Marine and coastal margins natural capital accounts, UK, methodology guide: 2025

How the marine and coastal margins natural capital ecosystem service accounts are measured and developed, including the specific methods used to value individual components of natural capital, and physical and monetary data sources.

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1 . Overview

This article describes the methodology used to develop the UK marine and coastal margins natural capital accounts. The estimates reported in our Marine and coastal margins natural capital accounts, UK: 2025 bulletin are official statistics in development (previously known as experimental statistics).

We use a wide variety of data sources to produce the marine and coastal margins natural capital accounts bulletin. We compile these sources in line with the guidelines recommended by the United Nations (UN) System of Environmental-Economic Accounting (SEEA) Central Framework and the UN SEEA Ecosystem Accounting. We published our Principles of UK natural capital accounting: 2023 methodology, which summarises the principles we apply when interpreting guidance and developing practical methodologies in the UK.

We continue to improve our methodological approaches. We welcome feedback on any of our approaches. To get in contact, please email natural.capital.team@ons.gov.uk.

Our marine and coastal margins natural capital accounts present:

- extent account: the UK area for marine and coastal margins habitats
- condition account: indicators of the quality of ecosystems and their ability to continue supplying services in marine and coastal margins habitats
- physical and monetary ecosystem service flow accounts: the quantity and value of services supplied by marine and coastal margins ecosystems
- monetary asset account: the value of marine and coastal margins ecosystems as an asset, for the stream of services expected to be provided over the lifetime of the asset

2 . Extent of marine and coastal margins habitats

Marine

This broad habitat is saltwater covering the tidal zone around the UK and the sea. The mapping extent is based on the sea boundary for the UK's Exclusive Economic Zone (EEZ). The Joint Nature Conservation Committee (JNCC) has created a digital UK Atlas of Seabed Habitats based on the European standard classification (EUNIS) . Full descriptions of each classification are available on the JNCC Marine Habitat Classification for Britain and Ireland website.

Coastal margins

This broad habitat is the intertidal areas such as the beach and saltmarsh, and the areas above the high tide mark, including rocky coastlines and sand dunes.

3 . Marine and coastal margins condition indicators

Ecosystem condition accounts provide a structured approach to recording and aggregating data describing the characteristics of ecosystem assets and how they have changed.

The United Nations System of Environmental-Economic Accounting - Ecosystem Accounting (SEEA EA) (PDF, 5.47MB) is a spatially-based, integrated statistical framework.

The first step is to define and select ecosystem characteristics and associated variables. To assess condition, this means looking at characteristics that can show a directional change over consecutive accounting periods in a scientifically robust manner. We also need to collect data on stable characteristics.

Ecosystem condition typology

The ecosystem condition typology (ECT) is a hierarchical typology for organising data on the condition characteristics.

Abiotic (physical) ecosystem characteristics:

- physical state characteristics — including soil structure, water availability
- chemical state characteristics — including soil nutrient levels, water quality, air pollutant concentrations

Biotic ecosystem characteristics:

- compositional state characteristics — including species-based indicators
- structural state characteristics — including vegetation, biomass, food chains
- functional state characteristics — including ecosystem processes, disturbance regimes

Landscape-level characteristics:

- landscape and seascape characteristics — including landscape diversity, connectivity, fragmentation, embedded semi-natural elements in farmland

Physical and chemical indicators

Water framework directive

The Water Framework Directive is used to represent the quality of bodies of water in the UK. Water bodies are assessed according to the directive and reported through the Joint Nature Conservation Committee (JNCC) and the Department for Environment, Food and Rural Affairs (Defra). Please see The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 for more details on methodology and the UK Biodiversity Indicators 2024 surface water status on the JNCC website for the source data.

Coastal bathing waters

Samples are collected from designated bathing water sites around England and Wales by the Environment Agency, which are monitored weekly from early May to the end of September.

In Scotland, samples are collected weekly by the Scottish Environment Protection Agency (SEPA) from 15 May to 15 September each year.

In Northern Ireland, the Department of Agriculture, Environment and Rural Affairs (DAERA) tests water quality on 20 different occasions from June to mid-September.

These samples are tested for indicators of water cleanliness and safety, such as concentration of faecal matter and the potentially infectious bacteria, Escherichia coli.

Several sites were not tested in 2020 because of the coronavirus (COVID-19) pandemic and related restrictions, including all sites in England and Scotland. Data from 2015 to 2020 were provided by the European Environmental Agency.

For more details on methodology please see the Environment Agency, SEPA and DAERA websites.

Plastic particles in sediment

Deep-sea sediments are a likely sink for microplastics. While there is not yet an agreed safe or unsafe threshold for microplastic concentrations in UK sea sediments, microplastics are damaging to marine ecosystems. They can cause damage to the health of marine organisms, and become present in fish consumed by humans.

Sediment samples (top 2 to 3 centimetres) were collected from the seafloor by the Centre for Environment, Fisheries and Aquaculture Science (Cefas). Organic matter was digested to isolate the microplastics. A process called Micro-Fourier Transform infrared spectroscopy was used to analyse the microplastics.

The number of particles per dry mass is standardised to number of particles per kilogramme of dry mass. We present these, indicating whether samples were taken from a sea to the east or west of Great Britain.

Sea temperatures

Sea temperatures can indicate the response of marine ecosystems to stressors such as climate change, and the ability for marine ecosystems to support temperature-sensitive species.

Sea temperatures for England and Wales were collected by the Centre for Environment, Fisheries and Aquaculture Science (Cefas) and external suppliers, from the sea surface, several times per month. This data collection was discontinued in 2018.

Sea temperatures for Northern Ireland were collected by the Department of Agriculture, Environment and Rural Affairs (DAERA). These were recorded at various depths every three hours. We used the sea surface and seabed temperatures for the Northern Ireland data.

The annual average temperature was then used to plot the change in average sea surface or seabed temperature through time.

For more details on methods, please see the Cefas for England and Wales and DAERA for Northern Ireland (PDF, 4.14MB) websites.

Compositional species indicators

Species indicators reflect habitat health, both through the diversity of species present in the habitat (and therefore its resilience), and the health of populations of keystone and/or protected species.

Seabirds

Bird populations measured by the Joint Nature Conservation Committee (JNCC) provide a useful indicator of the state of UK nature, as birds occupy a wide range of habitats and respond to environmental pressures.

The habitat-based bird populations are accredited official statistics (Wild bird populations in the UK and England), produced by the Royal Society for the Protection of Birds (RSPB) and the British Trust for Ornithology (BTO), under contract to the Department for Environment, Food and Rural Affairs (Defra) and the JNCC.

The data used to produce these indicators come from a range of surveys and sources. Species are selected for the indicator if they have a population of at least 300 breeding pairs and are a native species. To find out more about how bird populations are counted, and sources of data, please visit the BTO's breeding bird survey web page and Defra's technical report paper on the production of these indicators.

Mammals — seals

Harbour and Grey seals are protected under the Conservation of Seals Act 1970 and the Marine (Scotland) Act 2010. Seal population data were provided by the Sea Mammal Research Unit (SMRU) Special Committee on Seals (SCOS) at St. Andrews University. Seal populations were counted at haulout sites, where seals come to land to rest and breed. Records from monitoring units are aggregated to produce counts for the entire UK, which we then plot.

Bumblebees (coastal margins)

Bees provide a range of ecosystem services as well as being useful indicators of wider ecological health, and are one of the main groups of insects responsible for pollination of wildflowers, berries, orchards and crops. Because a third of all UK crops are pollinator dependent, this is a particularly important service. Habitat loss and degradation is related to declines in bee populations, making them a useful indicator of long-term changes in the condition and health of the environment.

The Bumblebee Conservation Trust runs the BeeWalk Survey Scheme. This uses citizen volunteers to monitor the number of bumblebees on a monthly walk from March to October, along a set route of approximately one mile. This identifies worker bees (the most common), drones (fertile males) and queens (the sole fertile female in any colony). The number of bumblebees per kilometre is counted and reported over time.

Structural indicators

Invasive species

Invasive non-native species can have negative consequences on the health and resilience of ecosystems. Some such species may outcompete native species, creating negative impacts on food chains, or cause physical damage.

Invasive species were selected as non-native species, which are known to have, or may potentially have, a negative ecological effect, and which have established in 10% or more of Great Britain's land or coastline. Indicators were produced from occurrence data taken from the National Biodiversity Network (NBN). For more details on methodology, please see UK Biodiversity Indicators (UKBI) - Invasive species.

Scallop fishing (seafloor integrity)

Most scallop fishing is from seafloor dredging, which damages the seabed. The amount of scallop fishing can indicate seafloor integrity.

Scallop fishing numbers have been derived from our UK natural capital accounts; 2024. See Section 4: Ecosystem services, fish provisioning for full details on the data collected and methods.

Aggregate dredging (seafloor integrity)

We use data from The Crown Estate on marine aggregate extraction operations, which over the last two decades have been monitored with an electronic monitoring system (EMS). For details on data and methodology, please see the 2021 Area Involved Report (PDF, 3.8KB).

Landscape and seascape indicators

Seagrass abundance

Seagrass meadows are an important marine habitat, providing a home and nursery ground for many marine species, and carbon sequestration services.

The seagrass abundance data represent ground-truthing monitoring for the ecological assessment of seagrasses within transitional and coastal waters of England and Wales. The monitoring of seagrass takes place between June and September and only data that are collected and owned by the Environment Agency are included.

Environmental pressure indicators

Some environmental pressure indicators provide a broad measure of potential effects on the condition of ecosystems. However, as they do not provide direct measures of condition for individual ecosystem assets, they are used as a proxy measure where no other data are available.

Marine protected areas

The extent of marine protected areas can indicate the amount of marine habitat experiencing reduced environmental pressures and exploitation. This was derived from the net area of a range of types of protected areas, including Marine Conservation Zones and Nature Conservation Marine Protected Areas. For details on the construction of these extents, please see the Joint Nature Conservation Committee's UK Biodiversity Indicators (UKBI) - Protected areas.

Wildfires (coastal margins)

Wildfires can be an indicator of pressure on ecosystems and ecosystem health. Most wildfires in the UK are started by human action, with or without intent.

Wildfire occurrence was taken from the Incident Recording System for both England and Wales, provided by the Home Office and processed by the Forestry Commission for England and StatsWales for Wales. For England, we used wildfire instances on coastal margins for land cover map classes. For Wales, we used the beach habitat.

For details on the production of this indicator, please see the Forestry Commission Wildlife statistics commission for England report and StatsWales Fires by detailed location, financial year and area.

Overflow spills

Spills from storm overflows indicate extreme weather events and pollution of marine environments and waterways, and thus ecosystem health.

Event Duration Monitoring (EDM) allows water and sewerage companies to track the frequency and duration of spilling events. This is submitted by these companies to Natural Resources Wales, the Environment Agency for England, and the Scottish Environment Protection Agency annually. We analyse the submitted data, which includes the frequency and duration of spills.

For data and more information on the data used, and how they are collected, please see Dr Cymru (Welsh Water) for Wales, the Environment Agency for England and Scottish Water for Scotland.

4 . Ecosystem services

The biotic ecosystem services in our marine and coastal margins accounts include:

- fish provisioning
- air pollution regulating
- greenhouse gas regulating
- flood regulating
- recreation and tourism (expenditure)
- recreation (health benefits)

The abiotic ecosystem services include:

- minerals and metals provisioning
- oil and gas provisioning
- renewable electricity provisioning

Biotic ecosystem services

Fish provisioning

Fish provisioning estimates the value of marine fish and shellfish caught from mainland UK waters. We remove aquaculture or farmed fish from estimates as we categorise these as a produced asset rather than a natural asset (Principle D2 shown in our Principles of UK natural capital accounting methodology).

To calculate marine fish capture from UK waters, exclusive economic zone (EEZ) Marine Management Organisation (MMO) statistical rectangle factors are used. For more detail on how fish capture in UK waters is estimated, see the UK commercial sea fisheries landings by Exclusive Economic Zone of capture report 2019 published on GOV.UK, and associated publications.

Live weight is the weight of fish when removed from the water. We source these physical data on marine fish capture from the statistical rectangle-level landings data published annually in Marine Management Organisation (MMO) UK Sea Fisheries Statistics and the EU Commission Joint Research Centre's Scientific, Technical and Economic Committee for Fisheries as part of the Fisheries Dependent Information.

We calculate the value of fish caught by multiplying annual net profit per tonne (landed weight) by tonnes of fish captured (live weight) for each species. We calculate net profit per tonne (landed) estimates for marine species by marine areas, provided by Seafish, using their economic estimates for fleet segments and MMO data on landings by stocks (landed value and landed weight) and landings by stocks and species (in cases where species are not managed by total allowable catches). Landed weight is the weight of a product at the time of landing, regardless of the state in which it has been landed. Landed fish may be whole, gutted and headed, or filleted.

We aggregate data for overall annual valuations of fish provisioning from the four UK nations and the UK's EEZ. An important limitation of our fish capture provisioning valuation methodology is that landed weight net profits are multiplied by live weight fish capture. Based on MMO data on live and landed weights of UK vessel landings into the UK, aggregate landed weight is around 7% less than live weight. Additionally, the economic data we use are based on the UK fleet, but we also need to apply these to EU vessels even though they may face different costs and prices.

Net profit per tonne is not available for all fish species, so not all of the physical flow is valued. Our valuation of fish capture from UK waters is therefore likely to be an underestimate.

In our UK natural capital accounts: 2024 release, we updated the asset value calculation to use the five-year average annual value, rather than the annual value for a single year, as per the principles set out in our Principles of UK natural capital accounting: 2023 methodology. Average annual values are calculated by species and area, so asset values are also available at this level of granularity.

We estimate the sustainability of fishing for species in UK waters using the International Council for the Exploration of the Sea's stock assessments. Their definition of sustainable does not include wider externalities from fishing, such as plastic pollution.

Those species estimated to be sustainable are valued using an asset lifetime of 100 years, while those estimated to be unsustainable, or unknown are valued over 25 years.

Air pollution regulating

Air pollution regulation estimates have been supplied by the UK Centre for Ecology and Hydrology (UKCEH), with a full methodology available in a July 2017 report Developing estimates for the valuation of air pollution removal in ecosystem accounts.

Physical flows use the European Monitoring and Evaluation Program Unified Model for the UK (EMEP4UK) of atmospheric chemistry and transport to generate pollutant concentrations directly from emissions and dynamically calculate pollutant transport and deposition, considering meteorology and pollutant interactions.

Air pollution removal by UK vegetation has been modelled for the years 2007, 2015 and 2019 and then scaled to create values for 2030. For remaining years, where government concentration data are available through the UK's Automatic Urban and Rural Network (AURN), figures are fed into the model to generate estimates for changes in air pollutant concentrations caused by vegetation. When no pollution concentration data are available, we assume concentrations fall by a constant rate until they reach 2030 values for all pollutants except sulphur dioxide (SO2). For SO2, the current concentrations are already lower than the 2030 estimates, so we instead hold the latest data constant until 2030.

Health benefits are calculated from the change in pollutant concentration to which people are exposed. Damage costs per unit of exposure are then applied to the benefitting population at the local authority level for the following avoided health outcomes:

- respiratory hospital admissions
- cardiovascular hospital admissions
- loss of life years, in terms of long-term exposure effects from particulate matter 2.5 (PM2.5) and nitrogen dioxide (NO2)
- deaths, in terms of short-term exposure effects from ozone (O3)

For the method of how damage costs are calculated, please see the Air Quality damage cost update 2023 report (PDF, 1.22MB), published by Defra (Department for Environment, Food and Rural Affairs) and for more information please see the Air Pollution in the UK 2023 report, also published by Defra.

We assign estimates to habitats based on the rates of deposition for different habitat types, including coastal margins.

Greenhouse gas regulating

Greenhouse gas regulating estimates the value of the removal of greenhouse gases, in carbon dioxide equivalent (CO2e), from the atmosphere by marine and coastal margins habitats in the UK.

Living organisms, such as seagrass species can capture, process and bury carbon dioxide (CO2). Abiotic (physical and non-living) ecosystems, such as subtidal muds and sands also sequester carbon. Saltmarsh ecosystems are intertidal coastal ecosystems with vascular plant species and sequestrating sediments that are effective at capturing carbon. These marine habitat natural capital accounts include sequestration of carbon by seagrass for the first time.

To estimate the value of this service we use the extent in hectares of four habitat types:

- sublittoral sand
- sublittoral mud
- saltmarsh
- seagrass

For sublittoral sand and mud, we calculate extent values using data from the Joint Nature Conservation Committee (JNCC) UK Atlas of Seabed Habitats Combined Map, 2025.

For saltmarsh and seagrass, we use extent values from the UK's Blue Carbon Inventory (UKBCI): assessment of marine carbon storage and sequestration potential in UK seas (including within marine protected areas) (PDF, 6.7 KB).

For physical flows, we take habitat-specific sequestration rates from the UKBCI and multiply them by the extent for each of the four habitat types to calculate the amount of CO2e sequestered each year. Given the wide variation in the literature for carbon sequestration rates, we present three sets of values using higher (maximum), lower (minimum) and average rates.

To estimate the annual value, we need to multiply the physical flow by a carbon price. The carbon price used in calculations is based on the projected non-traded price of carbon schedule. This is contained within Data table 3 of the Green Book supplementary guidance published on GOV.UK. Carbon prices are available from 2020 to 2050. Prices before 2020 and beyond 2050 are deflated or inflated, respectively, by 1.5% annually, based on Department for Energy Security and Net Zero (DESNZ) advice.

Flood regulating

Flood regulating estimates the value of saltmarsh in mitigating coastal flooding. Our methodology remains under development, and as such these estimates are experimental and should be interpreted as such.

The estimates used in this service were based on the 2019 data from our Saltmarsh flood mitigation in England and Wales, natural capital: 2022 bulletin. The methodology for estimating the extent of saltmarsh flood mitigation in England and Wales remains the same as used for the previous 2022 publication on Saltmarsh flood mitigation.

Any areas within a 439.8 metre buffer around saltmarsh were considered to benefit from flood mitigation. Flooding in these areas was compared with estimated flooding were the saltmarsh not present, based on estimated reductions in flooding. We then calculated the cost based on the land cover types affected.

The underlying physical data used, regarding number of properties, area of flood plains and saltmarsh, and likelihoods of flooding (with and without nearby saltmarsh) remain the same as those used for the 2022 publication. Economic valuation, however, has been updated from 2021 prices to 2023 prices.

The value to urban and suburban areas has been based on estimated economic cost of the flood damage mitigated by saltmarsh. This is based on the per household economic damage that resulted from the winter floods of 2015 to 2016, as estimated by the Environment Agency. These estimates were based on insurance claims and will likely include the cost of household repair work, replacement of belongings, as well as the cost of temporary accommodation while flood-damaged homes were uninhabitable.

To reflect the mixture of goods and services provided within these costs, we have updated urban and suburban components of the valuation using the general gross domestic product (GDP) deflator measure of inflation. The value of saltmarsh flood mitigation to agricultural land in our 2022 publication was based on the average amount spent by farmers on inputs into the land to generate agricultural output (through fertiliser, seeds and so on). As this is a more specific range of costs, the value of saltmarsh flood mitigation to agricultural land has been updated to 2023 prices using Defra's index of agricultural input prices.

For full details of the methodology used for this service, please see our Saltmarsh flood mitigation in England and Wales, methodology: 2022.

Recreation and tourism (expenditure)

Recreation and tourism (expenditure) estimates the amount spent to enable visits to the natural environment, such as transport, car parking and admission costs. In the absence of a ticket to access a public beach, buying a bus ticket represents the cost of the trip and this is taken as a proxy for the value of accessing the site.

These estimates combine separate estimates of nature-based tourism and outdoor recreation. Tourism estimates include day visits longer than three hours, overnight trips, and visits from international travellers visiting the UK. To avoid double counting, estimates of recreation include only day visits of three hours or shorter.

Estimates use survey data across multiple surveys covering England, Wales, Scotland and Northern Ireland.

Recreation data for England are taken annually from Natural England's Monitor of Engagement with the Natural Environment (MENE) survey between 2009 and 2018, and the People and Nature Survey (PaNS) between 2020 and 2022.

Because of differences in the level of reported expenditure between the two surveys, we use the Living Costs and Food Survey (LCF) as a proxy series to join the surveys without a step change. This involves linking LCF spend items to PaNS expenditure items and using the LCF growth rates between 2019 and 2020 to impute a 2020 expenditure value for PaNS. PaNS data are applied as growth rates to the imputed 2020 value, generating a consistent time series. Non-expenditure data do not feature a step change. However, changes to survey design and mode means that MENE and PaNS are not directly comparable across all variables.

In Scotland, we use data from two surveys to produce estimates of outdoor recreation:

- Scottish Recreation Survey (ScRS) from 2003 to 2012
- Scotland's People and Nature Survey (SPANS) for 2013 to 2014, 2017 to 2018, and 2019 to 2020

Unlike ScRS, SPANS excludes questions relating to respondent expenditure during their last outdoor recreation visit. To produce estimates of Scottish outdoor recreation expenditure beyond 2012, we created a statistical model. Using comparable MENE and ScRS data, this model examines the relationship between English and Scottish per-visit expenditure on a habitat basis. We use linear interpolation to produce estimates of Scottish recreation from 2014 to 2019. Data from PaNS are used as a proxy series to impute missing years from 2020 onwards.

In Wales, we use data from the Welsh Outdoor Recreation Survey (WORS) for 2014 to 2015, followed by recreation-based questions asked in the National Survey for Wales (NSW) for 2016 to 2017, and 2018 to 2019. The People and Nature Survey Wales (PaNSW) provides data for 2021 to 2022.

In Northern Ireland, estimates of outdoor recreation are compiled from the People in the Outdoors Monitor for Northern Ireland (POMNI). This survey ran for the first time in 2020 to 2021. For both nations, we use data from MENE and PaNS as a proxy series to impute missing years to generate a time series back to 2011.

We use four surveys to generate estimates of nature-based tourism. This includes Visit Britain's Great Britain Day Visits Survey (GBDVS) and Great Britain Tourism Survey (GBTS). Both surveys collect annual data from 2011 to present, with a pause in 2020. The LCF is used as a proxy series to impute expenditure estimates in 2020. We also use the International Passenger Survey (IPS), which collects data annually for international visitors; as well as Northern Ireland annual tourism statistics.

A limitation of the GBDVS data is that we need to make some assumptions on how to correctly apportion spend between activities. This is because respondents' spending is attributed to all types of activities they have completed, leading to a multiplication of expenditure.

To avoid the multiplication and double counting of spend between activity types, we apportion spending using data from ad hoc questions added to a single round of the GBDVS, which asked respondents about the importance of different activities within broader visit categories.

Changes to the GBDVS between 2019 and 2021 have led to a reduction in the amount of this double counting within their estimates. As our proportions are unchanged, the survey data have become subject to more double counting removal than they now require, leading to lower estimates.

Because of this, there is more uncertainty around our estimates from 2021 onwards, and these may be an underestimate of tourism expenditure in nature. We are looking to update our tourism methodology to adapt the approach to apportioning to activities in future, to more accurately reflect the categories present within updated surveys.

For a detailed methodology on how our tourism estimates were produced, please see Tourism values for Natural Capital Accounts - NR0176 published by Defra and UK natural capital accounts: Tourism - methodology.

We assign estimates equally to all UK habitats, not just marine and coastal margins, based on the types of natural places visited by respondents within their survey responses. Habitat disaggregated estimations may not sum to overall totals. This is because the habitat-visited question may be asked less frequently than other questions, resulting in smaller sample sizes. Estimations can differ depending on sample sizes.

For broad habitat classifications by country, please see Section 2: Habitats in our Health benefits from recreation methodology, natural capital, UK article.

For the asset valuation of outdoor recreation, we use projected population growth calculated from our Principal projection - UK summary dataset into the estimation. These assumptions project the annual value to increase over the 100-year asset lifetime.

Many outdoor recreation visits have no expenditure as people take local visits, such as walking to a local park. This means that our expenditure-based method underestimates the value provided by visits to the natural environment. Other services, such as recreation (health benefits) aim to capture some of this additional value.

Recreation (health benefits)

Recreation (health benefits) estimates the number of people gaining health benefits from regular recreation, and the monetary value associated with this. This service attempts to value the positive effect on health and well-being because of trips in natural environments by estimating the avoided health costs associated with these visits.

We calculate the number of people gaining these benefits using the recreation-based surveys discussed in Recreation and tourism (expenditure). The monetary value of health benefits from recreation are derived from the work of Claxon and others (2015) in their article Methods for the estimation of the National Institute for Health and Care Excellence cost-effectiveness threshold. This cost-saving approach concluded that £13,000 of NHS resources adds one Quality Adjusted Life Year (QALY) to the lives of NHS patients (2008 prices).

The methodology underpinning the health benefits gained from recreation can be found under Section 2: Exposure to nature in our Health benefits from recreation methodology, natural capital, UK. Since this methodology, we have undertaken further work to implement the "exposure to nature" approach.

We assign estimates equally to habitats based on the types of natural places visited by respondents within their survey responses.

Abiotic ecosystem services

Minerals and metals provisioning

The British Geological Survey (BGS) provides physical estimates of mineral extraction. Up to and including 2014, mineral extraction estimates were based on the annual minerals raised inquiry.

For the marine habitat, we only have estimates for construction minerals (sand and gravel) for England and Wales.

Monetary estimates are based on the residual value resource rent approach calculated from the Standard Industrial Classification subdivision classes Other mining and quarrying (SIC 08) and Mining of metal ores (SIC 07). Other mining and quarrying includes extraction from a mine or quarry, but also dredging of alluvial (river) deposits and rock crushing.

Products, such as stone and aggregates, are used most notably in construction, and while clay and gypsum are used in the manufacture of materials, minerals and metals are also used in the manufacture of chemicals. While crushing, grinding, cutting, cleaning, drying, sorting and mixing are included, this SIC division excludes some aspects of processing of the minerals extracted. This may inflate the resource rents associated with the pure natural provisioning service.

An important limitation of the resource rent approach is the inability to account for different profits and costs across different types of minerals and metals. In previous iterations of the natural capital accounts, all values were assigned to the mountains, moorlands and heath habitat. We have improved our approach to account for monetary values associated with marine minerals and metals by calculating the proportion of physical flow values attributed to the marine habitat. We multiply the total annual and asset values for the UK (all minerals, all habitats) by this proportion to produce marine habitat annual and asset values.

Oil and gas provisioning

Physical estimates of oil and gas production are available from the North Sea Transition Authority (NSTA).

Monetary estimates follow a residual value resource rent approach calculated from the income and expenditure on UK upstream oil and gas exploration, operating and decommissioning activities, published by the NSTA, and net capital stock and consumption of fixed capital data for SIC subdivision class: Extraction of crude petroleum and natural gas (SIC 06) from ONS capital stock data.

We estimate Scotland's oil and gas provisioning using Scottish Government oil and gas statistics, which are comparable with NSTA data. Consumption of fixed capital and cost of capital is estimated through an apportionment of SIC 06 capital stocks data, using relative operating expenditure reported by the NSTA and Scottish Government, respectively.

For oil and gas provisioning, production in Wales and Northern Ireland is assumed to be zero because there is minimal oil and gas extracted from Wales or Northern Ireland.

Infrastructure for the extraction of oil and gas must be decommissioned when a site is closed, and these costs are incurred at the end of an asset's lifetime. This distortion of the cost profile has a downward impact on the resource rents in later years. We adjust decommissioning costs, so they vary according to total income generated in each year, while maintaining the total value of the costs. The distribution of these costs mirrors total income as it changes over time and results in a smoother time series.

For the asset valuation, we use the NSTA's annual production and expenditure projections. For Scottish and English estimates, we apportion the projections based upon the relative five-year average of oil and gas production from 2018 to 2022. Annual five-year averages of unit resource rent (average resource rent divided by average production) are applied to production projections.

As all data comes from marine oilfields, entire estimates are assigned to the marine habitat.

Renewable electricity provisioning

Electricity generated by renewable sources is published by the Department for Energy and Net Zero (DESNZ) in the Digest of UK Energy Statistics.

For our monetary estimates, we apportion SIC 35.1: Electricity power generation, transmission, and distribution data using turnover from our Annual Business Survey (ABS) as published in our Non-financial business economy, UK dataset, to derive SIC 35.11: Production of electricity.

For Scotland, the ratio of Scotland to UK total installed capacity is used to apportion the UK's net capital stock and the resource rent for Scotland's SIC 35.1 is calculated, before we apportion to SIC 35.11 using turnover from the regional data from ABS.

For England, Wales and Northern Ireland, we deduct the value for Scotland for SIC 35.11 from the value for the UK and the remainder is apportioned across the nations using the gross operating surplus for SIC 35.11 from the regional ABS.

We then further apportion values for the four nations using the percentage of electricity generation from renewable sources from electricity generation and supply in Energy Trends. This provides a final estimate for the value of the production of electricity from renewable sources.

An important limitation is the lack of data reflecting the profits and cost for electricity generation from renewable sources, compared with other electricity generation.

We assign estimates for renewable energy provisioning to habitats based on technology. Wave and tidal, and offshore wind are all entirely assigned to the marine habitat.

5 . Related links

Marine and coastal margins natural capital accounts, UK: 2025
Bulletin | Released 8 August 2025
Natural capital accounts containing information on the extent, condition and ecosystem services for marine and coastal areas in the UK.

Principles of UK natural capital accounting: 2023
Article | Released 1 June 2023
The challenges and principles we have developed to transform the United Nations' guidance on environmental accounting into the UK's natural capital accounts.

6 . Cite this methodology

Office for National Statistics (ONS), released 8 August 2025, ONS website, methodology, Marine and coastal margins natural capital accounts, UK, methodology guide: 2025