

## **Section 2**

# **Land Use Change and Forestry: The 2004 UK Greenhouse Gas Inventory and Projections to 2020**



## Table of Contents

<b>2. Land Use Change and Forestry: The 2004 UK Greenhouse Gas Inventory and projections to 2020.....</b>	<b>2-1</b>
2.1. Introduction.....	2-1
2.2. LULUCF GHG Data on the basis of IPCC 2003 Good Practice Guidance .....	2-1
2.2.1. Introduction .....	2-1
2.2.2. Forest Land (5A).....	2-2
2.2.3. Cropland (5B).....	2-7
2.2.4. Grassland (5C).....	2-17
2.2.5. Wetlands (5D).....	2-21
2.2.6. Settlements (5E).....	2-21
2.2.7. Other Land (5F).....	2-23
2.2.8. Other Activities (5G).....	2-23
2.3. Results.....	2-24
2.3.1. Forest Land.....	2-24
2.3.2. Cropland.....	2-25
2.3.3. Grassland.....	2-25
2.3.4. Settlements.....	2-26
2.3.5. Other Activities.....	2-26
2.3.6. Net UK Emissions/Removals .....	2-26
2.3.7. LUCF GHG Data on basis of IPCC 1996 Guidelines .....	2-26
2.3.8. Uncertainties .....	2-27
2.4. Projections of Emissions and Removals to 2020 .....	2-30
2.4.1. Introduction .....	2-30
2.4.2. Basis for projections.....	2-30
2.4.3. Results for projections of LUCF Categories.....	2-30
2.4.4. Kyoto Protocol Article 3.3: Removals and emissions associated with post-1990 afforestation and deforestation.....	2-40
2.4.5. Kyoto Protocol Article 3.4: Removals and emissions associated with Forest Management, Cropland Management and Grassland Management.....	2-40
2.4.6. Kyoto Protocol Article 3.7: Deforestation emissions in Base Year .....	2-41
2.5. References.....	2-42
<b>Appendix 1 .....</b>	<b>2-45</b>
A.1. Summary Tables for 1990 to 2020 in LULUCF GPG Format and 1996 Guidelines Format (with High and Low future scenarios).....	2-45
<b>Appendix 2 .....</b>	<b>2-69</b>
A.2. Sectoral Tables for Land Use Change and Forestry Sector submitted as UK 2004 Greenhouse Gas Inventory in format defined by IPCC LULUCF Good Practice Guidance .....	2-69
<b>Appendix 3 .....</b>	<b>2-89</b>
A.3. Sectoral Tables for Land Use Change and Forestry Sector for the Devolved Administration Regions ..	2-89
<b>Appendix 4 .....</b>	<b>2-99</b>
A.4. Removals and Emissions by post-1990 afforestation and deforestation in the UK.....	2-99



## 2. Land Use Change and Forestry: The 2004 UK Greenhouse Gas Inventory and projections to 2020

R. Milne, A. Thomson & D. C. Mobbs  
Centre for Ecology & Hydrology, Bush Estate, Penicuik.

### 2.1. Introduction

This sector differs from others in the Greenhouse Gas Inventory in that it contains both sources and sinks of carbon dioxide. The sinks, or *removals*, are presented as negative quantities. Emissions from land use change and forestry were approximately 2.2% of the UK total in 2004 and are declining gradually.

The estimates for Land Use Change and Forestry are from work carried out by the Centre for Ecology & Hydrology. The structure of this Section and of the main submission for the national Inventory Report and CRF Tables is based on the Categories of the Common Reporting Format tables agreed at the 9<sup>th</sup> Conference of Parties to the UNFCCC and contained in FCCC/SBSTA/2004/8 (see also IPCC 2003). The Sector 5 Report Tables in the CRF format for each year from 1990 to 2004 have been submitted using the CRF Reporter software. The relationship of this reporting format to that used in previous submissions from the UK is discussed in Section 2.3.7.

Some revision of the data and methods used for this Sector has been made for the 2004 Inventory, starting from the approaches described by Cannell *et al.* (1999) and Milne & Brown (1999). Net emissions in 1990 are estimated here to be 2915 Gg CO<sub>2</sub> compared to 2645 Gg CO<sub>2</sub> in the 2003 National Inventory Report. For 2003 a net removal of -1180 Gg CO<sub>2</sub> is estimated here compared to a net removal of -1489 Gg CO<sub>2</sub> in the 2003 Inventory.

### 2.2. LULUCF GHG Data on the basis of IPCC 2003 Good Practice Guidance

#### 2.2.1. Introduction

In the IPCC Good Practice Guidance (GPG) for Land Use, Land Use Change and Forestry (IPCC 2003), a uniform structure for reporting emissions and removals of greenhouse gases was described. This format for reporting can be seen as “land based”: all land in the country is 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 the period since the last survey. 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) land 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 changes 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.

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 the time when the change occurred is also encouraged.

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

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 Forest Land category is divided into *Category 5.A.1 Forest remaining Forest Land* and *Category 5.A.2 Land converted to Forest Land*. Category 5.A.1 is disaggregated into the four geographical areas of England, Scotland, Wales and Northern Ireland. Category 5.A.2 is 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) two time periods, 1920 – 1990 and 1991 onwards.

Direct N<sub>2</sub>O emissions from N fertilization from land use, land use change and forestry changes in Category 5A are not estimated as they have been assessed as insignificant in the UK (Skiba *et al.* 2005). N<sub>2</sub>O emissions from drainage of soils for land in Category 5A are not reported for the same reason (Skiba *et al.* 2005)

#### **2.2.2.1 Forest Land remaining Forest Land**

There are about 822,000 ha of woodland in the UK that were planted prior to 1922 or are not considered of commercial importance. These forests are assumed to fall in *Category 5.A.1 Forest Land remaining Forest Land*. It is evident from the comparison of historical forest censuses that some of this forest area is still actively managed (see Thomson, this volume), but overall this category is assumed to be carbon-neutral.

##### *2.2.2.1.(a) Methodology*

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

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

- *Common Reporting Format under IPCC LULUCF Good Practice Guidance*

In Table 5.A. Forest Land (see Part II) the carbon stock changes (in living biomass, dead organic matter and soils) are entered as ‘Not Occurring’ (NO). The area of forest land in this category is entered separately for England, Scotland, Wales and Northern Ireland.

##### *2.2.2.1.(c) Planned Improvements*

The possible contribution of this category to carbon emissions and removals will be considered in more detail in future reporting.

#### **2.2.2.2 Land converted to Forest Land**

The estimates of changes in carbon stock in the biomass and soils 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. Activity data are obtained consistently from the same national forestry sources, which helps ensure time series consistency of estimated removals.

The estimates of emissions and removals due to afforestation were updated with planting statistics for 2004. The main revision was an adjustment in the forest planting calculations to take account of the impact of non-standard management practices in conifer forests, which were due to either deliberately shortened harvesting rotations or a response to forest disturbance. The conifer afforestation series in England and Wales were sub-divided into the standard Sitka spruce 59 year rotation (1921-2004), a 49 year rotation (1921-1950) and a 39 year rotation (1931-1940, England only). The areas of forest planting with non-standard management were small (8.8 kha in England, 20.0 kha in Wales), so the impact on forest removals reported here is less than  $\pm 0.1 \text{ Mt C a}^{-1}$  compared to removals reported previously.

#### 2.2.2.2.(a) Methodology

The carbon uptake by the forests planted since 1920 is calculated by a carbon accounting model, C-Flow, (Dewar & Cannell, Cannell & 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 in products. Restocking is assumed in all forests. The method can be described as Tier 3, as defined in the GPG LULUCF (IPCC 2003). Two types of input data and two parameter sets were required for the model (Cannell & 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 are 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 2004 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, which occur after clearfelling at the time of Maximum Area Increment (MAI). Therefore areas restocked in each year did not need to be considered separately. The key assumption is that the forests are harvested according to standard management tables. However, a comparison of forest census data over time has indicated that there are variations in the felling/replanting date during the 20<sup>th</sup> century, i.e. non-standard management. These variations in management have been incorporated into the forest model, and the methodology will be kept under review in future reporting.

The C-Flow model uses Forestry Commission Yield Tables (Edwards & Christie 1981) to describe forest growth after thinning and an expo-linear curve for growth 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 regime. Sitka spruce is the commonest species in UK forests being about 50% by area of conifer forests. Milne *et al.* (1998) have shown that mean Yield Class for Sitka spruce varies across Great Britain from  $10\text{-}16 \text{ m}^3 \text{ ha}^{-1} \text{ a}^{-1}$ , but with no obvious geographical pattern, and that this variation has 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 followed the growth pattern of Yield Class  $12 \text{ m}^3 \text{ ha}^{-1} \text{ a}^{-1}$ , but in Northern Ireland Yield Class  $14 \text{ m}^3 \text{ ha}^{-1} \text{ a}^{-1}$  was used. Milne *et al.* (1998) also showed that different assumptions for broadleaf species had little effect on carbon uptake. It is assumed that broadleaf forests have the characteristics of beech (*Fagus sylvatica* L.) of Yield Class  $6 \text{ m}^3 \text{ ha}^{-1} \text{ a}^{-1}$ . The most recent inventory of British woodlands (Forestry Commission 2002) shows that beech occupies about 8% of broadleaf forest area (all ages) and no single species occupies greater than 25%. Beech was selected to represent all broadleaves as it has characteristics intermediate between fast growing species e.g. birch, and very slow growing species e.g. oak. However, using oak or birch Yield Class data instead of beech data has been shown to have

an effect of less than 10% on the overall removal of carbon to UK forests (Milne *et al.* 1998). The use of beech as the representative species will be kept under review.

Irrespective of species assumptions, the variation in removals from 1990 to the present is determined by the afforestation rate in earlier decades and the effect this has on the age structure in the present forest estate, and hence the average growth rate. It can be shown that if forest expansion continues at the present rate, 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. This afforestation is all 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.

A comparison of historical forest census data and the historical annual planting rates has been undertaken. Forest censuses were taken in 1924, 1947, 1965, 1980 and the late 1990s. The comparison of data sources showed that discrepancies in annual planting rates and inferred planting/establishment date (from woodland age in the forest census) are due to restocking of older (pre-1920) woodland areas and variations in the harvesting rotations. However, there is also evidence of shortened conifer rotations in some decades and transfer of woodland between broadleaved categories (e.g. between coppice and high forest). As a result, the afforestation series for conifers in England and Wales were sub-divided into the standard 59 year rotation (1921-2004), a 49 year rotation (1921-1950) and a 39 year rotation (1931-1940, England only). It is difficult to incorporate non-standard management in older conifer forests and broadleaved forests into the Inventory because it is not known whether these forests are on their first rotation or subsequent rotations (which would affect carbon stock changes, particularly in soils). Further work is planned for this area.

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

Period	Planting rate (000 ha a <sup>-1</sup> )		Age distribution	
	Conifers	Broadleaves	Conifers	Broadleaves
1922-1929	4.9	2.4	2.9%	6.7%
1930-1939	7.2	2.2	5.3%	7.8%
1940-1949	6.3	1.9	4.6%	6.7%
1950-1959	20.0	3.0	14.8%	10.7%
1960-1969	28.4	2.9	21.0%	10.4%
1970-1979	33.2	1.5	24.6%	5.3%
1980-1989	22.5	1.4	16.7%	4.9%
1990	26.8	3.1	2.0%	1.1%
1991	15.4	5.8	1.1%	2.0%
1992	13.4	6.8	1.0%	2.4%
1993	11.6	6.5	0.9%	2.3%
1994	10.1	8.9	0.7%	3.1%
1995	7.4	11.2	0.5%	4.0%
1996	9.5	10.5	0.7%	3.7%
1997	7.4	8.9	0.5%	3.2%
1998	7.0	9.7	0.5%	3.4%
1999	6.6	10.1	0.5%	3.6%
2000	6.5	10.9	0.5%	3.9%
2001	4.9	13.4	0.4%	4.8%
2002	3.9	10.0	0.3%	3.5%
2003	3.7	9.3	0.3%	3.3%
2004	2.9	8.9	0.2%	3.1%



Increases in stemwood volume were based on standard Yield Tables, as in Dewar & Cannell (1992) and Cannell & Dewar (1995). These Tables do not provide information for years prior to first thinning so a curve was developed to bridge the gap (Hargreaves *et al.* 2003). The pattern fitted to the stemwood volume between planting and first thinning from the Yield Tables follows a smooth curve from planting to first thinning. The formulation 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 carbon in wood (0.5 assumed). The values used for these parameters for conifers and broadleaves are given in Table 2-2.

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 the United Kingdom (Dewar & Cannell 1992)

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

The parameters controlling the transfer of carbon into the litter pools and its subsequent decay are also given in Table 2-2. Litter transfer rate from foliage and fine roots increased to a maximum at canopy closure. A fraction of the litter was assumed to decay each year, half of which added to the soil organic matter pool, which then decayed at a slower rate. Tree species and Yield Class were assumed to control the decay of litter and soil matter. Additional litter was generated at times of thinning and felling.

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 tC ha<sup>-1</sup> a<sup>-1</sup> thirty years after afforestation. In addition, a short burst of regrowth of moorland vegetation occurs before forest canopy closure.

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 considered. 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 that same depth of deep peat. A simplified approach was used to decide on the proportionality factors, and it is assumed 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 assumed to proceed at half the rate of those from 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. The temporary re-growth of ground vegetation before forest canopy closure is, however, assumed to occur for all planting at the same rate as for afforested peat moorland. This assumption agrees with qualitative field observations of planting on agricultural land in England.

For the 2004 inventory, there was a minor revision of the modelling of the emissions due to soil disturbance. This is now estimated within C-Flow using a time-step of 0.1 years, rather than as a separate calculation with an annual time-step as used in the 2003 Inventory.

It is assumed in the C-Flow model that harvested material from thinning and felling is made into wood products. The net change in the carbon in this pool of wood products is reported in Category 5G.

#### 2.2.2.2.(b) Data Reporting

- *Common Reporting Format under IPCC LULUCF Good Practice Guidance*

The data for carbon stock changes in living biomass, dead organic matter and soils from afforestation are entered in Sectoral Background 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) two time periods, up to 1990 and 1991 onwards. The area associated with each set of disaggregated data is included in Sectoral Background Table 5.A.2.

The removals due to carbon stock changes in harvested wood products calculated here are entered into Sectoral Report Table 5, as “G Other, Harvested Wood Products”.

- *Common Reporting Format under IPCC 1996 Guidelines (no longer used)*

Removals due to changes in forest biomass stocks were previously included in the Category 5A2 (Changes in Temperate Woody Biomass) but removals to litter and soil for the afforested areas were reported under Category 5D4 (Forest Soils). Changes in stocks of harvested wood products were reported separately under Category 5A5.

#### 2.2.2.2.(c) 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 or grant application 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 more geographically explicit data than the national area for reporting removals due to afforestation and deforestation under Article 3.3. In addition, there will be further investigation into the

effects of non-standard management, externally imposed disturbances on both conifer and broadleaved forests and the effect of alternative assumptions on species distribution.

### 2.2.3. Cropland (5B)

The category is disaggregated into 5.B.1 *Cropland remaining Cropland* and 5.B.2 *Land converted to Cropland*. Category 5.B.1 is further disaggregated into the four geographical areas of England, Scotland, Wales and Northern Ireland. Three activities are considered for 5.B.1: Changes in non-forest biomass (resulting from yield improvements or land use change), carbon dioxide emissions from soils due to agricultural lime application to Cropland (which is further disaggregated into application of Limestone ( $\text{CaCO}_3$ ) and Dolomite ( $\text{CaMg}(\text{CO}_3)_2$ )) and the effect of fenland drainage on soil carbon stocks (which occurs only in England). Category 5.B.2 is disaggregated into conversions from Forest Land, Grassland and Settlements. These conversions are further disaggregated by a) the four geographical areas of England, Scotland, Wales and Northern Ireland, and b) two time periods, 1950 – 1990 and 1991 onwards

$\text{N}_2\text{O}$  emissions from disturbance associated with land use conversion to Cropland are not reported as a study has shown these to be small (Skiba *et al.* 2005)

#### 2.2.3.1 Cropland remaining Cropland

##### 2.2.3.1.(a) Methodology - Changes in non-forest biomass resulting from yield improvements

New approaches to estimating changes in the stock of carbon in biomass other than in forests have been introduced this year.

There is an annual increase in the biomass of cropland vegetation in the UK that is due to yield improvements (from improved species strains or management, rather than fertilization or nitrogen deposition). There has been a complete revision of the activity data and methodology in this category. The increases in crop yield are now calculated separately from those resulting from land use change. Under category 5.B.1 an annual value is reported for changes in carbon stock, on the assumption that the annual average standing biomass of cereals has increased linearly with increase in yield between 1980 and 2000 (Sylvester-Bradley *et al.* 2002).

##### 2.2.3.1.(b) Methodology – Application of Lime

Emissions of carbon dioxide from the application of limestone, chalk and dolomite to cropland were estimated using the method described in the IPCC 1996 Guidelines (IPCC, 1997a, b, c). Data on the use of limestone, chalk and dolomite for agricultural purposes is reported in BGS (2005). They also include ‘material for calcination’. In agriculture all three minerals are applied to the soil;  $\text{CO}_2$  emissions, weight for weight, from limestone and chalk are assumed to be identical since they have the same chemical formula. Dolomite, however, will have a slightly higher emission due to the presence of magnesium. The amount of each material (applied to cropland) is estimated each year as only the total amount is published, due to commercial confidentiality rules for reporting of small quantities. It is assumed that all the carbon within the applied material is released in the year of use. These application data were combined with fluxes from agricultural grassland and reported in Category 5D of previous inventory formats.

The method for estimating  $\text{CO}_2$  emissions due to the application of lime and related compounds is that described in the IPCC 1996 Guidelines. For limestone and chalk, an

emission factor of 120 tC/kt applied is used, and for dolomite application, 130 tC/kt. These factors are based on the stoichiometry of the reaction and assume pure limestone/chalk and dolomite.

Only dolomite is subjected to calcination. However, some of this calcinated dolomite is not suitable for steel making and is returned for addition to agricultural dolomite – this fraction is reported in BGS (2005) 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 carbonation in the refining of sugar but this is not specifically dealt with in the UK LUCF GHG Inventory.

Lime is applied to both grassland and cropland. The annual percentages of arable and grassland areas receiving lime in Great Britain for 1994-2004 were obtained from the Fertiliser Statistics Report 2005 (Agricultural Industries Confederation 2005). Percentages for 1990-1993 were assumed to be equal to those for 1994.

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.

#### 2.2.3.1.(c) Methodology – Lowland drainage

Fenland areas of England were drained many decades ago for agriculture. The soils in these areas are still emitting CO<sub>2</sub>, i.e. there is an ongoing change in soil carbon stock. These data were reported in Category 5D or 5E in previous inventory formats. No recalculations were undertaken for this category.

Lowland wetlands in England were drained many years ago for agricultural purposes and continue to emit carbon from the soil. 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 1 m deep) and the rest with thinner peat. Different loss rates were assumed for these two thicknesses as shown in Table 2-3. The large difference between the implied emission factors is due to the observation that those peats described as ‘thick’ lose volume (thickness) more rapidly than those peats described as ‘thin’. The ‘thick’ peats are deeper than 1m, have 21% carbon by mass and in general have different texture and less humose topsoil than the ‘thin’ peats, which have depths up to 1m (many areas ~0.45 m deep) and carbon content of 12% by mass.

Table 2-3 Area and carbon loss rates of UK fen wetland in 1990

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

The emissions trend since 1990 was estimated assuming that no more fenland has been drained since then but that existing drained areas have continued to lose carbon. The annual loss for a specific location decreases in proportion to the amount of carbon remaining. Furthermore, as the peat loses carbon it becomes more mineral in structure. The Century model of plant and soil carbon was used to average the carbon losses from these fenland soils over time (Bradley 1997): further data on how these soil structure changes proceed with time is provided in Burton (1995).

The emissions due to lowland drainage are obtained from a model driven by activity data from a single source, which provides good time series consistency.

#### 2.2.3.1.(d) Data Reporting

- *Common Reporting Format under IPCC LULUCF Good Practice Guidance*

The net emissions due to increases in non-forest biomass are disaggregated into the four geographical areas of England, Scotland, Wales and Northern Ireland and entered into Sectoral Background Table 5.B.1 (Cropland remaining Cropland) under carbon stock change in living biomass. The area of land associated with each set of data is also included in Sectoral Background Table 5.B.1.

The emissions in this Category from agricultural lime application are entered into Sectoral Background Table 5 (IV) (Carbon emissions from agricultural lime application). The data are disaggregated by application of limestone and dolomite separately on Cropland (and Grassland).

The emissions in this Category due to lowland drainage are entered into Sectoral Background Table 5.B.1 (Cropland remaining Cropland) under net carbon stock change in soils. This applies only to England so there is no further disaggregation. The area of land associated with lowland drainage is also included in Sectoral Background Table 5.B.1.

- *Common Reporting Format under IPCC 1996 Guidelines (no longer used)*

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

Emissions from liming were identified separately under Category 5D3 (CO<sub>2</sub> Emissions and Removals from Soils: Liming of Agricultural Soils).

Emission of CO<sub>2</sub> from drained lowland fens were reported in Category 5D5 (CO<sub>2</sub> Emissions and Removals - Other).

#### 2.2.3.1.(e) Planned Improvements

A review of the approaches will be undertaken for this activity, with reference to input data and appropriateness of reporting category.

### 2.2.3.2 Land Converted to Cropland

#### 2.2.3.2.(a) Methodology - Changes in non-forest biomass stocks resulting from land use change to Cropland

This is the annual change in the carbon stock in vegetation biomass due to all land use change to Cropland, excluding forests and woodland. Estimates of emissions and removals for this

category are made using the Countryside Survey Land Use Change matrix approach, with biomass densities weighted by expert judgment.

Changes in carbon stocks in biomass due to land use change are now based on the same area matrices used for estimating changes in carbon stocks in soils (Section 2.2.3.2.(b)). The biomass carbon density for each land type is assigned by expert judgement based on the work of Milne & Brown (1997) and these are shown in Table 2-4. Five basic land uses were assigned initial biomass carbon densities, then the relative occurrence of these land uses in the four countries of the UK were used to calculate mean biomass carbon densities for each of the IPCC types, Cropland, Grassland and Settlements. Biomass carbon stock changes due to conversions to and from Forest Land are dealt with elsewhere. The mean biomass carbon densities for each land type were then weighted by the relative proportions of change occurring between land types (Table 2-5 to Table 2-8), in the same way as the calculations for changes in soil carbon densities. Changes between these equilibrium biomass carbon densities were assumed to happen in a single year.

Table 2-4 Equilibrium biomass carbon density ( $\text{kg m}^{-2}$ ) for different land types

Density ( $\text{kg m}^{-2}$ )	Scotland	England	Wales	N. Ireland
Arable	0.15	0.15	0.15	0.15
Gardens	0.35	0.35	0.35	0.35
Natural	0.20	0.20	0.20	0.20
Pasture	0.10	0.10	0.10	0.10
Urban	0	0	0	0
IPPC types weighted by occurrence				
Cropland	0.15	0.15	0.15	0.15
Grassland	0.18	0.12	0.13	0.12
Settlements	0.29	0.28	0.28	0.26

Table 2-5 Weighted average change in equilibrium biomass carbon density ( $\text{kg m}^{-2}$ ) for changes between different land types in England (Transitions to and from Forestland are considered elsewhere)

From To	Forestland	Grassland	Cropland	Settlements
Forestland				
Grassland		0	-0.08	-0.13
Cropland		0.08	0	-0.08
Settlements		0.13	0.08	0

Table 2-6 Weighted average change in equilibrium biomass carbon density ( $\text{kg m}^{-2}$ ) for changes between different land types in Scotland. (Transitions to and from Forestland are considered elsewhere)

From To	Forestland	Grassland	Cropland	Settlements
Forestland				
Grassland		0	-0.02	-0.14
Cropland		0.02	0	-0.09
Settlements		0.14	0.09	0

Table 2-7 Weighted average change in equilibrium biomass carbon density ( $\text{kg m}^{-2}$ ) for changes between different land types in Wales. (Transitions to and from Forestland are considered elsewhere)

<b>From</b> <b>To</b>	<b>Forestland</b>	<b>Grassland</b>	<b>Cropland</b>	<b>Settlements</b>
<b>Forestland</b>				
<b>Grassland</b>		0	-0.07	-0.13
<b>Cropland</b>		0.07	0	-0.08
<b>Settlements</b>		0.13	0.08	0

Table 2-8 Weighted average change in equilibrium biomass carbon density ( $\text{kg m}^{-2}$ ) for changes between different land types in Northern Ireland. (Transitions to and from Forestland are considered elsewhere)

<b>From</b> <b>To</b>	<b>Forestland</b>	<b>Grassland</b>	<b>Cropland</b>	<b>Settlements</b>
<b>Forestland</b>				
<b>Grassland</b>		0	-0.08	-0.11
<b>Cropland</b>		0.08	0	-0.06
<b>Settlements</b>		0.11	0.06	0

#### 2.2.3.2.(b) Methodology – Changes in soil carbon stocks due to land use change to Cropland

Changes in soil stocks due to land use change to Cropland are estimated. All forms of land use change, including deforestation, are considered together and both mineral and organic soils are included. The Scottish soil carbon bulk densities have been updated, giving improved information on carbon content and the bulk density of organic rich soils. Estimates of emissions and removals have been updated to reflect these improvements.

The method for assessing changes in soil carbon stock due to land use change links a matrix of change from land surveys to a dynamic model of carbon stock change. For Great Britain (England, Scotland and Wales), matrices from the Monitoring Landscape Change (MLC) data from 1947 & 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 are available to build matrices of land use change, but for 1990 to 1998 a matrix for the whole of Northern Ireland was available from the Northern Ireland Countryside Survey (Cooper & McCann 2002). The only data available pre-1990 for Northern Ireland are land use areas from the Agricultural Census and the Forest Service (Cruickshank & Tomlinson 2000). Matrices of land use change were then estimated for 1970-80 and 1980-90 using area data. The basis of the method devised assumed that the relationship between the matrix of land use transitions for 1990-1998 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 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: Forest, Grassland, Cropland, Settlements, Wetlands and Other Land. The data currently available for the UK does not distinguish wetlands from other types, so land in the UK has been placed into the five other

types. The more detailed categories for the two surveys in Great Britain were combined as shown in Table 2-9 for MLC and Table 2-10 for CS.

The area data used between 1947 and 1998 are shown in Table 2-11 and Table 2-12. 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 2-13 to Table 2-16. 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 2.2.2.2.(a), 2.2.8 and 2.2.4.2.(a).

Table 2-9 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 2-10 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			

Table 2-11 Sources of land use change data in Great Britain for different periods in estimation of changes in soil carbon

<b>Year or Period</b>	<b>Method</b>	<b>Change matrix data</b>
1950 - 1979	Measured LUC matrix	MLC 1947->MLC1980
1980 - 1984	Interpolated	CS1984->CS1990
1984 - 1989	Measured LUC matrix	CS1984->CS1990
1990 - 1998	Measured LUC matrix	CS1990->CS1998
1999 - 2004	<i>Extrapolated</i>	CS1990->CS1998



Table 2-12 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	Extrapolation and ratio method	NICS1990->NICS1998
1970 - 1989	Land use areas and ratio method	NICS1990->NICS1998
1990 - 1998	Measured LUC matrix	NICS1990->NICS1998
1999-2003	<i>Extrapolated</i>	NICS1990->NICS1998

Table 2-13 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.

To \ From	Forestland	Grassland	Cropland	Settlements
Forestland		8.9	3.4	2.1
Grassland	8.7		55.3	3.4
Cropland	0.5	62.9		0.6
Settlements	1.2	8.5	2.1	

Table 2-14 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.

To \ From	Forestland	Grassland	Cropland	Settlements
Forestland		11.1	0.6	0.2
Grassland	5.0		16.8	0.7
Cropland	0.1	21.4		0.3
Settlements	0.3	2.2	0.1	

Table 2-15 Annual changes (000 ha) in land use in Wales 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.

To \ From	Forestland	Grassland	Cropland	Settlements
Forestland		2.4	0.2	0.2
Grassland	1.5		5.5	0.6
Cropland	0.0	8.0		0.0
Settlements	0.1	1.8	0.2	

Table 2-16 Annual changes (000 ha) in land use in Northern Ireland in matrix form for 1990 to 1999. Based on land use change between 1990 and 1998 from Northern Ireland Countryside Surveys (Cooper & McCann 2002). Data have been rounded to 100 ha.

To \ From	Forestland	Grassland	Cropland	Settlements
Forestland		1.6	0.0	0.0
Grassland	0.3		5.9	0.0
Cropland	0.0	3.7		0.0
Settlements	0.1	1.0	0.0	

The database of soil carbon density for the UK (Milne & Brown 1997, Cruickshank *et al.* 1998) used prior to the 2003 GHG Inventory was extensively revised (Bradley *et al.* 2005) and incorporated into the 2003 Inventory. There are three soil survey groups covering the UK and the field data, soil classifications and laboratory methods of each group were harmonized to reduce uncertainty in the final database. The depth of soil considered was also restricted to 1 m at maximum as part of this process. Values of carbon content and bulk densities for organic soils in Scotland have been more recently revised and incorporated into the 2004 Inventory. Table 2-17 shows total stock of soil carbon (1990) for different land types in the four devolved areas of the UK.

Table 2-17 Soil carbon stock (TgC = MtC) for depths to 1m in different land types in the UK

<b>Region</b> <b>Type</b>	England	Scotland	Wales	N. Ireland	<b>UK</b>
Forestland	108	295	45	20	467
Grassland	995	2,349	283	242	3,870
Cropland	583	114	8	33	738
Settlements	54	10	3	1	69
Other	0	0	0	0	-
<b>TOTAL</b>	<b>1,740</b>	<b>2,768</b>	<b>340</b>	<b>296</b>	<b>5,144</b>

The dynamic model of carbon stock change requires the change in equilibrium carbon density from the initial to the final land use. The core equation describing changes in soil carbon with time for any land use transition is:

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

where

- $C_t$  is carbon density at time  $t$
- $C_0$  is carbon density of initial land use
- $C_f$  is carbon density after 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, LUC matrices.

In the model, the change is required in equilibrium carbon density from the initial to the final land use during a transition. Here, 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:

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

This is the weighted mean, for each country, of change in equilibrium soil carbon when land use changes, where:

$i$  = initial land use (Forestland, Grassland, Cropland, Settlements)

$j$  = new land use (Forestland, Grassland, Cropland, Settlements)

$c$  = country (Scotland, England, N. Ireland & Wales)

$s$  = soil group (organic, organo-mineral, mineral, unclassified)

$C_{sijc}$  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 calculated are presented in Table 2-18 to Table 2-21.

Table 2-18 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>From</b> <b>To</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 2-19 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>From</b> <b>To</b>	<b>Forestland</b>	<b>Grassland</b>	<b>Cropland</b>	<b>Settlements</b>
<b>Forestland</b>	0	47	158	246
<b>Grassland</b>	-52	0	88	189
<b>Cropland</b>	-165	-90	0	96
<b>Settlements</b>	-253	-187	-67	0

Table 2-20 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>From</b> <b>To</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 2-21 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>From</b> <b>To</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 2-22). 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. A literature search for information on measured rates of changes of soil carbon due to land use was carried out and ranges of possible times for completion of different transitions were selected, in combination with expert judgement. These are shown in Table 2-23.

Table 2-22 Rates of change of soil carbon for land use change transitions. (“Fast” &amp; “Slow” refer to 99% of change occurring in times shown in Table 2-23)

		<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 2-23 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 (years)</b>	<b>High (years)</b>
Carbon loss (“fast”) E, S, W	50	150
Carbon gain (“slow”) E, W	100	300
Carbon gain (“slow”) S	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  $\pm 11\%$  of mean). The areas of land use change for each transition were assumed to fall a range of uncertainty of  $\pm 30\%$  of mean.

A Monte Carlo approach is used to vary the rate of change, the area activity data and the values for soil carbon equilibrium (under initial and final land use) for all countries in the UK. The model of change was run 1000 times using parameters selected 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 provides a better estimate of these fluxes in the Land Converted to Forestry category (see Section 2.2.2.2). Variations from year to year in the reported net emissions reflect the trend in land use change as described by the matrices of change.

As regards data quality, land use change activity data are obtained from several sources. The sources for Great Britain have separate good internal consistency, but there is poorer consistency between sources and with the data for Northern Ireland. There may be carry-over

effects on emission/removal estimates for the reported years due to the long time response of soil systems.

#### 2.2.3.2.(c) Data Reporting

- *Common Reporting Format under IPCC LULUCF Good Practice Guidance*

The carbon stock change in living biomass due to the increase in non-forest biomass in this category is disaggregated into the four geographical areas of England, Scotland, Wales and Northern Ireland and entered into Sectoral Background Table 5.B.2 Land Converted to Cropland. The area of land associated with each set of data is also included in Sectoral Background Table 5.B.

Net carbon stock change in soils resulting from land use change is included in Sectoral Background Table 5.B.2 Land converted to Cropland. The data for deforestation is included at the UK level while conversion of Grassland and Settlements to Cropland is disaggregated into the four geographical areas of England, Scotland, Wales and Northern Ireland plus two time periods (pre and post 1990). The areas of land associated with each set of data are also included in this Table.

- *Common Reporting Format under IPCC 1996 Guidelines (no longer used)*

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

Emissions or removals in soils resulting from land use change were reported in Category 5D (Cultivation of Soils).

#### 2.2.3.2.(d) 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 over this and the previous inventory. A new version of the Countryside Survey is planned for 2007/2008, which will allow the extension of the land use change matrices.

### 2.2.4. Grassland (5C)

The Category is disaggregated into 5.C.1 *Grassland remaining Grassland* and 5.C.2 *Land converted to Grassland*. Category 5.C.1 is disaggregated into the four geographical areas of England, Scotland, Wales and Northern Ireland. Category 5.C.2 is disaggregated into conversions from Forest Land, Cropland and Settlements. Conversions from Cropland and Settlements to Grassland are further disaggregated by a) the four geographical areas of England, Scotland, Wales and Northern Ireland and b) two time periods, 1950 – 1990 and 1991 onwards. Biomass burning emissions due to conversion of Forest Land to Grassland is reported at the 5C level for all of the UK in two time periods, 1950-1990 and 1990 onwards.

Carbon dioxide emissions from agricultural lime application to Grassland is disaggregated into application of Limestone (CaCO<sub>3</sub>) and Dolomite (CaMg(CO<sub>3</sub>)<sub>2</sub>).

### 2.2.4.1 Grassland remaining Grassland

#### 2.2.4.1.(a) Methodology – Application of Lime

See 2.2.3.1.(b) for details on Agricultural liming on Cropland and Grassland. This data was combined with fluxes from Cropland and reported in Category 5D of previous formats.

#### 2.2.4.1.(b) Methodology – Peat Extraction

Peat is extracted in the UK for use as either a fuel or in horticulture. Only peat used in horticulture is now reported in this category. Peat used as a fuel is reported in the Energy Sector of the UK Inventory. This change results in reporting of 390 Gg CO<sub>2</sub> for 1990, compared to 792 Gg CO<sub>2</sub> in the previous NIR, and 355 Gg CO<sub>2</sub> in 2004, compared to 894 reported for 2003 in the previous NIR. 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.

Cruickshank & Tomlinson (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 2004 have been estimated from activity data taken from the UK Minerals Handbook (BGS 2005). In Northern Ireland, no new data on use of peat for horticultural use has been available but a recent survey of extraction for fuel use suggested that there is no significant trend for this purpose. The contribution of emissions due to peat extraction in Northern Ireland is therefore incorporated as constant from 1990 to 2004. Peat extraction is negligible in Wales. For 2004, emissions due to peat used as a fuel are reported in the Energy Sector while peat for horticulture use remains in Sector 5; the Sector 5 figures are therefore lower than in previous inventory reports. Emissions factors are from Cruickshank & Tomlinson (1997) and are shown in Table 2-24.

Table 2-24 Emission Factors for Peat Extraction

	<b>Emission Factor</b> kg C m <sup>-3</sup>
Great Britain Horticultural Peat	55.7
Northern Ireland Horticultural Peat	44.1

#### 2.2.4.1.(c) Data Reporting

- *Common Reporting Format under IPCC LULUCF Good Practice Guidance*

The emissions in this Category from agricultural lime application are entered into Sectoral Background Table 5 (IV) Carbon emissions from agricultural lime application. The data are disaggregated by application of limestone and dolomite separately on Grassland (and Cropland).

The emissions in this Category due to peat extraction are entered into Sectoral Background Table 5.C.1 Grassland remaining Grassland, disaggregated into the four geographical areas of England, Scotland, Wales and Northern Ireland.

- *Common Reporting Format under IPCC 1996 Guidelines (no longer used)*

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

Removals of CO<sub>2</sub> due to peat extraction were reported in Category 5E (Other).

#### 2.2.4.1.(d) Planned Improvements

There are no planned improvements for this category. The availability of data on peat extraction for horticultural use will be kept under review.

#### 2.2.4.2 Land converted to Grassland

##### 2.2.4.2.(a) Methodology - Emissions from biomass burning after conversion of Forest Land to Grassland

These are emissions of CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O resulting from the burning of forest biomass when Forest Land is converted to Grassland. In the 2003 Inventory deforestation was assumed only to be a conversion to Settlements. A revised interpretation of the available data allows the emissions to be disaggregated into deforestation to Grassland and Settlements. Deforestation to Cropland in the UK is negligible.

Levy & Milne (2004) discuss methods for estimating deforestation using a number of data sources. Here we use their approach of combining Forestry Commission felling licence data for rural areas with Ordnance Survey data for non-rural areas.

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, around 14,000 ha a<sup>-1</sup> was 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 areas deforested. 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. The most recent deforestation rate available for rural areas is for 2002 so rates for 2003 and 2004 were estimated by extrapolating forwards from the rates for 1999 to 2002

Only local planning authorities hold documentation for allowed felling for urban development, and the need for collation makes estimating the national total difficult. However, in England, the Ordnance Survey (national mapping agency) makes an annual assessment of land use change (Office of The Deputy Prime Minister 2004) from the 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 2004) were available 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 on non-rural deforestation.

The rural and non-rural 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 licensed 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. Deforestation is not currently estimated for Northern Ireland. Rural deforestation is assumed to convert the land to Grassland use (reported in Category 5C2) and

non-rural deforestation causes conversion to the Settlement land type (reported in 5E2). Information from land use change matrices shows that conversion of Forest to Cropland is negligible.

On deforestation it is assumed that 60% of the standing biomass is removed as timber products and the remainder is burnt. The annual area loss rates were used in the method described in the IPCC 1996 guidelines (IPCC 1997c, 1997a, 1997b) to estimate immediate emissions of CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O from this biomass burning. Only immediate losses are considered because sites are normally completely cleared for development, leaving no debris to decay. Changes in stocks of soil carbon after deforestation are included with those due to other land use transitions as described in Section 2.2.3.2.(b).

The time series consistency of emissions from this activity is medium given that the two constituent data series are not both available for each year and the values for several years are partially derived from data in one region. Areas deforested in non-rural areas have been revised for each year from 1990 and updated to 2004. Data on rural deforestation is only available up to 2002; therefore areas for 2003 and 2004 were estimated by extrapolation from earlier years.

#### 2.2.4.2.(b) Methodology – Changes in Non forest biomass due to land use change to Grassland

This is the annual change in the carbon stock in biomass of vegetation due to all land use change, excluding forests and woodland, to Grassland. See 2.2.3.2.(a) for details on non-forest biomass calculations.

#### 2.2.4.2.(c) Methodology – Changes in soil carbon stocks due to land use change to Grassland

Changes in soil stocks due to land use change to Grassland are estimated. All forms of land use change, including deforestation, are considered together and both mineral and organic soils are included. Land use change activity data are obtained from several sources. The sources for Great Britain have separate good internal consistency, but there is poorer consistency between these sources and with the data for Northern Ireland. There may be carry-over effects on emission/removal estimates for the reported years due to the long time response of soil systems. The Scottish soil carbon bulk densities have been updated, giving improved information on carbon content and the bulk density of organic rich soils. Estimates of emissions and removals have been updated to reflect these improvements in the data. Details of the Methodology are given in Section 2.2.3.2.(b).

#### 2.2.4.2.(d) Data Reporting

- *Common Reporting Format under IPCC LULUCF Good Practice Guidance*

Emissions of CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O from biomass burning after conversion of land to Grassland are included in Sectoral Background Table 5 (V) Biomass Burning.

The carbon stock change in living biomass due to the increase in non-forest biomass in this category is disaggregated into the four geographical areas of England, Scotland, Wales and Northern Ireland and entered into Sectoral Background Table 5.C.2 Land Converted to Grassland. The area of land associated with each set of data is also included in Sectoral Background Table 5.C.

Net carbon stock change in soils resulting from land use change is included in Sectoral Background Table 5.C.2 Land converted to Grassland. The data for deforestation is included at the UK level while conversion of grassland and settlements to Grassland is disaggregated



into the four geographical areas of England, Scotland, Wales and Northern Ireland plus two time periods (pre- and post-1990).

- *Common Reporting Format under IPCC 1996 Guidelines (no longer used)*

The net emissions associated with this activity were reported under Source Category 5B2, 5D and 5E.

#### 2.2.4.2.(e) Planned Improvements

Future improvements of the method for biomass burning emissions will include collating Forestry Commission unconditional felling licence data for Scotland and Wales. Similar information for Northern Ireland has also become available recently and will be incorporated in next year's Inventory. All emission factors and activity data will be kept under review.

### 2.2.5. Wetlands (5D)

In the UK, Wetlands will either be saturated land (e.g. bogs, marshes) falling within the Grassland category (due to the classifications used in the Countryside Survey) or open water (e.g. lakes, rivers, reservoirs), which is included in the Other Land category. Sectoral Background Table 5.D. Wetlands is therefore completed with 'IE' (Included Elsewhere).

### 2.2.6. Settlements (5E)

Category 5.E (Settlements) is disaggregated into *5.E.1 Settlements remaining Settlements* and *5.E.2 Land converted to Settlements*. The area of Settlements in Category 5.E.1 is considered not to have long term changes in carbon stock. Category 5.E.2 is disaggregated into conversions from Forest Land, Cropland and Grassland and these conversions are further disaggregated by a) the four geographical areas of England, Scotland, Wales and Northern Ireland and b) two time periods, 1950 – 1990 and 1991 onwards. Biomass burning emissions due to conversion of Forest Land to Settlements are reported at the 5E level for all of the UK in two time periods, 1950-1990 and 1990 onwards.

#### 2.2.6.1 Settlements remaining Settlements

No changes in carbon stocks are reported for land remaining under Settlements. 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

##### 2.2.6.1.(a) Data Reporting

- *Common Reporting Format under IPCC LULUCF Good Practice Guidance*

Sectoral Background Table 5.E.1 Settlements remaining Settlements is completed with 'NO' (Not Occurring).

##### 2.2.6.1.(b) Planned Improvements

None are planned at the present time.

### 2.2.6.2 Land converted to Settlements

#### 2.2.6.2.(a) Methodology – Emissions from biomass burning after conversion of Forest Land to Settlements

These are emissions of CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O resulting from the burning of forest biomass when Forest Land is converted to Settlements. In the 2003 Inventory deforestation was assumed only to be a conversion to Settlements. A revised interpretation of the available data allows the emissions to be disaggregated into deforestation to Grassland and Settlements. Deforestation to Cropland is negligible. The methodology is described in Section 2.2.4.1.(a).

#### 2.2.6.2.(b) Methodology - Changes in non-forest biomass due to land use change to Settlements

This includes annual changes in the biomass of vegetation in the UK due to all land use change, excluding forests and woodland. Estimates of emissions and removals for this category are now made using the Countryside Survey Land Use Change matrix approach, with biomass densities weighted by expert judgment. See Section 2.2.3.2.(a) for details.

#### 2.2.6.2.(c) Methodology – Changes in soil carbon stocks due to land use change to Settlements

Changes in soil stocks due to land use change to Settlements are estimated (see Section 2.2.3.2.(b) for details). All forms of land use change, including deforestation, are considered together and both mineral and organic soils are included. Land use change activity data are obtained from several sources. The sources for Great Britain have separate good internal consistency, but there is poorer consistency between these sources and with the data for Northern Ireland. There may be carry-over effects on emission/removal estimates for the reported years due to the long time response of soil systems. The Scottish soil carbon bulk densities have been updated, giving improved information on carbon content and the bulk density of organic rich soils. Estimates of emissions and removals have been updated to reflect these improvements in the data.

#### 2.2.6.2.(d) Data Reporting

- *Common Reporting Format under IPCC LULUCF Good Practice Guidance*

Emissions of CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O from biomass burning after conversion of land to Settlements are included in Sectoral Background Table 5 (V) Biomass Burning.

The carbon stock change in living biomass due to the increase in non-forest biomass in this category is disaggregated into the four geographical areas of England, Scotland, Wales and Northern Ireland and entered into Sectoral Background Table 5.E.2 Land Converted to Settlements. The area of land associated with each set of data is also included in Sectoral Background Table 5.E.

Net carbon stock change in soils resulting from land use change is included in Sectoral Background Table 5.E.2 Land converted to Settlements. The data for deforestation is included at the UK level while conversion of Grassland and Cropland to Settlements is disaggregated into the four geographical areas of England, Scotland, Wales and Northern Ireland plus two time periods (pre- and post-1990).

- *Common Reporting Format under IPCC 1996 Guidelines (no longer used)*

The net emissions associated with this activity were reported under Category 5B2, 5D and 5E.

#### 2.2.6.2.(e) Planned Improvements

Future improvements of the method for biomass burning emissions will include collating Forestry Commission unconditional felling licence data for Scotland and Wales. Similar information for Northern Ireland has also become available recently and will be incorporated in next year's Inventory. All emission factors and activity data will be kept under review.

#### 2.2.7. 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 that become bare rock or water bodies, which make up the majority of this type. Therefore Sectoral Background Table 5.F Other Land is completed with 'NO' (Not Occurring).

#### 2.2.8. Other Activities (5G)

Changes in stocks of carbon in harvested wood products (HWP) are reported here.

##### 2.2.8.1.(a) Methodology

The net change in the pool of products from harvested material from conifer and broadleaf forests is calculated by the carbon accounting model, C-Flow (see Section 2.2.2.2.(a) for further details). Dewar & Cannell (1992) and Cannell & Dewar (1995) provided a detailed description of all the assumptions in the model. Only products from UK forests planted since 1920 (i.e. those for which biomass and soil carbon stock changes are reported) are considered at present. It is not considered to be of high priority to consider the decay of imported products etc. as there is no international agreement on a single methodology to be used for reporting.

The C-Flow model adopts a simple approach to the decay of HWP. A carbon stock loss of 5% is assumed to occur immediately at harvest. Subsequently, the decay time (time to 95% loss of carbon stock) of products is set equal to the rotation time for that species. This approach captures differences in wood product use: fast growing softwoods tend to be used for shorter lived products than slower growing hardwoods. Exponential single decay constants are used for HWP from conifers and broadleaves. Products from thinnings are assumed to have a lifetime (time to 95% loss) of 5 years (half life~0.9 years). The main harvest products have a lifetime equal to rotation length. For conifers this equates to a half life of 14 years and for broadleaves a half life of 21 years. These values fall mid range between those tabled in the LULUCF GPG (IPCC 2003) for paper and sawn products. Limited data were available for the decay of products in the UK when the model was originally developed. The mix of products may be changing in the UK and this could affect the 'true' mean value of product lifetime but there is very limited accurate data on either decay rates or volume statistics for different products. The method used in the UK takes a top-down approach by assuming that the decay of all conifer products and all broadleaf products can be approximated by separate single decay constants. Given the uncertainty on decay of products it is difficult to decide if this is worse than a bottom-up approach where each product is given an (uncertain) decay and combined with (uncertain) decay of other products using harvest statistics which are in themselves uncertain.

Calculated in this way, the total wood products pool from UK forests is presently increasing due to continuing expansion in forest area. The time pattern of HWP stock changes is due to the historical pattern of new planting and by the resulting history of production harvesting (and thinning). The stock of carbon in HWP (from UK forests planted since 1920) has been

increasing since 1990 but this rate of rise has recently reversed, reflecting a dip in new planting during the 1940s. The stock of carbon in HWP will fall for a few more years but will then begin to rise steeply due to harvesting of the extensive conifer forests planted between 1950 and the late 1980s.

#### 2.2.8.1.(b) Data Reporting

- *Common Reporting Format under IPCC LULUCF Good Practice Guidance*

Removals of CO<sub>2</sub> associated with harvested wood products are included in Sectoral Report Table 5, as “G Other, Harvested Wood Products”.

- *Common Reporting Format under IPCC 1996 Guidelines (no longer used)*

Changes in stocks of harvested wood products were reported under Category 5A5.

#### 2.2.8.1.(c) Planned Improvements

The emission factors and activity data for harvested wood products will be kept under review. It is likely that the current calculation method for HWP in the UK will be replaced in the next few years by one which uses information on the volume and decay characteristics of different products.

## 2.3. Results

Data for the 1990 to 2004 GHG Inventory are presented in Appendices 1 to 4 of this volume. The data for this period (2006 Inventory submission date) are summarised in Table 2-28

The Appendices contain data in the following formats:

A.1. Summary Tables for 1990 to 2020 in LULUCF GPG Format and 1996 Guidelines Format (with High and Low future scenarios)

A.2. Sectoral Tables for Land Use Change and Forestry Sector submitted as UK 2004 Greenhouse Gas Inventory in format defined by IPCC LULUCF Good Practice Guidance

A.3. Sectoral Tables for Land Use Change and Forestry Sector for the Devolved Administration Regions

A.4. Removals and Emissions by post-1990 afforestation and deforestation in the UK

In addition the Sectoral and Background Tables (5, 5A, 5B, 5C, 5D, 5E, 5F, 5(I), 5(II), 5(III), 5(IV) and 5(V)) in the Common Reporting Format of the LULUCF GPG are presented in a companion Data Table volume for each year 1990 to 2004. Summary data is also provided in the Data Table volume for the Devolved Administration areas of England, Scotland, Wales and Northern Ireland.

### 2.3.1. Forest Land

#### 2.3.1.1 Forest Land Remaining Forest Land

Changes in stocks 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 therefore has zero stock change.

### **2.3.1.2 Land converted to Forest Land**

All afforestation occurring since 1920 is reported in this category. Stock changes in above and below ground biomass, dead material and soil carbon are estimated by the C-Flow model as described in Section 2.2.2.2.(a). Carbon stock changes resulting in atmospheric removals increased from 12,203 Gg in 1990 to 14,193 Gg in 1994, then fell to 13,406 in 1998 but now appear to be on an upward trend, reaching 16,302 Gg in 2004. These changes reflect variation in planting rates in past decades which feed through growth and harvesting to the carbon uptake trends reported here.

## **2.3.2. Cropland**

### **2.3.2.1 Cropland Remaining Cropland**

Changes in carbon stocks resulting from changes in non-forest biomass resulting from yield improvements, application of lime and lowland drainage are reported in this category. Overall, the carbon stock changes in this category result in net emissions, which appear to be on a downward trend, from a peak of 1951 Gg in 1991 to 1050 Gg in 2004. This trend is mainly driven by the declining emissions from lowland drainage which have fallen steadily from 1650 Gg in 1990 to 1195 Gg in 2004. Removals from non-forest biomass yield improvements are constant, and emissions due to liming, although varying during the 1990s, appear to have stabilized around 480 Gg since 1998.

### **2.3.2.2 Land Converted to Cropland**

Carbon stock changes resulting from changes in non-forest biomass and soil carbon stocks due to land use change to Cropland are reported in this category. Emissions from land converted to Cropland show a small but steady rate of increase, from 14,037 Gg in 1990 to 14,279 Gg in 2004. This trend is due to changes in soil carbon stocks as changes in non-forest biomass stocks occur at a fixed rate.

## **2.3.3. Grassland**

### **2.3.3.1 Grassland Remaining Grassland**

Changes in carbon stocks due to application of lime to Grassland and peat extraction are reported in this category. Emissions from this category are variable over the time period, starting at 1,025 Gg in 1990, with a peak of 1,255 Gg in 1995, and then falling away to 563 Gg in 2002, with an emission of 674 Gg in 2004. Both of the carbon stock changes which contribute to this category are variable over time, but the downward trend between 1995 and 2002 seems to be mainly due to a reduction in emissions from liming of Grassland.

### **2.3.3.2 Land Converted to Grassland**

Changes in carbon stocks due to emissions from biomass burning after conversion of Forest Land to Grassland and changes in non-forest biomass and soil carbon stocks due to land use change to Grassland are reported in this category. Overall, this category results in a net removal from the atmosphere, which has increased over time, from 7,218 Gg in 1990 to 8,510 Gg in 2004. This trend is entirely due to changes in soil carbon stocks from land converted to Grassland, as changes in non-forest biomass stocks are a small and constant removal (198

Gg a<sup>-1</sup>), and changes due to biomass burning after deforestation are an equally small although variable emission (30-178 Gg a<sup>-1</sup>).

### **2.3.4. Settlements**

#### **2.3.4.1 Settlements Remaining Settlements**

No changes in carbon stocks are reported in this category.

#### **2.3.4.2 Land Converted to Settlements**

Changes in carbon stocks due to emissions from biomass burning after conversion of Forest Land to Settlements and changes in non-forest biomass and soil carbon stocks due to land use change to Settlements are reported in this category. Overall, this category results in a net emission to the atmosphere, although this is slowly decreasing over time, from 6,858 Gg in 1990 to 6,245 Gg in 2004. This trend is due to changes in soil carbon stocks from land converted to Settlements, as removals due to biomass changes and emissions due to biomass burning after deforestation are both small (50 and 53-122 Gg a<sup>-1</sup> respectively).

### **2.3.5. Other Activities**

Changes in carbon stocks in this category result from changes in harvested wood products. This category results in a net removal from the atmosphere in 1990 of 1,456 Gg, decreasing to 633 Gg in 1994, then rising to 1,306 Gg in 1998, before rapidly decreasing (and becoming a net emission in 2002) to a net emission of 619 Gg in 2004. This variability is driven by forest planting and harvesting patterns in previous decades (see Section 2.2.8.1.(a)). The current net emission from HWP results from the reduced levels of new planting during the 1940s, and we would expect this trend to reverse from 2006 onwards.

### **2.3.6. Net UK Emissions/Removals**

The picture of net emissions/removals from the Land Use Change and Forestry Sector in the UK has not changed significantly from the previous Inventory, as the data revisions that have been made are relatively minor. The net emission in 1990 is calculated to be slightly larger than that calculated in the 2003 inventory (2,915 Gg rather than 2,645 Gg). England is a net emitter between 1990 and 2004 (although on a downwards trend), while Scotland and Northern Ireland are net removers (with removals increasing over time). Wales has a small net removal but does not have the strong trend shown in the other countries. The net emissions for the UK follow a downward trend, reaching zero in 1998 and continuing to a net removal of 1,942 Gg in 2004.

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

The structures of this report and the 2006 submissions of the National Inventory Report and the main submission of CRF Tables, are based on the Categories of the Common Reporting Format tables agreed at the 9<sup>th</sup> Conference of Parties to the UNFCCC and contained in FCCC/SBSTA/2004/8, also referred to as the IPCC 2003 Good Practice Guidelines CRF categories. Table 2-25 outlines the relationship between this current reporting format and the older IPCC 1996 Guidelines CRF categories used as the basis of reports prior to the 2003 Inventory. A summary of the emissions and removals according to the IPCC 1996 Guidelines categories is given in Table 2-29. The reported totals for emissions and removals for the LULUCF Sector are the same in either format.

Table 2-25 This table shows how the older IPCC 1996 Guidelines categories map onto the current IPCC 2003 Good Practice Guidance categories for reporting.

<b>IPCC 1996 Guidelines CRF Categories</b>	<b>IPCC 2003 GPG CRF Categories</b>
5A2 Temperate Forests	5A2 Land converted to Forest Land (Living biomass)
5A5 Other (Harvested Wood)	5G Harvested Wood Products
5B2 Temperate Forests	5C2 Land converted to Grassland (Deforestation)
5B2 Temperate Forests	5E2 Land converted to Settlements (Deforestation)
5D Cultivation of Mineral Soils (includes 5D organic soils)	5B2 Land converted to Cropland (Change in soils due to LUC)
5D Cultivation of Mineral Soils (includes 5D organic soils)	5C2 Land converted to Grassland (Change in soils due to LUC)
5D Cultivation of Mineral Soils (includes 5D organic soils)	5E2 Land converted to Settlements (Change in soils due to LUC)
5D Forest Soils	5A2 Land converted to Forest Land (Soils)
5D Liming of Agricultural Soils	5B1 Cropland remaining Cropland (Liming)
5D Liming of Agricultural Soils	5C1 Grassland remaining Grassland (Liming)
5D Lowland Drainage	5B1 Cropland remaining Cropland (Lowland drainage)
5E Other (Changes in Non-forest Biomass)	5B1 Cropland remaining Cropland (Yield improvements)
5E Other (Changes in Non-forest Biomass)	5B2 Land converted to Cropland
5E Other (Changes in Non-forest Biomass)	5C2 Land converted to Grassland
5E Other (Changes in Non-forest Biomass)	5E2 Land converted to Settlements
5E Other (Peat Extraction)	5C1 Grassland remaining Grassland (Peat extraction)

### 2.3.8. Uncertainties

Approximate uncertainties for different activities used in the IPCC 1996 Guidelines reporting structure are shown in Table 2-26. These were reassigned and rounded to the nearest 5% for the LULUCF GPG reporting structure (Table 2-27). An uncertainty of 20% was estimated for CH<sub>4</sub> and N<sub>2</sub>O emissions from biomass burning after deforestation (categories 5C2 and 5E2). A full analysis of uncertainties is planned for future versions of the Inventory.

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

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

Table 2-27: Approximate uncertainties of estimates of emissions/removals for categories in LULUCF GPG reporting structure

<b>IPCC Source Category</b>	<b>Uncertainty in 1990 CO<sub>2</sub> emissions/removals, %</b>	<b>Uncertainty in 2004 CO<sub>2</sub> emissions/removals, %</b>
<b>5A Forest Land</b>	25	25
<b>5B Cropland</b>	45	50
<b>5C Grassland</b>	70	55
<b>5D Wetland</b>	-	-
<b>5E Settlements</b>	35	50
<b>5F Other Land</b>	-	-
<b>5G Other Activities</b>	30	30

Table 2-28: Emissions and removals in categories within 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	2004
<b>5</b>	<b>NET</b>	<b>2915</b>	<b>2782</b>	<b>2290</b>	<b>1082</b>	<b>889</b>	<b>1034</b>	<b>902</b>	<b>552</b>	<b>0</b>	<b>-234</b>	<b>-440</b>	<b>-596</b>	<b>-1120</b>	<b>-1180</b>	<b>-1942</b>
<b>5A</b>	<b>Forest-Land</b>	<b>-12203</b>	<b>-12715</b>	<b>-13340</b>	<b>-13714</b>	<b>-14193</b>	<b>-13948</b>	<b>-13720</b>	<b>-13512</b>	<b>-13406</b>	<b>-13504</b>	<b>-13805</b>	<b>-14348</b>	<b>-15045</b>	<b>-15646</b>	<b>-16302</b>
5A1	Forest-Land remaining Forest-Land	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5A2	Land converted to Forest-Land	-12203	-12715	-13340	-13714	-14193	-13948	-13720	-13512	-13406	-13504	-13805	-14348	-15045	-15646	-16302
<b>5B</b>	<b>Cropland</b>	<b>15842</b>	<b>16001</b>	<b>16004</b>	<b>15579</b>	<b>15632</b>	<b>15771</b>	<b>15802</b>	<b>15542</b>	<b>15427</b>	<b>15328</b>	<b>15339</b>	<b>15287</b>	<b>15314</b>	<b>15380</b>	<b>15329</b>
5B1	Cropland remaining Cropland	1805	1951	1940	1499	1536	1659	1673	1395	1262	1145	1136	1065	1073	1120	1050
5B2	Land converted to Cropland	14037	14050	14064	14080	14096	14112	14130	14147	14165	14183	14202	14222	14241	14260	14279
5B (liming)	Liming of Cropland	795	978	1003	599	673	832	883	642	546	465	493	445	474	543	496
<b>5C</b>	<b>Grassland</b>	<b>-6193</b>	<b>-6146</b>	<b>-6254</b>	<b>-6660</b>	<b>-6605</b>	<b>-6536</b>	<b>-6786</b>	<b>-6889</b>	<b>-7288</b>	<b>-7275</b>	<b>-7427</b>	<b>-7449</b>	<b>-7742</b>	<b>-7526</b>	<b>-7836</b>
5C1	Grassland remaining Grassland	1025	1190	1196	914	1081	1255	1107	1124	827	853	728	746	563	878	674
5C2	Land converted to Grassland	-7218	-7336	-7450	-7573	-7686	-7791	-7894	-8013	-8115	-8128	-8154	-8195	-8305	-8403	-8510
5C (liming)	Liming of Grassland	635	794	806	531	597	697	632	704	512	421	301	280	265	374	319
<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>	<b>IE</b>
5D1	Wetland remaining Wetland	IE	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	IE
<b>5E</b>	<b>Settlements</b>	<b>6925</b>	<b>6851</b>	<b>6799</b>	<b>6719</b>	<b>6688</b>	<b>6647</b>	<b>6627</b>	<b>6607</b>	<b>6573</b>	<b>6485</b>	<b>6402</b>	<b>6358</b>	<b>6306</b>	<b>6274</b>	<b>6248</b>
5E1	Settlements remaining Settlements	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5E2	Land converted to Settlements	6925	6851	6799	6719	6688	6647	6627	6607	6573	6485	6402	6358	6306	6274	6248
<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>	<b>0</b>
5F1	Other-Land remaining Other-land	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5F2	Land converted to Other-Land	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>5G</b>	<b>Other activities</b>	<b>-1456</b>	<b>-1210</b>	<b>-920</b>	<b>-842</b>	<b>-633</b>	<b>-900</b>	<b>-1021</b>	<b>-1197</b>	<b>-1306</b>	<b>-1268</b>	<b>-950</b>	<b>-445</b>	<b>47</b>	<b>337</b>	<b>619</b>
5G1	Harvested Wood Products	-1456	-1210	-920	-842	-633	-900	-1021	-1197	-1306	-1268	-950	-445	47	337	619
<b>5B2, 5C2, 5E2</b>	<b>Biomass burning Gg CH<sub>4</sub>/year</b>	<b>0.659</b>	<b>0.598</b>	<b>0.619</b>	<b>0.453</b>	<b>0.519</b>	<b>0.549</b>	<b>0.664</b>	<b>0.681</b>	<b>0.691</b>	<b>0.834</b>	<b>0.925</b>	<b>1.106</b>	<b>0.928</b>	<b>0.876</b>	<b>0.798</b>
<b>5B2, 5C2, 5E2</b>	<b>Biomass burning Gg N<sub>2</sub>O/year</b>	<b>0.0045</b>	<b>0.0041</b>	<b>0.0043</b>	<b>0.0031</b>	<b>0.0036</b>	<b>0.0038</b>	<b>0.0046</b>	<b>0.0047</b>	<b>0.0048</b>	<b>0.0057</b>	<b>0.0064</b>	<b>0.0076</b>	<b>0.0064</b>	<b>0.0060</b>	<b>0.0055</b>



Table 2-29 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.

<i>CRF</i>	<i>Gg CO<sub>2</sub></i>	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	<i>Category</i>	
Temperate forest	Removal	-9112	-9597	-10212	-10487	-10972	-10470	-10038	-9612	-9397	-9500	-9934	-10693	-11599	-12297	-13073	5A2	Removals due to Changes in forest biomass.
Harvested wood	Removal	-1456	-1210	-920	-842	-633	-900	-1021	-1197	-1306	-1268	-950	-445	47	337	619	5A5	Removals to Harvested wood
Deforestation	Emission	151	137	142	104	119	126	152	156	158	191	212	253	213	201	183	5B	Emissions (CO <sub>2</sub> ) due to Deforestation
Soils	Emission	16679	16819	16663	15798	15757	15843	15661	15330	14885	14561	14321	14123	14013	14070	13850	5D	Sum of Emissions from soils due to Land use change on agricultural soils (net emissions), Lowland drainage and liming of agricultural land
Soils	Removal	-3091	-3118	-3128	-3227	-3220	-3479	-3682	-3900	-4010	-4005	-3871	-3655	-3446	-3349	-3229	5D	Removals to Forest litter & soils.
Other	Emission	390	396	390	383	484	558	475	420	315	432	427	466	298	503	355	5E	Emissions from soils due to Peat extraction
Other	Removal	-646	-646	-646	-646	-646	-646	-646	-646	-646	-646	-646	-646	-646	-646	-646	5E	Removals due to changes in non-forest biomass
Total	Emission	17220	17353	17195	16284	16360	16527	16289	15906	15358	15184	14960	14842	14524	14775	14387	5	Gross Emissions LUCF
Total	Removal	-14304	-14571	-14905	-15202	-15471	-15494	-15387	-15354	-15358	-15418	-15401	-15439	-15643	-15954	-16329	5	Gross Removals LUCF
Total	Net	2915	2782	2290	1082	889	1034	902	552	0	-234	-440	-596	-1120	-1180	-1942	5	Net LUCF Emissions

## 2.4. Projections of Emissions and Removals to 2020

### 2.4.1. Introduction

Projections of emissions for years from 2005 to 2020 have been made for each activity for each of the Devolved Administration areas of England, Scotland, Wales and Northern Ireland. A “central” (Mid), high emission (High) and low emission scenario (Low) 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 Tables of Appendix A.1 Summary Tables. For simplicity detailed information on the emissions and removals is only supplied on the basis of the reporting format defined by the IPCC LULUCF Good Practice Guidance.

Table 2-30 Inventory (1990 to 2000) and projected (2005 to 2020) Emissions and Removals data (GgCO<sub>2</sub>/year). (-ve sign indicates Removal)

<b>Year</b>	<b>Net (LOW)</b>	<b>Net (MID)</b>	<b>Net (HIGH)</b>
<b>1990</b>	2915	<b>2915</b>	2915
<b>1995</b>	1034	<b>1034</b>	1034
<b>2000</b>	-440	<b>-440</b>	-440
<b>2005</b>	-9411	<b>-2067</b>	6161
<b>2010</b>	-9564	<b>-1797</b>	6923
<b>2015</b>	-8788	<b>243</b>	9831
<b>2020</b>	-8417	<b>2115</b>	12654

### 2.4.2. Basis for projections

The basis for projection of each activity varied between Scotland, England, Wales and N. Ireland as appropriate. These assumptions are described in Table 2-31, Table 2-32, Table 2-33 and

Table 2-34 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 Summary Tables. The UK emissions, removals and net flux for each scenario are presented in Table A1.1 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.

Table 2-31 Scenario assumptions for projection of LUCF net Emissions (Scotland)

<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 2005 in proportion to 2004 planting	Conifer planting from 2005 assumed to be as in 2004. Broadleaf planting from 2005 assumed to be as in 2004.	Conifer planting from 2005 assumed to be 0 ha/yr. Broadleaf planting from 2005 assumed to be 0 ha/yr.
<b>Deforestation</b>	As MID but trend adjusted to lower value (95% C.L.) of 1990 to 2004 trend	Autoregressive model (10 terms) fitted to 1990 to 2004 UK data	As MID but trend adjusted to upper value (95% C.L.) of 1990 to 2004 trend
<b>Land Use Change (Soils)</b>	Annual area land use change for 2005 to 2020 based on annual rate of change for 1990 to 2004. but minimum values from Monte Carlo simulation with range of areas	Annual area land use change for 2005 to 2020 assumed to be same as annual rate of change for 1990 to 2004. – mean values from Monte Carlo simulation starting from 2004	Annual area land use change for 2005 to 2020 based on annual rate of change for 1990 to 2004. but maximum values from Monte Carlo simulation with range of areas
<b>Peat extraction</b>	As MID but trend adjusted to lower value (95% C.L.) of 1990 to 2004 trend	Autoregressive model (10 terms) fitted to 1990 to 2004 Scottish data	As MID but trend adjusted to upper value (95% C.L.) of 1990 to 2004 trend
<b>Liming</b>	As MID but trend adjusted to lower value (95% C.L.) of 1990 to 2004 trend	Autoregressive model (10 terms) fitted to 1990 to 2004 UK data	As MID but trend adjusted to upper value (95% C.L.) of 1990 to 2004 trend
<b>Lowland drainage</b>	NA	NA	NA
<b>Non-forest biomass</b>	Flux remains at 2004 value	Flux remains at 2004 value	Flux remains at 2004 value

Table 2-32 Scenario assumptions for projection of LUCF net Emissions (England)

<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 2005 in proportion to 2004 planting	Conifer planting from 2005 assumed to be as in 2004. Broadleaf planting from 2005 assumed to be as in 2004.	Conifer planting from 2005 assumed to be 0 ha/yr. Broadleaf planting from 2005 assumed to be 0 ha/yr.
<b>Deforestation</b>	As MID but trend adjusted to lower value (95% C.L.) of 1990 to 2004 trend	Autoregressive model (10 terms) fitted to 1990 to 2004 UK data	As MID but trend adjusted to upper value (95% C.L.) of 1990 to 2004 trend
<b>Land Use Change (Soils)</b>	Annual area land use change for 2005 to 2020 based on annual rate of change for 1990 to 2004. but minimum values from Monte Carlo simulation with range of areas	Annual area land use change for 2005 to 2020 assumed to be same as annual rate of change for 1990 to 2004. – mean values from Monte Carlo simulation starting from 2004	Annual area land use change for 2005 to 2020 based on annual rate of change for 1990 to 2004. but maximum values from Monte Carlo simulation with range of areas
<b>Peat extraction</b>	As MID but trend adjusted to lower value (95% C.L.) of 1990 to 2004 trend	Autoregressive model (10 terms) fitted to 1990 to 2004 UK data	As MID but trend adjusted to upper value (95% C.L.) of 1990 to 2004 trend
<b>Liming</b>	As MID but trend adjusted to lower value (95% C.L.) of 1990 to 2004 trend	Autoregressive model (10 terms) fitted to 1990 to 2004 UK data	As MID but trend adjusted to upper value (95% C.L.) of 1990 to 2004 trend
<b>Lowland drainage</b>	Flux changes from 2004 at modelled rate of change for 1990 to 2000	Flux changes from 2004 at modelled rate of change	Flux changes from 2004 value at modelled rate of change for 2010 to 2020
<b>Non-forest biomass</b>	Flux remains at 2004 value	Flux remains at 2004 value	Flux remains at 2004 value

Table 2-33 Scenario assumptions for projection of LUCF net Emissions (Wales)

<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 2005 in proportion to 2004 planting	Conifer planting from 2005 assumed to be as in 2004. Broadleaf planting from 2005 assumed to be as in 2004.	Conifer planting from 2005 assumed to be 0 ha/yr. Broadleaf planting from 2005 assumed to be 0 ha/yr.
<b>Deforestation</b>	As MID but trend adjusted to lower value (95% C.L) of 1990 to 2004 trend	Autoregressive model (10 terms) fitted to 1990 to 2004 UK data	As MID but trend adjusted to upper value (95% C.L) of 1990 to 2004 trend
<b>Land Use Change (Soils)</b>	Annual area land use change for 2005 to 2020 based on annual rate of change for 1990 to 2004. but minimum values from Monte Carlo simulation with range of areas	Annual area land use change for 2005 to 2020 assumed to be same as annual rate of change for 1990 to 2004. – mean values from Monte Carlo simulation starting from 2004	Annual area land use change for 2005 to 2020 based on annual rate of change for 1990 to 2004. but maximum values from Monte Carlo simulation with range of areas
<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 2004 trend	Autoregressive model (10 terms) fitted to 1990 to 2004 UK data	As MID but trend adjusted to upper value (95% C.L) of 1990 to 2004 trend
<b>Lowland drainage</b>	NA	NA	NA
<b>Non-forest biomass</b>	Flux remains at 2004 value	Flux remains at 2004 value	Flux remains at 2004 value

Table 2-34 Scenario assumptions for projection of LUCF net Emissions (Northern Ireland)

<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 2005 in proportion to 2004 planting	Conifer planting from 2005 assumed to be as in 2004. Broadleaf planting from 2005 assumed to be as in 2004.	Conifer planting from 2005 assumed to be 0 ha/yr. Broadleaf planting from 2005 assumed to be 0 ha/yr.
<b>Deforestation</b>	NA	NA	NA
<b>Land Use Change (Soils)</b>	Annual area land use change for 2005 to 2020 based on annual rate of change for 1990 to 2004. but minimum values from Monte Carlo simulation with range of areas	Annual area land use change for 2005 to 2020 assumed to be same as annual rate of change for 1990 to 2004. – mean values from Monte Carlo simulation starting from 2004	Annual area land use change for 2005 to 2020 based on annual rate of change for 1990 to 2004. but maximum values from Monte Carlo simulation with range of areas
<b>Peat extraction</b>	Flux remains at 2004 value	Flux remains at 2004 value	Flux remains at 2004 value
<b>Liming</b>	As MID but trend adjusted to lower value (95% C.L) of 1990 to 2004 trend	Autoregressive model (10 terms) fitted to 1990 to 2004 UK data	As MID but trend adjusted to upper value (95% C.L) of 1990 to 2004 trend
<b>Lowland drainage</b>	NA	NA	NA
<b>Non-forest biomass</b>	Flux remains at 2004 value	Flux remains at 2004 value	Flux remains at 2004 value

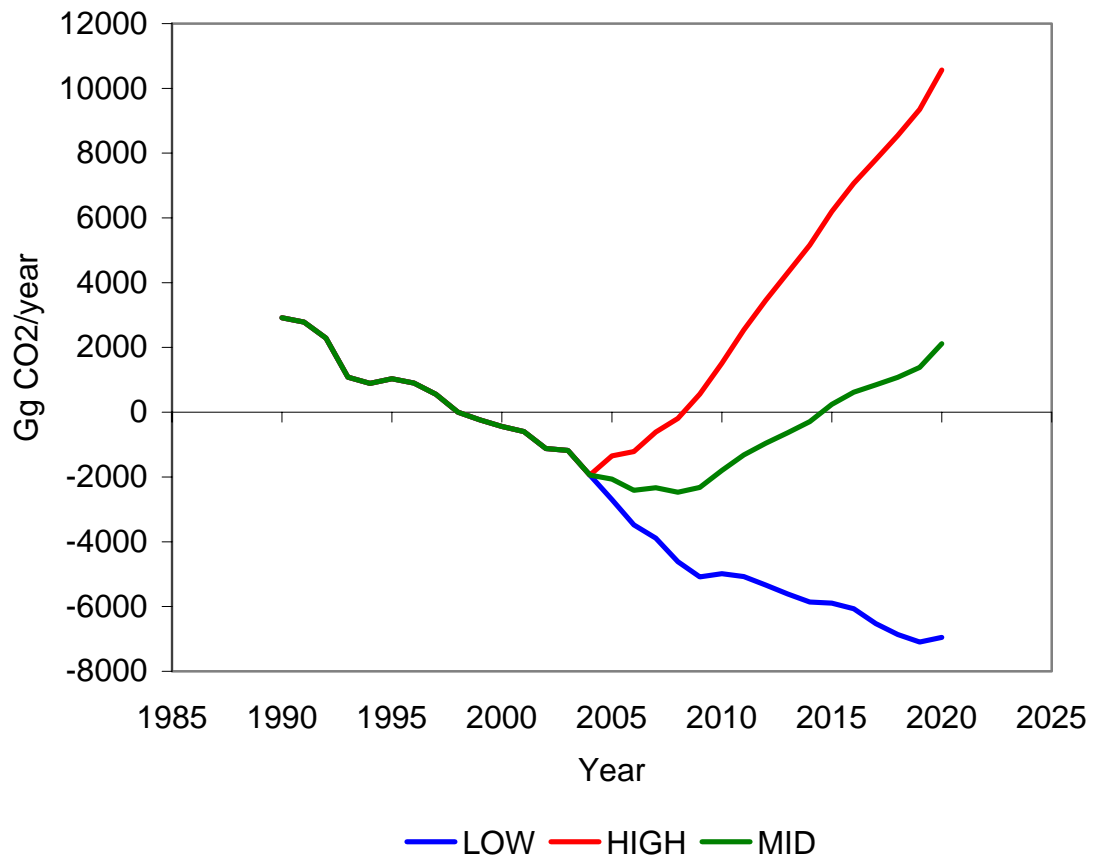


Figure 2-1 Projections to 2020 of Net Emissions and Removals of carbon from atmosphere in United Kingdom by land use, land use change and forestry for 3 future emissions scenarios

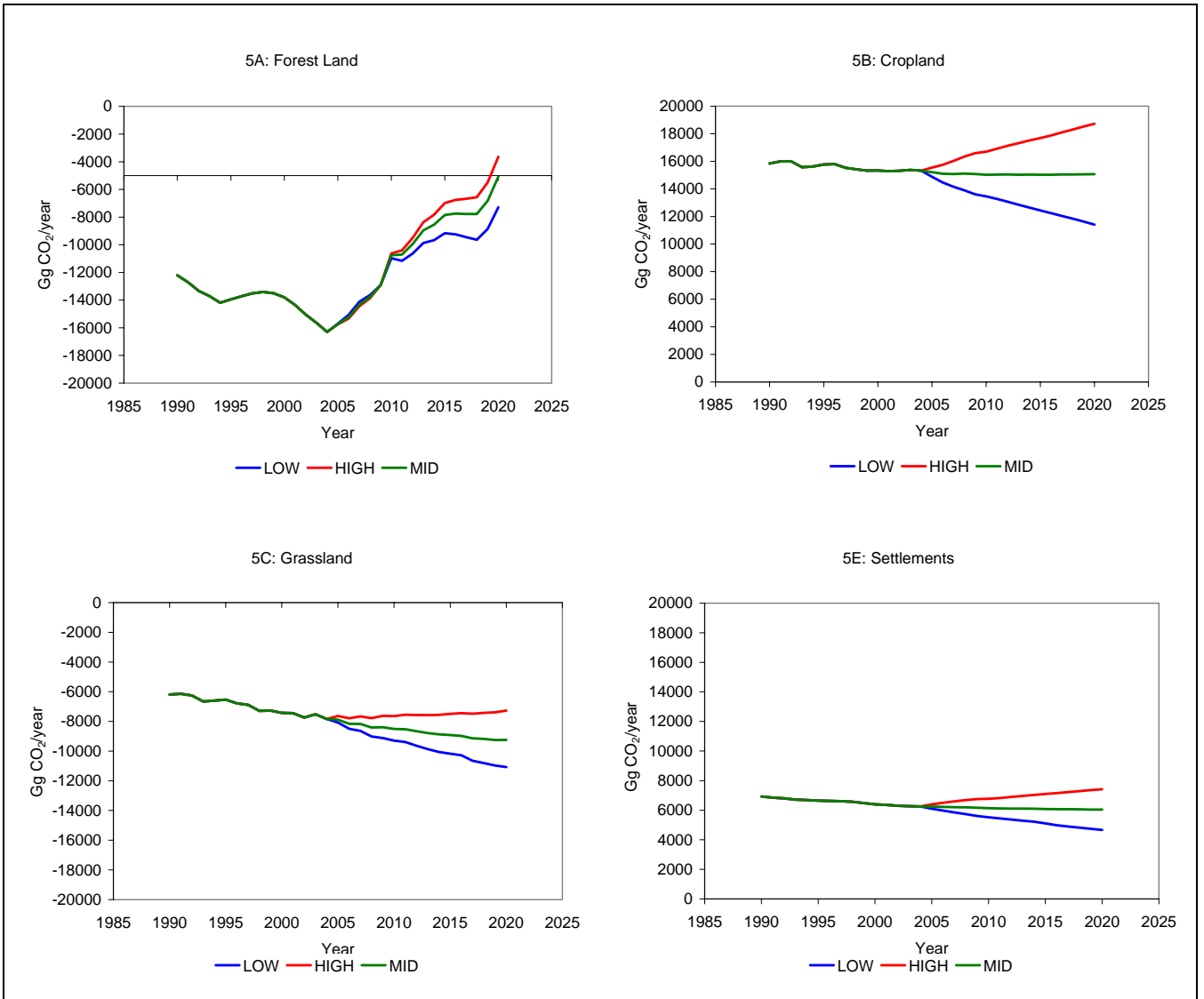


Figure 2-2 Projections to 2020 of Forest Land, Cropland, Grassland and Settlements (Urban) Net Emissions of carbon from atmosphere in United Kingdom by land use, land use change and forestry for 3 future emissions scenarios.

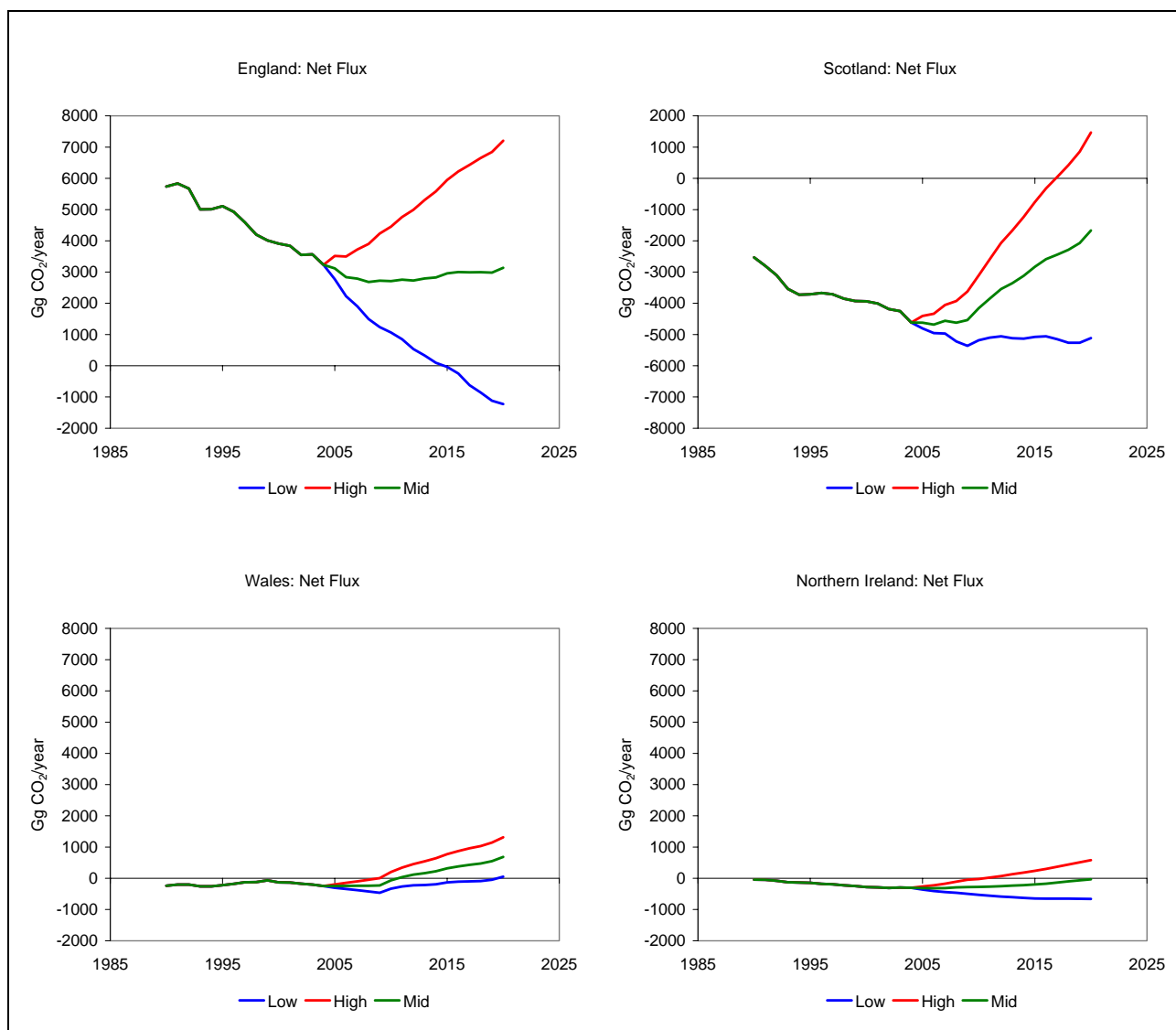


Figure 2-3 Projections to 2020 of Net Emissions of carbon from atmosphere in England, Scotland, Wales and N. Ireland by land use, land use change and forestry for 3 future emissions scenarios.

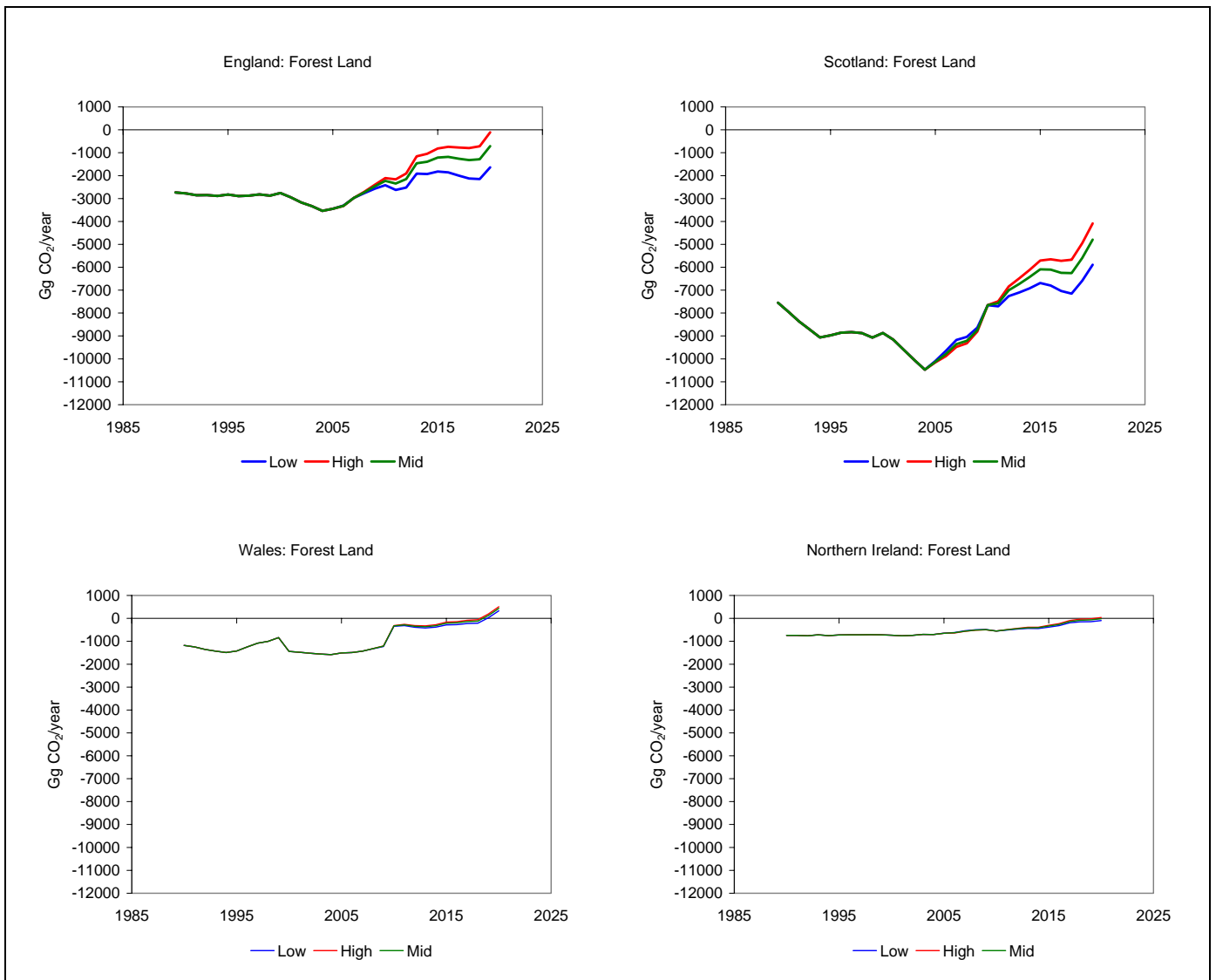


Figure 2-4 Projections to 2020 of Net Emissions of carbon from atmosphere in England, Scotland, Wales and N. Ireland by Forest Land Category of land use, land use change and forestry sector for 3 future emissions scenarios.



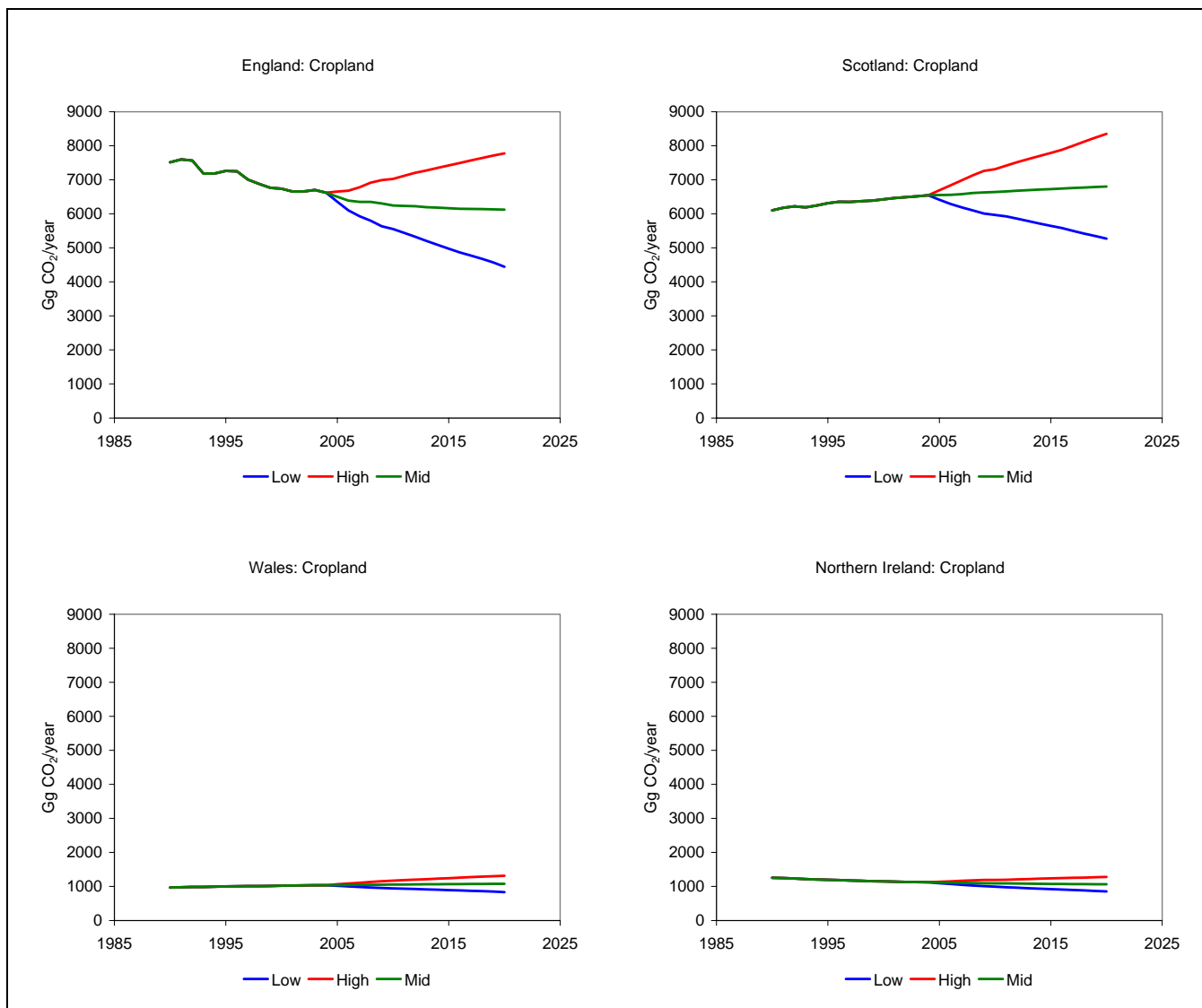


Figure 2-5 Projections to 2020 of Net Emissions of carbon from atmosphere in England, Scotland, Wales and N. Ireland by Cropland Category of land use, land use change and forestry sector for 3 future emissions scenarios

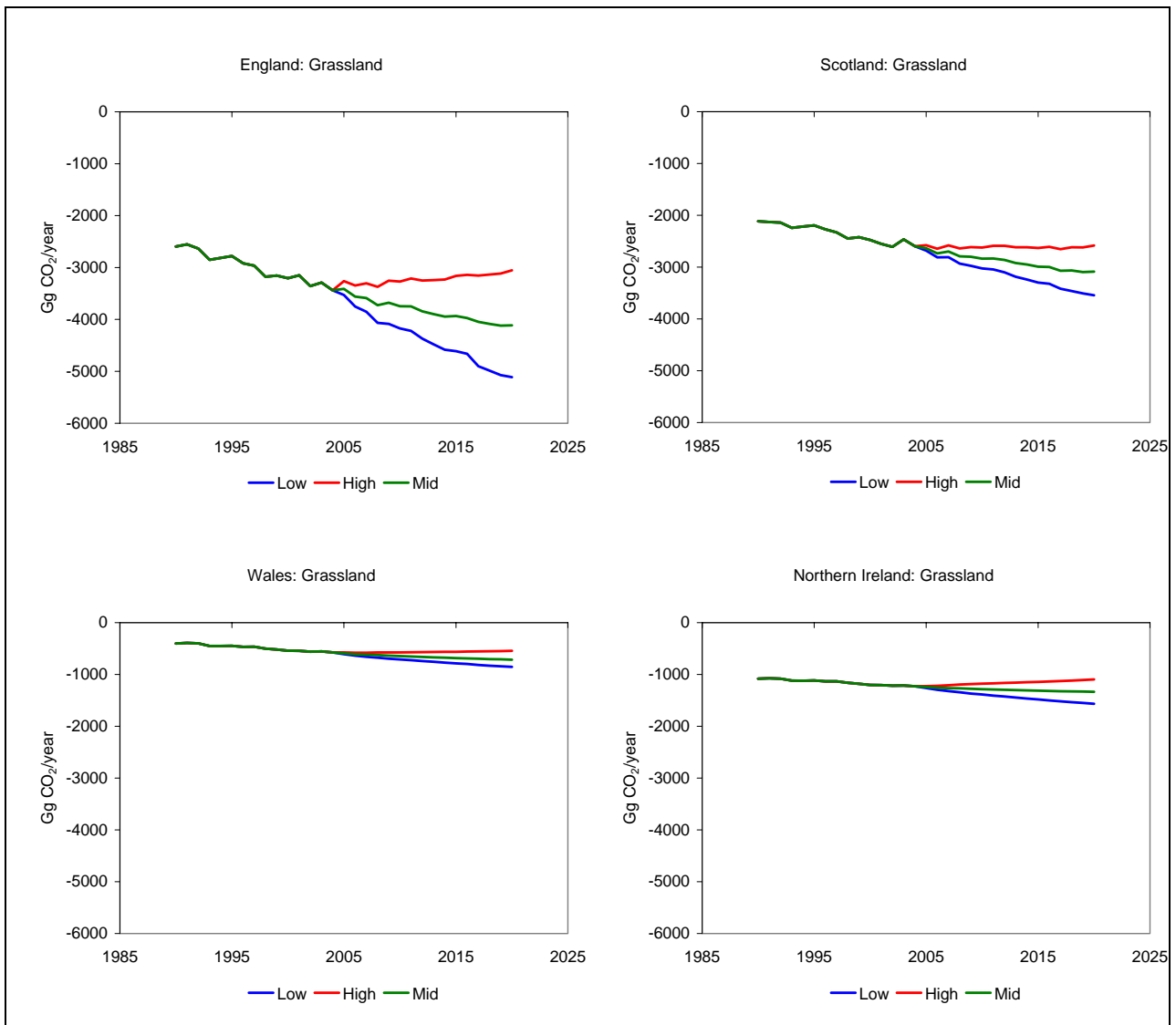


Figure 2-6 Projections to 2020 of Net Emissions of carbon from atmosphere in England, Scotland, Wales and N. Ireland by Grassland Category of land use, land use change and forestry sector for 3 future emissions scenarios

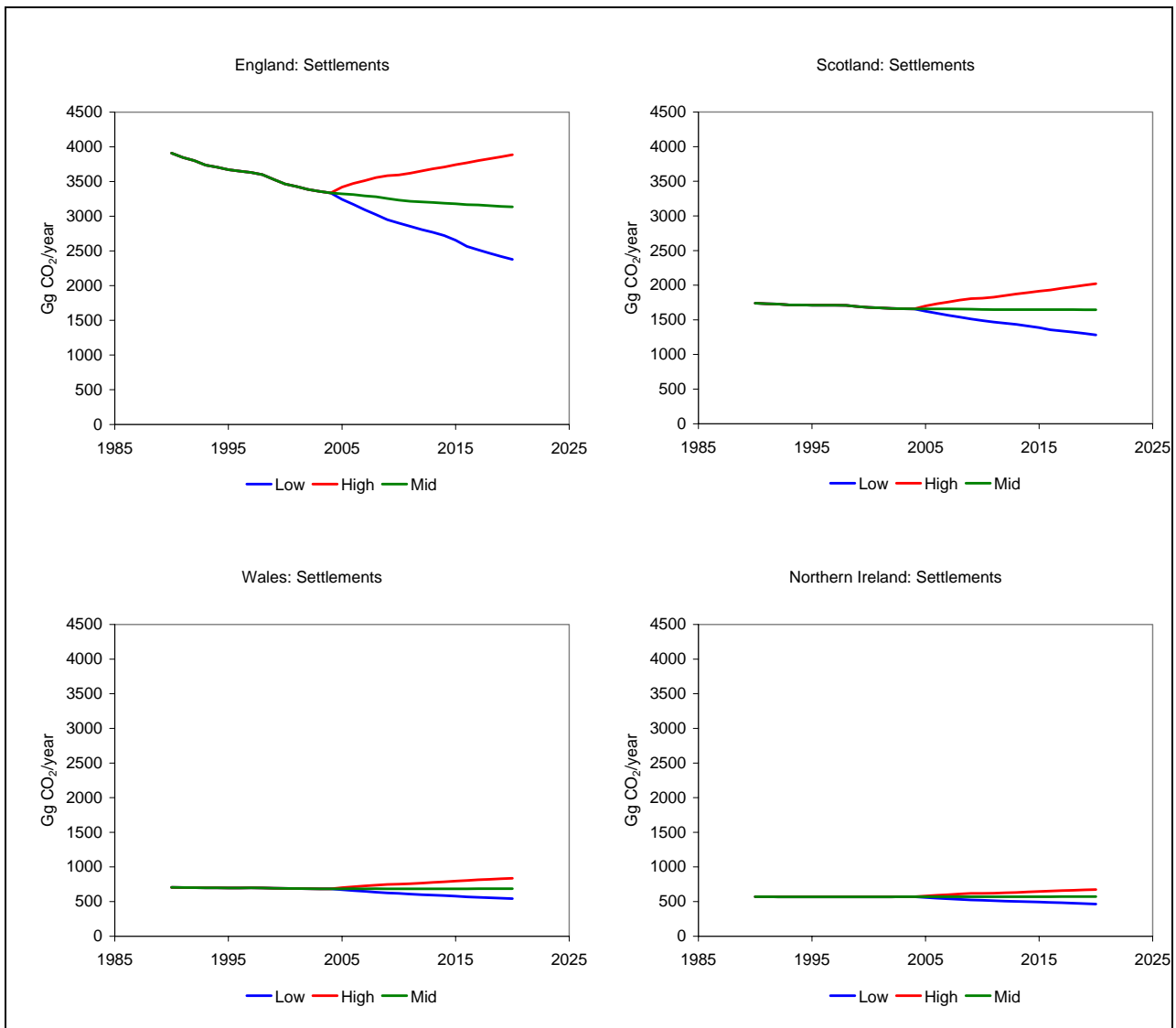


Figure 2-7 Projections to 2020 of Net Emissions of carbon from atmosphere in England, Scotland, Wales and N. Ireland by Settlements (Urban) Category of land use, land use change and forestry sector for 3 future emissions scenarios

#### 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 Removals and Emissions by post-1990 afforestation and deforestation in the UK and in Figure 2-8.

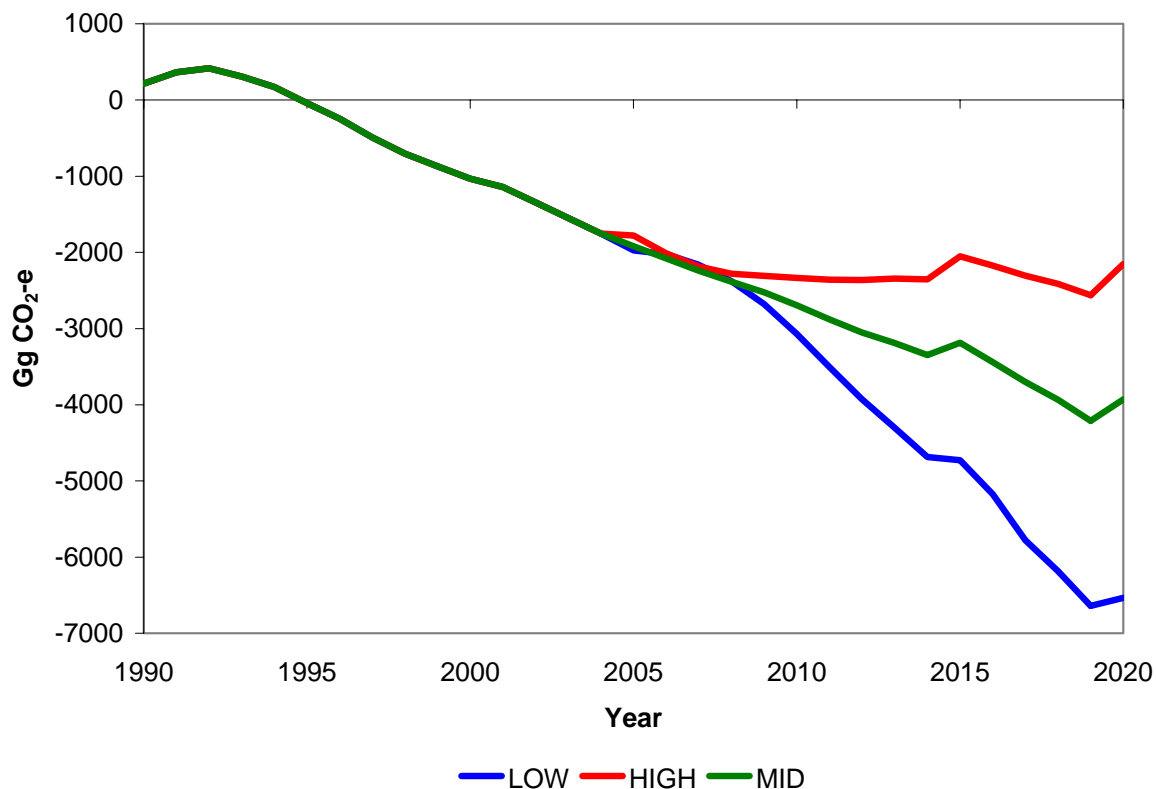


Figure 2-8 Kyoto Protocol Article 3.3: Net flux associated with post 1990 afforestation and deforestation for the Mid, High and Low emissions scenarios.

#### 2.4.5. Kyoto Protocol Article 3.4: Removals and emissions associated with Forest Management, Cropland Management and Grassland Management

Under Article 3.4 of the Kyoto Protocol countries may elect to use net sinks within Forest Management, Cropland Management (CM) and Grassland Management (GM) to offset emissions in the commitment period. In January 2006 the UK elected to use only Forest Management. The uncertainties associated with estimating emissions and removals due to

Cropland and Grassland Management were considered to be too large for the purposes of achieving acceptable emission reductions under the Protocol.

Fluxes associated with Forest Management were estimated to be those due to changes in carbon stocks in forests planted prior to 1990. The primary driver for these fluxes, as estimated by the C-Flow model, is the pattern of afforestation in that period and hence the age structure of the forest. This established age structure and the resulting patterns of stock change through rotation cycles are considered to be the standard “Forest Management” in the UK. Under the Kyoto Protocol it is agreed that such effects and any changes in carbon stock due to climate or environmental change should not be included under Article 3.4 emission offsets. Detailed methods to identify the contribution of these drivers to overall changes in forest carbon stock have not been internationally agreed. In order to provide an ad-hoc method to remove these effects a cap was negotiated for each KP signatory for Forest Management sinks. For the UK this sink is capped at 0.37 MtC/year in the 1<sup>st</sup> Commitment period.

Removals of carbon to pre-1990 forests after 2004 for the Mid scenario (i.e. business as Usual) were found to be (Figure 2-9 ) greater than the cap for all years except 2020.

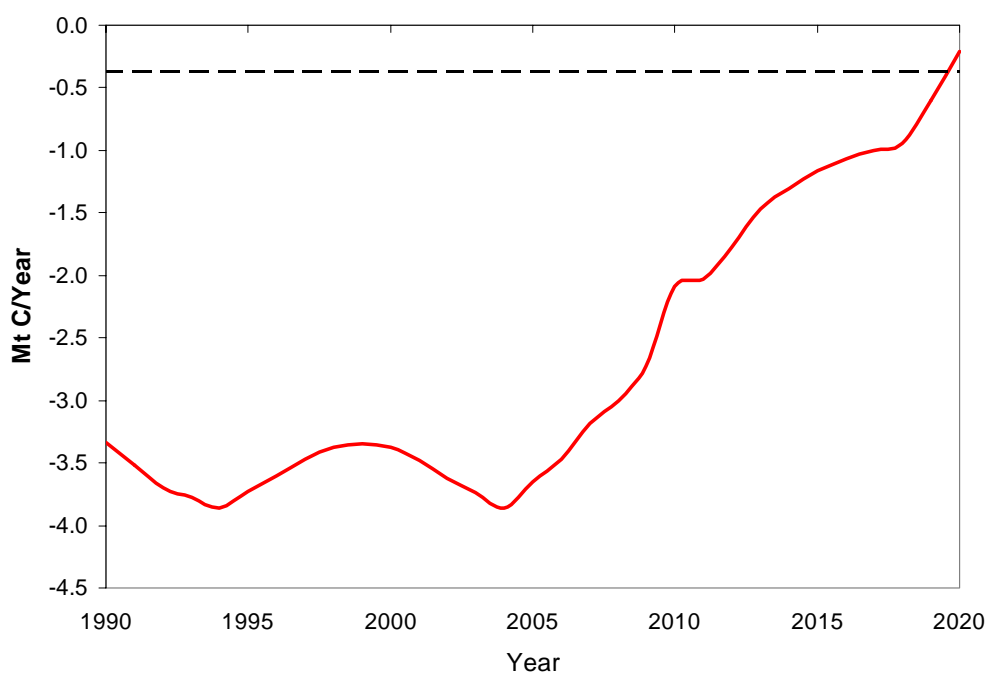


Figure 2-9 Kyoto Protocol Article 3.4: Removals and emissions associated with Forest Management for the MID scenario. The cap of -0.37 MtC/year is shown by the broken line.

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

Under Kyoto protocol Article 3.7 countries with a net emission in 1990 from the LULUCF Sector must count that part of the emission due to deforestation 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 2915 Gg CO<sub>2</sub>, therefore Article 3.7 applies. The deforestation emission in 1990 for the purposes of this Article has been taken to be that associated with all deforestation prior to and 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 deforestation component for 1990 from the 2004 GHG Inventory, which equals 366 Gg CO<sub>2</sub> - equivalent (including CH<sub>4</sub> and N<sub>2</sub>O emissions). This is smaller than the value estimated from the 2003 GHG Inventory due to a revised treatment of soil carbon stock changes

## 2.5. References

- Agricultural Industries Confederation (2005). Fertiliser Statistics 2005 Report [www.agindustries.org.uk](http://www.agindustries.org.uk)
- BGS (2005). United Kingdom Minerals Yearbook, (ed Survey, B.G.). Natural Environment Research Council.
- Bradley, R. I. (1997). Carbon loss from drained lowland fens. In: *Carbon Sequestration in Vegetation and Soils* (ed Cannell, M.G.R.). Department of Environment, London.
- Bradley, R. I., Milne, R., Bell, J., *et al.* (2005). A soil carbon and land use database for the United Kingdom. *Soil Use and Management*, **21**, 363-369.
- Burton, R. (1995). Evaluating organic matter dynamics in cultivated organic topsoils – use of historical analytical data. MAFF Contract to SSLRC No. LE0203 –81/3830.
- Cannell, M. G. R. and Dewar, R. C. (1995). The Carbon Sink Provided by Plantation Forests and Their Products in Britain. *Forestry*, **68**, 35-48.
- Cannell, M. G. R., Milne, R., Hargreaves, K. J., *et al.* (1999). National inventories of terrestrial carbon sources and sinks: The UK experience. *Climatic Change*, **42**, 505-530.
- Cooper, A. and McCann, T. (2002). Technical Report of the Northern Ireland Countryside Survey. University of Ulster.
- Cruickshank, M. and Tomlinson, R. (1997). Carbon loss from UK peatlands for fuel and horticulture. In: *Carbon Sequestration in Vegetation and Soils* (ed Cannell, M.G.R.). Department of Environment, London.
- Cruickshank, M. and Tomlinson, R. (2000). Changes in soil carbon storage in Northern Ireland: estimated by the IPCC default and matrix methods. *Carbon Sequestration in Vegetation and Soils*. DETR Contract EPG 1/1/39, (ed Milne, R.). Department of Environment, London.
- Cruickshank, M. M., Tomlinson, R. W., Devine, P. M. and Milne, R. (1998). Carbon in the vegetation and soils of Northern Ireland. *Biology and Environment-Proceedings of the Royal Irish Academy*, **98B**, 9-21.
- Dewar, R. C. and Cannell, M. G. R. (1992). Carbon Sequestration in the Trees, Products and Soils of Forest Plantations - an Analysis Using UK Examples. *Tree Physiology*, **11**, 49-71.
- Edwards, P. N. and Christie, J. M. (1981). Yield models for forest management. *Forestry Commission Booklet*. 48. Forestry Commission, Edinburgh.

- Forestry Commission (2002). National Inventory of Woodland and Trees Forestry Commission <http://www.forestry.gov.uk/forestry/hcou-54pg4d>
- Haines-Young, R. H., Barr, C. J., Black, H. I. J., *et al.* (2000). *Accounting for nature: assessing habitats in the UK countryside*. DETR Countryside Survey 2000, London.
- Hargreaves, K. J., Milne, R. and Cannell, M. G. R. (2003). Carbon balance of afforested peatland in Scotland. *Forestry*, **76**, 299-317.
- IPCC (1997a). *Greenhouse Gas Inventory Reference Manual*. IPCC WGI Technical Support Unit, Hadley Centre, Meteorological Office, Bracknell, UK.
- IPCC (1997b). *Greenhouse Gas Inventory Reporting Instructions*. IPCC WGI Technical Support Unit, Hadley Centre, Meteorological Office, Bracknell, UK.
- IPCC (1997c). *Greenhouse Gas Inventory Workbook*. IPCC WGI Technical Support Unit, Hadley Centre, Meteorological Office, Bracknell, UK.
- IPCC (2003). *Good Practice Guidance for Land Use, Land-Use Change and Forestry*. Institute for Global Environmental strategies (IGES) for the Intergovernmental Panel on Climate Change, Kanagawa, Japan.
- Levy, P. E. and Milne, R. (2004). Estimation of deforestation rates in Great Britain. *Forestry*, **77**, 9-16.
- Milne, R. and Brown, T. A. (1997). Carbon in the vegetation and soils of Great Britain. *Journal of Environmental Management*, **49**, 413-433.
- Milne, R. and Brown, T. A. W. (1999). Methods and data for Land Use Change and Forestry Sector in the 1997 IPCC Greenhouse Gas Inventory. In: *Carbon Sequestration in Vegetation and Soils* (ed Milne, R.).
- Milne, R., Brown, T. A. W. and Murray, T. D. (1998). The effect of geographical variation in planting rate on the uptake of carbon by new forests of Great Britain. *Forestry*, **71**, 298-309.
- MLC (1986). *Monitoring Landscape Change*. Report prepared by Hunting Surveys & Consultants Ltd for Department of the Environment and the Countryside Commission.
- Office of The Deputy Prime Minister (2004). Land Use Change Statistics Index <http://www.planning.odpm.gov.uk/luc/lucindex.htm>
- Skiba, U., Di Marco, C., Dragositz, U., *et al.* (2005). Quantification and validation of the total annual UK nitrous oxide budget. *Final report to NERC - GANE*. Centre for Ecology and Hydrology.
- Sylvester-Bradley, R., Lunn, G., Foulkes, J., *et al.* (2002). Management strategies for high yields of cereals and oilseed rape. In *HGCA R&D Conference - Agronomic Intelligence: The basis for profitable production*, pp. 8.1-8.17. Home-Grown Cereals Authority.





# **APPENDIX 1**

## **A.1. Summary Tables for 1990 to 2020 in LULUCF GPG Format and 1996 Guidelines Format (with High and Low future scenarios)**



Table A1. 1: United Kingdom data for 2004 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: “1996 GUIDELINES” summary of Inventory period (Italics are projections) (HWP = Harvested Wood Products).....	2-49
Table A1. 2: England data for 2004 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: “1996 GUIDELINES” summary (Italics are projections) (HWP = Harvested Wood Products).....	2-53
Table A1. 3: Scotland data for 2004 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: “1996 GUIDELINES” summary (Italics are projections) (HWP = Harvested Wood Products).....	2-57
Table A1. 4: Wales data for 2004 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: “1996 GUIDELINES” summary (Italics are projections) (HWP = Harvested Wood Products).....	2-61
Table A1. 5: Northern Ireland data for 2004 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: “1996 GUIDELINES” summary (Italics are projections) (HWP = Harvested Wood Products).....	2-65



Table A1. 1: United Kingdom data for 2004 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: “1996 GUIDELINES” summary of Inventory period (Italics are projections) (HWP = Harvested Wood Products)

<b>A (Mid) UK Gg CO2/year</b>	<b>5 NET</b>	<b>5A Forestland</b>	<b>5B Cropland</b>	<b>5C Grassland</b>	<b>5E Settlements</b>	<b>5G HWP</b>
<b>1990</b>	<b>2915</b>	<b>-12203</b>	<b>15842</b>	<b>-6193</b>	<b>6925</b>	<b>-1456</b>
1991	2782	-12715	16001	-6146	6851	-1210
1992	2290	-13340	16004	-6254	6799	-920
1993	1082	-13714	15579	-6660	6719	-842
1994	889	-14193	15632	-6605	6688	-633
<b>1995</b>	<b>1034</b>	<b>-13948</b>	<b>15771</b>	<b>-6536</b>	<b>6647</b>	<b>-900</b>
1996	902	-13720	15802	-6786	6627	-1021
1997	552	-13512	15542	-6889	6607	-1197
1998	0	-13406	15427	-7288	6573	-1306
1999	-234	-13504	15328	-7275	6485	-1268
<b>2000</b>	<b>-440</b>	<b>-13805</b>	<b>15339</b>	<b>-7427</b>	<b>6402</b>	<b>-950</b>
2001	-596	-14348	15287	-7449	6358	-445
2002	-1120	-15045	15314	-7742	6306	47
2003	-1180	-15646	15380	-7526	6274	337
2004	-1942	-16302	15329	-7836	6248	619
<b>2005</b>	<b>-2067</b>	<b>-15735</b>	<b>15215</b>	<b>-7880</b>	<b>6237</b>	<b>96</b>
2006	-2412	-15227	15103	-8162	6227	-354
2007	-2329	-14315	15086	-8173	6205	-1133
2008	-2469	-13770	15114	-8411	6193	-1595
2009	-2321	-12917	15080	-8389	6165	-2259
<b>2010</b>	<b>-1797</b>	<b>-10760</b>	<b>15037</b>	<b>-8513</b>	<b>6137</b>	<b>-3698</b>
2011	-1320	-10701	15042	-8522	6117	-3256
2012	-956	-9952	15052	-8662	6110	-3503
2013	-631	-8962	15038	-8787	6104	-4025
2014	-293	-8553	15040	-8877	6093	-3995
<b>2015</b>	<b>243</b>	<b>-7847</b>	<b>15035</b>	<b>-8921</b>	<b>6084</b>	<b>-4108</b>
2016	621	-7742	15037	-8979	6072	-3766
2017	847	-7771	15048	-9137	6068	-3362
2018	1078	-7778	15055	-9178	6056	-3076
2019	1386	-6822	15065	-9254	6045	-3647
<b>2020</b>	<b>2115</b>	<b>-5084</b>	<b>15070</b>	<b>-9251</b>	<b>6038</b>	<b>-4658</b>

<b>B (Low) UK Gg CO2/year</b>	<b>5 NET</b>	<b>5A Forestland</b>	<b>5B Cropland</b>	<b>5C Grassland</b>	<b>5E Settlements</b>	<b>5G HWP</b>
<b>1990</b>	<b>2915</b>	<b>-12203</b>	<b>15842</b>	<b>-6193</b>	<b>6925</b>	<b>-1456</b>
1991	2782	-12715	16001	-6146	6851	-1210
1992	2290	-13340	16004	-6254	6799	-920
1993	1082	-13714	15579	-6660	6719	-842
1994	889	-14193	15632	-6605	6688	-633
<b>1995</b>	<b>1034</b>	<b>-13948</b>	<b>15771</b>	<b>-6536</b>	<b>6647</b>	<b>-900</b>
1996	902	-13720	15802	-6786	6627	-1021
1997	552	-13512	15542	-6889	6607	-1197
1998	0	-13406	15427	-7288	6573	-1306
1999	-234	-13504	15328	-7275	6485	-1268
<b>2000</b>	<b>-440</b>	<b>-13805</b>	<b>15339</b>	<b>-7427</b>	<b>6402</b>	<b>-950</b>
2001	-596	-14348	15287	-7449	6358	-445
2002	-1120	-15045	15314	-7742	6306	47
2003	-1180	-15646	15380	-7526	6274	337
2004	-1942	-16302	15329	-7836	6248	619
<b>2005</b>	<b>-9411</b>	<b>-15699</b>	<b>11333</b>	<b>-9875</b>	<b>4733</b>	<b>96</b>
2006	-9741	-15065	11169	-10208	4718	-354
2007	-9732	-14117	11102	-10273	4689	-1133
2008	-10058	-13629	11073	-10575	4668	-1595
2009	-10162	-12923	10999	-10613	4634	-2259
<b>2010</b>	<b>-9564</b>	<b>-10976</b>	<b>11136</b>	<b>-10712</b>	<b>4685</b>	<b>-3698</b>
2011	-9272	-11152	11159	-10737	4714	-3256
2012	-9157	-10639	11155	-10904	4735	-3503
2013	-9101	-9872	11115	-11061	4741	-4025
2014	-9051	-9672	11082	-11188	4722	-3995
<b>2015</b>	<b>-8788</b>	<b>-9163</b>	<b>11039</b>	<b>-11240</b>	<b>4684</b>	<b>-4108</b>
2016	-8678	-9245	11001	-11282	4614	-3766
2017	-8842	-9454	10970	-11594	4598	-3362
2018	-8902	-9637	10933	-11700	4578	-3076
2019	-8854	-8856	10900	-11809	4557	-3647
<b>2020</b>	<b>-8417</b>	<b>-7294</b>	<b>10862</b>	<b>-11863</b>	<b>4536</b>	<b>-4658</b>

<b>C (High) UK Gg CO2/year</b>	<b>5 NET</b>	<b>5A Forestland</b>	<b>5B Cropland</b>	<b>5C Grassland</b>	<b>5E Settlements</b>	<b>5G HWP</b>
<b>1990</b>	<b>2915</b>	<b>-12203</b>	<b>15842</b>	<b>-6193</b>	<b>6925</b>	<b>-1456</b>
1991	2782	-12715	16001	-6146	6851	-1210
1992	2290	-13340	16004	-6254	6799	-920
1993	1082	-13714	15579	-6660	6719	-842
1994	889	-14193	15632	-6605	6688	-633
<b>1995</b>	<b>1034</b>	<b>-13948</b>	<b>15771</b>	<b>-6536</b>	<b>6647</b>	<b>-900</b>
1996	902	-13720	15802	-6786	6627	-1021
1997	552	-13512	15542	-6889	6607	-1197
1998	0	-13406	15427	-7288	6573	-1306
1999	-234	-13504	15328	-7275	6485	-1268
<b>2000</b>	<b>-440</b>	<b>-13805</b>	<b>15339</b>	<b>-7427</b>	<b>6402</b>	<b>-950</b>
2001	-596	-14348	15287	-7449	6358	-445
2002	-1120	-15045	15314	-7742	6306	47
2003	-1180	-15646	15380	-7526	6274	337
2004	-1942	-16302	15329	-7836	6248	619
<b>2005</b>	<b>6161</b>	<b>-15758</b>	<b>19264</b>	<b>-5341</b>	<b>7900</b>	<b>96</b>
2006	5850	-15332	19212	-5578	7902	-354
2007	6029	-14444	19252	-5537	7890	-1133
2008	6051	-13862	19338	-5718	7888	-1595
2009	6417	-12914	19360	-5634	7864	-2259
<b>2010</b>	<b>6923</b>	<b>-10620</b>	<b>19258</b>	<b>-5758</b>	<b>7741</b>	<b>-3698</b>
2011	7532	-10407	19268	-5738	7666	-3256
2012	8070	-9505	19293	-5843	7629	-3503
2013	8584	-8369	19295	-5925	7608	-4025
2014	9108	-7824	19313	-5972	7586	-3995
<b>2015</b>	<b>9831</b>	<b>-6990</b>	<b>19332</b>	<b>-5972</b>	<b>7568</b>	<b>-4108</b>
2016	10395	-6764	19360	-5984	7549	-3766
2017	10803	-6676	19396	-6094	7537	-3362
2018	11222	-6568	19429	-6089	7526	-3076
2019	11728	-5498	19464	-6120	7528	-3647
<b>2020</b>	<b>12654</b>	<b>-3646</b>	<b>19495</b>	<b>-6070</b>	<b>7533</b>	<b>-4658</b>

<b>D UK Gg CO2</b>	<b>Changes in woody biomass</b>	<b>HWP</b>	<b>Forest Conversion</b>	<b>Soils</b>	<b>Other</b>	<b>Other</b>	<b>NET Emission (+) Removal (-)</b>
<b>1990</b>	<b>-12203</b>	<b>-1456</b>	<b>151</b>	<b>15029</b>	<b>2040</b>	<b>-646</b>	<b>2915</b>
1991	-12715	-1210	137	15206	2010	-646	2782
1992	-13340	-920	142	15087	1966	-646	2290
1993	-13714	-842	104	14258	1923	-646	1082
1994	-14193	-633	119	14254	1987	-646	889
<b>1995</b>	<b>-13948</b>	<b>-900</b>	<b>126</b>	<b>14377</b>	<b>2025</b>	<b>-646</b>	<b>1034</b>
1996	-13720	-1021	152	14231	1905	-646	902
1997	-13512	-1197	156	13937	1813	-646	552
1998	-13406	-1306	158	13528	1671	-646	0
1999	-13504	-1268	191	13241	1752	-646	-234
<b>2000</b>	<b>-13805</b>	<b>-950</b>	<b>212</b>	<b>13038</b>	<b>1710</b>	<b>-646</b>	<b>-440</b>
2001	-14348	-445	253	12862	1727	-646	-596
2002	-15045	47	213	12773	1538	-646	-1120
2003	-15646	337	201	12853	1721	-646	-1180
2004	-16302	619	183	12654	1550	-646	-1942
1996 GUIDELINES Format	5A (Removals)	5A (Removals)	5B (Emissions)	5D (Emissions)	5E (Emissions)	5E (Removals)	
	Forest biomass, soils, litter.	Forest products	Deforestation (Biomass burning)	Effect of LUC (Net), liming of soils	Drainage of lowland soils, peat extraction	Non-forest biomass	



Table A1. 2: England data for 2004 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: “1996 GUIDELINES” summary (Italics are projections) (HWP = Harvested Wood Products)

<b>A (Mid) England Gg CO2/year</b>	<b>5 NET</b>	<b>5A Forestland</b>	<b>5B Cropland</b>	<b>5C Grassland</b>	<b>5E Settlements</b>	<b>5G HWP</b>
<b>1990</b>	<b>5736</b>	<b>-2733</b>	<b>7515</b>	<b>-2594</b>	<b>3909</b>	<b>-361</b>
1991	5835	-2775	7600	-2552	3848	-285
1992	5672	-2856	7565	-2633	3802	-206
1993	5007	-2851	7182	-2851	3738	-211
1994	5013	-2889	7187	-2816	3708	-177
<b>1995</b>	<b>5111</b>	<b>-2825</b>	<b>7261</b>	<b>-2778</b>	<b>3672</b>	<b>-219</b>
1996	4928	-2894	7250	-2918	3651	-162
1997	4587	-2872	7005	-2965	3630	-212
1998	4200	-2818	6879	-3177	3600	-284
1999	4013	-2874	6765	-3156	3531	-252
<b>2000</b>	<b>3911</b>	<b>-2760</b>	<b>6741</b>	<b>-3207</b>	<b>3466</b>	<b>-330</b>
2001	3842	-2946	6657	-3149	3429	-149
2002	3550	-3169	6661	-3357	3387	29
2003	3569	-3333	6701	-3291	3360	133
2004	3231	-3540	6622	-3439	3336	253
<b>2005</b>	<b>3119</b>	<b>-3448</b>	<b>6504</b>	<b>-3411</b>	<b>3324</b>	<b>150</b>
2006	2838	-3317	6390	-3561	3313	13
2007	2786	-2969	6352	-3588	3293	-302
2008	2683	-2729	6353	-3727	3281	-495
2009	2723	-2466	6303	-3678	3257	-693
<b>2010</b>	<b>2708</b>	<b>-2230</b>	<b>6247</b>	<b>-3745</b>	<b>3233</b>	<b>-796</b>
2011	2754	-2346	6234	-3747	3216	-602
2012	2729	-2149	6224	-3844	3207	-709
2013	2793	-1457	6197	-3896	3200	-1252
2014	2827	-1394	6183	-3945	3189	-1206
<b>2015</b>	<b>2960</b>	<b>-1209</b>	<b>6164</b>	<b>-3934</b>	<b>3180</b>	<b>-1241</b>
2016	3000	-1182	6151	-3973	3168	-1165
2017	2992	-1257	6146	-4046	3163	-1013
2018	2996	-1320	6138	-4084	3152	-891
2019	2980	-1284	6133	-4120	3142	-890
<b>2020</b>	<b>3135</b>	<b>-710</b>	<b>6125</b>	<b>-4115</b>	<b>3135</b>	<b>-1299</b>

<b>B (Low) England Gg CO<sub>2</sub>/year</b>	<b>5 NET</b>	<b>5A Forestland</b>	<b>5B Cropland</b>	<b>5C Grassland</b>	<b>5E Settlements</b>	<b>5G HWP</b>
<b>1990</b>	<b>5736</b>	<b>-2733</b>	<b>7515</b>	<b>-2594</b>	<b>3909</b>	<b>-361</b>
1991	5835	-2775	7600	-2552	3848	-285
1992	5672	-2856	7565	-2633	3802	-206
1993	5007	-2851	7182	-2851	3738	-211
1994	5013	-2889	7187	-2816	3708	-177
<b>1995</b>	<b>5111</b>	<b>-2825</b>	<b>7261</b>	<b>-2778</b>	<b>3672</b>	<b>-219</b>
1996	4928	-2894	7250	-2918	3651	-162
1997	4587	-2872	7005	-2965	3630	-212
1998	4200	-2818	6879	-3177	3600	-284
1999	4013	-2874	6765	-3156	3531	-252
<b>2000</b>	<b>3911</b>	<b>-2760</b>	<b>6741</b>	<b>-3207</b>	<b>3466</b>	<b>-330</b>
2001	3842	-2946	6657	-3149	3429	-149
2002	3550	-3169	6661	-3357	3387	29
2003	3569	-3333	6701	-3291	3360	133
2004	3231	-3540	6622	-3439	3336	253
<b>2005</b>	<b>-191</b>	<b>-3449</b>	<b>4943</b>	<b>-4335</b>	<b>2501</b>	<b>150</b>
2006	-519	-3305	4794	-4510	2489	13
2007	-642	-2968	4725	-4564	2468	-302
2008	-860	-2767	4686	-4737	2453	-495
2009	-945	-2570	4612	-4722	2428	-693
<b>2010</b>	<b>-926</b>	<b>-2420</b>	<b>4630</b>	<b>-4781</b>	<b>2441</b>	<b>-796</b>
2011	-967	-2627	4602	-4789	2451	-602
2012	-1095	-2521	4567	-4899	2468	-709
2013	-1138	-1913	4521	-4964	2470	-1252
2014	-1229	-1929	4482	-5029	2454	-1206
<b>2015</b>	<b>-1215</b>	<b>-1817</b>	<b>4435</b>	<b>-5018</b>	<b>2425</b>	<b>-1241</b>
2016	-1287	-1858	4394	-5032	2373	-1165
2017	-1528	-1999	4360	-5235	2360	-1013
2018	-1642	-2124	4321	-5291	2343	-891
2019	-1779	-2150	4286	-5352	2327	-890
<b>2020</b>	<b>-1743</b>	<b>-1638</b>	<b>4247</b>	<b>-5365</b>	<b>2312</b>	<b>-1299</b>

<b>C (High) England Gg CO2/year</b>	<b>5 NET</b>	<b>5A Forestland</b>	<b>5B Cropland</b>	<b>5C Grassland</b>	<b>5E Settlements</b>	<b>5G HWP</b>
<b>1990</b>	<b>5736</b>	<b>-2733</b>	<b>7515</b>	<b>-2594</b>	<b>3909</b>	<b>-361</b>
1991	5835	-2775	7600	-2552	3848	-285
1992	5672	-2856	7565	-2633	3802	-206
1993	5007	-2851	7182	-2851	3738	-211
1994	5013	-2889	7187	-2816	3708	-177
<b>1995</b>	<b>5111</b>	<b>-2825</b>	<b>7261</b>	<b>-2778</b>	<b>3672</b>	<b>-219</b>
1996	4928	-2894	7250	-2918	3651	-162
1997	4587	-2872	7005	-2965	3630	-212
1998	4200	-2818	6879	-3177	3600	-284
1999	4013	-2874	6765	-3156	3531	-252
<b>2000</b>	<b>3911</b>	<b>-2760</b>	<b>6741</b>	<b>-3207</b>	<b>3466</b>	<b>-330</b>
2001	3842	-2946	6657	-3149	3429	-149
2002	3550	-3169	6661	-3357	3387	29
2003	3569	-3333	6701	-3291	3360	133
2004	3231	-3540	6622	-3439	3336	253
<b>2005</b>	<b>6834</b>	<b>-3446</b>	<b>8132</b>	<b>-2242</b>	<b>4241</b>	<b>150</b>
2006	6607	-3325	8055	-2372	4237	13
2007	6630	-2970	8054	-2375	4223	-302
2008	6624	-2705	8091	-2484	4216	-495
2009	6779	-2398	8078	-2402	4194	-693
<b>2010</b>	<b>6714</b>	<b>-2107</b>	<b>7980</b>	<b>-2471</b>	<b>4109</b>	<b>-796</b>
2011	6821	-2162	7982	-2453	4058	-602
2012	6890	-1907	7997	-2528	4038	-709
2013	7044	-1159	7994	-2558	4019	-1252
2014	7165	-1046	8006	-2585	3997	-1206
<b>2015</b>	<b>7383</b>	<b>-814</b>	<b>8012</b>	<b>-2552</b>	<b>3977</b>	<b>-1241</b>
2016	7506	-742	8024	-2569	3957	-1165
2017	7580	-775	8043	-2618	3943	-1013
2018	7669	-796	8060	-2633	3929	-891
2019	7750	-720	8079	-2647	3929	-890
<b>2020</b>	<b>8001</b>	<b>-106</b>	<b>8095</b>	<b>-2619</b>	<b>3930</b>	<b>-1299</b>

<b>D England Gg CO2</b>	<b>Changes in woody biomass</b>	<b>HWP</b>	<b>Forest Conversion</b>	<b>Soils</b>	<b>Other</b>	<b>Other</b>	<b>NET Emission (+) Removal (-)</b>
1990	-2733	-361	108	7367	1878	-524	5736
1991	-2775	-285	98	7462	1859	-524	5835
1992	-2856	-206	102	7359	1797	-524	5672
1993	-2851	-211	75	6760	1758	-524	5007
1994	-2889	-177	85	6733	1784	-524	5013
1995	-2825	-219	90	6799	1789	-524	5111
1996	-2894	-162	109	6699	1698	-524	4928
1997	-2872	-212	112	6439	1644	-524	4587
1998	-2818	-284	114	6164	1548	-524	4200
1999	-2874	-252	137	5956	1570	-524	4013
2000	-2760	-330	152	5832	1540	-524	3911
2001	-2946	-149	182	5719	1559	-524	3842
2002	-3169	29	153	5647	1414	-524	3550
2003	-3333	133	144	5681	1468	-524	3569
2004	-3540	253	131	5532	1380	-524	3231
1996 GUIDELINES Format	5A (Removals)	5A (Removals)	5B (Emissions)	5D (Emissions)	5E (Emissions)	5E (Removals)	
	Forest biomass, soils, litter.	Forest products	Deforestation (Biomass burning)	Effect of LUC (Net), liming of soils	Drainage of lowland soils, peat extraction	Non-forest biomass	

Table A1. 3: Scotland data for 2004 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: “1996 GUIDELINES” summary (Italics are projections) (HWP = Harvested Wood Products)

<b>A (Mid) Scotland Gg CO2/year</b>	<b>5 NET</b>	<b>5A Forestland</b>	<b>5B Cropland</b>	<b>5C Grassland</b>	<b>5E Settlements</b>	<b>5G HWP</b>
<b>1990</b>	-2535	-7547	6102	-2116	1741	-714
1991	-2805	-7951	6178	-2128	1732	-635
1992	-3102	-8365	6222	-2139	1727	-546
1993	-3541	-8714	6194	-2241	1715	-495
1994	-3726	-9062	6246	-2218	1714	-406
<b>1995</b>	-3712	-8973	6313	-2195	1710	-567
1996	-3669	-8860	6359	-2272	1711	-607
1997	-3715	-8837	6353	-2329	1712	-615
1998	-3855	-8878	6371	-2449	1708	-607
1999	-3929	-9075	6391	-2422	1693	-516
<b>2000</b>	-3940	-8869	6427	-2477	1679	-699
2001	-4011	-9164	6464	-2552	1672	-431
2002	-4188	-9611	6489	-2609	1664	-122
2003	-4250	-10054	6514	-2465	1661	93
2004	-4617	-10473	6546	-2596	1658	247
<i>2005</i>	<i>-4622</i>	<i>-10130</i>	<i>6553</i>	<i>-2635</i>	<i>1659</i>	<i>-69</i>
<i>2006</i>	<i>-4683</i>	<i>-9790</i>	<i>6560</i>	<i>-2734</i>	<i>1659</i>	<i>-379</i>
<i>2007</i>	<i>-4561</i>	<i>-9358</i>	<i>6582</i>	<i>-2700</i>	<i>1657</i>	<i>-742</i>
<i>2008</i>	<i>-4622</i>	<i>-9212</i>	<i>6611</i>	<i>-2791</i>	<i>1657</i>	<i>-887</i>
<i>2009</i>	<i>-4535</i>	<i>-8746</i>	<i>6628</i>	<i>-2800</i>	<i>1653</i>	<i>-1269</i>
<i>2010</i>	<i>-4159</i>	<i>-7653</i>	<i>6642</i>	<i>-2838</i>	<i>1649</i>	<i>-1959</i>
<i>2011</i>	<i>-3848</i>	<i>-7575</i>	<i>6662</i>	<i>-2833</i>	<i>1647</i>	<i>-1750</i>
<i>2012</i>	<i>-3545</i>	<i>-7008</i>	<i>6682</i>	<i>-2863</i>	<i>1648</i>	<i>-2004</i>
<i>2013</i>	<i>-3357</i>	<i>-6731</i>	<i>6696</i>	<i>-2920</i>	<i>1649</i>	<i>-2050</i>
<i>2014</i>	<i>-3123</i>	<i>-6430</i>	<i>6713</i>	<i>-2949</i>	<i>1648</i>	<i>-2105</i>
<i>2015</i>	<i>-2835</i>	<i>-6094</i>	<i>6728</i>	<i>-2991</i>	<i>1648</i>	<i>-2126</i>
<i>2016</i>	<i>-2586</i>	<i>-6104</i>	<i>6744</i>	<i>-2998</i>	<i>1647</i>	<i>-1875</i>
<i>2017</i>	<i>-2441</i>	<i>-6241</i>	<i>6760</i>	<i>-3071</i>	<i>1648</i>	<i>-1536</i>
<i>2018</i>	<i>-2290</i>	<i>-6255</i>	<i>6775</i>	<i>-3065</i>	<i>1647</i>	<i>-1391</i>
<i>2019</i>	<i>-2073</i>	<i>-5596</i>	<i>6790</i>	<i>-3096</i>	<i>1646</i>	<i>-1817</i>
<i>2020</i>	<i>-1670</i>	<i>-4795</i>	<i>6804</i>	<i>-3088</i>	<i>1646</i>	<i>-2237</i>

B (Low) Scotland Gg CO <sub>2</sub> /year	5 NET	5A Forestland	5B Cropland	5C Grassland	5E Settlements	5G HWP
<b>1990</b>	<b>-2535</b>	<b>-7547</b>	<b>6102</b>	<b>-2116</b>	<b>1741</b>	<b>-714</b>
1991	-2805	-7951	6178	-2128	1732	-635
1992	-3102	-8365	6222	-2139	1727	-546
1993	-3541	-8714	6194	-2241	1715	-495
1994	-3726	-9062	6246	-2218	1714	-406
<b>1995</b>	<b>-3712</b>	<b>-8973</b>	<b>6313</b>	<b>-2195</b>	<b>1710</b>	<b>-567</b>
1996	-3669	-8860	6359	-2272	1711	-607
1997	-3715	-8837	6353	-2329	1712	-615
1998	-3855	-8878	6371	-2449	1708	-607
1999	-3929	-9075	6391	-2422	1693	-516
<b>2000</b>	<b>-3940</b>	<b>-8869</b>	<b>6427</b>	<b>-2477</b>	<b>1679</b>	<b>-699</b>
2001	-4011	-9164	6464	-2552	1672	-431
2002	-4188	-9611	6489	-2609	1664	-122
2003	-4250	-10054	6514	-2465	1661	93
2004	-4617	-10473	6546	-2596	1658	247
<b>2005</b>	<b>-7373</b>	<b>-10094</b>	<b>4783</b>	<b>-3258</b>	<b>1265</b>	<b>-69</b>
2006	-7370	-9653	4772	-3374	1263	-379
2007	-7239	-9175	4778	-3358	1257	-742
2008	-7351	-9042	4791	-3467	1253	-887
2009	-7365	-8644	4794	-3493	1247	-1269
<b>2010</b>	<b>-6998</b>	<b>-7657</b>	<b>4881</b>	<b>-3530</b>	<b>1268</b>	<b>-1959</b>
2011	-6789	-7703	4920	-3535	1278	-1750
2012	-6622	-7261	4943	-3578	1277	-2004
2013	-6577	-7104	4947	-3648	1278	-2050
2014	-6484	-6917	4952	-3690	1276	-2105
<b>2015</b>	<b>-6324</b>	<b>-6688</b>	<b>4955</b>	<b>-3735</b>	<b>1271</b>	<b>-2126</b>
2016	-6207	-6800	4959	-3747	1258	-1875
2017	-6184	-7038	4964	-3830	1257	-1536
2018	-6182	-7150	4968	-3864	1256	-1391
2019	-6079	-6589	4972	-3896	1252	-1817
<b>2020</b>	<b>-5823</b>	<b>-5888</b>	<b>4975</b>	<b>-3921</b>	<b>1248</b>	<b>-2237</b>

C (High) Scotland Gg CO <sub>2</sub> /year	5 NET	5A Forestland	5B Cropland	5C Grassland	5E Settlements	5G HWP
<b>1990</b>	<b>-2535</b>	<b>-7547</b>	<b>6102</b>	<b>-2116</b>	<b>1741</b>	<b>-714</b>
1991	-2805	-7951	6178	-2128	1732	-635
1992	-3102	-8365	6222	-2139	1727	-546
1993	-3541	-8714	6194	-2241	1715	-495
1994	-3726	-9062	6246	-2218	1714	-406
<b>1995</b>	<b>-3712</b>	<b>-8973</b>	<b>6313</b>	<b>-2195</b>	<b>1710</b>	<b>-567</b>
1996	-3669	-8860	6359	-2272	1711	-607
1997	-3715	-8837	6353	-2329	1712	-615
1998	-3855	-8878	6371	-2449	1708	-607
1999	-3929	-9075	6391	-2422	1693	-516
<b>2000</b>	<b>-3940</b>	<b>-8869</b>	<b>6427</b>	<b>-2477</b>	<b>1679</b>	<b>-699</b>
2001	-4011	-9164	6464	-2552	1672	-431
2002	-4188	-9611	6489	-2609	1664	-122
2003	-4250	-10054	6514	-2465	1661	93
2004	-4617	-10473	6546	-2596	1658	247
<b>2005</b>	<b>-1546</b>	<b>-10153</b>	<b>8388</b>	<b>-1796</b>	<b>2084</b>	<b>-69</b>
2006	-1631	-9879	8414	-1877	2089	-379
2007	-1497	-9477	8454	-1824	2091	-742
2008	-1509	-9323	8501	-1895	2095	-887
2009	-1338	-8813	8536	-1884	2093	-1269
<b>2010</b>	<b>-912</b>	<b>-7651</b>	<b>8550</b>	<b>-1913</b>	<b>2062</b>	<b>-1959</b>
2011	-529	-7492	8570	-1900	2042	-1750
2012	-149	-6843	8589	-1921	2030	-2004
2013	134	-6488	8604	-1962	2030	-2050
2014	461	-6113	8621	-1975	2033	-2105
<b>2015</b>	<b>839</b>	<b>-5707</b>	<b>8637</b>	<b>-2001</b>	<b>2037</b>	<b>-2126</b>
2016	1175	-5650	8652	-1991	2039	-1875
2017	1406	-5723	8669	-2047	2043	-1536
2018	1642	-5673	8685	-2024	2045	-1391
2019	1943	-4950	8701	-2038	2047	-1817
<b>2020</b>	<b>2432</b>	<b>-4083</b>	<b>8716</b>	<b>-2013</b>	<b>2049</b>	<b>-2237</b>

<b>D Scotland Gg CO2</b>	<b>Changes in woody biomass</b>	<b>HWP</b>	<b>Forest Conversion</b>	<b>Soils</b>	<b>Other</b>	<b>Other</b>	<b>NET Emission (+) Removal (-)</b>
1990	-7547	-714	34	8128	-2416	60	-79
1991	-7951	-635	31	8232	-2451	49	-79
1992	-8365	-546	32	8275	-2486	68	-79
1993	-8714	-495	23	8182	-2521	63	-79
1994	-9062	-406	27	8248	-2555	102	-79
1995	-8973	-567	28	8334	-2589	134	-79
1996	-8860	-607	34	8360	-2623	106	-79
1997	-8837	-615	35	8368	-2656	68	-79
1998	-8878	-607	36	8341	-2689	22	-79
1999	-9075	-516	43	8339	-2721	80	-79
2000	-8869	-699	48	8345	-2754	69	-79
2001	-9164	-431	57	8325	-2786	66	-79
2002	-9611	-122	48	8371	-2817	22	-79
2003	-10054	93	45	8442	-2849	151	-79
2004	-10473	247	41	8457	-2880	69	-79
1996 GUIDELINES Format	5A (Removals)	5A (Removals)	5B (Emissions)	5D (Emissions)	5E (Emissions)	5E (Removals)	
	Forest biomass, soils, litter.	Forest products	Deforestation (Biomass burning)	Effect of LUC (Net), liming of soils	Drainage of lowland soils, peat extraction	Non-forest biomass	



Table A1. 4: Wales data for 2004 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: “1996 GUIDELINES” summary (Italics are projections) (HWP = Harvested Wood Products)

<b>A (Mid) Wales Gg CO2/year</b>	<b>5 NET</b>	<b>5A Forestland</b>	<b>5B Cropland</b>	<b>5C Grassland</b>	<b>5E Settlements</b>	<b>5G HWP</b>
<b>1990</b>	-241	-1178	969	-402	705	-336
1991	-201	-1246	978	-392	703	-244
1992	-203	-1358	985	-400	701	-130
1993	-258	-1432	986	-449	698	-62
1994	-258	-1491	993	-451	698	-7
<b>1995</b>	-219	-1427	1001	-448	697	-42
1996	-179	-1247	1007	-465	697	-170
1997	-127	-1083	1009	-465	697	-286
1998	-120	-1001	1012	-501	696	-326
1999	-69	-837	1016	-518	693	-423
<b>2000</b>	-133	-1441	1021	-542	689	139
2001	-136	-1477	1025	-543	688	171
2002	-173	-1522	1030	-560	686	193
2003	-202	-1559	1035	-556	685	192
2004	-249	-1584	1038	-572	685	185
<i>2005</i>	<i>-251</i>	<i>-1510</i>	<i>1041</i>	<i>-591</i>	<i>685</i>	<i>124</i>
<i>2006</i>	<i>-246</i>	<i>-1491</i>	<i>1043</i>	<i>-610</i>	<i>686</i>	<i>127</i>
<i>2007</i>	<i>-242</i>	<i>-1430</i>	<i>1046</i>	<i>-620</i>	<i>685</i>	<i>77</i>
<i>2008</i>	<i>-238</i>	<i>-1321</i>	<i>1050</i>	<i>-626</i>	<i>685</i>	<i>-27</i>
<i>2009</i>	<i>-231</i>	<i>-1213</i>	<i>1053</i>	<i>-635</i>	<i>685</i>	<i>-121</i>
<b>2010</b>	-69	-325	1055	-645	684	-838
2011	40	-281	1058	-653	684	-768
2012	114	-345	1061	-660	684	-626
2013	165	-365	1063	-669	685	-549
2014	223	-319	1066	-676	685	-532
<b>2015</b>	318	-210	1068	-684	685	-542
2016	379	-192	1070	-691	685	-494
2017	432	-139	1073	-697	686	-490
2018	471	-121	1075	-703	686	-465
2019	547	126	1077	-708	686	-633
<b>2020</b>	685	437	1079	-714	686	-804

<b>B (Low) Wales Gg CO2/year</b>	<b>5 NET</b>	<b>5A Forestland</b>	<b>5B Cropland</b>	<b>5C Grassland</b>	<b>5E Settlements</b>	<b>5G HWP</b>
<b>1990</b>	<b>-241</b>	<b>-1178</b>	<b>969</b>	<b>-402</b>	<b>705</b>	<b>-336</b>
1991	-201	-1246	978	-392	703	-244
1992	-203	-1358	985	-400	701	-130
1993	-258	-1432	986	-449	698	-62
1994	-258	-1491	993	-451	698	-7
<b>1995</b>	<b>-219</b>	<b>-1427</b>	<b>1001</b>	<b>-448</b>	<b>697</b>	<b>-42</b>
1996	-179	-1247	1007	-465	697	-170
1997	-127	-1083	1009	-465	697	-286
1998	-120	-1001	1012	-501	696	-326
1999	-69	-837	1016	-518	693	-423
<b>2000</b>	<b>-133</b>	<b>-1441</b>	<b>1021</b>	<b>-542</b>	<b>689</b>	<b>139</b>
2001	-136	-1477	1025	-543	688	171
2002	-173	-1522	1030	-560	686	193
2003	-202	-1559	1035	-556	685	192
2004	-249	-1584	1038	-572	685	185
<b>2005</b>	<b>-839</b>	<b>-1510</b>	<b>767</b>	<b>-740</b>	<b>520</b>	<b>124</b>
2006	-839	-1490	767	-764	521	127
2007	-844	-1430	768	-778	519	77
2008	-855	-1325	770	-789	517	-27
2009	-863	-1225	771	-803	515	-121
<b>2010</b>	<b>-669</b>	<b>-347</b>	<b>794</b>	<b>-805</b>	<b>527</b>	<b>-838</b>
2011	-565	-314	800	-814	531	-768
2012	-505	-388	802	-825	531	-626
2013	-468	-417	804	-837	532	-549
2014	-423	-381	805	-847	532	-532
<b>2015</b>	<b>-341</b>	<b>-280</b>	<b>807</b>	<b>-857</b>	<b>531</b>	<b>-542</b>
2016	-292	-270	808	-863	528	-494
2017	-259	-225	809	-882	528	-490
2018	-231	-214	811	-890	528	-465
2019	-167	26	812	-899	528	-633
<b>2020</b>	<b>-40</b>	<b>330</b>	<b>813</b>	<b>-907</b>	<b>528</b>	<b>-804</b>

<b>C (High) Wales Gg CO2/year</b>	<b>5 NET</b>	<b>5A Forestland</b>	<b>5B Cropland</b>	<b>5C Grassland</b>	<b>5E Settlements</b>	<b>5G HWP</b>
<b>1990</b>	<b>-241</b>	<b>-1178</b>	<b>969</b>	<b>-402</b>	<b>705</b>	<b>-336</b>
1991	-201	-1246	978	-392	703	-244
1992	-203	-1358	985	-400	701	-130
1993	-258	-1432	986	-449	698	-62
1994	-258	-1491	993	-451	698	-7
<b>1995</b>	<b>-219</b>	<b>-1427</b>	<b>1001</b>	<b>-448</b>	<b>697</b>	<b>-42</b>
1996	-179	-1247	1007	-465	697	-170
1997	-127	-1083	1009	-465	697	-286
1998	-120	-1001	1012	-501	696	-326
1999	-69	-837	1016	-518	693	-423
<b>2000</b>	<b>-133</b>	<b>-1441</b>	<b>1021</b>	<b>-542</b>	<b>689</b>	<b>139</b>
2001	-136	-1477	1025	-543	688	171
2002	-173	-1522	1030	-560	686	193
2003	-202	-1559	1035	-556	685	192
2004	-249	-1584	1038	-572	685	185
<b>2005</b>	<b>398</b>	<b>-1509</b>	<b>1323</b>	<b>-403</b>	<b>863</b>	<b>124</b>
2006	410	-1492	1329	-418	864	127
2007	422	-1430	1335	-423	864	77
2008	437	-1318	1342	-424	865	-27
2009	457	-1205	1347	-429	864	-121
<b>2010</b>	<b>614</b>	<b>-311</b>	<b>1344</b>	<b>-441</b>	<b>860</b>	<b>-838</b>
2011	727	-260	1347	-449	857	-768
2012	808	-317	1349	-454	855	-626
2013	866	-330	1352	-460	854	-549
2014	932	-279	1354	-464	853	-532
<b>2015</b>	<b>1034</b>	<b>-164</b>	<b>1356</b>	<b>-468</b>	<b>852</b>	<b>-542</b>
2016	1103	-141	1358	-470	850	-494
2017	1164	-83	1360	-472	850	-490
2018	1213	-61	1362	-474	850	-465
2019	1298	191	1364	-475	851	-633
<b>2020</b>	<b>1445</b>	<b>507</b>	<b>1366</b>	<b>-476</b>	<b>852</b>	<b>-804</b>

<b>D Wales Gg CO2</b>	<b>Changes in woody biomass</b>	<b>HWP</b>	<b>Forest Conversion</b>	<b>Soils</b>	<b>Other</b>	<b>Other</b>	<b>NET Emission (+) Removal (-)</b>
1990	-1178	-336	9	1760	-487	0	-9
1991	-1246	-244	8	1789	-499	0	-9
1992	-1358	-130	8	1798	-511	0	-9
1993	-1432	-62	6	1760	-522	0	-9
1994	-1491	-7	7	1775	-533	0	-9
1995	-1427	-42	7	1796	-544	0	-9
1996	-1247	-170	9	1793	-554	0	-9
1997	-1083	-286	9	1806	-564	0	-9
1998	-1001	-326	9	1782	-574	0	-9
1999	-837	-423	11	1773	-584	0	-9
2000	-1441	139	12	1759	-593	0	-9
2001	-1477	171	14	1767	-603	0	-9
2002	-1522	193	12	1764	-611	0	-9
2003	-1559	192	11	1783	-620	0	-9
2004	-1584	185	10	1778	-629	0	-9
1996 GUIDELINES Format	5A (Removals)	5A (Removals)	5B (Emissions)	5D (Emissions)	5E (Emissions)	5E (Removals)	
	Forest biomass, soils, litter.	Forest products	Deforestation (Biomass burning)	Effect of LUC (Net), liming of soils	Drainage of lowland soils, peat extraction	Non-forest biomass	

Table A1. 5: Northern Ireland data for 2004 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: “1996 GUIDELINES” summary (Italics are projections) (HWP = Harvested Wood Products)

<b>A (Mid) N. Ireland Gg CO<sub>2</sub>/year</b>	<b>5 NET</b>	<b>5A Forestland</b>	<b>5B Cropland</b>	<b>5C Grassland</b>	<b>5E Settlements</b>	<b>5G HWP</b>
<b>1990</b>	<b>-45</b>	<b>-744</b>	<b>1256</b>	<b>-1081</b>	<b>569</b>	<b>-45</b>
1991	-47	-742	1245	-1073	569	-46
1992	-78	-761	1232	-1081	569	-37
1993	-126	-718	1216	-1119	569	-74
1994	-139	-750	1205	-1120	568	-43
<b>1995</b>	<b>-146</b>	<b>-723</b>	<b>1196</b>	<b>-1116</b>	<b>568</b>	<b>-72</b>
1996	-177	-719	1187	-1131	568	-82
1997	-192	-721	1175	-1131	568	-84
1998	-226	-709	1165	-1161	568	-89
1999	-249	-718	1156	-1179	568	-77
<b>2000</b>	<b>-279</b>	<b>-736</b>	<b>1149</b>	<b>-1201</b>	<b>568</b>	<b>-60</b>
2001	-291	-762	1141	-1204	569	-35
2002	-309	-744	1135	-1216	569	-53
2003	-296	-700	1130	-1215	569	-80
2004	-307	-705	1123	-1228	569	-66
<b>2005</b>	<b>-313</b>	<b>-648</b>	<b>1117</b>	<b>-1243</b>	<b>569</b>	<b>-108</b>
<i>2006</i>	<i>-321</i>	<i>-628</i>	<i>1110</i>	<i>-1257</i>	569	<i>-115</i>
<i>2007</i>	<i>-313</i>	<i>-558</i>	<i>1105</i>	<i>-1264</i>	570	<i>-166</i>
<i>2008</i>	<i>-291</i>	<i>-508</i>	<i>1101</i>	<i>-1268</i>	570	<i>-187</i>
<i>2009</i>	<i>-279</i>	<i>-492</i>	<i>1097</i>	<i>-1276</i>	570	<i>-177</i>
<b>2010</b>	<b>-277</b>	<b>-551</b>	<b>1092</b>	<b>-1284</b>	<b>570</b>	<b>-104</b>
<i>2011</i>	<i>-266</i>	<i>-499</i>	<i>1088</i>	<i>-1290</i>	570	<i>-135</i>
<i>2012</i>	<i>-254</i>	<i>-451</i>	<i>1085</i>	<i>-1295</i>	570	<i>-164</i>
<i>2013</i>	<i>-232</i>	<i>-410</i>	<i>1081</i>	<i>-1302</i>	571	<i>-173</i>
<i>2014</i>	<i>-219</i>	<i>-409</i>	<i>1078</i>	<i>-1307</i>	571	<i>-153</i>
<b>2015</b>	<b>-200</b>	<b>-334</b>	<b>1075</b>	<b>-1313</b>	<b>571</b>	<b>-199</b>
<i>2016</i>	<i>-171</i>	<i>-264</i>	<i>1072</i>	<i>-1318</i>	571	<i>-233</i>
<i>2017</i>	<i>-137</i>	<i>-134</i>	<i>1070</i>	<i>-1322</i>	571	<i>-322</i>
<i>2018</i>	<i>-99</i>	<i>-81</i>	<i>1067</i>	<i>-1326</i>	571	<i>-329</i>
<i>2019</i>	<i>-68</i>	<i>-68</i>	<i>1065</i>	<i>-1330</i>	572	<i>-306</i>
<b>2020</b>	<b>-34</b>	<b>-17</b>	<b>1063</b>	<b>-1335</b>	<b>572</b>	<b>-318</b>

<b>B (Low) N. Ireland Gg CO2/year</b>	<b>5 NET</b>	<b>5A Forestland</b>	<b>5B Cropland</b>	<b>5C Grassland</b>	<b>5E Settlements</b>	<b>5G HWP</b>
<b>1990</b>	<b>-45</b>	<b>-744</b>	<b>1256</b>	<b>-1081</b>	<b>569</b>	<b>-45</b>
1991	-47	-742	1245	-1073	569	-46
1992	-78	-761	1232	-1081	569	-37
1993	-126	-718	1216	-1119	569	-74
1994	-139	-750	1205	-1120	568	-43
<b>1995</b>	<b>-146</b>	<b>-723</b>	<b>1196</b>	<b>-1116</b>	<b>568</b>	<b>-72</b>
1996	-177	-719	1187	-1131	568	-82
1997	-192	-721	1175	-1131	568	-84
1998	-226	-709	1165	-1161	568	-89
1999	-249	-718	1156	-1179	568	-77
<b>2000</b>	<b>-279</b>	<b>-736</b>	<b>1149</b>	<b>-1201</b>	<b>568</b>	<b>-60</b>
2001	-291	-762	1141	-1204	569	-35
2002	-309	-744	1135	-1216	569	-53
2003	-296	-700	1130	-1215	569	-80
2004	-307	-705	1123	-1228	569	-66
<b>2005</b>	<b>-1008</b>	<b>-645</b>	<b>841</b>	<b>-1542</b>	<b>447</b>	<b>-108</b>
2006	-1014	-618	835	-1561	446	-115
2007	-1007	-544	830	-1573	446	-166
2008	-992	-495	827	-1582	445	-187
2009	-990	-484	822	-1595	445	-177
<b>2010</b>	<b>-972</b>	<b>-551</b>	<b>830</b>	<b>-1597</b>	<b>450</b>	<b>-104</b>
2011	-951	-509	838	-1599	455	-135
2012	-934	-469	843	-1603	459	-164
2013	-918	-437	843	-1612	461	-173
2014	-916	-445	844	-1621	459	-153
<b>2015</b>	<b>-908</b>	<b>-378</b>	<b>843</b>	<b>-1631</b>	<b>457</b>	<b>-199</b>
2016	-892	-316	840	-1639	455	-233
2017	-871	-193	837	-1647	453	-322
2018	-847	-148	833	-1655	452	-329
2019	-830	-142	830	-1662	450	-306
<b>2020</b>	<b>-811</b>	<b>-99</b>	<b>827</b>	<b>-1670</b>	<b>448</b>	<b>-318</b>

<b>C (High) N. Ireland Gg CO2/year</b>	<b>5 NET</b>	<b>5A Forestland</b>	<b>5B Cropland</b>	<b>5C Grassland</b>	<b>5E Settlements</b>	<b>5G HWP</b>
<b>1990</b>	<b>-45</b>	<b>-744</b>	<b>1256</b>	<b>-1081</b>	<b>569</b>	<b>-45</b>
1991	-47	-742	1245	-1073	569	-46
1992	-78	-761	1232	-1081	569	-37
1993	-126	-718	1216	-1119	569	-74
1994	-139	-750	1205	-1120	568	-43
<b>1995</b>	<b>-146</b>	<b>-723</b>	<b>1196</b>	<b>-1116</b>	<b>568</b>	<b>-72</b>
1996	-177	-719	1187	-1131	568	-82
1997	-192	-721	1175	-1131	568	-84
1998	-226	-709	1165	-1161	568	-89
1999	-249	-718	1156	-1179	568	-77
<b>2000</b>	<b>-279</b>	<b>-736</b>	<b>1149</b>	<b>-1201</b>	<b>568</b>	<b>-60</b>
2001	-291	-762	1141	-1204	569	-35
2002	-309	-744	1135	-1216	569	-53
2003	-296	-700	1130	-1215	569	-80
2004	-307	-705	1123	-1228	569	-66
<b>2005</b>	<b>475</b>	<b>-650</b>	<b>1422</b>	<b>-901</b>	<b>712</b>	<b>-108</b>
2006	465	-635	1415	-911	712	-115
2007	474	-567	1409	-915	712	-166
2008	499	-516	1404	-914	712	-187
2009	519	-497	1399	-919	712	-177
<b>2010</b>	<b>506</b>	<b>-551</b>	<b>1384</b>	<b>-933</b>	<b>710</b>	<b>-104</b>
2011	513	-493	1370	-937	708	-135
2012	521	-439	1357	-940	706	-164
2013	541	-392	1345	-944	705	-173
2014	550	-385	1333	-948	703	-153
<b>2015</b>	<b>575</b>	<b>-305</b>	<b>1328</b>	<b>-951</b>	<b>702</b>	<b>-199</b>
2016	611	-231	1326	-954	702	-233
2017	653	-95	1324	-956	702	-322
2018	698	-38	1322	-958	702	-329
2019	736	-19	1320	-960	701	-306
<b>2020</b>	<b>777</b>	<b>37</b>	<b>1319</b>	<b>-962</b>	<b>701</b>	<b>-318</b>

<b>D N. Ireland Gg CO2</b>	<b>Changes in woody biomass</b>	<b>HWP</b>	<b>Forest Conversion</b>	<b>Soils</b>	<b>Other</b>	<b>Other</b>	<b>NET Emission (+) Removal (-)</b>
1990	-744	-45	0	1948	-1272	102	-34
1991	-742	-46	0	1953	-1280	102	-34
1992	-761	-37	0	1940	-1287	102	-34
1993	-718	-74	0	1893	-1295	102	-34
1994	-750	-43	0	1888	-1302	102	-34
1995	-723	-72	0	1890	-1309	102	-34
1996	-719	-82	0	1872	-1316	102	-34
1997	-721	-84	0	1867	-1322	102	-34
1998	-709	-89	0	1833	-1329	102	-34
1999	-718	-77	0	1813	-1335	102	-34
2000	-736	-60	0	1790	-1342	102	-34
2001	-762	-35	0	1786	-1348	102	-34
2002	-744	-53	0	1773	-1354	102	-34
2003	-700	-80	0	1776	-1360	102	-34
2004	-705	-66	0	1762	-1366	102	-34
1996 GUIDELINES Format	5A (Removals)	5A (Removals)	5B (Emissions)	5D (Emissions)	5E (Emissions)	5E (Removals)	
	Forest biomass, soils, litter.	Forest products	Deforestation (Biomass burning)	Effect of LUC (Net), liming of soils	Drainage of lowland soils, peat extraction	Non-forest biomass	



## **APPENDIX 2**

### **A.2. Sectoral Tables for Land Use Change and Forestry Sector submitted as UK 2004 Greenhouse Gas Inventory in format defined by IPCC LULUCF Good Practice Guidance**



Table A2. 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.....	2-73
Table A2. 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.....	2-74
Table A2. 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.....	2-75
Table A2. 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.....	2-76
Table A2. 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.....	2-77
Table A2. 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.....	2-78
Table A2. 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.....	2-79
Table A2. 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.....	2-80
Table A2. 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.....	2-81
Table A2. 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.....	2-82
Table A2. 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.....	2-83
Table A2. 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.....	2-84
Table A2. 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.....	2-85
Table A2. 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.....	2-86
Table A2. 15 Emissions and Removals by Land Use, Land Use Change and Forestry (Sector 5) in 2004 for United Kingdom in Sectoral Report Table Format recommended by IPCC Good Practice Guidance for LULUCF.....	2-87



Table A2. 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 <sup>(1), (2)</sup>	CH <sub>4</sub>	N <sub>2</sub> O	NO <sub>x</sub>	CO
	(Gg)				
<b>Total Land-Use Categories</b>	2,915.429	0.659	0.005	0.164	5.767
<b>A. Forest Land</b>	-12,202.570	NE,NO	NE,NO	NO	NO
1. Forest Land remaining Forest Land	NE,NO	NE,NO	NE,NO	NO	NO
2. Land converted to Forest Land	-12,202.570	NE,NO	NE,NO	NO	NO
<b>B. Cropland</b>	15,841.672	NE,NO	NE,NO	NO	NO
1. Cropland remaining Cropland	1,009.609			NO	NO
2. Land converted to Cropland	14,036.826	NE,NO	NE,NO	NO	NO
<b>C. Grassland</b>	-6,192.802	0.147	0.001	0.036	1.282
1. Grassland remaining Grassland	389.539	NE,NO	NE,NO	NO	NO
2. Land converted to Grassland	-7,217.550	0.147	0.001	0.036	1.282
<b>D. Wetlands</b>	IE,NE,NO	NE,NO	NE,NO	NO	NO
1. Wetlands remaining Wetlands <sup>(3)</sup>	IE,NE,NO	NE,NO	NE,NO	NO	NO
2. Land converted to Wetlands	IE,NE,NO	NE,NO	NE,NO	NO	NO
<b>E. Settlements</b>	6,925.013	0.513	0.004	0.127	4.485
1. Settlements remaining Settlements <sup>(3)</sup>	IE,NO	NO	NO	NO	NO
2. Land converted to Settlements	6,807.558	IE	IE	0.127	4.485
<b>F. Other Land</b>	NE,NO	NE,NO	NE,NO	NO	NO
1. Other Land remaining Other Land <sup>(4)</sup>		NO	NO	NO	NO
2. Land converted to Other Land	NO	NO	NO	NO	NO
<b>G. Other (please specify)<sup>(5)</sup></b>	-1,455.883	NE	NE	NE	NE
<i>Harvested Wood Products<sup>(6)</sup></i>	-1,455.883	NE	NE	NE	NE
<b>Information items<sup>(7)</sup></b>					
Forest Land converted to other Land-Use Categories	350.349	0.659	0.005	0.164	5.767
Grassland converted to other Land-Use Categories	NO	NO	NO	NO	NO

Table A2. 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 <sup>(1), (2)</sup>	CH <sub>4</sub>	N <sub>2</sub> O	NO <sub>x</sub>	CO
	(Gg)				
<b>Total Land-Use Categories</b>	2,782.027	0.598	0.004	0.149	5.234
<b>A. Forest Land</b>	-12,714.630	NE,NO	NE,NO	NO	NO
1. Forest Land remaining Forest Land	NE,NO	NE,NO	NE,NO	NO	NO
2. Land converted to Forest Land	-12,714.630	NE,NO	NE,NO	NO	NO
<b>B. Cropland</b>	16,001.318	NE,NO	NE,NO	NO	NO
1. Cropland remaining Cropland	972.942			NO	NO
2. Land converted to Cropland	14,050.098	NE,NO	NE,NO	NO	NO
<b>C. Grassland</b>	-6,145.606	0.156	0.001	0.039	1.369
1. Grassland remaining Grassland	396.256	NE,NO	NE,NO	NO	NO
2. Land converted to Grassland	-7,335.535	0.156	0.001	0.039	1.369
<b>D. Wetlands</b>	IE,NE,NO	NE,NO	NE,NO	NO	NO
1. Wetlands remaining Wetlands <sup>(3)</sup>	IE,NE,NO	NE,NO	NE,NO	NO	NO
2. Land converted to Wetlands	IE,NE,NO	NE,NO	NE,NO	NO	NO
<b>E. Settlements</b>	6,851.140	0.442	0.003	0.110	3.865
1. Settlements remaining Settlements <sup>(3)</sup>	IE,NO	NO	NO	NO	NO
2. Land converted to Settlements	6,749.910	IE	IE	0.110	3.865
<b>F. Other Land</b>	NE,NO	NE,NO	NE,NO	NO	NO
1. Other Land remaining Other Land <sup>(4)</sup>		NO	NO	NO	NO
2. Land converted to Other Land	NO	NO	NO	NO	NO
<b>G. Other (please specify)<sup>(5)</sup></b>	-1,210.195	NE	NE	NE	NE
<i>Harvested Wood Products<sup>(6)</sup></i>	-1,210.195	NE	NE	NE	NE
<b>Information items<sup>(7)</sup></b>					
Forest Land converted to other Land-Use Categories	344.088	0.598	0.004	0.149	5.234
Grassland converted to other Land-Use Categories	NO	NO	NO	NO	NO

Table A2. 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 <sup>(1), (2)</sup>	CH <sub>4</sub>	N <sub>2</sub> O	NO <sub>x</sub>	CO
	(Gg)				
<b>Total Land-Use Categories</b>	<b>2,289.511</b>	<b>0.619</b>	<b>0.004</b>	<b>0.154</b>	<b>5.419</b>
<b>A. Forest Land</b>	<b>-13,340.088</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NO</b>	<b>NO</b>
1. Forest Land remaining Forest Land	NE,NO	NE,NO	NE,NO	NO	NO
2. Land converted to Forest Land	-13,340.088	NE,NO	NE,NO	NO	NO
<b>B. Cropland</b>	<b>16,004.231</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NO</b>	<b>NO</b>
1. Cropland remaining Cropland	936.275			NO	NO
2. Land converted to Cropland	14,064.471	NE,NO	NE,NO	NO	NO
<b>C. Grassland</b>	<b>-6,253.834</b>	<b>0.171</b>	<b>0.001</b>	<b>0.043</b>	<b>1.498</b>
1. Grassland remaining Grassland	389.721	NE,NO	NE,NO	NO	NO
2. Land converted to Grassland	-7,449.654	0.171	0.001	0.043	1.498
<b>D. Wetlands</b>	<b>IE,NE,NO</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NO</b>	<b>NO</b>
1. Wetlands remaining Wetlands <sup>(3)</sup>	IE,NE,NO	NE,NO	NE,NO	NO	NO
2. Land converted to Wetlands	IE,NE,NO	NE,NO	NE,NO	NO	NO
<b>E. Settlements</b>	<b>6,798.804</b>	<b>0.448</b>	<b>0.003</b>	<b>0.111</b>	<b>3.921</b>
1. Settlements remaining Settlements <sup>(3)</sup>	IE,NO	NO	NO	NO	NO
2. Land converted to Settlements	6,696.109	IE	IE	0.111	3.921
<b>F. Other Land</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NO</b>	<b>NO</b>
1. Other Land remaining Other Land <sup>(4)</sup>		NO	NO	NO	NO
2. Land converted to Other Land	NO	NO	NO	NO	NO
<b>G. Other (please specify)<sup>(5)</sup></b>	<b>-919.602</b>	<b>NE</b>	<b>NE</b>	<b>NE</b>	<b>NE</b>
Harvested Wood Products <sup>(6)</sup>	-919.602	NE	NE	NE	NE
<b>Information items<sup>(7)</sup></b>					
Forest Land converted to other Land-Use Categories	356.195	0.619	0.004	0.154	5.419
Grassland converted to other Land-Use Categories	NO	NO	NO	NO	NO

Table A2. 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 <sup>(1), (2)</sup>	CH <sub>4</sub>	N <sub>2</sub> O	NO <sub>x</sub>	CO
	(Gg)				
<b>Total Land-Use Categories</b>	<b>1,082.190</b>	<b>0.453</b>	<b>0.003</b>	<b>0.112</b>	<b>3.961</b>
<b>A. Forest Land</b>	<b>-13,714.070</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NO</b>	<b>NO</b>
1. Forest Land remaining Forest Land	NE,NO	NE,NO	NE,NO	NO	NO
2. Land converted to Forest Land	-13,714.070	NE,NO	NE,NO	NO	NO
<b>B. Cropland</b>	<b>15,578.642</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NO</b>	<b>NO</b>
1. Cropland remaining Cropland	899.609			NO	NO
2. Land converted to Cropland	14,079.764	NE,NO	NE,NO	NO	NO
<b>C. Grassland</b>	<b>-6,659.693</b>	<b>0.131</b>	<b>0.001</b>	<b>0.033</b>	<b>1.146</b>
1. Grassland remaining Grassland	382.640	NE,NO	NE,NO	NO	NO
2. Land converted to Grassland	-7,573.387	0.131	0.001	0.033	1.146
<b>D. Wetlands</b>	<b>IE,NE,NO</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NO</b>	<b>NO</b>
1. Wetlands remaining Wetlands <sup>(3)</sup>	IE,NE,NO	NE,NO	NE,NO	NO	NO
2. Land converted to Wetlands	IE,NE,NO	NE,NO	NE,NO	NO	NO
<b>E. Settlements</b>	<b>6,719.306</b>	<b>0.322</b>	<b>0.002</b>	<b>0.080</b>	<b>2.815</b>
1. Settlements remaining Settlements <sup>(3)</sup>	IE,NO	NO	NO	NO	NO
2. Land converted to Settlements	6,645.590	IE	IE	0.080	2.815
<b>F. Other Land</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NO</b>	<b>NO</b>
1. Other Land remaining Other Land <sup>(4)</sup>		NO	NO	NO	NO
2. Land converted to Other Land	NO	NO	NO	NO	NO
<b>G. Other (please specify)<sup>(5)</sup></b>	<b>-841.994</b>	<b>NE</b>	<b>NE</b>	<b>NE</b>	<b>NE</b>
Harvested Wood Products <sup>(6)</sup>	-841.994	NE	NE	NE	NE
<b>Information items<sup>(7)</sup></b>					
Forest Land converted to other Land-Use Categories	324.876	0.453	0.003	0.112	3.961
Grassland converted to other Land-Use Categories	NO	NO	NO	NO	NO



Table A2. 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 <sup>(1), (2)</sup>	CH <sub>4</sub>	N <sub>2</sub> O	NO <sub>x</sub>	CO
	(Gg)				
<b>Total Land-Use Categories</b>	889.216	0.519	0.004	0.129	4.541
<b>A. Forest Land</b>	-14,192.631	NE,NO	NE,NO	NO	NO
1. Forest Land remaining Forest Land	NE,NO	NE,NO	NE,NO	NO	NO
2. Land converted to Forest Land	-14,192.631	NE,NO	NE,NO	NO	NO
<b>B. Cropland</b>	15,631.569	NE,NO	NE,NO	NO	NO
1. Cropland remaining Cropland	862.942			NO	NO
2. Land converted to Cropland	14,095.816	NE,NO	NE,NO	NO	NO
<b>C. Grassland</b>	-6,604.748	0.140	0.001	0.035	1.221
1. Grassland remaining Grassland	484.077	NE,NO	NE,NO	NO	NO
2. Land converted to Grassland	-7,685.832	0.140	0.001	0.035	1.221
<b>D. Wetlands</b>	IE,NE,NO	NE,NO	NE,NO	NO	NO
1. Wetlands remaining Wetlands <sup>(3)</sup>	IE,NE,NO	NE,NO	NE,NO	NO	NO
2. Land converted to Wetlands	IE,NE,NO	NE,NO	NE,NO	NO	NO
<b>E. Settlements</b>	6,687.802	0.379	0.003	0.094	3.320
1. Settlements remaining Settlements <sup>(3)</sup>	IE,NO	NO	NO	NO	NO
2. Land converted to Settlements	6,600.855	IE	IE	0.094	3.320
<b>F. Other Land</b>	NE,NO	NE,NO	NE,NO	NO	NO
1. Other Land remaining Other Land <sup>(4)</sup>		NO	NO	NO	NO
2. Land converted to Other Land	NO	NO	NO	NO	NO
<b>G. Other (please specify)<sup>(5)</sup></b>	-632.776	NE	NE	NE	NE
Harvested Wood Products <sup>(6)</sup>	-632.776	NE	NE	NE	NE
<b>Information items<sup>(7)</sup></b>					
Forest Land converted to other Land-Use Categories	346.545	0.519	0.004	0.129	4.541
Grassland converted to other Land-Use Categories	NO	NO	NO	NO	NO

Table A2. 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 <sup>(1), (2)</sup>	CH <sub>4</sub>	N <sub>2</sub> O	NO <sub>x</sub>	CO
	(Gg)				
<b>Total Land-Use Categories</b>	1,033.528	0.549	0.004	0.137	4.807
<b>A. Forest Land</b>	-13,948.207	NE,NO	NE,NO	NO	NO
1. Forest Land remaining Forest Land	NE,NO	NE,NO	NE,NO	NO	NO
2. Land converted to Forest Land	-13,948.207	NE,NO	NE,NO	NO	NO
<b>B. Cropland</b>	15,771.111	NE,NO	NE,NO	NO	NO
1. Cropland remaining Cropland	826.275			NO	NO
2. Land converted to Cropland	14,112.482	NE,NO	NE,NO	NO	NO
<b>C. Grassland</b>	-6,536.314	0.155	0.001	0.039	1.359
1. Grassland remaining Grassland	558.009	NE,NO	NE,NO	NO	NO
2. Land converted to Grassland	-7,791.407	0.155	0.001	0.039	1.359
<b>D. Wetlands</b>	IE,NE,NO	NE,NO	NE,NO	NO	NO
1. Wetlands remaining Wetlands <sup>(3)</sup>	IE,NE,NO	NE,NO	NE,NO	NO	NO
2. Land converted to Wetlands	IE,NE,NO	NE,NO	NE,NO	NO	NO
<b>E. Settlements</b>	6,646.812	0.394	0.003	0.098	3.448
1. Settlements remaining Settlements <sup>(3)</sup>	IE,NO	NO	NO	NO	NO
2. Land converted to Settlements	6,556.505	IE	IE	0.098	3.448
<b>F. Other Land</b>	NE,NO	NE,NO	NE,NO	NO	NO
1. Other Land remaining Other Land <sup>(4)</sup>		NO	NO	NO	NO
2. Land converted to Other Land	NO	NO	NO	NO	NO
<b>G. Other (please specify)<sup>(5)</sup></b>	-899.875	NE	NE	NE	NE
<i>Harvested Wood Products<sup>(6)</sup></i>	-899.875	NE	NE	NE	NE
<b>Information items<sup>(7)</sup></b>					
Forest Land converted to other Land-Use Categories	359.636	0.549	0.004	0.137	4.807
Grassland converted to other Land-Use Categories	NO	NO	NO	NO	NO

Table A2. 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 <sup>(1), (2)</sup>	CH <sub>4</sub>	N <sub>2</sub> O	NO <sub>x</sub>	CO
	(Gg)				
<b>Total Land-Use Categories</b>	<b>901.905</b>	<b>0.664</b>	<b>0.005</b>	<b>0.165</b>	<b>5.806</b>
<b>A. Forest Land</b>	<b>-13,720.064</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NO</b>	<b>NO</b>
1. Forest Land remaining Forest Land	NE,NO	NE,NO	NE,NO	NO	NO
2. Land converted to Forest Land	-13,720.064	NE,NO	NE,NO	NO	NO
<b>B. Cropland</b>	<b>15,802.361</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NO</b>	<b>NO</b>
1. Cropland remaining Cropland	789.609			NO	NO
2. Land converted to Cropland	14,129.632	NE,NO	NE,NO	NO	NO
<b>C. Grassland</b>	<b>-6,786.447</b>	<b>0.183</b>	<b>0.001</b>	<b>0.045</b>	<b>1.600</b>
1. Grassland remaining Grassland	475.295	NE,NO	NE,NO	NO	NO
2. Land converted to Grassland	-7,893.784	0.183	0.001	0.045	1.600
<b>D. Wetlands</b>	<b>IE,NE,NO</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NO</b>	<b>NO</b>
1. Wetlands remaining Wetlands <sup>(3)</sup>	IE,NE,NO	NE,NO	NE,NO	NO	NO
2. Land converted to Wetlands	IE,NE,NO	NE,NO	NE,NO	NO	NO
<b>E. Settlements</b>	<b>6,627.146</b>	<b>0.481</b>	<b>0.003</b>	<b>0.119</b>	<b>4.206</b>
1. Settlements remaining Settlements <sup>(3)</sup>	IE,NO	NO	NO	NO	NO
2. Land converted to Settlements	6,516.992	IE	IE	0.119	4.206
<b>F. Other Land</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NO</b>	<b>NO</b>
1. Other Land remaining Other Land <sup>(4)</sup>		NO	NO	NO	NO
2. Land converted to Other Land	NO	NO	NO	NO	NO
<b>G. Other (please specify)<sup>(5)</sup></b>	<b>-1,021.090</b>	<b>NE</b>	<b>NE</b>	<b>NE</b>	<b>NE</b>
Harvested Wood Products <sup>(6)</sup>	-1,021.090	NE	NE	NE	NE
<b>Information items<sup>(7)</sup></b>					
Forest Land converted to other Land-Use Categories	391.598	0.664	0.005	0.165	5.806
Grassland converted to other Land-Use Categories	NO	NO	NO	NO	NO

Table A2. 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 <sup>(1), (2)</sup>	CH <sub>4</sub>	N <sub>2</sub> O	NO <sub>x</sub>	CO
	(Gg)				
<b>Total Land-Use Categories</b>	552.151	0.681	0.005	0.169	5.961
<b>A. Forest Land</b>	-13,511.595	NE,NO	NE,NO	NO	NO
1. Forest Land remaining Forest Land	NE,NO	NE,NO	NE,NO	NO	NO
2. Land converted to Forest Land	-13,511.595	NE,NO	NE,NO	NO	NO
<b>B. Cropland</b>	15,542.396	NE,NO	NE,NO	NO	NO
1. Cropland remaining Cropland	752.942			NO	NO
2. Land converted to Cropland	14,147.153	NE,NO	NE,NO	NO	NO
<b>C. Grassland</b>	-6,889.040	0.152	0.001	0.038	1.328
1. Grassland remaining Grassland	419.947	NE,NO	NE,NO	NO	NO
2. Land converted to Grassland	-8,013.064	0.152	0.001	0.038	1.328
<b>D. Wetlands</b>	IE,NE,NO	NE,NO	NE,NO	NO	NO
1. Wetlands remaining Wetlands <sup>(3)</sup>	IE,NE,NO	NE,NO	NE,NO	NO	NO
2. Land converted to Wetlands	IE,NE,NO	NE,NO	NE,NO	NO	NO
<b>E. Settlements</b>	6,607.311	0.529	0.004	0.132	4.633
1. Settlements remaining Settlements <sup>(3)</sup>	IE,NO	NO	NO	NO	NO
2. Land converted to Settlements	6,485.972	IE	IE	0.132	4.633
<b>F. Other Land</b>	NE,NO	NE,NO	NE,NO	NO	NO
1. Other Land remaining Other Land <sup>(4)</sup>		NO	NO	NO	NO
2. Land converted to Other Land	NO	NO	NO	NO	NO
<b>G. Other (please specify)<sup>(5)</sup></b>	-1,196.922	NE	NE	NE	NE
Harvested Wood Products <sup>(6)</sup>	-1,196.922	NE	NE	NE	NE
<b>Information items<sup>(7)</sup></b>					
Forest Land converted to other Land-Use Categories	401.132	0.681	0.005	0.169	5.961
Grassland converted to other Land-Use Categories	NO	NO	NO	NO	NO

Table A2. 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 <sup>(1), (2)</sup>	CH <sub>4</sub>	N <sub>2</sub> O	NO <sub>x</sub>	CO
	(Gg)				
<b>Total Land-Use Categories</b>	<b>-0.063</b>	<b>0.691</b>	<b>0.005</b>	<b>0.172</b>	<b>6.050</b>
<b>A. Forest Land</b>	<b>-13,406.214</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NO</b>	<b>NO</b>
1. Forest Land remaining Forest Land	NE,NO	NE,NO	NE,NO	NO	NO
2. Land converted to Forest Land	-13,406.214	NE,NO	NE,NO	NO	NO
<b>B. Cropland</b>	<b>15,427.296</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NO</b>	<b>NO</b>
1. Cropland remaining Cropland	716.275			NO	NO
2. Land converted to Cropland	14,164.941	NE,NO	NE,NO	NO	NO
<b>C. Grassland</b>	<b>-7,288.132</b>	<b>0.158</b>	<b>0.001</b>	<b>0.039</b>	<b>1.387</b>
1. Grassland remaining Grassland	314.563	NE,NO	NE,NO	NO	NO
2. Land converted to Grassland	-8,114.661	0.158	0.001	0.039	1.387
<b>D. Wetlands</b>	<b>IE,NE,NO</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NO</b>	<b>NO</b>
1. Wetlands remaining Wetlands <sup>(3)</sup>	IE,NE,NO	NE,NO	NE,NO	NO	NO
2. Land converted to Wetlands	IE,NE,NO	NE,NO	NE,NO	NO	NO
<b>E. Settlements</b>	<b>6,572.856</b>	<b>0.533</b>	<b>0.004</b>	<b>0.132</b>	<b>4.663</b>
1. Settlements remaining Settlements <sup>(3)</sup>	IE,NO	NO	NO	NO	NO
2. Land converted to Settlements	6,450.734	IE	IE	0.132	4.663
<b>F. Other Land</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NO</b>	<b>NO</b>
1. Other Land remaining Other Land <sup>(4)</sup>		NO	NO	NO	NO
2. Land converted to Other Land	NO	NO	NO	NO	NO
<b>G. Other (please specify)<sup>(5)</sup></b>	<b>-1,305.869</b>	<b>NE</b>	<b>NE</b>	<b>NE</b>	<b>NE</b>
Harvested Wood Products <sup>(6)</sup>	-1,305.869	NE	NE	NE	NE
<b>Information items<sup>(7)</sup></b>					
Forest Land converted to other Land-Use Categories	408.642	0.691	0.005	0.172	6.050
Grassland converted to other Land-Use Categories	NO	NO	NO	NO	NO

Table A2. 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 <sup>(1), (2)</sup>	CH <sub>4</sub>	N <sub>2</sub> O	NO <sub>x</sub>	CO
	(Gg)				
<b>Total Land-Use Categories</b>	-234.349	0.834	0.006	0.207	7.294
<b>A. Forest Land</b>	-13,504.349	NE,NO	NE,NO	NO	NO
1. Forest Land remaining Forest Land	NE,NO	NE,NO	NE,NO	NO	NO
2. Land converted to Forest Land	-13,504.349	NE,NO	NE,NO	NO	NO
<b>B. Cropland</b>	15,327.949	NE,NO	NE,NO	NO	NO
1. Cropland remaining Cropland	679.609			NO	NO
2. Land converted to Cropland	14,182.907	NE,NO	NE,NO	NO	NO
<b>C. Grassland</b>	-7,274.654	0.392	0.003	0.097	3.432
1. Grassland remaining Grassland	431.589	NE,NO	NE,NO	NO	NO
2. Land converted to Grassland	-8,127.739	0.392	0.003	0.097	3.432
<b>D. Wetlands</b>	IE,NE,NO	NE,NO	NE,NO	NO	NO
1. Wetlands remaining Wetlands <sup>(3)</sup>	IE,NE,NO	NE,NO	NE,NO	NO	NO
2. Land converted to Wetlands	IE,NE,NO	NE,NO	NE,NO	NO	NO
<b>E. Settlements</b>	6,484.711	0.441	0.003	0.110	3.862
1. Settlements remaining Settlements <sup>(3)</sup>	IE,NO	NO	NO	NO	NO
2. Land converted to Settlements	6,383.552	IE	IE	0.110	3.862
<b>F. Other Land</b>	NE,NO	NE,NO	NE,NO	NO	NO
1. Other Land remaining Other Land <sup>(4)</sup>		NO	NO	NO	NO
2. Land converted to Other Land	NO	NO	NO	NO	NO
<b>G. Other (please specify)<sup>(5)</sup></b>	-1,268.007	NE	NE	NE	NE
<i>Harvested Wood Products<sup>(6)</sup></i>	-1,268.007	NE	NE	NE	NE
<b>Information items<sup>(7)</sup></b>					
Forest Land converted to other Land-Use Categories	446.153	0.834	0.006	0.207	7.294
Grassland converted to other Land-Use Categories	NO	NO	NO	NO	NO

Table A2. 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 <sup>(1), (2)</sup>	CH <sub>4</sub>	N <sub>2</sub> O	NO <sub>x</sub>	CO
	(Gg)				
<b>Total Land-Use Categories</b>	<b>-440.306</b>	<b>0.925</b>	<b>0.006</b>	<b>0.230</b>	<b>8.096</b>
<b>A. Forest Land</b>	<b>-13,804.831</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NO</b>	<b>NO</b>
1. Forest Land remaining Forest Land	NE,NO	NE,NO	NE,NO	NO	NO
2. Land converted to Forest Land	-13,804.831	NE,NO	NE,NO	NO	NO
<b>B. Cropland</b>	<b>15,338.879</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NO</b>	<b>NO</b>
1. Cropland remaining Cropland	642.942			NO	NO
2. Land converted to Cropland	14,202.456	NE,NO	NE,NO	NO	NO
<b>C. Grassland</b>	<b>-7,426.563</b>	<b>0.589</b>	<b>0.004</b>	<b>0.146</b>	<b>5.150</b>
1. Grassland remaining Grassland	427.096	NE,NO	NE,NO	NO	NO
2. Land converted to Grassland	-8,154.356	0.589	0.004	0.146	5.150
<b>D. Wetlands</b>	<b>IE,NE,NO</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NO</b>	<b>NO</b>
1. Wetlands remaining Wetlands <sup>(3)</sup>	IE,NE,NO	NE,NO	NE,NO	NO	NO
2. Land converted to Wetlands	IE,NE,NO	NE,NO	NE,NO	NO	NO
<b>E. Settlements</b>	<b>6,402.293</b>	<b>0.337</b>	<b>0.002</b>	<b>0.084</b>	<b>2.946</b>
1. Settlements remaining Settlements <sup>(3)</sup>	IE,NO	NO	NO	NO	NO
2. Land converted to Settlements	6,325.130	IE	IE	0.084	2.946
<b>F. Other Land</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NO</b>	<b>NO</b>
1. Other Land remaining Other Land <sup>(4)</sup>		NO	NO	NO	NO
2. Land converted to Other Land	NO	NO	NO	NO	NO
<b>G. Other (please specify)<sup>(5)</sup></b>	<b>-950.083</b>	<b>NE</b>	<b>NE</b>	<b>NE</b>	<b>NE</b>
Harvested Wood Products <sup>(6)</sup>	-950.083	NE	NE	NE	NE
<b>Information items<sup>(7)</sup></b>					
Forest Land converted to other Land-Use Categories	471.834	0.925	0.006	0.230	8.096
Grassland converted to other Land-Use Categories	NO	NO	NO	NO	NO

Table A2. 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 <sup>(1), (2)</sup>	CH <sub>4</sub>	N <sub>2</sub> O	NO <sub>x</sub>	CO
	(Gg)				
<b>Total Land-Use Categories</b>	<b>-596.489</b>	<b>1.106</b>	<b>0.008</b>	<b>0.275</b>	<b>9.678</b>
<b>A. Forest Land</b>	<b>-14,347.953</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NO</b>	<b>NO</b>
1. Forest Land remaining Forest Land	NE,NO	NE,NO	NE,NO	NO	NO
2. Land converted to Forest Land	-14,347.953	NE,NO	NE,NO	NO	NO
<b>B. Cropland</b>	<b>15,287.306</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NO</b>	<b>NO</b>
1. Cropland remaining Cropland	620.942			NO	NO
2. Land converted to Cropland	14,221.843	NE,NO	NE,NO	NO	NO
<b>C. Grassland</b>	<b>-7,448.854</b>	<b>0.775</b>	<b>0.005</b>	<b>0.193</b>	<b>6.780</b>
1. Grassland remaining Grassland	465.900	NE,NO	NE,NO	NO	NO
2. Land converted to Grassland	-8,194.736	0.775	0.005	0.193	6.780
<b>D. Wetlands</b>	<b>IE,NE,NO</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NO</b>	<b>NO</b>
1. Wetlands remaining Wetlands <sup>(3)</sup>	IE,NE,NO	NE,NO	NE,NO	NO	NO
2. Land converted to Wetlands	IE,NE,NO	NE,NO	NE,NO	NO	NO
<b>E. Settlements</b>	<b>6,358.242</b>	<b>0.331</b>	<b>0.002</b>	<b>0.082</b>	<b>2.898</b>
1. Settlements remaining Settlements <sup>(3)</sup>	IE,NO	NO	NO	NO	NO
2. Land converted to Settlements	6,282.339	IE	IE	0.082	2.898
<b>F. Other Land</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NO</b>	<b>NO</b>
1. Other Land remaining Other Land <sup>(4)</sup>		NO	NO	NO	NO
2. Land converted to Other Land	NO	NO	NO	NO	NO
<b>G. Other (please specify)<sup>(5)</sup></b>	<b>-445.230</b>	<b>NE</b>	<b>NE</b>	<b>NE</b>	<b>NE</b>
Harvested Wood Products <sup>(6)</sup>	-445.230	NE	NE	NE	NE
<b>Information items<sup>(7)</sup></b>					
Forest Land converted to other Land-Use Categories	517.703	1.106	0.008	0.275	9.678
Grassland converted to other Land-Use Categories	NO	NO	NO	NO	NO



Table A2. 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 <sup>(1), (2)</sup>	CH <sub>4</sub>	N <sub>2</sub> O	NO <sub>x</sub>	CO
	(Gg)				
<b>Total Land-Use Categories</b>	<b>-1,119.831</b>	<b>0.928</b>	<b>0.006</b>	<b>0.231</b>	<b>8.122</b>
<b>A. Forest Land</b>	<b>-15,045.120</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NO</b>	<b>NO</b>
1. Forest Land remaining Forest Land	NE,NO	NE,NO	NE,NO	NO	NO
2. Land converted to Forest Land	-15,045.120	NE,NO	NE,NO	NO	NO
<b>B. Cropland</b>	<b>15,314.062</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NO</b>	<b>NO</b>
1. Cropland remaining Cropland	598.942			NO	NO
2. Land converted to Cropland	14,241.023	NE,NO	NE,NO	NO	NO
<b>C. Grassland</b>	<b>-7,741.998</b>	<b>0.673</b>	<b>0.005</b>	<b>0.167</b>	<b>5.891</b>
1. Grassland remaining Grassland	298.224	NE,NO	NE,NO	NO	NO
2. Land converted to Grassland	-8,304.951	0.673	0.005	0.167	5.891
<b>D. Wetlands</b>	<b>IE,NE,NO</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NO</b>	<b>NO</b>
1. Wetlands remaining Wetlands <sup>(3)</sup>	IE,NE,NO	NE,NO	NE,NO	NO	NO
2. Land converted to Wetlands	IE,NE,NO	NE,NO	NE,NO	NO	NO
<b>E. Settlements</b>	<b>6,305.806</b>	<b>0.255</b>	<b>0.002</b>	<b>0.063</b>	<b>2.231</b>
1. Settlements remaining Settlements <sup>(3)</sup>	IE,NO	NO	NO	NO	NO
2. Land converted to Settlements	6,247.377	IE	IE	0.063	2.231
<b>F. Other Land</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NO</b>	<b>NO</b>
1. Other Land remaining Other Land <sup>(4)</sup>		NO	NO	NO	NO
2. Land converted to Other Land	NO	NO	NO	NO	NO
<b>G. Other (please specify)<sup>(5)</sup></b>	<b>47.418</b>	<b>NE</b>	<b>NE</b>	<b>NE</b>	<b>NE</b>
Harvested Wood Products <sup>(6)</sup>	47.418	NE	NE	NE	NE
<b>Information items<sup>(7)</sup></b>					
Forest Land converted to other Land-Use Categories	481.150	0.928	0.006	0.231	8.122
Grassland converted to other Land-Use Categories	NO	NO	NO	NO	NO

Table A2. 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 <sup>(1), (2)</sup>	CH <sub>4</sub>	N <sub>2</sub> O	NO <sub>x</sub>	CO
	(Gg)				
<b>Total Land-Use Categories</b>	<b>-1,179.628</b>	<b>0.876</b>	<b>0.006</b>	<b>0.218</b>	<b>7.666</b>
<b>A. Forest Land</b>	<b>-15,645.775</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NO</b>	<b>NO</b>
1. Forest Land remaining Forest Land	NE,NO	NE,NO	NE,NO	NO	NO
2. Land converted to Forest Land	-15,645.775	NE,NO	NE,NO	NO	NO
<b>B. Cropland</b>	<b>15,380.229</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NO</b>	<b>NO</b>
1. Cropland remaining Cropland	576.942			NO	NO
2. Land converted to Cropland	14,259.961	NE,NO	NE,NO	NO	NO
<b>C. Grassland</b>	<b>-7,525.585</b>	<b>0.634</b>	<b>0.004</b>	<b>0.158</b>	<b>5.549</b>
1. Grassland remaining Grassland	503.479	NE,NO	NE,NO	NO	NO
2. Land converted to Grassland	-8,403.423	0.634	0.004	0.158	5.549
<b>D. Wetlands</b>	<b>IE,NE,NO</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NO</b>	<b>NO</b>
1. Wetlands remaining Wetlands <sup>(3)</sup>	IE,NE,NO	NE,NO	NE,NO	NO	NO
2. Land converted to Wetlands	IE,NE,NO	NE,NO	NE,NO	NO	NO
<b>E. Settlements</b>	<b>6,274.226</b>	<b>0.242</b>	<b>0.002</b>	<b>0.060</b>	<b>2.117</b>
1. Settlements remaining Settlements <sup>(3)</sup>	IE,NO	NO	NO	NO	NO
2. Land converted to Settlements	6,218.780	IE	IE	0.060	2.117
<b>F. Other Land</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NO</b>	<b>NO</b>
1. Other Land remaining Other Land <sup>(4)</sup>		NO	NO	NO	NO
2. Land converted to Other Land	NO	NO	NO	NO	NO
<b>G. Other (please specify)<sup>(5)</sup></b>	<b>337.277</b>	<b>NE</b>	<b>NE</b>	<b>NE</b>	<b>NE</b>
Harvested Wood Products <sup>(6)</sup>	337.277	NE	NE	NE	NE
<b>Information items<sup>(7)</sup></b>					
Forest Land converted to other Land-Use Categories	473.198	0.876	0.006	0.218	7.666
Grassland converted to other Land-Use Categories	NO	NO	NO	NO	NO

Table A2. 15 Emissions and Removals by Land Use, Land Use Change and Forestry (Sector 5) in 2004 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 <sup>(1), (2)</sup>	CH <sub>4</sub>	N <sub>2</sub> O	NO <sub>x</sub>	CO
	(Gg)				
<b>Total Land-Use Categories</b>	<b>-1,941.558</b>	<b>0.798</b>	<b>0.005</b>	<b>0.198</b>	<b>6.983</b>
<b>A. Forest Land</b>	<b>-16,302.000</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NO</b>	<b>NO</b>
1. Forest Land remaining Forest Land	NE,NO	NE,NO	NE,NO	NO	NO
2. Land converted to Forest Land	-16,302.000	NE,NO	NE,NO	NO	NO
<b>B. Cropland</b>	<b>15,329.120</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NO</b>	<b>NO</b>
1. Cropland remaining Cropland	554.942			NO	NO
2. Land converted to Cropland	14,278.623	NE,NO	NE,NO	NO	NO
<b>C. Grassland</b>	<b>-7,835.517</b>	<b>0.565</b>	<b>0.004</b>	<b>0.141</b>	<b>4.948</b>
1. Grassland remaining Grassland	354.797	NE,NO	NE,NO	NO	NO
2. Land converted to Grassland	-8,509.639	0.565	0.004	0.141	4.948
<b>D. Wetlands</b>	<b>IE,NE,NO</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NO</b>	<b>NO</b>
1. Wetlands remaining Wetlands <sup>(3)</sup>	IE,NE,NO	NE,NO	NE,NO	NO	NO
2. Land converted to Wetlands	IE,NE,NO	NE,NO	NE,NO	NO	NO
<b>E. Settlements</b>	<b>6,248.017</b>	<b>0.233</b>	<b>0.002</b>	<b>0.058</b>	<b>2.035</b>
1. Settlements remaining Settlements <sup>(3)</sup>	IE,NO	NO	NO	NO	NO
2. Land converted to Settlements	6,194.718	IE	IE	0.058	2.035
<b>F. Other Land</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NE,NO</b>	<b>NO</b>	<b>NO</b>
1. Other Land remaining Other Land <sup>(4)</sup>		NO	NO	NO	NO
2. Land converted to Other Land	NO	NO	NO	NO	NO
<b>G. Other (please specify)<sup>(5)</sup></b>	<b>618.822</b>	<b>NE</b>	<b>NE</b>	<b>NE</b>	<b>NE</b>
Harvested Wood Products <sup>(6)</sup>	618.822	NE	NE	NE	NE
<b>Information items<sup>(7)</sup></b>					
Forest Land converted to other Land-Use Categories	459.062	0.798	0.005	0.198	6.983
Grassland converted to other Land-Use Categories	NO	NO	NO	NO	NO



## **APPENDIX 3**

### **A.3. Sectoral Tables for Land Use Change and Forestry Sector for the Devolved Administration Regions**



	2-91
Table A3. 1: United Kingdom.....	2-93
Table A3. 2 : England .....	2-94
Table A3. 3 : Scotland.....	2-95
Table A3. 4 : Wales.....	2-96
Table A3. 5 : N. Ireland .....	2-97





Table A3. 1: United Kingdom

UK			1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
<b>5</b>	<b>Total Land-Use Categories</b>	<b>Gg CO2</b>	<b>2,915.4</b>	<b>2,782.0</b>	<b>2,289.5</b>	<b>1,082.2</b>	<b>889.2</b>	<b>1,033.5</b>	<b>901.9</b>	<b>552.2</b>	<b>-0.1</b>	<b>-234.3</b>	<b>-440.3</b>	<b>-596.5</b>	<b>-1,119.8</b>	<b>-1,179.6</b>	<b>-1,941.6</b>
5A	Forest Land	Gg CO2	-12,202.6	-12,714.6	-13,340.1	-13,714.1	-14,192.6	-13,948.2	-13,720.1	-13,511.6	-13,406.2	-13,504.3	-13,804.8	-14,348.0	-15,045.1	-15,645.8	-16,302.0
5A1	Forest-Land remaining Forest-Land	Gg CO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5A2	Land converted to Forest-Land	Gg CO2	-12,202.6	-12,714.6	-13,340.1	-13,714.1	-14,192.6	-13,948.2	-13,720.1	-13,511.6	-13,406.2	-13,504.3	-13,804.8	-14,348.0	-15,045.1	-15,645.8	-16,302.0
<b>5B</b>	<b>Cropland</b>	<b>Gg CO2</b>	<b>15,841.7</b>	<b>16,001.3</b>	<b>16,004.2</b>	<b>15,578.6</b>	<b>15,631.6</b>	<b>15,771.1</b>	<b>15,802.4</b>	<b>15,542.4</b>	<b>15,427.3</b>	<b>15,327.9</b>	<b>15,338.9</b>	<b>15,287.3</b>	<b>15,314.1</b>	<b>15,380.2</b>	<b>15,329.1</b>
5B1	Cropland remaining Cropland	Gg CO2	1,009.6	972.9	936.3	899.6	862.9	826.3	789.6	752.9	716.3	679.6	642.9	620.9	598.9	576.9	554.9
5B2	Land converted to Cropland	Gg CO2	14,036.8	14,050.1	14,064.5	14,079.8	14,095.8	14,112.5	14,129.6	14,147.2	14,164.9	14,182.9	14,202.5	14,221.8	14,241.0	14,260.0	14,278.6
5B (liming)	Liming of Cropland	Gg CO2	795.2	978.3	1,003.5	599.3	672.8	832.4	883.1	642.3	546.1	465.4	493.5	444.5	474.1	543.3	495.6
<b>5C</b>	<b>Grassland</b>	<b>Gg CO2</b>	<b>-6,192.8</b>	<b>-6,145.6</b>	<b>-6,253.8</b>	<b>-6,659.7</b>	<b>-6,604.7</b>	<b>-6,536.3</b>	<b>-6,786.4</b>	<b>-6,889.0</b>	<b>-7,288.1</b>	<b>-7,274.7</b>	<b>-7,426.6</b>	<b>-7,448.9</b>	<b>-7,742.0</b>	<b>-7,525.6</b>	<b>-7,835.5</b>
5C1	Grassland remaining Grassland	Gg CO2	389.5	396.3	389.7	382.6	484.1	558.0	475.3	419.9	314.6	431.6	427.1	465.9	298.2	503.5	354.8
5C2	Land converted to Grassland	Gg CO2	-7,217.5	-7,335.5	-7,449.7	-7,573.4	-7,685.8	-7,791.4	-7,893.8	-8,013.1	-8,114.7	-8,127.7	-8,154.4	-8,194.7	-8,305.0	-8,403.4	-8,509.6
5C (liming)	Liming of Grassland	Gg CO2	635.2	793.7	806.1	531.1	597.0	697.1	632.0	704.1	512.0	421.5	300.7	280.0	264.7	374.4	319.3
<b>5D</b>	<b>Wetland</b>	<b>Gg CO2</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>	<b>IE</b>
5D1	Wetland remaining Wetland	Gg CO2	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE
5D2	Land converted to Wetland	Gg CO2	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE
<b>5E</b>	<b>Settlements</b>	<b>Gg CO2</b>	<b>6,925.0</b>	<b>6,851.1</b>	<b>6,798.8</b>	<b>6,719.3</b>	<b>6,687.8</b>	<b>6,646.8</b>	<b>6,627.1</b>	<b>6,607.3</b>	<b>6,572.9</b>	<b>6,484.7</b>	<b>6,402.3</b>	<b>6,358.2</b>	<b>6,305.8</b>	<b>6,274.2</b>	<b>6,248.0</b>
5E1	Settlements remaining Settlements	Gg CO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5E2	Land converted to Settlements	Gg CO2	6,807.6	6,749.9	6,696.1	6,645.6	6,600.9	6,556.5	6,517.0	6,486.0	6,450.7	6,383.6	6,325.1	6,282.3	6,247.4	6,218.8	6,194.7
5E (Biomass burning)	Forest Land converted to Settlement	Gg CO2	117.5	101.2	102.7	73.7	86.9	90.3	110.2	121.3	122.1	101.2	77.2	75.9	58.4	55.4	53.3
<b>5F</b>	<b>Other-Land</b>	<b>Gg CO2</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>
5F1	Other-Land remaining Other-land	Gg CO2	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
5F2	Land converted to Other-Land	Gg CO2	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
<b>5G</b>	<b>Other activities</b>	<b>Gg CO2</b>	<b>-1,455.9</b>	<b>-1,210.2</b>	<b>-919.6</b>	<b>-842.0</b>	<b>-632.8</b>	<b>-899.9</b>	<b>-1,021.1</b>	<b>-1,196.9</b>	<b>-1,305.9</b>	<b>-1,268.0</b>	<b>-950.1</b>	<b>-445.2</b>	<b>47.4</b>	<b>337.3</b>	<b>618.8</b>
5G1	Harvested Wood Products	Gg CO2	-1,455.9	-1,210.2	-919.6	-842.0	-632.8	-899.9	-1,021.1	-1,196.9	-1,305.9	-1,268.0	-950.1	-445.2	47.4	337.3	618.8
Information Item	Forest Land converted to other Land-Use Categories	Gg CO2	350.3	344.1	356.2	324.9	346.5	359.6	391.6	401.1	408.6	446.2	471.8	517.7	481.2	473.2	459.1
Information Item	Grassland converted to other Land-Use Categories	Gg CO2	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
<b>5</b>	<b>Total Land-Use Categories</b>	<b>Gg CH4</b>	<b>0.659</b>	<b>0.598</b>	<b>0.619</b>	<b>0.453</b>	<b>0.519</b>	<b>0.549</b>	<b>0.664</b>	<b>0.681</b>	<b>0.691</b>	<b>0.834</b>	<b>0.925</b>	<b>1.106</b>	<b>0.928</b>	<b>0.876</b>	<b>0.798</b>
5C2	Land converted to Grassland	Gg CH4	0.147	0.156	0.171	0.131	0.140	0.155	0.183	0.152	0.158	0.392	0.589	0.775	0.673	0.634	0.565
5E	Settlements	Gg CH4	0.513	0.442	0.448	0.322	0.379	0.394	0.481	0.529	0.533	0.441	0.337	0.331	0.255	0.242	0.233
Information Item	Forest Land converted to other Land-Use Categories	Gg CH4	0.659	0.598	0.619	0.453	0.519	0.549	0.664	0.681	0.691	0.834	0.925	1.106	0.928	0.876	0.798
Information Item	Grassland converted to other Land-Use Categories	Gg CH4	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
<b>5</b>	<b>Total Land-Use Categories</b>	<b>Gg N2O</b>	<b>0.005</b>	<b>0.004</b>	<b>0.004</b>	<b>0.003</b>	<b>0.004</b>	<b>0.004</b>	<b>0.005</b>	<b>0.005</b>	<b>0.005</b>	<b>0.006</b>	<b>0.006</b>	<b>0.008</b>	<b>0.006</b>	<b>0.006</b>	<b>0.005</b>
5C2	Land converted to Grassland	Gg N2O	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.003	0.004	0.005	0.005	0.004	0.004
5E	Settlements	Gg N2O	0.004	0.003	0.003	0.002	0.003	0.003	0.003	0.004	0.004	0.003	0.002	0.002	0.002	0.002	0.002
Information Item	Forest Land converted to other Land-Use Categories	Gg N2O	0.005	0.004	0.004	0.003	0.004	0.004	0.005	0.005	0.005	0.006	0.006	0.008	0.006	0.006	0.005
Information Item	Grassland converted to other Land-Use Categories	Gg N2O	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
<b>5</b>	<b>Total Land-Use Categories</b>	<b>Gg NOx</b>	<b>0.164</b>	<b>0.149</b>	<b>0.154</b>	<b>0.112</b>	<b>0.129</b>	<b>0.137</b>	<b>0.165</b>	<b>0.169</b>	<b>0.172</b>	<b>0.207</b>	<b>0.230</b>	<b>0.275</b>	<b>0.231</b>	<b>0.218</b>	<b>0.198</b>
5C2	Land converted to Grassland	Gg NOx	0.036	0.039	0.043	0.033	0.035	0.039	0.045	0.038	0.039	0.097	0.146	0.193	0.167	0.158	0.141
5E	Settlements	Gg NOx	0.127	0.110	0.111	0.080	0.094	0.098	0.119	0.132	0.132	0.110	0.084	0.082	0.063	0.060	0.058
Information Item	Forest Land converted to other Land-Use Categories	Gg NOx	0.164	0.149	0.154	0.112	0.129	0.137	0.165	0.169	0.172	0.207	0.230	0.275	0.231	0.218	0.198
Information Item	Grassland converted to other Land-Use Categories	Gg NOx	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
<b>5</b>	<b>Total Land-Use Categories</b>	<b>Gg CO</b>	<b>5.767</b>	<b>5.234</b>	<b>5.419</b>	<b>3.961</b>	<b>4.541</b>	<b>4.807</b>	<b>5.806</b>	<b>5.961</b>	<b>6.050</b>	<b>7.294</b>	<b>8.096</b>	<b>9.678</b>	<b>8.122</b>	<b>7.666</b>	<b>6.983</b>
5C2	Land converted to Grassland	Gg CO	1.282	1.369	1.498	1.146	1.221	1.359	1.600	1.328	1.387	3.432	5.150	6.780	5.891	5.549	4.948
5E	Settlements	Gg CO	4.485	3.865	3.921	2.815	3.320	3.448	4.206	4.633	4.663	3.862	2.946	2.898	2.231	2.117	2.035
Information Item	Forest Land converted to other Land-Use Categories	Gg CO	5.767	5.234	5.419	3.961	4.541	4.807	5.806	5.961	6.050	7.294	8.096	9.678	8.122	7.666	6.983
Information Item	Grassland converted to other Land-Use Categories	Gg CO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO

Table A3.2 : England

England			1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
<b>5</b>	<b>Total Land-Use Categories</b>	<b>Gg CO2</b>	<b>5,735.6</b>	<b>5,835.1</b>	<b>5,671.9</b>	<b>5,006.9</b>	<b>5,012.7</b>	<b>5,110.5</b>	<b>4,927.5</b>	<b>4,587.2</b>	<b>4,199.6</b>	<b>4,012.9</b>	<b>3,911.0</b>	<b>3,841.6</b>	<b>3,550.5</b>	<b>3,569.0</b>	<b>3,231.3</b>
<b>5A</b>	<b>Forest Land</b>	<b>Gg CO2</b>	<b>-2,733.0</b>	<b>-2,775.4</b>	<b>-2,855.7</b>	<b>-2,850.9</b>	<b>-2,889.0</b>	<b>-2,825.1</b>	<b>-2,893.9</b>	<b>-2,871.5</b>	<b>-2,817.9</b>	<b>-2,874.0</b>	<b>-2,759.6</b>	<b>-2,945.8</b>	<b>-3,169.1</b>	<b>-3,333.1</b>	<b>-3,540.4</b>
5A1	Forest-Land remaining Forest-Land	Gg CO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5A2	Land converted to Forest-Land	Gg CO2	-2,733.0	-2,775.4	-2,855.7	-2,850.9	-2,889.0	-2,825.1	-2,893.9	-2,871.5	-2,817.9	-2,874.0	-2,759.6	-2,945.8	-3,169.1	-3,333.1	-3,540.4
<b>5B</b>	<b>Cropland</b>	<b>Gg CO2</b>	<b>7,515.1</b>	<b>7,600.4</b>	<b>7,565.0</b>	<b>7,182.4</b>	<b>7,187.2</b>	<b>7,261.1</b>	<b>7,249.8</b>	<b>7,005.2</b>	<b>6,878.7</b>	<b>6,764.7</b>	<b>6,741.5</b>	<b>6,657.0</b>	<b>6,660.7</b>	<b>6,700.5</b>	<b>6,621.6</b>
5B1	Cropland remaining Cropland	Gg CO2	1,124.7	1,088.0	1,051.3	1,014.7	978.0	941.3	904.7	868.0	831.3	794.7	758.0	736.0	714.0	692.0	670.0
5B2	Land converted to Cropland	Gg CO2	5,755.7	5,730.8	5,708.1	5,687.4	5,668.6	5,651.4	5,635.8	5,621.5	5,608.6	5,596.9	5,586.4	5,576.9	5,568.3	5,560.5	5,553.5
5B (liming)	Liming of Cropland	Gg CO2	634.8	781.6	805.6	480.3	540.7	668.3	709.4	515.7	438.7	373.2	397.1	344.1	378.4	448.0	398.2
<b>5C</b>	<b>Grassland</b>	<b>Gg CO2</b>	<b>-2,594.1</b>	<b>-2,552.1</b>	<b>-2,633.4</b>	<b>-2,850.7</b>	<b>-2,816.1</b>	<b>-2,777.9</b>	<b>-2,917.8</b>	<b>-2,964.5</b>	<b>-3,176.9</b>	<b>-3,156.3</b>	<b>-3,206.6</b>	<b>-3,149.5</b>	<b>-3,356.9</b>	<b>-3,290.7</b>	<b>-3,438.9</b>
5C1	Grassland remaining Grassland	Gg CO2	228.1	245.5	220.4	218.5	280.8	322.3	268.2	250.6	191.2	250.0	256.9	298.0	174.8	250.6	184.2
5C2	Land converted to Grassland	Gg CO2	-3,166.0	-3,226.9	-3,285.4	-3,351.0	-3,408.9	-3,462.0	-3,513.2	-3,576.7	-3,627.8	-3,615.6	-3,613.0	-3,620.6	-3,678.5	-3,728.3	-3,783.9
5C (liming)	Liming of Grassland	Gg CO2	343.8	429.3	431.6	281.9	311.9	361.8	327.2	361.6	259.7	209.3	149.4	173.1	146.8	187.1	160.8
<b>5D</b>	<b>Wetland</b>	<b>Gg CO2</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>	<b>IE</b>
5D1	Wetland remaining Wetland	Gg CO2	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE
5D2	Land converted to Wetland	Gg CO2	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE
<b>5E</b>	<b>Settlements</b>	<b>Gg CO2</b>	<b>3,908.9</b>	<b>3,847.6</b>	<b>3,802.2</b>	<b>3,737.6</b>	<b>3,707.8</b>	<b>3,671.5</b>	<b>3,650.9</b>	<b>3,630.4</b>	<b>3,599.7</b>	<b>3,530.8</b>	<b>3,466.2</b>	<b>3,429.5</b>	<b>3,386.9</b>	<b>3,359.5</b>	<b>3,336.3</b>
5E1	Settlements remaining Settlements	Gg CO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5E2	Land converted to Settlements	Gg CO2	3,824.6	3,774.9	3,728.4	3,684.6	3,645.3	3,606.6	3,571.8	3,543.3	3,512.0	3,458.1	3,410.8	3,374.9	3,344.9	3,319.7	3,298.0
5E (Biomass burning)	Forest Land converted to Settlement	Gg CO2	84.4	72.7	73.8	52.9	62.4	64.9	79.1	87.1	87.7	72.7	55.4	54.5	42.0	39.8	38.3
<b>5F</b>	<b>Other-Land</b>	<b>Gg CO2</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>
5F1	Other-Land remaining Other-land	Gg CO2	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
5F2	Land converted to Other-Land	Gg CO2	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
<b>5G</b>	<b>Other activities</b>	<b>Gg CO2</b>	<b>-361.3</b>	<b>-285.3</b>	<b>-206.2</b>	<b>-211.4</b>	<b>-177.2</b>	<b>-219.1</b>	<b>-161.5</b>	<b>-212.4</b>	<b>-284.0</b>	<b>-252.3</b>	<b>-330.5</b>	<b>-149.5</b>	<b>28.9</b>	<b>132.7</b>	<b>252.6</b>
5G1	Harvested Wood Products	Gg CO2	-361.3	-285.3	-206.2	-211.4	-177.2	-219.1	-161.5	-212.4	-284.0	-252.3	-330.5	-149.5	28.9	132.7	252.6
Information Item	Forest Land converted to other Land-Use Categories	Gg CO2	167.8	167.9	180.9	162.5	181.9	194.9	221.2	231.3	239.7	269.4	290.6	326.0	302.1	298.7	290.6
Information Item	Grassland converted to other Land-Use Categories	Gg CO2	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
<b>5</b>	<b>Total Land-Use Categories</b>	<b>Gg CH4</b>	<b>0.473</b>	<b>0.430</b>	<b>0.445</b>	<b>0.325</b>	<b>0.373</b>	<b>0.395</b>	<b>0.477</b>	<b>0.489</b>	<b>0.497</b>	<b>0.599</b>	<b>0.665</b>	<b>0.794</b>	<b>0.667</b>	<b>0.629</b>	<b>0.573</b>
5C2	Land converted to Grassland	Gg CH4	0.105	0.112	0.123	0.094	0.100	0.112	0.131	0.109	0.114	0.282	0.423	0.556	0.484	0.455	0.406
5E	Settlements	Gg CH4	0.368	0.317	0.322	0.231	0.272	0.283	0.345	0.380	0.383	0.317	0.242	0.238	0.183	0.174	0.167
Information Item	Forest Land converted to other Land-Use Categories	Gg CH4	0.473	0.430	0.445	0.325	0.373	0.395	0.477	0.489	0.497	0.599	0.665	0.794	0.667	0.629	0.573
Information Item	Grassland converted to other Land-Use Categories	Gg CH4	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
<b>5</b>	<b>Total Land-Use Categories</b>	<b>Gg N2O</b>	<b>0.003</b>	<b>0.003</b>	<b>0.003</b>	<b>0.002</b>	<b>0.003</b>	<b>0.003</b>	<b>0.003</b>	<b>0.003</b>	<b>0.003</b>	<b>0.004</b>	<b>0.005</b>	<b>0.005</b>	<b>0.005</b>	<b>0.004</b>	<b>0.004</b>
5C2	Land converted to Grassland	Gg N2O	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.003	0.004	0.003	0.003	0.003
5E	Settlements	Gg N2O	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.003	0.002	0.002	0.002	0.001	0.001	0.001
Information Item	Forest Land converted to other Land-Use Categories	Gg N2O	0.003	0.003	0.003	0.002	0.003	0.003	0.003	0.003	0.003	0.004	0.005	0.005	0.005	0.004	0.004
Information Item	Grassland converted to other Land-Use Categories	Gg N2O	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
<b>5</b>	<b>Total Land-Use Categories</b>	<b>Gg NOx</b>	<b>0.118</b>	<b>0.107</b>	<b>0.111</b>	<b>0.081</b>	<b>0.093</b>	<b>0.098</b>	<b>0.118</b>	<b>0.122</b>	<b>0.123</b>	<b>0.149</b>	<b>0.165</b>	<b>0.197</b>	<b>0.166</b>	<b>0.156</b>	<b>0.142</b>
5C2	Land converted to Grassland	Gg NOx	0.026	0.028	0.031	0.023	0.025	0.028	0.033	0.027	0.028	0.070	0.105	0.138	0.120	0.113	0.101
5E	Settlements	Gg NOx	0.091	0.079	0.080	0.057	0.068	0.070	0.086	0.094	0.095	0.079	0.060	0.059	0.045	0.043	0.042
Information Item	Forest Land converted to other Land-Use Categories	Gg NOx	0.118	0.107	0.111	0.081	0.093	0.098	0.118	0.122	0.123	0.149	0.165	0.197	0.166	0.156	0.142
Information Item	Grassland converted to other Land-Use Categories	Gg NOx	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
<b>5</b>	<b>Total Land-Use Categories</b>	<b>Gg CO</b>	<b>4.142</b>	<b>3.759</b>	<b>3.892</b>	<b>2.845</b>	<b>3.261</b>	<b>3.452</b>	<b>4.170</b>	<b>4.281</b>	<b>4.345</b>	<b>5.239</b>	<b>5.814</b>	<b>6.951</b>	<b>5.833</b>	<b>5.506</b>	<b>5.015</b>
5C2	Land converted to Grassland	Gg CO	0.921	0.983	1.076	0.823	0.877	0.976	1.149	0.954	0.996	2.465	3.698	4.869	4.231	3.986	3.553
5E	Settlements	Gg CO	3.221	2.776	2.816	2.021	2.384	2.476	3.021	3.327	3.349	2.774	2.116	2.081	1.602	1.520	1.462
Information Item	Forest Land converted to other Land-Use Categories	Gg CO	4.142	3.759	3.892	2.845	3.261	3.452	4.170	4.281	4.345	5.239	5.814	6.951	5.833	5.506	5.015
Information Item	Grassland converted to other Land-Use Categories	Gg CO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO

Table A3.3 : Scotland

Scotland			1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
<b>5</b>	<b>Total Land-Use Categories</b>	<b>Gg CO2</b>	<b>-2,534.6</b>	<b>-2,805.1</b>	<b>-3,102.0</b>	<b>-3,540.6</b>	<b>-3,726.1</b>	<b>-3,711.8</b>	<b>-3,669.5</b>	<b>-3,715.5</b>	<b>-3,854.5</b>	<b>-3,929.2</b>	<b>-3,939.8</b>	<b>-4,011.0</b>	<b>-4,188.2</b>	<b>-4,250.1</b>	<b>-4,617.2</b>
<b>5A</b>	<b>Forest Land</b>	<b>Gg CO2</b>	<b>-7,547.4</b>	<b>-7,951.4</b>	<b>-8,364.7</b>	<b>-8,714.0</b>	<b>-9,062.0</b>	<b>-8,973.0</b>	<b>-8,860.1</b>	<b>-8,837.0</b>	<b>-8,878.0</b>	<b>-9,075.3</b>	<b>-8,869.0</b>	<b>-9,163.7</b>	<b>-9,610.8</b>	<b>-10,053.5</b>	<b>-10,472.5</b>
5A1	Forest-Land remaining Forest-Land	Gg CO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5A2	Land converted to Forest-Land	Gg CO2	-7,547.4	-7,951.4	-8,364.7	-8,714.0	-9,062.0	-8,973.0	-8,860.1	-8,837.0	-8,878.0	-9,075.3	-8,869.0	-9,163.7	-9,610.8	-10,053.5	-10,472.5
<b>5B</b>	<b>Cropland</b>	<b>Gg CO2</b>	<b>6,101.5</b>	<b>6,178.1</b>	<b>6,221.7</b>	<b>6,193.9</b>	<b>6,245.8</b>	<b>6,312.7</b>	<b>6,358.7</b>	<b>6,353.5</b>	<b>6,371.0</b>	<b>6,390.5</b>	<b>6,427.3</b>	<b>6,464.0</b>	<b>6,488.6</b>	<b>6,514.5</b>	<b>6,545.9</b>
5B1	Cropland remaining Cropland	Gg CO2	-78.9	-78.9	-78.9	-78.9	-78.9	-78.9	-78.9	-78.9	-78.9	-78.9	-78.9	-78.9	-78.9	-78.9	-78.9
5B2	Land converted to Cropland	Gg CO2	6,040.3	6,085.4	6,128.8	6,170.6	6,210.7	6,249.2	6,286.3	6,321.9	6,356.1	6,389.0	6,421.8	6,453.2	6,483.3	6,512.0	6,539.6
5B (liming)	Liming of Cropland	Gg CO2	140.1	171.6	171.8	102.2	114.0	142.4	151.3	110.5	93.8	80.5	84.4	89.7	84.3	81.4	85.2
<b>5C</b>	<b>Grassland</b>	<b>Gg CO2</b>	<b>-2,115.9</b>	<b>-2,128.5</b>	<b>-2,139.4</b>	<b>-2,240.9</b>	<b>-2,218.1</b>	<b>-2,195.2</b>	<b>-2,271.9</b>	<b>-2,329.0</b>	<b>-2,448.8</b>	<b>-2,421.6</b>	<b>-2,477.3</b>	<b>-2,552.5</b>	<b>-2,608.7</b>	<b>-2,464.5</b>	<b>-2,595.8</b>
5C1	Grassland remaining Grassland	Gg CO2	59.9	49.2	67.8	62.6	101.7	134.2	105.6	67.8	21.9	80.1	68.6	66.4	21.9	151.3	69.0
5C2	Land converted to Grassland	Gg CO2	-2,309.0	-2,344.7	-2,379.7	-2,417.0	-2,452.0	-2,485.5	-2,518.5	-2,555.3	-2,588.4	-2,601.6	-2,618.0	-2,637.7	-2,673.1	-2,706.0	-2,740.7
5C (liming)	Liming of Grassland	Gg CO2	133.2	167.0	172.5	113.6	132.2	156.1	141.0	158.5	117.7	99.9	72.1	18.8	42.6	90.1	75.9
<b>5D</b>	<b>Wetland</b>	<b>Gg CO2</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>	<b>IE</b>
5D1	Wetland remaining Wetland	Gg CO2	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE
5D2	Land converted to Wetland	Gg CO2	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE
<b>5E</b>	<b>Settlements</b>	<b>Gg CO2</b>	<b>1,741.4</b>	<b>1,731.8</b>	<b>1,726.7</b>	<b>1,715.1</b>	<b>1,713.9</b>	<b>1,710.3</b>	<b>1,711.1</b>	<b>1,711.6</b>	<b>1,708.5</b>	<b>1,693.0</b>	<b>1,678.5</b>	<b>1,672.5</b>	<b>1,664.3</b>	<b>1,660.6</b>	<b>1,658.0</b>
5E1	Settlements remaining Settlements	Gg CO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5E2	Land converted to Settlements	Gg CO2	1,741.4	1,709.1	1,703.6	1,698.5	1,694.4	1,689.9	1,686.3	1,684.3	1,681.0	1,670.3	1,661.2	1,655.4	1,651.1	1,648.1	1,646.0
5E (Biomass burning)	Forest Land converted to Settlement	Gg CO2	26.4	22.8	23.1	16.6	19.6	20.3	24.8	27.3	27.5	22.8	17.4	17.1	13.7	12.5	12.0
<b>5F</b>	<b>Other-Land</b>	<b>Gg CO2</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>
5F1	Other-Land remaining Other-land	Gg CO2	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
5F2	Land converted to Other-Land	Gg CO2	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
<b>5G</b>	<b>Other activities</b>	<b>Gg CO2</b>	<b>-714.2</b>	<b>-635.1</b>	<b>-546.4</b>	<b>-494.7</b>	<b>-405.6</b>	<b>-566.5</b>	<b>-607.3</b>	<b>-614.5</b>	<b>-607.1</b>	<b>-515.8</b>	<b>-699.4</b>	<b>-431.3</b>	<b>-121.6</b>	<b>92.8</b>	<b>247.3</b>
5G1	Harvested Wood Products	Gg CO2	-714.2	-635.1	-546.4	-494.7	-405.6	-566.5	-607.3	-614.5	-607.1	-515.8	-699.4	-431.3	-121.6	92.8	247.3
Information Item	Forest Land converted to other Land-Use Categories	Gg CO2	99.3	98.8	98.5	90.5	94.5	96.6	102.9	104.3	105.3	113.1	118.2	127.9	119.1	116.8	113.1
Information Item	Grassland converted to other Land-Use Categories	Gg CO2	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
<b>5</b>	<b>Total Land-Use Categories</b>	<b>Gg CH4</b>	<b>0.148</b>	<b>0.135</b>	<b>0.139</b>	<b>0.102</b>	<b>0.117</b>	<b>0.124</b>	<b>0.149</b>	<b>0.153</b>	<b>0.156</b>	<b>0.188</b>	<b>0.208</b>	<b>0.249</b>	<b>0.209</b>	<b>0.197</b>	<b>0.180</b>
5C2	Land converted to Grassland	Gg CH4	0.033	0.035	0.039	0.029	0.031	0.035	0.041	0.034	0.036	0.088	0.132	0.174	0.151	0.143	0.127
5E	Settlements	Gg CH4	0.115	0.099	0.101	0.072	0.085	0.089	0.108	0.119	0.120	0.099	0.076	0.075	0.057	0.054	0.052
Information Item	Forest Land converted to other Land-Use Categories	Gg CH4	0.148	0.135	0.139	0.102	0.117	0.124	0.149	0.153	0.156	0.188	0.208	0.249	0.209	0.197	0.180
Information Item	Grassland converted to other Land-Use Categories	Gg CH4	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
<b>5</b>	<b>Total Land-Use Categories</b>	<b>Gg N2O</b>	<b>0.001</b>	<b>0.001</b>	<b>0.001</b>	<b>0.001</b>	<b>0.001</b>	<b>0.001</b>	<b>0.001</b>	<b>0.001</b>	<b>0.001</b>	<b>0.001</b>	<b>0.001</b>	<b>0.002</b>	<b>0.001</b>	<b>0.001</b>	<b>0.001</b>
5C2	Land converted to Grassland	Gg N2O	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.001
5E	Settlements	Gg N2O	0.001	0.001	0.001	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000
Information Item	Forest Land converted to other Land-Use Categories	Gg N2O	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.001	0.001
Information Item	Grassland converted to other Land-Use Categories	Gg N2O	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
<b>5</b>	<b>Total Land-Use Categories</b>	<b>Gg NOx</b>	<b>0.037</b>	<b>0.033</b>	<b>0.035</b>	<b>0.025</b>	<b>0.029</b>	<b>0.031</b>	<b>0.037</b>	<b>0.038</b>	<b>0.039</b>	<b>0.047</b>	<b>0.052</b>	<b>0.062</b>	<b>0.052</b>	<b>0.049</b>	<b>0.045</b>
5C2	Land converted to Grassland	Gg NOx	0.008	0.009	0.010	0.007	0.008	0.009	0.010	0.008	0.009	0.022	0.033	0.043	0.038	0.035	0.032
5E	Settlements	Gg NOx	0.029	0.025	0.025	0.018	0.021	0.022	0.027	0.030	0.030	0.025	0.019	0.019	0.014	0.014	0.013
Information Item	Forest Land converted to other Land-Use Categories	Gg NOx	0.037	0.033	0.035	0.025	0.029	0.031	0.037	0.038	0.039	0.047	0.052	0.062	0.052	0.049	0.045
Information Item	Grassland converted to other Land-Use Categories	Gg NOx	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
<b>5</b>	<b>Total Land-Use Categories</b>	<b>Gg CO</b>	<b>1.298</b>	<b>1.178</b>	<b>1.219</b>	<b>0.891</b>	<b>1.022</b>	<b>1.082</b>	<b>1.306</b>	<b>1.341</b>	<b>1.361</b>	<b>1.641</b>	<b>1.822</b>	<b>2.178</b>	<b>1.827</b>	<b>1.725</b>	<b>1.571</b>
5C2	Land converted to Grassland	Gg CO	0.288	0.308	0.337	0.258	0.275	0.306	0.360	0.299	0.312	0.772	1.159	1.525	1.326	1.249	1.113
5E	Settlements	Gg CO	1.009	0.870	0.882	0.633	0.747	0.776	0.946	1.042	1.049	0.869	0.663	0.652	0.502	0.476	0.458
Information Item	Forest Land converted to other Land-Use Categories	Gg CO	1.298	1.178	1.219	0.891	1.022	1.082	1.306	1.341	1.361	1.641	1.822	2.178	1.827	1.725	1.571
Information Item	Grassland converted to other Land-Use Categories	Gg CO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO

Table A3.4 : Wales

Wales			1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
<b>5</b>	<b>Total Land-Use Categories</b>	<b>Gg CO2</b>	<b>-241.1</b>	<b>-201.4</b>	<b>-202.5</b>	<b>-258.1</b>	<b>-258.4</b>	<b>-219.4</b>	<b>-179.0</b>	<b>-127.2</b>	<b>-119.5</b>	<b>-69.2</b>	<b>-132.6</b>	<b>-136.4</b>	<b>-173.1</b>	<b>-202.0</b>	<b>-248.6</b>
<b>5A</b>	<b>Forest Land</b>	<b>Gg CO2</b>	<b>-1,178.2</b>	<b>-1,245.9</b>	<b>-1,358.4</b>	<b>-1,431.5</b>	<b>-1,491.4</b>	<b>-1,427.4</b>	<b>-1,247.3</b>	<b>-1,082.5</b>	<b>-1,001.2</b>	<b>-837.5</b>	<b>-1,440.7</b>	<b>-1,476.8</b>	<b>-1,521.6</b>	<b>-1,558.8</b>	<b>-1,583.9</b>
5A1	Forest-Land remaining Forest-Land	Gg CO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5A2	Land converted to Forest-Land	Gg CO2	-1,178.2	-1,245.9	-1,358.4	-1,431.5	-1,491.4	-1,427.4	-1,247.3	-1,082.5	-1,001.2	-837.5	-1,440.7	-1,476.8	-1,521.6	-1,558.8	-1,583.9
<b>5B</b>	<b>Cropland</b>	<b>Gg CO2</b>	<b>969.3</b>	<b>978.2</b>	<b>985.1</b>	<b>986.3</b>	<b>993.3</b>	<b>1,000.9</b>	<b>1,006.9</b>	<b>1,008.9</b>	<b>1,012.5</b>	<b>1,016.3</b>	<b>1,021.2</b>	<b>1,024.9</b>	<b>1,029.9</b>	<b>1,035.4</b>	<b>1,038.4</b>
5B1	Cropland remaining Cropland	Gg CO2	-11.1	-11.1	-11.1	-11.1	-11.1	-11.1	-11.1	-11.1	-11.1	-11.1	-11.1	-11.1	-11.1	-11.1	-11.1
5B2	Land converted to Cropland	Gg CO2	969.4	978.0	982.5	988.6	994.5	1,000.2	1,005.7	1,011.0	1,016.0	1,020.9	1,025.6	1,030.2	1,034.5	1,038.7	1,042.7
5B (liming)	Liming of Cropland	Gg CO2	11.0	13.2	13.7	8.7	9.8	11.7	12.2	9.0	7.5	6.5	6.6	5.8	6.4	7.7	6.7
<b>5C</b>	<b>Grassland</b>	<b>Gg CO2</b>	<b>-402.0</b>	<b>-392.4</b>	<b>-400.3</b>	<b>-449.4</b>	<b>-450.9</b>	<b>-447.6</b>	<b>-465.4</b>	<b>-464.9</b>	<b>-501.4</b>	<b>-517.8</b>	<b>-541.5</b>	<b>-542.9</b>	<b>-560.0</b>	<b>-555.6</b>	<b>-572.5</b>
5C1	Grassland remaining Grassland	Gg CO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5C2	Land converted to Grassland	Gg CO2	-489.3	-501.0	-512.3	-524.0	-534.9	-545.2	-555.2	-566.0	-575.7	-580.2	-585.4	-591.2	-600.9	-609.8	-618.9
5C (liming)	Liming of Grassland	Gg CO2	87.3	108.6	112.0	74.6	84.0	97.6	89.8	101.1	74.3	62.5	43.9	48.3	40.9	54.1	46.5
<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>	<b>IE</b>	<b>IE</b>
5D1	Wetland remaining Wetland	Gg CO2	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE
5D2	Land converted to Wetland	Gg CO2	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE
<b>5E</b>	<b>Settlements</b>	<b>Gg CO2</b>	<b>705.4</b>	<b>702.7</b>	<b>701.2</b>	<b>698.1</b>	<b>697.7</b>	<b>696.8</b>	<b>697.0</b>	<b>697.2</b>	<b>696.5</b>	<b>692.7</b>	<b>689.2</b>	<b>687.8</b>	<b>685.9</b>	<b>685.2</b>	<b>684.8</b>
5E1	Settlements remaining Settlements	Gg CO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5E2	Land converted to Settlements	Gg CO2	698.7	699.9	699.4	698.9	697.7	696.8	697.0	697.2	696.5	692.7	689.2	687.8	685.9	685.2	684.8
5E (Biomass burning)	Forest Land converted to Settlement	Gg CO2	6.7	5.8	5.8	4.2	4.9	5.1	6.3	6.9	6.9	5.7	4.4	4.3	3.3	3.1	3.0
<b>5F</b>	<b>Other-Land</b>	<b>Gg CO2</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>
5F1	Other-Land remaining Other-land	Gg CO2	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
5F2	Land converted to Other-Land	Gg CO2	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
<b>5G</b>	<b>Other activities</b>	<b>Gg CO2</b>	<b>-335.5</b>	<b>-243.9</b>	<b>-130.2</b>	<b>-61.6</b>	<b>-7.1</b>	<b>-42.0</b>	<b>-170.2</b>	<b>-285.8</b>	<b>-325.8</b>	<b>-423.0</b>	<b>139.3</b>	<b>170.6</b>	<b>192.6</b>	<b>191.8</b>	<b>184.6</b>
5G1	Harvested Wood Products	Gg CO2	-335.5	-243.9	-130.2	-61.6	-7.1	-42.0	-170.2	-285.8	-325.8	-423.0	139.3	170.6	192.6	191.8	184.6
Information Item	Forest Land converted to other Land-Use Categories	Gg CO2	20.3	19.9	20.5	18.7	19.9	20.7	22.5	23.0	23.4	25.5	27.0	29.6	27.5	27.0	26.2
Information Item	Grassland converted to other Land-Use Categories	Gg CO2	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
<b>5</b>	<b>Total Land-Use Categories</b>	<b>Gg CH4</b>	<b>0.037</b>	<b>0.034</b>	<b>0.035</b>	<b>0.026</b>	<b>0.029</b>	<b>0.031</b>	<b>0.038</b>	<b>0.039</b>	<b>0.039</b>	<b>0.047</b>	<b>0.053</b>	<b>0.063</b>	<b>0.053</b>	<b>0.050</b>	<b>0.045</b>
5C2	Land converted to Grassland	Gg CH4	0.008	0.009	0.010	0.007	0.008	0.009	0.010	0.009	0.009	0.022	0.033	0.044	0.038	0.036	0.032
5E	Settlements	Gg CH4	0.029	0.025	0.025	0.018	0.022	0.022	0.027	0.030	0.030	0.025	0.019	0.019	0.014	0.014	0.013
Information Item	Forest Land converted to other Land-Use Categories	Gg CH4	0.037	0.034	0.035	0.026	0.029	0.031	0.038	0.039	0.039	0.047	0.053	0.063	0.053	0.050	0.045
Information Item	Grassland converted to other Land-Use Categories	Gg CH4	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
<b>5</b>	<b>Total Land-Use Categories</b>	<b>Gg N2O</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>
5C2	Land converted to Grassland	Gg N2O	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5E	Settlements	Gg N2O	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Information Item	Forest Land converted to other Land-Use Categories	Gg N2O	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Information Item	Grassland converted to other Land-Use Categories	Gg N2O	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
<b>5</b>	<b>Total Land-Use Categories</b>	<b>Gg NOx</b>	<b>0.009</b>	<b>0.008</b>	<b>0.009</b>	<b>0.006</b>	<b>0.007</b>	<b>0.008</b>	<b>0.009</b>	<b>0.010</b>	<b>0.010</b>	<b>0.012</b>	<b>0.013</b>	<b>0.016</b>	<b>0.013</b>	<b>0.012</b>	<b>0.011</b>
5C2	Land converted to Grassland	Gg NOx	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.002	0.002	0.006	0.008	0.011	0.010	0.009	0.008
5E	Settlements	Gg NOx	0.007	0.006	0.006	0.005	0.005	0.006	0.007	0.007	0.008	0.006	0.005	0.005	0.004	0.003	0.003
Information Item	Forest Land converted to other Land-Use Categories	Gg NOx	0.009	0.008	0.009	0.006	0.007	0.008	0.009	0.010	0.010	0.012	0.013	0.016	0.013	0.012	0.011
Information Item	Grassland converted to other Land-Use Categories	Gg NOx	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
<b>5</b>	<b>Total Land-Use Categories</b>	<b>Gg CO</b>	<b>0.328</b>	<b>0.297</b>	<b>0.308</b>	<b>0.225</b>	<b>0.258</b>	<b>0.273</b>	<b>0.330</b>	<b>0.339</b>	<b>0.344</b>	<b>0.414</b>	<b>0.460</b>	<b>0.550</b>	<b>0.461</b>	<b>0.436</b>	<b>0.397</b>
5C2	Land converted to Grassland	Gg CO	0.073	0.078	0.085	0.065	0.069	0.077	0.091	0.075	0.079	0.195	0.293	0.385	0.335	0.315	0.281
5E	Settlements	Gg CO	0.255	0.220	0.223	0.160	0.189	0.196	0.239	0.263	0.265	0.219	0.167	0.165	0.127	0.120	0.116
Information Item	Forest Land converted to other Land-Use Categories	Gg CO	0.328	0.297	0.308	0.225	0.258	0.273	0.330	0.339	0.344	0.414	0.460	0.550	0.461	0.436	0.397
Information Item	Grassland converted to other Land-Use Categories	Gg CO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO

Table A3. 5 : N. Ireland

Northern Ireland			1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
<b>5</b>	<b>Total Land-Use Categories</b>	<b>Gg CO2</b>	<b>-44.5</b>	<b>-46.7</b>	<b>-77.9</b>	<b>-126.1</b>	<b>-139.0</b>	<b>-145.8</b>	<b>-177.1</b>	<b>-192.3</b>	<b>-225.6</b>	<b>-248.9</b>	<b>-279.0</b>	<b>-290.7</b>	<b>-308.9</b>	<b>-296.5</b>	<b>-307.0</b>
<b>5A</b>	<b>Forest Land</b>	<b>Gg CO2</b>	<b>-743.9</b>	<b>-741.8</b>	<b>-761.4</b>	<b>-717.6</b>	<b>-750.1</b>	<b>-722.7</b>	<b>-718.8</b>	<b>-720.6</b>	<b>-709.1</b>	<b>-717.6</b>	<b>-735.6</b>	<b>-761.6</b>	<b>-743.6</b>	<b>-700.3</b>	<b>-705.2</b>
5A1	Forest-Land remaining Forest-Land	Gg CO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5A2	Land converted to Forest-Land	Gg CO2	-743.9	-741.8	-761.4	-717.6	-750.1	-722.7	-718.8	-720.6	-709.1	-717.6	-735.6	-761.6	-743.6	-700.3	-705.2
<b>5B</b>	<b>Cropland</b>	<b>Gg CO2</b>	<b>1,255.7</b>	<b>1,244.6</b>	<b>1,232.4</b>	<b>1,216.1</b>	<b>1,205.3</b>	<b>1,196.5</b>	<b>1,187.0</b>	<b>1,174.9</b>	<b>1,165.2</b>	<b>1,156.4</b>	<b>1,148.9</b>	<b>1,141.4</b>	<b>1,134.9</b>	<b>1,129.8</b>	<b>1,123.2</b>
5B1	Cropland remaining Cropland	Gg CO2	-25.1	-25.1	-25.1	-25.1	-25.1	-25.1	-25.1	-25.1	-25.1	-25.1	-25.1	-25.1	-25.1	-25.1	-25.1
5B2	Land converted to Cropland	Gg CO2	1,271.5	1,257.8	1,245.1	1,233.2	1,222.0	1,211.6	1,201.9	1,192.7	1,184.2	1,176.2	1,168.6	1,161.5	1,154.9	1,148.7	1,142.9
5B (liming)	Liming of Cropland	Gg CO2	9.4	11.9	12.4	8.0	8.4	10.0	10.2	7.2	6.1	5.3	5.4	4.9	5.7	6.2	5.5
<b>5C</b>	<b>Grassland</b>	<b>Gg CO2</b>	<b>-1,080.8</b>	<b>-1,072.6</b>	<b>-1,080.8</b>	<b>-1,118.8</b>	<b>-1,119.6</b>	<b>-1,115.6</b>	<b>-1,131.3</b>	<b>-1,130.6</b>	<b>-1,161.0</b>	<b>-1,179.0</b>	<b>-1,201.1</b>	<b>-1,204.0</b>	<b>-1,216.4</b>	<b>-1,214.8</b>	<b>-1,228.3</b>
5C1	Grassland remaining Grassland	Gg CO2	101.5	101.5	101.5	101.5	101.5	101.5	101.5	101.5	101.5	101.5	101.5	101.5	101.5	101.5	101.5
5C2	Land converted to Grassland	Gg CO2	-1,253.3	-1,262.9	-1,272.3	-1,281.3	-1,290.1	-1,298.7	-1,306.9	-1,315.0	-1,322.8	-1,330.3	-1,337.9	-1,345.3	-1,352.4	-1,359.3	-1,366.1
5C (liming)	Liming of Grassland	Gg CO2	70.9	88.7	89.9	61.0	69.0	81.5	74.0	82.8	60.2	49.8	35.3	39.8	34.4	43.0	36.2
<b>5D</b>	<b>Wetland</b>	<b>Gg CO2</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>	<b>IE</b>
5D1	Wetland remaining Wetland	Gg CO2	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE
5D2	Land converted to Wetland	Gg CO2	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE
<b>5E</b>	<b>Settlements</b>	<b>Gg CO2</b>	<b>569.3</b>	<b>569.0</b>	<b>568.7</b>	<b>568.5</b>	<b>568.4</b>	<b>568.3</b>	<b>568.2</b>	<b>568.2</b>	<b>568.2</b>	<b>568.2</b>	<b>568.4</b>	<b>568.5</b>	<b>568.7</b>	<b>568.8</b>	<b>569.0</b>
5E1	Settlements remaining Settlements	Gg CO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5E2	Land converted to Settlements	Gg CO2	569.3	569.0	568.7	568.5	568.4	568.3	568.2	568.2	568.2	568.2	568.4	568.5	568.7	568.8	569.0
5E (Biomass burning)	Forest Land converted to Settlement	Gg CO2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>5F</b>	<b>Other-Land</b>	<b>Gg CO2</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>
5F1	Other-Land remaining Other-land	Gg CO2	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
5F2	Land converted to Other-Land	Gg CO2	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
<b>5G</b>	<b>Other activities</b>	<b>Gg CO2</b>	<b>-44.9</b>	<b>-45.8</b>	<b>-36.8</b>	<b>-74.3</b>	<b>-42.9</b>	<b>-72.2</b>	<b>-82.1</b>	<b>-84.2</b>	<b>-88.9</b>	<b>-76.9</b>	<b>-59.6</b>	<b>-35.0</b>	<b>-52.5</b>	<b>-80.1</b>	<b>-65.8</b>
5G1	Harvested Wood Products	Gg CO2	-44.9	-45.8	-36.8	-74.3	-42.9	-72.2	-82.1	-84.2	-88.9	-76.9	-59.6	-35.0	-52.5	-80.1	-65.8
Information Item	Forest Land converted to other Land-Use Categories	Gg CO2	63.0	59.5	56.2	53.2	50.3	47.5	45.0	42.5	40.3	38.1	36.1	34.2	32.4	30.7	29.2
Information Item	Grassland converted to other Land-Use Categories	Gg CO2	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
<b>5</b>	<b>Total Land-Use Categories</b>	<b>Gg CH4</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>
5C2	Land converted to Grassland	Gg CH4	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5E	Settlements	Gg CH4	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Information Item	Forest Land converted to other Land-Use Categories	Gg CH4	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Information Item	Grassland converted to other Land-Use Categories	Gg CH4	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
<b>5</b>	<b>Total Land-Use Categories</b>	<b>Gg N2O</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>
5C2	Land converted to Grassland	Gg N2O	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5E	Settlements	Gg N2O	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Information Item	Forest Land converted to other Land-Use Categories	Gg N2O	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Information Item	Grassland converted to other Land-Use Categories	Gg N2O	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
<b>5</b>	<b>Total Land-Use Categories</b>	<b>Gg NOx</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>
5C2	Land converted to Grassland	Gg NOx	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5E	Settlements	Gg NOx	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Information Item	Forest Land converted to other Land-Use Categories	Gg NOx	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Information Item	Grassland converted to other Land-Use Categories	Gg NOx	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
<b>5</b>	<b>Total Land-Use Categories</b>	<b>Gg CO</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>
5C2	Land converted to Grassland	Gg CO	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5E	Settlements	Gg CO	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Information Item	Forest Land converted to other Land-Use Categories	Gg CO	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Information Item	Grassland converted to other Land-Use Categories	Gg CO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO



## **APPENDIX 4**

### **A.4. Removals and Emissions by post-1990 afforestation and deforestation 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.....	2-103
Table A4. 2: Removal of atmospheric carbon by post-1990 afforestation – England A: Mid emissions scenario, B: Low emission scenario, C: High emission scenario.....	2-107
Table A4. 3: Removal of atmospheric carbon by post-1990 afforestation – Scotland A: Mid emissions scenario, B: Low emission scenario, C: High emission scenario.....	2-111
Table A4. 4: Removal of atmospheric carbon by post-1990 afforestation – Wales A: Mid emissions scenario, B: Low emission scenario, C: High emission scenario.....	2-115
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.....	2-119

- 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 proportion of UK planting of that occurred in 2004 distributed across England, Scotland, Wales and N. Ireland

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 Gg CO<sub>2</sub> 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) UK	Afforestation		Deforestation				Art 3.3 (excludes HWP)
	Gg CO <sub>2</sub> /year or GWP equiv Gg CO <sub>2</sub> /year	Biomass stocks	Harvested Wood Products	Immediate loss (Biomass) CO <sub>2</sub>	Immediate loss (Biomass) CH <sub>4</sub>	Immediate loss (Biomass) N <sub>2</sub> O	Delayed loss (Soil) CO <sub>2</sub>
1990	28	0	151	14	1.4	19	213
1991	177	0	137	13	1.3	36	364
1992	208	0	142	13	1.3	53	417
1993	125	0	104	10	1.0	69	308
1994	-44	0	119	11	1.1	83	170
<b>1995</b>	<b>-278</b>	<b>0</b>	<b>126</b>	<b>12</b>	<b>1.2</b>	<b>97</b>	<b>-42</b>
1996	-522	0	152	14	1.4	110	-245
1997	-784	0	156	14	1.5	123	-490
1998	-1014	0	158	15	1.5	134	-705
1999	-1227	0	191	18	1.8	145	-872
<b>2000</b>	<b>-1422</b>	<b>0</b>	<b>212</b>	<b>19</b>	<b>2.0</b>	<b>156</b>	<b>-1033</b>
2001	-1586	0	253	23	2.4	166	-1142
2002	-1751	0	213	19	2.0	175	-1342
2003	-1954	0	201	18	1.9	184	-1549
2004	-2148	0	183	17	1.7	192	-1755
<b>2005</b>	<b>-2329</b>	<b>0</b>	<b>192</b>	<b>18</b>	<b>1.8</b>	<b>200</b>	<b>-1918</b>
2006	-2489	0	184	17	1.7	207	-2079
2007	-2632	0	161	15	1.5	214	-2240
<b>2008</b>	<b>-2773</b>	<b>0</b>	<b>150</b>	<b>14</b>	<b>1.4</b>	<b>221</b>	<b>-2386</b>
<b>2009</b>	<b>-2910</b>	<b>0</b>	<b>144</b>	<b>13</b>	<b>1.3</b>	<b>227</b>	<b>-2525</b>
<b>2010</b>	<b>-3092</b>	<b>0</b>	<b>149</b>	<b>14</b>	<b>1.4</b>	<b>233</b>	<b>-2695</b>
<b>2011</b>	<b>-3270</b>	<b>0</b>	<b>138</b>	<b>13</b>	<b>1.3</b>	<b>239</b>	<b>-2879</b>
<b>2012</b>	<b>-3445</b>	<b>0</b>	<b>136</b>	<b>12</b>	<b>1.3</b>	<b>244</b>	<b>-3051</b>
2013	-3580	-21	128	12	1.2	249	-3190
2014	-3746	-6	130	12	1.2	254	-3349
<b>2015</b>	<b>-3587</b>	<b>-210</b>	<b>130</b>	<b>12</b>	<b>1.2</b>	<b>259</b>	<b>-3186</b>
2016	-3840	-94	123	11	1.1	263	-3441
2017	-4095	-25	115	11	1.1	267	-3702
2018	-4325	-1	108	10	1.0	271	-3935
2019	-4606	40	108	10	1.0	275	-4213
<b>2020</b>	<b>-4324</b>	<b>-255</b>	<b>105</b>	<b>10</b>	<b>1.0</b>	<b>278</b>	<b>-3930</b>

<b>B (Low) UK</b>	<b>Afforestation</b>		<b>Deforestation</b>				<b>Art 3.3 (excludes HWP)</b>
<b>Gg CO<sub>2</sub>/year or GWP equiv Gg CO<sub>2</sub>/year</b>	<b>Biomass stocks</b>	<b>Harvested Wood Products</b>	<b>Immediate loss (Biomass) CO<sub>2</sub></b>	<b>Immediate loss (Biomass) CH<sub>4</sub></b>	<b>Immediate loss (Biomass) N<sub>2</sub>O</b>	<b>Delayed loss (Soil) CO<sub>2</sub></b>	<b>Afforestation + Deforestation</b>
<b>1990</b>	<b>28</b>	<b>0</b>	<b>151</b>	<b>14</b>	<b>1.4</b>	<b>19</b>	<b>213</b>
1991	177	0	137	13	1.3	36	364
1992	208	0	142	13	1.3	53	417
1993	125	0	104	10	1.0	69	308
1994	-44	0	119	11	1.1	83	170
<b>1995</b>	<b>-278</b>	<b>0</b>	<b>126</b>	<b>12</b>	<b>1.2</b>	<b>97</b>	<b>-42</b>
1996	-522	0	152	14	1.4	110	-245
1997	-784	0	156	14	1.5	123	-490
1998	-1014	0	158	15	1.5	134	-705
1999	-1227	0	191	18	1.8	145	-872
<b>2000</b>	<b>-1422</b>	<b>0</b>	<b>212</b>	<b>19</b>	<b>2.0</b>	<b>156</b>	<b>-1033</b>
2001	-1586	0	253	23	2.4	166	-1142
2002	-1751	0	213	19	2.0	175	-1342
2003	-1954	0	201	18	1.9	184	-1549
2004	-2148	0	183	17	1.7	192	-1755
<b>2005</b>	<b>-2293</b>	<b>0</b>	<b>188</b>	<b>17</b>	<b>1.8</b>	<b>110</b>	<b>-1976</b>
2006	-2327	0	172	16	1.6	115	-2022
2007	-2433	0	137	13	1.3	120	-2162
<b>2008</b>	<b>-2632</b>	<b>0</b>	<b>115</b>	<b>11</b>	<b>1.1</b>	<b>125</b>	<b>-2380</b>
<b>2009</b>	<b>-2916</b>	<b>0</b>	<b>96</b>	<b>9</b>	<b>0.9</b>	<b>130</b>	<b>-2680</b>
<b>2010</b>	<b>-3308</b>	<b>0</b>	<b>90</b>	<b>8</b>	<b>0.8</b>	<b>137</b>	<b>-3072</b>
<b>2011</b>	<b>-3721</b>	<b>0</b>	<b>66</b>	<b>6</b>	<b>0.6</b>	<b>143</b>	<b>-3506</b>
<b>2012</b>	<b>-4132</b>	<b>0</b>	<b>51</b>	<b>5</b>	<b>0.5</b>	<b>149</b>	<b>-3927</b>
2013	-4490	-21	31	3	0.3	153	-4303
2014	-4866	-6	20	2	0.2	158	-4686
<b>2015</b>	<b>-4903</b>	<b>-210</b>	<b>13</b>	<b>1</b>	<b>0.1</b>	<b>161</b>	<b>-4728</b>
2016	-5343	-94	6	1	0.1	163	-5172
2017	-5778	-25	0	0	0.0	0	-5778
2018	-6184	-1	0	0	0.0	0	-6184
2019	-6640	40	0	0	0.0	0	-6640
<b>2020</b>	<b>-6533</b>	<b>-255</b>	<b>0</b>	<b>0</b>	<b>0.0</b>	<b>0</b>	<b>-6533</b>

C (High) UK	Afforestation		Deforestation				Art 3.3 (excludes HWP)
	Gg CO <sub>2</sub> /year or GWP equiv Gg CO <sub>2</sub> /year	Biomass stocks	Harvested Wood Products	Immediate loss (Biomass) CO <sub>2</sub>	Immediate loss (Biomass) CH <sub>4</sub>	Immediate loss (Biomass) N <sub>2</sub> O	Delayed loss (Soil) CO <sub>2</sub>
<b>1990</b>	<b>28</b>	<b>0</b>	<b>151</b>	<b>14</b>	<b>1.4</b>	<b>19</b>	<b>213</b>
1991	177	0	137	13	1.3	36	364
1992	208	0	142	13	1.3	53	417
1993	125	0	104	10	1.0	69	308
1994	-44	0	119	11	1.1	83	170
<b>1995</b>	<b>-278</b>	<b>0</b>	<b>126</b>	<b>12</b>	<b>1.2</b>	<b>97</b>	<b>-42</b>
1996	-522	0	152	14	1.4	110	-245
1997	-784	0	156	14	1.5	123	-490
1998	-1014	0	158	15	1.5	134	-705
1999	-1227	0	191	18	1.8	145	-872
<b>2000</b>	<b>-1422</b>	<b>0</b>	<b>212</b>	<b>19</b>	<b>2.0</b>	<b>156</b>	<b>-1033</b>
2001	-1586	0	253	23	2.4	166	-1142
2002	-1751	0	213	19	2.0	175	-1342
2003	-1954	0	201	18	1.9	184	-1549
2004	-2148	0	183	17	1.7	192	-1755
<b>2005</b>	<b>-2353</b>	<b>0</b>	<b>196</b>	<b>18</b>	<b>1.8</b>	<b>358</b>	<b>-1779</b>
2006	-2594	0	195	18	1.8	366	-2013
2007	-2761	0	184	17	1.7	373	-2185
<b>2008</b>	<b>-2864</b>	<b>0</b>	<b>185</b>	<b>17</b>	<b>1.7</b>	<b>380</b>	<b>-2280</b>
<b>2009</b>	<b>-2907</b>	<b>0</b>	<b>191</b>	<b>18</b>	<b>1.8</b>	<b>387</b>	<b>-2310</b>
<b>2010</b>	<b>-2952</b>	<b>0</b>	<b>209</b>	<b>19</b>	<b>1.9</b>	<b>386</b>	<b>-2336</b>
<b>2011</b>	<b>-2976</b>	<b>0</b>	<b>210</b>	<b>19</b>	<b>2.0</b>	<b>386</b>	<b>-2359</b>
<b>2012</b>	<b>-2998</b>	<b>0</b>	<b>220</b>	<b>20</b>	<b>2.0</b>	<b>391</b>	<b>-2364</b>
2013	-2987	-21	226	21	2.1	394	-2345
2014	-3017	-6	240	22	2.2	398	-2355
<b>2015</b>	<b>-2730</b>	<b>-210</b>	<b>253</b>	<b>23</b>	<b>2.3</b>	<b>400</b>	<b>-2053</b>
2016	-2862	-94	259	24	2.4	402	-2175
2017	-3000	-25	263	24	2.4	404	-2306
2018	-3115	-1	269	25	2.5	406	-2413
2019	-3282	40	282	26	2.6	408	-2564
<b>2020</b>	<b>-2885</b>	<b>-255</b>	<b>292</b>	<b>27</b>	<b>2.7</b>	<b>410</b>	<b>-2154</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

A (Mid) England	Afforestation		Deforestation				Art 3.3 (excludes HWP)
	Gg CO <sub>2</sub> /year or GWP equiv Gg CO <sub>2</sub> /year	Biomass stocks	Harvested Wood Products	Immediate loss (Biomass) CO <sub>2</sub>	Immediate loss (Biomass) CH <sub>4</sub>	Immediate loss (Biomass) N <sub>2</sub> O	Delayed loss (Soil) CO <sub>2</sub>
<b>1990</b>	<b>-3.3</b>	<b>0.0</b>	<b>108.5</b>	<b>9.9</b>	<b>1.0</b>	<b>13.4</b>	<b>129.6</b>
1991	2.9	0.0	98.4	9.0	0.9	26.1	137.4
1992	-2.4	0.0	101.9	9.3	0.9	38.0	147.8
1993	-28.6	0.0	74.5	6.8	0.7	49.2	102.7
1994	-69.2	0.0	85.4	7.8	0.8	59.8	84.7
<b>1995</b>	<b>-123.7</b>	<b>0.0</b>	<b>90.4</b>	<b>8.3</b>	<b>0.8</b>	<b>69.8</b>	<b>45.7</b>
1996	-194.6	0.0	109.2	10.0	1.0	79.2	4.8
1997	-271.1	0.0	112.1	10.3	1.0	88.0	-59.6
1998	-344.2	0.0	113.8	10.4	1.1	96.4	-122.6
1999	-410.8	0.0	137.2	12.6	1.3	104.3	-155.4
<b>2000</b>	<b>-465.3</b>	<b>0.0</b>	<b>152.3</b>	<b>14.0</b>	<b>1.4</b>	<b>111.8</b>	<b>-185.9</b>
2001	-512.7	0.0	182.0	16.7	1.7	118.9	-193.4
2002	-560.3	0.0	152.8	14.0	1.4	125.6	-266.5
2003	-612.4	0.0	144.2	13.2	1.3	131.9	-321.7
2004	-664.2	0.0	131.3	12.0	1.2	137.9	-381.8
<b>2005</b>	<b>-721.5</b>	<b>0.0</b>	<b>137.9</b>	<b>12.6</b>	<b>1.3</b>	<b>143.5</b>	<b>-426.1</b>
2006	-774.4	0.0	132.1	12.1	1.2	148.8	-480.2
2007	-822.3	0.0	115.4	10.6	1.1	153.9	-541.4
<b>2008</b>	<b>-865.9</b>	<b>0.0</b>	<b>107.8</b>	<b>9.9</b>	<b>1.0</b>	<b>158.7</b>	<b>-588.5</b>
<b>2009</b>	<b>-906.7</b>	<b>0.0</b>	<b>103.1</b>	<b>9.4</b>	<b>1.0</b>	<b>163.2</b>	<b>-630.0</b>
<b>2010</b>	<b>-950.0</b>	<b>0.0</b>	<b>107.3</b>	<b>9.8</b>	<b>1.0</b>	<b>167.5</b>	<b>-664.4</b>
<b>2011</b>	<b>-994.6</b>	<b>0.0</b>	<b>99.1</b>	<b>9.1</b>	<b>0.9</b>	<b>171.6</b>	<b>-713.9</b>
<b>2012</b>	<b>-1040.8</b>	<b>0.0</b>	<b>97.4</b>	<b>8.9</b>	<b>0.9</b>	<b>175.4</b>	<b>-758.2</b>
2013	-1090.1	0.0	92.1	8.4	0.9	179.0	-809.6
2014	-1134.5	0.0	93.6	8.6	0.9	182.5	-849.0
<b>2015</b>	<b>-1167.6</b>	<b>-13.8</b>	<b>93.2</b>	<b>8.5</b>	<b>0.9</b>	<b>185.8</b>	<b>-879.3</b>
2016	-1230.8	-7.6	88.4	8.1	0.8	188.9	-944.5
2017	-1296.5	-1.2	82.4	7.5	0.8	191.8	-1014.0
2018	-1353.7	-3.2	77.5	7.1	0.7	194.6	-1073.7
2019	-1431.9	2.7	77.4	7.1	0.7	197.3	-1149.5
<b>2020</b>	<b>-1444.3</b>	<b>-28.6</b>	<b>75.2</b>	<b>6.9</b>	<b>0.7</b>	<b>199.8</b>	<b>-1161.7</b>

<b>B (Low) England</b>	<b>Afforestation</b>		<b>Deforestation</b>				<b>Art 3.3 (excludes HWP)</b>
	<b>Gg CO<sub>2</sub> /year or GWP equiv Gg CO<sub>2</sub>/year</b>	<b>Biomass stocks</b>	<b>Harvested Wood Products</b>	<b>Immediate loss (Biomass) CO<sub>2</sub></b>	<b>Biomass stocks</b>	<b>Harvested Wood Products</b>	<b>Immediate loss (Biomass) CO<sub>2</sub></b>
<b>1990</b>	<b>-3.3</b>	<b>0.0</b>	<b>108.5</b>	<b>9.9</b>	<b>1.0</b>	<b>13.4</b>	<b>129.6</b>
1991	2.9	0.0	98.4	9.0	0.9	26.1	137.4
1992	-2.4	0.0	101.9	9.3	0.9	38.0	147.8
1993	-28.6	0.0	74.5	6.8	0.7	49.2	102.7
1994	-69.2	0.0	85.4	7.8	0.8	59.8	84.7
<b>1995</b>	<b>-123.7</b>	<b>0.0</b>	<b>90.4</b>	<b>8.3</b>	<b>0.8</b>	<b>69.8</b>	<b>45.7</b>
1996	-194.6	0.0	109.2	10.0	1.0	79.2	4.8
1997	-271.1	0.0	112.1	10.3	1.0	88.0	-59.6
1998	-344.2	0.0	113.8	10.4	1.1	96.4	-122.6
1999	-410.8	0.0	137.2	12.6	1.3	104.3	-155.4
<b>2000</b>	<b>-465.3</b>	<b>0.0</b>	<b>152.3</b>	<b>14.0</b>	<b>1.4</b>	<b>111.8</b>	<b>-185.9</b>
2001	-512.7	0.0	182.0	16.7	1.7	118.9	-193.4
2002	-560.3	0.0	152.8	14.0	1.4	125.6	-266.5
2003	-612.4	0.0	144.2	13.2	1.3	131.9	-321.7
2004	-664.2	0.0	131.3	12.0	1.2	137.9	-381.8
<b>2005</b>	<b>-723.4</b>	<b>0.0</b>	<b>135.2</b>	<b>12.4</b>	<b>1.3</b>	<b>78.9</b>	<b>-495.7</b>
2006	-762.1	0.0	123.8	11.3	1.2	82.8	-543.0
2007	-821.0	0.0	98.7	9.0	0.9	86.5	-625.9
<b>2008</b>	<b>-903.5</b>	<b>0.0</b>	<b>82.5</b>	<b>7.6</b>	<b>0.8</b>	<b>90.1</b>	<b>-722.7</b>
<b>2009</b>	<b>-1010.8</b>	<b>0.0</b>	<b>69.0</b>	<b>6.3</b>	<b>0.6</b>	<b>93.6</b>	<b>-841.2</b>
<b>2010</b>	<b>-1139.5</b>	<b>0.0</b>	<b>64.4</b>	<b>5.9</b>	<b>0.6</b>	<b>98.6</b>	<b>-970.1</b>
<b>2011</b>	<b>-1276.3</b>	<b>0.0</b>	<b>47.3</b>	<b>4.3</b>	<b>0.4</b>	<b>102.9</b>	<b>-1121.4</b>
<b>2012</b>	<b>-1412.7</b>	<b>0.0</b>	<b>36.5</b>	<b>3.3</b>	<b>0.3</b>	<b>106.7</b>	<b>-1265.8</b>
2013	-1546.5	0.0	22.1	2.0	0.2	110.1	-1412.0
2014	-1669.3	0.0	14.6	1.3	0.1	113.2	-1540.0
<b>2015</b>	<b>-1775.2</b>	<b>-13.8</b>	<b>9.2</b>	<b>0.8</b>	<b>0.1</b>	<b>115.3</b>	<b>-1649.8</b>
2016	-1906.8	-7.6	4.6	0.4	0.0	117.2	-1784.5
2017	-2037.9	-1.2	0.0	0.0	0.0	0.0	-2037.9
2018	-2158.2	-3.2	0.0	0.0	0.0	0.0	-2158.2
2019	-2298.3	2.7	0.0	0.0	0.0	0.0	-2298.3
<b>2020</b>	<b>-2372.1</b>	<b>-28.6</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>-2372.1</b>



<b>C (High) England</b>	<b>Afforestation</b>		<b>Deforestation</b>				<b>Art 3.3 (excludes HWP)</b>
	<b>Gg CO<sub>2</sub> /year or GWP equiv Gg CO<sub>2</sub>/year</b>	<b>Biomass stocks</b>	<b>Harvested Wood Products</b>	<b>Immediate loss (Biomass) CO<sub>2</sub></b>	<b>Biomass stocks</b>	<b>Harvested Wood Products</b>	<b>Immediate loss (Biomass) CO<sub>2</sub></b>
<b>1990</b>	<b>-3.3</b>	<b>0.0</b>	<b>108.5</b>	<b>9.9</b>	<b>1.0</b>	<b>13.4</b>	<b>129.6</b>
1991	2.9	0.0	98.4	9.0	0.9	26.1	137.4
1992	-2.4	0.0	101.9	9.3	0.9	38.0	147.8
1993	-28.6	0.0	74.5	6.8	0.7	49.2	102.7
1994	-69.2	0.0	85.4	7.8	0.8	59.8	84.7
<b>1995</b>	<b>-123.7</b>	<b>0.0</b>	<b>90.4</b>	<b>8.3</b>	<b>0.8</b>	<b>69.8</b>	<b>45.7</b>
1996	-194.6	0.0	109.2	10.0	1.0	79.2	4.8
1997	-271.1	0.0	112.1	10.3	1.0	88.0	-59.6
1998	-344.2	0.0	113.8	10.4	1.1	96.4	-122.6
1999	-410.8	0.0	137.2	12.6	1.3	104.3	-155.4
<b>2000</b>	<b>-465.3</b>	<b>0.0</b>	<b>152.3</b>	<b>14.0</b>	<b>1.4</b>	<b>111.8</b>	<b>-185.9</b>
2001	-512.7	0.0	182.0	16.7	1.7	118.9	-193.4
2002	-560.3	0.0	152.8	14.0	1.4	125.6	-266.5
2003	-612.4	0.0	144.2	13.2	1.3	131.9	-321.7
2004	-664.2	0.0	131.3	12.0	1.2	137.9	-381.8
<b>2005</b>	<b>-720.2</b>	<b>0.0</b>	<b>140.6</b>	<b>12.9</b>	<b>1.3</b>	<b>257.3</b>	<b>-308.1</b>
2006	-782.4	0.0	140.3	12.9	1.3	262.7	-365.2
2007	-823.2	0.0	132.1	12.1	1.2	268.2	-409.6
<b>2008</b>	<b>-841.3</b>	<b>0.0</b>	<b>133.1</b>	<b>12.2</b>	<b>1.2</b>	<b>273.2</b>	<b>-421.6</b>
<b>2009</b>	<b>-838.9</b>	<b>0.0</b>	<b>137.2</b>	<b>12.6</b>	<b>1.3</b>	<b>277.8</b>	<b>-410.0</b>
<b>2010</b>	<b>-826.6</b>	<b>0.0</b>	<b>150.2</b>	<b>13.8</b>	<b>1.4</b>	<b>277.1</b>	<b>-384.2</b>
<b>2011</b>	<b>-811.2</b>	<b>0.0</b>	<b>151.0</b>	<b>13.8</b>	<b>1.4</b>	<b>277.4</b>	<b>-367.5</b>
<b>2012</b>	<b>-798.6</b>	<b>0.0</b>	<b>158.3</b>	<b>14.5</b>	<b>1.5</b>	<b>280.9</b>	<b>-343.5</b>
2013	-792.9	0.0	162.1	14.9	1.5	283.0	-331.5
2014	-786.4	0.0	172.7	15.8	1.6	285.7	-310.6
<b>2015</b>	<b>-772.1</b>	<b>-13.8</b>	<b>181.4</b>	<b>16.6</b>	<b>1.7</b>	<b>287.0</b>	<b>-285.3</b>
2016	-790.6	-7.6	185.9	17.0	1.7	288.5	-297.5
2017	-813.9	-1.2	189.0	17.3	1.8	289.9	-315.8
2018	-830.0	-3.2	193.4	17.7	1.8	291.5	-325.5
2019	-867.9	2.7	202.5	18.6	1.9	293.0	-352.0
<b>2020</b>	<b>-840.3</b>	<b>-28.6</b>	<b>209.7</b>	<b>19.2</b>	<b>2.0</b>	<b>294.5</b>	<b>-315.0</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

A (Mid) Scotland	Afforestation		Deforestation				Art 3.3 (excludes HWP)
	Gg CO <sub>2</sub> /year or GWP equiv Gg CO <sub>2</sub> /year	Biomass stocks	Harvested Wood Products	Immediate loss (Biomass) CO <sub>2</sub>	Immediate loss (Biomass) CH <sub>4</sub>	Immediate loss (Biomass) N <sub>2</sub> O	Delayed loss (Soil) CO <sub>2</sub>
<b>1990</b>	<b>30.8</b>	<b>0.0</b>	<b>34.0</b>	<b>3.1</b>	<b>0.3</b>	<b>4.2</b>	<b>72.4</b>
1991	159.1	0.0	30.8	2.8	0.3	8.2	201.2
1992	196.9	0.0	31.9	2.9	0.3	11.9	244.0
1993	152.4	0.0	23.3	2.1	0.2	15.4	193.5
1994	38.3	0.0	26.8	2.5	0.2	18.7	86.5
<b>1995</b>	<b>-120.4</b>	<b>0.0</b>	<b>28.3</b>	<b>2.6</b>	<b>0.3</b>	<b>21.9</b>	<b>-67.4</b>
1996	-268.5	0.0	34.2	3.1	0.3	24.8	-206.0
1997	-429.9	0.0	35.1	3.2	0.3	27.6	-363.6
1998	-563.4	0.0	35.6	3.3	0.3	30.2	-493.9
1999	-690.4	0.0	43.0	3.9	0.4	32.7	-610.4
<b>2000</b>	<b>-814.8</b>	<b>0.0</b>	<b>47.7</b>	<b>4.4</b>	<b>0.4</b>	<b>35.0</b>	<b>-727.3</b>
2001	-919.5	0.0	57.0	5.2	0.5	37.2	-819.4
2002	-1022.7	0.0	47.9	4.4	0.4	39.3	-930.6
2003	-1158.1	0.0	45.2	4.1	0.4	41.3	-1067.0
2004	-1286.4	0.0	41.1	3.8	0.4	43.2	-1197.9
<b>2005</b>	<b>-1396.5</b>	<b>0.0</b>	<b>43.2</b>	<b>4.0</b>	<b>0.4</b>	<b>45.0</b>	<b>-1303.9</b>
2006	-1490.9	0.0	41.4	3.8	0.4	46.6	-1398.7
2007	-1574.6	0.0	36.1	3.3	0.3	48.2	-1486.6
<b>2008</b>	<b>-1656.0</b>	<b>0.0</b>	<b>33.8</b>	<b>3.1</b>	<b>0.3</b>	<b>49.7</b>	<b>-1569.1</b>
<b>2009</b>	<b>-1738.1</b>	<b>0.0</b>	<b>32.3</b>	<b>3.0</b>	<b>0.3</b>	<b>51.1</b>	<b>-1651.4</b>
<b>2010</b>	<b>-1861.8</b>	<b>0.0</b>	<b>33.6</b>	<b>3.1</b>	<b>0.3</b>	<b>52.5</b>	<b>-1772.3</b>
<b>2011</b>	<b>-1979.0</b>	<b>0.0</b>	<b>31.1</b>	<b>2.8</b>	<b>0.3</b>	<b>53.7</b>	<b>-1891.1</b>
<b>2012</b>	<b>-2092.5</b>	<b>0.0</b>	<b>30.5</b>	<b>2.8</b>	<b>0.3</b>	<b>55.0</b>	<b>-2003.9</b>
2013	-2201.2	0.0	28.9	2.6	0.3	56.1	-2113.3
2014	-2297.8	0.0	29.3	2.7	0.3	57.2	-2208.4
<b>2015</b>	<b>-2090.7</b>	<b>-190.6</b>	<b>29.2</b>	<b>2.7</b>	<b>0.3</b>	<b>58.2</b>	<b>-2000.3</b>
2016	-2271.1	-79.2	27.7	2.5	0.3	59.2	-2181.4
2017	-2436.7	-23.8	25.8	2.4	0.2	60.1	-2348.2
2018	-2616.9	16.1	24.3	2.2	0.2	61.0	-2529.2
2019	-2798.3	42.3	24.2	2.2	0.2	61.8	-2709.8
<b>2020</b>	<b>-2488.4</b>	<b>-222.1</b>	<b>23.6</b>	<b>2.2</b>	<b>0.2</b>	<b>62.6</b>	<b>-2399.8</b>

<b>B (Low) Scotland</b>	<b>Afforestation</b>		<b>Deforestation</b>				<b>Art 3.3 (excludes HWP)</b>
	<b>Gg CO<sub>2</sub>/year or GWP equiv Gg CO<sub>2</sub>/year</b>	<b>Biomass stocks</b>	<b>Harvested Wood Products</b>	<b>Immediate loss (Biomass) CO<sub>2</sub></b>	<b>Biomass stocks</b>	<b>Harvested Wood Products</b>	<b>Immediate loss (Biomass) CO<sub>2</sub></b>
<b>1990</b>	<b>30.8</b>	<b>0.0</b>	<b>34.0</b>	<b>3.1</b>	<b>0.3</b>	<b>4.2</b>	<b>72.4</b>
1991	159.1	0.0	30.8	2.8	0.3	8.2	201.2
1992	196.9	0.0	31.9	2.9	0.3	11.9	244.0
1993	152.4	0.0	23.3	2.1	0.2	15.4	193.5
1994	38.3	0.0	26.8	2.5	0.2	18.7	86.5
<b>1995</b>	<b>-120.4</b>	<b>0.0</b>	<b>28.3</b>	<b>2.6</b>	<b>0.3</b>	<b>21.9</b>	<b>-67.4</b>
1996	-268.5	0.0	34.2	3.1	0.3	24.8	-206.0
1997	-429.9	0.0	35.1	3.2	0.3	27.6	-363.6
1998	-563.4	0.0	35.6	3.3	0.3	30.2	-493.9
1999	-690.4	0.0	43.0	3.9	0.4	32.7	-610.4
<b>2000</b>	<b>-814.8</b>	<b>0.0</b>	<b>47.7</b>	<b>4.4</b>	<b>0.4</b>	<b>35.0</b>	<b>-727.3</b>
2001	-919.5	0.0	57.0	5.2	0.5	37.2	-819.4
2002	-1022.7	0.0	47.9	4.4	0.4	39.3	-930.6
2003	-1158.1	0.0	45.2	4.1	0.4	41.3	-1067.0
2004	-1286.4	0.0	41.1	3.8	0.4	43.2	-1197.9
<b>2005</b>	<b>-1360.8</b>	<b>0.0</b>	<b>42.3</b>	<b>3.9</b>	<b>0.4</b>	<b>24.7</b>	<b>-1289.4</b>
2006	-1353.6	0.0	38.8	3.6	0.4	25.9	-1284.9
2007	-1391.7	0.0	30.9	2.8	0.3	27.1	-1330.6
2008	-1485.8	0.0	25.8	2.4	0.2	28.2	-1429.1
2009	-1635.4	0.0	21.6	2.0	0.2	29.3	-1582.2
2010	-1865.6	0.0	20.2	1.8	0.2	30.9	-1812.5
2011	-2106.9	0.0	14.8	1.4	0.1	32.2	-2058.3
2012	-2345.8	0.0	11.4	1.0	0.1	33.4	-2299.8
2013	-2574.7	0.0	6.9	0.6	0.1	34.5	-2532.6
2014	-2784.6	0.0	4.6	0.4	0.0	35.5	-2744.1
2015	-2684.7	-190.6	2.9	0.3	0.0	36.1	-2645.4
2016	-2967.6	-79.2	1.5	0.1	0.0	36.7	-2929.3
2017	-3232.9	-23.8	0.0	0.0	0.0	0.0	-3232.9
2018	-3511.4	16.1	0.0	0.0	0.0	0.0	-3511.4
2019	-3791.1	42.3	0.0	0.0	0.0	0.0	-3791.1
<b>2020</b>	<b>-3581.1</b>	<b>-222.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>-3581.1</b>

<b>C (High) Scotland</b>	<b>Afforestation</b>		<b>Deforestation</b>				<b>Art 3.3 (excludes HWP)</b>
	<b>Biomass stocks</b>	<b>Harvested Wood Products</b>	<b>Immediate loss (Biomass) CO<sub>2</sub></b>	<b>Biomass stocks</b>	<b>Harvested Wood Products</b>	<b>Immediate loss (Biomass) CO<sub>2</sub></b>	<b>Biomass stocks</b>
<b>1990</b>	<b>30.8</b>	<b>0.0</b>	<b>34.0</b>	<b>3.1</b>	<b>0.3</b>	<b>4.2</b>	<b>72.4</b>
1991	159.1	0.0	30.8	2.8	0.3	8.2	201.2
1992	196.9	0.0	31.9	2.9	0.3	11.9	244.0
1993	152.4	0.0	23.3	2.1	0.2	15.4	193.5
1994	38.3	0.0	26.8	2.5	0.2	18.7	86.5
<b>1995</b>	<b>-120.4</b>	<b>0.0</b>	<b>28.3</b>	<b>2.6</b>	<b>0.3</b>	<b>21.9</b>	<b>-67.4</b>
1996	-268.5	0.0	34.2	3.1	0.3	24.8	-206.0
1997	-429.9	0.0	35.1	3.2	0.3	27.6	-363.6
1998	-563.4	0.0	35.6	3.3	0.3	30.2	-493.9
1999	-690.4	0.0	43.0	3.9	0.4	32.7	-610.4
<b>2000</b>	<b>-814.8</b>	<b>0.0</b>	<b>47.7</b>	<b>4.4</b>	<b>0.4</b>	<b>35.0</b>	<b>-727.3</b>
2001	-919.5	0.0	57.0	5.2	0.5	37.2	-819.4
2002	-1022.7	0.0	47.9	4.4	0.4	39.3	-930.6
2003	-1158.1	0.0	45.2	4.1	0.4	41.3	-1067.0
2004	-1286.4	0.0	41.1	3.8	0.4	43.2	-1197.9
<b>2005</b>	<b>-1419.7</b>	<b>0.0</b>	<b>44.1</b>	<b>4.0</b>	<b>0.4</b>	<b>80.6</b>	<b>-1290.6</b>
2006	-1580.3	0.0	44.0	4.0	0.4	82.3	-1449.6
2007	-1693.8	0.0	41.4	3.8	0.4	84.0	-1564.2
<b>2008</b>	<b>-1766.9</b>	<b>0.0</b>	<b>41.7</b>	<b>3.8</b>	<b>0.4</b>	<b>85.6</b>	<b>-1635.4</b>
<b>2009</b>	<b>-1805.0</b>	<b>0.0</b>	<b>43.0</b>	<b>3.9</b>	<b>0.4</b>	<b>87.0</b>	<b>-1670.6</b>
<b>2010</b>	<b>-1859.2</b>	<b>0.0</b>	<b>47.1</b>	<b>4.3</b>	<b>0.4</b>	<b>86.8</b>	<b>-1720.6</b>
<b>2011</b>	<b>-1895.8</b>	<b>0.0</b>	<b>47.3</b>	<b>4.3</b>	<b>0.4</b>	<b>86.9</b>	<b>-1756.8</b>
<b>2012</b>	<b>-1927.5</b>	<b>0.0</b>	<b>49.6</b>	<b>4.5</b>	<b>0.5</b>	<b>88.0</b>	<b>-1784.9</b>
2013	-1957.9	0.0	50.8	4.7	0.5	88.7	-1813.4
2014	-1980.8	0.0	54.1	5.0	0.5	89.5	-1831.8
<b>2015</b>	<b>-1703.9</b>	<b>-190.6</b>	<b>56.8</b>	<b>5.2</b>	<b>0.5</b>	<b>89.9</b>	<b>-1551.4</b>
2016	-1817.6	-79.2	58.2	5.3	0.5	90.4	-1663.1
2017	-1918.4	-23.8	59.2	5.4	0.6	90.8	-1762.3
2018	-2034.6	16.1	60.6	5.6	0.6	91.3	-1876.6
2019	-2151.9	42.3	63.5	5.8	0.6	91.8	-1990.2
<b>2020</b>	<b>-1776.9</b>	<b>-222.1</b>	<b>65.7</b>	<b>6.0</b>	<b>0.6</b>	<b>92.3</b>	<b>-1612.3</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) Wales	Afforestation		Deforestation				Art 3.3 (excludes HWP)
	Gg CO <sub>2</sub> /year or GWP equiv Gg CO <sub>2</sub> /year	Biomass stocks	Harvested Wood Products	Immediate loss (Biomass) CO <sub>2</sub>	Immediate loss (Biomass) CH <sub>4</sub>	Immediate loss (Biomass) N <sub>2</sub> O	Delayed loss (Soil) CO <sub>2</sub>
<b>1990</b>	<b>-1.3</b>	<b>0.0</b>	<b>8.6</b>	<b>0.8</b>	<b>0.1</b>	<b>1.1</b>	<b>9.3</b>
1991	-0.3	0.0	7.8	0.7	0.1	2.1	10.3
1992	-2.0	0.0	8.1	0.7	0.1	3.0	9.9
1993	-6.0	0.0	5.9	0.5	0.1	3.9	4.3
1994	-12.0	0.0	6.8	0.6	0.1	4.7	0.2
<b>1995</b>	<b>-18.3</b>	<b>0.0</b>	<b>7.2</b>	<b>0.7</b>	<b>0.1</b>	<b>5.5</b>	<b>-4.9</b>
1996	-25.4	0.0	8.6	0.8	0.1	6.3	-9.7
1997	-32.9	0.0	8.9	0.8	0.1	7.0	-16.2
1998	-40.2	0.0	9.0	0.8	0.1	7.6	-22.6
1999	-46.5	0.0	10.9	1.0	0.1	8.3	-26.3
<b>2000</b>	<b>-52.0</b>	<b>0.0</b>	<b>12.0</b>	<b>1.1</b>	<b>0.1</b>	<b>8.8</b>	<b>-29.9</b>
2001	-57.0	0.0	14.4	1.3	0.1	9.4	-31.7
2002	-63.5	0.0	12.1	1.1	0.1	9.9	-40.3
2003	-70.5	0.0	11.4	1.0	0.1	10.4	-47.5
2004	-76.3	0.0	10.4	1.0	0.1	10.9	-53.9
<b>2005</b>	<b>-80.4</b>	<b>0.0</b>	<b>10.9</b>	<b>1.0</b>	<b>0.1</b>	<b>11.4</b>	<b>-57.0</b>
2006	-83.9	0.0	10.4	1.0	0.1	11.8	-60.6
2007	-87.4	0.0	9.1	0.8	0.1	12.2	-65.2
<b>2008</b>	<b>-91.5</b>	<b>0.0</b>	<b>8.5</b>	<b>0.8</b>	<b>0.1</b>	<b>12.6</b>	<b>-69.6</b>
<b>2009</b>	<b>-96.3</b>	<b>0.0</b>	<b>8.2</b>	<b>0.7</b>	<b>0.1</b>	<b>12.9</b>	<b>-74.4</b>
<b>2010</b>	<b>-102.7</b>	<b>0.0</b>	<b>8.5</b>	<b>0.8</b>	<b>0.1</b>	<b>13.2</b>	<b>-80.1</b>
<b>2011</b>	<b>-108.9</b>	<b>0.0</b>	<b>7.8</b>	<b>0.7</b>	<b>0.1</b>	<b>13.6</b>	<b>-86.7</b>
<b>2012</b>	<b>-114.9</b>	<b>0.0</b>	<b>7.7</b>	<b>0.7</b>	<b>0.1</b>	<b>13.9</b>	<b>-92.6</b>
2013	-120.7	0.0	7.3	0.7	0.1	14.2	-98.6
2014	-126.2	0.0	7.4	0.7	0.1	14.4	-103.6
<b>2015</b>	<b>-122.6</b>	<b>-6.0</b>	<b>7.4</b>	<b>0.7</b>	<b>0.1</b>	<b>14.7</b>	<b>-99.7</b>
2016	-132.9	-1.6	7.0	0.6	0.1	14.9	-110.3
2017	-142.7	0.7	6.5	0.6	0.1	15.2	-120.3
2018	-152.3	1.9	6.1	0.6	0.1	15.4	-130.1
2019	-159.5	0.8	6.1	0.6	0.1	15.6	-137.1
<b>2020</b>	<b>-154.9</b>	<b>-6.6</b>	<b>6.0</b>	<b>0.5</b>	<b>0.1</b>	<b>15.8</b>	<b>-132.6</b>

<b>B (Low) Wales</b>	<b>Afforestation</b>		<b>Deforestation</b>				<b>Art 3.3 (excludes HWP)</b>
	<b>Biomass stocks</b>	<b>Harvested Wood Products</b>	<b>Immediate loss (Biomass) CO<sub>2</sub></b>	<b>Biomass stocks</b>	<b>Harvested Wood Products</b>	<b>Immediate loss (Biomass) CO<sub>2</sub></b>	<b>Biomass stocks</b>
<b>1990</b>	<b>-1.3</b>	<b>0.0</b>	<b>8.6</b>	<b>0.8</b>	<b>0.1</b>	<b>1.1</b>	<b>9.3</b>
1991	-0.3	0.0	7.8	0.7	0.1	2.1	10.3
1992	-2.0	0.0	8.1	0.7	0.1	3.0	9.9
1993	-6.0	0.0	5.9	0.5	0.1	3.9	4.3
1994	-12.0	0.0	6.8	0.6	0.1	4.7	0.2
<b>1995</b>	<b>-18.3</b>	<b>0.0</b>	<b>7.2</b>	<b>0.7</b>	<b>0.1</b>	<b>5.5</b>	<b>-4.9</b>
1996	-25.4	0.0	8.6	0.8	0.1	6.3	-9.7
1997	-32.9	0.0	8.9	0.8	0.1	7.0	-16.2
1998	-40.2	0.0	9.0	0.8	0.1	7.6	-22.6
1999	-46.5	0.0	10.9	1.0	0.1	8.3	-26.3
<b>2000</b>	<b>-52.0</b>	<b>0.0</b>	<b>12.0</b>	<b>1.1</b>	<b>0.1</b>	<b>8.8</b>	<b>-29.9</b>
2001	-57.0	0.0	14.4	1.3	0.1	9.4	-31.7
2002	-63.5	0.0	12.1	1.1	0.1	9.9	-40.3
2003	-70.5	0.0	11.4	1.0	0.1	10.4	-47.5
2004	-76.3	0.0	10.4	1.0	0.1	10.9	-53.9
<b>2005</b>	<b>-80.7</b>	<b>0.0</b>	<b>10.7</b>	<b>1.0</b>	<b>0.1</b>	<b>6.2</b>	<b>-62.6</b>
2006	-82.5	0.0	9.8	0.9	0.1	6.6	-65.2
2007	-87.3	0.0	7.8	0.7	0.1	6.8	-71.8
<b>2008</b>	<b>-95.9</b>	<b>0.0</b>	<b>6.5</b>	<b>0.6</b>	<b>0.1</b>	<b>7.1</b>	<b>-81.6</b>
<b>2009</b>	<b>-108.4</b>	<b>0.0</b>	<b>5.5</b>	<b>0.5</b>	<b>0.1</b>	<b>7.4</b>	<b>-94.9</b>
<b>2010</b>	<b>-124.7</b>	<b>0.0</b>	<b>5.1</b>	<b>0.5</b>	<b>0.0</b>	<b>7.8</b>	<b>-111.3</b>
<b>2011</b>	<b>-141.5</b>	<b>0.0</b>	<b>3.7</b>	<b>0.3</b>	<b>0.0</b>	<b>8.1</b>	<b>-129.3</b>
<b>2012</b>	<b>-157.9</b>	<b>0.0</b>	<b>2.9</b>	<b>0.3</b>	<b>0.0</b>	<b>8.4</b>	<b>-146.3</b>
2013	-173.5	0.0	1.8	0.2	0.0	8.7	-162.9
2014	-188.0	0.0	1.2	0.1	0.0	9.0	-177.8
<b>2015</b>	<b>-192.8</b>	<b>-6.0</b>	<b>0.7</b>	<b>0.1</b>	<b>0.0</b>	<b>9.1</b>	<b>-182.9</b>
2016	-211.1	-1.6	0.4	0.0	0.0	9.3	-201.4
2017	-228.3	0.7	0.0	0.0	0.0	0.0	-228.3
2018	-245.2	1.9	0.0	0.0	0.0	0.0	-245.2
2019	-259.6	0.8	0.0	0.0	0.0	0.0	-259.6
<b>2020</b>	<b>-262.1</b>	<b>-6.6</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>-262.1</b>



<b>C (High) Wales</b>	<b>Afforestation</b>		<b>Deforestation</b>				<b>Art 3.3 (excludes HWP)</b>
	<b>Gg CO<sub>2</sub>/year or GWP equiv Gg CO<sub>2</sub>/year</b>	<b>Biomass stocks</b>	<b>Harvested Wood Products</b>	<b>Immediate loss (Biomass) CO<sub>2</sub></b>	<b>Biomass stocks</b>	<b>Harvested Wood Products</b>	<b>Immediate loss (Biomass) CO<sub>2</sub></b>
<b>1990</b>	<b>-1.3</b>	<b>0.0</b>	<b>8.6</b>	<b>0.8</b>	<b>0.1</b>	<b>1.1</b>	<b>9.3</b>
1991	-0.3	0.0	7.8	0.7	0.1	2.1	10.3
1992	-2.0	0.0	8.1	0.7	0.1	3.0	9.9
1993	-6.0	0.0	5.9	0.5	0.1	3.9	4.3
1994	-12.0	0.0	6.8	0.6	0.1	4.7	0.2
<b>1995</b>	<b>-18.3</b>	<b>0.0</b>	<b>7.2</b>	<b>0.7</b>	<b>0.1</b>	<b>5.5</b>	<b>-4.9</b>
1996	-25.4	0.0	8.6	0.8	0.1	6.3	-9.7
1997	-32.9	0.0	8.9	0.8	0.1	7.0	-16.2
1998	-40.2	0.0	9.0	0.8	0.1	7.6	-22.6
1999	-46.5	0.0	10.9	1.0	0.1	8.3	-26.3
<b>2000</b>	<b>-52.0</b>	<b>0.0</b>	<b>12.0</b>	<b>1.1</b>	<b>0.1</b>	<b>8.8</b>	<b>-29.9</b>
2001	-57.0	0.0	14.4	1.3	0.1	9.4	-31.7
2002	-63.5	0.0	12.1	1.1	0.1	9.9	-40.3
2003	-70.5	0.0	11.4	1.0	0.1	10.4	-47.5
2004	-76.3	0.0	10.4	1.0	0.1	10.9	-53.9
<b>2005</b>	<b>-80.2</b>	<b>0.0</b>	<b>11.1</b>	<b>1.0</b>	<b>0.1</b>	<b>20.4</b>	<b>-47.7</b>
2006	-84.8	0.0	11.1	1.0	0.1	20.8	-51.8
2007	-87.4	0.0	10.4	1.0	0.1	21.2	-54.7
<b>2008</b>	<b>-88.6</b>	<b>0.0</b>	<b>10.5</b>	<b>1.0</b>	<b>0.1</b>	<b>21.6</b>	<b>-55.4</b>
<b>2009</b>	<b>-88.4</b>	<b>0.0</b>	<b>10.9</b>	<b>1.0</b>	<b>0.1</b>	<b>22.0</b>	<b>-54.5</b>
<b>2010</b>	<b>-88.4</b>	<b>0.0</b>	<b>11.9</b>	<b>1.1</b>	<b>0.1</b>	<b>21.9</b>	<b>-53.4</b>
<b>2011</b>	<b>-87.7</b>	<b>0.0</b>	<b>11.9</b>	<b>1.1</b>	<b>0.1</b>	<b>21.9</b>	<b>-52.6</b>
<b>2012</b>	<b>-86.9</b>	<b>0.0</b>	<b>12.5</b>	<b>1.1</b>	<b>0.1</b>	<b>22.2</b>	<b>-50.9</b>
2013	-86.4	0.0	12.8	1.2	0.1	22.4	-49.9
2014	-86.0	0.0	13.7	1.3	0.1	22.6	-48.3
<b>2015</b>	<b>-76.8</b>	<b>-6.0</b>	<b>14.3</b>	<b>1.3</b>	<b>0.1</b>	<b>22.7</b>	<b>-38.3</b>
2016	-82.1	-1.6	14.7	1.3	0.1	22.8	-43.1
2017	-86.9	0.7	15.0	1.4	0.1	22.9	-47.5
2018	-91.8	1.9	15.3	1.4	0.1	23.1	-51.9
2019	-94.3	0.8	16.0	1.5	0.1	23.2	-53.5
<b>2020</b>	<b>-85.1</b>	<b>-6.6</b>	<b>16.6</b>	<b>1.5</b>	<b>0.2</b>	<b>23.3</b>	<b>-43.6</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) N. Ireland	Afforestation		Deforestation				Art 3.3 (excludes HWP)
	Gg CO <sub>2</sub> /year or GWP equiv Gg CO <sub>2</sub> /year	Biomass stocks	Harvested Wood Products	Immediate loss (Biomass) CO <sub>2</sub>	Immediate loss (Biomass) CH <sub>4</sub>	Immediate loss (Biomass) N <sub>2</sub> O	Delayed loss (Soil) CO <sub>2</sub>
<b>1990</b>	<b>2.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>2.2</b>
1991	14.9	0.0	0.0	0.0	0.0	0.0	14.9
1992	15.7	0.0	0.0	0.0	0.0	0.0	15.7
1993	7.6	0.0	0.0	0.0	0.0	0.0	7.6
1994	-1.5	0.0	0.0	0.0	0.0	0.0	-1.5
<b>1995</b>	<b>-15.5</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>-15.5</b>
1996	-34.0	0.0	0.0	0.0	0.0	0.0	-34.0
1997	-50.2	0.0	0.0	0.0	0.0	0.0	-50.2
1998	-66.0	0.0	0.0	0.0	0.0	0.0	-66.0
1999	-79.6	0.0	0.0	0.0	0.0	0.0	-79.6
<b>2000</b>	<b>-89.6</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>-89.6</b>
2001	-97.1	0.0	0.0	0.0	0.0	0.0	-97.1
2002	-105.0	0.0	0.0	0.0	0.0	0.0	-105.0
2003	-112.7	0.0	0.0	0.0	0.0	0.0	-112.7
2004	-121.4	0.0	0.0	0.0	0.0	0.0	-121.4
<b>2005</b>	<b>-130.7</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>-130.7</b>
2006	-139.4	0.0	0.0	0.0	0.0	0.0	-139.4
2007	-147.2	0.0	0.0	0.0	0.0	0.0	-147.2
<b>2008</b>	<b>-159.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>-159.2</b>
<b>2009</b>	<b>-169.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>-169.2</b>
<b>2010</b>	<b>-177.8</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>-177.8</b>
<b>2011</b>	<b>-187.6</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>-187.6</b>
<b>2012</b>	<b>-196.6</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>-196.6</b>
2013	-168.1	-21.4	0.0	0.0	0.0	0.0	-168.1
2014	-187.6	-6.5	0.0	0.0	0.0	0.0	-187.6
<b>2015</b>	<b>-206.3</b>	<b>0.9</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>-206.3</b>
2016	-205.1	-5.9	0.0	0.0	0.0	0.0	-205.1
2017	-219.5	-0.6	0.0	0.0	0.0	0.0	-219.5
2018	-202.2	-15.3	0.0	0.0	0.0	0.0	-202.2
2019	-216.5	-6.2	0.0	0.0	0.0	0.0	-216.5
<b>2020</b>	<b>-236.0</b>	<b>1.9</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>-236.0</b>

<b>B (Low) N. Ireland</b>	<b>Afforestation</b>		<b>Deforestation</b>				<b>Art 3.3 (excludes HWP)</b>
	<b>Gg CO<sub>2</sub> /year or GWP equiv Gg CO<sub>2</sub>/year</b>	<b>Biomass stocks</b>	<b>Harvested Wood Products</b>	<b>Immediate loss (Biomass) CO<sub>2</sub></b>	<b>Biomass stocks</b>	<b>Harvested Wood Products</b>	<b>Immediate loss (Biomass) CO<sub>2</sub></b>
<b>1990</b>	<b>2.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>2.2</b>
1991	14.9	0.0	0.0	0.0	0.0	0.0	14.9
1992	15.7	0.0	0.0	0.0	0.0	0.0	15.7
1993	7.6	0.0	0.0	0.0	0.0	0.0	7.6
1994	-1.5	0.0	0.0	0.0	0.0	0.0	-1.5
<b>1995</b>	<b>-15.5</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>-15.5</b>
1996	-34.0	0.0	0.0	0.0	0.0	0.0	-34.0
1997	-50.2	0.0	0.0	0.0	0.0	0.0	-50.2
1998	-66.0	0.0	0.0	0.0	0.0	0.0	-66.0
1999	-79.6	0.0	0.0	0.0	0.0	0.0	-79.6
<b>2000</b>	<b>-89.6</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>-89.6</b>
2001	-97.1	0.0	0.0	0.0	0.0	0.0	-97.1
2002	-105.0	0.0	0.0	0.0	0.0	0.0	-105.0
2003	-112.7	0.0	0.0	0.0	0.0	0.0	-112.7
2004	-121.4	0.0	0.0	0.0	0.0	0.0	-121.4
<b>2005</b>	<b>-128.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>-128.0</b>
2006	-129.1	0.0	0.0	0.0	0.0	0.0	-129.1
2007	-133.5	0.0	0.0	0.0	0.0	0.0	-133.5
<b>2008</b>	<b>-146.3</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>-146.3</b>
<b>2009</b>	<b>-161.3</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>-161.3</b>
<b>2010</b>	<b>-177.8</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>-177.8</b>
<b>2011</b>	<b>-196.8</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>-196.8</b>
<b>2012</b>	<b>-215.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>-215.2</b>
2013	-195.7	-21.4	0.0	0.0	0.0	0.0	-195.7
2014	-223.6	-6.5	0.0	0.0	0.0	0.0	-223.6
<b>2015</b>	<b>-250.4</b>	<b>0.9</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>-250.4</b>
2016	-257.0	-5.9	0.0	0.0	0.0	0.0	-257.0
2017	-278.9	-0.6	0.0	0.0	0.0	0.0	-278.9
2018	-269.1	-15.3	0.0	0.0	0.0	0.0	-269.1
2019	-290.9	-6.2	0.0	0.0	0.0	0.0	-290.9
<b>2020</b>	<b>-318.0</b>	<b>1.9</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>-318.0</b>

<b>C (High) N. Ireland</b>	<b>Afforestation</b>		<b>Deforestation</b>				<b>Art 3.3 (excludes HWP)</b>
	<b>Biomass stocks</b>	<b>Harvested Wood Products</b>	<b>Immediate loss (Biomass) CO<sub>2</sub></b>	<b>Immediate loss (Biomass) CH<sub>4</sub></b>	<b>Immediate loss (Biomass) N<sub>2</sub>O</b>	<b>Delayed loss (Soil) CO<sub>2</sub></b>	<b>Afforestation + Deforestation</b>
<b>1990</b>	<b>2.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>2.2</b>
1991	14.9	0.0	0.0	0.0	0.0	0.0	14.9
1992	15.7	0.0	0.0	0.0	0.0	0.0	15.7
1993	7.6	0.0	0.0	0.0	0.0	0.0	7.6
1994	-1.5	0.0	0.0	0.0	0.0	0.0	-1.5
<b>1995</b>	<b>-15.5</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>-15.5</b>
1996	-34.0	0.0	0.0	0.0	0.0	0.0	-34.0
1997	-50.2	0.0	0.0	0.0	0.0	0.0	-50.2
1998	-66.0	0.0	0.0	0.0	0.0	0.0	-66.0
1999	-79.6	0.0	0.0	0.0	0.0	0.0	-79.6
<b>2000</b>	<b>-89.6</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>-89.6</b>
2001	-97.1	0.0	0.0	0.0	0.0	0.0	-97.1
2002	-105.0	0.0	0.0	0.0	0.0	0.0	-105.0
2003	-112.7	0.0	0.0	0.0	0.0	0.0	-112.7
2004	-121.4	0.0	0.0	0.0	0.0	0.0	-121.4
<b>2005</b>	<b>-132.4</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>-132.4</b>
2006	-146.1	0.0	0.0	0.0	0.0	0.0	-146.1
2007	-156.2	0.0	0.0	0.0	0.0	0.0	-156.2
<b>2008</b>	<b>-167.5</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>-167.5</b>
<b>2009</b>	<b>-174.3</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>-174.3</b>
<b>2010</b>	<b>-177.8</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>-177.8</b>
<b>2011</b>	<b>-181.5</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>-181.5</b>
<b>2012</b>	<b>-184.5</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>-184.5</b>
2013	-150.2	-21.4	0.0	0.0	0.0	0.0	-150.2
2014	-164.1	-6.5	0.0	0.0	0.0	0.0	-164.1
<b>2015</b>	<b>-177.5</b>	<b>0.9</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>-177.5</b>
2016	-171.3	-5.9	0.0	0.0	0.0	0.0	-171.3
2017	-180.8	-0.6	0.0	0.0	0.0	0.0	-180.8
2018	-158.6	-15.3	0.0	0.0	0.0	0.0	-158.6
2019	-168.1	-6.2	0.0	0.0	0.0	0.0	-168.1
<b>2020</b>	<b>-182.6</b>	<b>1.9</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>-182.6</b>