

Terrestrial Biodiversity Group

Title: A geographical breakdown of the 200,000ha habitat creation aspiration.

Author: Natural England

1. Purpose:

- 1.1. The purpose of the paper, in response to TBG Evidence Commission 9, is to give a geographical definition to the habitat creation aspiration in Biodiversity 2020, Outcome 1B.

2. Recommendations

- 2.1. It is recommended that the Terrestrial Biodiversity Group should note and be informed by the geographical breakdown of its habitat creation aspiration as presented here and feedback any queries or comments via the TBG Secretariat.

3. Background

Biodiversity 2020

Outcome 1B "...an increase in the overall extent of priority habitats by at least 200,000 ha."

Terrestrial Biodiversity Group, Task & Finish Group 2

Recommendation 11. "...Table 5 provides an indicative breakdown of the 200,000 ha objective at England level to support the development of the delivery plan."

TBG Evidence Commission 9

"The task here is to provide a geographical perspective to these aspirations by recommending a breakdown of the national aspiration for each habitat by local geographical units (notably by NCAs)."

3.1 The habitats

Task & Finish Group 2 provided a habitat -scale breakdown of Biodiversity 2020's habitat creation aspiration as expressed as Outcome 1B. Of the 39 non-marine priority habitats that might contribute to the 200, 000ha total (note that the five woodland priority habitats were considered together as 'native woodlands') 24 habitats were identified to make a contribution to the new total¹: these are the habitats considered by this paper.

3.2 National Character Areas

National Character Areas (NCAs) '... provide a good spatial basis for ecological networks'², and so form the basis of the geographical breakdown described here. 'They divide England into 159 natural areas, each defined by a unique combination of landscape, biodiversity, geodiversity and economic and cultural activity.'³ Profiles of each are currently being written (20 have been completed), and these contain statements of environmental opportunity that include broad unquantified aspirations for habitat restoration and expansion. In addition, 120 Natural Areas are still recognised⁴, particularly by those working in the coastal zone. Most Natural Areas have directly equivalent NCAs, but many have subsidiary NCAs (the reverse is never the case). There is no such coincidence between coastal Natural Areas and NCAs, and boundaries often overlap in the coastal zone.

Unfortunately, the boundaries of NCAs do not relate to coastal processes, such as sediment transfer, through which there is an interaction between different coastal habitats, often over long stretches of coast. As NCAs have largely been developed to help express terrestrial concerns, their use in helping express aspirations for coastal habitats is limited. Furthermore, as the indicative increases for coastal habitats are mostly small, their geographical breakdown almost requires that specific sites be identified when such definition is not yet always possible. Therefore, for the time being at least, coastal Natural Areas have been used in preference to NCAs for the five coastal habitats.

4. Method

The approach has been to use a quick and simple method that could be applied to most of the habitats, but then to apply the principle of continual improvement, by subjecting a start-point area to a range of refinements, as outlined in Figure 1. Much more detail is provided in the following sections to clarify the derivation of the figures and maps which form the core output.

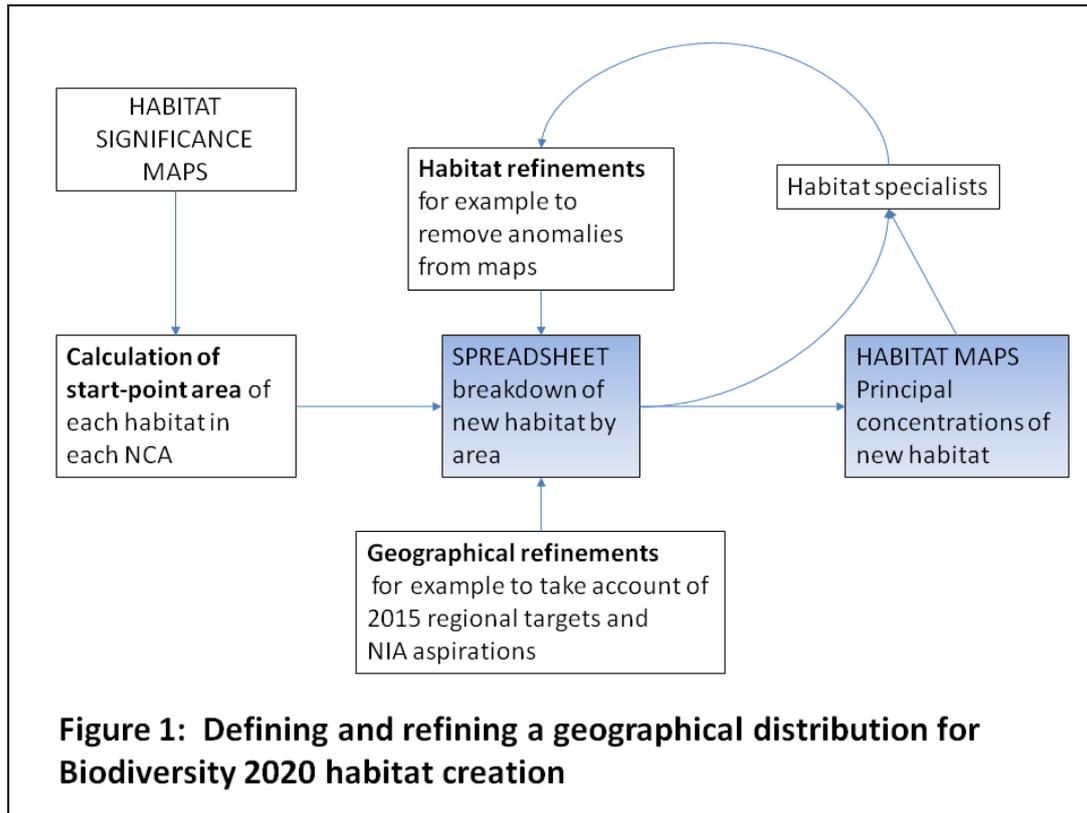
At the heart of the geographical breakdown is a spreadsheet (Habitat_2020_version_18.xls) from which 24 habitat maps have been derived.

¹ Table 5, Task & Finish Group 2 (2012) *Definitions of outcomes 1A, 1B and 3*. Report to the Terrestrial Biodiversity Group – 30 May 2012.

² Lawton, J.H. *et al* (2010) *Making Space for Nature: A review of England's wildlife sites and ecological network*. Report to Defra. [online], <http://archive.defra.gov.uk/environment/biodiversity/documents/201009space-for-nature.pdf>

³ 'National character areas: defining England's natural boundaries'. [online], <http://www.naturalengland.org.uk/publications/nca/default.aspx>

⁴ 'Natural areas'. [online], <http://www.naturalengland.org.uk/ourwork/conservation/biodiversity/englands/naturalareas.aspx>



4.1 The spreadsheet

The spreadsheet was first populated with a ‘start-point area’ for each habitat in each NCA. Start-point areas were derived in most cases from existing assessments of the significance of individual habitats in Natural Areas.⁵

4.1.1 Calculation of start-point figures

The starting point for most habitats was a spreadsheet [SIGNIF.xls] giving the significance of individual Natural Areas by priority habitat (no such information is available for NCAs). The same information is also available in map form⁶. For any particular habitat each Natural Area is assessed as being of ‘National significance’, ‘Local significance’, or left blank.

In using information about a habitat’s current significance it was necessary to make the assumption that restoration and extension will take place in areas where it is already well distributed. It was also assumed that larger NCAs will contribute more to habitat creation than smaller ones. These assumptions are not, of course, necessarily valid, but as a starting point for developing the spreadsheet it was considered reasonable to make them. The significance

⁵ These are also available in map form e.g ‘Natural areas. Lowland heathland. Habitat significance’. [online] http://www.naturalareas.naturalengland.org.uk/Science/natural/NA_HabMap.asp?Name=Dorset+Heaths&N=81&H=34&HName=Lowland+heathland&S=&R=7

⁶ e.g ‘Natural areas. Lowland heathland. Habitat significance’. [online] http://www.naturalareas.naturalengland.org.uk/Science/natural/NA_HabMap.asp?Name=Dorset+Heaths&N=81&H=34&HName=Lowland+heathland&S=&R=7

spreadsheet contained ratings for all the priority habitats that are being considered here, with the exception of:

- traditional orchards;
- ponds;
- arable field margins; and
- upland flushes, fens and swamps.

As described below, slightly different techniques were used for these habitats, and also for hedges and native woodlands.

Because of the incomplete match between Natural Areas and NCAs it was, in many cases, necessary to make an assessment of which NCAs were contributing to the significance rating for the relevant Natural Area, and to score them accordingly. Most were checked against NCA profiles or interim key facts and data.⁷

Each NCA was:

- given a score based on its significance (Nationally significant – 2, Locally significant – 1, Not significant – 0) for each habitat.
- placed into a size category based on a ranking of all NCAs (1st 25% - 4, 2nd 25% - 3, 3rd 25% - 2, 4th 25% - 1).

For any one habitat the size and significance scores for each NCA were multiplied to give either 1,2,3,4,6 or 8, and these figures were used to apportion the habitat totals⁸ amongst the NCAs.

For example, all the individual NCA scores (1,2,3,4,6 or 8) for lowland calcareous grassland were added, which gave 257. The target area of 10,000ha was divided by 257 to give 38.9ha. This was then multiplied by 1,2,3,4,6 and 8 and rounded, as below:

1 x 38.9ha = 38.9ha. Rounded to	40ha (yellow)
2 x 38.9ha = 77.8 ha. Rounded to	80ha (yellow)
3 x 38.9ha = 116.7ha. Rounded to	120ha (light green)
4 x 38.9ha = 155.6ha. Rounded to	160ha (light green)
6 x 38.9ha = 233.4ha. Rounded to	235ha (dark green)
8 x 38.9ha = 311.2ha. Rounded to	315ha (dark green)

NCAs scoring 1 were then allocated 40ha, those scoring 2 were allocated 80ha etc, and were colour coded, as above, in the spreadsheet to give an indication of their relative contribution to the habitat's total (yellow – low to dark green – high). The colour coding is to emphasise the usefulness of relative contribution over absolute values. A blank cell in the spreadsheet does not mean that there will be no expansion/or restoration of the habitat in that particular NCA, but simply that it will not be significant relative to those NCAs that do have an entry.

⁷ 'National character areas: defining England's natural boundaries'. [online], <http://www.naturalengland.org.uk/publications/nca/default.aspx>

⁸ As given in Table 5, Task & Finish Group 2 (2012) *Definitions of outcomes 1A, 1B and 3*. Report to the Terrestrial Biodiversity Group – 30 May 2012

Habitats that had their start-points calculated in a slightly different way are:

1. Traditional orchards – The habitat inventory map for traditional orchards was overlain by NCA boundaries and a rough assessment of their relative significance made, based on the density of orchards. The target total was then apportioned as for other habitats.
2. Ponds – The closest available significance ratings was for the broad habitat ‘standing open water and canals’, which includes ponds. It was assumed that the bulk of the restoration/expansion of the habitat would not take place in nationally significant NCAs. So, these were excluded. Locally significant areas were pooled with all other non-upland areas. The target total was then apportioned based on size categories.
3. Arable field margins - The target total for this habitat is based on an estimate of the area required to reverse the decline of farmland birds.⁹ So, a spreadsheet¹⁰ showing farmland bird categories was used in place of the significance categories used for other habitats.
4. Upland flushes, fens and swamps - Upland NCAs were determined from a map of upland Natural Areas¹¹ and the target total apportioned based just on their size categories.
5. Hedges - As with ponds, it was assumed that the bulk of the restoration/expansion of the habitat would not take place in nationally significant NCAs. So, these were excluded. Locally significant areas were pooled with all other non-upland or dry-stone wall areas. The target total was then apportioned based on size categories.
6. Native woodlands – Separate assessments of priority areas for restoration and for expansion were used¹², and the scores from each combined and then used to apportion the target total.

4.1.2 Initial refinement of the spreadsheet

An example of how one part of the spreadsheet evolved can be seen in Table 1.

Refinements were made on the basis of comments from Natural England habitat specialists. The figures for ponds were checked and amended by Pond Conservation.

The spreadsheet was also checked against, for example:

- Wetland Vision Maps¹³
- Areas Important for Ponds in South East England¹⁴
- Heathland Extent and Potential maps¹⁵

⁹ Task & Finish Group 2 (2012)

¹⁰ ‘Indicative Breakdown of Opportunities for ETIP Farm Wildlife Package Delivery (by NCA)’

¹¹ Backshall, J. & Rebane, M. (2001) ‘Introduction to the handbook’, in English Nature, *The Upland Management Handbook*, Peterborough, English Nature, pp. 1:1 – 1:7.

¹² Kirby, K. (Undated) An approach to identifying priority National Character Areas for woodland from a biodiversity perspective [revised priority for woods (2).docx].

¹³ ‘The Wetland Vision Toolkit: Wetland Vision reports and downloadable maps’. [online]

<http://www.wetlandvision.org.uk/dyndisplay.aspx?d=downloads>

¹⁴ Keeble, H., Williams, P., Biggs, J., & Athanson, M. (2009) ‘Important Areas for Ponds (IAPs) in the Environment Agency Southern Region’, Report prepared for the Environment Agency by Pond Conservation. [online],

<http://www.pondconservation.org.uk/Resources/Pond%20Conservation/Documents/PDF/SE%20IAP%20Report%20FINAL.pdf>

Values were increased, for example, for NCAs that appear to have opportunities for joining up fragmented habitat. Others that scored highly but are known to have relatively limited opportunities were reduced, e.g. heathland in the New Forest. The figures were also checked, and if necessary modified, to ensure that they were appropriate for the habitats being targeted by the 12 Nature Improvement Areas.

Changes were also made so that the values in the spreadsheet reflected previously agreed regional targets for 2015¹⁶. This was done by breaking the spreadsheet down into groups of NCAs that approximately corresponded to the regions, and then adjusting the figures until the regional contribution to each habitat was similar, in percentage terms, to that of the 2015 targets. In doing this the larger highly fragmented NCAs (see below) were favoured when apportioning some habitats. The regional adjustment, however, had the effect of adversely skewing the concentration of woodland towards the north east of the country. It was therefore discarded for this habitat, and the figures presented are the start-point figures as modified on advice from the habitat specialist.

¹⁵ RSPB (2008) 'HEaP (Heathland Extent and Potential) maps'. [online], <http://www.rspb.org.uk/ourwork/conservation/advice/heap.aspx>

¹⁶ As summarised in EBG-09-XX Feedback on Regional Biodiversity Targets for England, Paper for the England Biodiversity Group by Gavin Measures, Natural England – 10th March 2009. Note that not all habitats have a 2015 target for restoration/expansion.

Table 1: Refinement of the spreadsheet - Lowland calcareous grassland

Changes highlighted in red

Change 1: Adjustment to take account of Nature Improvement Area aspirations. Figures for NCAs containing NIAs targeting the habitat were increased. The figure of 1000 for the South Downs is an actual NIA target. Change to Somerset Levels on advice of a local adviser.

Change 2: Adjustment to bring figures in line with 2015 regional targets. Cross-checking against the Habitat Inventory map led to some areas being deleted.

Change 3: Adjustment on advice of the habitat specialist, and to re-establish the relative position of an NIA.

National Character Area	A Significance	B Size category	C (A x B)	Start point (C x 38.9)	Change 1	Change 2	Change 3
North Northumberland Coastal Plain	2	2	4	160	160	50	50
Northumberland Sandstone Hills	2	3	6	235	235	80	80
Cumbria High Fells	2	4	8	315	315	Deleted	
Tyne Gap and Hadrian's Wall	2	2	4	160	160	50	50
Mid Northumberland	2	2	4	160	160	50	50
Durham Magnesian Limestone Plateau	2	2	4	160	160	50	160
Orton Fells	2	1	2	80	80	Deleted	
South Cumbria Low Fells	2	3	6	235	235	Deleted	
Morcambe Bay Limestones	2	2	4	160	315	120	160
Yorkshire Dales	2	4	8	315	315	120	120
North Yorkshire Moors and Cleveland Hills	2	4	8	315	315	120	120
Yorkshire Wolds	2	4	8	315	315	160	160
Southern Magnesian Limestone	2	4	8	315	315	120	120
Morecambe Coast and Lune Estuary					40	Deleted	
Bowland Fringe and Pendle Hill	2	3	6	235	235	Deleted	
Bowland Fells	2	2	4	160	160	Deleted	
Lincolnshire Wolds	1	3	3	120	120	80	80
Central Lincolnshire Vale	1	3	3	120	120	Deleted	
Northern Lincolnshire Edge with Coversands	1	2	2	80	80	80	80
Southern Lincolnshire Edge	2	2	4	160	160	80	80
Trent and Belvoir Vales	1	4	4	160	160	40	40
White Peak	2	2	4	160	160	40	160
Oswestry Uplands	1	1	1	40	40	10	10
Shropshire Hills	1	4	4	160	160	40	40
Cannock Chase and Cank Wood					40	10	10
Melbourne Parklands	1	1	1	40	40	Deleted	
Leicestershire and Nottinghamshire Wolds	1	3	3	120	120	60	60
Kesteven Uplands	2	3	6	235	235	60	60

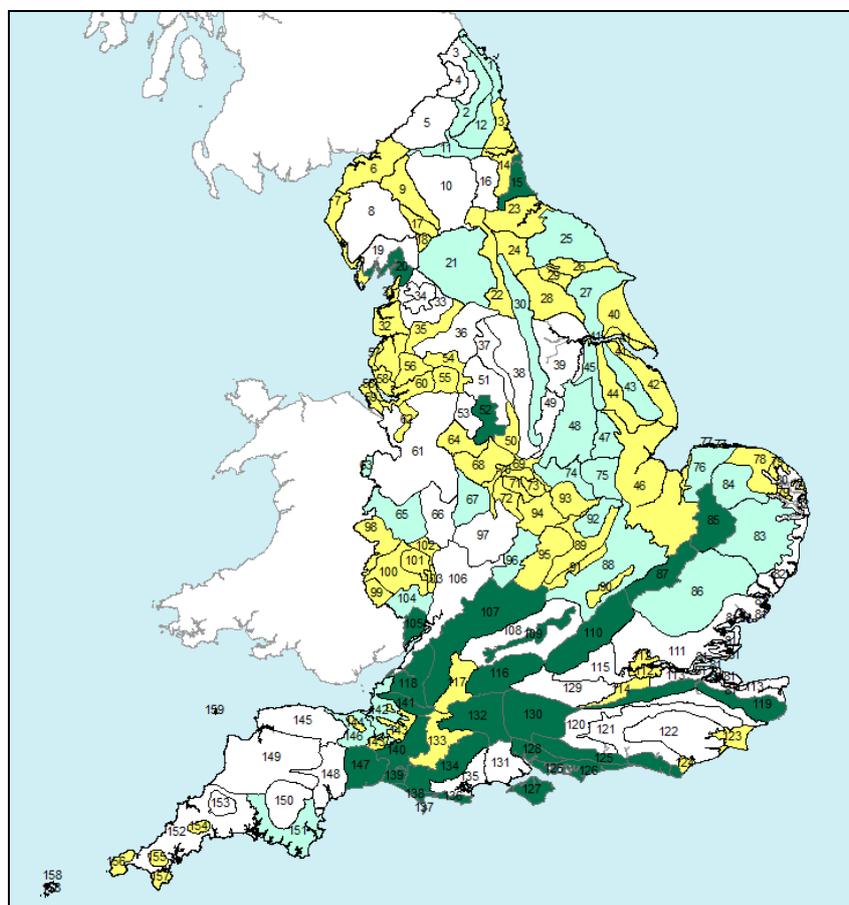
National Character Area	A Significance	B Size category	C (A x B)	Start point (C x 38.9)	Change 1	Change 2	Change 3
North West Norfolk						230	120
South Norfolk and High Suffolk Claylands						160	160
Mid Norfolk						40	40
Breckland	2	4	8	315	315	350	350
South Suffolk and North Essex Clayland						115	120
East Anglian Chalk	2	3	6	235	235	300	300
Bedfordshire and Cambridgeshire Claylands						160	160
Rockingham Forest	2	2	4	160	160	80	80
High Leicestershire	1	2	2	80	80	Deleted	
Leicestershire Vales	1	3	3	Deleted			
Northamptonshire Uplands	1	3	3	120	120	Deleted	
Dunsmore and Feldon	1	3	3	120	120	30	30
Malvern Hills	1	1	1	40	40	Deleted	
South Herefordshire and Over Severn	1	2	2	80	80	20	20
Forest of Dean and Lower Wye	1	1	1	40	40	80	80
Cotswolds	2	4	8	315	315	550	550
Chilterns	2	4	8	315	315	400	400
Berkshire and Malborough Downs	2	4	8	315	315	650	650
Bristol, Avon Valleys and Ridges	1	3	3	120	120	200	200
North Downs	2	4	8	315	315	400	400
South Downs	2	4	8	315	1000	1000	1000
South Coast Plain	1	2	2	80	80	100	100
Isle of Wight	2	2	4	160	160	200	200
South Hampshire Lowlands	1	2	2	80	80	100	100
Hampshire Downs	2	4	8	315	315	600	600
Salisbury Plain and West Wiltshire Downs	2	4	8	315	315	250	250
Blackmoor Vale and Vale of Wardour	1	3	3	120	120	Deleted	
Dorset Downs and Cranborne Chase	2	4	8	315	315	550	550
South Purbeck	2	1	2	80	80	300	300
Isle of Portland	2	1	2	80	80	100	100
Weymouth Lowlands	1	1	1	40	40	80	80
Marshwood and Powerstock Vales	1	1	1	40	40	80	80
Yeovil Scarplands	1	3	3	120	120	300	300
Mendip Hills	2	1	2	80	80	200	200
Somerset Levels and Moors	1	3	3	120	60	50	50
Vale of Taunton and Quantock Fringes	1	2	2	80	80	50	50
Blackdowns	1	3	3	120	120	150	150
South Devon	2	4	8	315	315	100	100
TOTAL			257	10060	10920	9595	9760
Target total				10000	10000	10000	10000

Note that although the total fluctuates, an approximation to the target total is adequate for the purposes of determining relative contributions.

4.2 The habitat maps

The 24 maps were derived from the spreadsheet and show the distribution of aspiration for each habitat. The aspirational areas for each habitat in each NCA were divided by the NCA's size category to give relative densities. These were then categorised as high and low, as shown for lowland calcareous grassland in Map 1¹⁷. Note that white on the maps does not necessarily represent a zero aspiration, but includes, in the case of very widespread habitats such as woodland and hedges, areas of that aspiration is relatively low.. The maps often revealed anomalies that were not so apparent in the spreadsheet and so contributed to the process of refinement (see Figure 1).

Map 1 - Example habitat map – Lowland calcareous grassland



 High density  Low density  NCAs with high fragmentation.

All the habitat maps are presented in the same format, as interactive PDFs with separate map layers for the habitat, NCA labels, and fragmentation. By turning the habitat layer on and off it is

¹⁷ It is possible to generate more but narrower categories for some habitats if required, but for the sake of consistency all are initially presented using just the two categories.

possible to get an impression of the extent to which the habitat has the potential to occupy the most highly fragmented NCAs.

5. Discussion

5.1 The need for further refinement

Although the columns of the spreadsheet have been sequentially refined following, for example, comment from habitat specialists, the rows have not yet received the same attention. The absence of such a feedback loop in Figure 1 is striking. It will thus be important to ensure that the aspirational figures for habitats in an area do not conflict with each other and that the total habitat creation aspiration for any one area is reasonable. For example, the aspiration for saltmarsh creation should not be attempting to use the same space as the aspiration for coastal and floodplain grazing marsh. We believe that this validation is best done at the local level, for example by Natural England's local advisers, county wildlife trusts, or by habitat networks that include local specialists, such as the Natural England Grassland Delivery Network.

Further refinements will be possible as new information becomes available. For example, Pond Conservation are doing work to define more Important Areas for Ponds, which they will complete in 2013.

Such an iterative process will allow plenty of opportunity to engage with a broad range of stakeholders, in order to reach a consensus, either nationally or in particular localities. The latter is particularly important, given the Government's localism agenda and that decisions about specific actions to create habitats are often best made locally.¹⁸

5.2 How can the geographical breakdown be used?

This geographical breakdown of the 200,000ha aspiration will be most useful if it can provide insights that help us convert that aspiration into reality. One such insight, into fragmentation, is described below. The breakdown as presented here can help answer questions such as:

- What might the 200,000 hectares look like when spread across habitats and different parts of the country?
- Does this look feasible, nationally or in different areas?
- Which areas could or should contribute more to the total?
- Is there likely to be an appropriate mix of habitats in any particular area?

It will be better able to do this if it is open to continual refinement, as discussed above. However, even with refinement, the picture painted here can only ever be one of an infinite number of possible future scenarios, so it would not be useful to regard it as a fixed plan of action. Indeed, the scale and complexity of the desired outcome is such that it cannot be planned in any conventional sense¹⁹. Similarly, the figures provided for habitats in individual NCAs should not be regarded as 'local targets'. Their value lies in the contribution that they make to the whole. All this is not to say, of course, that the insights gained cannot be used to inform actions that *can*

¹⁸ Lawton, J.H. *et al* (2010)

¹⁹ For the classic account of why this is see Rittel, H.W.J. & Webber, M.M. (1973) 'Dilemmas in a general theory of planning', *Policy Sciences*, Vol. 4, pp. 155-169. [online]

http://www.ucc.net/mwebber/Rittel+Webber+Dilemmas+General_Theory_of_Planning.pdf

more readily be planned; the deployment of resources to particular areas or habitats, for example.

The geographical breakdown presented here should, therefore, be regarded not as a plan but as a model of an evolving situation - a model that can be used to aid decision making.

5.2.1 An insight into reducing habitat fragmentation

There is a need to create new habitat, and to increase the size of sites, especially in areas where habitat fragmentation is high.²⁰ All NCAs were therefore allocated an index of fragmentation (1 – low, 4 – high)²¹. All those NCAs with the highest index (4) are shown on Map 2, and are similarly highlighted in the spreadsheet. The red NCAs, being both highly fragmented *and* large, might be expected to come high in a list of total habitat per NCA²². Sorting the spreadsheet accordingly gives the ranking shown in Table 2, in which three of the largest fragmented NCAs occur in the top 10 (in fact all six of the largest occur within the top 30). However, the dominance of arable field margins, which account for over 30% of the total target, does tend to skew the results in favour of NCAs that contain high proportions of this habitat. Nevertheless, this exercise provides a useful insight into the feasibility of putting habitats into the areas where they will make the optimum contribution to the ecological network.

6. Recommendations

It is recommended that the Terrestrial Biodiversity Group should note the geographical breakdown of its habitat creation aspiration as presented here.

It is also recommended that it should be open to a process of continual refinement. Further refinements are likely to reveal fresh insights that will aid decision making, and it is recommended that the generation of such insights should be regarded as its main purpose.

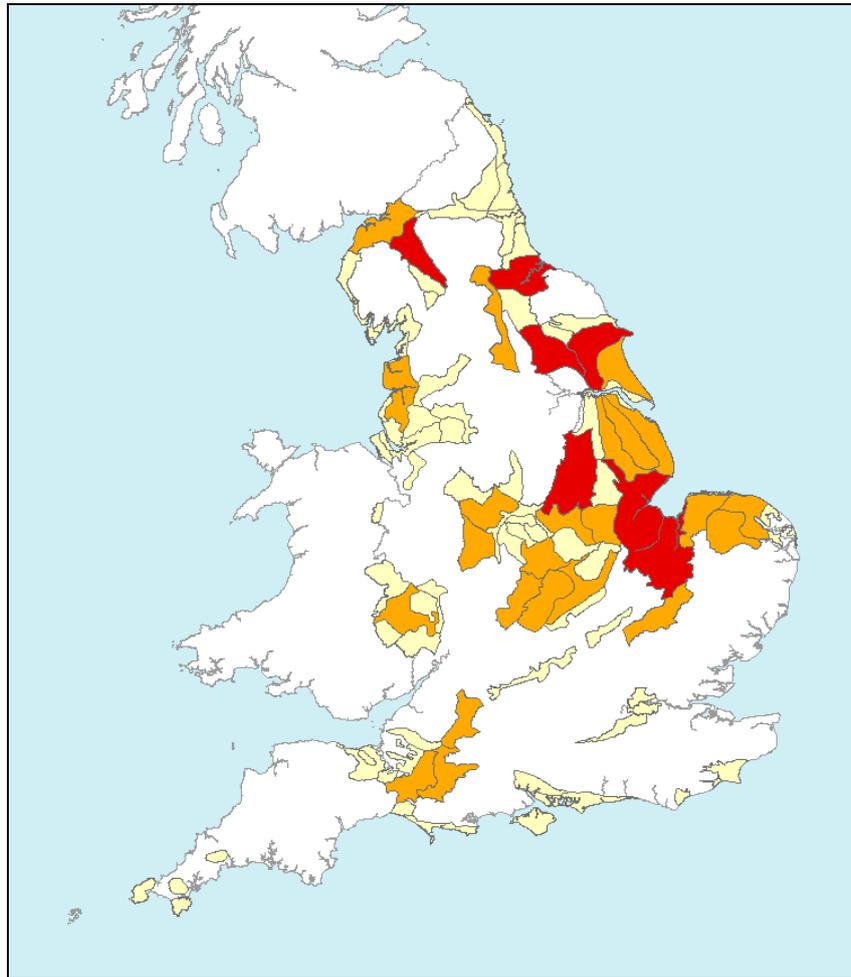
²⁰ Lawton, JH *et al* (2010) *Making Space for Nature: A review of England's wildlife sites and ecological network*. Report to Defra. [online], <http://archive.defra.gov.uk/environment/biodiversity/documents/201009space-for-nature.pdf>

²¹ Derived from Lawton *et al*, 2010, Figure 4 p. 51

²² As NCAs were not used for coastal habitats the latter were excluded from this exercise.

Map 2 - NCAs with high fragmentation – categorised by size

Source: Fig. 4, p.51 *Making Space for Nature*, and Habitat_2020_version_17.xls



Large (Size 4)
 Medium (Size 3)
 Small (Sizes 2 and 1)

NCA No.	National Character Area
39	Humberhead Levels
46	The Fens
28	Vale of York
61	Shropshire, Cheshire and Staffordshire Plain
130	Hampshire Downs
85	Breckland
78	Central North Norfolk
48	Trent and Belvoir Vales
76	North West Norfolk
116	Berkshire and Malborough Downs

Table 2: The top ten contributing NCAs

Source: Habitat_2020_version_17.xls