Forestry England

Natural Capital Account

2019-20

Contents

Natural Capital Accounts for the nation's forests 2019-20

This is our fifth annual natural capital account. These accounts help us to understand the value to society of various public benefits derived from the nation's forest.

We are continuously developing these accounts, including more ecosystem services where possible, and improving methodologies where we can each year. This year we have worked with Forest Research to include an estimate of the amount of carbon currently sequestered within the soils and leaf litter of the nation's forest.

When compared to previous year's accounts, we can see that the value of measured ecosystem services has largely remained steady, with small variations between years and no obvious trend either up or down.

The lower overall figure for this year is primarily due to a slightly lower number of recreation visits, and slightly less carbon sequestered in 2019-20 than the year before. To some degree these variations will simply naturally occur, and the differences between years are neither particularly large, nor indicative of a trend downwards or upwards.

These accounts are split into three parts:

1) The balance sheet: this shows the overall natural capital values of our forests over the next 50 years, split by the ecosystems we are currently able to measure.

2) The asset register: this breaks down the area of land and habitats that we manage, as well as the condition that it is in, and other important elements that impact natural capital delivery.

3) The physical and monetary flows: these show the in-year delivery of natural capital benefits.

Measuring the status of our natural capital assets helps us to ensure that we continue to use them sustainably.
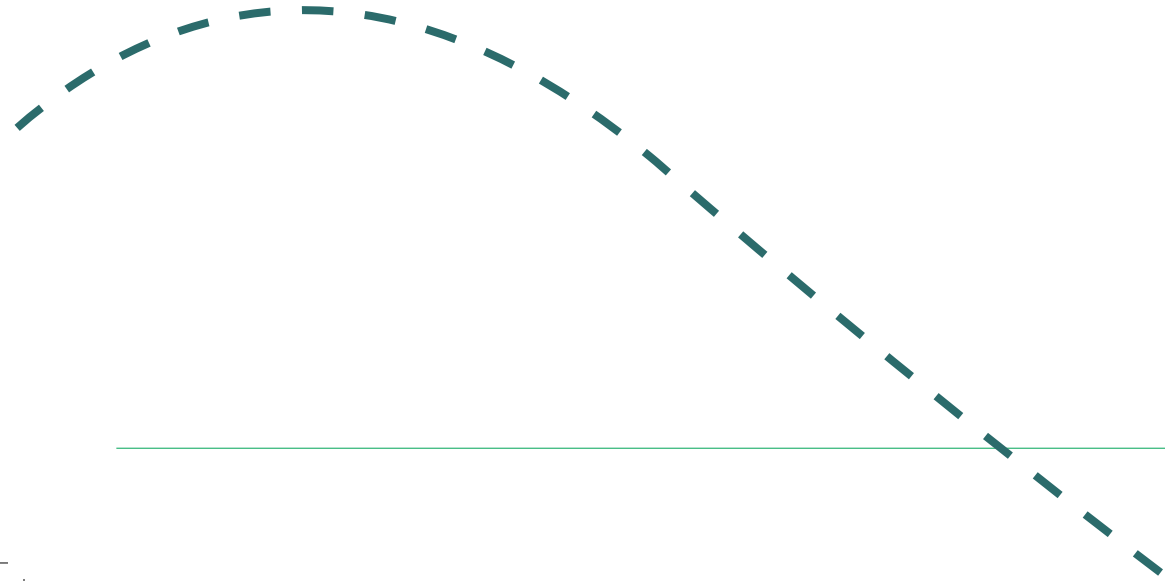
Balance sheet

This is a breakdown of the balance sheet, reporting asset values into perpetuity for each natural capital benefit. It draws together the headline values reported under each of the monetary account schedules and the maintenance cost schedule.

The balance sheet only represents those parts of the natural capital value of the nation's forests that can currently be measured in quantity, and where that quantity of physical benefit flow can also be given a monetary value. This excludes many of the benefits we know our land provides, for example flood mitigation or improvement of air quality. So the values in this balance sheet are highly conservative estimates of the net natural capital asset value. Values in brackets represent negative values.

Notes included on page 5.

Notes:

- All values in 2019-20 prices £m in present value terms, rounded to the nearest £1m.

- Present values are calculated as discounted flow of annual value in perpetuity. A 3% discount rate is used. Annual values are forecast over 50 years and from year 51 to perpetuity it is assumed that the annual value is constant (i.e. a constant flow assumption).

a. Private value of assets is to Forest England, external value of assets is to the rest of society.

b. The baseline value represents the value of assets at the baseline date (31 March 2014 where possible, if otherwise the baseline year is noted in the asset register).

c. Cumulative gains/losses show the net change in asset values (compared to the baseline date). The change is normally due to a change in the condition of the assets, either through natural improvement/deterioration or through management intervention.

d. Additions show the increase in asset values associated with the acquisition, realisation or discovery of new assets since the baseline date.

e. Disposals disclose the reduction in asset values associated with the disposal or extraction (for non-renewable resources) of natural assets.

f. Revaluations and adjustments calculate the asset value changes arising from changes in external factors and key assumptions (e.g. market prices).

g. Baseline data is from 2015-16 when Forestry England started regular surveying for visitor numbers The methodology is still being refined and so there are some amendments to the baseline and current year data in line with this. The increase in value is driven by an increase in visitor numbers, e.g. both our survey data of all visitors to the nation's forests, and the visitor counting we undertake at some of our more popular visitor destinations, has recorded an increase in visits year on year of about 20%.

h. Payment from central government for the provision of ecosystem services.

i. Total gross asset values are for the reporting year (2019-20) and are calculated after the deduction of production costs (i.e. value of benefits minus costs of production) as reported in the monetary account.

j. Maintenance costs include the cost of all legal obligations and other activities necessary to preserve the long term output of the natural assets at the benefit levels assumed in the asset values section of the balance sheet. This is shown as a flow of private benefit into FE, but the same value is repeated as a cost to society in the external value flows.
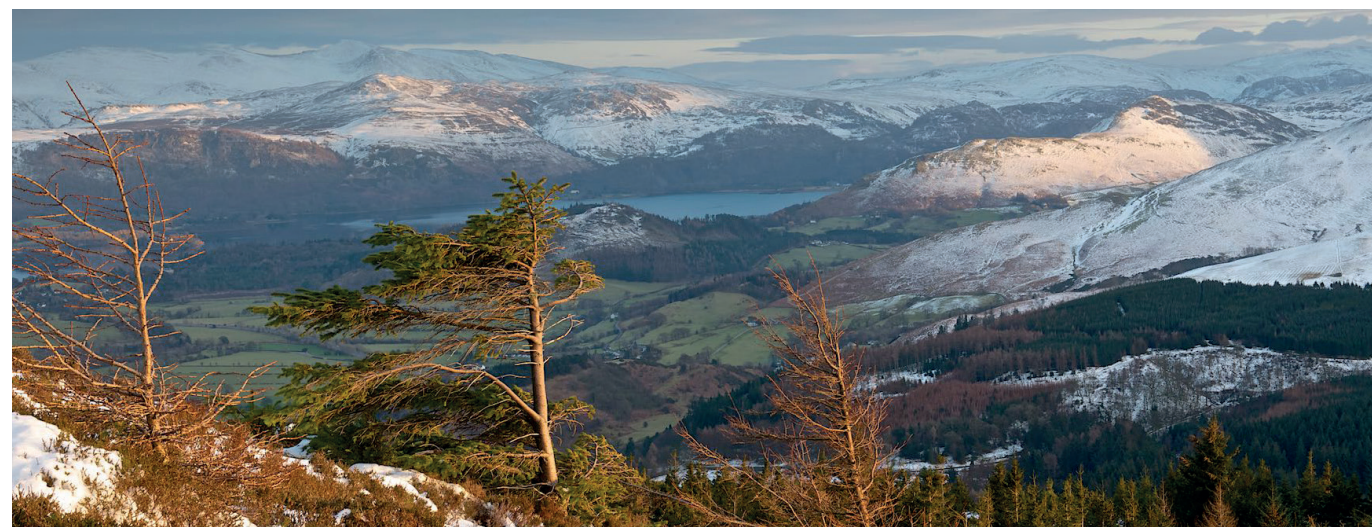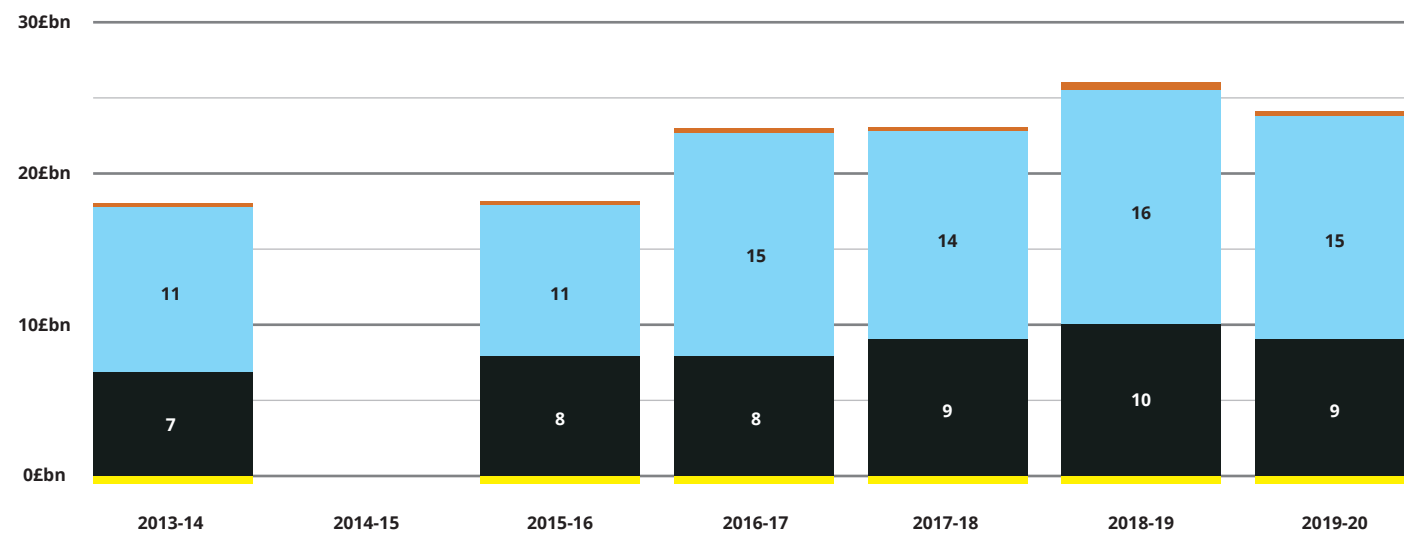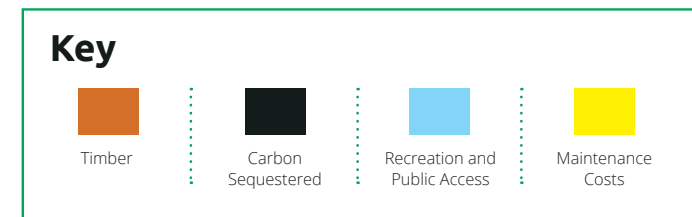
Private value[a] (PV £m)

	Baseline[b] (2013-14)	Cumulative gains/losses[c]	Additions[d]/ disposals[e]	Revaluations/ adjustments[f]	Reporting year (2019-20)
Non-renewables					
Minerals	4	-	(4)	-	-
Total non-renewables	4	-	(4)	-	-
Renewables					
Timber	289	18	-	(1)	306
Food	-	(10)	-	-	(10)
Plants and Seeds	-	-	-	-	-
Carbon sequestered	-	-	-	-	-
Recreation and public access[g]	(270)	37	-	-	(233)
Total renewables	19	45	-	(1)	63
Government payment for ecosystem services funding[h]	513	-	-	-	513
Total gross asset value[i]	**536**	**45**	**(4)**	**(1)**	**576**
Maintenance costs[j]	**(428)**	**(24)**	**-**	**-**	**(452)**
Total net natural capital assets	**108**	**21**	**(4)**	**(1)**	**124**

External value[a] (PV £m)

	Baseline[b] (2013-14)	Cumulative gains/losses[c]	Additions[d]/ disposals[e]	Revaluations/ adjustments[f]	Reporting year (2019-20)
Minerals	-	-	-	-	-
Total non-renewables	-	-	-	-	-
Timber	-	-	-	-	-
Food	-	-	-	-	-
Plants and Seeds	14	(3)	-	-	11
Carbon sequestered	7,234	554	-	1,564	9,352
Recreation and public access[g]	11,030	3,610	-	871	15,511
Total renewables	18,278	4,161	-	2,435	24,874
Government payment for ecosystem services funding[h]	(513)	-	-	-	(513)
Total gross asset value[i]	**17,765**	**4,161**	**-**	**2,435**	**24,361**
Maintenance costs[j]	(31)	(21)	-	(7)	(59)
Total net natural capital assets	**17,734**	**4,140**	**-**	**2,428**	**24,302**

Total Value (PV £m)

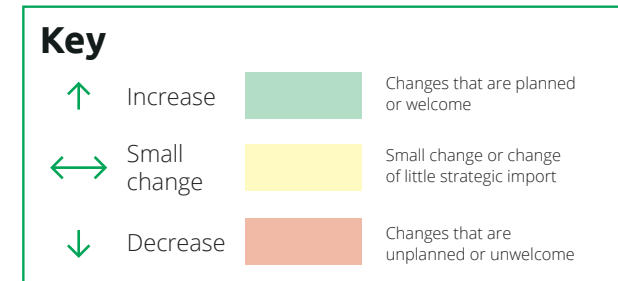|	Baseline[d] (2013-14)	Cumulative gains/losses[e]	Additions[d]/ disposals[e]	Revaluations/ adjustments[f]	Reporting year (2019-20)
Minerals	4	-	(4)	-	-
Total non-renewables	4	-	(4)	-	-
Timber	289	18	-	(1)	306
Food	-	(10)	-	-	(10)
Plants and Seeds	14	(3)	-	-	11
Carbon sequestered	7,234	554	-	1,564	9,352
Recreation and public access[g]	10,760	3,647	-	871	15,278
Total renewables	18,297	4,206	-	2,434	24,937
Government payment for ecosystem services funding[h]	-	-	-	-	-
Total gross asset value[i]	**18,301**	**4,206**	**(4)**	**2,434**	**24,937**
Maintenance costs[j]	(459)	(45)	-	(7)	(511)
Total net natural capital assets	**17,842**	**4,161**	**(4)**	**2,427**	**24,426**

NCA value breakdown by year (£ billion)

This graph shows the total natural capital value across years, as well as the breakdown between the ecosystem services that we currently measure. 2013-14 is the baseline year, and we did not produce a value for 2014-15. The biggest increase in value occurred between 2015-16 and 2016-17 due to an improvement in recreation visits methodology, and since then has largely remained steady, with small fluctuations.

The values for minerals, food and plant and seed supply are too low to show on the graph, so are not included.

Key

Timber (orange)	Carbon Sequestered (black)	Recreation and Public Access (blue)	Maintenance Costs (yellow)

NCA value breakdown by year bar chart. Y-axis: 0£bn, 10£bn, 20£bn, 30£bn. X-axis years 2013-14 through 2019-20.

Year	Carbon Sequestered	Recreation and Public Access
2013-14	7	11
2014-15	—	—
2015-16	8	11
2016-17	8	15
2017-18	9	14
2018-19	10	16
2019-20	9	15

Asset register

The asset register is an inventory of the status of the natural capital assets that make up the Public Forest Estate, including evidence of their extent, condition, and spatial configuration. Other forms of capital (e.g. car parks) that may influence natural capital benefits are also included. More detail on priority habitats is provided in S1.1.

Key

↑	Increase	(green)	Changes that are planned or welcome
↔	Small change	(yellow)	Small change or change of little strategic import
↓	Decrease	(pink)	Changes that are unplanned or unwelcome

	Indicator		Baseline year (2013-14)	Reporting year (2019-20)	Trend	% change	Units
		Ecological communities and species					
	Broad and priority habitat area		Full list of priority habitat areas given in S1.1				
Extent	Broad habitat area	Woodland area	207,876	203,132	↔	-2.3%	ha
		Grassland area	12,748	14,406	↑	13.0%	
		Mountain, moors and heathlands area	28,564	28,487	↔	-0.3%	
		Enclosed farmland	724	804	↑	11.0%	
		Freshwater	265	264	↔	-4.0%	
		Urban area	742	701	↓	-5.6%	
		Coastal margins area	17	18	↑	4.1%	
		Total area	250,936	247,811	↔	-1.2%	
	Priority habitat within the nation's forests	Broadleaved, mixed and yew woodland	22,757	22,859	↔	0.4%	
		Lowland dry acid grassland and lowland heath	14,628	14,619	↔	-0.1%	
		Other priority grassland	522	585	↑	12.0%	
		Lowland raised bog	782	783	↔	0.2%	
		Blanket bog	6,793	6,676	↔	-1.7%	
		Upland heathland	6,881	6,687	↔	-2.8%	
		Other	364	374	↔	2.7%	
		Total area	52,727	52,583	↔	-0.3%	
	Woodland area	Plantation	168,389	166,125	↔	-1.3%	
		Native	35,433	35,283	↔	-0.4%	
		Non-intervention	13,275	13,485	↔	1.6%	
		Wood pasture	735	735	↔	0.0%	
	Total land area holdings	Freehold	198,883	200,507	↔	0.8%	
		Leasehold	53,341	50,730	↓	-4.9%	
		Total area	252,223	251,237	↔	-0.4%	
	Total agricultural land use		3,284	7,277	↑	121.6%	
	Area land under statutory designations	Sites of Special Scientific Interest	68,192	68,262	↔	0.1%	
		Areas of Natural Beauty	29,832	29,762	↔	-0.2%	

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	Indicator		Baseline year (2013-14)	Reporting year (2019-20)	Trend	% change	Units
	Ecological communities and species						
	Area land under statutory designations	Scheduled Ancient Monuments	969	964	↔	-0.5%	ha
		National Parks	85,230	85,215	↔	0.0%	
		Total area (designations overlap so no additive)	147,982	147,971	↔	0.0%	
		Area of open habitat	35,911	35,917	↔	0.0%	
	Plantations on Ancient Woodland --area by semi-naturalness score	1 (over 80 % native)	8,261	9,979	↑	20.8%	
		2 (between 50 to 80% native)	3,332	3,851	↑	15.6%	
		3 (between 20 to 50% native)	5,765	5,950	↑	3.2%	
		4 (under 20% native)	27,252	22,100	↓	-18.9%	
		0 (no trees)	993	935	↓	-5.9%	
		Total area	45,603	42,814	↓	-6.1%	
	Ancient semi natural woodland and PAWS- -area by semi-natural-ness score	1 (over 80 % native)	19,774	20,613	↑	4.2%	
		2 (between 50 to 80% native)	4,272	6,575	↑	53.9%	
		3 (between 20 to 50% native)	6,459	6,822	↑	5.6%	
		4 (under 20% native)	28,614	23,386	↓	-18.3%	
		0 (no trees)	1,700	1,614	↓	-5.1%	
		Total area	60,819	59,011	↔	-3.0%	
Condition	Condition of SSSIs	% in favourable condition	35.6	37.48	↑	5.3%	%
		% in unfavourable recovering condition	63.9	60.91	↓	-4.7%	
		% in unfavourable no change or declining condition	0.5	1.65	↑	230%	
		% part destroyed or destroyed condition	-	-	↔	0.0%	
	Woodland Ecological Calculator Index[a]	Deadwood volume (native woodland)	6.0%	-	-	-	% ha favour-able
		Vertical structure (native woodland)	42.0%	-	-	-	
		Ground flora (native woodland)	9.0%	-	-	-	
		Veteran trees (native woodland)	0.0%	-	-	-	
		Nativeness of occupancy (native woodland)	89.0%	-	-	-	
		Invasive species (native woodland)	95.0%	-	-	-	
		Tree pests and diseases (native woodland)	89.0%	-	-	-	
		Herbivores/grazing pressure (native woodland)	49.0%	-	-	-	
		Regeneration at component group level (native woodland)	20.0%	-	-	-	
		Number of native tree/shrub species (native woodland)	46.0%	-	-	-	
		Age distribution of tree species (native woodland)	18.0%	-	-	-	
		Proportion of open space (native woodland)	5.0%	-	-	-	
		Proportion of woodland/open habitat (native woodland)	76.0%	-	-	-	
		Size of woodland parcel (native woodland)	97.0%	-	-	-	

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	Indicator		Baseline year (2013-14)	Reporting year (2019-20)	Trend	% change	Units
	Ecological communities and species						
	Woodland Ecological Calculator Index[a]	Regeneration at population level (native woodland)	41.0%	-	-	-	% ha favourable
		Overall ecological condition score (native woodland)	18.0%	-	-	-	
		Overall ecological condition score (non-native woodland)	0.5%	-	-	-	
	Deer Management	Fallow	3,347	3,606	↔	7.7%	Number of carcasses
		Muntjac	2,228	3,178	↑	42.6%	
		Red	544	431	↓	-20.8%	
		Roe	4,967	4,639	↔	-6.6%	
		Sika	301	254	↓	-15.6%	
		Boar	196	757	↑	286.2%	
		Chinese Water Deer	-	1	↑	n/a	
		Total	11,583	12,866	↑	11.1%	
	Carbon stock in...	...living biomass	12,397	-	-	-	Thousand metric tonnes
		...deadwood and litter	3,336	3,336	-	-	
		...soils	38,899	38,899	-	-	
	CO_2e stock in...	...living biomass	45,456	-	-	-	
		...deadwood and litter	-	-	-	-	
		...soils	-	-	-	-	
	Biomass stock...	...total above and below ground	24,794	-	-	-	Thousand metric tonnes oven-dry weight
		...above ground	19,295	-	-	-	
		...below ground	5,499	-	-	-	
		...in deadwood	-	-	-	-	
	Standing timber volume (overbark standing)	Coniferous	26,148	-	-	-	Thousand m3
		Broadleaved	8,147	-	-	-	
-	Location of nation's forests' by ONS land classification	Rural town and fringe	27,954	27,889	↔	-0.2%	ha
		Rural village and dispersed	206,223	206,242	↔	0.0%	
		Urban city and town	16,517	16,219	↔	-1.8%	
		Urban conurbation	2,201	1,997	↓	-9.3%	
		Total	252,895	252,347	↔	-0.2%	
	Woodland Accessibility						
-		Percentage of people in 'Priority Places' close to accessible PFE woodland	9	9	↔	0%	%
		Percent England population within 6 miles of all PFE land	49.1	48.7	↔	-0.8%	

Notes:

a. There is only woodland ecological data for for the baseline year.

Indicator			Baseline year (2013-14)	Reporting year (2019-20)	Trend	% change	Units
Woodland Accessibility							
-	Percent England population within 15min, 30min and 60min drive time to accessible sites	15 minutes	40.3	40.6	⟷	0.7%	%
		30 minutes	85.8	86.2	⟷	0.5%	
		60 minutes	99.9	99.9	⟷	0%	
Soil							
-	Area of woodland on deep peat soils	Yield Class > 6	16,384	16,145	⟷	-1.5%	ha
		Yield Class ≤ 6	3,118	2,784	↓	-10.7%	
	Area of woodland on shallow peat soils and peaty pockets	Yield Class > 6	45,675	45,159	⟷	-1.1%	
		Yield Class ≤ 6	7,164	6,945	↓	-3.1%	
Air							
-	Area of woodland in areas of differing air quality	Urban	15,422	15,212	⟷	-1.4%	ha
		Peri-urban	25,123	25,194	⟷	0.3%	
		Rural	159,989	158,584	⟷	-0.9%	
		Total	200,534	198,991	⟷	-0.8%	
Other forms of capital							
-	Area of land by accessibility status	CRoW Access	149,940	149,725	⟷	-0.1%	ha
		Other accessibility based on deeds	85,730	85,196	⟷	-0.6%	
	Km of published recreational routes across the estate	Walking	1,095	1,136	↑	3.7%	km
		Cycling	1,303	1,289	⟷	-1.1%	
		Other (e.g equestrian, rally)	497	532	↑	7.1%	
		Total	2,895	2,957	⟷	2.1%	
Active Forests Programme							
-	Gender of Visitors	Female	432,887	563,621	↑	30.2%	This figure is an estimate based on total survey responses across all years of programme being averaged across all activities and forest sites
		Male	420,406	530,404	↑	26.2%	
		Other	1,676	2,596	↑	54.9%	
		Unknown	10,726	15,894	↑	48.2%	
		Cycling	247,134	295,381	↑	19.5%	
	Activities	Cycling	174,257	303,157	↑	74.0%	Number of visits for cycling and walking have been adjusted down to account for introduction of counters at many forest sites that likely capture visits not associated with the Active Forests programme. Numbers presented are considered a conservative estimate.
		Running	207,719	271,332	↑	30.6%	
		Walking	236,584	242,645	⟷	2.6%	

Physical flow account

This schedule reports the flow of annual natural capital benefits that are produced on the nation's forests in the baseline year and the reporting year. This includes production by Forestry England itself, contractors and tenants. It is relevant to report all these aspects because total (annual) production relates to Forestry England management decisions.

This physical flow account is only a partial reflection of all the benefits produced by the nation's forests because we are not yet able to quantify many of them, for example improving air quality and mitigation of flooding are not yet measured here.

Spacial accounting by natural capital benefit	Indicator	Units	Baseline year 2013-14	Reporting year 2019-20
Timber provision				
Woodland	Total timber production across our forests	m³/yr	1,522,967	1,582,793
Climate regulation[a]				
Woodland	Carbon sequestered/(emitted)	tCO₂/yr	1,645,657	1,202,451
Bogs			(8,717)	(8,601)
Grassland			-	-
Heathland			-	-
Woodland on deep peat soils			(88,476)	(85,874)
Woodland	Carbon embodied in environmental goods (timber)[b]	tCO₂/yr	1,033,351	1,049,190
Recreation				
Whole estate	Visits to nation's forests[c]	visits/yr	BL 2016/17 165,000,000	219,000,000
	Visitors to nation's forests[c]	visitors/yr	BL 2016/17 21,000,000	25,900,000
	Volunteers	hours/yr	201,337	175,446
Plant and seed supply				
Whole estate	Plant production number	number/yr	14,961,000	12,611,400
Food provision				
Whole estate	Wild game carcass numbers	number/yr	11,586	12,726
	Livestock production from tenant farmers	number/yr	7,309	6,298
	Crop production from tenant farmers	kg/yr	381	597
Minerals				
Whole estate	Mineral production volume	tonnes/yr	1,295,850	1,313,408

Notes:

a. All GHG emissions are grossed out by expressing them all in terms of the same 'language': Carbon Dioxide Equivalents. Bogs on the nation's forests, for example, are net emitters of GHGs in the form of methane, nitrous oxide and carbon dioxide, depending on condition. Based on an understanding of our estate, we assume the bogs are 75% near natural and 25% modified.

b. Carbon embodied in environmental goods does not represent a release of carbon to the atmosphere. It represents carbon locked up in harvested timber, which leaves the estate for commercial uses in the reporting year. It does not include non timber biomass (such as brash and roots), which is left on site after felling. This flow is of a slightly different nature to the other flows in the accounts, as it does not take into account what that subsequent use is, and in order to avoid double counting alongside the carbon sequestered figure, does not contribute to the monetary account or the balance sheet.

c. The total figure for visit numbers quoted for 2016/17 is reduced from that published in last year's CNCA. This is the result of refined methodology which has also been used to calculate the 2017/18 visits total, ensuring consistency of approach across these two reporting cycles.

Monetary flow account

This schedule collates the estimated total annual value (£) of natural capital benefits that are produced from the PFE in both the baseline year and the reporting year. These values are calculated after the deduction of production costs (but not maintenance costs, which cannot be attributed to individual beneftis but are netted off the gross value of assets in the balance sheet).

Spacial accounting by natural capital benefit	Indicator	Units	Baseline year	Reporting year
			2013-14	2019-20
Timber provision				
Woodland	Net asset value for timber produced	£/yr	£11,824,815	£12,193,921
Climate regulation				
Woodland			£98,739,421	£83,073,067
Bogs			£(523,001)	£(587,087)
Grassland	Carbon sequestration value	£/yr		
Heathland				
Woodland on Deep Peat Soils			£(5,308,563)	£5,861,300)
Recreation				
Whole estate	Net asset value for recreation	£/yr	£346,308,992	£491,717,766
	Volunteers	£/yr		
Plant and seed supply[b]				
Whole estate	Plant and seed revenues	£/yr	£3,091,288	£3,741,898
Food provision				
Whole estate	Wild game carcass value[c]	£/yr	£12,677	£(293,351)
	Livestock production value	£/yr	-	-
	Crop production value	£/yr	-	-
Minerals				
Whole estate	Mineral sales value	£/yr	£896,060	£379,362

Notes:

a. The monetary account reports the value to the reporting entity (private value from rents) and to wider society (external value from the direct consumption of benefits only). It does not include the indirect or 'downstream' value to farmers and aggregates/timber contractors from the sale of their produce. This is because these sales are based on decisions outside of the control of Forestry England and exist further along the value chain. Values reported above are the sum of annual private and external value.

b. Our plant and seed sales are counted as a benefit to society as the actual value of plants and seeds is much higher than their sale value when they are sold at cost of production.

c. Although the number of wild carcasses has increased against baseline, the huge decline in wild boar value from £2.50 in October 2017 to £0.75 in November 2017, as well as changes in Forestry England venison contracts, has meant the revenues to Forestry England have fallen sharply alongside an increase in the cost of production. Wild game income is a byproduct of culling for forest management purposes, rather than done primarily for profit.

Acknowledgements

Find out more

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