Office for National Statistics

Statistical bulletin

UK natural capital accounts: 2024

Estimates of the financial and societal value of natural resources to people in the UK.

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1 . Main points

- The total asset value of ecosystem services in the UK was around £1.8 trillion in 2022, an increase of 11% since 2018.
- Health benefits from recreation made the largest contribution to the total asset value of UK ecosystem services, at £489 billion in 2022.
- The total annual value of ecosystem services in the UK was £87 billion in 2022; this is almost twice the 2021 level, largely because of oil and gas price fluctuations.
- The air pollution regulation service made up 81% of the annual value of all regulating services in 2022; nature removed almost 1.4 million tonnes of pollutants from the air.
- The net annual value of greenhouse gas regulating services was estimated to be negative £212 million in 2022; this is likely because some habitats, such as degraded peatland, emit more greenhouse gases than they remove.
- Renewable electricity provisioning was almost five times higher in 2022 than 2011, at 99,192 gigawatt hours (GWh), compared with 21,899 GWh, respectively.
- An estimated 20 million people gained health benefits from recreation in nature in 2022.

As a result of changing methods and expanding the range of ecosystem services measured, our latest accounts cannot be compared with previous accounts on a like-for-like basis. We have applied our latest methods across all years in these accounts, giving a consistent time series.

2 . Understanding natural capital accounts

Natural wealth is reflected in the productivity of soils, and access to clean water and recreational green space, for example. Any natural resource or process that supports human life, society, and the economy is an important part of our natural capital.

Natural capital accounting estimates the current value of natural wealth and what it could provide for current and future generations. This is also an important aspect of a wider move to better understand inclusive wealth, as defined in our New Beyond GDP measures for the UK article and as described in The Economics of Biodiversity: The Dasgupta Review published by the UK government.

Our natural capital monetary estimates should be interpreted as a partial or minimum value of the services provided by the natural environment. This is because they currently exclude some services, such as flood protection from natural resources.

We are working to include as much of the economic value of the natural world as possible, which is a challenge given its scale and complexity. We provide economic valuations as part of the United Nations System of Environmental-Economic Accounting — Ecosystem Accounting (PDF, 5.33MB). In addition to this, we continue to develop methods for tracking changes in ecosystems' extent and condition, as described in our Habitat extent and condition, natural capital, UK: 2022 bulletin.

You can download the data used in this publication from our All data related to UK natural capital accounts: 2024 webpage.

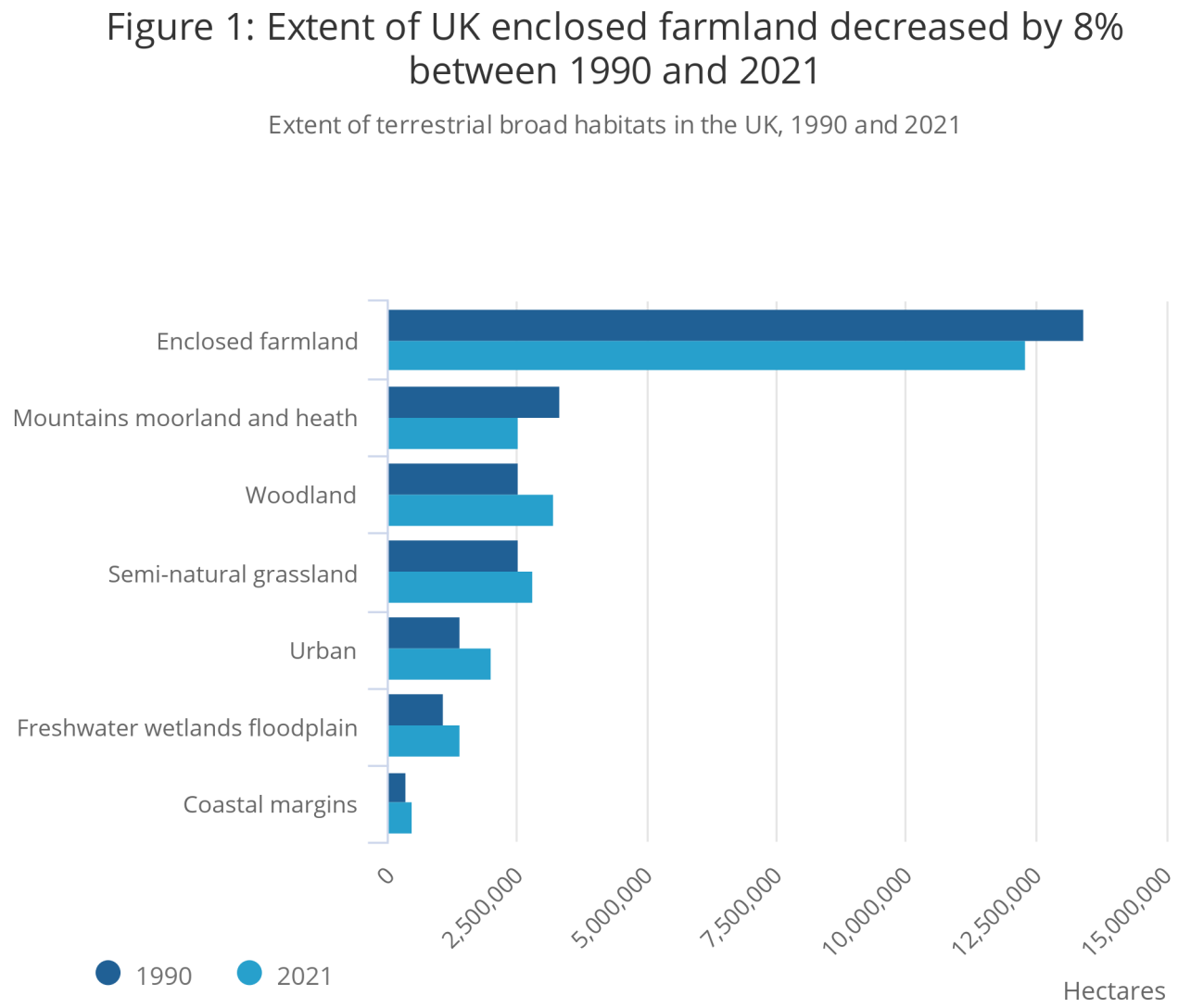
3 . Extent of habitats in the UK

Enclosed farmland accounted for 50% of the UK's land area in 2021 (Figure 1), down from 54% in 1990. This is an 8% decrease in this land type over that period. Our UK natural capital accounts: 2023 bulletin has a Sankey diagram in Figure 1 to show changes in habitat extent between 1990 and 2021.

We use UK Centre for Ecology and Hydrology (UKCEH) Land Cover Maps to create measures of extent for seven terrestrial habitats. We use other sources for our Woodland natural capital accounts bulletin and our Urban natural capital accounts bulletin.

Figure 1: Extent of UK enclosed farmland decreased by 8% between 1990 and 2021

Extent of terrestrial broad habitats in the UK, 1990 and 2021



Source: Land cover maps from UK Centre for Ecology and Hydrology (UKCEH)

Notes:

1. Raster data are from UKCEH's Great Britain land cover maps for 1990 and 2021.

2. Land cover maps raster data for Great Britain from 1990 are from Rowland, C, Marston, C, Morton, R, and O'Neil, A (2020), 'Land Cover Map 1990 (25 metre raster, Great Britain) v2 dataset' from the Natural Environment Research Council (NERC) Environmental Information Data Centre.

3. Land cover maps raster data for Great Britain from 2021 are from Morton, R, Marston, C, O'Neil, A, and Rowland, C (2022), 'Land Cover Map 2021 (25 metre rasterised land parcels, Great Britain) dataset' from the Natural Environment Research Council (NERC) Environmental Information Data Centre.

4 . Ecosystem services

Ecosystem services estimate the contribution of natural assets to the economy and society, in either physical volume or monetary value. These include:

- provisioning services, such as food, water, and non-renewable natural resources like minerals, oil and gas
- regulating services, such as pollution removal
- cultural services, such as recreation

The total annual value for the ecosystem services we are currently able to measure was £87 billion (in 2023 prices) in 2022, the latest year with complete data. This is nearly twice the annual value for 2021. This can be attributed to rapidly changing energy prices affecting oil and gas provisioning estimates, as described in our The energy intensity of the Consumer Prices Index: 2022 article, and the increased value placed on green space as a proportion of house prices. Oil and gas provisioning had the highest annual value of all the services in 2022, valued at £39 billion.

Figure 2: The value of oil and gas as an ecosystem service has fluctuated between £1.5 billion in 2015 and £39.4 billion in 2022

Annual value for ecosystem services in the UK, 1998 to 2022

Download the data

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In 2022, the total annual values currently measured for ecosystem services were £44 billion for England, £39 billion for Scotland, £2 billion for Wales, and £1 billion for Northern Ireland.

Figure 3: Recreation and tourism had the highest annual value for both England and Wales in 2022

Annual value of ecosystem services in England, Scotland, Wales and Northern Ireland, 1998 to 2022

Download the data

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Notes:

1. Comparable data for Northern Ireland are not available for urban heat regulating.

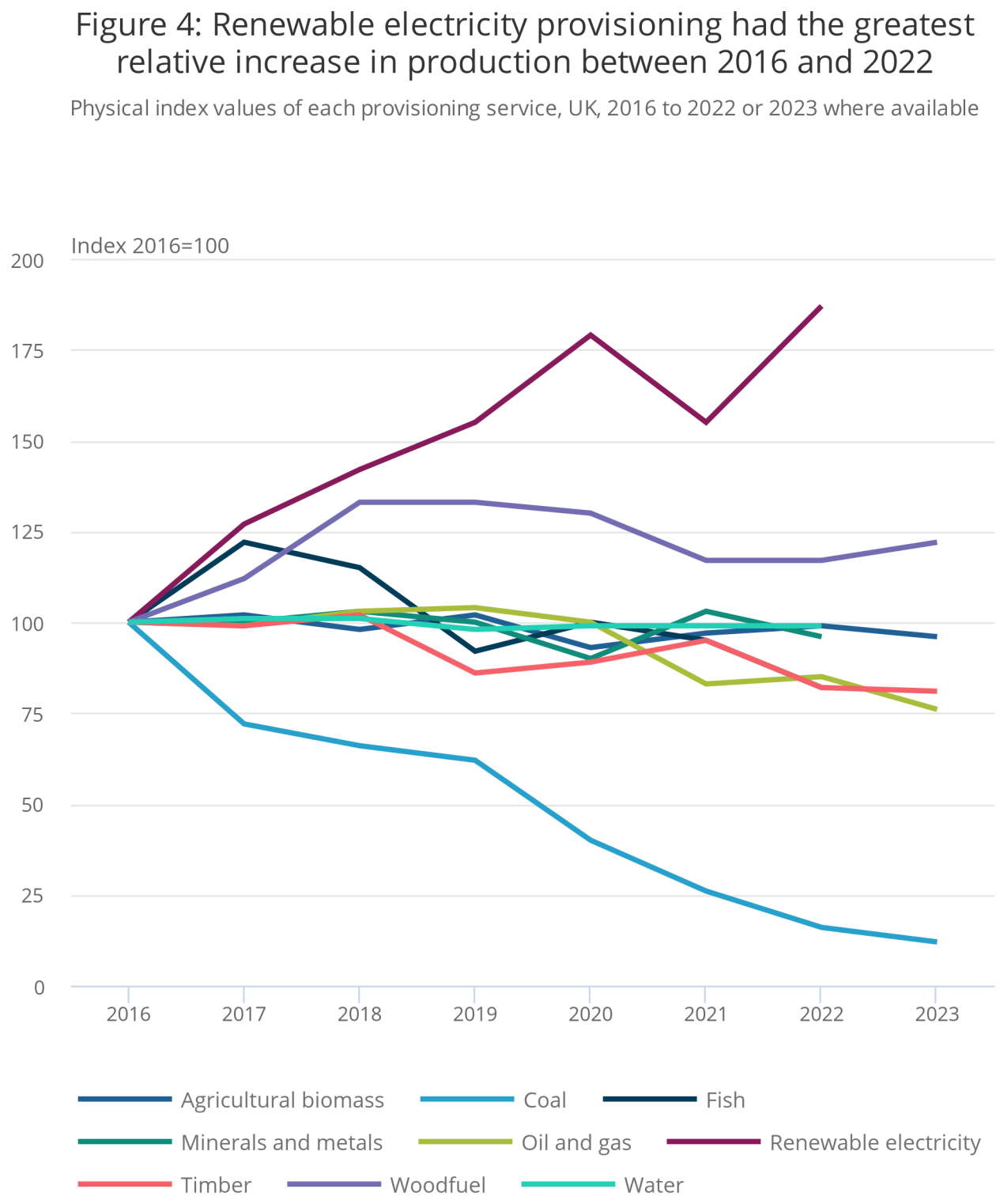
5 . Provisioning services

Provisioning services refer to tangible goods that people can harvest, extract, or derive from the environment, such as food, water, energy, and materials. In principle, these capture the value of nature's contribution to downstream production and exclude any form of industrial processing.

We provide estimates for agricultural biomass, oil, gas, coal, timber, woodfuel, mineral and metal extractions, fish, water, and renewable electricity provision.

Figure 4: Renewable electricity provisioning had the greatest relative increase in production between 2016 and 2022

Physical index values of each provisioning service, UK, 2016 to 2022 or 2023 where available



Source: UK natural capital accounts from the Office for National Statistics

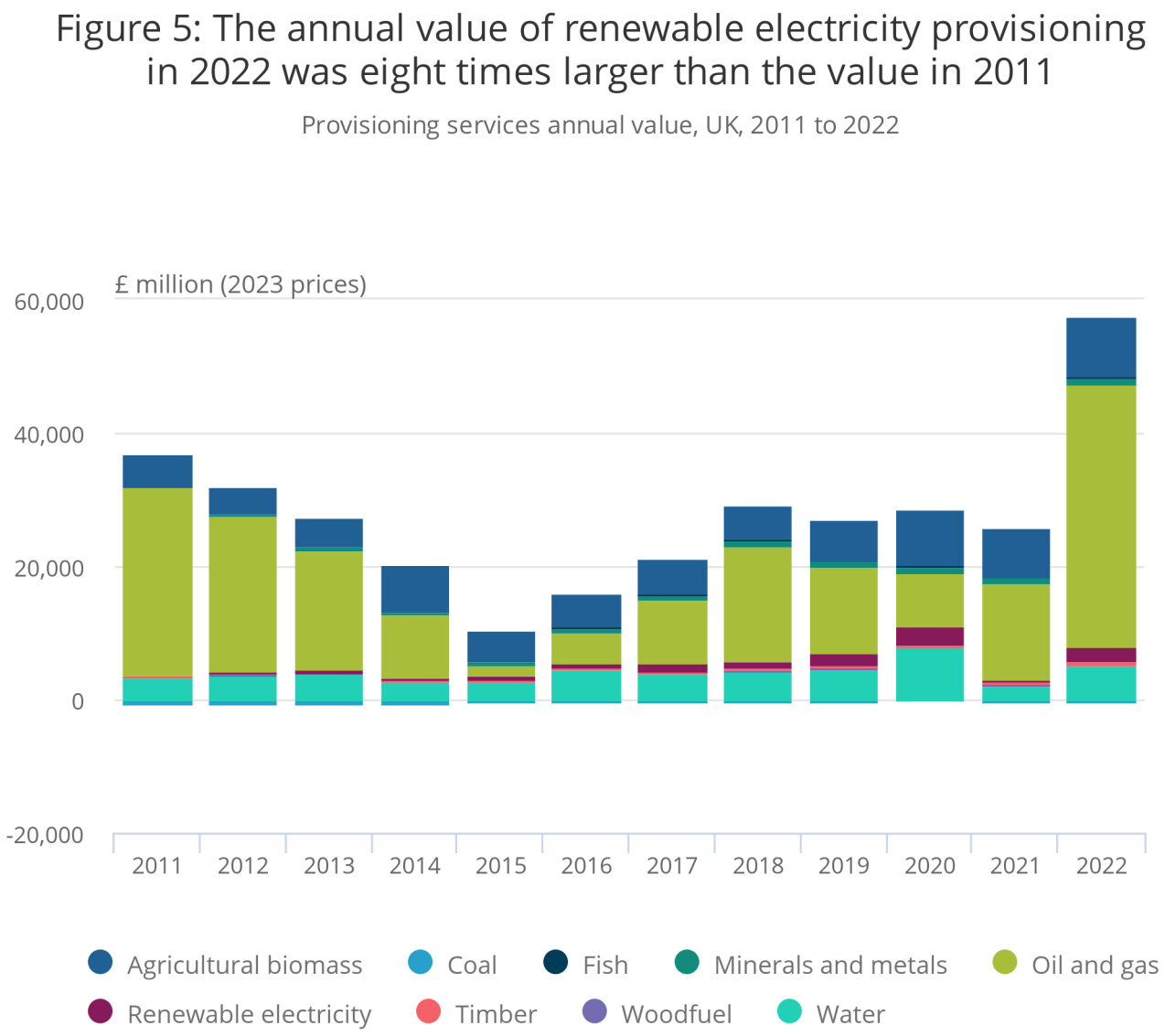
There was an 18% decline in the physical flow of fish provisioning between 2016 and 2022. This is because of reductions in fishing fleet size, landings, and the time vessels spend fishing, as described in the Marine Management Organisation's UK Sea Fisheries Statistics 2022 publication (PDF, 3.5MB).

The physical flow of renewable electricity services increased by 21% between 2021 and 2022. Electricity generated from offshore and onshore wind increased the most, by 27% and 21%, respectively. This is owing to higher average wind speeds and increased load factors, as described in the Department for Energy Security and Net Zero's (DESNZ's) Digest of UK Energy Statistics Annual data for UK, 2022 release (PDF, 17.4MB). Renewable electricity provisioning produced 99,192 gigawatt hours (GWh) in 2022, nearly five times the 21,899 GWh in 2011. In monetary terms, the annual value of renewable electricity provisioning in 2022 was eight times the value in 2011.

Oil and gas accounted for 69% of the total annual value of the provisioning services in 2022, and agricultural biomass accounted for 16% (Figure 5).

Figure 5: The annual value of renewable electricity provisioning in 2022 was eight times larger than the value in 2011

Provisioning services annual value, UK, 2011 to 2022



Source: UK natural capital accounts from the Office for National Statistics

Notes:

1. Data provided by the North Sea Transition Authority (NSTA) have been revised downwards from 2015. Data from Scotland have seen smaller revisions. These revisions have affected our estimates for England, because data for England are calculated as the residual of the UK and Scotland.

2. Data for fish provisioning are only available from 2016 to 2022.

Negative annual values for coal provisioning services are because of low industry profit levels. Deducting user cost of capital as part of the resource rent calculation produces negative natural capital annual values. More information on this is in Section 11: Data sources and quality and in our UK natural capital accounts methodology guide: 2024.

6 . Regulating services

Regulating services help to maintain the quality of the environment we rely on. These include natural processes like air quality, urban heat, greenhouse gas, and noise regulating services. We do not currently provide estimates for flood regulating services.

Table 1: Annual and asset values for UK regulating services, 2022

Ecosystem service	Annual value (flow) (£ million, 2023 prices)	Asset value (stock) (£ million, 2023 prices)
Air pollution regulating	2,770	132,512
Greenhouse gas regulating	-212	-25,873
Noise regulating	18	1,002
Urban heat regulating	824	22,452

Source: UK natural capital accounts from the Office for National Statistics

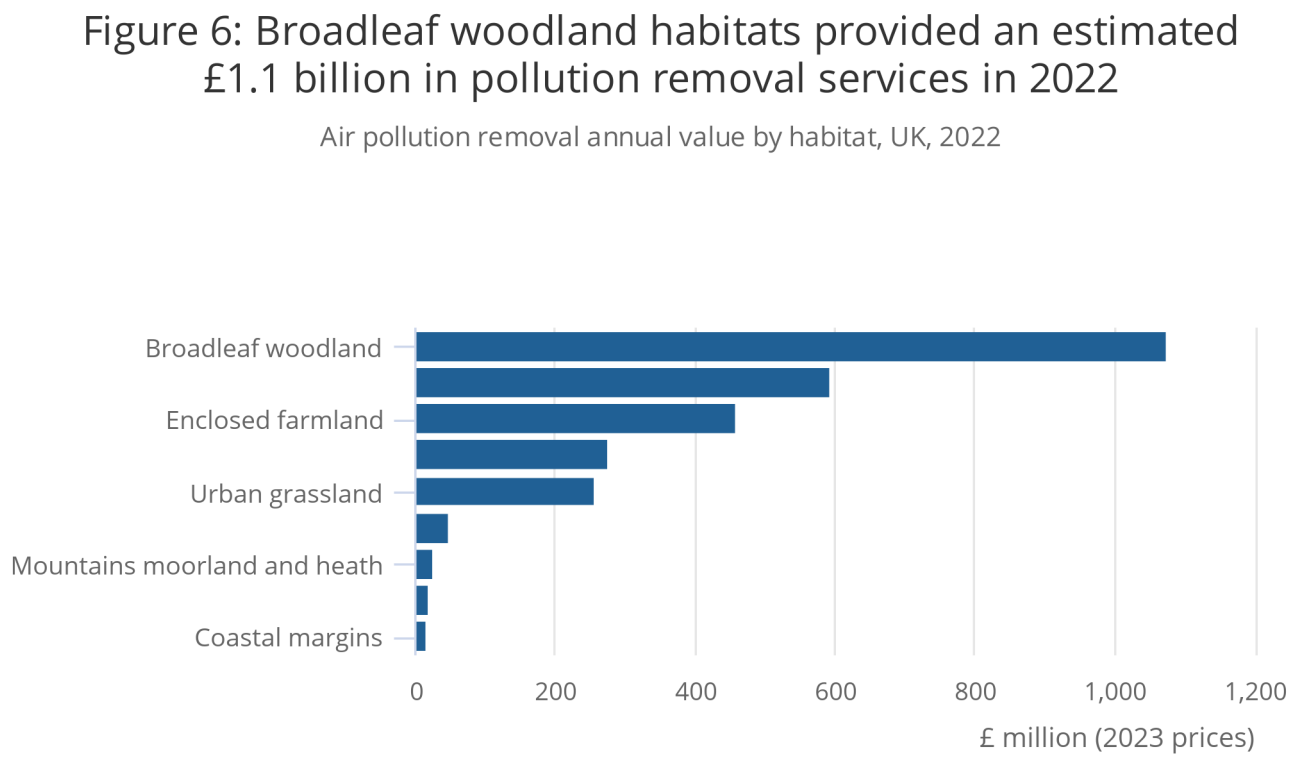
Vegetation can remove air pollutants from the environment, reducing harm to human health. We produce estimates for ammonia (NH3), nitrogen dioxide (NO2), ozone (O3), particulate matter 10 (PM10) with particulate matter 2.5 (PM2.5) as a subset, and sulphur dioxide (SO2).

Air pollution regulation accounted for 81% of the annual value of regulating services in 2022. Nature removed an estimated 1,384,278 tonnes of pollutants from the air. A full breakdown of value by pollutant type and by local authority area can be found in our accompanying dataset.

Pollution removal by broadleaved woodland habitats contributed the highest percentage of the annual value of air pollution regulating in 2022 at 39%, followed by urban trees at 21% (Figure 6).

Figure 6: Broadleaf woodland habitats provided an estimated £1.1 billion in pollution removal services in 2022

Air pollution removal annual value by habitat, UK, 2022



Source: Office for National Statistics, UK Centre for Ecology and Hydrology, and Department for Environment, Food and Rural Affairs

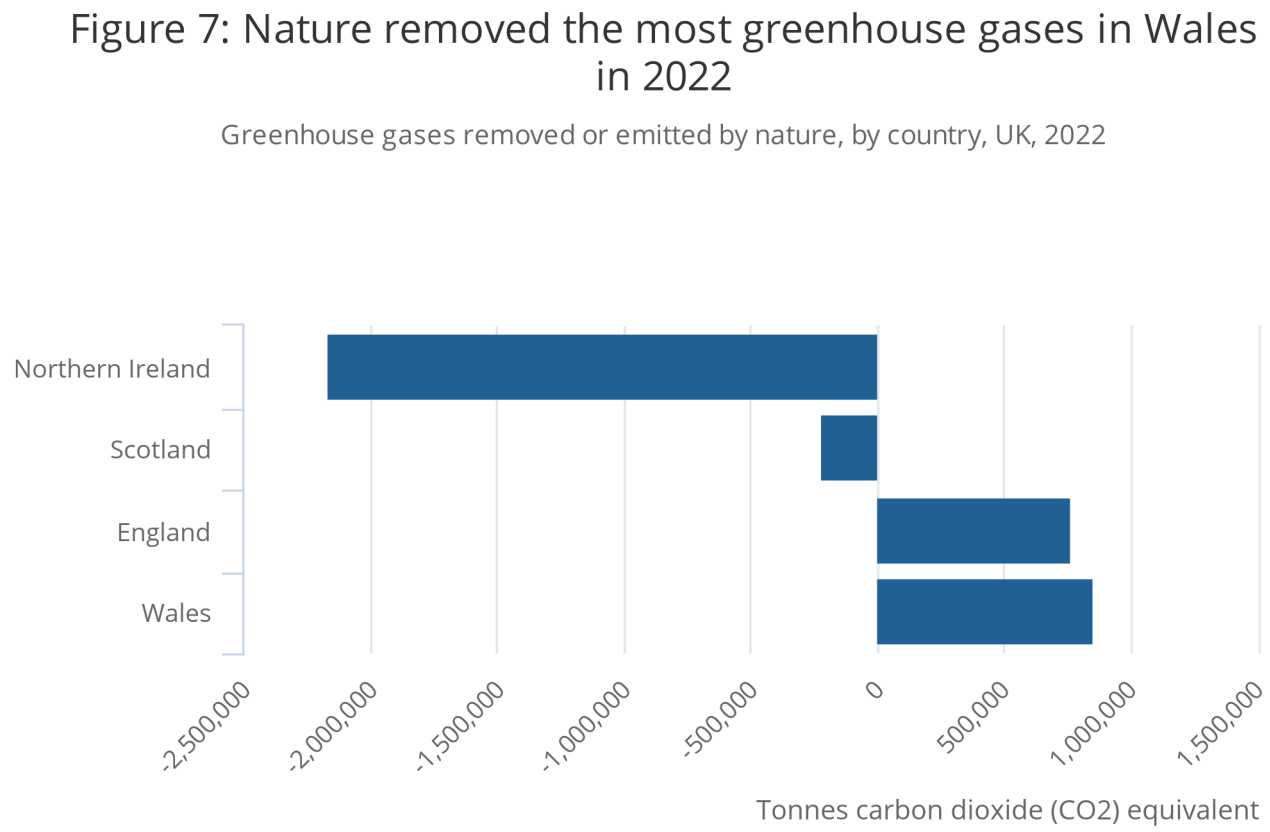
The net annual value of greenhouse gas regulating services was estimated to be negative £212 million in 2022 (Table 1). This is largely because the UK is estimated to emit more greenhouse gases than it removes from land use, land use change, and forestry, as explained in the Department for Energy Security and Net Zero's National Atmospheric Emissions Inventory 2024 report (PDF, 4.36MB). Peatlands that are in good condition are better at storing and long-term sequestering of greenhouse gases. However, degraded UK peatlands emit more greenhouse gases than they remove, as described in our UK natural capital: peatlands bulletin and in the UK Centre for Ecology and Hydrology's Peatlands factsheet (PDF, 612KB).

At the subnational level, England and Wales had positive annual values and physical flows, in terms of tonnes of carbon dioxide (CO2) equivalent sequestered. Wales sequestered the most greenhouse gases, with an annual value of £239 million in 2022.

Scotland and Northern Ireland had negative values for annual value and physical flows in 2022 (Figure 7). Forests sequester greenhouse gases, while degraded peatlands emit them. Northern Ireland's land area has a larger percentage of peatland (17%) than woodland (9%). In comparison, Wales's land area has 4% peatland and 15% woodland. This contributes to Northern Ireland emitting more greenhouse gases than it captures, while Wales captures more greenhouse gases than it emits. For more information, see our Woodland natural capital accounts, UK: 2024 bulletin and Natural Resources Wales's blogpost about peatland restoration.

Figure 7: Nature removed the most greenhouse gases in Wales in 2022

Greenhouse gases removed or emitted by nature, by country, UK, 2022



Source: Office for National Statistics, Department for Energy Security and Net Zero, and the National Atmospheric Emissions Inventory

The annual value of urban heat regulating in 2022 (£824 million) was almost four times the level in 2021 (£209 million). This is because of an increased number of hot days in 2022; see Section 10: Glossary for how we define hot days.

7 . Cultural services

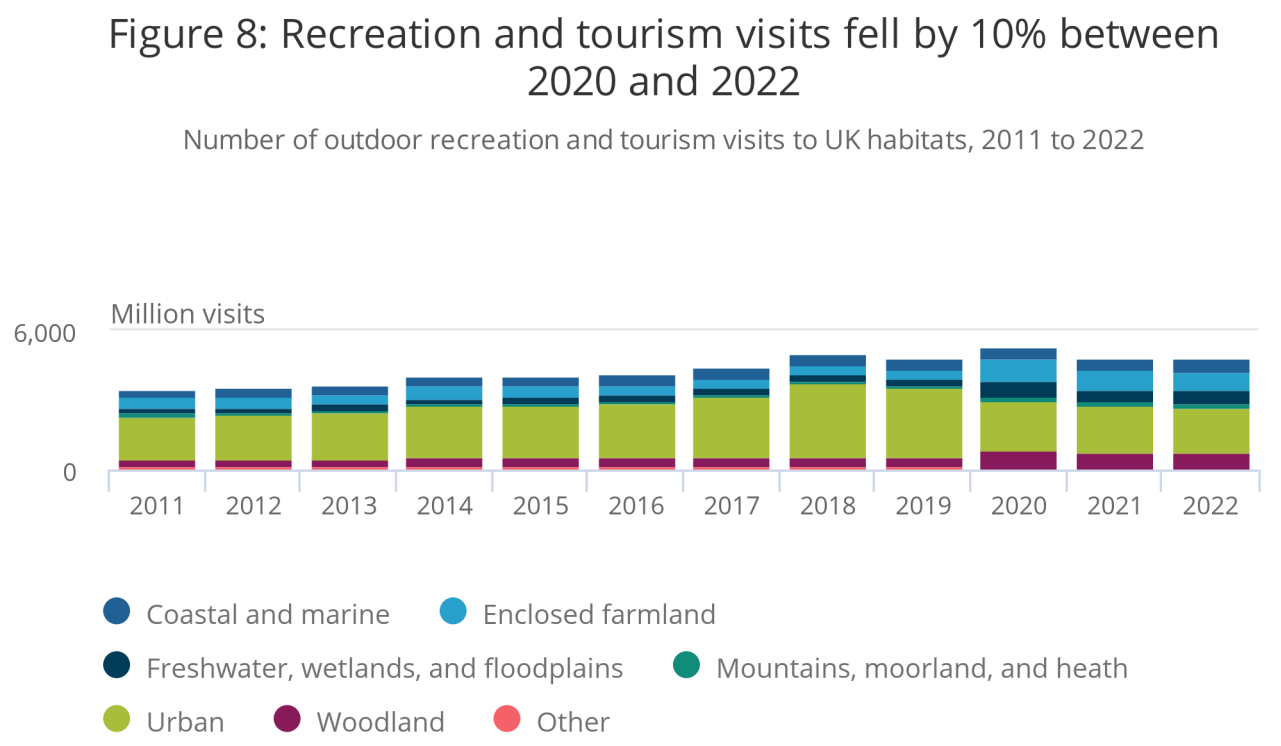
Cultural services are the non-material benefits we get from interacting with ecosystems through recreation and tourism, and their associated health benefits.

The number of recreation and tourism visits to nature in 2020 was at its highest since 2011 (Figure 8). However, the annual value, or money spent on recreation and tourism, was at its lowest in 2020 (Figure 9). This was likely because of coronavirus (COVID-19) pandemic restrictions implemented in that year.

The number of visits to nature fell by 10% between 2020 and 2022, while the amount of money people spent to visit nature increased by 154%. Visits to urban areas have decreased since 2020, while visits to all other habitats increased.

Figure 8: Recreation and tourism visits fell by 10% between 2020 and 2022

Number of outdoor recreation and tourism visits to UK habitats, 2011 to 2022



Source: The Monitor of Engagement with the Natural Environment Survey and the People and Nature Survey from Natural England, the Welsh Outdoor Recreation Survey from Natural Resources Wales (NRW), the People and Nature Survey Wales from NRW and Natural England, the Scottish Recreation Survey and Scotland's People and Nature Survey from NatureScot, and the People in the Outdoors Monitor for Northern Ireland from Outscape

Notes:

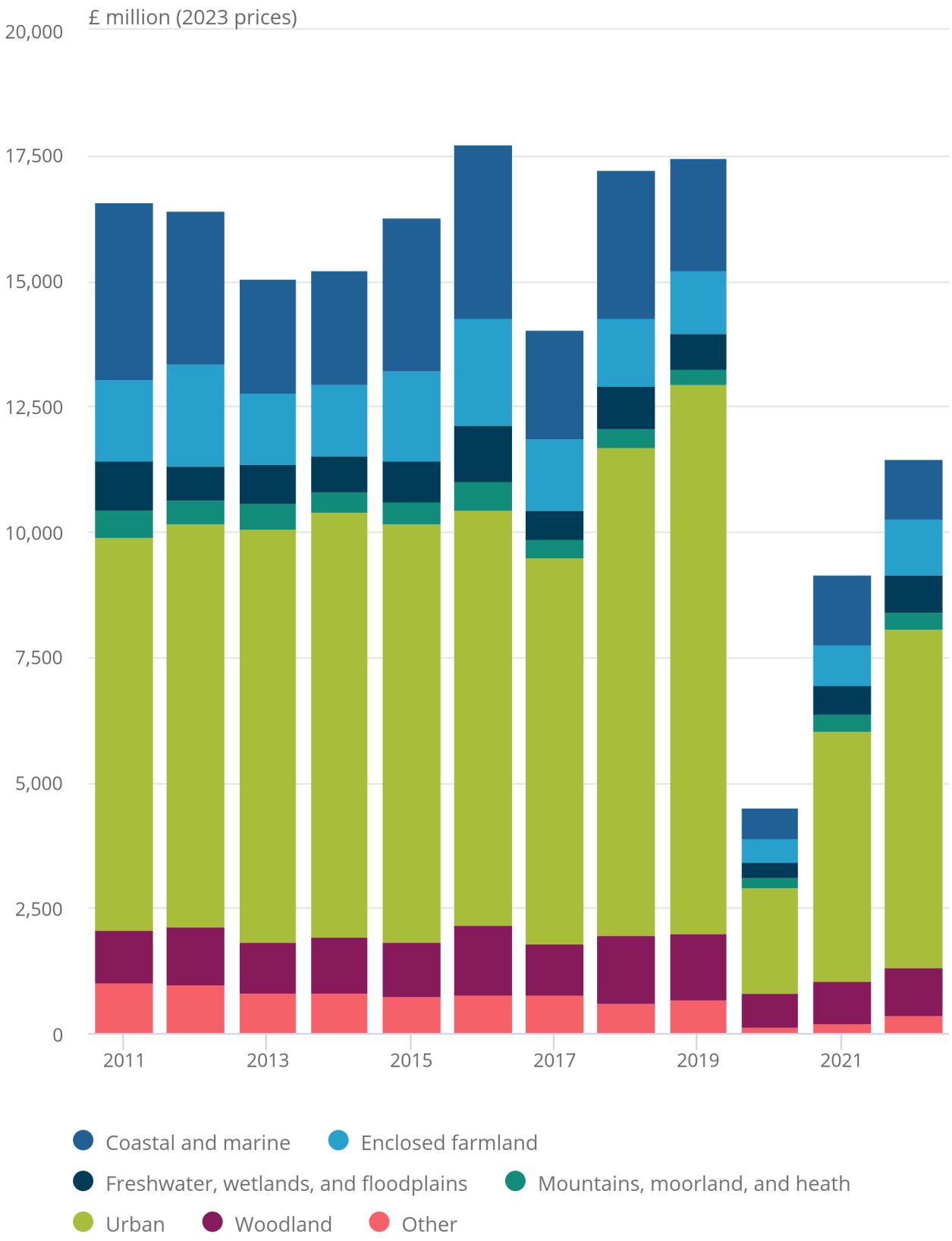
1. Natural England used Monitor of Engagement with the Natural Environment (MENE) Survey data up until 2019, when the survey concluded. They now use the People and Nature Survey (PaNS). The two surveys are not directly comparable.

Figure 9: Spending on recreation and tourism increased by 154% in the UK between 2020 and 2022

Annual value of outdoor recreation and tourism visits to UK habitats, 2011 to 2022

Figure 9: Spending on recreation and tourism increased by 154% in the UK between 2020 and 2022

Annual value of outdoor recreation and tourism visits to UK habitats, 2011 to 2022



Source: The Monitor of Engagement with the Natural Environment Survey and the People and Nature Survey from Natural England, the Welsh Outdoor Recreation Survey from Natural Resources Wales (NRW), the People and Nature Survey Wales from NRW and Natural England, the Scottish Recreation Survey and Scotland's People and Nature Survey from NatureScot, and the People in the Outdoors Monitor for Northern Ireland from Outscape

Notes:

1. Natural England used Monitor of Engagement with the Natural Environment (MENE) Survey data up until 2019, when the survey concluded. They now use the People and Nature Survey (PaNS). The two surveys are not directly comparable.

Health benefits from recreation had the highest asset value of ecosystem services in 2022, at £489 billion. There were an estimated 20 million people gaining health benefits from recreation in nature.

Another aspect of cultural services is captured in the value of house prices. This includes both:

- the value of opportunities for recreation associated with how close people are to green spaces (land) and blue spaces (water), enabling people to effectively make "free trips" to the natural environment
- the aesthetic value of a view of green or blue spaces, also known as visual amenity services

The combined aesthetic and recreation annual value increased by 107% between 2003 and 2022 and is now estimated to be worth £7 billion.

8 . Asset values

While annual valuations look at flows in a given year, asset values measure the stream of services from, or stock of, a natural resource in terms of the future expected supply and use over a reasonably predictable time horizon.

The total asset value of UK ecosystem services that we can currently value was an estimated £1.8 trillion in 2022 (Table 2). This value should not be considered as a simple indicator of environmental sustainability or ecological health, because it is partly influenced by economic factors like oil and gas prices.

Table 2: Asset value by ecosystem service and country in 2022, £ million (2023 prices)

Ecosystem service	England	Scotland	Wales	Northern Ireland	UK
Agricultural biomass provisioning	158,878	20,961	11,346	15,500	206,685
Coal provisioning	-572	-960	-1,968	0	-3,501
Fish provisioning	531	3,141	49	31	3,752
Minerals and metals provisioning	10,428	1,542	856	918	13,743
Oil and gas provisioning	13,389	112,483	0	0	125,872
Renewable electricity provisioning	24,663	18,955	1,419	2,303	47,339
Timber provisioning	2,842	8,965	1,332	571	13,709
Woodfuel provisioning	1,540	1,885	397	151	3,974
Water provisioning	104,245	20,179	7,226	9,297	140,947
Air pollution regulating	118,647	6,520	5,657	1,688	132,512
Greenhouse gas regulating	3,895	-18,536	12,297	-23,528	-25,873
Noise regulating	857	40	72	33	1,002
Urban heat regulating	21,545	305	602	[x]	22,452
Recreation (health benefits)	407,926	43,561	23,967	13,344	488,798
Recreation and aesthetic (house prices)	178,945	9,903	5,532	2,177	196,557
Recreation and tourism (expenditure)	307,758	25,722	26,965	13,935	393,396
All services	1,355,517	254,665	95,748	36,418	1,761,364

Source: UK natural capital accounts from the Office for National Statistics

Notes

1. [x] indicates that data are not available.
2. Country-level data may not add up to the UK total because of rounding and other data limitations.

9 . Data on UK natural capital accounts

UK natural capital accounts: 2024 – summary tables
Dataset | Released 8 November 2024
Summary data breakdowns of the financial and societal value of natural resources to people in the UK.

UK natural capital accounts: 2024 – detailed summary tables
Dataset | Released 8 November 2024
Detailed data breakdowns of the financial and societal value of natural resources to people in the UK.

10 . Glossary

Asset

A natural asset is a resource that can generate goods or services to humans into the future.

Asset valuation estimates the stream of services that are expected to be produced by the natural resource over a reasonably predictable time horizon.

Ecosystem services

Ecosystem services estimate the contribution of natural assets to the economy and society in the UK.

This includes provisioning services such as food and water, regulating services such as flood protection and pollution removal, and cultural services such as recreation.

Physical flow

The physical flow of a natural asset is the measure of its output in units appropriate to the goods or services.

This differs from the annual value and asset value, which measure the monetary value of a natural resource.

Air pollutants

The air pollutants reported on in this account are ammonia (NH3), nitrogen dioxide (NO2), sulphur dioxide (SO2), ozone (O3), particulate matter 10 (PM10), and particulate matter 2.5 (PM2.5), which is a subset of PM10.

Hot days

Hot days were calculated as the average number of hot days that were 28 degrees Celsius and above, for specific city regions in Great Britain. For detailed breakdowns see our UK natural capital accounts — detailed summary dataset.

11 . Data sources and quality

More detailed quality and methodology information on strengths, limitations, appropriate uses, and how the data were created is available in our accompanying UK natural capital accounts methodology guide: 2024.

We use a wide variety of sources to create estimates of UK natural capital.

These accounts have been compiled in line with the guidelines in the United Nations (UN) System of Environmental-Economic Accounting (SEEA) Central Framework (PDF, 5.3MB) and the UN SEEA Ecosystem Accounting. These, in turn, relate to the wider framework of the system of national accounts. We have also published our interpretation of the UN guidance used to produce our natural capital accounts in our Principles of UK natural capital accounting methodology.

Official statistics in development

These statistics are labelled as "official statistics in development". Until September 2023, these were called "experimental statistics". Read more about the change in the guide to official statistics in development.

These statistics in development are regularly revised to produce the best statistics possible given available data and methods.

12 . Related links

A million fewer people are gaining health benefits from nature since 2020
Article | Released 27 November 2023
People in the UK are spending less time in natural environments since the coronavirus (COVID-19) pandemic.

Urban natural capital accounts, UK: 2023
Bulletin | Released 7 September 2023
Additional information breaking down UK data for England, Scotland, Wales and Northern Ireland, including extra data on urban condition indicators, summary ecosystem services, and asset value.

Scotland natural capital accounts: 2023
Bulletin | Released 15 June 2023
Estimates of the financial and societal value of natural resources to people in Scotland.

England natural capital accounts: 2023
Bulletin | Released 25 January 2023
Estimates of the financial and societal value of natural resources to people in England.

Health benefits from recreation, natural capital, UK: 2022
Bulletin | Released 27 May 2022
Further development of the UK recreation natural capital ecosystem service accounts, including specific methods used to estimate the health benefits gained from nature-based recreational activities.

Habitat extent and condition, natural capital, UK: 2022
Bulletin | Released 3 May 2022
The size of area and condition indicators for eight natural UK habitats, including woodland, enclosed farmland, semi-natural grasslands, and coastal margins. Uses the System of Environmental-Economic Accounting framework for Ecosystem Accounting. Official statistics in development.

13 . Cite this statistical bulletin

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