

## **Section 2**

# **Land Use Change and Forestry: The 2003 UK Greenhouse Gas Inventory and projections to 2020**



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## **2. Land Use Change and Forestry: The 2003 UK Greenhouse Gas Inventory and projections to 2020**

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### **2.1. Introduction**

This sector of the Greenhouse Gas Inventory differs from others in that it contains both sources and sinks of carbon dioxide. The sinks, (or removals), are presented as negative quantities and are reported separately from emissions in the inventory tables. Emissions from land use change and forestry were approximately 2.5% of the UK total in 2003 and are declining gradually.

The estimates for Land Use Change and Forestry are from work carried out by the Centre for Ecology & Hydrology. The data have been submitted using both the new Common Reporting Format tables agreed at the 9th Conference of Parties to the UNFCCC and contained in FCCC/SBSTA/2004/8, and the previous Common Reporting Format under IPCC 1996 Guidelines.

Extensive revision of the data and methods used for this Sector has been made for this Report, starting from the approaches described by Cannell et al. (1999) and Milne and Brown (1999). These revisions have taken into account the recommendations of the IPCC Good Practice Guidance on Land Use, Land Use Change and Forestry (GPG LULUCF) (IPCC, 2003), particularly with respect to land use categories. Section 2.2 contains more detailed descriptions of the methods used to estimate emissions in this Sector.

The structure of this Chapter, and the main submission of CRF Tables is based on the Categories of the IPCC 1996 Guidelines. Each section below includes an account of how the estimates have been used to report under the Categories of the new Common Reporting Format. The Sectoral Report Table 5 in the new CRF format is presented for each year from 1990 to 2003 in Appendix A.2 and all the CRF Tables for Sector 5 (LULUCF) have been submitted to the UNFCCC using the CRF (LULUCF) Software v1.0. The UK also provided all data for the entire forest sink together, and hence non-forest emissions and removals from soils are provided separately. The activity data and the different groupings are discussed in more detail in Section 2.2.1.(b). Net emissions in 1990 are now estimated to be 2645 Gg CO<sub>2</sub> compared to 9050 Gg CO<sub>2</sub> in the 2002 National Inventory Report. For 2002 a net removal of -1489 Gg CO<sub>2</sub> is estimated here compared to a net emission of 1903 Gg CO<sub>2</sub> in the 2002 GHG Inventory.

### **2.2. LUCF GHG Data on basis of IPCC 1996 Guidelines**

#### **2.2.1. Changes in Forests and Other Woody Biomass Stocks**

##### **2.2.1.(a) Methodology**

The carbon uptake by the forests planted since 1920 is calculated by a carbon accounting model (C-Flow) as the net change in the pools of carbon in standing trees, litter, soil and products from harvested material for conifer and broadleaf forests. The method can be described as Tier 3, as defined in the GPG LULUCF (IPCC, 2003). The model calculates the masses of carbon in the pools of new even-aged plantations that were clearfelled and then replanted at the time of Maximum Area Increment. Activity data are obtained consistently from the same national forestry sources, which ensures time series consistency of estimated removals. The method used for this category has been revised for this Report and recalculations have been made for each

year since 1990. This results in an increase in removals of about 40% for each year with some variation due to the pattern of activity.

In the UK all forests can be classified as temperate and about 65% of these have been planted since 1920 on land that had not been forested for many decades. The forests in existence prior to 1920 are considered not to have significant long term changes in biomass stock. This is probably a conservative assumption. The estimates of changes in carbon stock of the forests established since 1920 are based on activity data in the form of annual planting areas of forest published by the UK Forestry Commission and the Northern Ireland Department of Agriculture.

The carbon uptake by the forests planted since 1920 is calculated by a carbon accounting model (Dewar and Cannell, 1992; Cannell and Dewar, 1995; Milne *et al.* 1998) as the net change in pools of carbon in standing trees, litter, soil in conifer and broadleaf forests and products. Restocking is assumed in all forests. The method of the IPCC 1996 Guidelines is not used. The UK carbon accounting model forests calculates the mass of carbon in trees, litter, soil and wood products from harvested material in new even-aged plantations that were clearfelled and then replanted at the time of Maximum Area Increment (MAI). Two types of input data and two parameter sets were required for the model (Cannell and Dewar, 1995). The input data are (a) areas of new forest planted in each year in the past, and (b) the stemwood growth rate and harvesting pattern. Parameter values were required to estimate (i) stemwood, foliage, branch and root masses from the stemwood volume and (ii) the decomposition rates of litter, soil carbon and wood products.

For the estimates described here we used the combined area of new private and state planting from 1920 to 2003 for England, Scotland, Wales and Northern Ireland sub-divided into conifers and broadleaves. Restocking was dealt with in the model through the second and subsequent rotations and hence areas restocked each year did not need to be considered separately. The implicit assumption is therefore that the forests are felled according to standard management tables. Data on variation in management, i.e. felling/replanting dates, from that recommended in the standard tables is not available to the Inventory compilers.

The carbon flow model uses Forestry Commission Yield Tables (Edwards and Christie, 1981) to describe forest growth after thinning and by an expo-linear curve before thinning. It was assumed that all new conifer plantations have the same growth characteristics as Sitka spruce (*Picea sitchensis* (Bong.) Carr.) under an intermediate thinning management. Milne *et al.* (1998) have shown that mean Yield Class for Sitka spruce varied across Great Britain from 10 to 16 m<sup>3</sup> ha<sup>-1</sup> a<sup>-1</sup> but with no obvious geographical pattern and that this variation had an effect of less than 10% on estimated carbon uptake for the country as a whole. The Inventory data has therefore been estimated by assuming all conifers in Great Britain follow the growth pattern of Yield Class 12 m<sup>3</sup> ha<sup>-1</sup> a<sup>-1</sup>, but in Northern Ireland the Yield Class 14 m<sup>3</sup> ha<sup>-1</sup> a<sup>-1</sup> is used. Milne *et al.* (1998) also showed that different assumptions for the yield of broadleaf species had little effect on overall carbon uptakes. It is assumed here that broadleaf forests had the characteristics of beech (*Fagus sylvatica* L.) of Yield Class 6 m<sup>3</sup> ha<sup>-1</sup> a<sup>-1</sup>. Data in the most recent inventory of British woodlands (Forestry Commission 2002) shows that beech is only about 8% of broadleaf forest (all ages). Sensitivity analysis of the carbon accounting model shows that different assumptions about the broadleaf species planted has little effect on overall carbon uptake; however, the assumption of using beech as the representative species will be reviewed. Using oak or the sycamore-ash-birch group Yield Class data instead of beech data is likely to have a less than 10% effect on the estimated value carbon removal by UK forests. The variation in removals from 1990 to the present is determined by the afforestation rate in earlier decades, irrespective of the species, and the effect that this has on the age structure in the present forest estate, and hence the average growth rate. This afforestation is on ground that has not been wooded for many

decades. Table 2-1 shows the afforestation rate since 1922 and the present age structure of these forests. In addition to these planted forests there are about 820,000 ha of woodland that were planted prior to 1922 or are not of commercial importance. Variation from year to year in the reported removals to woody biomass, soils and harvested products reflect the changing pattern of afforestation over the period of available data. For example, there is an increase in removals to harvested products about 50 years after a period of increased planting of conifers, which corresponds to the conifer forest rotation cycle. It can be shown that if forest expansion continues at the present rate then removals of atmospheric carbon will continue to increase until about 2005 and then will begin to decrease, reflecting the reduction in afforestation rate after the 1970s.

Table 2-1 Afforestation rate and age distribution of conifers and broadleaves in the United Kingdom since 1922

|                  | Planting rate (000 ha a <sup>-1</sup> ) |             | Age distribution |             |
|------------------|---|-------------|------------------|-------------|
|                  | Conifers                                | Broadleaves | Conifers         | Broadleaves |
| <b>1922-1929</b> | 4.9                                     | 2.4         | 2.9%             | 6.9%        |
| <b>1930-1939</b> | 7.2                                     | 2.2         | 5.3%             | 8.1%        |
| <b>1940-1949</b> | 6.3                                     | 1.9         | 4.6%             | 6.9%        |
| <b>1950-1959</b> | 20.0                                    | 3.0         | 14.8%            | 11.1%       |
| <b>1960-1969</b> | 28.4                                    | 2.9         | 21.0%            | 10.7%       |
| <b>1970-1979</b> | 33.2                                    | 1.5         | 24.6%            | 5.5%        |
| <b>1980-1989</b> | 22.5                                    | 1.4         | 16.7%            | 5.1%        |
| <b>1990</b>      | 26.8                                    | 3.1         | 2.0%             | 1.1%        |
| <b>1991</b>      | 15.4                                    | 5.8         | 1.1%             | 2.1%        |
| <b>1992</b>      | 13.4                                    | 6.8         | 1.0%             | 2.5%        |
| <b>1993</b>      | 11.6                                    | 6.5         | 0.9%             | 2.4%        |
| <b>1994</b>      | 10.1                                    | 8.9         | 0.7%             | 3.2%        |
| <b>1995</b>      | 7.4                                     | 11.2        | 0.5%             | 4.1%        |
| <b>1996</b>      | 9.5                                     | 10.5        | 0.7%             | 3.8%        |
| <b>1997</b>      | 7.4                                     | 8.9         | 0.6%             | 3.3%        |
| <b>1998</b>      | 7.0                                     | 9.7         | 0.5%             | 3.6%        |
| <b>1999</b>      | 6.6                                     | 10.1        | 0.5%             | 3.7%        |
| <b>2000</b>      | 6.5                                     | 10.9        | 0.5%             | 4.0%        |
| <b>2001</b>      | 4.9                                     | 13.4        | 0.4%             | 4.9%        |
| <b>2002</b>      | 3.9                                     | 10.0        | 0.3%             | 3.7%        |
| <b>2003</b>      | 3.7                                     | 9.3         | 0.3%             | 3.4%        |

Increases in stemwood volume were based on standard Yield Tables, as in Dewar and Cannell (1992) and Cannell and Dewar (1995). This pattern of increase in stemwood volume between planting and first thinning has been revised for this year's submission. The Tables do not provide information for years prior to first thinning so a growth curve was developed to bridge the gap (Hargreaves *et al.* 2003). The pattern fitted to the stemwood volume follows a smooth curve from planting to first thinning. The curve begins with an exponential pattern but progresses to a linear trend that merges with the pattern in forest management tables after first thinning.

The mass of carbon in a forest was calculated from volume by multiplying by species specific wood density, stem:branch and stem:root mass ratios and the fraction of wood carbon content (0.5 assumed). The values used for these parameters for conifers and broadleaves are given in Table 2-2. These parameters also control the transfer of carbon into the litter pools and its subsequent decay. Litter transfer rate from foliage and fine roots increases to a maximum at

canopy closure. A fraction of the litter is assumed to decay each year, half of which is added to the soil organic matter pool that then decays at a slower rate. Tree species and Yield Class, rather than other factors that vary with location, are assumed to control the decay of litter and soil matter. Additional litter is generated at times of thinning and felling.

Table 2-2 Main parameters for forest carbon flow model for species used to estimate carbon uptake by planting of forests of Sitka spruce (*P. sitchensis*) and beech (*F. sylvatica*) in United Kingdom (data from Dewar & Cannell, 1992)

|  | <i>P. sitchensis</i> <i>P. sitchensis</i> <i>F. sylvatica</i> |      |      |
|--|---|------|------|
|  | YC12  | YC14 | YC6  |
| <b>Rotation (years)</b>  | 59  | 57   | 92   |
| <b>Initial spacing (m)</b>   | 2   | 2    | 1.2  |
| <b>Year of first thinning</b>  | 25  | 23   | 30   |
| <b>Stemwood density (t m<sup>-3</sup>)</b>                           | 0.36  | 0.35 | 0.55 |
| <b>Max. carbon in foliage (t ha<sup>-1</sup>)</b>                    | 5.4   | 6.3  | 1.8  |
| <b>Max. carbon in fine roots (t ha<sup>-1</sup>)</b>                 | 2.7   | 2.7  | 2.7  |
| <b>Fraction of wood in branches</b>                                  | 0.09  | 0.09 | 0.18 |
| <b>Fraction of wood in woody roots</b>                               | 0.19  | 0.19 | 0.16 |
| <b>Max. foliage litterfall (t ha<sup>-1</sup> a<sup>-1</sup>)</b>    | 1.1   | 1.3  | 2    |
| <b>Max. fine root litter loss (t ha<sup>-1</sup> a<sup>-1</sup>)</b> | 2.7   | 2.7  | 2.7  |
| <b>Dead foliage decay rate (a<sup>-1</sup>)</b>                      | 1   | 1    | 3    |
| <b>Dead wood decay rate (a<sup>-1</sup>)</b>                         | 0.06  | 0.06 | 0.04 |
| <b>Dead fine root decay rate (a<sup>-1</sup>)</b>                    | 1.5   | 1.5  | 1.5  |
| <b>Soil organic carbon decay rate (a<sup>-1</sup>)</b>               | 0.03  | 0.03 | 0.03 |
| <b>Fraction of litter lost to soil organic matter</b>                | 0.5   | 0.5  | 0.5  |
| <b>Lifetime of wood products</b>                                     | 57  | 59   | 92   |

Estimates of carbon losses from the afforested soils are based on measurements taken at deep peat moorland locations, covering afforestation of peat from 1 to 9 years previously and at a 26 year old conifer forest (Hargreaves *et al.* 2003). These measurements suggest that long term losses from afforested peatlands are not as great as had been previously thought, settling to about 0.3 t C ha<sup>-1</sup> a<sup>-1</sup> thirty years after afforestation. In addition a short burst of regrowth of moorland plant species occurs before forest canopy closure. The pattern of carbon loss and gain from afforested deep peat moorland is summarized in Table 2-3

Carbon incorporated into the soil under all new forests is included and losses from pre-existing soil layers are described by the general pattern measured for afforestation of deep peat with conifers. The relative amounts of afforestation on deep peat and other soils in the decades since 1920 are taken into account. For planting on organo-mineral and mineral soils it is assumed that the pattern of emissions after planting will follow that measured for peat, but the emissions from the pre-existing soil layers will broadly be in proportion to the soil carbon density of the top 30 cm relative to the same depth of deep peat. The choice of proportionality factors was simplified: by assuming that emissions from pre-existing soil layers will be equal to those from the field measurements for all planting in Scotland and Northern Ireland and for conifer planting on peat in England and Wales. Losses from broadleaf planting in England and Wales are, however,



assumed to proceed at half the rate of the field measurements. These assumptions are based on consideration of mean soil carbon densities for non-forest in the fully revised UK soil carbon database. However, the temporary re-growth of grasses is assumed to occur for all planting at the same rate as in afforested peat moorland. This assumption agrees with qualitative field observations at plantings on agricultural land in England. As a first approach to quantifying fluxes of carbon dioxide after establishment of forests these assumptions are reasonable at the national scale but further work will be needed to account for variation in soil carbon densities, establishment methods and ground vegetation management between different tree species in different locations. This would be particularly the case where carbon accounting of specific projects or policies are required.

Table 2-3. Emissions of carbon from deep peat due to ploughing for afforestation. (Negative values mean uptake of carbon from the atmosphere. Here this is due to temporary re-growth of moorland plants between ploughing and forest canopy closure. (Based on work of Hargreaves *et al.* 2003).

| <b>Years after afforestation</b> | <b>Carbon loss<br/>(tC ha<sup>-1</sup> a<sup>-1</sup>)</b> |
|----------------------------------|--|
|                                  |  |
| 0                                | 0.0  |
| 1                                | 2.2  |
| 2                                | 3.8  |
| 3                                | 2.5  |
| 4                                | 1.1  |
| 5                                | -0.3   |
| 6                                | -1.2   |
| 7                                | -1.6   |
| 8                                | -1.6   |
| 9                                | -1.3   |
| 10                               | -1.1   |
|                                  |  |
| 15                               | -0.2   |
| 20                               | 0.1  |
| 25                               | 0.2  |
| 30                               | 0.3  |

In Inventory submissions prior to 2005 emissions and removals of carbon from soils after afforestation were treated more simply. For broadleaves the reported data included the new carbon accumulating in the afforested area and assumed that emissions from pre-existing soil layers were negligible. For conifers on peaty and mineral soils it was assumed that the newly accumulating soil carbon would exactly balance the emissions due to disturbance from pre-existing soil layers but that there would be an additional emission from afforested areas of deep peat. This latter emission was previously reported under Category 5D or 5E as “Upland drainage” but is no longer relevant due to the more consistent approach for all planting described above. With the smaller estimates of loss from pre-existing soil introduced with the enhanced removals to conifer forests there is a significant increase overall in the net level of removals of atmospheric carbon dioxide to forest soils.

In the carbon accounting model it is assumed that harvested material from thinning and felling is made into wood products. These products then decay over a period equal to the rotation of the forest, conifer or broadleaf as appropriate, since products from broadleaves (e.g. furniture) will decay more slowly than those from conifers (e.g. paper, building timber). The net change in the carbon in this pool of wood products is reported in Category 5A. This method of calculation indicates that part of the total wood products pool from UK forests is presently increasing due to

continuing expansion in forest area. Dewar and Cannell (1992) and Cannell and Dewar (1995) provide a detailed description of all the assumptions in the model.

### **2.2.1.(b) Data Reporting**

#### *2.2.1.(b) i - National Inventory Reports*

Removals to litter and soil for the afforested areas are reported in the 5A2 Category with changes in forest biomass stocks. Changes in stocks of harvested wood products are also included in this Category

#### *2.2.1.(b) ii - Common Reporting Format under IPCC 1996 Guidelines*

Removals due to changes in forest biomass stocks are reported in the 5A2 category but removals to litter and soil for the afforested areas are reported under CRF Category 5D4 (Forest Soils). Changes in stocks of harvested wood products are reported separately under Category 5A5.

#### *2.2.1.(b) iii - Common Reporting Format under IPCC LULUCF Good Practice Guidance*

The data for afforestation have been entered in Sectoral Background Table 5.A in the FCCC/SBSTA/2004/8 format (i.e. as recommended in IPCC LULUCF Good Practice Guidance) In Table 5.A.2 (Land converted to Forest Land) the data are disaggregated into afforestation of Cropland, Grassland and Settlements and further by (a) the four geographical areas of England, Scotland, Wales and Northern Ireland, and (b) three time periods, 1920 – 1949, 1950-1979 & 1980 onwards. The removals due to carbon stock changes in harvested wood products are entered into Sectoral Report Table 5.G (Other) as “Harvested Wood Products” in the FCCC/SBSTA/2004/8 format.

### **2.2.1.(c) Source-specific planned improvements**

The method for estimating removals and emissions due to afforestation is being developed to provide data for grid cells of 20 x 20 km. Periodically updated forest inventory data will be used rather than annual planting data to drive the new version. This approach is being developed to meet the requirements of the Kyoto Protocol for data more geographically explicit than the national area for reporting removals due to afforestation and deforestation under Article 3.3. The effect of deviations from standard management and externally imposed disturbances will also be accounted for using this approach.

## **2.2.2. Forest and Grassland Conversion - Temperate Forests (5B2)**

### **2.2.2.(a) Methodology**

In National Inventory Reports and CRF submissions prior to 2002, it was assumed that permanent conversion of forest to non-forest in the UK was negligible. This assumption was based on government guidelines against deforestation, including the need for approval for any permanent forest felling from the Forestry Commission or equivalent in Northern Ireland. Review of this assumption suggested that some deforestation was occurring, and several data sources were examined to estimate the rate quantitatively (Levy and Milne, 2004). This work suggested the approach of combining Forestry Commission unconditional felling licence data for rural areas with Ordnance Survey data for non-rural areas, to reduce suspected biases and inconsistencies in the available data sources. A mean deforestation rate of 1633 ha a<sup>-1</sup> was estimated for the period 1990 to 1999 and the associated emissions for 1990 to 2002 in the GHG

Inventory submitted in 2004 were each derived from this mean. This approach has now been revised to provide annual figures for the period 1990 to 2003.

In Great Britain, some activities that involve tree felling require permission from the Forestry Commission, in the form of a felling licence, or a felling application within the Woodland Grant Scheme. Under the Forestry Act 1967, there is a presumption that the felled areas will be restocked, usually by replanting. Thus, in the 1990s, ~14,000 ha a<sup>-1</sup> were felled and restocked. However, some licences are granted without the requirement to restock, where there is good reason – so-called unconditional felling licences. Most of these areas are small (1–20 ha), but their summation gives some indication of deforested area. These areas are not published, but recent figures from the Forestry Commission have been collated. These provide estimates of rural deforestation rates in England for 1990 to 2002 and for GB in 1999 to 2001.

Only local planning authorities hold documentation for allowed felling for urban development and the need for collation makes it difficult to estimate the national total. However, in England, The Ordnance Survey (national mapping agency) makes an annual assessment of land use change (Office of The Deputy Prime Minister, 2003) from data it collects for map updating. Eleven broad land-use categories are defined, with a number of sub-categories. The data for England (1990 to 2002) were used to produce a land-use change matrix, quantifying the transitions between land-use classes. Deforestation rate was calculated as the sum of transitions from all forest classes to all non-forest classes, providing estimates of non-rural deforestation.

The rural and non-rural deforestation values for England were each scaled up to GB scale, assuming that England accounted for 72 per cent of deforestation, based on the distribution of licenced felling between England and the rest of GB in 1999 to 2001. However, the Ordnance Survey data come from a continuous rolling survey programme, both on the ground and from aerial photography. The changes reported each year may have actually occurred in any of the preceding 1-5 years (the survey frequency varies among areas, and can be up to 10 years for moorland/mountain areas). Consequently, a three-year moving average was applied to the data to smooth out the between-year variation appropriately, to give a suitable estimate with annual resolution. The most recent deforestation rate available (1134 ha a<sup>-1</sup> for 2002) is made up of 243 ha a<sup>-1</sup> from non-rural areas and 891 ha a<sup>-1</sup> from rural areas. The rate for 2003 was estimated by extrapolating forwards from the rates for 1999 to 2002. Deforestation is not currently estimated for Northern Ireland. The annual area loss rates were used in the method described in the IPCC 1996 guidelines (IPCC 1997 a, b, c) to estimate immediate emissions of CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O. Only immediate losses are considered because sites are normally completely cleared for development leaving no debris to decay. It is assumed that 60% of the standing biomass is removed as timber products.

The time series consistency of emissions from this sector is only medium given that the two constituent data series are not both available for each year and some are partially derived from data in one region.

### **2.2.2.(b) Data Reporting**

#### *2.2.2.(b) i - National Inventory Reports*

The emissions associated with this activity are reported under Source Category 5B2

#### *2.2.2.(b) ii - Common Reporting Format under IPCC 1996 Guidelines*

Reported as in National Inventory Report

2.2.2.(b) iii - *Common Reporting Format under IPCC LULUCF Good Practice Guidance*

The data on carbon stock change in biomass from this Category are entered into Sectoral Background Table 5.E.2.1 (Forest Land converted to Settlements) and emissions of CH<sub>4</sub>, N<sub>2</sub>O, NO<sub>x</sub> and CO are entered into the Sectoral Report Table 5 in the CRF tables of the FCCC/SBSTA/2004/8 format. It is assumed that all deforestation is for the purpose of establishment of Settlements. Carbon stock change in soils due to deforestation is dealt with in Category 5D below. In Sectoral Report Table 5 in the FCCC/SBSTA/2004/8 format the Information item “Forest Land converted to other Land-Use Categories” includes both changes in carbon stock in biomass and soils under “Net CO<sub>2</sub> emissions/removals”.

**2.2.2.(c) Source-specific planned improvements**

Future improvements of the method should include (i) collating Forestry Commission unconditional felling licence data for Scotland and Wales, and (ii) analysing possible causes for the high deforestation rates estimated by OS data for rural areas, which are currently considered too high to be realistic.

**2.2.3. CO<sub>2</sub> Emissions and Removals from Soils: Land Use Change**

**2.2.3.(a) Methodology**

Changes in soil stocks due to land use change are estimated in this Category,. All forms of land use change except afforestation are considered together and both mineral and organic soils are included. Removals to soils due to afforestation are considered separately using the forest carbon accounting model described in Section 7.2. The net emissions due to land use change are reported in the previous CRF under Category 5D1 & 5D2 (CO<sub>2</sub> Emissions and Removals from Soils – Cultivation of Mineral & Organic Soils), combined in this and earlier UK NIRs with other Emissions from soils. For this NIR, emissions due to liming of agricultural land are reported separately. Removals due to the effect of Set Aside on soils are now fully reflected in revised land use data and therefore no longer separately estimated or reported.

The basic method for assessing changes in soil carbon due to land use change is to use a matrix of change from land surveys linked to a dynamic model of gain or loss of carbon. For Great Britain (England, Scotland and Wales) matrices from the Monitoring Landscape Change (MLC) data from 1947 and 1980 (MLC 1986) and the Countryside Surveys (CS) of 1984, 1990 and 1998 (Haines-Young *et al.* 2000) are used. In Northern Ireland less data is available to build matrices of land use change but a matrix for the whole of Northern Ireland was available for 1990 to 1998 from the Northern Ireland Countryside Survey (Cooper and McCann, 2002). The only data available pre-1990 for Northern Ireland are land use areas from The Agricultural Census and The Forest Service (2002) , which have been processed by Cruickshank and Tomlinson (2000). Matrices of land use change were then estimated for 1970-79 and 1980-89 using area data. The basis of the method was to assume that the relationship between the matrix of land use transitions for 1990 to 1998 and the area data for 1990 is the same as the relationship between the matrix and area data for each of two earlier periods – 1970-79 and 1980-89. The matrices developed by this approach were used to extrapolate areas of land use transition back to 1950, so as to match the start year in the rest of the UK.

The Good Practice Guidance for Land Use, Land Use Change and Forestry (IPCC, 2003) recommends use of six classes of land for descriptive purposes (e.g. in matrices): Forest, Grassland, Cropland, Settlements, Wetlands and Other Land. The data presently available for the UK does not distinguish wetlands from other types so land in the UK has all been placed into the

five other types. The more detailed categories for the two land surveys in Great Britain were combined as shown in Table 2-4 for MLC and Table 2-5 for CS.

Table 2-4 Grouping of MLC land cover types for soil carbon change modelling

| <b>CROPLAND</b> | <b>GRASSLAND</b>    | <b>FORESTLAND</b> | <b>SETTLEMENTS (URBAN)</b> | <b>OTHER</b>  |
|-----------------|---------------------|-------------------|----------------------------|---------------|
| Crops           | Upland heath        | Broadleaved wood  | Built up                   | Bare rock     |
| Market garden   | Upland smooth grass | Conifer wood      | Urban open                 | Sand/shingle  |
|                 | Upland coarse grass | Mixed wood        | Transport                  | Inland water  |
|                 | Blanket bog         | Orchards          | Mineral workings           | Coastal water |
|                 | Bracken             |                   | Derelict                   |               |
|                 | Lowland rough grass |                   |                            |               |
|                 | Lowland heather     |                   |                            |               |
|                 | Gorse               |                   |                            |               |
|                 | Neglected grassland |                   |                            |               |
|                 | Marsh               |                   |                            |               |
|                 | Improved grassland  |                   |                            |               |
|                 | Rough pasture       |                   |                            |               |
|                 | Peat bog            |                   |                            |               |
|                 | Fresh Marsh         |                   |                            |               |
|                 | Salt Marsh          |                   |                            |               |

Table 2-5 Grouping of Countryside Survey Broad Habitat types for soil carbon change modelling

| <b>CROPLAND</b> | <b>GRASSLAND</b>        | <b>FORESTLAND</b> | <b>SETTLEMENTS (URBAN)</b> | <b>OTHER</b>        |
|-----------------|-------------------------|-------------------|----------------------------|---------------------|
| Arable          | Improved grassland      | Broadleaved/mixed | Built up areas             | Inland rock         |
| Horticulture    | Neutral grassland       | Coniferous        | Gardens                    | Supra littoral rock |
|                 | Calcareous grassland    |                   |                            | Littoral rock       |
|                 | Acid grassland          |                   |                            | Standing waters     |
|                 | Bracken                 |                   |                            | Rivers              |
|                 | Dwarf shrub heath       |                   |                            | Sea                 |
|                 | Fen, marsh, swamp       |                   |                            |                     |
|                 | Bogs                    |                   |                            |                     |
|                 | Montane                 |                   |                            |                     |
|                 | Supra littoral sediment |                   |                            |                     |
|                 | Littoral sediment       |                   |                            |                     |

The database of soil carbon density for the UK (Milne and Brown, 1995; Cruickshank *et al.* 1998) used in previous GHG Inventories has been extensively revised recently (Bradley *et al.* 2005). There are three soil survey groups covering the UK and the field data, soil classifications and laboratory methods have been harmonized to reduce uncertainty in the final data. The depth of soil considered was also restricted to 1m at maximum as part of this process. Table 2-6 shows total stock of soil carbon (1990) for different land types in the four devolved areas of the UK.

Table 2-6 Soil carbon stock (TgC = MtC) for depths to 1m in different land types in the UK

| <b>Type \ Region</b> | <b>England</b> | <b>Scotland</b> | <b>Wales</b> | <b>N. Ireland</b> | <b>UK</b>    |
|----------------------|----------------|-----------------|--------------|-------------------|--------------|
| <b>Forestland</b>    | 108            | 227             | 45           | 20                | 400          |
| <b>Grassland</b>     | 995            | 1,839           | 283          | 242               | 3,359        |
| <b>Cropland</b>      | 583            | 110             | 8            | 33                | 734          |
| <b>Settlements</b>   | 54             | 10              | 3            | 1                 | 69           |
| <b>Other</b>         | 0              | 0               | 0            | 0                 | 0            |
| <b>TOTAL</b>         | <b>1,740</b>   | <b>2,187</b>    | <b>340</b>   | <b>296</b>        | <b>4,562</b> |

The effect of land use change from 1950 to the present on stocks of soil carbon is taken into account. Area data exist for various periods between 1947 and 1998 and how these are used is shown in Table 2-7 and Table 2-8. The land use change data over the different periods were used to estimate annual changes by assuming that these were uniform across the measurement period. Examples of these annual changes (for the period 1990 to 1999) are given in Table 2-9 to Table 2-12. The data for afforestation and deforestation shown in the Tables are adjusted before use for estimating carbon changes to harmonise the values with those used in the calculations described in Sections 2.2 and 2.3.

Table 2-7 Sources of land use change data in Great Britain for different periods in estimation of changes in soil carbon.

| Year or Period | Method              | Change matrix data       |
|----------------|---------------------|--------------------------|
| 1950-1979      | Measured LUC matrix | MLC 1947->MLC1980        |
| 1980 - 1984    | <i>Interpolated</i> | <i>CS1984-&gt;CS1990</i> |
| 1984 - 1989    | Measured LUC matrix | CS1984->CS1990           |
| 1990 - 1998    | Measured LUC matrix | CS1990->CS1998           |
| 1999-2003      | <i>Extrapolated</i> | <i>CS1990-&gt;CS1998</i> |

Table 2-8 Sources of land use change data in Northern Ireland for different periods in estimation of changes in soil carbon. (NICS = Northern Ireland Countryside Survey)

| Year or Period | Method                                 | Change matrix data           |
|----------------|--|------------------------------|
| 1950 - 1969    | <i>Extrapolation and ratio method</i>  | <i>NICS1990-&gt;NICS1998</i> |
| 1970 - 1989    | <i>Land use areas and ratio method</i> | <i>NICS1990-&gt;NICS1998</i> |
| 1990 - 1998    | Measured LUC matrix                    | NICS1990->NICS1998           |
| 1999-2003      | <i>Extrapolated</i>                    | <i>NICS1990-&gt;NICS1998</i> |

The core equation describing changes in soil carbon with time for any land use transition is

$$C_t = C_f - (C_f - C_0)e^{-kt}$$

$C_t$  is carbon density at time  $t$

$C_0$  is initial carbon density

$C_f$  is carbon density after the change to new land use

$k$  is time constant of change

By differentiating we obtain the equation for flux  $f_t$  (emission or removal) per unit area

$$f_t = k(C_f - C_0)e^{-kt}$$

From this equation we obtain, for any inventory year, the land use change effects from any specific year in the past. If  $A_T$  is area in a particular land use transition in year  $T$  considered from 1950 onwards then total carbon lost or gained in an inventory year, e.g. 1990, is given by:

$$F_{1990} = \sum_{T=1950}^{t=1990} kA_T (C_f - C_0) (e^{-k(1990-T)})$$

This equation is used with  $k$ ,  $A_T$  and  $(C_f - C_0)$  chosen by Monte Carlo methods within ranges set by prior knowledge e.g. literature, soil carbon database, agricultural census, and LUC matrices

The land use transitions considered are each of those between the Forestland, Grassland, Cropland and Settlement types . It is assumed there are no conversions between these and Other Land. Scotland, England, Northern Ireland and Wales are treated separately.

Table 2-9 Annual changes (000 ha) in land use in England in matrix form for 1990 to 1999. Based on land use change between 1990 and 1998 from Countryside Surveys (Haines-Young *et al.* 2000). Data have been rounded to 100 ha.

| <b>To \ From</b>   | <b>Forestland</b> | <b>Grassland</b> | <b>Cropland</b> | <b>Settlements</b> |
|--------------------|-------------------|------------------|-----------------|--------------------|
| <b>Forestland</b>  |                   | 8.9              | 3.4             | 2.1                |
| <b>Grassland</b>   | 8.7               |                  | 55.3            | 3.4                |
| <b>Cropland</b>    | 0.5               | 62.9             |                 | 0.6                |
| <b>Settlements</b> | 1.2               | 8.5              | 2.1             |                    |

Table 2-10 Annual changes (000 ha) in land use in Scotland in matrix form for 1990 to 1999. Based on land use change between 1990 and 1998 from Countryside Surveys (Haines-Young *et al.* 2000). Data have been rounded to 100 ha.

| <b>To \ From</b>   | <b>Forestland</b> | <b>Grassland</b> | <b>Cropland</b> | <b>Settlements</b> |
|--------------------|-------------------|------------------|-----------------|--------------------|
| <b>Forestland</b>  |                   | 11.1             | 0.6             | 0.2                |
| <b>Grassland</b>   | 5.0               |                  | 16.8            | 0.7                |
| <b>Cropland</b>    | 0.1               | 21.4             |                 | 0.3                |
| <b>Settlements</b> | 0.3               | 2.2              | 0.1             |                    |

Table 2-11 Annual changes (000 ha) in land use in matrix form for Wales from 1990 to 1999. Based on land use change between 1990 and 1998 from Countryside Surveys (Haines-Young *et al.* 2000). Data have been rounded to 100 ha.

| <b>To \ From</b>   | <b>Forestland</b> | <b>Grassland</b> | <b>Cropland</b> | <b>Settlements</b> |
|--------------------|-------------------|------------------|-----------------|--------------------|
| <b>Forestland</b>  |                   | 2.4              | 0.2             | 0.2                |
| <b>Grassland</b>   | 1.5               |                  | 5.5             | 0.6                |
| <b>Cropland</b>    | 0.0               | 8.0              |                 | 0.0                |
| <b>Settlements</b> | 0.1               | 1.8              | 0.2             |                    |

Table 2-12 Annual changes (000 ha) in land use in matrix form for Northern Ireland from 1990 to 1999. Based on land use change between 1990 and 1998 from Northern Ireland Countryside Surveys (Cooper and McCann 2002). Data have been rounded to 100 ha.

| <b>To \ From</b>   | <b>Forestland</b> | <b>Grassland</b> | <b>Cropland</b> | <b>Settlements</b> |
|--------------------|-------------------|------------------|-----------------|--------------------|
| <b>Forestland</b>  |                   | 1.6              | 0.0             | 0.0                |
| <b>Grassland</b>   | 0.3               |                  | 5.9             | 0.0                |
| <b>Cropland</b>    | 0.0               | 3.7              |                 | 0.0                |
| <b>Settlements</b> | 0.1               | 1.0              | 0.0             |                    |

In the model, the change is required in equilibrium carbon density from the initial to the final land use during a transition. These are calculated for each land use category as averages for

Scotland, England, Wales and Northern Ireland. These averages are weighted by the area of Land Use Change occurring in four broad soil groups (Organic, organo-mineral, mineral, unclassified) in order to account for the actual carbon density where change has occurred. Hence mean soil carbon density change is calculated as:

$$\bar{C}_{ijc} = \frac{\sum_{s=1}^6 (C_{sijc} L_{sijc})}{\sum_{s=1}^6 L_{sijc}}$$

which is the weighted mean, for each country, of change in equilibrium soil carbon when land use changes and

- i* is initial land use (Forestland, grassland, cropland, settlements),
- j* is new land use (Forestland, grassland, cropland, settlements),
- c* is country (Scotland, England, N. Ireland & Wales),
- s* is soil group (Organic, organo-mineral, mineral, unclassified), and
- $C_{sijc}$  is change in equilibrium soil carbon for a specific land use transition

The most recent land use data (1990 to 1998) is used in the weighting. The averages carbon densities calculated are presented in Table 2-13 to Table 2-16.

Table 2-13. Weighted average change in equilibrium soil carbon density ( $\text{kg m}^{-2}$ ) to 1 m deep for changes between different land types in England.

| <b>To \ From</b>   | <b>Forestland</b> | <b>Grassland</b> | <b>Cropland</b> | <b>Settlements</b> |
|--------------------|-------------------|------------------|-----------------|--------------------|
| <b>Forestland</b>  | 0                 | 25               | 32              | 83                 |
| <b>Grassland</b>   | -21               | 0                | 23              | 79                 |
| <b>Cropland</b>    | -31               | -23              | 0               | 52                 |
| <b>Settlements</b> | -87               | -76              | -54             | 0                  |

Table 2-14. Weighted average change in equilibrium soil carbon density ( $\text{kg m}^{-2}$ ) to 1 m deep for changes between different land types in Scotland.

| <b>To \ From</b>   | <b>Forestland</b> | <b>Grassland</b> | <b>Cropland</b> | <b>Settlements</b> |
|--------------------|-------------------|------------------|-----------------|--------------------|
| <b>Forestland</b>  | 0                 | 35               | 133             | 206                |
| <b>Grassland</b>   | -39               | 0                | 77              | 157                |
| <b>Cropland</b>    | -140              | -78              | 0               | 81                 |
| <b>Settlements</b> | -200              | -156             | -62             | 0                  |

Table 2-15. Weighted average change in equilibrium soil carbon density ( $\text{kg m}^{-2}$ ) to 1 m deep for changes between different land types in Wales.

| <b>To \ From</b>   | <b>Forestland</b> | <b>Grassland</b> | <b>Cropland</b> | <b>Settlements</b> |
|--------------------|-------------------|------------------|-----------------|--------------------|
| <b>Forestland</b>  | 0                 | 23               | 57              | 114                |
| <b>Grassland</b>   | -18               | 0                | 36              | 101                |
| <b>Cropland</b>    | -53               | -38              | 0               | 48                 |
| <b>Settlements</b> | -110              | -95              | -73             | 0                  |



Table 2-16. Weighted average change in equilibrium soil carbon density ( $\text{kg m}^{-2}$ ) to 1 m deep for changes between different land types in Northern Ireland.

| <b>To \ From</b>   | <b>Forestland</b> | <b>Grassland</b> | <b>Cropland</b> | <b>Settlements</b> |
|--------------------|-------------------|------------------|-----------------|--------------------|
| <b>Forestland</b>  | 0                 | 94               | 168             | 244                |
| <b>Grassland</b>   | -94               | 0                | 74              | 150                |
| <b>Cropland</b>    | -168              | -74              | 0               | 76                 |
| <b>Settlements</b> | -244              | -150             | -76             | 0                  |

The rate of loss or gain of carbon is dependent on the type of land use transition (Table 2-17). For transitions where carbon is lost e.g. transition from Grassland to Cropland, a ‘fast’ rate is applied whilst a transition that gains carbon occurs much more slowly. Information on measured rates of changes of soil carbon due to land use in the literature was used in combination with expert judgement to select ranges of possible times for completion of different transitions. These are shown in Table 2-18.

Table 2-17 Rates of change of soil carbon for land use change transitions. (“Fast” & “Slow” refer to 99% of change occurring in times shown in **Table A3.7.9**)

|              |                   | <b>Initial</b>  |                  |                   |                   |
|--------------|-------------------|-----------------|------------------|-------------------|-------------------|
|              |                   | <b>Cropland</b> | <b>Grassland</b> | <b>Settlement</b> | <b>Forestland</b> |
| <b>Final</b> | <b>Cropland</b>   |                 | <i>slow</i>      | <i>slow</i>       | <i>slow</i>       |
|              | <b>Grassland</b>  | <i>fast</i>     |                  | <i>slow</i>       | <i>slow</i>       |
|              | <b>Settlement</b> | <i>fast</i>     | <i>fast</i>      |                   | <i>slow</i>       |
|              | <b>Forestland</b> | <i>fast</i>     | <i>fast</i>      | <i>fast</i>       |                   |

Table 2-18 Range of times for soil carbon to reach 99% of a new value after a change in land use in England (E), Scotland (S) and Wales (W).

|                                      | <b>Low<br/>(years)</b> | <b>High<br/>(years)</b> |
|--------------------------------------|------------------------|-------------------------|
| <b>Carbon loss (“fast”) E, S, W.</b> | 50                     | 150                     |
| <b>Carbon gain (“slow”) E, W.</b>    | 100                    | 300                     |
| <b>Carbon gain (“slow”) S.</b>       | 300                    | 750                     |

Changes in soil carbon from equilibrium to equilibrium ( $C_f - C_o$ ) were assumed to fall within ranges based on 2004 database values for each transition and the uncertainty indicated by this source (up to +/-11% of the mean). The areas of land use change for each transition were assumed to fall within a range of uncertainty of +/- 30% of the mean.

The model of change was run 1000 times with each parameter (the time constant for change in soil carbon, land use change areas and equilibrium carbon change) being selected separately using a Monte Carlo approach. This was done for England, Scotland N. Ireland and Wales from within the ranges described above. The mean carbon flux for each region resulting from this imposed random variation is reported as the estimate for the Inventory. An adjustment was made to these calculations for each country to remove increases in soil carbon due to afforestation, as the C-Flow model (See Section 2.2) provides a better estimate of these fluxes.

Variations from year to year in the reported net emissions reflect the trend in land use change as described by the matrices of change.

The methodological revisions introduced for this submission have resulted in a reduction of net emissions in this category, compared to previous submissions, of about 3% for 1990, but an increase of about 25% for 2002.

### **2.2.3.(b) Data Reporting**

#### *2.2.3.(b) i - National Inventory Reports*

Emissions and removals for this activity are combined and reported as a net flux under Category 5D.

#### *2.2.3.(b) ii - Common Reporting Format under IPCC 1996 Guidelines*

Emissions and removals for this activity for both mineral and organic soils are all combined and reported as a net flux under Category 5D1 (CO<sub>2</sub> Emissions and Removals from Soils: Cultivation of Mineral Soils)

#### *2.2.3.(b) iii - Common Reporting Format under IPCC LULUCF Good Practice Guidance*

The data on carbon stock change in soils from this Category are entered into Sectoral Background Table 5.B.2 (Forest Land converted to Cropland), 5.C.2 (Forest Land converted to Grassland) and 5.E.2 (Forest Land converted to Settlements) in the CRF tables of the FCCC/SBSTA/2004/8 format. The data are reported as aggregate values for all land converted to Cropland, Grassland and Settlements, i.e. they are not disaggregated by the original land category. The aggregate data are however disaggregated by (a) the four geographical areas of England, Scotland, Wales and Northern Ireland, and (b) by changes that occurred in the two time periods, 1950-1979 and 1980 onwards. Soil carbon stock changes due to deforestation were identified within the aggregate data in 5.E.2 (Forest Land converted to Settlements) are included with carbon stock changes in biomass from 5.E.2.1 to provide the basis for "Net CO<sub>2</sub> emissions/removals" in the Information item "Forest Land converted to other Land-Use Categories" in Sectoral Report Table 5 in the FCCC/SBSTA/2004/8 format.

### **2.2.3.(c) Source-specific planned improvements**

In the long term, the UK is planning to implement the use of a process-based model for estimating emissions and removals from soils. This method is unlikely to be available for a few years, hence the enhancement of the existing approach.

## **2.2.4. CO<sub>2</sub> Emissions and Removals from Soils: Forest Soils**

### **2.2.4.(a) Methodology**

Removals associated with increases in soil carbon under areas of the UK afforested since 1920 are estimated by the carbon accounting method described in Section 2.2.2. These Removals are however reported under different categories for different requirements as described below

### 2.2.4.(b) Data Reporting

#### 2.2.4.(b) i - National Inventory Reports

In the NIR the fluxes associated with changes in carbon stocks in forest soils have been included in the 5A2 Category with changes in forest biomass stocks. This approach was that originally used by the UK and is now seen to be consistent with that in the LULUCF Good Practice Guidance.

#### 2.2.4.(b) ii - Common Reporting Format under IPCC 1996 Guidelines

In reporting to the UNFCCC under the IPCC 1996 Guidelines these removals to soil are identified under CRF Category 5D4 (Forest Soils),

#### 2.2.4.(b) iii - Common Reporting Format under IPCC LULUCF Good Practice Guidance

The emissions in this Category are entered into Sectoral Background Table 5.A.2 (Land converted to Forest Land) in the CRF tables of the FCCC/SBSTA/2004/8 format. The data in that table are disaggregated as described above for Source Category: Changes in Forests and Other Woody Biomass Stocks.

## 2.2.5. CO<sub>2</sub> Emissions and Removals from Soils: Emissions of CO<sub>2</sub> from soil due to liming

### 2.2.5.(a) Methodology

Emissions of carbon dioxide from the application of limestone, chalk and dolomite to agricultural soils were estimated using the method described in the IPCC 1996 Guidelines. Data on the use of limestone, chalk and dolomite for agricultural purposes is reported in BG S (2004). They also include 'material for calcination'. In agriculture all three minerals are applied to the soil, and CO<sub>2</sub> emissions, weight for weight, from limestone and chalk will be identical since they have the same chemical formula. Dolomite, however, will have a slightly higher emission due to the presence of Mg. For limestone and chalk, an emission factor of 120 tC kt<sup>-1</sup> applied is used, and for dolomite application, 130 tC kt<sup>-1</sup>. These factors are based on the stoichiometry of the reaction and assume pure limestone/chalk and dolomite (IPCC, 1997a, b, c). Only dolomite is subjected to calcination. However, some of this calcinated dolomite is not suitable for steel making and is returned for inclusion with agricultural dolomite – this fraction is reported in PA1007 as 'material for calcination' under agricultural end use. Calcinated dolomite, having already had its CO<sub>2</sub> removed, will therefore not cause the emissions of CO<sub>2</sub> and hence is not included here. Lime (calcinated limestone) is also used for carbonatation in the refining of sugar but this is not specifically dealt with in the UK LUCF GHG Inventory.

Estimates of the individual materials had to be made this year as only their total was published because of commercial confidentiality rules for small quantities. It is assumed that all the carbon contained in the materials applied is released in the year of use.

Uncertainty in both the activity data and emission factor used for this source are judged to be low. The main source of uncertainty in the estimates is caused by non-publication of some data due to commercial restrictions, although these are not judged to be very significant. Time-series consistency is underpinned by continuity in data source.

### 2.2.5.(b) Data Reporting

#### 2.2.5.(b) i - National Inventory Reports

In the NIR the emissions of CO<sub>2</sub> due to liming are combined with emissions from soils due to land use change and this total is reported under Category 5D (CO<sub>2</sub> Emissions and Removals from Soils)

#### 2.2.5.(b) ii - Common Reporting Format under IPCC 1996 Guidelines

For reporting to the UNFCCC under the IPCC 1996 Guidelines the emissions are identified separately under Category 5D3 (CO<sub>2</sub> Emissions and Removals from Soils: Liming of Agricultural Soils)

#### 2.2.5.(b) iii - Common Reporting Format under IPCC LULUCF Good Practice Guidance

The emissions in this Category are entered into Sectoral Background Table 5 (IV) (Carbon emissions from agricultural lime application) in the CRF tables of the FCCC/SBSTA/2004/8 format. The data in that table are disaggregated by application of limestone and dolomite separately on either Cropland or Grassland.

### 2.2.6. Lowland (fen) peat drainage

Lowland wetlands in England were drained many years ago for agricultural purposes and continue to emit CO<sub>2</sub> from the soil. This management activity is not modelled by the broad scale approach to land use change described in Section 2.2.1 and separate estimates of recent emissions have been included here. Bradley (1997) described the methods used to estimate these emissions. The baseline (1990) for the area of drained lowland wetland for the UK was taken as 150,000 ha. This represents all of the East Anglian Fen and Skirtland and limited areas in the rest of England. This total consists of 24,000 ha of land with thick peat (more than 1m deep) and the rest with thinner peat. Different loss rates were assumed for these two thicknesses as shown in Table 2-19.

Table 2-19 Area and carbon loss rates of UK fen wetland in 1990

|                     | Area   | Organic carbon content | Bulk density       | Volume loss rate                               | Carbon mass loss    | Implied emission factor            |
|---------------------|--|------------------------|--------------------|--|---------------------|------------------------------------|
|                     |  |                        | kg m <sup>-3</sup> | m <sup>3</sup> m <sup>-2</sup> a <sup>-1</sup> | GgC a <sup>-1</sup> | gC m <sup>-2</sup> a <sup>-1</sup> |
| <b>'Thick' peat</b> | 24x10 <sup>7</sup> m <sup>2</sup><br>(24,000 ha)   | 21%                    | 480                | 0.0127   | 307                 | 1280                               |
| <b>'Thin' peat</b>  | 126x10 <sup>7</sup> m <sup>2</sup><br>(126,000 ha) | 12%                    | 480                | 0.0019   | 138                 | 109                                |
| <b>Total</b>        | 150x10 <sup>7</sup> m <sup>2</sup><br>(150 kha)    |                        |                    |  | 445                 | 297                                |

The trend in emissions after 1990 was estimated on the assumption that no more area has been drained since then but the existing areas have continued to lose carbon. The annual loss decreases for a specific location in proportion to the amount of carbon remaining. But, in addition to this, as the peat loses carbon it will become more mineral in structure. Burton (1995) provides data on how these soil structure changes proceed with time. The Century model of plant and soil carbon was used to average the carbon losses for the areas of component soils as they thinned to lose peat, become humose and possibly even mineral (Bradley 1997).

### **2.2.6.(a) Data Reporting**

#### *2.2.6.(a) i - National Inventory Reports*

Emission of CO<sub>2</sub> from drained lowland fens are reported in Category 5E (Other) in National Inventory Reports.

#### *2.2.6.(a) ii - Common Reporting Format under IPCC 1996 Guidelines*

Emission of CO<sub>2</sub> from drained lowland fens are reported in Category 5D5 (CO<sub>2</sub> Emissions and Removals - Other) in submissions to the UNFCCC under the IPCC 1996 Guidelines

#### *2.2.6.(a) iii - Common Reporting Format under IPCC LULUCF Good Practice Guidance*

The emissions in this Category (due to lowland drainage) are entered into Sectoral Background Table 5.B.1 (Cropland remaining Cropland) in the CRF tables of the FCCC/SBSTA/2004/8 format.

## **2.2.7. Changes in Non-forest Biomass**

### **2.2.7.(a) Methodology**

This includes annual changes in the biomass of vegetation in the UK due to all land use change but excludes forests and woodland. Much of this change involves changes to or from agricultural crops, hence the previous use of the term “crop biomass” for this activity.

Adger and Subak (1996) estimated recent changes in carbon storage in biomass on non-forest lands in the UK, including land used for agriculture, horticulture and urbanization. The land area converted to forest was specifically excluded to avoid overlap with estimates for Category 5A and 5B. They used agricultural census statistics for the period 1988-1992 published by the Ministry of Agriculture, Fisheries and Food. These statistics are strongly correlated with agricultural land cover data in 1984 and 1990 UK Countryside Surveys, which were used to calculate changes in soil carbon on non-forest lands, so the two estimates are considered to be compatible.

Two carbon sinks were quantified. First, 0.23 MtC a<sup>-1</sup> was estimated to be accumulating in biomass as a result, mainly, of (i) the transfer of land from arable crops with 2.2 tC ha<sup>-1</sup> biomass to set aside land with 5.0 tC ha<sup>-1</sup> biomass, (ii) the establishment of woodlands on farms in response to financial incentives (Farm Woodland Scheme and Farm Woodland Premium), assuming that these woodlands increased in biomass by 2.8 tC ha<sup>-1</sup> a<sup>-1</sup>, (iii) the transfer of agricultural land to urban uses, assuming that urban land has an average carbon density of 3 tC ha<sup>-1</sup> and (iv) the transfer of rough grass to permanent grass.

Second, 0.14 MtC a<sup>-1</sup> was estimated to be accumulating on agricultural land, without a change in crop type, on the assumption that the annual average standing biomass has increased linearly with yield. Most of this component was due to increases in cereal yields.

Thus, the total increase in biomass on agricultural land was estimated to be 0.37 MtC a<sup>-1</sup>. However, this is an upper bound, because some of the farm woodlands were also counted in Forestry Commission statistics which were used to calculate the forest biomass carbon for Category 5A, and because increases in ‘harvest index’ mean that crop biomass generally increases proportionately less than yield. Thus, the lower estimate for this component of 0.3 MtC a<sup>-1</sup> ±30% has been adopted for non-forest biomass changes. From the 1998 Inventory

onwards more recent data from the Agricultural Census were considered but did not support any change to the existing estimate. This rate is therefore reported for all years from 1990 to 2003.

### 2.2.7.(b) Data Reporting

#### 2.2.7.(b) i - National Inventory Reports

Removals of CO<sub>2</sub> due to changes in stocks of non-forest carbon are reported in Category 5E (Other) in National Inventory Reports.

#### 2.2.7.(b) ii - Common Reporting Format under IPCC 1996 Guidelines

Removals of CO<sub>2</sub> due to changes in stocks of non-forest biomass carbon are reported in Category 5E (Other) in submissions to the UNFCCC under the IPCC 1996 Guidelines.

#### 2.2.7.(b) iii - Common Reporting Format under IPCC LULUCF Good Practice Guidance

In the CRF tables of the FCCC/SBSTA/2004/8 format the removals due to carbon stock changes in non-forest biomass are entered into Sectoral Report Table in 5.G (Other) as “Changes in non-forest biomass”.

### 2.2.7.(c) Source-specific planned improvements

A review of the approaches taken in for this activity will be made in terms of input data and appropriateness of reporting category

### 2.2.8. Peat Extraction

Peat is extracted in the UK for use as either a fuel or in horticulture. Estimates are made separately for each of these end uses

Cruickshank *et al.* (1997) provide initial estimates of Emissions due to peat extraction. Since their work trends in peat extraction in Scotland and England over the period 1990 to 2003 have been estimated from activity data taken from the UK Minerals Handbook (BGS 2004). In Northern Ireland no new data on use of peat for horticultural use has become available but a recent survey of extraction for fuel use suggested that there is no significant trend for this use. The contribution of emissions due to peat extraction in Northern Ireland is therefore incorporated as constant from 1990 to 2003. Peat extraction is negligible in Wales. Emissions factors are from Cruickshank *et al.* (1997) and are shown in Table 2-20.

Table 2-20 Emission Factors for Peat Extraction (GB Great Britain, NI Northern Ireland)

|                              | <b>Emission</b>      | <b>Factor</b>         |
|------------------------------|----------------------|-----------------------|
|                              | kg C m <sup>-3</sup> | Gg C Gg <sup>-1</sup> |
| <b>GB Horticultural Peat</b> | 55.7                 | -                     |
| <b>GB Fuel Peat</b>          | 55.7                 | -                     |
| <b>NI Horticultural Peat</b> | 44.1                 | -                     |
| <b>NI Fuel Peat</b>          | -                    | 0.3                   |

Activity data for peat extraction come from a number of sources, only some of which are reliable, which will have some effect on time series consistency.

**2.2.8.(a) Data Reporting***2.2.8.(a) i - National Inventory Reports*

Emissions of CO<sub>2</sub> due to peat extraction are reported in Category 5E (Other) in National Inventory Reports.

*2.2.8.(a) ii - Common Reporting Format under IPCC 1996 Guidelines*

Removals of CO<sub>2</sub> due to peat extraction are reported in Category 5E (Other) in submissions to the UNFCCC under the IPCC 1996 Guidelines.

*2.2.8.(a) iii - Common Reporting Format under IPCC LULUCF Good Practice Guidance*

In the CRF tables of the FCCC/SBSTA/2004/8 format the emissions in this Category due to peat extraction are entered into Sectoral Background Table 5.C.1 (Grassland remaining Grassland).

**2.2.8.(b) Source-specific planned improvements**

The data for this activity include some emissions due to use of extracted peat as a fuel. The relationship between this data and emissions estimated by other agencies for the Energy Sector of the GHG Inventory will be reviewed.

**2.2.9. Activities no longer used****2.2.9.(a) Upland drainage**

This source, which is due to the ploughing and drainage of deep peat for the purposes of establishment of new forests, is no longer reported. Losses from deep peat afforestation are now estimated within the forest carbon accounting model as described in Section 2.2.2.

**2.2.9.(b) Set Aside**

Various schemes for arable land to be set aside from agricultural production have been in place in the UK since 1990. A separate estimate was made of the changes in stocks of soil carbon (a net sink) due to set aside of arable land in previous UK GHG Inventories because the land use change data available were extrapolated from data collected before 1990. The effect of this activity is now estimated within the methods of Section 2.2.3 for assessing the effect of all land use change on soil carbon stocks. This has become possible due to the availability of post-1990 land use change data.

**2.2.10. Summary Tables**

The UK provides the National Inventory data for the entire forest sink together, and non-forest emissions and removals from soils in a separate group. This provides a broad separation of sinks and sources within the LUCF sector. This approach is not that taken by the UNFCCC Common Reporting Format based on the IPCC 1996 Guidelines, within which all soil fluxes (forest and non-forest) are reported together. Table 2-21, Table 2-22, Table 2-23 and Table 2-24 show the activities concerned and how they have been combined in the different ways. The reported totals for emissions and removals for the LUCF Sector are not affected.

The UK has also prepared the data in the format and tables described in FCCC/SBSTA/2004/8 as adopted at COP9 and based on the LULUCF Good Practice Guidance (IPCC, 2003) (Table 2-25). The Sectoral Report Tables for each year from 1990 to 2003 in this new CRF format are included here in Appendix A.3.

Approximate uncertainty for different activities is shown in Table 2-26.

Table 2-21 Categories used for reporting soils emissions and removals

| <b>Process</b>                               | <b>National Inventory Report</b> | <b>Common Reporting Format (IPCC 1996 Guidelines)</b> |
|--|----------------------------------|---|
| Removals to forest soils and litter          | 5A2 (Removal)                    | 5D (Removal)  |
| Emissions from soils due to lowland drainage | 5E (Emission)                    | 5D (Emission)   |



Table 2-22 Emissions and removals of carbon dioxide by activities in Land Use Change and Forestry Sector. The reporting categories used in the National Inventory Report (NIR) and for the UNFCCC Common Reporting Format based on the IPCC 1996 Guidelines are also shown. (IE - Included Elsewhere.)

| Activity                      | Gg CO <sub>2</sub> | 1990  | 1991  | 1992  | 1993  | 1994  | 1995  | 1996  | 1997  | 1998  | 1999  | 2000  | 2001  | 2002  | 2003  | NIR | CRF |
|-------------------------------|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|-----|
| Temperate forest              | Removal            | -6014 | -6486 | -6950 | -7215 | -7561 | -7245 | -7137 | -6927 | -6827 | -7171 | -6856 | -7776 | -8916 | -9808 | 5A2 | 5A2 |
| Harvested wood                | Removal            | -1587 | -1344 | -1130 | -1059 | -942  | -1123 | -1098 | -1195 | -1289 | -1161 | -1314 | -743  | -133  | 248   | 5A5 | 5A5 |
| Deforestation                 | Emission           | 164   | 137   | 107   | 124   | 132   | 161   | 185   | 152   | 159   | 297   | 223   | 228   | 180   | 141   | 5B  | 5B  |
| Mineral soils                 | Emission           | 13522 | 13326 | 13139 | 12961 | 12791 | 12630 | 12475 | 12327 | 12186 | 12050 | 11922 | 11798 | 11679 | 11565 | 5D  | 5D  |
| Mineral soils                 | Removal            | IE    | IE    | IE    | IE    | IE    | IE    | IE    | IE    | IE    | IE    | IE    | IE    | IE    | IE    | 5D  | 5D  |
| Organic soils                 | Emission           | IE    | IE    | IE    | IE    | IE    | IE    | IE    | IE    | IE    | IE    | IE    | IE    | IE    | IE    | 5D  | 5D  |
| Organic soils                 | Removal            | IE    | IE    | IE    | IE    | IE    | IE    | IE    | IE    | IE    | IE    | IE    | IE    | IE    | IE    | 5D  | 5D  |
| Liming                        | Emission           | 1430  | 1772  | 1810  | 1130  | 1270  | 1529  | 1515  | 1346  | 1058  | 887   | 794   | 725   | 739   | 918   | 5D  | 5D  |
| Forest soils                  | Removal            | -6211 | -6131 | -6168 | -6263 | -6297 | -6483 | -6524 | -6601 | -6633 | -6494 | -6556 | -6233 | -5859 | -5610 | 5A2 | 5D  |
| Lowland Drainage              | Emission           | 1650  | 1613  | 1577  | 1540  | 1503  | 1467  | 1430  | 1393  | 1357  | 1320  | 1283  | 1261  | 1239  | 1217  | 5E  | 5D  |
| Peat extraction               | Emission           | 792   | 803   | 792   | 781   | 889   | 950   | 869   | 815   | 704   | 822   | 816   | 855   | 683   | 894   | 5E  | 5E  |
| Changes in non-forest biomass | Removal            | -1100 | -1100 | -1100 | -1100 | -1100 | -1100 | -1100 | -1100 | -1100 | -1100 | -1100 | -1100 | -1100 | -1100 | 5E  | 5E  |

Table 2-23 Emissions and removals in categories with the Land Use Change and Forestry Sector as reported in the format used for the National Inventory Report. (IE - Included Elsewhere.)

| <i>NIR</i>       | Gg CO <sub>2</sub> | 1990         | 1991         | 1992         | 1993         | 1994         | 1995         | 1996         | 1997         | 1998         | 1999         | 2000         | 2001         | 2002         | 2003         | Category |  |
|------------------|--------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|----------|--|
| Temperate forest | Removal            | -12226       | -12616       | -13118       | -13478       | -13858       | -13727       | -13661       | -13527       | -13459       | -13665       | -13411       | -14009       | -14775       | -15418       | 5A2      | Sum of Removals due to Changes in Forest biomass, Forest litter & soils  |
| Harvested wood   | Removal            | -1587        | -1344        | -1130        | -1059        | -942         | -1123        | -1098        | -1195        | -1289        | -1161        | -1314        | -743         | -133         | 248          | 5A5      | Removals to Harvested wood   |
| Deforestation    | Emission           | 164          | 137          | 107          | 124          | 132          | 161          | 185          | 152          | 159          | 297          | 223          | 228          | 180          | 141          | 5B       | Emissions (CO <sub>2</sub> ) due to Deforestation  |
| Soils            | Emission           | 14952        | 15098        | 14948        | 14091        | 14061        | 14159        | 13990        | 13674        | 13244        | 12937        | 12716        | 12522        | 12418        | 12482        | 5D       | Sum of Emissions from soils and Removals to soils due to Land use change (not forestry), and Liming of agricultural land |
|                  | <i>Emission</i>    | <i>13522</i> | <i>13326</i> | <i>13139</i> | <i>12961</i> | <i>12791</i> | <i>12630</i> | <i>12475</i> | <i>12327</i> | <i>12186</i> | <i>12050</i> | <i>11922</i> | <i>11798</i> | <i>11679</i> | <i>11565</i> |          | <i>Land use change</i>   |
|                  | <i>Emission</i>    | <i>1430</i>  | <i>1772</i>  | <i>1810</i>  | <i>1130</i>  | <i>1270</i>  | <i>1529</i>  | <i>1515</i>  | <i>1346</i>  | <i>1058</i>  | <i>887</i>   | <i>794</i>   | <i>725</i>   | <i>739</i>   | <i>918</i>   |          | <i>Liming</i>  |
| Soils            | Removal            | IE           | IE           | IE           | IE           | IE           | IE           | IE           | IE           | IE           | IE           | IE           | IE           | IE           | IE           | 5D       | Included in Emission   |
| Other            | Emission           | 2442         | 2416         | 2368         | 2321         | 2392         | 2417         | 2299         | 2208         | 2060         | 2142         | 2099         | 2116         | 1922         | 2111         | 5E       | Sum of Emissions from soils due to Lowland drainage and Peat extraction  |
|                  | <i>Emission</i>    | <i>1650</i>  | <i>1613</i>  | <i>1577</i>  | <i>1540</i>  | <i>1503</i>  | <i>1467</i>  | <i>1430</i>  | <i>1393</i>  | <i>1357</i>  | <i>1320</i>  | <i>1283</i>  | <i>1261</i>  | <i>1239</i>  | <i>1217</i>  |          | <i>Lowland drainage</i>  |
|                  | <i>Emission</i>    | <i>792</i>   | <i>803</i>   | <i>792</i>   | <i>781</i>   | <i>889</i>   | <i>950</i>   | <i>869</i>   | <i>815</i>   | <i>704</i>   | <i>822</i>   | <i>816</i>   | <i>855</i>   | <i>683</i>   | <i>894</i>   |          | <i>Peat extraction</i>   |
| Other            | Removal            | -1100        | -1100        | -1100        | -1100        | -1100        | -1100        | -1100        | -1100        | -1100        | -1100        | -1100        | -1100        | -1100        | -1100        | 5E       | Removals due to changes in non-forest biomass  |
| Total            | Emission           | 17558        | 17650        | 17424        | 16536        | 16585        | 16737        | 16474        | 16034        | 15463        | 15376        | 15038        | 14866        | 14520        | 14734        | 5        | Gross LUCF Emissions   |
| Total            | Removal            | -14913       | -15061       | -15348       | -15637       | -15900       | -15950       | -15859       | -15823       | -15849       | -15926       | -15826       | -15852       | -16008       | -16270       | 5        | Gross LUCF Removals  |
| Total            | Net                | 2645         | 2590         | 2076         | 899          | 685          | 787          | 616          | 211          | -385         | -550         | -787         | -986         | -1489        | -1536        | 5        | Net LUCF Emissions   |

Table 2-24 Emissions and removals in categories with the Land Use Change and Forestry Sector as reported in the format used for the UNFCCC Common Reporting Format based on the IPCC 1996 Guidelines. (IE - Included Elsewhere.)

| <i>CRF</i>       | <b>Gg CO<sub>2</sub></b> | <b>1990</b>  | <b>1991</b>  | <b>1992</b>  | <b>1993</b>  | <b>1994</b>  | <b>1995</b>  | <b>1996</b>  | <b>1997</b>  | <b>1998</b>  | <b>1999</b>  | <b>2000</b>  | <b>2001</b>  | <b>2002</b>  | <b>2003</b>  | <i>Category</i> |  |
|------------------|--------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----------------|--|
| Temperate forest | Removal                  | -6014        | -6486        | -6950        | -7215        | -7561        | -7245        | -7137        | -6927        | -6827        | -7171        | -6856        | -7776        | -8916        | -9808        | 5A2             | Removals due to Changes in forest biomass.   |
| Harvested wood   | Removal                  | -1587        | -1344        | -1130        | -1059        | -942         | -1123        | -1098        | -1195        | -1289        | -1161        | -1314        | -743         | -133         | 248          | 5A5             | Removals to Harvested wood   |
| Deforestation    | Emission                 | 164          | 137          | 107          | 124          | 132          | 161          | 185          | 152          | 159          | 297          | 223          | 228          | 180          | 141          | 5B              | Emissions (CO <sub>2</sub> ) due to Deforestation  |
| Soils            | Emission                 | 16602        | 16711        | 16525        | 15631        | 15565        | 15626        | 15420        | 15067        | 14601        | 14257        | 13999        | 13784        | 13657        | 13700        | 5D              | Sum of Emissions from soils due to Land use change on agricultural soils (net emissions), Lowland drainage and liming of agricultural land |
|                  | <i>Emission</i>          | <i>13522</i> | <i>13326</i> | <i>13139</i> | <i>12961</i> | <i>12791</i> | <i>12630</i> | <i>12475</i> | <i>12327</i> | <i>12186</i> | <i>12050</i> | <i>11922</i> | <i>11798</i> | <i>11679</i> | <i>11565</i> |                 | <i>Land use change</i>   |
|                  | <i>Emission</i>          | <i>1650</i>  | <i>1613</i>  | <i>1577</i>  | <i>1540</i>  | <i>1503</i>  | <i>1467</i>  | <i>1430</i>  | <i>1393</i>  | <i>1357</i>  | <i>1320</i>  | <i>1283</i>  | <i>1261</i>  | <i>1239</i>  | <i>1217</i>  |                 | <i>Lowland drainage</i>  |
|                  | <i>Emission</i>          | <i>1430</i>  | <i>1772</i>  | <i>1810</i>  | <i>1130</i>  | <i>1270</i>  | <i>1529</i>  | <i>1515</i>  | <i>1346</i>  | <i>1058</i>  | <i>887</i>   | <i>794</i>   | <i>725</i>   | <i>739</i>   | <i>918</i>   |                 | <i>Liming</i>  |
| Soils            | Removal                  | -6211        | -6131        | -6168        | -6263        | -6297        | -6483        | -6524        | -6601        | -6633        | -6494        | -6556        | -6233        | -5859        | -5610        | 5D              | Removals to Forest litter & soils.   |
| Other            | Emission                 | 792          | 803          | 792          | 781          | 889          | 950          | 869          | 815          | 704          | 822          | 816          | 855          | 683          | 894          | 5E              | Emissions from soils due to Peat extraction  |
| Other            | Removal                  | -1100        | -1100        | -1100        | -1100        | -1100        | -1100        | -1100        | -1100        | -1100        | -1100        | -1100        | -1100        | -1100        | -1100        | 5E              | Removals due to changes in non-forest biomass  |
|                  |                          |              |              |              |              |              |              |              |              |              |              |              |              |              |              |                 |  |
| Total            | Emission                 | 17558        | 17650        | 17424        | 16536        | 16585        | 16737        | 16474        | 16034        | 15463        | 15376        | 15038        | 14866        | 14520        | 14734        | 5               | Gross LUCF Emissions   |
| Total            | Removal                  | -14913       | -15061       | -15348       | -15637       | -15900       | -15950       | -15859       | -15823       | -15849       | -15926       | -15826       | -15852       | -16008       | -16270       | 5               | Gross LUCF Removals  |
| Total            | Net                      | 2645         | 2590         | 2076         | 899          | 685          | 787          | 616          | 211          | -385         | -550         | -787         | -986         | -1489        | -1536        | 5               | Net LUCF Emissions   |

Table 2-25: Emissions and removals in categories with the Land Use Change and Forestry Sector as reported in the format used for the UNFCCC Common Reporting Format defined by the IPCC LULUCF Good Practice Guidance.

| Gg CO <sub>2</sub> /year |                                | 1990          | 1991          | 1992          | 1993          | 1994          | 1995          | 1996          | 1997          | 1998          | 1999          | 2000          | 2001          | 2002          | 2003          |
|--------------------------|--------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| <b>5</b>                 | <b>NET</b>                     | <b>2645</b>   | <b>2590</b>   | <b>2076</b>   | <b>899</b>    | <b>685</b>    | <b>787</b>    | <b>616</b>    | <b>211</b>    | <b>-385</b>   | <b>-550</b>   | <b>-787</b>   | <b>-986</b>   | <b>-1489</b>  | <b>-1536</b>  |
| <b>5A</b>                | <b>Forest-Land</b>             | <b>-12226</b> | <b>-12616</b> | <b>-13118</b> | <b>-13478</b> | <b>-13858</b> | <b>-13727</b> | <b>-13661</b> | <b>-13527</b> | <b>-13459</b> | <b>-13665</b> | <b>-13411</b> | <b>-14009</b> | <b>-14775</b> | <b>-15418</b> |
| 5A1                      | Forest-Land remaining          | 0             | 0             | 0             | 0             | 0             | 0             | 0             | 0             | 0             | 0             | 0             | 0             | 0             | 0             |
| 5A2                      | Land converted to Forest-      | -12226        | -12616        | -13118        | -13478        | -13858        | -13727        | -13661        | -13527        | -13459        | -13665        | -13411        | -14009        | -14775        | -15418        |
| <b>5B</b>                | <b>Cropland</b>                | <b>15544</b>  | <b>15693</b>  | <b>15681</b>  | <b>15286</b>  | <b>15331</b>  | <b>15442</b>  | <b>15407</b>  | <b>15289</b>  | <b>15108</b>  | <b>14990</b>  | <b>14917</b>  | <b>14870</b>  | <b>14869</b>  | <b>14956</b>  |
| 5B1                      | Cropland remaining             | 1650          | 1613          | 1577          | 1540          | 1503          | 1467          | 1430          | 1393          | 1357          | 1320          | 1283          | 1261          | 1239          | 1217          |
| 5B2                      | Land converted to              | 13127         | 13130         | 13134         | 13140         | 13147         | 13155         | 13164         | 13174         | 13184         | 13195         | 13207         | 13220         | 13233         | 13247         |
| 5B (liming)              | Liming of Cropland             | 767           | 950           | 970           | 606           | 681           | 820           | 812           | 722           | 567           | 476           | 426           | 388           | 396           | 492           |
| <b>5C</b>                | <b>Grassland</b>               | <b>-4929</b>  | <b>-4886</b>  | <b>-5003</b>  | <b>-5450</b>  | <b>-5394</b>  | <b>-5326</b>  | <b>-5525</b>  | <b>-5766</b>  | <b>-6117</b>  | <b>-6182</b>  | <b>-6333</b>  | <b>-6426</b>  | <b>-6688</b>  | <b>-6489</b>  |
| 5C1                      | Grassland remaining            | 792           | 803           | 792           | 781           | 889           | 950           | 869           | 815           | 704           | 822           | 816           | 855           | 683           | 894           |
| 5C2                      | Land converted to              | -6384         | -6511         | -6634         | -6754         | -6872         | -6986         | -7097         | -7206         | -7312         | -7415         | -7517         | -7617         | -7714         | -7809         |
| 5C (liming)              | Liming of Grassland            | 664           | 822           | 839           | 524           | 589           | 709           | 703           | 625           | 491           | 411           | 368           | 336           | 343           | 426           |
| <b>5D</b>                | <b>Wetland</b>                 | <b>IE</b>     | <b>IE</b>     | <b>IE</b>     | <b>IE</b>     | <b>IE</b>     | <b>IE</b>     | <b>IE</b>     | <b>IE</b>     | <b>IE</b>     | <b>IE</b>     | <b>IE</b>     | <b>IE</b>     | <b>IE</b>     | <b>IE</b>     |
| 5D1                      | Wetland remaining              | IE            | IE            | IE            | IE            | IE            | IE            | IE            | IE            | IE            | IE            | IE            | IE            | IE            | IE            |
| 5D2                      | Land converted to Wetland      | IE            | IE            | IE            | IE            | IE            | IE            | IE            | IE            | IE            | IE            | IE            | IE            | IE            | IE            |
| <b>5E</b>                | <b>Settlements</b>             | <b>6944</b>   | <b>6844</b>   | <b>6746</b>   | <b>6699</b>   | <b>6647</b>   | <b>6621</b>   | <b>6593</b>   | <b>6511</b>   | <b>6473</b>   | <b>6568</b>   | <b>6455</b>   | <b>6422</b>   | <b>6339</b>   | <b>6268</b>   |
| 5E1                      | Settlements remaining          | 0             | 0             | 0             | 0             | 0             | 0             | 0             | 0             | 0             | 0             | 0             | 0             | 0             | 0             |
| 5E2                      | Land converted to              | 6944          | 6844          | 6746          | 6699          | 6647          | 6621          | 6593          | 6511          | 6473          | 6568          | 6455          | 6422          | 6339          | 6268          |
| <b>5F</b>                | <b>Other-Land</b>              | <b>0</b>      | <b>0</b>      | <b>0</b>      | <b>0</b>      | <b>0</b>      | <b>0</b>      | <b>0</b>      | <b>0</b>      | <b>0</b>      | <b>0</b>      | <b>0</b>      | <b>0</b>      | <b>0</b>      | <b>0</b>      |
| 5F1                      | Other-Land remaining           | 0             | 0             | 0             | 0             | 0             | 0             | 0             | 0             | 0             | 0             | 0             | 0             | 0             | 0             |
| 5F2                      | Land converted to Other-       | 0             | 0             | 0             | 0             | 0             | 0             | 0             | 0             | 0             | 0             | 0             | 0             | 0             | 0             |
| <b>5G</b>                | <b>Other activities</b>        | <b>-2687</b>  | <b>-2444</b>  | <b>-2230</b>  | <b>-2159</b>  | <b>-2042</b>  | <b>-2223</b>  | <b>-2198</b>  | <b>-2295</b>  | <b>-2389</b>  | <b>-2261</b>  | <b>-2414</b>  | <b>-1843</b>  | <b>-1233</b>  | <b>-852</b>   |
| 5G1                      | Harvested Wood Products        | -1587         | -1344         | -1130         | -1059         | -942          | -1123         | -1098         | -1195         | -1289         | -1161         | -1314         | -743          | -133          | 248           |
| 5G2                      | Changes in non-forest          | -1100         | -1100         | -1100         | -1100         | -1100         | -1100         | -1100         | -1100         | -1100         | -1100         | -1100         | -1100         | -1100         | -1100         |
|                          |                                |               |               |               |               |               |               |               |               |               |               |               |               |               |               |
| <b>5E2</b>               | <b>Deforestation Gg</b>        | 0.716         | 0.597         | 0.468         | 0.540         | 0.574         | 0.703         | 0.807         | 0.664         | 0.695         | 1.295         | 0.974         | 0.993         | 0.784         | 0.614         |
| <b>5E2</b>               | <b>Deforestation Gg</b>        | 0.005         | 0.004         | 0.003         | 0.004         | 0.004         | 0.005         | 0.006         | 0.005         | 0.005         | 0.009         | 0.007         | 0.007         | 0.005         | 0.004         |
| <b>Included in</b>       | <b>Deforest immediate</b>      | 164           | 137           | 107           | 124           | 132           | 161           | 185           | 152           | 159           | 297           | 223           | 228           | 180           | 141           |
| <b>Included in</b>       | <b>Deforest delayed (Soil)</b> | 578           | 561           | 546           | 531           | 517           | 504           | 491           | 480           | 469           | 458           | 448           | 439           | 430           | 422           |

Table 2-26. Approximate uncertainty of estimates of emissions or removals in each of the Categories reported.

| Category                           | 5A Changes in Forest Biomass | 5B Forest Conversion | 5D Soils | 5E Other |
|------------------------------------|------------------------------|----------------------|----------|----------|
| Uncertainty in Emission/Removal, % | 30                           | 20                   | 60       | 50       |

### 2.2.11. Results

The data for the 2003 Inventory and equivalent values for 1990 to 2002 (2005 submission date) can be summarised from Table 2-24. The same data is also presented in Appendix 2 in the Common Reporting Format Table 5 Sectoral Report (IPCC 1996 Guidelines style) and in Appendix 3 in the Common Reporting Format defined by the IPCC LULUCF Good Practice Guidance for each year separately.

#### 2.2.11.(a) Changes in Forest and Other Woody Biomass Stocks

##### 2.2.11.(a) i - Temperate Forest

The Removal of atmospheric CO<sub>2</sub> to Woody Biomass Stocks caused by expanding UK forests in 2003 was estimated to be 9808 Gg but there was a source of 248 Gg due to a decrease in the stock of carbon in undecayed forest products from these forests. Removals to Woody Biomass have been varying around 7000 Gg since 1996 but appear now to be on an upward trend. Removals to wood products had been increasing since that date but have now fallen considerably. Removals to Woody Biomass increased from 6014 Gg in 1990 to a peak of 7561 Gg in 1994, fell to 7137 by 1996 but have now reached a new peak. Removals to products fell from 1587 Gg in 1990 to 942 Gg in 1994 and were varying around 1200 Gg from 1996 to 2000 before the fall to the present source of 248 Gg. These changes reflect variation in planting rates in past decades which feed through growth and felling to the carbon uptake trends reported here. Changes in forest soils are discussed with other processes related to changes in soils.

#### 2.2.11.(b) Forest Conversion

##### 2.2.11.(b) i - Deforestation

Variation in emissions of greenhouse gases due to deforestation in Great Britain are now included in inventory reports. Emissions are small with a low of 107 Gg CO<sub>2</sub> in 1992 and a high of 297 Gg in 1999. Emissions of CH<sub>4</sub> and N<sub>2</sub>O follow the same pattern as CO<sub>2</sub> (see Table 2-25).

#### 2.2.11.(c) CO<sub>2</sub> Emissions and Removals from Soil

##### 2.2.11.(c) i - Land use change

Estimates of changes in stored soil carbon due to land use change (excluding afforestation) continue to indicate large emissions to the atmosphere although the trend continues downwards. For 2003 the Emission of CO<sub>2</sub> is estimated to be 11565 Gg compared to 13522 Gg in 1990. The revisions to the soil carbon database, availability of more recent land use change areas and removal of the very uncertain data for peat deeper than 1m have had a greater effect on estimated emissions from Scotland compared to the other regions. The calculations now suggest that emissions in England make up about half of the UK total and Scotland about one third. Land use changes on both mineral and organic soils are included in these estimates but transitory fluxes

due to changes involving new forest planting or continuous emissions due to drainage of organic soils for agriculture are discussed elsewhere.

*2.2.11.(c) ii - Liming of Agricultural Soils*

Emissions due to liming of agricultural soils were following a downward trend that started in 1997 but in 2003 there has been a rise. The peak emission was 1515 Gg in 1996 but in 2001 this has fallen to 752 Gg but by 2003 had risen to 918 Gg. No information is presently available to explain this trend but it may be related to varying economic conditions in farming.

*2.2.11.(c) iii - Forest Soils*

All changes in stock of carbon in forest soils are now estimated to be significantly greater than previously reported due to the inclusion of accumulating carbon in soils of conifer forest (see Section 2.2.4. Forest soil carbon stocks are now estimated to have increased due to a sink of 5610 Gg for 2003. Removals of atmospheric carbon dioxide to the soils of the new forests have not varied much over the period 1990 to 2003 but show a peak of 6633 Gg in 1998 followed by a slow downward trend. These trends reflect variation in planting rates in the past now working through the slowly responding soil turnover system.

*2.2.11.(c) iv - Lowland (fen) peat drainage*

The downward trend in Emissions from drainage of organic soils in the lowlands (primarily English fens) continues for 2003. The Emissions are estimated to have fallen from 1650 Gg in 1990 to 1217 Gg in 2003 reflecting stabilisation of in the old drained areas.

**2.2.11.(d) Other**

*2.2.11.(d) i - Changes in Non-forest Biomass*

The uptake of carbon due to improvements in the productivity and area of crops is estimated in 2003 to be unchanged from previous years at 1100 Gg.

*2.2.11.(d) ii - Peat Extraction*

The estimated emission of carbon due to peat extraction shows variation both upwards and downwards over the 14 reported years with the latest year of 2003 showing an emission of 894 Gg compared to the lowest in the previous 11 years of 704 Gg estimated for 1998. Emissions were greatest at 950 Gg in 1995 and around 800 Gg in the early part of the decade

**2.2.11.(e) Net UK Emissions/Removals**

The picture of net emissions in the UK from the Land Use Change and Forestry Sector of the UK has changed significantly due to the data revisions introduced this year. For 1990 the UK remains a net emitter but the value of the emission is now estimated to be 2645 Gg CO<sub>2</sub> made up of 17558 Gg emissions offset by 14913 Gg of removals. With the revised data Scotland is shown to be a net remover of atmospheric CO<sub>2</sub> in 1990 because of the combination of enhanced estimated removals to the soil of the extensive conifer forest and reduced estimated losses from the soils of other land. England and N. Ireland are estimated to be net emitters in 1990 and Wales a net remover. The net emissions for the UK followed a downward trend, reaching zero between 1997 and 1998 continuing to a net removal of 1536 Gg in 2003. This downward trend is similar but a little less steep than reported in previous inventories.

## **2.3. LULUCF GHG Data on basis of IPCC 2004 Good Practice Guidance.**

### **2.3.1. Introduction**

In the recently produced (IPCC 2004) IPCC Good Practice Guidance for Land Use, Land Use Change and Forestry a uniform structure to reporting emissions and removals of green house gases was described. This was adopted by the UNFCCC at COP 10 and countries were asked to submit data in this format in 2005. The timescales were short for adapting existing methodologies and data for the UK, especially as extensive revisions to these were to be carried out separately from any reporting requirements. Finally the approach was taken to submit Common Reporting Format Tables for LULUCF in both the previous format and the new format.

The new format for reporting can be seen as “land based” with the need for all land in the country to be identified as having remained in one of 6 classes (Forest Land, Cropland, Grassland, Wetlands, Settlements, Other land) since a previous survey, or as having changed to a different (identified) class in that period. A land use change matrix can be used to capture all these transitions in a compact manner. At its most basic this would be a 6x6 matrix with the diagonal being the areas that remained unchanged and the off-diagonal entries being the areas that had changed. The reporting structure simplifies this 6x6 structure to a 6x2 structure where the 2 columns describe greenhouse gas fluxes associated with i) land that remained in a specific class or ii) converted into that class. For each of these 6x2 reporting groups changes in stocks of carbon for above ground biomass, below ground biomass, dead biomass and soil organic matter should be reported, where possible. Specific activities that do not directly cause stock change of carbon are reported in separate tables, e.g. greenhouse gases other than CO<sub>2</sub>, but are combined into the totals in a summary table for the Sector. In the UK we do not have a fully integrated methodology to match the new reporting structure but because of our work using land use change matrices for estimating the effect of land use change on soil carbon stock it has been a relatively easy step to match the calculations that are made with those needed in the 6x2 reporting structure. Further work is planned to align methodologies with this structure.

The LULUCF GPG allows modification of the basic set of six land classes to match national databases. Further subdivision of the classes by ecosystem, administrative region or time of occurrence of change is also encouraged.

Deforestation is not directly treated within this structure but may contribute to 5 “conversion to” categories depending on the final use of the previous forest. The total stock change for deforestation must be identified from the reported data and entered as separate “For Information” results.

The full detail of disaggregation of results reported to the UNFCCC is not provided here but will be made available at <http://www.edinburgh.ceh.ac.uk/ukcarbon>.

### **2.3.2. Forest Land (5A)**

#### **2.3.2.(a) Forest Land remaining Forest Land**

Changes in stock of carbon in Forest Land in the UK that remains Forest Land are assumed to be zero. This category is identified with 820,000 ha of forest that has existed since before 1920 and is also assumed to be in carbon balance because of its age and hence has zero stock change.

**2.3.2.(b) Land converting to Forest Land**

All afforestation occurring since 1920 is reported in this category. This data was reported under Category 5A or 5A/5D in previous reporting formats. Stock changes in above and below ground biomass, dead material (litter) and soil carbon are estimated by the C-Flow model as described in Section 2.2.1. The data was reported to UNFCCC further disaggregated by the time periods for planting of 1920-1949, 1950-1979 and 1980 – 2003 to align with periods used for Cropland and Grassland. The data was also reported disaggregated by afforestation in England, Scotland, Wales and N. Ireland. The effect of afforestation in period 1990 –2003 was not reported separately but was calculated for use in assessing possible removals under Article 3.3 of the Kyoto Protocol.

**2.3.3. Cropland****2.3.3.(a) Cropland remaining Cropland**

Ongoing emissions of CO<sub>2</sub> due to historical drainage of lowland fens (Section 2.2.6) are reported in this Category. This data was reported in Category 5D or 5E in previous formats.

Emissions of CO<sub>2</sub> due to liming of cropland are reported in this Category. This data was combined with fluxes from agricultural grassland and reported in Category 5D of previous formats.

**2.3.3.(b) Land converting to Cropland**

Changes in stocks of soil carbon due to land converting to Cropland from all other land types as described by the land use change matrices of the Monitoring Landscape Change and Countryside Surveys (see Section 2.2.3) are reported in this Category. The data are disaggregated by changes occurring between 1950 –1979 and 1980-2003 as well as by England, Scotland, Wales and N. Ireland. Changes in stocks of biomass are not reported here but are dealt with under “changes in stock of non-forest biomass” but further work is required.

**2.3.4. Grassland (5C)****2.3.4.(a) Grassland remaining Grassland**

Ongoing emissions of CO<sub>2</sub> due to peat extraction (Section 2.2.8) are reported in this Category. This data was reported in Category 5E in previous formats.

Emissions of CO<sub>2</sub> due to liming of grassland are reported in this Category (Section 2.2.5). This data was combined with fluxes from cropland and reported in Category 5D of previous formats.

**2.3.4.(b) Land converting to Grassland**

Changes in stocks of soil carbon due to land converting to Grassland from all other land types as described by the land use change matrices of the Monitoring Landscape Change and Countryside Surveys (see Section 2.2.3) are reported in this Category. The data are disaggregated by changes occurring between 1950 –1979 and 1980-2003 as well as by England, Scotland, Wales and N. Ireland. Changes in stocks of biomass are not reported here but are dealt with under “changes in stock of non-forest biomass” but further work is required.



### **2.3.5. Wetlands (5D)**

In the UK Wetlands will either be saturated land (e.g. bogs, marshes) and due to the classifications used in the CS will fall into the Grassland category or open water (e.g. lakes, rivers, reservoirs) and included in the Other Land category

### **2.3.6. Settlements (5E)**

#### **2.3.6.(a) Settlements remaining Settlements**

No changes in carbon stocks are reported for land remaining under settlement. A possible cause of carbon stock change with time would be increasing or decreasing stock of biomass in parks or gardens. This conceptually dealt with under the “changes in stock of non-forest biomass” but further work is required

#### **2.3.6.(b) Land converting to Settlements**

Changes in stocks of soil carbon due to land converting to Settlement from all other land types as described by the land use change matrices of the Monitoring landscape Change and Countryside Surveys (see Section 2.2.3) are reported in this Category. The data are disaggregated by changes occurring between 1950 –1979 and 1980-2003 as well as by England, Scotland, Wales and N. Ireland. Some changes in stocks of biomass are not reported here but are dealt with under “changes in stock of non-forest biomass” but further work is required. However it is assumed that most deforestation occurs due to expansion of villages and towns so loss of forest biomass stock and emissions of non-CO<sub>2</sub> gases due to burning of litter material are reported in this category. The changes in stocks of soil carbon due to deforestation will also be relevant to this category but are not specifically identified separately with such changes in other land types becoming settled. A separate assessment of the changes in soil carbon stocks was made and reported with the biomass loss etc. in the appropriate Information Item.

### **2.3.7. Other Land (5F)**

No emissions or removals are reported in this category. It is assumed that there are very few areas of land of other types become bare rock or water bodies, which make up the majority of this type. Further assessment of areas of new reservoirs or coastal flooding may be worth pursuing.

### **2.3.8. Other Activities (5G)**

Changes in stocks of carbon in harvested wood (Section 2.2.1 products are reported here. This data was reported in Category 5A in previous formats. It was not possible to disaggregate the data on changes in stocks of carbon in non-forest biomass discussed in Section 2.2.7 into contributions due to changes in Cropland, Grassland and Settlements. They were therefore reported under the Other Category 5G of the new reporting format.

## **2.4. Projections of Emissions and Removals to 2020**

### **2.4.1. Introduction**

Projections of emissions for years from 2004 to 2020 have been made for each activity for each of England, Scotland, Wales and Northern Ireland. A “central” (MID), high emission (HI) and low emission scenario (LO) was developed for each activity and the basis of these is described in Section 2.4.2. The UK emissions, removals and net flux for each scenario are presented in Table 2-32. More detailed information on the emissions and removals is only supplied for simplicity on the basis of the reporting format defined by the IPCC LULUCF Good Practice Guidance (Appendix 1).

### **2.4.2. Basis for projections**

The basis for projection of each activity varied between England, Scotland, Wales and N. Ireland as appropriate. These assumptions are described in Table 2-28, Table 2-29, Table 2-30 and Table 2-31 respectively.

### **2.4.3. Results for projections of LUCF Categories**

The projections for Mid, Low and High emissions scenarios for the UK, England, Scotland, Wales and N. Ireland are presented in the Tables of Appendix A.1. The UK emissions, removals and net flux for each scenario are presented in Table 2-32 and plotted in Figure 2-1. The reporting format of the GPG on LULUCF is used for these data. Projections to 2020 of Forest Land, Cropland, Grassland and Settlements (Urban) Emissions and Removals of carbon from atmosphere in United Kingdom are plotted in Figure 2-2. Projections to 2020 of Net Emissions and Removals of carbon from atmosphere in England, Scotland, Wales and N. Ireland are plotted in Figure 2-3. Projections of net fluxes for Forest Land, Cropland, Grassland and Settlements for each scenario for England, Scotland, Wales and N. Ireland are plotted in Figure 2-4, Figure 2-5, Figure 2-6 and Figure 2-7.

### **2.4.4. Kyoto Protocol Article 3.3: Removals and emissions associated with post-1990 afforestation and deforestation**

Projections of emissions associated with afforestation and deforestation since 1990 as required by the Kyoto Protocol Article 3.3 have been made. The scenarios used for the projections described above formed the basis for these post 1990 calculations. For changes in biomass and soil carbon stocks due to afforestation the C-Flow model was used but with planting data restricted to the post-1990 period. Biomass carbon stock changes and non-CO<sub>2</sub> emissions from burning occur immediately in the year of forest clearance therefore this contribution is equal to that reported for the annual UNFCCC Inventory. However a separate calculation of the changes in soil carbon stock due to post-1990 deforestation specifically was made.

These projections are presented for Mid, Low and High emissions scenarios for the UK, England, Scotland, Wales and N. Ireland in Appendix A.4.

### **2.4.5. Kyoto Protocol Article 3.4: Removals and emissions associated Cropland Management and Grassland Management**

Under Article 3.4 of the Kyoto Protocol countries may elect to use net sinks within Cropland Management (CM) and Grassland Management (GM) to offset emissions in the commitment

period. According to the IPCC LULUCF Good Practice Guidance emissions and removals for CM should consider land that has remained as cropland, land that has become cropland and land that changes out of cropland between two survey dates. For GM calculations land should be considered that has remained as grassland, land that has become grassland and land that changes out of grassland between two survey dates. Afforestation and deforestation should be dealt with prior to treating CM and GM. The period between surveys is suggested as twenty years as a default to allow soil carbon changes to equilibrate but it is recognized that in individual countries better information may be available. In the UK we treat changes of soil carbon stocks as described in Section 2.2.3 where the time to equilibrate is different for different land transitions but the principle of having emissions/removals due to transitions between different land types is inherent. It can be shown (Box 1) that for the UK net flux for CM plus GM can be calculated from data in the categories of the LULUCF GPG reporting format as the algebraic sum (5B Cropland) + (5C Grassland) + (5E Settlements) – (Deforestation). Fluxes calculated in this way for years 1990 to 2020 assuming different future emissions scenarios are shown in Table 2-27.

Table 2-27 Net fluxes for Cropland Management plus Grassland Management in the UK for consideration in context of Kyoto protocol Article 3.4 for three different future emissions scenarios. (Italics are projections)

| <b>Gg CO<sub>2</sub>/year</b> | <b>Art 3.4<br/>CM + GM<br/>Low scenario</b> | <b>Art 3.4<br/>CM + GM<br/>Mid scenario</b> | <b>Art 3.4<br/>CM + GM<br/>High scenario</b> |
|-------------------------------|---|---|--|
| <b>1990</b>                   | <b>16816</b>                                | <b>16816</b>                                | <b>16816</b>                                 |
| 1991                          | 16952                                       | 16952                                       | 16952  |
| 1992                          | 16771                                       | 16771                                       | 16771  |
| 1993                          | 15881                                       | 15881                                       | 15881  |
| 1994                          | 15936                                       | 15936                                       | 15936  |
| <b>1995</b>                   | <b>16072</b>                                | <b>16072</b>                                | <b>16072</b>                                 |
| 1996                          | 15798                                       | 15798                                       | 15798  |
| 1997                          | 15402                                       | 15402                                       | 15402  |
| 1998                          | 14836                                       | 14836                                       | 14836  |
| 1999                          | 14621                                       | 14621                                       | 14621  |
| <b>2000</b>                   | <b>14367</b>                                | <b>14367</b>                                | <b>14367</b>                                 |
| 2001                          | 14199                                       | 14199                                       | 14199  |
| 2002                          | 13910                                       | 13910                                       | 13910  |
| 2003                          | 14172                                       | 14172                                       | 14172  |
| <i>2004</i>                   | <i>13728</i>                                | <i>13952</i>                                | <i>14155</i>                                 |
| <b>2005</b>                   | <b>13119</b>                                | <b>13549</b>                                | <b>13957</b>                                 |
| <i>2006</i>                   | <i>12471</i>                                | <i>13106</i>                                | <i>13717</i>                                 |
| <i>2007</i>                   | <i>12198</i>                                | <i>13033</i>                                | <i>13848</i>                                 |
| <i>2008</i>                   | <i>11855</i>                                | <i>12887</i>                                | <i>13905</i>                                 |
| <i>2009</i>                   | <i>11582</i>                                | <i>12809</i>                                | <i>14014</i>                                 |
| <b>2010</b>                   | <b>10778</b>                                | <b>12649</b>                                | <b>14184</b>                                 |
| <i>2011</i>                   | <i>10237</i>                                | <i>12513</i>                                | <i>14314</i>                                 |
| <i>2012</i>                   | <i>10002</i>                                | <i>12381</i>                                | <i>14423</i>                                 |
| <i>2013</i>                   | <i>9818</i>                                 | <i>12170</i>                                | <i>14372</i>                                 |
| <i>2014</i>                   | <i>9680</i>                                 | <i>12093</i>                                | <i>14357</i>                                 |
| <b>2015</b>                   | <b>9484</b>                                 | <b>11942</b>                                | <b>14367</b>                                 |
| <i>2016</i>                   | <i>9371</i>                                 | <i>11919</i>                                | <i>14522</i>                                 |
| <i>2017</i>                   | <i>9151</i>                                 | <i>11740</i>                                | <i>14443</i>                                 |
| <i>2018</i>                   | <i>9059</i>                                 | <i>11680</i>                                | <i>14424</i>                                 |
| <i>2019</i>                   | <i>8938</i>                                 | <i>11614</i>                                | <i>14417</i>                                 |
| <b>2020</b>                   | <b>8813</b>                                 | <b>11656</b>                                | <b>14552</b>                                 |

There are 4 land types relevant to greenhouse gas emissions and removals in the UK: Forest (F), Cropland (C), Grassland (G) and Settlements (S). Using the 2 letter combinations of land type at start of a survey period followed by the land type at end e.g. FF is forest remaining forest, CG is cropland converting to grassland, it is possible to write (algebraic sums)

$$\text{Art 3.4 Cropland Management (CM)} = \text{CC} + \text{GC} + \text{SC} + \text{CG} + \text{CS}$$

$$\text{Art 3.4 Grassland Management (GM)} = \text{GG} + \text{CG} + \text{SG} + \text{GC} + \text{GS}$$

$$\text{Inventory Cropland (IC)} = \text{CC} + \text{GC} + \text{SC} + \text{FC}$$

$$\text{Inventory Grassland (IG)} = \text{GG} + \text{CG} + \text{SG} + \text{FG}$$

$$\text{Inventory Settlements (IS)} = \text{SS} + \text{CS} + \text{GS} + \text{FS}$$

$$\text{SS} = 0$$

$$\begin{aligned} \text{Therefore CM} + \text{GM} &= \text{IC} + \text{IG} + \text{IS} - (\text{FC} + \text{FG} + \text{FS}) \\ &= \text{IC} + \text{IG} + \text{IS} - (\text{Deforestation}) \end{aligned}$$

Box 1 Estimation of Article 3.4 emissions for Cropland Management and Grassland Management from GHG Inventory data.

#### 2.4.6. Kyoto Protocol Article 3.7: Deforestation emissions in Base Year

Under Kyoto protocol Article 3.7 countries with a net emissions in 1990 from the LULUCF Sector can count that part of these emissions due to deforestation with non-LULUCF GHG emissions for estimating “Base Year Emission”. These “Base Year Emissions” then become the basis for the emissions allowance for that country during the First Commitment Period. In 1990 the UK LULUCF Sector is estimated to have been a net emitter of 2645 Gg CO<sub>2</sub>, so Article 3.7 therefore applies. The deforestation emission in 1990 for the purposes of this Article have been taken to be those associated with all deforestation prior to including 1990. For 1990 the immediate emissions due to biomass removal and burning are relevant but there will also be delayed soil carbon stock change resulting from deforestation in earlier years. The emissions to be used for Article 3.7 are therefore the full 1990 deforestation component for 1990 from the GHG Inventory, which equals 759 Gg CO<sub>2</sub>.

Table 2-28 Assumptions in scenarios for projection of LUCF Emissions and Removals from 1990 to 2003 data to 2004 onwards

| <b>a</b>                       | <b>Scenario assumption: Scotland</b>  |  |   |
|--------------------------------|---|--|---|
| <b>Category</b>                | <b>LOW Emission</b>   | <b>MID Emission</b>  | <b>HIGH Emission</b>  |
| <b>Afforestation</b>           | UK Total of 30 kha/yr from 2003 in proportion to 2003 planting  | All planting from 2004 assumed to follow policy based on projected Woodland Grant Scheme support.  | All planting from 2004 assumed to be 0 ha/yr.   |
| <b>Deforestation</b>           | As MID but trend adjusted to lower value (95% C.L) of 1990 to 2003 trend  | Autoregressive model (10 terms) fitted to 1990 to 2003 UK data   | As MID but trend adjusted to upper value (95% C.L) of 1990 to 2003 trend  |
| <b>Land Use Change (Soils)</b> | Annual area land use change for 2004 to 2020 assumed to be same as annual rate of change for 1990 to 2003. – minimum values from Monte Carlo simulation | Annual area land use change for 2004 to 2020 assumed to be same as annual rate of change for 1990 to 2003. – mean values from Monte Carlo simulation | Annual area land use change for 2004 to 2020 assumed to be same as annual rate of change for 1990 to 2003. – maximum values from Monte Carlo simulation |
| <b>Peat extraction</b>         | As MID but trend adjusted to lower value (95% C.L) of 1990 to 2003 trend  | Autoregressive model (10 terms) fitted to 1990 to 2003 Scottish data   | As MID but trend adjusted to upper value (95% C.L) of 1990 to 2003 trend  |
| <b>Liming</b>                  | As MID but trend adjusted to lower value (95% C.L) of 1990 to 2003 trend  | Autoregressive model (10 terms) fitted to 1990 to 2003 UK data   | As MID but trend adjusted to upper value (95% C.L) of 1990 to 2003 trend  |
| <b>Lowland drainage</b>        | NA  | NA   | NA  |
| <b>Non-forest biomass</b>      | Flux remains at 2002 value  | Flux remains at 2002 value   | Flux remains at 2002 value  |

Table 2-29 Assumptions in scenarios for projection of LUCF Emissions and Removals from 1990 to 2003 data to 2004 onwards

| <b>b</b>                       | <b>Scenario assumption: England</b>   |  |   |
|--------------------------------|---|--|---|
| <b>Category</b>                | <b>LOW Emission</b>   | <b>MID Emission</b>  | <b>HIGH Emission</b>  |
| <b>Forestry</b>                | UK Total of 30 kha/yr from 2004 in proportion to 2003 planting  | Conifer planting from 2003 assumed to be 500 ha/year<br>Broadleaf planting from 2003 assumed to be 4500 ha/year                                      | Conifer planting from 2004 assumed to be 0 ha/yr.<br>Broadleaf planting from 2004 assumed to be 0 ha/yr.  |
| <b>Deforestation</b>           | As MID but trend adjusted to lower value (95% C.L) of 1990 to 2003 trend  | Autoregressive model (10 terms) fitted to 1990 to 2003 UK data   | As MID but trend adjusted to upper value (95% C.L) of 1990 to 2003 trend  |
| <b>Land Use Change (Soils)</b> | Annual area land use change for 2004 to 2020 assumed to be same as annual rate of change for 1990 to 2003. – minimum values from Monte Carlo simulation | Annual area land use change for 2004 to 2020 assumed to be same as annual rate of change for 1990 to 2003. – mean values from Monte Carlo simulation | Annual area land use change for 2004 to 2020 assumed to be same as annual rate of change for 1990 to 2003. – maximum values from Monte Carlo simulation |
| <b>Peat extraction</b>         | As MID but trend adjusted to lower value (95% C.L) of 1990 to 2003 trend  | Autoregressive model (10 terms) fitted to 1990 to 2003 English data  | As MID but trend adjusted to upper value (95% C.L) of 1990 to 2003 trend  |
| <b>Liming</b>                  | As MID but trend adjusted to lower value (95% C.L) of 1990 to 2003 trend  | Autoregressive model (10 terms) fitted to 1990 to 2003 UK data   | As MID but trend adjusted to upper value (95% C.L) of 1990 to 2003 trend  |
| <b>Lowland drainage</b>        | Flux changes from 2003 at modelled rate of change for 1990 to 2000  | Flux changes from 2003 at modelled rate of change  | Flux changes from 2003 value at modelled rate of change for 2010 to 2020  |
| <b>Non-forest biomass</b>      | Flux remains at 2003 value  | Flux remains at 2003 value   | Flux remains at 2003 value  |

Table 2-30 Assumptions in scenarios for projection of LUCF Emissions and Removals from 1990 to 2003 data to 2004 onwards

| <b>c</b>                       | <b>Scenario assumption: Wales</b>   |  |   |
|--------------------------------|---|--|---|
| <b>Category</b>                | <b>LOW Emission</b>   | <b>MID Emission</b>  | <b>HIGH Emission</b>  |
| <b>Forestry</b>                | UK Total of 30 kha/yr from 2004 in proportion to 2003 planting  | Conifer planting from 2004 assumed to be as in 2003.<br>Broadleaf planting from 2004 assumed to be as in 2003.                                       | Conifer planting from 2004 assumed to be 0 ha/yr.<br>Broadleaf planting from 2004 assumed to be 0 ha/yr.  |
| <b>Deforestation</b>           | As MID but trend adjusted to lower value (95% C.L) of 1990 to 2003 trend  | Autoregressive model (10 terms) fitted to 1990 to 2003 UK data   | As MID but trend adjusted to upper value (95% C.L) of 1990 to 2003 trend  |
| <b>Land Use Change (Soils)</b> | Annual area land use change for 2004 to 2020 assumed to be same as annual rate of change for 1990 to 2003. – minimum values from Monte Carlo simulation | Annual area land use change for 2004 to 2020 assumed to be same as annual rate of change for 1990 to 2003. – mean values from Monte Carlo simulation | Annual area land use change for 2004 to 2020 assumed to be same as annual rate of change for 1990 to 2003. – maximum values from Monte Carlo simulation |
| <b>Peat extraction</b>         | Flux zero   | Flux zero  | Flux zero   |
| <b>Liming</b>                  | As MID but trend adjusted to lower value (95% C.L) of 1990 to 2003 trend  | Autoregressive model (10 terms) fitted to 1990 to 2003 UK data   | As MID but trend adjusted to upper value (95% C.L) of 1990 to 2003 trend  |
| <b>Lowland drainage</b>        | NA  | NA   | NA  |
| <b>Non-forest biomass</b>      | Flux remains at 2003 value  | Flux remains at 2003 value   | Flux remains at 2003 value  |

Table 2-31 Assumptions in scenarios for projection of LUCF Emissions and Removals from 1990 to 2002 data to 2003 onwards

| <b>d</b>                       | <b>Scenario assumption: Northern Ireland</b>  |  |   |
|--------------------------------|---|--|---|
| <b>Category</b>                | <b>LOW Emission</b>   | <b>MID Emission</b>  | <b>HIGH Emission</b>  |
| <b>Forestry</b>                | UK Total of 30 kha/yr from 2004 in proportion to 2003 planting  | Conifer planting from 2004 assumed to be as in 2003.<br>Broadleaf planting from 2004 assumed to be as in 2003.                                       | Conifer planting from 2004 assumed to be 0 ha/yr.<br>Broadleaf planting from 2004 assumed to be 0 ha/yr.  |
| <b>Deforestation</b>           | NA  | NA   | NA  |
| <b>Land Use Change (Soils)</b> | Annual area land use change for 2004 to 2020 assumed to be same as annual rate of change for 1990 to 2003. – minimum values from Monte Carlo simulation | Annual area land use change for 2004 to 2020 assumed to be same as annual rate of change for 1990 to 2003. – mean values from Monte Carlo simulation | Annual area land use change for 2004 to 2020 assumed to be same as annual rate of change for 1990 to 2003. – maximum values from Monte Carlo simulation |
| <b>Peat extraction</b>         | Flux remains at 2003 value  | Flux remains at 2003 value   | Flux remains at 2003 value  |
| <b>Liming</b>                  | As MID but trend adjusted to lower value (95% C.L) of 1990 to 2003 trend  | Autoregressive model (10 terms) fitted to 1990 to 2003 UK data   | As MID but trend adjusted to upper value (95% C.L) of 1990 to 2003 trend  |
| <b>Lowland drainage</b>        | NA  | NA   | NA  |
| <b>Non-forest biomass</b>      | Flux remains at 2003 value  | Flux remains at 2003 value   | Flux remains at 2003 value  |

Table 2-32 Inventory (1990 to 2000) and projected (2005 to 2020) Emissions and Removals data (GgCO<sub>2</sub>/year). (-ve sign indicates Removal)

| Year | Net (LOW) | Emissions (MID) | Net (MID) | Removals (MID) | Net (HIGH) |
|------|-----------|-----------------|-----------|----------------|------------|
| 1990 | 2645      | 17558           | 2645      | -14913         | 2645       |
| 1995 | 787       | 16737           | 787       | -15950         | 787        |
| 2000 | -787      | 15038           | -787      | -15826         | -787       |
| 2005 | -2939     | 14136           | -2442     | -16578         | -1968      |
| 2010 | -4466     | 13236           | -2124     | -15360         | -270       |
| 2015 | -4625     | 12497           | -463      | -12960         | 3065       |
| 2020 | -4208     | 12156           | 1351      | -10805         | 5993       |

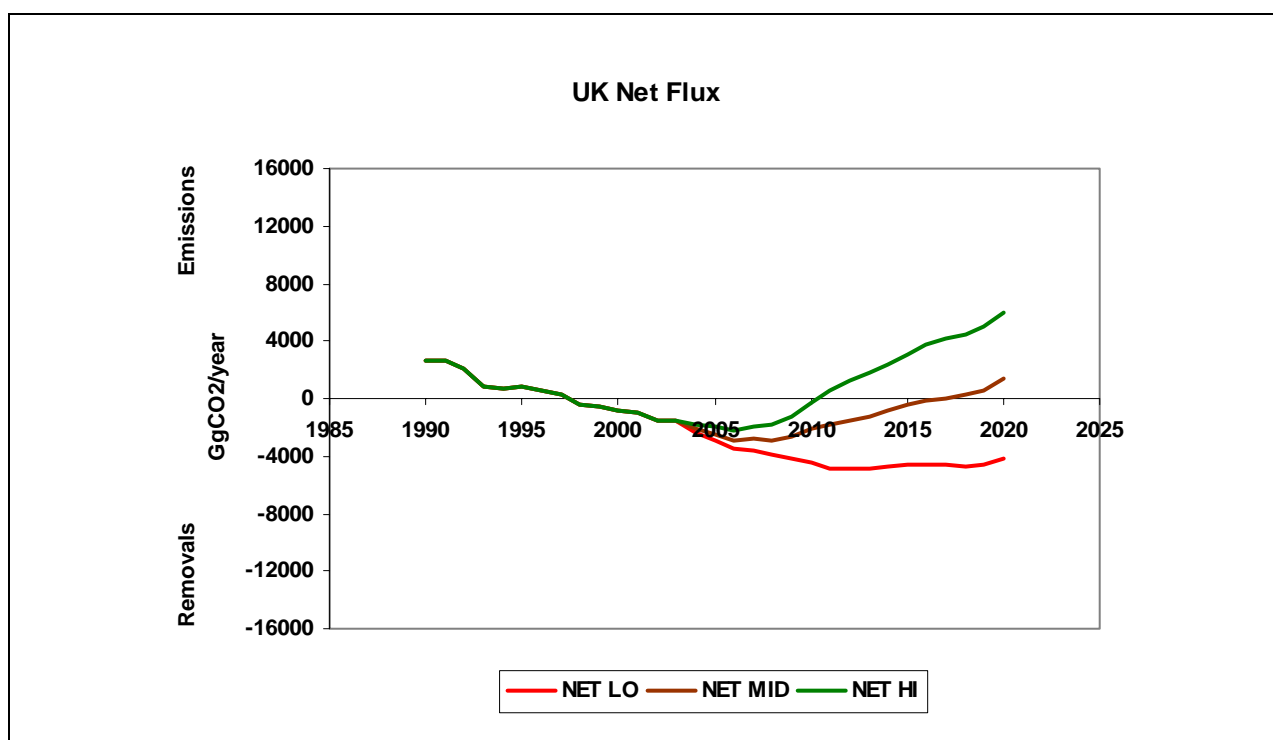


Figure 2-1 Projections to 2020 of Net Emissions and Removals of carbon from atmosphere in United Kingdom by land use, land use change and forestry for 3 future emissions scenarios

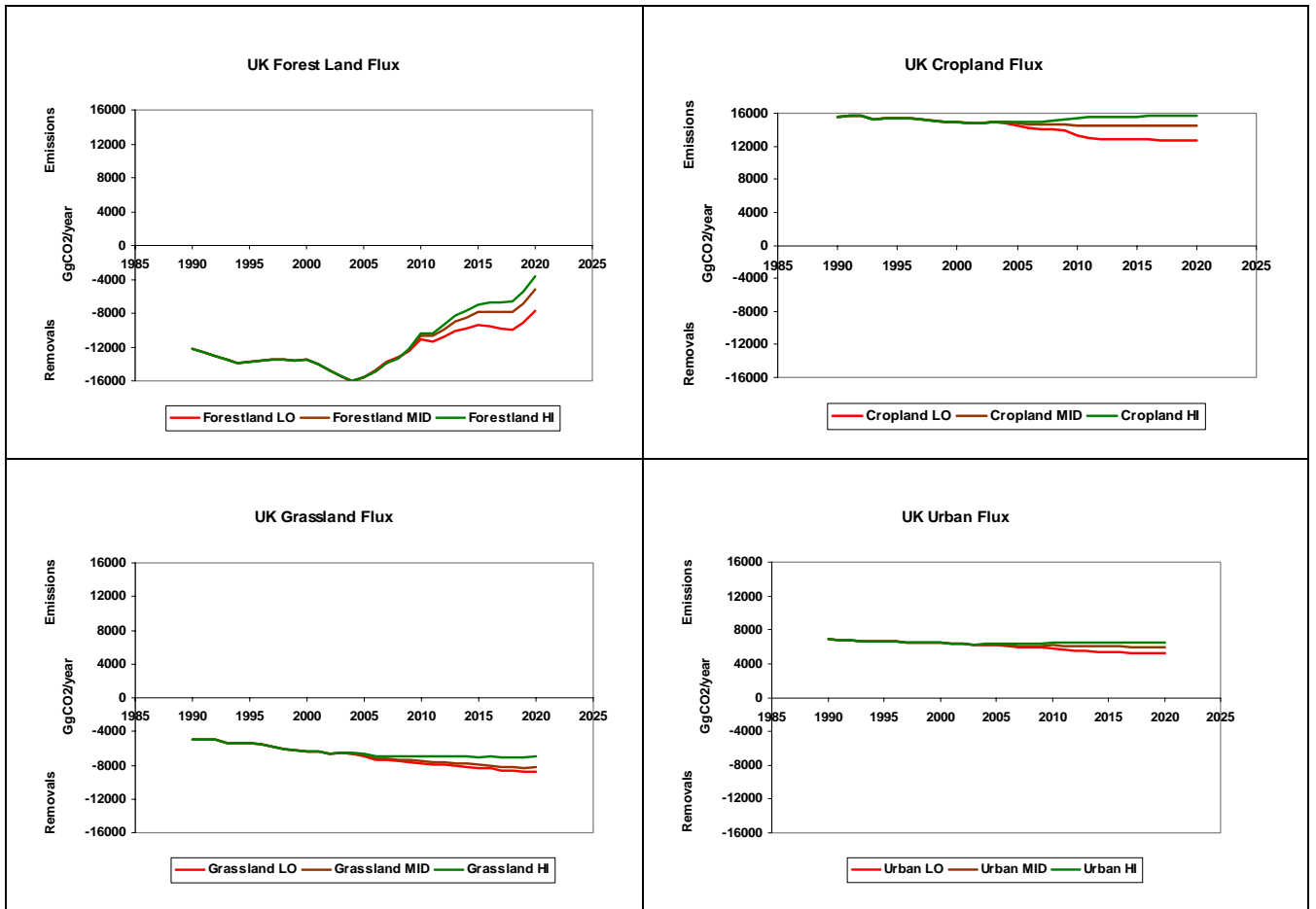


Figure 2-2 Projections to 2020 of Forest Land, Cropland, Grassland and Settlements (Urban) Emissions and Removals of carbon from atmosphere in United Kingdom by land use, land use change and forestry for 3 future emissions scenarios



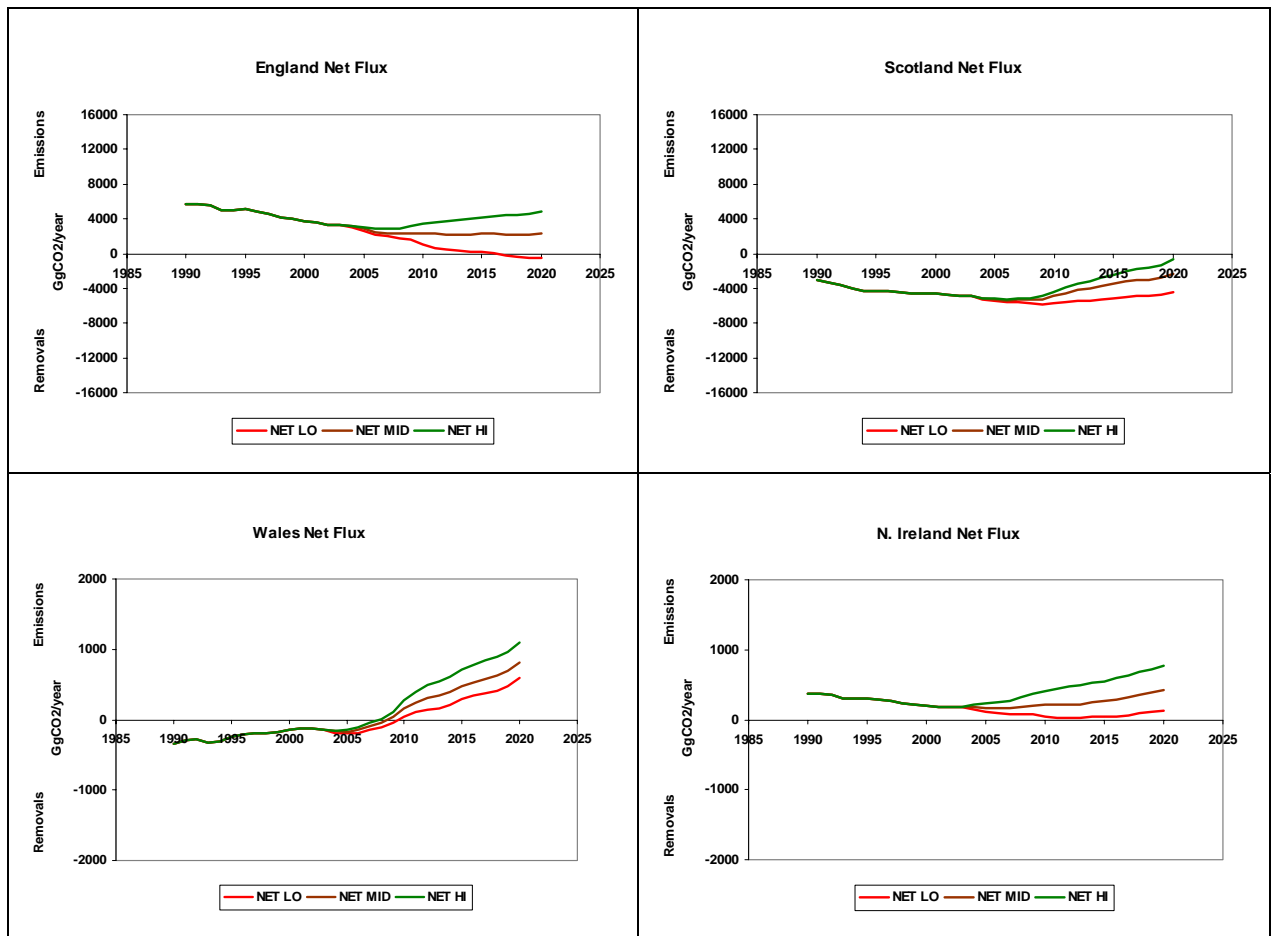


Figure 2-3 Projections to 2020 of Net Emissions and Removals of carbon from atmosphere in England, Scotland, Wales and N. Ireland by land use, land use change and forestry for 3 future emissions scenarios.

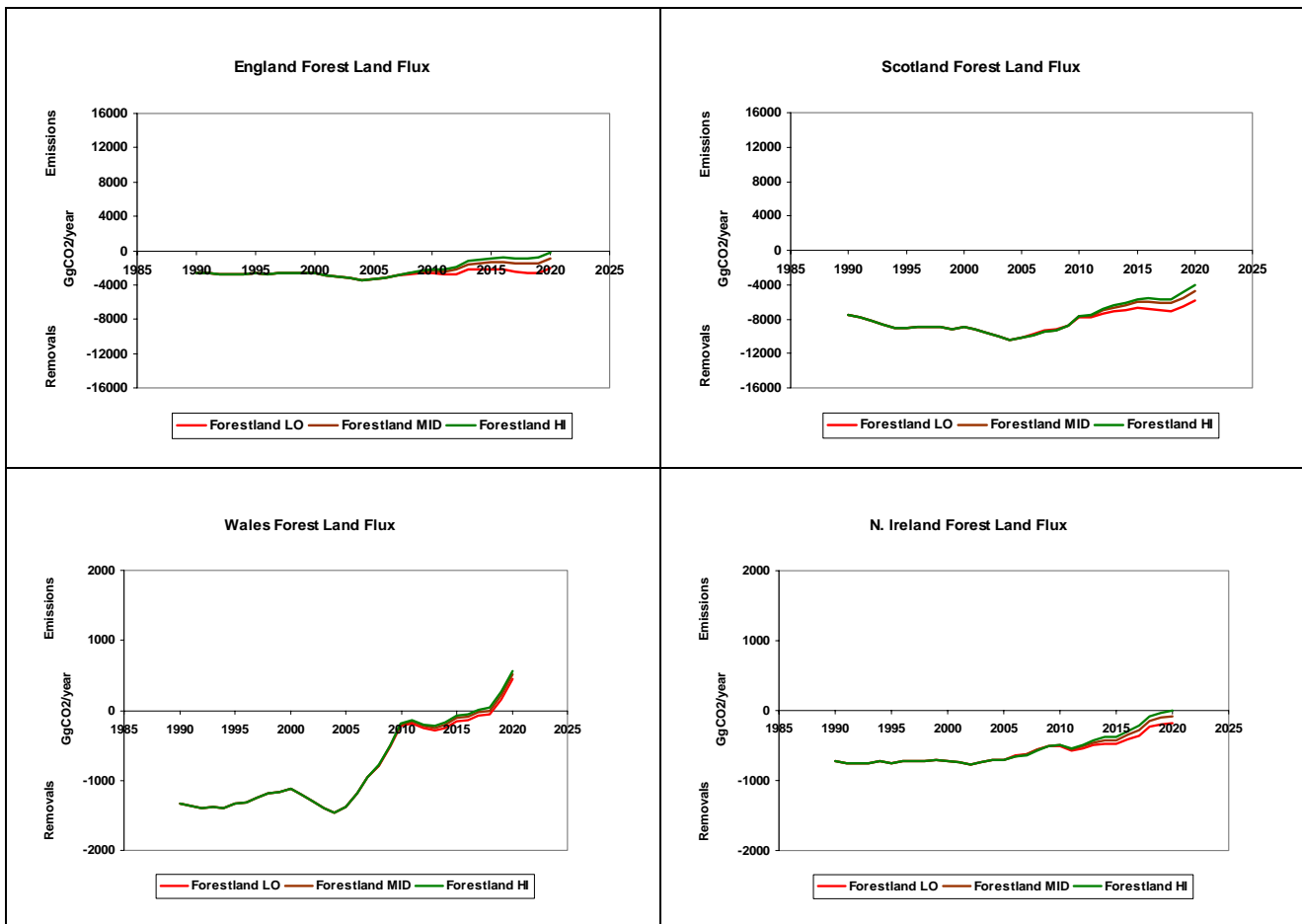


Figure 2-4 Projections to 2020 of Emissions and Removals of carbon from atmosphere in England, Scotland, Wales and N. Ireland by Forest Land Category of land use, land use change and forestry sector for 3 future emissions scenarios.

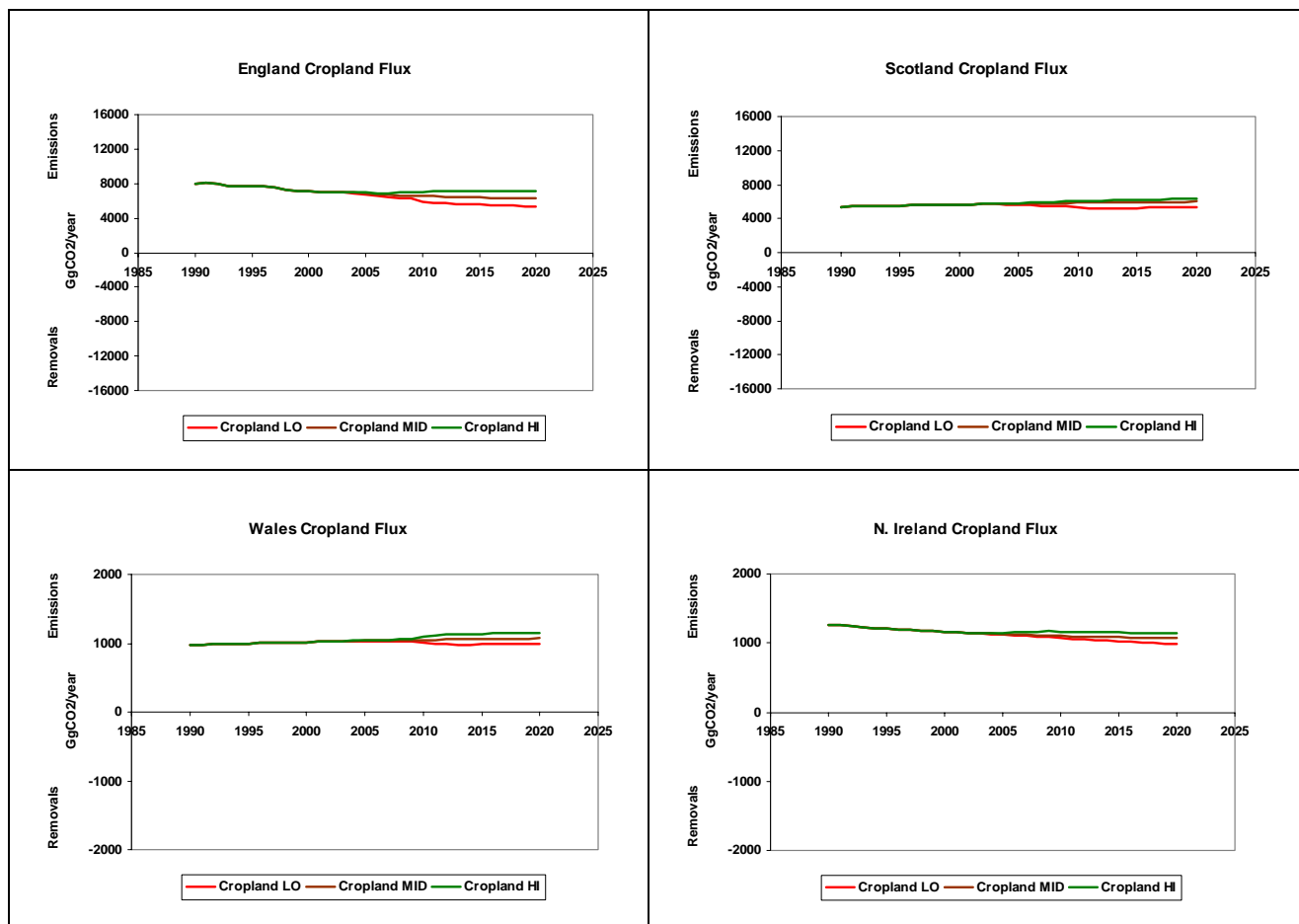


Figure 2-5 Projections to 2020 of Emissions and Removals of carbon from atmosphere in England, Scotland, Wales and N. Ireland by Cropland Category of land use, land use change and forestry sector for 3 future emissions scenarios

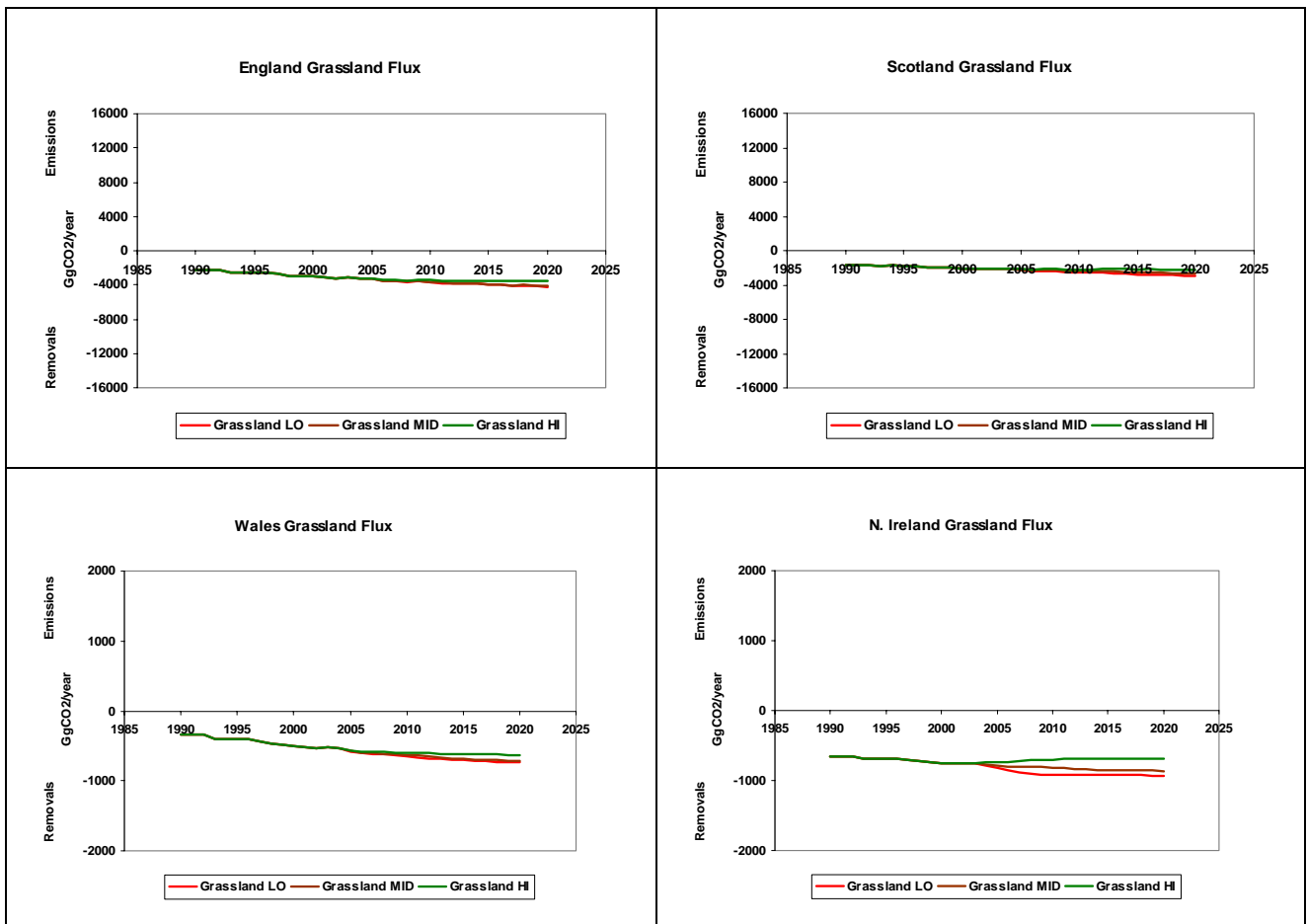


Figure 2-6 Projections to 2020 of Emissions and Removals of carbon from atmosphere in England, Scotland, Wales and N. Ireland by Grassland Category of land use, land use change and forestry sector for 3 future emissions scenarios

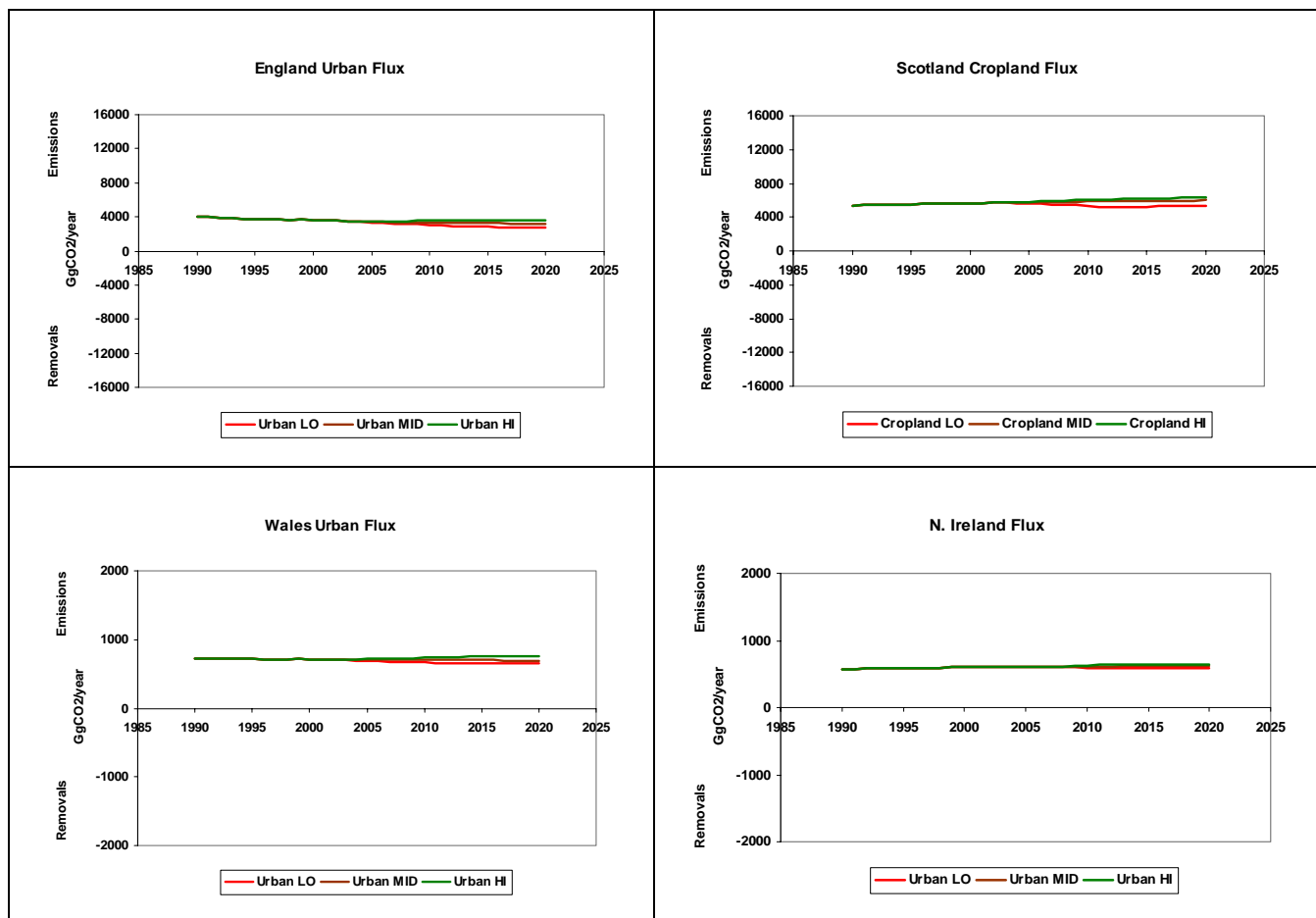


Figure 2-7 Projections to 2020 of Emissions and Removals of carbon from atmosphere in England, Scotland, Wales and N. Ireland by Settlements (Urban) Category of land use, land use change and forestry sector for 3 future emissions scenarios

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# **APPENDIX 1**

## **A.1. Data Tables**



|  |      |
|--|------|
| Table A1. 1: United Kingdom data for 2003 UK GHG Inventory: A: LULUCF GPG Format – with MID projection, B: LULUCF GPG Format – with LO projection, C: LULUCF GPG Format – with HI projection, D: “NIR” summary, of Inventory period (Italics are projections) (HWP = Harvested Wood Products)..... | 2-49 |
| Table A1. 2: England data for 2003 UK GHG Inventory: A: LULUCF GPG Format – with MID projection, B: LULUCF GPG Format – with LO projection, C: LULUCF GPG Format – with HI projection, D: “NIR” summary,. (Italics are projections) (HWP = Harvested Wood Products).....                           | 2-53 |
| Table A1. 3: Scotland data for 2003 UK GHG Inventory: A: LULUCF GPG Format – with MID projection, B: LULUCF GPG Format – with LO projection, C: LULUCF GPG Format – with HI projection, D: “NIR” summary,. (Italics are projections) (HWP = Harvested Wood Products).....                          | 2-57 |
| Table A1. 4: Wales data for 2003 UK GHG Inventory: A: LULUCF GPG Format – with MID projection, B: LULUCF GPG Format – with LO projection, C: LULUCF GPG Format – with HI projection, D: “NIR” summary,. (Italics are projections) (HWP = Harvested Wood Products).....                             | 2-61 |
| Table A1. 5: Northern Ireland data for 2003 UK GHG Inventory: A: LULUCF GPG Format – with MID projection, B: LULUCF GPG Format – with LO projection, C: LULUCF GPG Format – with HI projection, D: “NIR” summary,. (Italics are projections) (HWP = Harvested Wood Products) .....                 | 2-65 |



Table A1. 1: United Kingdom data for 2003 UK GHG Inventory: A: LULUCF GPG Format – with MID projection, B: LULUCF GPG Format – with LO projection, C: LULUCF GPG Format – with HI projection, D: “NIR” summary, of Inventory period (Italics are projections) (HWP = Harvested Wood Products)

| <b>A (Mid)<br/>UK</b> | <b>5</b>     | <b>5A</b>         | <b>5B</b>       | <b>5C</b>        | <b>5E</b>          | <b>5G</b>    | <b>5G</b>                     |
|-----------------------|--------------|-------------------|-----------------|------------------|--------------------|--------------|-------------------------------|
| <b>Gg CO2/year</b>    | <b>NET</b>   | <b>Forestland</b> | <b>Cropland</b> | <b>Grassland</b> | <b>Settlements</b> | <b>HWP</b>   | <b>Non-forest<br/>biomass</b> |
| <b>1990</b>           | <b>2645</b>  | <b>-12226</b>     | <b>15544</b>    | <b>-4929</b>     | <b>6944</b>        | <b>-1587</b> | <b>-1100</b>                  |
| 1991                  | 2590         | -12616            | 15693           | -4886            | 6844               | -1344        | -1100                         |
| 1992                  | 2076         | -13118            | 15681           | -5003            | 6746               | -1130        | -1100                         |
| 1993                  | 899          | -13478            | 15286           | -5450            | 6699               | -1059        | -1100                         |
| 1994                  | 685          | -13858            | 15331           | -5394            | 6647               | -942         | -1100                         |
| <b>1995</b>           | <b>787</b>   | <b>-13727</b>     | <b>15442</b>    | <b>-5326</b>     | <b>6621</b>        | <b>-1123</b> | <b>-1100</b>                  |
| 1996                  | 616          | -13661            | 15407           | -5525            | 6593               | -1098        | -1100                         |
| 1997                  | 211          | -13527            | 15289           | -5766            | 6511               | -1195        | -1100                         |
| 1998                  | -385         | -13459            | 15108           | -6117            | 6473               | -1289        | -1100                         |
| 1999                  | -550         | -13665            | 14990           | -6182            | 6568               | -1161        | -1100                         |
| <b>2000</b>           | <b>-787</b>  | <b>-13411</b>     | <b>14917</b>    | <b>-6333</b>     | <b>6455</b>        | <b>-1314</b> | <b>-1100</b>                  |
| 2001                  | -986         | -14009            | 14870           | -6426            | 6422               | -743         | -1100                         |
| 2002                  | -1489        | -14775            | 14869           | -6688            | 6339               | -133         | -1100                         |
| 2003                  | -1536        | -15418            | 14956           | -6489            | 6268               | 248          | -1100                         |
| <i>2004</i>           | <i>-2088</i> | <i>-16067</i>     | <i>14902</i>    | <i>-6632</i>     | <i>6265</i>        | <i>544</i>   | <i>-1100</i>                  |
| <b>2005</b>           | <b>-2442</b> | <b>-15561</b>     | <b>14730</b>    | <b>-6842</b>     | <b>6248</b>        | <b>83</b>    | <b>-1100</b>                  |
| <i>2006</i>           | <i>-2888</i> | <i>-14865</i>     | <i>14626</i>    | <i>-7161</i>     | <i>6172</i>        | <i>-560</i>  | <i>-1100</i>                  |
| <i>2007</i>           | <i>-2823</i> | <i>-13864</i>     | <i>14601</i>    | <i>-7190</i>     | <i>6148</i>        | <i>-1417</i> | <i>-1100</i>                  |
| <i>2008</i>           | <i>-2874</i> | <i>-13263</i>     | <i>14611</i>    | <i>-7329</i>     | <i>6120</i>        | <i>-1912</i> | <i>-1100</i>                  |
| <i>2009</i>           | <i>-2670</i> | <i>-12283</i>     | <i>14595</i>    | <i>-7374</i>     | <i>6148</i>        | <i>-2655</i> | <i>-1100</i>                  |
| <b>2010</b>           | <b>-2124</b> | <b>-10662</b>     | <b>14554</b>    | <b>-7479</b>     | <b>6160</b>        | <b>-3598</b> | <b>-1100</b>                  |
| <i>2011</i>           | <i>-1795</i> | <i>-10729</i>     | <i>14536</i>    | <i>-7583</i>     | <i>6142</i>        | <i>-3062</i> | <i>-1100</i>                  |
| <i>2012</i>           | <i>-1469</i> | <i>-9983</i>      | <i>14501</i>    | <i>-7667</i>     | <i>6103</i>        | <i>-3323</i> | <i>-1100</i>                  |
| <i>2013</i>           | <i>-1248</i> | <i>-8991</i>      | <i>14428</i>    | <i>-7792</i>     | <i>6080</i>        | <i>-3873</i> | <i>-1100</i>                  |
| <i>2014</i>           | <i>-889</i>  | <i>-8553</i>      | <i>14424</i>    | <i>-7853</i>     | <i>6072</i>        | <i>-3879</i> | <i>-1100</i>                  |
| <b>2015</b>           | <b>-463</b>  | <b>-7923</b>      | <b>14429</b>    | <b>-7999</b>     | <b>6067</b>        | <b>-3937</b> | <b>-1100</b>                  |
| <i>2016</i>           | <i>-88</i>   | <i>-7818</i>      | <i>14433</i>    | <i>-8016</i>     | <i>6027</i>        | <i>-3614</i> | <i>-1100</i>                  |
| <i>2017</i>           | <i>63</i>    | <i>-7905</i>      | <i>14438</i>    | <i>-8190</i>     | <i>5986</i>        | <i>-3165</i> | <i>-1100</i>                  |
| <i>2018</i>           | <i>246</i>   | <i>-7837</i>      | <i>14442</i>    | <i>-8246</i>     | <i>5955</i>        | <i>-2968</i> | <i>-1100</i>                  |
| <i>2019</i>           | <i>577</i>   | <i>-6858</i>      | <i>14446</i>    | <i>-8308</i>     | <i>5956</i>        | <i>-3560</i> | <i>-1100</i>                  |
| <b>2020</b>           | <b>1351</b>  | <b>-5160</b>      | <b>14450</b>    | <b>-8262</b>     | <b>5968</b>        | <b>-4545</b> | <b>-1100</b>                  |

| <b>B (Low)<br/>UK</b> |              |                   |                 |                  |                    |              |                               |
|-----------------------|--------------|-------------------|-----------------|------------------|--------------------|--------------|-------------------------------|
| <b>Gg CO2/year</b>    | <b>5</b>     | <b>5A</b>         | <b>5B</b>       | <b>5C</b>        | <b>5E</b>          | <b>5G</b>    | <b>5G</b>                     |
|                       | <b>NET</b>   | <b>Forestland</b> | <b>Cropland</b> | <b>Grassland</b> | <b>Settlements</b> | <b>HWP</b>   | <b>Non-forest<br/>biomass</b> |
| <b>1990</b>           | <b>2645</b>  | <b>-12226</b>     | <b>15543</b>    | <b>-4929</b>     | <b>6944</b>        | <b>-1587</b> | <b>-1100</b>                  |
| 1991                  | 2590         | -12616            | 15693           | -4886            | 6844               | -1344        | -1100                         |
| 1992                  | 2076         | -13118            | 15681           | -5003            | 6746               | -1130        | -1100                         |
| 1993                  | 899          | -13478            | 15286           | -5449            | 6699               | -1059        | -1100                         |
| 1994                  | 685          | -13858            | 15331           | -5393            | 6647               | -942         | -1100                         |
| <b>1995</b>           | <b>787</b>   | <b>-13727</b>     | <b>15442</b>    | <b>-5326</b>     | <b>6621</b>        | <b>-1123</b> | <b>-1100</b>                  |
| 1996                  | 616          | -13661            | 15406           | -5525            | 6593               | -1098        | -1100                         |
| 1997                  | 211          | -13527            | 15289           | -5766            | 6511               | -1195        | -1100                         |
| 1998                  | -385         | -13459            | 15108           | -6117            | 6473               | -1289        | -1100                         |
| 1999                  | -550         | -13665            | 14990           | -6182            | 6568               | -1161        | -1100                         |
| <b>2000</b>           | <b>-787</b>  | <b>-13411</b>     | <b>14916</b>    | <b>-6332</b>     | <b>6455</b>        | <b>-1314</b> | <b>-1100</b>                  |
| 2001                  | -986         | -14009            | 14870           | -6426            | 6422               | -743         | -1100                         |
| 2002                  | -1489        | -14775            | 14869           | -6688            | 6339               | -133         | -1100                         |
| 2003                  | -1536        | -15418            | 14956           | -6489            | 6268               | 248          | -1100                         |
| 2004                  | -2397        | -16142            | 14766           | -6687            | 6221               | 544          | -1100                         |
| <b>2005</b>           | <b>-2939</b> | <b>-15607</b>     | <b>14471</b>    | <b>-6944</b>     | <b>6159</b>        | <b>83</b>    | <b>-1100</b>                  |
| 2006                  | -3492        | -14804            | 14243           | -7309            | 6038               | -560         | -1100                         |
| 2007                  | -3613        | -13779            | 14098           | -7386            | 5971               | -1417        | -1100                         |
| 2008                  | -3945        | -13251            | 13989           | -7571            | 5900               | -1912        | -1100                         |
| 2009                  | -4108        | -12433            | 13857           | -7662            | 5885               | -2655        | -1100                         |
| <b>2010</b>           | <b>-4466</b> | <b>-11037</b>     | <b>13311</b>    | <b>-7798</b>     | <b>5756</b>        | <b>-3598</b> | <b>-1100</b>                  |
| 2011                  | -4819        | -11355            | 12998           | -7915            | 5615               | -3062        | -1100                         |
| 2012                  | -4857        | -10859            | 12897           | -7998            | 5527               | -3323        | -1100                         |
| 2013                  | -4855        | -10105            | 12844           | -8089            | 5467               | -3873        | -1100                         |
| 2014                  | -4789        | -9888             | 12829           | -8178            | 5427               | -3879        | -1100                         |
| <b>2015</b>           | <b>-4625</b> | <b>-9467</b>      | <b>12810</b>    | <b>-8336</b>     | <b>5405</b>        | <b>-3937</b> | <b>-1100</b>                  |
| 2016                  | -4548        | -9562             | 12787           | -8414            | 5355               | -3614        | -1100                         |
| 2017                  | -4641        | -9843             | 12761           | -8596            | 5302               | -3165        | -1100                         |
| 2018                  | -4689        | -9965             | 12732           | -8647            | 5258               | -2968        | -1100                         |
| 2019                  | -4614        | -9176             | 12705           | -8727            | 5246               | -3560        | -1100                         |
| <b>2020</b>           | <b>-4208</b> | <b>-7672</b>      | <b>12678</b>    | <b>-8812</b>     | <b>5242</b>        | <b>-4545</b> | <b>-1100</b>                  |

| <b>C (High)<br/>UK</b> |              |                   |                 |                  |                    |              |                               |
|------------------------|--------------|-------------------|-----------------|------------------|--------------------|--------------|-------------------------------|
| <b>Gg CO2/year</b>     | <b>5</b>     | <b>5A</b>         | <b>5B</b>       | <b>5C</b>        | <b>5E</b>          | <b>5G</b>    | <b>5G</b>                     |
|                        | <b>NET</b>   | <b>Forestland</b> | <b>Cropland</b> | <b>Grassland</b> | <b>Settlements</b> | <b>HWP</b>   | <b>Non-forest<br/>biomass</b> |
| <b>1990</b>            | <b>2645</b>  | <b>-12226</b>     | <b>15543</b>    | <b>-4929</b>     | <b>6944</b>        | <b>-1587</b> | <b>-1100</b>                  |
| 1991                   | 2590         | -12616            | 15693           | -4886            | 6844               | -1344        | -1100                         |
| 1992                   | 2076         | -13118            | 15681           | -5003            | 6746               | -1130        | -1100                         |
| 1993                   | 899          | -13478            | 15286           | -5449            | 6699               | -1059        | -1100                         |
| 1994                   | 685          | -13858            | 15331           | -5393            | 6647               | -942         | -1100                         |
| <b>1995</b>            | <b>787</b>   | <b>-13727</b>     | <b>15442</b>    | <b>-5326</b>     | <b>6621</b>        | <b>-1123</b> | <b>-1100</b>                  |
| 1996                   | 616          | -13661            | 15406           | -5525            | 6593               | -1098        | -1100                         |
| 1997                   | 211          | -13527            | 15289           | -5766            | 6511               | -1195        | -1100                         |
| 1998                   | -385         | -13459            | 15108           | -6117            | 6473               | -1289        | -1100                         |
| 1999                   | -550         | -13665            | 14990           | -6182            | 6568               | -1161        | -1100                         |
| <b>2000</b>            | <b>-787</b>  | <b>-13411</b>     | <b>14916</b>    | <b>-6332</b>     | <b>6455</b>        | <b>-1314</b> | <b>-1100</b>                  |
| 2001                   | -986         | -14009            | 14870           | -6426            | 6422               | -743         | -1100                         |
| 2002                   | -1489        | -14775            | 14869           | -6688            | 6339               | -133         | -1100                         |
| 2003                   | -1536        | -15418            | 14956           | -6489            | 6268               | 248          | -1100                         |
| 2004                   | -1823        | -16020            | 15002           | -6561            | 6311               | 544          | -1100                         |
| <b>2005</b>            | <b>-1986</b> | <b>-15543</b>     | <b>14932</b>    | <b>-6699</b>     | <b>6341</b>        | <b>83</b>    | <b>-1100</b>                  |
| 2006                   | -2285        | -14917            | 14929           | -6946            | 6309               | -560         | -1100                         |
| 2007                   | -2013        | -13929            | 15006           | -6904            | 6330               | -1417        | -1100                         |
| 2008                   | -1805        | -13286            | 15117           | -6971            | 6347               | -1912        | -1100                         |
| 2009                   | -1303        | -12208            | 15202           | -6949            | 6408               | -2655        | -1100                         |
| <b>2010</b>            | <b>-270</b>  | <b>-10451</b>     | <b>15352</b>    | <b>-6957</b>     | <b>6483</b>        | <b>-3598</b> | <b>-1100</b>                  |
| 2011                   | 496          | -10366            | 15479           | -6964            | 6510               | -3062        | -1100                         |
| 2012                   | 1233         | -9469             | 15567           | -6954            | 6513               | -3323        | -1100                         |
| 2013                   | 1771         | -8334             | 15538           | -6988            | 6528               | -3873        | -1100                         |
| 2014                   | 2338         | -7761             | 15529           | -6999            | 6547               | -3879        | -1100                         |
| <b>2015</b>            | <b>3065</b>  | <b>-7004</b>      | <b>15588</b>    | <b>-7047</b>     | <b>6566</b>        | <b>-3937</b> | <b>-1100</b>                  |
| 2016                   | 3751         | -6779             | 15658           | -6960            | 6547               | -3614        | -1100                         |
| 2017                   | 4130         | -6749             | 15686           | -7067            | 6526               | -3165        | -1100                         |
| 2018                   | 4481         | -6566             | 15685           | -7081            | 6512               | -2968        | -1100                         |
| 2019                   | 4998         | -5472             | 15695           | -7095            | 6531               | -3560        | -1100                         |
| <b>2020</b>            | <b>5993</b>  | <b>-3659</b>      | <b>15723</b>    | <b>-6986</b>     | <b>6560</b>        | <b>-4545</b> | <b>-1100</b>                  |

| <b>D UK</b><br>Gg<br>CO2 | Changes in<br>woody<br>biomass       | HWP                | Forest<br>Conversion | Soils   | Other   | Other                 | NET Emission<br>(+)<br>Removal (-) |
|--------------------------|--------------------------------------|--------------------|----------------------|---|---|-----------------------|------------------------------------|
| 1990                     | -12226                               | -1587              | 164                  | 14952   | 2442  | -1100                 | 2645                               |
| 1991                     | -12616                               | -1344              | 137                  | 15098   | 2416  | -1100                 | 2590                               |
| 1992                     | -13118                               | -1130              | 107                  | 14948   | 2368  | -1100                 | 2076                               |
| 1993                     | -13478                               | -1059              | 124                  | 14091   | 2321  | -1100                 | 899                                |
| 1994                     | -13858                               | -942               | 132                  | 14061   | 2392  | -1100                 | 685                                |
| 1995                     | -13727                               | -1123              | 161                  | 14159   | 2417  | -1100                 | 787                                |
| 1996                     | -13661                               | -1098              | 185                  | 13990   | 2299  | -1100                 | 616                                |
| 1997                     | -13527                               | -1195              | 152                  | 13674   | 2208  | -1100                 | 211                                |
| 1998                     | -13459                               | -1289              | 159                  | 13244   | 2060  | -1100                 | -385                               |
| 1999                     | -13665                               | -1161              | 297                  | 12937   | 2142  | -1100                 | -550                               |
| 2000                     | -13411                               | -1314              | 223                  | 12716   | 2099  | -1100                 | -787                               |
| 2001                     | -14009                               | -743               | 228                  | 12522   | 2116  | -1100                 | -986                               |
| 2002                     | -14775                               | -133               | 180                  | 12418   | 1922  | -1100                 | -1489                              |
| 2003                     | -15418                               | 248                | 141                  | 12482   | 2111  | -1100                 | -1536                              |
| NIR<br>Format            | 5A<br>(Removals)                     | 5A<br>(Removals)   | 5B<br>(Emissions)    | 5D<br>(Emissions)                             | 5E<br>(Emissions)                                   | 5E<br>(Removals<br>)  |                                    |
|                          | Forest<br>biomass,<br>soils, litter. | Forest<br>products | Deforestation        | Effect of<br>LUC (Net),<br>liming of<br>soils | Drainage of<br>lowland<br>soils, peat<br>extraction | Non-forest<br>biomass |                                    |



Table A1. 2: England data for 2003 UK GHG Inventory: A: LULUCF GPG Format – with MID projection, B: LULUCF GPG Format – with LO projection, C: LULUCF GPG Format – with HI projection, D: “NIR” summary,. (Italics are projections) (HWP = Harvested Wood Products)

| <b>A (Mid)<br/>England</b> | <b>5</b>    | <b>5A</b>         | <b>5B</b>       | <b>5C</b>        | <b>5E</b>          | <b>5G</b>    | <b>5G<br/>Non-forest<br/>biomass</b> |
|----------------------------|-------------|-------------------|-----------------|------------------|--------------------|--------------|--------------------------------------|
| <b>Gg CO2/year</b>         | <b>NET</b>  | <b>Forestland</b> | <b>Cropland</b> | <b>Grassland</b> | <b>Settlements</b> | <b>HWP</b>   |                                      |
| <b>1990</b>                | <b>5659</b> | <b>-2632</b>      | <b>7949</b>     | <b>-2285</b>     | <b>4034</b>        | <b>-471</b>  | <b>-935</b>                          |
| 1991                       | 5759        | -2674             | 8036            | -2240            | 3955               | -384         | -935                                 |
| 1992                       | 5579        | -2731             | 7990            | -2321            | 3877               | -302         | -935                                 |
| 1993                       | 4938        | -2703             | 7622            | -2579            | 3837               | -303         | -935                                 |
| 1994                       | 4953        | -2725             | 7625            | -2541            | 3793               | -265         | -935                                 |
| <b>1995</b>                | <b>5085</b> | <b>-2654</b>      | <b>7685</b>     | <b>-2487</b>     | <b>3768</b>        | <b>-292</b>  | <b>-935</b>                          |
| 1996                       | 4889        | -2706             | 7622            | -2604            | 3742               | -230         | -935                                 |
| 1997                       | 4558        | -2668             | 7492            | -2727            | 3678               | -282         | -935                                 |
| 1998                       | 4136        | -2607             | 7309            | -2925            | 3645               | -352         | -935                                 |
| 1999                       | 4004        | -2663             | 7181            | -2969            | 3708               | -318         | -935                                 |
| <b>2000</b>                | <b>3765</b> | <b>-2664</b>      | <b>7090</b>     | <b>-3041</b>     | <b>3622</b>        | <b>-307</b>  | <b>-935</b>                          |
| 2001                       | 3623        | -2859             | 7025            | -3072            | 3594               | -130         | -935                                 |
| 2002                       | 3317        | -3080             | 6999            | -3242            | 3530               | 45           | -935                                 |
| 2003                       | 3328        | -3241             | 7049            | -3165            | 3475               | 146          | -935                                 |
| <i>2004</i>                | <i>3102</i> | <i>-3446</i>      | <i>6980</i>     | <i>-3232</i>     | <i>3469</i>        | <i>265</i>   | <i>-935</i>                          |
| <b>2005</b>                | <b>2837</b> | <b>-3346</b>      | <b>6813</b>     | <b>-3306</b>     | <b>3453</b>        | <b>158</b>   | <b>-935</b>                          |
| <i>2006</i>                | <i>2473</i> | <i>-3225</i>      | <i>6703</i>     | <i>-3489</i>     | <i>3395</i>        | <i>23</i>    | <i>-935</i>                          |
| <i>2007</i>                | <i>2394</i> | <i>-2888</i>      | <i>6661</i>     | <i>-3528</i>     | <i>3374</i>        | <i>-292</i>  | <i>-935</i>                          |
| <i>2008</i>                | <i>2311</i> | <i>-2659</i>      | <i>6648</i>     | <i>-3610</i>     | <i>3351</i>        | <i>-484</i>  | <i>-935</i>                          |
| <i>2009</i>                | <i>2366</i> | <i>-2488</i>      | <i>6615</i>     | <i>-3573</i>     | <i>3368</i>        | <i>-621</i>  | <i>-935</i>                          |
| <b>2010</b>                | <b>2368</b> | <b>-2286</b>      | <b>6561</b>     | <b>-3632</b>     | <b>3374</b>        | <b>-715</b>  | <b>-935</b>                          |
| <i>2011</i>                | <i>2295</i> | <i>-2423</i>      | <i>6529</i>     | <i>-3711</i>     | <i>3358</i>        | <i>-523</i>  | <i>-935</i>                          |
| <i>2012</i>                | <i>2181</i> | <i>-2247</i>      | <i>6483</i>     | <i>-3815</i>     | <i>3327</i>        | <i>-632</i>  | <i>-935</i>                          |
| <i>2013</i>                | <i>2181</i> | <i>-1573</i>      | <i>6405</i>     | <i>-3846</i>     | <i>3309</i>        | <i>-1179</i> | <i>-935</i>                          |
| <i>2014</i>                | <i>2225</i> | <i>-1530</i>      | <i>6386</i>     | <i>-3859</i>     | <i>3300</i>        | <i>-1137</i> | <i>-935</i>                          |
| <b>2015</b>                | <b>2291</b> | <b>-1341</b>      | <b>6375</b>     | <b>-3914</b>     | <b>3295</b>        | <b>-1188</b> | <b>-935</b>                          |
| <i>2016</i>                | <i>2283</i> | <i>-1331</i>      | <i>6365</i>     | <i>-3969</i>     | <i>3264</i>        | <i>-1110</i> | <i>-935</i>                          |
| <i>2017</i>                | <i>2222</i> | <i>-1425</i>      | <i>6355</i>     | <i>-4045</i>     | <i>3232</i>        | <i>-959</i>  | <i>-935</i>                          |
| <i>2018</i>                | <i>2241</i> | <i>-1505</i>      | <i>6345</i>     | <i>-4033</i>     | <i>3207</i>        | <i>-839</i>  | <i>-935</i>                          |
| <i>2019</i>                | <i>2243</i> | <i>-1471</i>      | <i>6335</i>     | <i>-4045</i>     | <i>3206</i>        | <i>-847</i>  | <i>-935</i>                          |
| <b>2020</b>                | <b>2385</b> | <b>-888</b>       | <b>6326</b>     | <b>-4063</b>     | <b>3213</b>        | <b>-1268</b> | <b>-935</b>                          |

| <b>B (Low)<br/>England</b> |                  |                          |                        |                         |                           |                   |                                      |
|----------------------------|------------------|--------------------------|------------------------|-------------------------|---------------------------|-------------------|--------------------------------------|
| <b>Gg CO2/year</b>         | <b>5<br/>NET</b> | <b>5A<br/>Forestland</b> | <b>5B<br/>Cropland</b> | <b>5C<br/>Grassland</b> | <b>5E<br/>Settlements</b> | <b>5G<br/>HWP</b> | <b>5G<br/>Non-forest<br/>biomass</b> |
| <b>1990</b>                | <b>5659</b>      | <b>-2632</b>             | <b>7949</b>            | <b>-2285</b>            | <b>4034</b>               | <b>-471</b>       | <b>-935</b>                          |
| 1991                       | 5759             | -2674                    | 8036                   | -2240                   | 3955                      | -384              | -935                                 |
| 1992                       | 5579             | -2731                    | 7989                   | -2320                   | 3877                      | -302              | -935                                 |
| 1993                       | 4938             | -2703                    | 7622                   | -2579                   | 3837                      | -303              | -935                                 |
| 1994                       | 4953             | -2725                    | 7625                   | -2541                   | 3793                      | -265              | -935                                 |
| <b>1995</b>                | <b>5085</b>      | <b>-2654</b>             | <b>7684</b>            | <b>-2487</b>            | <b>3768</b>               | <b>-292</b>       | <b>-935</b>                          |
| 1996                       | 4889             | -2706                    | 7622                   | -2604                   | 3742                      | -230              | -935                                 |
| 1997                       | 4558             | -2668                    | 7492                   | -2727                   | 3678                      | -282              | -935                                 |
| 1998                       | 4136             | -2607                    | 7309                   | -2924                   | 3645                      | -352              | -935                                 |
| 1999                       | 4004             | -2663                    | 7181                   | -2968                   | 3708                      | -318              | -935                                 |
| <b>2000</b>                | <b>3765</b>      | <b>-2664</b>             | <b>7090</b>            | <b>-3041</b>            | <b>3622</b>               | <b>-307</b>       | <b>-935</b>                          |
| 2001                       | 3623             | -2859                    | 7025                   | -3072                   | 3594                      | -130              | -935                                 |
| 2002                       | 3317             | -3080                    | 6999                   | -3242                   | 3530                      | 45                | -935                                 |
| 2003                       | 3328             | -3241                    | 7048                   | -3165                   | 3475                      | 146               | -935                                 |
| 2004                       | 2975             | -3474                    | 6924                   | -3238                   | 3433                      | 265               | -935                                 |
| <b>2005</b>                | <b>2618</b>      | <b>-3376</b>             | <b>6700</b>            | <b>-3311</b>            | <b>3382</b>               | <b>158</b>        | <b>-935</b>                          |
| 2006                       | 2175             | -3242                    | 6532                   | -3494                   | 3290                      | 23                | -935                                 |
| 2007                       | 1986             | -2922                    | 6433                   | -3534                   | 3235                      | -292              | -935                                 |
| 2008                       | 1760             | -2745                    | 6363                   | -3618                   | 3179                      | -484              | -935                                 |
| 2009                       | 1638             | -2659                    | 6272                   | -3583                   | 3164                      | -621              | -935                                 |
| <b>2010</b>                | <b>1123</b>      | <b>-2565</b>             | <b>5935</b>            | <b>-3667</b>            | <b>3070</b>               | <b>-715</b>       | <b>-935</b>                          |
| 2011                       | 671              | -2819                    | 5744                   | -3759                   | 2962                      | -523              | -935                                 |
| 2012                       | 425              | -2756                    | 5701                   | -3857                   | 2904                      | -632              | -935                                 |
| 2013                       | 362              | -2188                    | 5658                   | -3862                   | 2869                      | -1179             | -935                                 |
| 2014                       | 254              | -2245                    | 5613                   | -3886                   | 2843                      | -1137             | -935                                 |
| <b>2015</b>                | <b>163</b>       | <b>-2147</b>             | <b>5567</b>            | <b>-3957</b>            | <b>2823</b>               | <b>-1188</b>      | <b>-935</b>                          |
| 2016                       | 9                | -2224                    | 5520                   | -4028                   | 2785                      | -1110             | -935                                 |
| 2017                       | -196             | -2401                    | 5473                   | -4120                   | 2747                      | -959              | -935                                 |
| 2018                       | -319             | -2562                    | 5425                   | -4124                   | 2715                      | -839              | -935                                 |
| 2019                       | -459             | -2607                    | 5377                   | -4153                   | 2707                      | -847              | -935                                 |
| <b>2020</b>                | <b>-460</b>      | <b>-2104</b>             | <b>5330</b>            | <b>-4187</b>            | <b>2705</b>               | <b>-1268</b>      | <b>-935</b>                          |

| <b>C (High)<br/>England</b> | <b>5</b>    | <b>5A</b>         | <b>5B</b>       | <b>5C</b>        | <b>5E</b>          | <b>5G</b>    | <b>5G</b>                     |
|-----------------------------|-------------|-------------------|-----------------|------------------|--------------------|--------------|-------------------------------|
| <b>Gg CO2/year</b>          | <b>NET</b>  | <b>Forestland</b> | <b>Cropland</b> | <b>Grassland</b> | <b>Settlements</b> | <b>HWP</b>   | <b>Non-forest<br/>biomass</b> |
| <b>1990</b>                 | <b>5659</b> | <b>-2632</b>      | <b>7949</b>     | <b>-2285</b>     | <b>4034</b>        | <b>-471</b>  | <b>-935</b>                   |
| 1991                        | 5759        | -2674             | 8036            | -2240            | 3955               | -384         | -935                          |
| 1992                        | 5579        | -2731             | 7989            | -2320            | 3877               | -302         | -935                          |
| 1993                        | 4938        | -2703             | 7622            | -2579            | 3837               | -303         | -935                          |
| 1994                        | 4953        | -2725             | 7625            | -2541            | 3793               | -265         | -935                          |
| <b>1995</b>                 | <b>5085</b> | <b>-2654</b>      | <b>7684</b>     | <b>-2487</b>     | <b>3768</b>        | <b>-292</b>  | <b>-935</b>                   |
| 1996                        | 4889        | -2706             | 7622            | -2604            | 3742               | -230         | -935                          |
| 1997                        | 4558        | -2668             | 7492            | -2727            | 3678               | -282         | -935                          |
| 1998                        | 4136        | -2607             | 7309            | -2924            | 3645               | -352         | -935                          |
| 1999                        | 4004        | -2663             | 7181            | -2968            | 3708               | -318         | -935                          |
| <b>2000</b>                 | <b>3765</b> | <b>-2664</b>      | <b>7090</b>     | <b>-3041</b>     | <b>3622</b>        | <b>-307</b>  | <b>-935</b>                   |
| 2001                        | 3623        | -2859             | 7025            | -3072            | 3594               | -130         | -935                          |
| 2002                        | 3317        | -3080             | 6999            | -3242            | 3530               | 45           | -935                          |
| 2003                        | 3328        | -3241             | 7048            | -3165            | 3475               | 146          | -935                          |
| 2004                        | 3231        | -3429             | 7040            | -3212            | 3502               | 265          | -935                          |
| <b>2005</b>                 | <b>3082</b> | <b>-3328</b>      | <b>6933</b>     | <b>-3266</b>     | <b>3520</b>        | <b>158</b>   | <b>-935</b>                   |
| 2006                        | 2826        | -3215             | 6885            | -3427            | 3495               | 23           | -935                          |
| 2007                        | 2875        | -2867             | 6904            | -3444            | 3508               | -292         | -935                          |
| 2008                        | 2940        | -2608             | 6953            | -3503            | 3518               | -484         | -935                          |
| 2009                        | 3151        | -2387             | 6981            | -3442            | 3556               | -621         | -935                          |
| <b>2010</b>                 | <b>3425</b> | <b>-2122</b>      | <b>7053</b>     | <b>-3450</b>     | <b>3595</b>        | <b>-715</b>  | <b>-935</b>                   |
| 2011                        | 3594        | -2192             | 7127            | -3479            | 3595               | -523         | -935                          |
| 2012                        | 3710        | -1949             | 7178            | -3533            | 3581               | -632         | -935                          |
| 2013                        | 3859        | -1213             | 7122            | -3515            | 3579               | -1179        | -935                          |
| 2014                        | 3986        | -1113             | 7087            | -3504            | 3587               | -1137        | -935                          |
| <b>2015</b>                 | <b>4207</b> | <b>-870</b>       | <b>7108</b>     | <b>-3506</b>     | <b>3598</b>        | <b>-1188</b> | <b>-935</b>                   |
| 2016                        | 4366        | -809              | 7139            | -3503            | 3584               | -1110        | -935                          |
| 2017                        | 4412        | -854              | 7136            | -3544            | 3569               | -959         | -935                          |
| 2018                        | 4497        | -887              | 7109            | -3512            | 3561               | -839         | -935                          |
| 2019                        | 4578        | -806              | 7090            | -3500            | 3576               | -847         | -935                          |
| <b>2020</b>                 | <b>4822</b> | <b>-177</b>       | <b>7088</b>     | <b>-3485</b>     | <b>3599</b>        | <b>-1268</b> | <b>-935</b>                   |

| <b>D<br/>England<br/>Gg CO2</b> | <b>Changes in<br/>woody<br/>biomass</b> | <b>HWP</b>               | <b>Forest<br/>Conversion</b> | <b>Soils</b>                                  | <b>Other</b>  | <b>Other</b>             | <b>NET<br/>Emission (+)<br/>Removal (-)</b> |
|---------------------------------|---|--------------------------|------------------------------|---|---|--------------------------|---|
| 1990                            | -2632                                   | -471                     | 118                          | 7701  | 1879  | -935                     | 5659  |
| 1991                            | -2674                                   | -384                     | 98                           | 7793  | 1859  | -935                     | 5759  |
| 1992                            | -2731                                   | -302                     | 77                           | 7671  | 1798  | -935                     | 5579  |
| 1993                            | -2703                                   | -303                     | 89                           | 7032  | 1759  | -935                     | 4938  |
| 1994                            | -2725                                   | -265                     | 95                           | 6999  | 1784  | -935                     | 4953  |
| 1995                            | -2654                                   | -292                     | 116                          | 7061  | 1789  | -935                     | 5085  |
| 1996                            | -2706                                   | -230                     | 133                          | 6929  | 1699  | -935                     | 4889  |
| 1997                            | -2668                                   | -282                     | 109                          | 6689  | 1644  | -935                     | 4558  |
| 1998                            | -2607                                   | -352                     | 114                          | 6368  | 1548  | -935                     | 4136  |
| 1999                            | -2663                                   | -318                     | 213                          | 6137  | 1570  | -935                     | 4004  |
| 2000                            | -2664                                   | -307                     | 160                          | 5970  | 1540  | -935                     | 3765  |
| 2001                            | -2859                                   | -130                     | 163                          | 5824  | 1560  | -935                     | 3623  |
| 2002                            | -3080                                   | 45                       | 129                          | 5744  | 1414  | -935                     | 3317  |
| 2003                            | -3241                                   | 146                      | 101                          | 5789  | 1468  | -935                     | 3328  |
| <b>NIR<br/>Format</b>           | <b>5A<br/>(Removals)</b>                | <b>5A<br/>(Removals)</b> | <b>5B<br/>(Emissions)</b>    | <b>5D<br/>(Emissions)</b>                     | <b>5E<br/>(Emissions)</b>                           | <b>5E<br/>(Removals)</b> |   |
|                                 | Forest<br>biomass, soils,<br>litter.    | Forest<br>products       | Deforestation                | Effect of<br>LUC (Net),<br>liming of<br>soils | Drainage of<br>lowland<br>soils, peat<br>extraction | Non-forest<br>biomass    |   |

Table A1. 3: Scotland data for 2003 UK GHG Inventory: A: LULUCF GPG Format – with MID projection, B: LULUCF GPG Format – with LO projection, C: LULUCF GPG Format – with HI projection, D: “NIR” summary,. (Italics are projections) (HWP = Harvested Wood Products)

| <b>A (Mid)<br/>Scotland</b> | <b>5</b>     | <b>5A</b>         | <b>5B</b>       | <b>5C</b>        | <b>5E</b>          | <b>5G</b>    | <b>5G</b>                     |
|-----------------------------|--------------|-------------------|-----------------|------------------|--------------------|--------------|-------------------------------|
| <b>Gg CO2/year</b>          | <b>NET</b>   | <b>Forestland</b> | <b>Cropland</b> | <b>Grassland</b> | <b>Settlements</b> | <b>HWP</b>   | <b>Non-forest<br/>biomass</b> |
| <b>1990</b>                 | <b>-3049</b> | <b>-7528</b>      | <b>5357</b>     | <b>-1637</b>     | <b>1608</b>        | <b>-714</b>  | <b>-136</b>                   |
| 1991                        | -3249        | -7822             | 5422            | -1666            | 1589               | -635         | -136                          |
| 1992                        | -3583        | -8244             | 5463            | -1690            | 1570               | -546         | -136                          |
| 1993                        | -4013        | -8627             | 5451            | -1769            | 1562               | -495         | -136                          |
| 1994                        | -4265        | -9020             | 5496            | -1754            | 1554               | -406         | -136                          |
| <b>1995</b>                 | <b>-4359</b> | <b>-8998</b>      | <b>5549</b>     | <b>-1759</b>     | <b>1550</b>        | <b>-567</b>  | <b>-136</b>                   |
| 1996                        | -4360        | -8922             | 5581            | -1822            | 1546               | -607         | -136                          |
| 1997                        | -4420        | -8897             | 5600            | -1902            | 1530               | -615         | -136                          |
| 1998                        | -4561        | -8949             | 5609            | -2002            | 1523               | -607         | -136                          |
| 1999                        | -4595        | -9131             | 5626            | -1985            | 1546               | -516         | -136                          |
| <b>2000</b>                 | <b>-4611</b> | <b>-8911</b>      | <b>5647</b>     | <b>-2036</b>     | <b>1523</b>        | <b>-699</b>  | <b>-136</b>                   |
| 2001                        | -4667        | -9212             | 5670            | -2075            | 1518               | -431         | -136                          |
| 2002                        | -4853        | -9637             | 5697            | -2156            | 1501               | -122         | -136                          |
| 2003                        | -4906        | -10039            | 5735            | -2045            | 1486               | 93           | -136                          |
| 2004                        | -5204        | -10459            | 5753            | -2098            | 1487               | 247          | -136                          |
| <b>2005</b>                 | <b>-5275</b> | <b>-10129</b>     | <b>5755</b>     | <b>-2180</b>     | <b>1485</b>        | <b>-69</b>   | <b>-136</b>                   |
| 2006                        | -5374        | -9813             | 5764            | -2280            | 1469               | -379         | -136                          |
| 2007                        | -5284        | -9400             | 5784            | -2255            | 1465               | -742         | -136                          |
| 2008                        | -5317        | -9258             | 5807            | -2304            | 1460               | -887         | -136                          |
| 2009                        | -5270        | -8786             | 5826            | -2374            | 1468               | -1269        | -136                          |
| <b>2010</b>                 | <b>-4861</b> | <b>-7679</b>      | <b>5842</b>     | <b>-2401</b>     | <b>1472</b>        | <b>-1959</b> | <b>-136</b>                   |
| 2011                        | -4551        | -7584             | 5859            | -2408            | 1468               | -1750        | -136                          |
| 2012                        | -4177        | -7001             | 5872            | -2369            | 1461               | -2004        | -136                          |
| 2013                        | -3992        | -6710             | 5879            | -2432            | 1457               | -2050        | -136                          |
| 2014                        | -3754        | -6397             | 5895            | -2468            | 1456               | -2105        | -136                          |
| <b>2015</b>                 | <b>-3491</b> | <b>-6048</b>      | <b>5912</b>     | <b>-2549</b>     | <b>1456</b>        | <b>-2126</b> | <b>-136</b>                   |
| 2016                        | -3184        | -6047             | 5928            | -2502            | 1448               | -1875        | -136                          |
| 2017                        | -3054        | -6175             | 5944            | -2590            | 1439               | -1536        | -136                          |
| 2018                        | -2963        | -6179             | 5959            | -2649            | 1433               | -1391        | -136                          |
| 2019                        | -2745        | -5510             | 5973            | -2689            | 1434               | -1817        | -136                          |
| <b>2020</b>                 | <b>-2263</b> | <b>-4697</b>      | <b>5987</b>     | <b>-2618</b>     | <b>1438</b>        | <b>-2237</b> | <b>-136</b>                   |

| <b>B (Low)<br/>Scotland</b> |                  |                          |                        |                         |                           |                   |                                      |
|-----------------------------|------------------|--------------------------|------------------------|-------------------------|---------------------------|-------------------|--------------------------------------|
| <b>Gg CO2/year</b>          | <b>5<br/>NET</b> | <b>5A<br/>Forestland</b> | <b>5B<br/>Cropland</b> | <b>5C<br/>Grassland</b> | <b>5E<br/>Settlements</b> | <b>5G<br/>HWP</b> | <b>5G<br/>Non-forest<br/>biomass</b> |
| <b>1990</b>                 | <b>-3049</b>     | <b>-7528</b>             | <b>5357</b>            | <b>-1637</b>            | <b>1608</b>               | <b>-714</b>       | <b>-136</b>                          |
| 1991                        | -3249            | -7822                    | 5421                   | -1666                   | 1589                      | -635              | -136                                 |
| 1992                        | -3583            | -8244                    | 5463                   | -1690                   | 1570                      | -546              | -136                                 |
| 1993                        | -4013            | -8627                    | 5451                   | -1769                   | 1562                      | -495              | -136                                 |
| 1994                        | -4265            | -9020                    | 5496                   | -1754                   | 1554                      | -406              | -136                                 |
| <b>1995</b>                 | <b>-4359</b>     | <b>-8998</b>             | <b>5549</b>            | <b>-1759</b>            | <b>1550</b>               | <b>-567</b>       | <b>-136</b>                          |
| 1996                        | -4360            | -8922                    | 5580                   | -1822                   | 1546                      | -607              | -136                                 |
| 1997                        | -4420            | -8897                    | 5600                   | -1902                   | 1530                      | -615              | -136                                 |
| 1998                        | -4561            | -8949                    | 5609                   | -2002                   | 1523                      | -607              | -136                                 |
| 1999                        | -4595            | -9131                    | 5626                   | -1985                   | 1546                      | -516              | -136                                 |
| <b>2000</b>                 | <b>-4611</b>     | <b>-8911</b>             | <b>5647</b>            | <b>-2036</b>            | <b>1523</b>               | <b>-699</b>       | <b>-136</b>                          |
| 2001                        | -4667            | -9212                    | 5670                   | -2075                   | 1518                      | -431              | -136                                 |
| 2002                        | -4853            | -9637                    | 5697                   | -2156                   | 1501                      | -122              | -136                                 |
| 2003                        | -4906            | -10039                   | 5735                   | -2045                   | 1486                      | 93                | -136                                 |
| 2004                        | -5340            | -10500                   | 5687                   | -2124                   | 1485                      | 247               | -136                                 |
| <b>2005</b>                 | <b>-5476</b>     | <b>-10143</b>            | <b>5625</b>            | <b>-2232</b>            | <b>1479</b>               | <b>-69</b>        | <b>-136</b>                          |
| 2006                        | -5581            | -9741                    | 5574                   | -2358                   | 1458                      | -379              | -136                                 |
| 2007                        | -5541            | -9289                    | 5535                   | -2358                   | 1449                      | -742              | -136                                 |
| 2008                        | -5678            | -9164                    | 5503                   | -2432                   | 1438                      | -887              | -136                                 |
| 2009                        | -5783            | -8758                    | 5469                   | -2527                   | 1438                      | -1269             | -136                                 |
| <b>2010</b>                 | <b>-5684</b>     | <b>-7754</b>             | <b>5294</b>            | <b>-2554</b>            | <b>1425</b>               | <b>-1959</b>      | <b>-136</b>                          |
| 2011                        | -5628            | -7776                    | 5195                   | -2565                   | 1405                      | -1750             | -136                                 |
| 2012                        | -5455            | -7313                    | 5157                   | -2540                   | 1380                      | -2004             | -136                                 |
| 2013                        | -5414            | -7136                    | 5163                   | -2616                   | 1360                      | -2050             | -136                                 |
| 2014                        | -5294            | -6930                    | 5200                   | -2671                   | 1348                      | -2105             | -136                                 |
| <b>2015</b>                 | <b>-5117</b>     | <b>-6684</b>             | <b>5234</b>            | <b>-2749</b>            | <b>1344</b>               | <b>-2126</b>      | <b>-136</b>                          |
| 2016                        | -4943            | -6782                    | 5266                   | -2748                   | 1331                      | -1875             | -136                                 |
| 2017                        | -4896            | -7007                    | 5295                   | -2832                   | 1318                      | -1536             | -136                                 |
| 2018                        | -4877            | -7107                    | 5322                   | -2872                   | 1307                      | -1391             | -136                                 |
| 2019                        | -4750            | -6535                    | 5347                   | -2912                   | 1303                      | -1817             | -136                                 |
| <b>2020</b>                 | <b>-4472</b>     | <b>-5822</b>             | <b>5370</b>            | <b>-2947</b>            | <b>1300</b>               | <b>-2237</b>      | <b>-136</b>                          |

| <b>C (High)<br/>Scotland</b> |              |                   |                 |                  |                    |              |                               |
|------------------------------|--------------|-------------------|-----------------|------------------|--------------------|--------------|-------------------------------|
| <b>Gg CO2/year</b>           | <b>5</b>     | <b>5A</b>         | <b>5B</b>       | <b>5C</b>        | <b>5E</b>          | <b>5G</b>    | <b>5G</b>                     |
|                              | <b>NET</b>   | <b>Forestland</b> | <b>Cropland</b> | <b>Grassland</b> | <b>Settlements</b> | <b>HWP</b>   | <b>Non-forest<br/>biomass</b> |
| <b>1990</b>                  | <b>-3049</b> | <b>-7528</b>      | <b>5357</b>     | <b>-1637</b>     | <b>1608</b>        | <b>-714</b>  | <b>-136</b>                   |
| 1991                         | -3249        | -7822             | 5421            | -1666            | 1589               | -635         | -136                          |
| 1992                         | -3583        | -8244             | 5463            | -1690            | 1570               | -546         | -136                          |
| 1993                         | -4013        | -8627             | 5451            | -1769            | 1562               | -495         | -136                          |
| 1994                         | -4265        | -9020             | 5496            | -1754            | 1554               | -406         | -136                          |
| <b>1995</b>                  | <b>-4359</b> | <b>-8998</b>      | <b>5549</b>     | <b>-1759</b>     | <b>1550</b>        | <b>-567</b>  | <b>-136</b>                   |
| 1996                         | -4360        | -8922             | 5580            | -1822            | 1546               | -607         | -136                          |
| 1997                         | -4420        | -8897             | 5600            | -1902            | 1530               | -615         | -136                          |
| 1998                         | -4561        | -8949             | 5609            | -2002            | 1523               | -607         | -136                          |
| 1999                         | -4595        | -9131             | 5626            | -1985            | 1546               | -516         | -136                          |
| <b>2000</b>                  | <b>-4611</b> | <b>-8911</b>      | <b>5647</b>     | <b>-2036</b>     | <b>1523</b>        | <b>-699</b>  | <b>-136</b>                   |
| 2001                         | -4667        | -9212             | 5670            | -2075            | 1518               | -431         | -136                          |
| 2002                         | -4853        | -9637             | 5697            | -2156            | 1501               | -122         | -136                          |
| 2003                         | -4906        | -10039            | 5735            | -2045            | 1486               | 93           | -136                          |
| 2004                         | -5117        | -10433            | 5780            | -2069            | 1493               | 247          | -136                          |
| <b>2005</b>                  | <b>-5154</b> | <b>-10131</b>     | <b>5809</b>     | <b>-2123</b>     | <b>1496</b>        | <b>-69</b>   | <b>-136</b>                   |
| 2006                         | -5248        | -9871             | 5846            | -2195            | 1487               | -379         | -136                          |
| 2007                         | -5116        | -9479             | 5892            | -2142            | 1490               | -742         | -136                          |
| 2008                         | -5080        | -9329             | 5942            | -2163            | 1492               | -887         | -136                          |
| 2009                         | -4932        | -8817             | 5988            | -2205            | 1507               | -1269        | -136                          |
| <b>2010</b>                  | <b>-4377</b> | <b>-7649</b>      | <b>6045</b>     | <b>-2206</b>     | <b>1528</b>        | <b>-1959</b> | <b>-136</b>                   |
| 2011                         | -3938        | -7483             | 6077            | -2188            | 1542               | -1750        | -136                          |
| 2012                         | -3433        | -6828             | 6106            | -2122            | 1551               | -2004        | -136                          |
| 2013                         | -3122        | -6468             | 6129            | -2160            | 1563               | -2050        | -136                          |
| 2014                         | -2780        | -6090             | 6156            | -2175            | 1570               | -2105        | -136                          |
| <b>2015</b>                  | <b>-2407</b> | <b>-5680</b>      | <b>6190</b>     | <b>-2230</b>     | <b>1574</b>        | <b>-2126</b> | <b>-136</b>                   |
| 2016                         | -1990        | -5619             | 6226            | -2156            | 1570               | -1875        | -136                          |
| 2017                         | -1761        | -5690             | 6256            | -2221            | 1565               | -1536        | -136                          |
| 2018                         | -1581        | -5636             | 6282            | -2260            | 1560               | -1391        | -136                          |
| 2019                         | -1272        | -4909             | 6309            | -2280            | 1562               | -1817        | -136                          |
| <b>2020</b>                  | <b>-694</b>  | <b>-4038</b>      | <b>6337</b>     | <b>-2186</b>     | <b>1565</b>        | <b>-2237</b> | <b>-136</b>                   |

| <b>D<br/>Scotland<br/>Gg CO2</b> | Changes in<br>woody<br>biomass       | HWP                | Forest<br>Conversion | Soils   | Other   | Other                 | NET<br>Emission (+)<br>Removal (-) |
|----------------------------------|--------------------------------------|--------------------|----------------------|---|---|-----------------------|------------------------------------|
| 1990                             | -7528                                | -714               | 37                   | 5213  | 79  | -136                  | -3049                              |
| 1991                             | -7822                                | -635               | 31                   | 5241  | 73  | -136                  | -3249                              |
| 1992                             | -8244                                | -546               | 24                   | 5233  | 86  | -136                  | -3583                              |
| 1993                             | -8627                                | -495               | 28                   | 5138  | 78  | -136                  | -4013                              |
| 1994                             | -9020                                | -406               | 30                   | 5143  | 124   | -136                  | -4265                              |
| 1995                             | -8998                                | -567               | 36                   | 5161  | 143   | -136                  | -4359                              |
| 1996                             | -8922                                | -607               | 42                   | 5147  | 116   | -136                  | -4360                              |
| 1997                             | -8897                                | -615               | 34                   | 5114  | 80  | -136                  | -4420                              |
| 1998                             | -8949                                | -607               | 36                   | 5066  | 28  | -136                  | -4561                              |
| 1999                             | -9131                                | -516               | 67                   | 5033  | 88  | -136                  | -4595                              |
| 2000                             | -8911                                | -699               | 50                   | 5009  | 75  | -136                  | -4611                              |
| 2001                             | -9212                                | -431               | 51                   | 4988  | 73  | -136                  | -4667                              |
| 2002                             | -9637                                | -122               | 40                   | 4977  | 24  | -136                  | -4853                              |
| 2003                             | -10039                               | 93                 | 32                   | 4985  | 159   | -136                  | -4906                              |
| NIR Format                       | 5A<br>(Removals)                     | 5A<br>(Removals)   | 5B<br>(Emissions)    | 5D<br>(Emissions)                             | 5E<br>(Emissions)                                   | 5E<br>(Removals)      |                                    |
|                                  | Forest<br>biomass, soils,<br>litter. | Forest<br>products | Deforestation        | Effect of<br>LUC (Net),<br>liming of<br>soils | Drainage of<br>lowland<br>soils, peat<br>extraction | Non-forest<br>biomass |                                    |



Table A1. 4: Wales data for 2003 UK GHG Inventory: A: LULUCF GPG Format – with MID projection, B: LULUCF GPG Format – with LO projection, C: LULUCF GPG Format – with HI projection, D: “NIR” summary,. (Italics are projections) (HWP = Harvested Wood Products)

| <b>A (Mid)<br/>Wales</b> | <b>5</b>    | <b>5A</b>         | <b>5B</b>       | <b>5C</b>        | <b>5E</b>          | <b>5G</b>   | <b>5G</b>                     |
|--------------------------|-------------|-------------------|-----------------|------------------|--------------------|-------------|-------------------------------|
| <b>Gg CO2/year</b>       | <b>NET</b>  | <b>Forestland</b> | <b>Cropland</b> | <b>Grassland</b> | <b>Settlements</b> | <b>HWP</b>  | <b>Non-forest<br/>biomass</b> |
| <b>1990</b>              | <b>-344</b> | <b>-1337</b>      | <b>970</b>      | <b>-344</b>      | <b>727</b>         | <b>-347</b> | <b>-15</b>                    |
| 1991                     | -293        | -1367             | 979             | -331             | 723                | -283        | -15                           |
| 1992                     | -280        | -1393             | 985             | -341             | 719                | -236        | -15                           |
| 1993                     | -326        | -1386             | 986             | -404             | 717                | -223        | -15                           |
| 1994                     | -305        | -1393             | 992             | -406             | 715                | -199        | -15                           |
| <b>1995</b>              | <b>-242</b> | <b>-1324</b>      | <b>999</b>      | <b>-397</b>      | <b>715</b>         | <b>-220</b> | <b>-15</b>                    |
| 1996                     | -206        | -1310             | 1004            | -410             | 714                | -190        | -15                           |
| 1997                     | -193        | -1247             | 1008            | -433             | 711                | -216        | -15                           |
| 1998                     | -192        | -1186             | 1010            | -466             | 710                | -246        | -15                           |
| 1999                     | -176        | -1163             | 1013            | -489             | 716                | -239        | -15                           |
| <b>2000</b>              | <b>-144</b> | <b>-1120</b>      | <b>1017</b>     | <b>-506</b>      | <b>711</b>         | <b>-231</b> | <b>-15</b>                    |
| 2001                     | -129        | -1200             | 1021            | -521             | 710                | -124        | -15                           |
| 2002                     | -129        | -1295             | 1025            | -530             | 706                | -21         | -15                           |
| 2003                     | -137        | -1393             | 1030            | -525             | 703                | 62          | -15                           |
| <i>2004</i>              | <i>-166</i> | <i>-1460</i>      | <i>1034</i>     | <i>-541</i>      | <i>703</i>         | <i>112</i>  | <i>-15</i>                    |
| <b>2005</b>              | <b>-169</b> | <b>-1379</b>      | <b>1035</b>     | <b>-572</b>      | <b>703</b>         | <b>59</b>   | <b>-15</b>                    |
| <i>2006</i>              | <i>-147</i> | <i>-1177</i>      | <i>1037</i>     | <i>-594</i>      | <i>700</i>         | <i>-98</i>  | <i>-15</i>                    |
| <i>2007</i>              | <i>-96</i>  | <i>-950</i>       | <i>1040</i>     | <i>-605</i>      | <i>699</i>         | <i>-266</i> | <i>-15</i>                    |
| <i>2008</i>              | <i>-46</i>  | <i>-787</i>       | <i>1044</i>     | <i>-610</i>      | <i>698</i>         | <i>-376</i> | <i>-15</i>                    |
| <i>2009</i>              | <i>36</i>   | <i>-500</i>       | <i>1047</i>     | <i>-619</i>      | <i>701</i>         | <i>-578</i> | <i>-15</i>                    |
| <b>2010</b>              | <b>158</b>  | <b>-200</b>       | <b>1049</b>     | <b>-631</b>      | <b>702</b>         | <b>-747</b> | <b>-15</b>                    |
| <i>2011</i>              | <i>248</i>  | <i>-163</i>       | <i>1051</i>     | <i>-642</i>      | <i>702</i>         | <i>-687</i> | <i>-15</i>                    |
| <i>2012</i>              | <i>305</i>  | <i>-228</i>       | <i>1053</i>     | <i>-655</i>      | <i>701</i>         | <i>-551</i> | <i>-15</i>                    |
| <i>2013</i>              | <i>339</i>  | <i>-249</i>       | <i>1055</i>     | <i>-673</i>      | <i>700</i>         | <i>-479</i> | <i>-15</i>                    |
| <i>2014</i>              | <i>391</i>  | <i>-205</i>       | <i>1057</i>     | <i>-681</i>      | <i>700</i>         | <i>-465</i> | <i>-15</i>                    |
| <b>2015</b>              | <b>476</b>  | <b>-110</b>       | <b>1059</b>     | <b>-688</b>      | <b>700</b>         | <b>-471</b> | <b>-15</b>                    |
| <i>2016</i>              | <i>530</i>  | <i>-90</i>        | <i>1062</i>     | <i>-694</i>      | <i>698</i>         | <i>-431</i> | <i>-15</i>                    |
| <i>2017</i>              | <i>582</i>  | <i>-27</i>        | <i>1064</i>     | <i>-701</i>      | <i>696</i>         | <i>-436</i> | <i>-15</i>                    |
| <i>2018</i>              | <i>620</i>  | <i>-3</i>         | <i>1066</i>     | <i>-707</i>      | <i>695</i>         | <i>-416</i> | <i>-15</i>                    |
| <i>2019</i>              | <i>692</i>  | <i>223</i>        | <i>1068</i>     | <i>-713</i>      | <i>695</i>         | <i>-567</i> | <i>-15</i>                    |
| <b>2020</b>              | <b>812</b>  | <b>510</b>        | <b>1070</b>     | <b>-719</b>      | <b>697</b>         | <b>-731</b> | <b>-15</b>                    |

| <b>B (Low)<br/>Wales</b> |                  |                          |                        |                         |                           |                   |                                      |
|--------------------------|------------------|--------------------------|------------------------|-------------------------|---------------------------|-------------------|--------------------------------------|
| <b>Gg CO2/year</b>       | <b>5<br/>NET</b> | <b>5A<br/>Forestland</b> | <b>5B<br/>Cropland</b> | <b>5C<br/>Grassland</b> | <b>5E<br/>Settlements</b> | <b>5G<br/>HWP</b> | <b>5G<br/>Non-forest<br/>biomass</b> |
| <b>1990</b>              | <b>-344</b>      | <b>-1337</b>             | <b>971</b>             | <b>-344</b>             | <b>727</b>                | <b>-347</b>       | <b>-15</b>                           |
| 1991                     | -293             | -1367                    | 979                    | -331                    | 723                       | -283              | -15                                  |
| 1992                     | -280             | -1393                    | 985                    | -341                    | 719                       | -236              | -15                                  |
| 1993                     | -326             | -1386                    | 986                    | -404                    | 717                       | -223              | -15                                  |
| 1994                     | -305             | -1393                    | 992                    | -406                    | 715                       | -199              | -15                                  |
| <b>1995</b>              | <b>-242</b>      | <b>-1324</b>             | <b>999</b>             | <b>-397</b>             | <b>715</b>                | <b>-220</b>       | <b>-15</b>                           |
| 1996                     | -206             | -1310                    | 1004                   | -410                    | 714                       | -190              | -15                                  |
| 1997                     | -193             | -1247                    | 1008                   | -433                    | 711                       | -216              | -15                                  |
| 1998                     | -192             | -1186                    | 1010                   | -466                    | 710                       | -246              | -15                                  |
| 1999                     | -176             | -1163                    | 1013                   | -489                    | 716                       | -239              | -15                                  |
| <b>2000</b>              | <b>-144</b>      | <b>-1120</b>             | <b>1017</b>            | <b>-506</b>             | <b>711</b>                | <b>-231</b>       | <b>-15</b>                           |
| 2001                     | -129             | -1200                    | 1021                   | -521                    | 710                       | -124              | -15                                  |
| 2002                     | -129             | -1295                    | 1025                   | -530                    | 706                       | -21               | -15                                  |
| 2003                     | -137             | -1393                    | 1031                   | -525                    | 703                       | 62                | -15                                  |
| 2004                     | -187             | -1462                    | 1023                   | -543                    | 697                       | 112               | -15                                  |
| <b>2005</b>              | <b>-199</b>      | <b>-1381</b>             | <b>1024</b>            | <b>-577</b>             | <b>691</b>                | <b>59</b>         | <b>-15</b>                           |
| 2006                     | -187             | -1178                    | 1025                   | -602                    | 681                       | -98               | -15                                  |
| 2007                     | -144             | -952                     | 1027                   | -615                    | 678                       | -266              | -15                                  |
| 2008                     | -104             | -792                     | 1028                   | -623                    | 674                       | -376              | -15                                  |
| 2009                     | -35              | -510                     | 1029                   | -634                    | 673                       | -578              | -15                                  |
| <b>2010</b>              | <b>45</b>        | <b>-216</b>              | <b>1009</b>            | <b>-653</b>             | <b>668</b>                | <b>-747</b>       | <b>-15</b>                           |
| 2011                     | 106              | -185                     | 997                    | -666                    | 661                       | -687              | -15                                  |
| 2012                     | 141              | -257                     | 985                    | -676                    | 654                       | -551              | -15                                  |
| 2013                     | 167              | -284                     | 980                    | -686                    | 649                       | -479              | -15                                  |
| 2014                     | 209              | -245                     | 982                    | -696                    | 647                       | -465              | -15                                  |
| <b>2015</b>              | <b>287</b>       | <b>-155</b>              | <b>984</b>             | <b>-705</b>             | <b>650</b>                | <b>-471</b>       | <b>-15</b>                           |
| 2016                     | 337              | -140                     | 986                    | -713                    | 650                       | -431              | -15                                  |
| 2017                     | 385              | -81                      | 987                    | -719                    | 649                       | -436              | -15                                  |
| 2018                     | 418              | -62                      | 987                    | -725                    | 649                       | -416              | -15                                  |
| 2019                     | 485              | 160                      | 988                    | -732                    | 650                       | -567              | -15                                  |
| <b>2020</b>              | <b>602</b>       | <b>443</b>               | <b>991</b>             | <b>-738</b>             | <b>652</b>                | <b>-731</b>       | <b>-15</b>                           |

| <b>C (High)<br/>Wales</b> |             |                   |                 |                  |                    |             |                               |
|---------------------------|-------------|-------------------|-----------------|------------------|--------------------|-------------|-------------------------------|
| <b>Gg CO2/year</b>        | <b>5</b>    | <b>5A</b>         | <b>5B</b>       | <b>5C</b>        | <b>5E</b>          | <b>5G</b>   | <b>5G</b>                     |
|                           | <b>NET</b>  | <b>Forestland</b> | <b>Cropland</b> | <b>Grassland</b> | <b>Settlements</b> | <b>HWP</b>  | <b>Non-forest<br/>biomass</b> |
| <b>1990</b>               | <b>-344</b> | <b>-1337</b>      | <b>971</b>      | <b>-344</b>      | <b>727</b>         | <b>-347</b> | <b>-15</b>                    |
| 1991                      | -293        | -1367             | 979             | -331             | 723                | -283        | -15                           |
| 1992                      | -280        | -1393             | 985             | -341             | 719                | -236        | -15                           |
| 1993                      | -326        | -1386             | 986             | -404             | 717                | -223        | -15                           |
| 1994                      | -305        | -1393             | 992             | -406             | 715                | -199        | -15                           |
| <b>1995</b>               | <b>-242</b> | <b>-1324</b>      | <b>999</b>      | <b>-397</b>      | <b>715</b>         | <b>-220</b> | <b>-15</b>                    |
| 1996                      | -206        | -1310             | 1004            | -410             | 714                | -190        | -15                           |
| 1997                      | -193        | -1247             | 1008            | -433             | 711                | -216        | -15                           |
| 1998                      | -192        | -1186             | 1010            | -466             | 710                | -246        | -15                           |
| 1999                      | -176        | -1163             | 1013            | -489             | 716                | -239        | -15                           |
| <b>2000</b>               | <b>-144</b> | <b>-1120</b>      | <b>1017</b>     | <b>-506</b>      | <b>711</b>         | <b>-231</b> | <b>-15</b>                    |
| 2001                      | -129        | -1200             | 1021            | -521             | 710                | -124        | -15                           |
| 2002                      | -129        | -1295             | 1025            | -530             | 706                | -21         | -15                           |
| 2003                      | -137        | -1393             | 1031            | -525             | 703                | 62          | -15                           |
| 2004                      | -152        | -1459             | 1036            | -537             | 711                | 112         | -15                           |
| <b>2005</b>               | <b>-141</b> | <b>-1378</b>      | <b>1040</b>     | <b>-566</b>      | <b>718</b>         | <b>59</b>   | <b>-15</b>                    |
| 2006                      | -110        | -1176             | 1045            | -584             | 718                | -98         | -15                           |
| 2007                      | -48         | -949              | 1051            | -591             | 721                | -266        | -15                           |
| 2008                      | 14          | -784              | 1058            | -592             | 722                | -376        | -15                           |
| 2009                      | 109         | -493              | 1064            | -597             | 728                | -578        | -15                           |
| <b>2010</b>               | <b>272</b>  | <b>-188</b>       | <b>1088</b>     | <b>-600</b>      | <b>734</b>         | <b>-747</b> | <b>-15</b>                    |
| 2011                      | 401         | -146              | 1112            | -603             | 739                | -687        | -15                           |
| 2012                      | 486         | -207              | 1122            | -607             | 743                | -551        | -15                           |
| 2013                      | 543         | -223              | 1130            | -617             | 746                | -479        | -15                           |
| 2014                      | 607         | -175              | 1134            | -624             | 751                | -465        | -15                           |
| <b>2015</b>               | <b>711</b>  | <b>-76</b>        | <b>1138</b>     | <b>-621</b>      | <b>755</b>         | <b>-471</b> | <b>-15</b>                    |
| 2016                      | 783         | -52               | 1142            | -617             | 754                | -431        | -15                           |
| 2017                      | 845         | 15                | 1145            | -618             | 753                | -436        | -15                           |
| 2018                      | 888         | 42                | 1148            | -624             | 753                | -416        | -15                           |
| 2019                      | 968         | 272               | 1150            | -628             | 754                | -567        | -15                           |
| <b>2020</b>               | <b>1097</b> | <b>563</b>        | <b>1153</b>     | <b>-629</b>      | <b>757</b>         | <b>-731</b> | <b>-15</b>                    |

| <b>D<br/>Wales</b><br>Gg CO2 | Changes in<br>woody<br>biomass       | HWP                      | Forest<br>Conversion      | Soils   | Other   | Other                    | NET<br>Emission (+)<br>Removal (-) |
|------------------------------|--------------------------------------|--------------------------|---------------------------|---|---|--------------------------|------------------------------------|
| 1990                         | -1337                                | -347                     | 9                         | 1345  | 0   | -15                      | -344                               |
| 1991                         | -1367                                | -283                     | 8                         | 1364  | 0   | -15                      | -293                               |
| 1992                         | -1393                                | -236                     | 6                         | 1357  | 0   | -15                      | -280                               |
| 1993                         | -1386                                | -223                     | 7                         | 1291  | 0   | -15                      | -326                               |
| 1994                         | -1393                                | -199                     | 7                         | 1294  | 0   | -15                      | -305                               |
| 1995                         | -1324                                | -220                     | 9                         | 1308  | 0   | -15                      | -242                               |
| 1996                         | -1310                                | -190                     | 11                        | 1299  | 0   | -15                      | -206                               |
| 1997                         | -1247                                | -216                     | 9                         | 1277  | 0   | -15                      | -193                               |
| 1998                         | -1186                                | -246                     | 9                         | 1245  | 0   | -15                      | -192                               |
| 1999                         | -1163                                | -239                     | 17                        | 1224  | 0   | -15                      | -176                               |
| 2000                         | -1120                                | -231                     | 13                        | 1209  | 0   | -15                      | -144                               |
| 2001                         | -1200                                | -124                     | 13                        | 1197  | 0   | -15                      | -129                               |
| 2002                         | -1295                                | -21                      | 10                        | 1191  | 0   | -15                      | -129                               |
| 2003                         | -1393                                | 62                       | 8                         | 1200  | 0   | -15                      | -137                               |
| <b>NIR<br/>Format</b>        | <b>5A<br/>(Removals)</b>             | <b>5A<br/>(Removals)</b> | <b>5B<br/>(Emissions)</b> | <b>5D<br/>(Emissions)</b>                     | <b>5E<br/>(Emissions)</b>                           | <b>5E<br/>(Removals)</b> |                                    |
|                              | Forest<br>biomass, soils,<br>litter. | Forest<br>products       | Deforestation             | Effect of<br>LUC (Net),<br>liming of<br>soils | Drainage of<br>lowland<br>soils, peat<br>extraction | Non-forest<br>biomass    |                                    |

Table A1. 5: Northern Ireland data for 2003 UK GHG Inventory: A: LULUCF GPG Format – with MID projection, B: LULUCF GPG Format – with LO projection, C: LULUCF GPG Format – with HI projection, D: “NIR” summary,. (Italics are projections) (HWP = Harvested Wood Products)

| <b>A (Mid)<br/>N. Ireland</b> | <b>5</b>   | <b>5A</b>         | <b>5B</b>       | <b>5C</b>        | <b>5E</b>          | <b>5G</b>   | <b>5G</b>                     |
|-------------------------------|------------|-------------------|-----------------|------------------|--------------------|-------------|-------------------------------|
| <b>Gg CO2/year</b>            | <b>NET</b> | <b>Forestland</b> | <b>Cropland</b> | <b>Grassland</b> | <b>Settlements</b> | <b>HWP</b>  | <b>Non-forest<br/>biomass</b> |
| <b>1990</b>                   | <b>379</b> | <b>-729</b>       | <b>1267</b>     | <b>-664</b>      | <b>574</b>         | <b>-55</b>  | <b>-15</b>                    |
| 1991                          | 373        | -753              | 1256            | -649             | 577                | -43         | -15                           |
| 1992                          | 361        | -750              | 1244            | -652             | 580                | -46         | -15                           |
| 1993                          | 300        | -762              | 1228            | -696             | 583                | -38         | -15                           |
| 1994                          | 301        | -720              | 1218            | -693             | 585                | -73         | -15                           |
| <b>1995</b>                   | <b>304</b> | <b>-751</b>       | <b>1209</b>     | <b>-684</b>      | <b>588</b>         | <b>-44</b>  | <b>-15</b>                    |
| 1996                          | 293        | -722              | 1199            | -689             | 590                | -71         | -15                           |
| 1997                          | 266        | -715              | 1189            | -704             | 593                | -83         | -15                           |
| 1998                          | 232        | -718              | 1179            | -725             | 595                | -84         | -15                           |
| 1999                          | 217        | -707              | 1170            | -740             | 597                | -89         | -15                           |
| <b>2000</b>                   | <b>203</b> | <b>-717</b>       | <b>1162</b>     | <b>-749</b>      | <b>599</b>         | <b>-77</b>  | <b>-15</b>                    |
| 2001                          | 187        | -738              | 1154            | -757             | 600                | -58         | -15                           |
| 2002                          | 176        | -763              | 1147            | -760             | 602                | -36         | -15                           |
| 2003                          | 179        | -745              | 1142            | -754             | 604                | -53         | -15                           |
| <i>2004</i>                   | <i>181</i> | <i>-702</i>       | <i>1135</i>     | <i>-763</i>      | <i>605</i>         | <i>-80</i>  | <i>-15</i>                    |
| <b>2005</b>                   | <b>164</b> | <b>-706</b>       | <b>1128</b>     | <b>-784</b>      | <b>607</b>         | <b>-66</b>  | <b>-15</b>                    |
| <i>2006</i>                   | <i>160</i> | <i>-650</i>       | <i>1121</i>     | <i>-798</i>      | <i>608</i>         | <i>-107</i> | <i>-15</i>                    |
| <i>2007</i>                   | <i>164</i> | <i>-627</i>       | <i>1116</i>     | <i>-803</i>      | <i>609</i>         | <i>-117</i> | <i>-15</i>                    |
| <i>2008</i>                   | <i>179</i> | <i>-559</i>       | <i>1111</i>     | <i>-804</i>      | <i>610</i>         | <i>-165</i> | <i>-15</i>                    |
| <i>2009</i>                   | <i>199</i> | <i>-509</i>       | <i>1107</i>     | <i>-809</i>      | <i>611</i>         | <i>-187</i> | <i>-15</i>                    |
| <b>2010</b>                   | <b>211</b> | <b>-496</b>       | <b>1102</b>     | <b>-816</b>      | <b>613</b>         | <b>-177</b> | <b>-15</b>                    |
| <i>2011</i>                   | <i>213</i> | <i>-558</i>       | <i>1098</i>     | <i>-822</i>      | <i>614</i>         | <i>-103</i> | <i>-15</i>                    |
| <i>2012</i>                   | <i>221</i> | <i>-506</i>       | <i>1093</i>     | <i>-829</i>      | <i>615</i>         | <i>-136</i> | <i>-15</i>                    |
| <i>2013</i>                   | <i>225</i> | <i>-459</i>       | <i>1089</i>     | <i>-841</i>      | <i>615</i>         | <i>-165</i> | <i>-15</i>                    |
| <i>2014</i>                   | <i>249</i> | <i>-420</i>       | <i>1085</i>     | <i>-845</i>      | <i>616</i>         | <i>-173</i> | <i>-15</i>                    |
| <b>2015</b>                   | <b>261</b> | <b>-423</b>       | <b>1082</b>     | <b>-848</b>      | <b>617</b>         | <b>-152</b> | <b>-15</b>                    |
| <i>2016</i>                   | <i>282</i> | <i>-350</i>       | <i>1079</i>     | <i>-852</i>      | <i>618</i>         | <i>-198</i> | <i>-15</i>                    |
| <i>2017</i>                   | <i>313</i> | <i>-278</i>       | <i>1076</i>     | <i>-855</i>      | <i>619</i>         | <i>-234</i> | <i>-15</i>                    |
| <i>2018</i>                   | <i>348</i> | <i>-150</i>       | <i>1073</i>     | <i>-857</i>      | <i>619</i>         | <i>-322</i> | <i>-15</i>                    |
| <i>2019</i>                   | <i>386</i> | <i>-100</i>       | <i>1070</i>     | <i>-860</i>      | <i>620</i>         | <i>-329</i> | <i>-15</i>                    |
| <b>2020</b>                   | <b>417</b> | <b>-85</b>        | <b>1068</b>     | <b>-863</b>      | <b>621</b>         | <b>-308</b> | <b>-15</b>                    |

| <b>B (Low)<br/>N. Ireland</b> |                  |                          |                        |                         |                           |                   |                                      |
|-------------------------------|------------------|--------------------------|------------------------|-------------------------|---------------------------|-------------------|--------------------------------------|
| <b>Gg CO2/year</b>            | <b>5<br/>NET</b> | <b>5A<br/>Forestland</b> | <b>5B<br/>Cropland</b> | <b>5C<br/>Grassland</b> | <b>5E<br/>Settlements</b> | <b>5G<br/>HWP</b> | <b>5G<br/>Non-forest<br/>biomass</b> |
| <b>1990</b>                   | <b>379</b>       | <b>-729</b>              | <b>1267</b>            | <b>-663</b>             | <b>574</b>                | <b>-55</b>        | <b>-15</b>                           |
| 1991                          | 373              | -753                     | 1256                   | -649                    | 577                       | -43               | -15                                  |
| 1992                          | 361              | -750                     | 1244                   | -652                    | 580                       | -46               | -15                                  |
| 1993                          | 300              | -762                     | 1228                   | -696                    | 583                       | -38               | -15                                  |
| 1994                          | 301              | -720                     | 1218                   | -693                    | 585                       | -73               | -15                                  |
| <b>1995</b>                   | <b>304</b>       | <b>-751</b>              | <b>1209</b>            | <b>-684</b>             | <b>588</b>                | <b>-44</b>        | <b>-15</b>                           |
| 1996                          | 293              | -722                     | 1199                   | -689                    | 590                       | -71               | -15                                  |
| 1997                          | 266              | -715                     | 1189                   | -704                    | 593                       | -83               | -15                                  |
| 1998                          | 232              | -718                     | 1179                   | -725                    | 595                       | -84               | -15                                  |
| 1999                          | 217              | -707                     | 1170                   | -740                    | 597                       | -89               | -15                                  |
| <b>2000</b>                   | <b>203</b>       | <b>-717</b>              | <b>1162</b>            | <b>-749</b>             | <b>599</b>                | <b>-77</b>        | <b>-15</b>                           |
| 2001                          | 187              | -738                     | 1154                   | -757                    | 600                       | -58               | -15                                  |
| 2002                          | 176              | -763                     | 1147                   | -760                    | 602                       | -36               | -15                                  |
| 2003                          | 179              | -745                     | 1142                   | -754                    | 604                       | -53               | -15                                  |
| 2004                          | 155              | -706                     | 1133                   | -783                    | 606                       | -80               | -15                                  |
| <b>2005</b>                   | <b>119</b>       | <b>-707</b>              | <b>1122</b>            | <b>-824</b>             | <b>608</b>                | <b>-66</b>        | <b>-15</b>                           |
| 2006                          | 100              | -643                     | 1112                   | -856                    | 609                       | -107              | -15                                  |
| 2007                          | 85               | -616                     | 1103                   | -879                    | 609                       | -117              | -15                                  |
| 2008                          | 78               | -549                     | 1095                   | -898                    | 609                       | -165              | -15                                  |
| 2009                          | 71               | -506                     | 1087                   | -918                    | 609                       | -187              | -15                                  |
| <b>2010</b>                   | <b>49</b>        | <b>-502</b>              | <b>1073</b>            | <b>-923</b>             | <b>593</b>                | <b>-177</b>       | <b>-15</b>                           |
| 2011                          | 33               | -575                     | 1063                   | -925                    | 588                       | -103              | -15                                  |
| 2012                          | 32               | -534                     | 1053                   | -925                    | 588                       | -136              | -15                                  |
| 2013                          | 31               | -497                     | 1043                   | -925                    | 589                       | -165              | -15                                  |
| 2014                          | 43               | -468                     | 1034                   | -925                    | 589                       | -173              | -15                                  |
| <b>2015</b>                   | <b>41</b>        | <b>-480</b>              | <b>1024</b>            | <b>-925</b>             | <b>589</b>                | <b>-152</b>       | <b>-15</b>                           |
| 2016                          | 49               | -416                     | 1015                   | -925                    | 588                       | -198              | -15                                  |
| 2017                          | 66               | -354                     | 1006                   | -925                    | 588                       | -234              | -15                                  |
| 2018                          | 88               | -234                     | 997                    | -925                    | 587                       | -322              | -15                                  |
| 2019                          | 111              | -194                     | 992                    | -930                    | 586                       | -329              | -15                                  |
| <b>2020</b>                   | <b>122</b>       | <b>-188</b>              | <b>987</b>             | <b>-940</b>             | <b>585</b>                | <b>-308</b>       | <b>-15</b>                           |

| <b>C (High)<br/>N. Ireland</b> |            |                   |                 |                  |                    |             |                               |
|--------------------------------|------------|-------------------|-----------------|------------------|--------------------|-------------|-------------------------------|
| <b>Gg CO2/year</b>             | <b>5</b>   | <b>5A</b>         | <b>5B</b>       | <b>5C</b>        | <b>5E</b>          | <b>5G</b>   | <b>5G</b>                     |
|                                | <b>NET</b> | <b>Forestland</b> | <b>Cropland</b> | <b>Grassland</b> | <b>Settlements</b> | <b>HWP</b>  | <b>Non-forest<br/>biomass</b> |
| <b>1990</b>                    | <b>379</b> | <b>-729</b>       | <b>1267</b>     | <b>-663</b>      | <b>574</b>         | <b>-55</b>  | <b>-15</b>                    |
| 1991                           | 373        | -753              | 1256            | -649             | 577                | -43         | -15                           |
| 1992                           | 361        | -750              | 1244            | -652             | 580                | -46         | -15                           |
| 1993                           | 300        | -762              | 1228            | -696             | 583                | -38         | -15                           |
| 1994                           | 301        | -720              | 1218            | -693             | 585                | -73         | -15                           |
| <b>1995</b>                    | <b>304</b> | <b>-751</b>       | <b>1209</b>     | <b>-684</b>      | <b>588</b>         | <b>-44</b>  | <b>-15</b>                    |
| 1996                           | 293        | -722              | 1199            | -689             | 590                | -71         | -15                           |
| 1997                           | 266        | -715              | 1189            | -704             | 593                | -83         | -15                           |
| 1998                           | 232        | -718              | 1179            | -725             | 595                | -84         | -15                           |
| 1999                           | 217        | -707              | 1170            | -740             | 597                | -89         | -15                           |
| <b>2000</b>                    | <b>203</b> | <b>-717</b>       | <b>1162</b>     | <b>-749</b>      | <b>599</b>         | <b>-77</b>  | <b>-15</b>                    |
| 2001                           | 187        | -738              | 1154            | -757             | 600                | -58         | -15                           |
| 2002                           | 176        | -763              | 1147            | -760             | 602                | -36         | -15                           |
| 2003                           | 179        | -745              | 1142            | -754             | 604                | -53         | -15                           |
| 2004                           | 216        | -699              | 1146            | -742             | 606                | -80         | -15                           |
| <b>2005</b>                    | <b>227</b> | <b>-706</b>       | <b>1149</b>     | <b>-744</b>      | <b>608</b>         | <b>-66</b>  | <b>-15</b>                    |
| 2006                           | 247        | -656              | 1153            | -740             | 610                | -107        | -15                           |
| 2007                           | 277        | -635              | 1159            | -727             | 612                | -117        | -15                           |
| 2008                           | 321        | -566              | 1165            | -712             | 614                | -165        | -15                           |
| 2009                           | 368        | -512              | 1170            | -705             | 617                | -187        | -15                           |
| <b>2010</b>                    | <b>409</b> | <b>-492</b>       | <b>1167</b>     | <b>-700</b>      | <b>626</b>         | <b>-177</b> | <b>-15</b>                    |
| 2011                           | 438        | -545              | 1163            | -695             | 634                | -103        | -15                           |
| 2012                           | 470        | -485              | 1160            | -692             | 639                | -136        | -15                           |
| 2013                           | 491        | -430              | 1156            | -695             | 640                | -165        | -15                           |
| 2014                           | 525        | -383              | 1153            | -697             | 639                | -173        | -15                           |
| <b>2015</b>                    | <b>554</b> | <b>-379</b>       | <b>1151</b>     | <b>-691</b>      | <b>639</b>         | <b>-152</b> | <b>-15</b>                    |
| 2016                           | 592        | -299              | 1150            | -685             | 639                | -198        | -15                           |
| 2017                           | 634        | -221              | 1148            | -684             | 639                | -234        | -15                           |
| 2018                           | 677        | -86               | 1147            | -686             | 638                | -322        | -15                           |
| 2019                           | 724        | -29               | 1145            | -687             | 638                | -329        | -15                           |
| <b>2020</b>                    | <b>768</b> | <b>-7</b>         | <b>1144</b>     | <b>-686</b>      | <b>638</b>         | <b>-308</b> | <b>-15</b>                    |

| <b>D<br/>N.<br/>Ireland</b><br>Gg CO2 | Changes in<br>woody<br>biomass       | HWP                      | Forest<br>Conversion      | Soils   | Other   | Other                    | NET<br>Emission (+)<br>Removal (-) |
|---------------------------------------|--------------------------------------|--------------------------|---------------------------|---|---|--------------------------|------------------------------------|
| 1990                                  | -729                                 | -55                      | 0                         | 694   | 484   | -15                      | 379                                |
| 1991                                  | -753                                 | -43                      | 0                         | 700   | 484   | -15                      | 373                                |
| 1992                                  | -750                                 | -46                      | 0                         | 687   | 484   | -15                      | 361                                |
| 1993                                  | -762                                 | -38                      | 0                         | 630   | 484   | -15                      | 300                                |
| 1994                                  | -720                                 | -73                      | 0                         | 626   | 484   | -15                      | 301                                |
| 1995                                  | -751                                 | -44                      | 0                         | 629   | 484   | -15                      | 304                                |
| 1996                                  | -722                                 | -71                      | 0                         | 616   | 484   | -15                      | 293                                |
| 1997                                  | -715                                 | -83                      | 0                         | 594   | 484   | -15                      | 266                                |
| 1998                                  | -718                                 | -84                      | 0                         | 565   | 484   | -15                      | 232                                |
| 1999                                  | -707                                 | -89                      | 0                         | 544   | 484   | -15                      | 217                                |
| 2000                                  | -717                                 | -77                      | 0                         | 528   | 484   | -15                      | 203                                |
| 2001                                  | -738                                 | -58                      | 0                         | 514   | 484   | -15                      | 187                                |
| 2002                                  | -763                                 | -36                      | 0                         | 505   | 484   | -15                      | 176                                |
| 2003                                  | -745                                 | -53                      | 0                         | 508   | 484   | -15                      | 179                                |
| <b>NIR<br/>Format</b>                 | <b>5A<br/>(Removals)</b>             | <b>5A<br/>(Removals)</b> | <b>5B<br/>(Emissions)</b> | <b>5D<br/>(Emissions)</b>                     | <b>5E<br/>(Emissions)</b>                           | <b>5E<br/>(Removals)</b> |                                    |
|                                       | Forest<br>biomass, soils,<br>litter. | Forest<br>products       | Deforestation             | Effect of<br>LUC (Net),<br>liming of<br>soils | Drainage of<br>lowland<br>soils, peat<br>extraction | Non-forest<br>biomass    |                                    |



## **APPENDIX 2**

### **A.2. Sectoral Tables for Land Use Change and Forestry Sector submitted as UK 2003 Greenhouse Gas Inventory in format defined by IPCC 1996 Guidelines**



|   |      |
|---|------|
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Table A2 1 Sectoral report for land-use change and forestry, 1990. ( Units are Gg CO2, NO = Not Occurring, NE = Not Established and IE = Included Elsewhere)

| TABLE 5 SECTORAL REPORT FOR LAND-USE CHANGE AND FORESTRY<br>(Sheet 1 of 1) |                  |                   |                             | United Kingdom of Great Britain and Northern Ireland<br>1990<br>Submission 2003 |             |               |             |
|--|------------------|-------------------|-----------------------------|---|-------------|---------------|-------------|
| GREENHOUSE GAS SOURCE AND SINK CATEGORIES                                  | CO2 emissions    | CO2 removals      | Net CO2 emissions/ removals | CH4   | N2O         | NOx           | CO          |
|  | (Gg)             |                   |                             |   |             |               |             |
| <b>Total Land-Use Change and Forestry</b>                                  | <b>17,558.03</b> | <b>-14,912.79</b> | <b>2,645.24</b>             | <b>0.72</b>   | <b>0.00</b> | <b>0.1780</b> | <b>6.27</b> |
| <b>A. Changes in Forest and Other Woody Biomass Stocks</b>                 | <b>0.00</b>      | <b>-7,601.31</b>  | <b>-7,601.31</b>            |   |             |               |             |
| 1. Tropical Forests  | NO               | NO                | 0.00                        |   |             |               |             |
| 2. Temperate Forests   | NO               | -6,014.29         | -6,014.29                   |   |             |               |             |
| 3. Boreal Forests  | NO               | NO                | 0.00                        |   |             |               |             |
| 4. Grasslands/Tundra   | NO               | NO                | 0.00                        |   |             |               |             |
| 5. Other (please specify)  | 0.00             | -1,587.02         | -1,587.02                   |   |             |               |             |
| Harvested Wood (1)   | NO               | -1,587.02         | -1,587.02                   |   |             |               |             |
|  |                  |                   | 0.00                        |   |             |               |             |
| <b>B. Forest and Grassland Conversion (2)</b>                              | <b>164.16</b>    |                   |                             | <b>0.72</b>   | <b>0.00</b> | <b>0.1780</b> | <b>6.27</b> |
| 1. Tropical Forests  | NO               |                   |                             | NO  | NO          | NO            | NO          |
| 2. Temperate Forests   | 164.16           |                   |                             | 0.72  | 0.005       | 0.18          | 6.27        |
| 3. Boreal Forests  | NO               |                   |                             | NO  | NO          | NO            | NO          |
| 4. Grasslands/Tundra   | NO               |                   |                             | NO  | NO          | NO            | NO          |
| 5. Other (please specify)  | 0.00             |                   |                             | 0.00  | 0.00        | 0.00          | 0.00        |
|  |                  |                   |                             |   |             |               |             |
| <b>C. Abandonment of Managed Lands</b>                                     | <b>0.00</b>      | <b>0.00</b>       | <b>0.00</b>                 |   |             |               |             |
| 1. Tropical Forests  | NO               | NO                | 0.00                        |   |             |               |             |
| 2. Temperate Forests   | NE               | NE                | 0.00                        |   |             |               |             |
| 3. Boreal Forests  | NO               | NO                | 0.00                        |   |             |               |             |
| 4. Grasslands/Tundra   | NE               | NE                | 0.00                        |   |             |               |             |
| 5. Other (please specify)  |                  |                   | 0.00                        |   |             |               |             |
|  |                  |                   | 0.00                        |   |             |               |             |
| <b>D. CO2 Emissions and Removals from Soil</b>                             | <b>16,602.30</b> | <b>-6,211.48</b>  | <b>10,390.82</b>            |   |             |               |             |
| Cultivation of Mineral Soils   | 13,521.85        | IE                | 13,521.85                   |   |             |               |             |
| Cultivation of Organic Soils   | IE               | IE                | 0.00                        |   |             |               |             |
| Liming of Agricultural Soils   | 1,430.45         | NO                | 1,430.45                    |   |             |               |             |
| Forest Soils   | NO               | -6,211.48         | -6,211.48                   |   |             |               |             |
| Other (please specify)(3)  | 1,650.00         | 0.00              | 1,650.00                    |   |             |               |             |
| Lowland Drainage   | 1,650.00         | NO                | 1,650.00                    |   |             |               |             |
|  |                  |                   | 0.00                        |   |             |               |             |
| <b>E. Other (please specify)</b>   | <b>791.57</b>    | <b>-1,100.00</b>  | <b>-308.43</b>              | <b>0.00</b>   | <b>0.00</b> | <b>0.00</b>   | <b>0.00</b> |
| Changes in Non-forest Biomass  | NO               | -1,100.00         | -1,100.00                   |   |             |               |             |
| Peat Extraction  | 791.57           | NO                | 791.57                      |   |             |               |             |
|  |                  |                   | 0.00                        |   |             |               |             |

Table A2 2 Sectoral report for land-use change and forestry, 1991

| TABLE 5 SECTORAL REPORT FOR LAND-USE CHANGE AND FORESTRY<br>(Sheet 1 of 1) |                  |                   |                             | United Kingdom of Great Britain and Northern Ireland<br>1991<br>Submission 2003 |              |              |             |
|--|------------------|-------------------|-----------------------------|---|--------------|--------------|-------------|
| GREENHOUSE GAS SOURCE AND SINK CATEGORIES                                  | CO2 emissions    | CO2 removals      | Net CO2 emissions/ removals | CH4   | N2O          | NOx          | CO          |
|  | (Gg)             |                   |                             |   |              |              |             |
| <b>Total Land-Use Change and Forestry</b>                                  | <b>17,650.27</b> | <b>-15,060.70</b> | <b>2,589.57</b>             | <b>0.60</b>   | <b>0.00</b>  | <b>0.148</b> | <b>5.22</b> |
| <b>A. Changes in Forest and Other Woody Biomass Stocks</b>                 | <b>0.00</b>      | <b>-7,829.88</b>  | <b>-7,829.88</b>            |   |              |              |             |
| 1. Tropical Forests  | NO               | NO                | 0.00                        |   |              |              |             |
| 2. Temperate Forests   | NO               | -6,485.54         | -6,485.54                   |   |              |              |             |
| 3. Boreal Forests  | NO               | NO                | 0.00                        |   |              |              |             |
| 4. Grasslands/Tundra   | NO               | NO                | 0.00                        |   |              |              |             |
| 5. Other (please specify)  | 0.00             | -1,344.34         | -1,344.34                   |   |              |              |             |
| Harvested Wood (1)   | NO               | -1,344.34         | -1,344.34                   |   |              |              |             |
|  |                  |                   | 0.00                        |   |              |              |             |
| <b>B. Forest and Grassland Conversion (2)</b>                              | <b>136.79</b>    |                   |                             | <b>0.60</b>   | <b>0.004</b> | <b>0.15</b>  | <b>5.22</b> |
| 1. Tropical Forests  | NO               |                   |                             | NO  | NO           | NO           | NO          |
| 2. Temperate Forests   | 136.79           |                   |                             | 0.60  | 0.004        | 0.15         | 5.22        |
| 3. Boreal Forests  | NO               |                   |                             | NO  | NO           | NO           | NO          |
| 4. Grasslands/Tundra   | NO               |                   |                             | NO  | NO           | NO           | NO          |
| 5. Other (please specify)  | 0.00             |                   |                             | 0.00  | 0.00         | 0.00         | 0.00        |
| <b>C. Abandonment of Managed Lands</b>                                     | <b>0.00</b>      | <b>0.00</b>       | <b>0.00</b>                 |   |              |              |             |
| 1. Tropical Forests  | NO               | NO                | 0.00                        |   |              |              |             |
| 2. Temperate Forests   | NE               | NE                | 0.00                        |   |              |              |             |
| 3. Boreal Forests  | NO               | NO                | 0.00                        |   |              |              |             |
| 4. Grasslands/Tundra   | NE               | NE                | 0.00                        |   |              |              |             |
| 5. Other (please specify)  |                  |                   | 0.00                        |   |              |              |             |
|  |                  |                   | 0.00                        |   |              |              |             |
| <b>D. CO2 Emissions and Removals from Soil</b>                             | <b>16,710.88</b> | <b>-6,130.82</b>  | <b>10,580.06</b>            |   |              |              |             |
| Cultivation of Mineral Soils   | 13,325.60        | IE                | 13,325.60                   |   |              |              |             |
| Cultivation of Organic Soils   | IE               | IE                | 0.00                        |   |              |              |             |
| Liming of Agricultural Soils   | 1,771.95         | NO                | 1,771.95                    |   |              |              |             |
| Forest Soils   | NO               | -6,130.82         | -6,130.82                   |   |              |              |             |
| Other (please specify)(3)  | 1,613.33         | 0.00              | 1,613.33                    |   |              |              |             |
| Lowland Drainage   | 1,613.33         | NO                | 1,613.33                    |   |              |              |             |
|  |                  |                   | 0.00                        |   |              |              |             |
| <b>E. Other (please specify)</b>   | <b>802.60</b>    | <b>-1,100.00</b>  | <b>-297.40</b>              | <b>0.00</b>   | <b>0.00</b>  | <b>0.00</b>  | <b>0.00</b> |
| Changes in Non-forest Biomass  | NO               | -1,100.00         | -1,100.00                   |   |              |              |             |
| Peat Extraction  | 802.60           | NO                | 802.60                      |   |              |              |             |
|  |                  |                   | 0.00                        |   |              |              |             |

Table A2 3 Sectoral report for land-use change and forestry, 1992

| TABLE 5 SECTORAL REPORT FOR LAND-USE CHANGE AND FORESTRY<br>(Sheet 1 of 1) |                  |                   |                             | United Kingdom of Great Britain and Northern Ireland<br>1992<br>Submission 2003 |              |             |             |
|--|------------------|-------------------|-----------------------------|---|--------------|-------------|-------------|
| GREENHOUSE GAS SOURCE AND SINK CATEGORIES                                  | CO2 emissions    | CO2 removals      | Net CO2 emissions/ removals | CH4   | N2O          | NOx         | CO          |
|  | (Gg)             |                   |                             |   |              |             |             |
| <b>Total Land-Use Change and Forestry</b>                                  | <b>17,423.84</b> | <b>-15,347.96</b> | <b>2,075.88</b>             | <b>0.47</b>   | <b>0.00</b>  | <b>0.12</b> | <b>4.09</b> |
| <b>A. Changes in Forest and Other Woody Biomass Stocks</b>                 | <b>0.00</b>      | <b>-8,080.44</b>  | <b>-8,080.44</b>            |   |              |             |             |
| 1. Tropical Forests  | NO               | NO                | 0.00                        |   |              |             |             |
| 2. Temperate Forests   | NO               | -6,950.05         | -6,950.05                   |   |              |             |             |
| 3. Boreal Forests  | NO               | NO                | 0.00                        |   |              |             |             |
| 4. Grasslands/Tundra   | NO               | NO                | 0.00                        |   |              |             |             |
| 5. Other (please specify)  | 0.00             | -1,130.39         | -1,130.39                   |   |              |             |             |
| Harvested Wood (1)   | NO               | -1,130.39         | -1,130.39                   |   |              |             |             |
|  |                  |                   | 0.00                        |   |              |             |             |
| <b>B. Forest and Grassland Conversion (2)</b>                              | <b>107.14</b>    |                   |                             | <b>0.47</b>   | <b>0.003</b> | <b>0.12</b> | <b>4.09</b> |
| 1. Tropical Forests  | NO               |                   |                             | NO  | NO           | NO          | NO          |
| 2. Temperate Forests   | 107.14           |                   |                             | 0.47  | 0.003        | 0.12        | 4.09        |
| 3. Boreal Forests  | NO               |                   |                             | NO  | NO           | NO          | NO          |
| 4. Grasslands/Tundra   | NO               |                   |                             | NO  | NO           | NO          | NO          |
| 5. Other (please specify)  | 0.00             |                   |                             | 0.00  | 0.00         | 0.00        | 0.00        |
|  |                  |                   |                             |   |              |             |             |
| <b>C. Abandonment of Managed Lands</b>                                     | <b>0.00</b>      | <b>0.00</b>       | <b>0.00</b>                 |   |              |             |             |
| 1. Tropical Forests  | NO               | NO                | 0.00                        |   |              |             |             |
| 2. Temperate Forests   | NE               | NE                | 0.00                        |   |              |             |             |
| 3. Boreal Forests  | NO               | NO                | 0.00                        |   |              |             |             |
| 4. Grasslands/Tundra   | NE               | NE                | 0.00                        |   |              |             |             |
| 5. Other (please specify)  | 0.00             | 0.00              | 0.00                        |   |              |             |             |
|  |                  |                   | 0.00                        |   |              |             |             |
| <b>D. CO2 Emissions and Removals from Soil</b>                             | <b>16,525.13</b> | <b>-6,167.52</b>  | <b>10,357.61</b>            |   |              |             |             |
| Cultivation of Mineral Soils   | 13,138.88        | IE                | 13,138.88                   |   |              |             |             |
| Cultivation of Organic Soils   | IE               | IE                | 0.00                        |   |              |             |             |
| Liming of Agricultural Soils   | 1,809.58         | NO                | 1,809.58                    |   |              |             |             |
| Forest Soils   | NO               | -6,167.52         | -6,167.52                   |   |              |             |             |
| Other (please specify)(3)  | 1,576.67         | 0.00              | 1,576.67                    |   |              |             |             |
| Lowland Drainage   | 1,576.67         | NO                | 1,576.67                    |   |              |             |             |
|  |                  |                   | 0.00                        |   |              |             |             |
| <b>E. Other (please specify)</b>   | <b>791.57</b>    | <b>-1,100.00</b>  | <b>-308.43</b>              | <b>0.00</b>   | <b>0.00</b>  | <b>0.00</b> | <b>0.00</b> |
| Changes in Non-forest Biomass  | NO               | -1,100.00         | -1,100.00                   |   |              |             |             |
| Peat Extraction  | 791.57           | NO                | 791.57                      |   |              |             |             |
|  |                  |                   | 0.00                        |   |              |             |             |

Table A2 4: Sectoral report for land-use change and forestry, 1993

| TABLE 5 SECTORAL REPORT FOR LAND-USE CHANGE AND FORESTRY<br>(Sheet 1 of 1) |                  |                   |                             | United Kingdom of Great Britain and Northern Ireland<br>1993<br>Submission 2003 |              |             |             |
|--|------------------|-------------------|-----------------------------|---|--------------|-------------|-------------|
| GREENHOUSE GAS SOURCE AND SINK CATEGORIES                                  | CO2 emissions    | CO2 removals      | Net CO2 emissions/ removals | CH4   | N2O          | NOx         | CO          |
|  | (Gg)             |                   |                             |   |              |             |             |
| <b>Total Land-Use Change and Forestry</b>                                  | <b>16,535.62</b> | <b>-15,636.91</b> | <b>898.71</b>               | <b>0.54</b>   | <b>0.00</b>  | <b>0.13</b> | <b>4.72</b> |
| <b>A. Changes in Forest and Other Woody Biomass Stocks</b>                 | <b>0.00</b>      | <b>-8,273.86</b>  | <b>-8,273.86</b>            |   |              |             |             |
| 1. Tropical Forests  | NO               | NO                | 0.00                        |   |              |             |             |
| 2. Temperate Forests   | NO               | -7,215.04         | -7,215.04                   |   |              |             |             |
| 3. Boreal Forests  | NO               | NO                | 0.00                        |   |              |             |             |
| 4. Grasslands/Tundra   | NO               | NO                | 0.00                        |   |              |             |             |
| 5. Other (please specify)  | 0.00             | -1,058.82         | -1,058.82                   |   |              |             |             |
| Harvested Wood (1)   | NO               | -1,058.82         | -1,058.82                   |   |              |             |             |
|  |                  |                   | 0.00                        |   |              |             |             |
| <b>B. Forest and Grassland Conversion (2)</b>                              | <b>123.72</b>    |                   |                             | <b>0.54</b>   | <b>0.004</b> | <b>0.13</b> | <b>4.72</b> |
| 1. Tropical Forests  | NO               |                   |                             | NO  | NO           | NO          | NO          |
| 2. Temperate Forests   | 123.72           |                   |                             | 0.54  | 0.004        | 0.13        | 4.72        |
| 3. Boreal Forests  | NO               |                   |                             | NO  | NO           | NO          | NO          |
| 4. Grasslands/Tundra   | NO               |                   |                             | NO  | NO           | NO          | NO          |
| 5. Other (please specify)  | 0.00             |                   |                             | 0.00  | 0.00         | 0.00        | 0.00        |
|  |                  |                   |                             |   |              |             |             |
| <b>C. Abandonment of Managed Lands</b>                                     | <b>0.00</b>      | <b>0.00</b>       | <b>0.00</b>                 |   |              |             |             |
| 1. Tropical Forests  | NO               | NO                | 0.00                        |   |              |             |             |
| 2. Temperate Forests   | NE               | NE                | 0.00                        |   |              |             |             |
| 3. Boreal Forests  | NO               | NO                | 0.00                        |   |              |             |             |
| 4. Grasslands/Tundra   | NE               | NE                | 0.00                        |   |              |             |             |
| 5. Other (please specify)  | 0.00             | 0.00              | 0.00                        |   |              |             |             |
|  |                  |                   | 0.00                        |   |              |             |             |
| <b>D. CO2 Emissions and Removals from Soil</b>                             | <b>15,631.36</b> | <b>-6,263.05</b>  | <b>9,368.31</b>             |   |              |             |             |
| Cultivation of Mineral Soils   | 12,961.04        | IE                | 12,961.04                   |   |              |             |             |
| Cultivation of Organic Soils   | IE               | IE                | 0.00                        |   |              |             |             |
| Liming of Agricultural Soils   | 1,130.32         | NO                | 1,130.32                    |   |              |             |             |
| Forest Soils   | NO               | -6,263.05         | -6,263.05                   |   |              |             |             |
| Other (please specify)(3)  | 1,540.00         | 0.00              | 1,540.00                    |   |              |             |             |
| Lowland Drainage   | 1,540.00         | NO                | 1,540.00                    |   |              |             |             |
|  |                  |                   | 0.00                        |   |              |             |             |
| <b>E. Other (please specify)</b>   | <b>780.54</b>    | <b>-1,100.00</b>  | <b>-319.46</b>              | <b>0.00</b>   | <b>0.00</b>  | <b>0.00</b> | <b>0.00</b> |
| Changes in Non-forest Biomass  | NO               | -1,100.00         | -1,100.00                   |   |              |             |             |
| Peat Extraction  | 780.54           | NO                | 780.54                      |   |              |             |             |
|  |                  |                   | 0.00                        |   |              |             |             |



Table A2 5 Sectoral report for land-use change and forestry, 1994

| TABLE 5 SECTORAL REPORT FOR LAND-USE CHANGE AND FORESTRY<br>(Sheet 1 of 1) |                  |                   |                             | United Kingdom of Great Britain and Northern Ireland<br>1994<br>Submission 2003 |              |             |             |
|--|------------------|-------------------|-----------------------------|---|--------------|-------------|-------------|
| GREENHOUSE GAS SOURCE AND SINK CATEGORIES                                  | CO2 emissions    | CO2 removals      | Net CO2 emissions/ removals | CH4   | N2O          | NOx         | CO          |
|  | (Gg)             |                   |                             |   |              |             |             |
| <b>Total Land-Use Change and Forestry</b>                                  | <b>16,585.08</b> | <b>-15,900.14</b> | <b>684.94</b>               | <b>0.57</b>   | <b>0.00</b>  | <b>0.14</b> | <b>5.03</b> |
| <b>A. Changes in Forest and Other Woody Biomass Stocks</b>                 | <b>0.00</b>      | <b>-8,502.87</b>  | <b>-8,502.87</b>            |   |              |             |             |
| 1. Tropical Forests  | NO               | NO                | 0.00                        |   |              |             |             |
| 2. Temperate Forests   | NO               | -7,560.56         | -7,560.56                   |   |              |             |             |
| 3. Boreal Forests  | NO               | NO                | 0.00                        |   |              |             |             |
| 4. Grasslands/Tundra   | NO               | NO                | 0.00                        |   |              |             |             |
| 5. Other (please specify)  | 0.00             | -942.31           | -942.31                     |   |              |             |             |
| Harvested Wood (1)   | NO               | -942.31           | -942.31                     |   |              |             |             |
|  |                  |                   | 0.00                        |   |              |             |             |
| <b>B. Forest and Grassland Conversion (2)</b>                              | <b>131.65</b>    |                   |                             | <b>0.57</b>   | <b>0.004</b> | <b>0.14</b> | <b>5.03</b> |
| 1. Tropical Forests  | NO               |                   |                             | NO  | NO           | NO          | NO          |
| 2. Temperate Forests   | 131.65           |                   |                             | 0.57  | 0.004        | 0.14        | 5.03        |
| 3. Boreal Forests  | NO               |                   |                             | NO  | NO           | NO          | NO          |
| 4. Grasslands/Tundra   | NO               |                   |                             | NO  | NO           | NO          | NO          |
| 5. Other (please specify)  | 0.00             |                   |                             | 0.00  | 0.00         | 0.00        | 0.00        |
| <b>C. Abandonment of Managed Lands</b>                                     | <b>0.00</b>      | <b>0.00</b>       | <b>0.00</b>                 |   |              |             |             |
| 1. Tropical Forests  | NO               | NO                | 0.00                        |   |              |             |             |
| 2. Temperate Forests   | NE               | NE                | 0.00                        |   |              |             |             |
| 3. Boreal Forests  | NO               | NO                | 0.00                        |   |              |             |             |
| 4. Grasslands/Tundra   | NE               | NE                | 0.00                        |   |              |             |             |
| 5. Other (please specify)  | 0.00             | 0.00              | 0.00                        |   |              |             |             |
|  |                  |                   | 0.00                        |   |              |             |             |
| <b>D. CO2 Emissions and Removals from Soil</b>                             | <b>15,564.64</b> | <b>-6,297.27</b>  | <b>9,267.37</b>             |   |              |             |             |
| Cultivation of Mineral Soils   | 12,791.49        | IE                | 12,791.49                   |   |              |             |             |
| Cultivation of Organic Soils   | IE               | IE                | 0.00                        |   |              |             |             |
| Liming of Agricultural Soils   | 1,269.82         | NO                | 1,269.82                    |   |              |             |             |
| Forest Soils   | NO               | -6,297.27         | -6,297.27                   |   |              |             |             |
| Other (please specify)(3)  | 1,503.33         | 0.00              | 1,503.33                    |   |              |             |             |
| Lowland Drainage   | 1,503.33         | NO                | 1,503.33                    |   |              |             |             |
|  |                  |                   | 0.00                        |   |              |             |             |
| <b>E. Other (please specify)</b>   | <b>888.79</b>    | <b>-1,100.00</b>  | <b>-211.21</b>              | <b>0.00</b>   | <b>0.00</b>  | <b>0.00</b> | <b>0.00</b> |
| Changes in Non-forest Biomass  | NO               | -1,100.00         | -1,100.00                   |   |              |             |             |
| Peat Extraction  | 888.79           | NO                | 888.79                      |   |              |             |             |
|  |                  |                   | 0.00                        |   |              |             |             |

Table A2 6 Sectoral report for land-use change and forestry, 1995

| TABLE 5 SECTORAL REPORT FOR LAND-USE CHANGE AND FORESTRY<br>(Sheet 1 of 1) |                  |                   |                             | United Kingdom of Great Britain and Northern Ireland<br>1995<br>Submission 2003 |              |             |             |
|--|------------------|-------------------|-----------------------------|---|--------------|-------------|-------------|
| GREENHOUSE GAS SOURCE AND SINK CATEGORIES                                  | CO2 emissions    | CO2 removals      | Net CO2 emissions/ removals | CH4   | N2O          | NOx         | CO          |
|  | (Gg)             |                   |                             |   |              |             |             |
| <b>Total Land-Use Change and Forestry</b>                                  | <b>16,736.88</b> | <b>-15,949.87</b> | <b>787.01</b>               | <b>0.70</b>   | <b>0.00</b>  | <b>0.17</b> | <b>6.16</b> |
| <b>A. Changes in Forest and Other Woody Biomass Stocks</b>                 | <b>0.00</b>      | <b>-8,367.27</b>  | <b>-8,367.27</b>            |   |              |             |             |
| 1. Tropical Forests  | NO               | NO                | 0.00                        |   |              |             |             |
| 2. Temperate Forests   | NO               | -7,244.51         | -7,244.51                   |   |              |             |             |
| 3. Boreal Forests  | NO               | NO                | 0.00                        |   |              |             |             |
| 4. Grasslands/Tundra   | NO               | NO                | 0.00                        |   |              |             |             |
| 5. Other (please specify)  | 0.00             | -1,122.76         | -1,122.76                   |   |              |             |             |
| Harvested Wood (1)   | NO               | -1,122.76         | -1,122.76                   |   |              |             |             |
|  |                  |                   | 0.00                        |   |              |             |             |
| <b>B. Forest and Grassland Conversion (2)</b>                              | <b>161.22</b>    |                   |                             | <b>0.70</b>   | <b>0.005</b> | <b>0.17</b> | <b>6.16</b> |
| 1. Tropical Forests  | NO               |                   |                             | NO  | NO           | NO          | NO          |
| 2. Temperate Forests   | 161.22           |                   |                             | 0.70  | 0.005        | 0.17        | 6.16        |
| 3. Boreal Forests  | NO               |                   |                             | NO  | NO           | NO          | NO          |
| 4. Grasslands/Tundra   | NO               |                   |                             | NO  | NO           | NO          | NO          |
| 5. Other (please specify)  | 0.00             |                   |                             | 0.00  | 0.00         | 0.00        | 0.00        |
| <b>C. Abandonment of Managed Lands</b>                                     | <b>0.00</b>      | <b>0.00</b>       | <b>0.00</b>                 |   |              |             |             |
| 1. Tropical Forests  | NO               | NO                | 0.00                        |   |              |             |             |
| 2. Temperate Forests   | NE               | NE                | 0.00                        |   |              |             |             |
| 3. Boreal Forests  | NO               | NO                | 0.00                        |   |              |             |             |
| 4. Grasslands/Tundra   | NE               | NE                | 0.00                        |   |              |             |             |
| 5. Other (please specify)  | 0.00             | 0.00              | 0.00                        |   |              |             |             |
|  |                  |                   | 0.00                        |   |              |             |             |
| <b>D. CO2 Emissions and Removals from Soil</b>                             | <b>15,625.81</b> | <b>-6,482.60</b>  | <b>9,143.21</b>             |   |              |             |             |
| Cultivation of Mineral Soils   | 12,629.70        | IE                | 12,629.70                   |   |              |             |             |
| Cultivation of Organic Soils   | IE               | IE                | 0.00                        |   |              |             |             |
| Liming of Agricultural Soils   | 1,529.44         | NO                | 1,529.44                    |   |              |             |             |
| Forest Soils   | NO               | -6,482.60         | -6,482.60                   |   |              |             |             |
| Other (please specify)(3)  | 1,466.67         | 0.00              | 1,466.67                    |   |              |             |             |
| Lowland Drainage   | 1,466.67         | NO                | 1,466.67                    |   |              |             |             |
|  |                  |                   | 0.00                        |   |              |             |             |
| <b>E. Other (please specify)</b>   | <b>949.85</b>    | <b>-1,100.00</b>  | <b>-150.15</b>              | <b>0.00</b>   | <b>0.00</b>  | <b>0.00</b> | <b>0.00</b> |
| Changes in Non-forest Biomass  | NO               | -1,100.00         | -1,100.00                   |   |              |             |             |
| Peat Extraction  | 949.85           | NO                | 949.85                      |   |              |             |             |
|  |                  |                   | 0.00                        |   |              |             |             |

Table A2 7 Sectoral report for land-use change and forestry, 1996

| TABLE 5 SECTORAL REPORT FOR LAND-USE CHANGE AND FORESTRY<br>(Sheet 1 of 1) |                  |                   |                             | United Kingdom of Great Britain and Northern Ireland<br>1996<br>Submission 2003 |              |             |             |
|--|------------------|-------------------|-----------------------------|---|--------------|-------------|-------------|
| GREENHOUSE GAS SOURCE AND SINK CATEGORIES                                  | CO2 emissions    | CO2 removals      | Net CO2 emissions/ removals | CH4   | N2O          | NOx         | CO          |
|  | (Gg)             |                   |                             |   |              |             |             |
| <b>Total Land-Use Change and Forestry</b>                                  | <b>16,474.13</b> | <b>-15,858.62</b> | <b>615.51</b>               | <b>0.81</b>   | <b>0.01</b>  | <b>0.20</b> | <b>7.06</b> |
| <b>A. Changes in Forest and Other Woody Biomass Stocks</b>                 | <b>0.00</b>      | <b>-8,234.85</b>  | <b>-8,234.85</b>            |   |              |             |             |
| 1. Tropical Forests  | NO               | NO                | 0.00                        |   |              |             |             |
| 2. Temperate Forests   | NO               | -7,137.00         | -7,137.00                   |   |              |             |             |
| 3. Boreal Forests  | NO               | NO                | 0.00                        |   |              |             |             |
| 4. Grasslands/Tundra   | NO               | NO                | 0.00                        |   |              |             |             |
| 5. Other (please specify)  | NO               | -1,097.85         | -1,097.85                   |   |              |             |             |
| Harvested Wood (1)   | NO               | -1,097.85         | -1,097.85                   |   |              |             |             |
|  |                  |                   | 0.00                        |   |              |             |             |
| <b>B. Forest and Grassland Conversion (2)</b>                              | <b>184.85</b>    |                   |                             | <b>0.81</b>   | <b>0.006</b> | <b>0.2</b>  | <b>7.06</b> |
| 1. Tropical Forests  | NO               |                   |                             | NO  | NO           | NO          | NO          |
| 2. Temperate Forests   | 184.85           |                   |                             | 0.81  | 0.006        | 0.2         | 7.06        |
| 3. Boreal Forests  | NO               |                   |                             | NO  | NO           | NO          | NO          |
| 4. Grasslands/Tundra   | NO               |                   |                             | NO  | NO           | NO          | NO          |
| 5. Other (please specify)  | 0.00             |                   |                             | 0.00  | 0.00         | 0.00        | 0.00        |
|  |                  |                   |                             |   |              |             |             |
| <b>C. Abandonment of Managed Lands</b>                                     | <b>0.00</b>      | <b>0.00</b>       | <b>0.00</b>                 |   |              |             |             |
| 1. Tropical Forests  | NO               | NO                | 0.00                        |   |              |             |             |
| 2. Temperate Forests   | NE               | NO                | 0.00                        |   |              |             |             |
| 3. Boreal Forests  | NO               | NO                | 0.00                        |   |              |             |             |
| 4. Grasslands/Tundra   | NE               | NO                | 0.00                        |   |              |             |             |
| 5. Other (please specify)  | 0.00             | 0.00              | 0.00                        |   |              |             |             |
|  |                  |                   | 0.00                        |   |              |             |             |
| <b>D. CO2 Emissions and Removals from Soil</b>                             | <b>15,420.30</b> | <b>-6,523.77</b>  | <b>8,896.53</b>             |   |              |             |             |
| Cultivation of Mineral Soils   | 12,475.14        | IE                | 12,475.14                   |   |              |             |             |
| Cultivation of Organic Soils   | IE               | IE                | 0.00                        |   |              |             |             |
| Liming of Agricultural Soils   | 1,515.16         | NO                | 1,515.16                    |   |              |             |             |
| Forest Soils   | NO               | -6,523.77         | -6,523.77                   |   |              |             |             |
| Other (please specify)(3)  | 1,430.00         | 0.00              | 1,430.00                    |   |              |             |             |
| Lowland Drainage   | 1,430.00         | NO                | 1,430.00                    |   |              |             |             |
|  |                  |                   | 0.00                        |   |              |             |             |
| <b>E. Other (please specify)</b>   | <b>868.98</b>    | <b>-1,100.00</b>  | <b>-231.02</b>              | <b>0.00</b>   | <b>0.00</b>  | <b>0.00</b> | <b>0.00</b> |
| Changes in Non-forest Biomass  | NO               | -1,100.00         | -1,100.00                   |   |              |             |             |
| Peat Extraction  | 868.98           | NO                | 868.98                      |   |              |             |             |
|  |                  |                   | 0.00                        |   |              |             |             |

Table A2 8 Sectoral report for land-use change and forestry, 1997

| TABLE 5 SECTORAL REPORT FOR LAND-USE CHANGE AND FORESTRY<br>(Sheet 1 of 1) |                  |                   |                             | United Kingdom of Great Britain and Northern Ireland<br>1997<br>Submission 2003 |              |             |             |
|--|------------------|-------------------|-----------------------------|---|--------------|-------------|-------------|
| GREENHOUSE GAS SOURCE AND SINK CATEGORIES                                  | CO2 emissions    | CO2 removals      | Net CO2 emissions/ removals | CH4   | N2O          | NOx         | CO          |
|  | (Gg)             |                   |                             |   |              |             |             |
| <b>Total Land-Use Change and Forestry</b>                                  | <b>16,033.97</b> | <b>-15,822.78</b> | <b>211.19</b>               | <b>0.66</b>   | <b>0.00</b>  | <b>0.16</b> | <b>5.81</b> |
| <b>A. Changes in Forest and Other Woody Biomass Stocks</b>                 | <b>0.00</b>      | <b>-8,121.97</b>  | <b>-8,121.97</b>            |   |              |             |             |
| 1. Tropical Forests  | NO               | NO                | 0.00                        |   |              |             |             |
| 2. Temperate Forests   | NO               | -6,926.63         | -6,926.63                   |   |              |             |             |
| 3. Boreal Forests  | NO               | NO                | 0.00                        |   |              |             |             |
| 4. Grasslands/Tundra   | NO               | NO                | 0.00                        |   |              |             |             |
| 5. Other (please specify)  | 0.00             | -1,195.34         | -1,195.34                   |   |              |             |             |
| Harvested Wood (1)   | NO               | -1,195.34         | -1,195.34                   |   |              |             |             |
|  |                  |                   | 0.00                        |   |              |             |             |
| <b>B. Forest and Grassland Conversion (2)</b>                              | <b>152.05</b>    |                   |                             | <b>0.66</b>   | <b>0.005</b> | <b>0.16</b> | <b>5.81</b> |
| 1. Tropical Forests  | NO               |                   |                             | NO  | NO           | NO          | NO          |
| 2. Temperate Forests   | 152.05           |                   |                             | 0.66  | 0.005        | 0.16        | 5.81        |
| 3. Boreal Forests  | NO               |                   |                             | NO  | NO           | NO          | NO          |
| 4. Grasslands/Tundra   | NO               |                   |                             | NO  | NO           | NO          | NO          |
| 5. Other (please specify)  | 0.00             |                   |                             | 0.00  | 0.00         | 0.00        | 0.00        |
| <b>C. Abandonment of Managed Lands</b>                                     | <b>0.00</b>      | <b>0.00</b>       | <b>0.00</b>                 |   |              |             |             |
| 1. Tropical Forests  | NO               | NO                | 0.00                        |   |              |             |             |
| 2. Temperate Forests   | NE               | NE                | 0.00                        |   |              |             |             |
| 3. Boreal Forests  | NO               | NO                | 0.00                        |   |              |             |             |
| 4. Grasslands/Tundra   | NE               | NE                | 0.00                        |   |              |             |             |
| 5. Other (please specify)  | 0.00             | 0.00              | 0.00                        |   |              |             |             |
|  |                  |                   | 0.00                        |   |              |             |             |
| <b>D. CO2 Emissions and Removals from Soil</b>                             | <b>15,067.07</b> | <b>-6,600.81</b>  | <b>8,466.26</b>             |   |              |             |             |
| Cultivation of Mineral Soils   | 12,327.36        | IE                | 12,327.36                   |   |              |             |             |
| Cultivation of Organic Soils   | IE               | IE                | 0.00                        |   |              |             |             |
| Liming of Agricultural Soils   | 1,346.38         | NO                | 1,346.38                    |   |              |             |             |
| Forest Soils   | NO               | -6,600.81         | -6,600.81                   |   |              |             |             |
| Other (please specify)(3)  | 1,393.33         | 0.00              | 1,393.33                    |   |              |             |             |
| Lowland Drainage   | 1,393.33         | NO                | 1,393.33                    |   |              |             |             |
|  |                  |                   | 0.00                        |   |              |             |             |
| <b>E. Other (please specify)</b>   | <b>814.85</b>    | <b>-1,100.00</b>  | <b>-285.15</b>              | <b>0.00</b>   | <b>0.00</b>  | <b>0.00</b> | <b>0.00</b> |
| Changes in Non-forest Biomass  | NO               | -1,100.00         | -1,100.00                   |   |              |             |             |
| Peat Extraction  | 814.85           | NO                | 814.85                      |   |              |             |             |
|  |                  |                   | 0.00                        |   |              |             |             |

Table A2 9 Sectoral report for land-use change and forestry, 1998

| TABLE 5 SECTORAL REPORT FOR LAND-USE CHANGE AND FORESTRY<br>(Sheet 1 of 1) |                  |                   |                             | United Kingdom of Great Britain and Northern Ireland<br>1998<br>Submission 2003 |              |              |             |
|--|------------------|-------------------|-----------------------------|---|--------------|--------------|-------------|
| GREENHOUSE GAS SOURCE AND SINK CATEGORIES                                  | CO2 emissions    | CO2 removals      | Net CO2 emissions/ removals | CH4   | N2O          | NOx          | CO          |
|  | (Gg)             |                   |                             |   |              |              |             |
| <b>Total Land-Use Change and Forestry</b>                                  | <b>15,463.45</b> | <b>-15,848.86</b> | <b>-385.41</b>              | <b>0.69</b>   | <b>0.00</b>  | <b>0.173</b> | <b>6.08</b> |
| <b>A. Changes in Forest and Other Woody Biomass Stocks</b>                 | <b>0.00</b>      | <b>-8,116.23</b>  | <b>-8,116.23</b>            |   |              |              |             |
| 1. Tropical Forests  | NO               | NO                | 0.00                        |   |              |              |             |
| 2. Temperate Forests   | NO               | -6,826.87         | -6,826.87                   |   |              |              |             |
| 3. Boreal Forests  | NO               | NO                | 0.00                        |   |              |              |             |
| 4. Grasslands/Tundra   | NO               | NO                | 0.00                        |   |              |              |             |
| 5. Other (please specify)  | 0.00             | -1,289.36         | -1,289.36                   |   |              |              |             |
| Harvested Wood (1)   | NO               | -1,289.36         | -1,289.36                   |   |              |              |             |
|  |                  |                   | 0.00                        |   |              |              |             |
| <b>B. Forest and Grassland Conversion (2)</b>                              | <b>159.25</b>    |                   |                             | <b>0.69</b>   | <b>0.005</b> | <b>0.17</b>  | <b>6.08</b> |
| 1. Tropical Forests  | NO               |                   |                             | NO  | NO           | NO           | NO          |
| 2. Temperate Forests   | 159.25           |                   |                             | 0.69  | 0.005        | 0.17         | 6.08        |
| 3. Boreal Forests  | NO               |                   |                             | NO  | NO           | NO           | NO          |
| 4. Grasslands/Tundra   | NO               |                   |                             | NO  | NO           | NO           | NO          |
| 5. Other (please specify)  | 0.00             |                   |                             | 0.00  | 0.00         | 0.00         | 0.00        |
| <b>C. Abandonment of Managed Lands</b>                                     | <b>0.00</b>      | <b>0.00</b>       | <b>0.00</b>                 |   |              |              |             |
| 1. Tropical Forests  | NO               | NO                | 0.00                        |   |              |              |             |
| 2. Temperate Forests   | NE               | NE                | 0.00                        |   |              |              |             |
| 3. Boreal Forests  | NO               | NO                | 0.00                        |   |              |              |             |
| 4. Grasslands/Tundra   | NE               | NE                | 0.00                        |   |              |              |             |
| 5. Other (please specify)  | 0.00             | 0.00              | 0.00                        |   |              |              |             |
|  |                  |                   | 0.00                        |   |              |              |             |
| <b>D. CO2 Emissions and Removals from Soil</b>                             | <b>14,600.65</b> | <b>-6,632.63</b>  | <b>7,968.02</b>             |   |              |              |             |
| Cultivation of Mineral Soils   | 12,185.93        | IE                | 12,185.93                   |   |              |              |             |
| Cultivation of Organic Soils   | IE               | IE                | 0.00                        |   |              |              |             |
| Liming of Agricultural Soils   | 1,058.05         | NO                | 1,058.05                    |   |              |              |             |
| Forest Soils   | NO               | -6,632.63         | -6,632.63                   |   |              |              |             |
| Other (please specify)(3)  | 1,356.67         | 0.00              | 1,356.67                    |   |              |              |             |
| Lowland Drainage   | 1,356.67         | NO                | 1,356.67                    |   |              |              |             |
|  |                  |                   | 0.00                        |   |              |              |             |
| <b>E. Other (please specify)</b>   | <b>703.55</b>    | <b>-1,100.00</b>  | <b>-396.45</b>              | <b>0.00</b>   | <b>0.00</b>  | <b>0.00</b>  | <b>0.00</b> |
| Changes in Non-forest Biomass  | NO               | -1,100.00         | -1,100.00                   |   |              |              |             |
| Peat Extraction  | 703.55           | NO                | 703.55                      |   |              |              |             |
|  |                  |                   | 0.00                        |   |              |              |             |

Table A2 10 Sectoral report for land-use change and forestry, 1999

| TABLE 5 SECTORAL REPORT FOR LAND-USE CHANGE AND FORESTRY<br>(Sheet 1 of 1) |                  |                   |                             | United Kingdom of Great Britain and Northern Ireland<br>1999<br>Submission 2003 |              |             |              |
|--|------------------|-------------------|-----------------------------|---|--------------|-------------|--------------|
| GREENHOUSE GAS SOURCE AND SINK CATEGORIES                                  | CO2 emissions    | CO2 removals      | Net CO2 emissions/ removals | CH4   | N2O          | NOx         | CO           |
| (Gg)   |                  |                   |                             |   |              |             |              |
| <b>Total Land-Use Change and Forestry</b>                                  | <b>15,375.75</b> | <b>-15,925.89</b> | <b>-550.14</b>              | <b>1.30</b>   | <b>0.01</b>  | <b>0.32</b> | <b>11.33</b> |
| <b>A. Changes in Forest and Other Woody Biomass Stocks</b>                 | <b>0.00</b>      | <b>-8,331.92</b>  | <b>-8,331.92</b>            |   |              |             |              |
| 1. Tropical Forests  | NO               | NO                | 0.00                        |   |              |             |              |
| 2. Temperate Forests   | NO               | -7,170.59         | -7,170.59                   |   |              |             |              |
| 3. Boreal Forests  | NO               | NO                | 0.00                        |   |              |             |              |
| 4. Grasslands/Tundra   | NO               | NO                | 0.00                        |   |              |             |              |
| 5. Other (please specify)  | 0.00             | -1,161.33         | -1,161.33                   |   |              |             |              |
| Harvested Wood (1)   | NO               | -1,161.33         | -1,161.33                   |   |              |             |              |
|  |                  |                   | 0.00                        |   |              |             |              |
| <b>B. Forest and Grassland Conversion (2)</b>                              | <b>296.79</b>    |                   |                             | <b>1.30</b>   | <b>0.009</b> | <b>0.32</b> | <b>11.33</b> |
| 1. Tropical Forests  | NO               |                   |                             | NO  | NO           | NO          | NO           |
| 2. Temperate Forests   | 296.79           |                   |                             | 1.30  | 0.009        | 0.32        | 11.33        |
| 3. Boreal Forests  | NO               |                   |                             | NO  | NO           | NO          | NO           |
| 4. Grasslands/Tundra   | NO               |                   |                             | NO  | NO           | NO          | NO           |
| 5. Other (please specify)  | 0.00             |                   |                             | 0.00  | 0.00         | 0.00        | 0.00         |
| <b>C. Abandonment of Managed Lands</b>                                     | <b>0.00</b>      | <b>0.00</b>       | <b>0.00</b>                 |   |              |             |              |
| 1. Tropical Forests  | NO               | NO                | 0.00                        |   |              |             |              |
| 2. Temperate Forests   | NE               | NE                | 0.00                        |   |              |             |              |
| 3. Boreal Forests  | NO               | NO                | 0.00                        |   |              |             |              |
| 4. Grasslands/Tundra   | NE               | NE                | 0.00                        |   |              |             |              |
| 5. Other (please specify)  | 0.00             | 0.00              | 0.00                        |   |              |             |              |
|  |                  |                   | 0.00                        |   |              |             |              |
| <b>D. CO2 Emissions and Removals from Soil</b>                             | <b>14,257.37</b> | <b>-6,493.97</b>  | <b>7,763.40</b>             |   |              |             |              |
| Cultivation of Mineral Soils   | 12,050.44        | IE                | 12,050.44                   |   |              |             |              |
| Cultivation of Organic Soils   | IE               | IE                | 0.00                        |   |              |             |              |
| Liming of Agricultural Soils   | 886.93           | NO                | 886.93                      |   |              |             |              |
| Forest Soils   | NO               | -6,493.97         | -6,493.97                   |   |              |             |              |
| Other (please specify)(3)  | 1,320.00         | 0.00              | 1,320.00                    |   |              |             |              |
| Lowland Drainage   | 1,320.00         | NO                | 1,320.00                    |   |              |             |              |
|  |                  |                   | 0.00                        |   |              |             |              |
| <b>E. Other (please specify)</b>   | <b>821.59</b>    | <b>-1,100.00</b>  | <b>-278.41</b>              | <b>0.00</b>   | <b>0.00</b>  | <b>0.00</b> | <b>0.00</b>  |
| Changes in Non-forest Biomass  | NO               | -1,100.00         | -1,100.00                   |   |              |             |              |
| Peat Extraction  | 821.59           | NO                | 821.59                      |   |              |             |              |
|  |                  |                   | 0.00                        |   |              |             |              |

Table A2 11 Sectoral report for land-use change and forestry, 2000

| TABLE 5 SECTORAL REPORT FOR LAND-USE CHANGE AND FORESTRY<br>(Sheet 1 of 1) |                  |                   |                             | United Kingdom of Great Britain and Northern Ireland<br>2000<br>Submission 2003 |              |             |             |
|--|------------------|-------------------|-----------------------------|---|--------------|-------------|-------------|
| GREENHOUSE GAS SOURCE AND SINK CATEGORIES                                  | CO2 emissions    | CO2 removals      | Net CO2 emissions/ removals | CH4   | N2O          | NOx         | CO          |
|  | (Gg)             |                   |                             |   |              |             |             |
| <b>Total Land-Use Change and Forestry</b>                                  | <b>15,038.44</b> | <b>-15,825.52</b> | <b>-787.08</b>              | <b>0.97</b>   | <b>0.01</b>  | <b>0.24</b> | <b>8.52</b> |
| <b>A. Changes in Forest and Other Woody Biomass Stocks</b>                 | <b>0.00</b>      | <b>-8,169.86</b>  | <b>-8,169.86</b>            |   |              |             |             |
| 1. Tropical Forests  | NO               | NO                | 0.00                        |   |              |             |             |
| 2. Temperate Forests   | NO               | -6,855.59         | -6,855.59                   |   |              |             |             |
| 3. Boreal Forests  | NO               | NO                | 0.00                        |   |              |             |             |
| 4. Grasslands/Tundra   | NO               | NO                | 0.00                        |   |              |             |             |
| 5. Other (please specify)  | 0.00             | -1,314.27         | -1,314.27                   |   |              |             |             |
| Harvested Wood (1)   | NO               | -1,314.27         | -1,314.27                   |   |              |             |             |
|  |                  |                   | 0.00                        |   |              |             |             |
| <b>B. Forest and Grassland Conversion (2)</b>                              | <b>223.22</b>    |                   |                             | <b>0.97</b>   | <b>0.007</b> | <b>0.24</b> | <b>8.52</b> |
| 1. Tropical Forests  | NO               |                   |                             | NO  | NO           | NO          | NO          |
| 2. Temperate Forests   | 223.22           |                   |                             | 0.97  | 0.007        | 0.24        | 8.52        |
| 3. Boreal Forests  | NO               |                   |                             | NO  | NO           | NO          | NO          |
| 4. Grasslands/Tundra   | NO               |                   |                             | NO  | NO           | NO          | NO          |
| 5. Other (please specify)  | 0.00             |                   |                             | 0.00  | 0.00         | 0.00        | 0.00        |
|  |                  |                   |                             |   |              |             |             |
| <b>C. Abandonment of Managed Lands</b>                                     | <b>0.00</b>      | <b>0.00</b>       | <b>0.00</b>                 |   |              |             |             |
| 1. Tropical Forests  | NO               | NO                | 0.00                        |   |              |             |             |
| 2. Temperate Forests   | NE               | NE                | 0.00                        |   |              |             |             |
| 3. Boreal Forests  | NO               | NO                | 0.00                        |   |              |             |             |
| 4. Grasslands/Tundra   | NE               | NE                | 0.00                        |   |              |             |             |
| 5. Other (please specify)  | 0.00             | 0.00              | 0.00                        |   |              |             |             |
|  |                  |                   | 0.00                        |   |              |             |             |
| <b>D. CO2 Emissions and Removals from Soil</b>                             | <b>13,999.14</b> | <b>-6,555.66</b>  | <b>7,443.48</b>             |   |              |             |             |
| Cultivation of Mineral Soils   | 11,921.63        | IE                | 11,921.63                   |   |              |             |             |
| Cultivation of Organic Soils   | IE               | IE                | 0.00                        |   |              |             |             |
| Liming of Agricultural Soils   | 794.18           | NO                | 794.18                      |   |              |             |             |
| Forest Soils   | NO               | -6,555.66         | -6,555.66                   |   |              |             |             |
| Other (please specify)(3)  | 1,283.33         | 0.00              | 1,283.33                    |   |              |             |             |
| Lowland Drainage   | 1,283.33         | NO                | 1,283.33                    |   |              |             |             |
|  |                  |                   | 0.00                        |   |              |             |             |
| <b>E. Other (please specify)</b>   | <b>816.08</b>    | <b>-1,100.00</b>  | <b>-283.92</b>              | <b>0.00</b>   | <b>0.00</b>  | <b>0.00</b> | <b>0.00</b> |
| Changes in Non-forest Biomass  | NO               | -1,100.00         | -1,100.00                   |   |              |             |             |
| Peat Extraction  | 816.08           | NO                | 816.08                      |   |              |             |             |
|  |                  |                   | 0.00                        |   |              |             |             |

Table A2 12 Sectoral report for land-use change and forestry, 2001

| TABLE 5 SECTORAL REPORT FOR LAND-USE CHANGE AND FORESTRY<br>(Sheet 1 of 1) |                  |                   |                             | United Kingdom of Great Britain and Northern Ireland<br>2001<br>Submission 2003 |              |             |             |
|--|------------------|-------------------|-----------------------------|---|--------------|-------------|-------------|
| GREENHOUSE GAS SOURCE AND SINK CATEGORIES                                  | CO2 emissions    | CO2 removals      | Net CO2 emissions/ removals | CH4   | N2O          | NOx         | CO          |
|  | (Gg)             |                   |                             |   |              |             |             |
| <b>Total Land-Use Change and Forestry</b>                                  | <b>14,866.00</b> | <b>-15,852.23</b> | <b>-986.23</b>              | <b>0.99</b>   | <b>0.01</b>  | <b>0.25</b> | <b>8.69</b> |
| <b>A. Changes in Forest and Other Woody Biomass Stocks</b>                 | <b>0.00</b>      | <b>-8,518.77</b>  | <b>-8,518.77</b>            |   |              |             |             |
| 1. Tropical Forests  | NO               | NO                | 0.00                        |   |              |             |             |
| 2. Temperate Forests   | NO               | -7,775.52         | -7,775.52                   |   |              |             |             |
| 3. Boreal Forests  | NO               | NO                | 0.00                        |   |              |             |             |
| 4. Grasslands/Tundra   | NO               | NO                | 0.00                        |   |              |             |             |
| 5. Other (please specify)  | 0.00             | -743.25           | -743.25                     |   |              |             |             |
| Harvested Wood (1)   | NO               | -743.25           | -743.25                     |   |              |             |             |
|  |                  |                   | 0.00                        |   |              |             |             |
| <b>B. Forest and Grassland Conversion (2)</b>                              | <b>227.56</b>    |                   |                             | <b>0.99</b>   | <b>0.007</b> | <b>0.25</b> | <b>8.69</b> |
| 1. Tropical Forests  | NO               |                   |                             | NO  | NO           | NO          | NO          |
| 2. Temperate Forests   | 227.56           |                   |                             | 0.99  | 0.007        | 0.25        | 8.69        |
| 3. Boreal Forests  | NO               |                   |                             | NO  | NO           | NO          | NO          |
| 4. Grasslands/Tundra   | NO               |                   |                             | NO  | NO           | NO          | NO          |
| 5. Other (please specify)  | 0.00             |                   |                             | 0.00  | 0.00         | 0.00        | 0.00        |
|  |                  |                   |                             |   |              |             |             |
| <b>C. Abandonment of Managed Lands</b>                                     | <b>0.00</b>      | <b>0.00</b>       | <b>0.00</b>                 |   |              |             |             |
| 1. Tropical Forests  | NO               | NO                | 0.00                        |   |              |             |             |
| 2. Temperate Forests   | NE               | NE                | 0.00                        |   |              |             |             |
| 3. Boreal Forests  | NO               | NO                | 0.00                        |   |              |             |             |
| 4. Grasslands/Tundra   | NE               | NE                | 0.00                        |   |              |             |             |
| 5. Other (please specify)  | 0.00             | 0.00              | 0.00                        |   |              |             |             |
|  |                  |                   | 0.00                        |   |              |             |             |
| <b>D. CO2 Emissions and Removals from Soil</b>                             | <b>13,783.76</b> | <b>-6,233.46</b>  | <b>7,550.30</b>             |   |              |             |             |
| Cultivation of Mineral Soils   | 11,797.93        | IE                | 11,797.93                   |   |              |             |             |
| Cultivation of Organic Soils   | IE               | IE                | 0.00                        |   |              |             |             |
| Liming of Agricultural Soils   | 724.50           | NO                | 724.50                      |   |              |             |             |
| Forest Soils   | NO               | -6,233.46         | -6,233.46                   |   |              |             |             |
| Other (please specify)(3)  | 1,261.33         | 0.00              | 1,261.33                    |   |              |             |             |
| Lowland Drainage   | 1,261.33         | NO                | 1,261.33                    |   |              |             |             |
|  |                  |                   | 0.00                        |   |              |             |             |
| <b>E. Other (please specify)</b>   | <b>854.68</b>    | <b>-1,100.00</b>  | <b>-245.32</b>              | <b>0.00</b>   | <b>0.00</b>  | <b>0.00</b> | <b>0.00</b> |
| Changes in Non-forest Biomass  | NO               | -1,100.00         | -1,100.00                   |   |              |             |             |
| Peat Extraction  | 854.68           | NO                | 854.68                      |   |              |             |             |
|  |                  |                   | 0.00                        |   |              |             |             |



Table A2 13 Sectoral report for land-use change and forestry, 2002

| TABLE 5 SECTORAL REPORT FOR LAND-USE CHANGE AND FORESTRY<br>(Sheet 1 of 1) |                  |                   |                             | United Kingdom of Great Britain and Northern Ireland<br>2002<br>Submission 2003 |              |             |             |
|--|------------------|-------------------|-----------------------------|---|--------------|-------------|-------------|
| GREENHOUSE GAS SOURCE AND SINK CATEGORIES                                  | CO2 emissions    | CO2 removals      | Net CO2 emissions/ removals | CH4   | N2O          | NOx         | CO          |
|  | (Gg)             |                   |                             |   |              |             |             |
| <b>Total Land-Use Change and Forestry</b>                                  | <b>14,519.78</b> | <b>-16,008.39</b> | <b>-1,488.61</b>            | <b>0.78</b>   | <b>0.01</b>  | <b>0.19</b> | <b>6.86</b> |
| <b>A. Changes in Forest and Other Woody Biomass Stocks</b>                 | <b>0.00</b>      | <b>-9,049.06</b>  | <b>-9,049.06</b>            |   |              |             |             |
| 1. Tropical Forests  | NO               | NO                | 0.00                        |   |              |             |             |
| 2. Temperate Forests   | NO               | -8,915.81         | -8,915.81                   |   |              |             |             |
| 3. Boreal Forests  | NO               | NO                | 0.00                        |   |              |             |             |
| 4. Grasslands/Tundra   | NO               | NO                | 0.00                        |   |              |             |             |
| 5. Other (please specify)  | 0.00             | -133.25           | -133.25                     |   |              |             |             |
| Harvested Wood (1)   | NO               | -133.25           | -133.25                     |   |              |             |             |
|  |                  |                   | 0.00                        |   |              |             |             |
| <b>B. Forest and Grassland Conversion (2)</b>                              | <b>179.66</b>    |                   |                             | <b>0.78</b>   | <b>0.005</b> | <b>0.19</b> | <b>6.86</b> |
| 1. Tropical Forests  | NO               |                   |                             | NO  | NO           | NO          | NO          |
| 2. Temperate Forests   | 179.66           |                   |                             | 0.78  | 0.005        | 0.19        | 6.86        |
| 3. Boreal Forests  | NO               |                   |                             | NO  | NO           | NO          | NO          |
| 4. Grasslands/Tundra   | NO               |                   |                             | NO  | NO           | NO          | NO          |
| 5. Other (please specify)  | 0.00             |                   |                             | 0.00  | 0.00         | 0.00        | 0.00        |
|  |                  |                   |                             |   |              |             |             |
| <b>C. Abandonment of Managed Lands</b>                                     | <b>0.00</b>      | <b>0.00</b>       | <b>0.00</b>                 |   |              |             |             |
| 1. Tropical Forests  | NO               | NO                | 0.00                        |   |              |             |             |
| 2. Temperate Forests   | NE               | NE                | 0.00                        |   |              |             |             |
| 3. Boreal Forests  | NO               | NO                | 0.00                        |   |              |             |             |
| 4. Grasslands/Tundra   | NE               | NE                | 0.00                        |   |              |             |             |
| 5. Other (please specify)  | 0.00             | 0.00              | 0.00                        |   |              |             |             |
|  |                  |                   | 0.00                        |   |              |             |             |
| <b>D. CO2 Emissions and Removals from Soil</b>                             | <b>13,657.20</b> | <b>-5,859.33</b>  | <b>7,797.87</b>             |   |              |             |             |
| Cultivation of Mineral Soils   | 11,679.04        | IE                | 11,679.04                   |   |              |             |             |
| Cultivation of Organic Soils   | IE               | IE                | 0.00                        |   |              |             |             |
| Liming of Agricultural Soils   | 738.83           | NO                | 738.83                      |   |              |             |             |
| Forest Soils   | NO               | -5,859.33         | -5,859.33                   |   |              |             |             |
| Other (please specify)(3)  | 1,239.33         | 0.00              | 1,239.33                    |   |              |             |             |
| Lowland Drainage   | 1,239.33         | NO                | 1,239.33                    |   |              |             |             |
|  |                  |                   | 0.00                        |   |              |             |             |
| <b>E. Other (please specify)</b>   | <b>682.92</b>    | <b>-1,100.00</b>  | <b>-417.08</b>              | <b>0.00</b>   | <b>0.00</b>  | <b>0.00</b> | <b>0.00</b> |
| Changes in Non-forest Biomass  | NO               | -1,100.00         | -1,100.00                   |   |              |             |             |
| Peat Extraction  | 682.92           | NO                | 682.92                      |   |              |             |             |
|  |                  |                   | 0.00                        |   |              |             |             |

Table A2 14 Sectoral report for land-use change and forestry, 2003

| TABLE 5 SECTORAL REPORT FOR LAND-USE CHANGE AND FORESTRY<br>(Sheet 1 of 1) |                  |                   |                             | United Kingdom of Great Britain and Northern Ireland<br>2003<br>Submission 2003 |              |             |             |
|--|------------------|-------------------|-----------------------------|---|--------------|-------------|-------------|
| GREENHOUSE GAS SOURCE AND SINK CATEGORIES                                  | CO2 emissions    | CO2 removals      | Net CO2 emissions/ removals | CH4   | N2O          | NOx         | CO          |
|  | (Gg)             |                   |                             |   |              |             |             |
| <b>Total Land-Use Change and Forestry</b>                                  | <b>14,982.16</b> | <b>-16,517.88</b> | <b>-1,535.72</b>            | <b>0.61</b>   | <b>0.00</b>  | <b>0.15</b> | <b>5.37</b> |
| <b>A. Changes in Forest and Other Woody Biomass Stocks</b>                 | <b>247.98</b>    | <b>-9,808.14</b>  | <b>-9,560.16</b>            |   |              |             |             |
| 1. Tropical Forests  | NO               | NO                | 0.00                        |   |              |             |             |
| 2. Temperate Forests   | NO               | -9,808.14         | -9,808.14                   |   |              |             |             |
| 3. Boreal Forests  | NO               | NO                | 0.00                        |   |              |             |             |
| 4. Grasslands/Tundra   | NO               | NO                | 0.00                        |   |              |             |             |
| 5. Other (please specify)  | 247.98           | 0.00              | 247.98                      |   |              |             |             |
| Harvested Wood (1)   | 247.98           | NO                | 247.98                      |   |              |             |             |
|  |                  |                   | 0.00                        |   |              |             |             |
| <b>B. Forest and Grassland Conversion (2)</b>                              | <b>140.61</b>    |                   |                             | <b>0.61</b>   | <b>0.004</b> | <b>0.15</b> | <b>5.37</b> |
| 1. Tropical Forests  | NO               |                   |                             | NO  | NO           | NO          | NO          |
| 2. Temperate Forests   | 140.61           |                   |                             | 0.61  | 0.004        | 0.15        | 5.37        |
| 3. Boreal Forests  | NO               |                   |                             | NO  | NO           | NO          | NO          |
| 4. Grasslands/Tundra   | NO               |                   |                             | NO  | NO           | NO          | NO          |
| 5. Other (please specify)  | 0.00             |                   |                             | 0.00  | 0.00         | 0.00        | 0.00        |
|  |                  |                   |                             |   |              |             |             |
| <b>C. Abandonment of Managed Lands</b>                                     | <b>0.00</b>      | <b>0.00</b>       | <b>0.00</b>                 |   |              |             |             |
| 1. Tropical Forests  | NO               | NO                | 0.00                        |   |              |             |             |
| 2. Temperate Forests   | NE               | NE                | 0.00                        |   |              |             |             |
| 3. Boreal Forests  | NO               | NO                | 0.00                        |   |              |             |             |
| 4. Grasslands/Tundra   | NE               | NE                | 0.00                        |   |              |             |             |
| 5. Other (please specify)  | 0.00             | 0.00              | 0.00                        |   |              |             |             |
|  |                  |                   | 0.00                        |   |              |             |             |
| <b>D. CO2 Emissions and Removals from Soil</b>                             | <b>13,699.68</b> | <b>-5,609.74</b>  | <b>8,089.94</b>             |   |              |             |             |
| Cultivation of Mineral Soils   | 11,564.66        | IE                | 11,564.66                   |   |              |             |             |
| Cultivation of Organic Soils   | IE               | IE                | 0.00                        |   |              |             |             |
| Liming of Agricultural Soils   | 917.69           | NO                | 917.69                      |   |              |             |             |
| Forest Soils   | NO               | -5,609.74         | -5,609.74                   |   |              |             |             |
| Other (please specify)(3)  | 1,217.33         | 0.00              | 1,217.33                    |   |              |             |             |
| Lowland Drainage   | 1,217.33         | NO                | 1,217.33                    |   |              |             |             |
|  |                  |                   | 0.00                        |   |              |             |             |
| <b>E. Other (please specify)</b>   | <b>893.89</b>    | <b>-1,100.00</b>  | <b>-206.11</b>              | <b>0.00</b>   | <b>0.00</b>  | <b>0.00</b> | <b>0.00</b> |
| Changes in Non-forest Biomass  | NO               | -1,100.00         | -1,100.00                   |   |              |             |             |
| Peat Extraction  | 893.89           | NO                | 893.89                      |   |              |             |             |
|  |                  |                   | 0.00                        |   |              |             |             |

## **APPENDIX 3**

**A.3. Sectoral Tables for Land Use Change and Forestry  
Sector submitted as UK 2003 Greenhouse Gas Inventory in  
format defined by IPCC LULUCF Good practice Guidance**



|   |       |
|---|-------|
| Table A3. 1 Emissions and Removals by Land Use, Land Use Change and Forestry<br>(Sector 5) in 1990 for United Kingdom in Sectoral Report Table Format<br>recommended by IPCC Good Practice Guidance for LULUCF. ....  | 2-91  |
| Table A3. 2 Emissions and Removals by Land Use, Land Use Change and Forestry<br>(Sector 5) in 1991 for United Kingdom in Sectoral Report Table Format<br>recommended by IPCC Good Practice Guidance for LULUCF. ....  | 2-92  |
| Table A3. 3 Emissions and Removals by Land Use, Land Use Change and Forestry<br>(Sector 5) in 1992 for United Kingdom in Sectoral Report Table Format<br>recommended by IPCC Good Practice Guidance for LULUCF. ....  | 2-93  |
| Table A3. 4 Emissions and Removals by Land Use, Land Use Change and Forestry<br>(Sector 5) in 1993 for United Kingdom in Sectoral Report Table Format<br>recommended by IPCC Good Practice Guidance for LULUCF. ....  | 2-94  |
| Table A3. 5 Emissions and Removals by Land Use, Land Use Change and Forestry<br>(Sector 5) in 1994 for United Kingdom in Sectoral Report Table Format<br>recommended by IPCC Good Practice Guidance for LULUCF. ....  | 2-95  |
| Table A3. 6 Emissions and Removals by Land Use, Land Use Change and Forestry<br>(Sector 5) in 1995 for United Kingdom in Sectoral Report Table Format<br>recommended by IPCC Good Practice Guidance for LULUCF. ....  | 2-96  |
| Table A3. 7 Emissions and Removals by Land Use, Land Use Change and Forestry<br>(Sector 5) in 1996 for United Kingdom in Sectoral Report Table Format<br>recommended by IPCC Good Practice Guidance for LULUCF. ....  | 2-97  |
| Table A3. 8 Emissions and Removals by Land Use, Land Use Change and Forestry<br>(Sector 5) in 1997 for United Kingdom in Sectoral Report Table Format<br>recommended by IPCC Good Practice Guidance for LULUCF. ....  | 2-98  |
| Table A3. 9 Emissions and Removals by Land Use, Land Use Change and Forestry<br>(Sector 5) in 1998 for United Kingdom in Sectoral Report Table Format<br>recommended by IPCC Good Practice Guidance for LULUCF. ....  | 2-99  |
| Table A3. 10 Emissions and Removals by Land Use, Land Use Change and Forestry<br>(Sector 5) in 1999 for United Kingdom in Sectoral Report Table Format<br>recommended by IPCC Good Practice Guidance for LULUCF. .... | 2-100 |
| Table A3. 11 Emissions and Removals by Land Use, Land Use Change and Forestry<br>(Sector 5) in 2000 for United Kingdom in Sectoral Report Table Format<br>recommended by IPCC Good Practice Guidance for LULUCF. .... | 2-101 |
| Table A3. 12 Emissions and Removals by Land Use, Land Use Change and Forestry<br>(Sector 5) in 2001 for United Kingdom in Sectoral Report Table Format<br>recommended by IPCC Good Practice Guidance for LULUCF. .... | 2-102 |
| Table A3. 13 Emissions and Removals by Land Use, Land Use Change and Forestry<br>(Sector 5) in 2002 for United Kingdom in Sectoral Report Table Format<br>recommended by IPCC Good Practice Guidance for LULUCF. .... | 2-103 |
| Table A3. 14 Emissions and Removals by Land Use, Land Use Change and Forestry<br>(Sector 5) in 2003 for United Kingdom in Sectoral Report Table Format<br>recommended by IPCC Good Practice Guidance for LULUCF. .... | 2-104 |



Table A3. 1 Emissions and Removals by Land Use, Land Use Change and Forestry (Sector 5) in 1990 for United Kingdom in Sectoral Report Table Format recommended by IPCC Good Practice Guidance for LULUCF.

| GREENHOUSE GAS SOURCE AND SINK CATEGORIES          | Net CO <sub>2</sub> emissions/ removals | CH <sub>4</sub> | N <sub>2</sub> O |
|--|---|-----------------|------------------|
|  | (Gg)                                    |                 |                  |
| <b>Total Land-Use Categories</b>                   | 2645.25                                 | 0.72            | 0.005            |
| <b>A. Forest Land</b>                              | -12225.76                               | 0.00            | 0.00             |
| 1. Forest Land remaining Forest Land               | 0.00                                    | 0.00            | 0.00             |
| 2. Land converted to Forest Land                   | -12225.76                               | 0.00            | 0.00             |
| <b>B. Cropland</b>                                 | 15543.69                                | 0.00            | 0.00             |
| 1. Cropland remaining Cropland                     | 1650.00                                 | 0.00            | 0.00             |
| 2. Land converted to Cropland                      | 13126.79                                | 0.00            | 0.00             |
| <b>C. Grassland</b>                                | -4929.31                                | 0.00            | 0.00             |
| 1. Grassland remaining Grassland                   | 791.57                                  | 0.00            | 0.00             |
| 2. Land converted to Grassland                     | -6384.42                                | 0.00            | 0.00             |
| <b>D. Wetlands</b>                                 | 0.00                                    | 0.00            | 0.00             |
| 1. Wetlands remaining Wetlands                     | 0.00                                    | 0.00            | 0.00             |
| 2. Land converted to Wetlands                      | 0.00                                    | 0.00            | 0.00             |
| <b>E. Settlements</b>                              | 6943.64                                 | 0.72            | 0.01             |
| 1. Settlements remaining Settlements               | 0.00                                    | NO              | NO               |
| 2. Land converted to Settlements                   | 6943.64                                 | 0.72            | 0.005            |
| <b>F. Other Land</b>                               | 0.00                                    | 0.00            | 0.00             |
| 1. Other Land remaining Other Land                 |   | NO              | NO               |
| 2. Land converted to Other Land                    | 0.00                                    | NO              | NO               |
| <b>G. Other (please specify)</b>                   | -2687.02                                | 0.00            | 0.00             |
| <i>Harvested Wood Products (6)</i>                 | -1587.02                                | NO              | NO               |
| Changes in non-forest biomass                      | -1100.00                                | NO              | NO               |
|  |   |                 |                  |
| <b>Information items</b>                           |   |                 |                  |
| Forest Land converted to other Land-Use Categories | 742.33                                  | 0.72            | 0.005            |
| Grassland converted to other Land-Use Categories   | NO                                      | NO              | NO               |

Table A3. 2 Emissions and Removals by Land Use, Land Use Change and Forestry (Sector 5) in 1991 for United Kingdom in Sectoral Report Table Format recommended by IPCC Good Practice Guidance for LULUCF.

| GREENHOUSE GAS SOURCE AND SINK CATEGORIES          | Net CO <sub>2</sub> emissions/ removals | CH <sub>4</sub> | N <sub>2</sub> O |
|--|---|-----------------|------------------|
|  | (Gg)                                    |                 |                  |
| <b>Total Land-Use Categories</b>                   | 2589.58                                 | 0.60            | 0.004            |
| <b>A. Forest Land</b>                              | -12616.36                               | 0.00            | 0.00             |
| 1. Forest Land remaining Forest Land               | 0.00                                    | 0.00            | 0.00             |
| 2. Land converted to Forest Land                   | -12616.36                               | 0.00            | 0.00             |
| <b>B. Cropland</b>                                 | 15693.14                                | 0.00            | 0.00             |
| 1. Cropland remaining Cropland                     | 1613.33                                 | 0.00            | 0.00             |
| 2. Land converted to Cropland                      | 13129.82                                | 0.00            | 0.00             |
| <b>C. Grassland</b>                                | -4886.40                                | 0.00            | 0.00             |
| 1. Grassland remaining Grassland                   | 802.60                                  | 0.00            | 0.00             |
| 2. Land converted to Grassland                     | -6510.96                                | 0.00            | 0.00             |
| <b>D. Wetlands</b>                                 | 0.00                                    | 0.00            | 0.00             |
| 1. Wetlands remaining Wetlands                     | 0.00                                    | 0.00            | 0.00             |
| 2. Land converted to Wetlands                      | 0.00                                    | 0.00            | 0.00             |
| <b>E. Settlements</b>                              | 6843.54                                 | 0.60            | 0.00             |
| 1. Settlements remaining Settlements               | 0.00                                    | NO              | NO               |
| 2. Land converted to Settlements                   | 6843.54                                 | 0.60            | 0.004            |
| <b>F. Other Land</b>                               | 0.00                                    | 0.00            | 0.00             |
| 1. Other Land remaining Other Land                 |   | NO              | NO               |
| 2. Land converted to Other Land                    | 0.00                                    | NO              | NO               |
| <b>G. Other (please specify)</b>                   | -2444.34                                | 0.00            | 0.00             |
| <i>Harvested Wood Products (6)</i>                 | -1344.34                                | NO              | NO               |
| Changes in non-forest biomass                      | -1100.00                                | NO              | NO               |
|  |   |                 |                  |
| <b>Information items</b>                           |   |                 |                  |
| Forest Land converted to other Land-Use Categories | 698.30                                  | 0.60            | 0.004            |
| Grassland converted to other Land-Use Categories   | NO                                      | NO              | NO               |



Table A3. 3 Emissions and Removals by Land Use, Land Use Change and Forestry (Sector 5) in 1992 for United Kingdom in Sectoral Report Table Format recommended by IPCC Good Practice Guidance for LULUCF.

| GREENHOUSE GAS SOURCE AND SINK CATEGORIES          | Net CO <sub>2</sub> emissions/ removals | CH <sub>4</sub> | N <sub>2</sub> O |
|--|---|-----------------|------------------|
|  | (Gg)                                    |                 |                  |
| <b>Total Land-Use Categories</b>                   | 2075.89                                 | 0.47            | 0.003            |
| <b>A. Forest Land</b>                              | -13117.57                               | 0.00            | 0.00             |
| 1. Forest Land remaining Forest Land               | 0.00                                    | 0.00            | 0.00             |
| 2. Land converted to Forest Land                   | -13117.57                               | 0.00            | 0.00             |
| <b>B. Cropland</b>                                 | 15681.21                                | 0.00            | 0.00             |
| 1. Cropland remaining Cropland                     | 1576.67                                 | 0.00            | 0.00             |
| 2. Land converted to Cropland                      | 13134.38                                | 0.00            | 0.00             |
| <b>C. Grassland</b>                                | -5003.27                                | 0.00            | 0.00             |
| 1. Grassland remaining Grassland                   | 791.57                                  | 0.00            | 0.00             |
| 2. Land converted to Grassland                     | -6634.26                                | 0.00            | 0.00             |
| <b>D. Wetlands</b>                                 | 0.00                                    | 0.00            | 0.00             |
| 1. Wetlands remaining Wetlands                     | 0.00                                    | 0.00            | 0.00             |
| 2. Land converted to Wetlands                      | 0.00                                    | 0.00            | 0.00             |
| <b>E. Settlements</b>                              | 6745.90                                 | 0.47            | 0.00             |
| 1. Settlements remaining Settlements               | 0.00                                    | NO              | NO               |
| 2. Land converted to Settlements                   | 6745.90                                 | 0.47            | 0.003            |
| <b>F. Other Land</b>                               | 0.00                                    | 0.00            | 0.00             |
| 1. Other Land remaining Other Land                 |   | NO              | NO               |
| 2. Land converted to Other Land                    | 0.00                                    | NO              | NO               |
| <b>G. Other (please specify)</b>                   | -2230.39                                | 0.00            | 0.00             |
| <i>Harvested Wood Products (6)</i>                 | -1130.39                                | NO              | NO               |
| Changes in non-forest biomass                      | -1100.00                                | NO              | NO               |
|  |   |                 |                  |
| <b>Information items</b>                           |   |                 |                  |
| Forest Land converted to other Land-Use Categories | 652.92                                  | 0.47            | 0.003            |
| Grassland converted to other Land-Use Categories   | NO                                      | NO              | NO               |

Table A3. 4 Emissions and Removals by Land Use, Land Use Change and Forestry (Sector 5) in 1993 for United Kingdom in Sectoral Report Table Format recommended by IPCC Good Practice Guidance for LULUCF.

| GREENHOUSE GAS SOURCE AND SINK CATEGORIES          | Net CO <sub>2</sub> emissions/ removals | CH <sub>4</sub> | N <sub>2</sub> O |
|--|---|-----------------|------------------|
|  | (Gg)                                    |                 |                  |
| <b>Total Land-Use Categories</b>                   | 898.71                                  | 0.54            | 0.004            |
| <b>A. Forest Land</b>                              | -13478.09                               | 0.00            | 0.00             |
| 1. Forest Land remaining Forest Land               | 0.00                                    | 0.00            | 0.00             |
| 2. Land converted to Forest Land                   | -13478.09                               | 0.00            | 0.00             |
| <b>B. Cropland</b>                                 | 15286.27                                | 0.00            | 0.00             |
| 1. Cropland remaining Cropland                     | 1540.00                                 | 0.00            | 0.00             |
| 2. Land converted to Cropland                      | 13140.27                                | 0.00            | 0.00             |
| <b>C. Grassland</b>                                | -5449.55                                | 0.00            | 0.00             |
| 1. Grassland remaining Grassland                   | 780.54                                  | 0.00            | 0.00             |
| 2. Land converted to Grassland                     | -6754.42                                | 0.00            | 0.00             |
| <b>D. Wetlands</b>                                 | 0.00                                    | 0.00            | 0.00             |
| 1. Wetlands remaining Wetlands                     | 0.00                                    | 0.00            | 0.00             |
| 2. Land converted to Wetlands                      | 0.00                                    | 0.00            | 0.00             |
| <b>E. Settlements</b>                              | 6698.91                                 | 0.54            | 0.00             |
| 1. Settlements remaining Settlements               | 0.00                                    | NO              | NO               |
| 2. Land converted to Settlements                   | 6698.91                                 | 0.54            | 0.004            |
| <b>F. Other Land</b>                               | 0.00                                    | 0.00            | 0.00             |
| 1. Other Land remaining Other Land                 |   | NO              | NO               |
| 2. Land converted to Other Land                    | 0.00                                    | NO              | NO               |
| <b>G. Other (please specify)</b>                   | -2158.82                                | 0.00            | 0.00             |
| <i>Harvested Wood Products (6)</i>                 | -1058.82                                | NO              | NO               |
| Changes in non-forest biomass                      | -1100.00                                | NO              | NO               |
|  |   |                 |                  |
| <b>Information items</b>                           |   |                 |                  |
| Forest Land converted to other Land-Use Categories | 654.68                                  | 0.54            | 0.004            |
| Grassland converted to other Land-Use Categories   | NO                                      | NO              | NO               |

Table A3. 5 Emissions and Removals by Land Use, Land Use Change and Forestry (Sector 5) in 1994 for United Kingdom in Sectoral Report Table Format recommended by IPCC Good Practice Guidance for LULUCF.

| GREENHOUSE GAS SOURCE AND SINK CATEGORIES          | Net CO <sub>2</sub> emissions/ removals | CH <sub>4</sub> | N <sub>2</sub> O |
|--|---|-----------------|------------------|
|  | (Gg)                                    |                 |                  |
| <b>Total Land-Use Categories</b>                   | 684.94                                  | 0.57            | 0.004            |
| <b>A. Forest Land</b>                              | -13857.83                               | 0.00            | 0.00             |
| 1. Forest Land remaining Forest Land               | 0.00                                    | 0.00            | 0.00             |
| 2. Land converted to Forest Land                   | -13857.83                               | 0.00            | 0.00             |
| <b>B. Cropland</b>                                 | 15331.43                                | 0.00            | 0.00             |
| 1. Cropland remaining Cropland                     | 1503.33                                 | 0.00            | 0.00             |
| 2. Land converted to Cropland                      | 13147.32                                | 0.00            | 0.00             |
| <b>C. Grassland</b>                                | -5393.73                                | 0.00            | 0.00             |
| 1. Grassland remaining Grassland                   | 888.79                                  | 0.00            | 0.00             |
| 2. Land converted to Grassland                     | -6871.55                                | 0.00            | 0.00             |
| <b>D. Wetlands</b>                                 | 0.00                                    | 0.00            | 0.00             |
| 1. Wetlands remaining Wetlands                     | 0.00                                    | 0.00            | 0.00             |
| 2. Land converted to Wetlands                      | 0.00                                    | 0.00            | 0.00             |
| <b>E. Settlements</b>                              | 6647.37                                 | 0.57            | 0.00             |
| 1. Settlements remaining Settlements               | 0.00                                    | NO              | NO               |
| 2. Land converted to Settlements                   | 6647.37                                 | 0.57            | 0.004            |
| <b>F. Other Land</b>                               | 0.00                                    | 0.00            | 0.00             |
| 1. Other Land remaining Other Land                 |   | NO              | NO               |
| 2. Land converted to Other Land                    | 0.00                                    | NO              | NO               |
| <b>G. Other (please specify)</b>                   | -2042.31                                | 0.00            | 0.00             |
| <i>Harvested Wood Products (6)</i>                 | -942.31                                 | NO              | NO               |
| Changes in non-forest biomass                      | -1100.00                                | NO              | NO               |
|  |   |                 |                  |
| <b>Information items</b>                           |   |                 |                  |
| Forest Land converted to other Land-Use Categories | 648.63                                  | 0.57            | 0.004            |
| Grassland converted to other Land-Use Categories   | NO                                      | NO              | NO               |

Table A3. 6 Emissions and Removals by Land Use, Land Use Change and Forestry (Sector 5) in 1995 for United Kingdom in Sectoral Report Table Format recommended by IPCC Good Practice Guidance for LULUCF.

| GREENHOUSE GAS SOURCE AND SINK CATEGORIES          | Net CO <sub>2</sub> emissions/ removals | CH <sub>4</sub> | N <sub>2</sub> O |
|--|---|-----------------|------------------|
|  | (Gg)                                    |                 |                  |
| <b>Total Land-Use Categories</b>                   | 786.99                                  | 0.70            | 0.005            |
| <b>A. Forest Land</b>                              | -13727.12                               | 0.00            | 0.00             |
| 1. Forest Land remaining Forest Land               | 0.00                                    | 0.00            | 0.00             |
| 2. Land converted to Forest Land                   | -13727.12                               | 0.00            | 0.00             |
| <b>B. Cropland</b>                                 | 15441.99                                | 0.00            | 0.00             |
| 1. Cropland remaining Cropland                     | 1466.67                                 | 0.00            | 0.00             |
| 2. Land converted to Cropland                      | 13155.35                                | 0.00            | 0.00             |
| <b>C. Grassland</b>                                | -5326.43                                | 0.00            | 0.00             |
| 1. Grassland remaining Grassland                   | 949.85                                  | 0.00            | 0.00             |
| 2. Land converted to Grassland                     | -6985.75                                | 0.00            | 0.00             |
| <b>D. Wetlands</b>                                 | 0.00                                    | 0.00            | 0.00             |
| 1. Wetlands remaining Wetlands                     | 0.00                                    | 0.00            | 0.00             |
| 2. Land converted to Wetlands                      | 0.00                                    | 0.00            | 0.00             |
| <b>E. Settlements</b>                              | 6621.31                                 | 0.70            | 0.01             |
| 1. Settlements remaining Settlements               | 0.00                                    | NO              | NO               |
| 2. Land converted to Settlements                   | 6621.31                                 | 0.70            | 0.005            |
| <b>F. Other Land</b>                               | 0.00                                    | 0.00            | 0.00             |
| 1. Other Land remaining Other Land                 |   | NO              | NO               |
| 2. Land converted to Other Land                    | 0.00                                    | NO              | NO               |
| <b>G. Other (please specify)</b>                   | -2222.76                                | 0.00            | 0.00             |
| <i>Harvested Wood Products (6)</i>                 | -1122.76                                | NO              | NO               |
| Changes in non-forest biomass                      | -1100.00                                | NO              | NO               |
|  |   |                 |                  |
| <b>Information items</b>                           |   |                 |                  |
| Forest Land converted to other Land-Use Categories | 665.05                                  | 0.70            | 0.005            |
| Grassland converted to other Land-Use Categories   | NO                                      | NO              | NO               |

Table A3. 7 Emissions and Removals by Land Use, Land Use Change and Forestry (Sector 5) in 1996 for United Kingdom in Sectoral Report Table Format recommended by IPCC Good Practice Guidance for LULUCF.

| GREENHOUSE GAS SOURCE AND SINK CATEGORIES          | Net CO <sub>2</sub> emissions/ removals | CH <sub>4</sub> | N <sub>2</sub> O |
|--|---|-----------------|------------------|
|  | (Gg)                                    |                 |                  |
| <b>Total Land-Use Categories</b>                   | 615.51                                  | 0.81            | 0.006            |
| <b>A. Forest Land</b>                              | -13660.77                               | 0.00            | 0.00             |
| 1. Forest Land remaining Forest Land               | 0.00                                    | 0.00            | 0.00             |
| 2. Land converted to Forest Land                   | -13660.77                               | 0.00            | 0.00             |
| <b>B. Cropland</b>                                 | 15406.55                                | 0.00            | 0.00             |
| 1. Cropland remaining Cropland                     | 1430.00                                 | 0.00            | 0.00             |
| 2. Land converted to Cropland                      | 13164.23                                | 0.00            | 0.00             |
| <b>C. Grassland</b>                                | -5525.30                                | 0.00            | 0.00             |
| 1. Grassland remaining Grassland                   | 868.98                                  | 0.00            | 0.00             |
| 2. Land converted to Grassland                     | -7097.12                                | 0.00            | 0.00             |
| <b>D. Wetlands</b>                                 | 0.00                                    | 0.00            | 0.00             |
| 1. Wetlands remaining Wetlands                     | 0.00                                    | 0.00            | 0.00             |
| 2. Land converted to Wetlands                      | 0.00                                    | 0.00            | 0.00             |
| <b>E. Settlements</b>                              | 6592.88                                 | 0.81            | 0.01             |
| 1. Settlements remaining Settlements               | 0.00                                    | NO              | NO               |
| 2. Land converted to Settlements                   | 6592.88                                 | 0.81            | 0.006            |
| <b>F. Other Land</b>                               | 0.00                                    | 0.00            | 0.00             |
| 1. Other Land remaining Other Land                 |   | NO              | NO               |
| 2. Land converted to Other Land                    | 0.00                                    | NO              | NO               |
| <b>G. Other (please specify)</b>                   | -2197.85                                | 0.00            | 0.00             |
| <i>Harvested Wood Products (6)</i>                 | -1097.85                                | NO              | NO               |
| Changes in non-forest biomass                      | -1100.00                                | NO              | NO               |
|  |   |                 |                  |
| <b>Information items</b>                           |   |                 |                  |
| Forest Land converted to other Land-Use Categories | 676.25                                  | 0.81            | 0.006            |
| Grassland converted to other Land-Use Categories   | NO                                      | NO              | NO               |

Table A3. 8 Emissions and Removals by Land Use, Land Use Change and Forestry (Sector 5) in 1997 for United Kingdom in Sectoral Report Table Format recommended by IPCC Good Practice Guidance for LULUCF.

| GREENHOUSE GAS SOURCE AND SINK CATEGORIES          | Net CO <sub>2</sub> emissions/ removals | CH <sub>4</sub> | N <sub>2</sub> O |
|--|---|-----------------|------------------|
|  | (Gg)                                    |                 |                  |
| <b>Total Land-Use Categories</b>                   | 211.21                                  | 0.66            | 0.005            |
| <b>A. Forest Land</b>                              | -13527.43                               | 0.00            | 0.00             |
| 1. Forest Land remaining Forest Land               | 0.00                                    | 0.00            | 0.00             |
| 2. Land converted to Forest Land                   | -13527.43                               | 0.00            | 0.00             |
| <b>B. Cropland</b>                                 | 15288.99                                | 0.00            | 0.00             |
| 1. Cropland remaining Cropland                     | 1393.33                                 | 0.00            | 0.00             |
| 2. Land converted to Cropland                      | 13173.83                                | 0.00            | 0.00             |
| <b>C. Grassland</b>                                | -5766.34                                | 0.00            | 0.00             |
| 1. Grassland remaining Grassland                   | 814.85                                  | 0.00            | 0.00             |
| 2. Land converted to Grassland                     | -7205.74                                | 0.00            | 0.00             |
| <b>D. Wetlands</b>                                 | 0.00                                    | 0.00            | 0.00             |
| 1. Wetlands remaining Wetlands                     | 0.00                                    | 0.00            | 0.00             |
| 2. Land converted to Wetlands                      | 0.00                                    | 0.00            | 0.00             |
| <b>E. Settlements</b>                              | 6511.33                                 | 0.66            | 0.01             |
| 1. Settlements remaining Settlements               | 0.00                                    | NO              | NO               |
| 2. Land converted to Settlements                   | 6511.33                                 | 0.66            | 0.005            |
| <b>F. Other Land</b>                               | 0.00                                    | 0.00            | 0.00             |
| 1. Other Land remaining Other Land                 |   | NO              | NO               |
| 2. Land converted to Other Land                    | 0.00                                    | NO              | NO               |
| <b>G. Other (please specify)</b>                   | -2295.34                                | 0.00            | 0.00             |
| <i>Harvested Wood Products (6)</i>                 | -1195.34                                | NO              | NO               |
| Changes in non-forest biomass                      | -1100.00                                | NO              | NO               |
|  |   |                 |                  |
| <b>Information items</b>                           |   |                 |                  |
| Forest Land converted to other Land-Use Categories | 631.75                                  | 0.66            | 0.005            |
| Grassland converted to other Land-Use Categories   | NO                                      | NO              | NO               |

Table A3. 9 Emissions and Removals by Land Use, Land Use Change and Forestry (Sector 5) in 1998 for United Kingdom in Sectoral Report Table Format recommended by IPCC Good Practice Guidance for LULUCF.

| GREENHOUSE GAS SOURCE AND SINK CATEGORIES          | Net CO <sub>2</sub> emissions/ removals | CH <sub>4</sub> | N <sub>2</sub> O |
|--|---|-----------------|------------------|
|  | (Gg)                                    |                 |                  |
| <b>Total Land-Use Categories</b>                   | -385.43                                 | 0.69            | 0.005            |
| <b>A. Forest Land</b>                              | -13459.50                               | 0.00            | 0.00             |
| 1. Forest Land remaining Forest Land               | 0.00                                    | 0.00            | 0.00             |
| 2. Land converted to Forest Land                   | -13459.50                               | 0.00            | 0.00             |
| <b>B. Cropland</b>                                 | 15107.94                                | 0.00            | 0.00             |
| 1. Cropland remaining Cropland                     | 1356.67                                 | 0.00            | 0.00             |
| 2. Land converted to Cropland                      | 13184.03                                | 0.00            | 0.00             |
| <b>C. Grassland</b>                                | -6117.37                                | 0.00            | 0.00             |
| 1. Grassland remaining Grassland                   | 703.55                                  | 0.00            | 0.00             |
| 2. Land converted to Grassland                     | -7311.72                                | 0.00            | 0.00             |
| <b>D. Wetlands</b>                                 | 0.00                                    | 0.00            | 0.00             |
| 1. Wetlands remaining Wetlands                     | 0.00                                    | 0.00            | 0.00             |
| 2. Land converted to Wetlands                      | 0.00                                    | 0.00            | 0.00             |
| <b>E. Settlements</b>                              | 6472.87                                 | 0.69            | 0.01             |
| 1. Settlements remaining Settlements               | 0.00                                    | NO              | NO               |
| 2. Land converted to Settlements                   | 6472.87                                 | 0.69            | 0.005            |
| <b>F. Other Land</b>                               | 0.00                                    | 0.00            | 0.00             |
| 1. Other Land remaining Other Land                 |   | NO              | NO               |
| 2. Land converted to Other Land                    | 0.00                                    | NO              | NO               |
| <b>G. Other (please specify)</b>                   | -2389.36                                | 0.00            | 0.00             |
| <i>Harvested Wood Products (6)</i>                 | -1289.36                                | NO              | NO               |
| Changes in non-forest biomass                      | -1100.00                                | NO              | NO               |
|  |   |                 |                  |
| <b>Information items</b>                           |   |                 |                  |
| Forest Land converted to other Land-Use Categories | 627.88                                  | 0.69            | 0.005            |
| Grassland converted to other Land-Use Categories   | NO                                      | NO              | NO               |

Table A3. 10 Emissions and Removals by Land Use, Land Use Change and Forestry (Sector 5) in 1999 for United Kingdom in Sectoral Report Table Format recommended by IPCC Good Practice Guidance for LULUCF.

| GREENHOUSE GAS SOURCE AND SINK CATEGORIES          | Net CO <sub>2</sub> emissions/ removals | CH <sub>4</sub> | N <sub>2</sub> O |
|--|---|-----------------|------------------|
|  | (Gg)                                    |                 |                  |
| <b>Total Land-Use Categories</b>                   | -550.14                                 | 1.30            | 0.009            |
| <b>A. Forest Land</b>                              | -13664.56                               | 0.00            | 0.00             |
| 1. Forest Land remaining Forest Land               | 0.00                                    | 0.00            | 0.00             |
| 2. Land converted to Forest Land                   | -13664.56                               | 0.00            | 0.00             |
| <b>B. Cropland</b>                                 | 14990.22                                | 0.00            | 0.00             |
| 1. Cropland remaining Cropland                     | 1320.00                                 | 0.00            | 0.00             |
| 2. Land converted to Cropland                      | 13194.71                                | 0.00            | 0.00             |
| <b>C. Grassland</b>                                | -6182.11                                | 0.00            | 0.00             |
| 1. Grassland remaining Grassland                   | 821.59                                  | 0.00            | 0.00             |
| 2. Land converted to Grassland                     | -7415.13                                | 0.00            | 0.00             |
| <b>D. Wetlands</b>                                 | 0.00                                    | 0.00            | 0.00             |
| 1. Wetlands remaining Wetlands                     | 0.00                                    | 0.00            | 0.00             |
| 2. Land converted to Wetlands                      | 0.00                                    | 0.00            | 0.00             |
| <b>E. Settlements</b>                              | 6567.64                                 | 1.30            | 0.01             |
| 1. Settlements remaining Settlements               | 0.00                                    | NO              | NO               |
| 2. Land converted to Settlements                   | 6567.64                                 | 1.30            | 0.009            |
| <b>F. Other Land</b>                               | 0.00                                    | 0.00            | 0.00             |
| 1. Other Land remaining Other Land                 |   | NO              | NO               |
| 2. Land converted to Other Land                    | 0.00                                    | NO              | NO               |
| <b>G. Other (please specify)</b>                   | -2261.33                                | 0.00            | 0.00             |
| <i>Harvested Wood Products (6)</i>                 | -1161.33                                | NO              | NO               |
| Changes in non-forest biomass                      | -1100.00                                | NO              | NO               |
|  |   |                 |                  |
| <b>Information items</b>                           |   |                 |                  |
| Forest Land converted to other Land-Use Categories | 754.97                                  | 1.30            | 0.009            |
| Grassland converted to other Land-Use Categories   | NO                                      | NO              | NO               |



Table A3. 11 Emissions and Removals by Land Use, Land Use Change and Forestry (Sector 5) in 2000 for United Kingdom in Sectoral Report Table Format recommended by IPCC Good Practice Guidance for LULUCF.

| GREENHOUSE GAS SOURCE AND SINK CATEGORIES          | Net CO <sub>2</sub> emissions/ removals | CH <sub>4</sub> | N <sub>2</sub> O |
|--|---|-----------------|------------------|
|  | (Gg)                                    |                 |                  |
| <b>Total Land-Use Categories</b>                   | -787.09                                 | 0.97            | 0.007            |
| <b>A. Forest Land</b>                              | -13411.25                               | 0.00            | 0.00             |
| 1. Forest Land remaining Forest Land               | 0.00                                    | 0.00            | 0.00             |
| 2. Land converted to Forest Land                   | -13411.25                               | 0.00            | 0.00             |
| <b>B. Cropland</b>                                 | 14916.50                                | 0.00            | 0.00             |
| 1. Cropland remaining Cropland                     | 1283.33                                 | 0.00            | 0.00             |
| 2. Land converted to Cropland                      | 13207.39                                | 0.00            | 0.00             |
| <b>C. Grassland</b>                                | -6332.64                                | 0.00            | 0.00             |
| 1. Grassland remaining Grassland                   | 816.08                                  | 0.00            | 0.00             |
| 2. Land converted to Grassland                     | -7517.11                                | 0.00            | 0.00             |
| <b>D. Wetlands</b>                                 | 0.00                                    | 0.00            | 0.00             |
| 1. Wetlands remaining Wetlands                     | 0.00                                    | 0.00            | 0.00             |
| 2. Land converted to Wetlands                      | 0.00                                    | 0.00            | 0.00             |
| <b>E. Settlements</b>                              | 6454.57                                 | 0.97            | 0.01             |
| 1. Settlements remaining Settlements               | 0.00                                    | NO              | NO               |
| 2. Land converted to Settlements                   | 6454.57                                 | 0.97            | 0.007            |
| <b>F. Other Land</b>                               | 0.00                                    | 0.00            | 0.00             |
| 1. Other Land remaining Other Land                 |   | NO              | NO               |
| 2. Land converted to Other Land                    | 0.00                                    | NO              | NO               |
| <b>G. Other (please specify)</b>                   | -2414.27                                | 0.00            | 0.00             |
| <i>Harvested Wood Products (6)</i>                 | -1314.27                                | NO              | NO               |
| Changes in non-forest biomass                      | -1100.00                                | NO              | NO               |
|  |   |                 |                  |
| <b>Information items</b>                           |   |                 |                  |
| Forest Land converted to other Land-Use Categories | 671.61                                  | 0.97            | 0.007            |
| Grassland converted to other Land-Use Categories   | NO                                      | NO              | NO               |

Table A3. 12 Emissions and Removals by Land Use, Land Use Change and Forestry (Sector 5) in 2001 for United Kingdom in Sectoral Report Table Format recommended by IPCC Good Practice Guidance for LULUCF.

| GREENHOUSE GAS SOURCE AND SINK CATEGORIES          | Net CO <sub>2</sub> emissions/ removals | CH <sub>4</sub> | N <sub>2</sub> O |
|--|---|-----------------|------------------|
|  | (Gg)                                    |                 |                  |
| <b>Total Land-Use Categories</b>                   | -986.24                                 | 0.99            | 0.005            |
| <b>A. Forest Land</b>                              | -14008.99                               | 0.00            | 0.00             |
| 1. Forest Land remaining Forest Land               | 0.00                                    | 0.00            | 0.00             |
| 2. Land converted to Forest Land                   | -14008.99                               | 0.00            | 0.00             |
| <b>B. Cropland</b>                                 | 14870.05                                | 0.00            | 0.00             |
| 1. Cropland remaining Cropland                     | 1261.33                                 | 0.00            | 0.00             |
| 2. Land converted to Cropland                      | 13220.29                                | 0.00            | 0.00             |
| <b>C. Grassland</b>                                | -6425.91                                | 0.00            | 0.00             |
| 1. Grassland remaining Grassland                   | 854.68                                  | 0.00            | 0.00             |
| 2. Land converted to Grassland                     | -7616.66                                | 0.00            | 0.00             |
| <b>D. Wetlands</b>                                 | 0.00                                    | 0.00            | 0.00             |
| 1. Wetlands remaining Wetlands                     | 0.00                                    | 0.00            | 0.00             |
| 2. Land converted to Wetlands                      | 0.00                                    | 0.00            | 0.00             |
| <b>E. Settlements</b>                              | 6421.86                                 | 0.99            | 0.01             |
| 1. Settlements remaining Settlements               | 0.00                                    | NO              | NO               |
| 2. Land converted to Settlements                   | 6421.86                                 | 0.99            | 0.005            |
| <b>F. Other Land</b>                               | 0.00                                    | 0.00            | 0.00             |
| 1. Other Land remaining Other Land                 |   | NO              | NO               |
| 2. Land converted to Other Land                    | 0.00                                    | NO              | NO               |
| <b>G. Other (please specify)</b>                   | -1843.25                                | 0.00            | 0.00             |
| <i>Harvested Wood Products (6)</i>                 | -743.25                                 | NO              | NO               |
| Changes in non-forest biomass                      | -1100.00                                | NO              | NO               |
|  |   |                 |                  |
| <b>Information items</b>                           |   |                 |                  |
| Forest Land converted to other Land-Use Categories | 666.66                                  | 0.99            | 0.005            |
| Grassland converted to other Land-Use Categories   | NO                                      | NO              | NO               |

Table A3. 13 Emissions and Removals by Land Use, Land Use Change and Forestry (Sector 5) in 2002 for United Kingdom in Sectoral Report Table Format recommended by IPCC Good Practice Guidance for LULUCF.

| GREENHOUSE GAS SOURCE AND SINK CATEGORIES          | Net CO <sub>2</sub> emissions/ removals | CH <sub>4</sub> | N <sub>2</sub> O |
|--|---|-----------------|------------------|
|  | (Gg)                                    |                 |                  |
| <b>Total Land-Use Categories</b>                   | -1488.63                                | 0.78            | 0.005            |
| <b>A. Forest Land</b>                              | -14775.15                               | 0.00            | 0.00             |
| 1. Forest Land remaining Forest Land               | 0.00                                    | 0.00            | 0.00             |
| 2. Land converted to Forest Land                   | -14775.15                               | 0.00            | 0.00             |
| <b>B. Cropland</b>                                 | 14868.79                                | 0.00            | 0.00             |
| 1. Cropland remaining Cropland                     | 1239.33                                 | 0.00            | 0.00             |
| 2. Land converted to Cropland                      | 13233.35                                | 0.00            | 0.00             |
| <b>C. Grassland</b>                                | -6688.22                                | 0.00            | 0.00             |
| 1. Grassland remaining Grassland                   | 682.92                                  | 0.00            | 0.00             |
| 2. Land converted to Grassland                     | -7713.86                                | 0.00            | 0.00             |
| <b>D. Wetlands</b>                                 | 0.00                                    | 0.00            | 0.00             |
| 1. Wetlands remaining Wetlands                     | 0.00                                    | 0.00            | 0.00             |
| 2. Land converted to Wetlands                      | 0.00                                    | 0.00            | 0.00             |
| <b>E. Settlements</b>                              | 6339.20                                 | 0.78            | 0.01             |
| 1. Settlements remaining Settlements               | 0.00                                    | NO              | NO               |
| 2. Land converted to Settlements                   | 6339.20                                 | 0.78            | 0.005            |
| <b>F. Other Land</b>                               | 0.00                                    | 0.00            | 0.00             |
| 1. Other Land remaining Other Land                 |   | NO              | NO               |
| 2. Land converted to Other Land                    | 0.00                                    | NO              | NO               |
| <b>G. Other (please specify)</b>                   | -1233.25                                | 0.00            | 0.00             |
| <i>Harvested Wood Products (6)</i>                 | -133.25                                 | NO              | NO               |
| Changes in non-forest biomass                      | -1100.00                                | NO              | NO               |
|  |   |                 |                  |
| <b>Information items</b>                           |   |                 |                  |
| Forest Land converted to other Land-Use Categories | 610.01                                  | 0.78            | 0.005            |
| Grassland converted to other Land-Use Categories   | NO                                      | NO              | NO               |

Table A3. 14 Emissions and Removals by Land Use, Land Use Change and Forestry (Sector 5) in 2003 for United Kingdom in Sectoral Report Table Format recommended by IPCC Good Practice Guidance for LULUCF.

| GREENHOUSE GAS SOURCE AND SINK CATEGORIES          | Net CO <sub>2</sub> emissions/ removals | CH <sub>4</sub> | N <sub>2</sub> O |
|--|---|-----------------|------------------|
|  | (Gg)                                    |                 |                  |
| <b>Total Land-Use Categories</b>                   | -1535.71                                | 0.61            | 0.004            |
| <b>A. Forest Land</b>                              | -15417.88                               | 0.00            | 0.00             |
| 1. Forest Land remaining Forest Land               | 0.00                                    | 0.00            | 0.00             |
| 2. Land converted to Forest Land                   | -15417.88                               | 0.00            | 0.00             |
| <b>B. Cropland</b>                                 | 14955.84                                | 0.00            | 0.00             |
| 1. Cropland remaining Cropland                     | 1217.33                                 | 0.00            | 0.00             |
| 2. Land converted to Cropland                      | 13246.51                                | 0.00            | 0.00             |
| <b>C. Grassland</b>                                | -6489.19                                | 0.00            | 0.00             |
| 1. Grassland remaining Grassland                   | 893.89                                  | 0.00            | 0.00             |
| 2. Land converted to Grassland                     | -7808.77                                | 0.00            | 0.00             |
| <b>D. Wetlands</b>                                 | 0.00                                    | 0.00            | 0.00             |
| 1. Wetlands remaining Wetlands                     | 0.00                                    | 0.00            | 0.00             |
| 2. Land converted to Wetlands                      | 0.00                                    | 0.00            | 0.00             |
| <b>E. Settlements</b>                              | 6267.53                                 | 0.61            | 0.00             |
| 1. Settlements remaining Settlements               | 0.00                                    | NO              | NO               |
| 2. Land converted to Settlements                   | 6267.53                                 | 0.61            | 0.004            |
| <b>F. Other Land</b>                               | 0.00                                    | 0.00            | 0.00             |
| 1. Other Land remaining Other Land                 |   | NO              | NO               |
| 2. Land converted to Other Land                    | 0.00                                    | NO              | NO               |
| <b>G. Other (please specify)</b>                   | -852.02                                 | 0.00            | 0.00             |
| <i>Harvested Wood Products (6)</i>                 | 247.98                                  | NO              | NO               |
| Changes in non-forest biomass                      | -1100.00                                | NO              | NO               |
|  |   |                 |                  |
| <b>Information items</b>                           |   |                 |                  |
| Forest Land converted to other Land-Use Categories | 562.67                                  | 0.61            | 0.004            |
| Grassland converted to other Land-Use Categories   | NO                                      | NO              | NO               |

## **APPENDIX 4**

### **A.4. Estimated Removals of atmospheric carbon by post-1990 afforestation in the UK**



|   |       |
|---|-------|
| Table A4. 1 Removal of atmospheric carbon by post-1990 afforestation –United Kingdom A: Mid emissions scenario, B: Low emission scenario, C: High emission scenario ..... | 2-109 |
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The following notes apply to all Tables

Low Mid High refer to Emissions Scenarios

Low means more forestry - proportion of UK planting of 30,000 ha/year distributed by conifer & broadleaf to the four individual countries by proportions in 2002.

Mid means policy based or business as usual forestry –Planting of 4500 kha/yr broadleaf and 0.5 kha/year conifer in England, planting in Scotland to followed planned financial support through Woodland Grant Scheme (4.0-4.5 kha/year broadleaf, ~ 2.7 kha/year conifer), proportion of UK planting of 13 kha/year distributed across Wales and N. Ireland as per 2003.

High means less forestry - 0 kha/year conifer, 0 kha/year broadleaf

These data include, biomass, litter, soils and products

Products are small in the time period covered

Units are ktC per year

Projected deforestation follows 10 term autoregressive model fitted to 1990 - 2003 for short term variation: unadjusted for Mid scenario but with upward long term trend for High scenario and downward long term trend for Low scenario.





Table A4. 1 Removal of atmospheric carbon by post-1990 afforestation –United Kingdom A: Mid emissions scenario, B: Low emission scenario, C: High emission scenario

| A (Mid)<br>UK | Afforestation  |                   | Deforestation                 |   |   |  | Art 3.3<br>(excludes<br>HWP) |
|---------------|--|-------------------|-------------------------------|---|---|--|------------------------------|
|               | Gg CO <sub>2</sub> /year<br>or GWP equiv<br>Gg CO <sub>2</sub> /year | Biomass<br>stocks | Harvested<br>Wood<br>Products | Immediate<br>loss<br>(Biomass)<br>CO <sub>2</sub> | Immediate<br>loss<br>(Biomass)<br>CH <sub>4</sub> | Immediate<br>loss<br>(Biomass)<br>N <sub>2</sub> O |                              |
| <b>1990</b>   | <b>-111</b>  | <b>0</b>          | <b>164</b>                    | <b>15</b>   | <b>1.5</b>  | <b>13</b>  | <b>83</b>                    |
| 1991          | -72  | 0                 | 137                           | 13  | 1.3   | 26   | 104                          |
| 1992          | 78   | 0                 | 107                           | 10  | 1.0   | 38   | 234                          |
| 1993          | 114  | 0                 | 124                           | 11  | 1.2   | 50   | 300                          |
| 1994          | 36   | 0                 | 132                           | 12  | 1.2   | 60   | 241                          |
| <b>1995</b>   | <b>-152</b>  | <b>0</b>          | <b>161</b>                    | <b>15</b>   | <b>1.5</b>  | <b>71</b>  | <b>96</b>                    |
| 1996          | -366   | 0                 | 185                           | 17  | 1.7   | 80   | -82                          |
| 1997          | -621   | 0                 | 152                           | 14  | 1.4   | 89   | -364                         |
| 1998          | -883   | 0                 | 159                           | 15  | 1.5   | 98   | -610                         |
| 1999          | -1117  | 0                 | 297                           | 27  | 2.8   | 106  | -684                         |
| <b>2000</b>   | <b>-1339</b>   | <b>0</b>          | <b>223</b>                    | <b>20</b>   | <b>2.1</b>  | <b>114</b>   | <b>-980</b>                  |
| 2001          | -1538  | 0                 | 228                           | 21  | 2.1   | 121  | -1166                        |
| 2002          | -1694  | 0                 | 180                           | 16  | 1.7   | 128  | -1369                        |
| 2003          | -1867  | 0                 | 141                           | 13  | 1.3   | 135  | -1577                        |
| 2004          | -2074  | 0                 | 168                           | 15  | 1.6   | 141  | -1747                        |
| <b>2005</b>   | <b>-2280</b>   | <b>0</b>          | <b>180</b>                    | <b>17</b>   | <b>1.7</b>  | <b>147</b>   | <b>-1934</b>                 |
| 2006          | -2480  | 0                 | 131                           | 12  | 1.2   | 152  | -2183                        |
| 2007          | -2662  | 0                 | 132                           | 12  | 1.2   | 158  | -2359                        |
| <b>2008</b>   | <b>-2825</b>   | <b>0</b>          | <b>128</b>                    | <b>12</b>   | <b>1.2</b>  | <b>163</b>   | <b>-2521</b>                 |
| <b>2009</b>   | <b>-2976</b>   | <b>0</b>          | <b>178</b>                    | <b>16</b>   | <b>1.7</b>  | <b>168</b>   | <b>-2612</b>                 |
| <b>2010</b>   | <b>-3163</b>   | <b>0</b>          | <b>211</b>                    | <b>19</b>   | <b>2.0</b>  | <b>172</b>   | <b>-2758</b>                 |
| <b>2011</b>   | <b>-3340</b>   | <b>0</b>          | <b>212</b>                    | <b>19</b>   | <b>2.0</b>  | <b>177</b>   | <b>-2929</b>                 |
| <b>2012</b>   | <b>-3515</b>   | <b>0</b>          | <b>192</b>                    | <b>18</b>   | <b>1.8</b>  | <b>181</b>   | <b>-3123</b>                 |
| 2013          | -3670  | -11               | 186                           | 17  | 1.7   | 185  | -3280                        |
| 2014          | -3816  | -16               | 194                           | 18  | 1.8   | 188  | -3414                        |
| <b>2015</b>   | <b>-3663</b>   | <b>-214</b>       | <b>204</b>                    | <b>19</b>   | <b>1.9</b>  | <b>192</b>   | <b>-3246</b>                 |
| 2016          | -3938  | -86               | 178                           | 16  | 1.7   | 195  | -3546                        |
| 2017          | -4184  | -29               | 150                           | 14  | 1.4   | 198  | -3821                        |
| 2018          | -4434  | 3                 | 132                           | 12  | 1.2   | 202  | -4087                        |
| 2019          | -4709  | 36                | 145                           | 13  | 1.3   | 204  | -4345                        |
| <b>2020</b>   | <b>-4423</b>   | <b>-263</b>       | <b>168</b>                    | <b>15</b>   | <b>1.6</b>  | <b>207</b>   | <b>-4031</b>                 |

| <b>B (Low)<br/>UK</b> | <b>Afforestation</b>      |  | <b>Deforestation</b>                                       |  |  |   | <b>Art 3.3<br/>(excludes<br/>HWP)</b> |
|-----------------------|---------------------------|--|--|--|--|---|---------------------------------------|
|                       | <b>Biomass<br/>stocks</b> | <b>Harvested<br/>Wood<br/>Products</b> | <b>Immediate<br/>loss<br/>(Biomass)<br/>CO<sub>2</sub></b> | <b>Immediate<br/>loss<br/>(Biomass)<br/>CH<sub>4</sub></b> | <b>Immediate<br/>loss<br/>(Biomass)<br/>N<sub>2</sub>O</b> | <b>Delayed loss<br/>(Soil) CO<sub>2</sub></b> |                                       |
| <b>1990</b>           | <b>-111</b>               | <b>0</b>                               | <b>164</b>   | <b>15</b>  | <b>1.5</b>   | <b>13</b>                                     | <b>83</b>                             |
| 1991                  | -72                       | 0                                      | 137  | 13   | 1.3  | 26  | 104                                   |
| 1992                  | 78                        | 0                                      | 107  | 10   | 1.0  | 38  | 234                                   |
| 1993                  | 114                       | 0                                      | 124  | 11   | 1.2  | 50  | 300                                   |
| 1994                  | 36                        | 0                                      | 132  | 12   | 1.2  | 60  | 241                                   |
| <b>1995</b>           | <b>-152</b>               | <b>0</b>                               | <b>161</b>   | <b>15</b>  | <b>1.5</b>   | <b>71</b>                                     | <b>96</b>                             |
| 1996                  | -366                      | 0                                      | 185  | 17   | 1.7  | 80  | -82                                   |
| 1997                  | -621                      | 0                                      | 152  | 14   | 1.4  | 89  | -364                                  |
| 1998                  | -883                      | 0                                      | 159  | 15   | 1.5  | 98  | -610                                  |
| 1999                  | -1117                     | 0                                      | 297  | 27   | 2.8  | 106   | -684                                  |
| <b>2000</b>           | <b>-1339</b>              | <b>0</b>                               | <b>223</b>   | <b>20</b>  | <b>2.1</b>   | <b>114</b>                                    | <b>-980</b>                           |
| 2001                  | -1538                     | 0                                      | 228  | 21   | 2.1  | 121   | -1166                                 |
| 2002                  | -1694                     | 0                                      | 180  | 16   | 1.7  | 128   | -1369                                 |
| 2003                  | -1867                     | 0                                      | 141  | 13   | 1.3  | 135   | -1577                                 |
| 2004                  | -2145                     | 0                                      | 161  | 15   | 1.5  | 141   | -1827                                 |
| <b>2005</b>           | <b>-2317</b>              | <b>0</b>                               | <b>166</b>   | <b>15</b>  | <b>1.5</b>   | <b>147</b>                                    | <b>-1988</b>                          |
| 2006                  | -2406                     | 0                                      | 109  | 10   | 1.0  | 150   | -2136                                 |
| 2007                  | -2558                     | 0                                      | 103  | 9  | 1.0  | 153   | -2293                                 |
| <b>2008</b>           | <b>-2788</b>              | <b>0</b>                               | <b>90</b>  | <b>8</b>   | <b>0.8</b>   | <b>155</b>                                    | <b>-2533</b>                          |
| <b>2009</b>           | <b>-3096</b>              | <b>0</b>                               | <b>133</b>   | <b>12</b>  | <b>1.2</b>   | <b>159</b>                                    | <b>-2790</b>                          |
| <b>2010</b>           | <b>-3502</b>              | <b>0</b>                               | <b>158</b>   | <b>15</b>  | <b>1.5</b>   | <b>163</b>                                    | <b>-3165</b>                          |
| <b>2011</b>           | <b>-3923</b>              | <b>0</b>                               | <b>151</b>   | <b>14</b>  | <b>1.4</b>   | <b>166</b>                                    | <b>-3591</b>                          |
| <b>2012</b>           | <b>-4341</b>              | <b>0</b>                               | <b>123</b>   | <b>11</b>  | <b>1.1</b>   | <b>169</b>                                    | <b>-4037</b>                          |
| 2013                  | -4725                     | -11                                    | 109  | 10   | 1.0  | 171   | -4435                                 |
| 2014                  | -5085                     | -16                                    | 109  | 10   | 1.0  | 173   | -4793                                 |
| <b>2015</b>           | <b>-5133</b>              | <b>-214</b>                            | <b>111</b>   | <b>10</b>  | <b>1.0</b>   | <b>175</b>                                    | <b>-4836</b>                          |
| 2016                  | -5599                     | -86                                    | 77   | 7  | 0.7  | 176   | -5337                                 |
| 2017                  | -6029                     | -29                                    | 41   | 4  | 0.4  | 177   | -5807                                 |
| 2018                  | -6458                     | 3                                      | 14   | 1  | 0.1  | 177   | -6266                                 |
| 2019                  | -6913                     | 36                                     | 19   | 2  | 0.2  | 177   | -6715                                 |
| <b>2020</b>           | <b>-6808</b>              | <b>-263</b>                            | <b>34</b>  | <b>3</b>   | <b>0.3</b>   | <b>177</b>                                    | <b>-6593</b>                          |

| <b>C (High)<br/>UK</b> | <b>Afforestation</b>  |                           | <b>Deforestation</b>                   |  |  |  | <b>Art 3.3<br/>(excludes<br/>HWP)</b>                 |
|------------------------|---|---------------------------|--|--|--|--|---|
|                        | <b>Gg CO<sub>2</sub>/year<br/>or GWP equiv<br/>Gg CO<sub>2</sub>/year</b> | <b>Biomass<br/>stocks</b> | <b>Harvested<br/>Wood<br/>Products</b> | <b>Immediate<br/>loss<br/>(Biomass)<br/>CO<sub>2</sub></b> | <b>Immediate<br/>loss<br/>(Biomass)<br/>CH<sub>4</sub></b> | <b>Immediate<br/>loss<br/>(Biomass)<br/>N<sub>2</sub>O</b> | <b>Delayed<br/>loss<br/>(Soil)<br/>CO<sub>2</sub></b> |
| <b>1990</b>            | <b>-111</b>   | <b>0</b>                  | <b>164</b>                             | <b>15</b>  | <b>1.5</b>   | <b>13</b>  | <b>83</b>   |
| 1991                   | -72   | 0                         | 137                                    | 13   | 1.3  | 26   | 104   |
| 1992                   | 78  | 0                         | 107                                    | 10   | 1.0  | 38   | 234   |
| 1993                   | 114   | 0                         | 124                                    | 11   | 1.2  | 50   | 300   |
| 1994                   | 36  | 0                         | 132                                    | 12   | 1.2  | 60   | 241   |
| <b>1995</b>            | <b>-152</b>   | <b>0</b>                  | <b>161</b>                             | <b>15</b>  | <b>1.5</b>   | <b>71</b>  | <b>96</b>   |
| 1996                   | -366  | 0                         | 185                                    | 17   | 1.7  | 80   | -82   |
| 1997                   | -621  | 0                         | 152                                    | 14   | 1.4  | 89   | -364  |
| 1998                   | -883  | 0                         | 159                                    | 15   | 1.5  | 98   | -610  |
| 1999                   | -1117   | 0                         | 297                                    | 27   | 2.8  | 106  | -684  |
| <b>2000</b>            | <b>-1339</b>  | <b>0</b>                  | <b>223</b>                             | <b>20</b>  | <b>2.1</b>   | <b>114</b>   | <b>-980</b>   |
| 2001                   | -1538   | 0                         | 228                                    | 21   | 2.1  | 121  | -1166   |
| 2002                   | -1694   | 0                         | 180                                    | 16   | 1.7  | 128  | -1369   |
| 2003                   | -1867   | 0                         | 141                                    | 13   | 1.3  | 135  | -1577   |
| 2004                   | -2023   | 0                         | 176                                    | 16   | 1.6  | 142  | -1689   |
| <b>2005</b>            | <b>-2253</b>  | <b>0</b>                  | <b>195</b>                             | <b>18</b>  | <b>1.8</b>   | <b>148</b>   | <b>-1891</b>  |
| 2006                   | -2519   | 0                         | 153                                    | 14   | 1.4  | 153  | -2198   |
| 2007                   | -2708   | 0                         | 162                                    | 15   | 1.5  | 157  | -2373   |
| <b>2008</b>            | <b>-2823</b>  | <b>0</b>                  | <b>165</b>                             | <b>15</b>  | <b>1.5</b>   | <b>162</b>   | <b>-2480</b>  |
| <b>2009</b>            | <b>-2871</b>  | <b>0</b>                  | <b>224</b>                             | <b>21</b>  | <b>2.1</b>   | <b>168</b>   | <b>-2457</b>  |
| <b>2010</b>            | <b>-2916</b>  | <b>0</b>                  | <b>264</b>                             | <b>24</b>  | <b>2.5</b>   | <b>174</b>   | <b>-2451</b>  |
| <b>2011</b>            | <b>-2934</b>  | <b>0</b>                  | <b>273</b>                             | <b>25</b>  | <b>2.5</b>   | <b>180</b>   | <b>-2453</b>  |
| <b>2012</b>            | <b>-2951</b>  | <b>0</b>                  | <b>261</b>                             | <b>24</b>  | <b>2.4</b>   | <b>186</b>   | <b>-2478</b>  |
| 2013                   | -2955   | -11                       | 263                                    | 24   | 2.4  | 191  | -2474   |
| 2014                   | -2958   | -16                       | 279                                    | 26   | 2.6  | 196  | -2455   |
| <b>2015</b>            | <b>-2670</b>  | <b>-214</b>               | <b>297</b>                             | <b>27</b>  | <b>2.8</b>   | <b>201</b>   | <b>-2142</b>  |
| 2016                   | -2816   | -86                       | 280                                    | 26   | 2.6  | 206  | -2302   |
| 2017                   | -2936   | -29                       | 259                                    | 24   | 2.4  | 210  | -2440   |
| 2018                   | -3060   | 3                         | 249                                    | 23   | 2.3  | 213  | -2572   |
| 2019                   | -3210   | 36                        | 270                                    | 25   | 2.5  | 217  | -2695   |
| <b>2020</b>            | <b>-2795</b>  | <b>-263</b>               | <b>301</b>                             | <b>28</b>  | <b>2.8</b>   | <b>221</b>   | <b>-2243</b>  |

Table A4. 2 Removal of atmospheric carbon by post-1990 afforestation –England A: Mid emissions scenario, B: Low emission scenario, C: High emission scenario

| <b>A (Mid)<br/>England</b> | <b>Afforestation</b>      |  | <b>Deforestation</b>                                       |  |  |   | <b>Art 3.3<br/>(excludes HWP)</b> |
|----------------------------|---------------------------|--|--|--|--|---|-----------------------------------|
|                            | <b>Biomass<br/>stocks</b> | <b>Harvested<br/>Wood<br/>Products</b> | <b>Immediate<br/>loss<br/>(Biomass)<br/>CO<sub>2</sub></b> | <b>Immediate<br/>loss<br/>(Biomass)<br/>CH<sub>4</sub></b> | <b>Immediate<br/>loss<br/>(Biomass)<br/>N<sub>2</sub>O</b> | <b>Delayed<br/>loss<br/>(Soil)<br/>CO<sub>2</sub></b> |                                   |
| <b>1990</b>                | <b>-15</b>                | <b>0</b>                               | <b>118</b>   | <b>11</b>  | <b>1.1</b>   | <b>10</b>   | <b>124</b>                        |
| 1991                       | -20                       | 0                                      | 98   | 9  | 0.9  | 19  | 107                               |
| 1992                       | -14                       | 0                                      | 77   | 7  | 0.7  | 27  | 99                                |
| 1993                       | -25                       | 0                                      | 89   | 8  | 0.8  | 36  | 109                               |
| 1994                       | -55                       | 0                                      | 95   | 9  | 0.9  | 43  | 93                                |
| <b>1995</b>                | <b>-93</b>                | <b>0</b>                               | <b>116</b>   | <b>11</b>  | <b>1.1</b>   | <b>51</b>   | <b>85</b>                         |
| 1996                       | -147                      | 0                                      | 133  | 12   | 1.2  | 58  | 57                                |
| 1997                       | -219                      | 0                                      | 109  | 10   | 1.0  | 64  | -35                               |
| 1998                       | -296                      | 0                                      | 114  | 10   | 1.1  | 70  | -100                              |
| 1999                       | -373                      | 0                                      | 213  | 20   | 2.0  | 76  | -62                               |
| <b>2000</b>                | <b>-442</b>               | <b>0</b>                               | <b>160</b>   | <b>15</b>  | <b>1.5</b>   | <b>82</b>   | <b>-184</b>                       |
| 2001                       | -498                      | 0                                      | 163  | 15   | 1.5  | 87  | -231                              |
| 2002                       | -544                      | 0                                      | 129  | 12   | 1.2  | 92  | -310                              |
| 2003                       | -594                      | 0                                      | 101  | 9  | 0.9  | 97  | -387                              |
| 2004                       | -645                      | 0                                      | 121  | 11   | 1.1  | 101   | -411                              |
| <b>2005</b>                | <b>-700</b>               | <b>0</b>                               | <b>129</b>   | <b>12</b>  | <b>1.2</b>   | <b>105</b>  | <b>-452</b>                       |
| 2006                       | -758                      | 0                                      | 94   | 9  | 0.9  | 109   | -545                              |
| 2007                       | -815                      | 0                                      | 95   | 9  | 0.9  | 113   | -597                              |
| <b>2008</b>                | <b>-868</b>               | <b>0</b>                               | <b>92</b>  | <b>8</b>   | <b>0.9</b>   | <b>117</b>  | <b>-650</b>                       |
| <b>2009</b>                | <b>-919</b>               | <b>0</b>                               | <b>128</b>   | <b>12</b>  | <b>1.2</b>   | <b>120</b>  | <b>-657</b>                       |
| <b>2010</b>                | <b>-971</b>               | <b>0</b>                               | <b>152</b>   | <b>14</b>  | <b>1.4</b>   | <b>124</b>  | <b>-680</b>                       |
| <b>2011</b>                | <b>-1024</b>              | <b>0</b>                               | <b>153</b>   | <b>14</b>  | <b>1.4</b>   | <b>127</b>  | <b>-729</b>                       |
| <b>2012</b>                | <b>-1077</b>              | <b>0</b>                               | <b>138</b>   | <b>13</b>  | <b>1.3</b>   | <b>130</b>  | <b>-795</b>                       |
| 2013                       | -1132                     | 0                                      | 134  | 12   | 1.2  | 133   | -852                              |
| 2014                       | -1185                     | 0                                      | 139  | 13   | 1.3  | 135   | -897                              |
| <b>2015</b>                | <b>-1224</b>              | <b>-14</b>                             | <b>147</b>   | <b>13</b>  | <b>1.4</b>   | <b>138</b>  | <b>-925</b>                       |
| 2016                       | -1292                     | -8                                     | 128  | 12   | 1.2  | 140   | -1011                             |
| 2017                       | -1364                     | -1                                     | 108  | 10   | 1.0  | 143   | -1103                             |
| 2018                       | -1427                     | -3                                     | 95   | 9  | 0.9  | 145   | -1178                             |
| 2019                       | -1509                     | 3                                      | 104  | 10   | 1.0  | 147   | -1248                             |
| <b>2020</b>                | <b>-1526</b>              | <b>-29</b>                             | <b>120</b>   | <b>11</b>  | <b>1.1</b>   | <b>149</b>  | <b>-1244</b>                      |

| <b>B (Low)<br/>England</b> | Afforestation   |                           | Deforestation                          |  |  |  | <b>Art 3.3<br/>(excludes<br/>HWP)</b> |
|----------------------------|---|---------------------------|--|--|--|--|---------------------------------------|
|                            | <b>Gg CO<sub>2</sub>/year<br/>or GWP equiv<br/>Gg CO<sub>2</sub>/year</b> | <b>Biomass<br/>stocks</b> | <b>Harvested<br/>Wood<br/>Products</b> | <b>Immediate<br/>loss<br/>(Biomass)<br/>CO<sub>2</sub></b> | <b>Immediate<br/>loss<br/>(Biomass)<br/>CH<sub>4</sub></b> | <b>Immediate<br/>loss<br/>(Biomass)<br/>N<sub>2</sub>O</b> |                                       |
| <b>1990</b>                | <b>-15</b>  | <b>0</b>                  | <b>118</b>                             | <b>11</b>  | <b>1.1</b>   | <b>10</b>  | <b>124</b>                            |
| 1991                       | -20   | 0                         | 98                                     | 9  | 0.9  | 19   | 107                                   |
| 1992                       | -14   | 0                         | 77                                     | 7  | 0.7  | 27   | 99                                    |
| 1993                       | -25   | 0                         | 89                                     | 8  | 0.8  | 36   | 109                                   |
| 1994                       | -55   | 0                         | 95                                     | 9  | 0.9  | 43   | 93                                    |
| <b>1995</b>                | <b>-93</b>  | <b>0</b>                  | <b>116</b>                             | <b>11</b>  | <b>1.1</b>   | <b>51</b>  | <b>85</b>                             |
| 1996                       | -147  | 0                         | 133                                    | 12   | 1.2  | 58   | 57                                    |
| 1997                       | -219  | 0                         | 109                                    | 10   | 1.0  | 64   | -35                                   |
| 1998                       | -296  | 0                         | 114                                    | 10   | 1.1  | 70   | -100                                  |
| 1999                       | -373  | 0                         | 213                                    | 20   | 2.0  | 76   | -62                                   |
| <b>2000</b>                | <b>-442</b>   | <b>0</b>                  | <b>160</b>                             | <b>15</b>  | <b>1.5</b>   | <b>82</b>  | <b>-184</b>                           |
| 2001                       | -498  | 0                         | 163                                    | 15   | 1.5  | 87   | -231                                  |
| 2002                       | -544  | 0                         | 129                                    | 12   | 1.2  | 92   | -310                                  |
| 2003                       | -594  | 0                         | 101                                    | 9  | 0.9  | 97   | -387                                  |
| 2004                       | -673  | 0                         | 116                                    | 11   | 1.1  | 101  | -445                                  |
| <b>2005</b>                | <b>-730</b>   | <b>0</b>                  | <b>119</b>                             | <b>11</b>  | <b>1.1</b>   | <b>105</b>   | <b>-493</b>                           |
| 2006                       | -775  | 0                         | 78                                     | 7  | 0.7  | 108  | -581                                  |
| 2007                       | -849  | 0                         | 74                                     | 7  | 0.7  | 110  | -658                                  |
| <b>2008</b>                | <b>-954</b>   | <b>0</b>                  | <b>65</b>                              | <b>6</b>   | <b>0.6</b>   | <b>112</b>   | <b>-771</b>                           |
| <b>2009</b>                | <b>-1090</b>  | <b>0</b>                  | <b>96</b>                              | <b>9</b>   | <b>0.9</b>   | <b>114</b>   | <b>-870</b>                           |
| <b>2010</b>                | <b>-1250</b>  | <b>0</b>                  | <b>114</b>                             | <b>10</b>  | <b>1.1</b>   | <b>117</b>   | <b>-1008</b>                          |
| <b>2011</b>                | <b>-1419</b>  | <b>0</b>                  | <b>109</b>                             | <b>10</b>  | <b>1.0</b>   | <b>119</b>   | <b>-1180</b>                          |
| <b>2012</b>                | <b>-1585</b>  | <b>0</b>                  | <b>88</b>                              | <b>8</b>   | <b>0.8</b>   | <b>121</b>   | <b>-1367</b>                          |
| 2013                       | -1748   | 0                         | 78                                     | 7  | 0.7  | 123  | -1539                                 |
| 2014                       | -1899   | 0                         | 78                                     | 7  | 0.7  | 124  | -1689                                 |
| <b>2015</b>                | <b>-2031</b>  | <b>-14</b>                | <b>80</b>                              | <b>7</b>   | <b>0.7</b>   | <b>125</b>   | <b>-1817</b>                          |
| 2016                       | -2185   | -8                        | 56                                     | 5  | 0.5  | 126  | -1998                                 |
| 2017                       | -2340   | -1                        | 29                                     | 3  | 0.3  | 127  | -2181                                 |
| 2018                       | -2484   | -3                        | 10                                     | 1  | 0.1  | 127  | -2345                                 |
| 2019                       | -2645   | 3                         | 14                                     | 1  | 0.1  | 127  | -2503                                 |
| <b>2020</b>                | <b>-2742</b>  | <b>-29</b>                | <b>25</b>                              | <b>2</b>   | <b>0.2</b>   | <b>127</b>   | <b>-2587</b>                          |

| <b>C (High)<br/>England</b> | Afforestation   |                           | Deforestation                          |  |  |  | <b>Art 3.3<br/>(excludes<br/>HWP)</b> |
|-----------------------------|---|---------------------------|--|--|--|--|---------------------------------------|
|                             | <b>Gg CO<sub>2</sub>/year<br/>or GWP equiv<br/>Gg CO<sub>2</sub>/year</b> | <b>Biomass<br/>stocks</b> | <b>Harvested<br/>Wood<br/>Products</b> | <b>Immediate<br/>loss<br/>(Biomass)<br/>CO<sub>2</sub></b> | <b>Immediate<br/>loss<br/>(Biomass)<br/>CH<sub>4</sub></b> | <b>Immediate<br/>loss<br/>(Biomass)<br/>N<sub>2</sub>O</b> |                                       |
| <b>1990</b>                 | <b>-15</b>  | <b>0</b>                  | <b>118</b>                             | <b>11</b>  | <b>1.1</b>   | <b>10</b>  | <b>124</b>                            |
| 1991                        | -20   | 0                         | 98                                     | 9  | 0.9  | 19   | 107                                   |
| 1992                        | -14   | 0                         | 77                                     | 7  | 0.7  | 27   | 99                                    |
| 1993                        | -25   | 0                         | 89                                     | 8  | 0.8  | 36   | 109                                   |
| 1994                        | -55   | 0                         | 95                                     | 9  | 0.9  | 43   | 93                                    |
| <b>1995</b>                 | <b>-93</b>  | <b>0</b>                  | <b>116</b>                             | <b>11</b>  | <b>1.1</b>   | <b>51</b>  | <b>85</b>                             |
| 1996                        | -147  | 0                         | 133                                    | 12   | 1.2  | 58   | 57                                    |
| 1997                        | -219  | 0                         | 109                                    | 10   | 1.0  | 64   | -35                                   |
| 1998                        | -296  | 0                         | 114                                    | 10   | 1.1  | 70   | -100                                  |
| 1999                        | -373  | 0                         | 213                                    | 20   | 2.0  | 76   | -62                                   |
| <b>2000</b>                 | <b>-442</b>   | <b>0</b>                  | <b>160</b>                             | <b>15</b>  | <b>1.5</b>   | <b>82</b>  | <b>-184</b>                           |
| 2001                        | -498  | 0                         | 163                                    | 15   | 1.5  | 87   | -231                                  |
| 2002                        | -544  | 0                         | 129                                    | 12   | 1.2  | 92   | -310                                  |
| 2003                        | -594  | 0                         | 101                                    | 9  | 0.9  | 97   | -387                                  |
| 2004                        | -628  | 0                         | 126                                    | 12   | 1.2  | 102  | -388                                  |
| <b>2005</b>                 | <b>-682</b>   | <b>0</b>                  | <b>140</b>                             | <b>13</b>  | <b>1.3</b>   | <b>106</b>   | <b>-422</b>                           |
| 2006                        | -748  | 0                         | 110                                    | 10   | 1.0  | 110  | -517                                  |
| 2007                        | -794  | 0                         | 116                                    | 11   | 1.1  | 113  | -553                                  |
| <b>2008</b>                 | <b>-817</b>   | <b>0</b>                  | <b>119</b>                             | <b>11</b>  | <b>1.1</b>   | <b>116</b>   | <b>-570</b>                           |
| <b>2009</b>                 | <b>-818</b>   | <b>0</b>                  | <b>161</b>                             | <b>15</b>  | <b>1.5</b>   | <b>120</b>   | <b>-521</b>                           |
| <b>2010</b>                 | <b>-807</b>   | <b>0</b>                  | <b>190</b>                             | <b>17</b>  | <b>1.8</b>   | <b>125</b>   | <b>-473</b>                           |
| <b>2011</b>                 | <b>-792</b>   | <b>0</b>                  | <b>196</b>                             | <b>18</b>  | <b>1.8</b>   | <b>129</b>   | <b>-446</b>                           |
| <b>2012</b>                 | <b>-779</b>   | <b>0</b>                  | <b>187</b>                             | <b>17</b>  | <b>1.7</b>   | <b>133</b>   | <b>-439</b>                           |
| 2013                        | -772  | 0                         | 189                                    | 17   | 1.8  | 137  | -427                                  |
| 2014                        | -767  | 0                         | 200                                    | 18   | 1.9  | 141  | -406                                  |
| <b>2015</b>                 | <b>-753</b>   | <b>-14</b>                | <b>214</b>                             | <b>20</b>  | <b>2.0</b>   | <b>145</b>   | <b>-373</b>                           |
| 2016                        | -770  | -8                        | 201                                    | 18   | 1.9  | 148  | -401                                  |
| 2017                        | -793  | -1                        | 186                                    | 17   | 1.7  | 151  | -437                                  |
| 2018                        | -809  | -3                        | 179                                    | 16   | 1.7  | 153  | -459                                  |
| 2019                        | -844  | 3                         | 194                                    | 18   | 1.8  | 156  | -475                                  |
| <b>2020</b>                 | <b>-815</b>   | <b>-29</b>                | <b>216</b>                             | <b>20</b>  | <b>2.0</b>   | <b>159</b>   | <b>-418</b>                           |

Table A4. 3 Removal of atmospheric carbon by post-1990 afforestation –Scotland A: Mid emissions scenario, B: Low emission scenario, C: High emission scenario

| <b>A (Mid)<br/>Scotland</b> | <b>Afforestation</b>  |                           | <b>Deforestation</b>                   |  |  |  | <b>Art 3.3<br/>(excludes HWP)</b> |
|-----------------------------|---|---------------------------|--|--|--|--|-----------------------------------|
|                             | <b>Gg CO<sub>2</sub>/year<br/>or GWP equiv<br/>Gg CO<sub>2</sub>/year</b> | <b>Biomass<br/>stocks</b> | <b>Harvested<br/>Wood<br/>Products</b> | <b>Immediate<br/>loss<br/>(Biomass)<br/>CO<sub>2</sub></b> | <b>Immediate<br/>loss<br/>(Biomass)<br/>CH<sub>4</sub></b> | <b>Immediate<br/>loss<br/>(Biomass)<br/>N<sub>2</sub>O</b> |                                   |
| <b>1990</b>                 | <b>-87</b>  | <b>0</b>                  | <b>37</b>                              | <b>3</b>   | <b>0.3</b>   | <b>3</b>   | <b>-43</b>                        |
| 1991                        | -41   | 0                         | 31                                     | 3  | 0.3  | 6  | -1                                |
| 1992                        | 90  | 0                         | 24                                     | 2  | 0.2  | 9  | 125                               |
| 1993                        | 132   | 0                         | 28                                     | 3  | 0.3  | 11   | 174                               |
| 1994                        | 97  | 0                         | 30                                     | 3  | 0.3  | 14   | 143                               |
| <b>1995</b>                 | <b>-37</b>  | <b>0</b>                  | <b>36</b>                              | <b>3</b>   | <b>0.3</b>   | <b>16</b>  | <b>18</b>                         |
| 1996                        | -182  | 0                         | 42                                     | 4  | 0.4  | 18   | -118                              |
| 1997                        | -339  | 0                         | 34                                     | 3  | 0.3  | 20   | -281                              |
| 1998                        | -499  | 0                         | 36                                     | 3  | 0.3  | 22   | -438                              |
| 1999                        | -631  | 0                         | 67                                     | 6  | 0.6  | 24   | -534                              |
| <b>2000</b>                 | <b>-762</b>   | <b>0</b>                  | <b>50</b>                              | <b>5</b>   | <b>0.5</b>   | <b>26</b>  | <b>-681</b>                       |
| 2001                        | -890  | 0                         | 51                                     | 5  | 0.5  | 27   | -806                              |
| 2002                        | -985  | 0                         | 40                                     | 4  | 0.4  | 29   | -912                              |
| 2003                        | -1092   | 0                         | 32                                     | 3  | 0.3  | 30   | -1027                             |
| 2004                        | -1233   | 0                         | 38                                     | 3  | 0.4  | 32   | -1160                             |
| <b>2005</b>                 | <b>-1370</b>  | <b>0</b>                  | <b>41</b>                              | <b>4</b>   | <b>0.4</b>   | <b>33</b>  | <b>-1292</b>                      |
| 2006                        | -1498   | 0                         | 29                                     | 3  | 0.3  | 34   | -1431                             |
| 2007                        | -1611   | 0                         | 30                                     | 3  | 0.3  | 35   | -1543                             |
| <b>2008</b>                 | <b>-1706</b>  | <b>0</b>                  | <b>29</b>                              | <b>3</b>   | <b>0.3</b>   | <b>37</b>  | <b>-1638</b>                      |
| <b>2009</b>                 | <b>-1791</b>  | <b>0</b>                  | <b>40</b>                              | <b>4</b>   | <b>0.4</b>   | <b>38</b>  | <b>-1709</b>                      |
| <b>2010</b>                 | <b>-1910</b>  | <b>0</b>                  | <b>48</b>                              | <b>4</b>   | <b>0.4</b>   | <b>39</b>  | <b>-1818</b>                      |
| <b>2011</b>                 | <b>-2019</b>  | <b>0</b>                  | <b>48</b>                              | <b>4</b>   | <b>0.4</b>   | <b>40</b>  | <b>-1927</b>                      |
| <b>2012</b>                 | <b>-2126</b>  | <b>0</b>                  | <b>43</b>                              | <b>4</b>   | <b>0.4</b>   | <b>41</b>  | <b>-2038</b>                      |
| 2013                        | -2229   | 0                         | 42                                     | 4  | 0.4  | 42   | -2142                             |
| 2014                        | -2324   | 0                         | 44                                     | 4  | 0.4  | 42   | -2234                             |
| <b>2015</b>                 | <b>-2115</b>  | <b>-191</b>               | <b>46</b>                              | <b>4</b>   | <b>0.4</b>   | <b>43</b>  | <b>-2021</b>                      |
| 2016                        | -2294   | -79                       | 40                                     | 4  | 0.4  | 44   | -2206                             |
| 2017                        | -2460   | -24                       | 34                                     | 3  | 0.3  | 45   | -2379                             |
| 2018                        | -2642   | 16                        | 30                                     | 3  | 0.3  | 45   | -2564                             |
| 2019                        | -2824   | 42                        | 33                                     | 3  | 0.3  | 46   | -2743                             |
| <b>2020</b>                 | <b>-2515</b>  | <b>-222</b>               | <b>38</b>                              | <b>3</b>   | <b>0.4</b>   | <b>47</b>  | <b>-2427</b>                      |

| <b>B (Low)<br/>Scotland</b> | Afforestation  |                   | Deforestation                 |   |   |  | Art 3.3<br>(excludes<br>HWP)                 |
|-----------------------------|--|-------------------|-------------------------------|---|---|--|--|
|                             | Gg CO <sub>2</sub> /year<br>or GWP equiv<br>Gg CO <sub>2</sub> /year | Biomass<br>stocks | Harvested<br>Wood<br>Products | Immediate<br>loss<br>(Biomass)<br>CO <sub>2</sub> | Immediate<br>loss<br>(Biomass)<br>CH <sub>4</sub> | Immediate<br>loss<br>(Biomass)<br>N <sub>2</sub> O | Delayed<br>loss<br>(Soil)<br>CO <sub>2</sub> |
| <b>1990</b>                 | <b>-87</b>   | <b>0</b>          | <b>37</b>                     | <b>3</b>  | <b>0.3</b>  | <b>3</b>   | <b>-43</b>                                   |
| 1991                        | -41  | 0                 | 31                            | 3   | 0.3   | 6  | -1   |
| 1992                        | 90   | 0                 | 24                            | 2   | 0.2   | 9  | 125  |
| 1993                        | 132  | 0                 | 28                            | 3   | 0.3   | 11   | 174  |
| 1994                        | 97   | 0                 | 30                            | 3   | 0.3   | 14   | 143  |
| <b>1995</b>                 | <b>-37</b>   | <b>0</b>          | <b>36</b>                     | <b>3</b>  | <b>0.3</b>  | <b>16</b>  | <b>18</b>                                    |
| 1996                        | -182   | 0                 | 42                            | 4   | 0.4   | 18   | -118   |
| 1997                        | -339   | 0                 | 34                            | 3   | 0.3   | 20   | -281   |
| 1998                        | -499   | 0                 | 36                            | 3   | 0.3   | 22   | -438   |
| 1999                        | -631   | 0                 | 67                            | 6   | 0.6   | 24   | -534   |
| <b>2000</b>                 | <b>-762</b>  | <b>0</b>          | <b>50</b>                     | <b>5</b>  | <b>0.5</b>  | <b>26</b>  | <b>-681</b>                                  |
| 2001                        | -890   | 0                 | 51                            | 5   | 0.5   | 27   | -806   |
| 2002                        | -985   | 0                 | 40                            | 4   | 0.4   | 29   | -912   |
| 2003                        | -1092  | 0                 | 32                            | 3   | 0.3   | 30   | -1027  |
| 2004                        | -1271  | 0                 | 36                            | 3   | 0.3   | 32   | -1199  |
| <b>2005</b>                 | <b>-1375</b>   | <b>0</b>          | <b>37</b>                     | <b>3</b>  | <b>0.3</b>  | <b>33</b>  | <b>-1301</b>                                 |
| 2006                        | -1413  | 0                 | 25                            | 2   | 0.2   | 34   | -1353  |
| 2007                        | -1482  | 0                 | 23                            | 2   | 0.2   | 34   | -1422  |
| <b>2008</b>                 | <b>-1588</b>   | <b>0</b>          | <b>20</b>                     | <b>2</b>  | <b>0.2</b>  | <b>35</b>  | <b>-1531</b>                                 |
| <b>2009</b>                 | <b>-1733</b>   | <b>0</b>          | <b>30</b>                     | <b>3</b>  | <b>0.3</b>  | <b>36</b>  | <b>-1665</b>                                 |
| <b>2010</b>                 | <b>-1948</b>   | <b>0</b>          | <b>36</b>                     | <b>3</b>  | <b>0.3</b>  | <b>37</b>  | <b>-1872</b>                                 |
| <b>2011</b>                 | <b>-2169</b>   | <b>0</b>          | <b>34</b>                     | <b>3</b>  | <b>0.3</b>  | <b>37</b>  | <b>-2094</b>                                 |
| <b>2012</b>                 | <b>-2387</b>   | <b>0</b>          | <b>28</b>                     | <b>3</b>  | <b>0.3</b>  | <b>38</b>  | <b>-2319</b>                                 |
| 2013                        | -2597  | 0                 | 25                            | 2   | 0.2   | 38   | -2532  |
| 2014                        | -2792  | 0                 | 24                            | 2   | 0.2   | 39   | -2727  |
| <b>2015</b>                 | <b>-2677</b>   | <b>-191</b>       | <b>25</b>                     | <b>2</b>  | <b>0.2</b>  | <b>39</b>  | <b>-2610</b>                                 |
| 2016                        | -2946  | -79               | 17                            | 2   | 0.2   | 40   | -2887  |
| 2017                        | -3199  | -24               | 9                             | 1   | 0.1   | 40   | -3149  |
| 2018                        | -3466  | 16                | 3                             | 0   | 0.0   | 40   | -3423  |
| 2019                        | -3735  | 42                | 4                             | 0   | 0.0   | 40   | -3691  |
| <b>2020</b>                 | <b>-3514</b>   | <b>-222</b>       | <b>8</b>                      | <b>1</b>  | <b>0.1</b>  | <b>40</b>  | <b>-3466</b>                                 |



| <b>C (High)<br/>Scotland</b> | <b>Afforestation</b>  |                           | <b>Deforestation</b>                   |  |  |  | <b>Art 3.3<br/>(excludes HWP)</b>                     |
|------------------------------|---|---------------------------|--|--|--|--|---|
|                              | <b>Gg CO<sub>2</sub>/year<br/>or GWP equiv<br/>Gg CO<sub>2</sub>/year</b> | <b>Biomass<br/>stocks</b> | <b>Harvested<br/>Wood<br/>Products</b> | <b>Immediate<br/>loss<br/>(Biomass)<br/>CO<sub>2</sub></b> | <b>Immediate<br/>loss<br/>(Biomass)<br/>CH<sub>4</sub></b> | <b>Immediate<br/>loss<br/>(Biomass)<br/>N<sub>2</sub>O</b> | <b>Delayed<br/>loss<br/>(Soil)<br/>CO<sub>2</sub></b> |
| <b>1990</b>                  | <b>-87</b>  | <b>0</b>                  | <b>37</b>                              | <b>3</b>   | <b>0.3</b>   | <b>3</b>   | <b>-43</b>  |
| 1991                         | -41   | 0                         | 31                                     | 3  | 0.3  | 6  | -1  |
| 1992                         | 90  | 0                         | 24                                     | 2  | 0.2  | 9  | 125   |
| 1993                         | 132   | 0                         | 28                                     | 3  | 0.3  | 11   | 174   |
| 1994                         | 97  | 0                         | 30                                     | 3  | 0.3  | 14   | 143   |
| <b>1995</b>                  | <b>-37</b>  | <b>0</b>                  | <b>36</b>                              | <b>3</b>   | <b>0.3</b>   | <b>16</b>  | <b>18</b>   |
| 1996                         | -182  | 0                         | 42                                     | 4  | 0.4  | 18   | -118  |
| 1997                         | -339  | 0                         | 34                                     | 3  | 0.3  | 20   | -281  |
| 1998                         | -499  | 0                         | 36                                     | 3  | 0.3  | 22   | -438  |
| 1999                         | -631  | 0                         | 67                                     | 6  | 0.6  | 24   | -534  |
| <b>2000</b>                  | <b>-762</b>   | <b>0</b>                  | <b>50</b>                              | <b>5</b>   | <b>0.5</b>   | <b>26</b>  | <b>-681</b>   |
| 2001                         | -890  | 0                         | 51                                     | 5  | 0.5  | 27   | -806  |
| 2002                         | -985  | 0                         | 40                                     | 4  | 0.4  | 29   | -912  |
| 2003                         | -1092   | 0                         | 32                                     | 3  | 0.3  | 30   | -1027   |
| 2004                         | -1204   | 0                         | 39                                     | 4  | 0.4  | 32   | -1128   |
| <b>2005</b>                  | <b>-1363</b>  | <b>0</b>                  | <b>44</b>                              | <b>4</b>   | <b>0.4</b>   | <b>33</b>  | <b>-1281</b>  |
| 2006                         | -1543   | 0                         | 34                                     | 3  | 0.3  | 34   | -1471   |
| 2007                         | -1672   | 0                         | 36                                     | 3  | 0.3  | 35   | -1596   |
| <b>2008</b>                  | <b>-1753</b>  | <b>0</b>                  | <b>37</b>                              | <b>3</b>   | <b>0.3</b>   | <b>36</b>  | <b>-1675</b>  |
| <b>2009</b>                  | <b>-1792</b>  | <b>0</b>                  | <b>50</b>                              | <b>5</b>   | <b>0.5</b>   | <b>38</b>  | <b>-1699</b>  |
| <b>2010</b>                  | <b>-1843</b>  | <b>0</b>                  | <b>60</b>                              | <b>5</b>   | <b>0.6</b>   | <b>39</b>  | <b>-1738</b>  |
| <b>2011</b>                  | <b>-1876</b>  | <b>0</b>                  | <b>62</b>                              | <b>6</b>   | <b>0.6</b>   | <b>41</b>  | <b>-1767</b>  |
| <b>2012</b>                  | <b>-1903</b>  | <b>0</b>                  | <b>59</b>                              | <b>5</b>   | <b>0.5</b>   | <b>42</b>  | <b>-1797</b>  |
| 2013                         | -1930   | 0                         | 59                                     | 5  | 0.6  | 43   | -1822   |
| 2014                         | -1952   | 0                         | 63                                     | 6  | 0.6  | 44   | -1839   |
| <b>2015</b>                  | <b>-1672</b>  | <b>-191</b>               | <b>67</b>                              | <b>6</b>   | <b>0.6</b>   | <b>45</b>  | <b>-1554</b>  |
| 2016                         | -1783   | -79                       | 63                                     | 6  | 0.6  | 46   | -1667   |
| 2017                         | -1882   | -24                       | 58                                     | 5  | 0.5  | 47   | -1771   |
| 2018                         | -1996   | 16                        | 56                                     | 5  | 0.5  | 48   | -1886   |
| 2019                         | -2109   | 42                        | 61                                     | 6  | 0.6  | 49   | -1994   |
| <b>2020</b>                  | <b>-1730</b>  | <b>-222</b>               | <b>68</b>                              | <b>6</b>   | <b>0.6</b>   | <b>50</b>  | <b>-1605</b>  |

Table A4. 4 Removal of atmospheric carbon by post-1990 afforestation –Wales A: Mid emissions scenario, B: Low emission scenario, C: High emission scenario

| A (Mid)<br>Wales | Afforestation     |                               | Deforestation                                     |   |  |  | Art 3.3<br>(excludes HWP) |
|------------------|-------------------|-------------------------------|---|---|--|--|---------------------------|
|                  | Biomass<br>stocks | Harvested<br>Wood<br>Products | Immediate<br>loss<br>(Biomass)<br>CO <sub>2</sub> | Immediate<br>loss<br>(Biomass)<br>CH <sub>4</sub> | Immediate<br>loss<br>(Biomass)<br>N <sub>2</sub> O | Delayed<br>loss<br>(Soil)<br>CO <sub>2</sub> |                           |
| <b>1990</b>      | <b>-4</b>         | <b>0</b>                      | <b>9</b>  | <b>1</b>  | <b>0.1</b>   | <b>1</b>                                     | <b>7</b>                  |
| 1991             | -4                | 0                             | 8   | 1   | 0.1  | 1  | 6                         |
| 1992             | -2                | 0                             | 6   | 1   | 0.1  | 2  | 6                         |
| 1993             | -4                | 0                             | 7   | 1   | 0.1  | 3  | 7                         |
| 1994             | -9                | 0                             | 7   | 1   | 0.1  | 3  | 3                         |
| <b>1995</b>      | <b>-15</b>        | <b>0</b>                      | <b>9</b>  | <b>1</b>  | <b>0.1</b>   | <b>4</b>                                     | <b>0</b>                  |
| 1996             | -21               | 0                             | 11  | 1   | 0.1  | 5  | -5                        |
| 1997             | -28               | 0                             | 9   | 1   | 0.1  | 5  | -13                       |
| 1998             | -36               | 0                             | 9   | 1   | 0.1  | 6  | -20                       |
| 1999             | -44               | 0                             | 17  | 2   | 0.2  | 6  | -19                       |
| <b>2000</b>      | <b>-51</b>        | <b>0</b>                      | <b>13</b>   | <b>1</b>  | <b>0.1</b>   | <b>6</b>                                     | <b>-30</b>                |
| 2001             | -55               | 0                             | 13  | 1   | 0.1  | 7  | -34                       |
| 2002             | -60               | 0                             | 10  | 1   | 0.1  | 7  | -41                       |
| 2003             | -67               | 0                             | 8   | 1   | 0.1  | 8  | -50                       |
| 2004             | -74               | 0                             | 10  | 1   | 0.1  | 8  | -55                       |
| <b>2005</b>      | <b>-80</b>        | <b>0</b>                      | <b>10</b>   | <b>1</b>  | <b>0.1</b>   | <b>8</b>                                     | <b>-60</b>                |
| 2006             | -84               | 0                             | 7   | 1   | 0.1  | 9  | -67                       |
| 2007             | -88               | 0                             | 8   | 1   | 0.1  | 9  | -70                       |
| <b>2008</b>      | <b>-91</b>        | <b>0</b>                      | <b>7</b>  | <b>1</b>  | <b>0.1</b>   | <b>9</b>                                     | <b>-73</b>                |
| <b>2009</b>      | <b>-93</b>        | <b>0</b>                      | <b>10</b>   | <b>1</b>  | <b>0.1</b>   | <b>10</b>                                    | <b>-73</b>                |
| <b>2010</b>      | <b>-98</b>        | <b>0</b>                      | <b>12</b>   | <b>1</b>  | <b>0.1</b>   | <b>10</b>                                    | <b>-75</b>                |
| <b>2011</b>      | <b>-102</b>       | <b>0</b>                      | <b>12</b>   | <b>1</b>  | <b>0.1</b>   | <b>10</b>                                    | <b>-78</b>                |
| <b>2012</b>      | <b>-106</b>       | <b>0</b>                      | <b>11</b>   | <b>1</b>  | <b>0.1</b>   | <b>10</b>                                    | <b>-83</b>                |
| 2013             | -110              | 0                             | 11  | 1   | 0.1  | 10   | -88                       |
| 2014             | -114              | 0                             | 11  | 1   | 0.1  | 11   | -91                       |
| <b>2015</b>      | <b>-109</b>       | <b>-6</b>                     | <b>12</b>   | <b>1</b>  | <b>0.1</b>   | <b>11</b>                                    | <b>-85</b>                |
| 2016             | -117              | -2                            | 10  | 1   | 0.1  | 11   | -95                       |
| 2017             | -126              | 1                             | 9   | 1   | 0.1  | 11   | -105                      |
| 2018             | -134              | 2                             | 7   | 1   | 0.1  | 11   | -115                      |
| 2019             | -140              | 1                             | 8   | 1   | 0.1  | 12   | -119                      |
| <b>2020</b>      | <b>-134</b>       | <b>-7</b>                     | <b>10</b>   | <b>1</b>  | <b>0.1</b>   | <b>12</b>                                    | <b>-112</b>               |

| <b>B (Low)<br/>Wales</b> | Afforestation  |                   | Deforestation                 |   |   |  | Art 3.3<br>(excludes HWP) |
|--------------------------|--|-------------------|-------------------------------|---|---|--|---------------------------|
|                          | Gg CO <sub>2</sub> /year<br>or GWP equiv<br>Gg CO <sub>2</sub> /year | Biomass<br>stocks | Harvested<br>Wood<br>Products | Immediate<br>loss<br>(Biomass)<br>CO <sub>2</sub> | Immediate<br>loss<br>(Biomass)<br>CH <sub>4</sub> | Immediate<br>loss<br>(Biomass)<br>N <sub>2</sub> O |                           |
| <b>1990</b>              | <b>-4</b>  | <b>0</b>          | <b>9</b>                      | <b>1</b>  | <b>0.1</b>  | <b>1</b>   | <b>7</b>                  |
| 1991                     | -4   | 0                 | 8                             | 1   | 0.1   | 1  | 6                         |
| 1992                     | -2   | 0                 | 6                             | 1   | 0.1   | 2  | 6                         |
| 1993                     | -4   | 0                 | 7                             | 1   | 0.1   | 3  | 7                         |
| 1994                     | -9   | 0                 | 7                             | 1   | 0.1   | 3  | 3                         |
| <b>1995</b>              | <b>-15</b>   | <b>0</b>          | <b>9</b>                      | <b>1</b>  | <b>0.1</b>  | <b>4</b>   | <b>0</b>                  |
| 1996                     | -21  | 0                 | 11                            | 1   | 0.1   | 5  | -5                        |
| 1997                     | -28  | 0                 | 9                             | 1   | 0.1   | 5  | -13                       |
| 1998                     | -36  | 0                 | 9                             | 1   | 0.1   | 6  | -20                       |
| 1999                     | -44  | 0                 | 17                            | 2   | 0.2   | 6  | -19                       |
| <b>2000</b>              | <b>-51</b>   | <b>0</b>          | <b>13</b>                     | <b>1</b>  | <b>0.1</b>  | <b>6</b>   | <b>-30</b>                |
| 2001                     | -55  | 0                 | 13                            | 1   | 0.1   | 7  | -34                       |
| 2002                     | -60  | 0                 | 10                            | 1   | 0.1   | 7  | -41                       |
| 2003                     | -67  | 0                 | 8                             | 1   | 0.1   | 8  | -50                       |
| 2004                     | -75  | 0                 | 9                             | 1   | 0.1   | 8  | -57                       |
| <b>2005</b>              | <b>-81</b>   | <b>0</b>          | <b>9</b>                      | <b>1</b>  | <b>0.1</b>  | <b>8</b>   | <b>-63</b>                |
| 2006                     | -85  | 0                 | 6                             | 1   | 0.1   | 9  | -70                       |
| 2007                     | -90  | 0                 | 6                             | 1   | 0.1   | 9  | -75                       |
| <b>2008</b>              | <b>-96</b>   | <b>0</b>          | <b>5</b>                      | <b>0</b>  | <b>0.0</b>  | <b>9</b>   | <b>-81</b>                |
| <b>2009</b>              | <b>-103</b>  | <b>0</b>          | <b>8</b>                      | <b>1</b>  | <b>0.1</b>  | <b>9</b>   | <b>-86</b>                |
| <b>2010</b>              | <b>-113</b>  | <b>0</b>          | <b>9</b>                      | <b>1</b>  | <b>0.1</b>  | <b>9</b>   | <b>-94</b>                |
| <b>2011</b>              | <b>-124</b>  | <b>0</b>          | <b>9</b>                      | <b>1</b>  | <b>0.1</b>  | <b>9</b>   | <b>-105</b>               |
| <b>2012</b>              | <b>-134</b>  | <b>0</b>          | <b>7</b>                      | <b>1</b>  | <b>0.1</b>  | <b>10</b>  | <b>-117</b>               |
| 2013                     | -144   | 0                 | 6                             | 1   | 0.1   | 10   | -128                      |
| 2014                     | -154   | 0                 | 6                             | 1   | 0.1   | 10   | -137                      |
| <b>2015</b>              | <b>-154</b>  | <b>-6</b>         | <b>6</b>                      | <b>1</b>  | <b>0.1</b>  | <b>10</b>  | <b>-137</b>               |
| 2016                     | -167   | -2                | 4                             | 0   | 0.0   | 10   | -152                      |
| 2017                     | -180   | 1                 | 2                             | 0   | 0.0   | 10   | -168                      |
| 2018                     | -193   | 2                 | 1                             | 0   | 0.0   | 10   | -182                      |
| 2019                     | -203   | 1                 | 1                             | 0   | 0.0   | 10   | -192                      |
| <b>2020</b>              | <b>-202</b>  | <b>-7</b>         | <b>2</b>                      | <b>0</b>  | <b>0.0</b>  | <b>10</b>  | <b>-190</b>               |

| <b>C (High)<br/>Wales</b> | Afforestation   |                           | Deforestation                          |  |  |  | Art 3.3<br>(excludes HWP)                             |
|---------------------------|---|---------------------------|--|--|--|--|---|
|                           | <b>Gg CO<sub>2</sub>/year<br/>or GWP equiv<br/>Gg CO<sub>2</sub>/year</b> | <b>Biomass<br/>stocks</b> | <b>Harvested<br/>Wood<br/>Products</b> | <b>Immediate<br/>loss<br/>(Biomass)<br/>CO<sub>2</sub></b> | <b>Immediate<br/>loss<br/>(Biomass)<br/>CH<sub>4</sub></b> | <b>Immediate<br/>loss<br/>(Biomass)<br/>N<sub>2</sub>O</b> | <b>Delayed<br/>loss<br/>(Soil)<br/>CO<sub>2</sub></b> |
| <b>1990</b>               | <b>-4</b>   | <b>0</b>                  | <b>9</b>                               | <b>0</b>   | <b>0.8</b>   | <b>1</b>   | <b>7</b>  |
| 1991                      | -4  | 0                         | 8                                      | 0  | 1.5  | 1  | 6   |
| 1992                      | -2  | 0                         | 6                                      | 0  | 2.2  | 1  | 6   |
| 1993                      | -4  | 0                         | 7                                      | 0  | 2.8  | 1  | 7   |
| 1994                      | -9  | 0                         | 7                                      | 0  | 3.4  | 1  | 3   |
| <b>1995</b>               | <b>-15</b>  | <b>0</b>                  | <b>9</b>                               | <b>0</b>   | <b>4.0</b>   | <b>1</b>   | <b>0</b>  |
| 1996                      | -21   | 0                         | 11                                     | 0  | 4.6  | 1  | -5  |
| 1997                      | -28   | 0                         | 9                                      | 0  | 5.1  | 1  | -13   |
| 1998                      | -36   | 0                         | 9                                      | 0  | 5.6  | 1  | -20   |
| 1999                      | -44   | 0                         | 17                                     | 0  | 6.0  | 2  | -19   |
| <b>2000</b>               | <b>-51</b>  | <b>0</b>                  | <b>13</b>                              | <b>0</b>   | <b>6.5</b>   | <b>1</b>   | <b>-30</b>  |
| 2001                      | -55   | 0                         | 13                                     | 0  | 6.9  | 1  | -34   |
| 2002                      | -60   | 0                         | 10                                     | 0  | 7.3  | 1  | -41   |
| 2003                      | -67   | 0                         | 8                                      | 0  | 7.6  | 1  | -50   |
| 2004                      | -72   | 0                         | 10                                     | 0  | 8.0  | 1  | -53   |
| <b>2005</b>               | <b>-78</b>  | <b>0</b>                  | <b>11</b>                              | <b>0</b>   | <b>8.4</b>   | <b>1</b>   | <b>-58</b>  |
| 2006                      | -83   | 0                         | 9                                      | 0  | 8.7  | 1  | -65   |
| 2007                      | -86   | 0                         | 9                                      | 0  | 8.9  | 1  | -67   |
| <b>2008</b>               | <b>-87</b>  | <b>0</b>                  | <b>9</b>                               | <b>0</b>   | <b>9.2</b>   | <b>1</b>   | <b>-67</b>  |
| <b>2009</b>               | <b>-86</b>  | <b>0</b>                  | <b>13</b>                              | <b>0</b>   | <b>9.5</b>   | <b>1</b>   | <b>-62</b>  |
| <b>2010</b>               | <b>-86</b>  | <b>0</b>                  | <b>15</b>                              | <b>0</b>   | <b>9.9</b>   | <b>1</b>   | <b>-59</b>  |
| <b>2011</b>               | <b>-85</b>  | <b>0</b>                  | <b>16</b>                              | <b>0</b>   | <b>10.2</b>  | <b>1</b>   | <b>-57</b>  |
| <b>2012</b>               | <b>-84</b>  | <b>0</b>                  | <b>15</b>                              | <b>0</b>   | <b>10.5</b>  | <b>1</b>   | <b>-57</b>  |
| 2013                      | -83   | 0                         | 15                                     | 0  | 10.8   | 1  | -56   |
| 2014                      | -83   | 0                         | 16                                     | 0  | 11.1   | 1  | -55   |
| <b>2015</b>               | <b>-74</b>  | <b>-6</b>                 | <b>17</b>                              | <b>0</b>   | <b>11.4</b>  | <b>2</b>   | <b>-44</b>  |
| 2016                      | -79   | -2                        | 16                                     | 0  | 11.7   | 1  | -50   |
| 2017                      | -84   | 1                         | 15                                     | 0  | 11.9   | 1  | -56   |
| 2018                      | -89   | 2                         | 14                                     | 0  | 12.1   | 1  | -61   |
| 2019                      | -91   | 1                         | 15                                     | 0  | 12.3   | 1  | -62   |
| <b>2020</b>               | <b>-82</b>  | <b>-7</b>                 | <b>17</b>                              | <b>0</b>   | <b>12.5</b>  | <b>2</b>   | <b>-50</b>  |

Table A4. 5 Removal of atmospheric carbon by post-1990 afforestation –N. Ireland A: Mid emissions scenario, B: Low emission scenario, C: High emission scenario

| A (Mid)<br>N. Ireland | Afforestation  |                   | Deforestation                 |   |   |  | Art 3.3<br>(excludes<br>HWP) |
|-----------------------|--|-------------------|-------------------------------|---|---|--|------------------------------|
|                       | Gg CO <sub>2</sub> /year<br>or GWP equiv<br>Gg CO <sub>2</sub> /year | Biomass<br>stocks | Harvested<br>Wood<br>Products | Immediate<br>loss<br>(Biomass)<br>CO <sub>2</sub> | Immediate<br>loss<br>(Biomass)<br>CH <sub>4</sub> | Immediate<br>loss<br>(Biomass)<br>N <sub>2</sub> O |                              |
| <b>1990</b>           | <b>-6</b>  | <b>0</b>          | <b>0</b>                      | <b>0</b>  | <b>0.0</b>  | <b>0</b>   | <b>-6</b>                    |
| 1991                  | -8   | 0                 | 0                             | 0   | 0.0   | 0  | -8                           |
| 1992                  | 4  | 0                 | 0                             | 0   | 0.0   | 0  | 4                            |
| 1993                  | 11   | 0                 | 0                             | 0   | 0.0   | 0  | 11                           |
| 1994                  | 3  | 0                 | 0                             | 0   | 0.0   | 0  | 3                            |
| <b>1995</b>           | <b>-8</b>  | <b>0</b>          | <b>0</b>                      | <b>0</b>  | <b>0.0</b>  | <b>0</b>   | <b>-8</b>                    |
| 1996                  | -17  | 0                 | 0                             | 0   | 0.0   | 0  | -17                          |
| 1997                  | -35  | 0                 | 0                             | 0   | 0.0   | 0  | -35                          |
| 1998                  | -52  | 0                 | 0                             | 0   | 0.0   | 0  | -52                          |
| 1999                  | -68  | 0                 | 0                             | 0   | 0.0   | 0  | -68                          |
| <b>2000</b>           | <b>-85</b>   | <b>0</b>          | <b>0</b>                      | <b>0</b>  | <b>0.0</b>  | <b>0</b>   | <b>-85</b>                   |
| 2001                  | -96  | 0                 | 0                             | 0   | 0.0   | 0  | -96                          |
| 2002                  | -105   | 0                 | 0                             | 0   | 0.0   | 0  | -105                         |
| 2003                  | -114   | 0                 | 0                             | 0   | 0.0   | 0  | -114                         |
| 2004                  | -122   | 0                 | 0                             | 0   | 0.0   | 0  | -122                         |
| <b>2005</b>           | <b>-131</b>  | <b>0</b>          | <b>0</b>                      | <b>0</b>  | <b>0.0</b>  | <b>0</b>   | <b>-131</b>                  |
| 2006                  | -139   | 0                 | 0                             | 0   | 0.0   | 0  | -139                         |
| 2007                  | -148   | 0                 | 0                             | 0   | 0.0   | 0  | -148                         |
| <b>2008</b>           | <b>-160</b>  | <b>0</b>          | <b>0</b>                      | <b>0</b>  | <b>0.0</b>  | <b>0</b>   | <b>-160</b>                  |
| <b>2009</b>           | <b>-173</b>  | <b>0</b>          | <b>0</b>                      | <b>0</b>  | <b>0.0</b>  | <b>0</b>   | <b>-173</b>                  |
| <b>2010</b>           | <b>-185</b>  | <b>0</b>          | <b>0</b>                      | <b>0</b>  | <b>0.0</b>  | <b>0</b>   | <b>-185</b>                  |
| <b>2011</b>           | <b>-195</b>  | <b>0</b>          | <b>0</b>                      | <b>0</b>  | <b>0.0</b>  | <b>0</b>   | <b>-195</b>                  |
| <b>2012</b>           | <b>-207</b>  | <b>0</b>          | <b>0</b>                      | <b>0</b>  | <b>0.0</b>  | <b>0</b>   | <b>-207</b>                  |
| 2013                  | -199   | -11               | 0                             | 0   | 0.0   | 0  | -199                         |
| 2014                  | -192   | -16               | 0                             | 0   | 0.0   | 0  | -192                         |
| <b>2015</b>           | <b>-215</b>  | <b>-4</b>         | <b>0</b>                      | <b>0</b>  | <b>0.0</b>  | <b>0</b>   | <b>-215</b>                  |
| 2016                  | -234   | 2                 | 0                             | 0   | 0.0   | 0  | -234                         |
| 2017                  | -234   | -5                | 0                             | 0   | 0.0   | 0  | -234                         |
| 2018                  | -231   | -11               | 0                             | 0   | 0.0   | 0  | -231                         |
| 2019                  | -236   | -10               | 0                             | 0   | 0.0   | 0  | -236                         |
| <b>2020</b>           | <b>-248</b>  | <b>-6</b>         | <b>0</b>                      | <b>0</b>  | <b>0.0</b>  | <b>0</b>   | <b>-248</b>                  |

| <b>B (Low)</b><br><b>N. Ireland</b> | Afforestation  |                   | Deforestation                 |   |   |  | Art 3.3<br>(excludes HWP)                    |
|-------------------------------------|--|-------------------|-------------------------------|---|---|--|--|
|                                     | Gg CO <sub>2</sub> /year<br>or GWP equiv<br>Gg CO <sub>2</sub> /year | Biomass<br>stocks | Harvested<br>Wood<br>Products | Immediate<br>loss<br>(Biomass)<br>CO <sub>2</sub> | Immediate<br>loss<br>(Biomass)<br>CH <sub>4</sub> | Immediate<br>loss<br>(Biomass)<br>N <sub>2</sub> O | Delayed<br>loss<br>(Soil)<br>CO <sub>2</sub> |
| <b>1990</b>                         | <b>-6</b>  | <b>0</b>          | <b>0</b>                      | <b>0</b>  | <b>0.0</b>  | <b>0</b>   | <b>-6</b>                                    |
| 1991                                | -8   | 0                 | 0                             | 0   | 0.0   | 0  | -8   |
| 1992                                | 4  | 0                 | 0                             | 0   | 0.0   | 0  | 4  |
| 1993                                | 11   | 0                 | 0                             | 0   | 0.0   | 0  | 11   |
| 1994                                | 3  | 0                 | 0                             | 0   | 0.0   | 0  | 3  |
| <b>1995</b>                         | <b>-8</b>  | <b>0</b>          | <b>0</b>                      | <b>0</b>  | <b>0.0</b>  | <b>0</b>   | <b>-8</b>                                    |
| 1996                                | -17  | 0                 | 0                             | 0   | 0.0   | 0  | -17  |
| 1997                                | -35  | 0                 | 0                             | 0   | 0.0   | 0  | -35  |
| 1998                                | -52  | 0                 | 0                             | 0   | 0.0   | 0  | -52  |
| 1999                                | -68  | 0                 | 0                             | 0   | 0.0   | 0  | -68  |
| <b>2000</b>                         | <b>-85</b>   | <b>0</b>          | <b>0</b>                      | <b>0</b>  | <b>0.0</b>  | <b>0</b>   | <b>-85</b>                                   |
| 2001                                | -96  | 0                 | 0                             | 0   | 0.0   | 0  | -96  |
| 2002                                | -105   | 0                 | 0                             | 0   | 0.0   | 0  | -105   |
| 2003                                | -114   | 0                 | 0                             | 0   | 0.0   | 0  | -114   |
| 2004                                | -126   | 0                 | 0                             | 0   | 0.0   | 0  | -126   |
| <b>2005</b>                         | <b>-131</b>  | <b>0</b>          | <b>0</b>                      | <b>0</b>  | <b>0.0</b>  | <b>0</b>   | <b>-131</b>                                  |
| 2006                                | -132   | 0                 | 0                             | 0   | 0.0   | 0  | -132   |
| 2007                                | -138   | 0                 | 0                             | 0   | 0.0   | 0  | -138   |
| <b>2008</b>                         | <b>-150</b>  | <b>0</b>          | <b>0</b>                      | <b>0</b>  | <b>0.0</b>  | <b>0</b>   | <b>-150</b>                                  |
| <b>2009</b>                         | <b>-169</b>  | <b>0</b>          | <b>0</b>                      | <b>0</b>  | <b>0.0</b>  | <b>0</b>   | <b>-169</b>                                  |
| <b>2010</b>                         | <b>-190</b>  | <b>0</b>          | <b>0</b>                      | <b>0</b>  | <b>0.0</b>  | <b>0</b>   | <b>-190</b>                                  |
| <b>2011</b>                         | <b>-212</b>  | <b>0</b>          | <b>0</b>                      | <b>0</b>  | <b>0.0</b>  | <b>0</b>   | <b>-212</b>                                  |
| <b>2012</b>                         | <b>-234</b>  | <b>0</b>          | <b>0</b>                      | <b>0</b>  | <b>0.0</b>  | <b>0</b>   | <b>-234</b>                                  |
| 2013                                | -236   | -11               | 0                             | 0   | 0.0   | 0  | -236   |
| 2014                                | -240   | -16               | 0                             | 0   | 0.0   | 0  | -240   |
| <b>2015</b>                         | <b>-272</b>  | <b>-4</b>         | <b>0</b>                      | <b>0</b>  | <b>0.0</b>  | <b>0</b>   | <b>-272</b>                                  |
| 2016                                | -301   | 2                 | 0                             | 0   | 0.0   | 0  | -301   |
| 2017                                | -309   | -5                | 0                             | 0   | 0.0   | 0  | -309   |
| 2018                                | -315   | -11               | 0                             | 0   | 0.0   | 0  | -315   |
| 2019                                | -329   | -10               | 0                             | 0   | 0.0   | 0  | -329   |
| <b>2020</b>                         | <b>-350</b>  | <b>-6</b>         | <b>0</b>                      | <b>0</b>  | <b>0.0</b>  | <b>0</b>   | <b>-350</b>                                  |

| <b>C (High)<br/>N. Ireland</b> | Afforestation   |                           | Deforestation                          |  |  |  | <b>Art 3.3<br/>(excludes<br/>HWP)</b> |
|--------------------------------|---|---------------------------|--|--|--|--|---------------------------------------|
|                                | <b>Gg CO<sub>2</sub>/year<br/>or GWP equiv<br/>Gg CO<sub>2</sub>/year</b> | <b>Biomass<br/>stocks</b> | <b>Harvested<br/>Wood<br/>Products</b> | <b>Immediate<br/>loss<br/>(Biomass)<br/>CO<sub>2</sub></b> | <b>Immediate<br/>loss<br/>(Biomass)<br/>CH<sub>4</sub></b> | <b>Immediate<br/>loss<br/>(Biomass)<br/>N<sub>2</sub>O</b> |                                       |
| <b>1990</b>                    | <b>-6</b>   | <b>0</b>                  | <b>0</b>                               | <b>0</b>   | <b>0.0</b>   | <b>0</b>   | <b>-6</b>                             |
| 1991                           | -8  | 0                         | 0                                      | 0  | 0.0  | 0  | -8                                    |
| 1992                           | 4   | 0                         | 0                                      | 0  | 0.0  | 0  | 4                                     |
| 1993                           | 11  | 0                         | 0                                      | 0  | 0.0  | 0  | 11                                    |
| 1994                           | 3   | 0                         | 0                                      | 0  | 0.0  | 0  | 3                                     |
| <b>1995</b>                    | <b>-8</b>   | <b>0</b>                  | <b>0</b>                               | <b>0</b>   | <b>0.0</b>   | <b>0</b>   | <b>-8</b>                             |
| 1996                           | -17   | 0                         | 0                                      | 0  | 0.0  | 0  | -17                                   |
| 1997                           | -35   | 0                         | 0                                      | 0  | 0.0  | 0  | -35                                   |
| 1998                           | -52   | 0                         | 0                                      | 0  | 0.0  | 0  | -52                                   |
| 1999                           | -68   | 0                         | 0                                      | 0  | 0.0  | 0  | -68                                   |
| <b>2000</b>                    | <b>-85</b>  | <b>0</b>                  | <b>0</b>                               | <b>0</b>   | <b>0.0</b>   | <b>0</b>   | <b>-85</b>                            |
| 2001                           | -96   | 0                         | 0                                      | 0  | 0.0  | 0  | -96                                   |
| 2002                           | -105  | 0                         | 0                                      | 0  | 0.0  | 0  | -105                                  |
| 2003                           | -114  | 0                         | 0                                      | 0  | 0.0  | 0  | -114                                  |
| 2004                           | -119  | 0                         | 0                                      | 0  | 0.0  | 0  | -119                                  |
| <b>2005</b>                    | <b>-130</b>   | <b>0</b>                  | <b>0</b>                               | <b>0</b>   | <b>0.0</b>   | <b>0</b>   | <b>-130</b>                           |
| 2006                           | -145  | 0                         | 0                                      | 0  | 0.0  | 0  | -145                                  |
| 2007                           | -157  | 0                         | 0                                      | 0  | 0.0  | 0  | -157                                  |
| <b>2008</b>                    | <b>-167</b>   | <b>0</b>                  | <b>0</b>                               | <b>0</b>   | <b>0.0</b>   | <b>0</b>   | <b>-167</b>                           |
| <b>2009</b>                    | <b>-175</b>   | <b>0</b>                  | <b>0</b>                               | <b>0</b>   | <b>0.0</b>   | <b>0</b>   | <b>-175</b>                           |
| <b>2010</b>                    | <b>-180</b>   | <b>0</b>                  | <b>0</b>                               | <b>0</b>   | <b>0.0</b>   | <b>0</b>   | <b>-180</b>                           |
| <b>2011</b>                    | <b>-182</b>   | <b>0</b>                  | <b>0</b>                               | <b>0</b>   | <b>0.0</b>   | <b>0</b>   | <b>-182</b>                           |
| <b>2012</b>                    | <b>-186</b>   | <b>0</b>                  | <b>0</b>                               | <b>0</b>   | <b>0.0</b>   | <b>0</b>   | <b>-186</b>                           |
| 2013                           | -170  | -11                       | 0                                      | 0  | 0.0  | 0  | -170                                  |
| 2014                           | -155  | -16                       | 0                                      | 0  | 0.0  | 0  | -155                                  |
| <b>2015</b>                    | <b>-171</b>   | <b>-4</b>                 | <b>0</b>                               | <b>0</b>   | <b>0.0</b>   | <b>0</b>   | <b>-171</b>                           |
| 2016                           | -183  | 2                         | 0                                      | 0  | 0.0  | 0  | -183                                  |
| 2017                           | -177  | -5                        | 0                                      | 0  | 0.0  | 0  | -177                                  |
| 2018                           | -166  | -11                       | 0                                      | 0  | 0.0  | 0  | -166                                  |
| 2019                           | -164  | -10                       | 0                                      | 0  | 0.0  | 0  | -164                                  |
| <b>2020</b>                    | <b>-169</b>   | <b>-6</b>                 | <b>0</b>                               | <b>0</b>   | <b>0.0</b>   | <b>0</b>   | <b>-169</b>                           |