Forestry Commission

Forestry Statistics 2020

Chapter 4: Carbon

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United Kingdom

Geographical breakdown:
Country

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Introduction

This chapter contains information on:

- carbon in forests;
- the Woodland Carbon Code; and
- public attitudes to forestry and climate change.

Estimates for England, Wales, Scotland and Northern Ireland are included, where possible, in addition to UK totals. International comparisons of carbon stocks are provided in the International Forestry chapter. Further information on the data sources and methodology used to compile the figures is provided in the Sources chapter.

All of the statistics presented in this chapter have been previously released.

A copy of all carbon tables can be accessed in spreadsheet format from the Data Downloads web page at www.forestresearch.gov.uk/tools-and-resources/statistics/data-downloads/.

In addition to the statistics presented here, information on UK forests and climate change is available from "Combating Climate Change - a role for UK forests" (The Read Report), an independent assessment of the science published in November 2009 and available at www.forestresearch.gov.uk/documents/2062/SynthesisUKAssessmentfinal.pdf.

This chapter had previously included statistics on net annual changes in carbon in UK woodlands. No update is currently available. Historical data have been released by the Department of Business, Energy and Industrial Strategy at https://www.gov.uk/government/collections/uk-greenhouse-gas-emissions-statistics.

Key findings

The main findings are:

- The total carbon stock in UK forests is estimated to have increased, from around 3.2 billion tonnes of carbon dioxide equivalent in 1990 to 4.0 billion tonnes of carbon dioxide equivalent in 2020.
- Around one half (51%) of the total UK forest carbon stock in 2020 is in Scotland (2.0 billion tonnes of carbon dioxide equivalent), 36% in England (1.5 billion tonnes), 8% in Wales (0.3 billion tonnes) and 4% in Northern Ireland (0.2 billion tonnes).
- A total of 239 projects had been validated to the Woodland Carbon Code at 31 March 2020, covering over 12,000 hectares and projected to sequester 4.7 million tonnes of carbon dioxide over their lifetime.

4.1 Forest carbon stock

Forest carbon stock is the amount of carbon that has been sequestered from the atmosphere and is now stored within the forest ecosystem, mainly within living biomass and soil, and to a lesser extent also in dead wood and litter.

Table 4.1a presents estimates of UK forest carbon stock that were compiled in 2018 for submission to international organisations. The total carbon stock stored within UK forests is estimated to have increased, around 3.2 billion tonnes of carbon dioxide equivalent in 1990 to 4.0 billion tonnes of carbon dioxide equivalent in 2020 (Table 4.1a). The carbon stored in forest soils accounts for around 70% of total forest carbon stock.

Table 4.1a UK forest carbon stock

million tonnes of carbon dioxide equivalent

	1990	2000	2010	2015	2020
Carbon in above-ground biomass	376	482	586	630	674
Carbon in below-ground biomass	135	174	211	227	242
Carbon in dead wood	130	138	143	147	149
Carbon in litter	165	175	182	188	190
Soil carbon [1, 3]	2,366	2,533	2,629	2,726	2,761
Total forest carbon	**3,172**	**3,502**	**3,750**	**3,918**	**4,016**

Source: Forest Research

Notes

1. Carbon in soil depth 0 to 100 cm.
2. To convert tonnes carbon dioxide equivalent (CO_2e) to tonnes carbon (C), multiply by 12/44.
3. Changes in soil carbon stocks over the period can be attributed to changes in UK forest area.

These figures are outside the scope of National Statistics. For further information see the Sources chapter.

Around one half (51%) of the estimated total UK forest carbon stock in 2020 is in Scotland (2.0 billion tonnes of carbon dioxide equivalent), 36% in England (1.5 billion tonnes), 8% in Wales (0.3 billion tonnes) and 4% in Northern Ireland (0.2 billion tonnes).

Table 4.1b Forest carbon stock by country, 2020

million tonnes of carbon dioxide equivalent

	England	Wales	Scotland	Northern Ireland	UK
Carbon in above-ground biomass	338	64	259	13	674
Carbon in below-ground biomass	122	23	93	5	242
Carbon in dead wood	61	14	68	5	149
Carbon in litter	80	18	85	7	190
Soil carbon[1]	864	217	1,545	134	2,761
Total forest carbon	**1,465**	**337**	**2,050**	**165**	**4,016**

Source: Forest Research

Notes

1. Carbon in soil depth 0 to 100 cm.
2. To convert tonnes carbon dioxide equivalent (CO_2e) to tonnes carbon (C), multiply by 12/44.

These figures are outside the scope of National Statistics. For further information see the Sources chapter.

4.2 Woodland Carbon Code

The Woodland Carbon Code is a voluntary standard, initiated in July 2011, for woodland creation projects that make claims about the carbon they sequester (take out of the atmosphere).

All projects must be placed on the UK Woodland Carbon Registry. Their claims about potential carbon sequestration are validated by an independent certification body. Validated projects are then verified on a regular basis to confirm the progress of carbon sequestration.

Further information on Woodland Carbon Code projects is provided in the Sources chapter and at www.woodlandcarboncode.org.uk/.

Table 4.2a provides annual data on projects registered under the Woodland Carbon Code. The table provides information on the number of projects, area of woodland covered by the projects and the total projected carbon sequestration over the lifetime (up to 100 years) of the projects.

A total of 239 projects had been validated (including those that had also been verified) to the Woodland Carbon Code at 31 March 2020, covering around 12 thousand hectares and projected to sequester 4.7 million tonnes of carbon dioxide over their lifetime.

Of the validated projects, 88 were also verified by the end of March 2020. These projects cover around 2.6 thousand hectares and are projected to sequester 1.2 million tonnes of carbon dioxide over their lifetime.

A total of 363 projects were registered under the Woodland Carbon Code at 31 March 2020, covering around 15 thousand hectares of woodland and projected to sequester 5.8 million tonnes of carbon dioxide.

Table 4.2a Woodland Carbon Code projects[1] in the UK

	Verified	Validated only	Awaiting validation	Total
Number of projects				
March 2013	0	36	69	105
March 2014	0	67	135	202
March 2015	0	100	99	199
March 2016	1	121	108	230
March 2017	3	140	107	250
March 2018	37	119	83	239
March 2019	70	117	79	266
March 2020	88	151	124	363
Area of woodland (hectares)				
March 2013	0	1,488	2,073	3,561
March 2014	0	2,824	12,576	15,401
March 2015	0	3,322	12,063	15,385
March 2016	5	4,749	11,087	15,841
March 2017	148	4,993	11,028	16,170
March 2018	1,578	3,680	10,868	16,125
March 2019	2,404	5,856	9,134	17,394
March 2020	2,633	9,372	2,962	14,967
Projected carbon sequestration[2] (thousand tonnes of carbon dioxide equivalent)				
March 2013	0	655	1,137	1,792
March 2014	0	1,323	4,364	5,687
March 2015	0	1,588	4,091	5,679
March 2016	2	2,278	3,519	5,799
March 2017	79	2,385	3,476	5,940

March 2018	713	1,790	3,285	5,788
March 2019	1,093	2,331	2,760	6,184
March 2020	1,207	3,480	1,121	5,809

Source: Provisional Woodland Statistics: 2020 Edition
Notes:

1. Projects can be validated/ verified individually or come together as part of a group. The statistics presented here show the number of projects validated or verified whether they were put through the process individually or as part of a group.
2. Figures for carbon sequestration indicate the total projected sequestration of the projects over their lifetime of up to 100 years, and include the amount claimable by a project plus the amount allocated to a shared "buffer" in case of unanticipated losses.

Awaiting validation: is when a project or group is undergoing assessment by a certification body.

Validated: is the initial evaluation of a project or group against the requirements of the Woodland Carbon Code. Upon completion a project/group will receive a 'Validation Opinion Statement'. The project/group will then be certified for a period of up to 5 years.

Verified: Verification is the evaluation of a project as it progresses to confirm the amount of CO2 sequestered to date as well as that it continues to meet the requirements of the Code.

These figures are outside the scope of National Statistics. For further information see the Sources chapter.

Together, all validated (including verified) projects were predicted to sequester 3,791 thousand tonnes of carbon dioxide in Scotland, 711 thousand tonnes in England, 175 thousand tonnes in Wales and 11 thousand tonnes in Northern Ireland over their lifetime (Table 4.2b).

Table 4.2b Woodland Carbon Code projects[1] at 31 March 2020

	England	Wales	Scotland	Northern Ireland	UK
Number of projects					
Awaiting validation	47	50	27	0	124
Validated only	51	17	82	1	151
Verified	36	3	48	1	88
Total validated	87	20	130	2	239
Total	**134**	**70**	**157**	**2**	**363**
Area of woodland (hectares)					
Awaiting validation	748	464	1,750	0	2,962
Validated only	884	250	8,224	14	9,372
Verified	376	52	2,196	9	2,633
Total validated	1,260	302	10,420	23	12,005
Total	**2,008**	**766**	**12,170**	**23**	**14,967**
Projected carbon sequestration[2] (thousand tonnes of carbon dioxide equivalent)					
Awaiting validation	460	144	517	0	1,121
Validated only	503	143	2,827	8	3,480
Verified	208	33	963	3	1,207
Total validated	711	175	3,791	11	4,687
Total	**1,171**	**319**	**4,308**	**11**	**5,809**

Source: Provisional Woodland Statistics: 2020 Edition

Notes:

1. Projects can be validated/ verified individually or come together as part of a group. The statistics presented here show the number of projects validated or verified whether they were put through the process individually or as part of a group.

2. Figures for carbon sequestration indicate the total projected sequestration of the projects over their lifetime of up to 100 years, and include the amount claimable by a project plus the amount allocated to a shared "buffer" in case of unanticipated losses.

Awaiting validation: is when a project or group is undergoing assessment by a certification body.

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Verified: Verification is the evaluation of a project as it progresses to confirm the amount of CO_2 sequestered to date as well as that it continues to meet the requirements of the Code.

These figures are outside the scope of National Statistics. For further information see the Sources chapter.

4.3 Public Opinion of Forestry - climate change

Forest Research has conducted similar surveys of public attitudes to forestry and forestry-related issues every two years since 1995. The most recent set of separate surveys was conducted in 2019 (in Northern Ireland, Wales, and across the UK as a whole) and 2017 (in Scotland). The full results are available on our website at www.forestresearch.gov.uk/tools-and-resources/statistics/statistics-by-topic/public-opinion-of-forestry/.

In the UK survey in 2019, questions were asked to gauge the public's agreement on climate change issues, including on the management of UK forests in response to the threat of climate change (Table 4.3). Some of the public views presented below do not reflect expert opinion.

There were high levels of agreement (respondents stating that they agreed or strongly agreed) with the statements:

- "A lot more trees should be planted", supported by 88% of the UK public in 2019; and
- "Different types of trees should be planted that will be more suited to future climates", supported by 78% in 2019.
- Conversely, there were much lower levels of agreement with the statements:
- "No action is needed, let nature take its course", supported by 26% in 2019; and
- "Trees should not be felled under any circumstances, even if they are replaced", supported by 29%.

Table 4.3 Management of UK forests in response to the threat of climate change

percent of respondents who agree or strongly agree

	2011	2013	2015	2017	2019
A lot more trees should be planted	90	86	80	84	88
Different types of trees should be planted that will be more suited to future climates	74	71	67	76	78
Trees should not be felled in any circumstances, even if they are replaced	21	22	25	26	29
No action is needed, let nature take its course	21	18	22	24	26

Source: UK Public Opinion of Forestry Surveys.

Notes:

1. Figures are based on all respondents: weighted totals = 2011 (2,068), 2013 (1,927), 2015 (1,804), 2017 (2,113), 2019 (2,174).
2. The range of uncertainty around any result should be no more than ±3.5% in any of the years shown. To compare results over time, a difference of at least 5 percentage points is required to indicate that there is a significant difference.

These figures are outside the scope of National Statistics. For further information see the Sources chapter.