 **Question 15: Under what circumstances are habitats created on previously developed land? How do the newly created habitats compare with habitats that were lost to development?**

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DEFINITIONS

LUCS – Land Use Change Statistics.

POLICY CONTEXT STATEMENT

1. Information on changes in land use is important in order to be able to assess the impacts of current planning policies and to inform the planning policies of the future. There are a number of important issues in the area of development which the government is currently concerned with (ODPM 2001). These include; the amount of land which is being urbanised on previously developed land, the transfer of agricultural land to housing and other developments and the development of vacant land in urban areas. LUCS for the period 1985-1996 reveal a continuing trend towards the urbanisation of rural areas, although there is also evidence of some urban land becoming rural. The statistics reveal differences between regions of the UK which are in part dependent on the availability of building land within cities, i.e. 'brownfield' sites. For example, urban increases in London largely result from development on previously developed sites, whilst in the South West the majority of development takes place on agricultural land.
2. Between 1995 and 1998 there was a net reduction in the amount of agricultural land of 11,300 ha per year, 40% of which was due to development. A small proportion of land lost to development between 1997 and 2000 was part of greenbelt land indicating that development is occurring in part at the edges of towns and cities.
3. Whilst Land Use Changes Statistics provide valuable information about changes in urban areas, they are not designed to provide detailed information about changes in rural areas. Conversely, Countryside Survey is designed to survey the countryside, not urban areas. Of the randomly selected squares for CS, any with more than 75% urban cover in 1990 were specifically excluded from the survey. Countryside Survey can therefore only inform us about the impacts of development on rural or urban fringe areas. However, it is perhaps these areas that are most at risk in terms of potential damage or degradation as a result of development in inappropriate areas (Harrison & Davies 2002, Harrison & Burgess 1994). Planners are likely to require good information about the ecological status of areas prone to development in order to optimise development and provide compensatory habitats if necessary (Yokohari *et al.* 1994, Yokohari *et al.* 2000, Cowell 1997 and Harrison & Davies 2002)
4. For CS, all developed land, apart from transport features in rural areas is included in a single BAP Broad Habitat, called *Built up and Gardens*. This BAP covers both urban and rural settlements, farm buildings and all man-made structures such as industrial estates, retail parks, waste and derelict ground, mineral workings, airports, urban parkland and transport infrastructure in urban areas. This question arises in part from

the fact that the *Built up and Gardens* Broad Habitat incorporates such a wide range of different features. It is hoped that by looking in more detail at the changes which occurred between 1990 and 1998 than has previously been possible, it may be possible to identify where change is occurring as well as the extent of change in those areas.

5. The CS in 1998 showed that the *Built up and Gardens* Broad Habitat accounted for around 6% of rural land, while transport features made up a further 2% and was particularly concentrated in the lowlands of England and Wales. The area of developed land in rural areas increased by about 58,000ha in Great Britain with biggest increases in the areas which already contained a concentration of the *Built up and Gardens* Broad Habitat. The growth in the area of the *Built up and Gardens* Broad Habitat reflects the continued pressures for urban development particularly in the south and east of England. Analyses of the patterns of transfer between other Broad Habitats and developed land since 1990, show that development in rural areas has largely been at the expense of agricultural land. Whilst this is not an area for great concern, the loss of *Broadleaf Woodlands* and *Neutral Grasslands*, may be of more concern. However, in the same way that the *Built up and Gardens* Broad Habitat covers a range of features, some of which may be more 'built-up' than others, the *Neutral Grassland* Broad Habitat includes a range of grassland types, some of which are of higher ecological quality than others.

Background

6. CS2000 is primarily a survey of rural land. Questions 15 and 16 attempt to discover to what extent it is able to inform us about land in more developed parts of the countryside. This question specifically concentrates on a comparison of the habitats lost and gained to developed land between 1990 and 1998.

SCIENTIFIC OUTPUTS

15.1. *Habitats created on previously developed land*

Approach

7. A total of 457 parcels of land which had changed from the *Built up and Gardens* Broad Habitat to any other Broad habitat type between 1990 and 1998 were investigated. The 457 parcels were manually checked by reference to the Field Assessment Booklets (FAB'S) to retrieve information on primary, use and condition codes in 1990, which were not available in the ORACLE database. Built up areas were not perceived as important habitats to report on at the time of the 1990 survey, hence attribute codes were amalgamated for simplification of data input. One consequence of this amalgamation was that in 1998 the surveyors did not have the attribute codes available on field recording sheets, thus affecting the ability of the surveyors to be conservative in their recording, thus identifying genuine change.
8. A proportion of parcels that were supposedly converted from *Built up & Gardens* to other Broad Habitat types were manually validated to assess whether change was genuine. This analysis resulted in the identification of a generic anomaly in the Broad Habitat allocation procedure for the following specific case: if a parcel was described both in the structure mapping sheet and in an 'other' sheet, usually the allocation was in favour of the 'other' mapping sheet, notably because more attribute codes were available to describe it (e.g. species and cover codes) and it therefore scored the highest. We introduced the simple rule that if a parcel was described in the structure

sheet, the structure description automatically took precedence. The result of this was that 150 parcels which had appeared to change from *Built up and Gardens* in 1990 to other Broad Habitats in 1998 had actually remained in the *Built up and Gardens* Broad Habitat

9. The area of the remaining 307 parcels added up to a very small area of recorded change, only 48 ha in total. These parcels, which changed from a *Built up and Gardens* primary code for cover type (e.g. buildings, gardens, public open spaces) in 1990, to any code not associated with *Built up and Gardens* in 1998 were analysed and national estimates derived (Table 15.1a and Table 15.1b).

Results

10. In England and Wales, an estimated 12,000 to 21,000 ha have been converted from *Built up and Gardens* to other Broad Habitat types, mostly in the lowlands (zones 1 and 2). This represents between 1 and 2% of the 1990 stock of *Built up and Gardens*. In Scotland, between 1000 and 5000 ha were converted, mainly in the lowlands (zone 4), which represents between 1 and 4% of the 1990 stock of *Built up and Gardens*.
11. Analysis of CS results shows that in England & Wales, parcels were mainly converted to intensive agriculture and to semi-natural grassland and woodland to a lesser extent (Table 15.1a). Conversions occurred mostly on parcels that were described in 1990 with primary codes of garden / grounds with or without trees (Table 15.1b). In Scotland, most changes took place on parcels described as 'other land' in 1990 and conversions were mostly to intensive agriculture.
12. We examined closely the attribute codes in 1990 of *Built up and Gardens* parcels that were converted into categories of Broad Habitat types in GB. The results are shown in Figs. 15.1 - 15.4. Conversions from *Built up and Gardens* to *Arable and Horticultural* (Fig 15.1) occurred mostly on parcels described as garden & grounds in 1990, as well as on parcels which were allocated both a garden/grounds and a building primary code. It is difficult to assess whether these changes are genuine as the difference between a parcel described on the structure map as garden / grounds and a parcel described as grassland on the agricultural map can be minimal. However, about 10% of the area converted appears to have occurred on parcels described as buildings in 1990. Conversions from *Built up and Gardens* to woodland (Fig 15.2) exhibited a wide range of attributes in 1990. About 45% of the area converted to woodland was garden / grounds, building and garden/grounds and public open space, all of which are likely conversions. The area converted to woodland described as road in 1990 came from a single 1 km square where a track surrounded by woodland disappeared between 1990 and 1998. The majority of conversions from *Built up and Gardens* to semi-natural grassland (Fig 15.3) happened to parcels described as garden / grounds and public space (which includes amenity grass). Conversions from *Built up and Gardens* to *Boundary and Linear features* are shown in Fig 15.4. The vast majority of parcels allocated to *Boundary and Linear Features* already had a 'road' primary code in 1990. Change between the 2 categories is in fact an artefact resulting from methodology. A section of road between 2 buildings will be recorded as *Built up and Garden*, but if a building on one side disappears, the road is recorded as a linear feature and is hence allocated to the *Boundary and Linear features* Broad Habitat.

Table 15.1a. Upper and lower estimates in '000 ha of conversion from *Built up and Gardens* to other Broad Habitats for each Environmental zone and country (1000 bootstraps). Intensive agriculture = *Arable & Horticultural* + *Improved grassland*; Semi-natural grassland = *Neutral grassland* + *Calcareous grassland* + *Acid grassland*; Wood = *Broadleaved, Mixed & Yew woodland* + *Coniferous woodland*; Linear = *Boundary and linear features*; Other = all Broad Habitat types not mentioned above.

	Intensive agriculture	Semi-natural grassland	Woodland	Linear	Other	<i>Total area converted</i>
Zone1	1.07 – 5.04	0.02 – 2.60	0.48 – 3.69	0.08 – 1.61	0.01 – 0.33	3.27 – 9.96
Zone 2	2.43 – 7.10	0.79 – 3.49	0.47 – 2.42	0.26 – 1.22	0.04 – 0.80	6.69 – 13.05
Zone 3	0.01 – 0.11	0 – 0.02	0 – 0.02	0	0 – 1.10	0.02 – 1.21
E&W.	4.40 – 10.62	1.28 – 5.10	1.40 – 5.14	0.57 – 2.31	0.19 – 1.73	11.99 – 21.11
Zone 4	0.05 – 2.31	0.02 – 0.64	0.03 – 0.63	0.01 – 0.97	0.01 – 0.97	0.75 – 5.18
Zone 5	0	0 – 0.02	0	0 – 0.17	0 – 0.17	0 – 0.18
Zone 6	0 – 0.06	0	0	0	0	0 – 0.06
Sc.	0.11 – 2.35	0.02 – 0.65	0.03 – 0.66	0.02 – 1.04	0.02 – 1.04	0.93 – 5.32

Table 15.1b. Upper and lower estimates in '000 ha of conversion from *Built up and Gardens* to other Broad Habitats, for each primary code in 1990 and for each Environmental zone (1000 bootstraps). Buildings = building, glasshouse; Grounds and buildings = building in combination with garden & grounds with trees/ garden & grounds without trees / agricultural curtilage; Grounds & gardens = garden & grounds with trees/ garden & grounds without trees / agricultural curtilage / allotment / golf course; Public space = public open space, amenity grass, school playing field; Campsites & similar = camp site, caravan park, car park; Road = railway track, road, constructed track, unconstructed track, footpath; Other = other land, embankment, waste.

	Buildings	Grounds & Buildings	Grounds & gardens	Public space	Campsites & similar	Road & tracks	Other	No information	Total area converted
Zone1	0.01 - 0.54	0.08 – 3.21	0.58 – 4.26	0 – 0.69	0 - 0.06	0.18 – 2.96	0.05 – 0.97	0.16 -1.43	3.27 – 9.96
Zone 2	0.29 – 3.50	0.30 – 1.69	1.37 – 5.47	0.32 – 2.48	0 – 2.01	0.31 – 1.21	0.16 – 2.21	0.04 – 0.57	6.69 – 13.05
Zone 3	0 – 0.23	0 – 0.02	0 – 0.09	0	0	0	0 – 1.13	0	0.02 – 1.21
E&W.	0.50 – 3.64	0.72 – 4.13	2.81 – 8.54	0.57 – 2.75	0 – 2.04	0.74 – 3.83	0.65 – 3.21	0.38 – 1.77	11.99 – 21.11
Zone 4	0.07 – 0.69	0 – 0.70	0 – 0.14	0	0 -0.14	0.08 – 1.27	0.02 – 2.44	0 – 1.40	0.75 – 5.18
Zone 5	0 – 0.01	0	0 – 0.17	0	0 – 0.01	0	0	0 – 0.01	0 – 0.18
Zone 6	0	0	0 – 0.06	0	0	0	0	0	0 – 0.06
Scotland	0.08 – 0.69	0 – 0.73	0.02 – 0.27	0	0 – 0.16	0.07 – 1.20	0.02 – 2.45	0 – 1.35	0.93 – 5.32

Figure 15.1a. Conversions from *Built up and Gardens* to ‘Intensive Agriculture’ (see Table 15.1a) (total land area = 19 ha, from 58 CS squares).

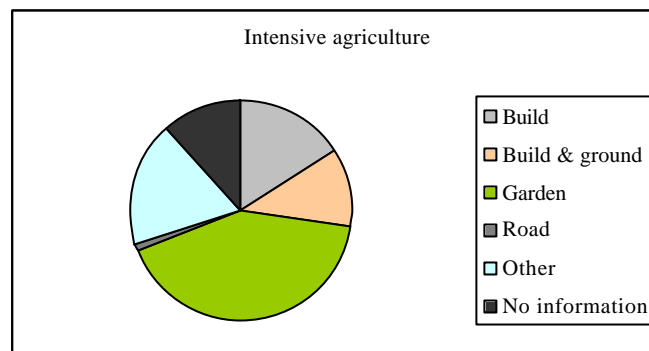


Figure 15.1b. Conversions from *Built up and Gardens* to ‘woodland’ (see Table 15.1a) (total land area = 6.8 ha, from 28 CS squares)

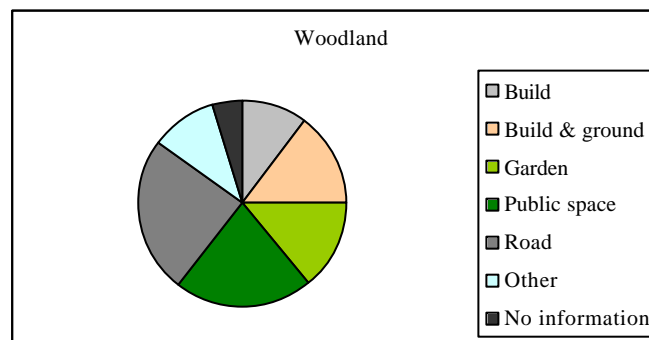


Figure 15.1c. Conversions from *Built up and Gardens* to ‘semi-natural grassland’ (see Table 15.1a) (total land area = 8.6 ha, from 27 CS squares).

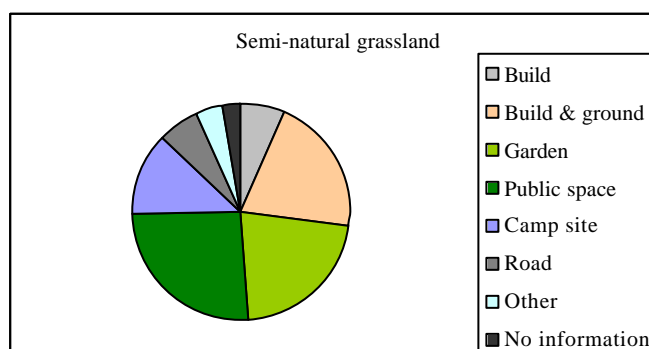
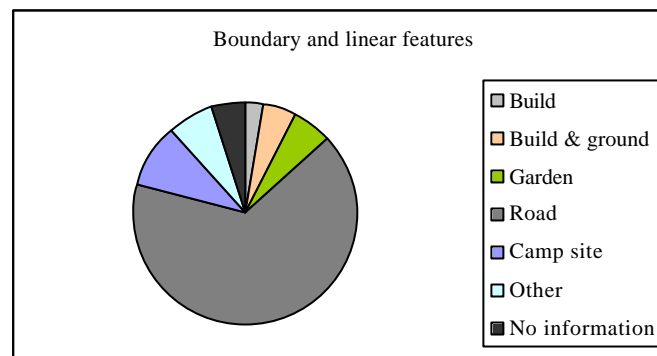


Figure 15.1d. Conversions from *Built up and Gardens* to *Boundary and Linear features*. (Total land area = 4.7 ha, from 21 CS squares).



15.2. Habitats lost to developed land

Approach

13. A total of 997 parcels of land (totalling 222ha) which had changed to the *Built up and Gardens* Broad Habitat from any other Broad habitat type between 1990 and 1998 were investigated. Information on primary, use and condition codes for these parcels in 1990 and 1998 were obtained from links with the Oracle database. In contrast to the parcels investigated in part 1 of this question it was possible to obtain attribute codes from the database as these parcels were not in the *Built up and Gardens* Broad Habitat in 1990. In order to ensure that the correct codes were being correctly linked to the parcels, 10% of the dataset was manually validated by reference to the Field Assessment Booklets (FAB'S). These data were also manually checked to evaluate the Broad Habitat allocation based on the codes recorded and to ascertain whether the change in the allocation was real. These parcels, which changed from any code not associated with *Built up and Gardens* in 1990 to a *Built Up and Gardens* primary code for cover type (e.g. buildings, gardens, public open spaces) in 1998 were analysed and national estimates derived (Table 15.2a and Table 15.2b).

Results

14. In Great Britain it is estimated that 97,000 ha of habitat has been lost to developed land between 1990 and 1998. This represents a total of 5% of the 1998 estimated total area of developed land. Two thirds of habitat lost (61,000 ha) were 'intensive agriculture' Broad Habitats (see Table 15.1a) representing less than 1% of the total stock of the area of these habitats in 1990. The next largest loss of habitat to developed land was 21,000 ha from 'semi-natural grasslands', but again this represents less than 1% of the total stock of area of these habitats in 1990. Loss of 'woodland' and 'other' habitat together represent less than 1% of the area of these Broad Habitats in 1990.

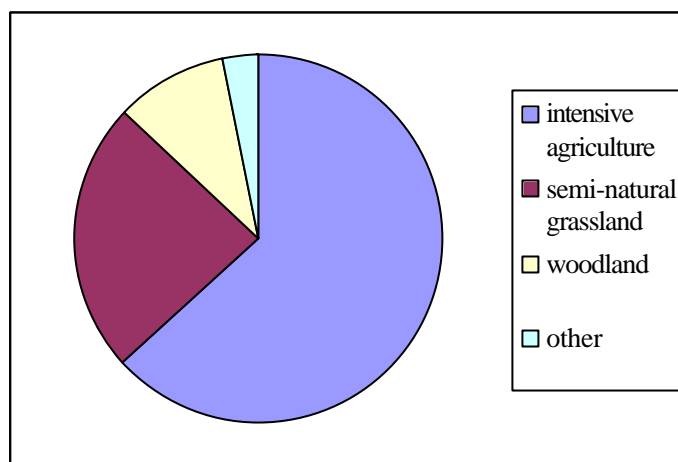


Table 15.2a. Estimates and Standard Errors (SE) in '000 ha of loss of habitats to developed land in Great Britain 1990-1998 (habitats as per Table 15.1).

	<i>area</i>	<i>S.E.</i>	<i>95% lower limit</i>	<i>95% upper limit</i>
intensive agriculture	61.1	9.1	46.1	79.3
semi-natural grassland	23.4	6.9	12.8	37.1
woodland	9.4	2.0	5.9	13.4
other	3.1	0.8	1.7	4.7
total	97.0	13.4	75.1	121.8

15. In England and Wales, it is estimated that 79,000 ha of habitat has been lost to developed land, mostly in Environmental Zones 1 and 2 (Table 15.2b) representing around 4% of the 1998 stock of developed land. In Scotland, the majority of loss to developed land was in Environmental Zone 1, where a total loss of 18,000 ha represented approximately 6% of the 1998 stock of developed land. In England & Wales, nearly 75% of habitat lost to developed land was from 'intensive agriculture' Broad Habitats. However, this area represents less than 1% of the total area of land in these Broad Habitats in 1990. In Scotland much less land (3,000ha) was lost from 'intensive agriculture' Broad Habitats to developed land, accounting for just 18% of all land lost to development.
16. Loss of habitats from 'semi-natural grassland' Broad Habitats was similar in actual area in both England & Wales and Scotland with 12,000ha and 11,000 ha respectively. However, whilst this loss contributed to 15% of the total habitat loss for England & Wales, for Scotland this made up 62% of total losses. In neither case did this amount to more than 1% of the total area for the 'semi-natural grassland' Broad Habitats in 1990. 'Semi-natural grassland' Broad Habitats were mainly lost from the lowlands and marginal uplands, Environmental Zones 1, 2, 4 and 5, whilst the uplands of England and Wales and the true uplands of Scotland lost very little.
17. In order to gather as much information as possible about the land which has been developed between 1990 and 1998 the descriptive 'attribute' codes of developed land parcels that had been converted from non-developed land in GB were examined closely. Table 15.2c shows the total area ('000ha) lost (base dataset figures) through conversion to developed land from

non-developed Broad Habitats, by Broad Habitat groupings and developed land category 1990-1998.

Loss from 'intensive agriculture'

18. Whilst losses from intensive agriculture (Figures 15.5 and 15.6) accounted for nearly two-thirds of all losses to developed land almost half of these losses were from the *Improved Grassland* Broad Habitat. 155 survey squares were affected totalling 139ha in the dataset. The habitat was lost to a variety of developed land categories but largely to 'Buildings' and 'Grounds & Gardens' which accounted for nearly half (63ha) of losses.

Loss from 'woodlands'.

19. Losses from woodland occurred in 75 survey squares and covered a total area of 20ha accounting for only 6% of all lost habitat. Almost half of this area (9ha) was to the *Boundary & Linear features* Broad Habitat, equally divided between both types of woodland Broad Habitats, occurring in 32 survey squares (although 3 squares on their own accounted for 5ha) (Figures 15.7). The majority of losses resulted from changes to constructed tracks and roads.

Loss from 'semi-natural grasslands'

20. Over 80% of semi-natural grassland loss was from *Neutral Grassland* (Figures 15.8.) with the rest being lost from *Acid Grassland*. Losses from *Neutral Grassland* occurred in 61 survey squares and totalled 41ha. The largest loss (20ha) was to 'Buildings' which occurred in 20 survey squares with an enlargement of an existing building complex in just one survey square accounting for nearly half the total area (9ha). The next largest loss (9ha) was to the *Boundary & Linear features* Broad Habitat and occurred in 17 survey squares. The largest loss of *Acid Grassland* was to the *Inland Rock* Broad Habitat and was almost entirely due to enlargement of a quarry in one survey square in Environmental Zone 4.
21. Losses from all other Broad Habitats totalled just 7.5ha (3% of all lost land) and was consequently not broken down further by Broad Habitats (Fig 15.9).

Figure 15.2b. Conversions from ‘intensive agriculture’ to developed land 1990-1998.

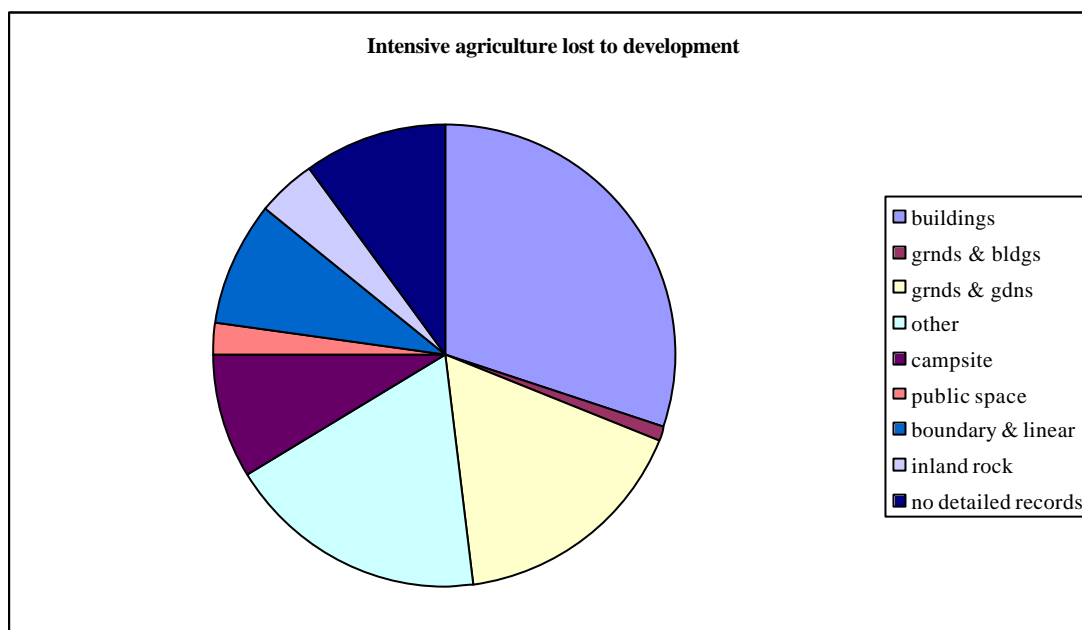


Figure 15.2c. Conversions from ‘woodland’ to developed land 1990-1998.

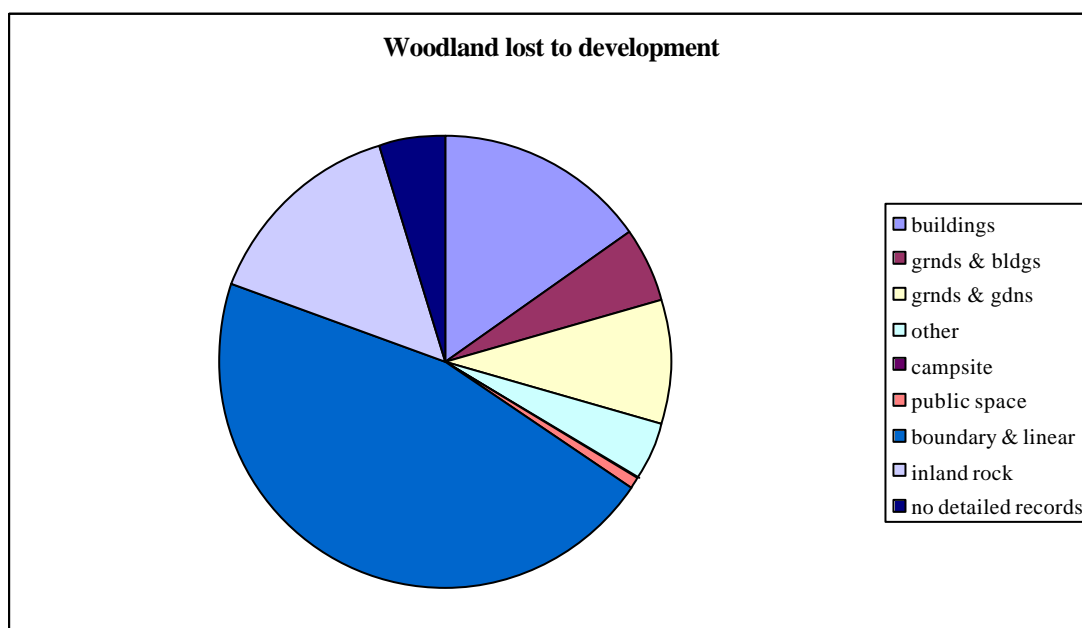


Figure 15.2d. Conversions from 'semi-natural grasslands' to developed land 1990-1998.

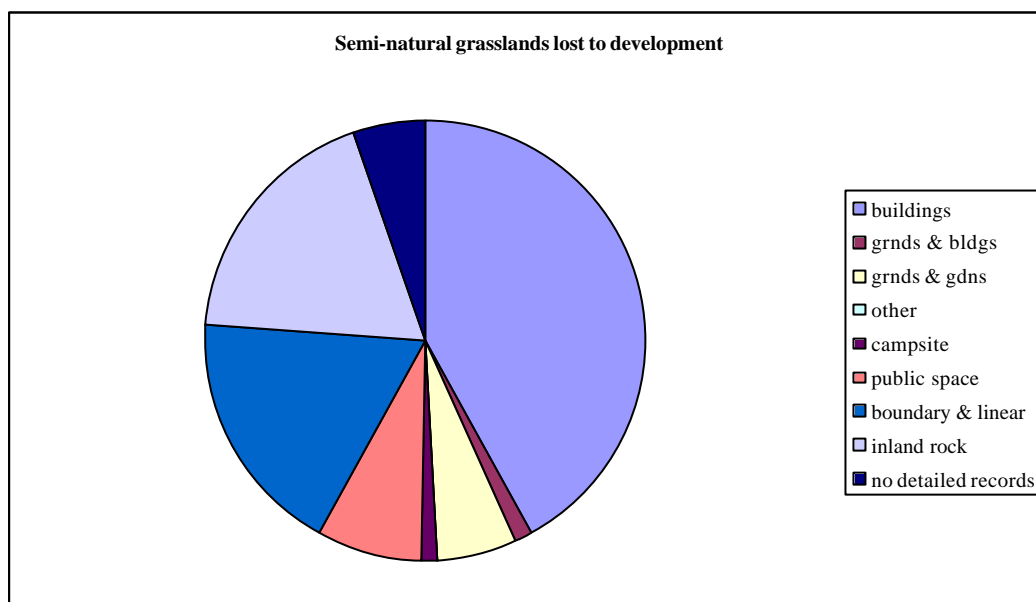


Figure 15.2e. Conversions from all 'other' Broad Habitats to developed land 1990-1998.

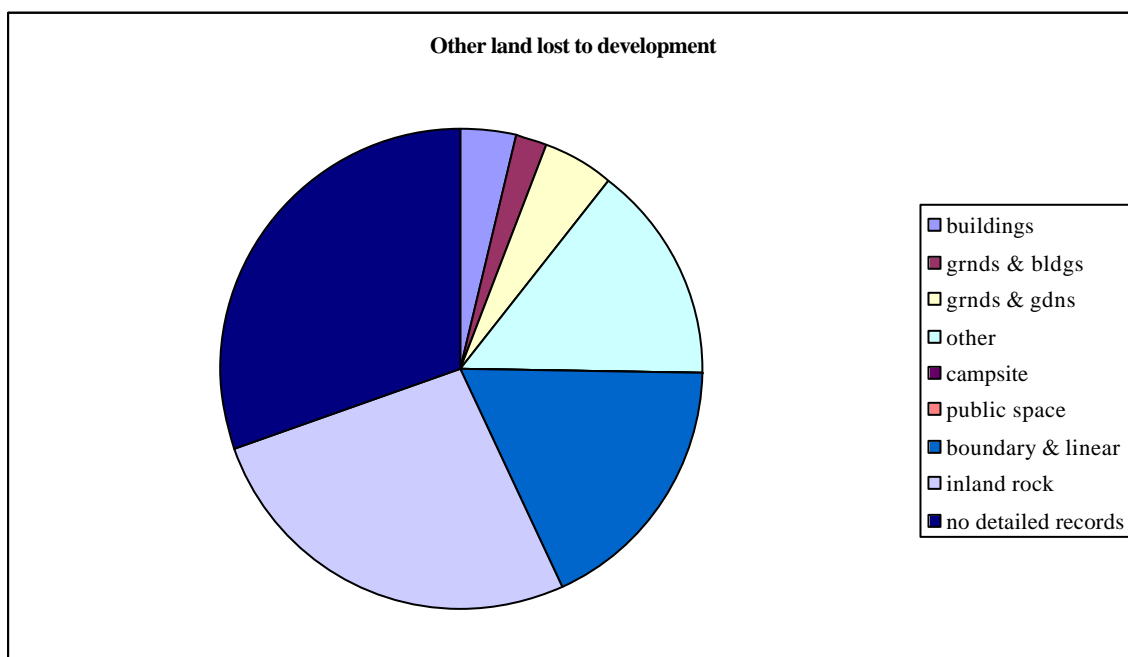


Table 15.2b : Upper and lower estimates in '000 ha of conversion to developed land from non-developed Broad Habitats, by category 1990- 1998, by Environmental Zone and country (1000 bootstraps). Buildings = building, glasshouse; Grounds and buildings = building in combination with garden & grounds with trees/ garden & grounds without trees / agricultural curtilage; Grounds & gardens = garden & grounds with trees/ garden & grounds without trees / agricultural curtilage / allotment / golf course; Public space = public open space, amenity grass, school playing field; Campsites & similar = camp site, caravan park, car park; Boundary & linear = railway track, road, constructed track, unconstructed track, footpath; Inland Rock= gravel pit, quarry; Other = other land, embankment, waste.

	Buildings	Grounds &Buildings	Grounds & gardens	Other	Campsites & similar	Public space	Boundary & linear	Inland Rock	No information	<i>Total area converted</i>
EZ 1	3.1 - 11.2	0.0 - 1.0	3.0 - 10.2	0.0 - 1.0	0.2 - 5.7	0.0 - 5.5	0.8 - 3.9	0.0 - 0.2	2.2 - 24.2	19.3 - 47.6
EZ 2	7.4 - 23.1	0.2 - 2.2	2.2 - 7.3	1.6 - 15.2	0.8 - 4.6	0.0 - 1.6	2.4 - 14.9	0.0 - 0.8	1.3 - 4.9	26.2 - 59.7
EZ 3	0.2 - 3.2	0.0 - 0.5	0.4 - 2.9	0.0 - 0.9	0.0 - 0.0	0.0 - 0.0	0.3 - 5.1	0.0 - 2.0	0.0 - 0.1	3.1 - 11.0
E&W	14.4 - 32.1	0.7 - 3.0	8.0 - 17.4	2.3 - 15.7	2.0 - 8.6	0.6 - 6.1	5.5 - 19.9	0.2 - 2.7	5.2 - 27.0	60.1 - 104.7
EZ 4	0.3 - 2.5	0.0 - 0.1	0.3 - 1.7	0.0 - 0.2	0.0 - 0.1	0.0 - 0.8	0.3 - 4.1	0.0 - 13.8	0.0 - 0.7	4.0 - 19.5
EZ 5	0.0 - 15.0	0.0 - 0.0	0.0 - 0.0	0.0 - 0.0	0.0 - 0.0	0.0 - 0.0	0.0 - 0.5	0.0 - 0.3	0.0 - 1.1	0.4 - 16.6
EZ 6	0.0 - 0.6	0.0 - 0.0	0.0 - 0.0	0.0 - 0.0	0.0 - 0.0	0.0 - 0.0	0.1 - 1.0	0.0 - 1.9	0.0 - 0.0	0.3 - 2.8
SCO	0.9 - 16.1	0.0 - 0.1	0.3 - 1.7	0.0 - 0.3	0.0 - 0.1	0.0 - 0.8	0.8 - 4.7	0.7 - 14.3	0.1 - 1.6	8.1 - 30.0

Table 15.2c Estimates in '000 ha of conversion to developed land from non-developed Broad Habitats, by Broad Habitat groupings and developed land category 1990-1998. (Developed land codes as in Table 15.2b)

1990 Broad Habitat	1998 developed land category								
	Buildings	Grounds & Bldgs	Grounds & Gardens	Other	Campsites & similar	Public space	Boundary & Linear	Inland rock	No detail records
Broadleaf, mixed & yew woodland	2.0	1.1	1.8	0.6	0.0	0.2	4.4	2.1	1.0
Conifer woodland	1.1	0.0	<1	0.2	0.0	0.0	4.9	0.8	0.0
‘Woodland’ total	3.1	1.1	1.8	0.8	0.0	0.2	9.3	2.9	1.0
Arable and horticultural	6.9	0.1	4.1	11.8	2.3	0.0	5.3	5.3	9.0
Improved Grass	33.3	1.5	18.6	12.7	9.3	2.8	6.2	0.5	4.4
‘Intensive agriculture’ total	40.3	1.6	22.7	24.5	11.6	2.8	11.5	5.8	13.4
Neutral Grass	20.3	0.7	2.3	0.0	0.6	4.0	9.2	2.6	1.9
Calcareous Grass	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acid Grass	1.3	0.0	0.7	0.0	0.0	0.0	0.1	6.9	0.9
‘Semi-natural-grasslands’ total	21.6	0.7	3.1	0.0	0.6	4.0	9.3	9.5	2.8
Bracken	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.2	0.5
Dwarf shrub heath	<1	0.0	0.1	0.3	0.0	0.0	<1	0.2	0.0
Fen, marsh and swamp	<1	0.0	0.2	0.5	0.0	0.0	0.2	1.3	0.1
Bog	<1	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0
Standing open water and canals	0.3	0.2	<1	0.3	0.0	0.0	<1	<1	1.7
Rivers and streams	0.0	0.0	0.0	0.0	0.0	0.0	0.1	<1	0.0
Supra-littoral rock	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0

Littoral sediment	0.0	0.0	0.0	0.0	0.0	0.0	<1	0.0	0.0
Other total	0.3	0.2	0.4	1.1	0.0	0.0	1.3	2.0	2.2

15.3. Ecological quality of land lost to development compared to similar land in the wider countryside.

Approach

22. Plots were identified in land which had changed from being in Broad Habitats not classified as developed in 1990 to developed land in 1998. The character of these plots was investigated to determine whether there were particular trends in the type of land that was being lost to development compared to land that was not.
23. Plots were classified by both adjacent Broad Habitat and plot type. The total number of plots identified was very small (100) (Table 15.3). Only plots adjacent to Broad Habitats 4, 5, and 6 were of significant numbers to allow analysis of ecological data. Due to small numbers and non-normal distribution of the data a non-parametric Wilcoxon pair test was used to compare plots in land that had been lost to development between 1990 and 1998 to those in land that remained undeveloped during that period. Ecological quality of land was assessed using cover-weighted (the score for each species present was weighted by the amount of it that was present) Ellenberg Scores for N (Nitrogen), R (pH), L (Light), W (Moisture), Grime's C (Competitive), S (Stress-tolerant), R (Ruderal) and species richness.

Results

Table 15.3. The number of plots in 1990 that were subsequently lost to development in 1998, by adjacent Broad Habitat.

Broad Habitat in 1990	No. of plots
1- Broadleaf woodland	8
2 - Conifer woodland	3
4 – Arable and horticultural	17
5 – Improved grassland	30
6 – Neutral grassland	29
7 – Calcareous grassland	1
8 – Acid grassland	3
9 - Bracken	1
10 – Dwarf shrub heath	1
11 – Fen, Marsh, Swamp	2
13 – Standing open water	5

24. The results of the Wilcoxon tests comparing plots lost to development to those which were not lost to development showed:
 - Significantly greater Ellenberg N value for X plots that were lost to development in Broad Habitat 4 (Fig 15.3a).
 - Significantly lower Grime's S score and species richness for X plots that were lost to development in Broad Habitat 4 (Fig 15.3a).
 - Significantly higher Ellenberg R in Boundary and Streamside plots in plots that were lost to development in Broad Habitat 5 (Fig 15.3b).
 - Significantly lower Ellenberg W value in X and Y plots lost to development in Broad Habitat 5 and significantly higher Ellenberg L and Grime R (Fig 15.3b).

- Significantly higher competitor score in Y plots lost to development in BH6 (Fig 15.3c).

Fig 15.3a Significant differences for condition scores in X plots adjacent to Broad Habitat 4, *Arable and Horticultural*.

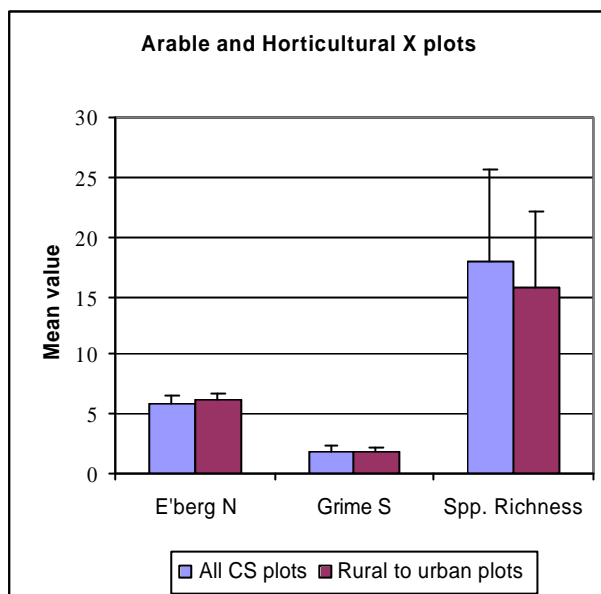


Fig 15.3b Significant differences for condition scores in plots adjacent to Broad Habitat 5, *Improved Grassland*.

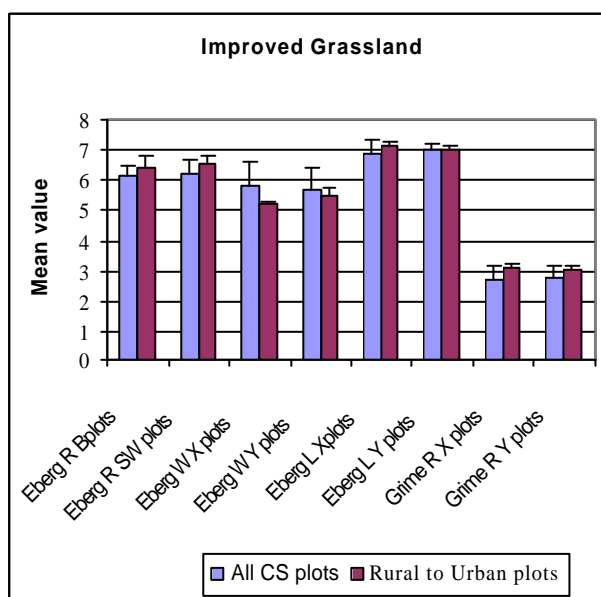
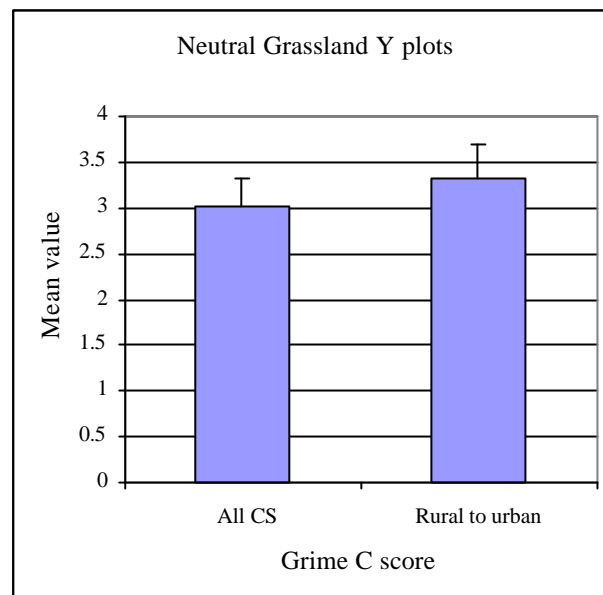


Fig 15.3c. Significant differences for condition scores in plots adjacent to Broad Habitat 6, *Neutral Grassland*.



25. Whilst sample sizes for the number of plots on land that was subsequently developed were very low and these results are therefore to be viewed cautiously, it appears that there may be some trends in the type of land that gets developed. For example, in the *Arable and Horticultural* Broad habitat, plots that were lost to development tended to be of lower ecological quality than plots which remained undeveloped. Plots lost to development were more fertile with lower species richness and contained less stress tolerant species.
26. Linear plots that were lost to development in *Improved Grassland* contained more ruderal species, characteristic of disturbed environments, as did area plots which also tended to be drier, with higher light levels. This suggests that sites which were already quite disturbed were being selected for development.

In *Neutral Grassland*, plots with a higher competitor score were being developed, again suggesting disturbance.

SUMMARY STATEMENT

- The findings from this question indicate that Countryside Survey is essentially a survey of rural land. The area of land moving into and out of development covered by CS squares is small.
- 48ha within survey squares was converted from developed land to other Broad Habitats between 1990 and 1998. The majority of this land was converted to intensive agriculture from developed land described as Gardens & Grounds with or without trees. Artefacts of the way in which spatial data is entered resulted in apparent changes from developed to undeveloped land in some cases.
- 207ha within survey squares was converted from undeveloped to developed land between 1990 and 1998. The majority of land lost was from intensive agriculture followed by semi-natural grassland and a small amount of woodland.
- Land tended to be developed from intensive agriculture and semi-natural grasslands to Buildings, Grounds and Gardens, whereas losses of woodland were to changes in tracks and roads. The scale of these changes was very small with extensions to

buildings of 9ha in one square making up over 20% of all development in semi-natural grasslands.

- The scale of the changes recorded in CS squares is such that analysis on the ecological quality of land lost to development must be viewed cautiously. However, there are indications that land which gets developed is of poorer ecological quality than comparable land in the wider countryside.

Further work and recommended changes to CS methodology

- Fundamentally Countryside Survey is designed as a survey of the countryside and the emphasis based on survey work and passed on to surveyors has been that urban habitats are comparatively unimportant. This has led to a number of problems with past datasets, with urban habitats covered in a relatively patchy manner and a potential lack of clarity in terms of definitions for land which is ‘developed’.
- If, in the future, Countryside Survey is required to cover urban areas more effectively within squares, there will need to be a number of changes in methodology. For example, definitions of features such as curtilage will need to be more explicit and surveyors will need to be made aware of which urban habitat types are appropriate for quadrats to be placed in.

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