The Biodiversity Metric 4.0

User Guide

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Further information

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Acknowledgements

Biodiversity Metric 4.0 builds on a series of previous versions of the biodiversity metric which have been published by Natural England with the input from the Environment Agency and the Forestry Commission, including authors and contributors cited in previous versions.

All versions of the biodiversity metric build on the biodiversity loss/gain framework developed by Jo Treweek and Bill Butcher[1,2], incorporating habitat condition and a new concept of distinctiveness scores, which was subsequently adopted by Defra and Natural England for their biodiversity offset pilots and metric[3].

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[1] Treweek J. et al. (2009) Scoping study for the design and use of biodiversity offsets in an English Context.

[2] Treweek J., Butcher B., and Temple H. (2010) Biodiversity offsets: possible methods for measuring biodiversity losses and gains for use in the UK. CIEEM In Practice.

[3] Defra (2012) *Biodiversity Offsetting Pilots. Technical paper: the metric for the biodiversity offsetting pilot in England* [online]. Defra, London.) Biodiversity Offsetting Pilots. Technical paper: the metric for the biodiversity offsetting pilot in England

Contents

1. Document guidance

1.1. Purpose of this guidance

1.1.1. This document provides guidance to support a competent person using the Biodiversity Metric 4.0 Calculation Tool. Instructions on how to manually input data into the tool are provided as a short guide in Appendix A: Tool Input Guide.

1.1.2. The technical habitat data and calculation methodology of the metric are embedded within the Biodiversity Metric 4.0 Calculation Tool and supporting documents (hereafter referred to as 'the metric' or 'this metric'). This metric has been published for applications across a wide range of scenarios.

1.2. Competency requirements

1.2.1. Competency is aligned with the British Standard 'Process for designing and implementing biodiversity net gain: BS 8683:2021'. A competent person is someone who can demonstrate they have acquired through training, qualifications or experience, or a combination of these, the knowledge and skills enabling that person to perform specified tasks in completing and reviewing metric calculations.

1.2.2. To undertake a River Condition Assessment assessors must be trained and accredited in the River Condition Assessment methodology. See the Watercourse Unit Module for further detail.

1.3. Metric documents

1.3.1. The following tools and supporting documents are available here:

- The Biodiversity Metric 4.0 – Calculation Tool
- The Biodiversity Metric 4.0 – Technical Annex 1: Condition Assessment Sheets and Methodology
- The Biodiversity Metric 4.0 – Technical Annex 2: Technical Information
- The Biodiversity Metric 4.0 – QGIS Template
- The Biodiversity Metric 4.0 – GIS Import Tool
- The Biodiversity Metric 4.0 – GIS Data Standard
- The Biodiversity Metric 4.0 – QGIS Template and GIS Import Tool User Guide

1.3.2. Additional case studies on applying the metric in different scenarios are also available.

1.3.3. Metric assessors are encouraged to follow developing industry best practice principles (CIRIA, CIEEM and IEMA) and BS 8683:2021.

1.4. Metric habitat types

1.4.1. The majority of habitats within the metric follow definitions set out by UK Habitat Classification (UKHab), Annex I habitats for Natura 2000, European Nature Information System (EUNIS) habitat type hierarchical view or the Water Framework Directive (WFD) Lake typologies.

1.4.2. A full list of metric habitat types and their source material may be found in Technical Annex 2 – Technical Information. This user guide includes additional details on how to record specific habitats within the metric.

1.5. Use of the metric

1.5.1. The metric can be used to inform and improve planning, design, land management and decision-making. The metric uses habitats and 'biodiversity units' as a proxy to describe biodiversity. These biodiversity units are the 'currency' of the metric. There are three types of biodiversity units, which are calculated in three separate 'modules' of the metric (area units, hedgerow units and watercourse units).

1.5.2. It is a simple assessment tool and only considers direct impacts on habitats, within the footprint of a development, estate or project. The metric can:

- assess or audit the biodiversity unit value of an area of land
- calculate the losses and forecast gains in biodiversity unit value resulting from interventions which affect habitats
- compare different proposals for a site, allowing more objective assessments of potential biodiversity changes
- be used to calculate biodiversity units and percentage biodiversity change

1.5.3. The metric can be used throughout all stages of a project, from site selection and detailed design to delivery. The earlier it is applied, the greater the opportunity to design for biodiversity and wider ecological benefits. The steps below outline how to make practical use of the metric. These are explained in more detail throughout the guidance.

Step 1: Project planning

- identify sites where the metric will be used

Step 2: Data collection

- collect habitat and other data from the sites to inform habitat baseline
- undertake a desk study determine strategic significance
- identify the planned actions or interventions that will change habitats, such as development or changes to land management

Step 3: Calculation

- identify metric modules to use
- input data into the metric to generate biodiversity unit scores
- identify if off-site habitat data will be required

Step 4: Informing design and decisions

- use results to improve design, communicate gains and losses, and inform planning decisions
- if there are changes to planned interventions run the calculator for pre- and post-change scenarios
- return to steps 1, 2 or 3 if required

1.5.4. If a project site has a baseline of zero biodiversity units, the metric will not provide results as a percentage change, but a unit gain can still be calculated. Where the metric is used to demonstrate BNG, and the baseline is zero biodiversity units, the relevant consenting body or planning authority may set an appropriate biodiversity unit target.

1.5.5. The outputs of this metric are not absolute values but provide a proxy for the relative biodiversity worth of a site pre- and post-intervention. The quality and reliability of outputs will depend on the quality of the inputs. The metric and its outputs should be used alongside ecological expertise as part of the evidence that informs plans and decisions.

2. Key terms and definitions

Table 2-1 sets out key terms that are used within the metric.

Table 2-1 Explanation of metric terms

Metric term	Explanation
Assessor	The competent person completing the metric.
Reviewer	A person reviewing the metric. Usually from a determining body or planning authority.
Habitat type	A habitat classification derived from multiple sources, including: • UK Habitat Classification • Annex I habitats for Natura 2000 • European Nature Information System habitat types • Water Framework Directive (WFD) Lake typologies
Biodiversity unit	Biodiversity units are a proxy to describe biodiversity. There are three types of biodiversity units: area units, hedgerow units and watercourse units. These are calculated in separate 'modules' of the metric.
Project timeframe	The timeframe over which the metric calculates gains and losses for specific habitat interventions.
On-site	On-site sheets of the metric are for all land within the boundary of a project. In a planning context, this usually means within the red line boundary of a planning application.
Off-site	Off-site sheets of the metric are for interventions on land outside of the on-site boundary, regardless of proximity or ownership.
Size	The size of the habitat parcel to be retained, enhanced, created, or lost. Size is measured in hectares for area features, or in kilometres for linear features. The metric accepts size measurements to any number of decimal places.

Metric term	Explanation
Distinctiveness	A measure based on the type of habitat and its distinguishing features. This includes consideration of species richness, rarity, the extent to which the habitat is protected by designations and the degree to which a habitat supports species rarely found in other habitats.
Condition	A measure of the habitat against its ecological optimum state. Condition is a way of measuring variation in the quality of patches of the same habitat type.
Condition assessment	The process of assigning habitat condition, to be undertaken by a competent person.
Linear habitat	Habitats recorded in the metric according to length (kilometres) rather than area (hectares). This includes habitats in the hedgerow and watercourse modules and is taken as a centre line measurement along the length of the feature.
Area habitat	Habitats recorded in the metric in area (hectares).
Strategic significance	Describes the local significance of the habitat based on its location and the habitat type.
Parcel	A linked area of habitat of the same distinctiveness, condition and strategic significance.
Difficulty	A measure which represents the uncertainty in the effectiveness of management techniques used to enhance or create habitat.
Time to target condition	The average time taken between starting creation or enhancement of habitats and that habitat reaching its target condition and or distinctiveness.
Spatial risk	Spatial risk represents the relationship between the location of biodiversity loss (on-site) and where the off-site habitat is being delivered. This is applied to off-site interventions only.

3. Metric rules and principles

3.1. Metric rules

3.1.1. The rules set out in Table 3-1 must be followed in applying the metric.

3.1.2. If these rules are not followed, then a project cannot claim to have achieved a gain in biodiversity.

Table 3-1 Biodiversity metric rules

Rule number	Rule detail
Rule 1	Competency requirements must be complied with.
Rule 2	Biodiversity unit outputs are unique to this metric. The results of other metrics, including previous versions of this metric, are not comparable to those of this metric. The three types of biodiversity units generated by this metric (area, hedgerow and watercourse) cannot be summed, traded, or converted between modules.
Rule 3	The trading rules of this metric (Table 3-2) must be followed.
Rule 4	Losses and deterioration of irreplaceable or very high distinctiveness habitat cannot be accounted for through this metric.
Rule 5	In exceptional ecological circumstances, deviation from this metric methodology may be permitted by the relevant consenting body or planning authority. Any deviation must be fully justified and evidenced, and follow advice set out in Section 3.3.

3.2. Metric trading rules (Rule 3)

3.2.1. Rule 3 is automatically applied by the metric and sets minimum habitat creation and enhancement requirements to compensate for specific habitat losses (up to the point of no net loss). These requirements are based on habitat type and distinctiveness, as set out in Table 3-2.

Table 3-2 Trading rules (Rule 3) to compensate for losses

Baseline habitat distinctiveness	**Area module** (area units)	**Hedgerow module** (hedgerow units)	**Watercourse module** (watercourse units)
Very high	Losses are not permitted within this metric AND bespoke assessment and compensation are required	Losses must be replaced with hedgerow units of the same habitat type	Losses are not permitted within this metric AND bespoke assessment and compensation are required
High	Losses must be replaced with area units of the same habitat type	Losses must be replaced with hedgerow units of the same habitat type or of a higher distinctiveness band	Losses must be replaced with watercourse units of the same habitat type
Medium	Losses must be replaced by area units of either: medium distinctiveness habitats within the same broad habitat type OR any habitat from a higher distinctiveness band (from any broad habitat type)	Losses must be replaced with hedgerow units of the same or higher distinctiveness band	Losses must be replaced with watercourse units of the same habitat type
Low	Losses must be replaced with area units of the same or higher distinctiveness band	Losses must be replaced with hedgerow units of the same or higher distinctiveness band	Losses must be replaced with watercourse units of a higher distinctiveness band

Baseline habitat distinctiveness	**Area module** (area units)	**Hedgerow module** (hedgerow units)	**Watercourse module** (watercourse units)
Very low	Not applicable	Losses must be replaced with hedgerow units of the same or higher distinctiveness band	Not applicable

Compensating for loss of high distinctiveness woodland

3.2.2. If woodland creation is required to compensate for the loss of high distinctiveness woodland, then:

- a 'like for like' replacement must be provided and input into the metric
- target habitat must replicate the woodland type that is being lost
- lower distinctiveness woodland habitat types must not be used
- a realistic target condition should be set (likely poor condition)

Woodland creation

3.2.3. If a woodland is being created, and is not replacing the loss of a high distinctiveness woodland, the newly created woodland should be input into the metric as either:

- Woodland and forest – 'other woodland; broadleaved' or
- Woodland and forest – 'other woodland; mixed' or
- Woodland and forest – 'other coniferous woodland'

Watercourse module

3.2.4. Any compensation for the loss of watercourse units should be on a section of watercourse with similar habitat features (were it in a natural state), and be of a similar size, function and stream order (rivers). For example:

- impacts on headwaters cannot be offset on large lowland rivers
- impacts on canals cannot be offset on rivers
- impacts on ditches cannot be offset on canals or rivers

3.3. Rule 5

3.3.1. Rule 5 allows for deviation from the metric methodology. Its use is not appropriate for the majority of projects. The use of Rule 5 is permitted only through prior agreement with the relevant consenting body or planning authority. How Rule 5 is applied is dependent on the specifics of a project.

3.3.2. An assessor must provide:

- evidence of specific ecological expertise relevant to the site
- robust justification for the decision to apply the rule
- robust evidence demonstrating the ecological benefits of the intervention

3.3.3. Rule 5 should only be used if there are rare and exceptional ecological circumstances, and the metric does not fully reflect the ecological benefit provided by a specific intervention. For example, it may be used where a site has optimal conditions for restoration of a wildlife-rich habitat or historic natural habitat, and the project team has the expertise and resource to deliver the habitat with negligible risk of failure.

3.4. Metric principles

3.4.1. The principles set out in Table 3-3 should inform the use of the metric.

Table 3-3 Biodiversity metric principles

Principle number	Principle detail
Principle 1	This metric does not change existing biodiversity protections, statutory obligations, or policy requirements. The use of this metric does not override the ecological mitigation hierarchy and other requirements (such as consenting or licensing processes, for example woodlands).
Principle 2	This metric should be used in accordance with established good practice guidance and professional codes.
Principle 3	This metric is not a complex or comprehensive ecological model and is not a substitute for expert ecological advice.
Principle 4	Biodiversity units are a proxy for biodiversity and should be treated as relative values.

Principle number	Principle detail
Principle 5	This metric is designed to inform decisions in conjunction with locally relevant evidence, expert input, or guidance.
Principle 6	Habitat interventions need to be realistic and deliverable within a relevant project timeframe.
Principle 7	Created and enhanced habitats should seek, where practical and reasonable, to be local to any impact and deliver strategically important outcomes for nature conservation.
Principle 8	The metric does not enforce a minimum habitat size ratio for compensation of losses. However, proposals should aim to: • maintain habitat extent (supporting more, bigger, better and more joined up ecological networks) and • ensure that proposed or retained habitat parcels are of sufficient size for ecological function

3.5. Irreplaceable habitats

Recording irreplaceable habitats

3.5.1. Rule 4 (Table 3-1) states losses and deterioration of irreplaceable habitat cannot be accounted for through this metric. Irreplaceable habitats require separate consideration which must comply with up-to-date policy, legislation and regulations.

3.5.2. All irreplaceable habitats must be recorded in the irreplaceable habitat sheet within the metric.

- on the metric start page, select if irreplaceable habitats are present on-site
- using the irreplaceable habitat sheet, specify the type, extent (number, area or length) and post-intervention status of all irreplaceable habitats within the site

3.5.3. Where there are no losses or deterioration of irreplaceable habitats, their enhancement may contribute towards the calculation of biodiversity units.

- you may record irreplaceable habitats within the baseline for enhancement only
- if recording irreplaceable habitats within a baseline then they must also be recorded within the irreplaceable habitats sheet

3.5.4. Bespoke compensation to address specific losses and deterioration of irreplaceable habitats needs to be agreed on a case-by-case basis with the determining body or planning authority.

- do not include any bespoke compensation to address specific losses and deterioration within post-development sheets of the metric

Very high distinctiveness habitats

3.5.5. Very high distinctiveness habitats (VHDH) are a metric-specific classification of highly threatened, internationally scarce habitats which require conservation action.

3.5.6. Metric assessors should note the following for VHDH and irreplaceable habitats:

- some VHDH will meet the definition of irreplaceable habitats
- not all metric habitat types that meet the definition of an irreplaceable habitat are VHDH

3.5.7. Losses of VHDH should be avoided. Bespoke compensation for losses to VHDH will be required. Bespoke compensation needs to be agreed on a case-by-case basis with the determining body or planning authority. The following notes are applicable when using VHDH within the metric:

- if VHDH are recorded as lost then the metric will not calculate a unit value for that habitat and the results of the metric will not be calculated
- to complete the calculation, assessors must indicate and evidence that bespoke compensation for losses has been agreed
- do not record bespoke compensation to address any specific losses or deterioration to VHDH, or irreplaceable habitats, within post-development sheets of the metric

3.5.8. Areas of VHDH can be enhanced. The metric applies the following precautions when VHDH are recorded within site baseline sheets, as:

- lost or retained – the metric removes biodiversity unit value from the biodiversity unit baseline
- enhanced – the metric adds the biodiversity unit value to the biodiversity unit baseline

3.5.9. VHDH distinctiveness habitats within the hedgerows module are not subject to the above.

Ancient woodland

3.5.10. Ancient woodland (an irreplaceable habitat) is not a discrete habitat type and, as such, is not listed in the metric.

3.5.11. Ancient woodland encompasses ancient semi-natural woodlands (ASNW), plantations on ancient woodland sites (PAWS) and ancient wood-pasture and parkland. These habitats may fit a range of metric woodland habitat types.

3.5.12. To ensure ASNW and PAWS are recorded in full, assessors should take the following steps where there is woodland within a site:

- check the current Ancient Woodland Inventory Database
- if a woodland is less than 2ha, check against the criteria set out in the Ancient Woodland Inventory Handbook

Ancient and veteran trees

3.5.13. Ancient and veteran trees may be found within a range of situations, including within hedgerows, lines of trees, woodland, open habitats and urban settings. Wherever ancient and veteran trees occur they should be considered and recorded as irreplaceable habitat.

4. Data requirements

4.1.1. Data required for completing the metric are set out in Table 4-1. A competent person should collect this through appropriate desk studies and site visits.

Table 4-1 Data inputs required for area, hedgerow, and watercourse biodiversity units

Calculation input	Area	Hedgerow	Watercourses
Metric habitat type	Required	Required	Required
Size	Hectares	Kilometres	Kilometres
Condition and target condition	Required	Required	Required
Strategic significance	Required	Required	Required
Timing of habitat intervention relative to biodiversity loss (advance or delay)	Required	Required	Required
Spatial risk	Required for off-site interventions only	Required for off-site interventions only	Required for off-site interventions only
Extent of interventions, encroachment into riparian zone and watercourse channel	Not required	Not required	Required
Whether watercourse is contained within a culvert	Not required	Not required	Required

Evidencing data and decision making

4.1.2. Justification for metric decisions should be provided and signposted within the 'Assessor comments' column of the metric tool.

5. Assessing habitat quality

5.1. Quality components

5.1.1. There are three habitat quality components of the metric:

- distinctiveness
- condition
- strategic significance

5.2. Distinctiveness

5.2.1. Distinctiveness is a measure based on the type of habitat and its distinguishing features. The metric automatically assigns distinctiveness category based on habitat type. Metric distinctiveness categories and scores are outlined in Table 5-1.

Table 5-1 Metric distinctiveness categories and scores

Distinctiveness category	Distinctiveness score applied in the metric
Very high	8
High	6
Medium	4
Low	2
Very low (hedgerow module)	1
Very low (area and watercourse module)	0

5.3. Condition

5.3.1. Habitat condition is a measure of the state of a habitat. This is often linked to past and present management and land use. It is a way of measuring variation in the quality of habitat parcels of the same habitat type. Table 5-2 outlines metric condition categories and scores.

Table 5-2 Metric condition categories and scores

Condition category	Condition score applied in the metric
Good	3
Fairly Good	2.5
Moderate	2
Fairly Poor	1.5
Poor	1
Condition Assessment N/A	1
N/A – Other	0

Baseline condition methodology

5.3.2. Condition sheets form a crucial part of any evidence base used to inform metric inputs. These should be provided to the consenting body or planning authority to support metric calculations.

5.3.3. Assessors must use the appropriate condition assessment sheets for the habitats identified. Technical Annex 1: Condition Assessment Sheets and Methodology contains the condition sheets and detailed guidance on their application.

5.3.4. Some habitats are allocated a fixed condition score in the metric. These habitats do not require a condition assessment for the metric to be completed. It may still be appropriate to survey these habitats for species or other environmental importance.

5.3.5. There is a separate condition assessment methodology for watercourses as set out in the watercourse unit module.

Intermediate condition categories

5.3.6. The 'Fairly good' or 'Fairly poor' condition categories are intermediate categories for site-specific features of condition not captured in the standard condition assessment. They should only be used through application of ecological expertise and any deviation from a standardised condition assessment must be explained against specific condition criterion.

5.3.7. If used, these categories can only adjust the results of a standard metric condition assessment result one condition category above or below the categories achieved. For example, you cannot go from a standard outcome of 'Poor' to an intermediate category of 'Fairly good '(nor from 'Good' to 'Fairly poor').

5.4. Strategic significance

5.4.1. Strategic significance is the local significance of the habitat based on its location and habitat type. Assessors should assign a strategic significance category (Table 5-3) for each individual habitat parcel both at baseline and at post-intervention. Assessors should use published plans, strategies or polices which are relevant to the habitat's location.

Table 5-3 Metric strategic significance categories, scores and descriptions

Strategic significance category	Score applied in the metric	Description
High	1.15	Where the location has been identified within a local plan, strategy or policy as being ecologically important for the specific habitat type or where that habitat has been identified as being locally ecologically important.
Medium	1.10	Where there is no relevant plan, strategy or policy in place, professional judgement may be used to justify the use of the medium strategic significance category. This judgement should consider the importance of that habitat in providing a linkage between other strategic locations.
Low	1	If the habitat is not included in local plans, strategy or policy, and there is no evidence to suggest that the habitat is of medium strategic significance.

5.4.2. Assessors should split the habitat parcel and apply the scores accordingly when a habitat parcel is intersected by:

- a boundary between two areas of different strategic significance
- a consenting body or planning authority boundary

5.4.3. Assessors must provide evidence by referencing relevant documents. If published, the relevant strategy is the Local Nature Recovery Strategy (LNRS). If an LNRS has not been published, the relevant consenting body or planning authority may specify alternative plans, policies or strategies to use.

5.4.4. Alternative plans, policies or strategies must specify suitable locations for habitat retention, habitat creation and or enhancements, and might, for example, be:

- Local Plans and Neighbourhood Plans
- Local Planning Authority Local Ecological Networks
- Tree Strategies
- Area of Outstanding Natural Beauty Management Plans
- Biodiversity Action Plans
- Species and protected sites conservation strategies
- Woodland strategies
- Green Infrastructure Strategies
- River Basin Management Plans
- Catchment Plans and Catchment Planning Systems
- Shoreline management plans
- Estuary Strategies

5.4.5. If no alternative is specified, agreement should be sought from the consenting body or Local Planning Authority when determining strategic significance.

6. Habitat interventions

6.1. Retention, enhancement and creation

6.1.1. The metric contains different habitat intervention scenarios:

- habitat retention
- habitat enhancement
- habitat creation

6.1.2. For each intervention, the assessor must determine the correct scenario using the descriptions set out in the sections below. Where it is not clear which scenario best fits the intervention, the assessor should use the habitat creation scenario.

6.1.3. Assigning creation or enhancement to watercourses requires separate consideration, as set out in the watercourse unit module.

Habitat retention

6.1.4. Habitat retention is where the baseline habitat is retained in its baseline condition and there is no action to enhance or create the habitat.

6.1.5. Habitats subject to retention may still require ongoing intervention to maintain their baseline condition. Where the condition of retained habitat cannot be maintained or enhanced over the project timeframe:

- record the habitat as lost
- record the same area and habitat type as created (in a lower condition)
- set the ‘habitat created in advance’ function to 30+ years
- provide an explanation in the assessor’s comments column

Habitat enhancement

6.1.6. Habitat enhancements can be:

- an improvement in condition compared to the baseline state
- a change to a higher distinctiveness habitat within the same broad habitat group compared to the baseline state

6.1.7. Condition must stay the same or improve, including when enhancing to a higher distinctiveness habitat.

Habitat creation

6.1.8. Habitat creation is where one habitat type is replaced by another habitat and includes:

- a loss of baseline habitat and its replacement with another
- a change in broad habitat type (for example a change from grassland to woodland)

6.1.9. For example, if young native trees and shrubs are planted on an area of arable land (the baseline habitat) to create a new broadleaved woodland (the post-intervention habitat), the baseline habitat would be recorded as a loss. The post-intervention habitat would be recorded as creation.

6.2. Restoration of existing habitats

6.2.1. Where ecologically viable, existing high or very high distinctiveness habitats may be recorded as an enhancement from the baseline, rather than creation. To be eligible there must be sufficient plant communities (of the target habitat) still visible in the degraded habitat at baseline. An example would be the restoration of a heathland overplanted with coniferous woodland (the baseline habitat may be coniferous woodland, enhanced to heathland).

6.3. Accounting for degraded sites

6.3.1. In some cases, policies or permissions might require that a specific baseline is applied where habitat has been altered on a site. You should check that your metric assessment complies with any such requirements.

6.3.2. If a habitat has been cleared, destroyed or degraded previously, and an earlier baseline should be used, assessors must use the following approach in the metric:

- use the pre-degradation habitat type as the site's baseline
- note how this habitat type and condition has been determined
- account for the time between the habitat loss and compensation through the temporal risk function

6.3.3. Data records, imagery, and historic field surveys may be used to determine pre-degradation habitat types. Use a precautionary approach when assigning condition scores. For example, assign a higher condition score in the absence of contrary evidence.

6.3.4. If there is evidence a woodland has been felled, then use the classification 'Woodland and Forest: Felled' when woodland is deemed to be the appropriate baseline.

6.4. Modelling realistic targets

6.4.1. Assessors should follow the Metric rules and principles when projecting target habitat type and target condition. For example, habitats prescribed in local strategies should be prioritised for retention, creation and enhancement, if achievable, reasonable and in adherence to trading rules. Targets should be ecologically viable within the project timeframe.

Setting appropriate target outcomes

6.4.2. Post-development target habitat type and condition must be realistic for the project timeframe. If the habitat's time to target condition exceeds the project timeframe (including when target habitat type and condition are met) assessors must provide ecological justification to demonstrate that the outcome is achievable.

6.4.3. If the time for a habitat to reach target condition exceeds the project timeframe, then the assessor and or the consenting body or planning authority should consider whether:

- more achievable outcomes would be more appropriate
- a longer project timeframe or agreement is required, for example, where like-for-like replacement of a high distinctiveness habitat is required

Evidencing target outcomes

6.4.4. Target outcomes should be appropriately evidenced and supported by ecological good practice.

High and very high distinctiveness habitats

6.4.5. High and very high distinctiveness habitats have very specific environmental requirements to successfully establish. Assessors should prove how these requirements will be met when set as a target outcome in the metric. Evidence provided should include reference to:

- habitat size
- management
- environmental conditions and habitat requirements

Landscape plans

6.4.6. Assessors and reviewers should be able to geo-spatially link habitat parcels recorded in the metric against landscape and planting plans, so that the size and location of post-development habitats parcels may be fully understood.

Limiting factors

6.4.7. Assessors should consider any limiting factors when selecting target habitat type and condition, including:

- habitat size and fragmentation
- environmental limits to condition and distinctiveness
- any future use of the area which may degrade habitat type and condition

Transitional habitat types

6.4.8. When the target habitats for a project are likely to take longer than 30 years, consider using realistic habitats that are likely to develop in the intervening period, or ‘transitional habitats’.

6.4.9. Using transitional habitat types to target longer term ecological outcomes does not remove the need to follow trading rules. For example, if a high distinctiveness woodland is lost, trading rules on compensation must still be met.

7. Assessing metric risk

7.1. Risk multipliers

7.1.1. The metric applies three risk multipliers to post-development enhancement and creation interventions:

- difficulty of creation or enhancement
- temporal risk
- spatial risk

7.2. Difficulty of creation or enhancement

7.2.1. This multiplier represents the uncertainty in the effectiveness of techniques to create or enhance habitats. The metric automatically assigns the delivery risk and score for each habitat, based on its habitat intervention category (creation or enhancement).

7.2.2. Despite this partial accounting for risk in the metric, proposals must still be based on sound ecological judgement and should consider the ecological context of the change.

7.3. Temporal risk

7.3.1. The temporal risk multiplier represents the average time lag, measured in years, between the start of habitat creation or enhancement works and the target outcome. This is known known as ‘time to target condition’. This multiplier is automatically applied by the metric and changes depending on data input. A more technical explanation of temporal risk is provided in Technical Annex 2 – Technical Information.

Use of advance or delayed habitat creation or enhancement

7.3.2. The metric can account for habitat that is created or enhanced in advance of a loss, or where habitat creation or enhancement is delayed. These functions are available for both on and off-site delivery for all habitat types.

7.3.3. Examples of when to use the creation in advance function including habitat banks, or where project phasing results in compensation ahead of losses. If the ‘Habitat created or enhanced in advance’ years function is used, provide evidence that the target condition of the habitat created in advance is being met.

7.3.4. The ‘delay in starting habitat creation or enhancement’ years function should be used when there is a delay between habitat loss and the start of habitat creation and enhancement works. For example, if land for habitat creation does not become available until the end of the construction.

7.3.5. When these functions are used, justification and evidence must be provided to the consenting body or planning authority. For example, assessors should reference project phasing plans or any additional agreements.

Accounting for temporary losses

7.3.6. A temporary loss is where there is restoration of a habitat, to its baseline type and condition within 2 years of the date of initial habitat loss, delivered in the same location. Where this applies, the habitat may be entered into the metric as ‘retained’.

7.3.7. Habitats subject to temporary losses can still be recorded as ‘enhanced’. However, a 1- or 2-year temporal risk multiplier should be applied through the ‘Delay in starting habitat creation or habitat enhancement’ function.

7.4. Spatial risk

7.4.1. Where a project cannot achieve a net gain in biodiversity units on-site, then off-site units can be used. All off-site data should be entered into the off-site sheets of the metric.

7.4.2. The spatial risk multiplier reflects the relationship between the location of on-site biodiversity loss and the location of off-site habitat compensation. It affects the number of biodiversity units provided to a project by penalising proposals where off-site habitat is located at distance from the impact site.

7.4.3. Assessors should use the descriptions provided in Table 7-1 to determine the correct spatial risk multiplier score.

Table 7-1 Spatial risk scores and descriptions for each habitat group

Score	Area habitats, hedgerows and lines of trees	Intertidal habitats	Watercourse habitats
1.0	Compensation inside Local Planning Authority (LPA) boundary or National Character Area (NCA) of impact site	Compensation inside Marine Plan Area of impact site	Within waterbody catchment
0.75	Compensation outside LPA or NCA of impact site, but in neighbouring LPA or NCA	Compensation outside Marine Plan Area of impact site, but in neighbouring Marine Plan Area	Outside waterbody catchment, but within operational catchment
0.5	Compensation outside LPA or NCA of impact site and neighbouring LPA or NCA	Compensation outside Marine Plan Area of impact site and neighbouring Marine Plan Area	Outside operational catchment

Using the metric as an off-site provider

7.4.4. An off-site provider can provide biodiversity units for other projects. An example of an off-site provider could be a habitat bank, land manager or landowner.

7.4.5. An off-site provider should complete the off-site sheets of the metric only. An off-site provider should select 'This metric is being used by an off-site provider' when selecting a spatial risk category.

Multiple off-site locations

7.4.6. If multiple habitats from multiple off-site locations are required, each site may be identified through a unique off-site reference. This should be entered in the 'Off-site reference' column within off-site data entry sheets.

8. Area unit module

8.1. Scope

8.1.1. The area unit module of the metric contains habitats measured in hectares, such as lakes, intertidal habitats, grassland and woodland.

8.1.2. Intertidal habitats are above water at low tide and under water at high tide. The metric does not include subtidal habitats, which are habitats found below mean low water.

8.2. Metric-specific recording notes

8.2.1. This section sets out assessment notes and clarifications for area habitats.

Notes on habitats with a land-use function

8.2.2. A habitat parcel might contain areas which meet the definition of multiple habitat types, sometimes of different distinctiveness scores. For example, arable margins may meet the definition of a higher quality habitat, or an allotment might contain an area of traditional orchard within its boundary.

8.2.3. Assessors need to apply particular care when assessing the following habitat types to ensure that each habitat type is mapped as an individual habitat parcel. This is to avoid under-recording biodiversity where habitat types also describe a land-use function:

- Cropland – Arable field margins
- Lakes – Reservoirs
- Urban – Allotments
- Urban – Vegetated garden
- Urban – Cemeteries and churchyards
- Urban – Sustainable drainage system

8.2.4. The metric habitat type ‘Urban – Actively worked sand pit quarry or open cast mine’ relates to non-vegetated working areas only.

Notes on recording habitat mosaics

Defined mosaics

8.2.5. A 'defined mosaic' is a habitat classification which include several habitat types as part of their primary definition. These should be recorded as their primary metric habitat type. Within the metric, defined mosaics are:

- Urban - Open mosaic on previously developed land
- Grassland - Floodplain wetland mosaic and CFGM (see recording floodplain wetland mosaic for additional recording notes)
- Grassland – Traditional orchard
- Woodland and forest – Wood-pasture and parkland

8.2.6. Separate components of a defined mosaic may be mapped to aid understanding of a habitat parcel (for example, by providing information on the structural complexity of a mosaic).

8.2.7. Other habitats should be recorded if these lie outside the primary habitat description. For example, a pond within a traditional orchard should be recorded and assessed as a separate feature.

Recording floodplain wetland mosaic and CFGM

8.2.8. Use the Coastal and Floodplain Grazing Marsh layer of the Priority Habitat Inventory to identify the metric habitat type 'Grassland - Floodplain wetland mosaic habitat and CFGM' (FWM-CFGM). This should be supplemented by local habitat data to identify FWM-CFGM which is not currently mapped.

- areas mapped as FWM-CFGM may include grassland habitats of low or medium distinctiveness
    - FWM-CFGM may include areas which meet the definition of high or very high distinctiveness habitat any losses of these within mapped or identified areas should be assessed as loss of FWM-CFGM
- FWM-CFGM may include existing areas which meet the definition of high or very high distinctiveness habitat
    - these should be assessed as the appropriate habitat type
- where there is habitat creation within a FWM-CFGM ecological expertise should be used to determine how best to record the habitat intervention
- in all cases, areas mapped or identified as FWM-CFGM should be clearly marked within the 'Assessors comments' column

8.2.9. Any ditches within recorded FWM-CFGM are part of the FWM-CFGM condition assessment and should not be recorded in separate modules

Other mosaics

8.2.10. Where a mosaic is not a defined mosaic it can be entered as separate habitat types. Assessors can map the component parts and estimate the proportion of each habitat component.

8.2.11. For example, if a 10 ha habitat mosaic is estimated to be 75% calcareous grassland and 25% mixed scrub; this should be recorded as 7.5 ha of calcareous grassland and 2.5 ha of mixed scrub.

Recording residential development

8.2.12. Where detailed landscaping information is available, this should be used to enter the area of habitats found within a residential development.

8.2.13. Where detailed landscaping is not available, assessors should apply the following habitat type ratios to areas allocated for housing and gardens.

- 70% ‘Urban – developed land; sealed surface’
- 30% ‘Urban – vegetated garden’

8.2.14. For particularly high- or low-density developments this ratio may be adjusted with appropriate evidence.

8.2.15. Access roads and public open spaces are not accounted for within this ratio.

Recording green roofs

8.2.16. Where there is an overlap between a building footprint and a green roof, then only record the green roof in the metric where there is overlap. For example, if a 0.10 ha building footprint has 0.05 ha of green roof, it would be recorded as 0.05 ha of green roof and 0.05 ha of developed land; sealed surface.

8.2.17. Where green roofs overlap other habitats, both can be recorded.

Recording green walls

8.2.18. Where ground based green walls are planted, assessors should use the projected growth of the green wall over 30 years to calculate the vegetated area of the green wall.

Area discrepancies

8.2.19. Any difference between site area, baseline habitat area and post-development habitat area (for example through the introduction of a green wall) this should be explained within the 'Assessor comments' column.

8.2.20. Within the area module the category 'Watercourse footprint - Watercourse footprint' may be used to record the area of wide watercourses within a boundary. This category is to account for the area only and there are no biodiversity units associated with this category. Lengths of watercourse must be assessed as linear features within the watercourse module.

Recording waterbody types

8.2.21. Waterbodies are recorded as different habitat types depending on area:

- waterbodies less than or equal to 2 ha are classified as ponds
- waterbodies more than or equal to 2 ha are classified as lakes.
    - tier one of the WFD Lakes Typology should be used to inform decisions on lake type.

8.2.22. Non-priority ponds are those which do not meet UK Habitat Classification definitions for priority habitat ponds or ornamental ponds.

8.2.23. The category 'Temporary lakes ponds and pools' is for Mediterranean temporary ponds (H3170) only. All temporary waterbodies not meeting this definition should be recorded as the most suitable equivalent.

Notes on recording intertidal enhancements

8.2.24. When intertidal habitats are restored by re-establishing natural processes (for example, through managed realignments), the resulting habitat should be considered as 'natural' and not as an artificial habitat type.

8.3. Assessing individual urban and rural trees

8.3.1. The broad habitat type 'Individual trees' may be used where a tree (or a group of trees) over 7.5cm in diameter at breast height (DBH) does not meet or contribute towards the definition of another broad habitat type.

8.3.2. Individual trees should not be recorded separately where they occur within habitat types characterised by the presence of trees, such as orchards, lines of trees or wood-pasture and parkland, but can be recorded where they do not form part of a primary habitat description.

8.3.3. Ancient and veteran trees are irreplaceable habitats and the broad habitat 'Individual trees' must not be used to record these. See section on irreplaceable habitats.

Choosing between the urban and rural environment

8.3.4. Individual trees may be classed as 'urban' or 'rural'. Typically, urban trees will be bound by (or near) hardstanding and rural trees are likely to be found in open countryside. The assessor should consider the degree of 'urbanisation' of habitats around the tree and assign the best fit for the location.

8.3.5. Individual trees may also be found in groups or stands (with overlapping canopies) within and around the perimeter of urban land. This includes those along urban streets, highways, railways and canals, and also former field boundary trees incorporated into developments. For example, if groups of trees within the urban environment do not match the descriptions for woodland, they may be assessed as a block of individual urban trees.

Figure 8-1 Trees in the urban environment

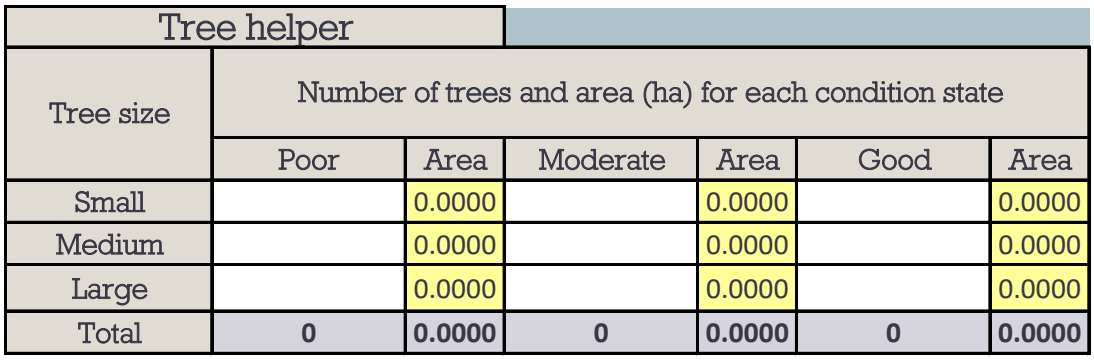
Trees within gardens

8.3.6. Established trees within gardens should be recorded in a site baseline.

8.3.7. Where private gardens are created, any tree planting within the created garden should not be included within post-development sheets of the metric. The habitat type 'Urban – Vegetated garden' should be used.

Recording individual trees

8.3.8. Once the size, number and condition of trees is known, assessors should generate an area equivalent value using the 'Tree helper' within the metric tool 'Main menu' (Figure 8-2). The 'area equivalent' is used to represent the area of individual trees. This value is a representation of canopy biomass, and is based on the root protection area formula, derived from BS 5837:2012.



Tree helper						
Tree size	Number of trees and area (ha) for each condition state					
	Poor	Area	Moderate	Area	Good	Area
Small		0.0000		0.0000		0.0000
Medium		0.0000		0.0000		0.0000
Large		0.0000		0.0000		0.0000
Total	0	0.0000	0	0.0000	0	0.0000

Figure 8-2 The tree helper embedded within the metric tool

8.3.9. Table 8-1 sets out class sizes of trees and their area equivalent. For multi-stemmed trees the DBH of the largest stem in the cluster should be used to determine size class.

Table 8-1 Tree size classes and area equivalents

Size class	Diameter at breast height (cm)	Metric RPA radius (m)	Metric area equivalent (ha)
Small	greater than 7cm and less than or equal to 30cm	3.6	0.0041
Medium	greater than 30cm and less than or equal to 90cm	10.8	0.0366
Large	greater than 90cm	15.6	0.0764

Underneath trees and area overlaps

8.3.10. Assessors should record the habitat underneath the canopy of an individual tree.

8.3.11. The area equivalent of individual trees is not related to the site area and the metric does not count the area of individual trees towards the total site area. Do not deduct the area of trees from the total area of other habitats within the site boundary.

8.3.12. Assessors should account for the size class (Table 8-1) of each individual tree within a group or block. The number of individual trees present within a group or block should be entered into the tree helper to calculate area equivalent. Do not reduce any area generated by the tree helper even if tree canopies overlap.

Forecasting post-development area

8.3.13. Size classes for newly planted trees should be classified by a projected size relevant to the project timeframe.

- most newly planted street trees should be categorised as ‘small’
- evidence is required to justify the input of larger size classes

8.3.14. When estimating the size of planted trees consideration should be given to growth rate, which is determined by a wide range of factors, including tree vigour, geography, soil conditions, sunlight, precipitation levels and temperature.

8.3.15. Do not record natural size increases of pre-existing baseline trees within post-development calculations.

9. Hedgerow unit module

9.1. Scope

9.1.1. This module includes hedgerows and lines of trees.

9.1.2. The descriptions for hedgerow types are set out as part of UKHab classifications and have been adapted from the Defra Hedgerow Survey Handbook.

9.2. Metric specific recording notes

How to record hedgerows

9.2.1. Hedgerows are recorded as a centre line measurement along the length of the feature.

9.2.2. Area habitats adjacent to hedgerows should be mapped to the centre line of the hedgerow (defined on OS maps by a black line).

- the footprint or canopy cover of a hedgerow or line of trees should not be subtracted from the total habitat area within a site
- the creation of hedgerows does not result in the loss of area habitat

9.2.3. Hedgerows bounding green lanes, and double hedgerows should be recorded as two hedgerows rather than a single hedgerow.

9.2.4. Where the process of succession results in scrub growing directly adjacent to established hedgerows, resulting in the hedgerow becoming less defined, assessors should:

- record the baseline hedgerow as retained
- show the hedgerow as retained in any post-development mapping
- record habitat changes adjacent to the hedgerow within the post-development sheet of the area habitat module

How to record ditches associated with hedgerows

9.2.5. Ditches associated with hedgerows may or may not hold water for part of the year. To be recorded as a ditch associated with hedgerows the ditch must:

- not meet the definition of a ditch within the watercourse module
- be a linear depression running adjacent to a hedgerow or line of trees

Ancient and veteran trees within lines of trees

9.2.6. Ancient and veteran trees are irreplaceable habitats requiring separate consideration.

- the presence of ancient and veteran trees is a defining feature of an ecologically valuable line of trees
- this does not mean that the rest of the line of trees is also deemed irreplaceable

10. Watercourse unit module

10.1. Scope

10.1.1. The watercourse unit module is applied to the following features:

- Priority rivers
- other rivers and streams
- canals
- ditches
- culverted sections of the above

10.1.2. Ditches may require assessment in other modules of the metric:

- see Recording floodplain wetland mosaic and CFGM for ditches within these habitats
- see Recording hedgerows and lines of trees for ditches associated with hedgerows

10.1.3. The watercourse module includes an assessment of the riparian zone. If the site boundary crosses into the riparian zone, adjacent lengths of watercourse must be included within a metric assessment (Figure 10-1).

10.1.4. Where appropriately evidenced, major engineering works that will significantly influence the watercourse (such as the removal of a weir) may be assessed as 'off-site' if beyond the project boundary.

10.1.5. Sub-tidal reaches are not included within the watercourse module of the metric. However, where subtidal estuary reaches display riverine features, predominantly in the upper sections around the boundary between rivers and estuaries, the watercourses metric can be applied. This assessment would be based on ecological expertise and discussion with the relevant consenting body or planning authority. To inform this discussion assessors should use the TraC waterbody layer to show the boundary between riverine and subtidal estuarine areas

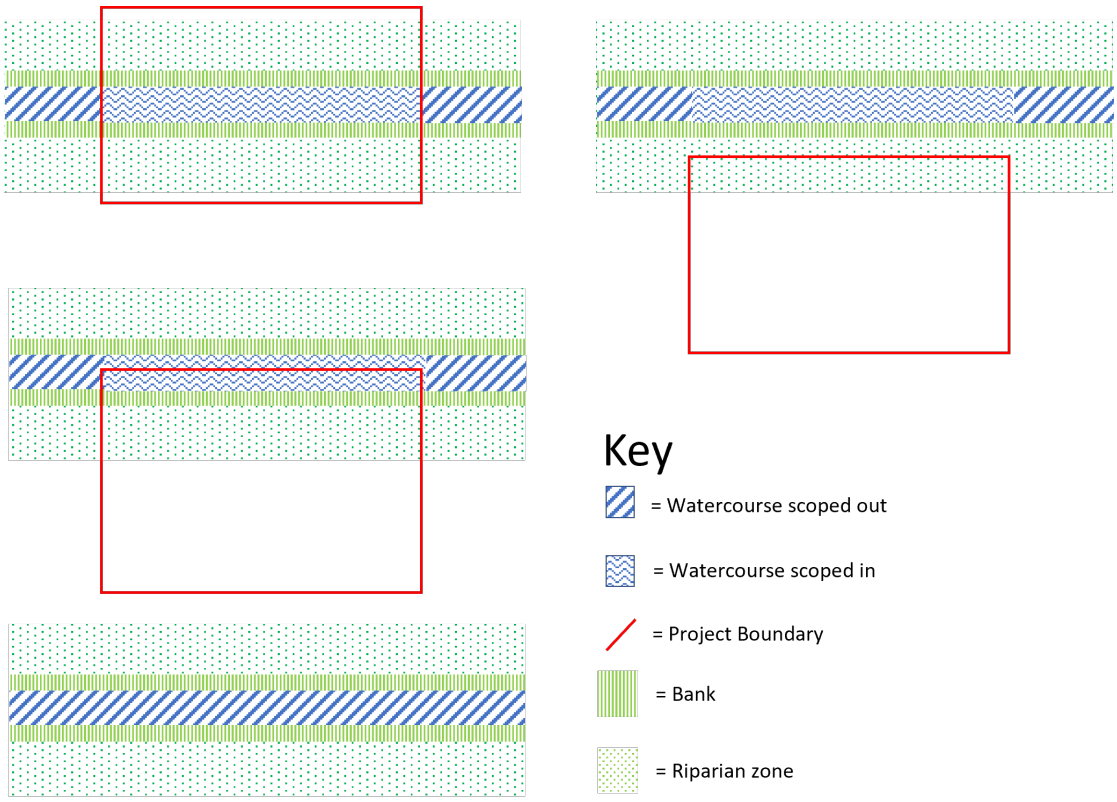


Figure 10-1 Length of watercourse scoped into the net gain calculations

Defining the riparian zone

10.1.6. The riparian zone is a set area from the bank top of the watercourse, which is the point where there is a break in slope between the river channel and the surrounding land. It supports features which influence the hydrological, geomorphological and biological functions or processes within the watercourse channel. It also provides ecological function for riparian or aquatic species. Table 10-1 sets out the riparian zone widths for different habitat types.

Table 10-1 Riparian zone widths

Habitat Type	Riparian Zone Width
Priority rivers	10m from the top of each bank
Other rivers and streams	10m from the top of each bank
Canals	10m from the top of each bank
Ditches	5m from the top of each bank
Culverts	Not applicable.

10.1.7. Vegetation within the riparian zone influences watercourse function. Habitats within the riparian zone must be recorded and assessed separately within the area and or hedgerow modules of the metric (if they are within the boundary of the site). This includes any changes in area habitats resulting from excavated or removed watercourse channels.

10.2. Quality Components

Watercourse distinctiveness

10.2.1. Assign watercourse type using the definitions provided in Table 10-2 below.

Table 10-2 Watercourse distinctiveness categories

Watercourse type	Metric watercourse definition	Distinctiveness
Priority habitat	Highly naturally functioning stretches of rivers identified on the Priority River Habitat Map, and un-mapped stretches meeting the criteria for inclusion into the Priority River Habitat Map.	Very high
Other rivers and streams	Rivers and streams that are not classified as Priority River Habitat. Resources: Statutory Main River Map, Local Data on ordinary watercourses, (including Internal Drainage boards) and MAGIC.	High
Canals	An artificial body of water originally created for the purposes of navigation, whether it is currently navigable or not. Sections of canalised rivers meeting this definition should be recorded as this habitat type. Resources: Canal and River Network, MAGIC and historic local data.	Medium

Watercourse type	Metric watercourse definition	Distinctiveness
Ditch	Artificially created linear water-conveyancing features which are less than 5m wide, and are likely to retain water for more than 4 months of the year. Record as a ditch only where the watercourse does not meet the definition of a higher distinctiveness watercourse.	Medium
Culvert	As defined by the Flood and Water Management Act 2010. A covered channel or pipe designed to prevent the obstruction of a watercourse or drainage path by an artificial construction. Record culverted sections of any watercourse type as 'culvert'. A site visit may be required to identify extent of culverting.	Low

River condition assessment

10.2.2. Different watercourse habitat types use a different condition assessment methodologies:

- culverts – do not require a condition assessment and are automatically assigned as 'poor' condition
- ditches – use Technical Annex 1: Condition Assessment Sheets and Methodology
- all other watercourses (including canals) – use the river condition assessment (RCA) methodology

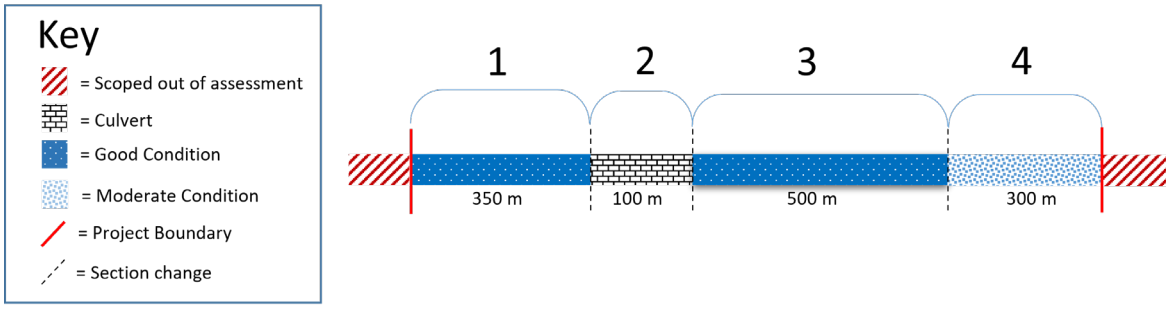
10.2.3. To undertake an RCA the competent person must be trained and accredited.

Recording watercourse sections

10.2.4. Assessors should enter watercourse sections into separate rows in the metric. Watercourse sections are defined as lengths of a consistent type and condition.

10.2.5. Follow the RCA guidance to determine the condition for each section. Enter the results on a row-by-row basis within the metric tool (Figure 10-2). At least one condition survey should be completed for each section.

- the RCA must capture at least 20% of the total length of the watercourse assessed
- points of known impacts, positive and negative, should be surveyed
- if data is required up-stream and down-stream of the site to complete an RCA then data may be extrapolated (and noted as a limitation)
-



Existing watercourse type			Habitat distinctiveness		Habitat condition	
Baseline ref	Watercourse type	Length (km)	Distinctiveness	Score	Condition	Score
1	Other Rivers and Streams	0.35	High	6	Good	3
2	Culvert	0.1	Low	2	Poor	1
3	Other Rivers and Streams	0.5	High	6	Good	3
4	Other Rivers and Streams	0.3	High	6	Moderate	2

Figure 10-2 Recording sections into metric rows

10.3. Habitat Interventions

Retention, enhancement or creation

10.3.1. Habitat retention is where the watercourse is retained and there are no creation or enhancement interventions to the channel, banks or riparian zone.

10.3.2. Habitat interventions for watercourses are categorised by whether the outcome results in the promotion or degradation of natural function. Table 10-3 should be used to determine if retention, creation or enhancement is applicable to the scheme. Illustrative examples are provided in

10.3.3. The creation option is only available for circumstances where new artificial watercourse channels are introduced, or natural rivers are impacted.

Table 10-3 Definitions of creation and enhancements for watercourse unit module

Type of intervention	Definition	Examples	Baseline recording notes	Post-intervention recording notes
Enhancement	Interventions which promote natural function, processes and the development of natural habitats, including removal of riparian zone encroachment and in-watercourse encroachment.	Removing culverts, re-aligning rivers closer to their natural alignment, improvement in the complexity or connectivity of the riparian zone.	Where the condition, distinctiveness or length increases, this should be recorded as enhancement of the baseline.	Enhanced lengths may be longer than the baseline length, for example where meanders, channels and braiding are added.
Creation	**Rivers:** Interventions that do not promote natural functions and processes, or the development of natural habitats, including increases in riparian zone encroachment and in-watercourse encroachment **Canals and ditches:** Where new canals and new ditches are introduced.	Trapezoidal channels, introduction of culverts, diverted channels outside of their natural alignment. Examples include channel straightening, physical modification or altering the channel line. Such as where a river has been artificially moved and channelised to accommodate a new development.	Where the condition, length or distinctiveness of natural rivers are impacted, record this as a loss within the baseline.	The post-intervention outcomes should be entered within the creation tab at post-intervention. Where riparian zone and in-watercourse encroachment increases and there are no other creation interventions, use the habitat created in advance function to input the standard time to target value (10 years) and then apply the new encroachment category.

Figure 10-3 Example of Enhancement. River restoration as part of the 'Urban Renaissance in Lewisham' programme. The lefthand picture shows the river before restoration, the righthand picture is after enhancement. Restoration action included removing the concrete walls, regrading banks, improving riparian habitat and marginal planting, and installing gravels in the river channel.

Figure 10-4 Example of Enhancement. Tokynton Park, River Brent River Restoration Project. The lefthand picture shows the river before restoration, the righthand picture is after enhancement. Restoration action included re-meandering channels, reinstating varied flow types and in channel features. Hard revetment was removed and banks reprofiled.

10.4. Riparian zone encroachment

10.4.1. Riparian zone encroachment describes any feature or intervention within the riparian zone that reduces the quantity, quality or ecological function of the riparian habitat. Examples include existing buildings or hardstanding, established footpaths, management interventions (such as agriculture), or structures that prevent wildlife from accessing the riverbank. The following are exempt:

- established canal or river navigation towpaths, footpaths and existing river crossings (including footbridges, road bridges, and rail crossings)

- existing small amenity features and utility units where the total footprint is less than 5% of the riparian zone area

10.4.2. Use the definitions provided in Table 10-4 to assign encroachment for both banks of each watercourse section entered into the metric. Then select the correct combination of encroachment within the metric. For example, if encroachment was major on one bank, and major on the other, then select 'Major / Major'.

Table 10-4 Watercourse riparian zone encroachment bands

Riparian zone encroachment band for a bank	Rivers and canals	Ditches
No encroachment	No encroachment within 10m of bank top	No encroachment within 5m of bank top
Minor	Any encroachment 8m to 10m from bank top (up to 100% of area within the 8-10m zone) or where the footprint of encroachment occupies 0-10% of the riparian zone area 4m to 10m from bank top.	Any encroachment 4m to 5m from bank top (up to 100% of area within the 4-5m zone) or where the footprint of encroachment occupies 0-10% of the riparian zone area 2m to 5m from bank top.
Moderate	Where the footprint of encroachment occupies between 10% to 25% of the riparian zone area 4m to 10m from bank top.	Where the footprint of encroachment occupies between 10% to 25% of the riparian zone area 2m to 5m from bank top.
Major	any encroachment 0m to 4m from bank top or where encroachment occupies greater than 25% of the total riparian zone area.	any encroachment 0m to 2m from bank top or where encroachment occupies greater than 25% of the total riparian zone area.

10.4.3. Figure 10-5 shows examples of watercourse riparian encroachment bands for rivers and canals.

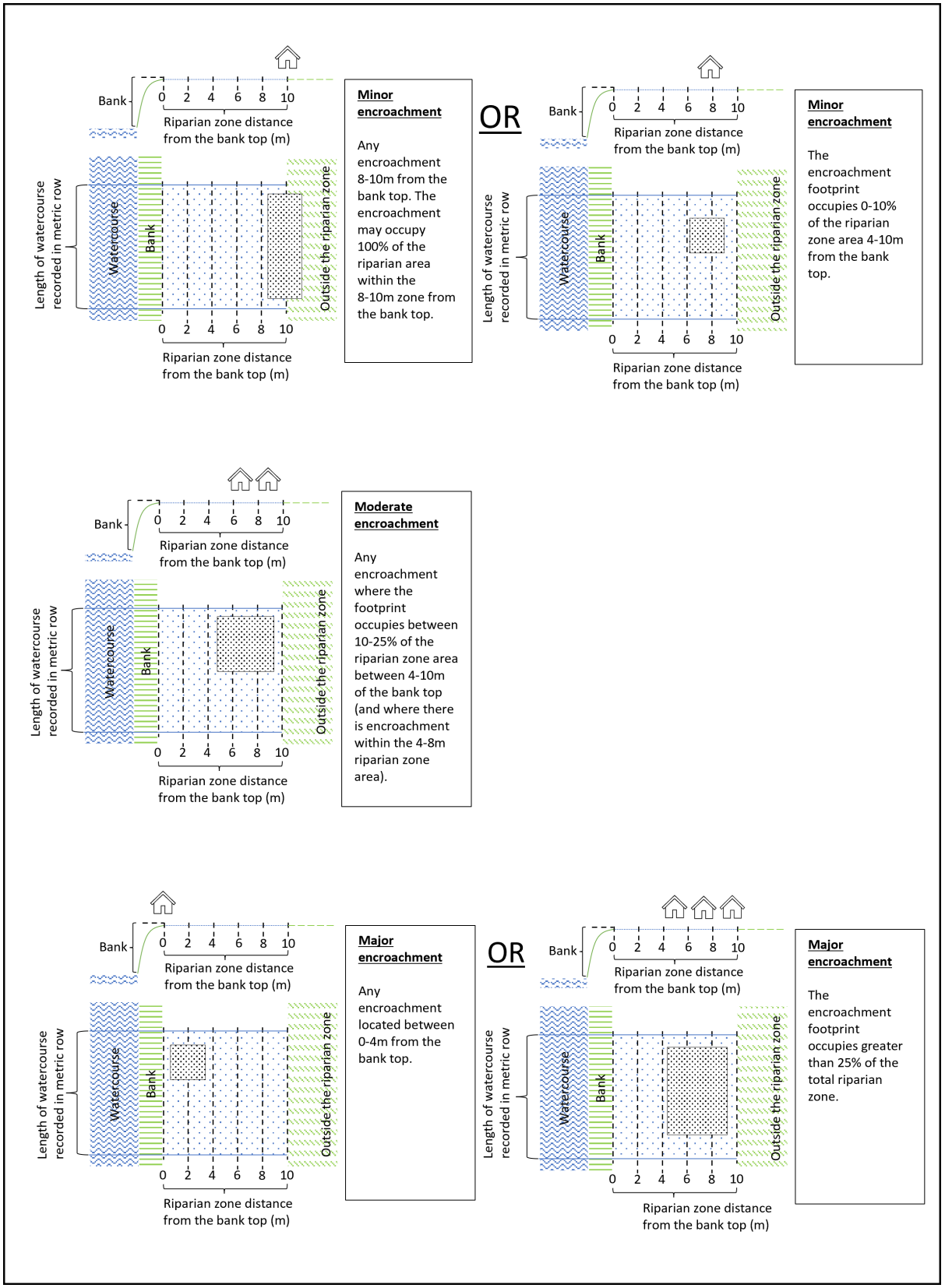


Figure 10-5 Examples of watercourse encroachment bands for rivers and canals

10.5. Watercourse encroachment

10.5.1. Watercourse encroachment accounts for development within a riverbank or channel that impacts the function of the river corridor. For the metric, watercourse encroachment is defined as a feature that adversely affects the natural function of the watercourse (for example sediment dynamics and riverine connectivity), resulting in localised changes in habitat, species and the use of migratory pathways.

10.5.2. Restorative interventions that are, or have been, introduced to improve the 'condition' of the river and or reinstate natural riverine processes are not encroachment. Examples include woody material dams (and or beaver *Castor fiber* dams), and soft bank revetment such as coir rolls, willow spiling or floating islands.

10.5.3. Assessors should use the descriptions in Table 10-5 to assign watercourse encroachment for watercourse section. This is taken as the percentage of total width of the channel, or percentage of total length along the bank.

Table 10-5 In-watercourse encroachment bands

Watercourse encroachment band	Multiplier	Description	Examples
No encroachment	1.0	Less than 5% of the bank length comprises an engineered bank revetment and there is no encroachment into the channel	N/A
Minor	0.8	5% to 20% of the bank length comprises an engineered bank revetment **or** there is channel encroachment across up to 10% of the channel width	Small headwalls, jetties, pontoons
Major	0.5	greater than 20% of the bank length comprises an engineered bank revetment **or** there is channel encroachment across greater than 10% of the channel width	Weirs, large headwalls, bank revetment

11. Metric results

11.1. Headline Results

11.1.1. Once data has been input into the metric the results are calculated and presented on the results pages. The final results are shown at the bottom of the headline results page. The figures below provide a walkthrough of the headline results page.

On-site baseline	*Habitat units*	0.00	
	Hedgerow units	0.00	
	Watercourse units	0.00	
On-site post-intervention (Including habitat retention, creation & enhancement)	*Habitat units*	0.00	
	Hedgerow units	0.00	
	Watercourse units	0.00	
On-site net change (units & percentage)	*Habitat units*	0.00	0.00%
	Hedgerow units	0.00	0.00%
	Watercourse units	0.00	0.00%

Figure 11-1 This shows biodiversity units the on-site baseline, on-site post-intervention and total on-site net change in biodiversity units. This is not the total project net gain.

Off-site baseline	*Habitat units*	0.00	
	Hedgerow units	0.00	
	Watercourse units	0.00	
Off-site post-intervention (Including habitat retention, creation & enhancement)	*Habitat units*	0.00	
	Hedgerow units	0.00	
	Watercourse units	0.00	
Off-site net change	*Habitat units*	0.00	0.00%
	Hedgerow units	0.00	0.00%
	Watercourse units	0.00	0.00%

Figure 11-2 This shows biodiversity units for habitat units for the off-site baseline, off-site post-intervention and total off-site net change in biodiversity units. This does not include spatial risk multiplier deductions.

Combined net unit change (Including all on-site & off-site habitat retention, creation & enhancement)	*Habitat units*	0.00
	Hedgerow units	0.00
	Watercourse units	0.00
Spatial risk multiplier (SRM) deductions	*Habitat units*	0.00
	Hedgerow units	0.00
	Watercourse units	0.00

Figure 11-3 This shows the sum of the on-site and off-site unit change before the spatial risk multiplier deductions are made. The total biodiversity unit value of spatial risk multiplier deductions are shown separately.

FINAL RESULTS		
Total net unit change (Including all on-site & off-site habitat retention, creation & enhancement)	*Habitat units*	0.00
	Hedgerow units	0.00
	Watercourse units	0.00
Total net % change (Including all on-site & off-site habitat retention, creation & enhancement)	*Habitat units*	0.00%
	Hedgerow units	0.00%
	Watercourse units	0.00%

Figure 11-4 This shows the total net biodiversity unit and net percentage change for the project, including all on-site and off-site interventions and including spatial risk multiplier deductions.

Trading rules satisfied?	Yes ✓

Figure 11-5 This box indicates if trading rules have been met or not. If trading rules have not been satisfied then a net gain in biodiversity cannot be claimed unless trading rules are resolved. The trading rules are not influenced by the spatial risk multiplier and are applied before any spatial risk multiplier deductions.

You must specify if irreplaceable habitats are on-site at baseline ▲

Figure 11-6 This flag at the bottom of the results summary indicates if the user has specified if irreplaceable habitats are on-site at baseline.

11.2. Habitat Trading Summary

11.2.1. There is a separate trading summary sheet for each metric module.

Trading Summary		
Distinctiveness Group	**Trading Rule**	**Trading Satisfied?**
Very High	Bespoke compensation likely to be required 🛠	Yes ✓
High	Same habitat required =	Yes ✓
Medium	Same broad habitat or a higher distinctiveness habitat required (≥	Yes ✓
Low	Same distinctiveness or better habitat required ≥	Yes ✓

Figure 11-7 Trading summary table for area module. If trading rules are satisfied a 'Yes' will show in the right-hand column. If trading rules are not satisfied, then a 'No' will show.

Medium Distinctiveness Summary	
Medium Distinctiveness Units available to offset Lower Distinctiveness Defecit	0.00
Medium Distinctiveness Broad Habitat Deficit to be offset by trading up	0.00
Higher Distinctiveness Surplus Units minus Medium Distinctivenss Broad Habitat Defecit	0.00
Cumulative surplus of units	0.00

Figure 11-8 For each module there is a separate trading summary for each distinctivness band of habitat. The summary table provides an summary of how biodiversity units are contirbuting towards the trading rules.

Medium Distinctiveness					
Habitat group	Group	On-site unit change	Off-site unit change	Project wide unit change	Cumulative broad habitat change
Cropland - Arable field margins cultivated annually	Cropland	0.00	0.00	0.00	0.00
Cropland - Arable field margins game bird mix	Cropland	0.00	0.00	0.00	
Cropland - Arable field margins pollen and nectar	Cropland	0.00	0.00	0.00	
Cropland - Arable field margins tussocky	Cropland	0.00	0.00	0.00	
Grassland - Other lowland acid grassland	Grassland	0.00	0.00	0.00	0.00
Grassland - Other neutral grassland	Grassland	0.00	0.00	0.00	
Grassland - Upland acid grassland	Grassland	0.00	0.00	0.00	
Heathland and shrub - Blackthorn scrub	Heathland and shrub	0.00	0.00	0.00	0.00
Heathland and shrub - Bramble scrub	Heathland and shrub	0.00	0.00	0.00	
Heathland and shrub - Gorse scrub	Heathland and shrub	0.00	0.00	0.00	
Heathland and shrub - Hawthorn scrub	Heathland and shrub	0.00	0.00	0.00	
Heathland and shrub - Willow scrub	Heathland and shrub	0.00	0.00	0.00	
Heathland and shrub - Hazel scrub	Heathland and shrub	0.00	0.00	0.00	
Heathland and shrub - Mixed scrub	Heathland and shrub	0.00	0.00	0.00	
Lakes - Ponds (non-priority habitat)	Lakes	0.00	0.00	0.00	0.00
Lakes - Reservoirs	Lakes	0.00	0.00	0.00	
Sparsely vegetated land - Other inland rock and scree	Sparsely vegetated land	0.00	0.00	0.00	0.00
Urban - Cemeteries and churchyards	Urban	0.00	0.00	0.00	0.00
Urban - Biodiverse green roof	Urban	0.00	0.00	0.00	
Individual trees - Urban tree	Individual trees	0.00	0.00	0.00	0.00
Individual trees - Rural tree	Individual trees	0.00	0.00	0.00	
Woodland and forest - Other Scot's pine woodland	Woodland and forest	0.00	0.00	0.00	0.00
Woodland and forest - Other woodland; broadleaved	Woodland and forest	0.00	0.00	0.00	
Woodland and forest - Other woodland; mixed	Woodland and forest	0.00	0.00	0.00	
Intertidal sediment - Littoral coarse sediment	Intertidal sediment	0.00	0.00	0.00	0.00
Intertidal sediment - Littoral sand	Intertidal sediment	0.00	0.00	0.00	
Intertidal hard structures - Artificial hard structures with integrated greening of grey infrastructure (IGGI)	Intertidal	0.00	0.00	0.00	
		0.00	0.00	0.00	

Figure 11-9 More detailed trading results are provided in the detailed habitat trading data tables, the example above shows medium distinctiveness habitats within the area module. Tables are set out by both habitat type and broad habitat group.

11.3. Detailed results

11.3.1. The detailed results tabs provide a breakdown of biodiversity unit change for each habitat type within the metric. This includes auto-generated graphs and charts to aid data interpretation.

12. Appendix A: Tool Input Guide

12.1. General information

12.1.1. The guide included below provides a walkthrough of each sheet and group of sheets within the metric calculation tool. The metric calculation tool has been designed for use with Microsoft Excel and a basic understanding of the software is required to use it.

12.1.2. The metric tool works best with macros and content enabled. Macros are used for navigation around the tool and for toggling different display modes for streamlined data input. A macro-disabled version is also available.

12.1.3. There are macro-enabled 'buttons' (round edged boxes) within the metric. With macros enabled, they are used to navigate through the tool. These buttons are disabled in the macro-disabled version.

Figure 12-1 Example of a macro enabled 'button

12.1.4. Tabs will automatically populate when a button is clicked. In both versions the tabs at the bottom of the sheet can be used for navigation.

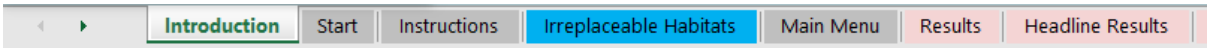


Figure 12-2 Tabs at the bottom of the metric calculation tool

12.1.5. Cells within the calculation tool are colour-coded to aid data entry and interpretation. Icons are also used to convey important information. Colour coding and iconography is set out in Appendix Table A.

Appendix Table A Cell formatting and symbols used within the metric

Cell formatting	Details
Data inputs	
	Fixed cells which do not change value
	Pre-populated values generated by the metric tool
	Results cell
	User data entry cells
Trading rule requirements	
=	Same habitat required
(≥)	Same broad habitat or a higher distinctiveness habitat required
≥	Same distinctiveness or better habitat required
🛠	Bespoke compensation likely to be required
Data flags	
Check ⚠	Attention required
Error ▲	Input error, rules and principles not met

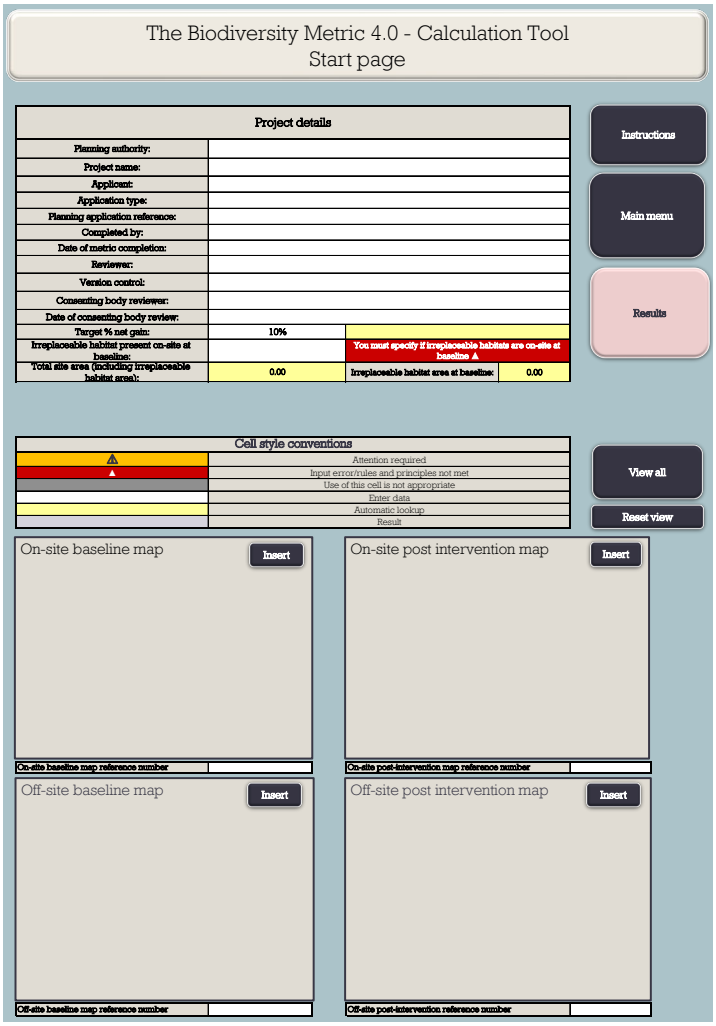
12.2. Introduction

The tool opens on the 'Introduction' tab.

Click on the 'Open tool' button. This will open the 'Start page'.

On the macro-disabled version, all tabs will preload at the bottom of the sheet.

12.3. Start page



All project details that are known or available to the user should be entered into the appropriate cells on the start page. Advice on filling in these cells is provided in Table 13-2.

Images or plans for the baseline and post-intervention scenarios can be added at the bottom of the start page. References can be added to each figure and will be reflected on the appropriate tab later in the metric.

When the start page data entry is complete, click 'Main menu' on the right to open the calculation tool main menu.

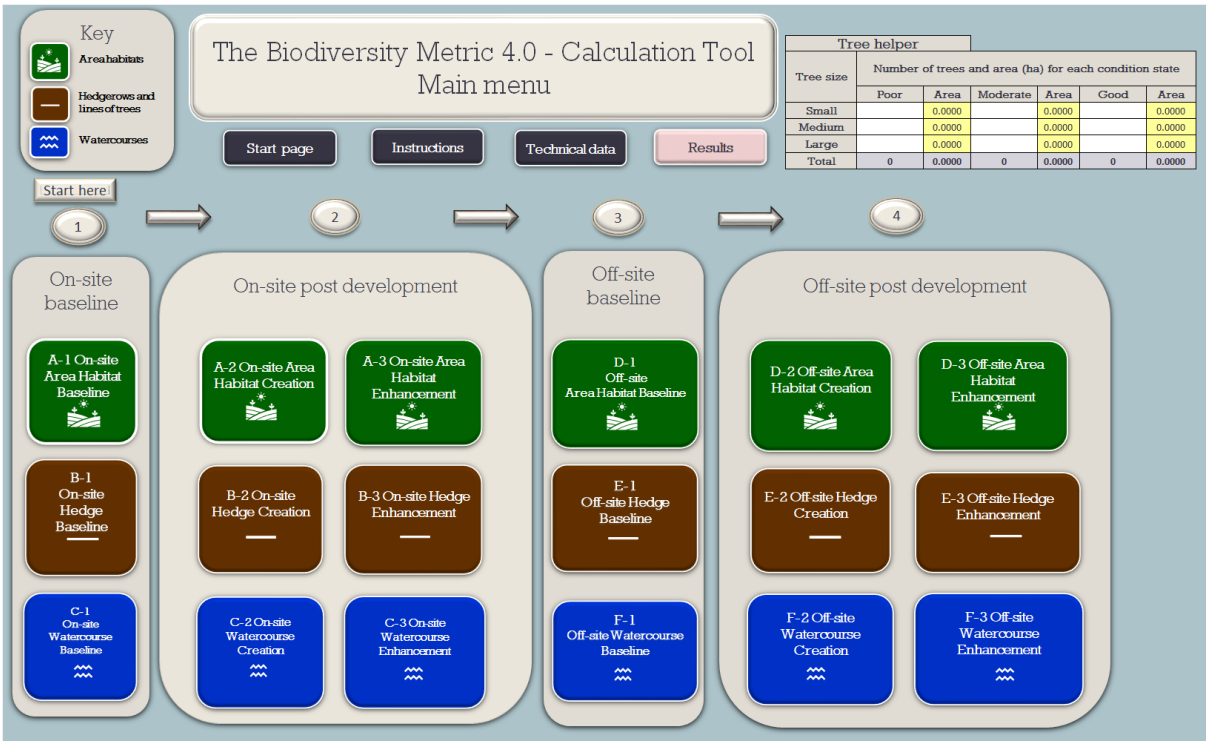
Appendix Table B Project information

Project Details	Information to enter (where relevant)
Planning authority	The determining authority for decision making
Project name	The name of the project and or planning application
Applicant	The applicant applying for permission or approval
Application type	The planning application type
Planning application reference	The planning application reference for the project
Completed by	The name of the user completing the metric
Date of metric completion	The date the metric assessment was completed (not the date of any survey or baseline data collection
Reviewer	For use by a competent person to review user inputs
Version control	For version control to distinguish between different iterations of a metric calculation
Consenting body reviewer	The name of the consenting body or planning authority reviewer
Date of consenting body review	The date the metric was reviewed by the consenting body
Target % gain	The target percentage gain for the project. This defaults to 10%, but can be increased.
Irreplaceable habitat present on-site at baseline	To indicate irreplaceable habitats are present on a site baseline. If 'Yes' is selected the irreplaceable habitats tab will open on the macro-enabled version.
Total site area	No data entry required. This cell automatically displays the total baseline site area (including any irreplaceable habitats) once habitat data sheets have been completed.

12.4. Other start page buttons

	Clicking this button takes you to the metric instructions page.
	Clicking this button opens all tabs of the metric.
	Clicking this button hides all tabs of the metric other than the introduction sheet.
	Clicking this button allows you to choose an image from file to upload baseline and post-intervention mapping
	Clicking this button takes you to the results sheets.

12.5. Main menu



12.5.1. The main menu can be accessed through the 'Main menu' button at the top of each sheet or through the tabs at the bottom of the workbook. Buttons to access the habitat data sheets are organised by:

- metric module (rows):
  - area units (top row)
  - hedgerows units (middle row)
  - watercourse units (bottom row)

- on-site or off-site baseline and post development (grouped in columns):
  - on-site baseline (group 1)
  - on-site post development (group 2)
  - off-site baseline (group 3)
  - off-site post development (group 4)

Tree helper

Tree size	Number of trees and area (ha) for each condition state					
	Poor	Area	Moderate	Area	Good	Area
Small		0.0000		0.0000		0.0000
Medium		0.0000		0.0000		0.0000
Large		0.0000		0.0000		0.0000
Total	0	0.0000	0	0.0000	0	0.0000

The main menu also includes a tree helper to convert the number of individual trees into an area for data input.

Other main menu buttons

	Clicking this button takes you to the metric instructions page.
	Clicking this button takes you back to the metric start page.
	Clicking this button takes you to technical data sheets G-1 to G-8 which detail the data tables and values used by the metric. It can also navigate to the 'Phase 1 Translation tool' sheet which can be used as an aid to convert historic Phase 1 data into other classification systems used by the metric.
	Clicking this button takes you to the results sheets.

12.6. Data entry sheets

12.6.1. From the main menu you can navigate to relevant data entry sheets. Specific instructions for each data entry sheet are provided in the sections below. Each data sheet hosts:

- a summary table proving a running total of unit and percentage change (at the top of the sheet)
- an area converter (m^2 to ha) at the bottom of the sheet
- four functional buttons at the top left of the sheet

12.6.2. The functions of the four buttons hosted at the top left of each data entry sheet are outlined below:

	Click to navigate back to the main menu.
	Click to hide and expand columns*. When hidden, only key data and information is displayed.
	Click to hide and expand rows*. Blank rows are hidden when toggled.
	Click to navigate to this Appendix of the user guide.

*It is recommended that all rows and columns are expanded until all data has been entered. This will avoid any data being obscured. The view can then be toggled accordingly to the user's needs.

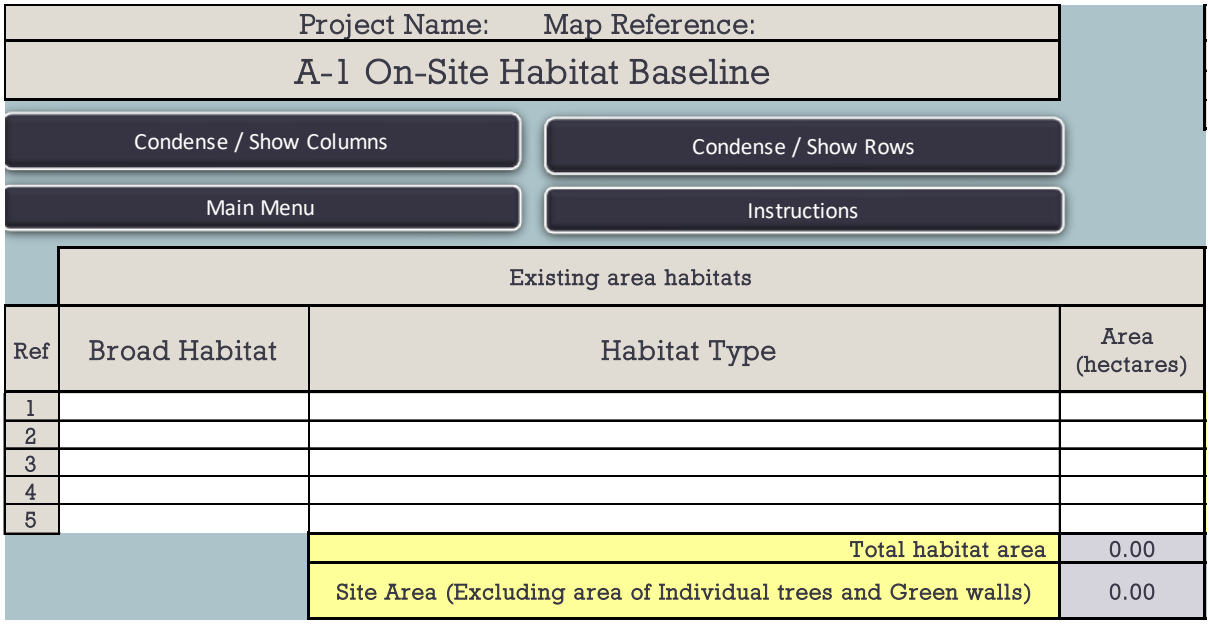


Figure 12-3 Broad habitat, habitat type and area data input boxes for sheet A-1. White cells are for data input.

12.6.3. Fill in the white boxes with your project data. Details on data entry are provided in Appendix Table C. Note that the metric treats baseline habitats as 'lost' unless an area is entered in the tool as retained or enhanced.

Appendix Table C Data input methods for data entry sheets

Data requiring manual input	Input method	Notes	Applicable sheets
Broad Habitat	Dropdown list	None.	Area habitat baseline and creation sheets
Habitat Type	Dropdown list	Broad habitat must be selected first.	Area habitat baseline and creation sheets
Proposed broad habitat	Dropdown list	For enhancement only, can be changed where the proposed habitat differs from the baseline.	Area habitat enhancement sheets
Proposed habitat or proposed watercourse type	Dropdown list	For enhancement only, can be changed where the proposed habitat differs from the baseline.	All enhancement sheets

Data requiring manual input	Input method	Notes	Applicable sheets
Area	Manual input (ha)	Area can be entered to any number of decimal places.	All area habitat baseline and creation sheets
Condition	Dropdown list	The list of condition options will not generate unless habitat type is selected.	All sheets
Strategic Significance	Dropdown list	None.	All sheets
Area Retained	Manual input (ha)	An area cannot be both 'Retained' and 'Enhanced'.	All area habitat baseline sheets
Area Enhanced	Manual input (ha)	An area cannot be both 'Retained' and 'Enhanced'.	All area habitat baseline sheets
Bespoke compensation agreed for unacceptable losses	Dropdown list	If losses of very high distinctiveness habitats cannot be avoided then enter if bespoke compensation has been agreed.	Hedgerow and watercourse baseline sheets.
Assessor and Local Authority reviewer comments	Manual input	This is a space for assessors and reviewers to make any comments relating to a specific habitat parcel.	All sheets
GIS reference number	Manual input	Space for GIS users to reference habitat parcels	All sheets
Hedge Number or New Hedge Number	Manual input	Can be used to aid cross-referencing to maps	All baseline and creation hedgerow sheets

Data requiring manual input	Input method	Notes	Applicable sheets
Hedgerow Type	Dropdown list	Condition options will not appear until hedgerow type is selected.	All baseline and creation hedgerow sheets
Length	Manual input (km)	Length can be to any number of decimal places.	All hedgerow and watercourse baseline and creation sheets
Length Retained	Manual input (km)	A length cannot be both 'Retained' and 'Enhanced'.	Hedgerow and watercourse baseline sheets
Length Enhanced	Manual input (km)	A length cannot be both 'Retained' and 'Enhanced'.	Hedgerow and watercourse baseline sheets
Watercourse Type	Dropdown list	Condition options will not appear until watercourse type is selected.	All watercourse sheets
Watercourse encroachment	Dropdown list	None.	All watercourse sheets
Riparian encroachment	Dropdown list	None.	All watercourse sheets
Habitat created in advance	Dropdown list	If nothing is entered, the metric will assume that the habitat will not be created in advance.	All creation and enhancement sheets
Delay in starting habitat creation	Dropdown list	If nothing is entered, the metric will assume that there will be no delay.	All creation and enhancement sheets
Spatial risk category	Dropdown list	None.	All off-site sheets
Off-site reference	Manual input	None.	All off-site sheets

12.7. Navigating to the results

12.7.1. From the ‘Main menu’, select the ‘Results’ button located in the top right-hand side of the page. The results are presented in four separate sheets. Click on the button for the appropriate results sheet.

Headline results	Click to see overall net changes in biodiversity units and percentage, separated into three sheets.
Detailed results	Click to understand the proposed changes in habitats and areas.
Habitat trading summaries	Click to see details of trading between habitat types and an indication of whether the development has met trading rules.
Off-site summary	Click to see details of where off-site habitats are provided.

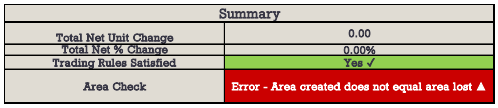
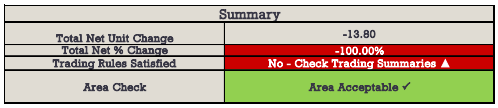
12.8. Tool troubleshooting

12.8.1. Appendix Table D below summarise common issues and any actions required to resolve these. In most cases, an ‘error’ or ‘check’ flag will appear to show that a problem has been encountered and to point the user to where this may have occurred.

Appendix Table D Troubleshooting guide

Issue	Action
There are not enough data entry rows in the metric for the site	The metric allows for 248 rows of data entry. It is good practice to put different habitat parcels into different rows. If required, multiple parcels of the same habitat type, condition and strategic significance can be combined into one row if the post-development outcome for those habitat parcels is the same.
The total baseline habitat area or length does not sum correctly	‘Total area’ / ‘Total length’ (summed at the bottom of the column) is displayed to two decimal places. This may result in small rounding discrepancies on large sites with many small parcels of habitat. The metric uses the true value entered in each row to calculate overall change in units (and not the displayed rounded value) to calculate. These rounding errors do not impact the results of the calculation tool.
Condense / Show functions are not working	These functions only work for the enhancement tab if the baseline tab is filled in

Issue	Action
The condition score is flagged as ‘not possible’, and the calculation is not resolving Condition / Score Condition Assessment N/A / Not Possible	The habitat type is not compatible with the selected condition score. This can occur if the habitat type selection is changed mid-way through data entry. Re-enter a valid condition input and the error message will disappear.
Error in areas Retention category biodiversity value Area retained: 1; Area enhanced: 1; Baseline units retained: 13.80; Baseline units enhanced: 13.80; Area habitat lost: Error in Areas ▲; Units lost: Error in Areas ▲ 1.00; 1.00; Error ▲; Error ▲; 0.00; 0.00	If the area of habitat in both categories (enhancement and retained) exceeds the total area of habitat in a row, then the metric tool will not resolve. Any areas marked as enhanced should not also be recorded as retained. Ensure the areas retained and enhanced are not greater than the total area of habitat entered.
Any loss unacceptable Retention category biodiversity value Area retained; Area enhanced; Baseline units retained; Baseline units enhanced; Area habitat lost; Units lost: Any Loss Unacceptable ▲; Bespoke compensation agreed for unacceptable losses 0.00; 0.00; 1.00	Once bespoke compensation is agreed, ‘Yes’ can be selected in the ‘Bespoke compensation agreed for unacceptable losses’ cell. This will clear the flag.
Using ‘Fairly’ categories for condition A 'Fairly' Category has been used - check evidence to ensure this is appropriate ⚠	Assigning a habitat either of the condition types with the qualifier ‘fairly’ will cause a check flag to be raised. Sound ecological evidence must be provided to justify the use of fairly categories.

Issue	Action
An error flag is triggered if there is a discrepancy bigger than 0.01ha that needs to be addressed.  	'Total area' / 'Total length' is displayed to two decimal places. This may result in small rounding discrepancies. These rounding errors do not impact the results of the calculation tool. If a rounding tolerance of 0.01 is exceeded an error flag will appear. Check the area of habitat entered in the tool for errors, or provide justification as to why areas do not match.
An error flag is triggered stating that both advance and delayed habitat creation have been implemented.  	Both advance and delayed creation cannot be used on the same habitat. Select either the advance creation or the delayed creation but not both. If two parcels of the same habitat are to be created in a staggered approach, then use two rows in the metric to present these separately.
The tool is not calculating a value for enhanced habitats.	This occurs if there is a trading error in either the distinctiveness or condition change cells. Condition must stay the same or improve, including when enhancement to a higher distinctiveness habitat.
Error flag appears, 'No – check trading summaries'.  	The error flag appears if the trading rules are broken within both the summary table at the top of each habitat tab and within the headline results. Consult the relevant trading summary tab for details on why the trading rules have been broken. Greater detail will be provided in the summary tables.
Habitat enhancement units are not being included in the headline results tab.	Check all the data required in the enhancement tab has been entered correctly and fully (in other words no required cells have been left blank).

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