

The Cambridge Biodiversity Metric

A method of quantifying biodiversity on the University of Cambridge estate



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The Cambridge Biodiversity Metric

1 Introduction

- 1.1 The Cambridge Biodiversity Metric (CBM) is a modified version of Natural England's Biodiversity Metric 2.0 (NEBM) for use by the University of Cambridge in quantifying biodiversity changes on its estate, developed via consultation with the University's Ecological Advisory Panel and the Wildlife Trust for Bedfordshire, Cambridgeshire & Northamptonshire (WTBCN). Due to the timing of the University's Biodiversity Action Plan, the CBM is based on the Beta test version of the NEBM rather than the finalised version due for release in December 2020.
- 1.2 The CBM is a simplified proxy measure of biodiversity. It incorporates proxies of habitats' biodiversity value (where habitats are defined largely by their vascular plant composition and structure) as well as actual biodiversity value (e.g. species richness) of vascular plants. The CBM is designed such that it can be carried out by a competent botanist.
- 1.3 Compared to the NEBM, the CBM aims to be fairer to land managers wishing to enhance existing habitats without an onus to compensate losses elsewhere, whilst going beyond the NEBM in terms of ambition for improving habitat quality. (The NEBM will continue to be used by the University for offsetting purposes to comply with regulation, although the CBM can also be used for offsetting.) The CBM addresses and (it is hoped) improves on the following limitations of the NEBM:
 - it is geared towards offsetting and less towards enhancing existing habitats in a non-compensatory manner;
 - it is 'lenient' in many places, which limits how much biodiversity increase the University can demonstrate numerically. E.g. a hedgerow is classed as the maximum Condition tier 'Good' in the NEBM even if it fails two of the ten Condition criteria;
 - it struggles to deal with relatively irreplaceable sites of LWS (or SSSI) standard;
 - it does not deal with certain features of high value for biodiversity, such as veteran trees;
 - it has a number of other ecological and technical flaws (some of these flaws may be corrected in the final version of the NEBM).
- 1.4 Although the CBM could potentially be adapted for other landowners to use, its primary purpose is to serve the University of Cambridge Biodiversity Action Plan on the University's estate.
- 1.5 For quick reference, the calculation of the CBM is as follows (the individual components are explained in detail below):

CBM = habitat size x (Distinctiveness + Standard) x Condition x Connectivity x Strategic Significance

2 Components of the CBM

- 2.1 The CBM follows the basic framework of the NEBM but is modified in a number of ways. See Appendix VII for information about Data Certainty and risk factors.

Distinctiveness

- 2.2 ‘Distinctiveness’ is a measure of how ‘significant’ the habitat type is for biodiversity in a national context because of its rarity or other priority. Distinctiveness has the following tiers in the CBM:

Distinctiveness tier	Associated score
Very High	8
High	6
Medium	4
Low	2
Very Low	1
Negligible	0

- 2.3 The CBM’s habitat categorisation largely follows the slightly modified UK Habitat Classification (UKHab) system (UK Habitat Classification Working Group 2018) used in the NEBM. Deviations from UKHab are described in detail in the CBM documentation, but surveyors are otherwise assumed to be able to identify UKHab habitats.
- 2.4 The CBM covers area-based habitats (e.g. grassland and woodland) and linear habitats (e.g. hedgerows, lines of trees and watercourses). A separate assessment has been designed for added point features (APFs) such as bird boxes, log piles and bug hotels, and these are not covered by the CBM. Species data other than vascular plants are also dealt with separately from the habitat component of the CBM (an exception being fish-stocking in standing waterbodies).

Standard

- 2.5 ‘Standard’ adds detail (especially county-level distinctiveness) to the habitat’s Distinctiveness. It is calculated for each broad habitat type using the Condition criteria in the survey sheets (see Appendix I).
- 2.6 Standard includes criteria which relate to plant species richness, detailed plant communities and abundance of notable features (e.g. veteran trees), borrowed largely from the Cambridgeshire and Peterborough CWS selection guidelines (CPCWSP 2014), hereby referred to as the ‘CWS selection guidelines’, and the Cambridge city CiWS selection guidelines (WTBCN & Cambridge City Council 2005), hereby referred to as the ‘CiWS selection guidelines’.
- 2.7 CWSs are generally designated from higher biodiversity thresholds than CiWSs. Note that CiWSs are strictly speaking only within and immediately around Cambridge city, but they are nonetheless used in the CBM as a useful established benchmark for biodiversity value.

2.8 Similar approaches to the CBM elsewhere in the UK could make use of their local Wildlife Trust’s LWS selection criteria. Scores from any Standard criteria met are added to the habitat’s Distinctiveness score.

2.9 Standard has the following tiers:

Standard tier	Score per Standard criterion	Explanation
Above CWS	0.4	Some criteria are set at a higher Standard than even CWSs (e.g. for ditches).
CWS	0.3	Criteria correspond to CWS selection guidelines.
CiWS	0.2	Criteria correspond to CiWS selection guidelines.
Basic	0.1	Criteria include those shifted over from the NEBM Condition assessment.
Poor	Effectively 0	Habitat fails to meet any of the above criteria.

2.10 A habitat’s Standard is important to know for the initial valuing of a habitat, and it may change (relatively slowly) over time as a result of changing habitat Condition, or change rapidly if plants are actively introduced to or removed from the habitat parcel. In some cases, Standard may be a relatively static property of the habitat (e.g. the species richness of trees and shrubs in a woodland).

2.11 It is possible that a habitat parcel will meet unrelated Standard criteria from two tiers simultaneously (e.g. some CWS criteria but also some unrelated CiWS criteria). Scores for these criteria are added together. Note that this *only* applies to unrelated criteria: in many cases, each tier has a criterion which ‘updates’ a related criterion in the tier below. E.g. in the line of trees Standard assessment, the Basic tier includes a criterion ‘Groups of 2 or more veteran trees of native species and associated semi-natural habitat’, whilst the CiWS tier includes a criterion ‘Contains at least 1 veteran or mature pollard of native tree species.’ In case, it would be unfair to add together the scores from both the Basic and CiWS tier; only the score from the CiWS tier (the highest tier) is counted.

2.12 If a habitat type has no Standard criteria above Poor that it needs to meet, it is automatically assigned a Standard score of 0.

2.13 The ‘Above CWS’ tier could include criteria corresponding to SSSI selection criteria where they are set at a higher threshold than CWSs (this is not always the case).

Condition

2.14 ‘Condition’ is a measure of habitat quality that typically relates to how well the habitat is being managed and refers to structural features, such as percentage cover of undesirable species. It is calculated for each broad habitat type using the Condition criteria in the survey sheets (see Appendix I). Condition has the following tiers in the CBM:

Condition tier	Associated score
Good	3
Fairly Good	2.5
Moderate	2
Fairly Poor	1.5
Poor	1

Connectivity

2.15 Connectivity is based on a habitat parcel's nearness to similar habitats (i.e. of the same broad type, e.g. both habitats are types of hedgerow) or related habitats (not necessarily the same type, but complementary habitats that could form a 'dynamic complex', e.g. scrub and grassland). Connectivity is not currently included in the CBM or the University's 2020 BAP targets (although the aim is to include a measure of Connectivity in future updates). This is because of limitations in the Connectivity calculation of the NEBM Beta version and the need to wait until December 2020, when the final NEBM is due to be published, to assess whether the updated Connectivity calculation is suitable for the University's purpose or whether an alternative Connectivity calculation needs to be designed specially for the CBM (see Appendix III).

Strategic Significance

2.16 Strategic Significance in the CBM depends on whether a habitat parcel falls within a strategic biodiversity area identified in local policy, and has the following tiers:

Strategic Significance tier	Associated score	Criteria
High	1.15	Within strategic biodiversity area formally identified in local policy.
Low	1	Outside any strategic biodiversity area formally identified in local policy.

2.17 In effect, Strategic Significance is akin to a landscape-scale Connectivity score. The only site on the University estate considered to fall within an area of strategic biodiversity significance as

identified in local policy is Lord's Bridge, which is located at the edge of the West Cambridgeshire Hundreds Living Landscape.

3 Calculation of the CBM

3.1 The CBM for area-based habitats is calculated as follows:

Area in ha x (Distinctiveness + Standard) x Condition x Connectivity x Strategic Significance

3.2 The CBM for linear habitats is calculated as follows:

Length in km x (Distinctiveness + Standard) x Condition x Connectivity x Strategic Significance

3.3 As in the NEBM, the CBM outputs for area-based and linear habitats are not comparable.

3.4 Note that the CBM calculations in the University's 2020 BAP do not currently incorporate Connectivity.

4 Recommendations for CBM users

Recommendations for CBM surveys

- 4.1 CBM survey sheets are provided in the following section of this document ('Survey sheets for broad habitat types').
- 4.2 The CBM has a bespoke survey methodology, albeit similar to the NEBM's. Other survey methodologies (e.g. Phase 1 and the methodology used by the WTBCN to survey LWSs) omit much of the information required to fulfil the requirements of even the NEBM, especially for Condition. The CBM calculation could probably be carried out without too much trouble based on data from a standard NEBM survey, although this is not ideal and some components required by the CBM could be missed in a NEBM survey, decreasing Data Certainty.
- 4.3 The CBM works best with complete or near-complete vascular (especially angiosperm) plant species lists from each habitat parcel, as this is often required to calculate Standard. There may be circumstances where it is appropriate to complete a single species list for multiple parcels of the same habitat type where they form a single 'management unit' even though they would technically be mapped as separate polygons (e.g. two adjacent areas of chalk grassland split by a tarmac path); this would usually be applicable to parcels in close proximity, but some sensible judgement may be required.
- 4.4 Knowledge of a limited selection of National Vegetation Classification (NVC) communities is required for recording the Standard of certain habitats.
- 4.5 In addition, an abundance scale is important for some Standard criteria. DAFOR (see Appendix II) is suitable, although technically speaking it is only necessary to know if a plant species is frequent or above, or less than frequent.

- 4.6 The table below summarises what extra information or knowledge is required for each broad habitat type. Note that the survey for rivers and streams follows a fundamentally different structure to surveys for other habitat types; see the NEBM Technical Supplement (Crosher *et al.* 2019b) for more detail.

Broad habitat type	Plants to include in species list	Importance of species list	NVC required?	DAFOR required?
Hedgerow	Woody species only	Essential	No	No
Line of trees	Trees only	Essential	No	No
Woodland	All vascular plants	Essential	Yes	No
Wood-pasture/parkland	All vascular plants	Essential	Yes	Yes (for grassland component)
Orchard	All vascular plants	Essential	Yes	Yes (for grassland component)
Scrub	All vascular plants	Essential	Yes	Yes (for grassland component)
Grassland	All vascular plants	Essential	Yes	Yes
Cropland	Isolated trees only	Essential	No	No
Urban	All vascular plants	Desirable	No	No
Rock	All vascular plants	Desirable	No	No
Wetland	All vascular plants	Essential	Yes	No
Ditch	All vascular plants	Essential	No	No
Pond	All vascular plants	Essential	No	No
Lake	All vascular plants	Essential	No	No

Recommendations for habitat-mapping

- 4.7 Habitat information from the University's estate is stored in a 'Biodiversity Map' on ArcGIS Pro. It is hoped that access to this map will be provided for ecological consultants undertaking CBM surveys so that they can input their data directly into it. The Biodiversity Map can also be used to inform consultants which habitats are to be surveyed as distinct 'parcels' (i.e. potentially with their own separate vascular plant species list).
- 4.8 Habitats should ideally be mapped as the largest possible continuous extent of that habitat type. This makes mapping easier, discourages 'micromanagement' as there will be more

complementarity of ecological attributes within larger habitats, and may reduce survey time required (e.g. because fewer separate plant species lists may be needed). There may be circumstances where it is appropriate to map multiple parcels of the same habitat type as a single multi-part feature even though they are separated, e.g. two adjacent areas of chalk grassland split by a tarmac path; this would usually be applicable to parcels in close proximity, but some sensible judgement may be required. If there is a sharp contrast in other habitat attributes within a single habitat type, e.g. Condition or Standard, then it may be appropriate to map separate parcels even if they are the same habitat type. The decision to 'split' or 'lump' habitats may also be determined by differences in management agreements, ownership, access, etc.

Recommendations for others interested in using the CBM on their land

4.9 The basic framework of the CBM would be applicable anywhere in the UK. However, other landowners should note the following:

- Many Standard criteria refer to county-level distinctiveness relevant specifically to Cambridgeshire. Nonetheless, some Standard criteria could be relevant across the UK, and users of the CBM outside of Cambridgeshire could design their own version of the metric incorporating Standard criteria from their LWS selection guidelines.
- The CBM survey sheets currently omit some of the habitat types in the NEBM because they are not relevant to Cambridgeshire; these omitted habitats may be relevant elsewhere in the UK.
- The NEBM is due to be updated following the recent consultation. The CBM was developed because a metric was needed before the NEBM consultation was completed, but other land managers may wish to wait until the final version of the NEBM has been published in December 2020, as this may satisfy their needs.

5 Abbreviations

BAP = Biodiversity Action Plan

CBM = Cambridge Biodiversity Metric

CiWS = City Wildlife Site

CWS = County Wildlife Site

NEBM = Natural England Biodiversity Metric 2.0 (Beta version)

LWS = Local Wildlife Site (includes both CWSs and CiWSs)

NVC = National Vegetation Classification

SSSI = Site of Special Scientific Interest

UKBAP = United Kingdom Biodiversity Action Plan

UKHab = UK Habitat Classification

WTBCN = Wildlife Trust for Bedfordshire, Cambridgeshire & Northamptonshire

6 References

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Appendix I: Survey sheets for broad habitat types

- 1.1 Survey sheets for each broad habitat type are provided below for the use of CBM surveyors. Details about how the NEBM methodology has been modified are provided in Appendix VII.
- 1.2 Habitat types included in the survey sheets are not comprehensive but rather types that are more relevant to Cambridgeshire (e.g. upland habitat types are excluded). Note that some more unusual recreated habitat types may be present in the Cambridge University Botanic Garden.
- 1.3 A habitat parcel need meet only one of the requirements for criteria met listed by each Condition tier in the survey sheets in order to be placed in that tier.
- 1.4 See the appendices in the CWS selection guidelines (CPCWSP 2014) for lists of grassland/woodland indicator plants, etc.

Hedgerow

- 1.5 The criterion descriptions are taken from the NEBM Condition assessment sheets. Note that in the NEBM, the description of criterion C1 (width of undisturbed ground) is erroneously a repeat of the description of criterion B1.

HEDGEROW CBM ASSESSMENT		
CBM UKHab habitat	Distinctiveness tier	Score
Native species-rich hedgerow with trees – Associated with bank or ditch	High	6
Native species-rich hedgerow – Associated with bank or ditch	High	6
Native species-rich hedgerow with trees	Medium	4
Native species-rich hedgerow	Medium	4
Native hedgerow with trees – Associated with bank or ditch	Medium	4
Native hedgerow with trees	Low	2
Native hedgerow	Low	2
Ornamental non-native hedgerow	Very Low	1
Standard tier	Score per criterion	Criteria
CWS	0.3	1) Native species-rich hedgerow systems at least 500 m in length.
CiWS	0.2	1) Hedgerows at least 100 m in length with 4 or more woody species per 30 m stretch on average. 2) Contains 2 or more veteran trees of native species. 3) Contains 4 or more mature pollards of native tree species.
Basic	0.1	1) Contains at least 3 woody species per 30 m stretch on average. 2) Contains at least 1 veteran or mature pollard of native tree species.
Condition criteria	Criterion description	

<p>1) Height >1.5 m on average along length.</p>	<p>The average height of woody growth estimated from the stem base to the top of shoots, excluding any bank beneath the hedgerow, any gaps or isolated trees. Newly laid or coppiced hedgerows are indicative of good management and pass this criterion for up to a maximum of four years (if undertaken according to good practice). A newly planted hedgerow does not pass this criterion (unless it is >1.5 m height).</p>
<p>2) Width >1.5 m on average along length.</p>	<p>The average width of woody growth estimated at the widest point of the canopy, excluding gaps and isolated trees. Outgrowths (e.g. Blackthorn suckers) are only included in the width estimate when they are >0.5 m in height. Laid, coppiced, cut and newly planted hedgerows are indicative of good management and pass this criterion for up to a maximum of four years (if undertaken according to good practice).</p>
<p>3) Gap between ground and base of canopy <0.5 m for >90% of length on both sides of hedge.</p>	<p>This is the vertical gappiness of the woody component of the hedgerow, and its distance from the ground to the lowest leafy growth. Certain exceptions to this criterion are acceptable (see page 65 of the Hedgerow Survey Handbook).</p>
<p>4) Canopy gaps make up <10% of total length and no canopy gaps >5 m.</p>	<p>This is the horizontal gappiness of the woody component of the hedgerow. Gaps are complete breaks in the woody canopy (no matter how small). Access points and gates contribute to the overall gappiness, but are not subject to the >5 m criterion (as this is the typical size of a gate). If dense Bramble is covering the gap, it is not counted as a canopy gap.</p>
<p>5) >1 m width of undisturbed ground with perennial herbaceous vegetation for >90% of hedge length measured from outer edge of hedgerow, and is present on one side of the hedge (at least).</p>	
<p>6) >90% of the hedgerow length is free of invasive non-native and neophyte vascular plant species.</p>	<p>Neophytes are plants that have naturalised in the UK since AD 1500. For information on neophytes see the JNCC website and for information on invasive non-native species see the GB Non-Native Secretariat website.</p>
<p>7) >90% of the hedgerow length is free of damage caused by human activities.</p>	<p>This criterion addresses damaging activities that may have led to or lead to deterioration in other attributes. This could include evidence of pollution, piles of manure or rubble, or inappropriate management practices (e.g. excessive hedge cutting)</p>

Condition tier	Score	Requirements
Good	3	<ul style="list-style-type: none"> No criteria failed.
Fairly Good	2.5	<ul style="list-style-type: none"> Fails 1 criterion.
Moderate	2	<ul style="list-style-type: none"> Fails 2 criteria.
Fairly Poor	1.5	<ul style="list-style-type: none"> Fails 3 criteria.
Poor	1	<ul style="list-style-type: none"> Fails 4 or more criteria.

Additional information

A native species-rich hedgerow does not score the CiWS and Basic tier Standard criteria referring to woody species richness, since a richness of at least five woody species per 30 m stretch on average is implicit in the CBM UKHab habitat category.

A hedgerow becomes a hedgerow with trees if trees (defined as being 5 m tall or above) are <20 m apart on average along the hedgerow.

Hedgerow systems should be allowed to flower and fruit every year, at least in part. This does not apply as a specific Condition criterion to each hedgerow in the CBM. This is because it may be appropriate to completely manage one hedgerow whilst the hedgerow adjacent to it is left to flower and fruit, for instance. This provides more management flexibility. However, hedgerow management should be planned such that hedgerows across the whole site are managed in a rotation to allow at least part of the hedgerow network to flower and fruit every year. If there is thought to be excessive hedgerow management on a site, then one or more of the hedgerows may fail Condition criterion 7.

Line of trees

LINE OF TREES CBM ASSESSMENT		
CBM UKHab habitat	Distinctiveness tier	Score
Line of trees (ecologically valuable) – Associated with bank or ditch	Medium	4
Line of trees (ecologically valuable)	Medium	4
Line of trees – Associated with bank or ditch	Low	2
Line of trees	Low	2

Standard tier	Score per criterion	Criteria
CWS	0.3	<ol style="list-style-type: none"> 1) Groups of 5-19 mature pollard willows when in association with other semi-natural features such as grassland, ditches and rivers (not in an arable setting). 2) Groups of 20 or more mature pollard willows, even in an arable setting.
CiWS	0.2	<ol style="list-style-type: none"> 1) Groups of 3 or more mature pollard willows when in association with other semi-natural features such as grassland, ditches and rivers (not in an arable setting). 2) Groups of 10 or more mature pollard willows, even in an arable setting. 3) Groups of 2 or more veteran trees of native species and associated semi-natural habitat. 4) Contains 4 or more mature pollards of native tree species other than willows.
Basic	0.1	<ol style="list-style-type: none"> 1) Contains at least 3 woody species. 2) Contains at least 1 veteran or mature pollard of native tree species.
Condition tier	Score	Requirements
Good	3	<ul style="list-style-type: none"> • Canopy continuous (i.e. gaps make up <10% of total length and there are no canopy gaps >5 m) and most trees mature (i.e. at least 1/3 expected fully mature height).
Fairly Good	2.5	<ul style="list-style-type: none"> • Canopy continuous (i.e. gaps make up <10% of total length and there are no canopy gaps >5 m) and most trees mature (i.e. at least 1/3 expected fully mature height), but most trees separated by hardstanding or other man-made impermeable surfaces.
Moderate	2	<ul style="list-style-type: none"> • Canopy continuous (i.e. gaps make up <10% of total length and there are no canopy gaps >5 m) but most trees immature (i.e. <1/3 expected fully mature height).
Fairly Poor	1.5	<ul style="list-style-type: none"> • Canopy continuous (i.e. gaps make up <10% of total length and there are no canopy gaps >5 m) but most trees immature (i.e. <1/3 expected fully mature height) and most trees separated by hardstanding or other man-made impermeable surfaces.

Poor	1	<ul style="list-style-type: none"> Broken canopy (i.e. gaps make up $\geq 10\%$ of total length and/or there is at least one canopy gap > 5 m).
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Woodland

WOODLAND CBM ASSESSMENT		
Habitat description		
Woodland is defined as land with $>25\%$ cover of trees >5 m high when mature, forming a distinct, although sometimes open, canopy. This includes felled, young or newly planted woodland. Orchard and wood-pasture/parkland have their own separate survey sheets.		
CBM UKHab habitat	Distinctiveness tier	Score
Woodland & forest – Lowland Beech & Yew woodland	High	6
Woodland & forest – Lowland mixed deciduous woodland	High	6
Woodland & forest – Wet woodland	High	6
Woodland & forest – Felled woodland	Medium	4
Woodland & forest – Other woodland; broadleaved	Medium	4
Woodland & forest – Other woodland; mixed	Medium	4
Woodland & forest – Other woodland; young trees planted	Medium	4
Woodland & forest – Other Scot's Pine woodland	Medium	4
Woodland & forest – Other coniferous woodland	Low	2
Standard tier	Score per criterion	Criteria
CWS	0.3	1) All ancient semi-natural woodlands included in Cambridgeshire Inventory of Ancient Woodlands which retain over 25% semi-natural cover.

		<p>2) Ancient woodlands over 75% replanted included in Cambridge Inventory of Ancient Woodlands and containing one or more of the following:</p> <p>a) more than 10 ancient woodland indicator species.</p> <p>b) more than 40 woodland plants.</p> <p>3) Ancient semi-natural woods under 2 ha with one of the following:</p> <p>a) more than 5 ancient woodland indicator species.</p> <p>b) more than 30 woodland plants.</p> <p>c) good example of NVC W8 (Ash - Field Maple - Dog's Mercury woodland).</p> <p>d) good example of NVC W10 (Pedunculate Oak - Bracken - Bramble woodland).</p> <p>4) Good examples of the following wet woodlands which are more than 0.5ha. in size:</p> <p>a) NVC W1 (Grey Willow - Marsh Bedstraw).</p> <p>b) NVC W2 (Grey Willow - Downy Birch - Common Reed).</p> <p>c) NVC W6 (Alder – Stinging-nettle).</p> <p>5) Contains a group of 5-19 veteran trees.</p>
CiWS	0.2	<p>1) All recent woodlands 1 ha or more in area and with 5 or more woodland plants.</p> <p>2) All recent woodlands between 0.5-1.0 ha in area with 5 or more woodland plants and which comprise 10% or more mature woodland.</p> <p>3) Contains a group of 2 or more veteran trees of native species and associated semi-natural habitat.</p> <p>4) Contains a group of 4 or more mature pollards of native tree species.</p>
Basic	0.1	<p>1) There are more than 3 different native trees and 3 shrub species in an average 10 m radius.</p> <p>2) Contains at least 1 veteran or mature pollard of native tree species.</p>
Condition criteria		

- 1) The woodland is not overly dense or shaded.
- 2) Non-native trees comprise <20% of the canopy.
- 3) Trees have a diverse age and height structure.
- 4) <20% of the trees/shrubs are damaged by stock or wild animals in the last five years (check for bark-stripping, browse lines and damaged shoot tips).
- 5) There should be evidence of successful tree regeneration such as seedlings, saplings and young trees (e.g. trees are not browsed off before they become well established).
- 6) Standing and fallen deadwood of over 20 cm diameter is present, including fallen large dead branches/stems and stumps.
- 7) The area is protected from damage by agricultural and other adjacent operations.
- 8) There should be no evidence of inappropriate management, e.g. deep ruts, animal poaching or compaction.
- 9) Cover of invasive non-native plants <5%.
- 10) No signs of significant nutrient enrichment present.
- 11) The woodland has extensive soft boundaries with adjacent non-woody habitats, especially around its perimeter.
- 12) There are extensive scalloped or otherwise topologically varied interfaces between the woodland and adjacent non-woody habitats.

Condition tier	Score	Requirements
Good	3	<ul style="list-style-type: none"> • No criteria failed.
Fairly Good	2.5	<ul style="list-style-type: none"> • Fails 1-2 criteria.
Moderate	2	<ul style="list-style-type: none"> • Fails 3-4 criteria (3 criteria if the woodland has no adjacent non-woody habitats). • Invasive non-native plant cover is 5-20%. • Non-native trees comprise between 20% and 50% of the canopy (inclusive). • Fails criterion 3. • Fails criterion 6.
Fairly Poor	1.5	<ul style="list-style-type: none"> • Fails 5-6 criteria (4-5 criteria if the woodland has no adjacent non-woody habitats).
Poor	1	<ul style="list-style-type: none"> • Fails 7 or more criteria (6 or more if the woodland has no adjacent non-woody habitats). • Invasive non-native plant cover >20%. • Non-native trees comprise >50% of the canopy.

- Hardstanding is present between most of the trees (this situation may arise in urban areas).

Additional information

'Shrub' species are probably referring to what NVC classifications consider to be shrub species. W8 (Cambridgeshire's most common NVC woodland type) lists shrubs including Hazel *Corylus avellana*, Hawthorn *Crataegus monogyna*, Blackthorn *Prunus spinosa*, Elder *Sambucus nigra*, Spindle *Euonymus europaeus*, Dogwood *Cornus sanguinea*, Alder *Alnus glutinosa*, Goat Willow *Salix caprea* and Grey Willow *Salix cinerea*.

Grassland habitats associated with rides and glades within woodland should be surveyed separately to the woodland if they are considered sufficiently wide or extensive and distinct from the surrounding woodland. This requires expert judgement. Small isolated grassy clearings or very narrow rides within woodland should probably be included within the woodland habitat.

The Condition of **Woodland & forest – Felled woodland** should be based as far as possible on the species composition and age of trees that stood on the site prior to felling. It should be possible to determine what these were from the stumps, bark and leaf litter. If this is not possible, record any tree recovery or seedlings present between the stumps. Where felling occurred a considerable time previously (at least 4-5 years ago) with no obvious replanting in progress, it may be appropriate to classify the felled woodland as the predominant habitat now replacing the felled trees (with stumps still present), particularly when they have high biodiversity value such as heathland or grassland development.

Woodland & forest – Other woodland; young trees planted comprises recently planted trees (often in tree tubes) within grassland. Where the tree species planted match another woodland description they should be recorded under this description (with a note to state the tree age and that it has been recently planted). If no woodland types match then the habitat can be recorded under the catch-all category of 'Planted young trees'. The grassland sward species and herbs present should also be recorded and described in field notes. Plantation woodlands should be automatically assigned Poor Condition until at least some trees are semi-mature, at which point they can be assessed as if they were semi-natural woodland (though they are likely to fail many of the criteria).

Wood-pasture/parkland

WOOD-PASTURE/PARKLAND CBM ASSESSMENT

Habitat description

Wood-pasture/parkland is a vegetation structure rather than a particular plant community. Typically, this structure consists of large, open-grown or high forest trees (often pollards) at various densities, in a matrix of grazed grassland, scrub, heathland and/or woodland floras. The habitat may be derived from medieval forests and embankments, wooded commons, parks and pastures with trees, and may still be counted as this habitat if the grassy component has been converted to amenity grassland.

CBM UKHab habitat		Distinctiveness tier	Score
Woodland & forest – Wood-pasture & parkland		High	6
Standard tier	Score per criterion	Criteria	
CWS	0.3	<ol style="list-style-type: none"> 1) Contains either: <ol style="list-style-type: none"> a) an average of more than 5 mature trees per hectare. b) groups of 5-19 veteran trees when in association with other semi-natural features such as grassland, hedgerows or woodlands. c) groups of 20 or more veteran trees, even in an arable setting. 2) Contains a group of 5-19 veteran trees. 3) Supports at least 0.05 ha (either in a block or as a number of smaller areas) of one or more of the following NVC communities: <ol style="list-style-type: none"> a) MG4 (Meadow Foxtail - Greater Burnet flood meadow). b) MG5 (Crested Dog's-tail - Common Knapweed meadow and pasture). c) MG8 (Crested Dog's-tail - Marsh-marigold flood pasture). d) MG11 (Red Fescue - Creeping Bent - Silverweed inundation pasture). e) MG13 (Creeping Bent - Marsh Foxtail inundation grassland). 4) Supports at least 0.05 ha (either in a block or as a number of smaller areas) of one or more of the following NVC communities: <ol style="list-style-type: none"> a) CG2 (Sheep's Fescue - Meadow Oat-grass grassland). b) CG3 (Upright Brome grassland). c) CG4 (Tor-grass grassland). d) CG5 (Upright Brome - Tor-grass grassland). e) CG7 (Sheep's Fescue - Mouse-ear Hawkweed - Wild Thyme grassland). 5) Contains chalk or limestone grassland with flushes, seepages or springs which are not appreciably degraded. 6) Supports frequent numbers of either: <ol style="list-style-type: none"> a) 3 or more strong neutral grassland indicator species. b) 8 or more neutral grassland indicator species (strong and weak). c) 6 or more strong calcareous grassland indicator species. d) 16 or more calcareous grassland indicator species (strong and weak). e) 'substantial' numbers of acid grassland indicator species (strong and weak) (at present there is insufficient field evidence and testing to set definitive thresholds for the numbers of strong and weak acid grassland indicator species required to select a CWS in Cambridgeshire). f) more than 50 grassland species. 	

		7) Contains acidic grassland supporting at least 0.05 ha (either in a block or as a number of smaller areas) of NVC U1 (Sheep's Fescue - Common Bent - Sheep's Sorrel grassland).
CiWS	0.2	<p>1) Contains a group of 2 or more veteran trees of native species and associated semi-natural habitat.</p> <p>2) Contains a group of 4 or more mature pollards of native tree species.</p> <p>3) Supports frequent numbers of either:</p> <p>a) 2 or more strong neutral grassland indicator species.</p> <p>b) 5 or more neutral grassland indicator species (strong and weak).</p> <p>c) 4 or more strong calcareous grassland indicator species.</p> <p>d) 6 or more calcareous grassland indicator species (strong and weak).</p>
Basic	0.1	<p>1) Contains at least 1 veteran or mature pollard of native tree species.</p> <p>2) Some indicator species for the specific Priority grassland habitat are at least frequent throughout the sward.</p>

Condition criteria

- 1) Non-native trees comprise <20% of the canopy.
- 2) Trees have a diverse age and height structure.
- 3) <20% of the trees/shrubs are damaged by stock or wild animals in the last five years (check for bark-stripping, browse lines and damaged shoot tips).
- 4) There should be evidence of successful tree regeneration such as seedlings, saplings and young trees (i.e. trees are not browsed off before they become well established).
- 5) Standing and fallen deadwood of over 20 cm diameter is present, including fallen large dead branches/stems and stumps.
- 6) The area is protected from damage by agricultural and other adjacent operations.
- 7) Cover of bare ground <5%.
- 8) There should be no evidence of inappropriate management, e.g. deep ruts, animal poaching or compaction.
- 9) There is considerable variation in grassland sward height, with some areas allowed to grow taller.
- 10) Cover of undesirable herbaceous species is <5% of the ground-layer vegetation.
- 11) Cover of Perennial Ryegrass is <20% of the ground-layer vegetation.

12) Cover of Bracken is <20% of the ground-layer vegetation and cover of other woody/scrubby species not excessive between the main trees.

Condition tier	Score	Requirements
Good	3	<ul style="list-style-type: none"> No criteria failed.
Fairly Good	2.5	<ul style="list-style-type: none"> Fails 1-2 criteria.
Moderate	2	<ul style="list-style-type: none"> Fails 3-4 criteria. Invasive non-native plant cover is 5-20%. Non-native trees comprise between 20% and 50% of the canopy (inclusive). Fails criterion 2. Fails criterion 5.
Fairly Poor	1.5	<ul style="list-style-type: none"> Fails 5-6 criteria.
Poor	1	<ul style="list-style-type: none"> Fails 7 or more criteria. Invasive non-native plant cover >20%. Grassy component converted to amenity grassland.

Orchard

ORCHARD CBM ASSESSMENT		
CBM UKHab habitat	Distinctiveness tier	Score
Cropland – Traditional orchards	High	6
Urban – Orchards	Medium	4
Cropland – Intensive orchards	Low	2
Habitat descriptions		

Cropland – traditional orchards are defined as five or more trees, where the distance between the crown edges is 20 m or less. They are characterised by the presence of either standard or half-standard fruit trees, grown on vigorous rootstocks and planted at low densities (usually less than 150 trees per hectare) on permanent grassland. Mature trees should have 90% of their foliage above 1.5 m, with trunks that are either at least 1 m in circumference at the base or form their first major fork at least 1.5 m above ground level.

Cropland – Intensive orchards are characterised by planting being relatively recent and in full agricultural production, usually above 150 trees per hectare.

Urban – Orchards can have similar attributes to the other two orchard types but are generally much smaller or much more recently planted within a built up (Urban) area. It is possible to have traditional orchards in an urban environment if they match the description. They may well fall below the age (and interest of fruit varieties) of traditional orchards but still be of an older age than an intensive productive orchard.

Standard tier	Score	Criteria
CWS	0.3	<ol style="list-style-type: none"> 1) Traditional orchards containing a group of 5 or more top fruit or nut trees (see Appendix 2c in the CWS selection guidelines) and satisfying at least two of the following: <ol style="list-style-type: none"> a) At least 20% of the trees are veteran. b) There is associated natural or semi-natural habitat within or adjacent to the site (e.g. woodland, unimproved grassland, ponds, hedgerows). c) There are rare or scarce fruit varieties, or varieties of local significance. 2) Contains either: <ol style="list-style-type: none"> a) groups of 5-19 veteran trees when in association with other semi-natural features such as grassland, hedgerows or woodlands. b) groups of 20 or more veteran trees, even in an arable setting. 3) Contains neutral grassland supporting at least 0.05 ha (either in a block or as a number of smaller areas) of one or more of the following NVC communities: <ol style="list-style-type: none"> a) MG4 (Meadow Foxtail - Greater Burnet flood meadow). b) MG5 (Crested Dog's-tail - Common Knapweed meadow and pasture). c) MG8 (Crested Dog's-tail - Marsh-marigold flood pasture). d) MG11 (Red Fescue - Creeping Bent - Silverweed inundation pasture). e) MG13 (Creeping Bent - Marsh Foxtail inundation grassland). 4) Contains calcareous grassland supporting at least 0.05 ha (either in a block or as a number of smaller areas) of one or more of the following NVC communities: <ol style="list-style-type: none"> a) CG2 (Sheep's Fescue - Meadow Oat-grass grassland). b) CG3 (Upright Brome grassland). c) CG4 (Tor-grass grassland). d) CG5 (Upright Brome - Tor-grass grassland).

		<p>e) CG7 (Sheep's Fescue - Mouse-ear Hawkweed - Wild Thyme grassland).</p> <p>5) Contains chalk or limestone grassland with flushes, seepages or springs which are not appreciably degraded.</p> <p>6) Supports frequent numbers of either:</p> <ul style="list-style-type: none"> a) 3 or more strong neutral grassland indicator species. b) 8 or more neutral grassland indicator species (strong and weak). c) 6 or more strong calcareous grassland indicator species. d) 16 or more calcareous grassland indicator species (strong and weak). e) 'substantial' numbers of acid grassland indicator species (strong and weak) (at present there is insufficient field evidence and testing to set definitive thresholds for the numbers of strong and weak acid grassland indicator species required to select a CWS in Cambridgeshire). f) more than 50 grassland species. <p>7) Contains acidic grassland supporting at least 0.05 ha (either in a block or as a number of smaller areas) of NVC U1 (Sheep's Fescue - Common Bent - Sheep's Sorrel grassland).</p>
CiWS	0.2	<p>1) Contains groups of 2 or more veteran trees of native species and associated semi-natural habitat.</p> <p>2) Supports frequent numbers of either:</p> <ul style="list-style-type: none"> a) 2 or more strong neutral grassland indicator species. b) 5 or more neutral grassland indicator species (strong and weak). c) 4 or more strong calcareous grassland indicator species. d) 6 or more calcareous grassland indicator species (strong and weak).
Basic	0.1	<p>1) Contains between 50 and 150 fruit or nut trees per hectare.</p> <p>2) Contains at least 1 veteran of a native tree species.</p> <p>3) Some indicator species for the specific Priority grassland habitat are at least frequent throughout the sward.</p>
Condition criteria		

- 1) At least 80% of the trees should be free from damage caused by browsing, bark-stripping or rubbing on non-adjusted ties.
- 2) The average height of the grass sward in summer should be between 5 cm and 30 cm.
- 3) There is considerable variation in sward height, with some areas allowed to grow taller. For amenity grasslands, the sward should not be uniformly short, i.e. substantial areas are allowed to grow taller.
- 4) Cover of bare ground <5%.
- 5) Physical damage to the ground (e.g. excessive poaching, damage from machinery use or storage, or any other damaging management activities) is at <5% cover.
- 6) Cover of undesirable herbaceous species is <5% of the ground-layer vegetation.
- 7) Cover of Perennial Ryegrass is <25% of the ground-layer vegetation.
- 8) Cover of Bracken is <20% and cover of other undesirable woody/scrubby species is <5% of the ground-layer vegetation.

Condition tier	Score	Requirements
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Good	3	<ul style="list-style-type: none"> • No criteria failed.
Fairly Good	2.5	<ul style="list-style-type: none"> • Fails 1 criterion.
Moderate	2	<ul style="list-style-type: none"> • Fails 2-3 criteria. • Fails criterion 6. • Fails criterion 7. • Total cover of undesirable species (apart from Bracken) between 5% and 20% (inclusive).
Fairly Poor	1.5	<ul style="list-style-type: none"> • Fails 4 criteria.
Poor	1	<ul style="list-style-type: none"> • Fails 5 or more criteria. • An Intensive Orchard in full agricultural production. • Total cover of undesirable species >20%.

Additional information

Note that the actual orchard CWS selection guidelines use a greater range of criteria than those included in the Standard assessment above. The criteria included here have the greatest relevance to biodiversity.

Scrub

SCRUB CBM ASSESSMENT		
CBM UKHab habitat	Distinctiveness tier	Score
Woodland & forest – Natural Box scrub	High	6
Juniper on heaths or calcareous grasslands	High	6
Heathland & shrub – Caldicole scrub	High	6
Heathland & shrub – Lowland willow scrub on peat soils	High	6
Grassland – South-facing Bracken stands with violets	High	6
Heathland & shrub – Mixed scrub	Medium	4
Heathland & shrub – Blackthorn scrub	Medium	4
Heathland & shrub – Bramble scrub	Medium	4
Heathland & shrub – Gorse scrub	Medium	4
Heathland & shrub – Hawthorn scrub	Medium	4
Heathland & shrub – Hazel scrub	Medium	4
Grassland – Bracken	Medium	4
Heathland & shrub – Rhododendron scrub	Low	2
Standard tier	Score per criterion	Criteria
CWS	0.3	1) Areas of scrub more than 0.5 ha in extent with NVC W21 (Hawthorn - Ivy) with more than 8 woody species. 2) Scattered scrub with neutral grassland supporting at least 0.05 ha (either in a block or as a number of smaller areas) of one or more of the following NVC communities: a) MG4 (Meadow Foxtail - Greater Burnet flood meadow). b) MG5 (Crested Dog's-tail - Common Knapweed meadow and pasture). c) MG8 (Crested Dog's-tail - Marsh-marigold flood pasture).

		<p>d) MG11 (Red Fescue - Creeping Bent - Silverweed inundation pasture).</p> <p>e) MG13 (Creeping Bent - Marsh Foxtail inundation grassland).</p> <p>3) Scattered scrub with calcareous grassland supporting at least 0.05 ha (either in a block or as a number of smaller areas) of one or more of the following NVC communities:</p> <p>a) CG2 (Sheep's Fescue - Meadow Oat-grass grassland).</p> <p>b) CG3 (Upright Brome grassland).</p> <p>c) CG4 (Tor-grass grassland).</p> <p>d) CG5 (Upright Brome – Tor-grass grassland).</p> <p>e) CG7 (Sheep's Fescue - Mouse-ear Hawkweed - Wild Thyme grassland).</p> <p>4) Scattered scrub with chalk or limestone grassland containing flushes, seepages or springs which are not appreciably degraded.</p> <p>5) Scattered scrub supporting frequent numbers of either:</p> <p>a) 3 or more strong neutral grassland indicator species.</p> <p>b) 8 or more neutral grassland indicator species (strong and weak).</p> <p>c) 6 or more strong calcareous grassland indicator species.</p> <p>d) 16 or more calcareous grassland indicator species (strong and weak).</p> <p>e) 'substantial' numbers of acid grassland indicator species (strong and weak) (at present there is insufficient field evidence and testing to set definitive thresholds for the numbers of strong and weak acid grassland indicator species required to select a CWS in Cambridgeshire).</p> <p>f) more than 50 grassland species.</p> <p>6) Scattered scrub with acidic grassland supporting at least 0.05 ha (either in a block or as a number of smaller areas) of NVC U1 (Sheep's Fescue - Common Bent - Sheep's Sorrel grassland).</p>
CiWS	0.2	<p>1) All blocks over 0.5 ha in area with 4 or more woody species.</p> <p>2) Scattered scrub of any size supporting frequent numbers of either:</p> <p>a) 2 or more strong neutral grassland indicator species.</p> <p>b) 5 or more neutral grassland indicator species (strong and weak).</p> <p>c) 4 or more strong calcareous grassland indicator species.</p> <p>d) 6 or more calcareous grassland indicator species (strong and weak).</p>
Basic	0.1	<p>1) There are at least 3 woody species, with no one species comprising more than 75% of the cover (except Juniper, Sea-buckthorn or Box, which can be 100% cover).</p> <p>2) Some indicator species for the specific Priority grassland habitat are at least frequent throughout the sward.</p>

Condition criteria

- 1) There is a good age range: a mixture of seedlings, saplings, young shrubs and mature shrubs.
- 2) Cover of undesirable species <5%.
- 3) The scrub has a well-developed edge with un-grazed tall herbs.
- 4) There are extensive scalloped or otherwise topologically varied interfaces between the scrub and adjacent non-woody habitats, and/or larger scrub parcels have clearings within the scrub.

Condition tier	Score	Requirements
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Good	3	<ul style="list-style-type: none"> • No criteria failed.
Moderate	2	<ul style="list-style-type: none"> • Fails 1-2 criteria. • The age range is missing some size classes. • Cover of undesirable species between 5% and 20% (inclusive).
Poor	1	<ul style="list-style-type: none"> • Heathland & shrub – Rhododendron scrub. • Fails 3 or more criteria. • Single-age scrub present. • Cover of undesirable species >20%.

Additional information

According to UKHab definitions, Blackthorn, Bramble, Gorse, Hawthorn, Hazel and Rhododendron scrub are recognised by the species in question being 'dominant'. If there is a mixture of species with no one species dominant, the habitat is **Heathland & shrub – Mixed scrub**.

As in the NEBM, note that although Bracken stands are classified in the 'grassland' group of habitats, they are assessed according to the scrub Condition criteria.

Grassland

GRASSLAND CBM ASSESSMENT

Habitat description

Habitats assessed using this survey sheet will be dominated by grassland species with very little (if any) dwarf shrub, wetland or woody species within the sward.

CBM UKHab habitat

**Distinctiveness
tier**

Score

Grassland – Lowland dry acid grassland	Very High	8
Grassland – Lowland meadows	Very High	8
Sparsely vegetated land – Calaminarian grassland	Very High	8
Grassland – Floodplain wetland mosaic	High	6
Grassland – Lowland calcareous grassland	High	6
Grassland – Tall herb communities	High	6
Grassland – Other lowland acid grassland	Medium	4
Grassland – Other neutral grassland	Medium	4
Cropland – Arable field margins cultivated annually	Medium	4
Cropland – Arable field margins game bird mix	Medium	4
Cropland – Arable field margins pollen & nectar	Medium	4
Cropland – Arable field margins tussocky	Medium	4
Grassland – Modified grassland	Low	2
Cropland – Temporary grass & clover leys	Low	2
Sparsely vegetated land – Ruderal (if suitable for grassland assessment)	Low	2
Urban – Amenity grassland	Low	2
Standard tier	Score per criterion	Criteria
CWS	0.3	1) Neutral grasslands supporting at least 0.05 ha (either in a block or as a number of smaller areas) of one or more of the following NVC communities: a) MG4 (Meadow Foxtail - Greater Burnet flood meadow). b) MG5 (Crested Dog's-tail - Common Knapweed meadow and pasture). c) MG8 (Crested Dog's-tail - Marsh-marigold flood pasture). d) MG11 (Red Fescue - Creeping Bent - Silverweed inundation pasture).

		<p>e) MG13 (Creeping Bent - Marsh Foxtail inundation grassland).</p> <p>2) Calcareous grasslands supporting at least 0.05 ha (either in a block or as a number of smaller areas) of one or more of the following NVC communities:</p> <p>a) CG2 (Sheep's Fescue - Meadow Oat-grass grassland).</p> <p>b) CG3 (Upright Brome grassland).</p> <p>c) CG4 (Tor-grass grassland).</p> <p>d) CG5 (Upright Brome - Tor-grass grassland).</p> <p>e) CG7 (Sheep's Fescue - Mouse-ear Hawkweed - Wild Thyme grassland).</p> <p>3) Chalk or limestone grasslands containing flushes, seepages or springs which are not appreciably degraded.</p> <p>4) Sites supporting frequent numbers of either:</p> <p>a) 3 or more strong neutral grassland indicator species.</p> <p>b) 8 or more neutral grassland indicator species (strong and weak).</p> <p>c) 6 or more strong calcareous grassland indicator species.</p> <p>d) 16 or more calcareous grassland indicator species (strong and weak).</p> <p>e) 'substantial' numbers of acid grassland indicator species (strong and weak) (at present there is insufficient field evidence and testing to set definitive thresholds for the numbers of strong and weak acid grassland indicator species required to select a CWS in Cambridgeshire).</p> <p>f) more than 50 grassland species.</p> <p>5) Acidic grasslands supporting at least 0.05 ha (either in a block or as a number of smaller areas) of NVC U1 (Sheep's Fescue - Common Bent - Sheep's Sorrel grassland).</p>
CiWS	0.2	<p>1) Grassland sites of any size supporting frequent numbers of either:</p> <p>a) 2 or more strong neutral grassland indicator species.</p> <p>b) 5 or more neutral grassland indicator species (strong and weak).</p> <p>c) 4 or more strong calcareous grassland indicator species.</p> <p>d) 6 or more calcareous grassland indicator species (strong and weak).</p>
Basic	0.1	<p>1) Cover of desirable herbaceous forbs and sedges >30%.</p> <p>2) Some indicator species for the specific Priority grassland habitat are at least frequent throughout the sward.</p> <p>3) Contains at least one isolated mature tree, where the habitat is not considered to fit under a wood-pasture/parkland category, and the trees do not negatively impact the Condition or Standard of the grassland.</p>
Condition criteria		

- 1) There is considerable variation in sward height, with some areas allowed to grow taller. For amenity grasslands, the sward should not be uniformly short, i.e. substantial areas are allowed to grow taller.
- 2) Cover of bare ground (including localised areas, e.g. rabbit warrens) <5%.
- 3) Physical damage to the ground (e.g. excessive poaching, damage from machinery use or storage, or any other inappropriate management activities) is at <5% cover.
- 4) Cover of undesirable herbaceous species <5%.
- 5) Cover of Perennial Ryegrass <25%.
- 6) Cover of Bracken <20% and cover of other undesirable woody/scrubby species <5%.

Condition tier	Score	Requirements
Good	3	<ul style="list-style-type: none"> • No criteria failed.
Fairly Good	2.5	<ul style="list-style-type: none"> • Fails 1 criterion.
Moderate	2	<ul style="list-style-type: none"> • Fails 2 criteria. • Cover of all undesirable species between 5% and 15% (inclusive).
Fairly Poor	1.5	<ul style="list-style-type: none"> • Fails 3 criteria.
Poor	1	<ul style="list-style-type: none"> • Fails 4 or more criteria. • Cropland – Temporary grass & clover leys. • Urban – Amenity grassland. • Cover of all undesirable species >15%.

Additional information

An area of grassland is effectively considered to fail Standard Basic criterion 2 if its trees become a line of trees. The value of the trees is now captured by the line of trees in the linear habitats section of the CBM.

Cropland

CROPLAND CBM ASSESSMENT		
CBM UKHab habitat	Distinctiveness tier	Score
Cropland - Cereal crops winter stubble	Medium	4

Cropland - Cereal crops		Low	2
Cropland - Cereal crops other		Low	2
Cropland - Horticulture		Low	2
Cropland - Non-cereal crops		Low	2
Standard tier	Score per criterion	Criteria	
CWS	0.3	1) Contains a group of 5-19 veteran trees.	
CiWS	0.2	1) Contains a group of 2 or more veteran trees of native species. 2) Contains a group of 4 or more mature pollards of native tree species.	
Basic	0.1	1) Contains at least 1 isolated native mature tree.	
Condition criteria			
1) Farmed organically for at least one year.			
Condition tier	Score	Requirements	
Moderate	2	<ul style="list-style-type: none"> Meets criterion 1. 	
Poor	1	<ul style="list-style-type: none"> Fails criterion 1. 	
Additional information			
See the grassland survey sheet for information about field margins.			
<p>Some arable fields contain isolated trees within them. These add a biodiversity value which is not captured by the NEBM; in the CBM, is it captured in Standard. Although it is unlikely that cropland will reach CWS or even CiWS Standard due to its trees, the associated criteria borrowed from the LWS selection guidelines are included in the survey sheet in case. If wood-pasture/parkland is thought to be a more appropriate habitat assignment than cropland, e.g. because the grassland component of the wood-pasture/parkland has been relatively recently converted to arable, then the wood-pasture/parkland survey sheet should be used. Note that an area of cropland is effectively considered to fail Basic criterion 1 if its trees become a line of trees. The value of the trees is now captured by the line of trees in the linear habitats section of the CBM.</p>			

Urban

URBAN CBM ASSESSMENT

Habitat description

For information on identifying open mosaic habitats on previously developed land (including brownfield sites), see <https://www.buglife.org.uk/sites/default/files/Identifying%20open%20mosaic%20habitat.pdf>.

CBM UKHab habitat	Distinctiveness tier	Score
Urban – Open mosaic habitats on previously developed land	High	6
Urban – Allotments	Medium	4
Urban – Brown roof	Medium	4
Urban – Extensive green roof	Medium	4
Urban – Cemeteries & churchyards	Medium	4
Urban – Bioswale	Low	2
Urban – Façade-bound green wall	Low	2
Urban – Ground-based green wall	Low	2
Urban – Ground-level planters	Low	2
Urban – Intensive green roof	Low	2
Urban – Introduced shrub	Low	2
Urban – Rain garden	Low	2
Urban – Sand pit quarry or open-cast mine	Low	2
Urban – Suburban / mosaic of developed/natural surface	Low	2
Urban – Sustainable urban drainage feature	Low	2

Urban – Vacant/derelict land / bare ground	Low	2
Urban – Vegetated garden	Low	2
Sparsely vegetated land – Ruderal (if suitable for urban assessment)	Low	2
Urban – Artificial unvegetated, unsealed surface	Very Low	0
Urban – Built linear features	Very Low	0
Urban – Developed land; sealed surface	Very Low	0
Urban – Unvegetated garden	Very Low	0
Standard tier	Score per criterion	Criteria
Basic	0.1	<ol style="list-style-type: none"> 1) Artificial sealed or unsealed surfaces covered with green trellises (e.g. car parks). 2) Brownfield sites with at least one isolated mature tree, where the trees do not negatively impact the Condition or Standard of the brownfield site. 3) Sealed surfaces with at least one isolated tree.
Condition criteria		

- 1) There is a known history of disturbance at the site or evidence that soil has been removed or severely modified by previous use(s) of the site. Extraneous materials/substrates such as industrial spoil may have been added which in turn has led to a low-nutrient environment.
- 2) There is substantial topographical variation.
- 3) The site contains unvegetated, loose bare substrate.
- 4) The site contains relatively unpolluted pools.
- 5) The site contains a reasonable amount of desirable early-successional communities consisting mainly of stress-tolerant species (e.g. indicative of low nutrient status or drought). Early-successional communities may be composed of (a) annuals, (b) mosses/liverworts, (c) lichens, (d) ruderals, (e) inundation species, (f) open grassland, (g) flower-rich grassland or (h) heathland.
- 6) The site shows spatial variation, forming a mosaic of one or more of the early-successional communities (a)–(h) above plus bare substrate or pools.
- 7) Cover of undesirable species <10%.

Condition tier	Score	Requirements
Good	3	<ul style="list-style-type: none"> • No criteria failed.
Fairly Good	2.5	<ul style="list-style-type: none"> • Fails 1 criterion.
Moderate	2	<ul style="list-style-type: none"> • Fails 2 criteria. • Undesirable species cover between 10% and 20% (inclusive).
Fairly Poor	1.5	<ul style="list-style-type: none"> • Fails 3 criteria.
Poor	1	<ul style="list-style-type: none"> • Urban – Intensive green roof. • Urban – Introduced shrub. • Urban – Rain garden. • Urban – Vegetated garden. • Fails 4 or more criteria. • Undesirable species cover >20%.
Very Poor	0	<ul style="list-style-type: none"> • Urban – Artificial unvegetated, unsealed surface. • Urban – Built linear features. • Urban – Developed land; sealed surface. • Urban – Unvegetated garden.

Additional information

Where possible, a habitat should be assigned **Urban – Open mosaic habitat on previously developed land** if this is suitable, rather than many smaller individual habitat types within the mosaic (e.g. a small pond, an area of **Sparsely vegetated land – Ruderal**, etc.). There should be good justification for not assigning open mosaic habitat.

Note that an area of urban habitat is effectively considered to fail Basic criterion 2 if its trees become a line of trees. The value of the trees is now captured by the line of trees in the linear habitats section of the CBM.

The habitat type **Urban – Amenity grassland** is assessed using the grassland survey sheet.

The habitat type **Urban – Orchard** is assessed using the orchard survey sheet.

The habitat type **Urban – Woodland** is assessed using the woodland survey sheet.

Rock

ROCK CBM ASSESSMENT

Habitat description

Sparsely vegetated land – Inland rock outcrop & scree habitats are found on stony ground on cliff ledges, crags, ridges, summits, scree slopes, and amongst cracks and fissures of rock faces. Although much more common at higher altitudes, rock and scree habitats are also found at lower elevations (but not sea cliffs). This includes vegetation growing out of crevices, cracks and ledges on exposed rocks, including cliffs, scree, rubble and rocky slopes. A wide range of vegetation communities are found. Some are very sparse with lichens dominating, some are dominated by ferns, grasses and herbs, and others are dominated by bryophytes. Lichens and bryophytes are some of the most notable and distinctive features associated with inland rock outcrop and scree.

Sparsely vegetated land – Other inland rock & scree comprises all other rock habitat which does not meet the Priority Habitat description or location. It may well have been artificially created by human activities.

The rock assessment includes ruderal habitats of low-growing early-successional plants on open rocky ground, e.g. in quarries and on railway ballast.

CBM UKHab habitat	Distinctiveness tier	Score
Sparsely vegetated land – Inland rock outcrop & scree habitats	High	6
Sparsely vegetated land – Other inland rock & scree	Medium	4

Condition criteria

- 1) Cover of Bracken, scrub and trees together <25%.
- 2) Cover of injurious weeds or non-native species together <1%.
- 3) <50% of live leaves (broad-leaved plants), fronds (ferns) or shoots (dwarf shrubs) show signs of grazing or browsing by mammals.

Condition tier	Score	Requirements
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Good	3	<ul style="list-style-type: none"> • No criteria failed.
Moderate	2	<ul style="list-style-type: none"> • Fails 1 criterion.
Poor	1	<ul style="list-style-type: none"> • Fails 2 or more criteria.

Additional information

The CBM considers it fairest to assess ruderal habitats on bare rock using the rock assessment and using the appropriate rocky outcrop/scree habitat type rather than **Sparsely vegetated land – Ruderal**. In effect, the latter habitat type is restricted to ruderal vegetation on soil or other non-rock substrate (unless it can be incorporated into **Urban – Open mosaic habitat on previously developed land**).

Wetland

WETLAND CBM ASSESSMENT

Habitat description

Wetlands are characterised by waterlogged soils, with the water table close to or above the surface for most of the year. They are found on floodplains, on the fringes of open water, in valleys, in basin-like depressions, and also around springs and flushes. They are often associated with peat soils.

Grassland – Floodplain wetland mosaic is a new Priority Habitat including all land that fits the criteria for the UKHab habitat 'Coastal and floodplain grazing marsh' (25). The NEBM defines it as

- a) mosaics of priority wetland habitats with natural/near-natural hydrological function and/or water quality.
- b) floodplain areas providing important refuges for wetland wildlife whose natural habitats have been lost, including:
 - i. land with breeding waders and/or wintering waterbirds, or other terrestrial wetland priority species or assemblages.
 - ii. species currently dependent on ditches and other seasonal or permanent standing water within, or surrounding the land.

CBM UKHab habitat		Distinctiveness tier	Score
Wetland – Depressions on peat substrates		Very High	8
Wetland – Fens (upland & lowland)		Very High	8
Wetland – Lowland raised bog		Very High	8
Wetland – Purple Moor-grass & rush pastures		Very High	8
Wetland – Transition mires & quaking bogs		Very High	8
Wetland – Reedbeds		High	6
Grassland – Floodplain wetland mosaic		High	6
Wetland – Other swamps		Medium	4
Standard tier	Score per criterion	Criteria	
CWS	0.3	<ol style="list-style-type: none"> 1) Good examples of topogenous fens supporting at least 0.05 ha (either in a block or as a number of smaller areas) of the following NVC communities: <ol style="list-style-type: none"> a) S24 (Common Reed – Milk-parsley tall herb fen) b) S2 (Saw-sedge swamp and sedge beds) c) S3 (tussock-sedge swamp) d) S13 (Lesser Reedmace swamp) e) S20 (Grey Club-rush swamp) 2) Good examples of topogenous fens supporting at least 0.5 ha (either in a block or as a number of smaller areas) of the following NVC communities: <ol style="list-style-type: none"> a) S25 (Common Reed - Hemp-agrimony tall herb fen) b) S26 (Common Reed - Common Nettle tall herb fen) c) S4 (Common Reed swamp and reedbeds) d) S5 (Reed Sweet-grass swamp) e) S6 (Greater Pond-sedge swamp) f) S7 (Lesser Pond-sedge swamp). 3) Good examples of soligenous fens supporting NVC M13 (Black Bog-rush – Blunt-flowered Rush). 4) Good examples of fen meadow supporting at least 0.05 ha (either in a block or as a number of smaller areas) of the following NVC communities: <ol style="list-style-type: none"> a) M22 (Blunt-flowered Rush - Marsh Thistle fen meadow) 	

		<p>b) M24 (Purple moor-grass - meadow thistle fen meadow).</p> <p>5) Good examples of fen meadow supporting at least 0.25 ha of NVC community M27 (meadowsweet - wild angelica mire).</p> <p>6) Continuous area of fen of any tier over 2.5 ha which is not appreciably degraded.</p> <p>7) Sites at least 0.5 ha in extent containing well-developed vegetation mosaics which represent hydroseral zonation.</p> <p>8) Sites at least 0.1 ha in extent which have a combination of two or more fen types.</p>
CiWS	0.2	<p>1) Good examples of topogenous fens of any size with the following National Vegetation Classification (NVC) communities: a) S6 (Greater Pond-sedge swamp) b) S7 (Lesser Pond-sedge swamp) c) S13 (Lesser Reedmace swamp).</p> <p>2) Good examples of topogenous fens supporting at least 0.25 ha (either in a block or as a number of small areas) of the following National Vegetation Classification (NVC) communities: a) S4 (Common Reed swamp) b) S5 (Reed Sweet-grass swamp) c) S12 (Common Reed-mace swamp).</p> <p>3) Continuous area of fen of any tier over 0.5 ha which is not appreciably degraded.</p> <p>4) Sites of any size containing well-developed vegetation mosaics which represent hydroseral zonation.</p> <p>5) Sites of any size which have a combination of two or more fen types.</p>
Basic	0.1	<p>1) Bogs with bog-moss (<i>Sphagnum</i>) cover between 40% and 100% (inclusive), and with heathers and cottongrasses (combined) at least frequent.</p> <p>2) Bogs with dwarf shrub cover between 20% and 75% (inclusive) except when bog-mosses (<i>Sphagnum</i>) or other wetland indicators are dominant, and with at least 2 dwarf shrub species.</p> <p>3) Reedbeds with at least 60% Common Reed.</p>

Condition criteria

- 1) There is no artificial drainage, which would include ditches that are now revegetated and streams that have been deepened and widened.
- 2) The water level and its management result in surface water throughout the year.
- 3) Water quality is good, with no evidence of pollution.
- 4) Cover of undesirable herbaceous species <10%.
- 5) Cover of scrub <10%.
- 6) Cover of bare ground <10%.

Condition tier	Score	Requirements
Good	3	<ul style="list-style-type: none"> • No criteria failed.
Fairly Good	2.5	<ul style="list-style-type: none"> • Fails 1 criterion.
Moderate	2	<ul style="list-style-type: none"> • Fails 2 criteria. • Minor drainage present. • The site is too dry during parts of the year, with some minor hydrology impacts. • Water quality moderate. • Non-native species comprise >10% of the vegetation.
Fairly Poor	1.5	<ul style="list-style-type: none"> • Fails 3 criteria.
Poor	1	<ul style="list-style-type: none"> • Fails 4 or more criteria. • Extensive drainage features active, reducing water table significantly. • The site is very dry for much of the year. • There is clear evidence that the wetland was previously degraded, e.g. in the peat soil or high cover of Soft Rush (which may indicate a previously drained peat lens). • Improved grass sward present.

Additional information

Where features within a floodplain wetland mosaic fit other Priority Habitats (e.g. fen, reedbed, species-rich grassland, etc.) they should be recorded as these individual habitats with a note to state that they also sit within the mosaic. If the mosaic contains species-rich grassland (such as floodplain meadows – see <http://www.floodplainmeadows.org.uk>) it is categorised as **Grassland – Lowland meadows** and assessed using the grassland survey sheet.

Ditch

DITCH CBM ASSESSMENT		
CBM UKHab habitat	Distinctiveness tier	Score
Lakes – Ditches	Medium	4
Standard tier	Score per criterion	Criteria
Above CWS	0.4	1) There are more than 10 species of emergent, floating or submerged plants (altogether) in an average 20 m ditch length.
CWS	0.3	1) There are at least 5 submerged, floating and emergent species per 20 m or at least 10 submerged, floating, emergent and wetbank species per 20 m. 2) Contains 3 or more species of pondweed (<i>Potamogeton</i> spp.).
Condition criteria		
1) Sufficient water levels are maintained; as a rough guide, a minimum summer depth of 50 cm in minor ditches and 1 m in main drains should be maintained. 2) Water quality is good, with no sign of pollution (e.g. the water should not be green or turbid) in the waterbody or water supply. 3) Physical damage (e.g. from excessive poaching, damage from machinery use, litter, or any other inappropriate management), including from use of the riparian land, is at <5% cover. 4) <10% of the ditch length is heavily shaded. 5) Clear water should be dominated by plants, be they submerged or floating (note dominance of duckweed is a sign of eutrophication). 6) A marginal fringe of emergent vegetation is present. 7) Non-native species are absent. 8) Cover of filamentous algae and/or duckweed is <10%.		
Condition tier	Score	Requirements
Good	3	<ul style="list-style-type: none"> No criteria failed.
Fairly Good	2.5	<ul style="list-style-type: none"> Fails 1 criterion.
Moderate	2	<ul style="list-style-type: none"> Fails 2-3 criteria.

		<ul style="list-style-type: none"> • Water level insufficient but ditch does not dry out entirely. • Water quality moderate. • Limited desirable plant species present (submerged species are often the first to be lost). • Non-native (but non-invasive) plants comprise >10% of the vegetation. • Fails criterion 8.
Fairly Poor	1.5	<ul style="list-style-type: none"> • Fails 4 criteria.
Poor	1	<ul style="list-style-type: none"> • Fails 5 or more criteria. • Waterbody dries out. • Water quality poor. • No or very limited desirable submerged plant species present. • Widespread undesirable species. • Invasive non-native species present.
Additional information		
<p>'Aquatic marginal vegetation' (f2d) is a UKHab habitat type. In the CBM, this habitat should be recorded as a component of the waterbody that it sits adjacent to rather than as a habitat parcel in its own right.</p>		

Pond

POND CBM ASSESSMENT		
Habitat description		
<p>All standing waterbodies <2 ha in area. Expert judgement should be used to decide if a standing waterbody between 1 and 2 ha is assessed as a pond or a lake. Ponds include sunny or shaded and temporary or permanent ponds at any stage of succession, from newly created ponds to ones that are completely overgrown. They also include scrapes and other temporary ponds that may be dry at certain times of the year.</p>		
CBM UKHab habitat	Distinctiveness tier	Score
Lakes – Ponds (Priority Habitat)	High	6
Lakes – Ponds (non-Priority Habitat)	High	6
Lakes – Temporary lakes, ponds & pools (if <1 ha. If area is between 1 and 2 ha, the surveyor should decide whether the pond or lake assessment is most appropriate)	High	6

Urban – Artificial lake or pond		Medium	4
Standard tier	Score per criterion	Criteria	
CWS	0.3	<ol style="list-style-type: none"> 1) Type 10A standing water bodies (most ponds and gravel pits will fall into this vegetation type) with one or more of the following: <ol style="list-style-type: none"> a) 5 submerged and floating species b) 15 submerged, floating and emergent species. 2) Type 10B standing water bodies (strongly calcareous water bodies, especially in flooded brickpits, chalkpits and in chalk lodes) with one or more of the following: <ol style="list-style-type: none"> a) 3 submerged and floating species b) 10 submerged, floating and emergent species c) beds of stoneworts. 3) Contains 3 or more species of pondweed (<i>Potamogeton</i> spp.). 	
Condition criteria			
<ol style="list-style-type: none"> 1) The pond's water levels are able to fluctuate naturally throughout the year. 2) Water quality is good, with clear water (substrate can be seen) and no obvious sign of pollution. 3) Physical damage (e.g. from excessive poaching, damage from machinery use, litter, or any other inappropriate management) is at <5% cover. 4) There is semi-natural riparian land for at least 10 m from the pond edge. 5) The pond is not artificially connected to other waterbodies, e.g. ditches. 6) Non-woodland ponds (i.e. those that have historically been open) are <50% shaded. 7) Non-woodland ponds are dominated by plants, be they submerged or floating (note that dominance of duckweed is a sign of eutrophication). 8) Ponds which naturally contain fish are not artificially stocked. 9) Cover of filamentous algae and/or duckweed is <10%. 			
Condition tier	Score	Requirements	
Good	3	<ul style="list-style-type: none"> • No criteria failed. 	
Fairly Good	2.5	<ul style="list-style-type: none"> • Fails 1 criterion. 	

Moderate	2	<ul style="list-style-type: none"> • Fails 2-3 criteria. • Water levels are subject to some control. • Water quality moderate. • Fails criterion 4, but there is still some semi-natural riparian land present. • There are some artificial connections to other waterbodies, but they are not delivering poor-quality water or preventing water level fluctuations. • Fails criterion 6 but pond is not completely shaded. • Non-woodland ponds with limited presence of desirable submerged and floating plants. • Fish have been stocked at a low density in a pond naturally containing fish, but they are native species and there is sufficient aquatic vegetation and habitat heterogeneity to reduce the effects of predation. • Non-native species comprise between 10% and 50% (non-inclusive) of the vegetation.
Fairly Poor	1.5	<ul style="list-style-type: none"> • Fails 4 criteria.
Poor	1	<ul style="list-style-type: none"> • Fails 5 or more criteria. • No natural fluctuations in water levels. • Water quality poor. • Semi-natural riparian land is absent. • Non-woodland ponds completely overgrown with trees and scrub. • Non-woodland ponds with an absence of desirable submerged and floating plants. • There is a high density of stocked fish. • Fails criterion 9.

Additional information

'Aquatic marginal vegetation' (f2d) is a UKHab habitat type. In the CBM, this habitat should be recorded as a component of the waterbody that it sits adjacent to rather than as a habitat parcel in its own right.

Lake

LAKE CBM ASSESSMENT

Habitat description

All standing waterbodies >2 ha in area. Expert judgement should be used to decide if a standing waterbody between 1 and 2 ha is assessed as a pond or a lake.

CBM UKHab habitat		Distinctiveness tier	Score
Lakes – Aquifer-fed naturally fluctuating waterbodies		Very High	8
Lakes – High alkalinity lakes		High	6
Lakes – Moderate alkalinity lakes		High	6
Lakes – Low alkalinity lakes		High	6
Lakes – Marl lakes		High	6
Lakes – Peat lakes		High	6
Lakes – Temporary lakes, ponds & pools		High	6
Lakes – Reservoirs		Medium	4
Urban – Artificial lake or pond		Medium	4
Standard tier	Score per criterion	Criteria	
CWS	0.3	1) Type 10A standing water bodies (most ponds and gravel pits will fall into this vegetation type) with one or more of the following: <ol style="list-style-type: none"> 5 submerged and floating species 15 submerged, floating and emergent species. 2) Type 10B standing water bodies (strongly calcareous water bodies, especially in flooded brickpits, chalkpits and in chalk lodes) with one or more of the following: <ol style="list-style-type: none"> 3 submerged and floating species 10 submerged, floating and emergent species beds of stoneworts. 3) Contains 3 or more species of pondweed (<i>Potamogeton</i> spp.).	
Basic	0.1	1) A range of desirable submerged and floating-leaved plants is present.	
Condition criteria			

The Freshwater Biological Association ‘Habitat Naturalness Assessment’ is used to assess the Condition of lakes. The average naturalness assessment scores for a lake are then converted into Condition scores for use in the CBM (see below). Details of the methodology for assessing lake naturalness are available at <http://priorityhab.wpengine.com/contribute/>. Links to key documents are provided in the NEBM lake assessment sheet (Crosher *et al.* 2019b). Surveyors are encouraged to log lake data on the Freshwater Biological Association ‘Habitat Naturalness Assessment’ website portal (<http://priorityhab.wpengine.com/contribute/>).

Condition tier	Score	Average ‘Habitat Naturalness Assessment’ class
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Good	3	1 Natural
Fairly Good	2.5	2
Moderate	2	3
Fairly Poor	1.5	4
Poor	1	5 Least natural

Additional information

‘Aquatic marginal vegetation’ (f2d) is a UKHab habitat type. In the CBM, this habitat should be recorded as a component of the waterbody that it sits adjacent to rather than as a habitat parcel in its own right.

Rivers and streams

- 1.6 The CBM assessment of rivers and streams follows the methodology described in the NEBM Technical Supplement (Crosher *et al.* 2019b).

Appendix II: DAFOR scale

Value	Cover
D = Dominant	>75%
A = Abundant	51-75%
F = Frequent	26-50%
O = Occasional	11-25%
R = Rare	1-10%

Appendix III: Alternative method for calculating Connectivity

- 1.1 If the Connectivity tool in the final version of the NEBM is deemed to be unsuitable for the University, the following alternative method for calculating connectivity may be developed. Patch separation distances have not been finalised and require further discussion (they are currently left as 'x'). The habitats mentioned in the 'Connectivity' columns are assumed to be 'nice' examples of those habitats, e.g. semi-natural rather than amenity grassland. Artificial dispersal barriers include roads and buildings.

Broad habitat type	Connectivity		
	High	Medium	Low
Hedgerow or line of trees	Directly connected to hedgerow, line of trees, woodland or scrub at both ends (at least).	Directly connected to these habitats at a single point.	Not directly connected to these habitats (i.e. >5 m gap – this figure is taken from the NEBM).
Woodland	Directly adjacent to hedgerow, line of trees, woodland, wood-pasture/parkland, scrub or orchard.	Not directly adjacent to these habitats but they are within x m, with no significant artificial dispersal barriers in the way.	Not directly adjacent to these habitats and they are >x m away and/or with significant artificial dispersal barriers in the way.
Orchard or wood-pasture/parkland	Directly adjacent to grassland, orchard, scrub or woodland.	Not directly adjacent to these habitats but they are within x m, with no significant artificial dispersal barriers in the way.	Not directly adjacent to these habitats and they are >x m away and/or with significant artificial dispersal barriers in the way.
Scrub	Directly adjacent to scrub, woodland, wood-pasture/parkland, orchard, hedgerow, line of trees or grassland.	Not directly adjacent to these habitats but they are within x m, with no significant artificial dispersal barriers in the way.	Not directly adjacent to these habitats and they are >x m away and/or with significant artificial dispersal barriers in the way.
Grassland	Directly adjacent to grassland, scrub, orchard or wood-pasture.	Not directly adjacent to these habitats but they are within x m, with no significant artificial dispersal barriers in the way.	Not directly adjacent to these habitats and they are >x m away and/or with significant artificial dispersal barriers in the way.
Cropland	Directly adjacent to semi-natural habitat.	Not directly adjacent to semi-natural habitat but it is within x m, with no significant artificial dispersal barriers in the way.	Not directly adjacent to semi-natural habitat and it is >x m away and/or with significant artificial dispersal barriers in the way.

Urban	Directly adjacent to semi-natural habitat or brownfield.	Not directly adjacent to these habitats but they are within x m, with no significant artificial dispersal barriers in the way.	Not directly adjacent to these habitats and they are >x m away and/or with significant artificial dispersal barriers in the way.
Rock	Directly adjacent to semi-natural habitat.	Not directly adjacent to semi-natural habitat but it is within x m, with no significant artificial dispersal barriers in the way.	Not directly adjacent to semi-natural habitat and it is >x m away and/or with significant artificial dispersal barriers in the way.
Wetland	Directly adjacent to wetland, standing water, flowing water or wet woodland.	Not directly adjacent to these habitats but they are within x m, with no significant artificial dispersal barriers in the way.	Not directly adjacent to these habitats and they are >x m away and/or with significant artificial dispersal barriers in the way.
Ditch/pond/lake	Directly connected to standing water, flowing water or wetland.	Not directly adjacent to these habitats but they are within x m, with no significant artificial dispersal barriers in the way.	Not directly adjacent to these habitats and they are >x m away and/or with significant artificial dispersal barriers in the way.
River	Directly adjacent to semi-natural habitat on both sides.	Directly adjacent to semi-natural habitat on one side only.	Not directly adjacent to semi-natural habitat on either side.

1.2 The scores associated with the three Connectivity tiers depends on how Connectivity is valued relative to other characteristics, such as Distinctiveness and Condition. Conservatively, CBM Connectivity is currently scored in the same way as in the NEBM 2.0 Beta version:

Connectivity tier	Associated score
High	1.15
Medium	1.1
Low	1

Appendix IV: Limitations of the CBM

1.1 See Crosher *et al.* (2019a) for a discussion of the general limitations of biodiversity metrics such as the NEBM and CBM.

- 1.2 The NEBM includes criteria addressing both cause and effect of habitat Condition, which could lead to double-counting. For instance, it is recognised that the anthropogenic damage criterion (D2) in the hedgerow Condition assessment refers to damage that could lead to a decline in other Condition attributes. The CBM adopts this same approach, aware that it is imperfect from the perspective of double-counting.
- 1.3 CWS/CiWS selection criteria sometimes contain size constraints (e.g. the habitat parcel must be over 0.5 ha), which are retained in the CBM Standard assessment. This effectively double-counts habitat size, but this is because the size of particular habitats contributes to their (at least) county-level ‘distinctiveness’. Size constraints in the CBM Standard assessment could be seen to represent the biodiversity value of greater habitat size which is ‘greater than the sum of its parts’, i.e. biodiversity value is likely to increase non-linearly (and, the CBM assumes, to increase more than would be expected given a linear relationship) with increasing habitat size, e.g. due to complex thresholds for ecosystem functioning. A side-effect is that there is extra incentive for increasing the size of certain habitats.
- 1.4 For some habitat types, fewer criteria need to be failed to be in Poor Condition than in the NEBM. This is because the CBM is geared more towards enhancing existing habitats rather than offsetting, so it aims to increase incentive to improve the management of the habitat. However, this trades off with increasing the risk of ‘gaming the metric’ if the CBM is used for offsetting. If a habitat parcel is at the upper end of the Poor Condition tier, an offsetter could replace it with the same habitat at the lower end of the Poor Condition tier (i.e. it fails more criteria than the original parcel) whilst still scoring the same number of points.
- 1.5 Some of the Condition criteria become less meaningful as habitat parcel size decreases. E.g. Condition criterion 1 for woodland may be less important for very small woodland parcels.

Appendix V: Stylistic choices in the CBM

- 1.1 The CBM survey sheets follow species nomenclature recommendations as found in (for example) the *British Wildlife* journal; the target audience is knowledgeable about biodiversity. Words in the English vernacular names of species are all capitalised as they are referring to distinct, specific entities, reducing ambiguity. Scientific names follow English names directly, i.e. they are not placed within brackets. After its first mention, a species is referred to by its English name only. When a broader group of species is being referred to, such as all within a genus, the English names are not capitalised (e.g. ‘bedstraws *Galium* spp.’ in contrast to ‘Lady’s Bedstraw *Galium verum*’). For consistency, the species nomenclature in the rest of this document follows the style of the survey sheets.
- 1.2 There is much inconsistency within the NEBM regarding capitalisation (there is a lot of unnecessary capitalisation) and other grammatical aspects of UKHab-based habitat names. The CBM follows the broad style of NEBM habitat nomenclature whilst reducing unnecessary capitalisation and ensuring greater consistency. Note that ‘Priority Habitat’ is capitalised in the CBM (as in the NEBM) because it refers to habitats identified as priorities in the UKBAP.
- 1.3 Components of the CBM and tiers within them – including Distinctiveness (Very High, High, Medium, Low, Very Low, Negligible), Condition (Good, Fairly Good, Moderate, Fairly Poor, Poor), Standard (Above CWS, CWS, CiWS, Basic, Poor), Connectivity, Strategic Significance

(High, Low) and Data Certainty (Very High, High, Medium, Low) – are capitalised as they are referring to specific entities with a distinct definition.

- 1.4 The CBM Condition assessment sheets are adapted from the NEBM Technical Supplement (Crosher *et al.* 2019b) and are designed to appear similar, e.g. using the font Arial. Text within the survey sheets is designed to be quick and easy to read.

Appendix VI: Inconsistencies in NEBM Condition criteria

- 1.1 Condition criteria which appear across most habitat types in the NEBM are those relating to undesirable species and physical anthropogenic damage. Criteria relating to bare ground as a negative feature also crop up quite frequently. However, the NEBM is inconsistent across habitat types in how it apportions these issues into Condition criteria. Moreover, the NEBM is inconsistent in what types of plant are included in lists of ‘undesirable species’, and how ‘undesirable species’ are apparently defined. The table below summarises how these types of criteria are laid out in the NEBM to illustrate inconsistencies. Note that rivers/streams and lakes have distinct types of Condition assessment which do not fit the NEBM’s general format.

Habitat type	Condition criteria relating to undesirable species, bare ground (as negative) and physical anthropogenic damage	Comments
Hedgerow	Plant species indicative of nutrient enrichment of soils dominate <20% cover of the area of undisturbed ground.	Only a list of plants indicative of nutrient enrichment is provided.
	>90% of the hedgerow and undisturbed ground is free of invasive non-native and neophyte species.	
	>90% of the hedgerow or undisturbed ground is free of damage caused by human activities.	
Line of trees	No mention of such criteria	
Woodland	There should be no evidence of inappropriate management (e.g. deep ruts, animal poaching or compaction).	The list of ‘undesirable species’ includes only non-native invasives. The criterion about nutrient enrichment presumably refers to plants indicating eutrophication, although such plants are not listed. The canopy cover of non-native species (i.e. not necessarily invasive) is mentioned as a requirement in individual Condition tiers (e.g. Moderate) but not in the general list of Condition criteria nor in the list of ‘undesirable species’.
	Invasive non-native plants are below 5% (see list below).	
	No signs of significant nutrient enrichment present.	
Orchard	There should be an absence of scrub growing between or up the trees.	The list of ‘undesirable species’ includes only native herbaceous injurious weeds. However, one

	At least 80% of the trees should be free from damage caused by browsing, bark stripping or rubbing on non-adjusted ties.	of the requirements for Poor Condition, 'Cover of undesirable species above 20%, usually resulting in a dense scrub or tree cover, or high cover of exotic and invasive species, lack of bare ground and lack of structural diversity', implies that 'undesirable species' also include non-native species and scrub/trees. Note that the two criteria mentioning scrub apparently contradict each other.
	There should be less than 5% cover of bare ground, injurious weeds or scrub.	
Scrub	Pernicious weeds and invasive species make up less than 5% of the ground cover.	<p>The list of 'undesirable species' includes non-native invasives and a relatively small selection of native herbaceous injurious weeds. Requirements for the different Condition tiers such as 'Cover of undesirable and invasive species at 5-20%' (under Moderate Condition) imply that undesirable and invasive species are separate entities, which is not the case elsewhere in the NEBM Condition assessments (e.g. for wetland).</p> <p>It is a little unclear whether the 5% cover threshold refers to both pernicious weeds and invasive species together, or each separately. It is presumed that the former is the case.</p>
Heathland	Cover of undesirable species (injurious weeds and invasive non-native plants – see list below) should be less than 5%.	The list of 'undesirable species' includes non-native invasives, native herbaceous injurious weeds, 'dense mats of acrocarpous mosses' (native and non-native invasive), and native scrub/tree species.
	Cover of trees and/or scrub should be less than 15%.	
	Physical damage to the vegetation from: excessive poaching, damage from machinery use or storage, or any other damaging management or public access activities.	
Coastal	Non-native and invasive species are absent or infrequent (less than 5% cover and not expanding).	The list of 'undesirable species' includes non-native invasives, native herbaceous injurious weeds, and native scrub/tree species.
	Other negative indicators of damage or modification are not present, such as excessive poaching, damage from machinery use or storage, or any other damaging management or public access activities.	
Grassland	Undesirable species and physical damage is below 5% cover.	The list of 'undesirable species' includes only native herbaceous injurious weeds. However, one of the requirements for Poor Condition, 'Cover of undesirable species above 15%, usually resulting in a dense scrub or tree cover, or high cover of
	Cover of bare ground greater than 10% (including localised areas, for example, rabbit warrens).	

	Cover of bracken less than 20% and cover of scrub and bramble less than 5%.	exotic species', implies that 'undesirable species' also includes non-natives and scrub/trees. Note that the bare ground criterion is presumably a typo – cover of bare ground should surely be 'less than' rather than 'greater than' 10%.
Urban	No mention of such criteria	The list of 'undesirable species' includes only non-native invasives.
Sparsely vegetated and rock habitat	Cover of all undesirable herbaceous species (false oat-grass, crested dog's-tail, brambles, creeping thistle, spear thistle, curled dock, broad-leaved dock, common ragwort, common nettle and other pernicious perennial species) should be less than 5%.	The list of 'undesirable species' includes only native herbaceous injurious weeds and <i>Rhododendron ponticum</i> . Some requirements for different Condition tiers, e.g. 'Cover of undesirable species below 5%' for Good Condition, could be misleading because 'undesirable woody species' feature in a Condition criterion but not in the list at the end of the assessment, and the threshold for such woody species is 10% rather than 5%.
	Cover of undesirable woody species (sycamore, beech, blackthorn and cotoneasters) should be less than 10% of the woody cover.	
	Cover of bracken, scrub and trees less than 25%.	
	Cover of weed (for example, creeping and spear thistles, docks, brambles, common ragwort and common nettle) or non-native species less than 1%.	
Wetland	Cover of undesirable species (common nettle, docks, creeping/spear thistles, common ragwort and Indian (Himalayan) balsam) should be less than 10%.	The list of 'undesirable species' includes native herbaceous injurious weeds, a small selection of non-native invasives and 'conifer seedlings'.
	Cover of scrub should be less than 10%.	
	Cover of bare ground should be less than 10%.	
Ditch	The water body should not be impacted by use of the riparian land.	The list of 'undesirable species' includes non-natives (invasive or otherwise) and native indicators of eutrophication.
	There should be an absence of non-native species.	
	There should be less than 10% cover of filamentous algae and/or duckweed.	
Pond	Non-native species should be absent.	The list of 'undesirable species' includes non-natives (invasive or otherwise) and native indicators of eutrophication.
	Less than 10% of the pond should be covered with duckweed or filamentous algae.	

Appendix VII: Modifications to the NEBM

1 Introduction

- 1.1 The NEBM was chosen by the University as a starting point for quantifying biodiversity because it is likely to become an industry standard like its predecessor, and it has many advantages, not least as a useful way to focus habitat management. However, aspects of the NEBM were modified in order to create the CBM.
- 1.2 The NEBM framework has been largely preserved, and most of the modifications relate to the finer detail. Feedback on the NEBM that arose from designing the CBM was submitted to Natural England's consultation on its new metric, so the CBM may inform improvements to the NEBM.

2 Components of the CBM

- 2.1 The CBM follows the basic framework of the NEBM but is modified in a number of ways. See Appendix VII for information about Data Certainty and risk factors.

Distinctiveness

- 2.2 No major changes to Distinctiveness have been made in the CBM other than the wording for Very Low Distinctiveness tiers. The NEBM uses 'Very Low' Distinctiveness to refer both to scores 0 (e.g. hardstanding) and 1 (e.g. ornamental non-native hedges). For clarity, the CBM refers to score 1 as 'Very Low' and score 0 as 'Negligible'.
- 2.3 No major changes have been made to the habitat classification system used by the NEBM (see specific changes in 'Modifications per habitat type' below). Some minor changes to capitalisation and other grammatical aspects of the habitat names have been altered for clarity and consistency. The CBM focuses on habitats which are more relevant to the University of Cambridge estate and the local area, so some habitats are omitted from the survey sheets (see Appendix I).
- 2.4 The CBM discourages evaluating individual trees using the NEBM's Urban Street Trees assessment, which effectively measures individual trees as very small area-based habitats.

Standard

- 2.5 Some NEBM Condition assessment criteria appear closer to a measure of habitat Distinctiveness than Condition. For example, in the Woodland Broad Habitat Type Condition assessment, one of the criteria is 'More than 3 different native trees and 3 shrub species in an average 10 m radius.' It feels inconsistent that this criterion should be incorporated into the Condition assessment whilst other similar criteria are incorporated into the fundamental UKHab habitat type and therefore Distinctiveness score. For instance, the species richness of hedges is not included as a Condition criterion, but rather as a habitat type and therefore a different Distinctiveness tier: a hedge is classified as 'Native species-rich hedgerow' (Medium Distinctiveness, scores 4) if it contains 5 or more woody species per average 30 m stretch, and

‘Native hedgerow’ (Low Distinctiveness, scores 2) if the species richness is lower than this. An extra component of the CBM, ‘Standard’, includes such criteria that effectively add more detail (especially county-level distinctiveness) to the habitat’s Distinctiveness. In this way, the CBM allows even a Low Distinctiveness habitat to have a high Standard. Such habitats may be under-valued in the NEBM.

- 2.6 The scores assigned per Standard criterion are an attempt to fairly value the features described in the Standard criteria relative to the Distinctiveness scores. The scores have been chosen such that a habitat would need to meet a considerable number of Standard criteria in order to be effectively bumped up to a new Distinctiveness tier when Distinctiveness and Standard are added together; features in Standard criteria are considered to be a ‘subset’ of the overall habitat, and as such, the Distinctiveness score should have the greatest effect on the CBM calculation. Having a difference of 0.1 between the consecutive Standard tiers may not be fair for all features described in the Standard criteria, but there is in general a reasonably even difference between them (e.g. for criteria describing aspects of plant species richness).
- 2.7 Criteria in Standard should theoretically be able to have their Condition assessed, but this should not be the case for criteria in Condition. For example, a Condition criterion for lines of trees is the level of canopy cover, whereas a Standard criterion for lines of trees is ‘Contains groups of 10 or more mature pollard willows, even in an arable setting.’ This ensures that criteria included in the Condition assessments are restricted to those relating more to structural features and management quality which site managers may have greater immediate control over.
- 2.8 Condition may be a proxy for Standard (or even Distinctiveness) in some cases, so there is a risk of double-counting, but this problem is also inherent in the NEBM, not least because criteria relating to plant species richness are included in the Condition assessment.

Condition

- 2.9 No major changes to the NEBM’s Condition have been made in the CBM. The same tiers and scores are used. Specific changes to Condition for each broad habitat type are detailed in Appendix VII.
- 2.10 Like the NEBM, the CBM considers some Condition criteria to be more ‘serious’ than others. For instance, in the scrub Condition assessment, if an area of scrub fails the criterion ‘There is a good age range – a mixture of seedlings, saplings, young shrubs and mature shrubs’ such that single-age scrub is present, it is immediately in Poor Condition, whereas normally the scrub would have to fail three or more criteria.
- 2.11 There are some criteria omitted by the NEBM which provide a more complete picture of a habitat’s Condition. In the CBM, these criteria have been added to the lists of NEBM Condition criteria for each habitat. This makes the NEBM Condition assessment harsher but also allows the University to numerically demonstrate biodiversity increases that would otherwise go unvalued by the NEBM.
- 2.12 In the NEBM, the number of criteria that need to be met to be in Good, Moderate or Poor Condition are sometimes vaguely indicated (e.g. in the Pond Habitat Type, for Good, ‘Few of the indicators of poor Condition are present’, and for Moderate, ‘Fails a number of the criteria above’). In the CBM, clear thresholds have been chosen for the number of criteria that must

be failed to be in a particular Condition tier to avoid ambiguity and increase consistency across habitat types. To be in Good Condition requires none of the Condition criteria corresponding to that habitat type to be failed. Poor Condition is assigned to any habitat which fails more than half of the criteria. The other Condition tiers are then segregated as fairly and symmetrically as possible given how Poor Condition has been defined, with Moderate Condition always half-way between Poor and Good. Where there are six or more criteria, the CBM attempts to discriminate more finely between habitats based on their Condition, adding requirements for Fairly Good (2.5) and Fairly Poor (1.5) Condition tiers.

- 2.13 Condition criteria which appear across most habitat types are those relating to undesirable species and physical anthropogenic damage. Criteria relating to bare ground as a negative feature also crop up quite frequently. However, the NEBM is inconsistent across habitat types in how it apportions these issues into Condition criteria. Moreover, the NEBM is inconsistent in what types of plant are included in lists of ‘undesirable species’, and how ‘undesirable species’ are apparently defined (see Appendix VII). Although some of these inconsistencies may be due to differences in the nature of the habitat types in question, many inconsistencies are confusing. The CBM aims to increase consistency in these Condition criteria across habitat types and remove any confusing or misleading statements.
- 2.14 The CBM aims to make separate Condition criteria for issues which are considerably different in their nature, causes and solutions. There are some cases in the NEBM where ‘grouped’ criteria are ambiguous in terms of whether percentage cover thresholds refer to all issues together or separately. In such cases, the CBM groups issues into separate criteria as described in the table below. When the CBM refers to ‘undesirable species’, this encompasses all undesirable plants of all functional types.

Condition criterion type	Justification for grouping
Woody or otherwise ‘scrubby’ plants: e.g. scrub, trees and woody climbers (including native and non-native, invasive or otherwise), Bracken <i>Pteridium aquilinum</i> , Bramble <i>Rubus fruticosus</i> agg.	Suggest succession to more scrubby/woody habitats.
Undesirable herbaceous plants, including non-natives (invasive or otherwise), and native ‘injurious/pestiferous weeds’ (including those indicative of nutrient enrichment), e.g. Cow Parsley <i>Anthriscus sylvestris</i> , Creeping Thistle <i>Cirsium arvense</i> , Spear Thistle <i>Cirsium vulgare</i> , Cleavers <i>Galium aparine</i> , duckweeds <i>Lemna</i> spp., Creeping Buttercup <i>Ranunculus repens</i> , Curled Dock <i>Rumex crispus</i> , Broad-leaved Dock <i>Rumex obtusifolius</i> , Common Ragwort <i>Senecio jacobaea</i> , White Clover <i>Trifolium repens</i> , Common Nettle <i>Urtica dioica</i> and filamentous algae.	May suggest a build-up of nutrients rather than succession <i>per se</i> .
Bare ground.	
Physical anthropogenic damage.	Such damage may be superimposed on other features, such as bare ground.

- 2.15 The NEBM provides prescriptive lists of ‘undesirable species’ in its Condition assessments. However, rather than using these lists as rote, CBM surveyors are encouraged to use expert judgement and common sense in deciding if a species is ‘undesirable’ or not. The NEBM lists

miss out many species that could be considered undesirable (not least many non-native invasive plants), which could make the lists misleading. ‘Desirable’ species are all those which are not undesirable.

Connectivity

- 2.16 In the NEBM, Connectivity is based on a habitat parcel’s nearness to similar habitats (i.e. of the same broad type, e.g. both habitats are types of hedgerow) or related habitats (not necessarily the same type, but complementary habitats that could form a ‘dynamic complex’, e.g. scrub and grassland). The NEBM is unclear as to what habitats comprise a dynamic complex.
- 2.17 Connectivity is incompletely worked out in the Beta version of the NEBM. At the time of writing, an NEBM Connectivity calculation tool has been published, but this only works for High or Very High Distinctiveness habitats and other habitats are assigned default Connectivity scores. In addition, the calculation tool does not take into account disproportionately serious artificial dispersal barriers (e.g. roads). For these reasons, the CBM does not currently include NEBM-style Connectivity, although it aims to incorporate a measure of Connectivity in future updates. CBM targets set in the University’s 2020 BAP do not incorporate Connectivity.
- 2.18 The NEBM authors may publish further updates in December 2020 on how Connectivity should be calculated, in which case the CBM may incorporate NEBM methodology for calculating Connectivity. However, if the NEBM methodology is still considered to be insufficient, an alternative simplified method for calculating Connectivity is suggested for the CBM in Appendix III.

Strategic Significance

- 2.19 In the NEBM, Strategic Significance depends on both a habitat parcel’s ‘potential’ and whether it falls within a strategic biodiversity area identified in local policy. Including the site’s ‘potential’ is considered to be a case of double-counting that can easily be avoided (‘potential’ is already captured to some extent by the parcel’s Distinctiveness, Standard, Condition and Connectivity scores, as well as planned improvements to these components) so Strategic Significance in the CBM is simplified to the following categories, whereby it effectively becomes a landscape-scale Connectivity score:

Strategic Significance tier	Associated score	Criteria	Explanation
High	1.15	Within strategic biodiversity area formally identified in local policy.	1.15 is the score used in the NEBM for sites of high potential and within a strategic area identified in local policy.
Low	1	Outside any strategic biodiversity area formally identified in local policy.	1 is the score used in the NEBM for sites of low potential that are outside any strategic area identified in local policy.

- 2.20 Some green infrastructure target areas in Cambridgeshire, especially around the city of Cambridge, are targets because of their potential to increase human access to green space rather than being of ecological importance. Habitat parcels falling into the former type of target area were not considered to be in an area of Strategic Significance for biodiversity.
- 2.21 The only site on the University estate considered to fall within an area of strategic biodiversity significance as identified in local policy is Lord’s Bridge, which is located at the edge of the West Cambridgeshire Hundreds Living Landscape.

Data Certainty

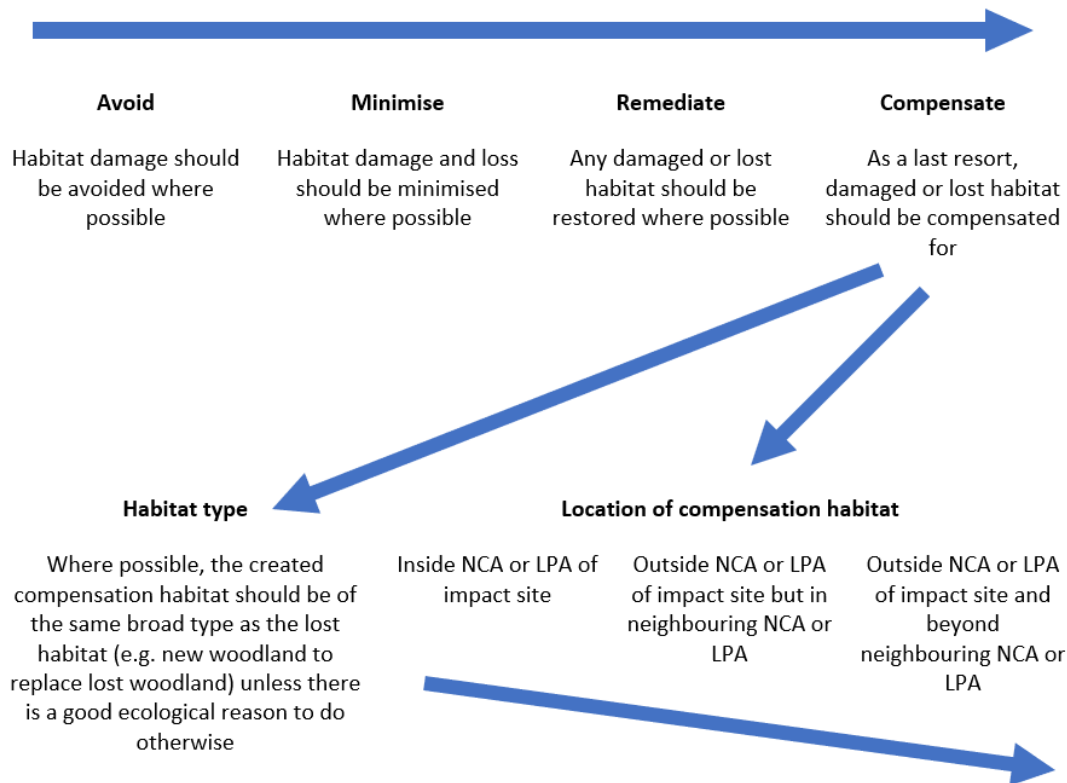
- 2.22 The NEBM does not take into account the certainty of the data used to inform its calculations; it is assumed that the data are certain. Data certainty is of particular relevance to the University because some of the habitat information used to inform its target-setting came from sources which were not in terms of the NEBM or CBM, e.g. the Woodland Management Plan, surveys of LWSs by the WTBCN, and Phase 1 surveys by ecological consultants, which led to a degree of uncertainty when translating these data into CBM terms.
- 2.23 In the CBM, a certainty score (effectively a probability of correctness) is attached to assignments of habitat type (and therefore Distinctiveness), Condition and Standard. Data Certainty is not a multiplier incorporated into the CBM calculation but a separate score in light of which the CBM components should be judged.
- 2.24 Data Certainty is classed as follows:

Certainty tier	Associated probability (roughly speaking)	Explanation
Very High	1	Any data which is ‘beyond reasonable doubt’ should fall into this tier. Any habitats surveyed using the full NEBM methodology (plus SB’s suggested modifications) falls into this tier.
High	0.75	There may be some ambiguity but this is unlikely to have a major impact, e.g. the habitat is likely to be in Good Condition regardless of the data uncertainty.
Medium	0.5	There is considerable ambiguity – e.g. a Condition could potentially be either Good or Moderate.
Low	0.25	If certainty is this low, then the University should probably not include the habitat parcel in the CBM assessment until the data is more certain, as there could be substantial changes in CBM score if data certainty is increased.

- 2.25 If a habitat is to be offset, then Data Certainty for all relevant CBM components should ideally be High or Very High. The University should generally aim for a Data Certainty of Very High across its estate.

Risk factors

- 2.26 The NEBM includes three ‘risk factors’ as multipliers when calculating target NEBM value: the technical difficulty of habitat creation or restoration, ‘temporal risk’ (based on how long it takes to reach target Condition) and ‘off-site risk’ (based on whether the planned habitat creation/enhancement is taking place within, near or far from the original habitat). These risk factors are not incorporated into the CBM calculation. There are three main justifications for this:
- 1) The risk factors are geared towards offsetting. Because of the penalty they place on projected biodiversity increases, the risk factors are beneficial for offsetting because they encourage more management action than would otherwise occur without using the risk factors (e.g. enhancement of a greater land area). This makes it more likely that biodiversity will actually be compensated after damage/development. However, when the purpose is simply to enhance the value of existing habitats (i.e. there is no offsetting requirement), using the risk factors would make some of the subtler habitat enhancement carried out by the University result in a negative change in the metric, which is nonsensical; the risk factors place an unfairly large penalty on planned biodiversity increases for enhancing existing habitats. Moreover, the risk factors could disincentivise the creation of more ‘difficult’ habitats (e.g. species-rich hedgerows) – which are usually potentially most biodiverse – when there is no offsetting onus, and discourage longer-term habitat planning, such as creation of new ancient woodland.
 - 2) All of the risk factors depend on what type of habitat restoration is taking place (e.g. planting up gaps in a hedgerow or letting a hedgerow grow wider) – a fact which is not currently taken into account by the NEBM – and in many cases the resulting penalty in the NEBM calculation would likely be lower in real life than the generic risk multipliers suggested by the NEBM.
 - 3) Incorporating the risk factors fundamentally alters the ‘unit’ of the metric from biodiversity value to ‘biodiversity-risk’ value, which makes interpretation more difficult. The CBM retains a purer unit of biodiversity value by not including the risk factors.
- 2.27 There are several issues with the off-site risk factor specifically. In the NEBM, off-site risk includes cultural value as well as ecological reasoning, and implicitly gives some value to constancy of species composition, which (although these considerations may be important) again complicates the ‘unit’ of the metric. The desirable proximity of the compensation habitat to the impact site is likely to be heavily context-specific. It may in some cases be ecologically valuable for the compensation habitat to remain in the same NCA, especially when the impacted site contains habitats of high ecological value and which are highly distinctive of that NCA. However, if the impacted habitat does not have such NCA-specific distinctiveness, then it may be beneficial to compensate further away from the impact site if this allows greater biodiversity increases overall, but off-site risk could discourage this. Off-site risk in the NEBM does not currently take into account the habitat type compensated (although rivers and streams have a different form of off-site risk multiplier).
- 2.28 Nonetheless, the NEBM risk factors could still act as useful measures for judging whether a planned management action will feasibly increase biodiversity. For instance, the technical difficulty of habitat creation or enhancement suggests which habitats should ideally not be damaged or lost at all. See Crosher *et al.* (2019b) for tables of risk factors for each habitat type. Users of the CBM for offsetting are also expected to always follow the ‘mitigation hierarchy’:



2.29 To ensure that biodiversity compensation is likely to succeed, offsetting calculations could be carried out in two possible ways. The NEBM’s method is to set a relatively low target, such as 10% net gain of biodiversity, and then use risk factors to make it more likely that this target is achieved. The second method is to omit the risk factors altogether but set higher targets, such as ‘50% biodiversity net gain’, whilst also keeping in mind the approach that the risk factors incentivise, such as offsetting as near as possible to the compensated site (this approach should be used regardless of whether risk factors are used or not). This is the CBM’s preferred approach. Further study is required to investigate typical numerical relationships between the NEBM and CBM and therefore what offsetting targets would result in a roughly equivalent biodiversity maintenance/gain in both metrics. Further study on the relationship between CBM (or, indeed, NEBM) scores and actual biodiversity measures would also be useful.

3 Modifications per habitat type

- 3.1 Criterion numbers mentioned under ‘Specific modifications to Condition criteria’ refer to the relevant Condition assessment sheets in the NEBM Technical Supplement (Crosher *et al.* 2019b). The ‘Habitat Description’ and ‘Additional information relevant to data collection’ associated with the NEBM Condition assessment sheets have typically been included in the CBM survey sheets, though their wording has often been altered for clarity.
- 3.2 Note that some additions to Standard criteria are described in the ‘Specific modifications to Condition criteria’ sections because the criteria have been transferred from Condition to Standard. Changes to Standard criteria not related to Condition are described in the ‘Specific modifications to Standard criteria’ sections.

Hedgerow

General modifications

- 3.3 The NEBM hedgerow Condition assessment is based on the methodology described in the Hedgerow Survey Handbook (Defra 2007). CBM surveyors are encouraged to consult the Handbook for detailed information, but should be wary of the CBM hedgerow survey's changes to the Handbook methodology.

Hedgerow Survey Handbook/NEBM methodology	Change in CBM	Justification for change
The NEBM UKHab habitat 'Hedgerow Ornamental Non Native' is assigned a Very Low Distinctiveness (score 0) in the Calculation Tool.	This habitat is assigned Very Low Distinctiveness but scores 1 rather than 0. (A score of 0 is called 'Negligible' in the CBM.)	The NEBM is inconsistent in how this habitat type is scored. In the Technical Supplement, a score of 1 is assigned, but a score of 0 is assigned in the Calculation Tool. Even an ornamental hedgerow composed of non-native species has greater biodiversity value than an area of hardstanding (which is assigned a score of 0 in the NEBM), e.g. as a habitat for nesting birds, so it would be unfair for the habitat's biodiversity value to be dismissed completely.
The Handbook considers a single hedgerow 'unit' to be a length of hedgerow between two end nodes.	The CBM allows a hedgerow to be mapped as a single unit even if it includes a T-junction, turns a corner, etc., as long as it makes sense in terms of the continuity of habitat type and physical features.	A CBM principle is that habitats should be mapped as the largest possible continuous units, so that they are as close as possible to corresponding 'management units' (i.e. units that could be managed in the same way, perhaps on the same day). This also saves time whilst GIS-mapping.
The Handbook considers a hedgerow <20 m in length, which is not connected to another hedgerow, not to be a hedgerow.	The CBM allows a habitat of any length and connectivity to be categorised as a hedgerow if this is felt to be the most appropriate habitat.	It is unclear what a <20 m isolated hedgerow-like line of shrubs would be classed as if not a hedgerow, unless scrub is more appropriate (this depends on the habitat's management history).
The Handbook considers a species-rich hedgerow to include at least five woody species (native or archaeophytes, excluding climbers and Bramble <i>Rubus fruticosus</i> agg. but including roses <i>Rosa</i> spp.) per 30 m stretch on average everywhere but northern and eastern England, upland Wales and Scotland, where a	On the University of Cambridge estate, five woody species is used as the threshold for a species-rich hedgerow.	The area covered by 'eastern England' is not clearly defined by the Handbook, and in other Defra documentation (here , for instance) eastern England is apparently not exempt from the five woody species criterion. Using the higher threshold is conservative and encourages higher targets for biodiversity to be set.

hedgerow can be considered species-rich if it includes at least four woody species per 30 m stretch.		
The Handbook and NEBM treat the basal herbaceous flora as part of the hedgerow.	The CBM considers the basal herbaceous flora of hedgerows to belong to the adjacent (e.g. grassland) habitat rather than the hedge itself, so it does not affect the habitat type or Condition of the hedgerow.	This helps to focus management to the relevant habitat type.
In the NEBM, failing two criteria within the same 'functional group' is considered more serious than failing two criteria in different functional groups.	The CBM considers all criteria failures to be equally serious.	This simplifies the scoring system, and fits the updated list of Condition criteria better given that the criteria from one of the functional groups (C2) is removed from the CBM. Although the NEBM's approach may make sense from a real-life biodiversity perspective, insufficient justification is given. It is perhaps more likely that the greatest differences in 'seriousness' between criteria exists between the functional groups. The CBM's approach is more conservative in the absence of clear justification for a more complex approach.

Specific modifications to Standard criteria

Standard tier	Change in CBM	CBM criterion description	Justification for change
Basic	Added criterion	Contains at least 3 woody species per 30 m stretch on average.	Extrapolation from related CiWS and CWS tier criteria.
Basic	Added criterion	Contains at least 1 veteran or mature pollard of native tree species.	Ensures that isolated notable trees in hedgerows are valued.

Specific modifications to Condition criteria

NEBM criterion number	NEBM criterion description	Change in CBM	CBM criterion description	Justification for change
B1	Gap between ground and base of canopy <0.5 m for >90% of	Modified	Gap between ground and base of canopy <0.5 m for	Although a hedgerow may still be stockproof if only one side meets the base-gap criterion, ground-nesting birds and other wildlife

	length (unless 'line of trees').		>90% of length on both sides of hedge.	requiring a sheltered hedge base will be exposed. There were some examples of this sort of 'asymmetric' hedge on the University estate. (It should be self-explanatory that lines of trees have a separate Condition assessment.)
B2	Gaps make up <10% of total length and no canopy gaps >5 m.	Modified	Gaps make up <10% of total length and no canopy gaps >5 m. If dense Bramble is covering the gap, it is not counted as a canopy gap.	Although Bramble is not counted as one of the woody hedgerow species, if it covers a >5 m gap in the canopy of 'official' woody hedgerow species, the hedgerow is continued to be continuous. Dense Bramble is a valuable habitat in its own right and can provide good shelter. Where dense Bramble has already developed in a canopy gap, it could cause unnecessary harm to the habitat to remove the Bramble in order to plant up the gap with other woody species.
C2	Plant species indicative of nutrient enrichment of soils dominate <20% cover of the area of undisturbed ground.	Removed		This criterion is treated as an issue of the habitat adjacent to the hedgerow (e.g. grassland) rather than the hedgerow itself. This helps to focus management to the relevant habitat type.
D1	>90% of the hedgerow and undisturbed ground is free of invasive non-native and neophyte species.	Modified	>90% of the hedgerow length is free of invasive non-native and neophyte vascular plant species.	The undisturbed ground is treated as a separate habitat parcel with its own Condition assessment. A clarification is added that the '>90%' refers to hedgerow length and that the undesirable species refer to vascular plants.
D2	>90% of the hedgerow or undisturbed ground is free of damage caused by human activities.	Modified	>90% of the hedgerow length is free of damage caused by human activities.	The undisturbed ground is treated as a separate habitat parcel with its own Condition assessment. A clarification is added that the '>90%' refers to hedgerow length.
Good	No more than 2 failures in total and no more than 1 in any functional group.	Modified	No criteria failed.	This makes the Condition assessment harsher and more consistent across habitat types, and increases the incentive to improve hedgerow management.
Fairly Good		Added requirement	Fails 1 criterion.	Helps to standardise the CBM Condition assessment across

				different habitat types and numerically discriminate between habitats of different Condition.
Moderate	No more than 4 failures in total and fails both attributes in a maximum of one functional group e.g. fails attribute 1 & 2, 5 & 7 = Moderate condition.	Modified	Fails 2 criteria.	This makes the Condition assessment harsher and more consistent across habitat types, and increases the incentive to improve hedgerow management.
Fairly Poor		Added requirement	Fails 3 criteria.	Helps to standardise the CBM Condition assessment across different habitat types and numerically discriminate between habitats of different Condition.
Poor	Fails a total of more than 4 attributes or both attributes in more than one functional group.	Modified	Fails 4 or more criteria.	This makes the Condition assessment harsher and more consistent across habitat types, and increases the incentive to improve hedgerow management.

Line of trees

General modifications

NEBM methodology	Change in CBM	Justification for change
The NEBM is unclear about the minimum length or minimum number of constituents for a line of trees.	At least two adjacent trees can count as a line of trees.	Although two trees would constitute a very small line of trees, this still gives a fairer value to the trees than the NEBM's Urban Street Trees assessment. Single isolated trees are valued within Standard for relevant habitat types.

Specific modifications to Standard criteria

LWS type	LWS selection criterion number	Standard tier	Change in CBM	LWS selection criterion description	CBM criterion description	Justification for change
CWS	1h(i)	CWS	Modified	Groups of 5-19 mature pollard willows when in association with other semi-natural features such	Groups of 5-19 mature pollard willows when in association with other semi-natural features such as grassland, ditches	Helps to distinguish from CWS criterion 2.

				as grassland, ditches and rivers.	and rivers (not in an arable setting).	
CiWS	2.7(a)	CiWS	Modified	Groups of 3 or more mature pollard willows when in association with other semi-natural features such as grassland, ditches and rivers.	Groups of 3 or more mature pollard willows when in association with other semi-natural features such as grassland, ditches and rivers (not in an arable setting).	Helps to distinguish from CiWS criterion 2.
CiWS	2.8	CiWS	Modified	Groups of four or more mature pollards of native tree species.	Contains 4 or more mature pollards of native tree species other than willows.	Avoids a line of trees double-counting Standard criteria if it also meets a willow-focused criterion.
N/A	N/A	Basic	Added criterion		Contains at least 3 woody species.	Greater consistency with hedgerow Standard criteria.
N/A	N/A	Basic	Added criterion		Contains at least 1 veteran or mature pollard of native tree species.	Ensures that isolated notable trees in lines of trees are valued.

Specific modifications to Condition criteria

NEBM Condition tier	NEBM criterion description	Change in CBM	CBM criterion description	Justification for change
Good	Mature trees with continuous canopy Definition: <ul style="list-style-type: none"> • a 'mature tree' in this context is one that is at least 1/3 expected fully mature height • gaps make up <10% of total length and there are no canopy gaps >5 m 	Modified	Canopy continuous (i.e. gaps make up <10% of total length and there are no canopy gaps >5 m) and most trees mature (i.e. at least 1/3 expected fully mature height).	There may be cases where most trees in a continuous-canopy line of trees are mature but not all, in which case the line of trees still deserves to be assigned Good Condition.
Moderate	Continuous canopy	Modified	Canopy continuous (i.e. gaps make up <10% of	There may be cases where lines of trees

	<p>Definition:</p> <ul style="list-style-type: none"> • trees < 1/3 expected fully mature height • gaps make up <10% of total length and there are no canopy gaps >5 m 		<p>total length and there are no canopy gaps >5 m) but most trees immature (i.e. <1/3 expected fully mature height).</p>	<p>have a mixture of mature and immature trees. If most of the trees are immature, the line of trees deserves to be assigned Moderate Condition.</p>
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Woodland

General modifications

NEBM methodology	Change in CBM	Justification for change
The NEBM implicitly assigns plantation woodlands Poor Condition regardless of their age.	Plantation woodlands should be automatically assigned Poor Condition until at least some trees are semi-mature, at which point they can be assessed as if they were semi-natural woodland (though they are likely to fail many of the criteria).	This is fairer, as even plantation woodlands can develop high biodiversity value.
The NEBM includes wood-pasture/parkland in the woodland Condition assessment.	Wood-pasture/parkland is given its own Condition assessment.	Wood-pasture/parkland is sufficiently different from the structure of other woodlands to warrant its own Condition assessment, much like how orchards, which also incorporate grassland and woodland, are given their own assessment in the NEBM. Many of the Condition criteria applied to woodlands do not apply to wood-pasture/parkland.
Woodland is defined as having 'trees with a canopy greater than 20%'.	The definition of woodland follows UKHab: 'land with more than 25% cover of trees'.	The NEBM's definition is confusingly worded and does not appear to match the UKHab definition, which underpins habitat categorisation in the NEBM.
'Urban – Woodland' is included as a distinct habitat type with Medium Distinctiveness.	This habitat type is removed.	The NEBM fails to define the characteristics of this habitat type, and it does not directly correspond to a UKHab habitat. Woodland in urban areas should be assigned the woodland category it most closely matches rather than a catch-all 'Urban – Woodland'. Note that all 'woodland' with substantial areas of hardstanding between the trees are automatically assigned Poor Condition within the CBM.

Specific modifications to Standard criteria

Standard tier	Change in CBM	CBM criterion description	Justification for change
Basic	Added criterion	Contains at least 1 veteran or mature pollard of native tree species.	Ensures that isolated notable trees in woodland are valued.

Specific modifications to Condition criteria

NEBM criterion number or Condition tier	NEBM criterion description	Change in CBM	CBM criterion description	Justification for change
		Added criterion	The woodland has extensive soft boundaries with adjacent non-woody habitats, especially around its perimeter.	The presence of this feature is likely to increase biodiversity. (In the Biodiversity Map baseline layers, this criterion is referred to as criterion 13.) Note that the vast majority of woodland habitat parcels on the University estate have at least one interface with a non-woody habitat, which is why this criterion has been chosen. This criterion would not be applicable to woodland parcels entirely surrounded by another woodland parcel, for instance.
		Added criterion	There are extensive scalloped or otherwise topologically varied interfaces between the woodland and adjacent non-woody habitats.	The presence of these features is likely to increase biodiversity, especially due to the varied microclimates created. (In the Biodiversity Map baseline layers, this criterion is referred to as criterion 14.) Note that the vast majority of woodland habitat parcels on the University estate have at least one interface with a non-woody habitat, which is why this criterion has been chosen. This criterion would not be applicable to woodland parcels entirely surrounded by another

				woodland parcel, for instance.
1	This should be an area of trees with complete canopy cover.	Modified	The woodland is not overly dense or shaded.	The NEBM criterion is misleading; woodland should be allowed to have some canopy gaps to increase light levels, and this is likely to increase biodiversity (e.g. of the ground flora and associated invertebrates). Note that the CBM criterion requires some expert judgement: e.g. although Beech woodlands may be shadier than other woodlands, they are valuable in their own right. Note that grassland habitats associated with rides and glades within woodland should be surveyed separately to the woodland if they are considered sufficiently wide or extensive and distinct from the surrounding woodland. This requires expert judgement. Small isolated grassy clearings or very narrow rides within woodland should probably be included within the woodland habitat.
2	Native species are dominant. Non-native and invasive species account for less than 10% of the vegetation cover.	Modified	Non-native trees comprise <20% of the canopy.	The criteria for undesirable species in the NEBM woodland Condition assessment are confusing and contradictory. It is unclear whether this criterion is referring to woody or herbaceous plants, and if woody plants are implied, whether these are the main canopy-forming species or understorey species. The 10% threshold is not mentioned anywhere else in the assessment in requirements for the individual Condition tiers. However, canopy cover of non-native trees (with a 20% threshold) is

				mentioned in the Moderate Condition tier. Invasive non-native species are then taken into account by NEBM criterion 10, which becomes criterion 9 in the CBM.
4	Free from damage [Bark stripping; Browse line; Damage shoot tips] (in the last five years) from stock or wild mammals with less than 20% of vegetation being browsed.		<20% of the trees/shrubs are damaged by stock or wild animals in the last five years (check for bark-stripping, browse lines and damaged shoot tips).	Adds clarity. The NEBM criterion is implicitly only referring to trees and shrubs.
7	Wetland habitat if they exist [sic] within the wood has little sign of drainage or channel straightening.	Removed		Such wetland habitats should ideally be given their own separate Condition assessment and not be lumped with the woodland. This increases consistency across the methodology of the CBM.
12	More than 3 different native trees and 3 shrub species in an average 10 m radius.	Moved to Standard (Basic tier)		Adds detail to the habitat's Distinctiveness more than its Condition.
Good	Meets at least 10 of the criteria with only minor variation.	Modified	No criteria failed.	Note that due to what is presumably an error, the requirements regarding number of criteria failures in Good and Moderate are not mutually exclusive. The CBM modification removes ambiguity, makes the Condition assessment harsher and increases the incentive to improve woodland management.
Good	No more than 1 of the indicators of poor condition are present: [sic]	Removed		Already implicit in the CBM requirement 'no criteria failed'.
Good	Stands of native trees that do not obviously originate from planting should be classified as	Removed		This NEBM statement is somewhat unclear. The CBM aims to prevent habitat type from biasing the Condition score

	native semi-natural woodland.			assigned, thus minimising double-counting of biodiversity value and being fairer to lower-Distinctiveness habitats.
Fairly Good		Added requirement	Fails 1-2 criteria.	Helps to standardise the CBM Condition assessment across different habitat types and numerically discriminate between habitats of different Condition.
Moderate	Clearly fails at least 2 of the criteria above.	Modified	Fails 3-4 criteria (3 criteria if the woodland has no adjacent non-woody habitats).	Helps to standardise the CBM Condition assessment across different habitat types. Accounts for the fact that woodlands without adjacent non-woody habitats cannot meet CBM criteria 11 and 12, so have only 10 relevant criteria rather than 12. Although all the Condition tiers would ideally be the same 'size' in terms of the number of criterion failures, the approach taken here is the fairest and most symmetrical way to segregate the tiers when there are ten criteria.
Moderate	OR where non-native species comprise more than 20% of the canopy, the woodland should be recorded as either non-native plantation or mixed woodland. • A mixed woodland is woodland with native and non-native species. (This includes woodlands established by planting and by natural regeneration.) [sic]	Modified	Non-native trees comprise between 20% and 50% of the canopy (inclusive).	Habitat definitions are already provided elsewhere (e.g. in the UKHab documentation). Implicitly, if non-native trees are 'dominant' (assumed to mean at >50% canopy cover), then the woodland should be assigned Poor Condition (see below).
Fairly Poor		Added requirement	Fails 5-6 criteria (4-5 criteria if the woodland has no adjacent non-woody habitats).	Helps to standardise the CBM Condition assessment across different habitat types and numerically discriminate between habitats of different Condition. Accounts for the

				fact that woodlands without adjacent non-woody habitats cannot meet CBM criteria 11 and 12, so have only 10 relevant criteria rather than 12. Although all the Condition tiers would ideally be the same 'size' in terms of the number of criterion failures, the approach taken here is the fairest and most symmetrical way to segregate the tiers when there are ten criteria.
Poor		Added requirement	Fails 7 or more criteria.	Helps to standardise the CBM Condition assessment across different habitat types.
Poor		Added requirement	Hardstanding is present between most of the trees (this situation may arise in urban areas).	'Woodland' may be the most appropriate habitat for describing groups of trees in heavily urbanised environments, but the presence of hardstanding may significantly reduce their wildlife value.
Poor	<p>The following characteristics can help to identify plantations: (note: BAP woodlands can be plantation woodlands)</p> <ul style="list-style-type: none"> • Non-native trees often of a single species or the same age are the dominant component; • OR invasive non-native plants are greater than 20%. • Mixed species show a consistent planting pattern across the site. • Original planting lines, or remains of planting lines, can be seen. • Drainage features and channel straightening of watercourses. 	Split and modified	<p>Invasive non-native plants are greater than 20%.</p> <p>Non-native trees comprise >50% of the canopy.</p>	This entry in the NEBM Condition assessment is confusing. See discussion of plantation woodlands in General Modifications. The >50% canopy cover of non-native trees is implied in the NEBM. Wetland habitats should be given their own Condition assessment.

Wood-pasture/parkland

General modifications

NEBM methodology	Change in CBM	Justification for change
The NEBM includes wood-pasture/parkland in the woodland Condition assessment and the assessment does not include criteria for a grassland component.	Wood-pasture/parkland is given its own Condition assessment which includes grassland-focused criteria.	Wood-pasture/parkland is sufficiently different from the structure of other woodlands to warrant its own Condition assessment, much like how orchards, which also incorporate grassland and woodland, are given their own assessment in the NEBM. The definition of wood-pasture/parkland used in the CBM assumes there is a grazed grassland component. Moreover, some of the Condition criteria applied to woodlands do not apply to wood-pasture/parkland.
Wood-pasture/parkland is allowed to include areas 'where the land use has been converted to arable, forestry or amenity, but where ancient trees are still present' (following the UKHab approach), but the NEBM is not explicit about how the Condition of such examples should be assessed.	Wood-pasture/parkland converted to arable, forestry or amenity grassland is automatically in Poor Condition.	Treating such habitats as poor-quality wood-pasture/parkland rather than arable/plantation woodland with notable trees (e.g. veterans or mature pollards) may provide clearer encouragement to restore the wood-pasture/parkland.

Specific modifications to Standard criteria

Standard tier	Change in CBM	CBM criterion description	Justification for change
Basic	Added criterion	Contains at least 1 veteran or mature pollard of native tree species.	Ensures that isolated notable trees in wood-pasture/parkland are valued.

Specific modifications to Condition criteria

CBM woodland Condition criterion number or Condition tier	CBM woodland Condition criterion description	Change in CBM wood-pasture/parkland Condition assessment	CBM wood-pasture/parkland Condition criterion description	Justification for change
		Added criterion	Cover of bare ground <5%.	Increases consistency between the wood-pasture/parkland Condition assessment and that for orchards and grassland.
		Added criterion	There is considerable variation in grassland sward height, with some areas allowed to grow taller.	Increases consistency between the wood-pasture/parkland Condition assessment and that for orchards and grassland.
		Added criterion	Cover of Perennial Ryegrass is <25% of the ground-layer vegetation.	Increases consistency with the grassland CBM Condition assessment.
		Added criterion	Cover of Bracken is <20% of the ground-layer vegetation and cover of other woody/scrubby species not excessive between the main trees.	Increases consistency between the wood-pasture/parkland Condition assessment and that for orchards and grassland. Some scrub may be beneficial in the wood-pasture/parkland matrix, not least for providing protection to regenerating trees, but it should not become over-dominant and threaten any grassland interest. The threshold cover for scrub is currently not specific and requires the surveyor's expert judgement.
1	The woodland is not overly dense or shaded.	Removed		Not relevant to wood-pasture/parkland.

9	Cover of invasive non-native plants <5%.	Modified	Cover of undesirable herbaceous species <5%.	Increases consistency between the wood-pasture/parkland Condition assessment and that for orchards and grassland. See 'Components of the CBM' for the definition of undesirable species.
11	The woodland has an extended soft boundary for at least part of its perimeter length.	Removed		Not relevant to wood-pasture/parkland.
12	There are extensive scalloped or otherwise topologically varied interfaces between the woodland and adjacent non-woody habitats.	Removed		Not relevant to wood-pasture/parkland.
Moderate	Fails criterion 3.	Modified	Fails criterion 2.	New order of Condition criteria numbering.
Moderate	Fails criterion 6.	Split and modified	Fails criterion 5.	New order of Condition criteria numbering.
Poor		Added requirement	Grassy component converted to amenity grassland.	Equivalent to the placing of all 'Urban – Amenity grassland' habitats in Poor Condition in the NEBM/CBM grassland assessment.

Orchard

General modifications

NEBM methodology	Change in CBM	Justification for change
The NEBM implicitly assigns plantation woodlands Poor Condition regardless of their age.	Plantation woodlands should be automatically assigned Poor Condition until at least some trees are semi-mature, at which point they can be assessed as if they were semi-natural woodland (though they are likely to fail many of the criteria).	This is fairer, as even plantation woodlands can develop high biodiversity value.

Specific modifications to Standard criteria

Standard tier	Change in CBM	CBM criterion description	Justification for change
Basic	Added criterion	Contains at least 1 veteran of a native tree species.	Ensures that isolated notable trees in orchards are valued.

Specific modifications to Condition criteria

NEBM criterion number or Condition tier	NEBM criterion/requirement description	Change in CBM	CBM criterion description	Justification for change
		Added criterion	There is considerable variation in sward height, with some areas allowed to grow taller. For amenity grasslands, the sward should not be uniformly short, i.e. substantial areas are allowed to grow taller.	This criterion has also been added to the grassland Condition assessment. Having variation in sward height is likely to support greater biodiversity overall.
		Added criterion	Physical damage to the ground (e.g. excessive poaching, damage from machinery use or storage, or any other damaging management activities) is at <5% cover.	This criterion features in the grassland Condition assessment, so its inclusion here improves consistency. Note that the corresponding grassland criterion has itself been modified (see section on Grassland below).
		Added criterion	Cover of Perennial Ryegrass is <25% of the ground-layer vegetation.	Increases consistency with the grassland CBM Condition assessment.
1	There should be between 50 and 150 fruit or nut trees per hectare.	Moved to Standard		This criterion adds detail to the habitat's Distinctiveness more than its Condition.

2	There should be an absence of scrub growing between or up the trees.	Removed		Requirements for scrub cover are already covered in criterion 5. Criterion 2 could cause confusion as it suggests a harsher requirement for scrub cover than criterion 5. Criterion 5 is fairer.
4	The average height of the grass sward should be between 5 cm and 30 cm.	Modified	The average height of the grass sward in summer should be between 5 cm and 30 cm.	Improves clarity.
5	There should be less than 5% cover of bare ground, injurious weeds or scrub.	Split and modified	<p>Cover of bare ground <5%.</p> <p>Cover of undesirable herbaceous species is <5% of the ground-layer vegetation.</p> <p>Cover of Bracken is <20% and cover of other undesirable woody/scrubby species is <5% of the ground-layer vegetation.</p>	The NEBM criterion is ambiguous as to whether the 5% cover threshold refers to all issues together or individually. In the grassland Condition assessment, these issues are mostly treated as separate criteria rather than lumped under a single criterion, so the approach taken here improves consistency (see also the justifications for grouping issues in this way in the 'Components of the CBM' section of this document). Bracken is given a specific threshold in the grassland Condition assessment, so is included in the orchard assessment for consistency. Note that the bare ground criterion is stricter for orchards than the corresponding criterion for grassland. It is unknown why this is the case in the NEBM but the CBM conservatively retains this disparity.

Good	Meets the majority of the criteria with only minor variation.	Modified	No criteria failed.	Makes the Condition assessment harsher and less ambiguous, and increases incentive to improve orchard management.
Good	None of the indicators of poor condition are present.	Removed		Already implicit in the requirement 'no criteria failed'.
Fairly Good Good		Added requirement	1 criterion failed.	Helps to standardise the CBM Condition assessment across different habitat types and numerically discriminate between habitats of different Condition. Although all the Condition tiers would ideally be the same 'size' in terms of the number of criterion failures, the approach taken here is the fairest and most symmetrical way to segregate the tiers when there are eight criteria.
Moderate	A poorer quality Traditional Orchard, missing a number of defining features or Urban Orchard.			This NEBM requirement is vague. The CBM aims to prevent habitat type from biasing the Condition score assigned, thus minimising double-counting of biodiversity value and being fairer to lower-Distinctiveness habitats.
Moderate	Some of the Condition criteria are being failed.	Modified	Fails 2-3 criteria.	Removes ambiguity and makes the Condition assessment harsher and more consistent across habitat types, and increases incentive to improve orchard management. Although all the Condition tiers would

				ideally be the same 'size' in terms of the number of criterion failures, the approach taken here is the fairest and most symmetrical way to segregate the tiers when there are eight criteria.
Moderate	The Orchard type has minor differences between what is described in the relevant habitat classifications and what is visible on site.	Removed		Avoids penalising more unusual orchard types which are nonetheless valuable for biodiversity.
Moderate	Cover of undesirable species at 5% or above.	Split and modified	<p>Fails criterion 6.</p> <p>Fails criterion 7.</p> <p>Total cover of undesirable species (apart from Bracken) between 5% and 20% (inclusive).</p>	It is ambiguous what 'undesirable species' this NEBM requirement is referring to. Conservatively, it is assumed that both herbaceous and woody/scrubby undesirable species are being referred to. Note that the list of 'undesirable species' in the NEBM orchard Condition assessment is confusing as it implies these species need to be 'above 10% cover' to be counted, but this threshold is not mentioned anywhere else in the assessment.
Fairly Poor		Added requirement	Fails 4 criteria.	Helps to standardise the CBM Condition assessment across different habitat types and numerically discriminate between habitats of different Condition. Although all the Condition tiers would ideally be the same 'size' in terms of the number of criterion failures, the

				approach taken here is the fairest and most symmetrical way to segregate the tiers when there are eight criteria.
Poor	Poor Quality Urban Orchard with little biodiversity value.	Removed		This NEBM requirement is vague. The CBM aims to prevent habitat type from biasing the Condition score assigned, thus minimising double-counting of biodiversity value and being fairer to lower-Distinctiveness habitats.
Poor	Potentially restorable to higher biodiverse state with improved management.	Removed		This NEBM requirement is misleadingly vague. Arguably, the biodiversity value of any sort of orchard can be improved to some extent by improved management.
Poor	Most of the Condition criteria are being failed.	Modified	Fails 5 or more criteria.	Effectively no change, but reworded for consistency.
Poor	The Orchard type has major differences between what is described in the relevant habitat classifications and what is visible on site.	Removed		Avoids penalising more unusual orchard types which are nonetheless valuable for biodiversity.
Poor	Cover of undesirable species above 20%, usually resulting in a dense scrub or tree cover, or high cover of exotic and invasive species, lack of bare ground and lack of structural diversity.	Modified	Total cover of undesirable species >20%.	Adds clarity and avoids unnecessary complication. Note that 'lack of bare ground' is presumably a typo (bare ground should be treated as a negative feature here). Bare ground is given its own criterion in the CBM.

Scrub

General modifications

NEBM methodology	Change in CBM	Justification for change
<p>The NEBM is somewhat inconsistent regarding the Distinctiveness tier of the habitat 'Heathland & shrub – Hazel scrub'. In most of the NEBM documentation, the habitat is assigned Medium Distinctiveness, but on the scrub Condition assessment sheet, the habitat is implicitly High Distinctiveness.</p>	<p>For now, the CBM treats this habitat as Medium Distinctiveness.</p>	<p>Increases consistency.</p>
<p>The NEBM lists Juniper scrub as a High Distinctiveness type of scrub on the scrub Condition assessment but this habitat is not mentioned anywhere else in the NEBM documentation.</p>	<p>The CBM adds the UKHab habitat '22 Juniper on heaths or calcareous grasslands (H5130)', which is assigned High Distinctiveness and should be assessed using the scrub Condition assessment.</p>	<p>Allows this habitat type to be assessed more fairly.</p>
<p>The NEBM lists Box scrub as a High Distinctiveness type of scrub on the scrub Condition assessment but is unclear as to how its Condition should be assessed. It is mentioned elsewhere in the NEBM documentation under the 'Woodland and forest' group as '(H5110) Natural box scrub'.</p>	<p>This habitat type should be assessed using the scrub Condition assessment in the CBM.</p>	<p>Adds clarity.</p>
<p>The NEBM lists 'Scrub on calcareous soils with three or more of wayfaring-tree. • Wild privet, dogwood, buckthorn, hawthorn and spindle [sic]' as a High Distinctiveness type of scrub on the scrub Condition assessment but this habitat is not mentioned anywhere else in the NEBM documentation, nor in the UKHab documentation.</p>	<p>The CBM adds a CBM UKHab habitat type 'Heathland & shrub – Calcicole scrub' which corresponds to the habitat described in passing in the NEBM. The habitat is assigned High Distinctiveness and assessed using the scrub Condition assessment.</p>	
<p>The NEBM lists 'scrub on peat soils with two or more of alder buckthorn, eared willow, goat willow, grey willow, bay willow, purple willow and osier' as a High Distinctiveness type of scrub on the scrub Condition</p>	<p>The CBM adds a CBM UKHab habitat type 'Heathland & shrub – Lowland willow scrub on peat soils' which corresponds to the habitat described in passing in the NEBM. The habitat is assigned High Distinctiveness and</p>	<p>Adds clarity.</p>

assessment but this habitat is not mentioned anywhere else in the NEBM documentation, nor in the UKHab documentation.	assessed using the scrub Condition assessment.	
The NEBM lists ‘South facing bracken stands with violets, when associated with UK priority butterfly species; high brown fritillary, pearl-bordered fritillary and small pearl-bordered fritillary’ as a High Distinctiveness type of scrub on the scrub Condition assessment but this habitat is not mentioned anywhere else in the NEBM documentation, nor in the UKHab documentation.	The CBM adds a CBM UKHab habitat type ‘Grassland – South-facing Bracken stands with violets’ which corresponds to the habitat described in passing in the NEBM. The habitat is assigned High Distinctiveness and assessed using the scrub Condition assessment. In the CBM, this habitat does not need to be in association with the priority butterfly species mentioned in order to be assigned High Distinctiveness.	Adds clarity. The habitat is categorised under the ‘grassland’ group to be more consistent with the NEBM and UKHab, although it could arguably also be categorised under the ‘heathland & shrub’ group. This habitat could potentially be a site for re-introducing the priority butterfly species mentioned.

Specific modifications to Condition criteria

NEBM criterion number or Condition tier	NEBM criterion description	Change in CBM	CBM criterion description	Justification for change
1	Condition assessment criteria for Scrub Habitats.	Removed		This is apparently a typo in the NEBM.
2	There are at least three woody species, with no one species comprising more than 75% of the cover (except common juniper, sea buckthorn or box, which can be 100% cover).	Moved to Standard		This criterion adds detail to the habitat’s Distinctiveness more than its Condition.
6	There are many clearings and glades within the scrub.	Modified	There are extensive scalloped or otherwise topologically varied interfaces between the scrub and adjacent non-woody habitats, and/or larger scrub parcels have clearings within the scrub.	Smaller scrub parcels should not have to contain clearings as clearings might take up greater area than the scrub itself! However, larger scrub parcels would benefit biodiversity by having a variety of denser patches and sparser patches with clearings.

				Currently, the CBM sets no precise thresholds for what size of scrub this criterion should apply to, so subjective judgement is required. Nonetheless, the presence of scalloping or other topologically varied interfaces is a criterion that can be applied to scrub of all size, including small scrub areas (i.e. around the perimeter of the scrub area). The presence of these features is likely to increase biodiversity, especially due to the varied microclimates created. The effect is likely to be similar to a larger scrub parcel having clearings within it, hence the inclusion of both features within the same criterion.
Good	Meets all of the 5 criteria with only minor variation.	Modified	No criteria failed.	Makes the Condition assessment harsher and less ambiguous, and increases incentive to improve scrub management.
Good	Scrub type of high biodiversity value in good condition.	Removed		The CBM aims to prevent habitat type from biasing the Condition score assigned, thus minimising double-counting of biodiversity value and being fairer to lower-Distinctiveness habitats.
Good	None of the indicators of poor condition are present.	Removed		Already implicit in the requirement 'no criteria failed'.
Moderate		Added requirement	Fails 1-2 criteria.	Helps to standardise the CBM Condition

				assessment across different habitat types.
Moderate	The single woody species cover is greater than 75%.	Removed		The criterion the requirement refers to has been moved to Standard in the CBM.
Moderate	Scrub type of high biodiversity value in poor condition.			The CBM aims to prevent habitat type from biasing the Condition score assigned, thus minimising double-counting of biodiversity value and being fairer to lower-Distinctiveness habitats.
Moderate	The scrub type has minor differences between what is described in the relevant habitat classifications and what is visible on site.			Avoids penalising more unusual scrub types which are nonetheless valuable for biodiversity.
Moderate	Cover of undesirable and invasive species at 5-20%.	Modified; also added to general criteria list and modified	In the general criteria list: 'Cover of undesirable species < 5%.' For the Moderate Condition tier: 'Cover of undesirable species between 5% and 20% (inclusive).'	Adds clarity and consistency. See 'Components of the CBM' for the CBM's definition of undesirable species.
Poor	The single woody species cover is greater than 75%.	Removed		This requirement is apparently repeated in error from the Moderate Condition requirements. Moreover, the criterion it refers to has been moved to Standard in the CBM.
Poor	The age range is missing some size classes.	Removed		This requirement is apparently repeated in error from the Moderate Condition requirements.

Poor	Scrub type of high biodiversity value in poor condition.	Removed		This requirement is apparently repeated in error from the Moderate Condition requirements.
Poor	The scrub type has minor differences between what is described in the relevant habitat classifications and what is visible on site.	Removed		This requirement is apparently repeated in error from the Moderate Condition requirements.
Poor	Cover of undesirable and invasive species at 5-20%.	Removed		This requirement is apparently repeated in error from the Moderate Condition requirements.
Poor	Potentially restorable to improved scrub habitat with improved management.	Removed		This NEBM requirement is misleadingly vague. Arguably, the biodiversity value of any sort of scrub can be improved to some extent by improved management.
Poor	All of the condition criteria are being failed.	Modified	Fails 3 or more criteria.	Makes the Condition assessment harsher and increases the incentive to improve scrub management.
Poor	The scrub type has major differences between what is described in the relevant habitat classifications and what is visible on site.			Avoids penalising more unusual scrub types which are nonetheless valuable for biodiversity.
Poor	Cover of undesirable and invasive species above 20% [see below]. [sic]	Modified	Cover of undesirable species >20%.	Adds clarity and consistency. See 'Components of the CBM' for the CBM's definition of undesirable species.

Grassland

General modifications

NEBM methodology	Change in CBM	Justification for change
The NEBM automatically assigns any arable field margin habitat Poor Condition.	The CBM requires arable field margins to have their Condition assessed like any other type of grassland, unbiased by the habitat type.	The NEBM's approach is unfair, as some arable field margins (especially those associated with organic or other low-input agriculture) may be in good condition for wildlife and even support a high diversity of desirable herbaceous species (including threatened arable weeds). The CBM aims to prevent habitat type from biasing the Condition score assigned, thus minimising double-counting of biodiversity value and being fairer to lower-Distinctiveness habitats.

Specific modifications to Standard criteria

Standard tier	Change in CBM	CBM criterion description	Justification for change
Basic	Added criterion	Contains at least one isolated mature tree, where the habitat is not considered to fit under a wood-pasture/parkland category, and the trees do not negatively impact the Condition or Standard of the grassland.	Ensures that isolated notable trees in grassland are valued.

Specific modifications to Condition criteria

NEBM criterion number or Condition tier	NEBM criterion/requirement description	Change in CBM	CBM criterion description	Justification for change
		Added criterion	There is considerable variation in sward height, with some areas allowed to grow taller. For amenity grasslands, the sward should not be uniformly short, i.e. substantial areas are allowed to grow taller.	Having variation in sward height is likely to support greater biodiversity overall. This is referred to as criterion 7 in the Biodiversity Map baseline layers. Note that a similar criterion appears in the Coastal Condition assessment (criterion no. 3): 'Vegetation structure (sward height variation, zonation) is varied and not uniform.'

		Added criterion	Cover of Perennial Ryegrass <i>Lolium perenne</i> is less than 25%.	Perennial Ryegrass is effectively treated as a type of undesirable species, justifying its inclusion in the Condition criteria. If the parcel fails this criterion, it is automatically assigned Poor Condition, as implied in the corresponding NEBM Condition assessment. Note that although this criterion is included in the orchard and wood- pasture/parkland assessments, its failure does not automatically make the habitat in Poor Condition, as the grassland is not the only feature of the habitat.
1	The area is clearly and easily recognisable as a good example of this type of habitat and there is little difference between what is described in the relevant habitat classifications and what is visible on site.	Removed		Avoids penalising more unusual scrub types which are nonetheless valuable for biodiversity. The surveyor should their best judgement in assigning a habitat type which most closely fits the habitat present.
2	The appearance and composition of the vegetation on site should very closely match the characteristics for the specific Priority Habitat [i.e [sic] as described by either the Phase 1 Habitat Classification or the UK Habitat Classification], with species typical of the habitat representing a significant majority of the vegetation.	Removed		This is essentially a repeat of criterion 1.
3	Wildflowers, sedges and indicator species for the specific Priority grassland	Moved to Standard	Some indicator species for the specific Priority grassland habitat are	Adds detail to the habitat's Distinctiveness more

	habitat are very clearly and easily visible throughout the sward and occur at high densities in high frequency.	(Basic tier) and modified	at least frequent throughout the sward.	than its Condition. Reworded for clarity, removal of unnecessary verbiage, and consistency with other Standard criteria relating to grassland indicator species.
4	Undesirable species and physical damage is below 5% cover.	Split and modified	Cover of undesirable herbaceous species <5%. Physical damage (e.g. excessive poaching, damage from machinery use or storage, or any other inappropriate management activities) is at <5% cover.	The NEBM criterion is ambiguous as to whether the 5% cover threshold refers to undesirable species and physical damage together or individually. The CBM aims to make separate Condition criteria for issues which are considerably different in their nature, causes and solutions. The CBM clarifies that this NEBM criterion refers to undesirable herbaceous species in contrast to undesirable woody/scrubby species, which are dealt with in a separate criterion.
5	Cover of bare ground greater than 10% (including localised areas, for example, rabbit warrens).	Modified	Cover of bare ground <10% (including localised areas, e.g. rabbit warrens).	The NEBM criterion is apparently a typo: bare ground should be treated as a negative feature in this context.
6	Cover of bracken less than 20% and cover of scrub and bramble less than 5%.	Modified	Cover of Bracken <20% and cover of other woody/scrubby species <5%.	Reworded for consistency with how the CBM categorises different plant functional types (see 'Components of the CBM').
Good	Species-rich Grassland of all Priority Habitat Types. Of high to moderate quality.	Removed		The CBM aims to prevent habitat type from biasing the Condition score assigned, thus minimising double-counting of biodiversity value and being fairer to lower-

				Distinctiveness habitats. 'Of high to moderate quality' is also vaguely worded (it presumably refers to Distinctiveness).
Good	Wildflower and sedges above 30% excluding white clover <i>Trifolium repens</i> , creeping buttercup <i>Ranunculus repens</i> and injurious weeds.	Moved to Standard (Basic tier) and modified	Cover of desirable herbaceous forbs and sedges >30%.	Adds detail to the habitat's Distinctiveness more than its Condition. Wording clarified and simplified.
Good	Meets all the Condition criteria with only minor variation.	Modified	No criteria failed.	Makes the Condition assessment harsher and less ambiguous, and increases incentive to improve grassland management.
Good	None of the indicators of poor condition are present (4, 5 & 6).	Removed		Already implicit in the CBM requirement 'no criteria failed'.
Fairly Good		Added requirement	Fails 1 criterion.	Helps to standardise the CBM Condition assessment across different habitat types and numerically discriminate between habitats of different Condition.
Moderate	Semi-improved grassland occurs on a wide range of soils and may be derived from higher quality Priority Habitat grassland habitats in poor condition. Often as they deteriorate following nutrient inputs [sic]. Typical grasses include: cock's-foot, common bent, creeping bent, crested dog's-tail, false oat-grass, meadow fescue, meadow foxtail, red fescue, sweet vernal grass, Timothy, tufted hair-grass and Yorkshire-fog.	Removed		The CBM aims to prevent habitat type from biasing the Condition score assigned, thus minimising double-counting of biodiversity value and being fairer to lower-Distinctiveness habitats.

Moderate	Total cover of wildflowers and sedges less than 30%, excluding white clover, creeping buttercup and injurious weeds.	Removed		This is captured by Standard instead. If the situation is as described in the NEBM criterion, the habitat may be of Poor rather than Basic Standard.
Moderate	Rye-grass cover is less than 25% including amenity grasslands.	Removed		Corresponding criterion added to the general list (see above).
Moderate	Clearly fails at least 1 of the Condition criteria.	Modified	Fails 2 criteria.	Helps to standardise the CBM Condition assessment across different habitat types and numerically discriminate between habitats of different Condition.
Moderate	The grassland type has some differences between what is described in the relevant habitat classifications and what is visible on site. It is a Lower Quality Priority Habitat, but clearly recognisable as such.	Removed		Avoids penalising more unusual grassland types which are nonetheless valuable for biodiversity. The CBM aims to prevent habitat type from biasing the Condition score assigned, thus minimising double-counting of biodiversity value and being fairer to lower-Distinctiveness habitats.
Moderate	Potentially restorable to grassland Priority Habitat with improved management.	Removed		This NEBM requirement is misleadingly vague. Arguably, the biodiversity value of any sort of orchard can be improved to some extent by improved management.
Moderate	Cover of undesirable species at 5- 15% [sic].	Modified	Cover of all undesirable species between 5% and 15% (inclusive).	Reworded for clarity. The NEBM requirement suggests that the 'undesirable species' refer to the list at the bottom of the assessment sheet, which includes only

				native injurious weeds. Conservatively, the CBM extends the definition of 'undesirable species' to include all unwanted scrub, invasives, injurious weeds, etc. (see Components of the CBM).
Fairly Poor		Added requirement	Fails 3 criteria.	Helps to standardise the CBM Condition assessment across different habitat types and numerically discriminate between habitats of different Condition.
Poor	Agricultural grasslands is [sic] characterised by vegetation dominated by a few fast-growing grasses on fertile, neutral soils. It is frequently characterised by an abundance of rye-grass <i>Lolium</i> spp. (above 25% cover) and white clover <i>Trifolium repens</i> . These grasslands are typically either managed as pasture or mown regularly for silage production or in non-agricultural contexts for recreation and amenity purposes; they are often periodically re-sown and are maintained by fertiliser treatment and weed control. They may also be temporary and sown as part of the rotation of arable crops but they are only included in this broad habitat type if they are more than one year old.	Modified	Cropland - Temporary grass & clover leys.	Such habitats could equally be assessed like any other grassland, but they will almost certainly come out as Poor Condition anyway because they fail CBM criteria 4 and 5 (undesirable species probably at >15% cover). The CBM considers temporary grass & clover leys to be a type of grassland whatever its age.
Poor	Amenity and Road verge grasslands with similar species to description for agriculture grasslands.	Modified	Urban – Amenity grassland.	Adds clarity. Amenity grassland deserves to automatically be in Poor Condition

				because it will almost certainly fail criterion 5 and is in any case likely to receive a lot of disturbance from the public. Road verges have a greater variety of habitat types than amenity grassland and should be assessed without the assumption that they are likely to be in Poor Condition.
Poor	Most of the Condition criteria are being failed.		Fails 4 or more criteria.	Effectively no change, but reworded for clarity and consistency.
Poor	Cover of undesirable species above 15%, usually resulting in a dense scrub or tree cover, or high cover of exotic species.	Modified	Cover of all undesirable species >15%.	Reworded for clarity. The NEBM requirement confusingly suggests that the 'undesirable species' refer to only scrub, trees and exotic species (i.e. not native injurious herbaceous weeds). Conservatively, the CBM extends the definition of 'undesirable species' to include all unwanted scrub, invasives, injurious weeds, etc. (see Components of the CBM).

Cropland

Specific modifications to Standard criteria

LWS type	LWS selection criterion number	LWS selection criterion description	Modified CBM criterion description	Justification for change
CWS	1g(ii)	Pasture woodland and Parkland with	Contains a group of 5-19 veteran trees.	Made more lenient to accommodate the unnatural

		groups of 5-19 veteran trees when in association with other seminatural features such as grassland, hedgerows or woodlands.		surrounding habitat of arable crops. Although such a habitat would officially be below CWS standard, it is close enough to still be meaningfully included in the CWS Standard tier, especially if the veterans are known to support significant invertebrate interest.
CiWS	2.8	Groups of two or more veteran trees of native species and associated semi-natural habitat.	Contains a group of 2 or more veteran trees of native species.	Made more lenient to accommodate the unnatural surrounding habitat of arable crops. Although such a habitat would officially be below CiWS standard, it is close enough to still be meaningfully included in the CiWS Standard tier, especially if the veterans are known to support significant invertebrate interest. Note that official CiWS selection may be more lenient if there is high invertebrate interest, e.g. for mature pollards: 'Smaller groups of mature pollards will be considered under this criterion if they have known invertebrate interest which is insufficient to merit selection under the invertebrate criteria (Expert advice should be taken before a decision is made).'

Specific modifications to Condition criteria

Change in CBM	CBM criterion description	Justification for change
Added criterion	Farmed organically for at least one year.	Organic cropland typically supports higher biodiversity than more intensively farmed cropland. As a compromise between reflecting this higher biodiversity in the Condition score and avoiding substantial deviation from the NEBM's approach, cropland which meets this criterion can only reach Moderate Condition rather than Good. If it fails the criterion, it is in Poor Condition, which is the default assigned to all cropland other than traditional orchards in the NEBM.

Urban

General modifications

NEBM methodology	Change in CBM	Justification for change
The NEBM includes the habitat 'Urban – Artificial vegetated, unsealed surface' under the Urban Condition assessment.	This habitat type is altered to 'Urban – Artificial unvegetated, unsealed surface' and given a default Condition score of Very Poor (0).	'Urban – Artificial vegetated, unsealed surface' is apparently a typo and should include the description 'unvegetated' rather than 'vegetated', matching the UKHab habitat u1c. Because of the lack of vegetation and artificial nature, it is felt that the default Condition score assigned is appropriate.

Specific modifications to Standard criteria

Standard tier	Change in CBM	CBM criterion description	Justification for change
Basic	Added criterion	Sealed surfaces covered with green trellises (e.g. car parks).	Green trellises provide greater biodiversity value. They are effectively a form of green roof/wall but available NEBM UKHab habitats do not provide a sufficient fit.
Basic	Added criterion	Brownfield sites with at least one isolated mature tree, where the trees do not negatively impact the Condition or Standard of the brownfield site.	Such trees will probably increase the site's overall biodiversity.
Basic	Added criterion	Sealed surfaces with at least one isolated tree.	Trees likely improve the biodiversity value of sealed surface habitats (although the improvement may be small, especially if the tree is young).

Specific modifications to Condition criteria

NEBM criterion number or Condition tier	NEBM criterion description	Change in CBM	CBM criterion description	Justification for change
		Added criterion	There is substantial topographical variation.	Topographical variation is likely to create a greater variety of microclimates and thus increase biodiversity. There may be more scope to manually alter topography in urban

				habitats (e.g. brownfield) than other habitat types (e.g. chalk grassland).
2	The site contains some vegetation. This will comprise of [sic] early successional communities consisting mainly of stress-tolerant species (e.g. indicative of low nutrient status or drought). Early successional communities are composed of (a) annuals, or (b) mosses/liverworts, or (c) lichens, or (d) ruderals, or (e) inundation species, or (f) open grassland, or (g) flower-rich grassland, or (h) heathland.	Modified	The site contains a reasonable amount of desirable early-successional communities consisting mainly of stress-tolerant species (e.g. indicative of low nutrient status or drought). Early-successional communities may be composed of (a) annuals, (b) mosses/liverworts, (c) lichens, (d) ruderals, (e) inundation species, (f) open grassland, (g) flower-rich grassland or (h) heathland.	Reworded for clarity, to avoid unnecessary verbiage, and to make the criterion more ecologically meaningful. 'A reasonable amount' is still a vague quantity but hopefully less vague than 'some'; i.e. there should be an ecologically meaningful amount of early-successional vegetation. 'Some' has the potential to be interpreted as a quantity which is too small to be ecologically meaningful.
3	The site contains unvegetated, loose bare substrate and pools may be present and desirable.	Split and modified	<p>The site contains unvegetated, loose bare substrate.</p> <p>The site contains relatively unpolluted pools.</p>	Bare ground is an important component of brownfield sites. There is a hint in NEBM criterion 4 that bare substrate and pools may be 'either/or' options for brownfield sites, but criterion 3 suggests both features need to be present to meet the criterion. To avoid confusion, bare substrate and pools are given their own criteria. The CBM aims to make separate Condition criteria for features which are considerably different in their nature, causes and associated management. Note that bare substrate and pools are included in the Condition rather than the Standard assessment because they may be relatively impermanent features

				of the habitat that can also be recreated relatively easily by site managers. 'Desirable' pools are assumed to mean those that are relatively unpolluted (pollution is likely to be an important issue in brownfield sites, though note that some pollution, e.g. heavy metals, can create desirable habitats on dry land).
Good	Vegetation provides multiple opportunities for a high number of species to live and breed (complete their life cycles).	Removed		This is an odd and vague criterion. Botanists carrying out the CBM assessment should not necessarily be expected to survey non-plant species as well. Other physical/vegetational features covered by the Condition assessment should act as reasonable proxies for this criterion: the purpose of the CBM is to act as a proxy for wider biodiversity.
Good	Bare open ground is common throughout the area.	Removed		Already implicit if the habitat meets the criterion referring to 'unvegetated, loose bare substrate' (number 3 in the CBM assessment). This NEBM requirement could also be misleading, as at least some vegetation is desirable.
Good	Plant species are flowering extensively and so providing ready nectar sources for insects.	Removed		This criterion will depend on the time of year and most flowering plant species can be assumed to flower anyway in a given year.

Good	Insects and butterflies are common and using the site extensively.	Removed		This is a vague and oddly worded criterion (note that insects and butterflies are not mutually exclusive). Botanists carrying out the CBM assessment should not necessarily be expected to survey invertebrates as well. Physical/vegetational features of urban sites should provide reasonable proxies for invertebrate presence: the purpose of the CBM is to act as a proxy for wider biodiversity.
Good	None of the indicators of poor condition are present.	Modified	No criteria failed.	Reworded for clarity and consistency.
Good	The invasive none-native species are low or absent from the site, or in the process of being eradicated if beneficial to wildlife to do so.	Moved to general criteria list and modified	Cover of undesirable species <10%.	Reworded and resituated in the general criteria list to improve consistency.
Fairly Good		Added requirement	Fails 1 criterion.	Helps to standardise the CBM Condition assessment across different habitat types and numerically discriminate between habitats of different Condition.
Moderate	Some of the Condition criteria are being failed.	Modified	Fails 2 criteria.	Reduces ambiguity, and helps to standardise the CBM Condition assessment across different habitat types and numerically discriminate between habitats of different Condition.
Moderate	Cover of undesirable and invasive species at 10-20%.	Modified	Undesirable species cover between 10% and 20% (inclusive).	Reworded for clarity and consistency. See 'Components of the CBM' for the definition of undesirable species.

Moderate	The areas of bare ground with little species colonisation are large, with a high potential for improvement with better wildlife management.	Removed		This requirement is confusing and possibly misleading. 'Large' is a vague term and could even be deemed equivalent to the Good tier requirement, 'Bare open ground is common throughout the area.' Some bare substrate is valuable. The criteria in the general list have been reworded to avoid the need for this type of requirement in the individual Condition tiers.
Fairly Poor		Added requirement	Fails 3 criteria.	Helps to standardise the CBM Condition assessment across different habitat types and numerically discriminate between habitats of different Condition.
Poor	Most of the Condition criteria are being failed.	Modified	Fails 4 or more criteria.	Effectively no change, but reworded for clarity and consistency.
Poor	Cover of undesirable species high above 20%.	Modified	Undesirable species cover >20%.	Reworded for clarity and consistency.

Rock

General modifications

NEBM methodology	Change in CBM	Justification for change
The corresponding NEBM Condition assessment refers to 'sparsely vegetated and rock habitat type'.	The corresponding CBM assessment refers only to 'rock'.	The NEBM's approach is confusing because although it suggests that the assessment can be used for ruderal habitats, it only provides Condition criteria for limestone pavement and 'rock outcrops and scree'. The NEBM itself suggests using the urban or grassland Condition assessment for most ruderal habitats.
The NEBM describes the NEBM UKHab habitat 'Sparsely vegetated land – Other inland rock and scree' as follows: 'All	The CBM allows this habitat type to contain a little cover of	The NEBM's description of the habitat is somewhat vague (especially 'devoid of any significant vegetation of note'). In the CBM, if a rocky habitat is felt to sufficiently replicate 'Sparsely vegetated land – Inland rock outcrop & scree habitats', even though it is man-made, then it should be

<p>other rock habitat which does not meet the Priority Habitat description or location and is devoid of any significant vegetation of note. May well be artificially created by human activities and have the possibility of creating an artificial habitat that replicates the above with management'. intervention or if left to natural processes.'</p>	<p>desirable vascular plants.</p>	<p>assigned this habitat type. Such habitats may have significant lichen and bryophyte value (e.g. imported boulders in the Cambridge University Botanic Garden). Otherwise, the habitat should be assigned 'Sparsely vegetated land – Other inland rock and scree', even if it contains some vegetation (e.g. ruderal). The NEBM suggests using the urban or grassland Condition assessment for most ruderal habitats. However, these assessments have considerably different thresholds to the rock assessment (e.g. for undesirable species cover). The CBM considers it fairest to assess ruderal habitats on bare rock using the rock assessment and using the appropriate rocky outcrop/scree habitat type rather than 'Sparsely vegetated land – Ruderal'. In effect, the latter habitat type is restricted to ruderal vegetation on soil or other non-rock substrate (unless it can be incorporated into 'Urban – Open mosaic habitat on previously developed land').</p> <p>Note also that the NEBM is not absolutely clear as to whether its Condition criteria for 'Rock Outcrops and Scree' can be used for all habitats of this nature or only the Priority Habitat.</p>
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Specific modifications to Condition criteria

NEBM criterion number or Condition tier	NEBM criterion description	Change in CBM	CBM criterion description	Justification for change
1	Cover of bracken, scrub and trees less than 25%.	Modified	Cover of Bracken, scrub and trees together <25%.	Reworded for clarity. It is assumed that the 25% threshold refers to all of these 'scrubby' plants together.
2	Cover of weed (for example, creeping and spear thistles, docks, brambles, common ragwort and common nettle) or non-native species less than 1%.	Modified	Cover of injurious weeds or non-native species together <1%.	Reworded for clarity. Lists of injurious weeds are already provided elsewhere in the CBM. It is assumed that the 1% threshold refers to both 'weed' and 'non-native species' together.
3	Less than 50% of live leaves (broad-leaved plants), fronds (ferns) or shoots (dwarf shrubs)	Modified	<50% of live leaves (broad-leaved plants), fronds (ferns) or shoots (dwarf shrubs) show signs of grazing	Reworded for clarity. It is assumed that grazing/browsing by mammals such as deer is undesirable (grazing

	show signs of grazing or browsing.		or browsing by mammals.	by invertebrates is not necessarily a bad sign).
Good	Meets the majority of the criteria with only minor variation for the habitat.	Modified	No criteria failed.	Makes the Condition assessment harsher and less ambiguous, and increases incentive to improve management.
Good	None of the indicators of poor condition are present: [sic]	Removed		Already implicit in the CBM requirement 'no criteria failed'.
Good	Cover of undesirable species below 5%.	Removed		Refers to the limestone pavement assessment, which is not dealt with in the CBM.
Good	Species rich with good example of habitat matching description.	Removed		The CBM aims to prevent habitat type from biasing the Condition score assigned, thus minimising double-counting of biodiversity value and being fairer to lower-Distinctiveness habitats and more unusual habitats which do not fit conventional habitat descriptions but are nonetheless valuable for biodiversity.
Moderate	Some of the condition criteria are being failed.	Modified	Fails 1 criterion.	Reduces ambiguity and increases consistency across habitat types.
Moderate	The rock habitat type has minor differences between what is described in the relevant habitat classifications and what is visible on site.	Removed		Avoids penalising more unusual habitat types which are nonetheless valuable for biodiversity.
Moderate	Has been created through human activity and natural processes over considerable time, but is an important wildlife and habitat	Removed		This is a vague and oddly worded requirement. It is likely to add confusion more than clarity.

	resource in its present form.			
Moderate	Cover of undesirable species at 5-10%.	Removed		Refers to the limestone pavement assessment, which is not dealt with in the CBM.
Moderate	Ruderal Habitat with High biodiversity value.	Removed		The CBM aims to prevent habitat type from biasing the Condition score assigned, thus minimising double-counting of biodiversity value and being fairer to lower-Distinctiveness habitats.
Poor	Ruderal Habitat with low biodiversity value.	Removed		The CBM aims to prevent habitat type from biasing the Condition score assigned, thus minimising double-counting of biodiversity value and being fairer to lower-Distinctiveness habitats.
Poor	Relict of any of the habitat that can be restored.	Removed		This NEBM requirement is misleadingly vague. Arguably, the biodiversity value of any sort of sparsely vegetated/rock habitat can be improved to some extent by improved management.
Poor	Potentially restorable to a good condition with improved management.			Effectively a repeat of the requirement above. This NEBM requirement is misleadingly vague. Arguably, the biodiversity value of any sort of sparsely vegetated/rock habitat can be improved to some extent by

				improved management.
Poor	Most of the condition criteria are being failed.	Modified	Fails 2 or more criteria.	Effectively no change, but reworded for clarity and consistency.
Poor	The habitat type has major differences between what is described in the relevant habitat classifications and what is visible on site, but is still fitting the vegetation components of the habitat type.	Removed		Avoids penalising more unusual habitat types which are nonetheless valuable for biodiversity.
Poor	Habitat is now severely degraded, or is created by accident but through human activity, with intervention and natural processes will develop the key characteristics of the habitat.	Removed		This NEBM requirement is confusingly worded (not helped by poor grammar) and vague. It is likely to add confusion more than clarity. Failures of other Condition criteria should capture the degradation described in this requirement.
Poor	Cover of undesirable species above 20%, usually resulting in a dense scrub or tree cover, or high cover of exotic species, lack of bare ground and lack of structural diversity.	Removed		It is unclear where the 20% threshold has come from. It is possibly referring to total undesirable species cover for the limestone pavement assessment, but this is not obvious. Failures of the undesirable species criteria already listed in the assessment should sufficiently segregate habitats into their Condition tiers.

Wetland

General modifications

NEBM methodology	Change in CBM	Justification for change
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The habitat type 'Wetlands - Other swamps' is always recorded as fen habitat in Poor Condition.	'Wetland – Other swamps' has its Condition assessed like any other wetland habitat.	The CBM aims to prevent habitat type from biasing the Condition score assigned, thus minimising double-counting of biodiversity value and being fairer to lower-Distinctiveness habitats. Note that the CBM renames the habitat type to 'Wetland – Other swamps' rather than 'Wetlands – Other swamps'. The NEBM name is presumably a typo.
'Wetlands – Other swamps' is missing a Distinctiveness tier.	'Wetland – Other swamps' is assigned Medium Distinctiveness.	Medium Distinctiveness is thought to be a fair tier for this habitat.

Specific modifications to Condition criteria

NEBM criterion number or Condition tier	NEBM criterion description	Change in CBM	CBM criterion description	Justification for change
		Added criterion	Water quality is good, with no significant evidence of pollution.	This would be an obvious criterion to have in a Condition assessment for wetland. There is a similar criterion for ditches in the NEBM, for instance. Water quality is admittedly mentioned in the requirements for the individual Condition tiers in the NEBM wetland assessment, but adding it as a criterion in the general list adds clarity and consistency across habitat types.
3	Cover of undesirable species (common nettle, docks, creeping/spear thistles, common ragwort and Indian (Himalayan) balsam) should be less than 10%.	Modified	Cover of undesirable herbaceous species <10%.	Reworded for clarity and simplicity, and to avoid being misleading. It is assumed that the NEBM criterion is referring only to undesirable herbaceous species. The NEBM list provided could be misleading as there are many other

				undesirable herbaceous species, e.g. non-native invasives, which do not appear on this list.
7	On bogs sphagnum moss cover should be between 40% - 100%. Heathers and cottongrasses should be at least frequent. Cover of dwarf shrubs between 20% and 75% (except when bogmosses (<i>Sphagnum</i>) or other wetland indicators are dominant), with at least two dwarf shrub species frequent.	Moved to Standard, split and modified	<p>Bogs with bog-moss (<i>Sphagnum</i>) cover between 40% and 100% (inclusive), and with heathers and cottongrasses (combined) at least frequent.</p> <p>Bogs with dwarf shrub cover between 20% and 75% (inclusive) except when bog-mosses (<i>Sphagnum</i>) or other wetland indicators are dominant, and with at least 2 dwarf shrub species.</p>	Adds detail to the habitat's Distinctiveness more than its Condition. Reworded for clarity. It is assumed that heathers and cottongrasses <i>combined</i> should be at least frequent rather than both heathers and cottongrasses individually, although this is not altogether clear from the NEBM's wording.
8	Flowering cottongrass plants frequent in spring (where present), or flowering heather plants at least frequent in autumn (where present).	Removed		It is assumed that most cottongrass and heather will flower where they are present, so the information in NEBM criterion 7 is already sufficient.
9	Reedbed vegetation should include at least 60% Common Reeds.	Moved to Standard		Adds detail to the habitat's Distinctiveness more than its Condition.
Good	Meets all the criteria for habitat with only minor variation.	Modified	No criteria failed.	Makes the Condition assessment harsher and less ambiguous, and increases incentive to improve bog management.
Good	None of the indicators of poor condition are present.	Removed		Already implicit in the requirement 'no criteria failed'.
Good	Hydrology very close to ideal.	Removed		Already implicit in the requirement 'no criteria failed'.

Good	Water quality good or impacts very localised.	Removed		Already implicit in the requirement 'no criteria failed'.
Fairly Good		Added requirement	Fails 1 criterion.	Helps to standardise the CBM Condition assessment across different habitat types and numerically discriminate between habitats of different Condition.
Moderate	Clearly fails at least 1 of the criteria for the habitat above.	Modified	Fails 2 criteria.	Helps to standardise the CBM Condition assessment across different habitat types and numerically discriminate between habitats of different Condition.
Moderate	Moderate water quality enriching the site.	Modified	Water quality moderate.	'Enriching the site' is a vague and possibly misleading phrase, though it presumably refers to eutrophication. Pollution could potentially take forms other than eutrophication.
Fairly Poor		Added requirement	Fails 3 criteria.	Helps to standardise the CBM Condition assessment across different habitat types and numerically discriminate between habitats of different Condition.
Poor		Added requirement	Fails 4 or more criteria.	Makes the CBM Condition assessment more consistent across habitat types.
Poor	High soft rush cover may indicate a previous drained peat lens. Any peat soil indicates a previous degraded wetland habitat of some type. As such if peat soil is present, irrespective of	Combined and modified	There is clear evidence that the wetland was previously degraded, e.g. in the peat soil or high cover of Soft Rush (which may indicate a previously drained peat lens).	Both of these NEBM criteria appear to be referring to previously degraded wetland and obvious field evidence of it, so the CBM combines them to improve efficiency. Unnecessary

	its current land-use, it should be considered a poor quality wetland.			explanation is removed to reduce verbiage.
Poor	Very dry for much of the time.	Modified	The site is very dry for much of the year.	Wording altered for clarity.
Poor	Very poor water quality present.	Modified	Water quality poor.	Makes the Condition assessment harsher and increases incentive to improve wetland management. Note that definitions of water quality in the CBM (as in the NEBM) currently require subjective judgement.

Ditch

General modifications

NEBM methodology	Change in CBM	Justification for change
Ditches are implicitly treated as area-based habitats.	Ditches are treated as linear habitats.	It is hard to understand why the NEBM would not value ditches as linear habitats in the same way that streams are, for instance. The NEBM justifies treating hedgerows, lines of trees and running watercourses as linear habitats because an area-based approach would under-value them. Ditches are therefore surely also under-valued in the NEBM.

Specific modifications to Condition criteria

NEBM criterion number or Condition tier	NEBM criterion/requirement description	Change in CBM	CBM criterion description	Justification for change
		Added criterion	Physical damage (e.g. from excessive poaching, damage from machinery use, litter, or any other inappropriate management), including from use of	Increases consistency across habitat types. Other habitat types have criteria relating to physical damage. Such damage (especially poaching by cattle etc.) is relevant to ditches. This criterion is

			the riparian land, is at <5% cover.	combined with NEBM criterion 5, which apparently deals with similar issues (though is somewhat vague).
2	Clear water should be dominated by plants, be they submerged or floating (note dominance of duckweed is a sign of eutrophication).	Modified	Clear water should be dominated by desirable plants, be they submerged or floating (note dominance of duckweed is a sign of eutrophication).	Reworded for clarity.
3	A range of submerged and floating leaved plants should be present. As a guide more than 10 species of emergent, floating or submerged species in a 20 m ditch length or 7 species of submerged or floating species in 150 m canal length.	Moved to Standard (Above CWS tier) and modified	There are more than 10 species of emergent, floating or submerged plants (altogether) in an average 20 m ditch length.	Adds detail to the habitat's Distinctiveness more than its Condition. Reworded for clarity. Canals are apparently assessed as a type of river in the NEBM rather than a ditch, so their mention in this criterion is confusing.
6	If a fish assemblage is present it should comprise of [sic] a range of native species and the assemblage should not reach an excessive biomass or be overly dominated by benthivorous or zooplanktivorous fish.	Removed		Although this criterion does provide more information about the biodiversity value of the ditch, CBM surveyors are expected to be botanists and not have the expertise to carry out a fish survey.
7	Sufficient water levels should be maintained; as a guide a minimum summer depth of approximately 50 cm in minor ditches and 1 m in main drains and linear waterbodies should be maintained.	Modified	Sufficient water levels are maintained; as a rough guide, a minimum summer depth of 50 cm in minor ditches and 1 m in main drains should be maintained.	Reworded for clarity. It is unclear how 'linear waterbodies' are different from minor ditches and main drains.
8	Less than 10% of the ditch or linear waterbody should be heavily shaded.	Modified	<10% of the ditch length is heavily shaded.	Reworded for clarity. It is unclear how 'linear waterbodies' are different from minor ditches and main drains.

Good	Water bodies of high to moderate quality.	Removed		This requirement is vague. It is unclear how 'high to moderate quality' is measured. The requirement is unnecessary and adds confusion rather than clarity.
Good	Meets the majority of the criteria with only minor variation.	Modified	No criteria failed.	Makes the Condition assessment harsher and less ambiguous, and increases incentive to improve ditch management.
Good	Few of the indicators of poor condition are present.	Removed		Redundant given the requirement 'no criteria failed'.
Fairly Good Good		Added requirement	Fails 1 criterion.	Helps to standardise the CBM Condition assessment across different habitat types and numerically discriminate between habitats of different Condition. Although all the Condition tiers would ideally be the same 'size' in terms of the number of criterion failures, the approach taken here is the fairest and most symmetrical way to segregate the tiers when there are eight criteria.
Moderate	Waterbodies in moderate health.	Removed		This requirement is vague. It is unclear how 'moderate health' is measured. The requirement is unnecessary and adds confusion rather than clarity.
Moderate	Fails 2 or more of the criteria above.	Modified	Fails 2-3 criteria.	Helps to standardise the CBM Condition assessment across different habitat types and numerically discriminate between habitats of different

				Condition. Although all the Condition tiers would ideally be the same 'size' in terms of the number of criterion failures, the approach taken here is the fairest and most symmetrical way to segregate the tiers when there are eight criteria.
Moderate	Where non-native species comprise more than 10% of the vegetation.	Modified	Non-native (but non-invasive) plants comprise >10% of the vegetation.	It is unclear precisely what types of undesirable plants the NEBM requirement is referring to and how it is supposed to correspond to NEBM criterion 9. Invasives could be non-natives, but if they are present, the ditch would automatically be in Poor Condition. For this requirement to be meaningful, it would have to refer to non-native but non-invasive plants.
Moderate	Filamentous algae and or duckweed cover more than 10% of the water body.	Modified	Fails criterion 8.	Reworded for clarity and to reduce unnecessary verbiage.
Moderate	Insufficient water levels.	Modified	Water level insufficient but ditch does not dry out entirely.	To be meaningful given the requirement 'water body dries out' in the Poor Condition tier, the Moderate tier requirement must refer to insufficient water levels but without the ditch drying out.
Moderate	Limited plant species present (submerged species are often the first to be lost).	Modified	Limited desirable plant species present (submerged species are often the first to be lost).	Reworded for clarity.

Moderate	Intensive land use directly adjacent to the water body.	Removed		Remove criterion from Moderate and Poor Condition tiers: 'Intensive land use directly adjacent to the water body.' A ditch should allowed to be Good Condition despite its surroundings, and it may be in some cases. Water quality or Standard may indicate negative impacts of adjacent intensive land use. The surrounding land use will be taken into account to some extent by Connectivity.
Fairly Poor		Added requirement	Fails 4 criteria.	Helps to standardise the CBM Condition assessment across different habitat types and numerically discriminate between habitats of different Condition. Although all the Condition tiers would ideally be the same 'size' in terms of the number of criterion failures, the approach taken here is the fairest and most symmetrical way to segregate the tiers when there are eight criteria.
Poor	Fails 5 or more of the criteria.	Modified		Makes the CBM Condition assessment more consistent across habitat types.
Poor	No or very limited submerged plants present.	Modified	No or very limited desirable submerged plants present.	Reworded for clarity.
Poor	Intensive land use directly adjacent to the water body.	Removed		Apparently a typo (it repeats the same requirement in the Moderate tier).

Pond

Specific modifications to Condition criteria

NEBM criterion number or Condition tier	NEBM criterion/requirement description	Change in CBM	CBM criterion description	Justification for change
		Added criterion	Physical damage (e.g. from excessive poaching, damage from machinery use, litter, or any other inappropriate management) is at <5% cover.	Increases consistency across habitat types. Other habitat types have criteria relating to physical damage, which is also arguably relevant to ponds.
3	Non-woodland ponds should be dominated by plants, be they submerged or floating (note dominance of duckweed is a sign of eutrophication).	Modified	Non-woodland ponds are dominated by desirable plants, be they submerged or floating (note that dominance of duckweed is a sign of eutrophication).	Reworded for clarity.
5	Many ponds will be fishless, those which naturally contain fish should not be stocked and should contain a native fish assemblage.	Modified	Ponds which naturally contain fish are not artificially stocked.	Reworded to reduce unnecessary verbiage. Information on whether a pond has been stocked or not is hopefully easy to obtain. CBM surveyors are not expected to be able to carry out a fish survey, so for most natural (especially larger) ponds, it should probably be assumed that a native fish assemblage is present.
Good	Meets the majority of the criteria with only minor variation.	Modified	No criteria failed.	Makes the Condition assessment harsher and less ambiguous, and increases incentive to improve pond management.

Good	Few of the indicators of poor condition are present.	Removed		Redundant given the requirement 'no criteria failed'.
Fairly Good		Added requirement	Fails 1 criterion.	Helps to standardise the CBM Condition assessment across different habitat types and numerically discriminate between habitats of different Condition. Although all the Condition tiers would ideally be the same 'size' in terms of the number of criterion failures, the approach taken here is the fairest and most symmetrical way to segregate the tiers when there are nine criteria.
Moderate	Fails a number of the criteria above.	Modified	Fails 2-3 criteria.	Helps to standardise the CBM Condition assessment across different habitat types and numerically discriminate between habitats of different Condition. Although all the Condition tiers would ideally be the same 'size' in terms of the number of criterion failures, the approach taken here is the fairest and most symmetrical way to segregate the tiers when there are nine criteria.
Moderate	Where non-native species comprise more than 10% of the vegetation.	Modified	Non-native species comprise between 10% and 50% (non-inclusive) of the vegetation.	The aim is for this requirement to correspond better with the requirement relating to non-native species in the Poor Condition tier, 'extensive non-native species'. Without defining some thresholds, the Moderate and Poor requirements are not mutually exclusive. 'Extensive' is effectively taken to mean 'cover of 50% or more', which is a reasonable threshold.
Moderate	There is insufficient extent of semi natural [sic] riparian land.	Modified	Fails criterion 4, but there is still some semi-natural riparian land present.	Reworded for clarity. Corresponds better to the requirement relating to semi-natural riparian land in the Poor Condition tier.
Moderate	Fish have been stocked at a low density, but they	Modified	Fish have been stocked at a low	Reworded for clarity.

	are native species and there is sufficient aquatic plants and habitat heterogeneity to reduce the effects of predation.		density in a pond naturally containing fish, but they are native species and there is sufficient aquatic vegetation and habitat heterogeneity to reduce the effects of predation.	
Moderate	Moderate shading of non-woodland ponds.	Modified	Fails criterion 6 but pond is not completely shaded.	Reworded for clarity and better correspondence with the Poor Condition tier requirement relating to shading.
Moderate	Submerged and floating plants are limited but still presence [sic].	Modified	Non-woodland ponds with limited presence of desirable submerged and floating plants.	Reworded for clarity.
Fairly Poor		Added requirement	Fails 4 criteria.	Helps to standardise the CBM Condition assessment across different habitat types and numerically discriminate between habitats of different Condition. Although all the Condition tiers would ideally be the same 'size' in terms of the number of criterion failures, the approach taken here is the fairest and most symmetrical way to segregate the tiers when there are nine criteria.
Poor	Ponds in poor health.	Removed		Vague and unnecessary. Other criteria define the reasons for a pond being in poor health.
Poor	Fails the majority of criteria.	Modified	Fails ... or more criteria.	Makes the CBM Condition assessment more consistent across habitat types.
Poor	Extensive filamentous algae or duckweed.	Modified	Fails criterion 9.	Reworded for clarity. Since there is no requirement relating to filamentous algae or duckweed in the Moderate

				Condition tier, it is implicit that this Poor Condition tier requirement refers to criterion 9 being failed, i.e. 'extensive' equates to $\geq 10\%$ cover.
Poor	Extensive non-native species.	Modified	Non-native species cover $> 50\%$.	See comments on the corresponding requirement in the Moderate Condition tier.
Poor	Absence of submerged and floating plants (unless naturally a shaded woodland pond).	Modified	Non-woodland ponds with an absence of desirable submerged and floating plants.	Reworded for clarity.

Lake

Specific modifications to Condition criteria

NEBM criterion number or Condition tier	NEBM criterion/requirement description	Change in CBM	CBM criterion description	Justification for change
6	A range of submerged and floating leaved plants is present.	Moved to Standard (Basic tier) and modified	A range of desirable submerged and floating-leaved plants is present.	Adds detail to the lake's Distinctiveness more than its Condition.

Appendix VIII: Example CBM calculations and comparison with the NEBM

1 Hedgerow example

OBJECTID	15
Length (km)	0.34
Target length (km)	0.34
Umbrella site	Madingley Estate

Site	Park Farm
Date assessed	06/12/2019
CBM UKHab habitat	Native hedgerow - Associated with bank or ditch
CBM UKHab habitat Certainty	Very High
Target CBM UKHab habitat	Native hedgerow - Associated with bank or ditch
Distinctiveness tier	Medium
Distinctiveness score	4
Target Distinctiveness score	4
Highest Standard tier	CiWS
Standard score	0.2
Standard Certainty	High
Standard criteria met	CiWS: 1
Target highest Standard tier	CiWS
Target Standard score	0.2
Target Standard criteria met	CiWS: 1
Condition tier	Fairly Good
Condition score	2.5
Condition Certainty	Very High
Reasons for Condition	Failed criterion 4 (two >5 m canopy gaps)
Target Condition change	Increase
Target Condition score	3
Connectivity tier	Unknown
Connectivity score	Unknown
Target Connectivity score	N/A
Strategic Significance tier	Low
Strategic Significance score	1
Target Strategic Significance score	1
CBM	3.62
Targeted in original BAP?	Yes

Target CBM set?	Yes
Target CBM	4.34
Target absolute CBM increase	0.72
Target % CBM increase	20
Year when CBM target detectable	2030
Management required to reach BAP target	<ul style="list-style-type: none"> - Plant up canopy gaps - Allow at least part of the hedgerow or surrounding hedgerow network to flower and fruit every year
Next survey year	2030
Notes	Associated with ditch. Trees include Pedunculate Oak, elm and Ash.
Features of interest	Two mature Pedunculate Oaks. Some Ash trees with part-dead trunks.
No. of woody species	6

2 Grassland example

OBJECTID	20
Area (ha)	1.40
Target area (ha)	1.40
Umbrella site	Lord's Bridge
Site	Lord's Bridge Observatory
Designation(s)	CWS
Date assessed	19/07/2012
CBM UKHab habitat	Grassland - Lowland meadows
CBM UKHab habitat Certainty	High
Target CBM UKHab habitat	Grassland - Lowland meadows
Distinctiveness tier	Very High
Distinctiveness score	8
Target Distinctiveness score	8
Highest Standard tier	CWS

Standard score	1.1
Standard Certainty	Very High
Standard criteria met	CWS: 4a, b & f CiWS: 1d
Target highest Standard tier	CWS
Target Standard score	1.1
Target Standard criteria met	CWS: 4a, b & f CiWS: 1d
Condition tier	Good
Condition score	3
Condition Certainty	High
Reasons for Condition	No criteria obviously failed
Target Condition change	Maintain
Target Condition score	3
Connectivity tier	Unknown
Connectivity score	Unknown
Target Connectivity score	N/A
Strategic Significance tier	High
Strategic Significance score	1.15
Target Strategic Significance score	1.15
CBM	43.82
Targeted in original BAP?	Yes
Target CBM set?	Yes
Target CBM	43.82
Target absolute CBM increase	0
Target % CBM increase	0
Year when CBM target detectable	2025
Management required to reach BAP target	Continue routine mowing, ideally in August/September after wildflowers have set seed (remove cuttings)
Next survey year	2025

3 CBM vs NEBM calculation example

- 3.1 This hypothetical (but realistic, based roughly on a real area of the University estate) example of the target being to increase the CBM of an area of grassland illustrates how the NEBM produces a non-sensical calculation (i.e. a negative change in the metric), mainly because of the inclusion of risk factors. As a reminder, the calculations are performed as follows:

CBM = Area x (Distinctiveness + Standard) x Condition x Strategic Significance (In future it is hoped that this calculation will include Connectivity)

The target CBM follows the same pattern but with the target versions of the individual components.

Target NEBM = Area x Distinctiveness x Condition x Connectivity x Strategic Significance

Target NEBM = Target Area x Target Distinctiveness x Target Condition x Target Connectivity x Target Strategic Significance x Difficulty of enhancement x Temporal risk x Off-site risk

	CBM	NEBM
Area (ha)	1.40	1.40
Target area (ha)	1.40	1.40
Habitat	Grassland - Lowland meadows	Grassland - Lowland meadows
Target habitat	Grassland - Lowland meadows	Grassland - Lowland meadows
Distinctiveness tier	Very High	Very high
Distinctiveness score	8	8
Target Distinctiveness score	8	8
Standard score	0.3	N/A
Target Standard score	1.1	N/A
Condition tier	Moderate	Moderate
Condition score	2	2
Target Condition score	3	3
Connectivity tier	N/A	Medium
Connectivity score	N/A	1.1
Target Connectivity score	N/A	1.1
Strategic Significance tier	High	Medium

Strategic Significance score	1.15	1.15
Target Strategic Significance score	1.15	1.15
Difficulty of enhancement	N/A	Medium (0.67)
Temporal risk	N/A	0.837
Off-site risk	N/A	1
Metric score	26.65	28.25
Target metric score	43.82	23.77
Target absolute metric increase	17.18	-4.49
Target % metric increase	64.46	-15.88