

Updating the Defra Biodiversity Metric



1. Introduction

We are proposing to update the **metric** approach to quantifying biodiversity net gain. The metric selected is an evolution of the one piloted by Defra in 2012¹. We are calling this the 'Defra Biodiversity Metric 2.0'. This guide briefly explains how the updated metric will work.

This release explains the 'beta' version of the Defra Biodiversity Metric 2.0, which is still subject to refinement according to stakeholder feedback. Further detailed guidance and a finalised metric will follow early next year to enable users of the metric to apply it effectively and consistently in practice, and to minimise risks of misinterpretation. Natural England will provide an automated spreadsheet tool to support users of the Defra metric, which will also be accompanied by guidance for those using the tool in practice.

Headline changes from the 2012-2014 Defra metric

Like the 2012-2014 metric, the updated version will use habitats as a proxy for the biodiversity value of a site. Some alterations have been made to give a fairer and more balanced assessment, including:

- A different mechanism for spatial factors, which allow habitat connectivity and strategic importance to be assessed for development sites as well as for compensation sites.
- A new multiplier to incentivise local delivery when compensation is required.
- New intermediate scores for condition, allowing for greater precision where a habitat's condition does not fit well into the existing three condition tiers.
- Updated habitat distinctiveness bands reflecting expert assessment, new habitat types which are better suited to urban and on-site habitat creation, and a new higher tier band.
- The finalised updated metric will include supplementary metrics for linear features such as hedgerows and rivers.
- The finalised updated metric will include a function to recognise the value of intermediate habitats before target condition is reached.
- A translation of the distinctiveness bands to the new UKHAB habitat classification will be provided (Phase 1 habitat types may still be used), and new condition guidance will be provided to supersede the previously used Farm Environment Plan (FEP) specifications.

2. General approach

The metric uses **habitat** to describe biodiversity, which is converted into measurable '**biodiversity units**' according to the area of each type of habitat. The metric scores different habitat types (e.g. woodland, grassland) according to their relative biodiversity value and adjusts this according to the condition and location of the habitat. Where new habitat is created or existing habitat is enhanced then the associated risks of doing so are factored into the metric.

¹ DEFRA. 2012. Biodiversity offsetting pilots. Technical paper: the metric for the biodiversity offsetting pilot in England. Defra. March 2012. <https://www.gov.uk/government/collections/biodiversity-offsetting>

The metric can be used as an auditing tool to quantify the biodiversity value of habitats on a patch of land and it can be used to calculate the losses and gains in biodiversity from actions such as development or from positive conservation management.

The biodiversity metric is based on **habitat area**. There are, in addition, supplementary metrics for habitats with special biodiversity properties that require separate consideration to properly reflect their value to biodiversity. Examples that will be included in the finalised version of the metric are: hedgerows and lines of trees, and rivers and streams. These have their own assessment and output units, which are distinct and need to be kept separate in any 'account' of biodiversity value or change. For simplicity's sake, this guide focuses solely on the main habitat area metric. The general approach and principles are, however, similar for the supplementary metrics.

3. Key principles of using this metric

- **The metric does not change policy or the protection afforded to biodiversity:** existing levels of protection afforded to protected species and to habitats are not affected by the use of this metric.
- **The metric sits within a decision framework based on the mitigation hierarchy:** it informs decision-making where application of the mitigation hierarchy² and good practice principles³ has concluded that compensation for habitat losses is justified.
- **The metric is a proxy for biodiversity:** while it is underpinned by ecological evidence the metric is only a proxy for biodiversity and has been kept deliberately simple to make it of practical use.
- **The metric focuses on widespread species and typical habitats:** it is a suitable proxy for widespread species found in typical examples of different habitats. Scarce and protected species are likely to need separate consideration to the biodiversity metric.
- **The metric recognises the importance of place and connectivity:** it seeks to enhance biodiversity in the locality of impacts so far as possible as well as contributing to wider ecological networks by creating more, bigger, better and joined areas for biodiversity⁴.
- **The metric informs decisions:** Decisions and management interventions need to take account of expert ecological advice and not just the biodiversity unit outputs of the metric. The historic or landscape significance of a habitat, and relevant planning policies, are also relevant.

4. Valuing habitats for biodiversity

To apply the metric a site should be surveyed, mapped and divided into parcels of distinct habitat types present using a recognised habitat classification system. All surfaces present, including built on surfaces, can be included. Users have a choice between the 'Phase 1' and the new 'UKHAB' habitat classification systems, the latter providing a more detailed classification for urban areas. Whichever habitat classification is used, this needs to be used consistently for the whole project to maintain comparability. The unit of area measurement is hectares.

The biodiversity 'value' of a habitat parcel is evaluated on the basis of its area and the relative 'quality' of its habitat. The assessment of quality comprises four components (explained further below):

- Distinctiveness
- Condition
- Strategic significance
- Habitat connectivity

² Planning policy explained: <https://www.gov.uk/guidance/national-planning-policy-framework>

³ CIEEM, CIRIA, IEMA. 2016 Biodiversity Net Gain – Good Practice Principles for Development. https://www.cieem.net/data/files/Publications/Biodiversity_Net_Gain_Principles.pdf

⁴ Lawton et al (2010) Making Space for Nature: a review of England's wildlife sites and ecological network.

The metric operates by applying a score to each of these elements for a habitat parcel. Then a calculation using the scores and the area of the habitat gives a number of **biodiversity units** that represents the biodiversity value of that habitat parcel. The calculation for a simple scenario is illustrated in Appendix 1.

The initial calculation determines the 'baseline' or 'pre intervention' value in biodiversity units. The process is then repeated using a 'post development' or 'post intervention' scenario to account for the impact of the development or intervention (including any on site measures to retain, enhance or create additional biodiversity within the development site).

At this point additional factors to account for the risk associated with creating, restoring or enhancing habitats are considered. The risks (explained further below) are:

- Difficulty of creating or restoring a habitat
- Temporal risk
- Spatial Risk

The relative value in biodiversity units 'post development' is then deducted from the 'baseline' to give a value for the extent of change. If a 'Net Gain' is achieved on site there is no need to consider off site measures. However if the calculation does not result in a sufficient 'Net Gain' in biodiversity units the development proposal can be revisited to improve the number of biodiversity units obtained or, if there is no scope for additional on-site compensation or enhancement, off-site measures will need to be considered.

If off site measures are required, a similar process is undertaken to establish biodiversity unit values on the offsite land 'pre intervention' and 'post intervention' to calculate how many units that land can contribute as compensation. The change in biodiversity units on site is then added to the change in units off site to provide a total change in biodiversity units for the development. The total change in units needs to be sufficient to ensure a 'Net Gain' is achieved.

The example in Appendix 1 illustrates the general approach used to calculate biodiversity value for habitats as described above. The metric will be accompanied by a freely available tool which will perform the calculations shown in Appendix 1.

5. Description of quality components

5.1 Distinctiveness

Habitats are assigned to distinctiveness bands based on an assessment of their distinguishing features including consideration of species richness, rarity (at local, regional, national and international scales), and the degree to which a habitat supports species rarely found in other habitats. The distinctiveness band of each habitat is preassigned for each habitat classification scheme.

Distinctiveness categories (area habitat)		
Category	Score	Example of habitat type
Very High	8	Priority habitats as defined in Section 41 of the NERC Act that are highly threatened, internationally scarce and require conservation action e.g. blanket bog
High	6	Priority habitats as defined in Section 41 of the NERC Act requiring conservation action e.g. lowland fens
Medium	4	Semi-natural vegetation not classed as a priority habitat e.g. hazel scrub
Low	2	Semi-natural or modified vegetation not classed as a priority habitat and of lower relative value to most wildlife e.g. Temporary grass and clover ley; intensive orchard; rhododendron scrub
Very Low	0	Habitats and land cover of little or no value to wildlife e.g. Developed land sealed surface

5.2 Condition

The metric takes account of the condition of a habitat. This means assessing the characteristics of a habitat parcel against a set of minimum requirements equating to 'good' condition for that habitat type. Condition assessment uses agreed standards and methodology tailored to the habitat unit type, which will be provided early next year and will supersede the previously used Farm Environment Plan (FEP) methodology, which can be difficult to apply in non-agricultural contexts.

Condition categories (area habitat)	
Category	Score
Good	3
Fairly good	2.5
Moderate	2
Fairly poor	1.5
Poor	1
N/A - Agriculture	1
N/A - Other	0

5.3 Habitat connectivity

The focus of the **habitat connectivity component** in the metric is the relationship of a particular habitat patch to other surrounding similar or related semi-natural habitats, which could be facilitating flows of species and ecosystem services. The approach is based upon the 'structural connectivity' model within the National Biodiversity Climate Change Vulnerability Model⁵. The calculation will be automated using a freely available tool to generate output that can be fed into the metric calculation. Where available local or site level data sets can also be entered into tool before the calculation is run. Connectivity is applied both pre and post intervention scenarios.

Guidance will provide advice on taking a proportionate approach to assessing habitat connectivity, recognising that smaller developments will typically result in less significant connectivity impacts.

Habitat connectivity categories	
Category	Score
High connectivity	1.15
Moderate connectivity	1.1
Low connectivity	1

5.4 Strategic significance

The idea of strategic significance works at a landscape scale taking account of published Nature Recovery Areas, local biodiversity plans, National Character Area⁶ objectives and local plans for targeting green infrastructure and biodiversity. This component gives extra value to habitats that are located in optimal locations to meet biodiversity and other environmental objectives. This could include areas identified as suitable for protected species compensation.

⁵ Taylor S, Knight, M. & Harfoot, A. 2014. *National biodiversity climate change vulnerability model*. Natural England Research Report NERR054. Natural England. ISBN 978-1-78354-084-6.

⁶ For more details of National Character Areas see: <https://www.gov.uk/government/publications/national-character-area-profiles-data-for-local-decision-making/national-character-area-profiles>

Strategic significance categories			
Category	Score	Point applied to calculation	
		Pre-impact	Post-impact
High strategic significance Within an area formally identified as being of good environmental potential in local policy	1.15	Yes	Yes
Medium strategic significance Good environmental potential but not in an area formally identified as being of good environmental potential in local policy	1.1	Yes	Yes
Low strategic Significance Low environmental potential and not in an area formally identified as being of good environmental potential in local policy	1	Yes	Yes

6 Dealing with risk

There are uncertainties and a risk of failure in any endeavour to create or improve the biodiversity value of a habitat. Where it is not possible to complete the habitat improvements works required to compensate for future losses in advance of the habitat losses occurring, risks need to be mitigated. This is done in the metric by adopting a multiplier to reduce the number of units generated by an area of compensation habitat. The following risks are recognised in this metric.

6.1 Temporal risk

If there is a mismatch between a negative impact on biodiversity and compensation habitat reaching the required quality or level of maturity, there will be a loss of biodiversity for a period of time.

This issue can be managed by the creation of compensation habitat ahead of the impact taking place, either through the setting up of habitat banks or, for projects with a long lead in, by starting the offset work well ahead of the development. However, this is not always possible and even where the management to create compensation habitat starts in advance, the time taken for habitats to mature means that there will almost inevitably be a time lag. Where a time lag does occur, a multiplier is applied to take account of it. This is referred to as the 'Time to target condition' multiplier.

Where time discounting is used in compensation schemes a standard discount rate of 3.5% is used. This is the value recommended in the Treasury Green Book. The maximum multiplier taking account of temporal risk increases the compensation required three-fold, which equates to approximately 32 years.

Time to target condition categories	
Number of years	Multiplier
1 year	0.965
5 years	0.837
10 years	0.700
20 years	0.490
30 years	0.343

6.2 Difficulty of creation and restoration

This component recognises how difficult it is to create or restore a given habitat type and the related uncertainty of outcome this creates. The level of risk will differ between habitat types because of ecological factors and the availability of techniques or know-how to create habitats in a realistic time-frame. Uncertainty in achieving the target outcome for each habitat is addressed by a habitat-specific 'difficulty' multiplier.

Difficulty categories	
Category	Multiplier
Very High	0.1
High	0.33
Medium	0.67
Low	1

6.3 Spatial risk

This component is a simple reflection of the fact that habitat created at a great distance from the site of habitat losses carries a risk of depleting local areas of natural habitats, and of depriving the communities experiencing development of the associated benefits. The multiplier is very simple, and should be applied as a rule but with the discretion of the local planning authority (for example, where a development near to a local planning authority boundary creates compensatory habitat locally, but technically in a separate planning area).

Local risk	
Category	Multiplier
Compensation inside LPA or NCA, or deemed to be sufficiently local to site of biodiversity loss	1
Compensation <u>outside</u> LPA or NCA of impact site but in neighbouring LPA or NCA	0.75
Compensation <u>outside</u> LPA or NCA of impact site and beyond neighbouring LPA or NCA	0.5

7 Additional metric rules

This summary of core rules and principles is not exhaustive and further guidance will be provided in due course to help users in applying the updated metric effectively and consistently.

7.1 Compensation for losses

Compensation for habitat losses can be provided by creation and by restoration or enhancement of existing habitats. Measures taken to improve existing habitats must provide a significant and demonstrable uplift in distinctiveness and/or condition.

7.2 'Trading down' is not permitted

Newly created or restored habitats should result in an improvement in the extent or quality of the habitat affected. New or restored habitats should aim to achieve a higher distinctiveness and / or condition than those lost. At no time should compensation measures result in "trading down", for instance in the replacement of a habitat of high distinctiveness with creation or restoration of a habitat of a lower distinctiveness. Losses of habitat of a high distinctiveness are expected to be compensated on a "like for like" basis.

7.3 Differences in size between impacted site and compensation habitat

A difference between the size of an area of an impacted site and the size of an area of compensation habitat is permitted using this metric. A difference can occur because of a difference in quality between the site impacted and the compensation provided. For example, if a habitat of low distinctiveness is impacted and is compensated for by the creation of habitat of high distinctiveness, the area needed to compensate for losses can theoretically be less than the area impacted.

7.4 Local and special characteristics need to be considered

Those creating and restoring habitats should aim to replicate the characteristics of the habitats that have been lost, to achieve a similar community of characteristic species, and to take account of particular species in a locality that give habitats their local distinctiveness.

Appendix 1: Calculating the biodiversity value of a habitat

The example below illustrates the general approach used to calculate biodiversity value for habitats

PRE - intervention biodiversity calculation

$$\begin{array}{l}
 \text{Size of habitat parcel} \times \text{Distinctiveness} \times \text{Condition} \times \text{Strategic location} \times \text{Connectivity} = \text{Biodiversity units} \\
 10 \text{ (ha)} \times 6 \text{ (high)} \times 3 \text{ (good)} \times 1.15 \text{ (high)} \times 1.15 \text{ (high)} = 238 \text{ units}
 \end{array}$$





POST-intervention biodiversity calculation (for newly created habitat)

$$\begin{array}{l}
 \text{Size of habitat parcel} \times \text{Distinctiveness} \times \text{Condition} \times \text{Strategic location} \times \text{Connectivity} \times \text{Difficulty} \times \text{Time to target condition} \times \text{Spatial Risk} = \text{Biodiversity units} \\
 10 \text{ (ha)} \times 6 \text{ (high)} \times 3 \text{ (good)} \times 1.15 \text{ (high)} \times 1.15 \text{ (high)} \times 0.7 \text{ (med)} \times 0.8 \text{ (5 yrs)} \times 0.75 = 100 \text{ units}
 \end{array}$$

=

The net effect of an intervention (or a series of interventions) on biodiversity is calculated as follows:

$$\begin{array}{l}
 \text{POST units} - \text{PRE units} = \text{Outcome} \\
 100 \text{ units} - 238 \text{ units} = -138 \text{ units}
 \end{array}$$

	Habitat parcel		Risk factor
	Measure of biodiversity quality		Value in biodiversity units