Office for National Statistics

Statistical bulletin

Scotland natural capital accounts: 2023

Estimates the value of Scottish natural capital and its beneficial effects for the population.

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To be announced

Notice

19 December 2023

Data included in this release contain an error affecting the service of air pollution removal. Some physical removals were incorrectly excluded due to errors in the aggregation of geographic areas. Monetary values split by habitat are also affected as physical flows are used to apportion annual monetary values across habitats. This error has been corrected in the UK Natural Capital Accounts: 2023 and subsequent releases, which also include the latest methodologies and data split by nation and habitat.

Table of contents

1 . Main points

- The total asset value of natural capital in Scotland that we can currently value is an estimated £230 billion in 2019, representing 13% of the total UK asset value.
- The total annual value of ecosystem services that we can currently value in Scotland is estimated to be £15 billion in 2019, 30% of the total UK annual value.
- Provisioning services account for 89% of Scotland's annual value in 2019, predominantly oil and gas (£12 billion) and agricultural biomass (£706 million).
- Air pollution removal had the highest annual value of the regulating services, worth £145 million in avoided health impacts in 2019.
- Health benefits from recreation, a newly estimated cultural service, had an asset value of £51 billion in 2019.
- Renewable electricity generation in 2021 was three times greater than in 2008, despite a 15% fall between 2020 and 2021.
- Between 1990 and 2021, the extent of mountain, moorland and heath in Scotland decreased from 34% to 26%.

2 . Understanding natural capital

Natural wealth is reflected in things like the productivity of soils and access to clean water. Any natural resource or process that supports human life, society and the economy forms a part of our natural capital. We are estimating both the current value and what it could provide for future generations. Valuing natural capital is an important part of a wider move to better understand inclusive wealth, as described in The Economics of Biodiversity: The Dasgupta Review.

Natural capital monetary estimates should be interpreted as a partial or minimum value of the services provided by the natural environment, as several services, such as flood protection from natural resources, are not currently measured. We continue to work to encompass as much of the economic value of the natural world as possible, which is challenging given its scale and complexity. In addition to economic value, as part of the United Nations System of Environmental-Economic Accounting - Ecosystem Accounting (SEEA EA) (PDF, 5.3MB), we are continuing to develop methods for tracking changes in the ecosystem's extent and condition.

As a result of changing methods and an expanding portfolio of natural services measured, these latest accounts cannot be compared with previous years' accounts on a like-for-like basis. The latest methods developed have been applied retrospectively, giving a consistent time series.

All monetary valuations are given in constant 2021 prices.

You can view and download the complete list of data and sources used in this publication on our All data related to Scotland natural capital accounts: 2023 page.

3 . Extent of habitats in Scotland

Scotland accounts for around 32% of the total UK land area. Figure 1 provides headline figures for extent by area of the seven terrestrial habitats in Scotland, using the broad classifications from the UK National Ecosystem Assessment (PDF, 2.09MB), with summary area statistics from UK Centre for Ecology and Hydrology Land Cover Maps (LCM).

The predominant habitat types in Scotland's land cover are mountains, moorland, and heath (26%) and enclosed farmland (25%). Mountains, moorland, and heath habitats had the largest change in coverage between 1990 and 2021, with 633,108 hectares changing mostly to a combination of semi-natural grassland, fresh water, wetlands and floodplains, and woodlands. While urban areas increased the most in relative terms (46%), woodlands increased the most in area, by 418,998 hectares (42%). While 27% of land area in Scotland was farmland in 1990, by 2021 this area had decreased by 141,382 hectares to 25%, with 99,397 hectares of farmland becoming woodland.

Figure 1: Mountains, moorland, and heath habitat area in Scotland decreased by 24% between 1990 and 2021

Change of broad habitat extent in Scotland, 1990 to 2021

Notes:

1. Raster data were used from UK Centre for Ecology and Hydrology - Great Britain land cover maps for 1990 and 2021.

2. Digital Object Identifier (DOI) for LCM1990 Raster data for Great Britain. Rowland, C. S., Marston, C. G., Morton, R. D., and O'Neil, A. W. (2020). Land Cover Map 1990 (25 metre raster, Great Britain) v2 [Dataset]. NERC Environmental Information Data Centre.

3. Digital Object Identifier (DOI) for LCM2021 Raster data for Great Britain. Morton, R. D., Marston, C. G., O' Neil, A. W., and Rowland, C. S. (2022). Land Cover Map 2021 (25 metre rasterised land parcels, Great Britain) [Dataset]. NERC Environmental Information Data Centre.

Download the data

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4 . Ecosystem services

Ecosystem services are the contributions of ecosystems to economic and other human activity.

In 2019, the total annual value for the ecosystem services in Scotland that we are currently able to measure was £15 billion, representing 30% of the total UK value. The highest value ecosystem service for 2019 was oil and gas, estimated at £12 billion, 77% of Scotland's annual value.

Where available, estimates are presented between the period of 2003 to 2020. Data coverage constraints in input-output tables for Scotland mean 2019 is currently the latest year for which we can estimate an overall annual value for all services.

Figure 2: Tourism and recreation was the second-largest contributor to total annual value of natural capital in 2019, after oil and gas

Ecosystem services for Scotland, £ million (2021 prices), 2019

Notes:

1. The negative value for carbon sequestration is a result of land use emitting more carbon (equivalent) than sequestering.

Download the data

.xlsx

5 . Provisioning services

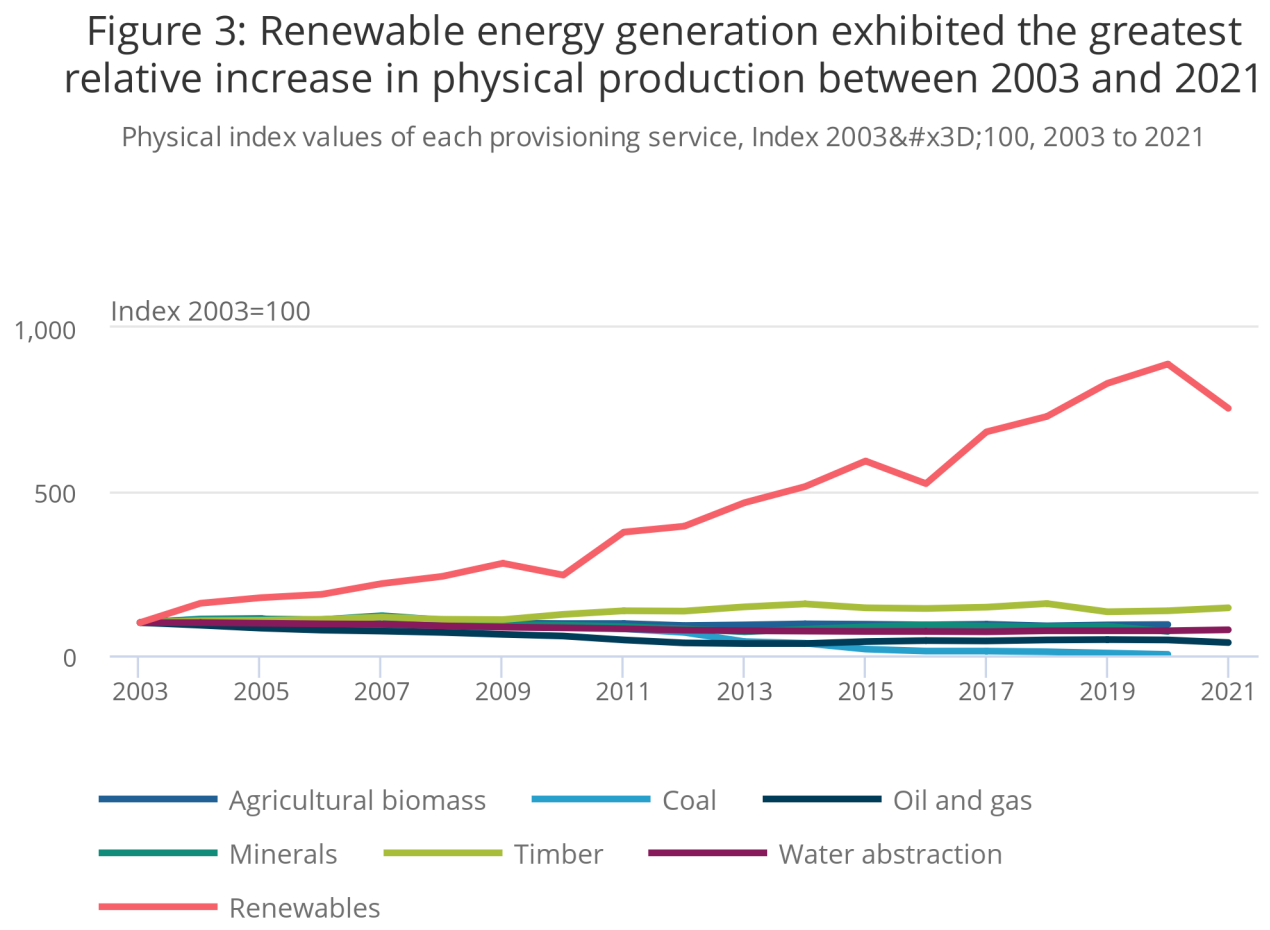
Provisioning services are products extracted, harvested or derived from nature, such as food, water, energy and materials. These include:

- agricultural biomass - the value of crops, fodder, and grazing (while farmed animals are not included as they are considered produced rather than natural assets, the food these animals eat, such as grass and feed, is included)
- water abstraction - water removal for public water supplies
- fossil fuels extraction - production of crude oil, gas, and coal
- renewable energy generation - electricity generated from renewable sources (wind, hydroelectric, solar, wave, and tidal)
- timber removals - wood production (also referred to as removals) is the harvesting of roundwood (trunks and branches) from coniferous (softwood) and broadleaved (hardwood) trees
- mineral extraction - largely consisting of construction mineral aggregates
- fish capture - the value of marine fish taken from Scottish waters (aquaculture of farmed fish is excluded as these are viewed as produced rather than natural assets)

In 2019, the annual value of provisioning services in Scotland was £14 billion, 57% of the annual value of provisioning services across the UK. Generally, the value of provisioning services is determined by the extent and location of underlying natural capital assets rather than where the people that ultimately benefit from these assets are based.

Figure 3: Renewable energy generation exhibited the greatest relative increase in physical production between 2003 and 2021

Physical index values of each provisioning service, Index 2003=100, 2003 to 2021



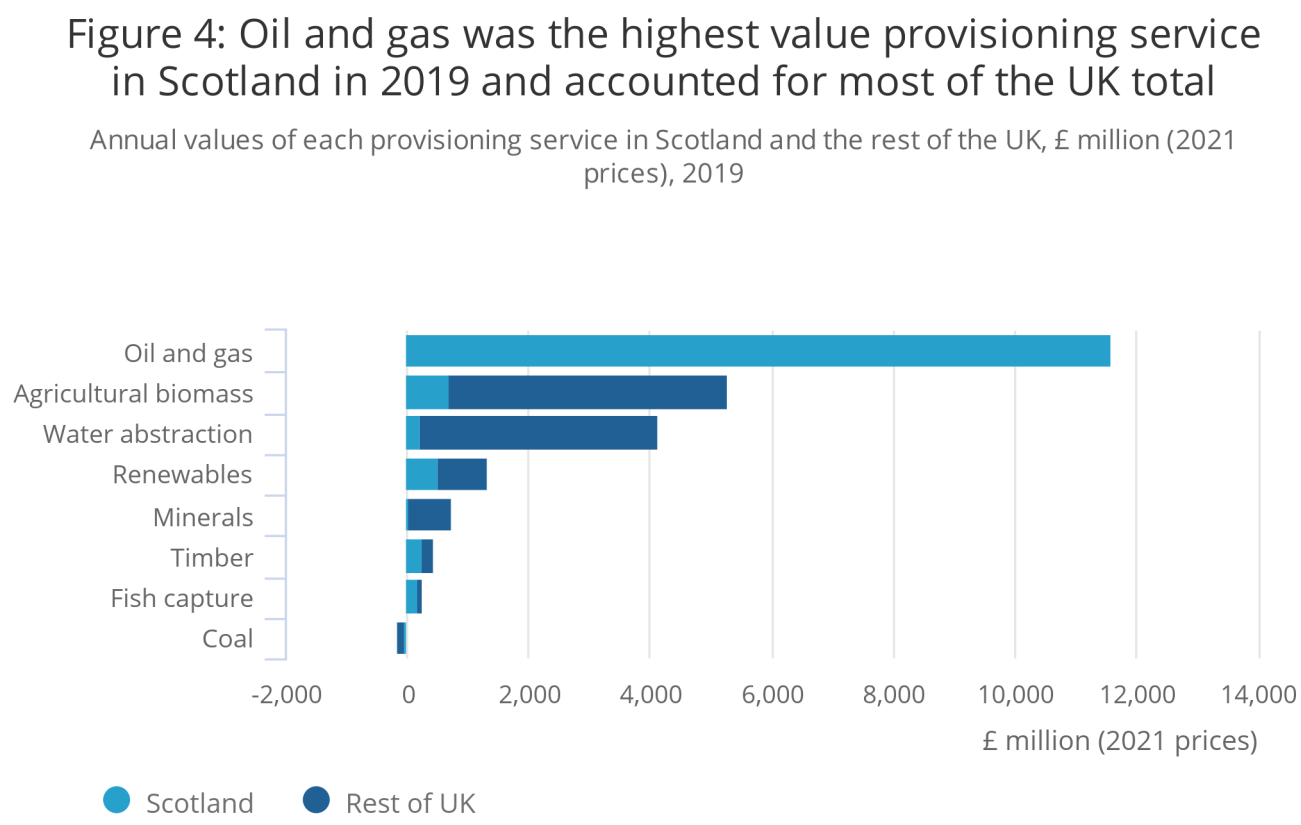
Source: UK natural capital accounts from the Office for National Statistics

Notes:

1. Data for fish capture are only available from 2014 and so are excluded.
2. Data for agricultural biomass and coal are only available up to 2020.

Figure 4: Oil and gas was the highest value provisioning service in Scotland in 2019 and accounted for most of the UK total

Annual values of each provisioning service in Scotland and the rest of the UK, £ million (2021 prices), 2019



Source: Department for Business, Energy and Industrial Strategy, Scientific, Technical and Economic Committee for Fisheries, Seafish, Marine and Management Organisation, British Geological Survey, Forest Research and Department for Environment, Food and Rural Affairs

Fossil fuels

Fossil fuel production covers the extraction and sale of oil, gas and coal reserves.

The physical production of fossil fuels has declined markedly, with output down 53% for oil and gas and 97% for coal between 2003 and 2020.

Even so, oil and gas was the highest-value provisioning service in 2019, estimated at £12 billion, 86% of total provisioning services in Scotland, and more than 99% of the total UK oil and gas value.

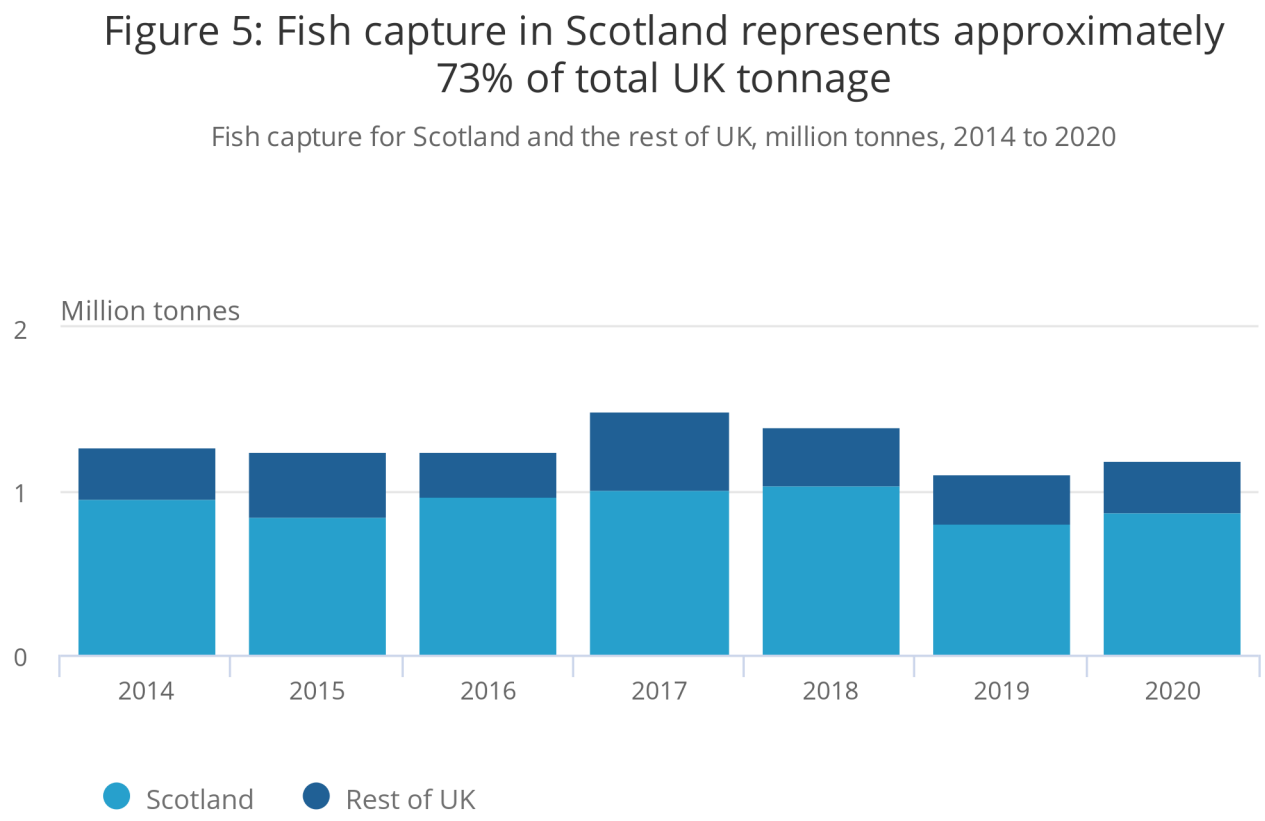
Changes in the annual value of the fossil fuel services are driven more by fluctuations in the parameters used in the resource rent method than changes in the industries' physical output. See more information in our Scotland natural capital accounts methodology: 2023.

Fish capture

Fish capture refers to marine fish taken from Scottish waters. Farmed fish, or aquaculture, is excluded from this value, as these are considered produced, rather than natural asset.

Figure 5: Fish capture in Scotland represents approximately 73% of total UK tonnage

Fish capture for Scotland and the rest of UK, million tonnes, 2014 to 2020

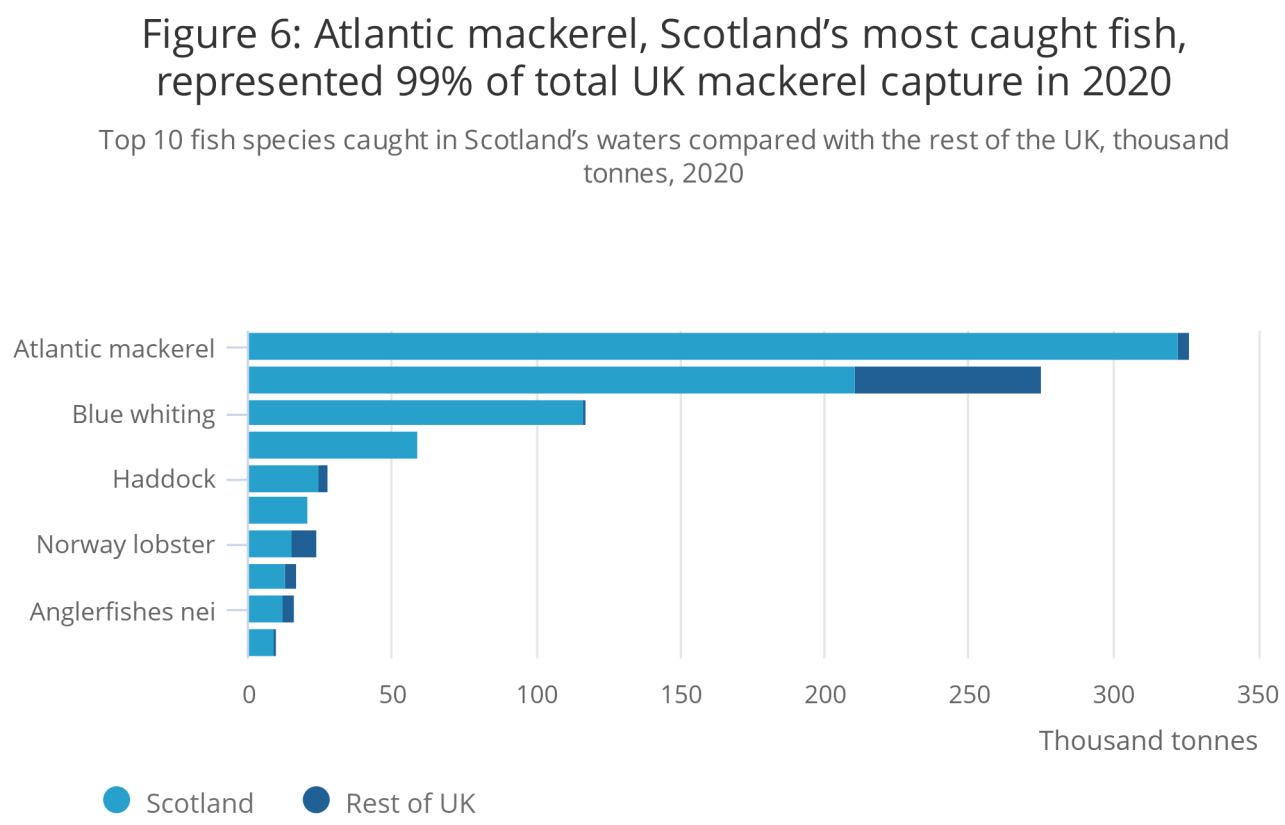


Source: UK natural capital accounts from the Office for National Statistics, Scientific, Technical and Economic Committee for Fisheries, Seafish, Marine and Management Organisation

Some 73% of the total UK fish capture in 2020 was in Scotland (Figure 5), but this proportion was greater for certain fish species. The top 10 species caught in Scotland represented 90% of the total UK catch. Atlantic mackerel accounted for an average of 35% of all fish caught in Scotland's waters over the last five years. While 238 different species of fish were caught in Scotland's waters between 2015 to 2020, Atlantic mackerel (35%) and herring (29%) made up 64% of total catches over this period.

Figure 6: Atlantic mackerel, Scotland's most caught fish, represented 99% of total UK mackerel capture in 2020

Top 10 fish species caught in Scotland's waters compared with the rest of the UK, thousand tonnes, 2020



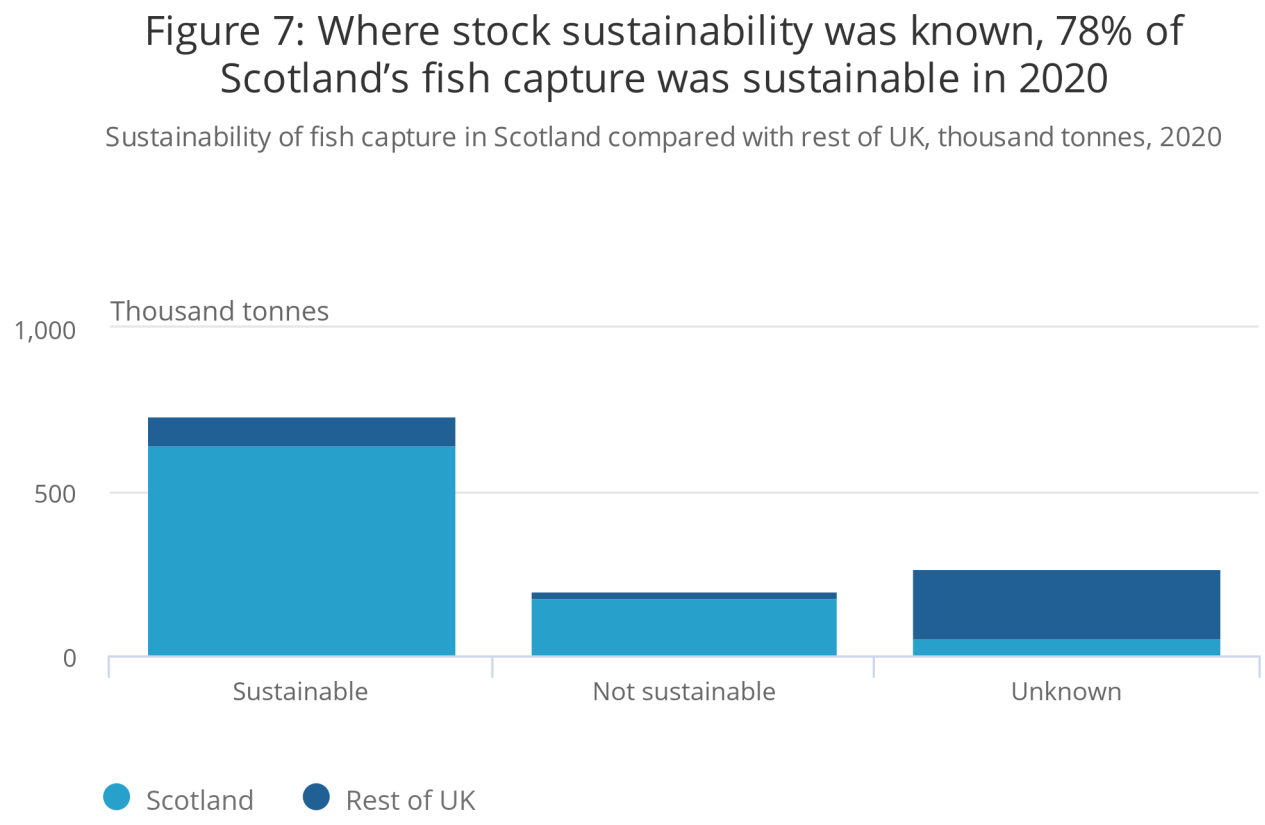
Source: UK natural capital accounts from the Office for National Statistics, Scientific, Technical and Economic Committee for Fisheries, Seafish, Marine and Management Organisation

In the natural capital accounts, fishing pressure for each stock is checked against the maximum sustainable yield, as can be seen in the International Council for the Exploration of the Sea's stock assessment graphs. We also check whether each species' reproductive fish stock is at or above the level capable of producing the maximum sustainable yield.

This approach does not consider the knock-on effects of unsustainable fishing to the ecosystem. For instance, if a fish species which forms a significant part of other fish species' diets is managed unsustainably, it may affect the sustainability of other fish stocks higher up the food chain.

Figure 7: Where stock sustainability was known, 78% of Scotland's fish capture was sustainable in 2020

Sustainability of fish capture in Scotland compared with rest of UK, thousand tonnes, 2020



Source: UK natural capital accounts from the Office for National Statistics, Scientific, Technical and Economic Committee for Fisheries, Seafish, Marine and Management Organisation

In 2020, 73% of fish capture tonnage in Scotland was categorised as sustainable, while 20% was categorised as unsustainable, and the sustainability status was unknown for 7%. In the rest of the UK, 65% of total capture had an unknown sustainability status. The share of fish caught in Scotland's waters for which the sustainability status is known is higher than for the UK as a whole. This is mainly because the top 10 catches in Scotland in 2020, which accounted for 92% of total Scottish fish capture, all had a known sustainability status.

Agricultural biomass

Agricultural biomass relates to the value of crops, fodder and grazed biomass provided to support agricultural production in Scotland.

Physical production of agricultural biomass decreased by 6% between 2003 and 2020, mostly driven by a 39% drop in grazed biomass, which on average constituted 27% of total production across this period. At the same time, the annual value of biomass increased from £407 million in 2003 to £706 million in 2019, largely because of increases in the industry's gross operating surplus.

Renewables

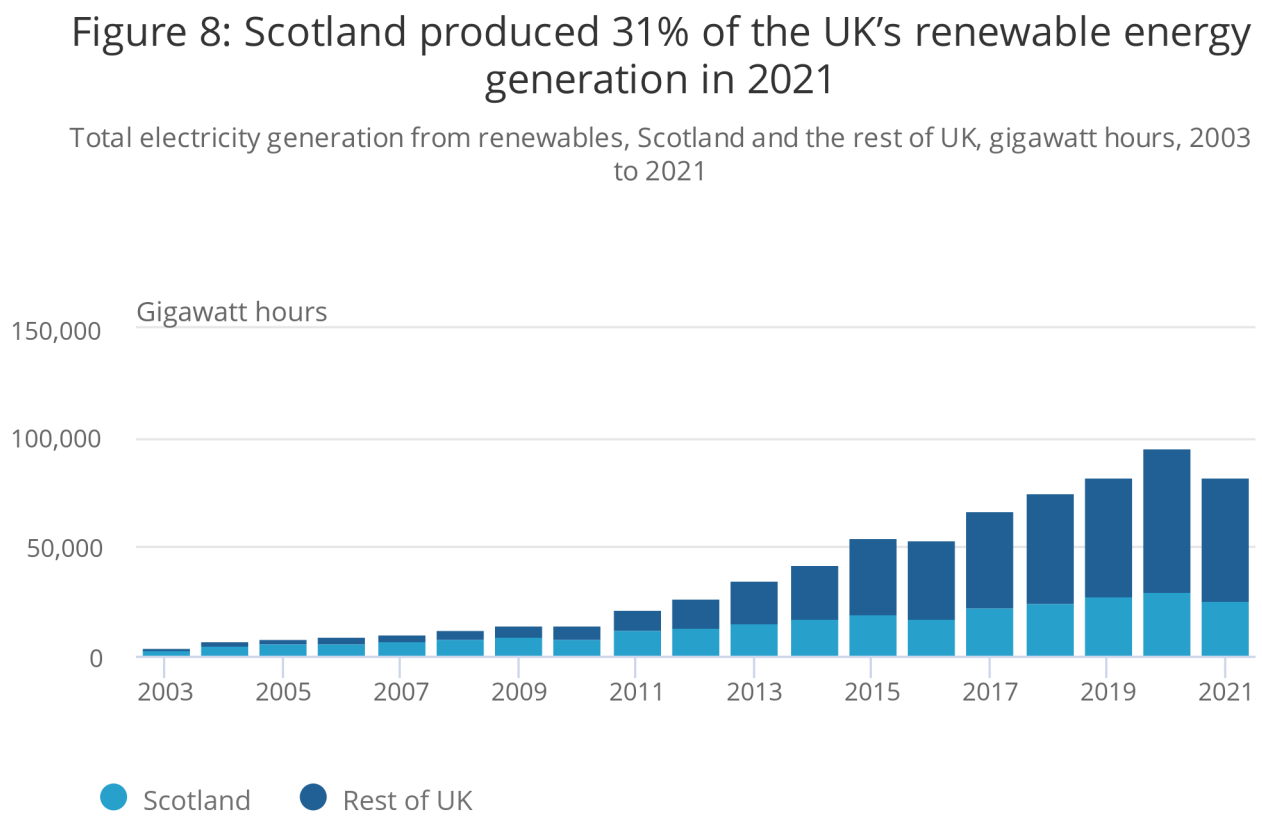
Renewable energy generation refers to electricity generated from renewable sources, dependent on the natural services of wind, sunshine, tides and rainfall, through offshore and onshore wind turbines, hydroelectric plants and solar panels.

Total renewable energy generation in Scotland was more than three times greater in 2021 than in 2008, increasing 213% from 8,062 gigawatt hours (GWh) in 2008 to 25,260 GWh in 2021. In comparison, energy generation from oil and gas fell by 60% from 13,126 GWh to 5,261 GWh over the same period.

The percentage of total energy generation in Scotland which comes from renewable sources has increased considerably, from 16% in 2008 to 52% in 2020.

Figure 8: Scotland produced 31% of the UK's renewable energy generation in 2021

Total electricity generation from renewables, Scotland and the rest of UK, gigawatt hours, 2003 to 2021



Source: UK natural capital accounts from the Office for National Statistics and Department for Business, Energy and Industrial Strategy

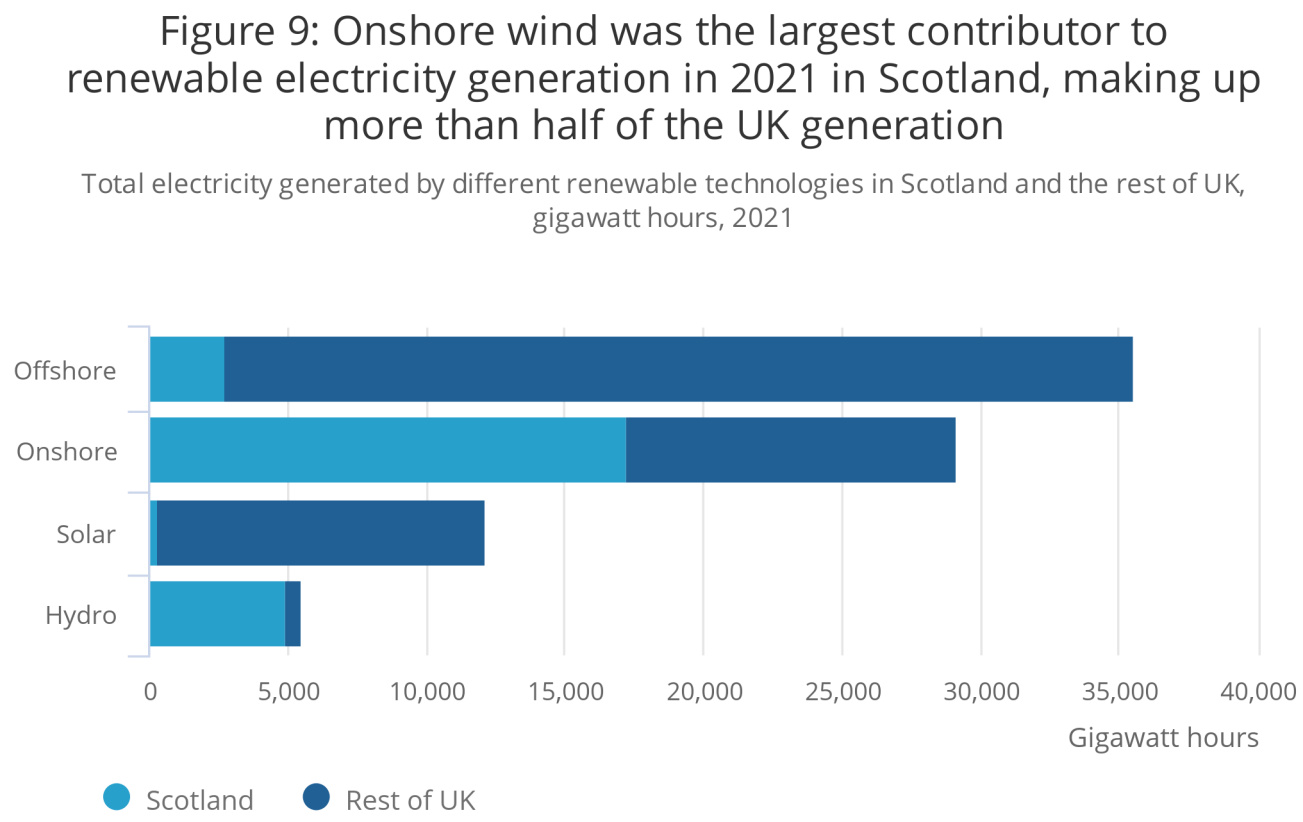
Between 2020 and 2021 renewable energy generation decreased by 15%, with onshore wind and hydro showing the largest decreases of 22% and 21% respectively.

In 2021, the largest share of renewable energy generation in Scotland was from onshore wind at 68% (Figure 9). Scotland produces 31% of the UK total wind electricity generation and 86% of Scotland's contribution comes from onshore wind.

The composition of renewable energy generation in Scotland has also changed. In 2008, hydro accounted for 58% and wind 41%, by 2021 hydro accounted for 20% and wind 79%.

Figure 9: Onshore wind was the largest contributor to renewable electricity generation in 2021 in Scotland, making up more than half of the UK generation

Total electricity generated by different renewable technologies in Scotland and the rest of UK, gigawatt hours, 2021



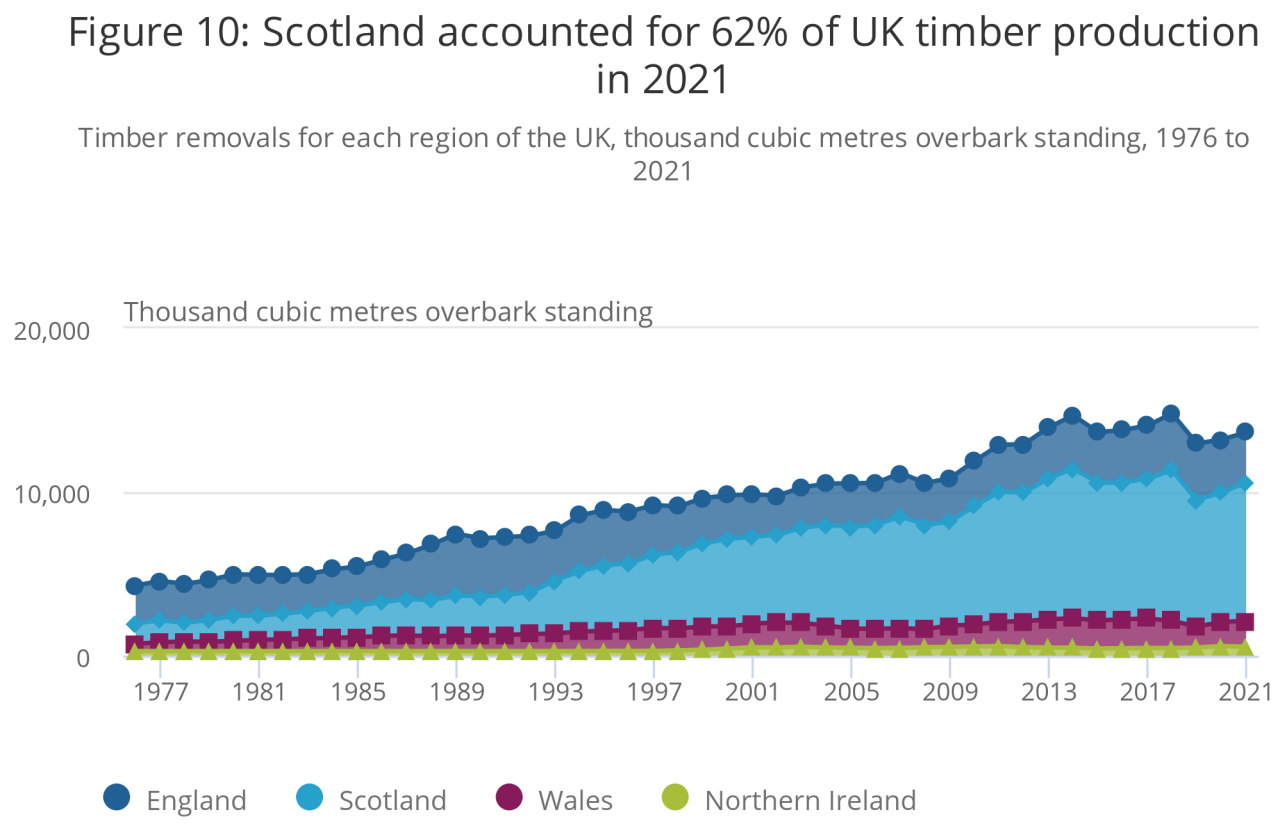
Source: UK natural capital accounts from the Office for National Statistics and Department for Business, Energy and Industrial Strategy

Timber

Timber removals refer to the harvesting of roundwood (trunks and branches) from coniferous and broadleaved trees. Our data cover softwood, from coniferous trees such as spruce, pine and larch, and hardwood, from non-coniferous trees such as oak, birch and beech, from both private and public sources.

Figure 10: Scotland accounted for 62% of UK timber production in 2021

Timber removals for each region of the UK, thousand cubic metres overbark standing, 1976 to 2021



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

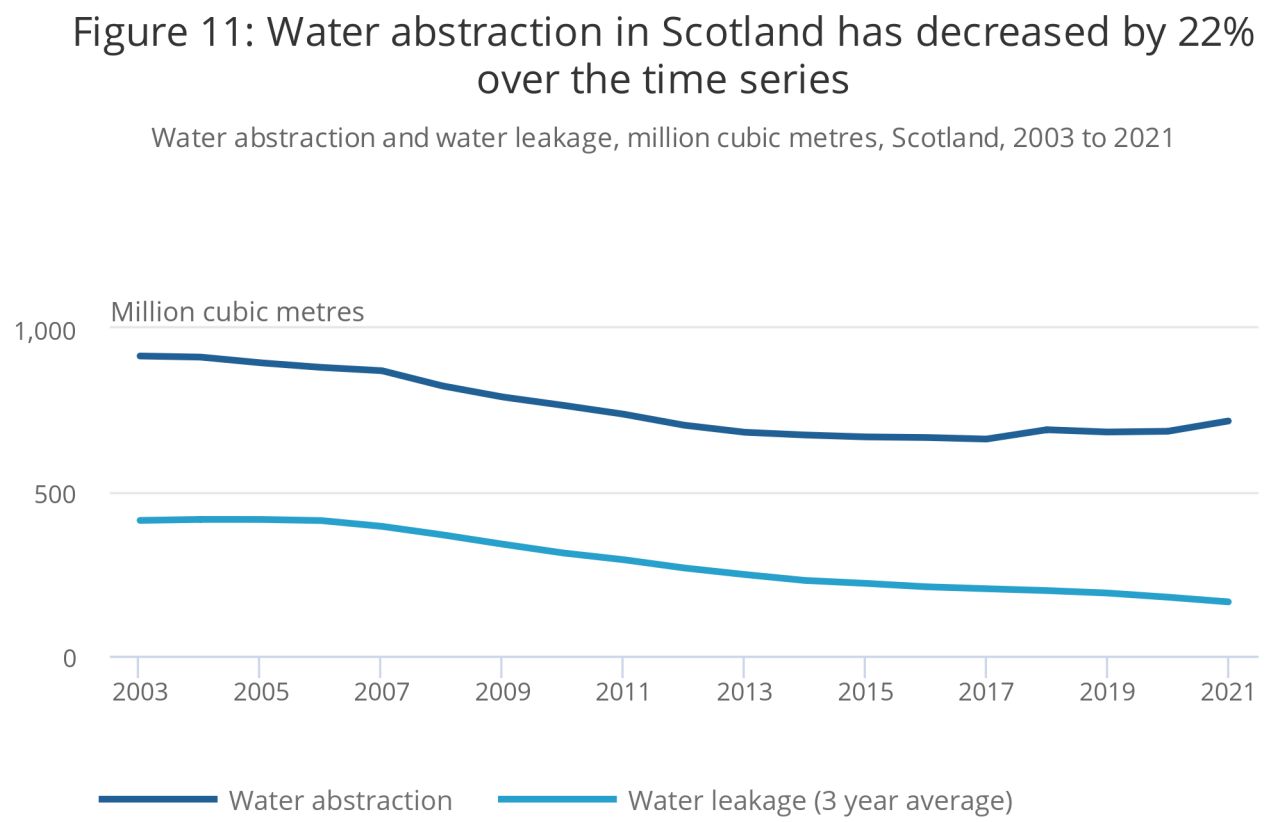
UK timber removal has increased since 1976, largely driven by removals in Scotland. Between 1976 and 2021, timber production in Scotland increased nearly sixfold, by 7,217 thousand cubic metres. However, during this period there were some annual reductions in production, notably in 2019, which saw a 16% decrease.

Water abstraction

Water abstraction decreased 28% between 2003 to 2017, from 915 million cubic metres to 662 million cubic metres. This was partly because of a decrease in water leakage, with the three-year moving average declining every year since 2005. Over the four years to 2021, there has been a 4% increase in water abstraction.

Figure 11: Water abstraction in Scotland has decreased by 22% over the time series

Water abstraction and water leakage, million cubic metres, Scotland, 2003 to 2021



Source: Scottish Water

Notes:

1. Data for water leakages are for financial years.

2. Water leakage data are on a 3-year moving average basis. This aligns with Ofwat targets/reporting and helps to reduce sensitivity to anomalous events such as weather conditions.

6 . Regulating services

Regulating services help to maintain the quality of the environment we rely upon, from the regulation of natural processes such as air quality regulation, climate regulation and natural hazard regulation. For Scotland, these include:

- sequestering and storing of climate change-causing greenhouse gases (GHGs) - a range of habitats, particularly woodlands, enable the removal of GHGs, mostly carbon dioxide (CO2), from the atmosphere
- removing air pollutants - the removal of air pollutants by vegetation, the monetary value of which is measured in terms of the willingness to pay to avoid hospitalisation and early mortality
- urban cooling - green (for example, parks) and blue (rivers, lakes, and canals) spaces can cool urban environments on hot days; benefits include limiting loss of labour productivity and reducing air conditioning use
- mitigating noise - vegetation acts as a buffer against noise pollution such as from road traffic

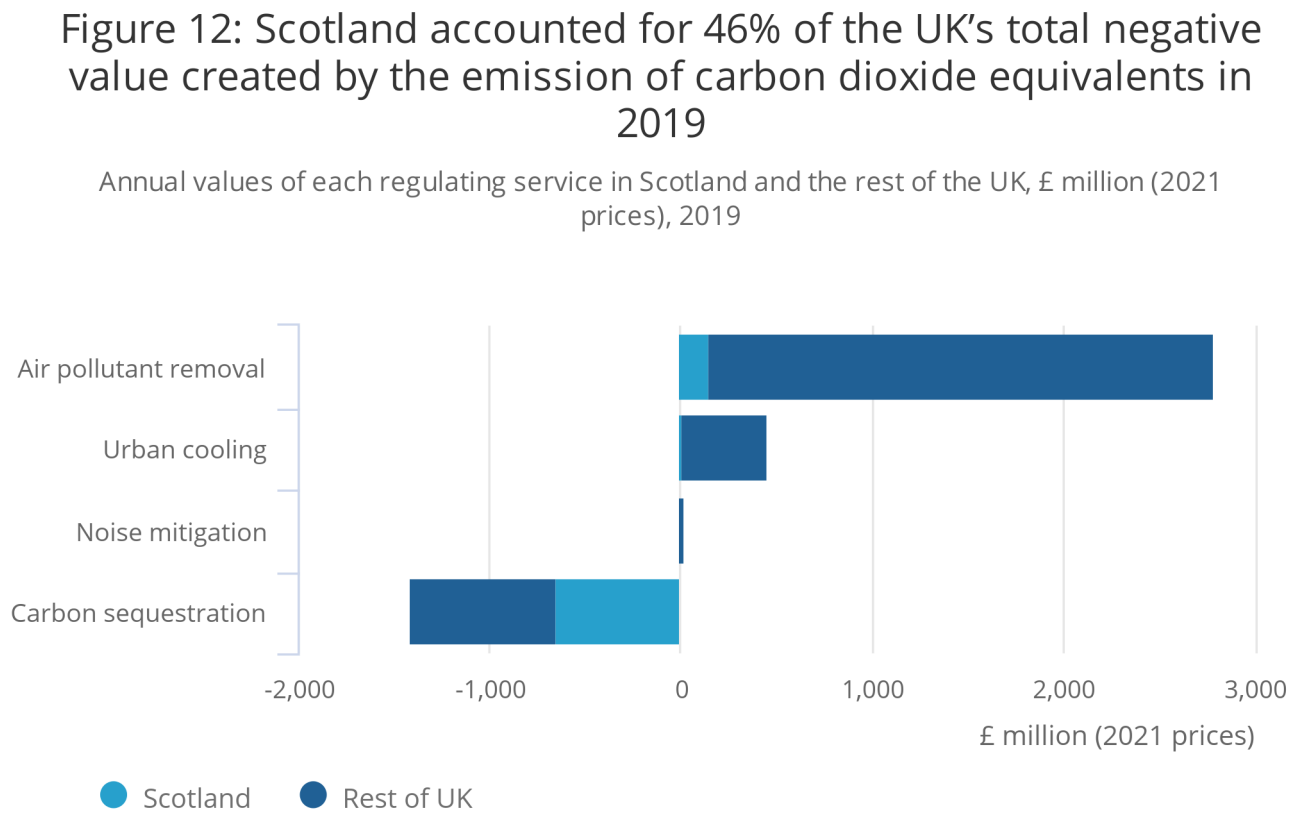
In 2019, the annual value of regulating services in Scotland was negative £498 million.

As with the rest of the UK, land use in Scotland results in net emissions of GHGs, which generates negative flow and asset values for this ecosystem service. Scotland accounted for 46% (2,724 thousand tonnes of CO2 equivalent) of net carbon emissions from land use in the UK in 2019, proportionally higher than the 32% of UK land area situated in Scotland.

These emissions are particularly high in areas with degraded peatland, since this emits carbon that has been stored up over centuries. Scotland has 66% of UK peatlands, and with 25% of Scotland's peatlands in a near-natural or rewetted condition, the share of net land emissions is also large. However, woodlands in Scotland have consistently removed more GHGs than they emit, and as such are valued at £1.5 billion in 2019.

Figure 12: Scotland accounted for 46% of the UK's total negative value created by the emission of carbon dioxide equivalents in 2019

Annual values of each regulating service in Scotland and the rest of the UK, £ million (2021 prices), 2019



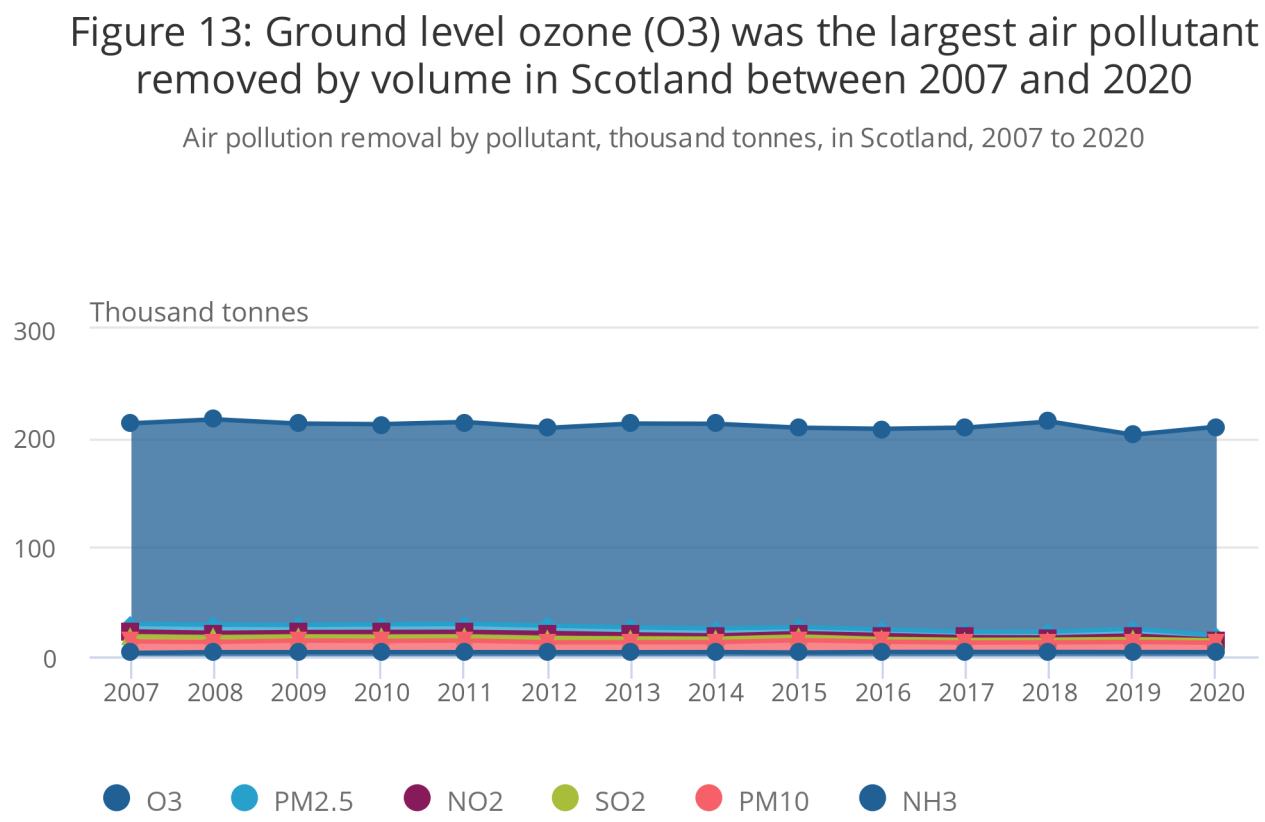
Source: UK natural capital accounts from the Office for National Statistics

The annual value of air pollution removal by nature was £145 million in Scotland in 2019. As this is estimated through avoided health impacts, values are driven by the number of people benefitting from this service.

The largest amount of pollutant removed by physical volume is ozone (Figure 13), however this accounts for a low proportion of the total annual value of air pollution removal, 6% in 2020.

Figure 13: Ground level ozone (O3) was the largest air pollutant removed by volume in Scotland between 2007 and 2020

Air pollution removal by pollutant, thousand tonnes, in Scotland, 2007 to 2020



Source: UK natural capital accounts from the Office for National Statistics and the UK Centre for Ecology and Hydrology

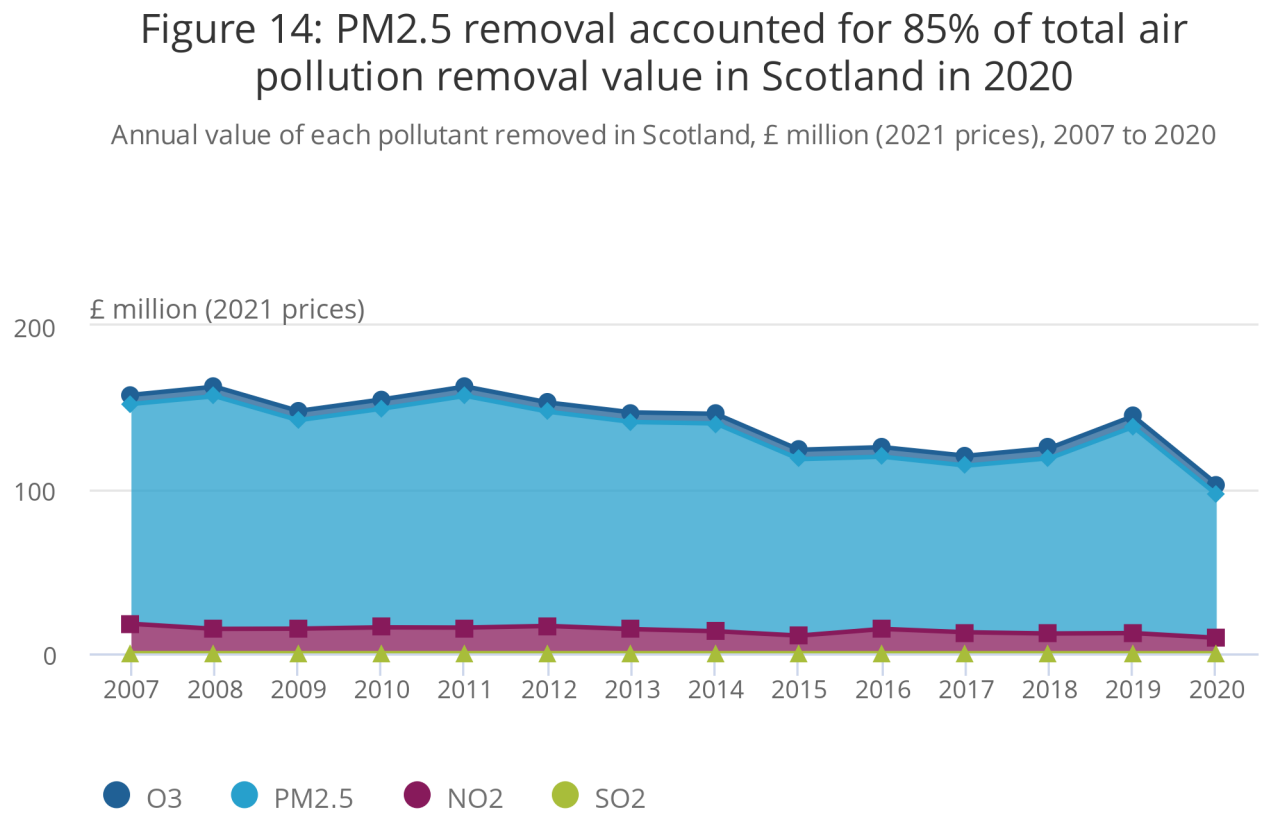
Notes:

1. Pollutants considered include Ozone (O3), Nitrogen Dioxide (NO2), Ammonia (NH3), Particulate Matter 10 and 2.5 (PM10 and PM2.5), and Sulphur Dioxide (SO2).

Although a relatively small physical volume of particulate matter 2.5 (PM2.5, a fine particulate matter with a diameter of 2.5 micrometres or less) air pollution is removed by nature, it has consistently accounted for the greatest share of the annual value in Scotland, representing 85% of the total in 2020.

Figure 14: PM2.5 removal accounted for 85% of total air pollution removal value in Scotland in 2020

Annual value of each pollutant removed in Scotland, £ million (2021 prices), 2007 to 2020



Source: UK natural capital accounts from the Office for National Statistics and the UK Centre for Ecology and Hydrology

Notes:

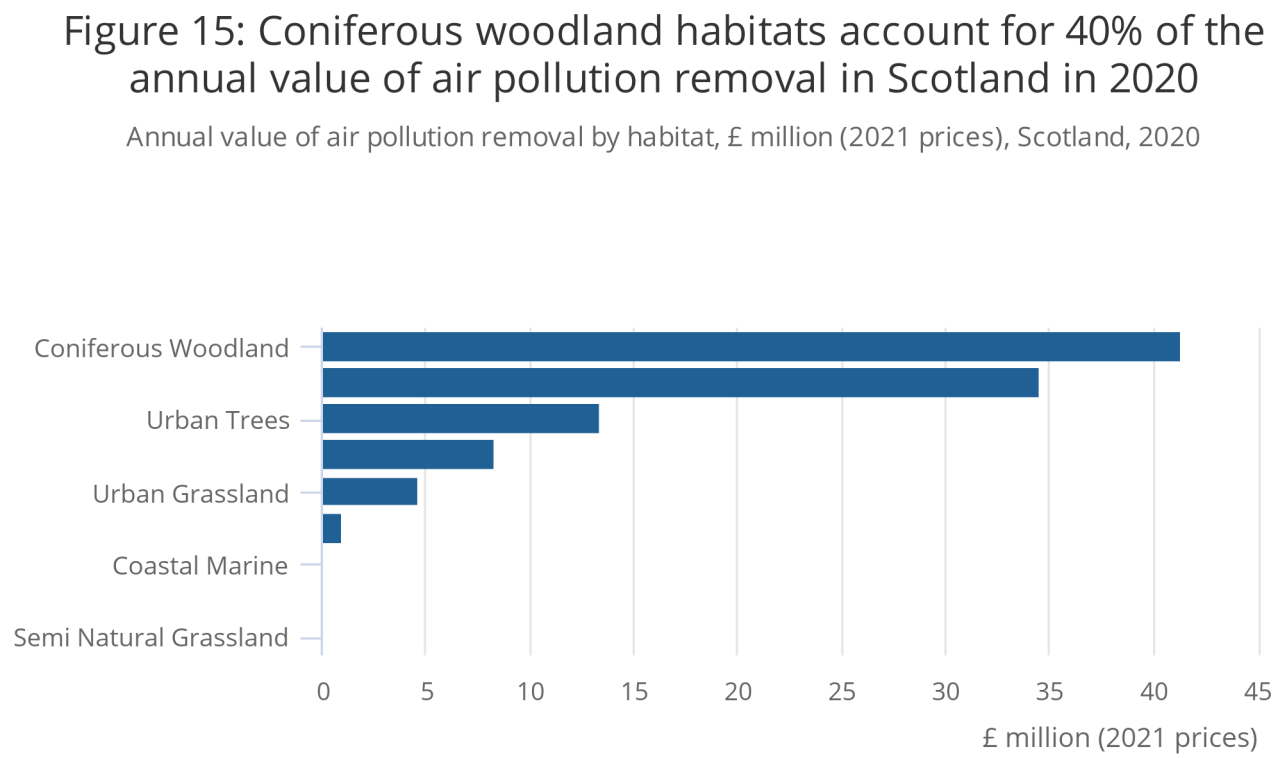
1. Pollutants considered include ozone (O3), nitrogen dioxide (NO2), ammonia (NH3), particulate matter 10 and 2.5 (PM10 and PM2.5), and sulphur dioxide (SO2).

2. The negative health effects of PM10 and NH3 are captured under PM2.5 estimates.

The biggest impact of particulate air pollution on public health is from long-term exposure to PM2.5, which increases the age-specific mortality risk, particularly from cardiovascular and respiratory diseases. This pollutant is emitted from multiple sources including wood and coal stoves, and wear of tyres and brakes. See more information in the Department for the Environment, Food and Rural Affairs Assessing progress towards WHO guideline levels of PM2.5 in the UK (PDF, 210KB).

Figure 15: Coniferous woodland habitats account for 40% of the annual value of air pollution removal in Scotland in 2020

Annual value of air pollution removal by habitat, £ million (2021 prices), Scotland, 2020



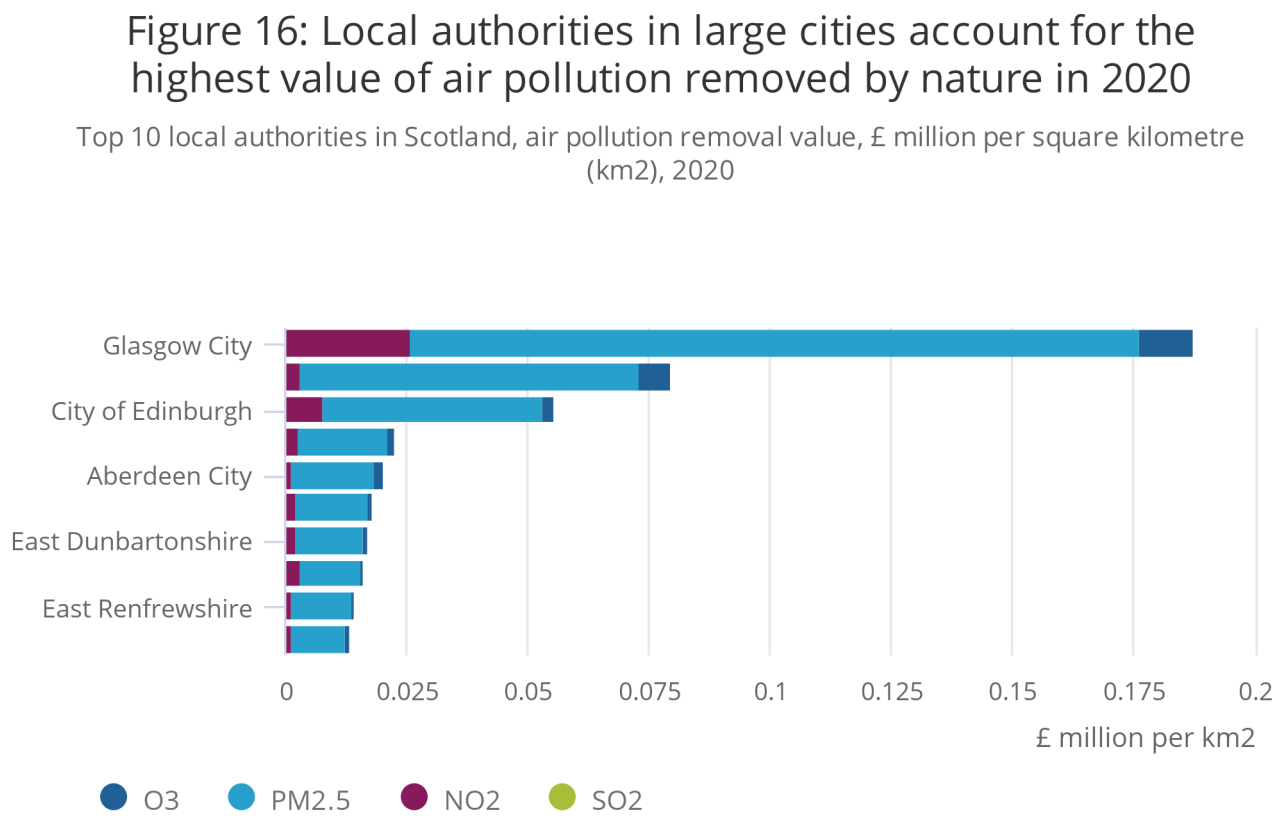
Source: UK natural capital accounts from the Office for National Statistics and the UK Centre for Ecology and Hydrology

Coniferous woodlands provide the highest value in removing air pollution in Scotland (Figure 15). This is partly because of the extent of this habitat, covering 12% of Scotland's land area compared with 6% across the UK, but also the relative efficiency of woodlands in pollution removal compared with other habitat types. Trees and woodland habitats accounted for 86% of the total of air pollution removal service value in Scotland in 2020.

Densely populated local authority areas typically generate the greatest air pollution removal values because of the number of people benefitting being considerably higher than in more sparsely populated areas, despite comparatively lower levels of vegetation. Urban trees and grasslands have the highest value per square kilometre because of their proximity to urban populations.

Figure 16: Local authorities in large cities account for the highest value of air pollution removed by nature in 2020

Top 10 local authorities in Scotland, air pollution removal value, £ million per square kilometre (km2), 2020



Source: UK natural capital accounts from the Office for National Statistics and the UK Centre for Ecology and Hydrology

Of the UK's physical pollutant removal, 23% occurred in Scotland. This is because of the relative abundance of green vegetation in Scotland. However, because of the population size and geographical distribution, this translated into 4% of the UK's total annual value.

Urban cooling

Nature has a cooling effect in urban environments, avoiding labour productivity losses therefore benefitting the economy, and reducing the use of artificial cooling such as air conditioning.

Urban cooling services were valued at £4 million in 2019. Woodlands contributed the greatest amount in temperature regulation, reducing the average temperature by 0.35 degrees Celsius in Edinburgh and Glasgow. The benefit from improved labour productivity makes up most of the value, with avoided air conditioning energy costs accounting for a small fraction.

Noise mitigation

Nature can act as a buffer against noise pollution, in particular road traffic noise. Noise pollution causes adverse health outcomes through sleep disturbance, hypertension and annoyance. The economic value is estimated through avoided loss of quality adjusted life years (QALY) using the Department for Environment, Food and Rural Affairs' (Defra's) marginal noise damage cost values.

The total number of buildings in Scotland that benefitted from a reduction in noise in 2019 was 7,000, with an estimated £664,506 annual value and £36 million in asset value.

7 . Cultural services

Cultural services are the non-material benefits we obtain from ecosystems through recreation, tourism and the associated health benefits. Within the Scotland accounts there are three distinct forms of cultural services:

- house prices (recreation and aesthetic) - recreation house prices include the additional value on houses that are near to green (land) and blue (water) spaces, enabling people to make "free trips" to the natural environment, while aesthetic house prices include how much value is added to a house that has a view of a green and/or blue space

- tourism and recreation - spending on travel to the natural environment and some aspects of expenditure incurred during visits (parking fees, transport costs, vehicle running costs and admissions)

- health benefits from recreation - the value associated with improved health and well-being resulting from regular visits to nature

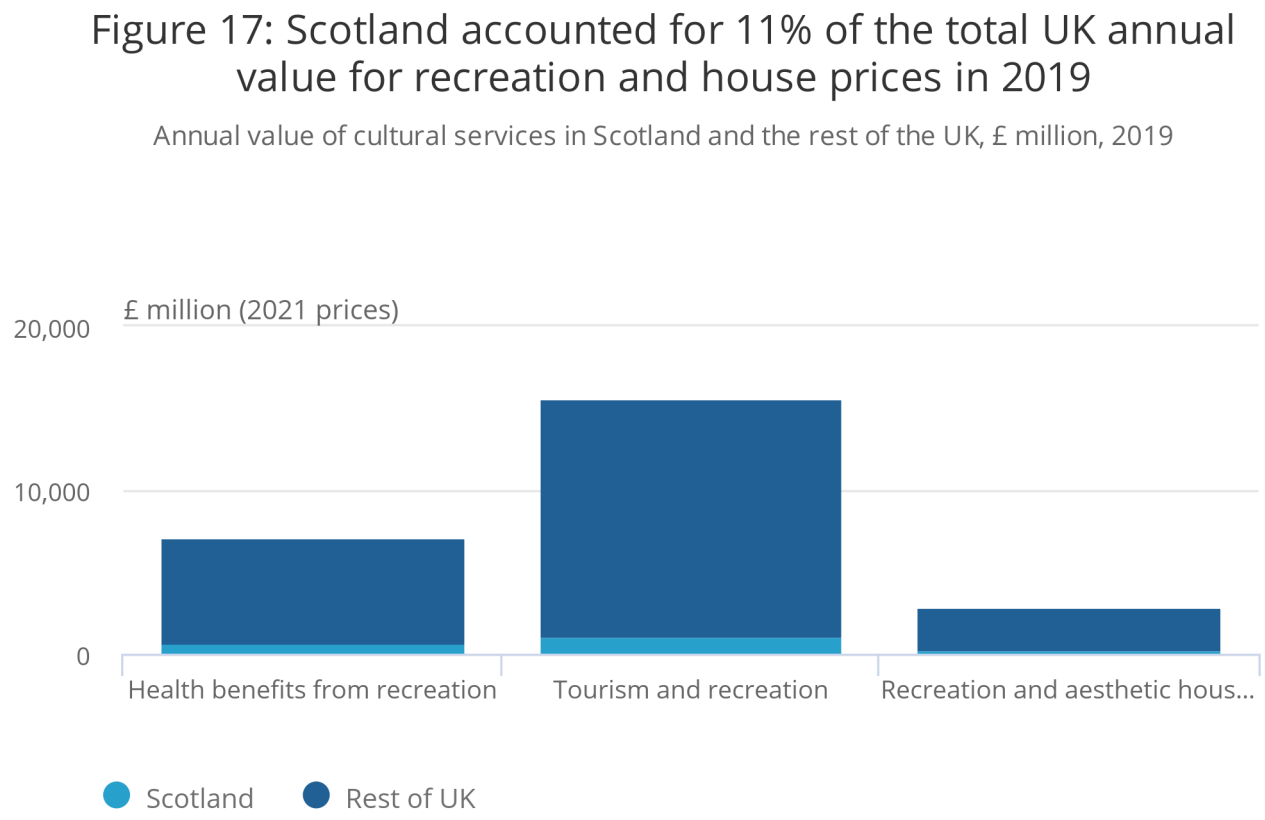
In 2019, the annual value of cultural services in Scotland was £2 billion, making up 8% of the total value of UK cultural services. This is in line with Scotland accounting for 8% of the UK population. Scotland accounted for 7% of the UK's annual value from nature for tourism and recreation, 10% of health benefits from recreation, and 11% of recreation and house prices.

For these cultural services, we are able to quantify both welfare benefits, explored further by the Outdoor Recreation Valuation model, and the more direct and transactional aspects such as recreation and people's engagement with the outdoors. The natural environment provides a space for recreational activities, which in turn, creates additional satisfaction, pleasure and enjoyment while reducing levels of stress and anxiety.

The recreation estimates were produced using the Scottish Recreation Survey (ScRS) and the Scotland's People and Nature Survey (SPANS). These surveys gather evidence and trend data relating to people's enjoyment, access, understanding of and attitudes to the natural environment, and contributions to well-being.

Figure 17: Scotland accounted for 11% of the total UK annual value for recreation and house prices in 2019

Annual value of cultural services in Scotland and the rest of the UK, £ million, 2019



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

House prices (recreation and aesthetic)

Recreation house prices include the additional expenditure on houses that are near to green (land) and blue (water) spaces, enabling people to make "free trips" to the natural environment, while aesthetic house prices estimate the value added to a property by a view of a green or blue space.

We are currently updating this methodology, so we have not included detailed figures in this bulletin. However, the annual value from house prices that can be attributed to living near to nature was £313 million in 2019. This measures the value of the "free trips" to these spaces within 500 metres of the house.

Tourism and recreation

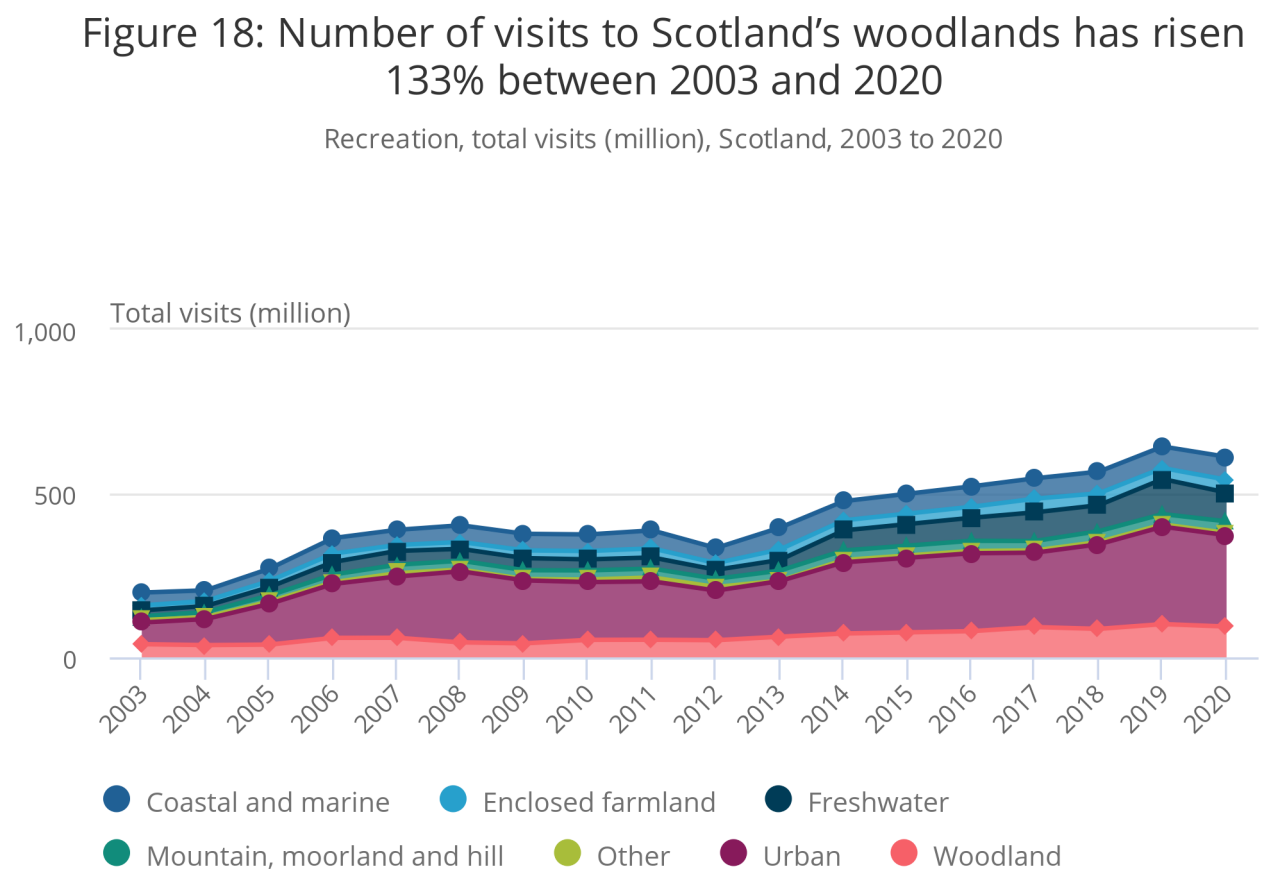
The value of tourism and recreation includes spending on travel to the natural environment and some aspects of expenditure incurred during visits, including parking fees, transport costs, vehicle running costs and admissions. The annual value of tourism and recreation in Scotland was £1 billion in 2019.

The surveys used to calculate the figures for tourism and recreation focus on both short recreational day trips from home, trips equal to or shorter than three hours, and all spending on outdoor activity. We also include visits and expenditure from international travellers through data from the International Passenger Survey (IPS).

Despite several country specific surveys being used to calculate estimates, results are comparable across the four nations because of the application of the same methodology. This is further explored in our Scotland natural capital accounts methodology: 2023.

Figure 18: Number of visits to Scotland's woodlands has risen 133% between 2003 and 2020

Recreation, total visits (million), Scotland, 2003 to 2020



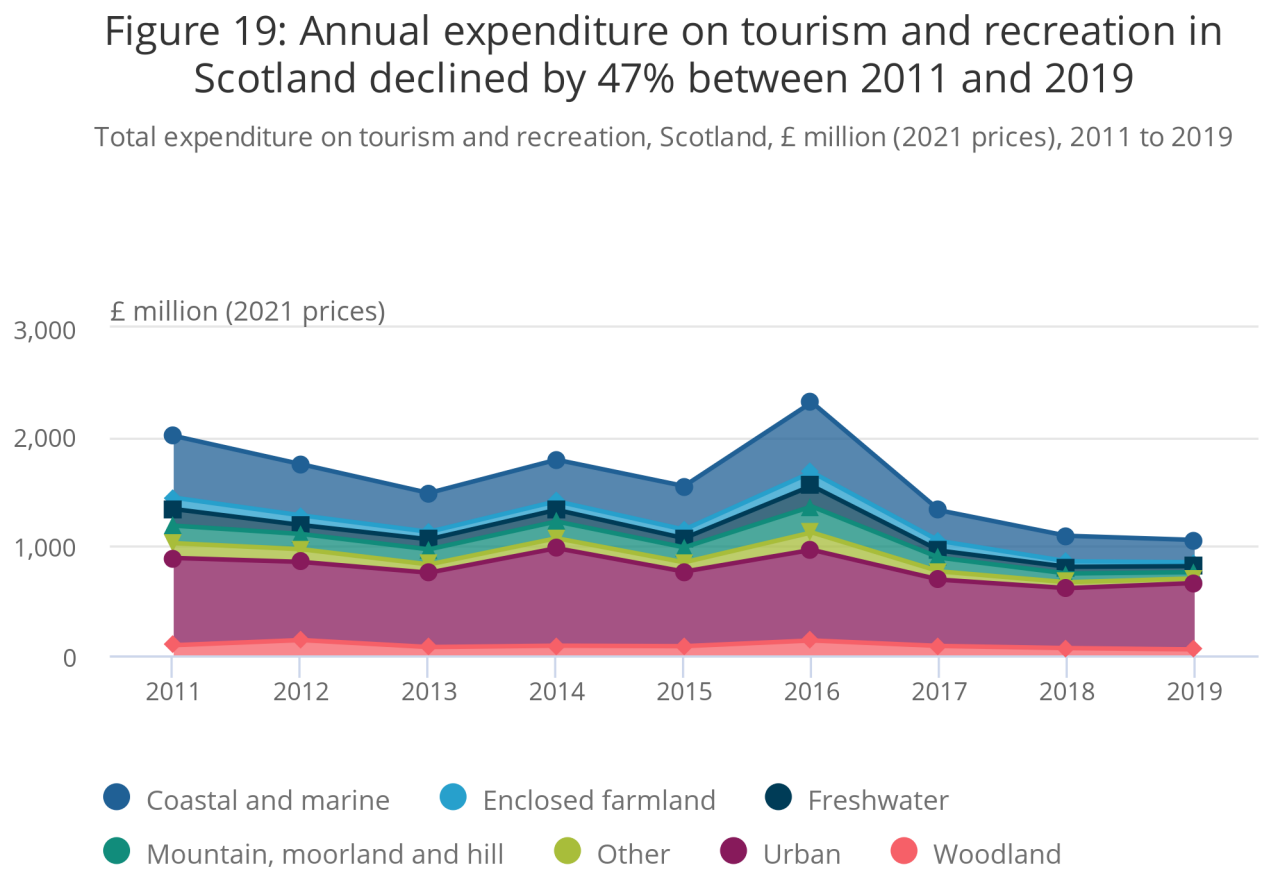
Source: NatureScot, The Scottish Recreation Survey (ScRS) and the Scotland's People and Nature Survey (SPANS)

Tourism and recreation trips have increased from 366 million in 2011 to 569 million in 2020. Visits to natural spaces in urban areas made up most of these visits, averaging 48% of total visits across the period. Destinations have changed during this period, with urban, freshwater and woodland habitat types exhibiting the largest rates of increase.

The reduction in total visits to nature in 2020 is likely to be partly because of coronavirus (COVID-19) pandemic-related travel restrictions.

Figure 19: Annual expenditure on tourism and recreation in Scotland declined by 47% between 2011 and 2019

Total expenditure on tourism and recreation, Scotland, £ million (2021 prices), 2011 to 2019



Source: NatureScot and The Scottish Recreation Survey (ScRS)

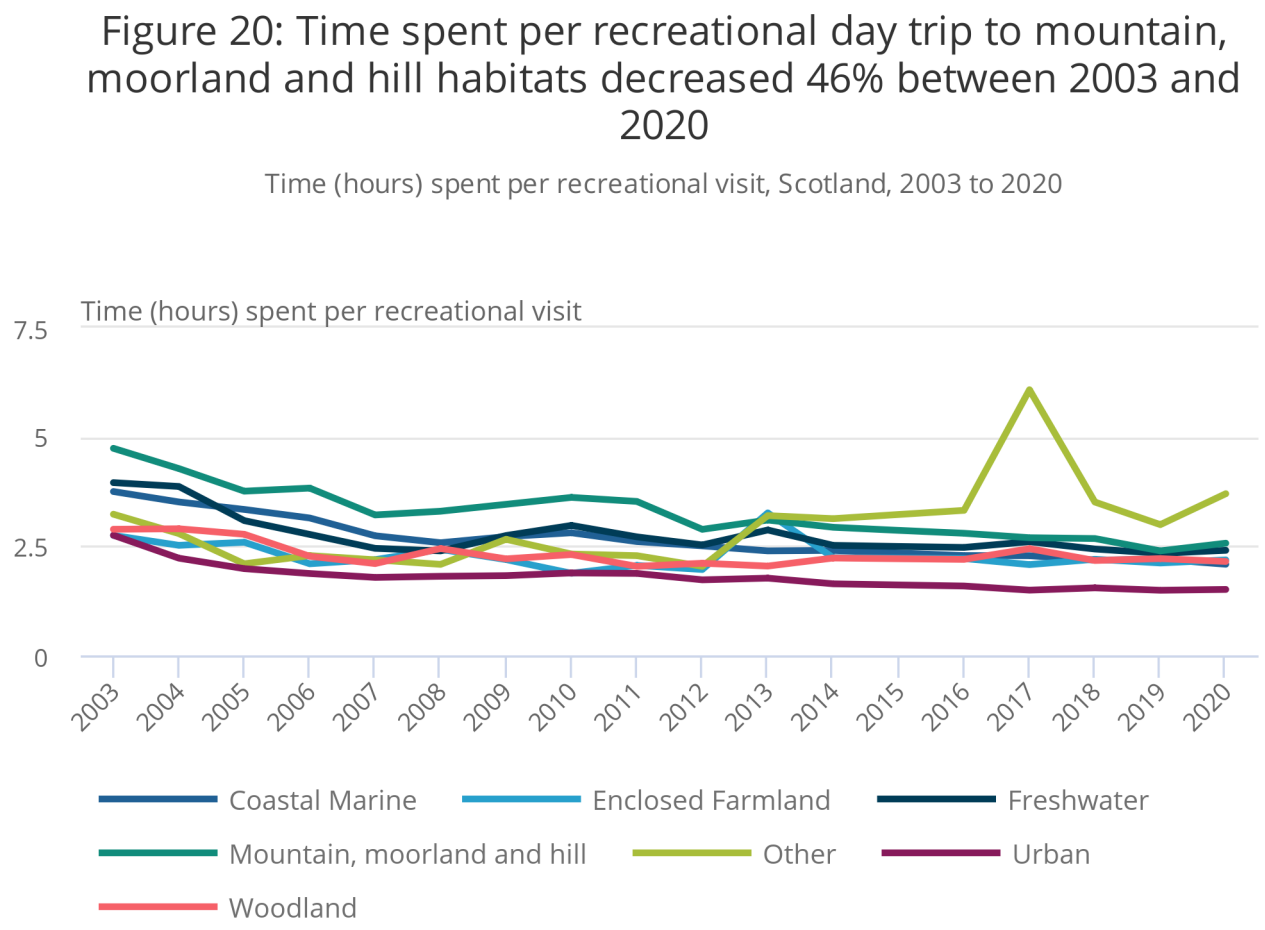
Between 2011 and 2019 there was a decline in total expenditure across all habitats of 4% a year on average, from £2 billion to £1 billion. Coastal marine and urban destinations accounted for 77% of expenditure in 2019.

An increasing number of people are choosing to walk or cycle to natural spaces instead of using cars. This change in transport method has led to a 42% decline in travel costs between 2011 and 2019. See further information in Scotland's People and Nature Survey 2019/20 - outdoor recreation, health, and environmental attitudes modules (PDF, 5.5MB).

Typically, longer trips are associated with higher travel costs and declines in average length of trip (Figure 20) have driven the reduction in annual expenditure.

Figure 20: Time spent per recreational day trip to mountain, moorland and hill habitats decreased 46% between 2003 and 2020

Time (hours) spent per recreational visit, Scotland, 2003 to 2020

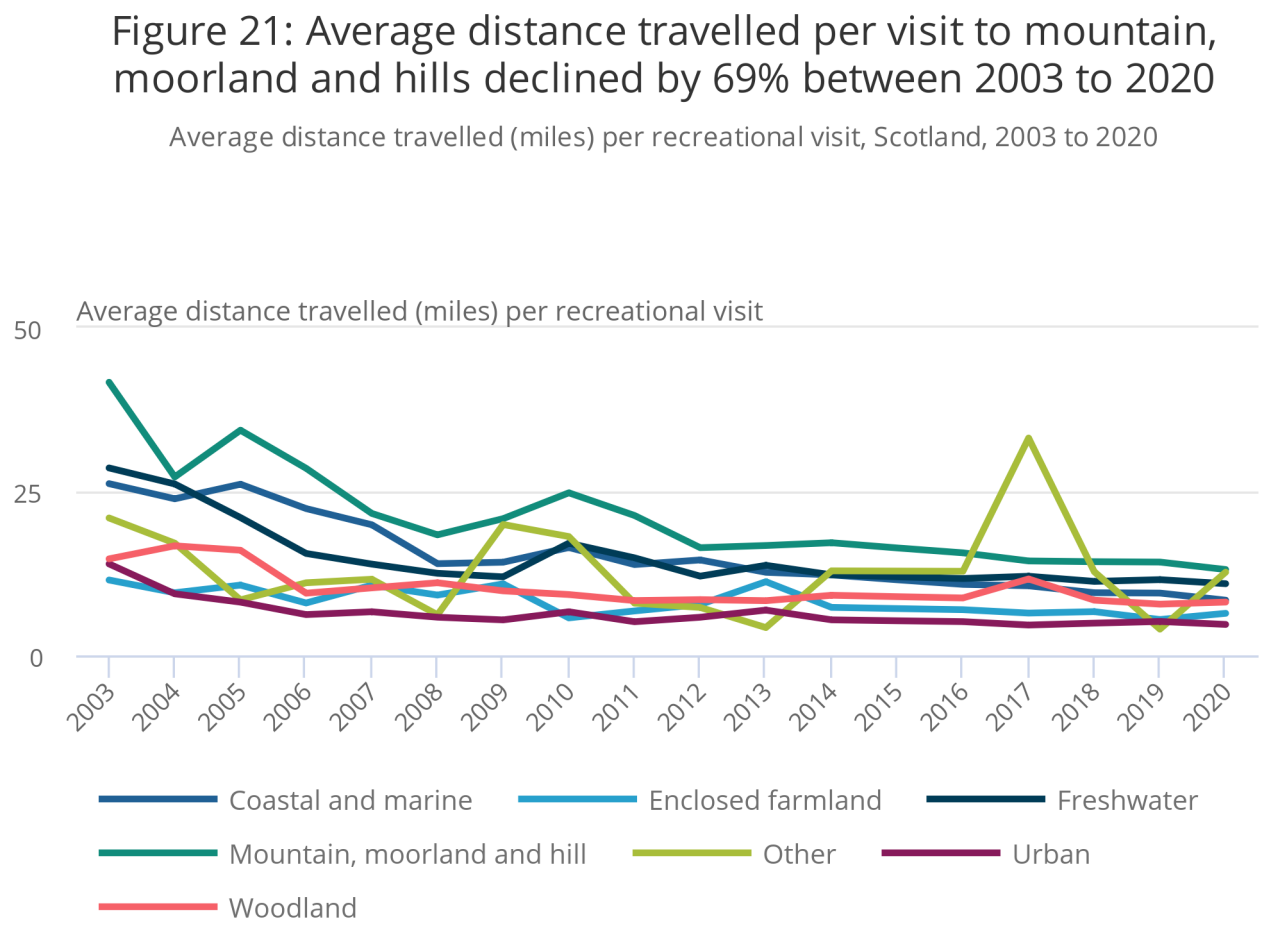


Source: NatureScot and Scotland's People and Nature Survey

Between 2011 and 2020, total time on day trips to nature increased by 38% to 1 billion hours, while total visits increased by 58% to 612 million over the same period. This resulted in a decline in the duration of each visit of 13%.

Figure 21: Average distance travelled per visit to mountain, moorland and hills declined by 69% between 2003 to 2020

Average distance travelled (miles) per recreational visit, Scotland, 2003 to 2020



Source: NatureScot, The Scottish Recreation Survey (ScRS) and the Scotland's People and Nature Survey (SPANS)

Mountain, moorland and hill habitats had the greatest distance travelled per visit at 13 miles in 2020, a decline of 69% from 2003. All habitats witnessed a decline in the average travel distance ranging from a 44% to 69% decrease since 2003. Urban natural spaces as destinations for tourism had the shortest average distance travelled at 5 miles, because of the proximity of urban housing to urban natural spaces.

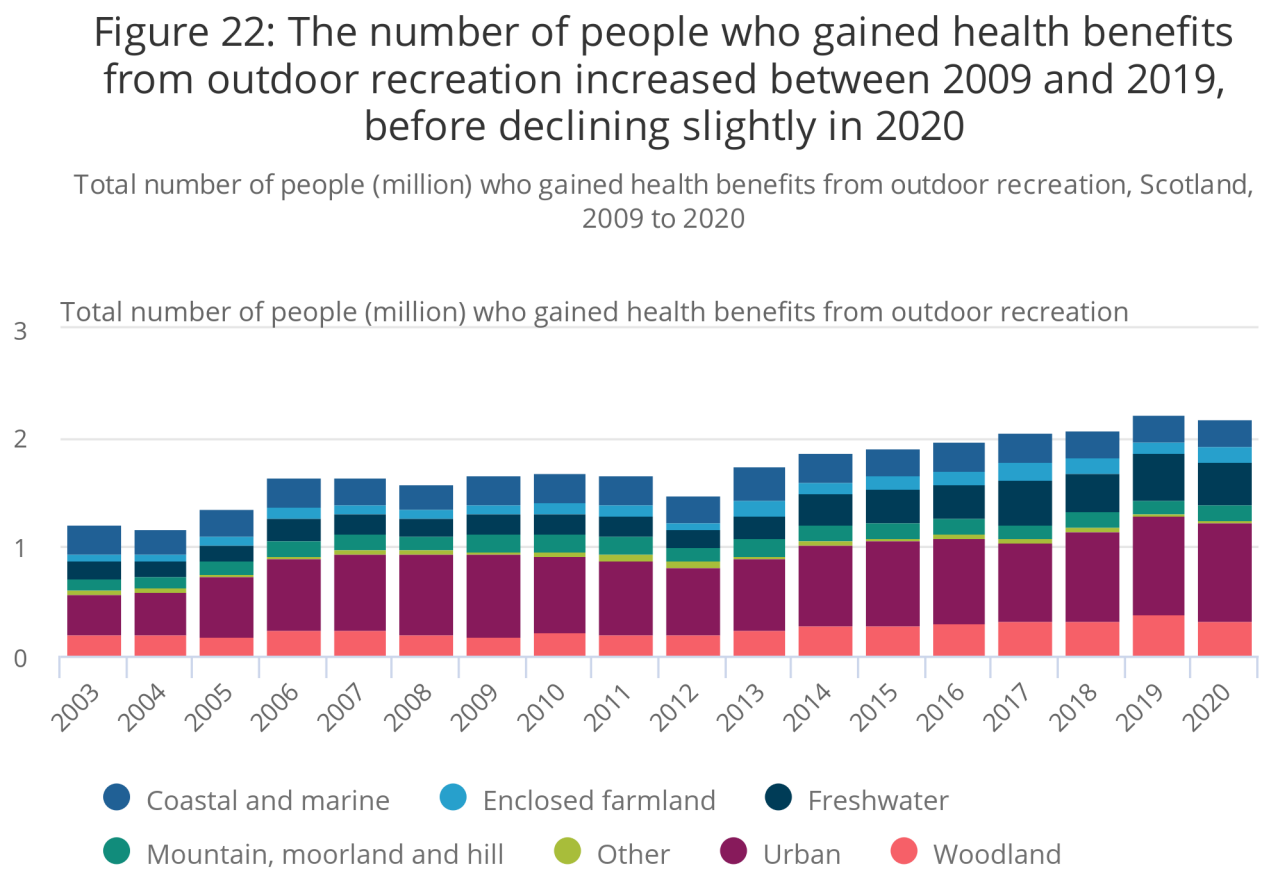
Health benefits from recreation

The annual value of health benefits is estimated at £717 million in 2020, up 32% from £544 million in 2011.

Research has shown that there are clear health benefits from spending time in nature. For example, according to the paper Spending at least 120 minutes a week in nature is associated with good health and wellbeing by White and others (2019), spending at least 120 minutes a week in nature gives statistically significant health advantages. Our modelling uses this as a minimum threshold, with only those meeting this considered to have experienced benefits. See further information in our Health benefits from recreation, natural capital, UK: 2022 bulletin..

Figure 22: The number of people who gained health benefits from outdoor recreation increased between 2009 and 2019, before declining slightly in 2020

Total number of people (million) who gained health benefits from outdoor recreation, Scotland, 2009 to 2020



Source: NatureScot, The Scottish Recreation Survey (ScRS) and the Scotland's People and Nature Survey (SPANS)

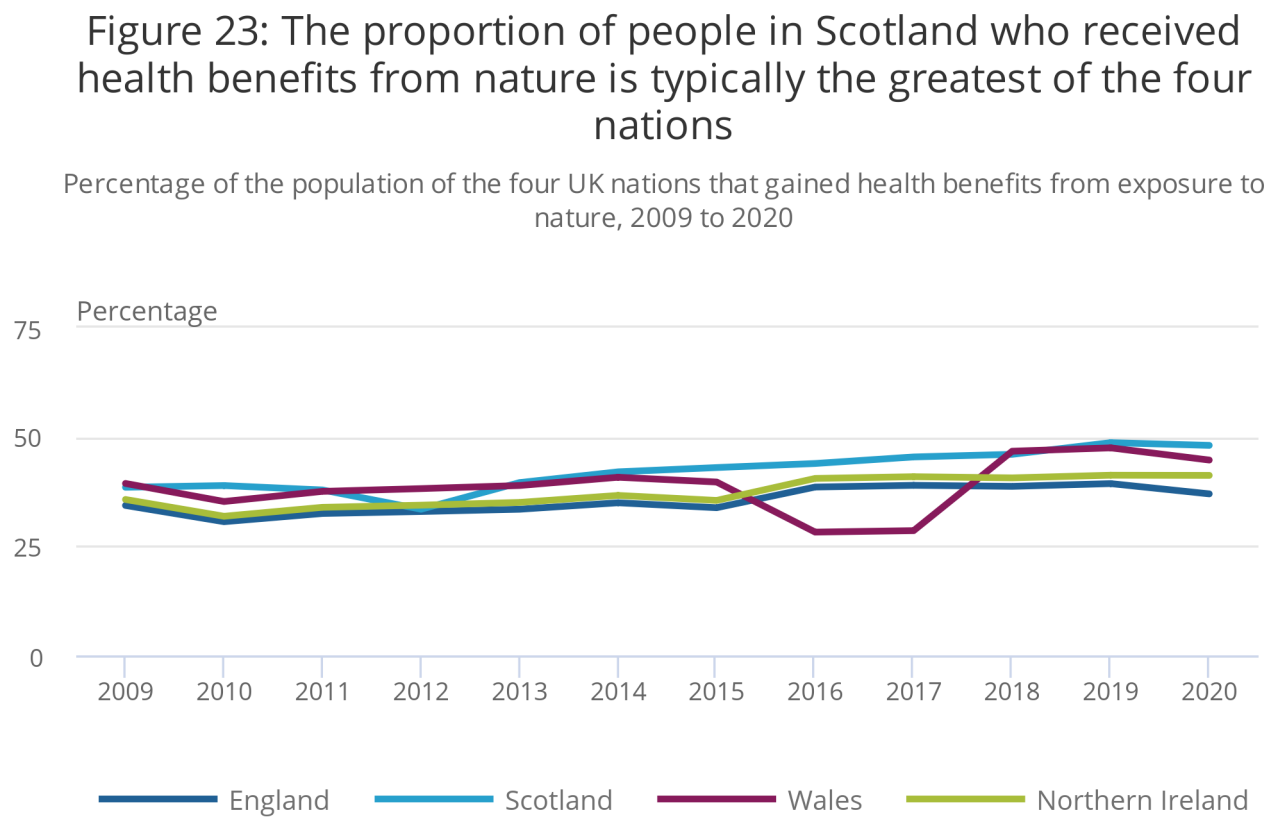
The number of people who gained health benefits within Scotland from time spent in nature reached 2 million in 2019, increasing an average of 3% a year between 2009 and 2020.

The fall of 25,000 people benefitting from nature between 2019 and 2020 was driven by a decline in the average length of trips taken. The average duration of a trip was 133 minutes in 2011, which fell to 116 minutes in 2020. As a result, people are less likely to meet the 120-minute threshold.

Although urban areas consistently featured as the most popular habitat for deriving health benefits from nature, freshwater habitat visits increased the most relatively, doubling between 2009 and 2020. Mountains, moorland, and hill areas saw a 5% decline in visits over the same period.

Figure 23: The proportion of people in Scotland who received health benefits from nature is typically the greatest of the four nations

Percentage of the population of the four UK nations that gained health benefits from exposure to nature, 2009 to 2020



Source: UK natural capital accounts from the Office for National Statistics, Monitor of Engagement with the Natural Environment for England, Scotland's People and Nature Survey, National Survey for Wales, and People and Nature Survey

The proportion of the population that gained health benefits from time spent in nature has seen a long-term upward trend from 2009 to 2020, for all four UK nations (Figure 23). Scotland typically has the highest proportion of people benefitting from nature, reaching 48% in 2020.

8 . Asset values

Asset values of natural resources measure the long-term potential (stock) of that resource to provide goods and services to people.

The total asset value for all ecosystem services we can currently value in Scotland is an estimated £230 billion in 2019, which was 13% of the total UK asset value.

Scotland's contributions to the UK asset value are greatest for oil and gas (98%), fish capture (79%), timber (63%), and renewable energy (56%).

Figure 24: Oil and gas had the highest total asset value of all natural capital services in Scotland, making up the majority of the UK value in 2019

Asset values for all services, Scotland and the rest of the UK, £ million (2021 prices), 2019

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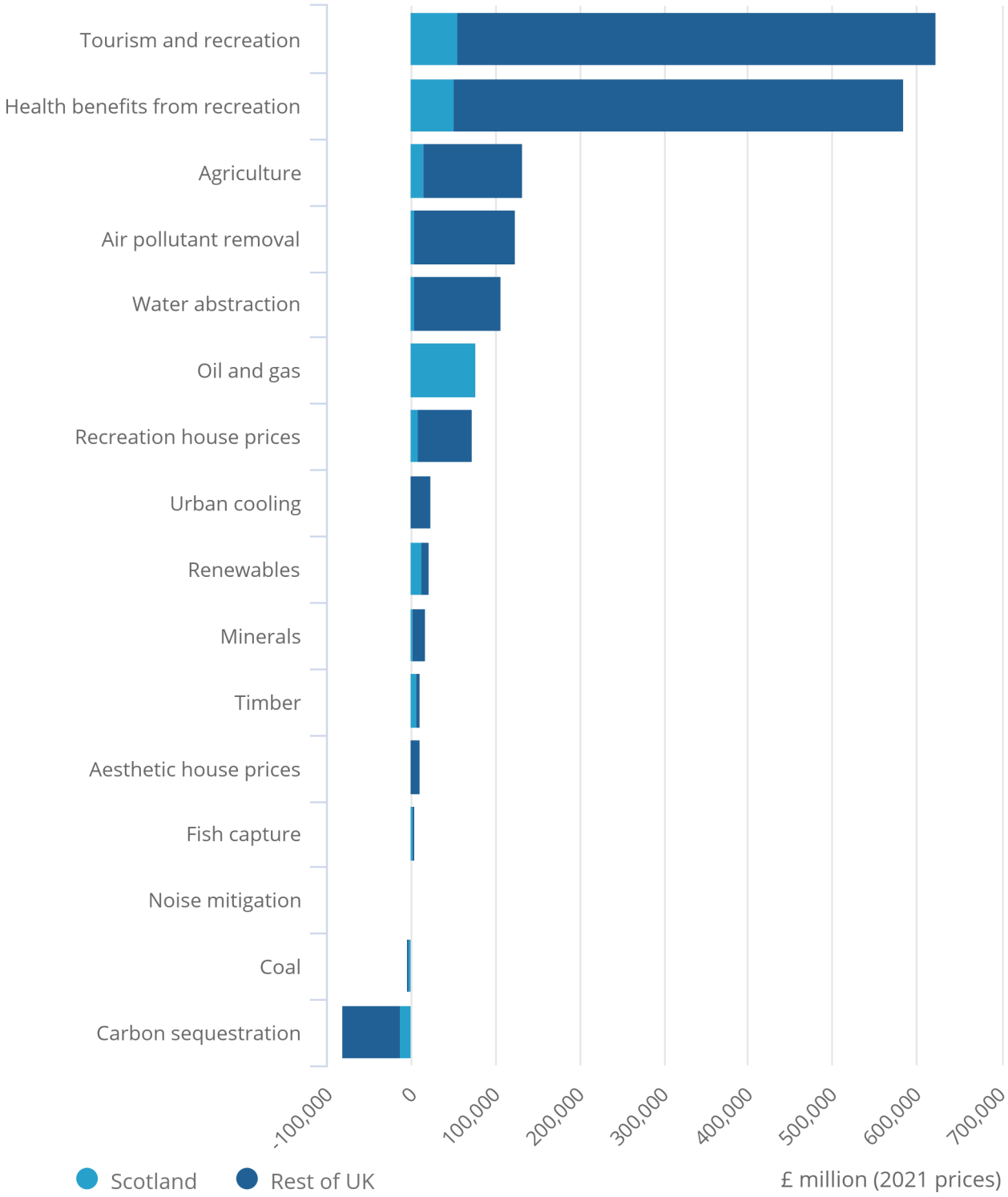
Asset values for all services, Scotland and the rest of the UK, £ million (2021 prices), 2019



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

Scotland's oil and gas deposits are the largest component of its total natural asset valuation, some 33% in 2019. This is followed by tourism and recreation (25%) and health benefits from recreation (22%). These top three services combined account for 80% of Scotland's total asset value.

The oil and gas asset value exceeding that of the cultural services is a notable result. Comparatively, the cultural services have the greatest asset value within the England and UK accounts. This demonstrates the size and importance of fossil fuel resources to Scotland's overall natural capital asset value.

9 . Scotland natural capital accounts data

Natural capital accounts, Scotland, supplementary tables
Dataset | Released 15 June 2023
Physical (non-monetary) and monetary estimates of services provided by natural assets in Scotland between 1998 and 2020.

Natural capital accounts, Scotland, detailed supplementary tables
Dataset | Released 15 June 2023
A detailed data breakdown of the financial and societal value of Scotland's natural resources.

10 . Glossary

Asset

A natural asset is a resource that can generate goods or services to humans into the future. The valuation of the natural asset estimates the stream of services that are expected to be produced over a reasonably predictable time horizon.

Ecosystem services

Ecosystem services are the living (biotic) components of the Earth that provide services to humans, such as woodland.

Overbark

The volume of wood including the bark. Can be either standing volume or felled volume.

Physical flow

The physical flow of a natural asset is the measure of its output in units appropriate to the good or service. This differs from the annual value and asset value, which measure the monetary value of a natural resource.

11 . Measuring the data

We have used a wide variety of sources for estimates of natural capital in Scotland.

The Office for National Statistics (ONS) and the Department for Environment, Food and Rural Affairs (Defra) have published a summary of the principles underlying the natural capital accounts.

These accounts have been compiled in line with the guidelines recommended by the United Nations (UN) System of Environmental-Economic Accounting (SEEA) Central Framework and the UN SEEA Experimental Ecosystem Accounting principles. These are, in turn, part of the wider framework of the system of national accounts. UN guidance continues to develop.

We welcome feedback on this output or any of the approaches taken in it to natural.capital.team@ons.gov.uk.

More detailed quality and methodology information on strengths, limitations, appropriate uses, and how the data were created is available in our accompanying Scotland natural capital accounts methodology: 2023.

This bulletin was produced for the Scottish Government by the Office for National Statistics.

12 . Strengths and limitations

These experimental accounts are being continually revised to produce the best statistics with the available data and methods.

We have identified strengths and limitations of the data as well as avenues for future development. These are outlined, along with detailed information on quality, methodology and appropriate uses, and how the data were created, in our accompanying Scotland natural capital accounts methodology: 2023.

13 . Related links

UK natural capital accounts: 2022
Bulletin | Released 10 November 2022
Estimates of the financial and societal value of natural resources to people in the UK.

England natural capital accounts: 2023
Bulletin | Released 25 January 2023
Estimates the value of English natural capital and its beneficial effects for the population.

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.

Woodland natural capital accounts: 2022
Bulletin | Released 15 December 2022
Natural capital accounts containing information on ecosystem services for woodlands in the UK.

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. Experimental estimates.

14 . Cite this statistical bulletin

Office for National Statistics (ONS), released 15 June 2023, ONS website, statistical bulletin, Scotland natural capital accounts: 2023