**Question 7: What were the characteristics and locations of the hedges that were gained as opposed to those that were lost? To what extent do new and restored hedges compensate for hedges that are lost or degenerate into lines of trees?**

***Colin Barr & Rick Stuart***

## DEFINITIONS

- 'Characteristics' (of hedges) – this is taken to mean all 'attributes' recorded in the field when mapping hedges, as well as a summary of botanical information from vegetation plots associated with hedges.
- 'Locations' (of hedges) – this is taken to mean geographical locations (as opposed to spatial positions within landscapes) and covers (a) countries, (b) Environmental Zones (*sensu* CS2000) and, (c) where statistically meaningful, Government Office Regions (in England).
- 'Gained / lost' (hedges) are taken in the broadest sense to mean features that have been recruited to, or lost from, the summary group 'hedge' (see Table 4.1, Haines-Young *et al* 2000). Gained hedges can be newly planted hedges as well as regenerated Remnant or Relict Hedges whereas lost hedges can be grubbed-out as well as degeneration to Remnant or Relict Hedges.

## POLICY CONTEXT STATEMENT

1 *The following policy context statement has been drafted but has not been circulated for comment.*

2 Estimates of the length of hedgerow in the UK, and in countries within the UK, have been derived from successive Countryside Surveys and related projects since 1984. Results are given in a number of papers and reports (and, most recently, web sites).

3 The most recent report was 'Accounting for nature: assessing habitats in the UK countryside' (Haines-Young *et al.* 2000) which presents results from Countryside Survey 2000. In this report it is stated that, in contrast with the period 1984 to 1990, there is no statistically significant change in the length of hedgerows in England and Wales or in Scotland, between the two most recent Countryside Surveys in 1990 and 1998. There was a reported loss in N Ireland.

4 The zero net change between in Great Britain between 1990 and 1998 reflects a balance of losses and gains. Indeed, the main report of CS2000 results shows that, for example, in England and Wales the estimated total stock of hedgerows in 1998 was 468,000 km which included gains of about 39,900 km and losses of about 40,100 km. Thus, nearly 9% of the stock resulted from 'turnover'.

5 The obvious question that arises, from biodiversity, landscape and management perspectives relates to 'compensation': do new hedges compensate for removed ones? The question incorporates some value judgement but a clear starting point is to identify the physical and biological characteristics of both the gained and lost hedgerows.

6 A comparison of these characteristics, broken down by the type of change that has occurred (eg from 'hedge' to 'no boundary', or 'hedge' to 'line of trees') will allow some general assessments to be made as to the extent to which new and restored hedges compensate for hedges that are lost or degenerate into lines of trees. Such conclusions will be made in the context of deliberations by groups such as the UK Steering Group for the Ancient and/or Species-rich Hedgerow HAP which is expected to produce guidelines on what constitutes favourable condition of hedgerows.

## APPROACH

1. 'Characteristics' (of hedges) is taken to mean all 'attributes' recorded in the field when mapping hedges, as well as a summary of botanical information from vegetation plots associated with hedges.
2. 'Locations' (of hedges) is taken to mean geographical locations (as opposed to spatial positions within landscapes) and covers (a) countries, (b) Environmental Zones (*sensu* CS2000) and, (c) where statistically meaningful, Government Office Regions (in England).
3. Using data from 501 survey squares that were repeat surveyed in 1990 and 1998, linear features allocated to the 'hedge' summary group lost and gained between the two surveys were identified. Gains and losses were ascribed to one of three categories based on the type of feature change.
4. Characteristics of each hedge were identified from recorded field-codes including physical characteristics and management. Additional characteristics such as adjacent land-use and other features were identified from GIS analysis.
5. Total lengths of gained or lost hedge per survey square were computed separately for each type of loss and for each characteristic. National estimates of length for gains and losses for each characteristic were produced and significance tests to detect differences between the two estimates carried out.
6. Associated hedgerow plots were identified in order to assess differences in the characteristics of the vegetation between lost and gained hedges.

## RESULTS

7 All 1990 or 1998 linear boundary features classified as being in the summary group 'hedges' in the presentation of earlier CS2000 results (eg Haines-Young *et al.* 2000) were included in a database. Features classified only as 'remnant', 'relict' or 'derelict' hedges in both years were not included. The database comprises 1495 records (individual lengths) of hedges that have been gained between 1990 and 1998 and 1802 records of hedges that have been lost.

### Types of gains and losses

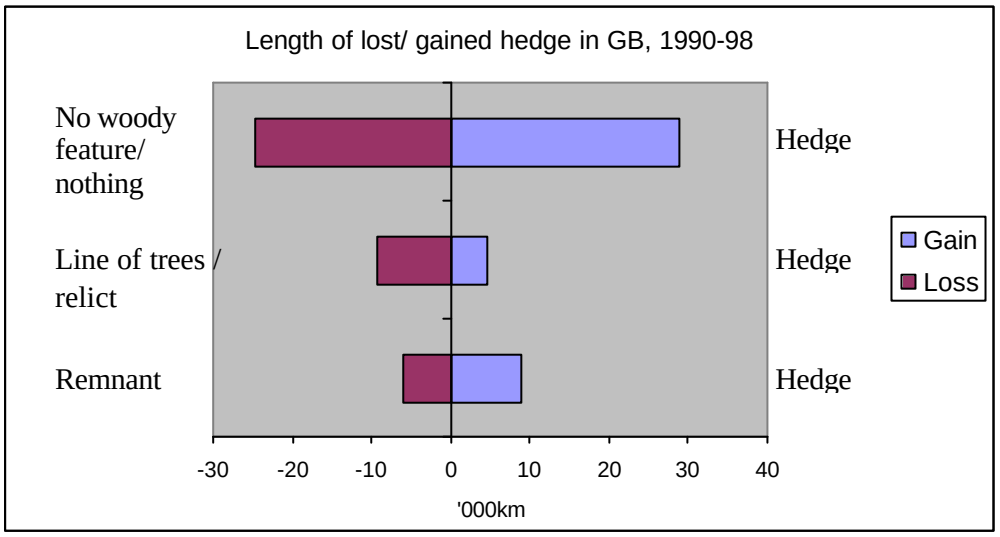
8 From these records different types of gains and losses were identified based on the type of change between:

- hedge and other woody features representing an improvement (gain) or a degeneration (loss)
- hedge and either a non-woody feature or no feature representing a new hedge (gain) or complete removal (loss).

9 Total length of hedges lost and total length of hedges gained in each survey square , for each type of loss and for each characteristic were computed. From these figures national and regional estimates of length were produced based on the ITE Land Classes and significance tests of the change between the two estimates carried out using a bootstrapped two-sided T-test.

10 The estimated length of lost and gained hedges in Great Britain between 1990 and 1998 are shown in Figure 7.1 by type of loss or gain. Only one quarter of gained hedges were previously other 'woody' linear features with the majority being gained where no 'woody' feature existed previously. Similarly the most hedge loss was complete loss rather than a degeneration to another type of 'woody' feature.

**Figure 7.1** Estimated length of hedgerow lost and gained between 1990 and 1998 in GB, by type of loss or gain.




11 CS2000 Module 1 results have already reported that there was no statistically significant change in the overall length of hedges between 1990 and 1998. There was however, a statistically significant greater loss from hedge to lines of trees/shrub and relict hedge than from gains involving these two categories in Great Britain (P=0.04) and in England & Wales (P=0.03) and in Environmental Zone 1 (P=0.01) between 1990 and 1998. All other losses and gains from and to hedge from other categories show no statistical significance in change at the national, country or Environmental Zone level. See Annex 7.1 for data-tables.

## Characteristics of gained and lost hedges

12 Hedges were described in terms of recorded characteristics (species dominance in three classes, height, stockproofness, gappiness, management, shape, any relevant associated descriptions (eg recent laying, signs of removal of a boundary, regrowth from cut stumps), adjacent land use, adjacent features (eg ditch), all by country and Environmental Zone.

13 Total length of hedges lost and total length of hedges gained in each survey square , for each type of loss and for each characteristic were computed. From these figures national and regional estimates of length were produced based on the ITE Land Classes and significance tests of the change between the two estimates carried out using a bootstrapped two-sided T-test.

14 The following tables (Tables 7.1 - 7.6) show results, grouped by broad attribute type. Differences in estimated gain and loss shown by significance tests are highlighted in bold and the corresponding data are shown in as annexes.

## Woody species composition

15 Results are given in Table 7.1. There appears to be remarkably little difference in the woody species composition between gained and lost hedges.

**Table 7.1** Estimated length of hedgerow lost and gained between 1990 and 1998 by country, by dominant woody species. Where significant differences between gained and lost hedges the corresponding figures are in bold. Environmental Zone 6 omitted as no hedge present. See Annexes 7.2-5 for more detailed change data-tables

| | | Lost /degenerated ('000 km) | | | | Gained /regenerated('000 km) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Species composition | Hedge to non woody | Hedge to remnant | Hedge to line trees | Total | Non woody to hedge | Remnant to hedge | Line trees to hedge | Total |
| GB | >50% hawthorn | 11.9 | **2.7** | **3.1** | 17.7 | 11.8 | **5.9** | **1.2** | 18.9 |
| | >50% other | 2.5 | 0.8 | 0.9 | 4.3 | 3.4 | 0.7 | 1 | 5.1 |
| | mixed | 10.3 | 2.5 | 5 | 17.7 | 13.8 | 2.3 | 2.4 | 18.5 |
| | Total | 24.7 | 6 | 9 | 39.7 | 29 | 8.9 | 4.6 | 42.5 |
| EW | >50% hawthorn | 11.5 | **2.6** | **3.1** | 17.2 | 10.8 | **5.5** | **1.1** | 17.4 |
| | >50% other | 2.4 | 0.7 | 0.9 | 4.0 | 3.4 | 0.7 | 1.0 | 5.1 |
| | mixed | 10.2 | 2.5 | 5.0 | 17.7 | 13.5 | 2.3 | 2.3 | 18.1 |
| SC | >50% hawthorn | 0.5 | 0.1 | 0.0 | 0.5 | 0.9 | 0.3 | 0.1 | 1.4 |
| | >50% other | 0.1 | 0.1 | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 |
| | mixed | 0.1 | 0.0 | 0.0 | 0.1 | 0.2 | 0.0 | 0.0 | 0.2 |
| EZ 1 | >50% hawthorn | 4.7 | 1.7 | 1.0 | 7.3 | 4.83 | 2.6 | 0.5 | 8.0 |
| | >50% other | 0.6 | 0.4 | 0.1 | 1.2 | 1.21 | 0.5 | 0.1 | 1.9 |
| | mixed | 3.9 | 1.4 | 1.9 | 7.2 | 5.92 | 1.2 | 0.5 | 7.6 |
| EZ 2 | >50% hawthorn | 6.3 | **0.9** | **2.0** | 9.1 | 5.79 | **2.0** | **0.5** | 8.4 |
| | >50% other | 1.7 | 0.4 | 0.4 | 2.5 | 1.97 | 0.1 | 0.6 | 2.7 |
| | mixed | 5.1 | 0.9 | 3.0 | 9.0 | 5.62 | 1.0 | 1.7 | 8.3 |
| EZ 3 | >50% hawthorn | 0.5 | 0.0 | 0.1 | 0.7 | 0.21 | 0.8 | 0.0 | 1.1 |
| | >50% other | 0.1 | 0.0 | 0.3 | 0.4 | 0.20 | 0.1 | 0.3 | 0.6 |
| | mixed | 1.2 | 0.2 | 0.1 | 1.4 | 1.93 | 0.2 | 0.2 | 2.3 |
| EZ 4 | >50% hawthorn | 0.4 | 0.1 | 0.0 | 0.4 | 0.43 | 0.3 | 0.0 | 0.8 |
| | >50% other | 0.1 | 0.1 | 0.0 | 0.2 | 0.01 | 0.0 | 0.0 | 0.0 |
| | mixed | 0.0 | 0.0 | 0.0 | 0.0 | 0.09 | 0.0 | 0.0 | 0.1 |
| EZ 5 | >50% hawthorn | 0.1 | 0.0 | 0.0 | 0.1 | 0.50 | 0.0 | 0.1 | 0.6 |
| | >50% other | 0.0 | 0.0 | 0.0 | 0.0 | 0.01 | 0.0 | 0.0 | 0.0 |
| | mixed | 0.0 | 0.0 | 0.0 | 0.0 | 0.12 | 0.0 | 0.0 | 0.1 |

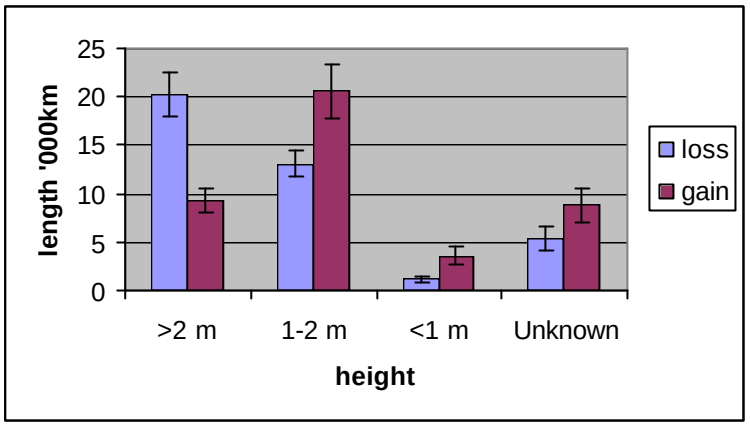
## Height classes

16 Height of hedge was an attribute that was not well recorded by surveyors; in this sample over 13% of lost hedges (recorded in 1990) and 21% of gained hedges (recorded in 1998), were not allocated a height category. A summary of lengths by height class is given in Table 7.2.

**Table 7.2** Estimated length of hedgerow lost and gained between 1990 and 1998 by country, by height class. Where significant differences between gained and lost hedges the corresponding figures are in bold. Environmental Zone 6 omitted as no hedge present. See Annexes 7.2-5 for more detailed change data-tables

| | | Lost/ degenerated ('000 km) | | | | Gained /regenerated('000 km) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Height | Hedge to non woody | Hedge to remnant | Hedge to line trees | Total | Non woody to hedge | Remnant to hedge | Line trees to hedge | Total |
| GB | >2 m | 9.9 | 3.8 | 6.5 | **20.2** | 6.3 | 2.4 | 0.7 | **9.4** |
| | 1-2 m | 10.3 | **1.6** | 1.2 | **13.1** | 14.1 | **4.7** | 1.9 | **20.7** |
| | <1 m | 0.9 | **0.2** | 0.1 | **1.2** | 2.5 | **1** | 0.1 | **3.6** |
| | Unknown | 3.7 | 0.3 | 1.4 | 5.4 | 6.2 | 0.9 | 1.8 | 8.9 |
| | Total | 24.8 | 6 | 9.2 | 40 | 29 | 8.9 | 4.6 | 42.5 |
| EW | >2m | 9.9 | 3.8 | 6.5 | **20.1** | 5.7 | 2.4 | 0.7 | **8.7** |
| | 1-2m | 9.9 | **1.5** | 1.2 | **12.6** | 13.9 | **4.4** | 1.9 | **20.2** |
| | <1m | 0.9 | **0.2** | 0.1 | **1.2** | 2.5 | **1.0** | 0.1 | **3.5** |
| | Unknown | 3.6 | 0.2 | 1.4 | 5.2 | 5.6 | 0.8 | 1.8 | 8.2 |
| SC | >2m | 0.1 | 0.0 | 0.0 | 0.1 | 0.5 | 0.0 | 0.0 | 0.6 |
| | 1-2m | 0.4 | 0.1 | 0.0 | 0.5 | 0.2 | 0.2 | 0.0 | 0.4 |
| | <1m | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | Unknown | 0.1 | 0.1 | 0.0 | 0.2 | 0.5 | 0.1 | 0.1 | 0.6 |
| EZ 1 | >2m | 4.4 | **2.3** | 2.0 | **8.7** | 2.22 | **1.5** | 0.2 | **3.9** |
| | 1-2m | 3.0 | 1.1 | 0.4 | **4.5** | 5.62 | 2.1 | 0.4 | **8.1** |
| | <1m | 0.5 | 0.1 | 0.1 | **0.7** | 1.70 | 0.5 | 0.0 | **2.2** |
| | Unknown | 1.3 | 0.0 | 0.7 | 2.0 | 2.41 | 0.3 | 0.5 | 3.2 |
| EZ 2 | >2m | 4.6 | 1.3 | 4.2 | **10.1** | 3.44 | 0.8 | 0.4 | **4.7** |
| | 1-2m | 6.0 | **0.5** | 0.9 | 7.3 | 6.60 | **1.5** | 1.3 | 9.5 |
| | <1m | 0.3 | 0.1 | 0.0 | 0.5 | 0.69 | 0.5 | 0.1 | 1.2 |
| | Unknown | 2.2 | 0.2 | 0.4 | 2.9 | 2.70 | 0.3 | 1.0 | 4.0 |
| EZ 3 | >2m | 0.9 | 0.2 | 0.3 | **1.4** | 0.06 | 0.1 | 0.0 | **0.1** |
| | 1-2m | 0.8 | **0.0** | 0.0 | **0.8** | 1.68 | **0.8** | 0.2 | **2.7** |
| | <1m | 0.0 | 0.0 | 0.0 | 0.0 | 0.08 | 0.0 | 0.0 | 0.1 |
| | Unknown | 0.1 | 0.0 | 0.2 | 0.3 | 0.52 | 0.2 | 0.3 | 1.0 |
| EZ 4 | >2m | 0.0 | 0.0 | 0.0 | 0.0 | 0.03 | 0.0 | 0.0 | 0.1 |
| | 1-2m | 0.3 | 0.1 | 0.0 | 0.4 | 0.15 | 0.2 | 0.0 | 0.4 |
| | <1m | 0.0 | 0.0 | 0.0 | 0.0 | 0.04 | 0.0 | 0.0 | 0.0 |
| | Unknown | 0.1 | 0.1 | 0.0 | 0.2 | 0.31 | 0.1 | 0.0 | 0.4 |
| EZ 5 | >2m | 0.0 | 0.0 | 0.0 | 0.0 | 0.47 | 0.0 | 0.0 | 0.5 |
| | 1-2m | 0.1 | 0.0 | 0.0 | 0.1 | 0.00 | 0.0 | 0.0 | 0.0 |
| | <1m | 0.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.0 | 0.0 | 0.0 |
| | Unknown | 0.0 | 0.0 | 0.0 | 0.0 | 0.15 | 0.0 | 0.1 | 0.2 |

**Figure 7.2** Estimated length of total hedgerow lost and gained between 1990 and 1998 in GB, by height class.




17 Of those where height was described, the majority of lost hedges in Great Britain had been in the >2 m category (58%), and most of those had been removed completely (49%) or become lines of trees (32%). A surprising number of gained hedges were also in the >2m class (28%), and two-thirds of these were there had been no boundary feature before (67%) suggesting, perhaps, that they had not been managed since planting.

18 The majority of gained/regenerated (70%) and lost/degenerated (83%) were over 1m height, the height at which a hedge can be deemed to be in 'favourable condition'. There was no statistical difference in the length of hedge lost and gained in these height categories.

## 'Stockproofness'

19 A relatively high proportion of hedges were not coded for stockproofness (36% of lost hedges and 18% of gained hedges). A summary of lengths by stockproofness is given in Table 7.3.

**Table 7.3** Estimated length of hedgerow lost and gained between 1990 and 1998 by country, by stockproofness. . Where significant differences between gained and lost hedges the corresponding figures are in bold. Environmental Zone 6 omitted as no hedge present. See Annexes 7.2-5 for more detailed change data-tables

| | | Lost/ degenerated ('000 km) | | | | Gained/regenerated('000 km) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Hedge to non woody | Hedge to remnant | Hedge to line trees | Total | Non woody to hedge | Remnant to hedge | Line trees to hedge | Total |
| GB | stockproof not | **7.4** | 1.2 | 2.0 | 10.7 | **11.6** | 1.4 | 2.1 | 15.1 |
| GB | stockproof | 9.7 | **2.5** | 2.7 | 14.9 | 12.6 | **5.9** | 1.5 | 19.9 |
| GB | unknown | 7.8 | 2.2 | 4.4 | 14.4 | 4.8 | 1.7 | 1.0 | 7.5 |
| EW | stockproof not | **7.3** | 1.1 | 2.0 | 10.5 | **11.2** | 1.4 | 2.1 | 14.6 |
| EW | stockproof | 9.1 | **2.4** | 2.7 | 14.3 | 12.3 | **5.5** | 1.5 | 19.3 |
| EW | unknown | 7.7 | 2.2 | 4.4 | 14.3 | 4.2 | 1.7 | 0.9 | 6.8 |
| SC | stockproof not | 0.1 | 0.1 | 0.0 | 0.2 | 0.5 | 0.0 | 0.0 | 0.5 |
| SC | stockproof | 0.5 | 0.1 | 0.0 | 0.6 | 0.2 | 0.3 | 0.0 | 0.6 |
| SC | unknown | 0.0 | 0.0 | 0.0 | 0.1 | 0.5 | 0.0 | 0.1 | 0.6 |
| EZ1 | stockproof not | **2.1** | 0.5 | 0.2 | **2.8** | **3.8** | 0.4 | 0.4 | **4.6** |
| EZ1 | stockproof | 4.8 | 1.7 | 0.8 | 7.2 | 6.3 | 2.9 | 0.6 | 9.8 |
| EZ1 | unknown | 2.3 | 1.3 | 2.2 | 5.9 | 1.8 | 1.0 | 0.1 | 2.9 |
| EZ2 | stockproof not | 4.6 | 0.6 | 1.9 | 7.1 | 5.9 | 0.8 | 1.6 | 8.4 |
| EZ2 | stockproof | 3.3 | **0.6** | **1.8** | 5.8 | 5.2 | **1.9** | **0.7** | 7.8 |
| EZ2 | unknown | 5.1 | 0.9 | 1.8 | 7.8 | 2.3 | 0.4 | 0.5 | 3.2 |
| EZ3 | stockproof not | 0.6 | 0.0 | 0.0 | 0.6 | 1.4 | 0.2 | 0.0 | 1.6 |
| EZ3 | stockproof | 1.0 | 0.1 | 0.2 | 1.3 | 0.8 | 0.7 | 0.1 | 1.7 |
| EZ3 | unknown | 0.3 | 0.0 | 0.3 | 0.6 | 0.1 | 0.2 | 0.3 | 0.7 |
| EZ4 | stockproof not | 0.1 | 0.1 | 0.0 | 0.2 | 0.3 | 0.0 | 0.0 | 0.3 |
| EZ4 | stockproof | 0.4 | 0.1 | 0.0 | 0.5 | 0.2 | 0.3 | 0.0 | 0.5 |
| EZ4 | unknown | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 | 0.1 |
| EZ5 | stockproof not | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | 0.0 | 0.2 |
| EZ5 | stockproof | 0.1 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 | 0.1 |
| EZ5 | unknown | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | 0.0 | 0.1 | 0.5 |

20 Where this attribute was recorded, there was little difference in the percentage of lost and gained hedges that were classified as stockproof (42% and 43% respectively).

## Filled gaps

21 The lengths of hedge that were coded with either of the 'filled gaps' attributes is a relatively small proportion of the whole (c. 12% of lost hedges and c. 11% of gained hedges). From the foregoing, it may be assumed that this may include an element of non-recording. A summary of length by gap type is given in Table 7.4.

**Table 7.4** Estimated length of hedgerow lost and gained between 1990 and 1998 by country, by gap type. Where significant differences between gained and lost hedges the corresponding figures are in bold. Environmental Zone 6 omitted as no hedge present. See Annexes 7.2-5 for more detailed change data-tables

| | | Lost/degenerated ('000 km) | | | | Gained/regenerated ('000 km) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | filled gaps | Hedge to non woody | Hedge to remnant | Hedge to line trees | Total | Non woody to hedge | Remnant to hedge | Line trees to hedge | Total |
| GB | < 10% of length | 1.7 | 0.1 | 0.6 | 2.4 | 2.2 | 0.3 | 0.2 | 2.6 |
| | >10% of length | 1.8 | 0.2 | 0.2 | 2.2 | 1.1 | 0.6 | 0.2 | 1.9 |
| EW | < 10% of length | 1.7 | 0.1 | 0.6 | 2.4 | 2.1 | 0.3 | 0.2 | 2.6 |
| | >10% of length | 1.7 | 0.2 | 0.2 | 2.0 | 1.1 | 0.6 | 0.2 | 1.9 |
| SC | < 10% of length | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | >10% of length | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| EZ1 | < 10% of length | 0.4 | 0.0 | 0.1 | 0.5 | 0.38 | 0.2 | 0.1 | 0.7 |
| | >10% of length | 0.9 | 0.0 | 0.1 | 1.0 | 0.15 | 0.0 | 0.2 | 0.4 |
| EZ2 | < 10% of length | 1.0 | 0.1 | **0.5** | 1.6 | 1.58 | 0.1 | **0.1** | 1.8 |
| | >10% of length | 0.5 | 0.1 | 0.1 | 0.6 | 0.94 | 0.2 | 0.0 | 1.1 |
| EZ3 | < 10% of length | 0.3 | 0.0 | 0.0 | 0.3 | 0.18 | 0.0 | 0.0 | 0.2 |
| | >10% of length | 0.3 | 0.1 | 0.1 | 0.4 | 0.02 | 0.4 | 0.0 | 0.5 |
| EZ4 | < 10% of length | 0.0 | 0.0 | 0.0 | 0.0 | 0.03 | 0.0 | 0.0 | 0.0 |
| | >10% of length | 0.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.0 | 0.0 | 0.0 |
| EZ5 | < 10% of length | 0.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.0 | 0.0 | 0.0 |
| | >10% of length | 0.1 | 0.0 | 0.0 | 0.1 | 0.00 | 0.0 | 0.0 | 0.0 |

22 Where filled gaps have been recorded, there is a very similar proportion of lost and gained hedges that have gaps that have been filled but hedges that have been lost have a higher proportion of hedges where more than 10% of the hedge is comprised of filled gaps (48% as opposed to 41% for gained hedges). Interestingly, the hedges that came from remnant hedges tend to have a higher proportion of >10% gaps than any other type of hedge (gained or lost). This suggests either (a) that some remnant hedges have had a degree of gapping as a part of their reclamation or (b) the results confirm the already documented difficulties in applying the definition of 'hedge' consistently between surveys.

## Trimming and shape

23 Signs of management were not well recorded by surveyors. From the table above, only about 17,500 km of gained hedge were coded whereas, from results elsewhere, it is known that the total length of gained hedge was about 42,500. A summary of length by trimming regime is given in Table 7.5 for GB only.

**Table 7.5** Estimated length of hedgerow lost and gained between 1990 and 1998 in GB, by trimming regime.

| | Lost ('000 km) | | | | Gained ('000 km) | | | |
|---|---|---|---|---|---|---|---|---|
| | Hedge to non woody | Hedge to remnant | Hedge to line trees | Total lost | Non woody to hedge | Remnant to hedge | Line trees to hedge | Total gained |
| Trimmed | 9.5 | 1.9 | 2.0 | 13.4 | 9.6 | 2.3 | 1.0 | 12.9 |
| Box-shape | n/a | n/a | n/a | n/a | 5.7 | 1.2 | 0.7 | 7.5 |
| Pointed box | n/a | n/a | n/a | n/a | 0.2 | 0.0 | 0.0 | 0.2 |
| Chamfered | n/a | n/a | n/a | n/a | 0.3 | 0.0 | 0.0 | 0.3 |
| A-shaped | n/a | n/a | n/a | n/a | 0.1 | 0.1 | 0.0 | 0.3 |
| Topped A | n/a | n/a | n/a | n/a | 0.6 | 0.4 | 0.0 | 1.0 |
| Round-topped | n/a | n/a | n/a | n/a | 0.3 | 0.1 | 0.0 | 0.4 |
| Untopped | n/a | n/a | n/a | n/a | 2.4 | 0.6 | 0.2 | 3.1 |
| Uncut | n/a | n/a | n/a | n/a | 3.8 | 0.6 | 0.2 | 4.6 |

24 The only category which was used by surveyors in both CS1990 and CS2000 was 'trimmed' and, still bearing in mind the incompleteness of the data, this is where the only direct comparison that can be made. There is little obvious difference between the trimming status of lost and gained hedges.

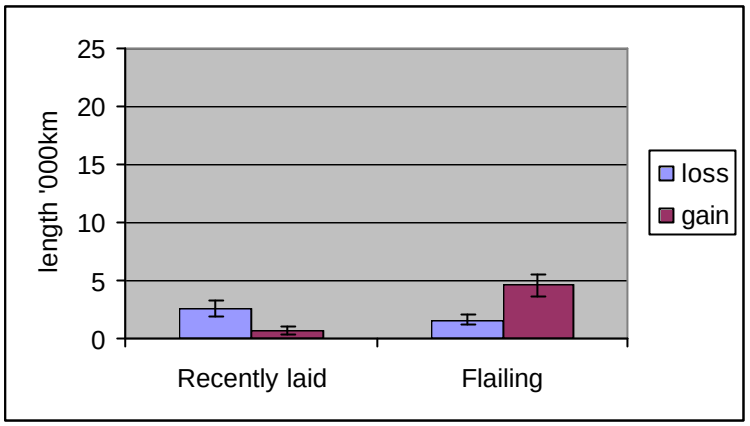
## Other characteristics

25 The 'signs of replacement' attribute was only used for hedges where surveyors recognised that a previous boundary had been replaced by a hedge (and therefore should only be applied to gained hedges). If all such cases were adequately recognised by surveyors, this would suggest that of the 42,500 km of new hedge, less than 2% were on the lines of previous boundaries. This seems unlikely. A summary of length by other management characteristics is given in Table 7.6.

**Table 7.6** Estimated length of hedgerow lost and gained between 1990 and 1998 in GB, by other management characteristics.. Where significant differences between gained and lost hedges the corresponding figures are in bold. Environmental Zone 6 omitted as no hedge present. See Annexes 7.2-5 for more detailed change data-tables

| | | Lost/ degenerated ('000 km) | | | | Gained/ regenerated ('000 km) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Hedge to non woody | Hedge to remnant | Hedge to line trees | Total | Non woody to hedge | Remnant to hedge | Line trees to hedge | Total |
| GB | signs replacement | **0.0** | 0.0 | 0.0 | **0.0** | **0.7** | 0.0 | 0.0 | **0.7** |
| | signs removal | 0.2 | 0.1 | 0.1 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 |
| | recent laying | **1.6** | 0.4 | 0.6 | **2.6** | **0.3** | 0.1 | 0.3 | **0.7** |
| | flailing | **1.0** | **0.2** | 0.4 | **1.6** | **3.3** | **1.2** | 0.1 | **4.6** |
| | re-growth f stumps | 0.3 | 0.0 | 0.1 | 0.4 | 0.3 | 0.0 | 0.4 | 0.7 |
| EW | signs replacement | **0.0** | 0.0 | 0.0 | **0.0** | **0.7** | 0.0 | 0.0 | **0.7** |
| | signs removal | 0.2 | 0.1 | 0.1 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 |
| | recent laying | **1.6** | 0.4 | 0.6 | **2.6** | **0.3** | 0.1 | 0.3 | **0.7** |
| | flailing | **0.9** | **0.2** | 0.4 | **1.5** | **3.3** | **1.2** | 0.1 | **4.6** |
| | re-growth f stumps | 0.3 | 0.0 | 0.1 | 0.4 | 0.3 | 0.0 | 0.4 | 0.7 |
| SC | signs replacement | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | signs removal | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | recent laying | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | flailing | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| | re-growth f stumps | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| EZ1 | signs replacement | 0.0 | 0.0 | 0.0 | **0.0** | 0.4 | 0.0 | 0.0 | **0.4** |
| | signs removal | 0.1 | 0.1 | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 |
| | recent laying | 0.4 | 0.2 | 0.0 | **0.6** | 0.0 | 0.0 | 0.0 | **0.0** |
| | flailing | 0.7 | **0.2** | 0.1 | **1.0** | 1.9 | **0.8** | 0.0 | **2.7** |
| | re-growth f stumps | 0.2 | 0.0 | 0.1 | 0.3 | 0.2 | 0.0 | 0.0 | 0.2 |
| EZ2 | signs replacement | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | 0.0 | 0.2 |
| | signs removal | 0.1 | 0.0 | 0.1 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 |
| | recent laying | **0.7** | **0.2** | 0.5 | **1.4** | **0.2** | **0.0** | 0.2 | **0.3** |
| | flailing | **0.2** | **0.0** | 0.3 | **0.5** | **1.3** | **0.4** | 0.1 | **1.8** |
| | re-growth f stumps | 0.1 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | 0.1 | 0.2 |
| EZ3 | signs replacement | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 |
| | signs removal | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | recent laying | 0.5 | 0.0 | 0.1 | 0.6 | 0.1 | 0.1 | 0.1 | 0.4 |
| | flailing | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 |
| | re-growthf stumps | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.3 |
| EZ4 | signs replacement | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | signs removal | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | recent laying | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | flailing | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| | re-growth f stumps | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| EZ5 | signs replacement | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | signs removal | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | recent laying | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | flailing | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | re-growth f stumps | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

**Figure 7.3** Significant differences between estimated length of hedgerow lost and gained between 1990 and 1998 in GB, by other management characteristics.




26 The 'signs of removal' code was used where surveyors judged that a hedge was no longer present (from signs of disturbance, bare earth or burned remains) and was only likely to apply where hedges have been removed shortly before the survey.

27 Recently planted hedges were noted if it was estimated that the hedge had been planted in the previous five years. This code was first used in CS2000.

28 Similarly, recently laid hedges were recorded if the surveyor believed that laying had taken place in the previous five-year period. It is interesting to note that as much as 7% of the total length of lost hedge has been laid in the five years prior to loss. Conversely, and as expected, less than 2% of new hedges had been laid; of this length, a significant proportion was from hedges regained from lines of trees (where laying might form part of a restoration process) and from hedges being newly planted (where normal management cycles would not see hedges laid within seven to ten years of planting).

29 A greater length of hedge was recorded as flailed in the gained hedges category (c. 11%) than in the case of lost hedges (c. 4%). It has been estimated elsewhere (Hooper, 1992) that up to 90% of hedgerow management takes place by the use of a flail but surveyors may not have had evidence to use the code more frequently than they did.

30 Re-growth from cut stumps is a coding which applies to hedges that have been cut to ground level but have sprouted again, often at intervals along the old boundary. It is interesting to note that small percentages of both gained and lost hedgerows were coded in this way, again, perhaps, as part of restoration management techniques.

### Adjacent land cover

31 Habitat adjacent to either side of a hedge was identified using simple GIS analysis. Each individual GIS line representing part or all of a hedge was identified and the Broad Habitat allocation of the polygon area on either side recorded. The area of the adjacent polygon was not taken into account, for example by buffering the line and calculating the area of each habitat and allocating to the largest area.

32 For lost hedges the adjacent habitat was the Broad Habitat allocation for 1990 and for gained hedges the allocation from 1998. Each hedge was coded with two adjacent Broad Habitat allocations, one for each side of the hedge. The lengths of the hedges were used to compute the total length of hedge and adjacent Broad Habitats by sample square.

33 Countryside Survey methodology excludes boundaries forming part of a 'curtilage' . A curtilage is defined as 'an area of ground that is associated with a building and which

has a use linked with that building eg gardens, 'grounds', forecourts etc.'. Therefore, Buillt-Up & Gardens Broad Habitat does not appear as an adjacent land use.

34 Gains and losses of hedges are shown in Figure 7.4 and Table 7.7a and b by the Broad Habitat on both sides of the hedge. The largest turnover in Great Britain is where grassland occurs on both sides of the hedge and losses are balanced by gains. However, the gains of hedges were greater than the losses where there was grassland on one side and non-arable/non-grassland on the other.

35 There are a small number of hedges that have Boundary & Linear Broad Habitat on either side. These were often found to be where a track or siding runs parallel to a road.

**Figure 7.4** Estimated length of hedgerow lost and gained between 1990 and 1998 in GB, by adjacent land use.

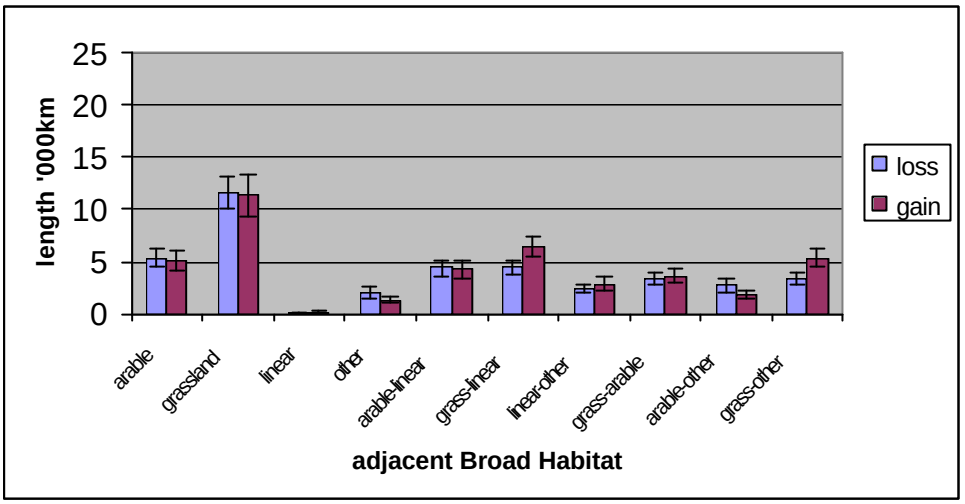


**Table 7.7a** Estimated length of hedgerow lost and gained between 1990 and 1998 by country, by adjacent land use. Where significant differences between gained and lost hedges the corresponding figures are in bold. Environmental Zone 6 omitted as no hedge present. See Annexes 7.2-5 for more detailed change data-tables

| | | Lost/ degenerated ('000 km) | | | | Gained /regenerated('000 km) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Adjacent land | Hedge to non woody | Hedge to remnant | Hedge to line trees | Total | Non woody to hedge | Remnant to hedge | Line trees to hedge | Total |
| GB | Arable both sides | 3.5 | 1 | 0.9 | 5.3 | 2.9 | 1.7 | 0.4 | 5.1 |
| | Grass both sides | 6.9 | 1.6 | 3.1 | 11.6 | 7.1 | 1.9 | 2.4 | 11.4 |
| | Linear both sides | <0.1 | <0.1 | 0 | 0.1 | 0.2 | 0 | 0 | 0.2 |
| | Other both sides | 1.8 | 0.1 | 0.1 | 2.1 | 0.9 | 0.3 | 0.1 | 1.3 |
| | Linear-arable | 2.2 | 0.9 | **1.2** | 4.4 | 2.7 | 1.4 | **0.1** | 4.2 |
| | Linear-grass | **2.9** | **0.3** | 1.3 | **4.5** | **4.5** | **1.2** | 0.8 | **6.4** |
| | Linear-other | 1.7 | 0.5 | 0.1 | 2.4 | 2.5 | 0.3 | 0.1 | 2.9 |
| | Arable-grass | 1.8 | 0.6 | **1** | 3.4 | 2.3 | 1.1 | **0.2** | 3.6 |
| | Arable-other | 1.7 | 0.5 | **0.5** | 2.8 | 1.5 | 0.2 | **0.1** | 1.8 |
| | Grass-other | **2.1** | 0.5 | 0.7 | **3.3** | **4.3** | 0.7 | 0.4 | **5.4** |
| EW | Arable both sides | 3.5 | 1.0 | 0.9 | 5.3 | 2.9 | 1.7 | 0.4 | 5.0 |
| | Grass both sides | 6.6 | 1.6 | 3.1 | 11.4 | 7.0 | 1.7 | 2.4 | 11.0 |
| | Linear both sides | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | 0.0 | 0.2 |
| | Other both sides | 1.8 | 0.1 | 0.1 | 2.1 | 0.8 | 0.3 | 0.1 | 1.2 |
| | Linear-arable | 2.2 | 0.9 | **1.2** | 4.4 | 2.7 | 1.4 | **0.1** | 4.2 |
| | Linear-grass | **2.7** | **0.2** | 1.3 | **4.2** | **4.3** | **1.1** | 0.8 | **6.2** |
| | Linear-other | 1.6 | 0.5 | 0.1 | 2.2 | 2.2 | 0.3 | 0.1 | 2.6 |
| | Arable-grass | 1.8 | 0.6 | **1.0** | 3.4 | 2.2 | 1.1 | **0.2** | 3.5 |
| | Arable-other | 1.7 | 0.5 | **0.5** | 2.7 | 1.5 | 0.2 | **0.1** | 1.8 |
| | Grass-other | **2.1** | 0.5 | 0.7 | **3.2** | **4.0** | 0.6 | 0.3 | **4.9** |
| SC | Arable both sides | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 |
| | Grass both sides | 0.2 | 0.0 | 0.0 | 0.2 | 0.1 | 0.2 | 0.0 | 0.4 |
| | Linear both sides | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | Other both sides | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 |
| | Linear-arable | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | Linear-grass | 0.2 | 0.1 | 0.0 | 0.2 | 0.2 | 0.0 | 0.0 | 0.3 |
| | Linear-other | 0.1 | 0.0 | 0.0 | 0.2 | 0.2 | 0.0 | 0.0 | 0.2 |
| | Arable-grass | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 |
| | Arable-other | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| | Grass-other | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | 0.0 | 0.0 | 0.4 |

**Table 7.7b** Estimated length of hedgerow lost and gained between 1990 and 1998 by Environmental Zones, by adjacent land use. Where significant differences between gained and lost hedges the corresponding figures are in bold. Environmental Zone 6 omitted as no hedge present. See Annexes 7.2-5 for more detailed change data-tables (H – hedge, NW – non-woody)

| | | Lost / degenerated ('000 km) | | | | Gained /regenerated('000 km) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Adjacent land | H to non woody | Hedge to remnant | H to line trees | Total | NW to H | Remnant to hedge | Line trees to H | Total |
| EZ1 | Arable both sides | 2.2 | 0.9 | 0.6 | 3.6 | 2.5 | 1.2 | 0.3 | 4.1 |
| | Grass both sides | 1.1 | 0.8 | 0.8 | 2.6 | 2.1 | 0.6 | 0.3 | 2.9 |
| | Linear both sides | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | Other both sides | 1.2 | 0.0 | 0.0 | 1.2 | 0.3 | 0.0 | 0.1 | 0.4 |
| | Linear-arable | 1.2 | 0.8 | **0.8** | 2.7 | 1.6 | 0.8 | **0.0** | 2.4 |
| | Linear-grass | 0.7 | **0.0** | 0.3 | 1.0 | 1.0 | **0.5** | 0.1 | 1.7 |
| | Linear-other | 0.6 | 0.2 | 0.0 | 0.8 | 0.9 | 0.0 | 0.0 | 0.9 |
| | Arable-grass | 0.6 | 0.3 | 0.3 | 1.2 | 1.1 | 0.4 | 0.2 | 1.7 |
| | Arable-other | 1.1 | 0.3 | 0.3 | 1.7 | 1.0 | 0.1 | 0.0 | 1.2 |
| | Grass-other | 0.5 | 0.2 | 0.1 | **0.8** | 1.3 | 0.5 | 0.2 | **2.0** |
| EZ2 | Arable both sides | 1.1 | 0.1 | 0.3 | 1.5 | 0.3 | 0.5 | 0.0 | 0.9 |
| | Grass both sides | 4.6 | 0.8 | 2.0 | 7.3 | 3.7 | 0.7 | 1.7 | 6.1 |
| | Linear both sides | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 |
| | Other both sides | 0.6 | 0.0 | 0.1 | 0.8 | 0.3 | 0.2 | 0.0 | 0.5 |
| | Linear-arable | 1.0 | 0.1 | 0.4 | 1.5 | 1.0 | 0.4 | 0.1 | 1.5 |
| | Linear-grass | 1.6 | 0.2 | 0.9 | 2.8 | 2.9 | 0.2 | 0.7 | 3.8 |
| | Linear-other | 0.9 | 0.2 | 0.1 | 1.2 | 1.0 | 0.3 | 0.0 | 1.4 |
| | Arable-grass | 1.2 | 0.3 | **0.7** | 2.2 | 1.2 | 0.7 | **0.1** | 1.9 |
| | Arable-other | 0.7 | 0.1 | 0.2 | 1.1 | 0.4 | 0.1 | 0.0 | 0.5 |
| | Grass-other | 1.5 | 0.3 | **0.6** | 2.3 | 2.4 | 0.1 | **0.1** | 2.6 |
| EZ3 | Arable both sides | 0.2 | 0.0 | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 |
| | Grass both sides | 1.0 | 0.1 | 0.4 | 1.4 | 1.1 | 0.4 | 0.4 | 1.9 |
| | Linear both sides | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | Other both sides | 0.1 | 0.0 | 0.0 | **0.1** | 0.2 | 0.1 | 0.0 | **0.3** |
| | Linear-arable | 0.1 | 0.1 | 0.0 | 0.2 | 0.0 | 0.2 | 0.0 | 0.2 |
| | Linear-grass | 0.3 | 0.0 | 0.1 | 0.4 | 0.4 | 0.4 | 0.0 | 0.8 |
| | Linear-other | 0.1 | 0.0 | 0.0 | 0.2 | 0.3 | 0.0 | 0.0 | 0.4 |
| | Arable-grass | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | Arable-other | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | Grass-other | 0.1 | 0.0 | 0.0 | 0.1 | 0.3 | 0.0 | 0.0 | 0.4 |
| EZ4 | Arable both sides | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | Grass both sides | 0.1 | 0.0 | 0.0 | 0.1 | 0.1 | 0.2 | 0.0 | 0.3 |
| | Linear both sides | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | Other both sides | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 |
| | Linear-arable | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | Linear-grass | 0.2 | 0.1 | 0.0 | 0.2 | 0.2 | 0.0 | 0.0 | 0.3 |
| | Linear-other | 0.1 | 0.0 | 0.0 | 0.2 | 0.1 | 0.0 | 0.0 | 0.1 |
| | Arable-grass | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | Arable-other | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| | Grass-other | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

**Table 7.7b (contd)** Estimated length of hedgerow lost and gained between 1990 and 1998 by Environmental Zones, by adjacent land use. Where significant differences between gained and lost hedges the corresponding figures are in bold. Environmental Zone 6 omitted as no hedge present. See Annexes 7.2-5 for more detailed change data-tables (H – hedge, NW – non-woody)

| | | Lost / degenerated ('000 km) | | | | Gained /regenerated('000 km) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Adjacent land | H to non woody | Hedge to remnant | H to line trees | Total | NW to H | Remnant to hedge | Line trees to H | Total |
| EZ5 | Arable both sides | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 |
| | Grass both sides | 0.1 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 | 0.1 |
| | Linear both sides | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | Other both sides | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | Linear-arable | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | Linear-grass | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | Linear-other | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 |
| | Arable-grass | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | Arable-other | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | Grass-other | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | 0.0 | 0.0 | 0.4 |

### Adjacent streams and ditches

36 Streams and ditches within 2m of a hedge are reported here as a single figure. Table 7.8 shows that there was no loss of hedges adjacent to streams or ditches between 1990 and 1998 but an increase of hedges adjacent to streams or ditches. These increases account for 22% of all the length of new hedges. It may be that due to 1998 being a wetter year during the field-survey more streams and ditches were flowing. Module 1 stock figures for streams and ditches detected a statistical significant but modest increase in the estimated combined length of streams and ditches between 1990 and 1998.

**Table 7.8** Estimated length of hedgerow lost and gained between 1990 and 1998 in GB, by adjacency to streams or ditches.

| | Lost/ degenerated ('000 km) | | | | Gained/regenerated ('000 km) | | | |
|---|---|---|---|---|---|---|---|---|
| adjacent stream / ditch | Hedge to non woody | Hedge to remnant | Hedge to line trees | Total | Non woody to hedge | Remnant to hedge | Line trees to hedge | Total |
| GB | **0.0** | **0.0** | **0.0** | **0.0** | **5.3** | **2.3** | **1.6** | **9.2** |
| EW | **0.0** | **0.0** | **0.0** | **0.0** | **5.1** | **2.1** | **1.6** | **8.8** |
| SC | 0.0 | 0.0 | 0.0 | **0.0** | 0.2 | 0.1 | 0.1 | **0.4** |
| EZ1 | **0.0** | **0.0** | **0.0** | **0.0** | **2.66** | **1.9** | **0.5** | **5.0** |
| EZ2 | **0.0** | **0.0** | **0.0** | **0.0** | **1.90** | **0.2** | **1.0** | **3.2** |
| EZ3 | **0.0** | 0.0 | 0.0 | **0.0** | **0.51** | 0.0 | 0.0 | **0.6** |
| EZ4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.1 | 0.0 | 0.1 |
| EZ5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.23 | 0.0 | 0.1 | 0.3 |

*Assess the characteristics of the vegetation in associated hedgerow plots.*

37 There is a theoretical flaw in the use of CS2000 data for this task: although the vegetation plots associated with lost hedgerows can be identified and their 1990 vegetation described, hedgerows that have been gained since 1990 are unlikely to have

associated vegetation plots. This is because the protocols for survey do not require surveyors to place additional plots (eg where a new hedgerow appears), only to re-survey earlier plots where the hedge still exists.

38 Additionally because only two hedgerow plots per survey square were recorded in 1990 the probability that either of the plots would be associated with a hedge that was lost is likely to be low. GIS analysis confirmed that the number of 1990 plots that are associated with hedgerows that have been lost or degenerated was 7. Similarly, only 4 plots recorded in 1998 are associated with hedges that have been gained or regenerated. Some of them undoubtedly have come from features reclassified as true hedges. This would make a meaningful comparison very difficult.

*Assess the balance of ecological value from gained and lost hedgerows.*

39 Outputs from Question 8 help to define the criteria to be used in assessing the 'ecological value' of hedgerows. However, only 3 of the current draft measures for assessing a hedgerow for 'favourable condition' (Barr *et all* 2003) are available from CS2000 data: species composition, height and gappiness.

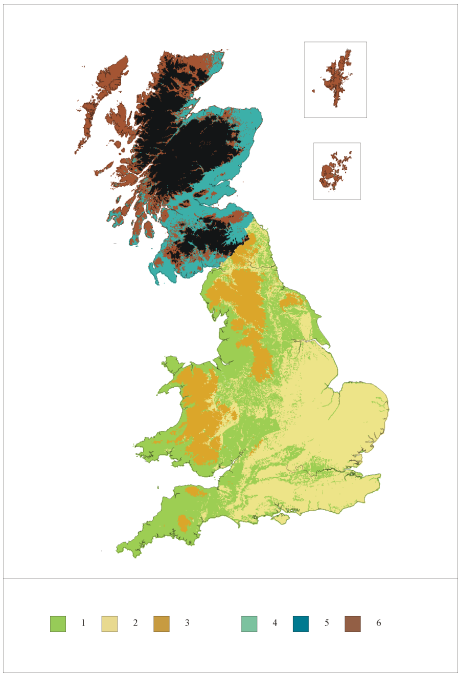
40 An equal amount of hedges lost and gained were greater than 1m tall but with greater loss of hedges over 2m tall and a greater gain in hedges between 1 and 2m. The loss of tall, overgrown hedges may have a deleterious effect on some hedgerow specialists such as dormice and corvids. - An additional attribute, width, would be useful in assessing the volume of the hedge.-

41 Although no analysis of vegetation plots was possible, Question 5 has reported that hedges adjacent to grasslands (including those with 'Boundary and Linear' on one side) have the highest species-rich ground flora. There may have been little change in this aspect as the gains in hedges adjacent to grassland, being the most abundant type, balanced the losses.

42 The insufficient number of hedgerow vegetation plots makes further assessment of ecological value of lost and gained hedges difficult.

## LOCATION OF LOST AND GAINED HEDGES

43 The geographical locations of total lost and gained hedges are given by Environmental Zone. Fig 7.5 shows the Environmental Zones in Great Britain.



44 The geographical locations of total lost and gained hedges are shown in Figure 7.6. Environmental Zones 1 and 2, the eastern and western lowlands of England & Wales, show the greatest turnover which broadly reflect the high densities of hedge in 1990 and 1998 for each Environmental Zone. No significant difference was found between losses and gains in any Environmental Zone.

**Figure 7.6** Estimated length of hedgerow lost and gained between 1990 and 1998 by Environmental Zone

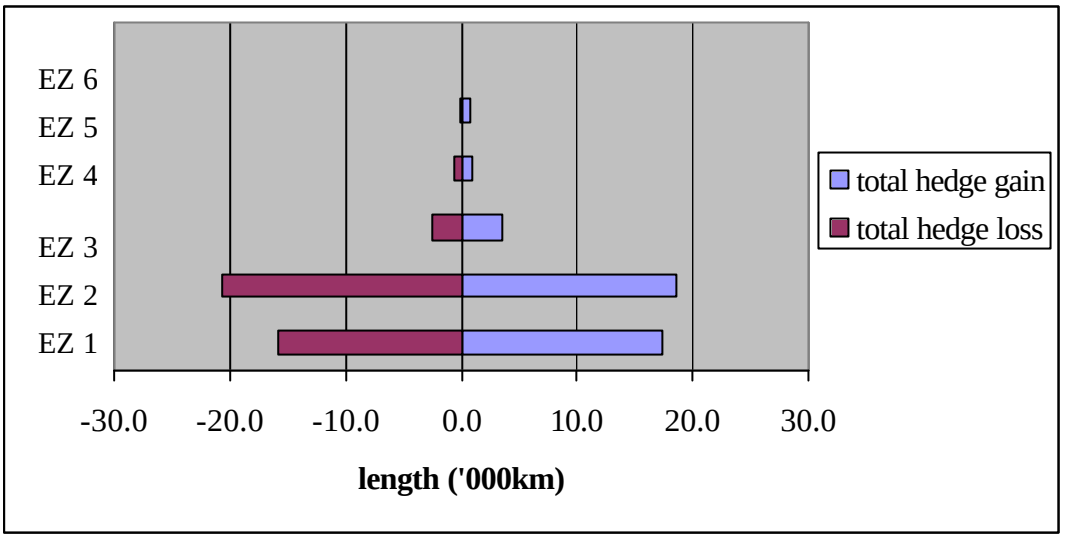
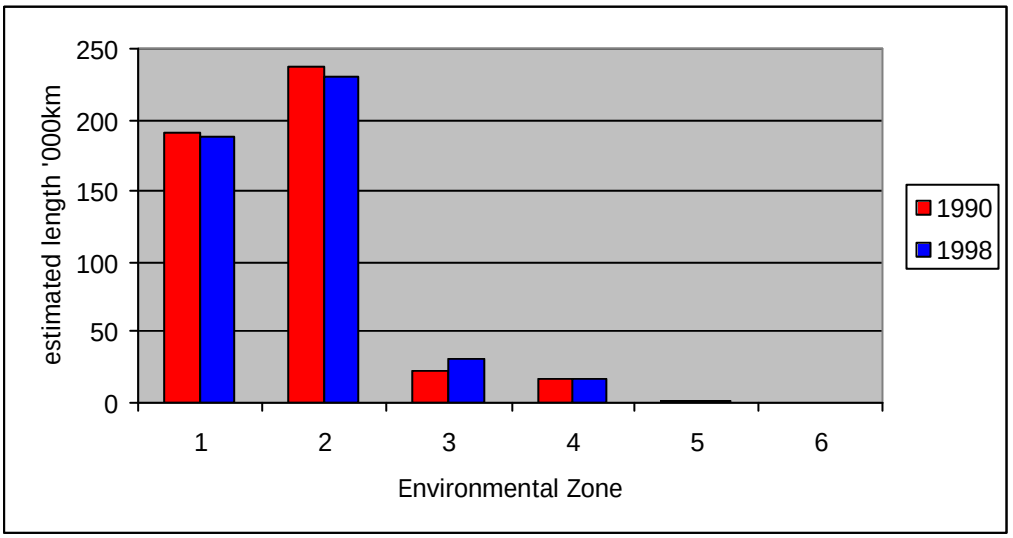


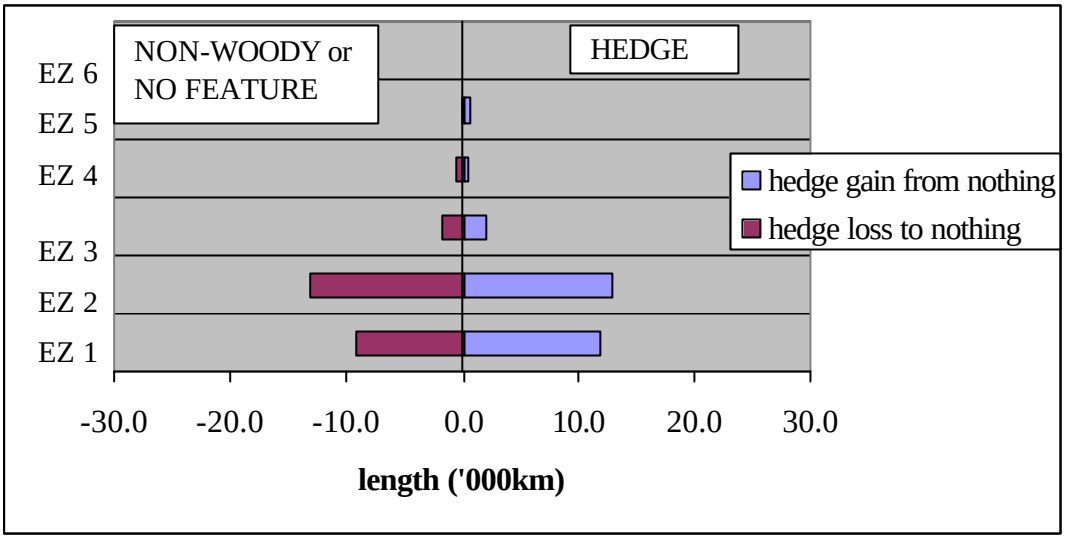

**Figure 7.7** Estimated stock of hedgerow in 1990 and 1998 by Environmental Zone.

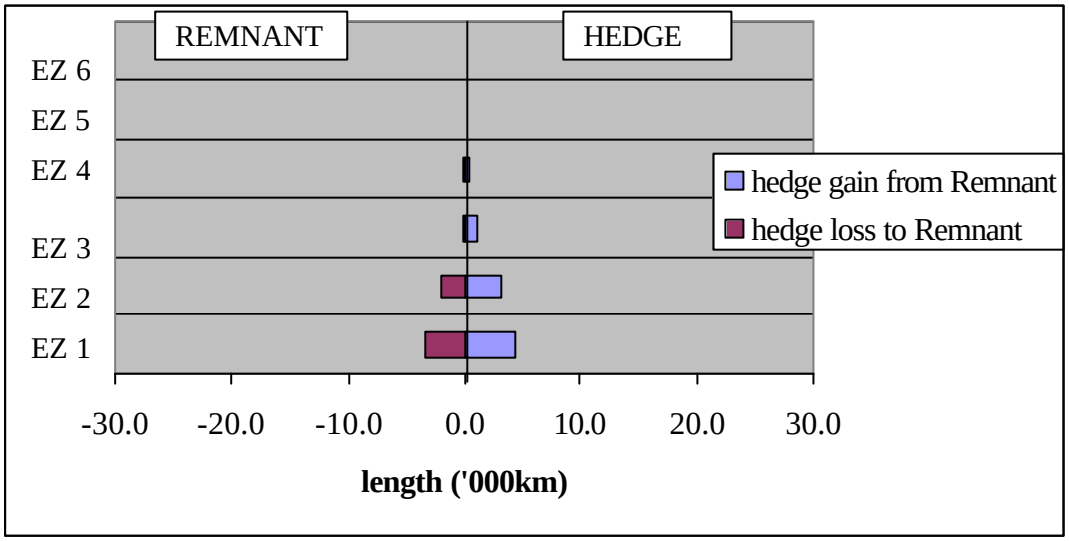


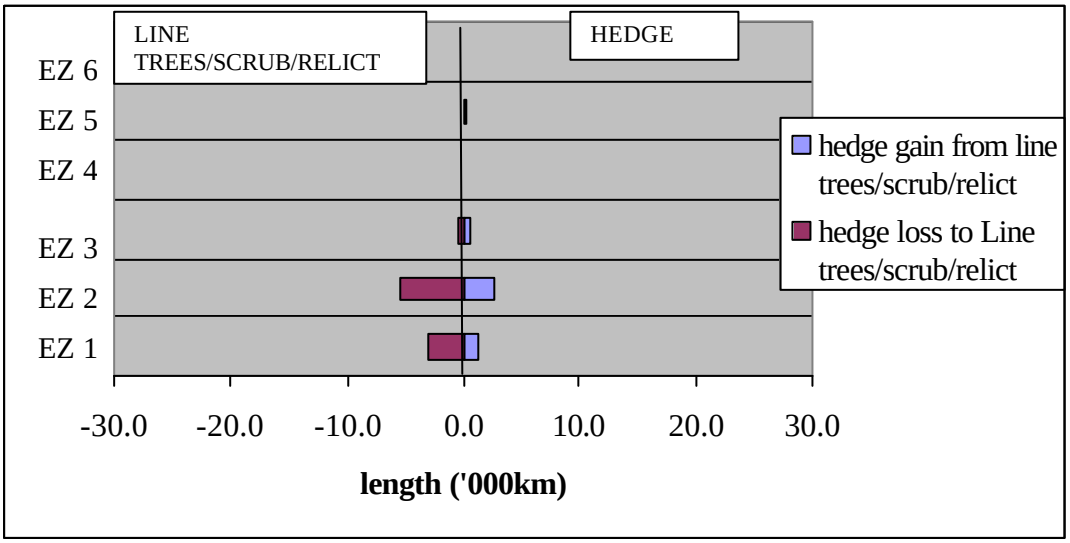

45 The geographical locations of lost and gained hedges between hedge and other features are shown in Figure 7.8 a,b & c. Environmental Zones 1 and 2 again show the greatest turnover which broadly reflect the stock levels in 1990 and 1998 for each Environmental Zone except for Hedge / Remnant flows which are greater in Environmental Zone 1. There was a statistically significant change in Environmental Zone 1 where the loss from Hedge to Lines of trees/scrub and relict was greater than the gains (P=0.01).

**Figure 7.8 a,b,c** Estimated length of hedgerow lost and gained between 1990 and 1998 by

type and by Environmental Zone



## SUMMARY

46 Analyses suggest that, apart from height, there is little difference in the physical and management characteristics between hedges that have been lost since 1990 and those that have been gained. As far as height classes are concerned, hedges that were lost tend to be taller than those that have been gained. It might be assumed that the total volume of such hedges might therefore be greater (although width measurements were only introduced in 1998 and only then for a limited number of hedges, so it is difficult to confirm this) and therefore the value of such lost hedges would be greater.

47 CS data is limited in assessing the ecological balance of lost and gained hedges due partly to lack of appropriate attributes and partly to the scarcity of detailed vegetation plots associated with lost or gained hedges.

## RECOMMENDED CHANGES TO CS METHODS

48 In future surveys:

- consideration must be given as to characterising the vegetation associated with new features (eg gained hedges) – this recommendation applies to other aspects of CS protocols.
- Consideration needs to be given to additional attribute codes for recording all 'woody' linear features in order to assess ecological value.
- mechanisms must be implemented to ensure that surveyors gather the full suite of records when describing hedgerows; this would be most easily done using compulsory fields in an electronic data-logging system.

## REFERENCES

Barr CJB, Petit S, Robertson H and Wolton R *The Definition Of Favourable Condition Of Hedgerows:Main Findings.* Draft report to the Steering Group for the UK BAP for Ancient and/or Species Rich Hedgerows. (May 2003)

Haines-Young, R.H., Barr, C.J., Black, H.I.J., Briggs, D.J., Bunce, R.G.H., Clarke, R.T., Cooper, A., Dawson, F.H., Firbank, L.G., Fuller, R.M., Furse, M.T., Gillespie, M.K., Hill, R., Hornung, M., Howard, D.C., McCann, T., Morecroft, M.D., Petit, S., Sier, A.R.J., Smart, S.M., Smith, G.M., Stott, A.P., Stuart, R.C., and Watkins, J.W. (2000). *Accounting for nature: assessing habitats in the UK countryside*. Department of the Environment, Transport and the Regions, London.

Hooper, M.D. (1992) *Hedge Management*. (Unpublished Institute of Terrestrial Ecology report for the Department of the Environment. August 1992).

## ANNEXES

**ANNEX 7.1 Gains, loss and significance tests of changes in hedges by type of change between 1990 and 1998 for all countries and regions. Significant change indicated in 'sig' column.**

| | | lost | | gained | | change | | | |
|---|---|---|---|---|---|---|---|---|---|
| Country / region | feature change | length 000km | se 000km | length 000km | se 000km | length 000km | se 000km | sig | 2-sided P |
| Great Britain | H-R / R-H | 5.9 | 0.9 | 8.9 | 1.3 | 2.8 | 1.6 | ns | 0.07 |
| | H-L / L-H | 9.2 | 1.4 | 4.5 | 1.5 | -4.8 | 2.1 | * | 0.04 |
| | H-~ / ~-H | 24.8 | 2.4 | 28.9 | 3.2 | 3.0 | 3.7 | ns | 0.38 |
| | Total to/from Hedge | 39.9 | 3.2 | 42.3 | 4.0 | 1.0 | 4.8 | ns | 0.82 |
| England and Wales | H-R / R-H | 5.8 | 0.9 | 8.6 | 1.3 | 2.6 | 1.6 | ns | 0.09 |
| | H-L / L-H | 9.1 | 1.4 | 4.4 | 1.5 | -5.0 | 2.1 | * | 0.03 |
| | H-~ / ~-H | 24.2 | 2.4 | 27.7 | 3.2 | 2.6 | 3.6 | ns | 0.45 |
| | Total to/from Hedge | 39.2 | 3.2 | 40.7 | 3.9 | 0.2 | 4.8 | ns | 0.97 |
| Scotland | H-R / R-H | 0.1 | 0.1 | 0.3 | 0.3 | 0.2 | 0.3 | ns | 0.61 |
| | H-L / L-H | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | ns | 0.25 |
| | H-~ / ~-H | 0.7 | 0.2 | 1.2 | 0.6 | 0.5 | 0.6 | ns | 0.41 |
| | Total to/from Hedge | 0.8 | 0.3 | 1.6 | 0.7 | 0.8 | 0.8 | ns | 0.26 |
| Environmental Zone 1 | H-R / R-H | 3.5 | 0.7 | 4.3 | 0.9 | 0.8 | 1.2 | ns | 0.48 |
| | H-L / L-H | 3.2 | 0.8 | 1.2 | 0.4 | -2.0 | 0.8 | ** | 0.01 |
| | H-~ / ~-H | 9.2 | 1.3 | 12 | 2.1 | 2.7 | 2.2 | ns | 0.22 |
| | Total to/from Hedge | 15.9 | 1.8 | 17.4 | 2.3 | 1.5 | 2.6 | ns | 0.55 |
| Environmental Zone 2 | H-R / R-H | 2.1 | 0.5 | 3.1 | 0.6 | 1.0 | 0.8 | ns | 0.21 |
| | H-L / L-H | 5.5 | 1.1 | 2.8 | 1.5 | -2.9 | 1.9 | ns | 0.15 |
| | H-~ / ~-H | 13.1 | 1.9 | 13.4 | 2.1 | -0.2 | 2.7 | ns | 0.94 |
| | Total to/from Hedge | 20.7 | 2.5 | 19.3 | 2.9 | -2.1 | 3.8 | ns | 0.59 |
| Environmental Zone 3 | H-R / R-H | 0.2 | 0.1 | 1.1 | 0.6 | 0.8 | 0.6 | ns | 0.12 |
| | H-L / L-H | 0.5 | 0.3 | 0.5 | 0.3 | -0.1 | 0.4 | ns | 0.89 |
| | H-~ / ~-H | 1.9 | 0.7 | 2.3 | 1.1 | 0.1 | 1.0 | ns | 0.94 |
| | Total to/from Hedge | 2.6 | 0.9 | 3.9 | 1.3 | 0.8 | 1.3 | ns | 0.47 |
| Environmental Zone 4 | H-R / R-H | 0.1 | 0.1 | 0.3 | 0.3 | 0.2 | 0.3 | ns | 0.56 |
| | H-L / L-H | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | ns | 0.66 |
| | H-~ / ~-H | 0.5 | 0.2 | 0.5 | 0.2 | 0.0 | 0.3 | ns | 0.95 |
| | Total to/from Hedge | 0.7 | 0.3 | 0.9 | 0.4 | 0.2 | 0.4 | ns | 0.61 |
| Environmental Zone 5 | H-R / R-H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | ns | na |
| | H-L / L-H | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | ns | 0.69 |
| | H-~ / ~-H | 0.1 | 0.1 | 0.6 | 0.5 | 0.5 | 0.5 | ns | 0.53 |
| | Total to/from Hedge | 0.1 | 0.1 | 0.7 | 0.6 | 0.6 | 0.6 | ns | 0.53 |
| Environmental Zone 6 | H-R / R-H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | na | na | na |
| | H-L / L-H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | na | na | na |
| | H-~ / ~-H | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | na | na | na |
| | Total to/from Hedge | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | na | na | na |

Key: H =hedge, R = remnant, L = line of trees/shrub/relict hedge, ~ = no feature present

**Annex 7.2 Significant differences in estimates for Total hedge gains vs loss between 1990-98 by characteristic and by country.**

**Significance differences in estimates for Total Hedge gains vs loss**

| | Feature | Length 000km | se 000km | cv | 95% ll | 95% ul | sig | 2-sided P |
|---|---|---|---|---|---|---|---|---|
| GB | >2m | -10.9 | 2.7 | 24.4 | -16.2 | -5.8 | *** | <0.001 |
| GB | 1-2m | 7.5 | 2.9 | 38.6 | 2.4 | 13.6 | ** | <0.01 |
| GB | <1m | 2.4 | 1.0 | 43.4 | 0.6 | 4.3 | ** | <0.01 |
| GB | signs of replacement | 0.7 | 0.3 | 40.7 | 0.2 | 1.3 | *** | <0.001 |
| GB | uncut | 4.5 | 1.1 | 23.4 | 2.6 | 6.7 | *** | <0.001 |
| GB | recently laid | -1.9 | 0.8 | 39.8 | -3.5 | -0.6 | *** | <0.001 |
| GB | flailing | 3.0 | 1.0 | 32.4 | 1.2 | 5.0 | *** | <0.001 |
| GB | adjacent stream/ditch | 9.2 | 1.3 | 14.4 | 6.8 | 11.9 | *** | <0.001 |
| GB | Adjacent grass-linear | 2.0 | 1.1 | 57.8 | 0.0 | 4.2 | * | 0.05 |
| GB | Adjacent grass-other | 2.1 | 1.0 | 47.5 | 0.3 | 4.2 | * | 0.02 |
| EW | >2m | -11.4 | 2.6 | 23.0 | -16.6 | -6.4 | *** | <0.001 |
| EW | 1-2m | 7.6 | 2.9 | 37.7 | 2.6 | 13.8 | ** | <0.01 |
| EW | <1m | 2.3 | 1.0 | 44.1 | 0.6 | 4.3 | ** | <0.01 |
| EW | signs of replacement | 0.7 | 0.3 | 40.7 | 0.2 | 1.3 | *** | <0.001 |
| EW | uncut | 4.5 | 1.1 | 23.7 | 2.5 | 6.6 | *** | <0.001 |
| EW | recently laid | -1.9 | 0.8 | 39.8 | -3.5 | -0.6 | *** | <0.001 |
| EW | flailing | 3.1 | 1.0 | 31.1 | 1.3 | 5.1 | *** | <0.001 |
| EW | adjacent stream/ditch | 8.8 | 1.3 | 14.7 | 6.4 | 11.4 | *** | <0.001 |
| EW | Adjacent grass-linear | 2.0 | 1.1 | 56.6 | 0.1 | 4.2 | * | 0.04 |
| EW | grass-other | 1.7 | 0.9 | 53.8 | 0.0 | 3.6 | * | 0.05 |
| SCO | adjacent stream/ditch | 0.4 | 0.3 | 73.9 | 0.0 | 1.1 | * | 0.04 |
| EZ1 | >2m | -4.7 | 1.7 | 35.8 | -8.0 | -1.4 | ** | <0.01 |
| EZ1 | 1-2m | 3.6 | 1.3 | 35.2 | 1.3 | 6.1 | ** | <0.01 |
| EZ1 | <1m | 1.5 | 0.9 | 59.0 | 0.0 | 3.2 | * | 0.05 |
| EZ1 | stockproof | 1.9 | 1.0 | 52.9 | 0.1 | 3.8 | * | 0.03 |
| EZ1 | signs of replacement | 0.4 | 0.3 | 56.1 | 0.0 | 1.0 | * | 0.01 |
| EZ1 | uncut | 2.0 | 0.8 | 42.0 | 0.7 | 3.7 | *** | <0.001 |
| EZ1 | recently laid | -0.6 | 0.3 | 58.7 | -1.4 | 0.0 | * | 0.03 |
| EZ1 | flailing | 1.8 | 0.9 | 49.6 | 0.3 | 3.6 | * | 0.01 |
| EZ1 | adjacent stream/ditch | 5.0 | 0.9 | 18.4 | 3.3 | 6.9 | *** | <0.001 |
| EZ1 | adjacent land -grass-other | 1.2 | 0.6 | 46.7 | 0.1 | 2.3 | * | 0.03 |
| EZ2 | >2m | -5.4 | 1.9 | 35.9 | -9.3 | -1.8 | ** | <0.01 |
| EZ2 | uncut | 2.4 | 0.6 | 26.3 | 1.3 | 3.7 | *** | <0.001 |
| EZ2 | recently laid | -1.1 | 0.6 | 52.2 | -2.2 | -0.1 | * | 0.02 |
| EZ2 | flailing | 1.3 | 0.4 | 32.3 | 0.5 | 2.1 | *** | <0.001 |
| EZ2 | adjacent stream/ditch | 3.2 | 0.8 | 23.8 | 1.8 | 4.8 | *** | <0.001 |
| EZ3 | >2m | -1.3 | 0.5 | 38.5 | -2.2 | -0.5 | *** | <0.001 |
| EZ3 | 1-2m | 1.8 | 1.2 | 64.5 | 0.1 | 4.1 | * | 0.04 |
| EZ3 | adjacent stream/ditch | 0.6 | 0.5 | 85.4 | 0.0 | 1.5 | *** | <0.001 |
| EZ3 | adjacent land - other | 0.2 | 0.1 | 57.3 | 0.0 | 0.4 | * | 0.04 |

**Annex 7.3 Significant differences in estimates for gains vs loss between Hedge – Remnant features, between 1990-98 by characteristic and by country.**

Significant differences in estimates of gains vs loss between Hedge - Remnant features

| | Feature | Length 000km | se 000km | cv | 95% ll | 95% ul | sig | 2-sided P |
|---|---|---|---|---|---|---|---|---|
| GB | >50% hawthorn | 3.2 | 1.3 | 41.4 | 0.9 | 5.7 | ** | 0.01 |
| GB | ht 1-2m | 3.0 | 1.0 | 33.1 | 1.3 | 5.1 | *** | <0.001 |
| GB | ht <1m | 0.8 | 0.4 | 55.0 | 0.1 | 1.6 | * | 0.02 |
| GB | not stockproof | 3.4 | 1.1 | 33.6 | 1.2 | 5.5 | *** | <0.001 |
| GB | uncut | 0.6 | 0.2 | 38.2 | 0.2 | 1.1 | ** | <0.01 |
| GB | flailing | 1.0 | 0.4 | 41.0 | 0.3 | 1.9 | *** | <0.001 |
| GB | adjacent stream/ditch | 2.3 | 0.5 | 24.2 | 1.3 | 3.4 | *** | <0.001 |
| GB | adjacent land grass-linear | 0.9 | 0.5 | 57.7 | 0.0 | 1.9 | * | 0.05 |
| EW | >50% hawthorn | 2.9 | 1.3 | 43.9 | 0.7 | 5.3 | * | 0.01 |
| EW | ht 1-2m | 2.9 | 1.0 | 34.1 | 1.2 | 4.9 | *** | <0.001 |
| EW | ht <1m | 0.8 | 0.4 | 55.0 | 0.1 | 1.6 | * | 0.02 |
| EW | not stockproof | 3.1 | 1.1 | 35.0 | 1.1 | 5.1 | *** | <0.001 |
| EW | uncut | 0.6 | 0.2 | 38.2 | 0.2 | 1.1 | ** | <0.01 |
| EW | flailing | 1.0 | 0.4 | 41.0 | 0.3 | 1.9 | *** | <0.001 |
| EW | adjacent stream/ditch | 2.1 | 0.5 | 25.2 | 1.2 | 3.2 | *** | <0.001 |
| EW | adjacent land grass-linear | 0.9 | 0.5 | 56.1 | 0.0 | 1.9 | * | 0.05 |
| EZ1 | ht <1m | 0.4 | 0.2 | 59.0 | 0.0 | 0.9 | * | 0.03 |
| EZ1 | uncut | 0.3 | 0.2 | 58.0 | 0.0 | 0.6 | * | 0.02 |
| EZ1 | flailing | 0.6 | 0.3 | 54.6 | 0.1 | 1.4 | ** | <0.01 |
| EZ1 | adjacent stream/ditch | 1.9 | 0.5 | 27.4 | 1.0 | 3.0 | *** | <0.001 |
| EZ1 | adjacent land grass-linear | 0.5 | 0.3 | 51.1 | 0.1 | 1.1 | ** | 0.01 |
| EZ2 | >50% hawthorn | 1.2 | 0.6 | 48.8 | 0.1 | 2.3 | * | 0.03 |
| EZ2 | ht 1-2m | 1.1 | 0.5 | 43.7 | 0.3 | 2.1 | * | 0.01 |
| EZ2 | not stockproof | 1.2 | 0.5 | 42.6 | 0.3 | 2.3 | * | 0.01 |
| EZ2 | uncut | 0.4 | 0.2 | 50.8 | 0.0 | 0.8 | * | 0.02 |
| EZ2 | recently laid | -0.2 | 0.1 | 60.7 | -0.4 | 0.0 | * | 0.03 |
| EZ2 | flailing | 0.4 | 0.2 | 60.0 | 0.0 | 0.9 | * | 0.03 |
| EZ2 | adjacent stream/ditch | 0.2 | 0.1 | 58.6 | 0.0 | 0.5 | ** | 0.01 |
| EZ3 | ht 1-2m | 0.8 | 0.5 | 63.3 | 0.0 | 1.8 | * | 0.03 |

**Annex 7.4 Significant differences in estimates for gains vs loss between Hedge – non-wood features/nothing, between 1990-98 by characteristic and by country.**

Significant differences in estimates of gains vs loss between Hedge - non-woody features/nothing

| | Feature | Length 000km | se 000km | cv | 95% ll | 95% ul | sig | 2-sided P |
|---|---|---|---|---|---|---|---|---|
| GB | ht >2m | -3.7 | 1.9 | 50.1 | -7.3 | -0.4 | * | 0.04 |
| GB | ht <1m | 1.6 | 0.9 | 54.8 | 0.1 | 3.5 | * | 0.03 |
| GB | stockproof | 4.2 | 2.0 | 46.6 | 0.7 | 7.7 | * | 0.02 |
| GB | signs of replacement | 0.7 | 0.3 | 43.2 | 0.2 | 1.3 | *** | <0.001 |
| GB | uncut | 3.8 | 1.0 | 26.8 | 2.0 | 6.0 | *** | <0.001 |
| GB | recently laid | -1.3 | 0.5 | 39.3 | -2.3 | -0.4 | *** | <0.001 |
| GB | flailing | 2.3 | 0.8 | 36.2 | 0.8 | 4.1 | *** | <0.001 |
| GB | bracken present | -2.0 | 0.9 | 44.0 | -3.8 | -0.5 | ** | 0.01 |
| GB | adjacent stream/ditch | 5.3 | 0.9 | 16.7 | 3.7 | 7.1 | *** | <0.001 |
| GB | adjacent grass-linear | 1.6 | 0.8 | 52.5 | 0.1 | 3.4 | * | 0.04 |
| GB | adjacent grass-other | 2.2 | 0.9 | 39.7 | 0.6 | 3.9 | ** | 0.01 |
| EW | ht >2m | -4.1 | 1.8 | 44.0 | -7.6 | -0.8 | * | 0.02 |
| EW | ht <1m | 1.6 | 0.9 | 56.1 | 0.1 | 3.5 | * | 0.04 |
| EW | stockproof | 3.9 | 2.0 | 50.7 | 0.4 | 7.4 | * | 0.03 |
| EW | signs of replacement | 0.7 | 0.3 | 43.2 | 0.2 | 1.3 | *** | <0.001 |
| EW | uncut | 3.7 | 1.0 | 27.3 | 1.9 | 5.9 | *** | <0.001 |
| EW | recently laid | -1.3 | 0.5 | 39.3 | -2.3 | -0.4 | *** | <0.001 |
| EW | flailing | 2.4 | 0.8 | 34.4 | 1.0 | 4.2 | *** | <0.001 |
| EW | bracken present | -1.9 | 0.9 | 45.6 | -3.7 | -0.4 | * | 0.02 |
| EW | adjacent stream/ditch | 5.1 | 0.9 | 16.9 | 3.6 | 6.8 | *** | <0.001 |
| EW | adjacent grass-linear | 1.6 | 0.8 | 51.0 | 0.2 | 3.4 | * | 0.03 |
| EW | adjacent grass-other | 1.9 | 0.8 | 42.1 | 0.3 | 3.4 | * | 0.03 |
| EZ1 | ht 1-2m | 2.6 | 1.2 | 46.0 | 0.4 | 4.9 | * | 0.02 |
| EZ1 | stockproof | 1.7 | 0.8 | 49.5 | 0.2 | 3.3 | * | 0.02 |
| EZ1 | uncut | 1.8 | 0.8 | 47.7 | 0.5 | 3.4 | *** | <0.001 |
| EZ1 | adjacent stream/ditch | 2.7 | 0.6 | 21.9 | 1.6 | 3.8 | *** | <0.001 |
| EZ2 | uncut | 1.9 | 0.6 | 29.0 | 0.9 | 3.1 | *** | <0.001 |
| EZ2 | recently laid | -0.5 | 0.3 | 63.1 | -1.1 | 0.0 | * | 0.04 |
| EZ2 | flailing | 1.1 | 0.3 | 30.4 | 0.5 | 1.8 | *** | <0.001 |
| EZ2 | adjacent stream/ditch | 1.9 | 0.4 | 21.6 | 1.2 | 2.7 | *** | <0.001 |
| EZ3 | ht >2m | -0.9 | 0.3 | 35.7 | -1.5 | -0.4 | *** | <0.001 |
| EZ3 | adjacent stream/ditch | 0.5 | 0.5 | 92.5 | 0.0 | 1.5 | * | 0.02 |

**Annex 7.5 Significant differences in estimates for gains vs loss between Hedge – Lines of trees/schrub/relict hedge, between 1990-98 by characteristic and by country.**

Significant differences in estimates of gains vs loss between Hedge and Lines of trees/schrub/relict hedge

| | Feature | Length 000km | se 000km | cv | 95% ll | 95% ul | sig | 2-sided P |
|---|---|---|---|---|---|---|---|---|
| GB | >50% hawthorn | -1.9 | 0.8 | 42.8 | -3.4 | -0.5 | ** | <0.01 |
| GB | ht >2m | -5.8 | 1.2 | 20.3 | -8.1 | -3.8 | *** | <0.001 |
| GB | unknown | -3.4 | 1.1 | 33.3 | -5.8 | -1.4 | *** | <0.001 |
| GB | uncut | 0.2 | 0.1 | 56.0 | 0.0 | 0.3 | * | 0.04 |
| GB | adjacent stream/ditch | 1.6 | 0.6 | 38.6 | 0.6 | 3.1 | *** | <0.001 |
| GB | adjacent land arable-linear | -1.1 | 0.5 | 43.3 | -2.1 | -0.4 | *** | <0.001 |
| GB | adjacent land arable-grass | -0.8 | 0.4 | 43.6 | -1.6 | -0.2 | ** | <0.01 |
| GB | adjacent land arable-other | -0.4 | 0.2 | 45.0 | -0.8 | -0.1 | * | 0.01 |
| EW | >50% hawthorn | -2.0 | 0.8 | 39.7 | -3.5 | -0.6 | ** | 0.00 |
| EW | ht >2m | -5.8 | 1.2 | 20.2 | -8.1 | -3.8 | *** | <0.001 |
| EW | uncut | 0.2 | 0.1 | 56.0 | 0.0 | 0.3 | * | 0.04 |
| EW | adjacent stream/ditch | 1.6 | 0.6 | 40.1 | 0.6 | 3.0 | *** | <0.001 |
| EW | adjacent land arable-linear | -1.1 | 0.5 | 43.3 | -2.1 | -0.4 | *** | <0.001 |
| EW | adjacent land arable-grass | -0.8 | 0.4 | 43.8 | -1.6 | -0.2 | ** | <0.01 |
| EW | adjacent land arable-other | -0.4 | 0.2 | 45.0 | -0.8 | -0.1 | * | 0.01 |
| EZ1 | mixed | -1.4 | 0.6 | 44.2 | -2.8 | -0.3 | ** | <0.01 |
| EZ1 | >2m | -1.8 | 0.6 | 34.2 | -3.0 | -0.8 | *** | <0.001 |
| EZ1 | adjacent stream/ditch | 0.5 | 0.3 | 53.9 | 0.1 | 1.0 | *** | <0.001 |
| EZ1 | adjacent land arable-linear | -0.8 | 0.4 | 56.3 | -1.7 | -0.1 | *** | <0.001 |
| EZ2 | >50% hawthorn | -1.4 | 0.6 | 42.8 | -2.7 | -0.4 | ** | <0.01 |
| EZ2 | ht >2m | -3.8 | 1.0 | 26.1 | -5.9 | -2.2 | *** | <0.001 |
| EZ2 | not stockproof | -1.1 | 0.6 | 54.7 | -2.4 | -0.1 | * | 0.04 |
| EZ2 | filled gaps < 10% | -0.4 | 0.2 | 54.6 | -0.9 | 0.0 | * | 0.02 |
| EZ2 | adjacent stream/ditch | 1.0 | 0.6 | 55.0 | 0.2 | 2.3 | *** | <0.001 |
| EZ2 | adjacent land arable-grass | -0.7 | 0.3 | 44.0 | -1.3 | -0.2 | *** | <0.001 |
| EZ2 | adjacent land grass-other | -0.4 | 0.2 | 46.1 | -0.8 | -0.1 | * | 0.01 |
| EZ3 | ht 1-2m | 0.2 | 0.1 | 63.6 | 0.0 | 0.4 | * | 0.05 |