

Emissions and Removals of Greenhouse Gases from Land Use, Land Use Change and Forestry (LULUCF) for England, Scotland, Wales and Northern Ireland: 1990-2012

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1.0 Executive Summary

This report presents a summary of the net emissions and removals of greenhouse gases for 1990-2012 by the Land Use, Land Use Change and Forestry sector of the UNFCCC National Inventory for each of the UK Administrations (England, Scotland, Wales and Northern Ireland). Supporting data is available at http://naei.defra.gov.uk/reports/reports?report_id=788. A full report for the UK is available in the 1990-2012 UK Greenhouse Gas Inventory Report, available on the National Atmospheric Emissions Inventory at http://naei.defra.gov.uk/reports/reports?report_id=789.

The LULUCF sector in England was a net sink of GHG emissions in 2012 (-1.0 Mt CO₂e). Between 1990 and 2003 it was a net source (greatest at 2.6 Mt CO₂e in 1995). From 2003-2012 emissions declined steadily to 2010 (-1.4 Mt CO₂e) rising thereafter to 2011 (-1.3 Mt CO₂e) and 2012 (-1.0 Mt CO₂e).

The LULUCF sector in Scotland was a net sink of GHG emissions in 2012 (-5.7Mt CO₂e) and has remained a net sink throughout the whole timeline. In 1990 the Scotland LULUCF sector net emissions were at their highest at -0.8 Mt CO₂e and gradually reduced to the 1994 level of -1.2 Mt CO₂e. They rose to -0.9 Mt CO₂e in 1995, followed by a steady decline to -5.7 Mt CO₂e in 2012.

The LULUCF sector in Wales was a small net sink of GHG emissions in 2012 (-0.5Mt CO₂e). In 1990 Wales was a small source (0.07Mt CO₂e), becoming a small net sink in 1991 with net emissions gradually decreasing thereafter until 2007 (0.6Mt CO₂e). Emissions since 2007 show small annual fluctuations between -0.6Mt CO₂e and -0.5Mt CO₂e but are always a net sink.

The LULUCF sector in Northern Ireland was a net source in 2012 (0.2 Mt CO₂). In 1990 Northern Ireland was a small source (0.1Mt CO₂e) but was a small net sink between 1993 and 2011, becoming a net source again in 2012.

Devolved Administration-level emissions estimates differ from previous inventories, mainly due to improved methodology for the Forest land category, as a different carbon accounting model was used along with updated input datasets on forest planting and deforestation. These improved estimates also have an impact on estimates for land use categories converted from Forest land, particularly to Grassland. Some activity data in other categories has also been updated. Verification of the new modelling approach for forestry is provided in a separate technical report.

2.0 Introduction

2.1 National Reporting

The Centre for Ecology and Hydrology (CEH) under contract to the Department of Energy and Climate Change (DECC) and previously under contract to the Department for Environment Food and Rural Affairs (Defra), produces yearly estimates of greenhouse gas emissions arising as a result of land-use, land use change and forestry activities.

Under international conventions; reporting is required at the UK, Overseas Territories and Crown Dependencies level, to the United Nations Framework Convention on Climate Change (UNFCCC) and at the UK level for the European Union Monitoring Mechanism (EUMM); and at both levels for Kyoto Protocol (KP). KP reporting consists of five year commitment periods commencing in 2008. KP reporting currently covers emissions and removals for the first commitment period 2008-2012 arising from afforestation, deforestation

and forest management activities. Forest management is capped at -1.36 MtCO₂ per year. See Appendix 2 for KP data for each UK Administration.

LULUCF emissions estimates are reported as part of the UK Greenhouse Gas Inventory Report, available on the National Atmospheric Emissions Inventory website <http://naei.defra.gov.uk/reports/>. Chapter 7 and Annex 3.6 of the National Inventory Report contain information on the LULUCF sector, and Chapter 11 contains additional information on the reporting of LULUCF activities for the Kyoto Protocol. Additional information on LULUCF and KP-LULUCF inventory reporting will be made available at <http://ecosystemghg.ceh.ac.uk/> once the current restructuring of this website is complete.

The current LULUCF inventory methods use a combination of top-down and bottom-up¹ approaches, based on activity data for each of the UK Devolved Administrations and the UK as a whole. As a result of this approach, separate estimates of emissions and removals from LULUCF activities are produced for England, Scotland, Wales and Northern Ireland, and these are summed along with data from the relevant Crown Dependencies and Overseas Territories, to give emissions and removals at the UK scale.

2.2 UK Administration Reporting

This report details net emissions for each UK administration for 1990-2012 inventory and provides explanation of changes since the previous edition of this report (1990-2011). In the main text, the trends in CO₂ emissions / removals are presented and discussed for each UK administration and each category within LULUCF, along with total emissions of methane and nitrous oxide.

Summary tables and graphs for 1990, 1995, 2000, 2005, 2010, 2011 and 2012 are given for each country in Appendix 1, and for LULUCF emissions/removals under the Kyoto Protocol in Appendix 2. Appendix 3 contains the annual Land Use Change matrices for each country. A full set of GHG emissions/removals and areas of land use change for each country are published with this report at <http://naei.defra.gov.uk/reports/>

2.3 LULUCF

The Land Use, Land Use Change and Forestry (LULUCF) sector includes carbon stock changes, emissions of greenhouse gases (carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O)) by sources and removals of CO₂ by sinks from land use, land use change and forestry activities. Removals of CO₂ are conventionally presented as negative quantities. Total greenhouse gas emissions are described as carbon dioxide equivalents (CO₂e), using Global Warming Potentials (GWP) of 21 for CH₄ and 310 for N₂O (as used in the inventories submitted to the UNFCCC). CO₂ comprises the majority of emissions (96%) and all of the removals (100%) for LULUCF in the UK. The LULUCF categories mainly comprises estimates of emissions and removals of carbon dioxide (CO₂) stored in soil and biomass and as a result of changes to this storage capacity due to either land use practices, conversions between land use categories and a limited number of land management practices.

¹ A top-down approach takes UK level activity data and spatially disaggregates it report at the Devolved-Administration level whereas a bottom up approach takes individual spatially-disaggregated activity data which it combines to give a UK national total.

The Land Use, Land Use Change and Forestry (LULUCF) sector comprises six categories: Forest Land, Cropland, Grassland, Wetland, Settlement, Other Land and Other - Harvested Wood Products. See Appendix 4 for input data tables.

Emissions resulting from land use change are those due to a change between two of the land use categories (excludes Harvested Wood Products). These emissions are reported under Land converted to X for each category. For instance emissions from Deforestation are reported in (in descending order of land area): Land converted to Grassland, Land converted to Cropland, Land converted to Settlement. As land changes from one land use category to another CO₂ is emitted or removed due to gradual changes in soil carbon stocks which continue for decades to centuries. After twenty years the area of land moves from being reported under Land converted to X into Land remaining X for each category. For example, Grassland remaining Grassland values for 1990 are all historic grassland and conversions which happened in 1970 or earlier. Land converted to Grassland for 1990 is all conversions between 1971 and 1990. However, emissions and removals as a result of the historical land use change continue to occur after the twenty year transition period.

The Forest land category mainly comprises estimates of removals. Emissions from this category are relatively small and arise from non-CO₂ gases. Nitrous oxide (N₂O) is produced on conversion of land to forest as a result of fertilisation or drainage of soil. Nitrous oxide and methane (CH₄) are given off by wildfires on Forest land.

Cropland soils tend to have lower carbon stocks than soils under other land uses. The Cropland category mainly comprises estimates of emissions as a result of land conversion to Cropland and emissions from historical land conversion in Cropland remaining Cropland. Additional CO₂ emissions are released by the carbonate in agricultural lime in the form of dolomite, limestone and chalk applied to fields to improve soil pH. Emissions from non-CO₂ gases arise from nitrous oxide (N₂O) which is produced when soil is disturbed on conversion of land to Cropland. Very small amounts of nitrous oxide and methane (CH₄) are given off by wildfires on cropland and these gases are given off from controlled burning during forest conversion to cropland. (Note that N₂O emissions from application of fertiliser to Cropland are reported in the Agriculture sector inventory).

The Grassland category mainly comprises estimates of removals due to historical conversion of land to Grassland reported under Grassland remaining Grassland. Grassland remaining Grassland which has not undergone historic conversion to Grassland is taken to be in carbon equilibrium, so is not a major carbon sink. CO₂ emissions are released by carbonate in agricultural lime in the form of dolomite, limestone and chalk applied to fields to improve soil pH. Small amounts of nitrous oxide (N₂O) and methane (CH₄) are given off by wildfires on Grassland and controlled burning during forest conversion to Grassland (0.34% of UK Grassland emissions).

The main land use changes for Cropland and Grassland are conversions between these categories. The main source of emissions is from Cropland remaining Cropland which was converted from Grassland more than 20 years before the inventory date, and the main removal is by Grassland remaining Grassland which was converted from Cropland more than 20 years before the inventory date. Emissions and removals due to changes in soil carbon stocks resulting from land management such as tillage regimes, inputs of manure and crop residues and improvement of grassland are not currently captured in LULUCF. Emissions and removals

from short term “churn²” between Grassland and Cropland are not fully captured at present. Work which will refine churn rates for each Devolved Administration is currently ongoing.

The Wetland category estimates emissions of managed peatlands only, that is CO₂ emitted from current and abandoned sites of commercial peat extraction. The inventory does not currently report removals from managed or natural wetlands or those arising from wetland creation or rewetting. The reporting requirements for the wetland sector are changing and this may be revised in future inventories. Estimates of CO₂ released from peat extraction sites are on-site emissions arising from site disturbance and off-site emissions from horticultural peat only. Off-site emissions from fuel peat are estimated in the Energy Sector under Residential emissions in 1A4b of the NIR <http://naei.defra.gov.uk/reports/>. Approximately 90% of the volume of peat sold in the UK is for horticultural use, most of which is sold via retail for domestic use, and to the horticultural industry for use as growing media for commercial plant propagation.

The Settlements category is a net source of emissions due to soil emissions of CO₂ produced on land conversion to Settlements and continuation of the land use change emission after the twenty year transition period (see above) when land is considered to be Settlement remaining Settlement. Small amounts of non-CO₂ emissions are produced on land conversion to Settlements and wildfires on town parks in the UK (0.1% of Settlement emissions)

Harvested Wood Products reported under LULUCF are long-lived and short-lived sawn timber, particleboard and paper. These are removed from Forest land remaining Forest land in forest management and on deforestation of Forest land to other land categories. Harvested Wood Products represent a temporary removal of CO₂ from the environment, until they reach the end of their lifetime and decay releasing CO₂. Harvested Wood Products trends reflect demand for and lifetime of timber products and forest management thinning and felling regimes.

2.4 Changes to LULUCF Sector since 1990-2011

With every annual update of the greenhouse gas inventory, emissions and removals will vary for each year from 1990 onwards due to the incorporation of new datasets and methodologies used to underpin the inventory. An overview of the improvements and data revisions since the 1990-2011 inventory are provided in Table 1.

The most significant change in methodology was a change in the model used for carbon accounting in the forestry sector and a subsequent change in the forestry activity data fed into the models. Previous inventories were based upon the C-Flow model which uses representative broadleaf (beech) and conifer (sitka spruce) species to model all forests in the UK with constant management regimes and harvesting times. The new inventory was compiled using the CARBINE model which is able to represent all of the introduced and native plantation and naturally-occurring species relevant to the UK, the different growth rates of forests and four broad classes of forest management (clear-fell with thinnings, clear-fell without thinnings, thinned but not clear-felled and no timber production). The forest carbon sub-model is further compartmentalised to represent fractions due to tree stems, branches, foliage, and roots. The method can be described as Tier 3, as defined in the Good Practice Guidance for LULUCF (IPCC 2006) and gives a more realistic representation of UK forestry.

² Churn refers to cropland – grassland rotation practices where the land undergoes ongoing conversions between cropland and grassland more quickly than the 20 year transition period required for land to be reported as either cropland remaining cropland or grassland remaining grassland.

As part of the move to the CARBINE model, the forestry datasets which provide input to the model have been changed. Planting data have been back-dated to 1500, whereas with C-Flow, all forests planted prior to 1920 were assumed to be in carbon equilibrium. Deforestation rates have also increased from those used in previous submissions which were believed to under-report deforestation. The changes to deforestation rates were most significant from 2000 onwards. The data on harvested wood products produced by CARBINE is more closely related to timber production statistics rather than the standard rotation lengths assumed by C-Flow.

A detailed description of the changes in method and datasets can be found in Annex 3.6 of the 1990-2012 National Greenhouse Gas Inventory Report³. A more in depth review of the differences between the CARBINE and C-Flow models, including inter-model comparisons when run with identical input data, is provided in a separate technical report (CEH, 2014).

The improved methodology has changed Forest land and Harvested Wood Products estimates at a devolved administration level, particularly for England and Scotland (see sections 3.0 and 4.0). These improved estimates also have an impact on estimates for land use categories converted from Forest land, particularly Forest land converted to Grassland.

In addition to methodology changes, other changes arise from updated activity data which has become available since the previous reporting year. In a few areas accuracy has also improved under QA/QC procedures. All changes to LULUCF categories are summarised in Table 1.

Table 1: Improvements in the source data and/or methodology

IPCC Sector	Method and data revisions
5A Forest Land	Change to using the CARBINE carbon accounting model for forest modelling. Changes in carbon stocks in Forest soils and biomass due to change from C-Flow to CARBINE. Emissions are now estimated from all Forest remaining Forest Areas (not just post-1920 forest). Total Forest remaining Forest area changed due to move to CARBINE model. Updates to forest wildfire activity data.
5B Cropland	Land to Forest areas changed slightly due to update of new planting data with the move to the CARBINE model. Changes in carbon stocks in Forest soils and biomass due to change from C-Flow to CARBINE reflected in changes to emission from deforestation to Cropland. Updates to some activity data and inclusion of LimeX data with emissions from agricultural lime application.
5C Grassland	Land to Forest areas changed slightly due to update of new planting data with the move to the CARBINE model. Changes in carbon stocks in Forest soils and biomass due to change from C-Flow to CARBINE reflected in changes to emission from deforestation to Grassland. Updates to some activity data and inclusion of LimeX data with emissions from agricultural lime application.
5D Wetlands	Correct 2011 activity data now available.
5E Settlements	Land to Forest areas changed slightly due to update of new planting data with the move to the CARBINE model. Changes in carbon stocks in Forest soils and biomass due to change from C-Flow to CARBINE reflected in changes to emission from deforestation to Settlement. Updates to wildfire activity data.
5G Harvested Wood Products	Change to using the CARBINE carbon accounting model for forest modelling including the modelling of Harvested Wood Products.

³ http://naei.defra.gov.uk/reports/reports?report_id=788

3.0 LULUCF Emissions and Removals in England

3.1 England LULUCF Trends

The 1990-2012 Inventory shows England is a net sink of greenhouse gases from LULUCF activities since 2003 (Figure 1). In 1990 the England LULUCF sector was a net source at 2.5 Mt CO₂e rising to a peak of 2.6 Mt CO₂e in 1995, followed by a decline to 0.1 Mt CO₂e in 2003. The trend then declined steadily to -1.4 Mt CO₂e in 2010 rising to -1.0 Mt CO₂e in 2012 (see Appendix 1 for emissions / removals by LULUCF category and gas).

The main influences on the trend for the LULUCF sector in England are emissions from Cropland and Settlement, balanced by removals from Forest land and historic conversion to Grassland. Emissions from Wetland (see section 2.2) are low for England relative to other emissions due to the relatively small areas of peat extraction, as are removals from Harvested Wood Products (Figure 1).

The largest emissions source in England is the Cropland category, but this has steadily decreased since its peak of 7.7 Mt CO₂e in 1991 to 5.0 Mt CO₂e in 2012. Note that emissions reported from cropland only include those from land use, land use change and a limited number of cropland management practices including application of lime and dolomite, and biomass burning. They do not currently take into account all cropland management practices undertaken in the UK. Work is in progress to develop a more comprehensive reporting framework for emissions from cropland. The Settlement category is a net source showing a declining trend from 3.8 Mt CO₂e in 1990 to 3.0 Mt CO₂e in 2009, followed by an increasing trend to 3.2 Mt CO₂e in 2012.

The Forest land and Grassland categories are net sinks throughout the whole time series from 1990 to 2012. Net emissions from Forest land were greatest in 1990 at -6.7 Mt CO₂e, with emissions increasing to -4.9 Mt CO₂e in 1999, followed by a general decrease. Net emissions from Grassland were lowest in 1991 at -2.5 Mt CO₂e gradually decreasing to -3.8 Mt CO₂e in 2007 before increasing to -3.5 Mt CO₂e in 2012.

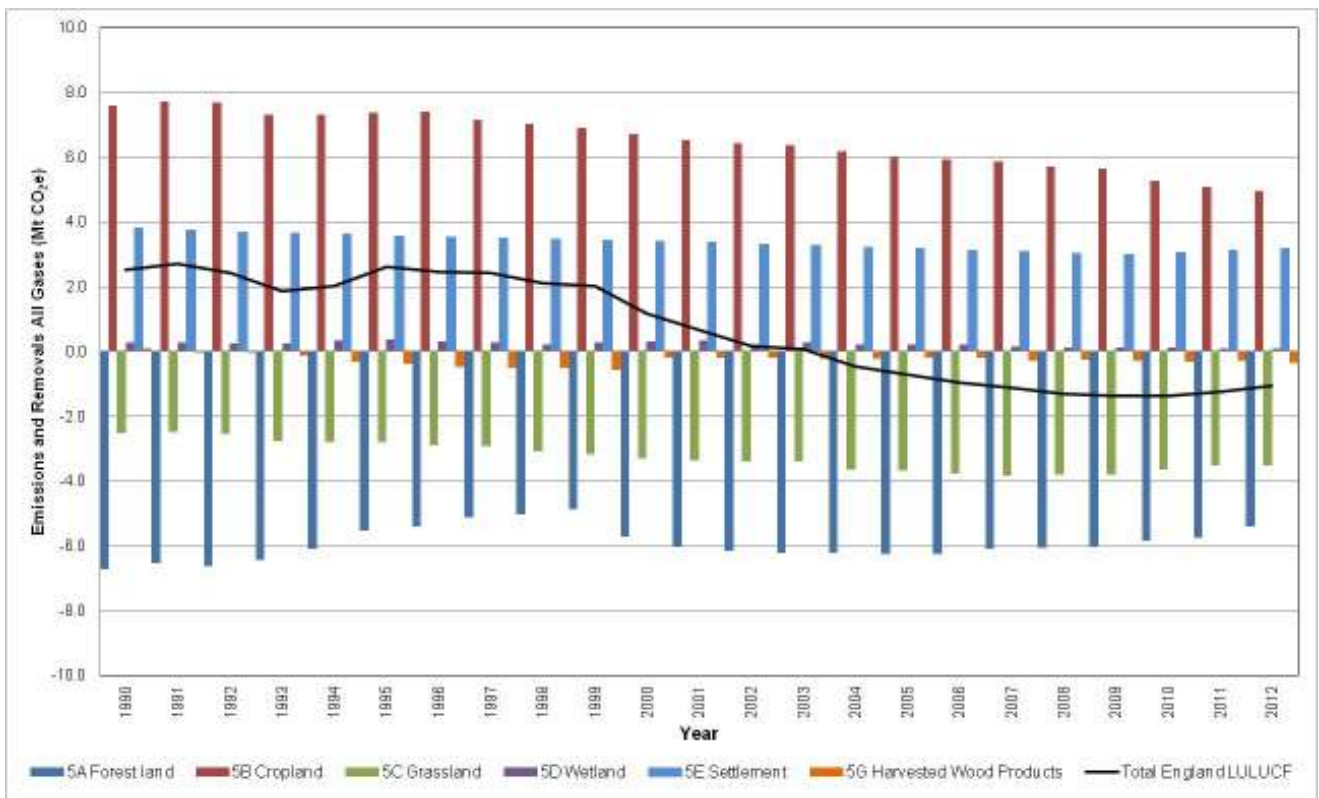


Figure 1: Emissions and removals of all gases by category for the LULUCF sector in England 1990-2012

3.2 England LULUCF Category Trends

The Forest land category (see 2.2) for England is a net sink for 1990-2012. Much of the sink arises from ancient broadleaf forests which have undergone minimal or no management or harvesting. There is an increasing trend in net emissions from 1990-1999. This arises from harvesting of conifers planted in the 1920-1930s during the 1990s coinciding with a reduction in conifer planting. Note that emissions from wildfires show inter-annual variability (Figure 2A).

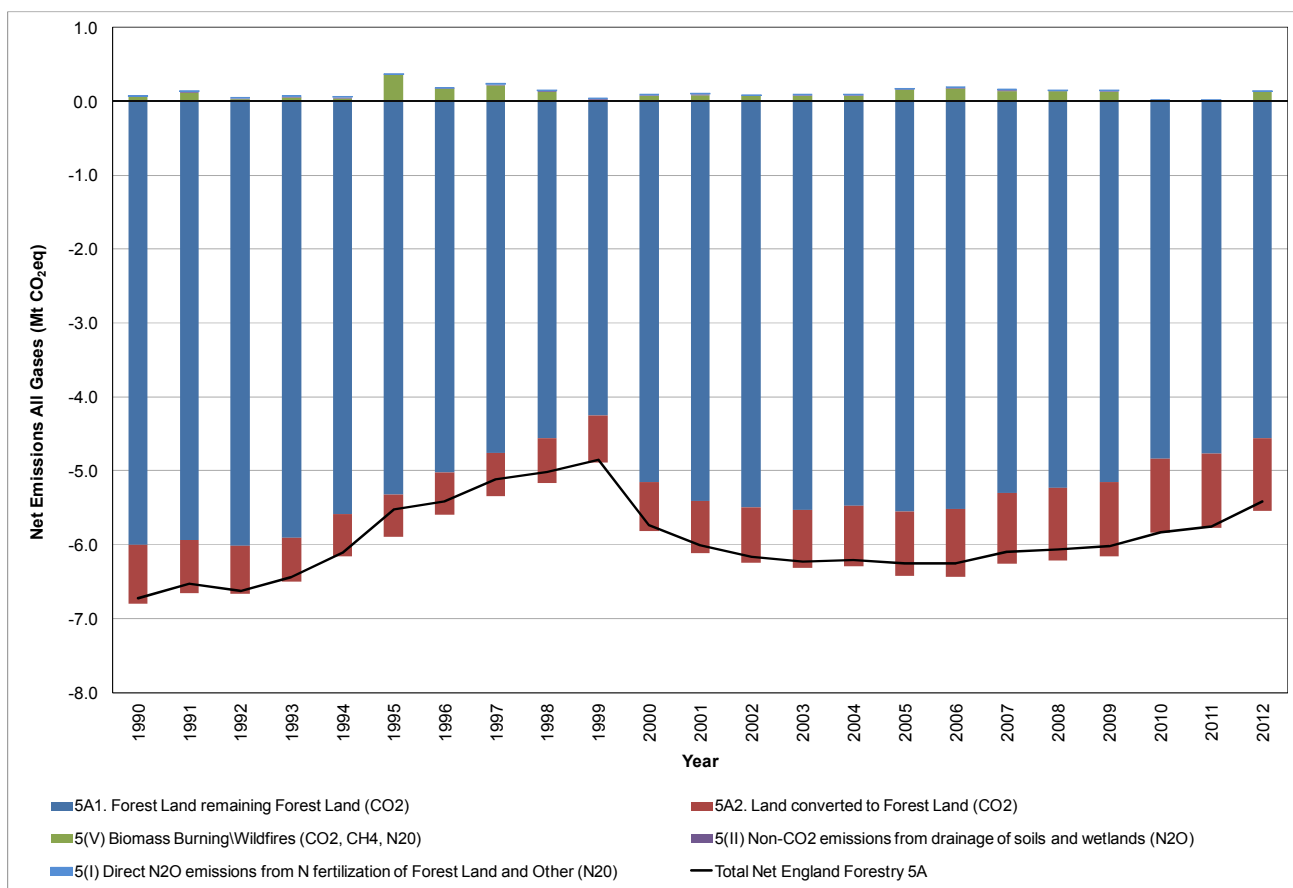


Figure 2A: Emissions and removals of all gases by category for the 5A Forestry category in England 1990-2012

The Cropland category (see 2.2) for England is a source for 1990-2012. Land converted to Cropland accounts for the highest emissions from Cropland in England for LULUCF (Figure 2B). These emissions are the result of historical drainage of lowland agricultural land combined with more recent conversion from grassland and other land uses. Lowland agricultural lands that have been historically drained include the fens of East Anglia. Emissions from Cropland remaining Cropland are due to a combination of historical drainage of lowland agricultural land (see 2.2) and a limited number of land management practices.

The Grassland category (see 2.2) for England is a net sink for 1990-2012. The main removals occur from Land converted to Grassland from other land uses, primarily from conversion of Cropland to Grassland (Figure 2C). Emissions from Grassland land management in England are currently limited to small amounts of CO₂ due to agricultural liming (see 2.2). There are a small amount of wildfire emissions reported in the timeseries, with considerable inter-annual variability.

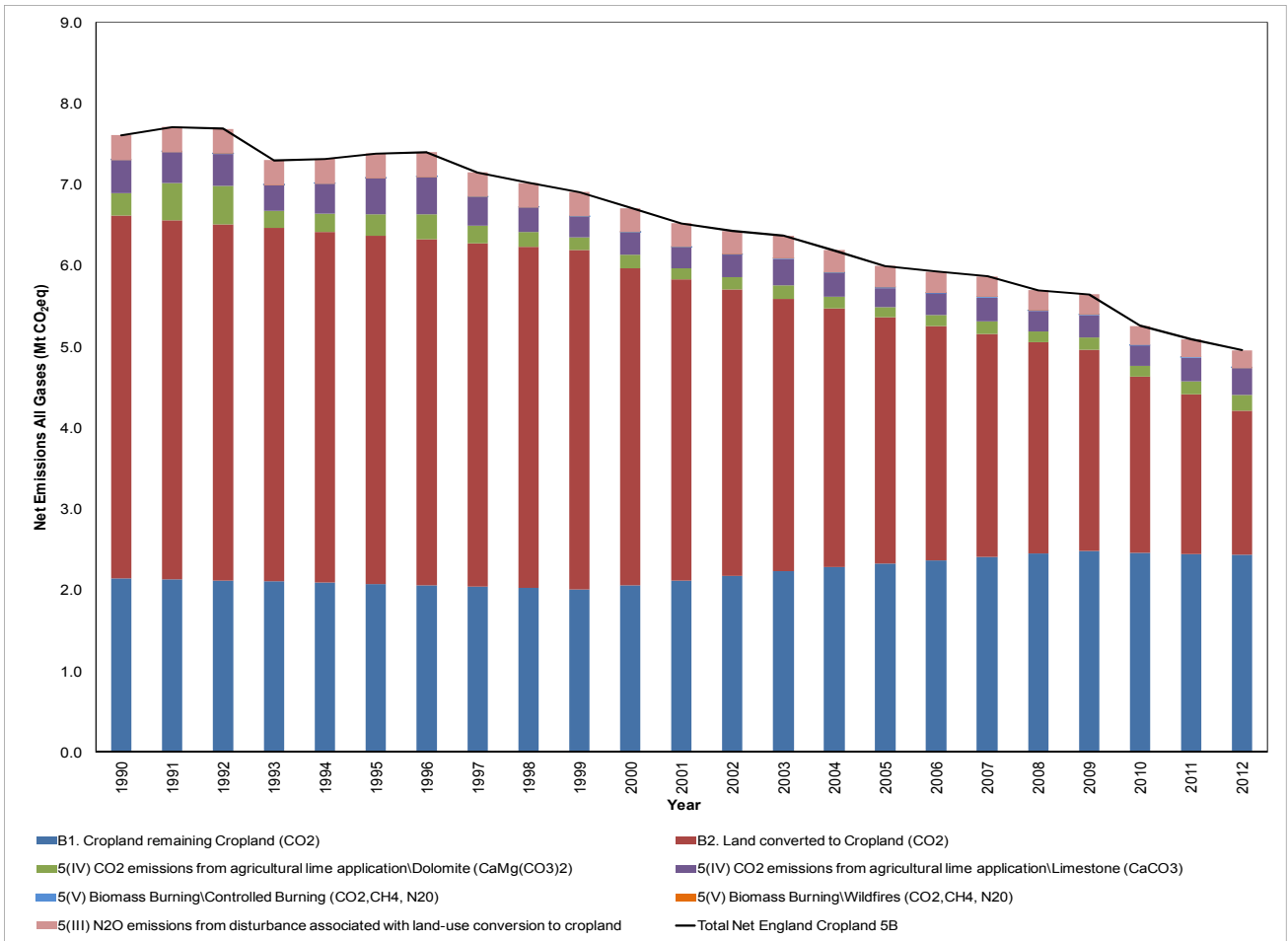


Figure 2B: Emissions and removals of all gases by category for the 5B Cropland category in England 1990-2012

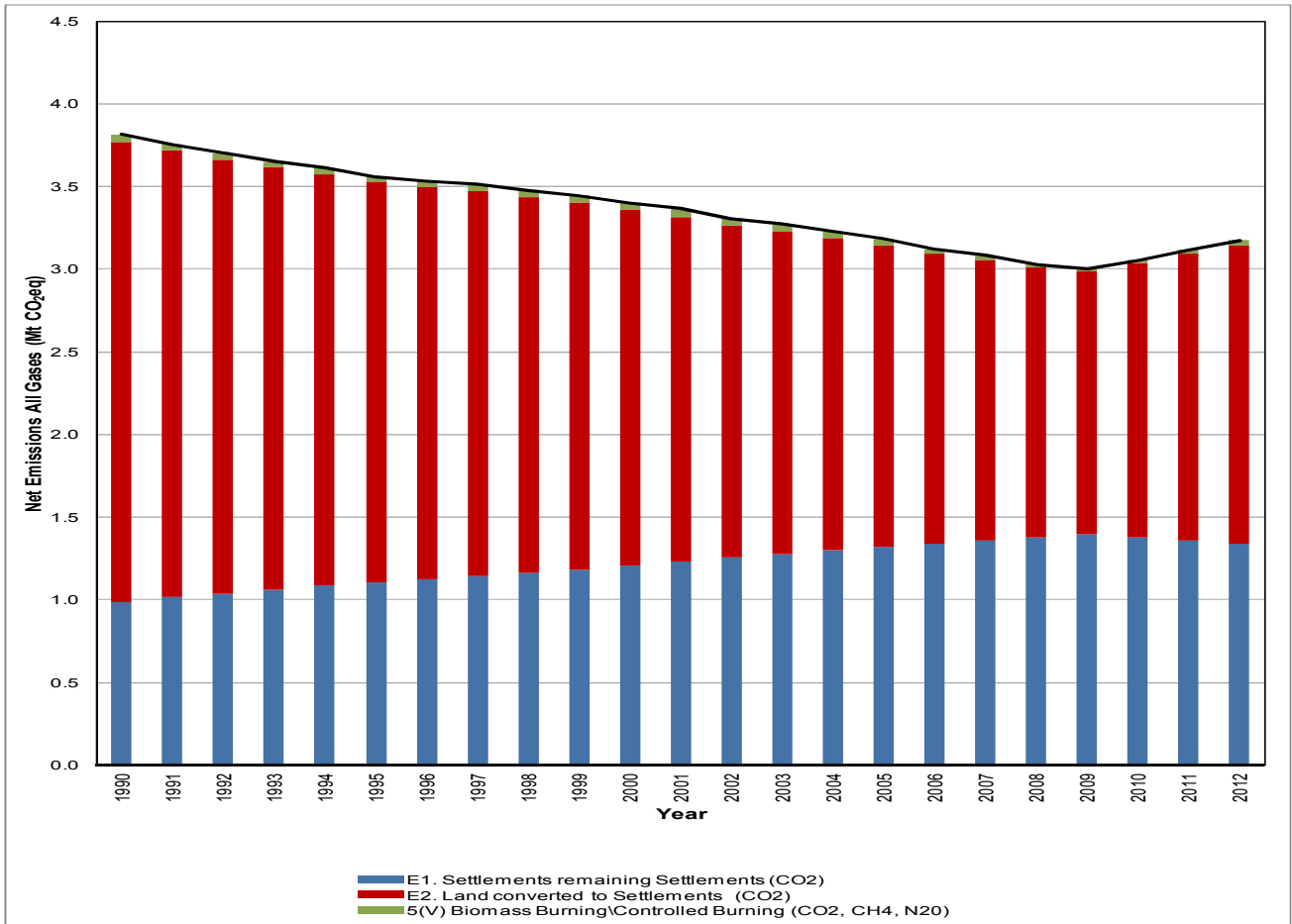


Figure 2C: Emissions and removals of all gases by category for the 5C Grassland category in England 1990-2012

The Wetland category (see section 2.2) is a decreasing source for England, however it has the largest emissions from peat extraction in the UK at 5.4 Mt CO₂e for 1990-2012. Between 1990-2012, approximately 5kha was estimated to be undergoing commercial peat extraction in England. Approximately 90% of the volume of peat sold in the UK is for horticultural use, most of which is sold via retail for domestic use, and to the horticultural industry for use as growing media for commercial plant propagation. Emissions from peat extraction in England are declining due to reducing demand for horticultural peat (Figure 2D). Between 2003-2009 there were minor emissions from Grassland converted to Wetland (<0.00%).

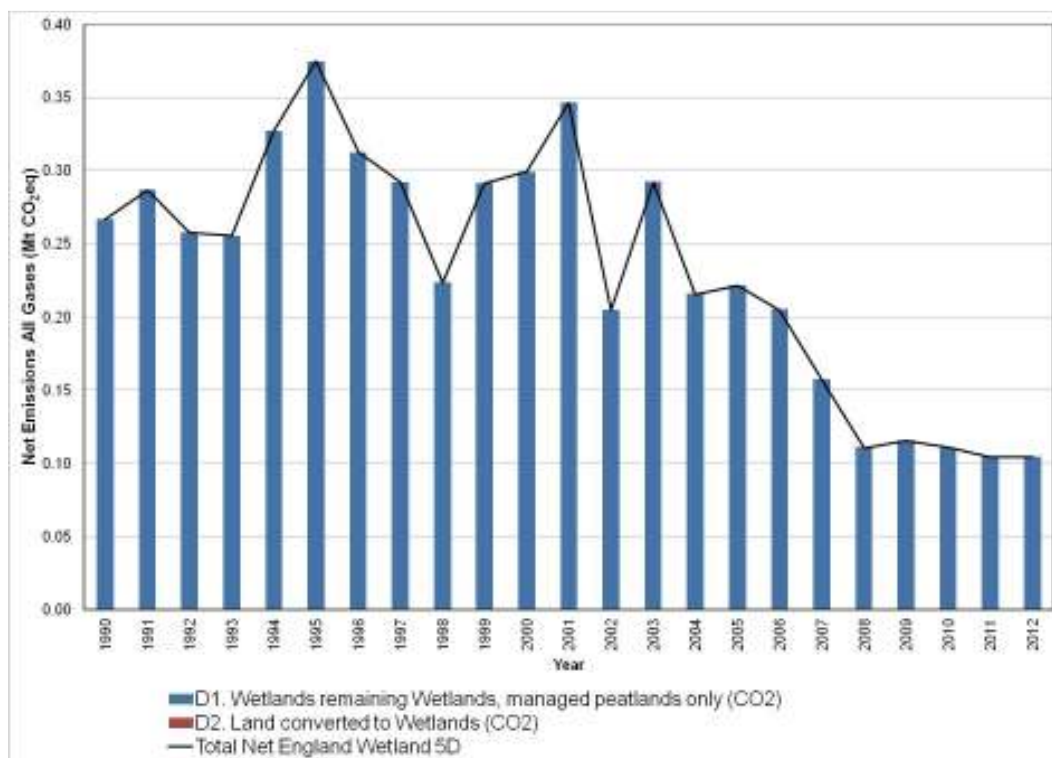


Figure 2D: Emissions and removals of all gases by category for the 5D Wetland category in England 1990-2012

The Settlements category (see section 2.2) is the second largest emissions source in England after Cropland. Emissions produced by CO₂ emissions from soil on land converted to Settlements during 1990-2012 accounting for 64% of Settlements' emissions with land converted to Settlement twenty years prior to reporting year accounting for 36% (Figure 5E). There are a small amount of CO₂, CH₄ and N₂O emissions (1%) resulting from controlled biomass burning on conversion of Forest land to Settlements.

As part of the move to the CARBINE forest accounting model, the data on Harvested Wood products are now more closely aligned with timber production statistics. The Harvested Wood Products category (see section 2.2) is a net sink of CO₂ for England, except for 1990. England forestry provides the second largest sink for Harvested Wood Products in the UK (36% of UK removals from this category).

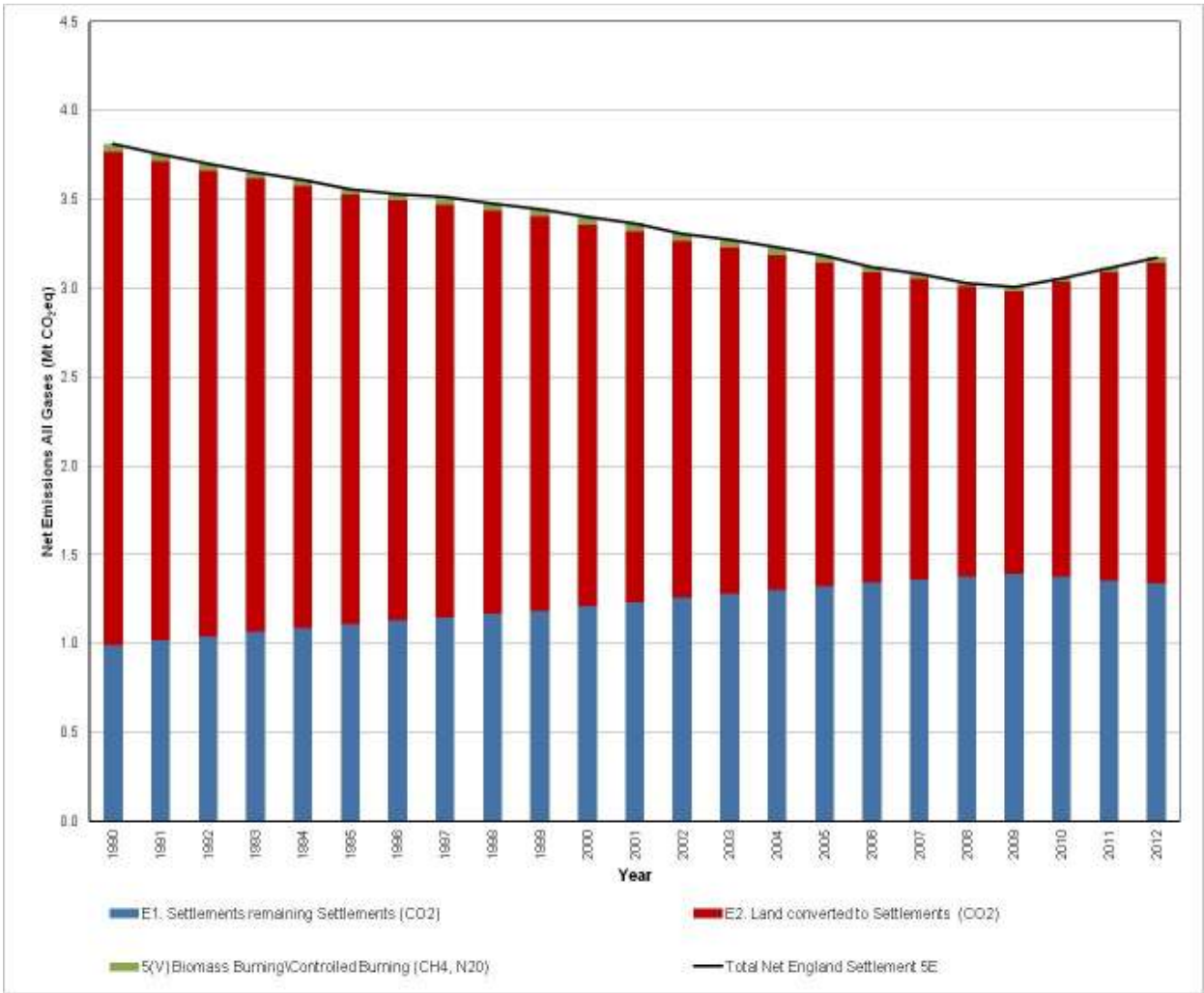


Figure 2E: Emissions and removals of all gases by category for the 5E Settlement category in England 1990-2012

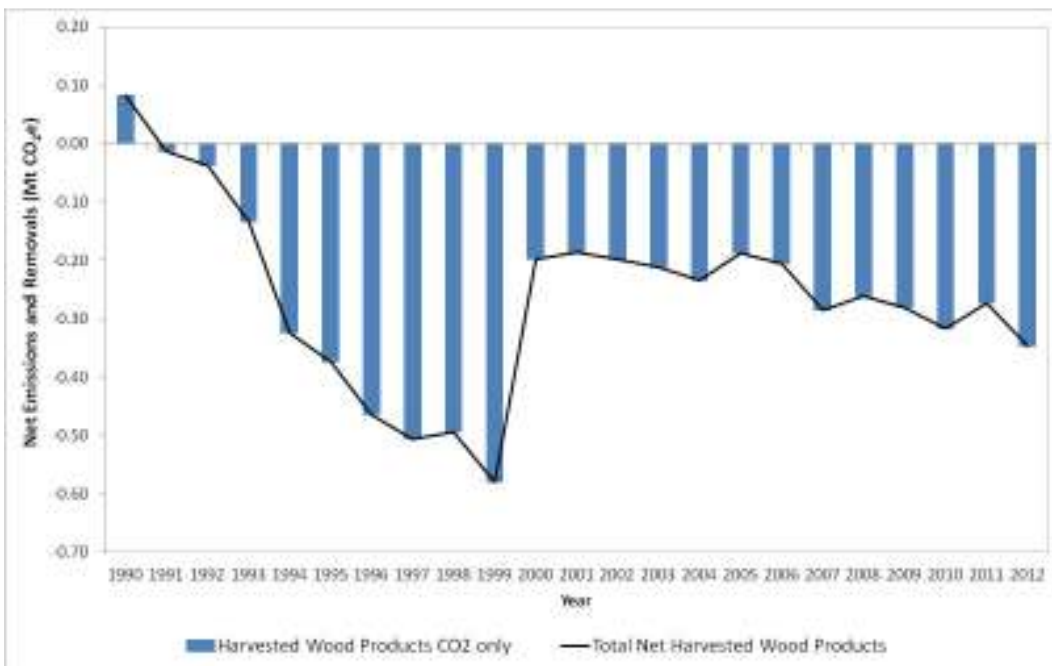


Figure 2G: Emissions and removals of all gases by category for the 5G Harvested Wood Products category in England 1990-2012

3.3 England LULUCF comparison with 2011 inventory

These revised estimates reflect improved Forest land estimates (see CEH, 2014 for detailed analysis of methodology changes). Previous inventories showed England as a net source. Compared to the 1990-2011 Inventory, net emissions of greenhouse gases in the 1990-2012 inventory in 1990 have decreased by 3.4 Mt CO₂e, a decrease of 138% (Figure 3). Emissions in 2011 decreased by 3.0 Mt CO₂e. The main reason for the change in estimate for England is due to methodology now incorporating historically planted broadleaf forests from 1500 onwards, compared to the previous model which only used data from 1920 onwards (Table 1). Differences between the 2011 and 2012 inventories for CO₂ in each category are presented in Figure 4A-G. Differences between the 2011 and 2012 inventories for non-CO₂ for England are presented in Figure 5&6.

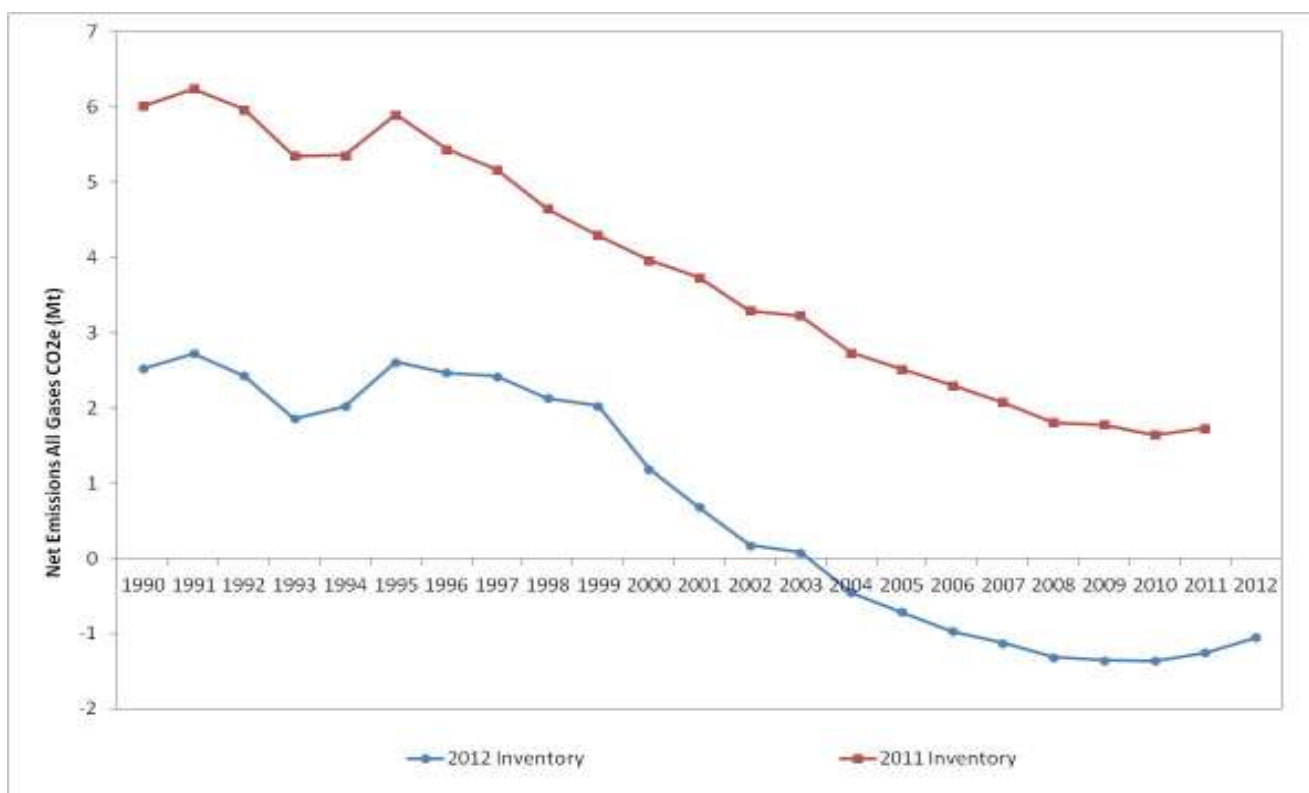


Figure 3: Changes in net emissions of all gases across all LULUCF categories 1990-2012 between the 2011 Inventory and 2012 Inventory for England

In the Forest land category (see section 2.2, 3.2, Figure 4A) estimates of removals for England have increased by 4.1 Mt CO₂e in 1990 since the 1990-2011 inventory estimates (Table 2). This is due to the inclusion of forest planted pre-1920, given the large amount of historically planted broadleaf forests in England from 1500 onwards. The reduction in removals from 1990-1999, seen in the current inventory is due to improved estimates for forest rotation length. Trend now shows harvesting of conifers planted in the 1920-1930s during the 1990s coinciding with a reduction in conifer planting.

In the Cropland category (see section 2.2, 3.2, Figure 4B) estimates for emissions for England have slightly increased for 1990-2012. This is mainly due to change in methodology estimates for emissions from deforestation to Cropland.

In the Grassland category (see section 2.2, 3.2, Figure 4C) estimates for emissions for England have slightly increased for 1990-2012, particularly after 2004. This is mainly due to change in methodology estimates for emissions from deforestation to Grassland.

In the Wetland category (see section 2.2, 3.2, Figure 4D) estimates for emissions for England remain the same as the previous inventory, except for 2011 where updated peat extraction data has become available.

In the Settlements category (see section 2.2, 3.2, Figure 4E) estimates for emissions for England have slightly decreased for 1990-2012. This is mainly due to change in methodology estimates for emissions from deforestation to Settlement.

In the Harvested Wood Products category (see section 2.2, 3.2, Figure 4F) estimates for the emissions trend for England have changed for 1990-2012. This is due to the change from modelling harvesting assuming a fixed rotation to adding rotation of different lengths to the modelling, more reflective of real trends.

Non-CO₂ emissions for England show little variation from previous estimates. CH₄ emission trend has changed slightly, mainly due to updated activity data for wildfires (Figure 5). N₂O emissions continue to follow the previous trend of emissions mainly due to emissions arising from historic lowland drainage (Figure 6).

Table 2: Effects of improvements in the source data and/or methodology on Inventory data for England

IPCC Sector	Difference between 2012 and 2011 inventory estimates, kt CO ₂ e	
	1990	2011
5A Forest Land	-4095.29	-3561.64
5B Cropland	24.62	74.17
5C Grassland	8.93	121.67
5D Wetlands	0.00	-6.35
5E Settlements	-36.10	-6.56
5G Harvested Wood Products	608.81	397.81

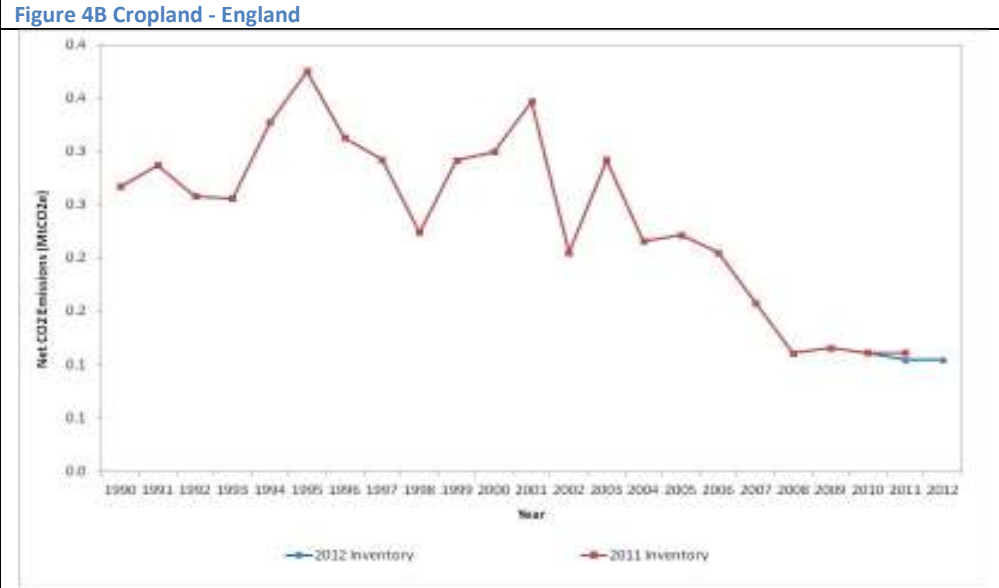
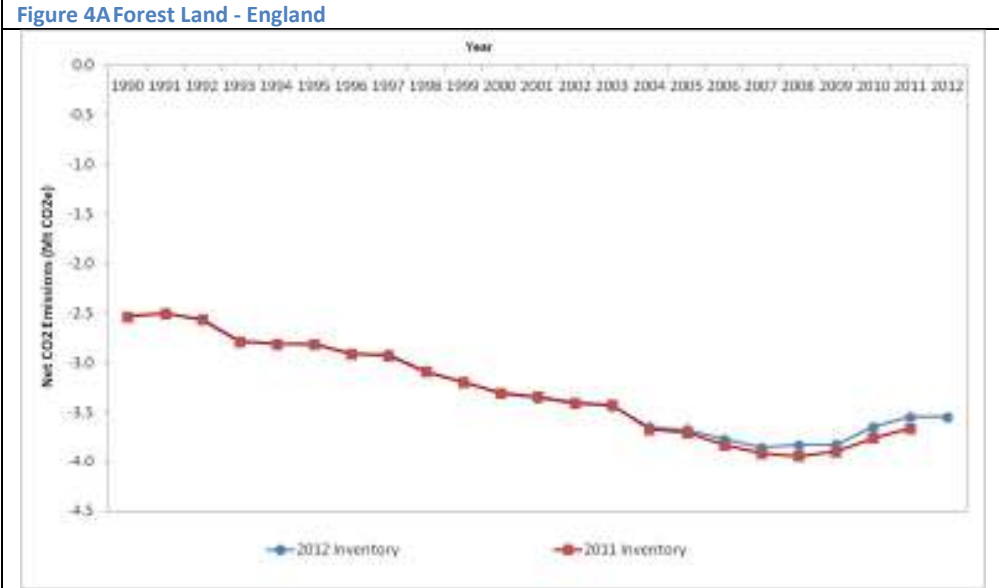
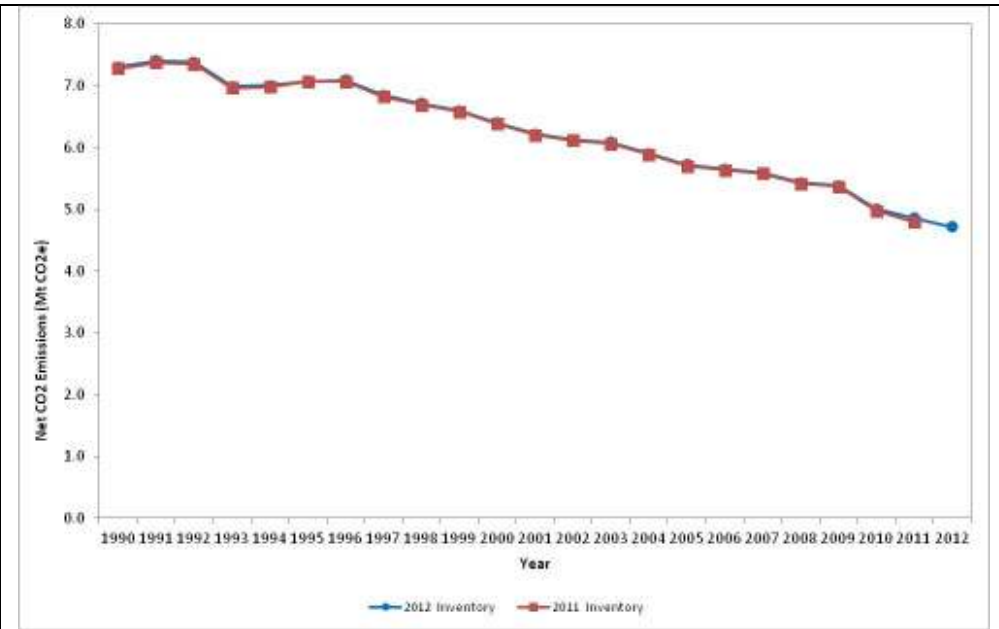
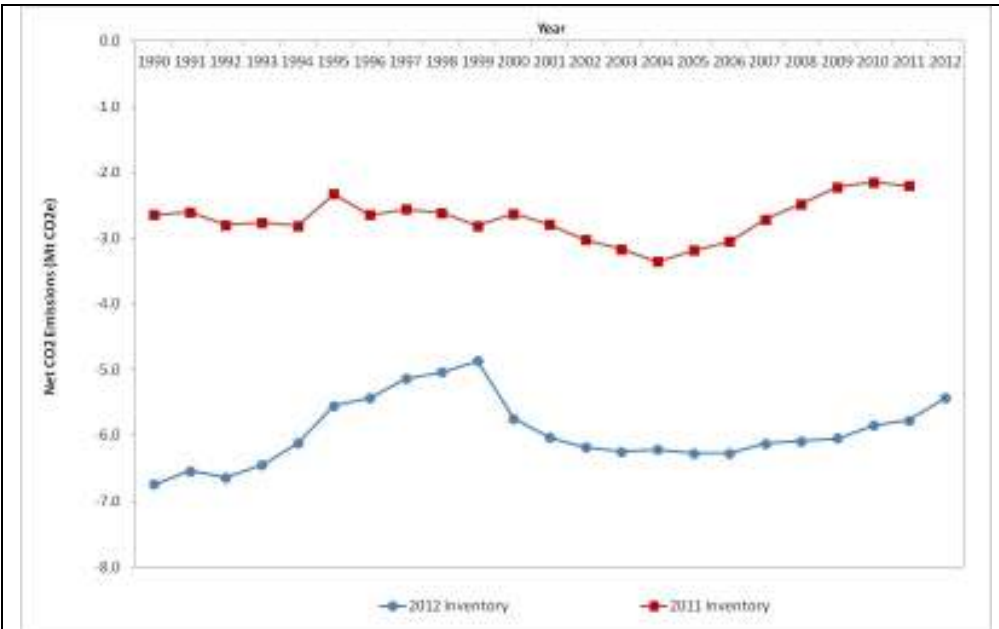


Figure 4C Grassland - England

Figure 4D Wetlands - England

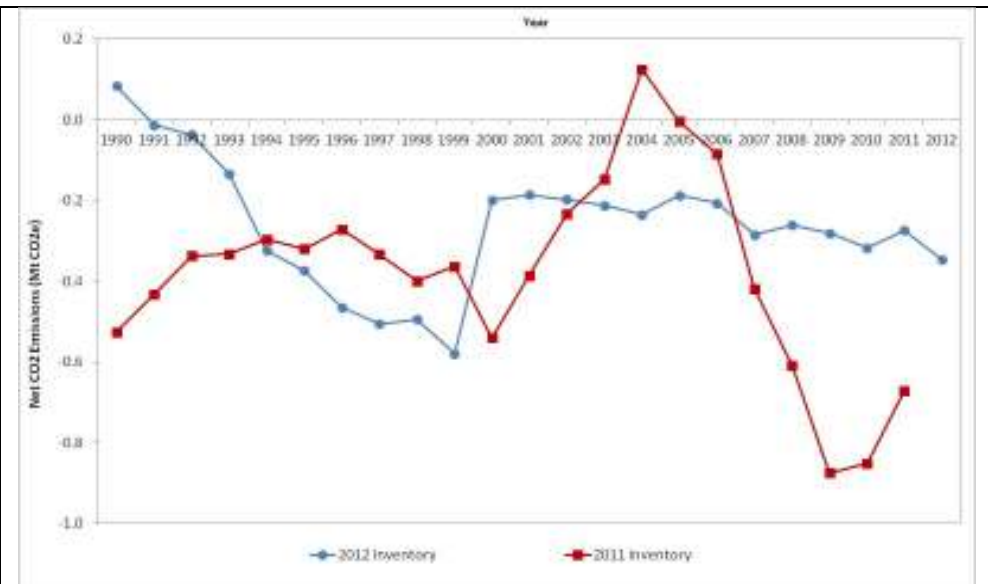
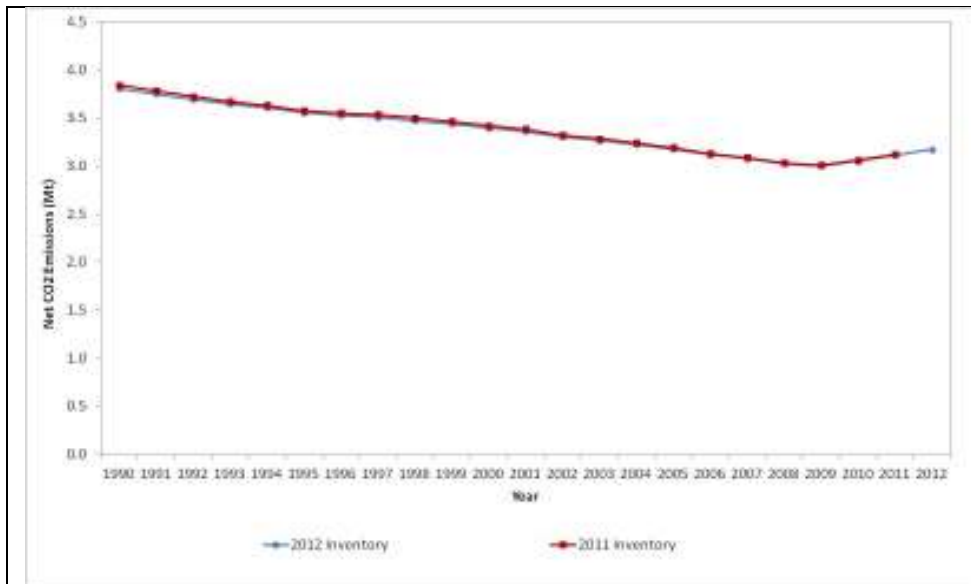


Figure 4E Settlements - England

Figure 4F Harvested Wood Products - England

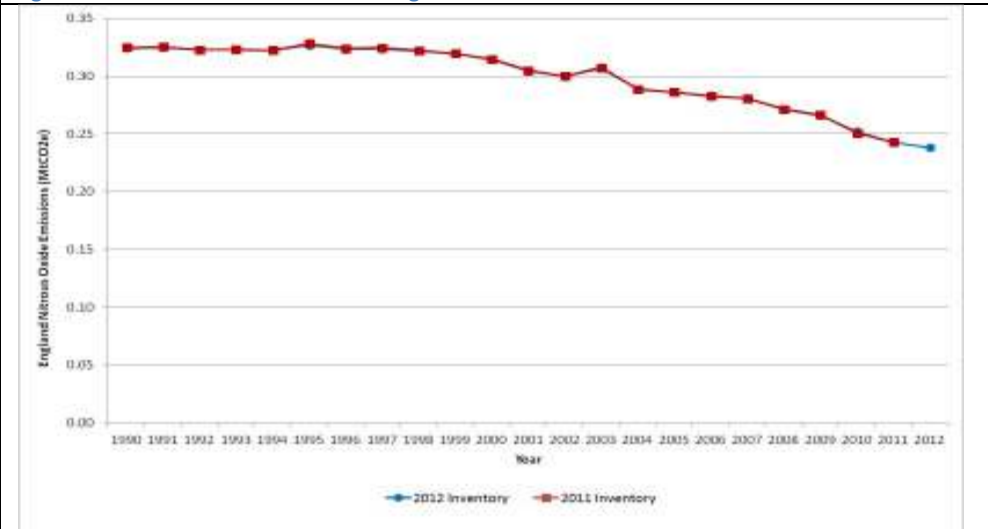
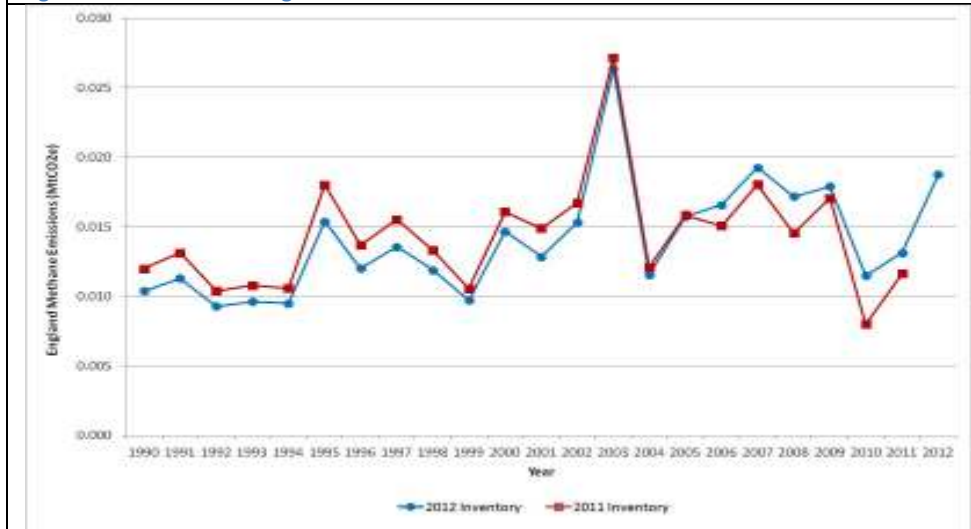


Figure 5: Changes in net emissions of CH₄ only 1990-2012 between the 2011 Inventory and 2012 Inventory for England LULUCF

Figure 6: Changes in net emissions of N₂O only 1990-2012 between the 2011 Inventory and 2012 Inventory for England LULUCF.

4.0 LULUCF Emissions and Removals in Scotland

4.1 Scotland LULUCF Trends

The 1990-2012 Inventory shows that Scotland was a net sink of greenhouse gases from LULUCF activities throughout the complete timeseries (1990-2012) (Figure 7). In 1990 net emissions from the LULUCF sector in Scotland were at their highest at -0.8 Mt CO₂e and have generally shown a steady decline to -5.7 Mt CO₂e in 2012. (see Appendix 1 for emissions / removals by LULUCF category and gas).

The main influences on the trend for the LULUCF sector in Scotland are emissions from Cropland and Settlement, outweighed by removals from Forest land and historic conversion to Grassland. Emissions from Wetland (see section 2.2) are low for Scotland relative to other emissions, as are removals from Harvested Wood Products (Figure 7).

Cropland produces the largest emissions source in Scotland, in 1990 levels were 6.1 Mt CO₂e gradually rising to a peak of 6.5 Mt CO₂e in 1998 and gradually decreasing to 4.6 Mt CO₂e in 2012. The Settlement category is a net source varying between 1.7 Mt CO₂e and 1.6 Mt CO₂e from 1990-2012.

The Forest land and Grassland categories are net sinks from 1990 to 2012. Forest land has been an increasing sink in Scotland, with net emissions of -7.0 Mt CO₂e in 1990 gradually decreasing to -9.4 Mt CO₂e, in 2012. Grassland removals have fluctuated between -2.1 Mt CO₂e and -2.5 Mt CO₂e between 1990-2012.

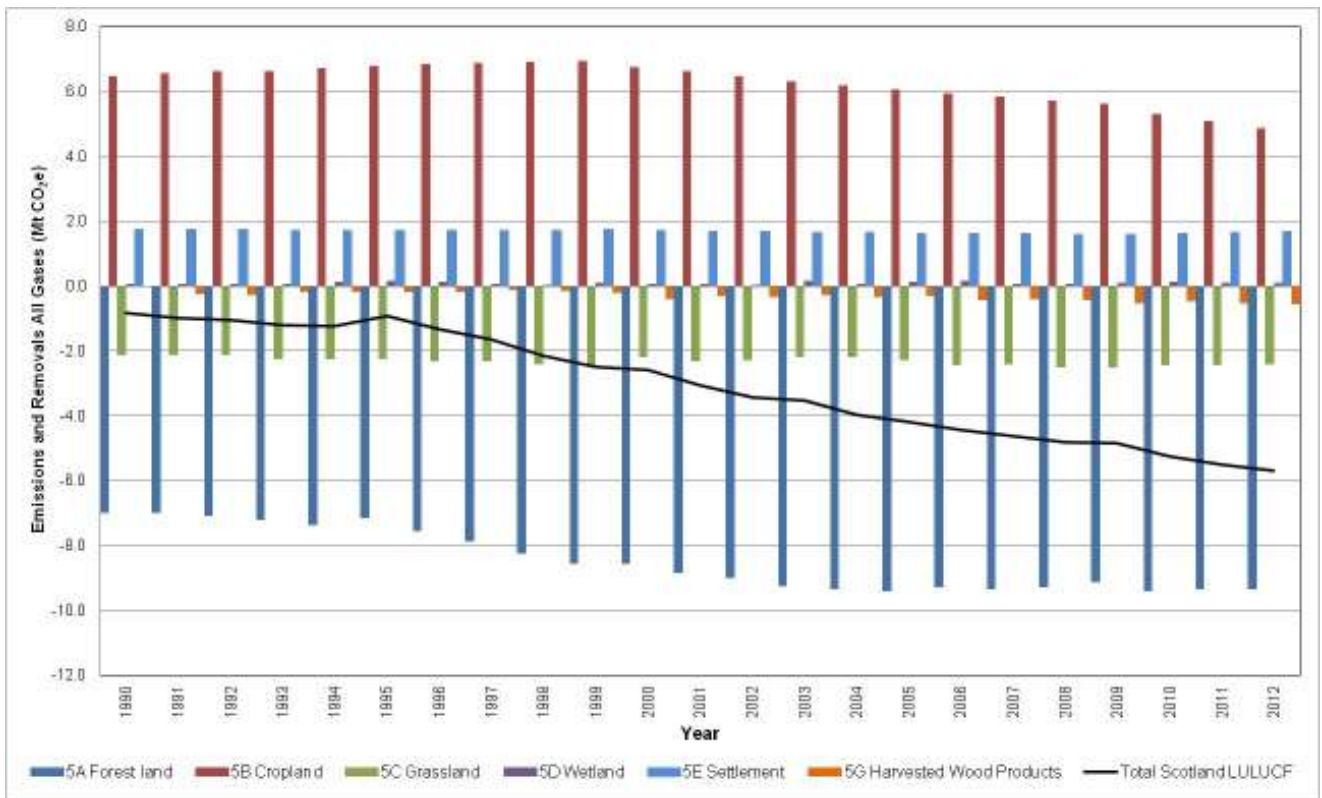


Figure 7: Emissions and removals of all gases by category for the LULUCF sector in Scotland 1990-2012

4.2 Scotland LULUCF Category Trends

The Forest land category (see 2.2) for Scotland is a net sink for 1990-2012. The majority of the sink arises from the large area of conifer plantations, which is subject to forest management such as thinning and varying harvesting rotations. There is an increasing trend in removals between 1990 and 2005, during which time there was harvesting of mature conifers planted in the 1920-1940s and a reduced rate of forest planting. Emissions from wildfires vary each year (Figure 8A).

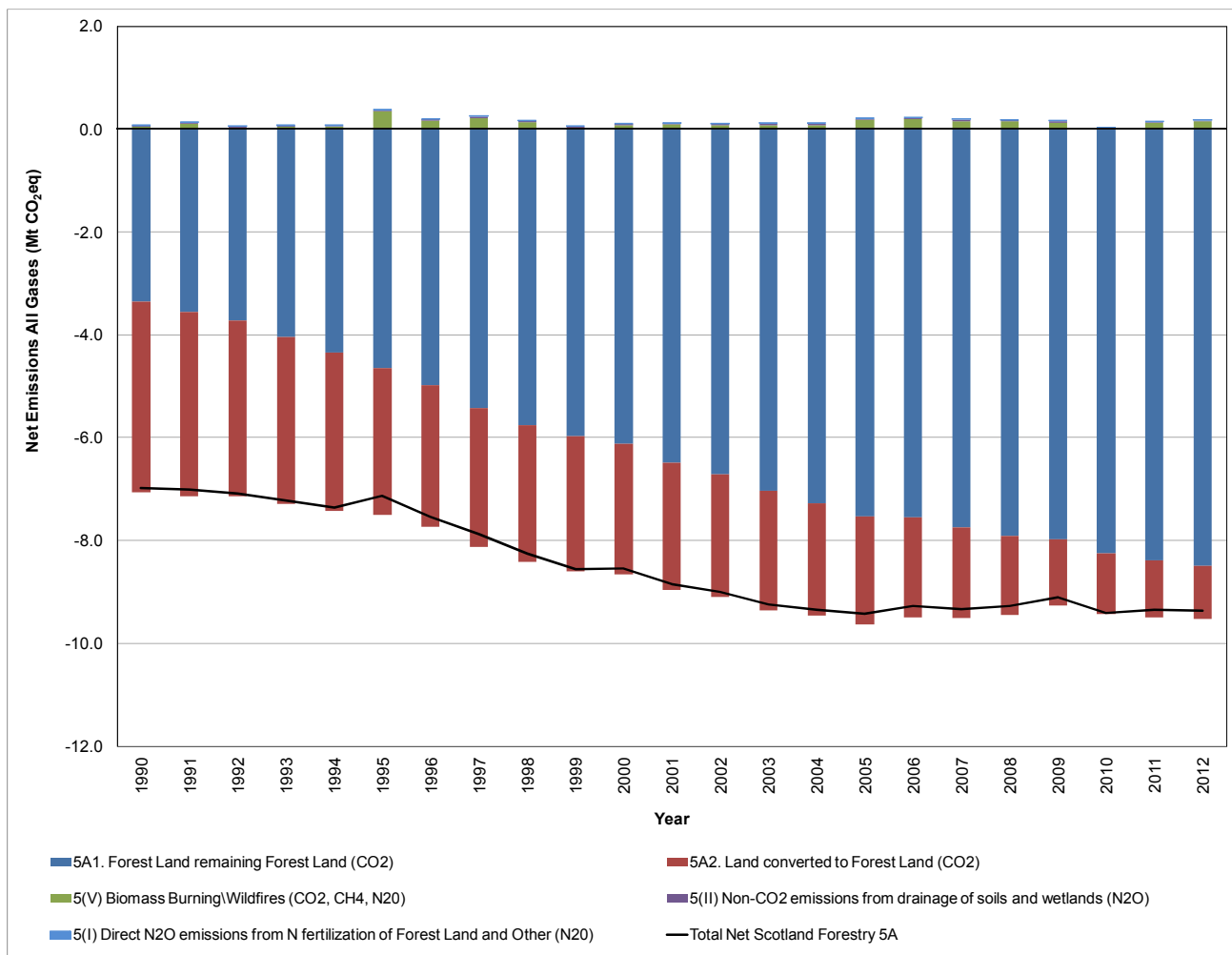


Figure 8A: Emissions and removals of all gases by category for the 5A Forestry category in Scotland 1990-2012

The Cropland category (see 2.2) for Scotland is a source for 1990-2012. Land converted to Cropland accounts for the highest emissions from Cropland in Scotland for LULUCF (Figure 8B). These emissions are mainly the result of Land converted to Cropland from Grassland. Emissions from Cropland remaining Cropland are due to a combination of Land converted to Cropland from Grassland 20 years prior to inventory year (see 2.2) and land management practices.

The Grassland category (see 2.2) for Scotland is a net sink for 1990-2012. The main removals occur from Grassland remaining Grassland and Land converted to Grassland from other land uses, primarily from conversion of Cropland to Grassland (Figure 8C). Emissions from biomass burning increase a hundred fold after 2000, this is due to increased Land converted to Grassland from Forest land (Deforestation of conifers) and corresponding controlled burning of woody biomass. Agricultural Grassland in Scotland emits small amounts of CO₂ due to agricultural liming. Emissions from wildfires vary each year.

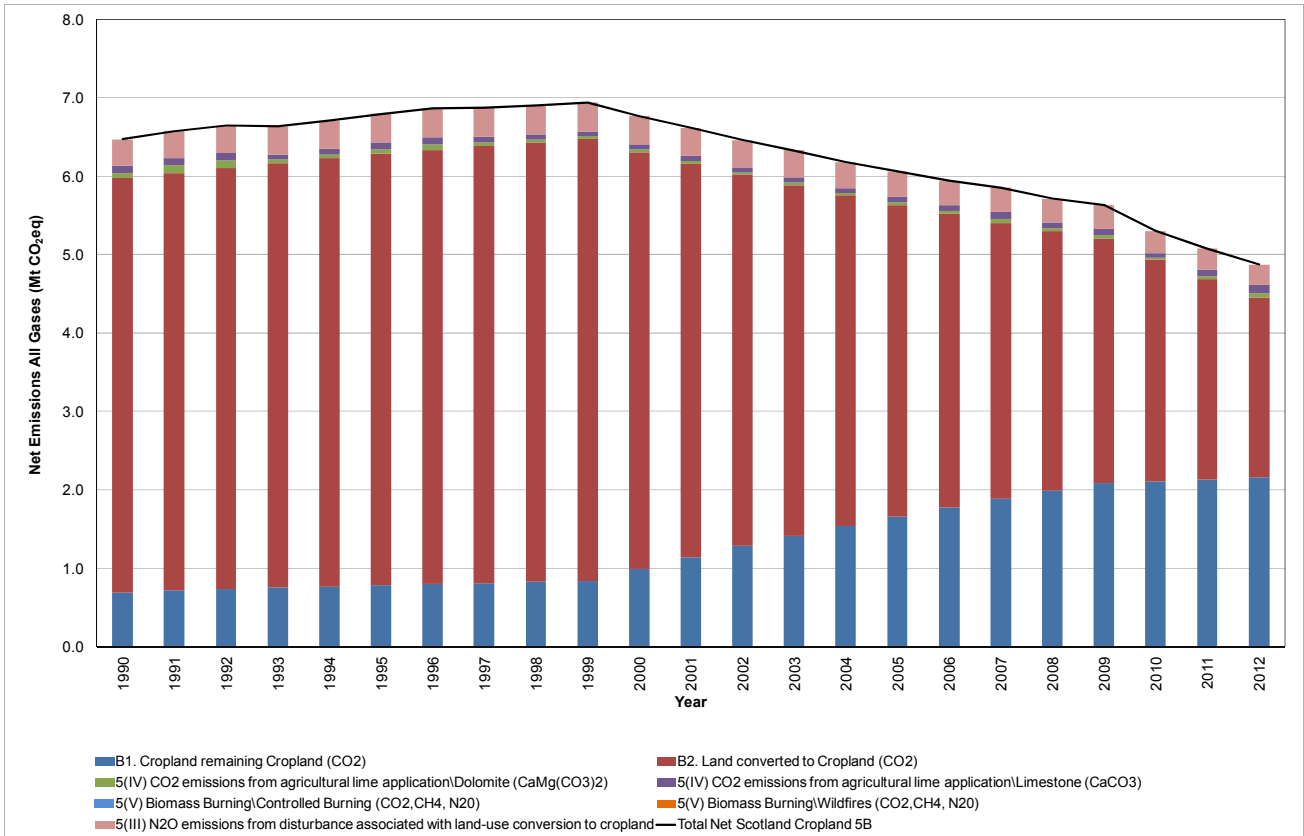


Figure 8B: Emissions and removals of all gases by category for the 5B Cropland category in Scotland 1990-2012

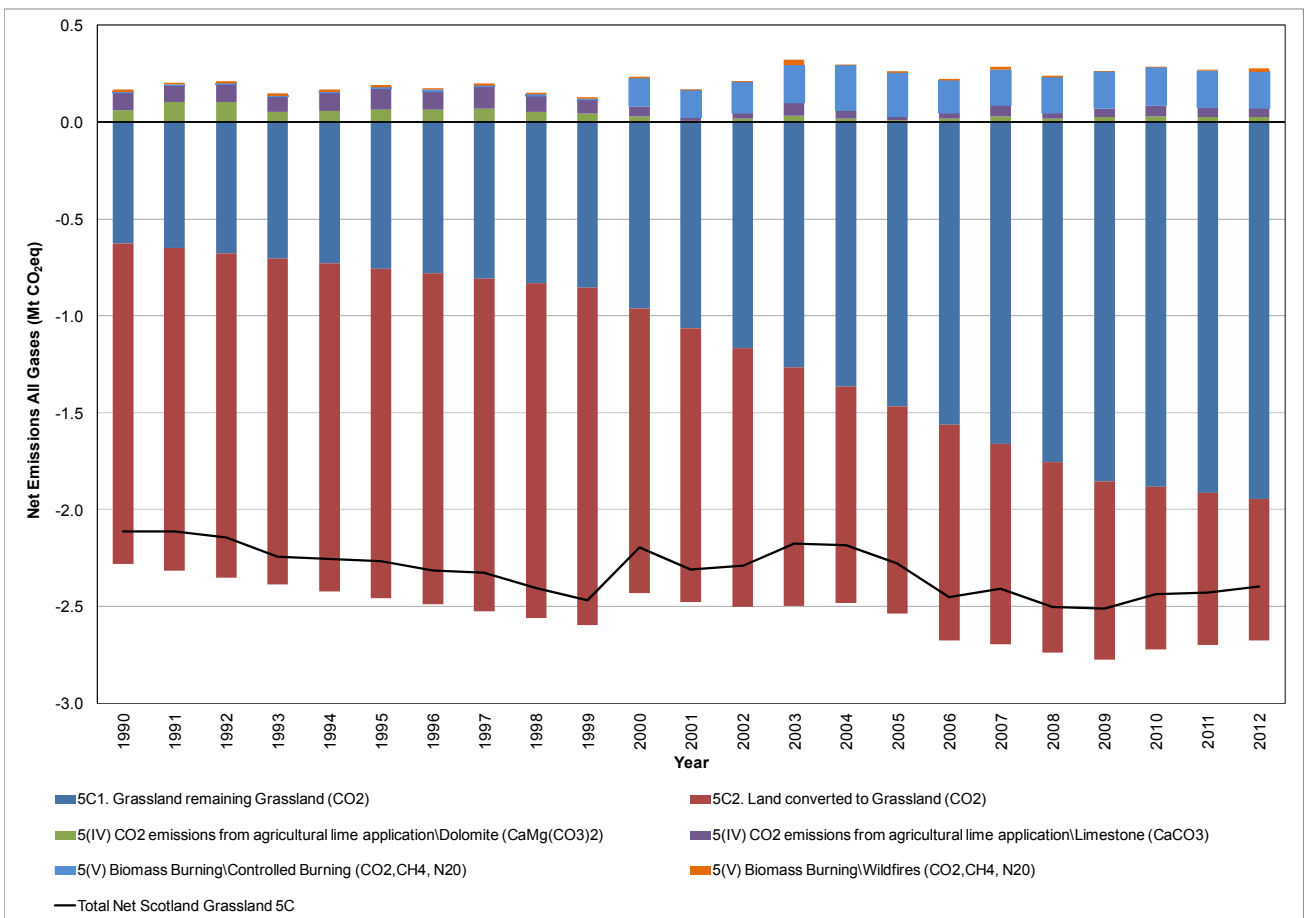


Figure 8C: Emissions and removals of all gases by category for the 5C Grassland category in Scotland 1990-2012

The Wetland category (see section 2.2) is a fluctuating source of emissions for Scotland (Figure 8D). These emissions are from the extraction of peat, and this is largely dependant upon the weather and economic factors, hence the fluctuating trend. Between 1990 and 2012, the land areas in Scotland undergoing commercial peat extraction in Scotland was estimated to be 1.6kha. More than 90% of the volume of peat sold in Scotland was for the horticultural industry. Nitrous oxide emissions from drainage of soils for peat production accounts for 3% of emissions. Between 2003-2009 there were small emissions from Grassland converted to Wetland (2%).

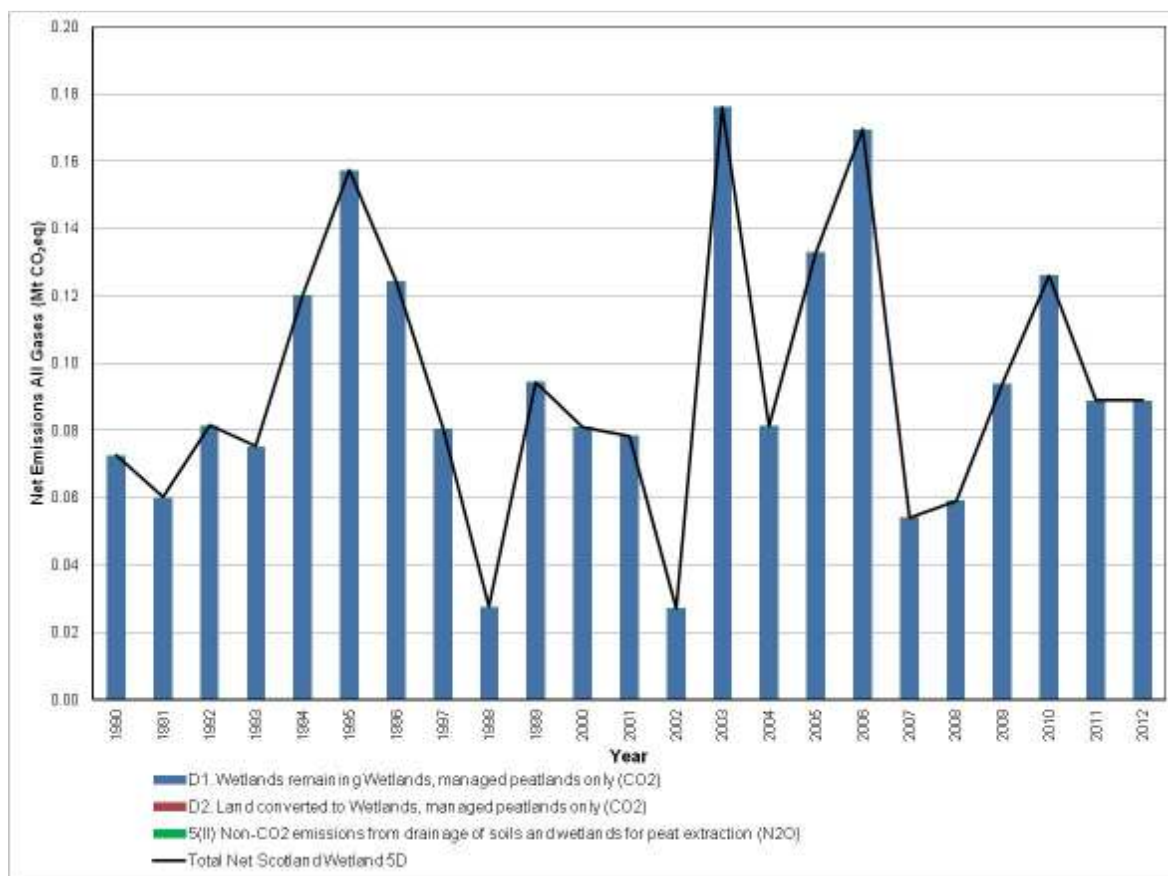


Figure 8D: Emissions and removals of all gases by category for the 5D Wetland category in Scotland 1990-2012

The Settlements category (see section 2.2) is the second largest emissions source in Scotland, after Cropland. Emissions produced by CO₂ emissions from soil on land converted to Settlements during 1990-2012 account for 65% of Settlements' emissions with land converted to Settlement twenty years prior to reporting year accounting for 34% (Figure 8E). There are a small emissions of CO₂, CH₄ and N₂O resulting from controlled biomass burning on conversion of Forest land to Settlements, equivelent to 1% of the Settlements category.

The Harvested Wood Products category (see section 2.2) is a net sink of CO₂ for Scotland (Figure 8G). Forestry in Scotland provides the largest sink for Harvested Wood Products in the UK (42% of UK removals from this category).

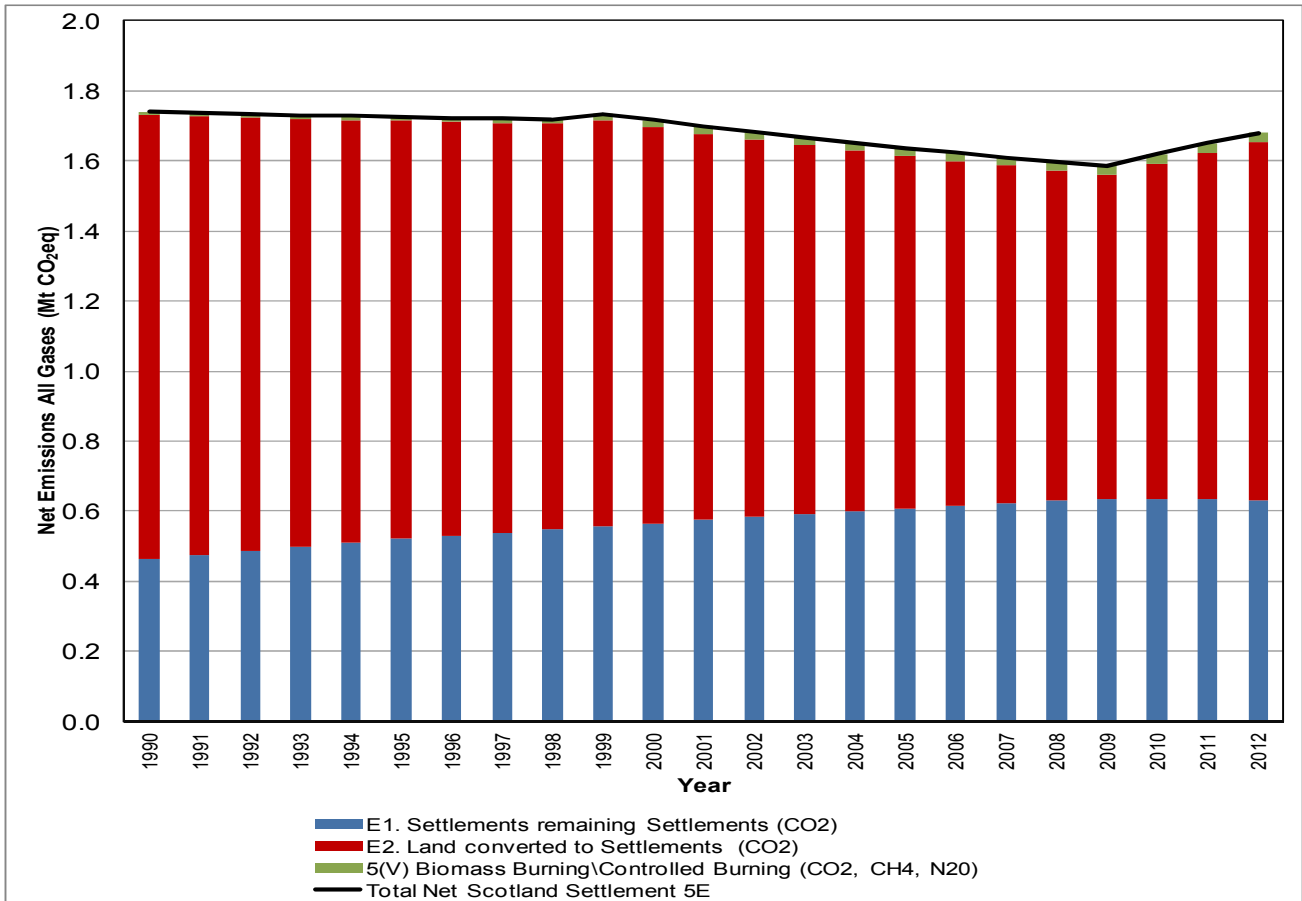


Figure 8E: Emissions and removals of all gases by category for the 5E Settlement category in Scotland 1990-2012

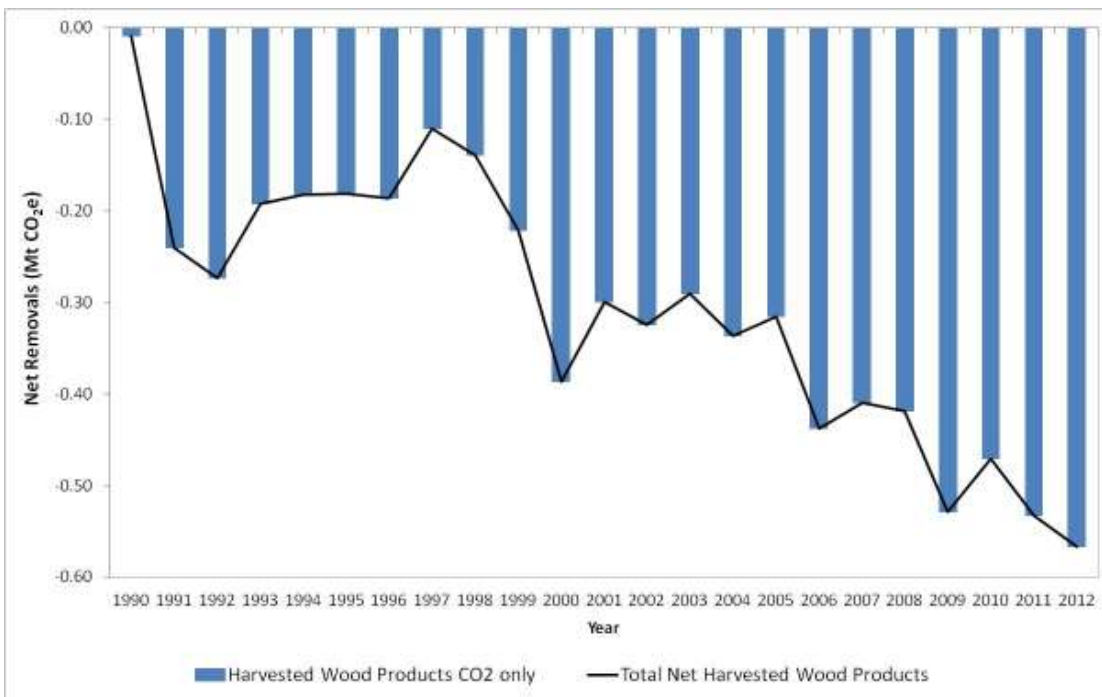


Figure 8G: Emissions and removals of all gases by category for the 5G Harvested Wood Products category in Scotland 1990-2012

4.3 Scotland LULUCF comparison with 2011 inventory

These revised estimates reflect improved Forest land estimates (see CEH, 2014 for detailed analysis of methodology changes). Previous inventories showed Scotland as a greater net sink than improved estimates. Compared to the 1990-2011 Inventory, net removals of greenhouse gases in the 1990-2012 inventory in 1990 have decreased by 1.2 Mt CO₂e, a decrease of 60% (Figure 9). The sink in 2011 increased by 0.3 Mt CO₂e when compared to the sink reported for 2011 in the 1990-2011 inventory. The main reasons for the change in estimate for Scotland is due to improved modelling of removals from Harvested Wood Products, followed by changes to Grassland and Forest land (Table 1 & Table 3). Differences between the 2011 and 2012 inventories for CO₂ in each category are presented in Figure 10A-G. Differences between the 2011 and 2012 inventories for non-CO₂ for Scotland are presented in Figure 11&12.

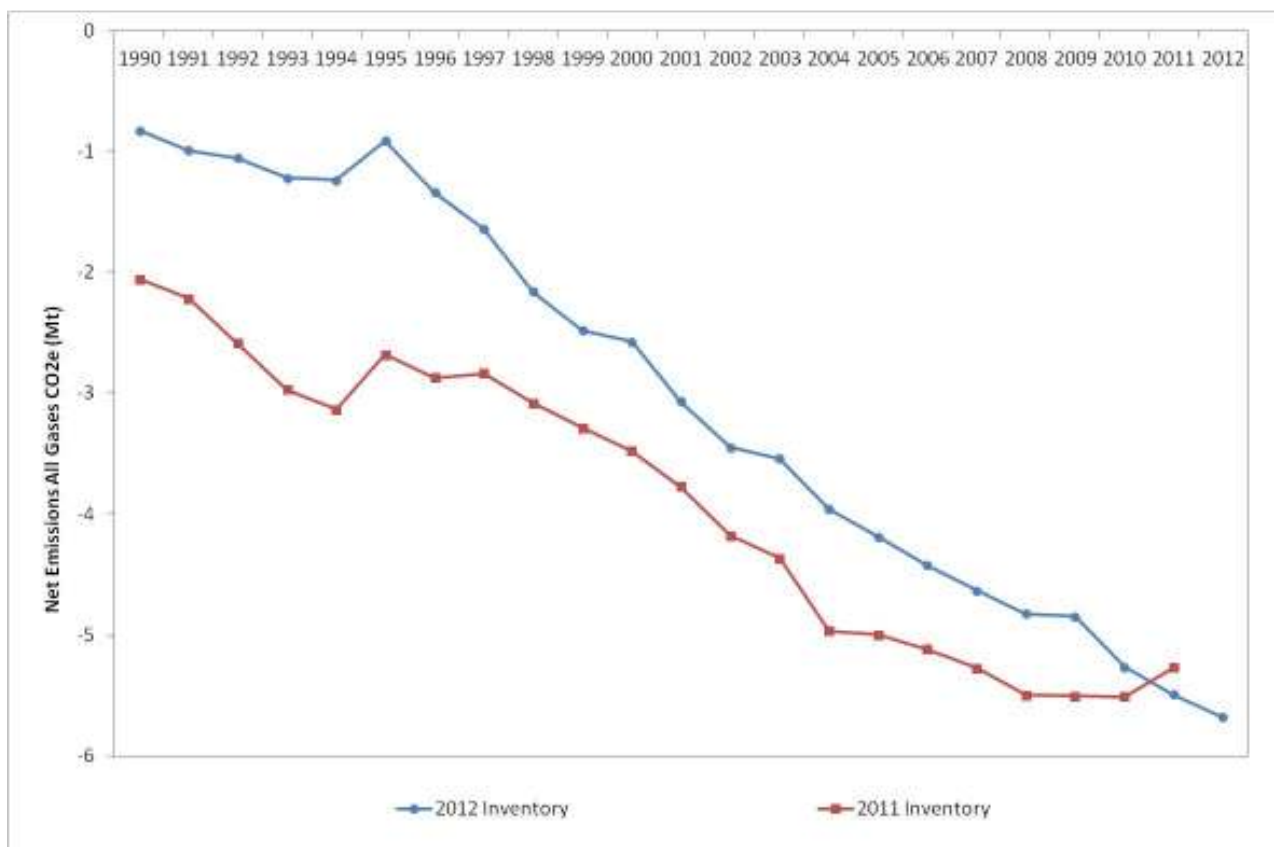


Figure 9: Changes in net removals of all gases 1990-2009 between the 2011 Inventory and 2012 Inventory for Scotland

In the Forest land category (see section 2.2, 4.2, Figure 8A) estimates of removals for Scotland have decreased for 1990-2006 and increased for 2007-2012 since the 1990-2011 inventory estimates (Figure 10A). This is due to changes in carbon stocks in Forest soils and biomass due to methodology change (Table 1), affecting estimates for both Forest land remaining Forest land and Land converted to Forest land.

In the Cropland category (see section 2.2, 4.2, Figure 8B) estimates for emissions for Scotland have slightly increased for 1990-2012 (Table 3, Figure 10B). This is mainly due to change in methodology estimates for emissions from deforestation to Cropland.

In the Grassland category (see section 2.2, 4.2, Figure 8C) estimates for removals for Scotland have slightly decreased for 1990-1999, with a marked decrease between 2000-2012 (Table 3, Figure 10C). This is mainly due to a revision in the deforestation data, with increased forestland being converted to grassland reported from 2000 onwards.

In the Wetland category (see section 2.2, 4.2, Figure 8D) estimates for emissions for Scotland remain the same as the previous inventory, except for 2011 where updated peat extraction data has become available (Table 3, Figure 10D).

In the Settlements category (see section 2.2, 4.2, Figure 8E) estimates for emissions for Scotland have slightly decreased for 1990-2012 (Table 3, Figure 10E). This is mainly due to change in methodology estimates for emissions from deforestation to Settlement.

In the Harvested Wood Products category (see section 2.2, 4.2, Figure 8F) estimates for the emissions trend for Scotland have changed for 1990-2012 (Table 3, Figure 10F). This is due to the change from modelling harvesting assuming a fixed rotation to adding rotation of different lengths to the modelling, more reflective of real trends.

Non-CO₂ emissions for Scotland show relatively minor variations from previous estimates. CH₄ emissions trend increases after 2000 (Figure 11), this reflects the increase in controlled burning of deforested woody biomass, as shown in Forest land (see section 4.2, Figure 8A). N₂O emissions have changed slightly, increasing between 1990-1999 and decreasing between 2000-2012, this is mainly due to change in methodology estimates for emissions from deforestation to Cropland (see section 4.2).

Table 3: Effects of improvements in the source data and/or methodology on Inventory data for Scotland

IPCC Sector	Difference between 2012 and 2011 inventory estimates, kt CO ₂ e	
	1990	2011
5A Forest Land	466.73	-2000.55
5B Cropland	5.60	108.77
5C Grassland	1.24	457.89
5D Wetlands	0.00	-37.14
5E Settlements	-9.16	-10.35
5G Harvested Wood Products	766.25	1260.09

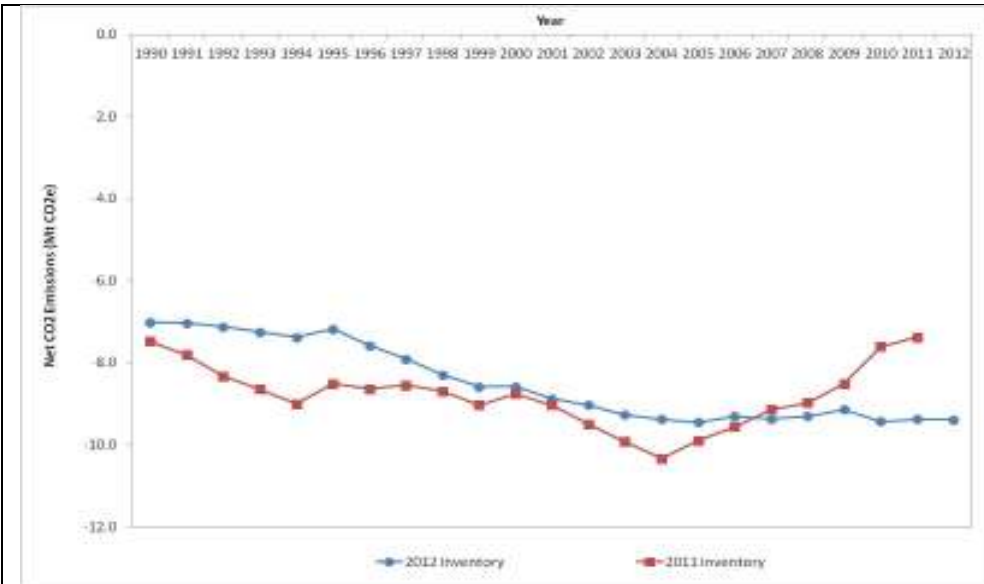


Figure 4A Forest Land - Scotland

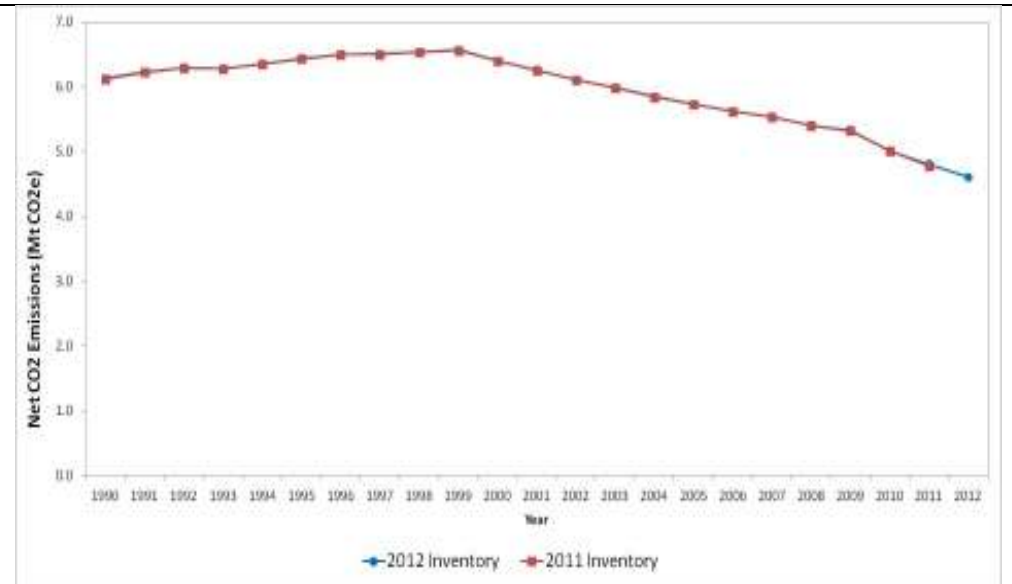


Figure 4B Cropland - Scotland

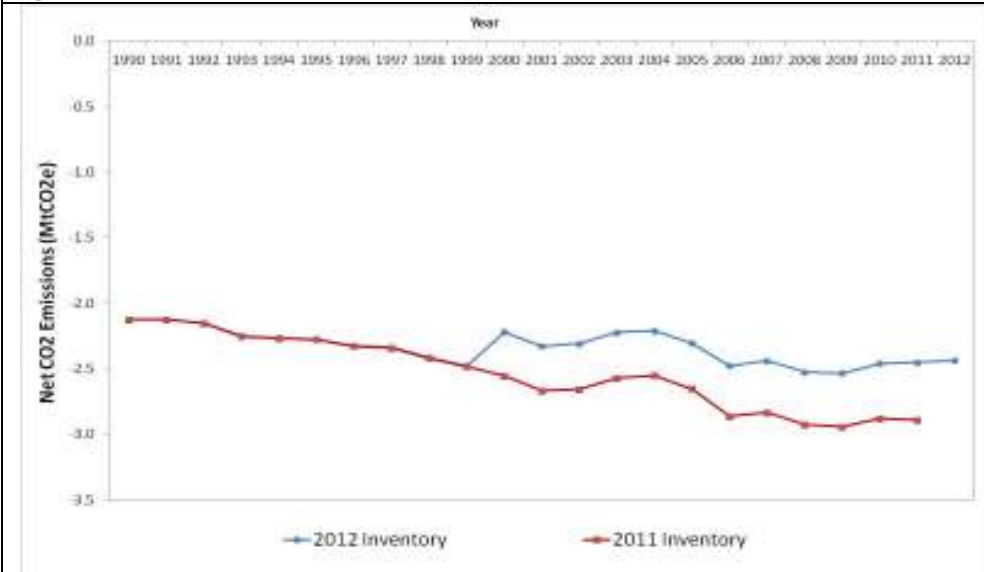


Figure 4C Grassland - Scotland

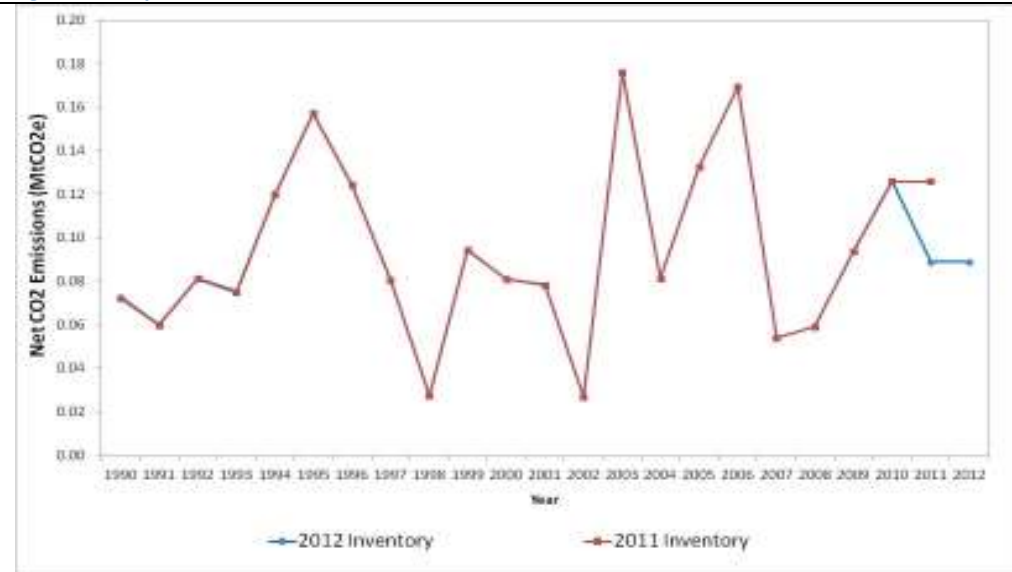


Figure 4D Wetlands - Scotland

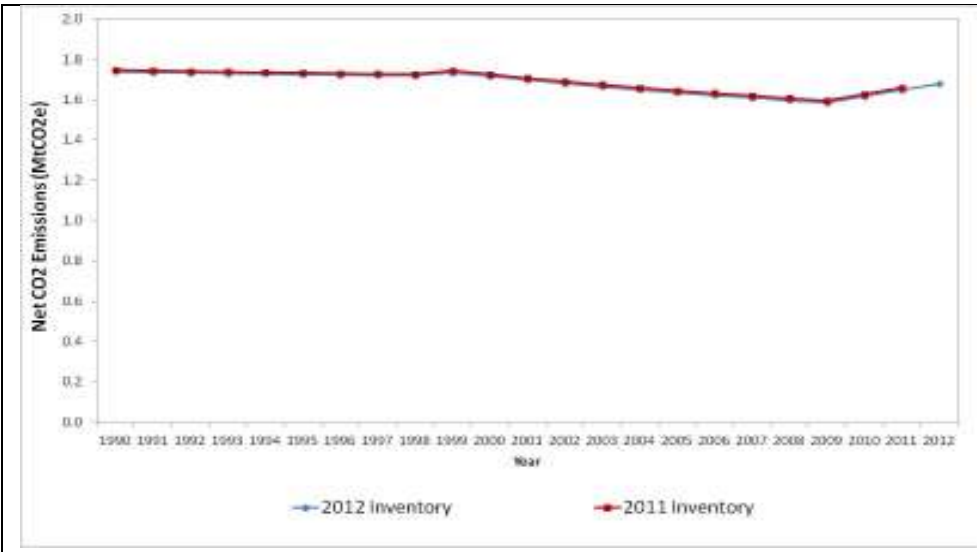


Figure 4E Settlements - Scotland

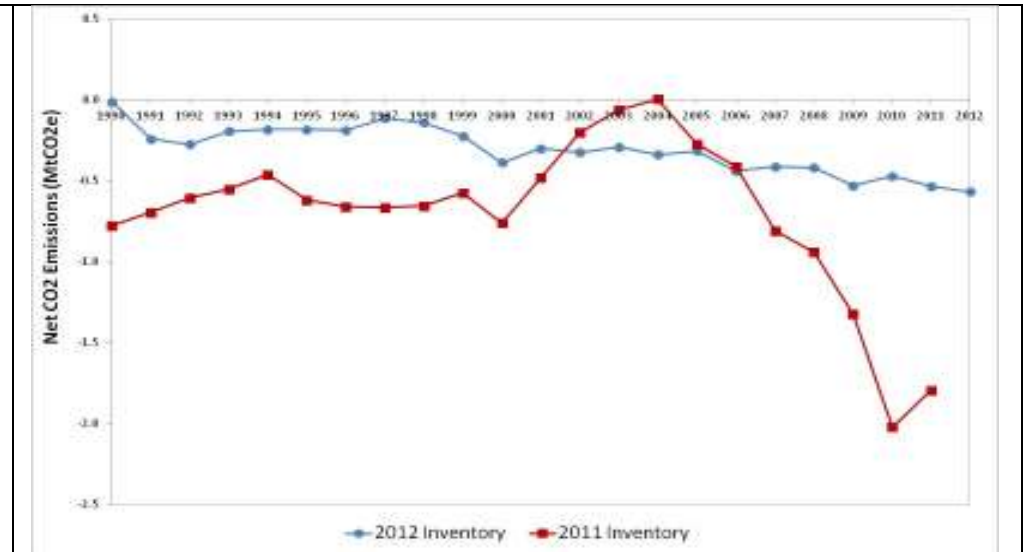


Figure 4F Harvested Wood Products - Scotland

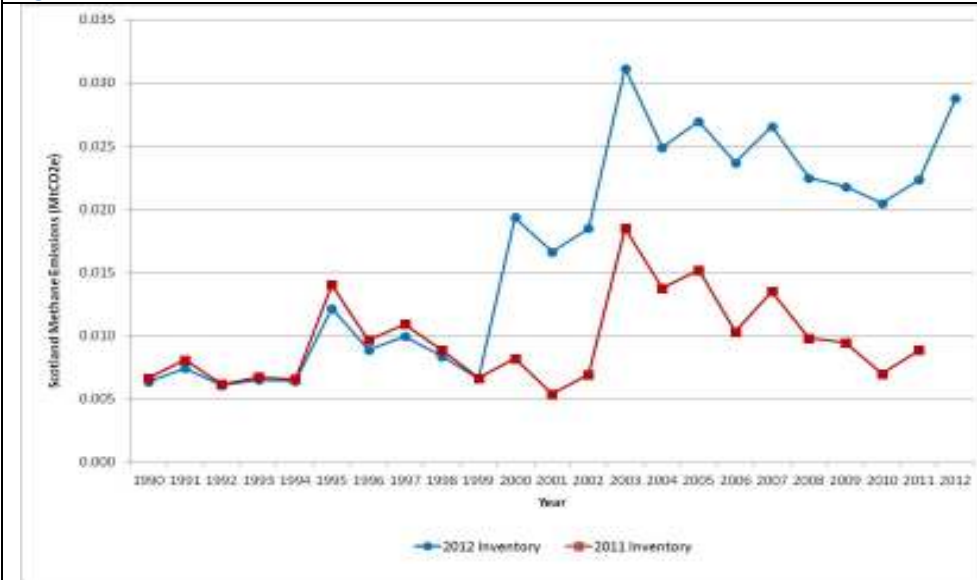


Figure 5: Changes in net emissions of CH₄ only 1990-2012 between the 2011 Inventory and 2012 Inventory for Scotland LULUCF

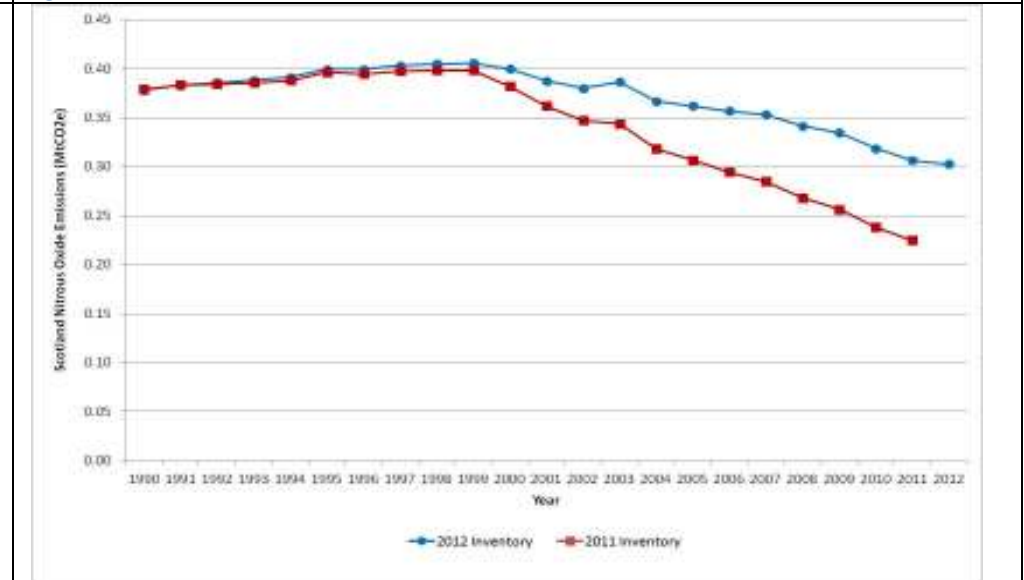


Figure 6: Changes in net emissions of N₂O only 1990-2012 between the 2011 Inventory and 2012 Inventory for Scotland LULUCF.

5.0 LULUCF Emissions and Removals in Wales

5.1 Wales LULUCF Trends

The 1990-2012 Inventory shows Wales is a small sink for greenhouse gases for LULUCF activities in 1991-2012 (Figure 13). In 1990 Wales was a small source at 0.07Mt CO₂e, becoming a small net sink in 1991 and net emissions gradually decreased thereafter until 2007 at -0.6Mt CO₂e. After 2002, net emissions fluctuate slightly between -0.6Mt CO₂e and -0.5Mt CO₂e (see Appendix 1 for emissions / removals by LULUCF category and gas).

The main influences on the trend for the LULUCF sector in Wales are emissions from Cropland and Settlement, outweighed by removals from Forest land and historic conversion to Grassland. Emissions from Wetland (see section 2.2) are low for Wales relative to other emissions, as are removals from Harvested Wood Products (Figure 13).

Cropland produces the largest emissions source in Wales, between 1990-2002 levels were fairly constant at approximately 1.2 Mt CO₂e, gradually decreasing after 2003 to 0.9 Mt CO₂e in 2012. The Settlement category is a small net source at approximately 0.8Mt CO₂e for 1990-2004, decreasing to 0.7 Mt CO₂e for 2005-2012.

The Forest land and Grassland categories are net sinks from 1990 to 2012. Between 1990-2006 Forest land is a generally increasing sink in Wales increasing from -1.4 Mt CO₂e in 1990 to -1.7 Mt CO₂e in 1996 and remaining fairly constant until 2006. After 2007, net emissions fluctuate between -1.7 Mt CO₂e and -1.4 Mt CO₂e. Grassland net emissions have fluctuated between -0.4 Mt CO₂e and -0.6 Mt CO₂e between 1990-2012.

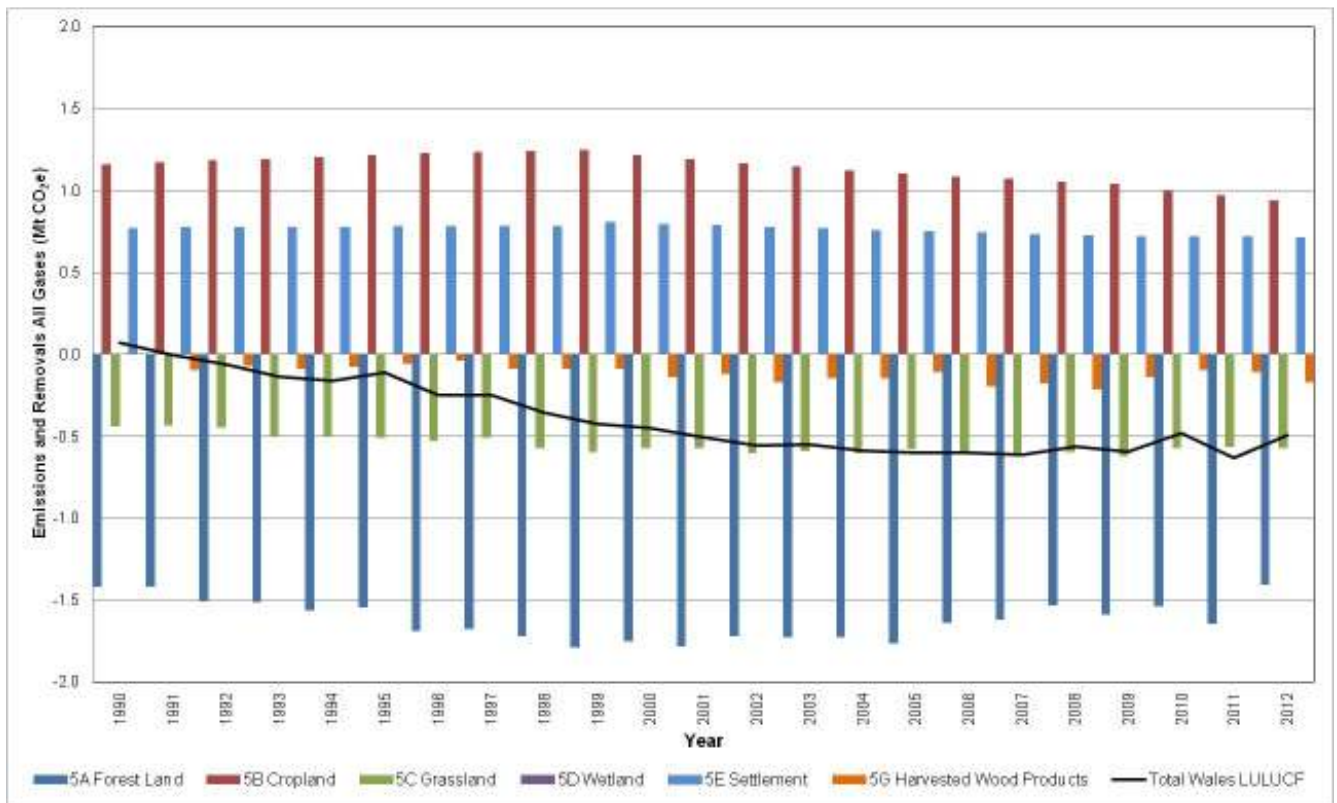


Figure 13: Emissions and removals for all gases by category for the LULUCF sector in Wales 1990-2012

5.2 Wales LULUCF Category Trends

The Forest land category (see 2.2) for Wales is a net sink for 1990-2012. The sink arises from a combination of broadleaf forest not subject to forest management and conifer plantations subject to forest management such as thinning and varying harvesting rotations. There has been a gradual decline in Land converted to Forest since 1990. There are peaks in emissions resulting from forest wildfires in 1995, 2010 and 2012 (Figure 14A).

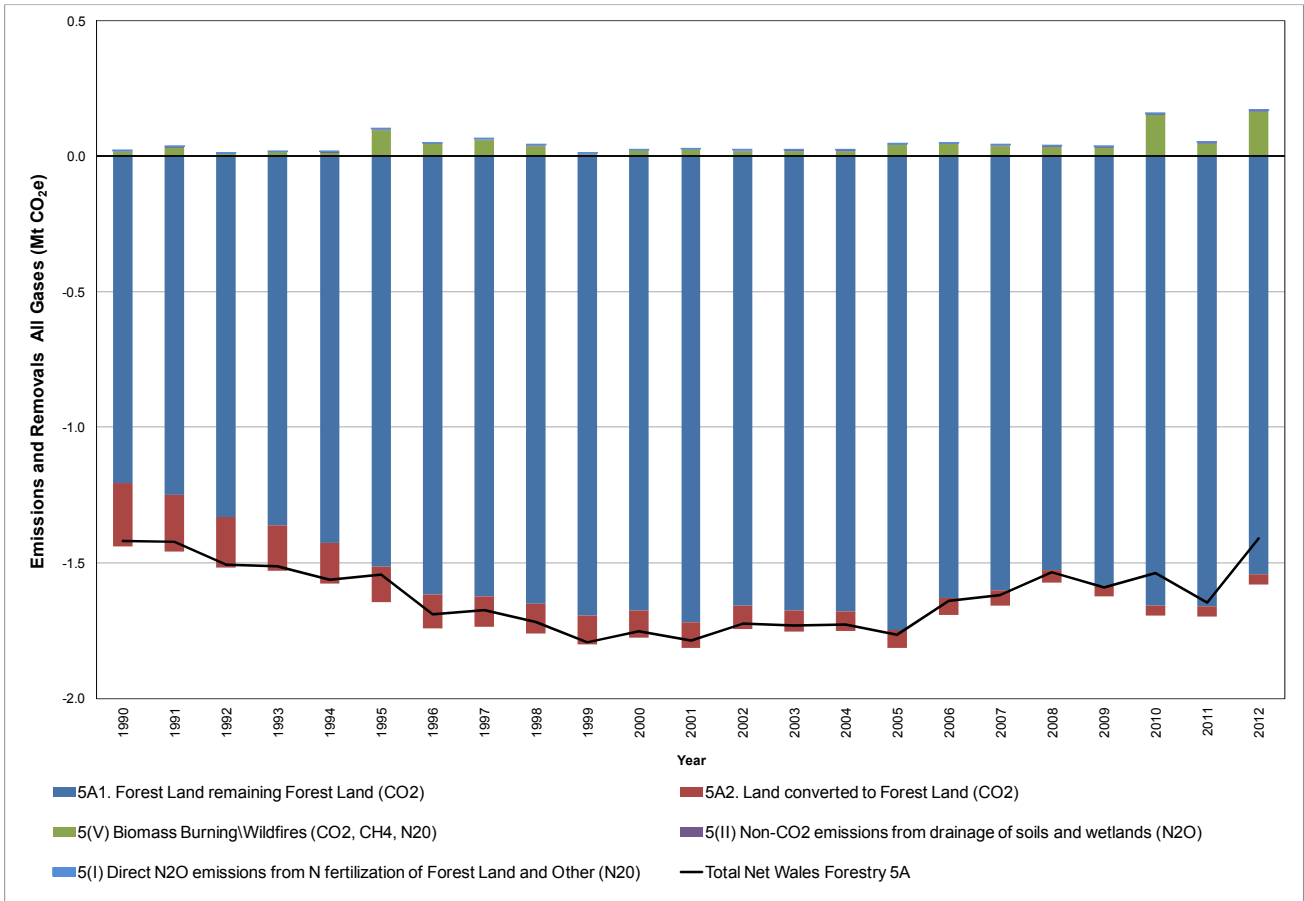


Figure 14A: Emissions and removals of all gases by category for the 5A Forestry category in Wales 1990-2012

The Cropland category (see 2.2) for Wales is an emission source for the complete 1990-2012 time series. Land converted to Cropland accounts for the highest emissions from Cropland in Wales for LULUCF. These emissions are mainly the result of Land converted to Cropland from Grassland. Land converted to Cropland has been decreasing since 1999 and Cropland remaining Cropland has been increasing (Figure 14B). Emissions from Cropland remaining Cropland are mainly due to a combination of Land converted to Cropland from Grassland 20 years prior to inventory year (see 2.2) and land management practices.

The Grassland category (see 2.2) for Wales is a net sink for 1990-2012. The majority of the sink is from Land converted to Grassland from Cropland (Figure 14C). The largest source of emissions for Grassland in Wales is CO₂ due to agricultural liming. Emissions from biomass burning increase twenty fold after 2000, this is due to increased Land converted to Grassland from Forest land (Deforestation of conifers) and corresponding controlled burning of woody biomass. There are a small amount of wildfire emissions reported in the timeseries, notably in 2003, coinciding with a hot summer across the UK.

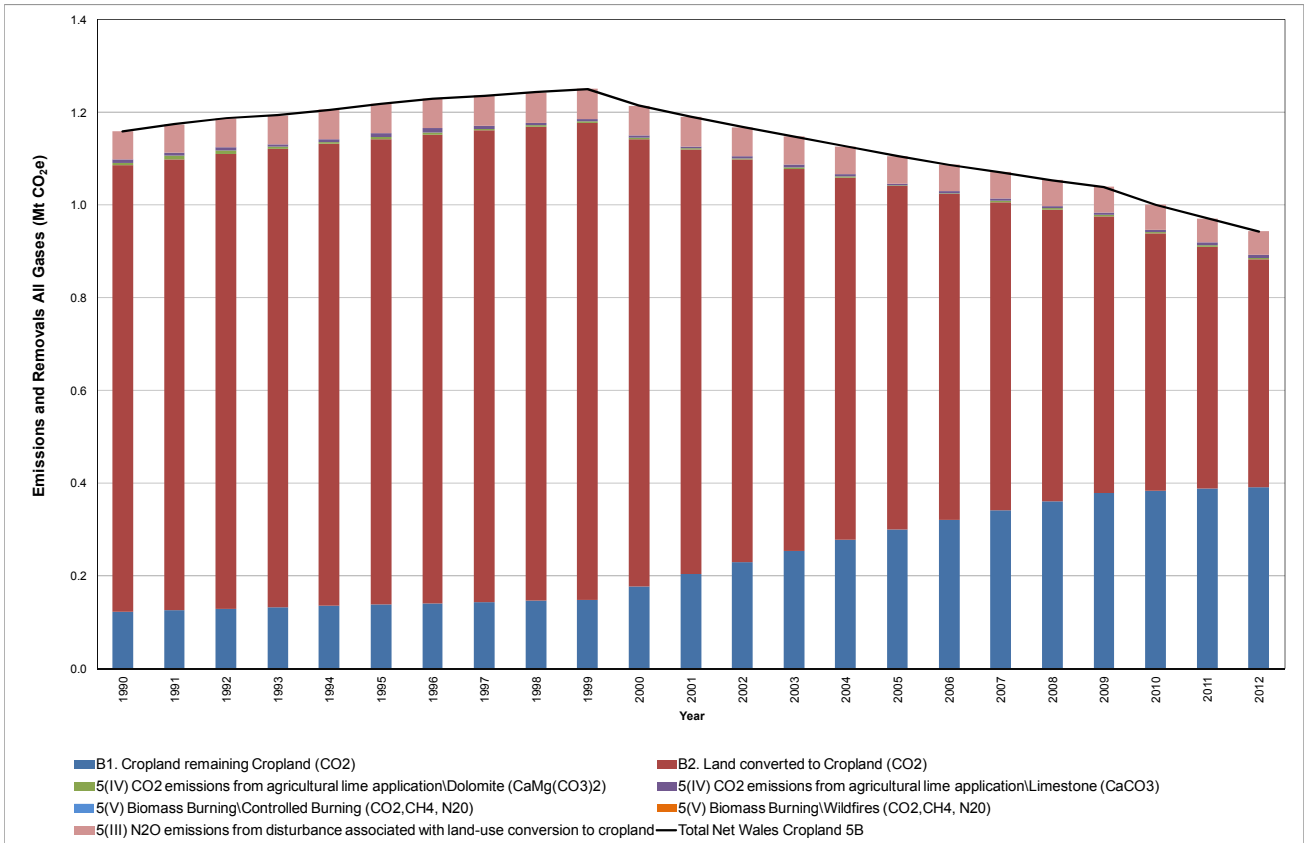


Figure 14B: Emissions and removals of all gases by category for the 5B Cropland category in Wales 1990-2012

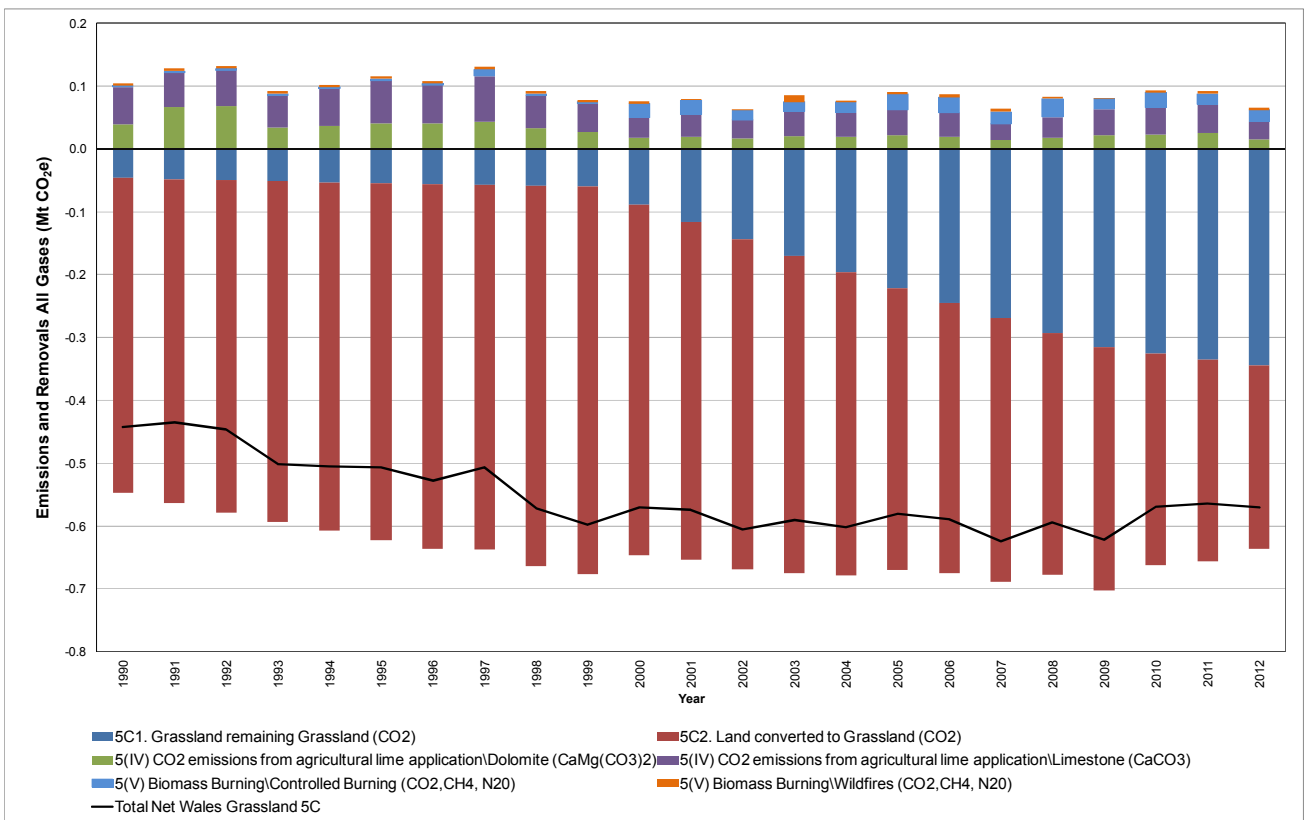


Figure 14C: Emissions and removals of all gases by category for the 5C Grassland category in Wales 1990-2012

The Wetland category (see section 2.2) is a constant minor source for Wales (Figure 14D), with the smallest emissions from peat extraction in the UK, at <0.00Mt CO₂e. Between 1990-2012, approximately 0.5 kha was estimated to be emitting carbon dioxide as a result of historic commercial peat extraction in Wales. There was no new peat extracted and sold in Wales for the horticultural industry.

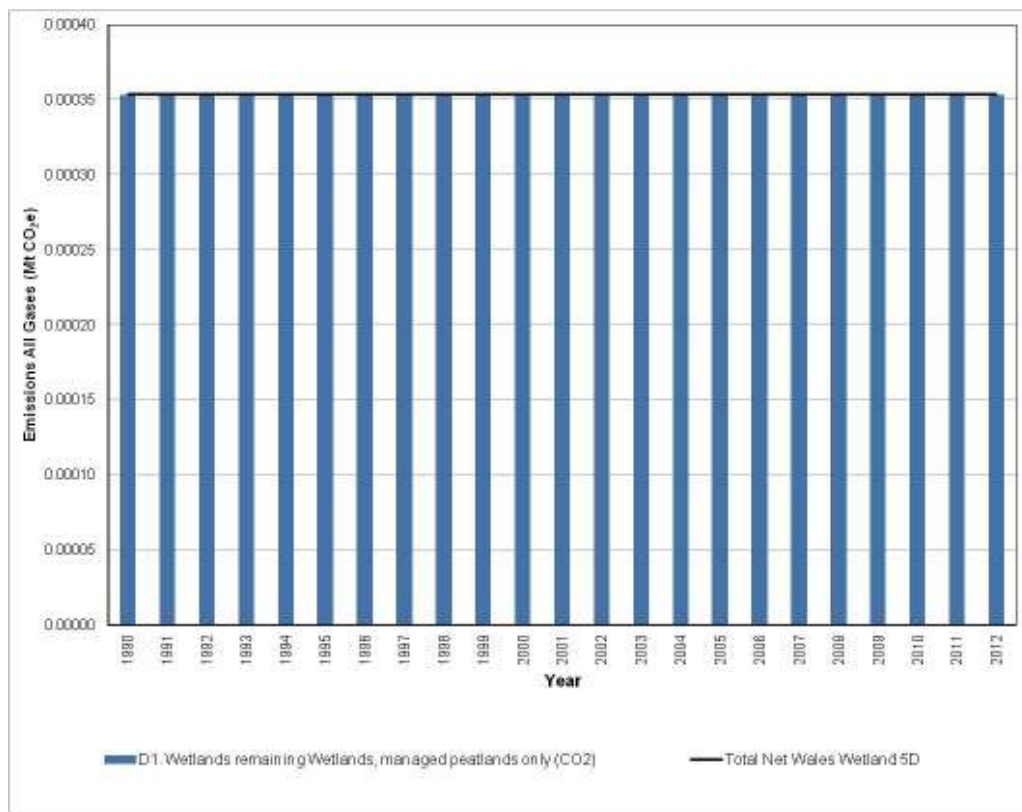


Figure 14D: Emissions and removals of all gases by category for the 5D Wetland category in Wales 1990-2012

The Settlements category (see section 2.2) is the second largest emissions source in Wales, after Cropland due to emissions produced by CO₂ emissions from soil on land conversion to Settlements (Figure 14E). The majority of emissions are from Grassland converted to Settlements within the twenty year transition period (see Section 2.2) which then become emissions from Settlement remaining Settlement shown in the increase from 2000. There are a small amount of CO₂, CH₄ and N₂O emissions (2%) resulting from controlled biomass burning on conversion of Forest land to Settlements.

The Harvested Wood Products category (see section 2.2) is a net sink of CO₂ for Wales (Figure 14G). Wales forestry provides the third largest sink for Harvested Wood Products in the UK, after Scotland and England (16% of UK removals from this category).

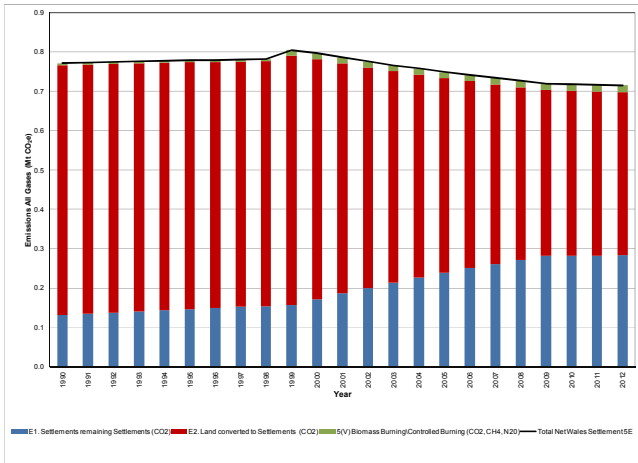


Figure 14E: Emissions and removals of all gases by category for the 5E Settlement category in Wales 1990-2012

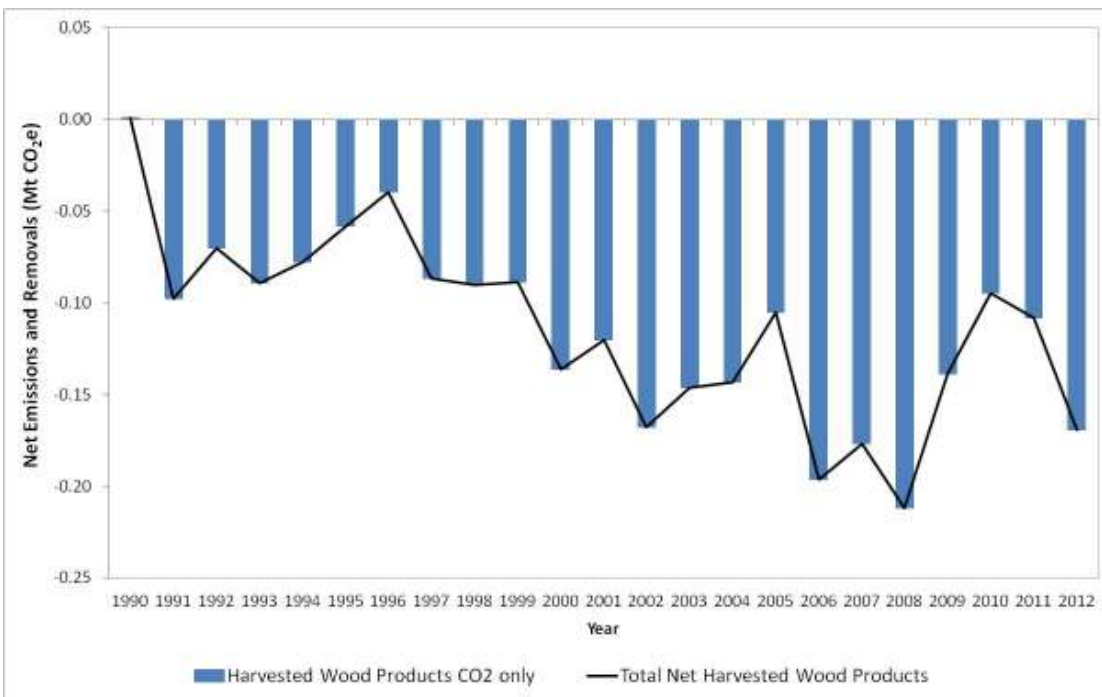


Figure 14G: Emissions and removals of all gases by category for the 5G Harvested Wood Products category in Wales 1990-2012

5.3 Wales LULUCF comparison with 2011 inventory

These revised estimates reflect improved Forest land estimates (see CEH, 2014 for detailed analysis of methodology changes). Previous inventories showed Wales as a small net source, improved estimates show Wales is a small net sink. Compared to the 1990-2011 Inventory, net removals of greenhouse gases in the 1990-2012 inventory in 1990 have increased by 0.08 Mt CO₂e (Figure 15). The sink in 2011 increased by 0.7 Mt CO₂e. One of the main reasons for the change in estimate for Wales is due to methodology now incorporating historically planted broadleaf forests and conifer plantations from 1500 onwards, compared to the previous model which assumed that forests planted prior to 1920 are now in carbo equilibrium (Table 1). There has been improved modelling of removals from Harvested Wood Products and changes to Grassland and Forest land (Table 1 & Table 4). Differences between the 2011 and 2012 inventories for CO₂ in each category are presented in Figure 16A-G. Differences between the 2011 and 2012 inventories for non-CO₂ for Wales are presented in Figure 17&18.

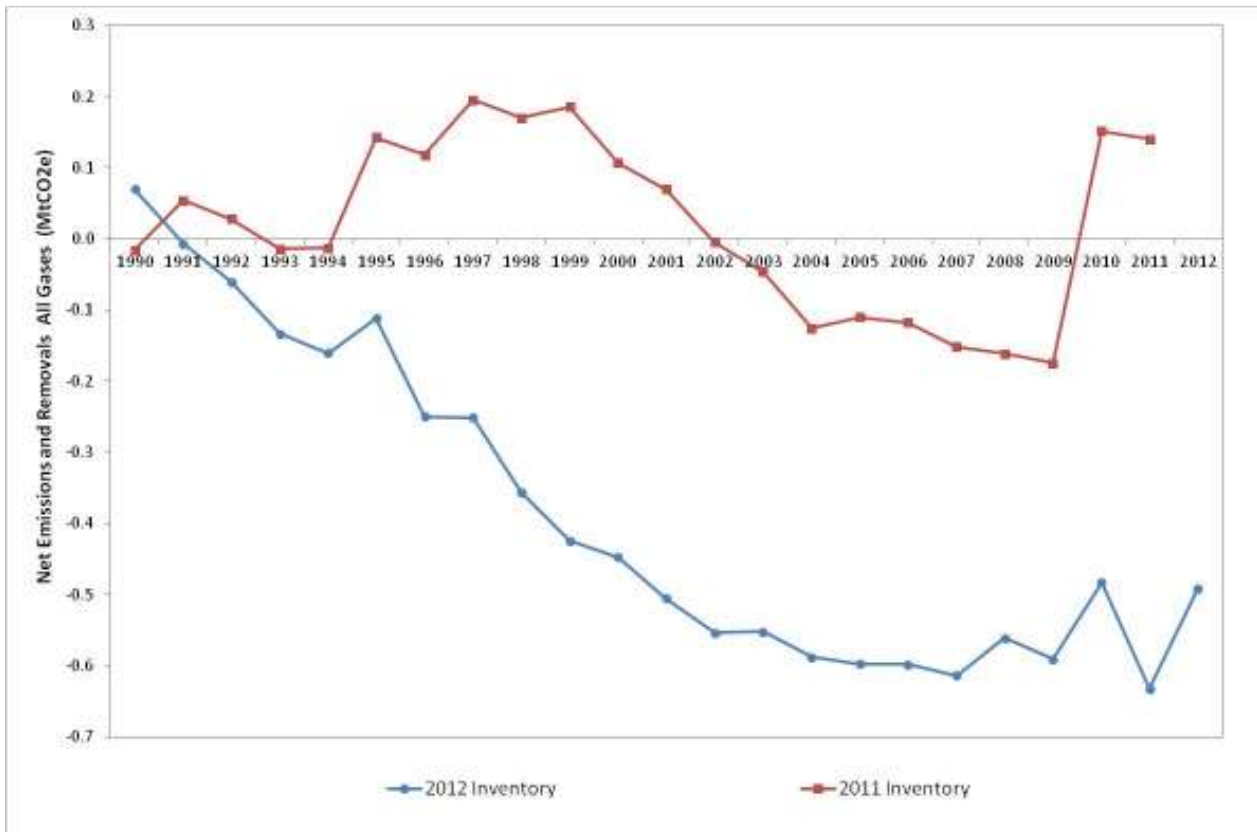


Figure 15: Changes in net emissions and removals of all gases 1990-2012 between the 2011 Inventory and 2012 Inventory for Wales

In the Forest land category (see section 2.2, 5.2, Figure 14A) estimates of removals for Wales have decreased for 1990-2012, the greatest changes are between 1995-1999 and 2009 onwards (Figure 16A). This is due to methodology now incorporating historically planted forests from 1500 onwards: broadleaf forests not subject to forest management and conifer plantations subject to forest management such as thinning and varying harvesting rotations (Table 1). This also effects estimates for both Forest land remaining Forest land and Land converted to Forest land.

In the Cropland category (see section 2.2, 5.2, Figure 14B) estimates for emissions for Wales have remained constant for 1990-2011 (Table 4, Figure 16B).

In the Grassland category (see section 2.2, 5.2, Figure 14C) estimates for removals for Wales have slightly decreased for 1990-1999, with a marked decrease between 2000-2012 (Table 4, Figure 16C). This is mainly due to change in methodology estimates for emissions from deforestation to Grassland.

In the Wetland category (see section 2.2, 5.2, Figure 14D) estimates for emissions for Wales remain the same as the previous inventory (Table 4, Figure 16D).

In the Settlements category (see section 2.2, 5.2, Figure 14E) estimates for emissions for Wales have slightly decreased for 1990-2012 (Table 4, Figure 16E). This is mainly due to change in methodology estimates for emissions from deforestation to Settlement.

In the Harvested Wood Products category (see section 2.2, 5.2, Figure 14F) estimates for the emissions trend for Wales have changed for 1990-2012 (Table 4, Figure 16F). This is due to the change from modelling harvesting assuming a fixed rotation to adding rotation of different lengths to the modelling, more reflective of real trends.

Non-CO₂ emissions for Wales show relatively minor variations from previous estimates. CH₄ emissions trend has decreased, notably before 2000 (Figure 17), this reflects a decrease in emissions estimates for controlled burning of deforested woody biomass due to deforestation of conifer plantations to Grassland (see section 5.2, Figure 14A). N₂O emissions have reduced slightly, this is mainly due to change in methodology estimates for emissions from land conversion from to Forest land (see section 5.2).

Table 4: Effects of improvements in the source data and/or methodology on Inventory data for Wales

IPCC Sector	Difference between 2012 and 2011 inventory estimates, kt CO ₂ e	
	1990	2011
5A Forest Land	-269.51	-1431.06
5B Cropland	0.00	0.00
5C Grassland	-1.87	39.99
5D Wetlands	0.00	0.00
5E Settlements	-3.70	-9.94
5G Harvested Wood Products	357.46	676.76

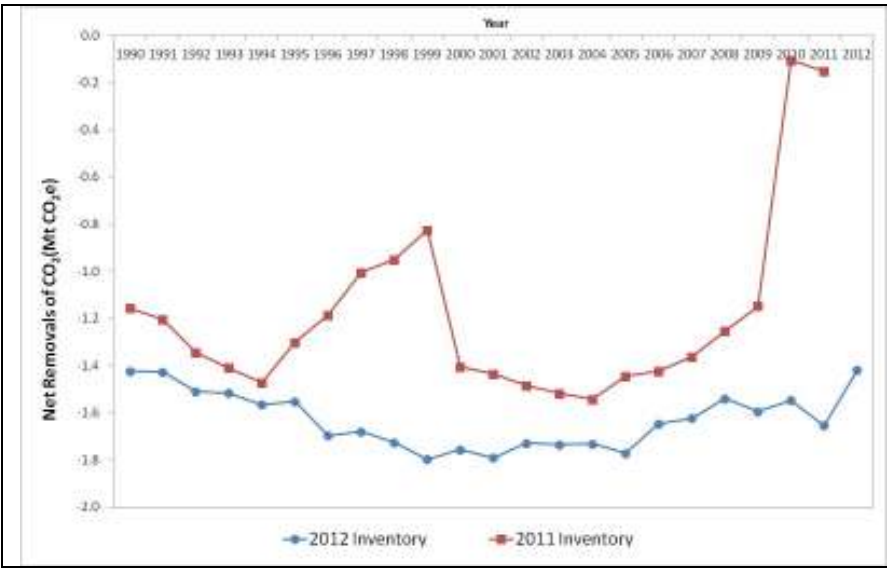


Figure 4A Forest Land - Wales

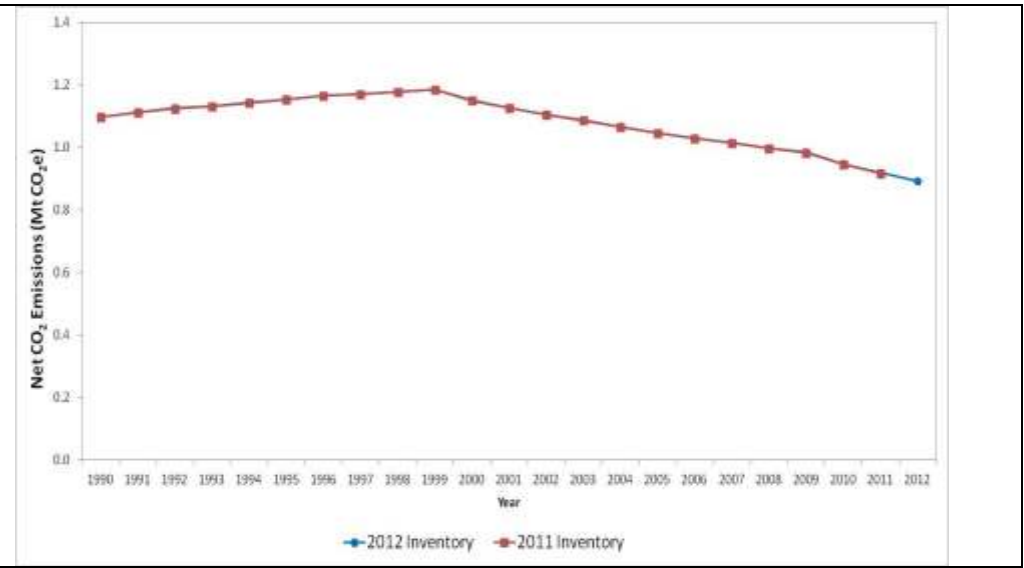


Figure 4B Cropland - Wales

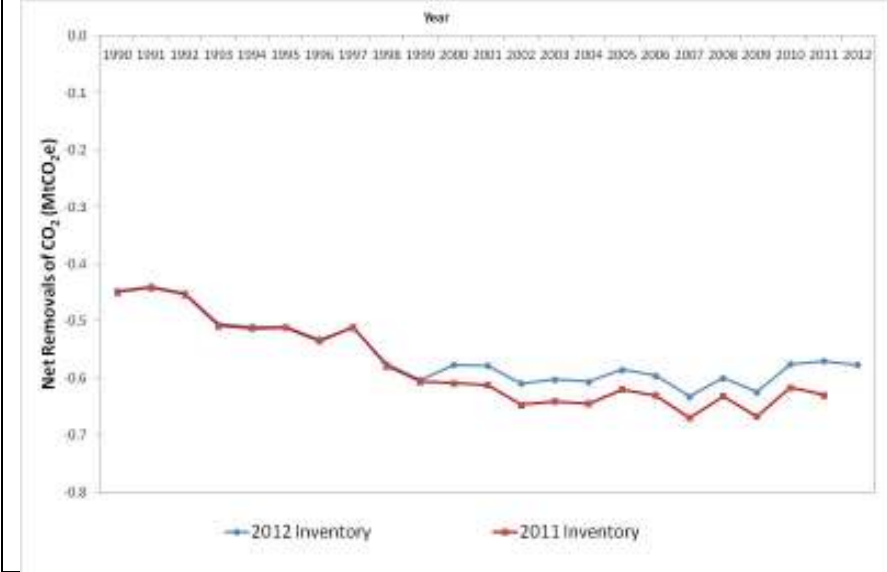


Figure 4C Grassland - Wales

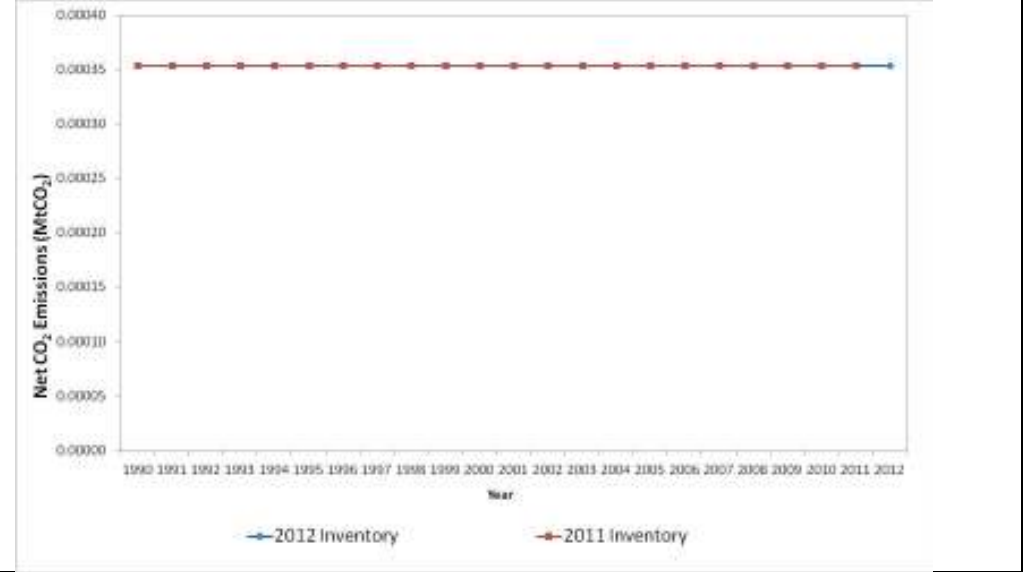


Figure 4D Wetlands - Wales

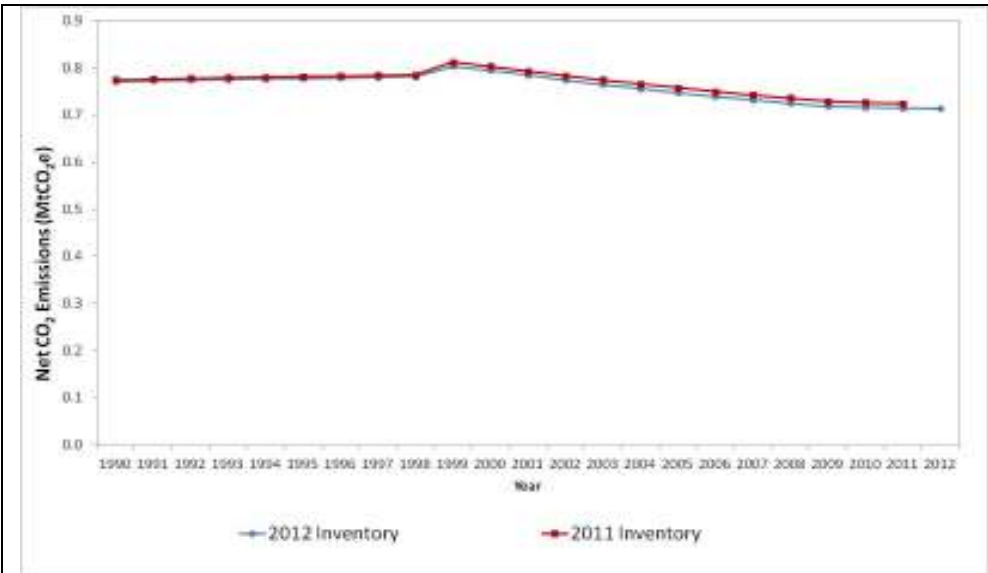


Figure 4E Settlements - Wales

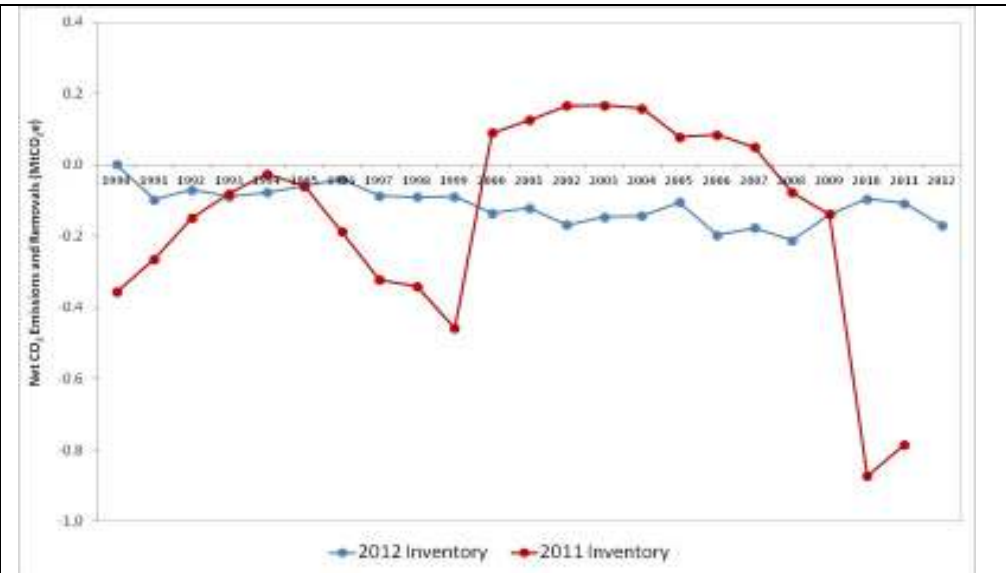


Figure 4F Harvested Wood Products - Wales

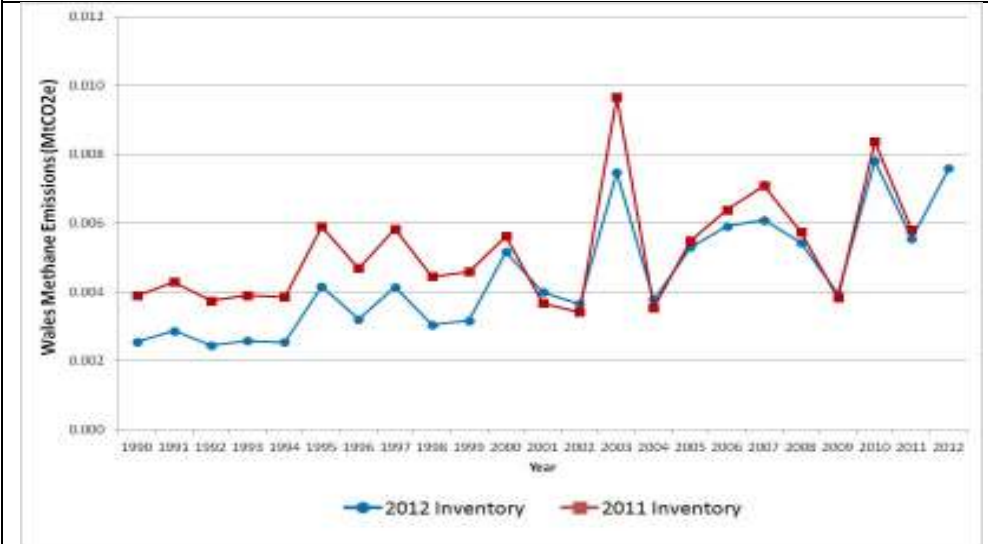


Figure 5: Changes in net emissions of CH₄ only 1990-2012 between the 2011 Inventory and 2012 Inventory for Wales LULUCF

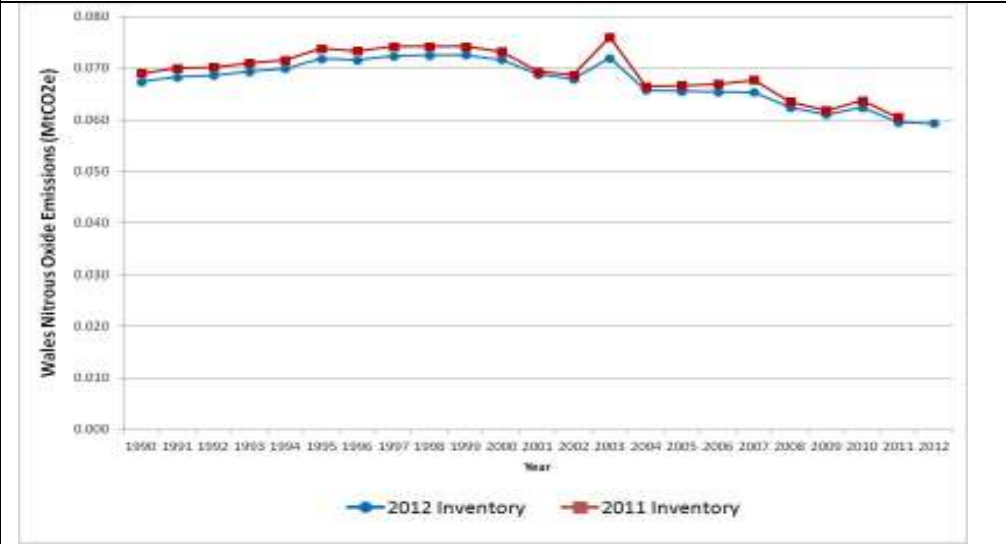


Figure 6: Changes in net emissions of N₂O only 1990-2012 between the 2011 Inventory and 2012 Inventory for Wales LULUCF.

6.0 LULUCF Emissions and Removals in Northern Ireland

6.1 Northern Ireland LULUCF Trends

The 1990-2012 Inventory shows that Northern Ireland became a small source of emissions of greenhouse gases from LULUCF activities in 2012, having been a small sink between 1993 and 2011 (Figure 19). In 1990 Northern Ireland was a small source at 0.1Mt CO₂e, becoming a small net sink from 1993-2011. In 1993, net emissions are -0.05Mt CO₂e and they gradually decrease to -0.2Mt CO₂e in 1998 to 2010. The main driver for Northern Ireland becoming a net source in 2012 was the increased area of forest wildfires (see 6.2). (see Appendix 1 for emissions / removals by LULUCF category and gas).

The main influences on the trend for the LULUCF sector in Northern Ireland are emissions from Cropland and Settlement, outweighed by removals from Grassland and Forest land (except in 2012). Emissions from Wetland (see section 2.2) are low for Northern Ireland relative to other emissions, as are removals from Harvested Wood Products (Figure 19).

Cropland produces the largest emissions source in Northern Ireland, between 1990-2012 levels gradually decreased from 1.3Mt CO₂e in 1990 to 1.1Mt CO₂e in 2003-2009, before decreasing from 1.0Mt CO₂e in 2010-2011 to 0.9 Mt CO₂e in 2012. The Settlement category is a small increasing net source at approximately 0.6Mt CO₂e for 1990-2001, gradually increasing from 2002-2005 to 0.8Mt CO₂e for 2006-2012.

The Grassland category is a net sink from 1990 to 2012, Grassland removals have fluctuated between -1.1 Mt CO₂e and -1.3 Mt CO₂e between 1990-2012. Between 1990-2003 Forest land is a generally increasing sink in Northern Ireland increasing from -0.7 Mt CO₂e in 1990 to -0.9 Mt CO₂e in 2003 and remaining fairly constant until 2010. In 2011 removals drop to -0.8Mt CO₂e halving in 2012 to -0.4 Mt CO₂e (see 6.2).

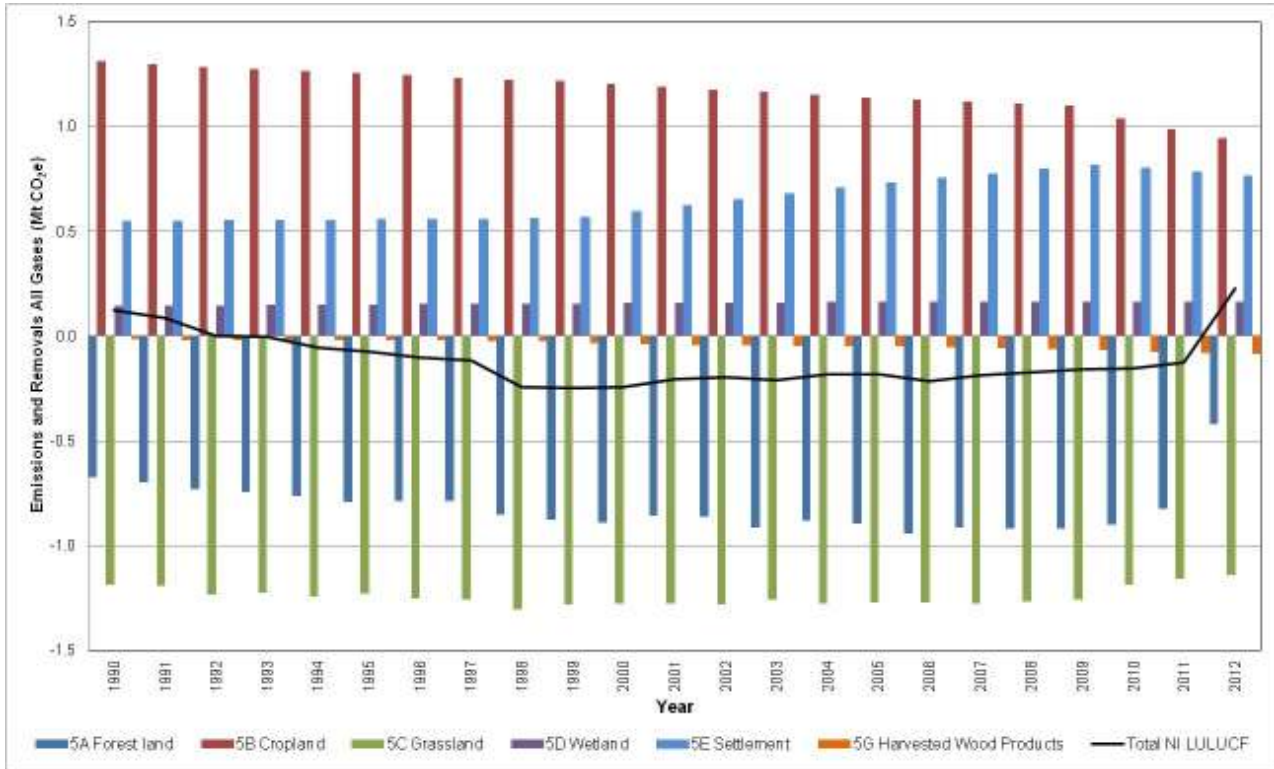


Figure 19: Emissions and removals for all gases by category for the LULUCF sector in Northern Ireland 1990-2012

6.2 Northern Ireland LULUCF Category Trends

The Forest land category (see 2.2) for Northern Ireland is a net sink for 1990-2011. The majority of the sink arises from broadleaf forest planted after 1900, estimates do not include pre 1900 forest for Northern Ireland. There has been a gradual decline in Land converted to Forest since 1990.

Emissions from biomass burning due to forest wildfires show summer peaks throughout 1990-2012, notably in 2012 (Figure 20A). This was due to a wildfire area 704ha, 14 times the 1990-2011 forest wildfire average for Northern Ireland and the greatest total forest wildfire area in the UK in 2012. This halved the net removals from Forest land for 2012 from -0.8Mt CO₂e in 2011 to -0.4Mt CO₂e in 2012.

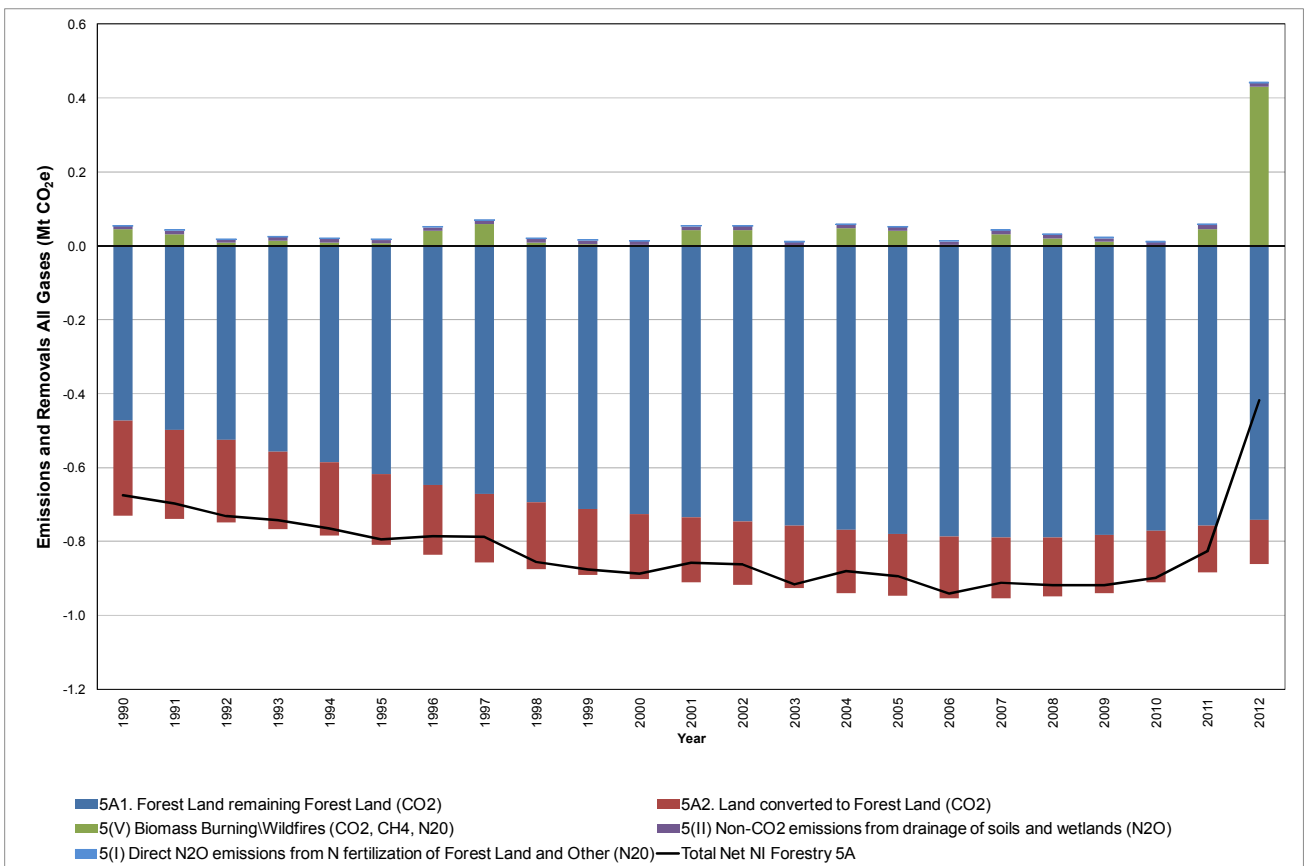


Figure 20A: Emissions and removals of all gases by category for the 5A Forestry category in Northern Ireland 1990-2012

The Cropland category (see 2.2) for Northern Ireland is a source for 1990-2012. Land converted to Cropland accounts for the highest emissions from Cropland in Northern Ireland for LULUCF. These emissions are mainly the result of Land converted to Cropland from Grassland. Land converted to Cropland has been decreasing since 1990 and Cropland remaining Cropland has been increasing (Figure 20B). Emissions from Cropland remaining Cropland are mainly due to a combination of Land converted to Cropland from Grassland 20 years prior to inventory year (see 2.2).

The Grassland category (see 2.2) for Northern Ireland is a net sink for 1990-2012. The majority of the sink is from Land converted to Grassland from Cropland due to either historic (reported in Cropland remaining Cropland) or recent conversion (Figure 20C). The largest source of emissions for Grassland in Northern Ireland is CO₂ due to agricultural liming. There are a small amount of biomass burning due to controlled burning on deforestation of Forest land to Grassland and wildfire emissions reported in the timeseries (0.3%).

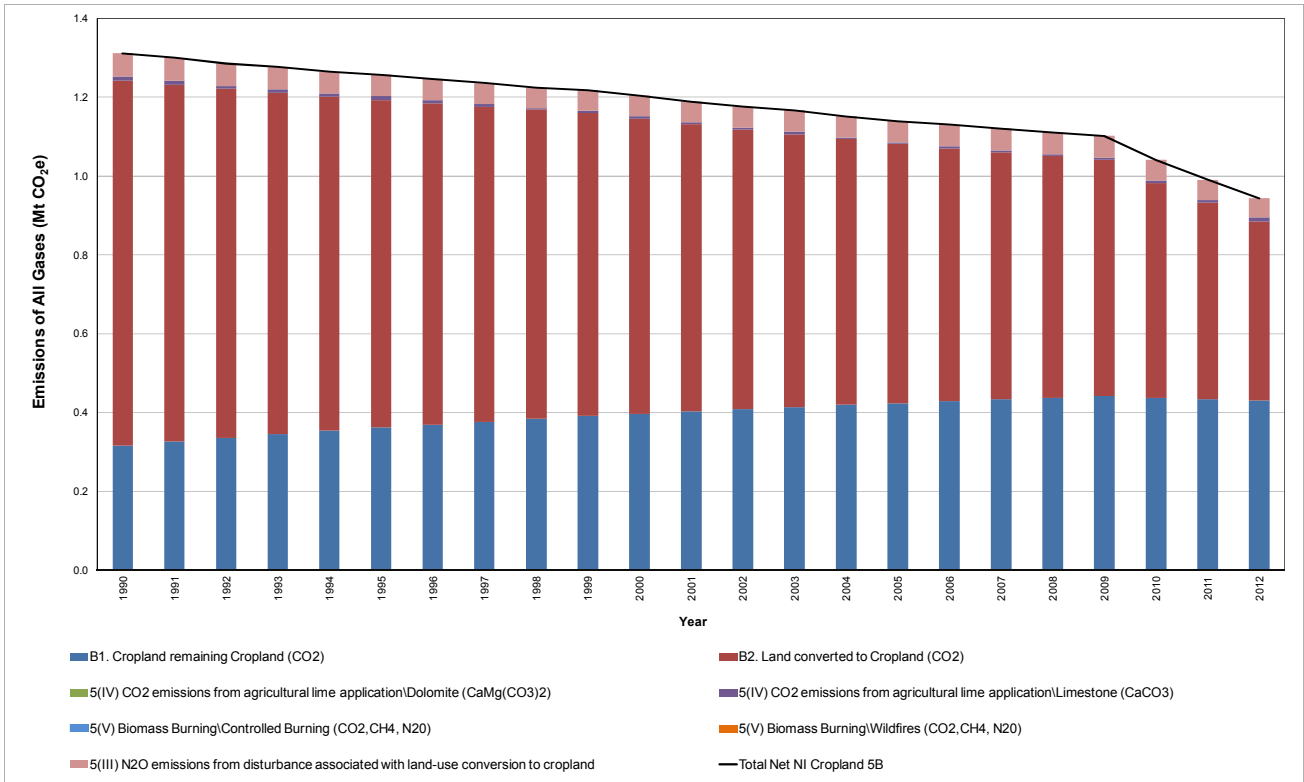


Figure 20B: Emissions and removals of all gases by category for the 5B Cropland category in Northern Ireland 1990-2012

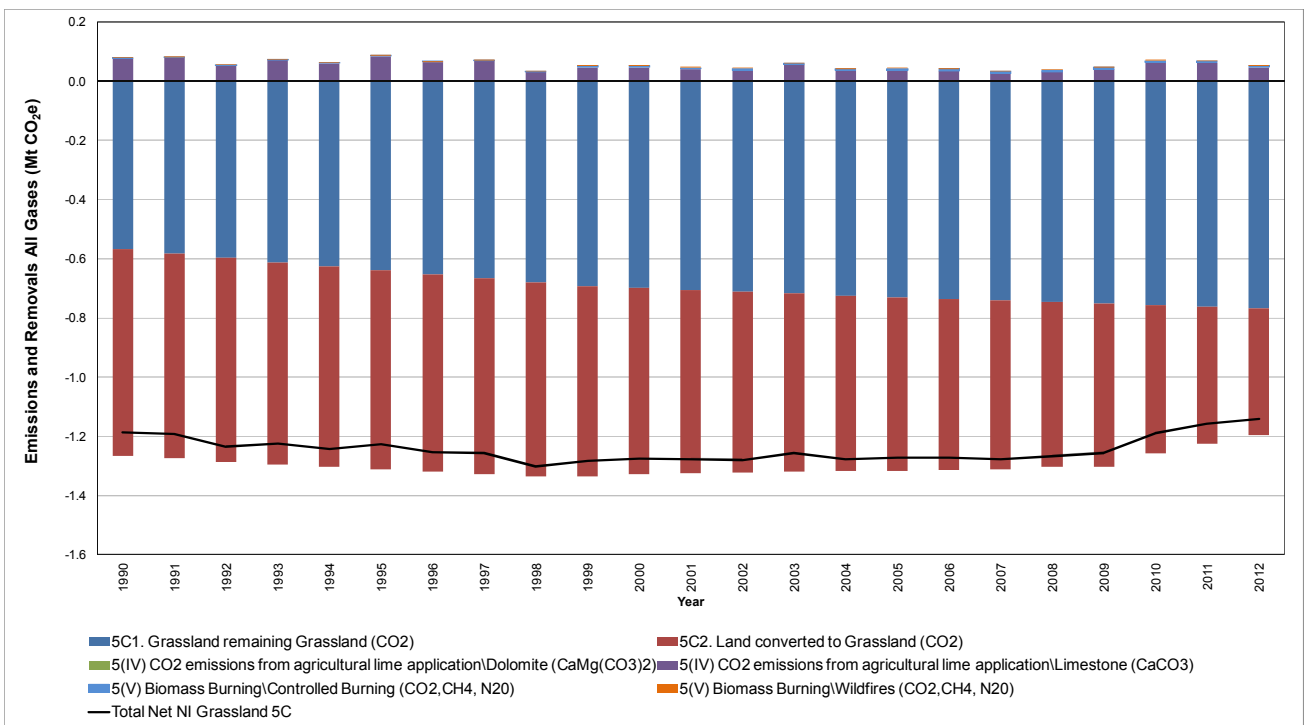


Figure 20C: Emissions and removals of all gases by category for the 5C Grassland category in Northern Ireland 1990-2012

The Wetland category (see section 2.2) is a net source for Northern Ireland (Figure 14D), with the second largest emissions from peat extraction in the UK. In 1990 approximately 4.5 kha was estimated to be emitting carbon dioxide as a result of commercial peat extraction in Northern Ireland. This has gradually decreased to 1.0 kha in 2007-2012. An estimated 71% of the UK fuel peat extraction occurs in Northern Ireland. There were small N₂O emissions (1%) and minor CO₂ emissions (0.01%) from land conversion to peat extraction from areas from 1992-2012.

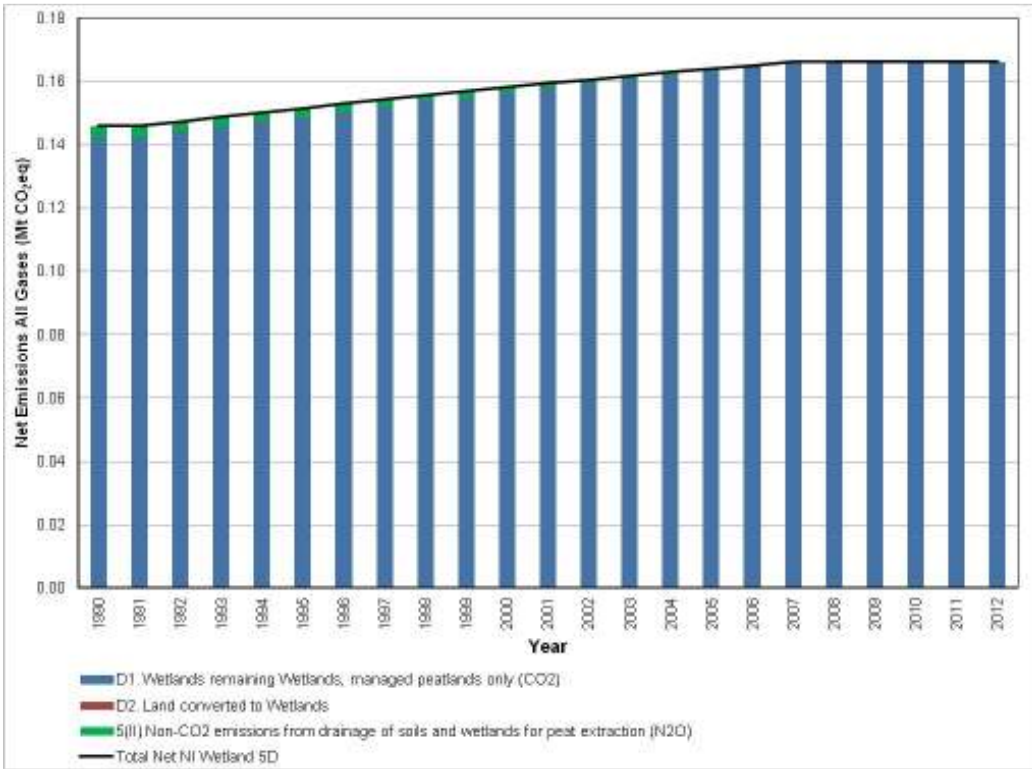


Figure 20D: Emissions and removals of all gases by category for the 5D Wetland category in Northern Ireland 1990-2012

The Settlements category (see section 2.2) is the second largest emissions source in Northern Ireland, after Cropland due to emissions produced by CO₂ emissions from soil on land conversion to Settlements (Figure 20E). The majority of emissions are from Grassland converted to Settlements (72%). There are a small amount of CO₂, CH₄ and N₂O emissions (0.7%) resulting from controlled biomass burning on conversion of Forest land to Settlements.

The Harvested Wood Products category (see section 2.2) is a net sink of CO₂ for Northern Ireland (Figure 20G). Northern Ireland forestry provides the smallest sink for Harvested Wood Products in the UK (6% of UK removals from this category). The sink has increased from 0.1Mt CO₂e in 1990 to 0.9Mt CO₂e, a change of 442%.

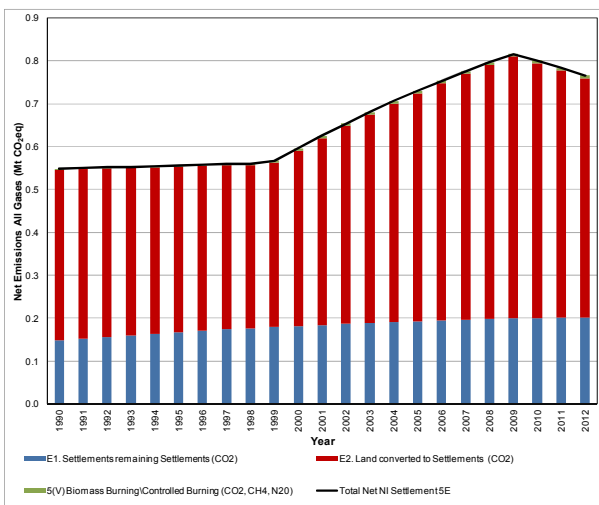


Figure 20E: Emissions and removals of all gases by category for the 5E Settlement category in Northern Ireland 1990-2012

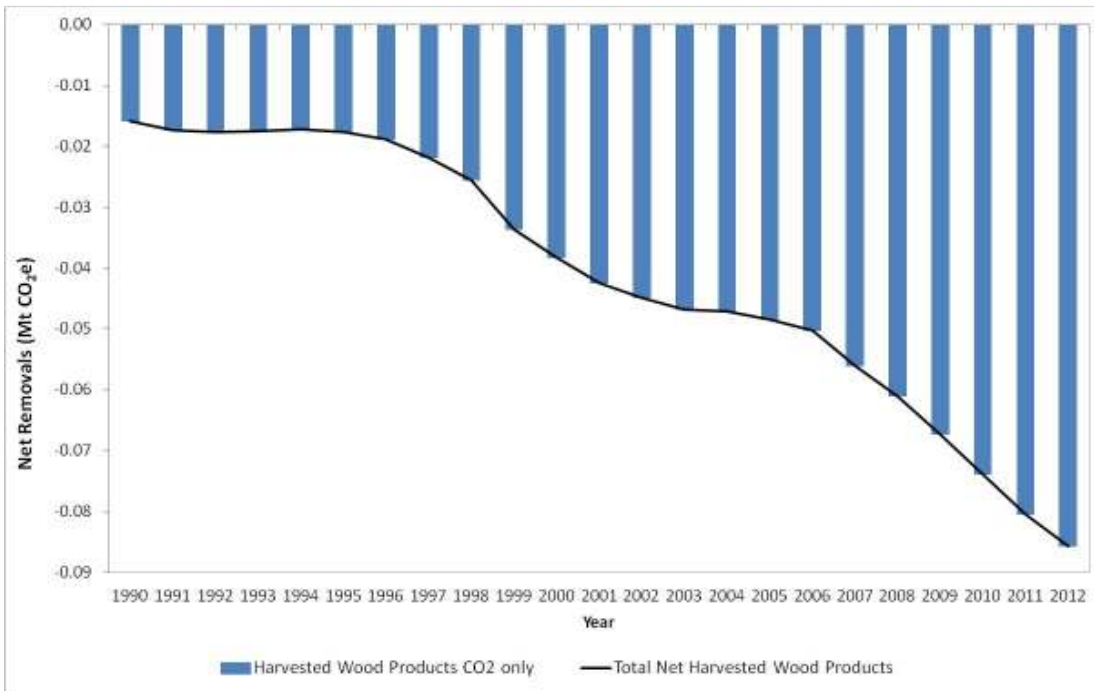


Figure 20G: Emissions and removals of all gases by category for the 5G Harvested Wood Products category in Northern Ireland 1990-2012

6.3 Northern Ireland LULUCF comparison with 2011 inventory

These revised estimates reflect improved Forest land estimates (see CEH, 2014 for detailed analysis of methodology changes). The previous inventory showed Northern Ireland as a small net source in 1990-1991 and 2004-2011 and a small net sink from 1992-2003. Improved estimates show Northern Ireland is a slightly larger source 1990-1991, a source in 2012 (see 6.2) and a greater net sink 1994-2011. Compared to the 1990-2011 Inventory, net removals of greenhouse gases in the 1990-2012 inventory in 1990 have increased by 0.02 Mt CO₂e (Figure 21). For 2011 Northern Ireland has changed from a source to a sink, decreasing by 0.3 Mt CO₂e. One of the main reasons for the change in estimate for Northern Ireland is due to methodology now incorporating historically planted broadleaf forests from 1900 onwards, compared to the previous model which only used data from 1920 onwards (Table 1). There has been improved modelling of removals from Harvested Wood Products and changes to Grassland and Forest land (Table 1 & Table 5). Differences between the 2011 and 2012 inventories for CO₂ in each category are presented in Figure 22A-G. Differences between the 2011 and 2012 inventories for non-CO₂ for Northern Ireland are presented in Figure 23&24.

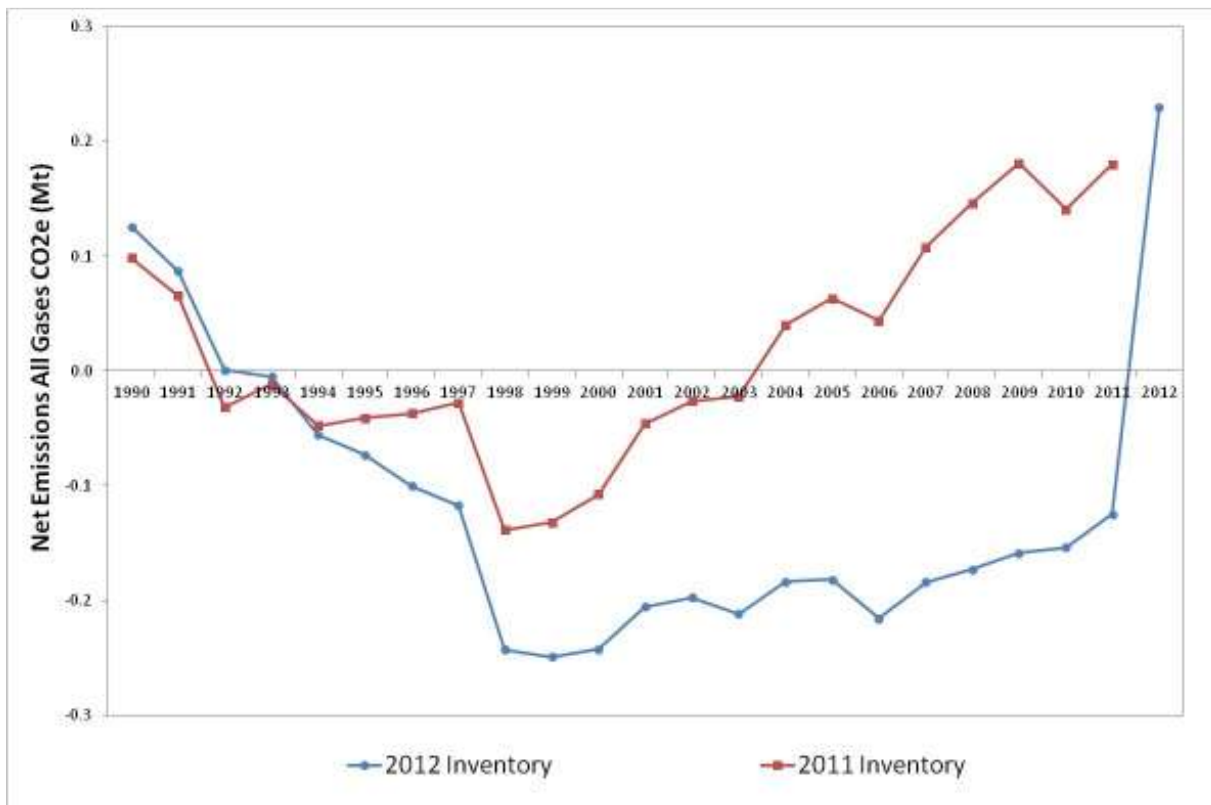


Figure 21: Changes in net emissions of all gases 1990-2009 between the 2011 Inventory and 2012 Inventory for Northern Ireland

In the Forest land category (see section 2.2, 6.2, Figure 20A) estimates of removals for Northern Ireland have increased gradually for 1993-2011 (Figure 22A). This is due to methodology now incorporating historically planted forests from 1900 onwards (Table 1). This also effects estimates for both Forest land remaining Forest land and Land converted to Forest land.

In the Cropland category (see section 2.2, 6.2, Figure 20B) estimates for emissions for Northern Ireland have remained constant for 1990-2011 (Table 5, Figure 22B).

In the Grassland category (see section 2.2, 6.2, Figure 20C) estimates for removals for Northern Ireland have slightly decreased, with a marked decrease between 2010-2011 (Table 5, Figure 22C). This is mainly due to change in methodology estimates for emissions from deforestation to Grassland.

In the Wetland category (see section 2.2, 6.2, Figure 20D) estimates for emissions for Northern Ireland remain the same as the previous inventory, aside from minor improvements to accuracy (Table 5, Figure 22D).

In the Settlements category (see section 2.2, 6.2, Figure 20E) estimates for emissions for Northern Ireland have slightly decreased for 1990-2012 (Table 5, Figure 22E). This is mainly due to change in methodology estimates for emissions from deforestation to Settlement.

In the Harvested Wood Products category (see section 2.2, 6.2, Figure 20F) estimates for the removals trend for Northern Ireland have decreased for 1990-2012 (Table 5, Figure 22F). This is due to the change from modelling harvesting assuming a fixed rotation to adding rotation of different lengths to the modelling, more reflective of real trends.

Non-CO₂ emissions for Northern Ireland show relatively minor variations from previous estimates. CH₄ emissions trend have slightly decreased (Figure 23), this reflects a decrease in emissions estimates for controlled burning of deforested woody biomass due to deforestation of conifer plantations to Grassland (see

section 6.2, Figure 20A). N₂O emissions have increased slightly, this is mainly due to change in methodology estimates for emissions from land conversion from to Forest land (see section 6.2).

Table 5: Effects of improvements in the source data and/or methodology on Inventory data for Northern Ireland

IPCC Sector	Difference between 2012 and 2011 inventory estimates, kt CO ₂ e	
	1990	2011
5A Forest Land	-8.46	-399.75
5B Cropland	0.00	0.00
5C Grassland	-0.40	-2.14
5D Wetlands	<0.00	<0.00
5E Settlements	-2.32	-2.26
5G Harvested Wood Products	37.33	70.11

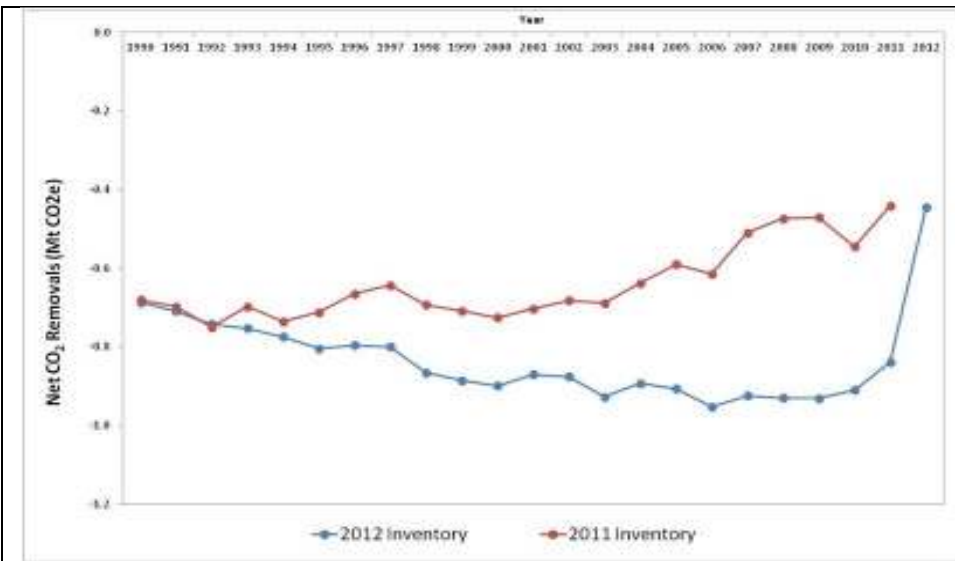


Figure 4A Forest Land - Northern Ireland

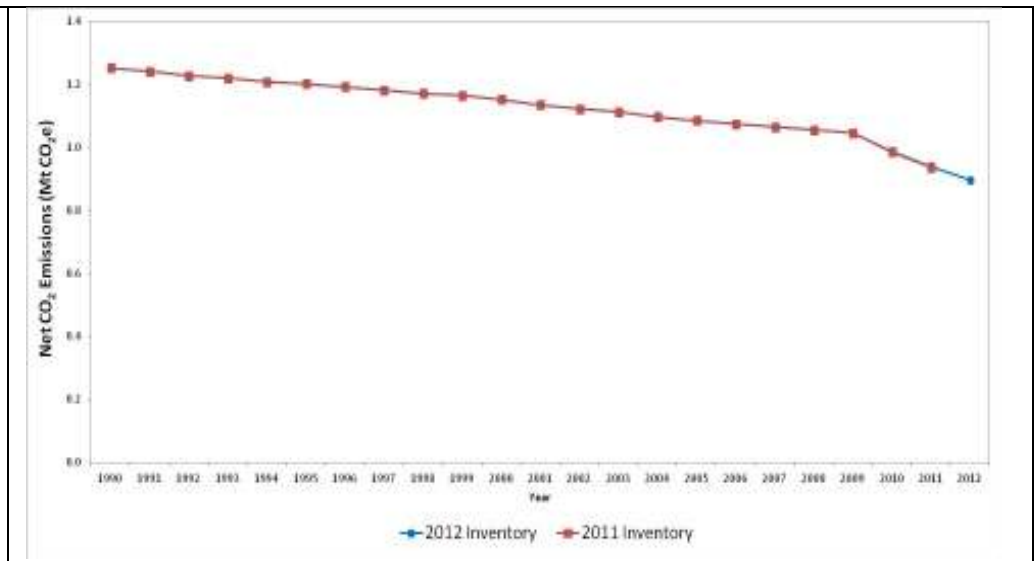


Figure 4B Cropland - Northern Ireland

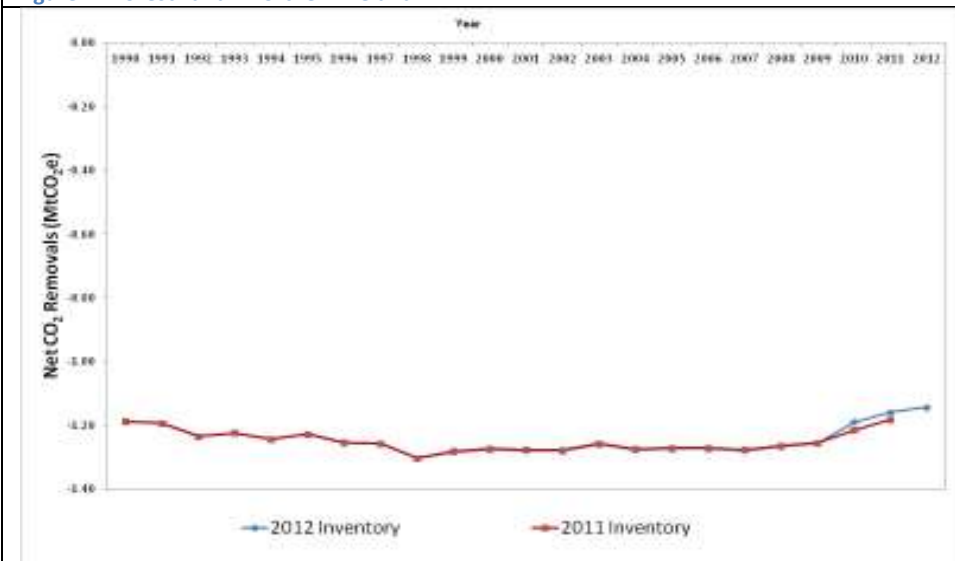


Figure 4C Grassland - Northern Ireland

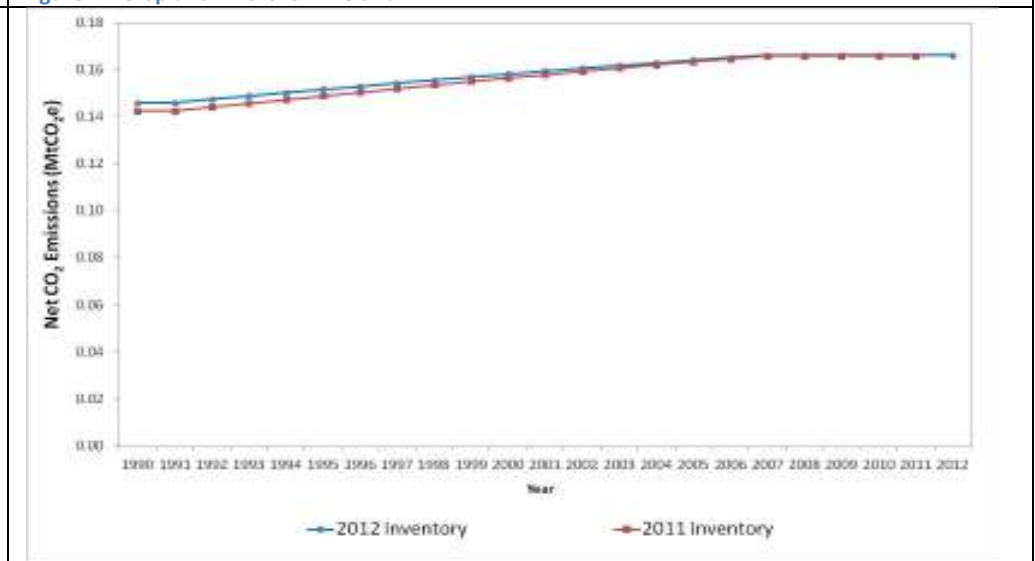


Figure 4D Wetlands - Northern Ireland

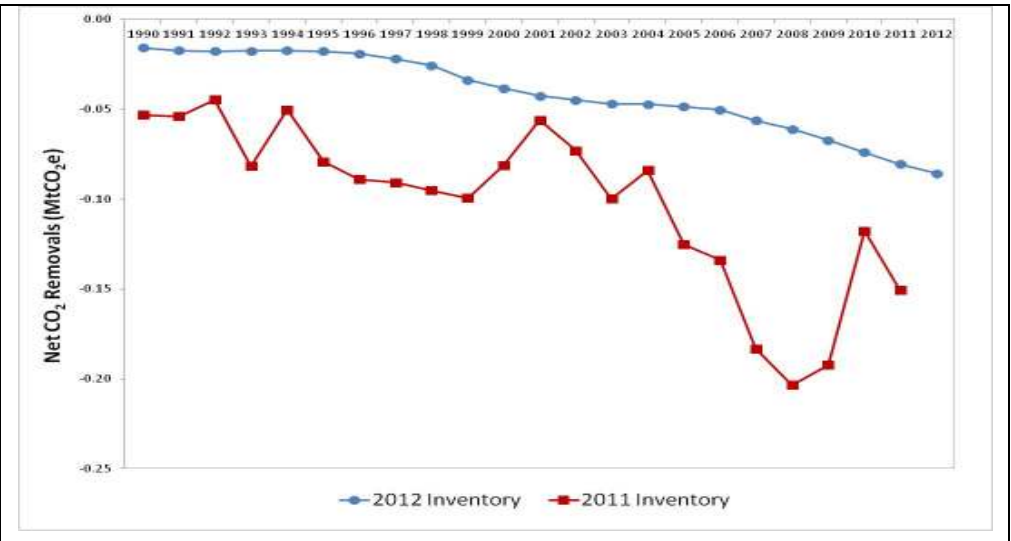
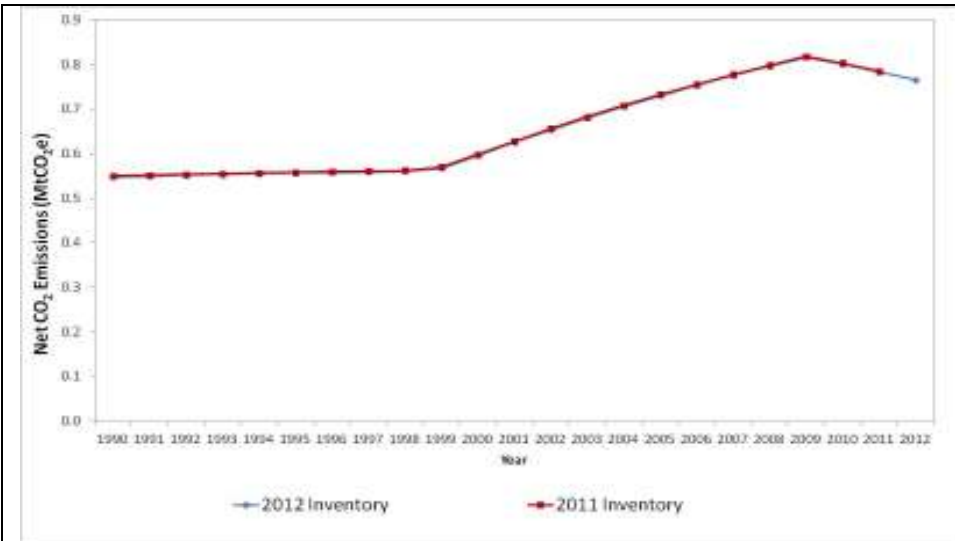


Figure 4E Settlements - Northern Ireland

Figure 4F Harvested Wood Products - Northern Ireland

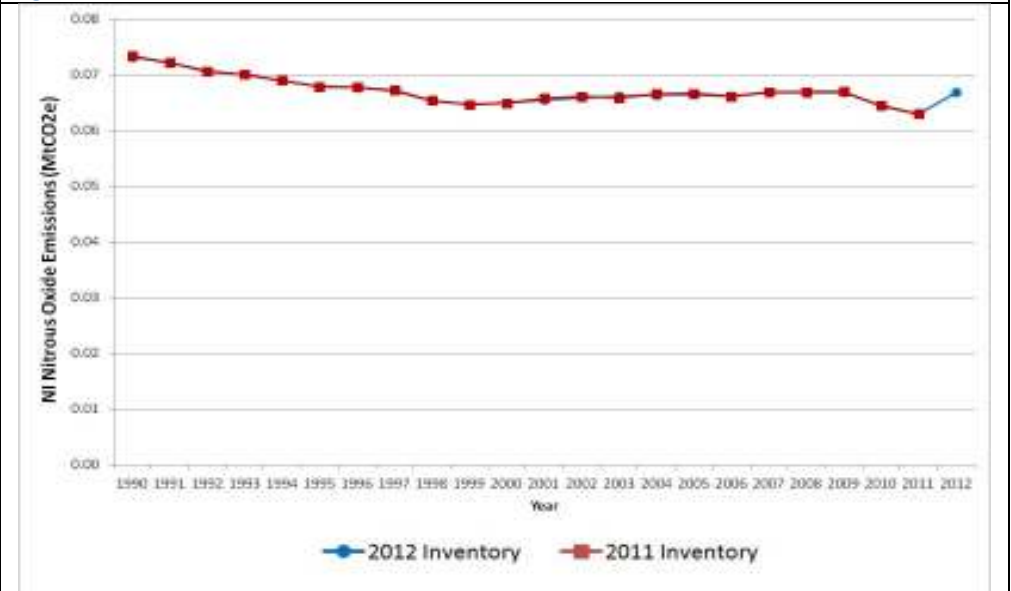
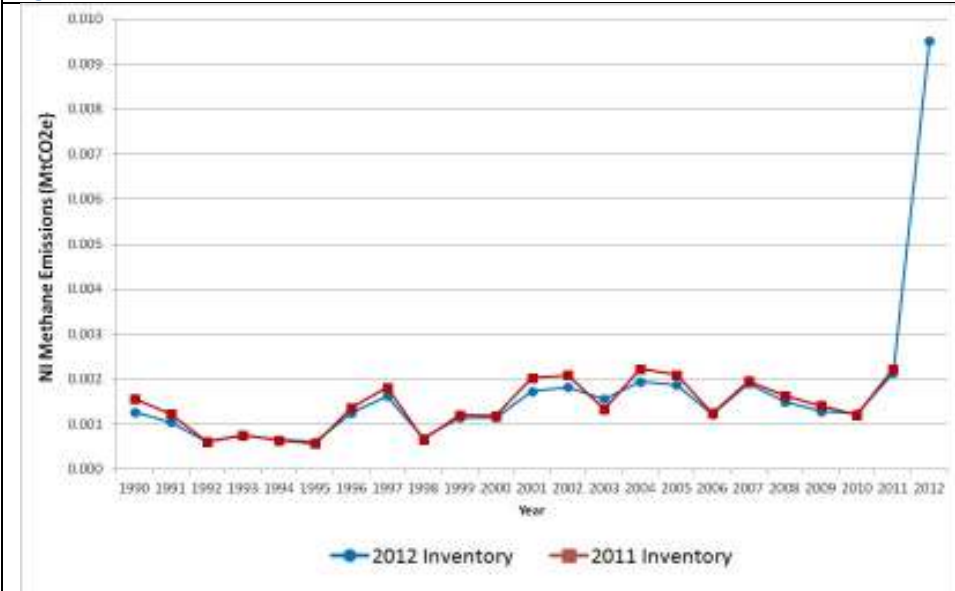


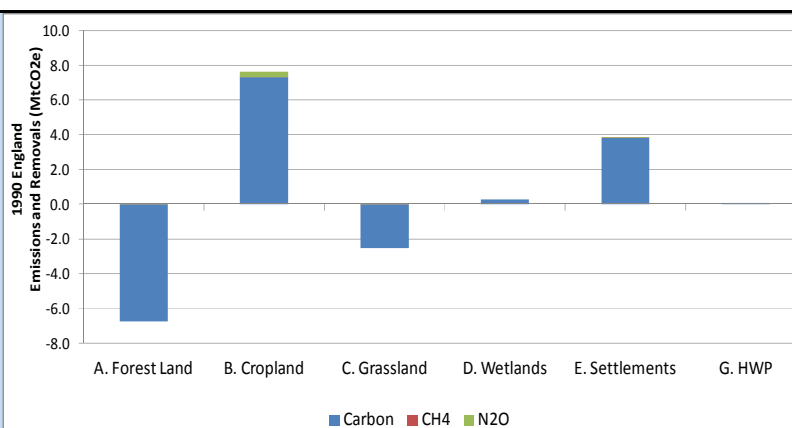
Figure 5: Changes in net emissions of CH₄ only 1990-2012 between the 2011 Inventory and 2012 Inventory for Northern Ireland LULUCF

Figure 6: Changes in net emissions of N₂O only 1990-2012 between the 2011 Inventory and 2012 Inventory for Northern Ireland LULUCF.

Appendix 1: LULUCF Summary Tables and Graphs

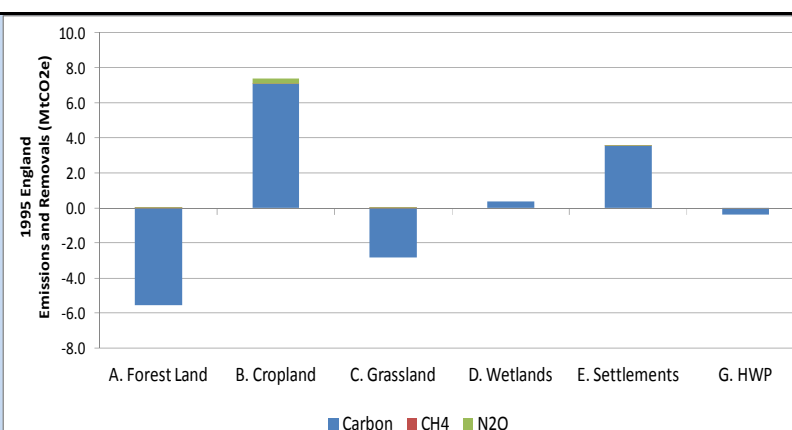
England 1990

Greenhouse gas source and sink categories	CO ₂	CH ₄	N ₂ O	CO ₂ e
	kt			
A. Forest Land	-6741.61	1.13	11.72	-6728.75
B. Cropland	7302.09	0.09	306.24	7608.42
C. Grassland	-2531.98	5.53	6.00	-2520.44
D. Wetlands	266.88			266.88
E. Settlements	3808.81	3.62	0.37	3812.80
F. Other Land				
G. Other activities (Harvested Wood Products)	83.37			83.37
Total	2187.57	10.38	324.33	2522.28



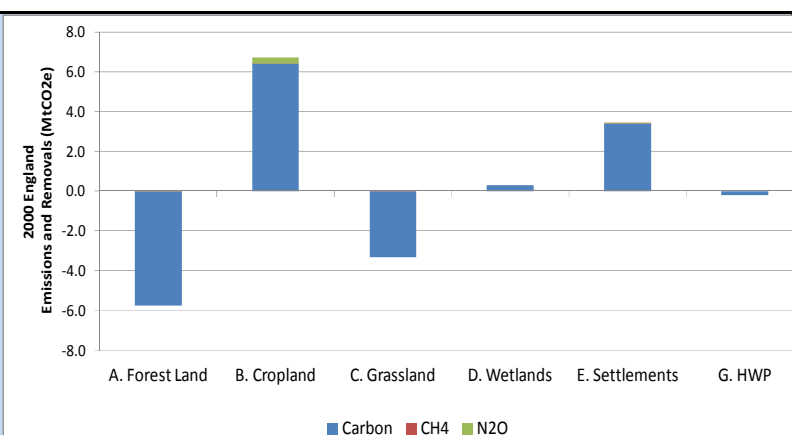
England 1995

Greenhouse gas source and sink categories	CO ₂	CH ₄	N ₂ O	CO ₂ e
	kt			
A. Forest Land	-5545.75	7.13	17.47	-5521.15
B. Cropland	7076.93	0.10	302.98	7380.01
C. Grassland	-2818.42	5.61	6.01	-2806.79
D. Wetlands	374.89			374.89
E. Settlements	3555.35	2.55	0.26	3558.17
F. Other Land				
G. Other activities (Harvested Wood Products)	-373.51			-373.51
Total	2269.50	15.39	326.72	2611.61



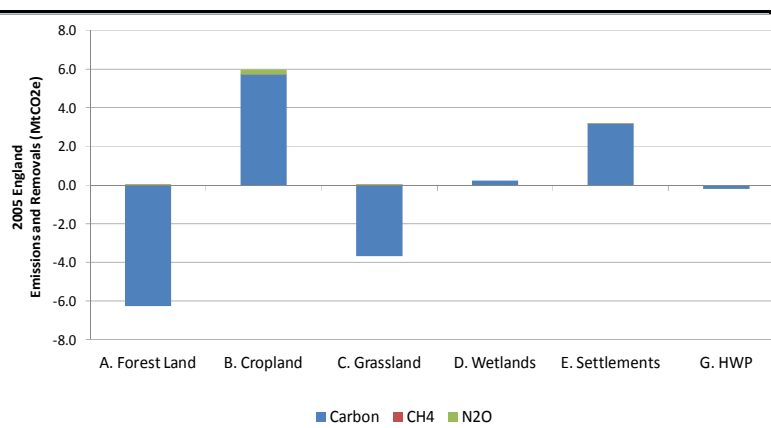
England 2000

Greenhouse gas source and sink categories	CO ₂	CH ₄	N ₂ O	CO ₂ e
	kt			
A. Forest Land	-5743.68	1.46	13.30	-5728.92
B. Cropland	6416.31	0.24	294.35	6710.90
C. Grassland	-3311.56	9.25	6.38	-3295.94
D. Wetlands	299.32			299.32
E. Settlements	3396.84	3.73	0.38	3400.95
F. Other Land				
G. Other activities (Harvested Wood Products)	-198.21			-198.21
Total	859.02	14.68	314.40	1188.09



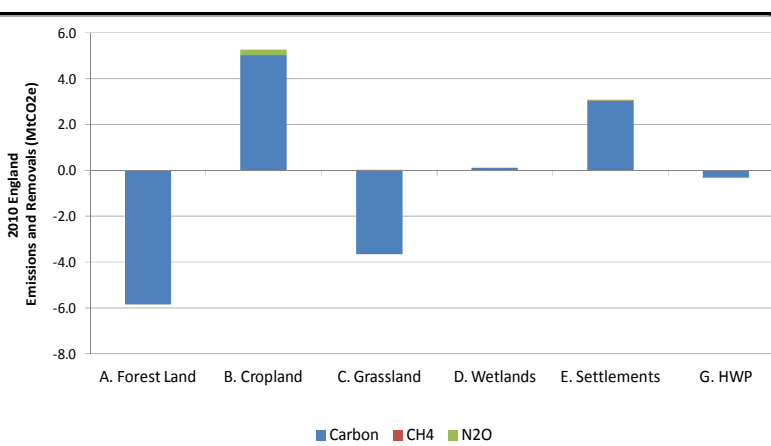
England 2005

Greenhouse gas source and sink categories	CO ₂	CH ₄	N ₂ O	CO ₂ e
	kt			
A. Forest Land	-6271.35	3.13	15.06	-6253.16
B. Cropland	5727.88	0.25	266.02	5994.16
C. Grassland	-3678.68	9.10	4.67	-3664.90
D. Wetlands	221.41			221.41
E. Settlements	3178.62	3.26	0.33	3182.21
F. Other Land				
G. Other activities (Harvested Wood Products)	-186.90			-186.90
Total	-1009.02	15.74	286.09	-707.20



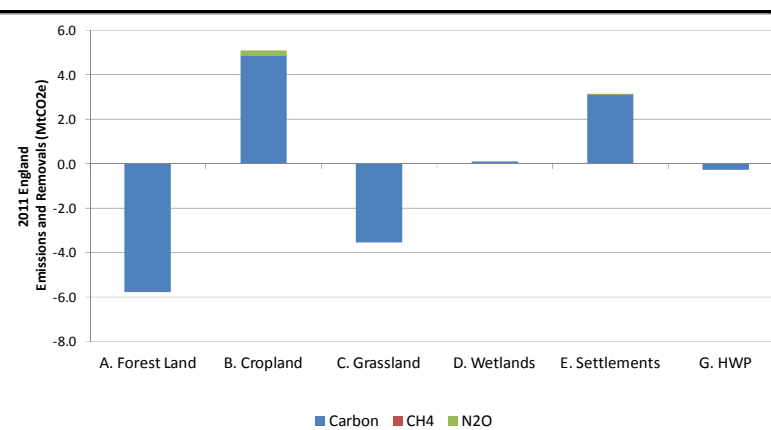
England 2010

Greenhouse gas source and sink categories	CO ₂	CH ₄	N ₂ O	CO ₂ e
	kt			
A. Forest Land	-5843.61	0.00	12.38	-5831.23
B. Cropland	5021.30	0.21	235.85	5257.37
C. Grassland	-3649.34	9.52	3.65	-3636.16
D. Wetlands	110.69			110.69
E. Settlements	3053.60	1.75	0.18	3055.53
F. Other Land				
G. Other activities (Harvested Wood Products)	-317.27			-317.27
Total	-1624.63	11.49	252.06	-1361.08



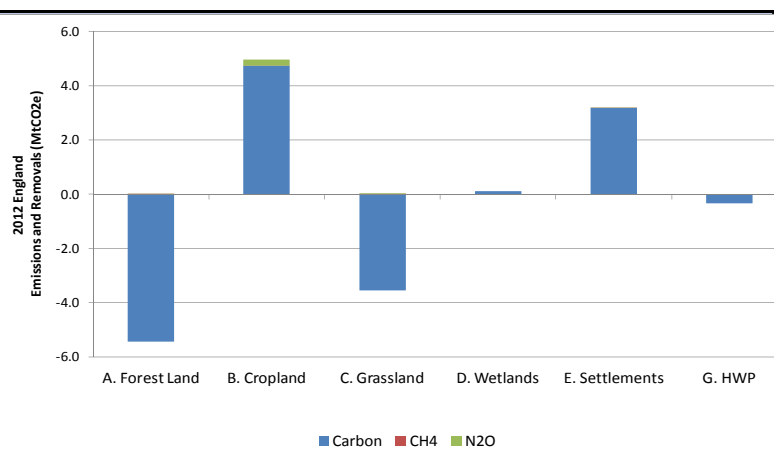
England 2011

Greenhouse gas source and sink categories	CO ₂	CH ₄	N ₂ O	CO ₂ e
	kt			
A. Forest Land	-5767.27	0.00	12.40	-5754.87
B. Cropland	4866.64	0.27	224.38	5091.28
C. Grassland	-3546.75	10.80	5.59	-3530.36
D. Wetlands	104.35			104.35
E. Settlements	3113.47	2.08	0.21	3115.76
F. Other Land				
G. Other activities (Harvested Wood Products)	-273.80			-273.80
Total	-1503.37	13.15	242.58	-1247.64



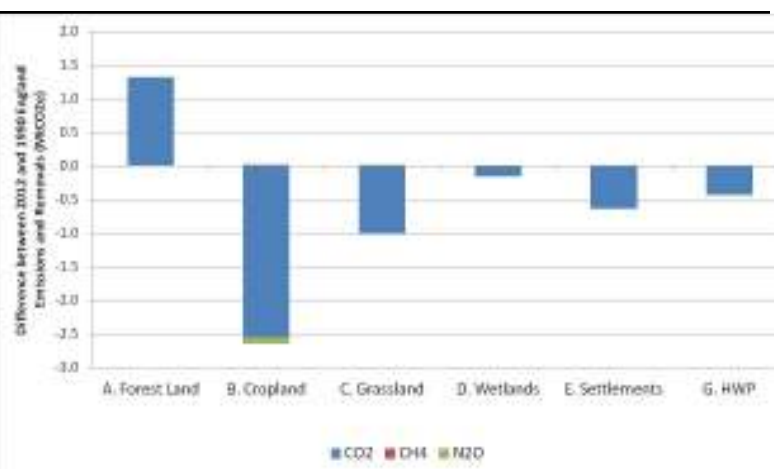
England 2012

Greenhouse gas source and sink categories	CO ₂	CH ₄	N ₂ O	CO ₂ e
	kt			
A. Forest Land	-5430.10	2.39	14.39	-5413.32
B. Cropland	4741.14	0.22	213.43	4954.79
C. Grassland	-3546.99	13.69	10.06	-3523.24
D. Wetlands	104.35			104.35
E. Settlements	3172.36	2.46	0.25	3175.07
F. Other Land				
G. Other activities (Harvested Wood Products)	-346.22			-346.22
Total	-1305.46	18.75	238.13	-1048.58



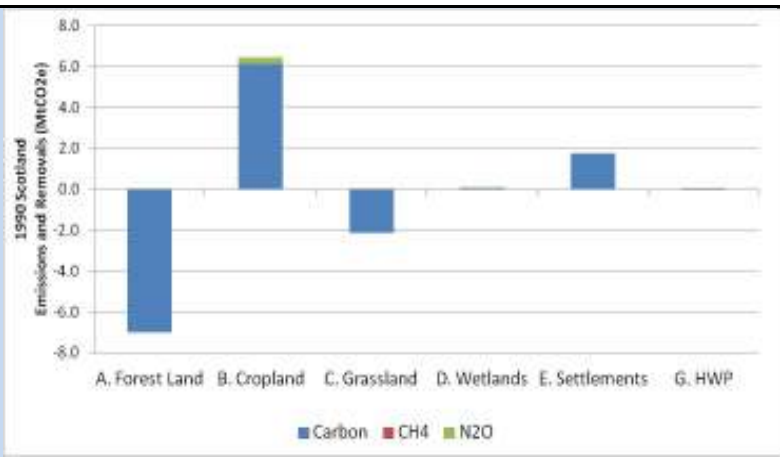
England Difference between 2012 and 1990 value

Greenhouse gas source and sink categories	CO ₂	CH ₄	N ₂ O	CO ₂ e
	kt			
A. Forest Land	1311.51	1.25	2.66	1315.43
B. Cropland	-2560.94	0.12	-92.81	-2653.63
C. Grassland	-1015.02	8.16	4.06	-1002.80
D. Wetlands	-162.54	0.00	0.00	-162.54
E. Settlements	-636.45	-1.16	-0.12	-637.73
F. Other Land	0.00	0.00	0.00	0.00
G. Other activities (Harvested Wood Products)	-429.59	0.00	0.00	-429.59
Total	-3493.02	8.37	-86.20	-3570.86



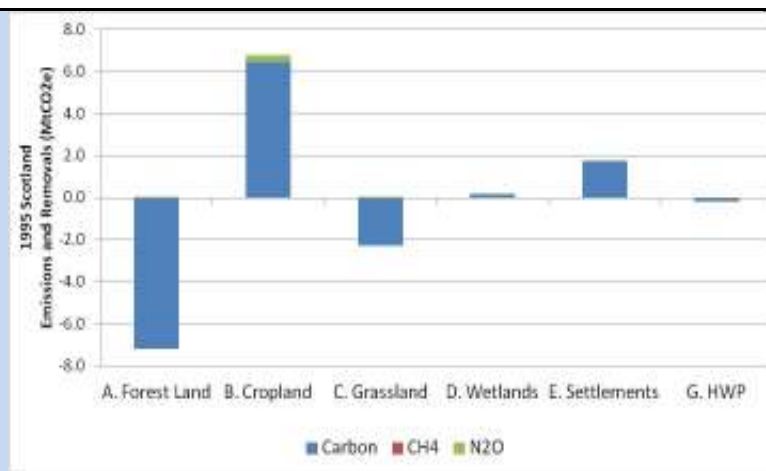
Scotland 1990

Greenhouse gas source and sink categories	CO2	CH4	N2O	CO2e
	kt			
A. Forest Land	-7012.37	0.88	27.87	-6983.62
B. Cropland	6127.01		343.81	6470.82
C. Grassland	-2124.56	4.72	5.79	-2114.06
D. Wetlands	72.10		0.51	72.60
E. Settlements	1738.66	0.75	0.08	1739.49
F. Other Land				
G. Other activities (Harvested Wood Products)	-9.43			-9.43
Total	-1208.60	6.36	378.04	-824.19



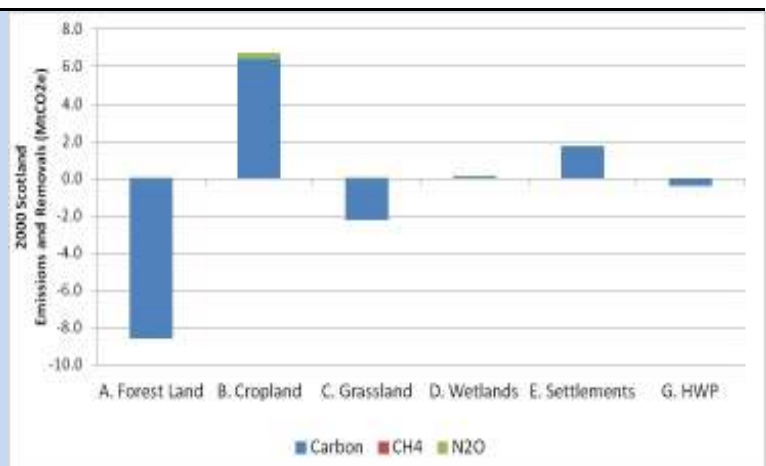
Scotland 1995

Greenhouse gas source and sink categories	CO2	CH4	N2O	CO2e
	kt			
A. Forest Land	-7177.27	6.43	32.07	-7138.77
B. Cropland	6432.05		361.16	6793.21
C. Grassland	-2276.89	4.82	5.80	-2266.28
D. Wetlands	157.02		0.37	157.39
E. Settlements	1724.51	0.91	0.09	1725.51
F. Other Land				
G. Other activities (Harvested Wood Products)	-181.15			-181.15
Total	-1321.74	12.16	399.49	-910.09



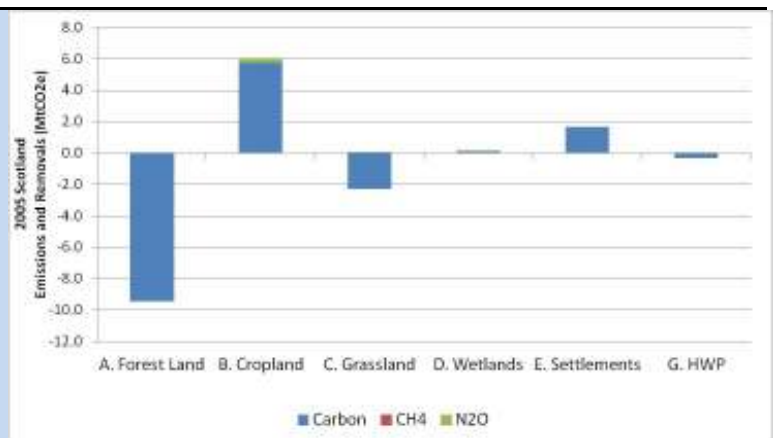
Scotland 2000

Greenhouse gas source and sink categories	CO2	CH4	N2O	CO2e
	kt			
A. Forest Land	-8580.50	1.45	29.02	-8550.02
B. Cropland	6403.09		363.36	6766.46
C. Grassland	-2220.06	16.20	6.95	-2196.90
D. Wetlands	80.92		0.22	81.15
E. Settlements	1714.67	1.68	0.17	1716.53
F. Other Land				
G. Other activities (Harvested Wood Products)				
Total	-2988.79	19.34	399.73	-2569.73



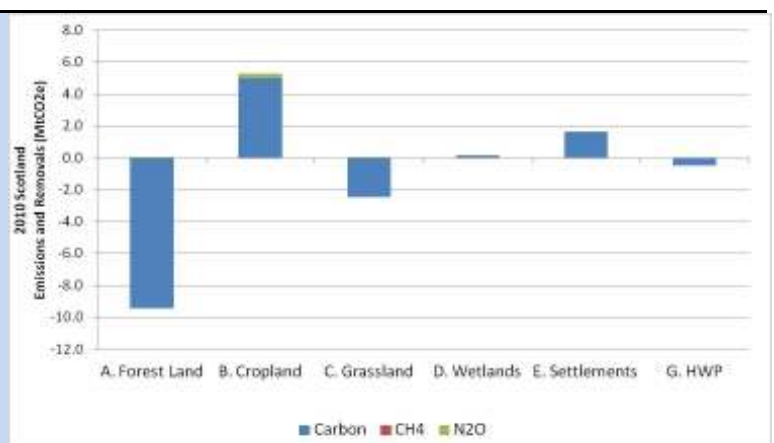
Scotland 2005

Greenhouse gas source and sink categories	CO2	CH4	N2O	CO2e
	kt			
A. Forest Land	-9455.01	3.28	30.67	-9421.07
B. Cropland	5733.52		325.06	6058.58
C. Grassland	-2304.47	21.75	5.87	-2276.85
D. Wetlands	132.58		0.20	132.77
E. Settlements	1634.95	1.93	0.20	1637.07
F. Other Land				
G. Other activities (Harvested Wood Products)	-314.96			-314.96
Total	-4573.39	26.96	361.99	-4184.45



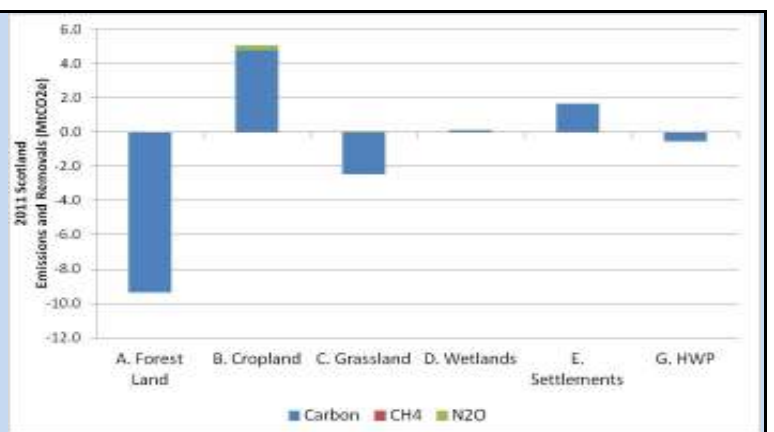
Scotland 2010

Greenhouse gas source and sink categories	CO2	CH4	N2O	CO2e
	kt			
A. Forest Land	-9429.79		27.84	-9401.95
B. Cropland	5015.33		285.96	5301.28
C. Grassland	-2458.80	18.34	4.40	-2436.06
D. Wetlands	125.76		0.20	125.96
E. Settlements	1616.44	2.13	0.22	1618.79
F. Other Land				
G. Other activities (Harvested Wood Products)	-470.63			-470.63
Total	-5601.70	20.48	318.61	-5262.61



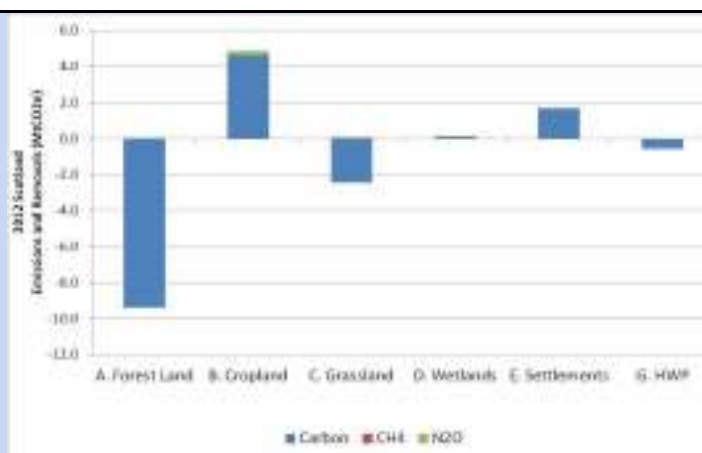
Scotland 2011

Greenhouse gas source and sink categories	CO2	CH4	N2O	CO2e
	kt			
A. Forest Land	-9379.89	2.13	29.64	-9348.12
B. Cropland	4806.42		272.01	5078.42
C. Grassland	-2449.97	18.03	4.39	-2427.54
D. Wetlands	88.68		0.21	88.88
E. Settlements	1647.73	2.17	0.22	1650.12
F. Other Land				
G. Other activities (Harvested Wood Products)	-533.05			-533.05
Total	-5820.09	22.34	306.46	-5491.28



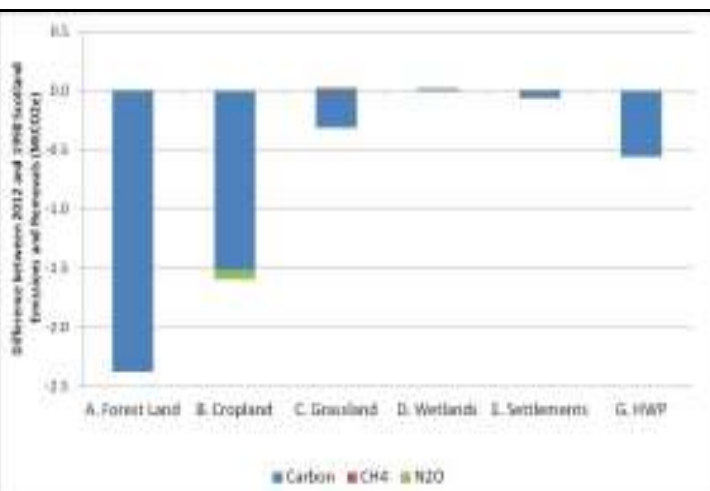
Scotland 2012

Greenhouse gas source and sink categories	CO2	CH4	N2O	CO2e
	kt			
A. Forest Land	-9389.71	2.71	30.61	-9356.39
B. Cropland	4613.93		258.74	4872.67
C. Grassland	-2435.34	23.84	12.79	-2398.71
D. Wetlands	88.73		0.22	88.95
E. Settlements	1677.53	2.21	0.22	1679.97
F. Other Land				
G. Other activities (Harvested Wood Products)	-566.60			-566.60
Total	-6011.46	28.76	302.59	-5680.11



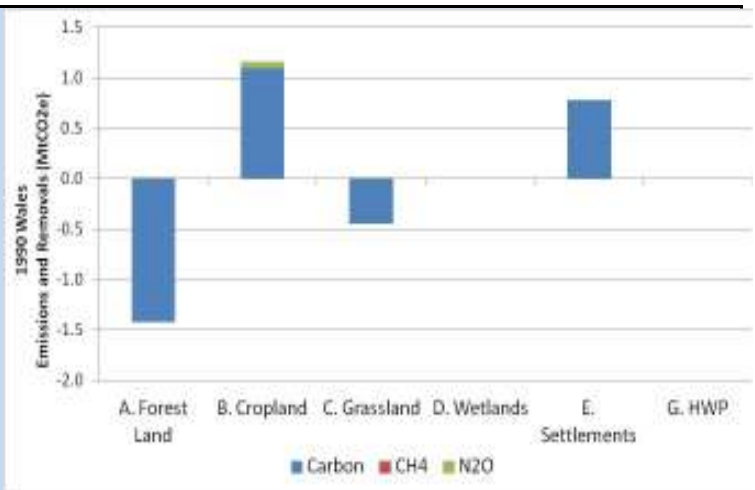
Scotland Difference between 2012 and 1990 value

Greenhouse gas source and sink categories	CO2	CH4	N2O	CO2e
	kt			
A. Forest Land	-2367.52	1.25	1.77	-2364.50
B. Cropland	-1320.60	0.00	71.80	-1392.40
C. Grassland	-325.41	13.32	-1.40	-313.49
D. Wetlands	16.58	0.00	-0.30	16.28
E. Settlements	-90.93	1.42	0.14	-89.36
F. Other Land	0.00	0.00	0.00	0.00
G. Other activities (Harvested Wood Products)	-523.62	0.00	0.00	-523.62
Total	-4611.49	15.99	71.58	-4667.09



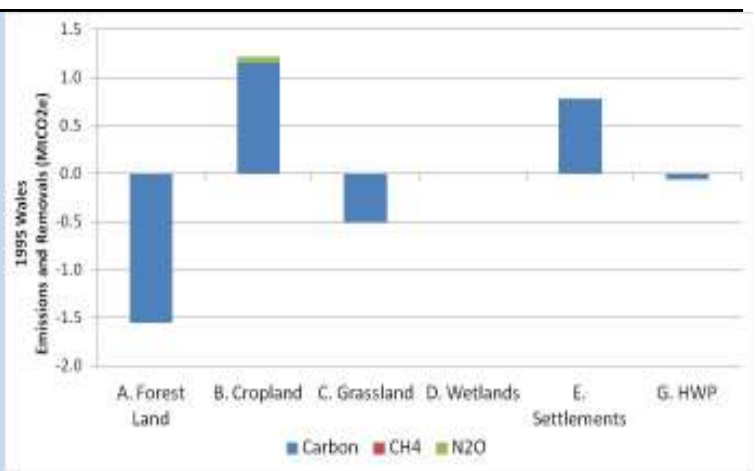
Wales 1990

Greenhouse gas source and sink categories	CO2	CH4	N2O	CO2e
	kt			
A. Forest Land	-1423.65	0.28	4.38	-1418.99
B. Cropland	1098.13		60.66	1158.79
C. Grassland	-446.85	1.88	2.28	-442.70
D. Wetlands	0.35			0.35
E. Settlements	770.85	0.39	0.04	771.28
F. Other Land				
G. Other activities (Harvested Wood Products)	1.13			1.13
Total	-0.03	2.55	67.36	69.87



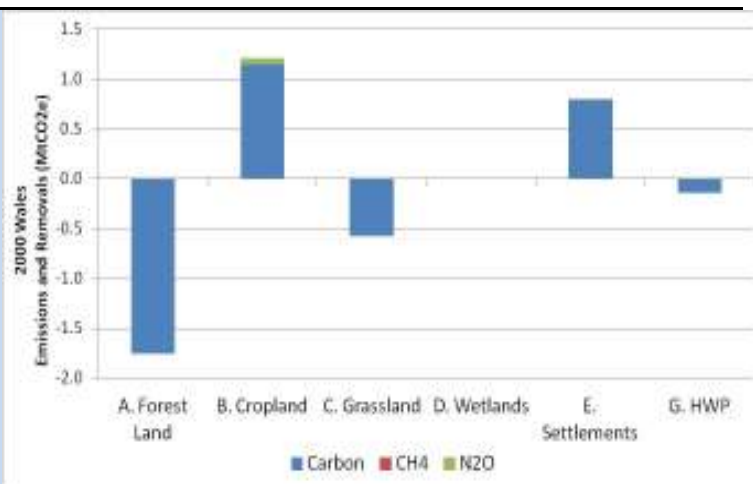
Wales 1995

Greenhouse gas source and sink categories	CO2	CH4	N2O	CO2e
	kt			
A. Forest Land	-1550.65	1.82	5.65	-1543.19
B. Cropland	1154.09		63.85	1217.93
C. Grassland	-510.77	1.90	2.28	-506.59
D. Wetlands	0.35			0.35
E. Settlements	777.82	0.44	0.04	778.31
F. Other Land				
G. Other activities (Harvested Wood Products)	-58.00			-58.00
Total	-187.16	4.16	71.82	-111.18



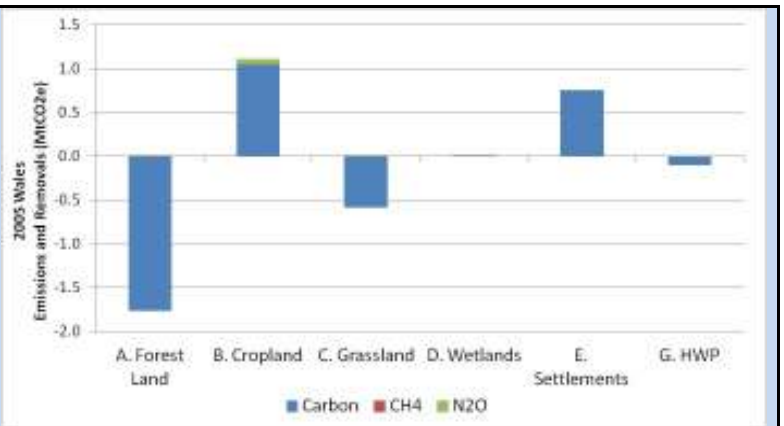
Wales 2000

Greenhouse gas source and sink categories	CO2	CH4	N2O	CO2e
	kt			
A. Forest Land	-1756.40	0.39	4.53	-1751.48
B. Cropland	1149.76		64.55	1214.31
C. Grassland	-576.58	3.56	2.45	-570.57
D. Wetlands	0.35			0.35
E. Settlements	794.74	1.21	0.12	796.07
F. Other Land				
G. Other activities (Harvested Wood Products)	-136.04			-136.04
Total	-524.17	5.16	71.65	-447.35



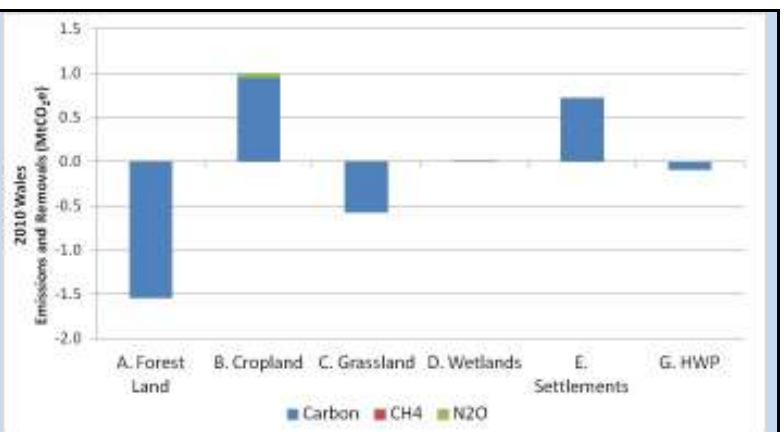
Wales 2005

Greenhouse gas source and sink categories	CO2	CH4	N2O	CO2e
	kt			
A. Forest Land	-1771.77	0.79	4.87	-1766.11
B. Cropland	1046.29		58.81	1105.10
C. Grassland	-585.28	3.22	1.77	-580.29
D. Wetlands	0.35			0.35
E. Settlements	747.49	1.29	0.13	748.91
F. Other Land				
G. Other activities (Harvested Wood Products)	-105.34			-105.34
Total	-668.26	5.30	65.58	-597.38



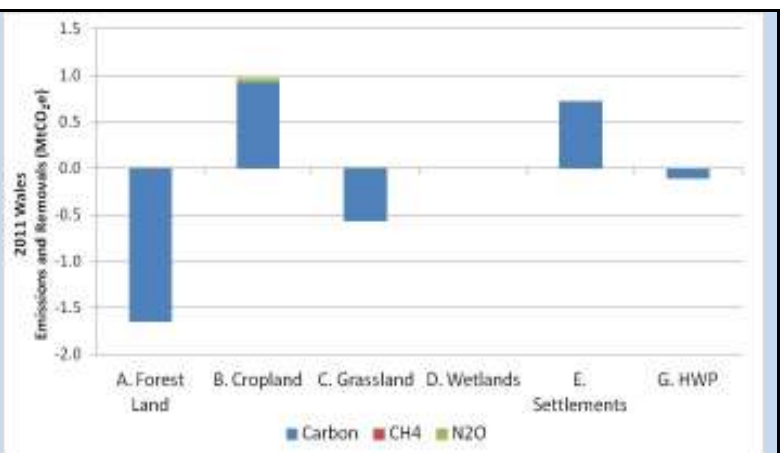
Wales 2010

Greenhouse gas source and sink categories	CO2	CH4	N2O	CO2e
	kt			
A. Forest Land	-1546.74	2.90	6.59	-1537.26
B. Cropland	946.96		53.43	1000.39
C. Grassland	-575.06	3.53	2.25	-569.28
D. Wetlands	0.35			0.35
E. Settlements	716.27	1.38	0.14	717.79
F. Other Land				
G. Other activities (Harvested Wood Products)	-94.84			-94.84
Total	-553.05	7.81	62.41	-482.83



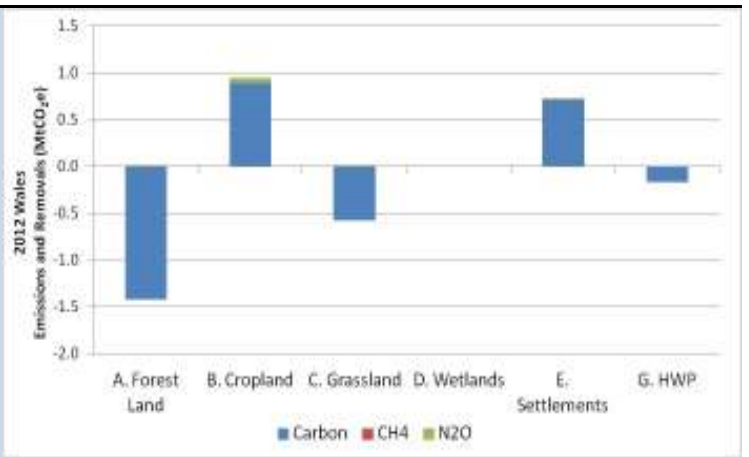
Wales 2011

Greenhouse gas source and sink categories	CO2	CH4	N2O	CO2e
	kt			
A. Forest Land	-1653.25	0.89	4.93	-1647.43
B. Cropland	919.44		51.79	971.23
C. Grassland	-570.08	3.27	2.66	-564.15
D. Wetlands	0.35			0.35
E. Settlements	714.73	1.40	0.14	716.27
F. Other Land				
G. Other activities (Harvested Wood Products)	-108.41			-108.41
Total	-697.23	5.55	59.53	-632.15



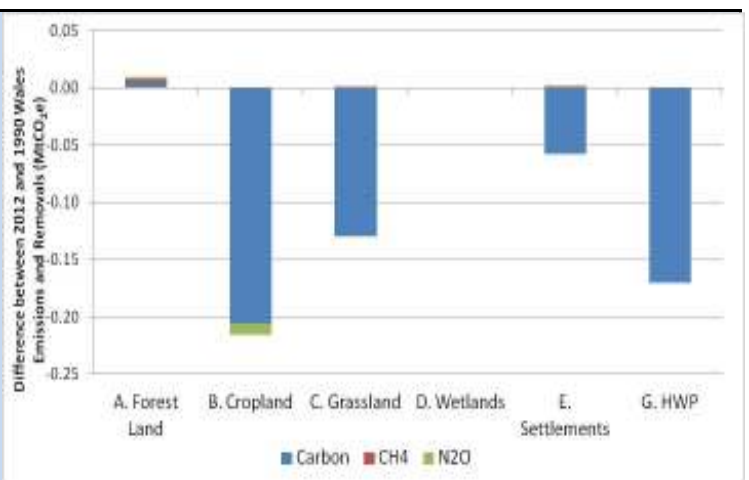
Wales 2012

Greenhouse gas source and sink categories	CO2	CH4	N2O	CO2e
	kt			
A. Forest Land	-1419.20	3.12	6.79	-1409.29
B. Cropland	892.82		50.24	943.05
C. Grassland	-576.27	3.05	2.18	-571.04
D. Wetlands	0.35			0.35
E. Settlements	713.31	1.41	0.14	714.86
F. Other Land				
G. Other activities (Harvested Wood Products)	-169.10			-169.10
Total	-558.09	7.59	59.35	-491.15



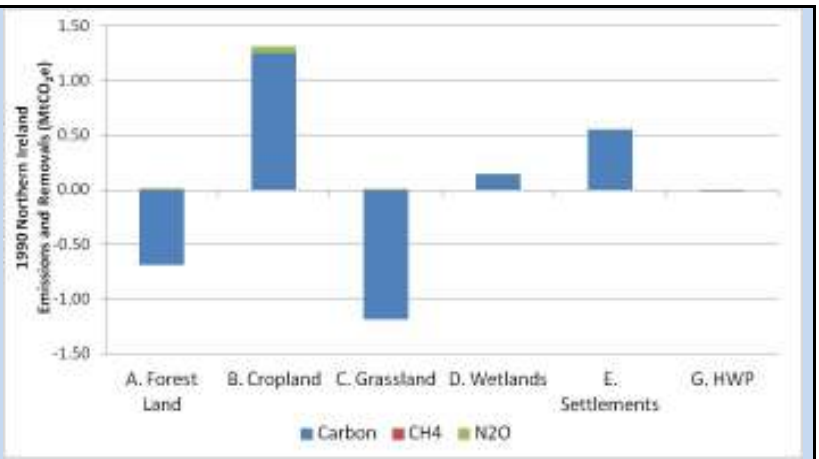
Wales Difference between 2012 and 1990 value

Greenhouse gas source and sink categories	CO2	CH4	N2O	CO2e
	kt			
A. Forest Land	4.45	2.84	2.41	9.70
B. Cropland	-205.32	0.00	10.42	-215.74
C. Grassland	-325.41	13.32	-1.40	-313.49
D. Wetlands	0.00	0.00	0.00	0.00
E. Settlements	-57.54	1.02	0.10	-56.42
F. Other Land	0.00	0.00	0.00	0.00
G. Other activities (Harvested Wood Products)	-170.23	0.00	0.00	-170.23
Total	-754.05	17.18	-9.30	-746.17



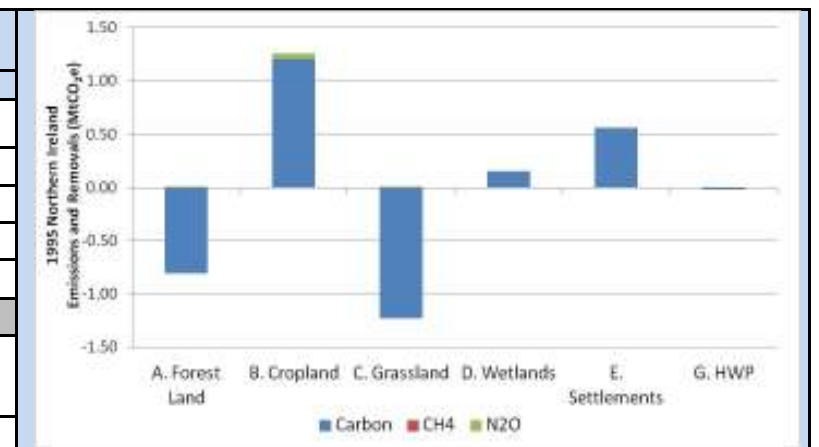
Northern Ireland 1990

Greenhouse gas source and sink categories	CO2	CH4	N2O	CO2e
	kt			
A. Forest Land	-686.79	0.83	10.19	-675.78
B. Cropland	1252.17		59.17	1311.34
C. Grassland	-1188.17	0.27	0.32	-1187.58
D. Wetlands	142.39		3.47	145.87
E. Settlements	547.56	0.18	0.02	547.76
F. Other Land				
G. Other activities (Harvested Wood Products)	-15.78			-15.78
Total	51.38	1.27	73.17	125.82



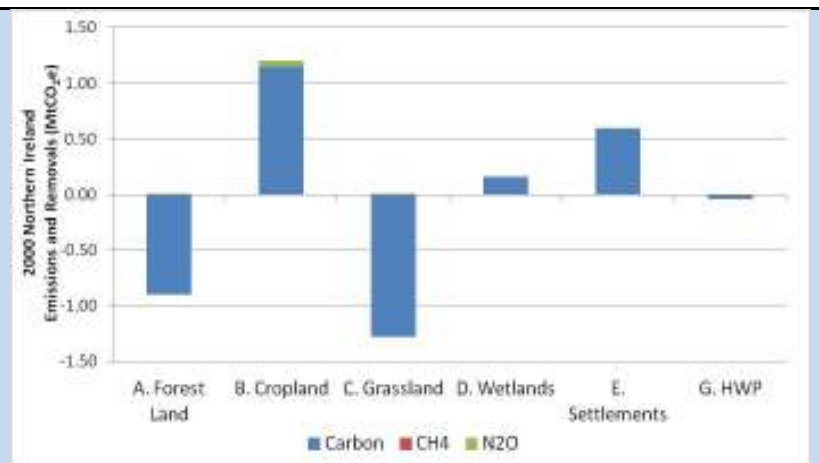
Northern Ireland 1995

Greenhouse gas source and sink categories	CO2	CH4	N2O	CO2e
	kt			
A. Forest Land	-803.68	0.13	10.16	-793.40
B. Cropland	1202.46		54.72	1257.18
C. Grassland	-1227.55	0.27	0.32	-1226.96
D. Wetlands	148.84		2.68	151.53
E. Settlements	555.99	0.21	0.02	556.23
F. Other Land				
G. Other activities (Harvested Wood Products)	-17.70			-17.70
Total	-141.63	0.61	67.90	-73.12



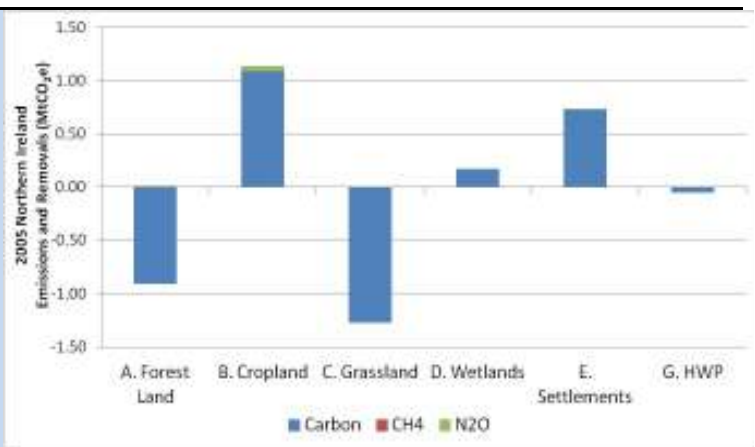
Northern Ireland 2000

Greenhouse gas source and sink categories	CO2	CH4	N2O	CO2e
	kt			
A. Forest Land	-898.55	0.06	10.52	-887.98
B. Cropland	1151.89		52.31	1204.20
C. Grassland	-1275.84	0.65	0.36	-1274.83
D. Wetlands	156.43		1.69	158.12
E. Settlements	595.49	0.44	0.04	595.97
F. Other Land				
G. Other activities (Harvested Wood Products)	-38.23			-38.23
Total	-308.81	1.14	64.92	-242.74



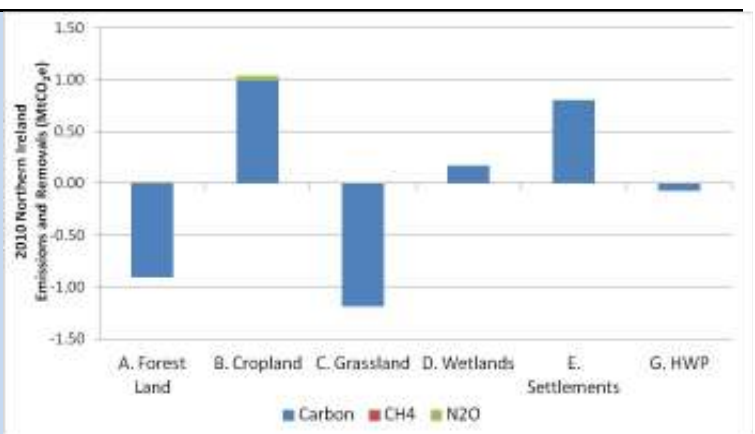
Northern Ireland 2005

Greenhouse gas source and sink categories	CO2	CH4	N2O	CO2e
	kt			
A. Forest Land	-906.48	0.78	11.28	-894.42
B. Cropland	1085.32		54.17	1139.49
C. Grassland	-1273.69	0.62	0.26	-1272.81
D. Wetlands	163.31		0.70	164.00
E. Settlements	729.82	0.48	0.05	730.35
F. Other Land				
G. Other activities (Harvested Wood Products)	-48.42			-48.42
Total	-250.14	1.88	66.46	-181.81



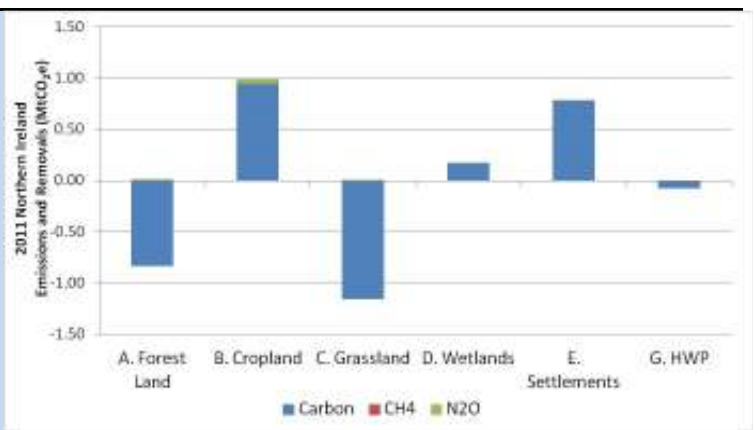
Northern Ireland 2010

Greenhouse gas source and sink categories	CO2	CH4	N2O	CO2e
	kt			
A. Forest Land	-909.92		10.82	-899.10
B. Cropland	987.97		52.96	1040.93
C. Grassland	-1189.90	0.72	0.36	-1188.83
D. Wetlands	165.82		0.30	166.12
E. Settlements	800.53	0.52	0.05	801.10
F. Other Land				
G. Other activities (Harvested Wood Products)	-73.88			-73.88
Total	-219.39	1.24	64.49	-153.66



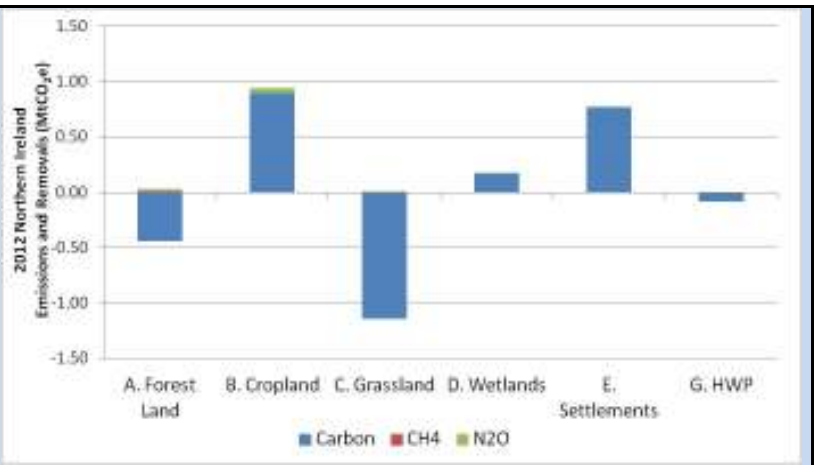
Northern Ireland 2011

Greenhouse gas source and sink categories	CO2	CH4	N2O	CO2e
	kt			
A. Forest Land	-838.79	0.88	11.57	-826.33
B. Cropland	939.58		50.68	990.25
C. Grassland	-1158.71	0.73	0.36	-1157.63
D. Wetlands	165.82		0.30	166.12
E. Settlements	782.74	0.52	0.05	783.31
F. Other Land	-80.49			-80.49
G. Other activities (Harvested Wood Products)	-80.49			-80.49
Total	-189.86	2.13	62.96	-124.76



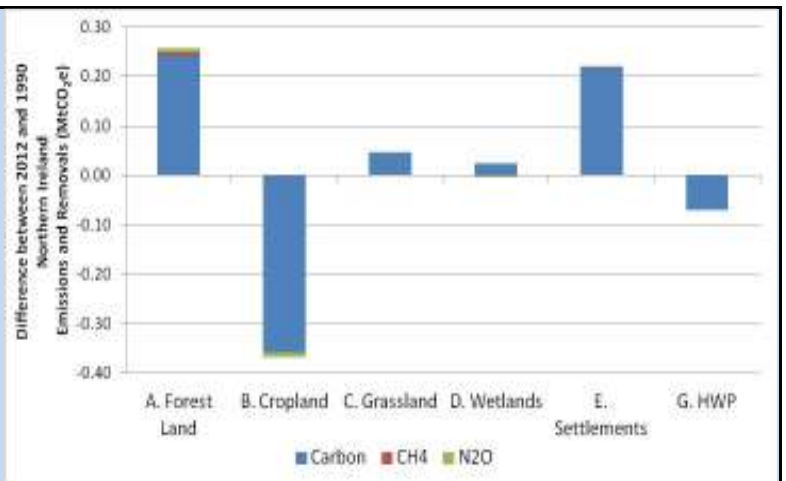
Northern Ireland 2012

Greenhouse gas source and sink categories	CO2	CH4	N2O	CO2e
	kt			
A. Forest Land	-444.96	8.26	17.61	-419.09
B. Cropland	895.37		48.51	943.88
C. Grassland	-1143.10	0.73	0.36	-1142.00
D. Wetlands	165.82		0.30	166.12
E. Settlements	765.81	0.53	0.05	766.39
F. Other Land				
G. Other activities (Harvested Wood Products)	-85.67			-85.67
Total	153.28	9.52	66.83	229.63



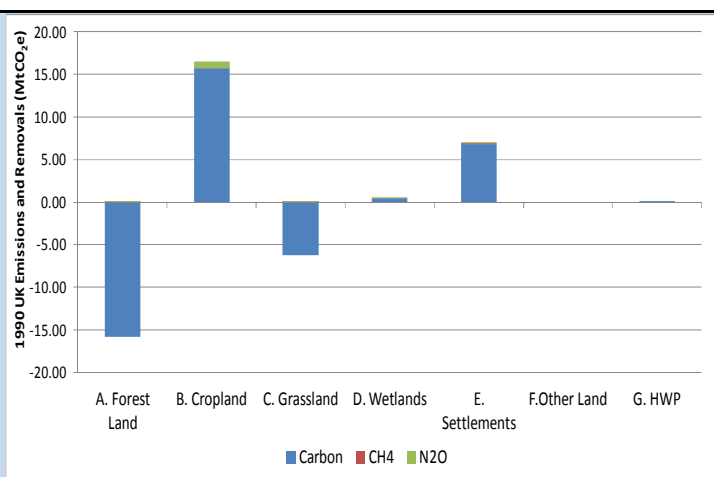
Northern Ireland Difference between 2012 and 1990 value

Greenhouse gas source and sink categories	CO2	CH4	N2O	CO2e
	kt			
A. Forest Land	-152.00	0.06	1.38	-150.56
B. Cropland	-312.59	0.00	-8.50	-321.09
C. Grassland	29.46	0.46	0.04	29.96
D. Wetlands	23.42	0.00	-3.17	20.25
E. Settlements	235.17	0.35	0.04	235.56
F. Other Land	-80.49	0.00	0.00	-80.49
G. Other activities (Harvested Wood Products)	-64.70	0.00	0.00	-64.70
Total	-321.73	0.87	-10.21	-331.07



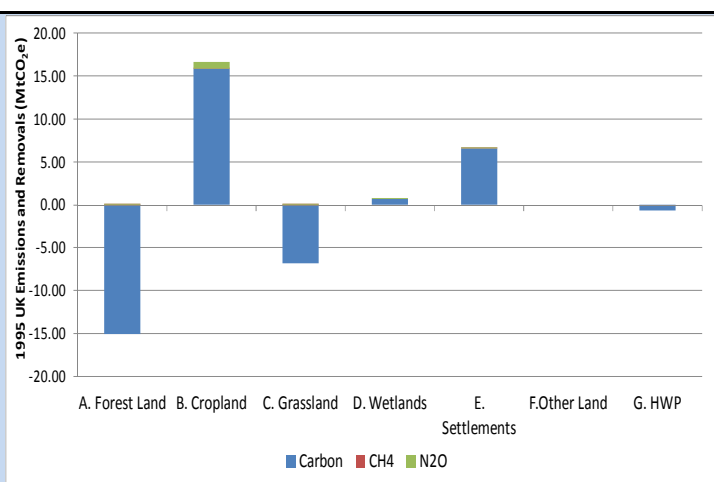
United Kingdom 1990

Greenhouse gas source and sink categories	CO2	CH4	N2O	CO2e
	kt			
A. Forest Land	-15864.42	3.12	54.16	-15807.14
B. Cropland	15779.41	0.09	769.88	16549.38
C. Grassland	-6291.56	12.39	14.39	-6264.78
D. Wetlands	481.73		3.98	485.71
E. Settlements	6865.88	4.95	0.50	6871.33
F. Other Land				
G. Other activities (Harvested Wood Products)	59.29			59.29
Total	1030.32	20.56	842.90	1893.78



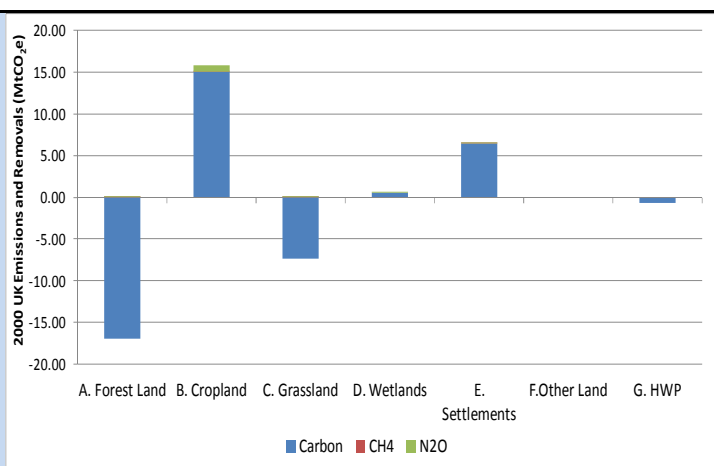
United Kingdom 1995

Greenhouse gas source and sink categories	CO2	CH4	N2O	CO2e
	kt			
A. Forest Land	-15077.35	15.50	65.34	-14996.51
B. Cropland	15865.53	0.10	782.71	16648.33
C. Grassland	-6833.64	12.60	14.41	-6806.63
D. Wetlands	681.11		3.05	684.16
E. Settlements	6613.68	4.12	0.42	6618.22
F. Other Land				
G. Other activities (Harvested Wood Products)	-630.36			-630.36
Total	618.97	32.32	865.93	1517.22



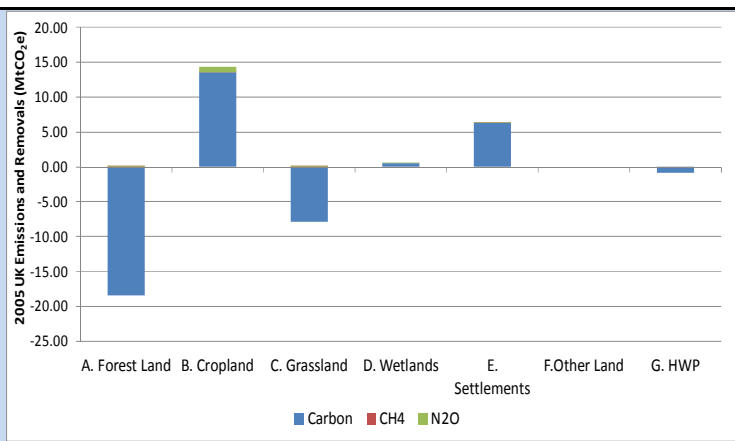
United Kingdom 2000

Greenhouse gas source and sink categories	CO2	CH4	N2O	CO2e
	kt			
A. Forest Land	-16979.12	3.36	57.36	-16918.40
B. Cropland	15121.05	0.24	774.57	15895.86
C. Grassland	-7384.04	29.67	16.14	-7338.23
D. Wetlands	537.03		1.91	538.94
E. Settlements	6501.73	7.06	0.72	6509.51
F. Other Land				
G. Other activities (Harvested Wood Products)	-643.05			-576.99
Total	-2846.40	40.33	850.70	-1889.31



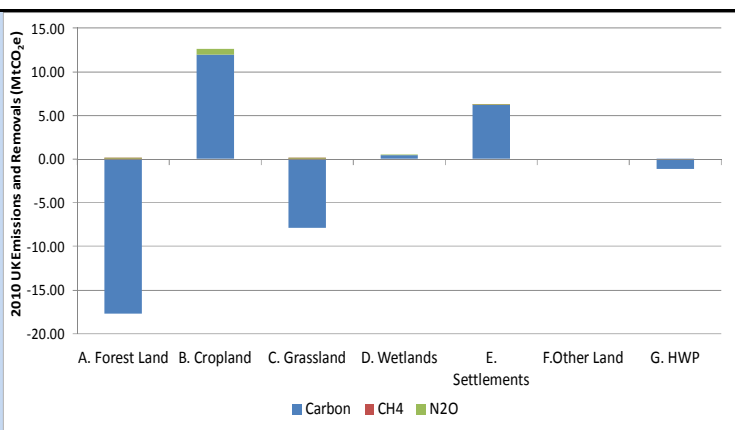
United Kingdom 2005

Greenhouse gas source and sink categories	CO2	CH4	N2O	CO2e
	kt			
A. Forest Land	-18404.62	7.98	61.88	-18334.76
B. Cropland	13593.01	0.25	704.06	14297.33
C. Grassland	-7842.12	34.69	12.57	-7794.85
D. Wetlands	517.64		0.89	518.54
E. Settlements	6290.87	6.95	0.71	6298.53
F. Other Land				
G. Other activities (Harvested Wood Products)	-857.34			-789.00
Total	-6702.55	49.88	780.11	-5804.22



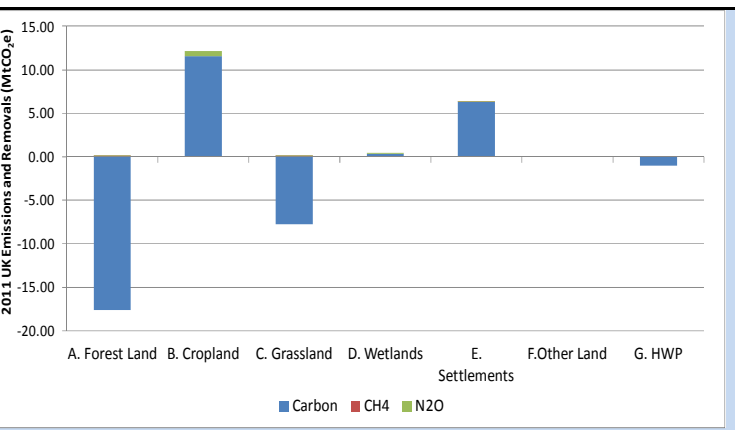
United Kingdom 2010

Greenhouse gas source and sink categories	CO2	CH4	N2O	CO2e
	kt			
A. Forest Land	-17730.06	2.90	57.63	-17669.53
B. Cropland	11971.56		628.19	12599.97
C. Grassland	-7873.10	32.11	10.66	-7830.33
D. Wetlands	402.63		0.50	403.12
E. Settlements	6186.84	5.79	0.59	6193.21
F. Other Land				
G. Other activities (Harvested Wood Products)	-1102.13			-1036.40
Total	-8144.27	40.80	697.58	-7339.96



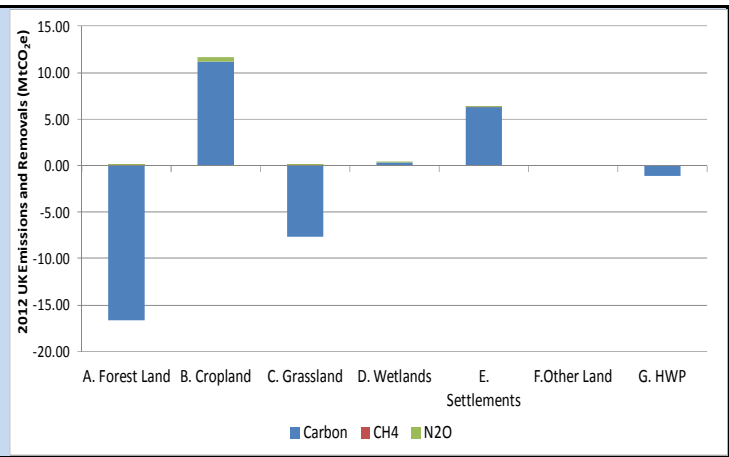
United Kingdom 2011

Greenhouse gas source and sink categories	CO2	CH4	N2O	CO2e
	kt			
A. Forest Land	-17639.21	3.91	58.54	-17576.76
B. Cropland	11532.07		598.86	12131.19
C. Grassland	-7725.52	32.83	13.00	-7679.69
D. Wetlands	359.19		0.51	359.70
E. Settlements	6258.66	6.18	0.63	6265.47
F. Other Land				
G. Other activities (Harvested Wood Products)	-995.75			-995.75
Total	-8210.55	42.92	671.54	-7495.83



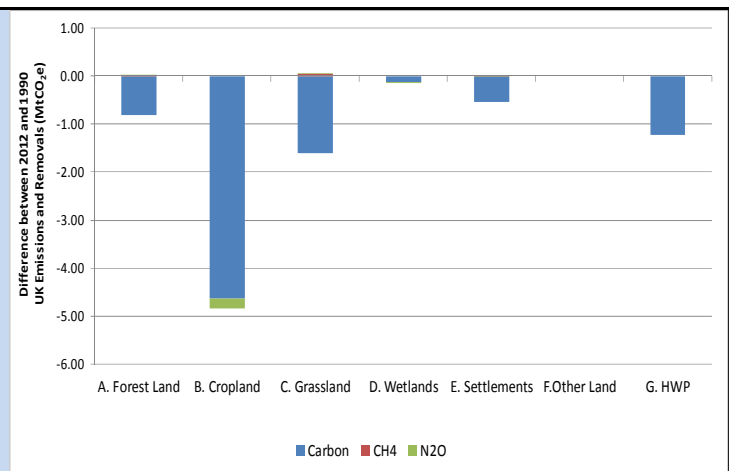
United Kingdom 2012

Greenhouse gas source and sink categories	CO2	CH4	N2O	CO2e
	kt			
A. Forest Land	-16683.96	16.48	69.40	-16598.09
B. Cropland	11143.25		570.92	11714.39
C. Grassland	-7701.70	41.32	25.39	-7635.00
D. Wetlands	359.24		0.52	359.76
E. Settlements	6329.01	6.62	0.67	6336.30
F. Other Land				
G. Other activities (Harvested Wood Products)	-1167.58			-1167.58
Total	-7721.73	64.41	666.89	-6990.21



UK Difference between 2012 and 1990 value

Greenhouse gas source and sink categories	CO2	CH4	N2O	CO2e
	kt			
A. Forest Land	-819.54	13.35	15.24	-790.95
B. Cropland	-4636.15		-198.96	-4834.99
C. Grassland	-1606.13	41.06	9.71	-1555.36
D. Wetlands	-122.48		-3.46	-125.94
E. Settlements	-536.87	1.67	0.17	-535.02
F. Other Land				
G. Other activities (Harvested Wood Products)	-1226.87			-1226.87
Total	-8948.04	56.09	-177.30	-9069.14



Appendix 2: Kyoto Protocol LULUCF Summary Tables

England

Activity		2008	2009	2010	2011	2012
3.3 Afforestation & Reforestation	Area, kha	90.71	93.05	95.53	98.11	100.71
	Net CO ₂ emissions/removals, kt CO ₂	-952.14	-1010.52	-1066.27	-1126.18	-1183.12
	GHG emissions from biomass burning, kt CO ₂ e.	3.74	3.62	0.00	0.00	3.80
	N ₂ O emissions from N fertilization, kt CO ₂ e	0.49	0.38	0.33	0.31	0.31
3.3 Deforestation	Area, kha	15.32	16.68	17.58	18.49	19.38
	Net CO ₂ emissions/removals, kt CO ₂	254.23	286.26	211.88	219.62	222.57
	GHG emissions from biomass burning, kt CO ₂ e	145.02	164.63	113.27	114.06	112.97
	N ₂ O emissions from LUC to cropland, kt CO ₂ e	0.03	0.04	0.04	0.05	0.06
	CO ₂ emissions from lime application, kt CO ₂	0.08	0.09	0.09	0.09	0.10
3.4 Forest Management	Area, kha	1126.72	1125.56	1124.84	1124.18	1123.57
	Net CO ₂ emissions/removals, kt CO ₂	-5237.39	-5239.96	-5205.22	-5160.37	-5098.54
	GHG emissions from biomass burning, kt CO ₂ e	35.82	33.64	0.00	0.00	32.15
	N ₂ O emissions from drainage of soils, kt CO ₂ e	7.41	7.42	7.43	7.45	7.46

Scotland

Activity		2008	2009	2010	2011	2012
3.3 Afforestation & Reforestation	Area, kha	198.17	201.16	205.82	214.20	221.95
	Net CO ₂ emissions/removals, kt CO ₂	-1105.81	-1214.43	-1323.09	-1439.21	-1549.92
	GHG emissions from biomass burning, kt CO ₂ e.	7.44	6.43	0.00	6.20	8.19
	N ₂ O emissions from N fertilization, kt CO ₂ e	0.77	0.58	0.72	0.68	1.00
3.3 Deforestation	Area, kha	20.60	22.51	24.45	26.32	28.12
	Net CO ₂ emissions/removals, kt CO ₂	339.72	350.09	374.31	380.49	383.59
	GHG emissions from biomass burning, kt CO ₂ e	207.46	213.37	221.52	218.12	217.03
	N ₂ O emissions from LUC to cropland, kt CO ₂ e					
	CO ₂ emissions from lime application, kt CO ₂					
3.4 Forest Management	Area, kha	1650.72	1647.61	1643.32	1638.35	1635.31
	Net CO ₂ emissions/removals, kt CO ₂	-8706.41	-8594.00	-8453.09	-8260.32	-7997.53
	GHG emissions from biomass burning, kt CO ₂ e	36.52	30.89	0.00	27.30	34.32
	N ₂ O emissions from drainage of soils, kt CO ₂ e	20.55	20.51	20.42	20.29	20.25

Wales

Activity		2008	2009	2010	2011	2012
3.3 Afforestation & Reforestation	Area, kha	9.34	9.55	9.83	10.47	11.34
	Net CO ₂ emissions/removals, kt CO ₂	-34.55	-39.33	-44.31	-49.43	-54.28
	GHG emissions from biomass burning, kt CO ₂ e.	0.35	0.32	1.65	0.54	2.05
	N ₂ O emissions from N fertilization, kt CO ₂ e	0.04	0.04	0.04	0.03	0.05
3.3 Deforestation	Area, kha	3.76	4.02	4.35	4.62	4.89
	Net CO ₂ emissions/removals, kt CO ₂	74.19	54.21	69.07	60.82	66.32
	GHG emissions from biomass burning, kt CO ₂ e	45.95	32.57	40.67	33.58	35.67
	N ₂ O emissions from LUC to cropland, kt CO ₂ e					
	CO ₂ emissions from lime application, kt CO ₂					
3.4 Forest Management	Area, kha	323.09	322.78	322.39	322.03	321.74
	Net CO ₂ emissions/removals, kt CO ₂	-1295.24	-1286.60	-1289.72	-1279.75	-1254.50
	GHG emissions from biomass burning, kt CO ₂ e	10.02	8.76	44.07	13.47	47.16
	N ₂ O emissions from drainage of soils, kt CO ₂ e	2.86	2.86	2.86	2.85	2.85

Northern Ireland

Activity		2008	2009	2010	2011	2012
3.3 Afforestation & Reforestation	Area, kha	18.50	18.73	18.98	19.29	19.56
	Net CO ₂ emissions/removals, kt CO ₂	-132.96	-143.58	-153.20	-162.25	-169.38
	GHG emissions from biomass burning, kt CO ₂ e.	1.32	0.70	0.00	3.20	30.39
	N ₂ O emissions from N fertilization, kt CO ₂ e	0.04	0.04	0.03	0.04	0.02
3.3 Deforestation	Area, kha	1.21	1.30	1.40	1.49	1.58
	Net CO ₂ emissions/removals, kt CO ₂	19.69	20.11	23.19	26.10	28.90
	GHG emissions from biomass burning, kt CO ₂ e	11.78	11.96	12.13	12.28	12.44
	N ₂ O emissions from LUC to cropland, kt CO ₂ e					
	CO ₂ emissions from lime application, kt CO ₂					
3.4 Forest Management	Area, kha	149.17	148.90	148.57	148.20	147.90
	Net CO ₂ emissions/removals, kt CO ₂	-498.11	-478.19	-460.40	-439.05	-423.31
	GHG emissions from biomass burning, kt CO ₂ e	4.69	2.44	0.00	10.55	97.93
	N ₂ O emissions from drainage of soils, kt CO ₂ e	8.38	8.36	8.33	8.29	8.27

United Kingdom

Activity		2008	2009	2010	2011	2012
3.3 Afforestation & Reforestation	Area, kha	316.71	322.50	330.16	342.07	353.56
	Net CO ₂ emissions/removals, kt CO ₂	-2225.47	-2407.86	-2586.86	-2777.06	-2956.70
	GHG emissions from biomass burning, kt CO ₂ e.	12.86	11.08	1.65	9.93	44.43
	N ₂ O emissions from N fertilization, kt CO ₂ e	1.35	1.04	1.12	1.06	1.39
3.3 Deforestation	Area, kha	40.89	44.51	47.78	50.92	53.98
	Net CO ₂ emissions/removals, kt CO ₂	687.83	710.67	678.45	687.03	701.38
	GHG emissions from biomass burning, kt CO ₂ e	410.21	422.54	387.59	378.05	378.11
	N ₂ O emissions from LUC to cropland, kt CO ₂ e	0.03	0.04	0.04	0.05	0.06
	CO ₂ emissions from lime application, kt CO ₂	0.08	0.09	0.09	0.09	0.10
3.4 Forest Management	Area, kha	3249.70	3244.85	3239.12	3232.76	3228.52
	Net CO ₂ emissions/removals, kt CO ₂	-15737.14	-15598.74	-15408.43	-15139.50	-14773.88
	GHG emissions from biomass burning, kt CO ₂ e	87.06	75.72	44.07	51.32	211.55
	N ₂ O emissions from drainage of soils, kt CO ₂ e	39.20	39.15	39.04	38.89	38.84

Appendix 3: Land Use Change Matrices

The 1990-2012 UK National Inventory Report contains the annual land use change matrices at a UK level⁴, as requested by the 2011 UN Expert Review. For comparison, the annual land use change matrices for each UK Administration are presented below. Matrices have change from previous inventories due to new Forest land estimates.

England

England 1990 to 1991

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	962	1	2	0	1	0	965
Cropland	0	4385	63	0	1	0	4449
Grassland	0	55	6064	0	3	0	6123
Wetland	0	0	0	21	0	0	21
Settlement	0	2	8	0	1348	0	1359
Other Land	0	0	0	0	0	126	126
Total	962	4444	6137	21	1352	126	13044

England 1991 to 1992

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	965	1	3	0	1	0	969
Cropland	0	4390	63	0	1	0	4454
Grassland	0	55	6049	0	3	0	6108
Wetland	0	0	0	21	0	0	21
Settlement	0	2	8	0	1354	0	1365
Other Land	0	0	0	0	0	126	126
Total	965	4449	6123	21	1359	126	13044

England 1992 to 1993

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	969	1	2	0	1	0	973
Cropland	0	4395	63	0	1	0	4459
Grassland	0	55	6034	0	3	0	6093
Wetland	0	0	0	21	0	0	21
Settlement	0	2	8	0	1360	0	1371
Other Land	0	0	0	0	0	126	126
Total	969	4454	6108	21	1365	126	13044

⁴ For UK data see Table 7.1 at http://naei.defra.gov.uk/reports/reports?report_id=789

England 1993 to 1994

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	973	1	3	0	1	0	978
Cropland	0	4400	63	0	1	0	4464
Grassland	0	55	6019	0	3	0	6078
Wetland	0	0	0	21	0	0	21
Settlement	0	2	8	0	1366	0	1377
Other Land	0	0	0	0	0	126	126
Total	973	4459	6093	21	1371	126	13044

England 1994 to 1995

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	977	1	4	0	1	0	983
Cropland	0	4405	63	0	1	0	4469
Grassland	0	55	6002	0	3	0	6061
Wetland	0	0	0	21	0	0	21
Settlement	0	2	8	0	1372	0	1383
Other Land	0	0	0	0	0	126	126
Total	978	4464	6077	21	1377	126	13044

England 1995 to 1996

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	983	1	3	0	1	0	988
Cropland	0	4410	63	0	1	0	4474
Grassland	0	55	5986	0	3	0	6045
Wetland	0	0	0	21	0	0	21
Settlement	0	2	8	0	1378	0	1389
Other Land	0	0	0	0	0	126	126
Total	984	4469	6061	21	1383	126	13044

England 1996 to 1997

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	988	1	3	0	1	0	993
Cropland	0	4415	63	0	1	0	4479
Grassland	0	55	5971	0	3	0	6030
Wetland	0	0	0	21	0	0	21
Settlement	0	2	8	0	1384	0	1395
Other Land	0	0	0	0	0	126	126
Total	989	4474	6045	21	1389	126	13044

England 1997 to 1998

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	992	1	3	0	1	0	997
Cropland	0	4420	63	0	1	0	4484
Grassland	0	55	5956	0	3	0	6015
Wetland	0	0	0	21	0	0	21
Settlement	0	2	8	0	1390	0	1401
Other Land	0	0	0	0	0	126	126
Total	993	4479	6030	21	1395	126	13044

England 1998 to 1999

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	996	1	3	0	1	0	1001
Cropland	0	4425	63	0	1	0	4489
Grassland	0	55	5942	0	3	0	6001
Wetland	0	0	0	20	0	0	20
Settlement	0	2	8	0	1396	0	1407
Other Land	0	0	0	0	0	126	126
Total	997	4484	6016	21	1401	126	13044

England 1999 to 2000

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	1000	1	3	0	1	0	1005
Cropland	0	4430	63	0	1	0	4494
Grassland	0	55	5926	0	3	0	5985
Wetland	0	0	0	20	0	0	20
Settlement	0	2	8	0	1402	0	1413
Other Land	0	0	0	0	0	126	126
Total	1001	4489	6001	20	1407	126	13044

England 2000 to 2001

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	1005	1	4	0	1	0	1010
Cropland	0	4415	35	0	0	0	4451
Grassland	1	73	5940	0	5	0	6018
Wetland	0	0	0	20	0	0	20
Settlement	0	5	5	0	1408	0	1418
Other Land	0	0	0	0	0	126	126
Total	1006	4494	5984	20	1413	126	13044

England 2001 to 2002

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	1010	1	4	0	1	0	1015
Cropland	0	4372	35	0	0	0	4408
Grassland	1	73	5973	0	5	0	6051
Wetland	0	0	0	20	0	0	20
Settlement	0	5	5	0	1413	0	1423
Other Land	0	0	0	0	0	126	126
Total	1011	4451	6017	20	1418	126	13044

England 2002 to 2003

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	1015	1	3	0	1	0	1020
Cropland	0	4329	35	0	0	0	4365
Grassland	1	73	6007	0	5	0	6085
Wetland	0	0	0	20	0	0	20
Settlement	0	5	5	0	1418	0	1428
Other Land	0	0	0	0	0	126	126
Total	1016	4408	6051	20	1423	126	13044

England 2003 to 2004

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	1019	1	3	0	1	0	1024
Cropland	0	4286	35	0	0	0	4322
Grassland	1	73	6040	0	5	0	6118
Wetland	0	0	0	20	0	0	20
Settlement	0	5	5	0	1423	0	1433
Other Land	0	0	0	0	0	126	126
Total	1020	4365	6084	20	1428	126	13044

England 2004 to 2005

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	1023	1	3	0	0	0	1028
Cropland	0	4243	35	0	0	0	4279
Grassland	0	73	6075	0	5	0	6153
Wetland	0	0	0	20	0	0	20
Settlement	0	5	5	0	1428	0	1438
Other Land	0	0	0	0	0	126	126
Total	1024	4322	6119	20	1433	126	13044

England 2005 to 2006

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	1027	1	3	0	1	0	1032
Cropland	0	4200	35	0	0	0	4236
Grassland	1	73	6109	0	5	0	6187
Wetland	0	0	0	20	0	0	20
Settlement	0	5	5	0	1433	0	1443
Other Land	0	0	0	0	0	126	126
Total	1028	4279	6153	20	1438	126	13044

England 2006 to 2007

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	1032	1	2	0	0	0	1035
Cropland	0	4158	35	0	0	0	4194
Grassland	1	73	6143	0	5	0	6221
Wetland	0	0	0	20	0	0	20
Settlement	0	5	5	0	1438	0	1448
Other Land	0	0	0	0	0	125	125
Total	1033	4236	6186	20	1443	125	13044

England 2007 to 2008

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	1034	1	2	0	0	0	1037
Cropland	0	4116	35	0	0	0	4152
Grassland	1	73	6178	0	5	0	6256
Wetland	0	0	0	20	0	0	20
Settlement	0	5	5	0	1443	0	1453
Other Land	0	0	0	0	0	125	125
Total	1035	4194	6220	20	1448	125	13044

England 2008 to 2009

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	1037	0	1	0	0	0	1039
Cropland	0	4074	35	0	0	0	4110
Grassland	1	73	6213	0	5	0	6291
Wetland	0	0	0	20	0	0	20
Settlement	0	5	5	0	1448	0	1458
Other Land	0	0	0	0	0	125	125
Total	1038	4152	6255	20	1453	125	13044

England 2009 to 2010

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	1038	0	1	0	0	0	1040
Cropland	0	4032	35	0	0	0	4068
Grassland	1	73	6249	0	5	0	6327
Wetland	0	0	0	20	0	0	20
Settlement	0	5	5	0	1453	0	1463
Other Land	0	0	0	0	0	125	125
Total	1039	4110	6291	20	1458	125	13044

England 2010 to 2011

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	1039	0	1	0	0	0	1041
Cropland	0	4067	0	0	0	0	4067
Grassland	1	0	6314	0	0	0	6314
Wetland	0	0	0	20	0	0	20
Settlement	0	0	13	0	1462	0	1476
Other Land	0	0	0	0	0	125	125
Total	1040	4068	6328	20	1463	125	13044

England 2011 to 2012

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	1040	1	2	0	0	0	1043
Cropland	0	4067	0	0	0	0	4067
Grassland	1	0	6299	0	0	0	6299
Wetland	0	0	0	20	0	0	20
Settlement	0	0	13	0	1476	0	1489
Other Land	0	0	0	0	0	125	125
Total	1041	4068	6313	20	1476	125	13044

England 2012 to 2013

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	1042	1	2	0	0	0	1044
Cropland	0	4067	0	0	0	0	4067
Grassland	1	0	6284	0	0	0	6284
Wetland	0	0	0	20	0	0	20
Settlement	0	0	13	0	1489	0	1502
Other Land	0	0	0	0	0	125	125
Total	1043	4068	6298	20	1489	125	13044

Scotland

Scotland 1990 to 1991

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	1057	1	14	0	0	0	1072
Cropland	0	1003	21	0	0	0	1025
Grassland	0	17	5394	0	1	0	5412
Wetland	0	0	0	89	0	0	89
Settlement	0	0	2	0	185	0	187
Other Land	0	0	0	0	0	95	95
Total	1057	1021	5432	89	186	95	7881

Scotland 1991 to 1992

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	1072	1	13	0	0	0	1086
Cropland	0	1007	21	0	0	0	1029
Grassland	0	17	5375	0	1	0	5393
Wetland	0	0	0	89	0	0	89
Settlement	0	0	2	0	186	0	188
Other Land	0	0	0	0	0	95	95
Total	1072	1025	5412	89	187	95	7881

Scotland 1992 to 1993

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	1086	1	12	0	0	0	1099
Cropland	0	1011	21	0	0	0	1033
Grassland	0	17	5358	0	1	0	5376
Wetland	0	0	0	89	0	0	89
Settlement	0	0	2	0	187	0	189
Other Land	0	0	0	0	0	95	95
Total	1086	1029	5394	89	188	95	7881

Scotland 1993 to 1994

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	1099	1	11	0	0	0	1111
Cropland	0	1015	21	0	0	0	1037
Grassland	0	17	5341	0	1	0	5359
Wetland	0	0	0	89	0	0	89
Settlement	0	0	2	0	188	0	190
Other Land	0	0	0	0	0	95	95
Total	1099	1033	5376	89	189	95	7881

Scotland 1994 to 1995

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	1110	1	10	0	0	0	1121
Cropland	0	1019	21	0	0	0	1041
Grassland	0	17	5326	0	1	0	5344
Wetland	0	0	0	89	0	0	89
Settlement	0	0	2	0	189	0	191
Other Land	0	0	0	0	0	95	95
Total	1111	1037	5360	89	190	95	7881

Scotland 1995 to 1996

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	1121	1	13	0	0	0	1134
Cropland	0	1023	21	0	0	0	1045
Grassland	0	17	5308	0	1	0	5326
Wetland	0	0	0	89	0	0	89
Settlement	0	0	2	0	190	0	192
Other Land	0	0	0	0	0	95	95
Total	1121	1041	5344	89	191	95	7881

Scotland 1996 to 1997

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	1134	1	10	0	0	0	1144
Cropland	0	1027	21	0	0	0	1049
Grassland	0	17	5293	0	1	0	5310
Wetland	0	0	0	89	0	0	89
Settlement	0	0	2	0	191	0	193
Other Land	0	0	0	0	0	95	95
Total	1134	1045	5326	89	192	95	7881

Scotland 1997 to 1998

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	1144	1	11	0	0	0	1156
Cropland	0	1031	21	0	0	0	1053
Grassland	0	17	5276	0	1	0	5294
Wetland	0	0	0	89	0	0	89
Settlement	0	0	2	0	192	0	194
Other Land	0	0	0	0	0	95	95
Total	1144	1049	5311	89	193	95	7881

Scotland 1998 to 1999

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	1156	1	11	0	0	0	1167
Cropland	0	1035	21	0	0	0	1057
Grassland	0	17	5260	0	1	0	5278
Wetland	0	0	0	89	0	0	89
Settlement	0	0	2	0	193	0	195
Other Land	0	0	0	0	0	95	95
Total	1156	1053	5294	89	194	95	7881

Scotland 1999 to 2000

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	1167	1	10	0	0	0	1177
Cropland	0	1039	21	0	0	0	1061
Grassland	0	17	5246	0	1	0	5264
Wetland	0	0	0	89	0	0	89
Settlement	0	0	2	0	192	0	195
Other Land	0	0	0	0	0	95	95
Total	1167	1057	5280	89	194	95	7881

Scotland 2000 to 2001

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	1177	1	8	0	1	0	1187
Cropland	0	1040	10	0	0	0	1050
Grassland	2	19	5243	0	2	0	5266
Wetland	0	0	0	89	0	0	89
Settlement	0	1	2	0	192	0	194
Other Land	0	0	0	0	0	95	95
Total	1179	1061	5263	89	195	95	7881

Scotland 2001 to 2002

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	1186	1	9	0	1	0	1197
Cropland	0	1029	10	0	0	0	1039
Grassland	2	19	5245	0	2	0	5268
Wetland	0	0	0	89	0	0	89
Settlement	0	1	2	0	191	0	193
Other Land	0	0	0	0	0	94	94
Total	1187	1050	5266	89	194	95	7881

Scotland 2002 to 2003

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	1196	0	6	0	1	0	1204
Cropland	0	1019	10	0	0	0	1029
Grassland	2	19	5250	0	2	0	5273
Wetland	0	0	0	89	0	0	89
Settlement	0	1	2	0	190	0	192
Other Land	0	0	0	0	0	94	94
Total	1198	1039	5268	89	193	94	7881

Scotland 2003 to 2004

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	1202	0	5	0	1	0	1208
Cropland	0	1009	10	0	0	0	1019
Grassland	2	19	5256	0	2	0	5279
Wetland	0	0	0	89	0	0	89
Settlement	0	1	2	0	189	0	191
Other Land	0	0	0	0	0	94	94
Total	1204	1029	5273	89	192	94	7881

Scotland 2004 to 2005

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	1206	0	5	0	1	0	1213
Cropland	0	999	10	0	0	0	1009
Grassland	2	19	5262	0	2	0	5285
Wetland	0	0	0	89	0	0	89
Settlement	0	1	2	0	188	0	190
Other Land	0	0	0	0	0	94	94
Total	1209	1019	5279	89	191	94	7881

Scotland 2005 to 2006

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	1211	0	5	0	1	0	1216
Cropland	0	989	10	0	0	0	999
Grassland	2	19	5269	0	2	0	5292
Wetland	0	0	0	89	0	0	89
Settlement	0	1	2	0	188	0	190
Other Land	0	0	0	0	0	94	94
Total	1213	1009	5285	89	190	94	7881

Scotland 2006 to 2007

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	1214	0	3	0	0	0	1218
Cropland	0	979	10	0	0	0	989
Grassland	2	19	5278	0	2	0	5301
Wetland	0	0	0	89	0	0	89
Settlement	0	1	2	0	188	0	190
Other Land	0	0	0	0	0	94	94
Total	1216	999	5293	89	190	94	7881

Scotland 2007 to 2008

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	1216	0	5	0	1	0	1223
Cropland	0	969	10	0	0	0	979
Grassland	2	19	5284	0	2	0	5307
Wetland	0	0	0	89	0	0	89
Settlement	0	1	2	0	187	0	189
Other Land	0	0	0	0	0	94	94
Total	1218	989	5301	89	190	94	7881

Scotland 2008 to 2009

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	1221	0	3	0	1	0	1225
Cropland	0	959	10	0	0	0	969
Grassland	2	19	5292	0	2	0	5315
Wetland	0	0	0	89	0	0	89
Settlement	0	1	2	0	187	0	189
Other Land	0	0	0	0	0	94	94
Total	1223	979	5307	89	189	94	7881

Scotland 2009 to 2010

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	1223	0	3	0	0	0	1226
Cropland	0	949	10	0	0	0	959
Grassland	2	19	5301	0	2	0	5323
Wetland	0	0	0	89	0	0	89
Settlement	0	1	2	0	187	0	189
Other Land	0	0	0	0	0	94	94
Total	1225	969	5315	89	189	94	7881

Scotland 2010 to 2011

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	1224	0	2	0	0	0	1227
Cropland	0	959	0	0	0	0	959
Grassland	2	0	5319	0	0	0	5321
Wetland	0	0	0	89	0	0	89
Settlement	0	0	2	0	189	0	191
Other Land	0	0	0	0	0	94	94
Total	1226	959	5323	89	189	94	7881

Scotland 2011 to 2012

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	1225	0	4	0	1	0	1230
Cropland	0	959	0	0	0	0	959
Grassland	2	0	5314	0	0	0	5316
Wetland	0	0	0	89	0	0	89
Settlement	0	0	2	0	191	0	193
Other Land	0	0	0	0	0	94	94
Total	1227	959	5320	89	191	94	7881

Scotland 2012 to 2013

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	1227	1	8	0	1	0	1238
Cropland	0	959	0	0	0	0	959
Grassland	2	0	5305	0	0	0	5307
Wetland	0	0	0	89	0	0	89
Settlement	0	0	2	0	193	0	195
Other Land	0	0	0	0	0	94	94
Total	1229	960	5315	89	194	94	7881

Wales

Wales 1990 to 1991

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	273	0	1	0	0	0	274
Cropland	0	332	8	0	0	0	340
Grassland	0	5	1306	0	1	0	1313
Wetland	0	0	0	5	0	0	5
Settlement	0	0	2	0	130	0	132
Other Land	0	0	0	0	0	14	14
Total	273	338	1317	5	131	14	2078

Wales 1991 to 1992

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	274	0	0	0	0	0	274
Cropland	0	334	8	0	0	0	342
Grassland	0	5	1303	0	1	0	1309
Wetland	0	0	0	5	0	0	5
Settlement	0	0	2	0	131	0	133
Other Land	0	0	0	0	0	14	14
Total	274	340	1313	5	132	14	2078

Wales 1992 to 1993

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	274	0	0	0	0	0	275
Cropland	0	336	8	0	0	0	344
Grassland	0	5	1300	0	1	0	1306
Wetland	0	0	0	5	0	0	5
Settlement	0	0	2	0	132	0	134
Other Land	0	0	0	0	0	14	14
Total	274	342	1310	5	133	14	2078

Wales 1993 to 1994

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	275	0	0	0	0	0	275
Cropland	0	338	8	0	0	0	346
Grassland	0	5	1296	0	1	0	1302
Wetland	0	0	0	5	0	0	5
Settlement	0	0	2	0	133	0	135
Other Land	0	0	0	0	0	14	14
Total	275	344	1306	5	134	14	2078

Wales 1994 to 1995

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	275	0	1	0	0	0	276
Cropland	0	340	8	0	0	0	348
Grassland	0	5	1293	0	1	0	1299
Wetland	0	0	0	5	0	0	5
Settlement	0	0	2	0	134	0	136
Other Land	0	0	0	0	0	14	14
Total	275	346	1303	5	135	14	2078

Wales 1995 to 1996

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	276	0	0	0	0	0	276
Cropland	0	342	8	0	0	0	350
Grassland	0	5	1289	0	1	0	1295
Wetland	0	0	0	5	0	0	5
Settlement	0	0	2	0	135	0	137
Other Land	0	0	0	0	0	14	14
Total	276	348	1300	5	136	14	2078

Wales 1996 to 1997

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	276	0	0	0	0	0	276
Cropland	0	344	8	0	0	0	352
Grassland	0	5	1286	0	1	0	1292
Wetland	0	0	0	5	0	0	5
Settlement	0	0	2	0	136	0	138
Other Land	0	0	0	0	0	14	14
Total	276	350	1296	5	137	14	2078

Wales 1997 to 1998

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	276	0	0	0	0	0	277
Cropland	0	346	8	0	0	0	354
Grassland	0	5	1283	0	1	0	1289
Wetland	0	0	0	5	0	0	5
Settlement	0	0	2	0	137	0	139
Other Land	0	0	0	0	0	14	14
Total	277	352	1293	5	138	14	2078

Wales 1998 to 1999

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	277	0	0	0	0	0	277
Cropland	0	348	8	0	0	0	356
Grassland	0	5	1279	0	1	0	1285
Wetland	0	0	0	5	0	0	5
Settlement	0	0	2	0	138	0	140
Other Land	0	0	0	0	0	14	14
Total	277	354	1289	5	139	14	2078

Wales 1999 to 2000

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	277	0	1	0	0	0	278
Cropland	0	350	8	0	0	0	358
Grassland	0	5	1276	0	1	0	1282
Wetland	0	0	0	5	0	0	5
Settlement	0	0	2	0	139	0	141
Other Land	0	0	0	0	0	14	14
Total	277	356	1286	5	140	14	2078

Wales 2000 to 2001

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	278	0	1	0	0	0	278
Cropland	0	354	4	0	0	0	358
Grassland	0	4	1276	0	1	0	1280
Wetland	0	0	0	5	0	0	5
Settlement	0	0	1	0	141	0	142
Other Land	0	0	0	0	0	14	14
Total	278	358	1282	5	141	14	2078

Wales 2001 to 2002

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	278	0	0	0	0	0	278
Cropland	0	354	4	0	0	0	358
Grassland	0	4	1275	0	1	0	1279
Wetland	0	0	0	5	0	0	5
Settlement	0	0	1	0	142	0	143
Other Land	0	0	0	0	0	14	14
Total	278	358	1281	5	142	14	2078

Wales 2002 to 2003

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	278	0	0	0	0	0	278
Cropland	0	354	4	0	0	0	358
Grassland	0	4	1274	0	1	0	1278
Wetland	0	0	0	5	0	0	5
Settlement	0	0	1	0	143	0	144
Other Land	0	0	0	0	0	14	14
Total	278	358	1279	5	143	14	2078

Wales 2003 to 2004

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	278	0	0	0	0	0	279
Cropland	0	354	4	0	0	0	358
Grassland	0	4	1273	0	1	0	1277
Wetland	0	0	0	5	0	0	5
Settlement	0	0	1	0	144	0	145
Other Land	0	0	0	0	0	14	14
Total	278	358	1278	5	144	14	2078

Wales 2004 to 2005

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	278	0	0	0	0	0	279
Cropland	0	354	4	0	0	0	358
Grassland	0	4	1272	0	1	0	1276
Wetland	0	0	0	5	0	0	5
Settlement	0	0	1	0	145	0	146
Other Land	0	0	0	0	0	14	14
Total	279	358	1277	5	145	14	2078

Wales 2005 to 2006

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	278	0	1	0	0	0	279
Cropland	0	354	4	0	0	0	358
Grassland	0	4	1270	0	1	0	1275
Wetland	0	0	0	5	0	0	5
Settlement	0	0	1	0	146	0	147
Other Land	0	0	0	0	0	14	14
Total	279	358	1276	5	146	14	2078

Wales 2006 to 2007

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	279	0	0	0	0	0	279
Cropland	0	354	4	0	0	0	358
Grassland	0	4	1269	0	1	0	1273
Wetland	0	0	0	5	0	0	5
Settlement	0	0	1	0	147	0	148
Other Land	0	0	0	0	0	14	14
Total	279	358	1275	5	147	14	2078

Wales 2007 to 2008

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	279	0	0	0	0	0	280
Cropland	0	354	4	0	0	0	358
Grassland	0	4	1268	0	1	0	1272
Wetland	0	0	0	5	0	0	5
Settlement	0	0	1	0	148	0	149
Other Land	0	0	0	0	0	14	14
Total	279	358	1274	5	148	14	2078

Wales 2008 to 2009

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	279	0	0	0	0	0	279
Cropland	0	354	4	0	0	0	358
Grassland	0	4	1267	0	1	0	1271
Wetland	0	0	0	5	0	0	5
Settlement	0	0	1	0	149	0	150
Other Land	0	0	0	0	0	14	14
Total	280	358	1272	5	149	14	2078

Wales 2009 to 2010

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	279	0	0	0	0	0	279
Cropland	0	354	4	0	0	0	358
Grassland	0	4	1267	0	1	0	1271
Wetland	0	0	0	5	0	0	5
Settlement	0	0	1	0	149	0	150
Other Land	0	0	0	0	0	14	14
Total	279	358	1272	5	150	14	2078

Wales 2010 to 2011

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	279	0	0	0	0	0	279
Cropland	0	358	6	0	0	0	363
Grassland	0	0	1264	0	0	0	1264
Wetland	0	0	0	5	0	0	5
Settlement	0	0	1	0	151	0	152
Other Land	0	0	0	0	0	14	14
Total	279	358	1271	5	151	14	2078

Wales 2011 to 2012

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	279	0	0	0	0	0	279
Cropland	0	363	6	0	0	0	369
Grassland	0	0	1257	0	0	0	1257
Wetland	0	0	0	5	0	0	5
Settlement	0	0	1	0	152	0	154
Other Land	0	0	0	0	0	14	14
Total	279	363	1264	5	152	14	2078

Wales 2012 to 2013

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	279	0	1	0	0	0	280
Cropland	0	369	6	0	0	0	374
Grassland	0	0	1249	0	0	0	1249
Wetland	0	0	0	5	0	0	5
Settlement	0	0	1	0	154	0	155
Other Land	0	0	0	0	0	14	14
Total	279	369	1257	5	154	14	2078

Northern Ireland

Northern Ireland 1990 to 1991

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	66	0	2	0	0	0	68
Cropland	0	301	4	0	0	0	305
Grassland	0	6	906	0	0	0	912
Wetland	0	0	0	61	0	0	61
Settlement	0	0	1	0	49	0	50
Other Land	0	0	0	0	0	17	17
Total	66	307	912	61	49	17	1413

Northern Ireland 1991 to 1992

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	68	0	1	0	0	0	69
Cropland	0	299	4	0	0	0	303
Grassland	0	6	906	0	0	0	911
Wetland	0	0	0	61	0	0	61
Settlement	0	0	1	0	50	0	51
Other Land	0	0	0	0	0	17	17
Total	68	305	911	61	50	17	1413

Northern Ireland 1992 to 1993

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	69	0	1	0	0	0	70
Cropland	0	297	4	0	0	0	301
Grassland	0	6	906	0	0	0	912
Wetland	0	0	0	61	0	0	61
Settlement	0	0	1	0	51	0	52
Other Land	0	0	0	0	0	17	17
Total	69	303	911	61	51	17	1413

Northern Ireland 1993 to 1994

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	70	0	1	0	0	0	71
Cropland	0	295	4	0	0	0	299
Grassland	0	6	906	0	0	0	912
Wetland	0	0	0	61	0	0	61
Settlement	0	0	1	0	52	0	53
Other Land	0	0	0	0	0	17	17
Total	70	301	912	61	52	17	1413

Northern Ireland 1994 to 1995

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	71	0	1	0	0	0	73
Cropland	0	293	4	0	0	0	297
Grassland	0	6	906	0	0	0	912
Wetland	0	0	0	61	0	0	61
Settlement	0	0	1	0	53	0	54
Other Land	0	0	0	0	0	17	17
Total	71	299	912	61	53	17	1413

Northern Ireland 1995 to 1996

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	72	0	1	0	0	0	73
Cropland	0	291	4	0	0	0	295
Grassland	0	6	906	0	0	0	912
Wetland	0	0	0	60	0	0	60
Settlement	0	0	1	0	54	0	55
Other Land	0	0	0	0	0	17	17
Total	73	297	912	61	54	17	1413

Northern Ireland 1996 to 1997

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	73	0	1	0	0	0	74
Cropland	0	289	4	0	0	0	293
Grassland	0	6	906	0	0	0	912
Wetland	0	0	0	60	0	0	60
Settlement	0	0	1	0	55	0	56
Other Land	0	0	0	0	0	17	17
Total	73	295	912	60	55	17	1413

Northern Ireland 1997 to 1998

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	74	0	1	0	0	0	75
Cropland	0	287	4	0	0	0	291
Grassland	0	6	907	0	0	0	913
Wetland	0	0	0	60	0	0	60
Settlement	0	0	1	0	56	0	57
Other Land	0	0	0	0	0	17	17
Total	74	293	912	60	56	17	1413

Northern Ireland 1998 to 1999

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	75	0	1	0	0	0	76
Cropland	0	285	4	0	0	0	289
Grassland	0	6	907	0	0	0	913
Wetland	0	0	0	60	0	0	60
Settlement	0	0	1	0	57	0	58
Other Land	0	0	0	0	0	17	17
Total	75	291	913	60	57	17	1413

Northern Ireland 1999 to 2000

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	76	0	1	0	0	0	76
Cropland	0	283	4	0	0	0	287
Grassland	0	6	908	0	0	0	914
Wetland	0	0	0	60	0	0	60
Settlement	0	0	1	0	58	0	59
Other Land	0	0	0	0	0	17	17
Total	76	289	913	60	58	17	1413

Northern Ireland 2000 to 2001

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	76	0	1	0	0	0	77
Cropland	0	283	3	0	0	0	286
Grassland	0	4	908	0	0	0	912
Wetland	0	0	0	59	0	0	59
Settlement	0	0	2	0	59	0	61
Other Land	0	0	0	0	0	17	17
Total	76	287	914	60	59	17	1413

Northern Ireland 2001 to 2002

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	77	0	1	0	0	0	78
Cropland	0	282	3	0	0	0	285
Grassland	0	4	907	0	0	0	911
Wetland	0	0	0	59	0	0	59
Settlement	0	0	2	0	61	0	63
Other Land	0	0	0	0	0	17	17
Total	77	286	912	59	61	17	1413

Northern Ireland 2002 to 2003

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	78	0	1	0	0	0	78
Cropland	0	281	3	0	0	0	284
Grassland	0	4	905	0	0	0	910
Wetland	0	0	0	59	0	0	59
Settlement	0	0	2	0	63	0	65
Other Land	0	0	0	0	0	17	17
Total	78	285	911	59	63	17	1413

Northern Ireland 2003 to 2004

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	78	0	1	0	0	0	79
Cropland	0	280	3	0	0	0	283
Grassland	0	4	904	0	0	0	908
Wetland	0	0	0	59	0	0	59
Settlement	0	0	2	0	65	0	67
Other Land	0	0	0	0	0	17	17
Total	78	284	910	59	65	17	1413

Northern Ireland 2004 to 2005

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	79	0	0	0	0	0	79
Cropland	0	279	3	0	0	0	282
Grassland	0	4	903	0	0	0	907
Wetland	0	0	0	58	0	0	58
Settlement	0	0	2	0	67	0	69
Other Land	0	0	0	0	0	17	17
Total	79	283	908	59	67	17	1413

Northern Ireland 2005 to 2006

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	79	0	0	0	0	0	79
Cropland	0	278	3	0	0	0	281
Grassland	0	4	902	0	0	0	906
Wetland	0	0	0	58	0	0	58
Settlement	0	0	2	0	69	0	71
Other Land	0	0	0	0	0	17	17
Total	79	282	907	58	69	17	1413

Northern Ireland 2006 to 2007

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	79	0	1	0	0	0	80
Cropland	0	277	3	0	0	0	280
Grassland	0	4	900	0	0	0	905
Wetland	0	0	0	58	0	0	58
Settlement	0	0	2	0	71	0	73
Other Land	0	0	0	0	0	17	17
Total	79	281	906	58	71	17	1413

Northern Ireland 2007 to 2008

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	80	0	0	0	0	0	80
Cropland	0	276	3	0	0	0	279
Grassland	0	4	899	0	0	0	904
Wetland	0	0	0	58	0	0	58
Settlement	0	0	2	0	73	0	75
Other Land	0	0	0	0	0	17	17
Total	80	280	905	58	73	17	1413

Northern Ireland 2008 to 2009

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	80	0	1	0	0	0	81
Cropland	0	275	3	0	0	0	278
Grassland	0	4	898	0	0	0	902
Wetland	0	0	0	58	0	0	58
Settlement	0	0	2	0	75	0	77
Other Land	0	0	0	0	0	17	17
Total	80	279	904	58	75	17	1413

Northern Ireland 2009 to 2010

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	81	0	0	0	0	0	81
Cropland	0	274	3	0	0	0	277
Grassland	0	4	897	0	0	0	901
Wetland	0	0	0	58	0	0	58
Settlement	0	0	2	0	77	0	79
Other Land	0	0	0	0	0	17	17
Total	81	278	902	58	77	17	1413

Northern Ireland 2010 to 2011

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	81	0	0	0	0	0	81
Cropland	0	277	0	0	0	0	277
Grassland	0	0	900	0	0	0	900
Wetland	0	0	0	58	0	0	58
Settlement	0	0	1	0	79	0	80
Other Land	0	0	0	0	0	17	17
Total	81	277	901	58	79	17	1413

Northern Ireland 2011 to 2012

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	81	0	0	0	0	0	81
Cropland	0	277	0	0	0	0	277
Grassland	0	0	899	0	0	0	899
Wetland	0	0	0	58	0	0	58
Settlement	0	0	1	0	80	0	81
Other Land	0	0	0	0	0	17	17
Total	81	277	900	58	80	17	1413

Northern Ireland 2012 to 2013

From To	Forest	Cropland	Grassland	Wetland	Settlement	Other Land	Total
Forest	80	0	1	0	0	0	81
Cropland	0	277	0	0	0	0	277
Grassland	0	0	898	0	0	0	898
Wetland	0	0	0	58	0	0	58
Settlement	0	0	1	0	81	0	81
Other Land	0	0	0	0	0	17	17
Total	80	277	900	58	81	17	1413

Appendix 4: Dataset Sources

Dataset	Organisation	Update Frequency
Forest Planting Statistics	Forestry Commission	Annual – request data in August.
Deforestation – Felling Licences	Forestry Commission	Annual – downloads data in August / September.
Deforestation – LUC to developed land	Department for Communities and Local Government	Irregular – request on an annual basis to check if there has been an update.
Deforestation – Expert Opinion	Forestry Commission & Forest Research	Annual – although may be superseded by the NIWT when complete.
Countryside Survey	Centre for Ecology & Hydrology	Approximately decadal.
Liming & Peat Production – GB Mineral Extraction Business Monitor	Department for Communities and Local Government / Office of National Statistics / British Geological Survey	Annual – 2011 data released in Feb 2013
NI Limestone purchased by farmers	Department of Agriculture and Rural Development, NI Government / Office of National Statistics	Annual – 2012 data released in March 2013
Liming – GB British Survey of Fertiliser Practice	Department for Environment Food and Rural Affairs	Annual – 2012 data released in April 2013
Liming – GB Fertiliser use	Agricultural industries confederation	Report used for hindcasting, one off.
Liming – UK Limex from Sugar Production	British Sugar	Unknown
Liming – UK Cropland Grassland Areas from Agricultural Census	Government Organisations for each of the DA's	Annual – download in the summer / autumn prior to inventory production.
Peat – Directory of Mines and Quarries	British Geological Survey	3 yearly – expected summer 2014
Peat – GB Google Earth Imagery	Google Earth Imagery	Unknown, not updated since 2010
Peat – Extraction data NI	Scientific Reports	<i>Ad hoc</i> updates.
Wildfires – IRS Data	Fire and Rescue Service	Annual updates in September. Data supplied as Excel spreadsheet on request.
Wildfires – Northern Ireland Forest Service Annual Report	Northern Ireland Forest Service	Updated annually.
Wildfires – Remote Sensing Data	NASA - EOSDIS	New data provided annually in August. No revisions to previous year's data, just additional datapoint for UK burnt area in most recent year.
Lowland Drainage	Department of Environment	No updates predicted.
Soils Data	James Hutton Institute/ Cranfield Soil and AgriFood Institute (CSAI),	One off dataset.
Forest Carbon Stock Changes – CARBINE model	Forest Research	Annual – request model output to be provided by the end of September each year.
Cropland Yield Improvement – improvement factor	HGCA (the cereals and oilseeds division of the Agriculture and Horticulture Development Board)	No updates predicted.