25 year environment plan.**
3. **The most recent DEFRA guidance for biodiversity offsetting could be revised, with the offsetting metric used to measure biodiversity net gain tightened, whilst maintaining simplicity.**
4. **Creating a consistent understanding of guidance at a local level could create a level playing field for developers.**
5. **Biodiversity net gain could be incorporated at a corporate level and in private sector developments.**
6. **Collaboration to build an evidence base of the long term performance of biodiversity net gain developments.**

IT MATTERS THAT BRITAIN'S BIODIVERSITY IS DECLINING

DESPITE CONSERVATION EFFORTS, BIODIVERSITY IN THE UK CONTINUES TO DECLINE.

A variety of habitats, along with their animal and plant species, are facing growing pressures. These pressures include: habitat loss, climate change, increased competition from invasive species, pests and diseases, increased use of insecticides and pesticides, extreme weather and air pollution. The result of these factors is a reduction in the number of species and habitats in the UK. This includes many species and habitats of significant conservation importance. The decline of the abundance of conservation priority species is shown in Figure 1.

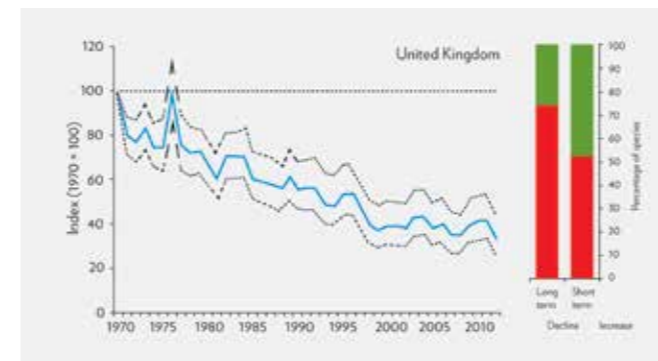


Figure 1: The decline in abundance of conservation priority species from 1970 to 2012

In the most recent review of UK biodiversity, the UK's Natural Ecosystem Assessment (NEA) states that 40% of our most important habitats and 30% of our rarest species were still declining. Nature is being consistently undervalued in decision making processes too, resulting in a decline in the services that nature provides us with. This is despite recognition of the problem and conservation efforts over decades. For example, eight conservation priority species became extinct in the UK between 2002 and 2008.

The mid-term review of EU biodiversity strategy to 2020 demonstrates that habitat loss is still a major concern and that "no significant progress has been made towards the 2020 target of no net loss to biodiversity".

BIODIVERSITY IS IMPORTANT TO THE UK ECONOMY

There are many reasons why losing biodiversity is a big concern for the UK.

Healthy ecosystems offer free, natural services which can often be taken for granted.

Human health, our food supply and our businesses all depend on the variety of our Earth's natural resources in some way. Businesses, for example, need to use the planet's raw materials and other biological resources for their daily operations. Therefore, it is important to ensure that there is a sustainable supply of resources to enable continued economic growth.

ECOSYSTEMS SERVICES

TYPE OF SERVICE	EXAMPLES
Supporting Services	Nutrient cycling, Soil formation
Provisioning Services	Food, Freshwater, Wood, Fuel
Regulating Services	Climate regulation, Disease Regulation, Flood Regulation, Water Purification
Cultural Services	Aesthetic, spiritual, educational, recreational

Table 1: Adapted from Millennium Ecosystem Services Assessment

THE UK HAS MADE A NUMBER OF COMMITMENTS TO BIODIVERSITY

The UK's biodiversity strategy "Biodiversity 2020" sets out the strategic direction for UK biodiversity policy. It gives a picture of how Britain is implementing international and EU commitments. Although Britain recently chose to leave the EU, many EU commitments are enshrined in UK law so it is likely that these commitments will be operative for the foreseeable future.

The strategy describes what will be required to help the UK achieve no net loss to biodiversity by 2020 and sets 11 ambitious biodiversity goals to be achieved including:

- 90% of priority habitats to be in favourable or recovering condition
- 50% of Sites of Special Scientific Interest (SSSIs) to be in favourable condition
- No net loss of priority habitat and an increase in the overall extent of priority habitats by at least 200 000 ha
- The establishment of a Marine Protected Area Network

HOW DEVELOPMENT CAN ENHANCE RATHER THAN ENDANGER BIODIVERSITY

WHAT IS BIODIVERSITY NET GAIN?

A loss of biodiversity can occur from human activities (such as infrastructure projects or developments) even when every effort is made to avoid, minimize and restore nature. The principle of biodiversity net gain is that any damages from human activities and development to biodiversity need to be balanced by at least equivalent gains for biodiversity.

In order to determine whether there is no net loss or a net gain to biodiversity from a development project, a quantitative approach involving the use of a metric is required. Otherwise it is impossible to know if biodiversity net gain has been achieved!

THE UK'S APPROACH TO QUANTIFYING BIODIVERSITY

DEFRA's Biodiversity Offsetting Metric

In 2012, DEFRA created such a metric to quantify the impact of a development in terms of 'biodiversity units'. The metric is designed to provide a transparent unit to represent biodiversity that can be exchanged between sites of different quality or condition and between habitat types. The metric design tries to balance biodiversity needs with need to keep it user-friendly.

It's important to remember that using the metric to get a number of biodiversity units is just one piece of the puzzle. This number should be combined with a full 'biodiversity assessment' that considers all the other pieces - species composition (animals and plants), habitat structure, ecological functionality and people's use and cultural values associated with that biodiversity. The biodiversity assessment informs decisions about an offset including habitat type, which animals are to use it and its ecological function. The biodiversity unit calculation is then only used to answer how large an offset is needed to achieve biodiversity net gain.

WHAT IS A BIODIVERSITY UNIT?

DEFRA's biodiversity unit calculation is based on habitat distinctiveness, condition and area (or length for linear habitats). To calculate baseline biodiversity units (i.e. before development) distinctiveness and condition are given numerical 'scores' which are multiplied, together with hectares or kilometres of habitat:

DISTINCTIVENESS X CONDITION X AREA (HA) OR LENGTH (KM) = BASELINE BIODIVERSITY UNITS

To calculate the biodiversity units which may be achieved post-development, risk multipliers are introduced to account for difficulty of habitat creation (delivery risk); distance of offset from development (spatial risk); and time for created habitats to reach target condition (temporal risk). Each risk multiplier is assigned a numerical 'score' enabling post-development biodiversity units to be calculated as follows:

DISTINCTIVENESS X CONDITION X AREA (HA) OR LENGTH (KM) X SPATIAL RISK X TEMPORAL RISK X DELIVERY RISK = POST-DEVELOPMENT BIODIVERSITY UNITS

How to use the metric:

1. Calculate the baseline number of biodiversity units at the proposed development site (Baseline Biodiversity Units)
2. Calculate the anticipated future number of biodiversity units at the development site (Post-Development Biodiversity Units) using the multipliers provided by DEFRA
3. Take the number of baseline units away from the future number of biodiversity units to get the number of biodiversity units created
I.E. Post Development Biodiversity Units – Baseline Biodiversity Units = Biodiversity Units Created
4. If this number is positive, the development has achieved biodiversity net gain and if the number is negative there is a loss

WHAT IS A BIODIVERSITY OFFSET?

'Biodiversity offsets are measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development, after appropriate prevention and mitigation measures have been taken. The goal of biodiversity offsets is to achieve no net loss and preferably a net gain of biodiversity on the ground with respect to species composition, habitat structure, ecosystem function and people's use and cultural values associated with biodiversity' – Business and Biodiversity Offsets Programme



THE MITIGATION HIERARCHY

The mitigation hierarchy is a tool designed to help users limit possible negative impacts on biodiversity from development projects. It requires that impacts should be first avoided, then reduced/mitigated and only as a last resort be compensated (offset).

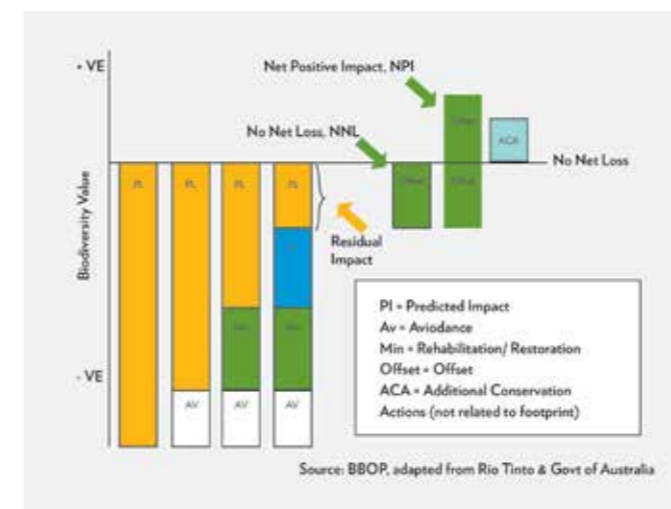


Figure 3: The Mitigation Hierarchy

1. Avoidance

Measures taken to avoid creating impacts from the start. For example, changing the location of the development.

2. Minimisation

Measures taken to reduce the duration, intensity, extent and/or likelihood of impacts that cannot be avoided.

3. Restoration/ Rehabilitation

Measures taken to improve degraded ecosystems following exposure to impacts which cannot be completely avoided or minimised.

4. Offset

Measures taken to compensate for any residual, adverse impacts after full implementation of the previous three steps of the Mitigation Hierarchy.

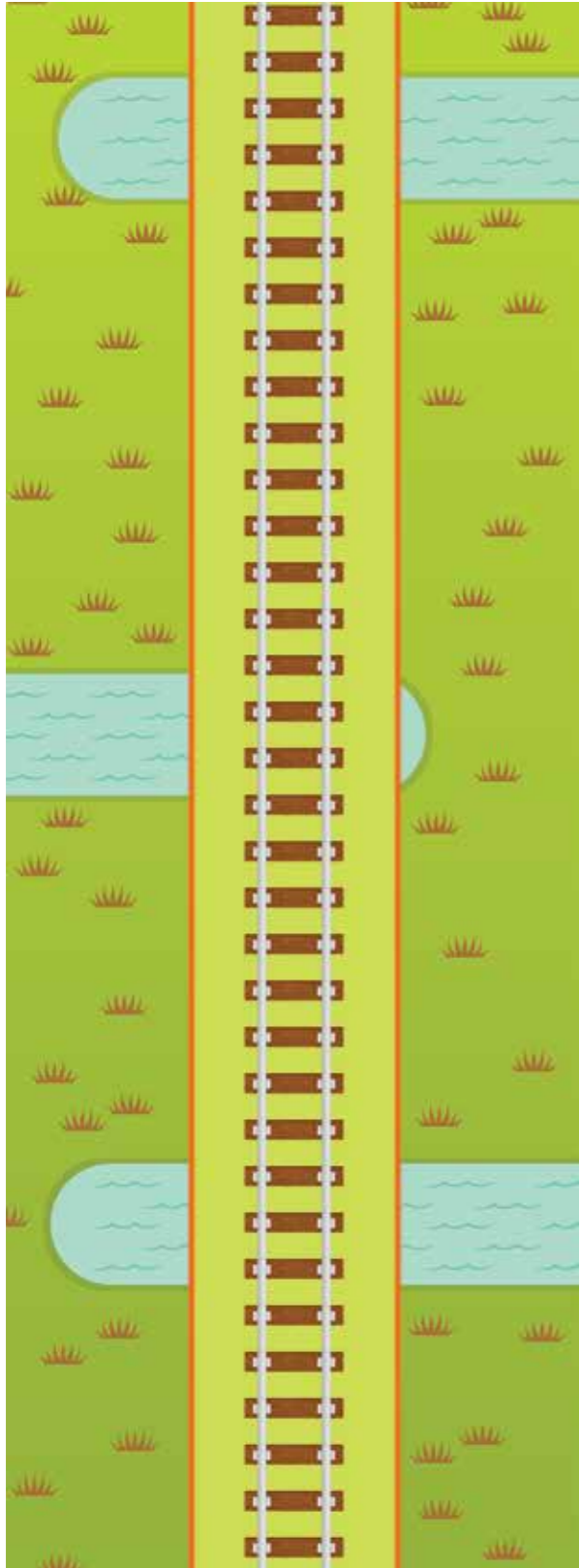
The first three steps alone (avoidance, minimisation and rehabilitation/restoration) are designed to reduce the impacts that a development project has on biodiversity. However, even after these three steps have been carefully considered, an offset may be required to ensure no net biodiversity loss or a net gain for biodiversity.

USING A BIODIVERSITY OFFSET SHOULD ALWAYS BE A LAST RESORT FOR ANY DEVELOPER AND SHOULD ONLY BE CONSIDERED AFTER ALL STEPS OF THE MITIGATION HIERARCHY HAVE BEEN APPLIED TO A DEVELOPMENT.

ORIGINAL SITE

1. AVOIDANCE

Development avoided this site because it went through SSSI marshland.



CHOSEN SITE

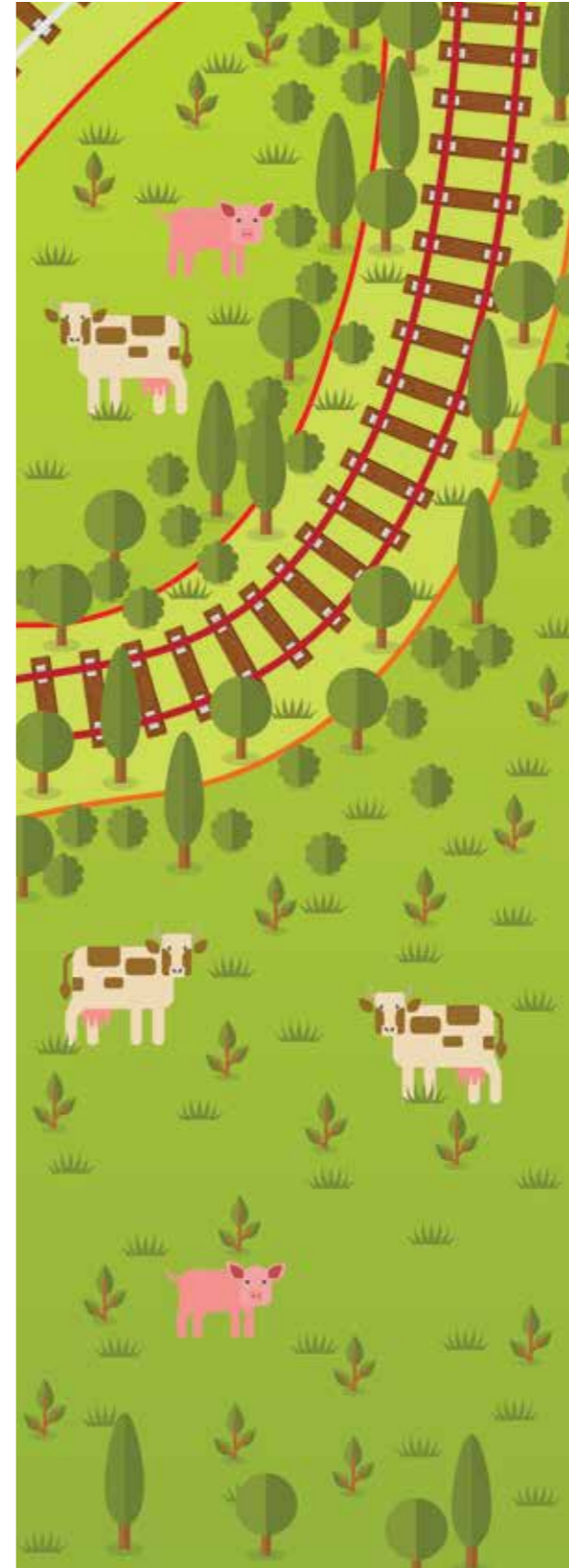
2. MINIMISATION

On the new site the development will impact woodland and farmland. The original route is amended to an alternative route (in red) to impact more farmland (a habitat of low nature conservation value) than woodland. This has mitigated the overall impact to habitats.



3. RESTORATION/ REHABILITATION

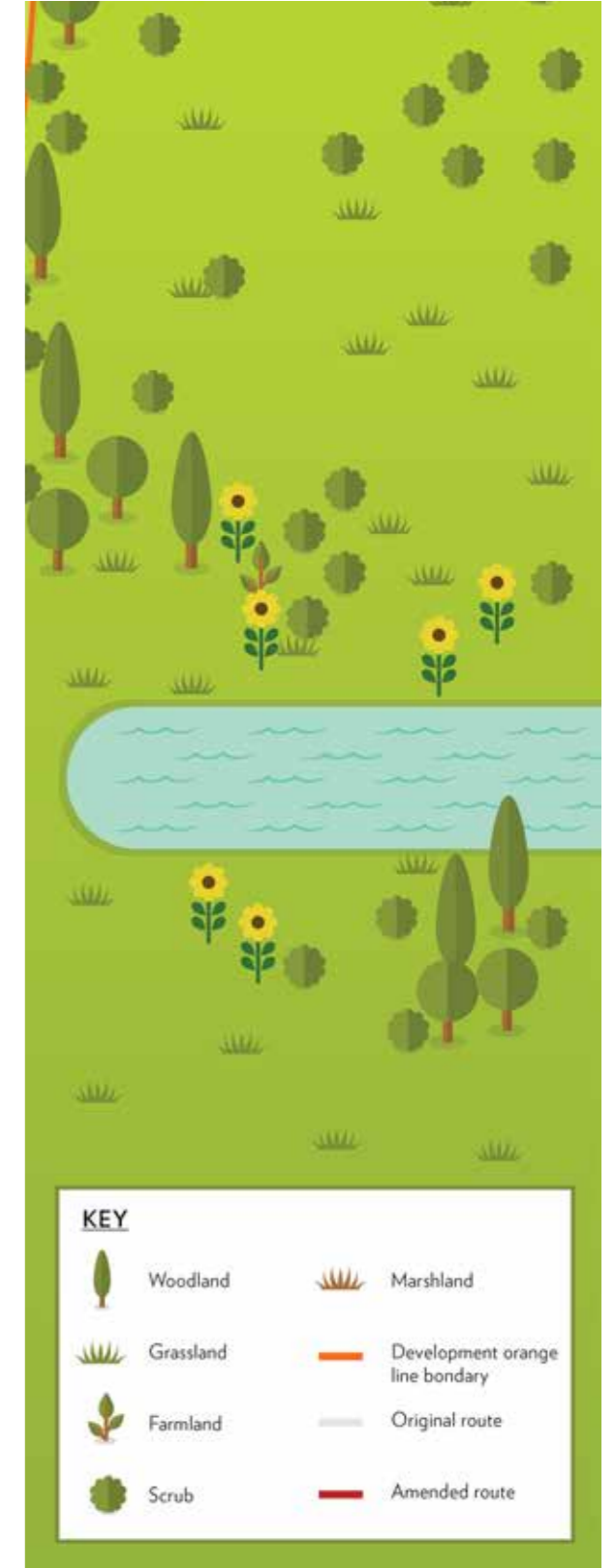
The project requires vegetation clearance within the orange line boundary. Habitat is restored onsite where possible by replanting affected habitats and following appropriate rail lineside strategy (i.e. no trees adjacent to tracks)



OFF SITE

4. OFFSET

To compensate for habitat loss which cannot be restored onsite, an offset is created in accordance with BBOP's best practice principles to achieve biodiversity no net loss or biodiversity net gain.



KEY			
	Woodland		Marshland
	Grassland		Development orange line boundary
	Farmland		Original route
	Scrub		Amended route

BUSINESS AND BIODIVERSITY OFFSETS PROGRAMME'S (BBOP) 10 PRINCIPLES FOR SUCCESSFUL BIODIVERSITY OFFSETS

BBOP is an international collaboration between companies, financial institutions, government agencies and civil society organisations. Its members are developing best practice in following the mitigation hierarchy to achieve no net loss or a net gain for biodiversity. BBOP developed a standard for biodiversity offsets in 2012, which is based upon 10 principles:

PRINCIPLE	EXPLANATION
1 - Adhere to the mitigation hierarchy	An offset is a promise to compensate for significant impacts on biodiversity identified after appropriate avoidance, minimization and on-site restoration measures have been taken according to the mitigation hierarchy. Offsetting is designed to be used as the last step in a hierarchical process, not as a “license to trash” nature.
2 - Respect the limits of offsetting	In some cases, where residual impacts cannot be fully compensated for by an offset due to either the irreplaceability or vulnerability of the biodiversity which is being affected, there are limits to what can be offset. In the UK, an example of a habitat which arguably cannot be offset is ancient woodland, which will take many, many years to recreate.
3 - Consider the landscape context	An offset should fit into the character of the existing landscape, taking not only biological, but also social and cultural values associated with biodiversity into account.
4 - No net loss	An offset should be designed to achieve biodiversity no net loss at a minimum. Ideally, an offset should result in biodiversity net gain.
5 - Additionality	An offset should achieve additional conservation outcomes. These outcomes should go beyond any outcomes which would have taken place anyway, in the absence of an offset.
6 - Facilitate stakeholder participation	Effective stakeholder participation should take place in areas affected by the project and by the offset from an early stage to allow stakeholder opinions to inform decision making.
7 - Ensure that stakeholders are treated equally	The rights, risks, responsibilities and rewards associated with a development project and any offset should be shared equally among stakeholder groups. Internationally and nationally recognised rights of indigenous peoples and local communities should be respected.
8 - Long-term outcomes	The design and implementation of a biodiversity offset should be based on an adaptive management approach, incorporating monitoring and evaluation, with the objective of securing outcomes that last at least as long as the project's impacts and preferably in perpetuity.
9 - Be transparent	The decision to offset significant impacts on biodiversity should be communicated to the public in a timely manner.
10 - Make use of available scientific and traditional knowledge	The implementation of an offset should be documented and informed by science and traditional knowledge, where appropriate.

Table 2: BBOP's 10 Principles for Successful Biodiversity Offsets



WSP | Parsons Brinckerhoff has developed a biodiversity net gain and toolkit as an efficient method of tracking biodiversity units before and after construction, as a result of avoidance, mitigation and offsetting activities (i.e. the Mitigation Hierarchy). The toolkit is used to calculate the biodiversity units and record evidence on adhering to the Mitigation Hierarchy.

The toolkit enables users to:

- record where avoidance, minimisation and restoration of habitat losses occurs on site
- calculate and track any offsetting required to achieve 'no net loss' or 'net gain'
- consider and take action on the risk of offset creation
- create an evidence base for compliance
- provide a definitive account of whether 'no net loss' or 'net gain' has been achieved

Total biodiversity units		Biodiversity units per hectare		Tracker Overview	
Before Works (baseline)	After Works	Before Works (baseline)	After Works	Saved (%)	Lost (%)
17610	1593	269	160	21%	25%
756	255	26	10	34%	28%
240.00	126.67	12.00	6.33	53%	52%
180.00	80.33	6.00	2.68	45%	55%
336.00	48.00	8.00	1.14	14%	86%

Once baseline data has been entered, the toolkit calculates the biodiversity units that have been lost and saved.



The toolkit tracks offsetting and provides a definitive account of whether 'no net loss' or 'net gain' has been achieved



THE UK'S TAKEN SOME STEPS TO IMPLEMENT NET GAIN PRINCIPLES

THE PLANNING SYSTEM

The National Planning Policy Framework (NPPF), introduced in 2012, sets out how planning and development in the UK should aim to enhance the natural environment. Section 11 makes explicit references to biodiversity at a national level in paragraph 109 and at a local level in paragraph 114.

Paragraph 109: "The planning system should contribute to and enhance the natural and local environment by minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures"

Paragraph 114: "Local planning authorities should set out a strategic approach in their Local Plans, planning positively for the creation, protection, enhancement and management of networks of biodiversity and green infrastructure"

DEFRA BIODIVERSITY OFFSETTING PILOTS 2012-2014

From 2012 to 2014, DEFRA piloted offsetting to achieve biodiversity net gain.

The pilot took place in six local authorities across England: Coventry, Solihull & Warwickshire, Essex, Nottinghamshire, Devon, Doncaster and Greater Norwich. Each group was made up of the local planning authority and local stakeholders such as NGOs, developers and landowners.

There were three objectives:

1. To assess the extent to which offsetting helps to deliver greater benefits to biodiversity from development
2. To assess the extent to which offsetting streamlines the process of agreeing compensation for biodiversity loss
3. To test the "biodiversity unit" metric which was developed by DEFRA in 2012 for the offset pilot

The pilots ran from April 2012 to March 2014 but by June 2014 only one of the six pilot areas had agreed an offset site. No offsets sites were created during the two years either and some of the pilot hosts did comment that the timeframe was too short to secure offset sites. However, although no offset sites were legally in place by the end of programme, 16 applications were expected to result in Section 106 planning agreements (a 'developer contributions' mechanism that makes a development proposal acceptable in planning terms) to mitigate impacts, including by offsite compensation.

PILOT HOSTS	NO OF TIMES METRIC USED IN A PLANNING APPLICATION DURING PILOTS
Coventry, Solihull and Warwickshire (CSWAPO)	63
Devon	10
Doncaster	5
Essex	11
Greater Norwich	0
Nottinghamshire	6

Table 3: LPA application of metric in planning applications

Despite the pilot finishing in 2014, the evaluation report was not published until mid-February 2016. There was unanimous agreement among the pilot groups that the whole exercise highlighted the «current and ongoing failure of planning applications to meet the objective of no net loss, or achieve a net gain of biodiversity» .

The report showed that there was controversy surrounding biodiversity offsetting and that views varied between different stakeholders. In spite of this, the report also highlighted the potential of offsetting to ensure that development delivers better outcomes of biodiversity than the current UK planning system.

Despite the UK's national and local policy commitment, the DEFRA biodiversity offsetting evaluation report demonstrates the struggles of UK planning policy to meet the biodiversity 2020 objectives.

LOCAL PLANNING AUTHORITIES HAVE MADE DIFFERENT PROGRESS SINCE THE PILOTS

WSP | Parsons Brinckerhoff has interviewed stakeholders involved in four of the six pilots. These interviews revealed two key findings:

- There were vast differences in whether LPAs had applied the metric or used biodiversity offsetting since the pilots ended
- Most LPAs felt that existing government policy was not strong enough and that making the use of the DEFRA metric mandatory would help developments to achieve biodiversity net gain

For instance, at **Warwickshire Council**, not much has changed since the pilots, as biodiversity net gain was already a part of their local policy and green infrastructure strategy

when the pilots began. The metric has been applied to many development projects. When asked how developers responded to the challenges of offsetting and the use of the metric **David Lowe, Team Leader of Ecology, Historic Environment & Landscape, Warwickshire County Council** says he explains to developers: "You (the developer) don't have to do offsetting but you have to make a net gain... It is voluntary to offset but we will recommend that planning permission is refused if you don't make a net gain."

Warwickshire Council are happy for developers to use other metrics to prove that they are achieving biodiversity net gain if they wish to do so, but report that in a majority of cases developers are supportive of the metric and like its transparency. Some developers were reported to be unhappy that applying the metric requires some additional costs. However, once the process was explained clearly to them costs were rarely raised again.

In **Nottinghamshire**, since the pilots the metric has only been used on a handful of applications and they have never followed the metric through to the point where offsetting has been used. **Nick Crouch, Senior Practitioner Nature Conservation, Nottinghamshire County Council** states that "I think we (in Nottinghamshire) very rarely achieve biodiversity net gain for non-minerals development. In my experience biodiversity and impacts on habitats are still quite far down the list of considerations when a planning application is going through, it is all about economic viability and providing houses...Without any sort of government planning policy to require and obligate use of the metric, allowing an objective quantification of losses and gains, it is difficult to see how it (biodiversity net gain) will ever become commonplace."

In **Essex**, throughout the pilot the metric was only applied theoretically as few suitable developments were happening in the two year pilot period. However, since the pilots' completion, there have been two cases where the metric has been applied, which have resulted in offset sites being secured.

In **Devon**, the principles of biodiversity offsetting have been included in local policy since the pilots finished and offset compensation has been identified as necessary on three schemes. One offset site which is directly related to species (improving habitat for cirl bunting) has been secured. **Jonny Miller, Green Infrastructure Officer, Teignbridge District Council** highlights some of the difficulties associated with biodiversity net gain: "We have only required of our developers to apply the offsetting metric on a few sites so far and they have not always achieved no net loss for non-statutory biodiversity. It

is then a policy decision as to whether we (the council) decide to accept that or not. There are a range of other competing priorities for the council such as securing affordable housing etc. which, when considered in the planning balance, mean that achieving no net loss for non-statutory biodiversity is does not always come out on top.”

It is important to note that the LPAs were involved in the pilots on a voluntary basis. Nationally only around a third of LPAs have access to in-house ecologists, which would certainly make it harder to implement a biodiversity net gain approach. However, Jonny Miller suggests that it should not stop LPAs from trying to use offsetting or a biodiversity net gain approach, saying: “The offsetting process could still work in those scenarios (where LPAs do not have in-house ecologists) assuming that you have got sufficiently qualified and capable consultants supporting the developers and / or the LPA and that those consultants are providing objective advice and not overly influenced by the developer’s aims. It would still require further training for planning officers so that they can critique ecologists’ reports including any offsetting analysis.”

A GROWING NUMBER OF BUSINESSES ARE ADOPTING NET GAIN PRINCIPLES

OPPORTUNITIES	CHALLENGES
<ul style="list-style-type: none"> • Cost effective conservation outcomes through reduced operational and project development risks • Enhancing social licence to operate • Demonstrating leadership • Ability to influence the regulatory process • Taking advantage of new business opportunities 	<ul style="list-style-type: none"> • Long term costs of managing offsets in perpetuity • Reputational risks associated with the use of metrics and offsetting • Implementation issues including stakeholder buy in • Transparency and monitoring of ecological outcomes

Table 4: Opportunities and Challenges for Businesses

Despite there being challenges to this approach, a growing number of UK businesses are voluntarily incorporating no net loss or net gain to biodiversity as a part of their sustainability or environmental strategies.

WHO HAS ALREADY COMMITTED TO BIODIVERSITY NET GAIN?

NETWORK RAIL

Network Rail are industry leaders when it comes to their ambitious biodiversity “Net Positive” approach, which aims to achieve net positive biodiversity by replacing more habitat than is lost through development projects .

The approach has been piloted on six of NR’s major infrastructure projects Great Western Route Modernisation, Crossrail, Thameslink, East West Rail, Midland Main Line and Gospel Oak to Barking.

Emmanuel Deschamps, Environment Manager for Great Western Route Modernisation (GWRM) explains one of the reasons why a net positive approach was a big opportunity for this project. GWRM is one of Network Rail’s largest infrastructure projects across the country with some of the most extensive vegetation clearance of around 6.6m on either side of the line. This will be a significant impact which NR will need to mitigate against. Emmanuel understands that net positive was a business opportunity for Network Rail, saying: *“The Biodiversity No Net Loss initiative is helping us delivering our major programme of works in face of some public pressure and concerns regarding the extensive vegetation clearance required to build and safely operate an electrified railway. This voluntary approach, going beyond legal compliance, allowed us to proactively engage with stakeholders, with the common objective of halting biodiversity loss in the UK. We received some very positive feedback from stakeholders who are willing to collaboratively work with us in order to make a difference and deliver positive benefits for nature and local communities.”*

HIGHWAYS ENGLAND

Highways England have made positive steps towards tackling their impacts on biodiversity. They produced the Highways Biodiversity Plan in June 2015. In this plan, Highways England acknowledged that they were currently causing negative impacts for biodiversity through their infrastructure developments.

They state that they are committed to meeting the objectives of the Government’s Road Investment Strategy, which sets the bar high: *Highways England must deliver biodiversity no net loss by 2020 and a biodiversity net gain by 2040. In order to measure their performance towards these objectives, Highways England have a key performance indicator, a target and 5 outcomes linked to biodiversity. They understand that being able to*

demonstrate whether they are achieving a net gain or no net loss through quantifying their impacts on biodiversity is valuable not only to meet their own regulatory commitments, but to wider society.

BERKELEY GROUP

Berkeley Group, a residential property developer, has made a commitment to develop and apply an approach to ensure that all new developments create a net biodiversity gain.

Helen Wickham, Sustainability Manager expanded on why biodiversity net gain was important to Berkeley: *“The Berkeley Group (“Berkeley”) has an overarching goal to be a*

world-class business generating long-term value by creating successful, sustainable places where people aspire to live. As part of Berkeley’s ten headline commitments under Our Vision for 2016-2018, Berkeley has committed to develop and apply an approach to ensure new developments create a net biodiversity gain. Through this commitment, Berkeley aims to ensure that development works positively contribute to the natural environment. Berkeley also recognises that the incorporation of high quality and diverse habitats can have multiple positive effects on the places created. This includes helping to improve local air quality, providing resilience to climate change, adding amenity benefits, and enhancing the health and wellbeing of residents and the local community.”



WSP | PARSONS BRINCKERHOFF CASE STUDY: EAST WEST RAIL – BIODIVERSITY NET POSITIVE: STAKEHOLDER ENGAGEMENT AND BIODIVERSITY ASSESSMENT ON A MAJOR UK RAIL SCHEME



East West Rail (EWR) aims to establish a strategic railway connecting East Anglia with Central, Southern and Western England. It has been promoted and developed since 1995 by the East West Rail Consortium, a group of local authorities and strategic partners.

Proposed New Passenger Services on East West Rail Western Section



Phase 1 between Oxford and the Chiltern Mainline east of Bicester Village is due to be completed in December 2016.

Phase 2 will connect Bicester Village, Princes Risborough, Milton Keynes Central, Bletchley and Bedford with West Coast and Midland Mainlines.

Network Rail commissioned WSP | Parsons Brinckerhoff to implement Biodiversity Net Positive on East West Rail Phase 2, using our industry leading biodiversity net gain process (below).

A key stage for Net Positive on EWR was to determine how the local authorities and conservation organisations along its route define the good practice principles in context of the project. This was vital to gain consensus amongst stakeholders and to ensure that stakeholder views are incorporated into decision-making on offsets.



Image Caption: EWR Phase 2 Stakeholder Engagement Workshop

WSP | Parsons Brinckerhoff ecologists made extensive use of the firm's in-house Biodiversity Toolkit, planned surveys of proposed offset sites, and are preparing a Biodiversity Net Positive Technical Appendix for the EWR Environmental Impact Assessment.

WHAT ARE THE UK'S STAKEHOLDER PERCEPTIONS OF BIODIVERSITY NET GAIN?

In light of developments both in the public and private sector, WSP | Parsons Brinckerhoff launched a short survey to improve our awareness of stakeholder perceptions and their understanding of biodiversity net gain. We asked almost 200 environmental professionals from various backgrounds (including NGOs, contractors, consultants, LPAs, academics and national government bodies) to complete the survey. Here is a summary of our results.

- **Over half of survey respondents (52%) felt that biodiversity offsetting was helpful or very helpful in achieving biodiversity net gain from developments. Only 4% felt this approach was unhelpful.** This suggests that stakeholders recognise updating existing legislation would help to achieve improved outcomes for nature and indicates a willingness to use offsetting.
- **40% of survey respondents have used a biodiversity net gain approach and only 29% have used biodiversity offsetting.** This demonstrates that the professionals surveyed are applying the mitigation hierarchy effectively, using offsetting as a last resort.
- **Despite controversial media coverage, less than 1% of respondents had a negative view of biodiversity net gain.** This advocates that there is a willingness among UK stakeholders to use these new approaches.
- **Although 3/4 of survey respondents were aware of biodiversity net gain (73%) and biodiversity offsetting (77%) half had mixed views or were unsure of their views.** This shows that there is a lack of understanding of these approaches within the environmental profession which needs to be addressed.

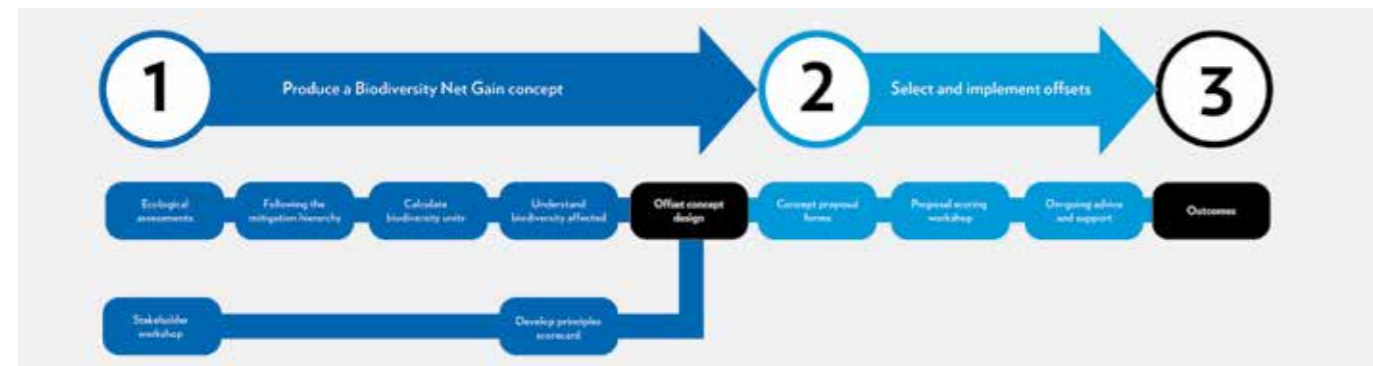
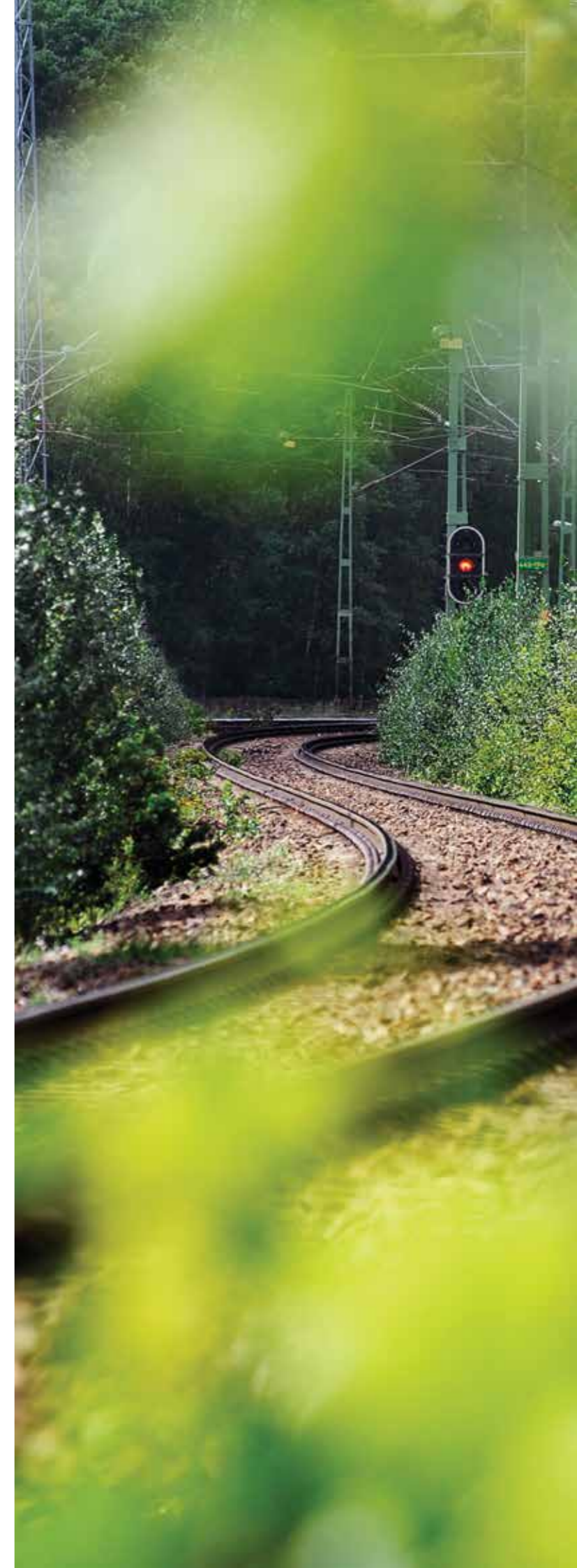


Figure 4: Our Net Gain process is industry leading, and benefits from our experience of applying it extensively on built environment projects





OTHER COUNTRIES PROVIDE VALUABLE LESSONS

There are 69 countries known to have a national policy in place or under development that requires or enables biodiversity offsets. Some countries including Germany and USA have had legal systems in place for 40 years. Other

countries including the UK are just only just beginning to look at no net loss to biodiversity approaches.

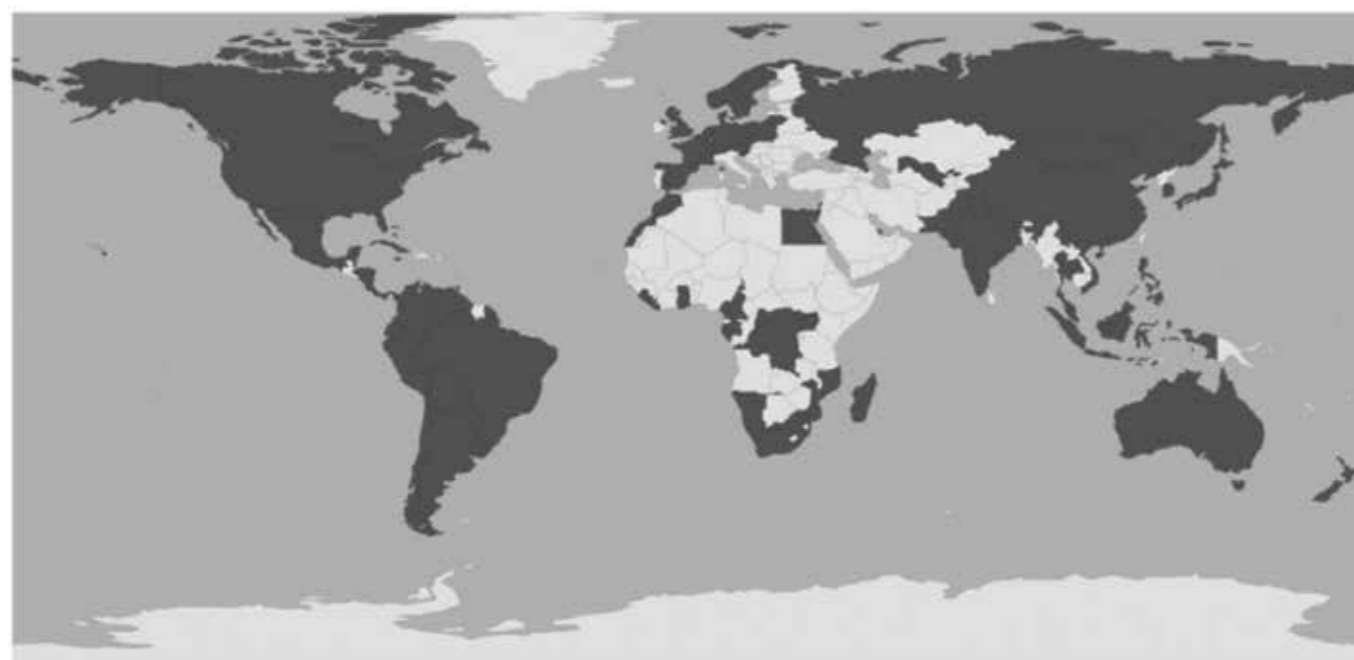


Figure 5: 69 countries known to have national policy in place or under development that requires or enables biodiversity offsets (Source: Maron et al 2016)

“We (the UK) are nowhere near the forefront of offsetting, Germany and the US have had No Net Loss policy legislation in place for 40 years now, and Australia has had regional policies in place for upwards of 10 years. I’d say that in some respects Uganda is at a similar stage to offsetting as the UK”

Joe W. Bull, Academic and Founder of Wild Business.

Examples of mandatory biodiversity net gain in international legislation and policy

COUNTRY	PROGRAMME	LEGISLATION	POLICY GOAL
US	Species mitigation (of which conservation banking is one tool for mitigation)	Endangered Species Act 1973 and ‘Guidance on establishment, use and operations of conservation banks’	To offset adverse impacts to threatened and endangered species
	Wetland Mitigation	Clean Water Act 1972 Chapter 404 (b) (1) and the US Army Corps of Engineers regulations (33 CFR 320.4 [®])	‘no overall loss of values and functions’ (1990); ‘net gain’ (2004)
AUSTRALIA	New South Wales	Green offsets for sustainable development’ Concept Paper (2002); Native Vegetation Act (2003) & subsequent regulations (2005); The Threatened Species Conservation Amendment (Biodiversity Banking) Bill (2006)	‘net environmental gain’
	Victoria	Native Vegetation Management Framework (2002) & subsequent amendments to related Acts; Bush Broker – native vegetation credit registration & trading, Information Paper (2006)	‘a reversal, across the entire landscape, of the long-term decline in extent and quality of native vegetation, leading to a net gain’
	Western Australia	Native Vegetation Act (2003); Environmental offsets, Position statement No 9 (2006)	‘net environmental benefit’
GERMANY	Interventions in Nature and Landscape	Federal Nature Conservation Act (1976)	‘full compensation’ including by offsetting ‘Unavoidable significant adverse effects are to be offset via compensation measures or substitution measures’
BRAZIL	Forest regulation and national system of conservation units	Lei No. 4771 of 1965; Lei No. 14.247 of 22/7/2002, Lei No 9.985 of 18/7/2000, Decreto No 4.340 of 22/8/2002	No net loss of habitat under a defined minimum forest cover for private landholdings

Table 5: Examples of mandatory legislation for biodiversity net gain adapted from Ten Kate & Inbar 2008

GERMANY

The Federal Nature Conservation Act of 1976, which prescribes the mitigation hierarchy for all parties, has become a part of business-as-usual in Germany. Article 14 of this act, defines Interventions in Nature and Landscape as “1.Interventions in nature and landscape, as defined in this Act, shall refer to any changes affecting the shape or use of areas, or changes in the groundwater level associated with the active soil layer, which may significantly impair the performance and functioning of the natural balance or landscape appearance.” It is a comprehensive approach for all impacts, on all scales and is not restricted to specific areas.

Article 13 states the general principle of how to use offsetting “Intervening parties shall primarily avoid any significant adverse effects on nature and landscape. Unavoidable significant adverse effects are to be offset via compensation measures or substitution measures or, where such offset is not possible, via monetary substitution.”

This differs to UK planning legislation as it makes it very clear that developers are required to offset when necessary whereas the UK National Planning Policy Framework is worded more softly stating that the “planning system should contribute” as opposed to making biodiversity net gain a non-negotiable requirement.

NATIVE VEGETATION CLEARANCE IN VICTORIA, AUSTRALIA

The regulated Victorian system in Australia, where a metric is used to quantify biodiversity losses and gains, and Native Vegetation Credits are traded to secure off-site compensation (offsets), is in its 14th year and is reviewed regularly.

The native vegetation clearance regulations were under review until May 2016. The Consultation Paper reveals that this mandatory system has seen some positive behavioural changes one of which showed that developers began to plan their projects earlier. The two most common reasons that developers decided to take steps to avoid and/or minimise impacts on biodiversity were to meet planning application requirements (82%) and to reduce offset costs (82%). This shows that the regulated system has been strengthening adherence to the mitigation hierarchy.

One way to purchase credits from habitat banks is “Over the Counter (OTC)” but it can only be used for low-level impacts. The OTC program made up over 60% of total sales. OTC sales have time-savings valued at A\$500 (£294m).

Stakeholders reported that OTC sales were an efficient way to streamline the offsetting process and expressed high levels of satisfaction. This improved compliance with the requirement to provide offsets.

VegetationLink, a habitat broker working in Victoria reports that the company is now doing over 300 credit trades every year. There are three reasons for the increase in trades over the past 2 years:

- Offsets have become mandatory in Victoria and are required under the planning and environment act.
- In 2014 the government changed the like-for-like rules so that for low risk impacts, offsets can be arranged at sites restoring different habitat types if within the same catchment.
- The standards associated with offsets have been increased. These increased standards result in more developers deciding to obtain help from third parties or brokers rather than attempt to meet the standards without guidance. As it is obligatory for offsets to be secured ahead of developments, using a third-party to purchase habitat credits can make the process quicker for the developer.

WETLAND MITIGATION BANKING, USA

In 1972 paragraph 404 of the US Clean Water Act (CWA) introduced a wetland banking scheme which requires developers to restore, establish or enhance an aquatic resource to compensate for any unavoidable damage they cause. Although the CWA is designed to prevent chemical pollution of lakes and river, it has also been proven to be an innovative biodiversity law.

Initially, developers took on the compensatory work themselves, but now a credits-based system has emerged and third parties help developers with the offsetting process. These third parties buy wetland areas in parts of the US that are likely to experience growth and work with regulatory bodies such as the Environmental Protection Agency (EPA) to obtain credits for their “creation, enhancement, and restoration” of wetlands. They are then able to sell these wetland credits to developers who need compensation. As a result of this, more than 1000 wetland banks have now been established in a market which is estimated to be worth over \$3 billion a year.

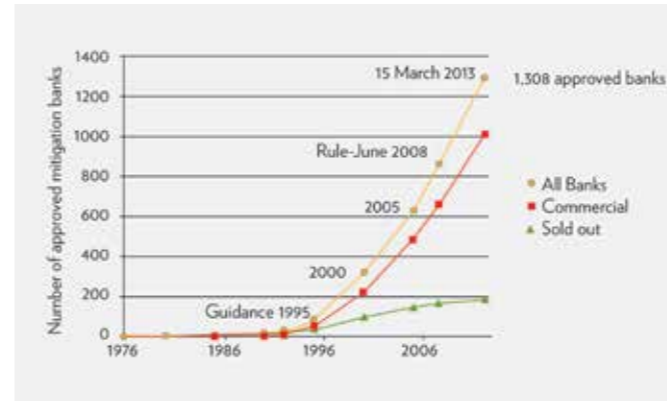


Figure 6: US Rapid growth in wetland offset supply by mitigation banks (<http://geo.usace.army.mil>)

Government analysis of official data on time-to-permit for developments demonstrates that third party mitigation banking offsets deliver an average of around 5 months’ worth of time saved when compared to developer-led offsets.

Wetland mitigation banking is only possible because the US government is restricting the supply of wetlands, which allows the market to set a price on this aspect of biodiversity. Assigning a dollar value to biodiversity has received some criticisms. However, without wetland banking, wetlands would cost very little to developers and would most likely continue to disappear under new housing or shopping developments. Mitigation banking means that the loss of wetlands has a monetary cost and the potential to generate funds which could be used to create new, similar wetlands.

Here are three key lessons that the UK should take away from international experiences of biodiversity net gain which can result in benefits for both businesses and biodiversity.

KEY LESSON	BUSINESS BENEFITS	BIODIVERSITY BENEFITS
1. The UK should make adherence to the mitigation hierarchy mandatory part of planning legislation	<ul style="list-style-type: none"> • Creating a level playing field for developers, who currently have to meet expectations which differ between LPAs • Streamlining the planning process 	<ul style="list-style-type: none"> • Potential to improve outcomes for nature by ensuring that offsetting is not used as a licence to trash.

2. UK developers and environmentalists alike should embrace the rise of habitat banking or brokering in the UK to help developers demonstrate biodiversity net gain	Using a third party offset provider can: <ul style="list-style-type: none"> • Reduce delays with planning applications and time-to-permit for UK developers • Reduce administrative costs 	<ul style="list-style-type: none"> • Creating additional habitats which could result in improved outcomes for biodiversity, nature and wildlife.
3. Quantifying and even monetising aspects of biodiversity should become commonplace in the UK	<ul style="list-style-type: none"> • Easier for non-environmental stakeholders to understand the importance and value of biodiversity 	<ul style="list-style-type: none"> • Increasing understanding of the value of biodiversity could incentivise its conservation • Quantifying helps to demonstrate whether net gain commitments are being met

Table 6: Key lessons from international experiences





PRACTICAL RECOMMENDATIONS TO MAKE A BIODIVERSITY STEP CHANGE

Biodiversity net gain's time has come. The UK already has the foundations in place, but more can be done to apply net gain principles systematically across the UK's planning system.

1. Biodiversity net gain and the use of the DEFRA metric could be an obligatory part of the National Planning Policy Framework.

There are many factors that affect the outcomes of planning applications, for example: health, education and other socioeconomic factors. Therefore if biodiversity net gain is a recommendation rather than a requirement, it can be bypassed.

If we are to meet UK biodiversity 2020 commitments then the policy could require mandatory use of the DEFRA metric to ensure that developers are transparent about whether a development is achieving biodiversity net gain.

2. Biodiversity net gain could be incorporated into DEFRA's forthcoming 25 year environment plan.

This expansion in the scope of the plan could look to include biodiversity net gain policies, and how these could improve Britain's biodiversity in the long term.

3. The most recent DEFRA guidance for biodiversity offsetting could be revised, with the offsetting metric

used to measure biodiversity net gain tightened, whilst maintaining simplicity.

Here lessons can be learned from both the UK over the past five years and also the experience from several countries that have already made biodiversity net gain or no net loss mandatory. New guidance should not be purely focused on biodiversity offsetting and could reflect pilot findings that offsetting is just one way to achieve biodiversity net gain. The primary aims of the updated guidance would help developers and LPAs to:

- Apply the mitigation hierarchy effectively to development projects.
- Use the DEFRA metric to calculate the biodiversity unit value of pre-development and post development sites.
- Document and monitor the ecological outcomes at each stage of the hierarchy in the long term.

Interviewees in this report have identified several areas where they feel the metric could benefit from revision. Revisions to the DEFRA metric could include:

Accounting for connectivity or fragmentation of habitats

Considering species & features: The reason this could be included is that habitats of low value in terms of biodiversity units may serve key ecological functions (such as nesting habitat for birds or commuting habitat for bats) which may not be covered by protected species requirements.

Enhancing subtlety: Stakeholders believed that the numerical values and weightings of some components of the metric could be too crude in some instances, perhaps 1-5 would be better than 1-3 to allow for more subtle differences.

Providing guidance on monetising biodiversity units: Both LPAs and organisations have attempted to put a monetary value on biodiversity units. It would be helpful if there was a consistent approach based on best practice examples of offsetting costs.

Improving the condition assessment guidance: For the purpose of the pilots, the Farm Environment Plan (FEP) handbook was used. This methodology was unsuitable as it was too focused on agricultural impacts. The unsuitable assessment is a core part of the metric so updating this guidance could result in a more accurate biodiversity unit calculation.

4. Creating a consistent understanding of guidance at a local level could create a level playing field for developers.

Today there is a lot of variation in the understanding and application of biodiversity net gain between Local Planning Authorities, meaning inconsistent application and unclear benefits. Some LPAs have biodiversity net gain or no net loss as part of their local policy, others do not.

As LPAs do not always have in-house ecological expertise, organisations such as the Association of Local Government Ecologists (ALGE) the Chartered Institute of Ecology and Environmental Management (CIEEM) could work together to produce standards and deliver training and/or support to other LPAs.

5. Biodiversity net gain could be incorporated at a corporate level and in developments.

It should not only be the regulators' responsibility to drive ecological gain. Biodiversity net gain is an enabling tool for developers to show their contribution to enhancing the UK's natural environment. Developers could support

the biodiversity net gain movement, treating it as an opportunity to maintain their social license to operate and recognition that offsetting can lead to faster planning consent and reducing costs, when third-parties are involved.

6. Collaboration to build an evidence base of the long term performance of biodiversity net gain developments.

Today there is little evidence of whether biodiversity net gain works to achieve improved ecological outcomes in the long term. There needs to be further monitoring and evaluation of mitigation measures and offsets once they are put in place. These processes could be focussed on answering important questions such as: Did the predicted impacts of the development occur? Did the mitigation measures which were put in place help improve outcomes for biodiversity? Monitoring and evaluation will help to build an evidence base which can be used by Local Planning Authorities, developers and other stakeholders.

The creation of a standing independent committee to oversee offsets, which could be a collaborative effort involving experts and stakeholders, will assure the proper operation of the offset system. More long term evidence would produce and inform best practice, contribute to shaping future policies and help to demonstrate that the approach works in practice not just overseas, but in the UK too.



Appendix 1: Details for Calculating a Biodiversity Unit

Habitat Distinctiveness: For each site, the original habitat and the future habitat will be categorised using the Integrated Habitat System (IHS). Habitat types will then be put into one of three type bands with high habitat types being allocated to priority habitats, as described within the UK Biodiversity Action Plan (BAP) Priority Habitat Descriptions. These types are then allocated according to distinctiveness. Each band of habitat distinctiveness has a number, or ‘points’, associated with it (2 for low, 4 for medium and 6 for high).

HABITAT TYPE BAND	HABITAT DISTINCTIVENESS	POINTS	BROAD HABITAT COVERED
High	High	6	Priority habitat, e.g. ancient woodland, lowland meadows
Medium	Medium	4	Semi natural, e.g. unimproved grassland
Low	Low	2	Heavily modified, e.g. intensive agriculture, quarries.

Table 1 - Habitat distinctiveness bands and points

Habitat Condition: The condition of the existing habitat type will be assessed based on the criteria of the Higher Level agri-environment Scheme (HLS). The HLS Farm Environment Plan handbook provides a methodology which enables different habitats within the UK to be evaluated and allows their condition to be divided into one of three categories; good; moderate; poor. For the purpose of biodiversity offsetting these three categories are given a weighting and provided point scores of either 1 for poor, 2 for moderate or 3 for good.

HABITAT CONDITION	POINTS
Good	3
Moderate	2
Poor	1

Table 2 - Habitat condition points

Combining Distinctiveness and Condition: Following the calculation of habitat distinctiveness and condition, the two are combined to give the number of biodiversity units per hectare of habitat (Table 3). Therefore for example, one

hectare of medium distinctiveness habitat in good condition would be worth 12 biodiversity units.

		HABITAT DISTINCTIVENESS		
		Low (2)	Medium (4)	High (6)
Condition	Good (3)	6	12	18
	Moderate (2)	4	8	12
	Poor (1)	2	4	6

Table 3 - Combined condition and distinctiveness matrix

DELIVERY RISK MULTIPLIERS

DIFFICULTY OF RECREATION	MULTIPLIER
Very High	10
High	3
Medium	1.5
Low	1

Table 4 - Multipliers for different categories of delivery risk

SPATIAL RISK MULTIPLIERS

LOCATION PARAMETERS	MULTIPLIER
Offset is in a location identified in the offsetting strategy	No multiplier required
Offset is buffering, linking, restoring or expanding a habitat outside an area identified in the offsetting strategy	2
Offset is not making a contribution to the offsetting strategy	3

Table 5 - Proposed multipliers to deal with spatial risk

TEMPORAL RISK MULTIPLIERS

YEARS TO TARGET CONDITION	MULTIPLIER
5	1.2
10	1.4
15	1.7
20	2.0
25	2.4
30	2.8
32	3

Table 6 - Multipliers for different time periods

ABOUT US

WSP | Parsons Brinckerhoff is one of the world's leading engineering professional services consulting firms. We bring together a unique pool of technical experts and strategic advisors including engineers, technicians, scientists, architects, planners, surveyors and environmental specialists, as well as other design, program and construction management professionals. The depth of our expertise and advice spans across the Property & Buildings, Transportation & Infrastructure, Environment, Industry, Resources (including Mining and Oil & Gas) and Power & Energy sectors as well as project delivery and strategic consulting services. With approximately 34,000 talented people in 500 offices across 40 countries, we are uniquely positioned to deliver successful and sustainable projects, wherever our clients need us.



WSP-PB.CO.UK



Laura Homfray

laura.homfray@wspgroup.com
+44 (0) 11 7930 6195



Mark Webb

mark.webb@wspgroup.com
+44 (0) 16 1886 2400

WSP | Parsons Brinckerhoff

WSP House
70 Chancery Lane
WC2A 1AF
London

Tel: +44 (0)20 7314 5000

Fax: +44 (0)20 7314 5111

© 2016 WSP | Parsons Brinckerhoff. All rights reserved.

The contents of this publication may not be reproduced by any means in whole or in part, without prior written consent from the publisher.