



Cheshire
Wildlife Trust

**Biodiversity metric calculations for
South Macclesfield Development Area**

September 2017

1. Background

Biodiversity metric calculations (also known as No Net Loss calculations) are a mechanism for quantifying the residual loss or gain in biodiversity once a site is developed. The calculations do not account for the impacts on protected or priority species; instead it is designed to account for the losses and gains in wildlife habitat.

The proposed development site at South Macclesfield Development Area consists of a number of wildlife habitats including hedgerows, semi-improved grassland, marshy grassland, acid grassland, woodland, scattered trees and scrub, all of which have some wildlife value.

2. Biodiversity metric calculations

The calculation has been undertaken in accordance with policies set out in the Cheshire East Local Plan 2017, the NERC Act 2006 and the National Planning Policy Framework 2012 and is based upon the guidance published by DEFRA Biodiversity Offset Pilots – Technical Paper March 2012.

Habitat distinctiveness

The guidance requires that habitats are categorised according to their distinctiveness. Priority habitat is classified as high distinctiveness, semi natural habitat as medium distinctiveness and intensive agricultural habitat as low distinctiveness.

Habitat condition

Following site visits by CWT and CEC the condition of each habitat was assessed against the criteria set out in the Defra FEP manual 2008 (Condition assessment for semi-improved grassland) and Defra FEP manual 2010 (Condition assessments for Lowland dry acid grassland, Purple moor-grass and rush pasture, Native semi-natural woodland).

Biodiversity metrics (D in table 1) are calculated by multiplying the hectares of habitat by the product of the habitat distinctiveness and habitat condition values.

Baseline value of the site

Existing habitats on site	Total area of habitat lost(ha)	Habitat distinctiveness score for existing habitat	Habitat condition score for existing habitat	Biodiversity units to be lost AxBxC
	A	B	C	D
Semi-improved acid grassland	9.67	4	2	77.36
Semi-improved grassland	11.09	4	2	88.72

(LWS quality)				
Wet woodland	1.78	6	2	21.36
Unimproved marshy grassland	1.74	6	2	20.88
Unimproved acid grassland	3.48	6	2	41.76
Tall ruderal and scrub	7.51	4	1	30.04
Hedgerow	1140m		2 (moderate condition)	2280m (equivalent)

Table 1 – Biodiversity metric calculations

3. Calculating the amount of compensatory habitat required

The calculations presume a baseline biodiversity value of 2u/ha for land that will be used for habitat creation (i.e. low distinctiveness and poor condition). Time and risk multipliers are applied to account for the speed and difficulty of creating habitat of equal value to that lost (detailed guidance on the use of multipliers is published by DEFRA Guidance for Offset Providers 2012 – Appendices figures 5 and 7). The calculations are given in table 3.

Existing habitat on creation scheme	Distinctiveness	Condition	Number of units/ha
Arable or improved grassland	Low (2)	Poor (1)	2

Table 2 Baseline value of land to be used for compensatory habitat creation

Habitat	Baseline score for habitat scheme	Score achieved by scheme	Net credits per ha(F – E)	Equivalence ratio (BxC)/G	Basic offset area (ha) H x A	Time multiplier	Risk multiplier (Difficulty)	Area of habitat required L
	E	F	G	H	J	K	L	M
Semi-improved grassland (non-LWS quality)	2	12	10	0.8	7.73	10.82 (Jx1.4)	16.23 (Kx1.5)	16.23 ha
Semi-improved grassland (LWS quality)	2	12	10	0.8	8.87	12.42 (J x1.4)	18.63 (Kx1.5)	18.63 ha
Wet woodland	2	12	10	1.2	2.13	5.98 (J x 2.8)	8.97 (Kx1.5)	8.97 ha
Unimproved marshy grassland	2	12	10	1.2	2.08	4.16 (J x 2)	12.48 (K x 3)	12.48 ha
Unimproved acid grassland	2	12	10	1.2	4.17	8.34 (J x 2)	12.51 (Kx1.5)	12.51 ha
Tall ruderal and scrub	2	4	2	2	15.02	18.02 (Jx 1.2)	18.02 (K x 1)	18.02 ha
Hedgerow				2 (moderate condition – appendices figure 8)	1140	2280		2280m
Total								86.84 ha

Table 3 – Calculation for hectares of compensatory habitat required. Figures in red indicate habitats of LWS quality

4. Pricing of offset provision

The cost of re-creating different the different habitats is set out by DEFRA 2011.

Habitat	Area of compensatory habitat required (ha) N	Cost of habitat creation /ha (£) P	Land price £ per ha (including admin costs) ¹ Q	Final offset cost excluding land purchase costs (N x P)	Final offset cost including land purchase costs Nx(P+Q)
Semi-improved grassland (non-LWS quality)	16.23	4946	24,217	£80,273	£473,315
Semi-improved grassland (LWS quality)	18.63	4946	24,217	£92,143	£543,306
Wet woodland	8.97	3404	24,217	£30,533	£247,760
Unimproved marshy grassland	12.48	4946	24,217	£61,726	£363,954
Unimproved acid grassland	12.51	4946	24,217	£61,874	£364,829
Tall ruderal and scrub	18.02	3404	24,217	£61,340	£497,730
Hedgerow	2280m	£5.50/m ²		£12,540	£12,540
Total				£400,429	£2,503,434

Table 4 – Cost of creating compensatory habitat (assuming land is purchased not leased)

5. Summary

The figure of £400,429 **only** covers the cost of habitat creation and assumes the land used for creation is of low distinctiveness and poor condition. The cost of land purchase in the Northwest is £24,217/ha in 2010 (RICS rural land prices 2010, Appendix table 4.3). This includes admin and central costs. The total land purchase costs for 86.84 ha is £2,103,004.

The total cost for compensating for the loss of semi-natural habitat in relation to the South Macclesfield Development Area is estimated as £2,503,433

¹ RICS rural land prices 2010, Appendix table 4.3

² Cost estimation for the creation of species-rich hedgerows including species, spirals and labour (CWT 2017).

6. References

Biodiversity Offsetting Pilots. Guidance for developers. Department for Environment Food and Rural Affairs (2012).

Biodiversity Offsetting Pilots. Guidance for offset providers. Department for Environment Food and Rural Affairs (2012).

DEFRA Biodiversity Offset Pilots – Technical Paper March 2012

Costing potential actions to offset the impact of development on biodiversity – Final Report. Department for Environment Food and Rural Affairs (2011)

Higher Level Stewardship: Farm Environment Plan (FEP) Manual. Natural England (2008, 2010).

Handbook for Phase 1 Habitat Survey: A Technique for Environmental Audit. Joint Nature Conservation Council (2010).

7. Appendices

Figures and tables referred to in the text

Habitat type band	Distinctiveness	Broad habitat type covered	Type of offset
High	High	Priority habitat as defined in section 41 of the NERC Act	Same band and ideally like for like
Medium	Medium	Semi-natural	Within band type or trade up
Low	Low	E.g. Intensive agricultural but may still form an important part of the ecological network in an area.	Trade up

Figure 1. Habitat type bands (Defra March 2012)

Habitat condition *	Habitat distinctiveness		
	Low (2)	Medium (4)	High (6)
Good (3)	6	12**	18
Moderate (2)	4	8	12
Poor (1)	2	4	6

Figure 4. Matrix showing how condition and distinctiveness are combined to give the number of biodiversity units per hectare (Defra March 2012). *Condition should be assessed by methodology in HLS Farm Environment Plan – Defra. **Habitat is deemed to be restorable to BAP quality.

Habitats	Technical difficulty of recreating	Technical difficulty of restoration
Aquifer Fed Naturally Fluctuating Water Bodies	Very high/impossible	Medium
Arable Field Margins	Low	n/a
Blanket bog	Very high/impossible	High
Calaminarian Grasslands	High	Medium
Coastal and Floodplain Grazing Marsh	Low	Low
Coastal Saltmarsh	Medium	Medium
Coastal Sand Dunes	Very high/impossible	Medium
Coastal Vegetated Shingle	High	High
Eutrophic Standing Water	Medium	Medium
Hedgerows	Low	Low
Inland Rock Outcrop and Scree Habitats	Very high/impossible	Medium
Limestone Pavements	Very high/impossible	High
Lowland Beech and Yew Woodland	Medium	Low
Lowland Calcareous Grassland	Medium	Low
Lowland Dry Acid Grassland	Medium	Low
Lowland Fens	Medium	Low
Lowland Heathland	Medium	Medium
Lowland Meadows	Medium	Low
Lowland Mixed Deciduous Woodland	Medium	Low
Lowland Raised Bog	Very high/impossible	Medium
Maritime Cliff and Slopes	Very high/impossible	High
Mountain Heaths and Willow Scrub	High	Medium
Oligotrophic and Dystrophic Lakes	Medium	Medium
Open Mosaics on Previously Developed Land	Low	Low

Ponds	Low	Low
Purple Moor Grass and Rush Pasture	High	Medium
Reedbeds	Low	Low
Saline Lagoons	Low	Low
Traditional Orchards	Low	Low
Upland Calcareous Grassland	High	Medium
Upland Flushes, Fens and Swamps	High	Medium
Upland Hay Meadows	Medium	Low
Upland Heathland	Medium	Medium
Upland Mixed Ashwoods	Medium	Low
Upland Oakwood	Medium	Low
Wet Woodland	Medium	Low
Wet Heath	High	High
Wood Pasture and Parkland	Medium	Low

Appendix 1: Risk factors for restoring or recreating different habitats (Defra March 2012)

Difficulty of recreation/restoration	Multiplier
Very high	10
High	3
Medium	1.5
Low	1

Figure 5. Multipliers for different categories of delivery risk (Defra March 2012)

Years to target condition	Multiplier
5	1.2
10	1.4
15	1.7
20	2.0
25	2.4
30	2.8
32	3

Figure 7. Multipliers for different time periods using a 3.5% discount rate (Defra March 2012)

Ecosystem type	Time-scale	Notes
Temporary pools	1-5 years	Even when rehabilitated, may never support all pre-existing organisms.
Eutrophic ponds	1-5 years	Rehabilitation possible provided adequate water supply. Readily colonised by water beetles and dragonflies but fauna restricted to those with limited specialisations.
Mudflats	1-10 years	Restoration dependent upon position in tidal frame and sediment supply. Ecosystem services: flood regulation, sedimentation.
Eutrophic grasslands	1-20 years	Dependent upon availability of propagules. Ecosystem services: carbon sequestration, erosion regulation and grazing for domestic livestock and other animals.
Reedbeds	10-100 years	Will readily develop under appropriate hydrological conditions. Ecosystem services: stabilisation of sedimentation, hydrological processes.
Saltmarshes	10-100 years	Dependent upon availability of propagules, position in tidal frame and sediment supply. Ecosystem services: coastal protection, flood control.
Oligotrophic grasslands	20-100 years +	Dependent upon availability of propagules and limitation of nutrient input. Ecosystem services: carbon sequestration, erosion regulation.
Chalk grasslands	50-100 years +	Dependent upon availability of propagules and limitation of nutrient input. Ecosystem services: carbon sequestration, erosion regulation.
Yellow dunes	50-100 years +	Dependent upon sediment supply and availability of propagules. More likely to be restored than re-created. Main ecosystem service: coastal protection.
Heathlands	50-100 years +	Dependent upon nutrient loading, soil structure and availability of propagules. No certainty that vertebrate and invertebrate assemblages will arrive without assistance. More likely to be restored than re-created. Main ecosystem services: carbon sequestration, recreation.
Grey dunes and dune slacks	100-500 years	Potentially restorable, but in long time frames and depending on intensity of disturbance. Main ecosystem service: coastal protection, water purification.
Ancient woodlands	500 – 2000 years	No certainty of success if ecosystem function is sought – dependent upon soil chemistry and mycology plus availability of propagules. Restoration is possible for plant assemblages and ecosystem services (water regulation, carbon sequestration, erosion control) but questionable for rarer invertebrates.
Blanket/Raised bogs	1,000 – 5,000 years	Probably impossible to restore quickly but will gradually reform themselves over millennia if given the chance. Main ecosystem service: carbon sequestration.
Limestone pavements	10,000 years	Impossible to restore quickly but will reform over many millennia if a glaciation occurs.

Appendix 2. Feasibility and timetables of restoring: examples from Europe (Defra March 2012)

	Restoration PV Unit Costs £ per Hectare (incl admin, regulatory and transaction costs)	Creation PV Unit Costs £ per Hectare (incl admin, regulatory and transaction costs)
Upland habitats	999	4,030
Lowland heathland	2,914	3,892
Lowland grassland	4,552	4,946
Woodland	5,058	3,404
Wetlands	4,268	4,644
Coastal	2,623	28,456

Table 4.2 PV unit costs of offsetting future developments under the land purchase option (including restoration and creation costs but excluding land purchase costs) (Defra March 2011)

	Arable land	Pasture land	Average (mid point)	Total land price per hectare (incl admin/ central costs)
North East	14,209	9,946	12,078	16,909
North West	17,298	17,298	17,298	24,217
Yorkshire and the Humber	15,753	11,120	13,437	18,811
East Midlands	14,827	12,603	13,715	19,201
West Midlands	16,062	13,591	14,827	20,757
East of England	16,062	11,120	13,591	19,027
London	14,827	12,356	13,592	19,028
South East	14,827	12,356	13,592	19,028
South West	14,827	12,973	13,900	19,460
England and Wales	15,736	13,154	14,445	20,223

Table 4.3 Rural Land prices £ per hectare (Defra March 2011 – Source: RICS Economics, RICS Rural Land Market Survey, H1 2010)

Condition of hedgerow lost³	Multiplier applied
Good	3
Moderate	2
Poor	1

Figure 8. Multiplier required for different conditions of offset provision (Biodiversity Offset Pilots – Technical Paper March 2012)

³ Appendix 3 Biodiversity Offset Pilots – Technical Paper March 2012