



Forestry England

Natural Capital Accounts

2020-21





Contents

Introduction	3
Balance sheet	4
Total NC breakdown by year	6
Asset register	7
Physical flow account	12
Monetary flow account	13
Acknowledgements	14

Natural capital accounts for the nation's forests 2020-21

This is our sixth natural capital account (NCA). These accounts help us understand the value that the nation's forests provide to society through ecosystem services.

The value of measured ecosystem services has increased steadily since 2013/14, with fluctuations from year to year. The recreation value in particular has increased substantially over the last six reporting years, and saw a large increase during 2020/21 while coronavirus restrictions were in place.

To some degree variations like this will naturally occur: the differences between years are usually not particularly large, though generally indicative of an upwards trend. This reporting year is an exception due to clearly exceptional circumstances, and whether this may signal longer term changes in recreation visit numbers is yet to be seen.

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 both measured in quantity, and where that quantity of physical benefit flow can 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.

Notes included on page 5.

	Private value ^c				
	Baseline (2013-14) ^d	Cumulative gains/losses ^e	Additions/disposals ^f	Revaluations/adjustments ^h	Reporting year (2020-21)
	PV £m				
Non-renewables					
Minerals	4	-	-	-	4
Total non-renewables	4	-	-	-	4
Renewables					
Timber	339	21	-	20	380
Food	-	(20)	-	-	(20)
Plants & Seeds	-	-	-	-	-
Carbon sequestered	-	-	-	-	-
Recreation and public access ⁱ	(270)	75	-	-	(195)
Total renewables	69	76	-	20	165
Government payment for ecosystem services funding ^j	513	(25)	-	-	488
Total gross asset value^k	586	51	-	20	657
Maintenance costs^l	(428)	10	-	-	(418)
Total net natural capital assets	158	61	-	20	239

Notes:

- All values in 2020/21 prices £m (million) is 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 into perpetuity it is assumed that the annual value is constant (i.e. a constant flow assumption).
- Private value of assets is to Forestry England, external value of assets is to the rest of society.
- 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).
- 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.
- Additions show the increase in asset values associated with the acquisition, realisation or discovery of new assets since the baseline date.
- Disposals disclose the reduction in asset values associated with the disposal or extraction (for non-renewable resources) of natural assets.
- Revaluations and adjustments calculate the asset value changes arising from changes in external factors and key assumptions (e.g. market prices).
- Baseline data is from 2015-16 when Forestry England started regularly modelling visitor numbers. The increase in value over time is driven both by an increase in estimated visits, and an increase in the per visit value due to inflation that occurs each year. The model has seen some refinements since it was first brought in, hence changes in previous years' values since published.
- Payment from central government for the provision of Ecosystem Services.
- Total gross asset values are for the reporting year (2020/21) and are calculated after the deduction of production costs (i.e. value of benefits minus costs of production) as reported in the monetary account. This is shown as a flow of private benefit into Forestry England, but the same value is repeated as a cost to society in the external value flows.
- 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.

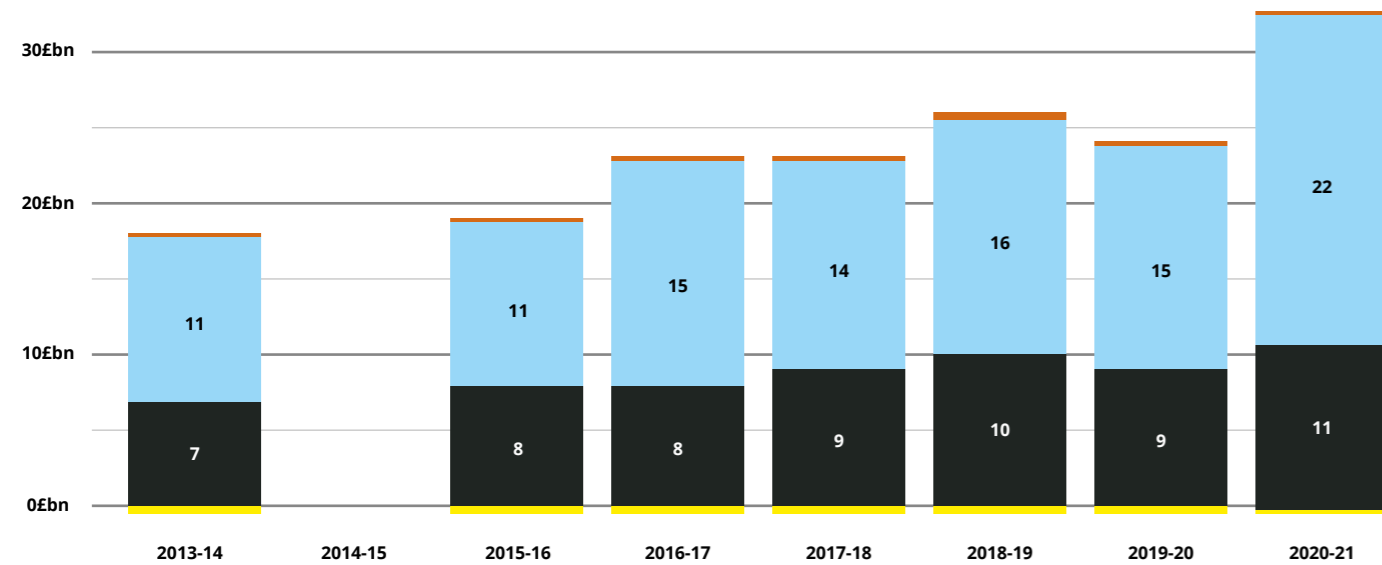
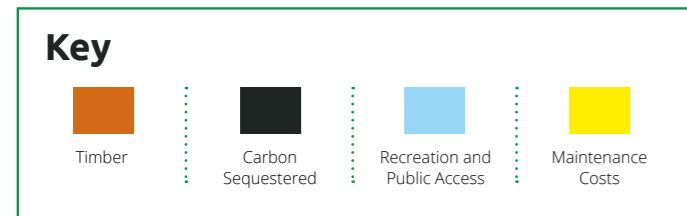
	External value ^c				
	Baseline (2013-14) ^d	Cumulative gains/losses ^e	Additions/disposals ^f	Revaluations/adjustments ^h	Reporting year (2020-21)
	PV £m				
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	14	(3)	-	-	11
	7,234	749	-	2,984	10,967
	11,030	8,757	-	2,397	22,184
	18,278	9,503	-	5,381	33,162
	(513)	25	-	-	(488)
	17,765	9,528	-	5,381	32,674
	(31)	27	-	(3)	(7)
	17,734	9,555	-	5,378	32,667

	Total Value				
	Baseline (2013-14) ^d	Cumulative gains/losses ^e	Additions/disposals ^f	Revaluations/adjustments ^h	Reporting year (2020-21)
	PV £m				
	4	-	-	-	4
	4	-	-	-	4
	339	21	-	20	380
	-	(20)	-	-	(20)
	14	(3)	-	-	11
	7,234	749	-	2,984	10,967
	10,760	8,832	-	2,397	21,989
	18,347	9,579	-	5,401	33,327
	-	-	-	-	-
	18,351	9,579	-	5,401	33,331
	(459)	37	-	(3)	(425)
	17,892	9,616	-	5,398	32,906

Total NC value breakdown by year (£ billion)

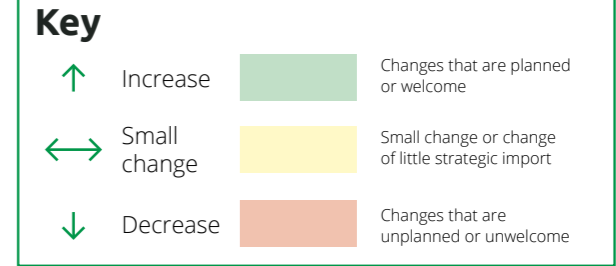
The graph below shows the total natural capital value across years, as well as the breakdown between the ecosystem services that we currently measure. 2013-14 is the baseline year, and we did not produce a value for 2014-15. Previously, the biggest increase in value occurred between 2015-16 and 2016-17 due to an improvement in recreation visits methodology, and since then has largely remained steady, with small fluctuations and since then the values have steadily increased, with fluctuations. This year (2020/21) has seen an even larger increase in the total value, mainly due to the increase in recreation visits, off the back of coronavirus restrictions: whether this will translate into a long term change is yet to be seen.

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



Asset register

The asset register is an inventory of the status of the natural capital assets that make up the nation's forests, 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.



Indicator		Baseline year (2013-14)	Reporting year (2020-21)	Trend	% change	Units	
Ecological communities and species							
Extent	Broad and priority habitat area		Full list of priority habitat areas given in S1.1				
	Broad habitat area	Woodland area	207,876	203,642	↔	-2.0%	ha
		Grassland area	12,748	14,790	↑	16.0%	
		Mountain, moors and heathlands area	28,564	28,908	↔	1.2%	
		Enclosed farmland	724	803	↑	10.9%	
		Freshwater	265	265	↔	-0.2%	
		Urban area	742	719	↓	-3.1%	
		Coastal margins area	17	18	↑	4.1%	
		Total area	250,936	249,144	↔	-0.7%	
	Priority habitat within the nation's forests	Broadleaved, mixed and yew woodland	22,757	22,661	↔	-0.4%	
		Lowland dry acid grassland and lowland heath	14,628	14,656	↔	0.2%	
		Other priority grassland	522	590	↑	13.0%	
		Lowland raised bog	782	783	↔	0.2%	
		Blanket bog	6,793	6,766	↔	-0.4%	
		Upland heathland	6,881	6,956	↔	1.1%	
		Other	364	372	↔	2.1%	
		Total area	52,727	52,784	↔	0.1%	
	Woodland area	Plantation	164,199	160,294	↔	-2.4%	
		Native	38,890	41,111	↑	5.7%	
		Non-intervention	13,275	13,588	↔	2.4%	
		Wood pasture	735	735	↔	0.0%	
	Total land area holdings	Freehold	198,883	203,106	↔	2.1%	
Leasehold		53,341	48,229	↓	-9.6%		
Total area		252,223	251,335	↔	-0.4%		
Total agricultural land use		3,284	6,954	↑	111.7%		
Area land under statutory designations	Sites of Special Scientific Interest	68,192	68,253	↔	0.1%		
	Areas of Natural Beauty	29,832	29,756	↔	-0.3%		

Indicator		Baseline year (2013-14)	Reporting year (2020-21)	Trend	% change	Units
Ecological communities and species						
Extent	Area land under statutory designations	Scheduled Ancient Monuments	969	968	↔	-0.2%
		National Parks	85,230	85,214	↔	0.0%
		Total area (designations overlap so no additive)	147,982	147,960	↔	0.0%
	Area of open habitat		35,911	45,502	↑	26.7%
	Plantations on Ancient Woodland --area by semi-naturalness score	1 (over 80 % native)	9,066	11,209	↑	23.6%
		2 (between 50 to 80% native)	3,372	3,640	↑	7.9%
		3 (between 20 to 50% native)	5,336	5,797	↑	8.6%
		4 (under 20% native)	25,775	21,212	↓	-17.7%
		0 (no trees)	981	955	↔	-2.7%
		Total area	44,531	42,813	↓	-3.9%
	Ancient semi natural woodland and PAWS --area by semi-naturalness score	1 (over 80 % native)	21,840	23,360	↑	7.0%
		2 (between 50 to 80% native)	4,077	5,101	↑	25.1%
		3 (between 20 to 50% native)	5,910	6,615	↑	11.9%
		4 (under 20% native)	27,272	22,346	↓	-18.1%
		0 (no trees)	1,698	1,632	↓	-3.9%
		Total area	60,797	59,054	↔	-2.9%
	Condition of Sites of Special Scientific Interest	% in favourable condition	35.6	38.29	↑	7.6%
		% in unfavourable recovering condition	63.9	59.97	↓	-6.2%
		% in unfavourable no change or declining condition	0.5	1.74	↓	248.0%
		% part destroyed or destroyed condition	0%	0%	↔	0.0%
Woodland Ecological Calculator Index ^a	Deadwood volume (native woodland)	6.0%	-	-	-	
	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%	-	-	-	

Indicator		Baseline year (2013-14)	Reporting year (2020-21)	Trend	% change	Units
Ecological communities and species						
Condition	Woodland Ecological Calculator Index ^a	Regeneration at population level (native woodland)	41.0%	-	-	-
		Overall ecological condition score (native woodland)	18.0%	-	-	-
		Overall ecological condition score (non-native woodland)	0.5%	-	-	-
	Wildlife Management	Fallow	3,347	3,938	↑	17.7%
		Muntjac	2,228	4,253	↑	90.9%
		Red	544	514	↔	-5.5%
		Roe	4,967	4,931	↔	-0.7%
		Sika	301	335	↑	-11.3%
		Feral boar	196	703	↑	258.7%
		Chinese water deer	-	13	↑	n/a
Total		11,583	14,687	↑	26.8%	
Carbon stock in...	...living biomass	11,361	12,707	↑	11.8%	
	...deadwood and litter	3,336	-	-	-	
	...soils	38,899	-	-	-	
CO ₂ e stock in...	...living biomass	41,658	46,592	↑	11.8%	
	...deadwood and litter	12,232	-	-	-	
	...soils	142,630	-	-	-	
Biomass stock...	...total above and below ground	22,723	25,414	↑	11.8%	
	...above ground	17,692	19,801	↑	11.9%	
	...below ground	5,030	5,613	↑	11.6%	
Standing timber volume (overbark standing)	Coniferous	26,148	27,583	↑	5.5%	
	Broadleaved	8,147	10,292	↑	26.3%	
Location of the nation's forests by ONS land classification	Rural town and fringe	27,954	27,889	↔	-0.2%	
	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						
-	Percent of England population in 'Priority Places' close to accessible woodland within the nation's forests.		9	9.2	↔	2.2%
	Percent of England population residing within 6 miles of the nation's forests.		49.1	48.7	↔	-0.8%

Notes:

a. There is only woodland ecological data for the baseline year as this measure is only calculated once every 5 years.

Indicator		Baseline year (2013-14)	Reporting year (2020-21)	Trend	% change	Units	
Ecological communities and species							
-	Percent of England population within 15min, 30min and 60min drive time to accessible the nation's forests	15 minutes	40.3	41.4	↔	2.7%	%
		30 minutes	85.8	86.9	↔	1.3%	
		60 minutes	99.9	99.9	↔	0.0%	
Soil							
-	Area of woodland on deep peat soils	Yield Class > 6	16,384	16,203	↔	-1.1%	ha
		Yield Class ≤ 6	3,118	2,664	↓	-14.6%	
	Area of woodland on shallow peat soils and peaty pockets	Yield Class > 6	45,675	45,250	↔	-0.9%	
		Yield Class ≤ 6	7,164	6,905	↓	-3.6%	
Air							
-	Area of woodland in areas of differing air quality	Urban	15,422	15,245	↔	-1.1%	ha
		Peri-urban	25,123	25,191	↔	0.3%	
		Rural	159,989	158,566	↔	-0.9%	
		Total	200,534	199,003	↔	-0.8%	
Other forms of capital							
-	Area of land by accessibility status	CRoW Access	150,430	150,254	↔	-0.1%	ha
		Other accessibility based on deeds	86,228	86,029	↔	-0.2%	
-	Km of published recreational routes across the estate	Walking	1,095	1,139	↑	4.0%	km
		Cycling	1,303	1,316	↔	1.0%	
		Other (e.g equestrian, rally)	497	569	↑	14.5%	
		Total	239,554	239,307	↔	-0.1%	
Active Forests programme							
	Total visitors	865,618	980,795	↑	13.3%	%	
-	Gender of visitors ^b	Female	474,701	560,007	↑		18.0%
		Male	389,475	418,884	↑		7.6%
		Other	1,442	1,904	↑		32.1%
-	Activities ^c	Cycling	247,134	286,333	↑		15.9%
		Running	174,181	237,966	↑		36.6%
		Walking	207,719	390,640	↑		88.1%
		Other	236,584	65,856	↓		-72.2%

Notes:

b. This figure is an estimate based on total survey responses across all years of programme being averaged across all activities and forest sites.

c. 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.



Physical flow account

This schedule reports the flow of annual natural capital benefits that are produced from 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.

Spatial accounting by natural capital benefit	Indicator	Units	Baseline year		Reporting year	
			2013-14	2020-21	2013-14	2020-21
Timber provision						
Woodland	The nation's forests timber production	m ³ /yr	1,521,967		1,320,048	
Climate regulation^a						
Woodland	Carbon sequestered/(emitted)	tCO ₂ /yr	1,645,657		1,641,499	
Bogs			(8,717)		(8,737)	
Grassland			-		-	
Heathland			-		-	
Woodland on deep peat soils			(88,476)		(85,593)	
Woodland			Carbon embodied in environmental goods (timber) ^b	tCO ₂ /yr	1,030,851	
Recreation						
Whole estate	Visits to the nation's forests ^c	visits/yr	BL 2016/17 165,000,000		296,000,000	
	Visitors to the nation's forests ^c	visitors/yr	BL 2016/17 21,000,000		25,900,000	
	Volunteers	hours/yr	201,337		14,424	
Plant and seed supply						
Whole estate	Plant production number	number/yr	14,961,000		11,976,000	
	Seed production weight	kg/yr	-		-	
Food provision						
Whole estate	Wild game carcass numbers	number/yr	11,586		14,814	
	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		802,478	

Notes:

- 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. The nation's forests bogs are assumed to be 75% near natural and 25% modified.
- 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 brush 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.
- 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 nation's forests 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 benefits but are netted off the gross value of assets in the balance sheet R1).

Spatial accounting by natural capital benefit	Indicator	Units	Baseline year		Reporting year	
			2013-14	2020-21	2013-14	2020-21
Timber provision						
Woodland	Net asset value for timber produced	£/yr	£13,894,253		£12,543,850	
Climate regulation						
Woodland	Carbon sequestration value	£/yr	£98,739,421		£126,692,377	
Bogs			£(523,001)		£(674,309)	
Grassland			-		-	
Heathland			-		-	
Woodland on deep peat soils			£(5,308,563)		£(6,606,137)	
Recreation						
Whole estate	Net asset value for recreation	£/yr	£346,308,992		£707,714,064	
	Volunteers	£/yr	-		-	
Plant and seed supply^a						
Whole estate	Plant and seed revenues	£/yr	£3,091,288		£3,098,591	
Food provision						
Whole estate	Wild game carcass value ^c	£/yr	£12,677		£(645,710)	
	Livestock production value	£/yr	-		-	
	Crop production value	£/yr	-		-	
Minerals						
Whole estate	Mineral sales value	£/yr	£896,060		£283,690	

Notes:

- 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.
- 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.
- 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 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 by-product of culling for forest management purposes, rather than done primarily for profit.

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Butterfly Conservation

British Trust for Ornithology

Find out more

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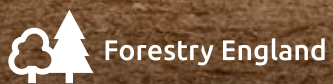
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