Biodiversity metric 4 case study 5: Rewilding and Biodiversity Net Gain

This case study demonstrates how biodiversity metric 4 can quantify losses and gains in different habitats associated with rewilding projects.

Overview

This case study discusses a hypothetical rewilding project in which the habitats present change over time through a relaxing of management and natural succession. It demonstrates how biodiversity metric 4 can be applied to rewilding projects to quantify predicted changes in habitats that occur through rewilding, often over many decades.

This case study demonstrates:

- ✓ The application of biodiversity metric 4 to a rewilding project to calculate predicted changes in biodiversity units that are generated through the creation and enhancement of habitats via both deliberate management intervention or through natural changes and succession.
- ✓ The opportunity that rewilding projects can present to landowners for generating biodiversity unit 'sales' over time.

Note: All habitat data presented in the tables of this case study are generated directly from biodiversity metric 4.

The site

This case study considers the hypothetical rewilding of a site predominantly composed of improved grassland which was previously used as an intensive dairy farm.

The landowner will remove internal fences within the site and introduce hardy cattle breeds at a very low stocking density. Habitats will then be left to develop naturally with minimal management intervention. Figure 1 defines the boundary of the proposed rewilding site.

Figure 1. The rewilding project site.

Approach to biodiversity net gain assessment

Rewilding primarily relies on allowing habitats to develop and evolve over time through natural succession, with little to no management intervention. However, rewilding projects may involve the initial creation of some habitats, for example digging ponds or creating wetland areas to provide water for livestock, and planting or seeding to encourage the development of certain habitats. Habitat changes resulting from projects such as rewilding can be accounted for within biodiversity metric 4.

Biodiversity metric 4 calculates how many biodiversity units the site scores prior to the rewilding project commencing, at 'baseline', and estimates the number of biodiversity units delivered after a period of time based on predicted habitat types. Area habitats, hedgerows and watercourses are included in this case study, and the biodiversity units for these are treated separately and cannot be summed, traded, or converted.

When recording expected habitat changes due to rewilding in biodiversity metric 4 – whether that be through management or natural changes – the guidance set out in the biodiversity metric 4 User Guide should be followed. The approach is summarised below:

- Enhancement is where a habitat improves by distinctiveness or condition, for example 'modified grassland' to 'other neutral grassland'.
- Creation is where a habitat changes to another type which is in a different broad habitat type, for example a grassland habitat to a scrub habitat.

A habitat needs to improve by distinctiveness or condition to be recorded as enhancement – a change from one habitat to another which has the same, or lower distinctiveness or condition cannot be recorded as such.

Assumptions and limitations

Predicting future habitat composition and quality

For rewilding projects which use biodiversity metric 4, a competent person should use their ecological expertise and evidence when predicting the type, condition and proportions of habitats that may develop.

It is possible to predict the habitat types that are likely to develop with some confidence, using site information on physical factors such as geology, topography, and hydrology, as well as the habitats present at baseline and nearby. It may be harder to predict the proportions of habitats and the condition that they are likely to reach within a specified timeframe, such as the minimum 30 years that will apply to mandatory net gain provision.

The habitat type and condition predicted should be realistically achievable within the project timeframe. Habitats such as 'wood-pasture and parkland' (see UK Habitat Classification definition), which can take many decades or centuries to develop, are not usually appropriate. A habitat such as this can still be achieved in the longer term, while assigning the most appropriate habitat types in the shorter term.

Because of the uncertainty in predicting the outcome, rewilding projects should adopt a precautionary and incremental approach to forecasting the proportions of different habitat types to avoid setting overly-ambitious initial targets. This allows for key 'phases' of habitat change to be identified and recorded. Each of these phases could, once the previous

habitat targets have been reached, provide additional biodiversity units into the net gain market. This approach should be taken when aiming to create complex habitats that take a long time to develop, such as 'wood-pasture and parkland'. In this situation, a separate biodiversity metric would be produced for each 30-year phase, recording the baseline, and most appropriate projected habitat types for each 30-year period. Figures 2 and 3 demonstrate how this can be approached.

For any rewilding project, habitat estimations will also be dependent on many influencing factors including grazing pressure and the method of vegetating the area – for example seeding, planting or reliance on self-seeding from local seed sources. This, and any other assumptions made, should be explained within the 'User Comments' column of biodiversity metric 4.

In practice, proposed habitats require monitoring and oversight by an ecologist to ensure that the estimated area of each habitat and its target condition is going to be achieved. Monitoring may highlight any required management interventions needed, or a recalculation of the biodiversity units predicted to be delivered by the project.

For this hypothetical case study, it is assumed that the habitats will develop in the following ways over the first 30-year phase:

- Approximately one third of the original 'modified grassland' will be retained, and will improve in species-richness and structure to become 'other neutral grassland' in good condition due to the presence of grazing animals and the absence of pesticide and fertiliser application.
- The remaining areas will develop into a mosaic of approximately 50% scrub and 50% woodland, recorded on the habitat creation tab.

The following assumptions have also been made when recording the predicted habitat changes in biodiversity metric 4:

Habitats

- All habitats are in poor condition at baseline.
- Enhanced hedgerow and ditches will reach good condition, while 'modified grassland' will be enhanced by distinctiveness to become 'other neutral grassland' in good condition.
- Enhanced 'wet woodland', 'other woodland; broadleaved' and 'mixed scrub' is projected to reach moderate condition.
- Further creation of 'mixed scrub' is predicted to reach moderate condition, and 'other woodland; broadleaved' is predicted to be poor condition.

Biodiversity metric 4 multipliers

- There is no watercourse or riparian encroachment along the ditches.
- The strategic significance of each habitat may vary within one site depending on local priorities. For simplicity, the strategic significance for all habitats except 'modified grassland' and ditches is set to medium. This means that that the habitats' locations are ecologically desirable, but they are not formally identified within the local strategy. Within biodiversity metric 4, this option requires justification using ecological expertise.

Baseline area habitat, hedgerow, and watercourse biodiversity units

At baseline, the 50 ha site is predominantly made up of 'modified grassland' with small areas of scrub and broadleaved woodland, including 'wet woodland' and 'other woodland; broadleaved'. There are also some hedgerows, 0.77 km of 'lines of trees' and 2 km of 'ditches'. Using biodiversity metric 4, the baseline value of this site was calculated to yield:

- 114.20 area habitat biodiversity units
- 2.68 hedgerow biodiversity units
- 8.00 watercourse biodiversity units

Losses and gains in these three biodiversity unit types are compared against the baseline to measure the net change. Table 1 shows the details of area habitats, hedgerows, and watercourses at baseline, including the baseline area habitat, hedgerow, and watercourse biodiversity unit values.

Table 1. Baseline area habitat, hedgerow, and watercourse details.

Habitat type	Area (ha) / length (km)	Habitat condition	Strategic significance	Total biodiversity units
Modified grassland	45	Poor	Low	90.00
Mixed scrub	2	Poor	Medium	8.80
Other woodland; broadleaved	2	Poor	Medium	8.80
Wet woodland	1	Poor	Medium	6.60
Total area (ha)	**50**	**Total area habitat biodiversity units**		**114.20**
Native hedgerow with trees	0.45	Poor	Medium	1.98
Line of trees	0.32	Poor	Medium	0.70
Total length (km)	**0.77**	**Total hedgerow biodiversity units**		**2.68**
Ditches with no encroachment	2	Poor	Low	8.00
Total length (km)	**2**	**Total watercourse biodiversity units**		**8.00**

Post-intervention area habitat, hedgerow, and watercourse biodiversity units

Area habitats

In this case study, the expected changes to area habitats are improvements in distinctiveness and condition, as habitat structure and species diversity increase over time; or changes due to natural succession, as habitats develop into scrub and woodland. New areas of wetland habitat may also develop, as ditches become blocked or grazing animals trample banks and alter their structure, and these could be included in the calculation.

Over the first 30 years of rewilding, it is predicted that the original 45 ha of 'modified grassland' will develop into approximately equal areas of 'other neutral grassland' through enhancement. This, in combination with the predicted enhancement of the scrub and woodland, generates 170.52 area habitat biodiversity units. Over this time, it is also expected that a mosaic of 'mixed scrub' and 'other broadleaved woodland' will develop, which is recorded as creation, generating 165.69 area habitat biodiversity units. In total, these add up to 336.21 area habitat biodiversity units, which is an uplift of 222.01 against the baseline, and a 194.4% net increase.

It is possible to achieve a further biodiversity net gain on-site once habitats have achieved their projected type and condition over the first 30-year phase. Figure 2 illustrates predicted habitat enhancement and creation at the site for this first phase along with a second phase spanning the following 30-60 years. For the second phase, a new biodiversity metric 4 would need to be populated, using the projected final state of the first phase as the new baseline state.

For example, over the second 30-year period, enhancements might include the 'other neutral grassland' continuing to increase in species diversity and meet the definition of a higher distinctiveness grassland.

Hedgerow habitats

During the first phase, 0.45 km of 'native hedgerow with trees' and 0.32 km of 'lines of trees' will be enhanced from poor to good condition as they mature naturally. This enhancement generates 5.94 hedgerow biodiversity units, and a 121.3% net gain.

Where hedgerows are expected to expand due to relaxed management, the baseline width of the hedgerow should be treated as a 'retained' hedgerow in biodiversity metric 4, and any additional width beyond the baseline should be recorded as the most appropriate scrub type. Where baseline information is not available, a precautionary 1.5 m width should be used as the hedgerow width, with expansion beyond this recorded as scrub. Professional ecological judgement and evidence should be used when deciding between hedgerow and scrub habitats.

Watercourse habitats

No watercourse biodiversity units are lost as part of this project, however, the 2 km of 'ditches' present at baseline are recorded as enhanced by condition in biodiversity metric 4. This is because the water quality and habitat structure are expected to improve. This improvement in condition generates 16.06 watercourse biodiversity units, amounting to a 100.8% increase.

Summary

Overall, the combination of habitat enhancement and creation delivers a net gain in area habitat, hedgerow, and watercourse biodiversity units relative to the baseline, as shown in Table 2.

Figure 2. Illustrative example of how rewilding and natural succession can be recognised in biodiversity metric 4 by using a new biodiversity metric tool for each 30-year phase.

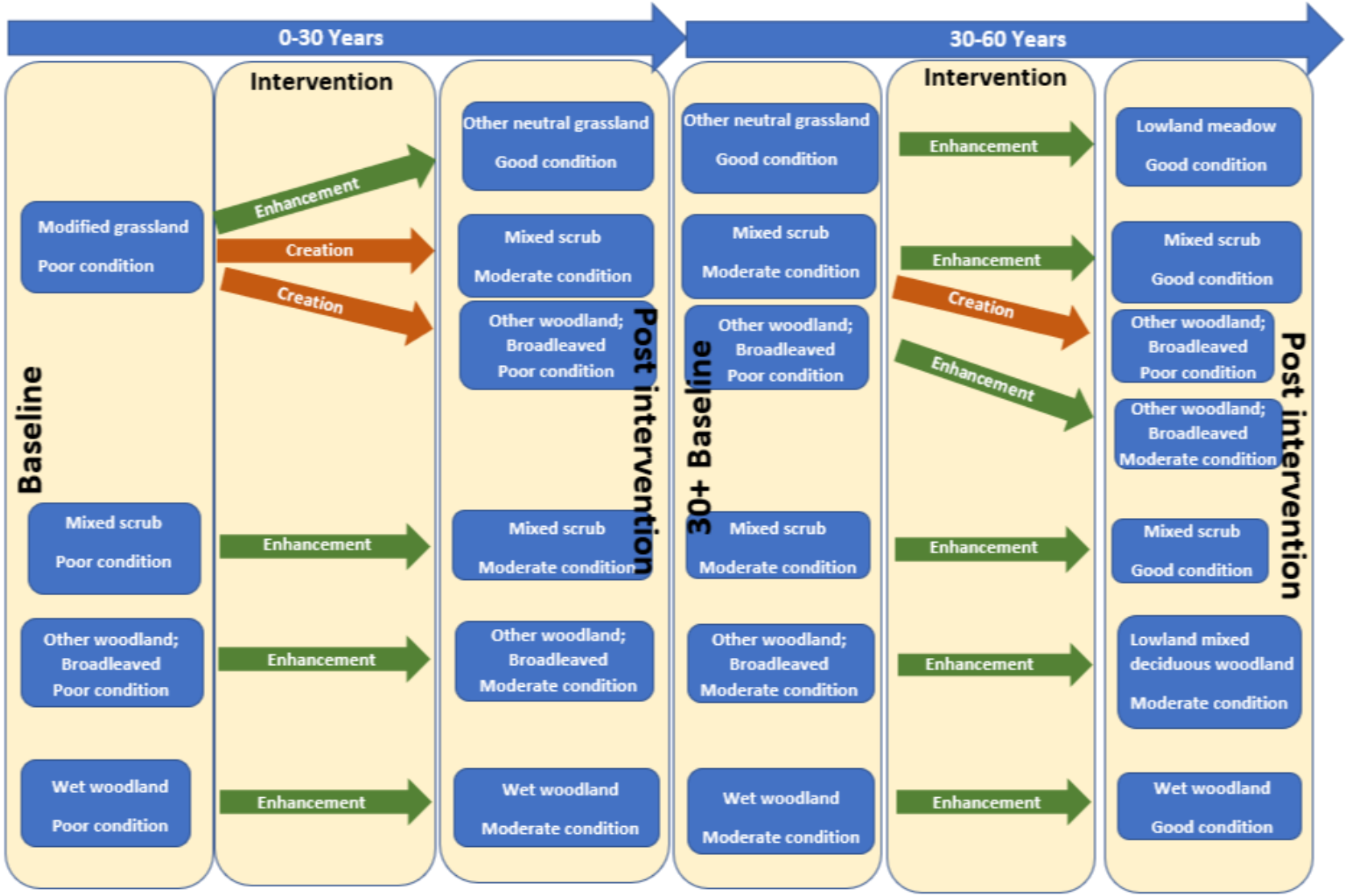
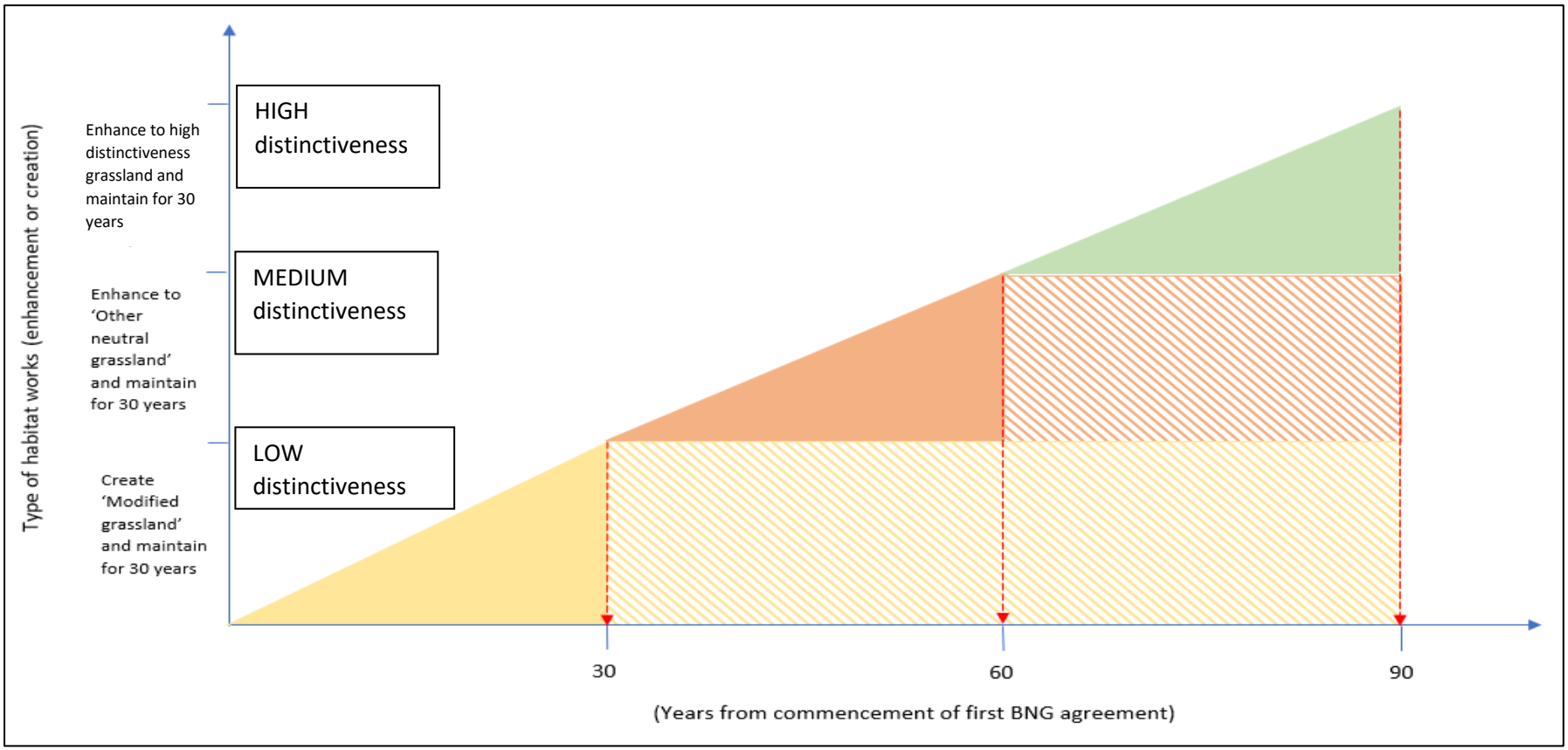


Table 2. Losses and gains of area habitat, hedgerow, and watercourse biodiversity units within the first 30-year phase.

Biodiversity unit type	Description	Losses and gains of biodiversity units
Area habitat	**Baseline** area habitat biodiversity units	**114.20**
Area habitat	**On-site** enhancement and creation of habitats Habitat enhancement: - 2 ha of 'mixed scrub' from poor to moderate condition, of medium strategic significance - 2ha of 'other woodland; broadleaved' from poor to moderate condition, of medium strategic significance - 1 ha of 'wet woodland' from poor to moderate condition, of medium strategic significance - 15 ha of 'modified grassland' in poor condition, with low strategic significance, to 'other neutral grassland' in good condition, of medium strategic significance	170.52
	Habitat creation on former modified grassland: - 15 ha of 'mixed scrub' in moderate condition, of medium strategic significance - 15 ha of 'other woodland; broadleaved' in poor condition, of medium strategic significance	165.69
	Total net gain in area habitat biodiversity units	**+222.01**
	Overall net percentage change in area habitat biodiversity units	**+194.4%**
Hedgerow	**Baseline** hedgerow biodiversity units	**2.68**
Hedgerow	**On-site** enhancement and creation of habitats Habitat enhancement: - 0.45 km of 'native hedgerow with trees' from poor to good condition, of medium strategic significance - 0.32 km of 'line of trees' from poor to good condition, of medium strategic significance	5.94
	Total net gain in hedgerow biodiversity units	**+3.26**
	Overall net percentage change in area habitat biodiversity units	**+121.3%**
Watercourse	**Baseline** watercourse biodiversity units	**8.00**
Watercourse	**On-site** enhancement of habitats Habitat enhancement: - 2 km of 'ditches' from poor to good condition, of low strategic significance with no riparian or watercourse encroachment	16.06
	Total net gain in watercourse biodiversity units	**+8.06**
	Overall net percentage change in watercourse habitat biodiversity units	**+100.8%**

Figure 3 gives an idea of how a grassland increasing in distinctiveness over time and delivering increasing numbers of area habitat biodiversity units, can be recorded in phases using successive biodiversity metrics.

Figure 3. An example of how multiple biodiversity net gain agreements could operate on the same piece of land over multiple phases



Conclusions

This case study is based on a hypothetical rewilding project which has been simplified to illustrate how rewilding projects should be approached when using biodiversity metric 4. It demonstrates how this metric can be applied to estimate the predicted losses and gains associated with natural succession, and how such projects can yield large net gains in area habitat, hedgerow, and watercourse biodiversity units. Consequently, projects such as the one described here could contribute to the local off-site net gain market, by becoming a provider of biodiversity units for developments that are unable to fulfil their net gain requirements on-site.

The reliability of predicted habitat type, condition and proportions can be increased by being precautionary and realistic, and using available information and ecological expertise when predicting them. Once these habitat predictions have been reached, and following the initial 30-year period, it is then possible to enter into a further net gain delivery agreement, or a second phase, for additional habitat changes occurring through natural succession. This can be done by updating the baseline of a biodiversity metric 4 representing the second phase, to reflect the habitats present after the first 30 years, and following the same process as above, reflecting habitat changes as enhancement or creation.

By taking this approach, biodiversity metric 4 will not penalise rewilding projects that seek to achieve a specific end point, for example, traditional wood-pasture and parkland habitats, which will take many decades or hundreds of years to achieve.

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Key messages and top tips

- Rewilding projects can create high quality habitats which can contribute towards area habitat, hedgerow, and or watercourse biodiversity unit delivery when recorded in biodiversity metric 4.
- It is recommended that an incremental and precautionary approach is taken when predicting habitat type and condition, and the proportions in which they will develop across a site.
- Regular monitoring and review should be undertaken to ensure habitats are developing into the predicted habitat types, conditions and proportions.
- The creation tab should be used to account for any deliberate or passive management intervention such as natural enhancement and succession, which results in a change from one broad habitat type to another.
- In most instances, where habitat changes or natural succession results in habitats evolving over time within the same broad habitat type, the habitat enhancement tab should be used to record habitat changes and improvements to the condition of any existing habitats.
- Any hedgerows or lines of trees which are retained should continue to be mapped and treated as hedgerows post-intervention. New scrub, developing beyond the baseline hedgerow width, or 1.5 m width if this is not known, should be recorded as the appropriate scrub type within the area habitat creation tab. Professional judgement should be used for these assessments.