Office for National Statistics

Marine natural capital accounts, UK methodology guide

Describes the methodology used to develop natural capital ecosystem service accounts and explains the broad approach to valuation and the overarching assumptions made. Also provides details of methodologies used to value individual components of natural capital and physical and monetary data sources.

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1 . Overview of methodology for UK natural capital

The methodology used to develop the marine natural capital accounts estimates remains under development. The estimates reported in Marine natural capital accounts, UK: 2021 are experimental and should be interpreted in this context.

Experimental Statistics are those that are in the testing phase, are not yet fully developed and have not been submitted for assessment to the UK Statistics Authority. Experimental Statistics are published to involve customers and stakeholders in their development and as a means of building in quality at an early stage.

We have used a wide variety of sources for estimates of UK natural capital, which have been compiled in line with the guidelines recommended by the United Nations (UN) System of Environmental-Economic Accounting Central Framework, and System of Environmental-Economic Accounting Experimental Ecosystem Accounting principles, which are in turn part of the wider framework of the system of national accounts.

As the UN guidance is still under development, the Office for National Statistics (ONS) and the Department for Environment, Food and Rural Affairs (Defra) published a summary of the principles underlying the accounts.

We welcome discussion regarding any of the approaches presented in this article via email at natural.capital.team@ons.gov.uk.

2 . Annual ecosystem service flow valuation

Broadly, two approaches are used to value the annual service flows. For fish capture, timber, carbon sequestration, pollution removal, noise mitigation, urban cooling, and recreation, an estimate of physical quantity is multiplied by a price. This price is not a market price but satisfies two accounting conditions:

- identifying a price that relates, as closely as possible, to contributions provided by the ecosystem to the economy
- where no market exists, imputing a price that an ecosystem could charge for its services in a theoretical market

These conditions are necessary to integrate and align ecosystem services to services elsewhere in the national accounts; for example, in the accounts, woodland timber is an input to the timber sector.

For agricultural biomass, water abstraction, minerals, fossil fuels, renewable, and electricity generation a "residual value" resource rent approach is used. Before detailed data source and methodology is described, the resource rent approach is defined.

3 . Resource rent definition and assumptions

The resource rent can be interpreted as the annual return stemming directly from the natural capital asset itself. This is the surplus value accruing to the extractor or user of a natural capital asset calculated after all costs and normal returns have been considered.

Variations of this approach are applied depending on the category of natural capital under assessment; the variations are explained in the individual ecosystem service methodology.

Calculating resource rent

The steps involved in calculating the resource rent are as follows:

Output equals operating costs:

- minus intermediate consumption
- minus compensation of employees -
- mins other taxes on production
- plus other subsidies on production

This sums to gross operating surplus on an SNA basis.

Goss operating surplus (SNA basis) minus specific subsidies on extraction plus specific taxes on extraction equals gross operating surplus (resource rent derivation).

To calculate resource rent we use the following:

Resource rent equals gross operating surplus (resource rent derivation) minus user costs of produced assets (consumption of fixed capital and return to produced assets)

Most of the data used in resource rent calculations are available from the input-output tables. Return to produced asset estimates are calculated using industry-based net capital stocks and the nominal 10-year government bond yield published by the Bank of England, then deflated using the gross domestic product (GDP) deflator to produce the real yield. This rate is relatively conservative compared with those expected in certain markets and could overstate the resulting resource rent estimates.

Technical guidance on SEEA Experimental Ecosystems Accounting (page 107) (PDF, 2.9MB) acknowledges that the use of the method may result in very small or even negative resource rents.

Obst, Hein and Edens (2015) conclude in National Accounting and the Valuation of Ecosystem Assets and Their Services that:

"Resource rent type approaches are inappropriate in cases where market structures do not permit the observed market price to incorporate a reasonable exchange value for the relevant ecosystem service. Under these circumstances, alternative approaches, for example, replacement cost approaches, may need to be considered."

If the residual value approach does not produce plausible estimates for subsoil assets and provisioning services, alternative methods should be explored (Principle 7.7 in Principals of natural capital accounting). Finally, where unit resource rents can be satisfactorily derived, care still needs to be taken in applying these at a disaggregated level. Even for abiotic flows, the extraction or economic costs could vary spatially, and hence national unit resource rents could be misleading for specific regions.

4 . Asset valuation

The net present value (NPV) approach is recommended by the System of Environmental-Economic Accounts (SEEA) and is applied for all ecosystem services to estimate the asset value. The NPV approach estimates the stream of services that are expected to be generated over the life of the asset. These values are then discounted back to the present accounting period. This provides an estimate of the capital value of the asset relating to that service at a given point in time.

There are three main aspects of the NPV method:

- pattern of expected future flows of values
- asset life - period over which the flows of values are expected to be generated
- choice of discount rate

Pattern of expected future flows of services

An important factor in the valuation of natural capital is determining the expected pattern of future flows of services. These paths are not observed and hence assumptions concerning the flows must be made, generally as a projection of the latest trends.

A more basic way to estimate the expected flows is to assume that the current flow (averaged over recent years) is constant over the asset life, but this might not be the case. In some cases, more information is available on future expected levels of services in non-monetary terms or future unit prices. Where there are readily available official projections, these have been considered but otherwise the default assumption in these estimates is that the value of the services is constant over time.

This article assumes constant service values throughout the asset life, except for the estimates for carbon sequestration and air pollutant removal by vegetation, where further projections are used.

Where the pattern of expected service values is assumed to be constant, it is based on averages over the latest five years of data, up to and including the reference year in question.

Asset life

The asset life is the expected time over which the services from a natural resource are expected to be provided. An estimate of the asset life is an important component in the NPV model because it determines the expected term over which the service flows from an asset should be discounted.

Following the Office for National Statistics (ONS) and Department for Environment, Food and Rural Affairs (Defra) principles paper, this article takes one of three approaches when determining the life of a natural capital asset.

Non-renewable natural capital assets: where a sufficient level of information on the expected asset lives is available, this asset life is applied in the calculations. Where a sufficient level of information on their respective asset lives is not available, a 25-year asset life is assumed.

Renewable natural capital assets: a 100-year asset life is applied to all assets that fall within this category of natural capital.

Choice of discount rate

A discount rate is required to convert the expected stream of service flows into a current period estimate of the overall value. A discount rate expresses a time preference - the preference for the owner of an asset to receive income now rather than in the future. It also reflects the owner's attitude to risk. The use of discount rates in NPV calculations can be interpreted as an expected rate of return on the environmental assets.

Based on an extensive review (PDF, 453KB) by external consultants, the ONS and Defra use the social discount rate set out in the HM Treasury Green Book (2003, page 100). In line with guidance set out in the document, estimates presented in this article assume a 3.5% discount rate for flows projected out to 30 years, declining to 3.0% thereafter and 2.5% after 75 years. The rationale for this approach is discussed further in the ONS and Defra principles paper.

5 . Methodology by service

The following section provides an explanation of the data sources and methods used in each service.

Fish capture

We rely on a range of external sources that all involve known uncertainties. For instance, Norway and Faroese landings are excluded from this analysis. The economic data are based on UK fleet data, which we also apply to foreign vessels that may face different costs and prices.

Aquaculture or farmed fish, like farmed livestock, have been removed from estimates as farmed fish are viewed as a produced asset and not a natural asset.

Physical data on marine fish capture (live weight) is sourced from the rectangle-level landings data published annually by the EU Commission's Joint Research Centre (JRC) Scientific, Technical and Economic Committee for Fisheries (STECF) as part of the Fisheries Dependent Information (FDI) data call (deep sea).

To calculate marine fish capture in the UK, exclusive economic zone (EEZ) Marine Management Organisation ICES statistical rectangle factors were used. The overall fish capture provisioning service physical flow presented in this article represents landings (tonnage) from UK waters. UK boundaries do not perfectly align with the geographical areas of fish capture statistics. For more detail on how fish capture in UK waters is estimated, see the Marine Management Organisation Exclusive Economic Zone Analysis and associated publications.

Valuations are calculated using net profit per tonne (landed) estimates, provided by Seafish, for different marine species by marine areas. Net profit per tonne is calculated using Seafish economic estimates for fleet segments and Marine Management Organisation 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). Annual net profit per tonne (landed weight) is multiplied by tonnes of fish captured (live weight) for a specific species. The data are aggregated for overall annual valuations of fish provisioning from the UK EEZ.

Landed weight is the weight 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. Live weight is the weight of a product, when removed from the water.

A notable limitation of the fish capture provisioning valuation methodology is that landed weight net profits were multiplied by live weight fish capture. Based on Marine Management Organisation data on live and landed weights of UK vessel landings into the UK, aggregate landed weight is around 7% less than live weight.

Net profit per tonne was not available for all fish species so not all the physical flow is valued. On average between 2015 and 2018 we can estimate a net profit valuation for 85% of the fish capture tonnage. The provisioning service valuation of fish capture from UK waters is likely to be an underestimate.

For all the fish species, across different areas in UK waters, we estimate if fishing is sustainable using the International Council for the Exploration of the Sea stock assessments. For each stock we check that fishing pressure is at or below levels capable of producing maximum sustainable yield. We also check if each stock's spawning biomass is at or above the level capable of producing the maximum sustainable yield. Across the years we can determine stock sustainability for 72% of the fish capture tonnage, leaving 28% as unknown.

Whilst we can determine if the level of fishing for a specific stock is sustainable, this approach does not consider the knock-on impacts 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 impact the sustainability of other fish stocks higher up the food chain.

Renewable energy

Energy generated by renewable sources is published by the Department for Business, Energy and Industrial Strategy (BEIS) in the Digest of UK Energy Statistics. Bioenergy is excluded to avoid valuation double counting with timber removals and agricultural biomass.

Monetary estimates are based on the "residual value" resource rent approach calculated from the SIC Group 35.1: Electric power generation, transmission and distribution. These data are then apportioned using turnover from the ONS Annual Business Survey (ABS) to derive the resource rent of 35.11: Production of electricity. To estimate the renewable provisioning valuation, data were further apportioned using renewables proportion of total energy generation.

Fossil fuels

Physical estimates of oil and gas production are available from the Oil and Gas Authority (OGA).

Monetary estimates of oil and gas are based on the methodology published by the ONS in June 2013, following a "residual value" resource rent approach calculated from the SIC subdivision class: Extraction of crude petroleum and natural gas (SIC 06). Production statistics are combined with oil and gas price data supplied by the Oil and Gas Authority (OGA) to calculate income. Deductions are then made for operating expenditure, from the OGA, and user costs of produced assets, from the ONS capital stocks data.

For the asset valuation of fossil fuels, an asset life of 25 years has been assumed. Asset valuation utilises annual projected UK oil and gas production from the OGA until 2035. Then, following the OGA methodology, assumes a further 5% production decline per year (for all years following 2035) to be able to project over the full 25-year asset lifetime. To estimate valuations in future years, annual five-year averages of "unit resource rent" (average resource rent divided by average production) are applied to production projections.

Estimates of fossil fuel consumption carbon costs use greenhouse gases equivalencies for crude oil, natural gas, and coal. Once the carbon dioxide equivalence has been calculated, these are multiplied by the central non-traded price of carbon, from BEIS, based on estimates of the marginal abatement cost (MAC) required to meet a specific emission reduction target. This is contained within the Data Table 3 of the Green Book supplementary guidance. Carbon prices are available from 2010 to 2100. Prices prior to 2010 are backdated in line with recent trends.

Minerals

Marine aggregates extraction data is sourced from The Crown Estates.

Monetary estimates are based on the "residual value" resource rent approach calculated from the SIC subdivision class: Other mining and quarrying (SIC 08). This division includes extraction from a mine or quarry, but also dredging of alluvial deposits, rock crushing and the use of salt marshes. This division does not include processing (except crushing, grinding, cutting, cleaning, drying, sorting and mixing) of the minerals extracted.

The residual value of SIC 08 is apportioned based on total output to estimate the value of the provisioning service of marine aggregates extraction. The total output sales of the marine aggregates sector are obtained multiplying the quantity of marine aggregates extracted by the market price of aggregates. The market price used, £10.30 per tonne including levies and royalties, is the most recently available estimated value from ABPme (PDF 3.91 MB).

Flood protection

This project aims to observe the of extent land and number houses saltmarshes protects in the UK. The land types currently valued include urban areas, suburban areas, neutral grassland, improved grassland, and arable and horticulture land. Land classifications are determined by the Land Cover Map 2015 from the UK Centre for Ecology and Hydrology. Housing footprints and topography layers were determined using the Ordinance Survey Zoomstack Map. Crop and livestock costings were obtained from the Farm Business Survey. Housing flood damage costings were obtained from Association of British Insurers (ABI). Flood defence maps were obtained from Natural Resources Wales and the Environment Agency. Housing footprints were calculated using dwelling stock estimates and land use data from the Ministry of Housing, Communities and Local Government.

Firstly, using the Land Cover Map 2015 (LCM), we identify where saltmarshes are in the UK and the area of land 200m behind them assumed to be the protected area. We discount any areas of land behind the saltmarsh which are above a 10-meter elevation or are protected by coastal flood defences. As of this project, we only include costal flood defences for England and Wales. We aim to incorporate flood defence structures in Scotland and Northern Ireland in the future.

Once we have discounted the relevant areas, we calculate the total area, in hectares, of each land type that could potentially flood. We calculate the number of properties based on an average English household footprint. This average footprint is equal to a medium sized house with a small front and rear garden. This is approximately 260 square metres.

Once we have calculated the number of houses, this is multiplied by the average flood damage cost for housing (this is £32,000 per household). For each of the agricultural land classes, we multiply the area of agricultural land that could be flooded by the cost per hectare for that land type. This cost varies across the agricultural land classes and is comprised of estimated input costs and profit loss. All estimated costs are then added together to provide an estimate for all selected land areas being flooded.

To provide illustrative figures for this topic, we provide service and asset values based on changes in risk of flooding. We first calculate a baseline 1-in-50-year flood risk. From this, a change to a 1-in-60-year flood and a 1-in-100-year flood risk. We multiply each flood risk value by the total cost of flooding at all sites to estimate a service value. To estimate asset values, we multiply the service value by the sum of discount rates over 100 years.

Carbon sequestration

To estimate the value of carbon sequestration in the UK marine environment, we firstly observe the extent of three habitat types, measured in hectares. These are saltmarsh and reedbeds (EUNIS 2.5), sublittoral sands (EUNIS A5.2) and sublittoral muds (EUNIS A5.3). The total extent of these habitats is based on the 2018 Joint Nature Conservation Committee 2019 JNCC EUNIS Level 3 "Combined Map".

Given the variation in the literature for carbon sequestration rates for our three selected habitats, we use two sets of values.

The higher carbon sequestration rates are based on findings presented in [Assessing the natural capital value of water quality and climate regulation in temperate marine systems using a EUNIS biotope classification approach](). This paper references: [Assessment of Blue Carbon Resources in Scotland's Inshore Marine Protected Area Network]().

The lower carbon sequestration rates are based on findings presented in [Initial natural capital accounts for the UK marine and coastal environment](). This paper references: [Quantifying and valuing carbon flows and stores in coastal and shelf ecosystems in the UK](https://people.uea.ac.uk/en/publications/quantifying-and-valuing-carbon-flows-and-stores-in-coastal-and-shelf-ecosystems-in-the-uk(ea9f8849-e7a6-4c21-9251-75d3aa043cc9).html) and [Recent sedimentation and organic carbon burial in a shelf sea: The North Sea]().

We then calculate the total tonnes of carbon, in CO2 equivalent, sequestrated by per hectare of habitat in a year. We then multiply the total extent of each habitat by the carbon sequestration rates per hectare to estimate a total quantity captured in a year.

To work out the annual value, we multiply the physical flow by the carbon price. The carbon price used in calculations is based on the [projected non-traded price of carbon]() schedule. This is contained within the Data Table 3 of the Green Book supplementary guidance. Carbon prices are available from 2010 to 2100. Prices beyond 2100 are constant at 2100 levels.

The non-traded carbon prices are used in [appraising policies]() influencing emissions in sectors not covered by the EU Emissions Trading System (ETS) (the non-traded sector). This is based on estimates of the marginal abatement cost (MAC) required to meet a specific emission reduction target. Beyond 2030, with the (expected) development of a more comprehensive global carbon market, the traded and non-traded prices of carbon are assumed to converge into a single traded price of carbon.

Wastewater remediation

Estimating the total flow of nutrients from all human activity into the marine environment is very difficult. Given the paucity of data regarding nutrient flows from land run-off, this approach captures the physical flow of nutrients discharged by secondary stage wastewater treatment plants at coastal and estuary locations. This approach will likely underestimate the full extent of nutrient flows into the marine environment.

We estimate the flows of Nitrogen and Phosphorus from urban water treatment plants that treat wastewater up to and including a secondary stage. We excluded tertiary level water treatment plants as most of the Nitrogen and Phosphorous are removed at this stage. Biological Oxygen Demand (BOD) is significantly reduced during the secondary stage of treatment and is therefore not included in this analysis. Biological Oxygen Demand refers to the amount of oxygen consumed by micro-organisms as they break down organic matter. We hold daily per capita flows of BOD constant to allow a standardised measurement of daily per capita Nitrogen and Phosphorus into wastewater.

The flow of wastewater and discharge locations for 2018 and 2016 (reporting years) are from the [EU Urban Wastewater Treatment Directive](). The physical quantity of nutrients in urban wastewater are based on the WPC Nutrient Control Manual (1983) (Nitrogen and Phosphorous).

From the EU datasets, the overall physical flow of from wastewater treatment plants that treat up to, and including, a secondary level of wastewater treatment is identified. The urban wastewater treatment plants that discharge effluent water to coastal and estuarine areas are then identified.

After applying a standard reduction factor to the flows of secondary treated wastewater. This reduction factor tells us what quantity of nutrients have been removed during the secondary treatment stage. We estimate the quantity of Nitrogen and Phosphorous by per capita per day (Equivalent to one-unit Population Equivalent). The physical flow of wastewater is measured by Population Equivalent. Population Equivalent is a measure of the equivalent flow of wastewater per capita per day, based on one individual producing 60 grams of Biological Oxygen Demand per day.

To calculate the cost of treating wastewater to remove 75% of the remaining nutrients left over from a secondary stage treatment, we use a costing model provided by the Environment Agency. This costing approach is based on the capital and operating costs of running terrestrial water treatment plants. In this approach, we estimate the cost of removing Nitrogen and Phosphorus from wastewater that has been treated to a secondary level. This provides an estimated replacement cost for the value of the marine nutrient remediation service.

Recreation

The recreation estimates are adapted from the "simple travel cost" method developed by Ricardo-AEA in the methodological report Reviewing cultural services valuation methodology for inclusion in aggregate UK natural capital estimate. This method was originally created for use on the Monitor of Engagement with the Natural Environment (MENE) Survey, which covers recreational visits by respondents in England.

The method looks at the expenditure incurred to travel to the natural environment and some expenditure incurred during the visit. This expenditure method considers the market goods consumed as part of making the recreational visit (that is, fuel, public transport costs, admission charges and parking fees). This expenditure is currently assumed as a proxy for a marginal price for accessing the site.

Estimates for the cultural service of outdoor recreation in this publication use survey data across four surveys covering England, Wales, and Scotland. Combined Great Britain outputs are scaled up to UK level using population estimates for people aged 16 years and over.

The questions used from these surveys can be broadly summarised as:

- How many visits to the outdoors for leisure and recreation have you made in the last four weeks?
- On the last visit to the outdoors, what type of habitat did you go to?
- What was the main means of transport used on this last visit?
- How far did you travel to get to and from the main destination of this visit?
- How long was the visit, in terms of time (including travel time)?
- How much did you spend on [spending category]?

For estimates of outdoor recreation in England, the Monitor of Engagement with the Natural Environment (MENE) Survey is used. The survey collects detailed information on people's use and enjoyment of the natural environment during visits. This report relates to the full 10 years of surveying from March 2009 to February 2019. MENE samples around 47,000 respondents, containing around 20,000 visit-takers, annually.

In Scotland, data from two surveys are used to produce estimates of outdoor recreation. From 2003 to 2012, data from the Scottish Recreation Survey (ScRS) were used. The ScRS was undertaken through the inclusion of a series of questions in every monthly wave of the TNS Omnibus survey, the Scottish Opinion Survey (SOS). In every month of the Scottish Opinion Survey around 1,000 face-to-face interviews are undertaken with adults in Scotland aged 16 years and over.

Replacing the ScRS, Scottish Natural Heritage commissioned the Scotland's People and Nature Survey (SPANS) for the first time in 2013 to 2014, then again in 2017 to 2018. 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 examined the relationship between English and Scottish per visit expenditure on a habitat basis. Linear interpolation was used to produce estimates of Scottish recreation from 2014 to 2016.

Previously, we used the Welsh Outdoor Recreation Survey (WORS 2014) in combination with England's MENE survey to produce outdoor recreation estimates for Wales. However, since obtaining 2016 and 2018 data from the National Survey for Wales (NSW), all Welsh estimates are calculated using NSW only, as NSW provides improved quality of the sampling approach and comparability between WORS and NSW is not advisable.

Estimates of outdoor recreation in Wales for 2017 and prior to 2015 are based on an index of MENE outputs. Because of this, we multiply estimates of total expenditure by the proportion spent on each expenditure type in the most recent year we have data available. This allows the different expenditure types to sum to total expenditure, despite some years being based on an index of MENE outputs.

Firstly, the absence of a question relating to the transport method affects our ability to estimate overall running costs and travel time, given that we do not know how respondents travel to their visit destination. We address this by calculating the proportion of total distance travelled to MMH habitats by different methods of transport in the MENE survey for the years of 2016 and 2017. These are used as proxy variables for NSW and the years of 2016 and 2018 respectively. We multiply the proxy variables by the total distance travelled in NSW to produce estimates for distance travelled by different methods of transport, which are used in our running costs calculations.

Secondly, there is not a breakdown available for expenditure type, for instance, how much money a respondent spends on food and drink, fuel or admissions. Instead, an overall amount is collected in the "VisitMoney" variable of the NSW (PDF, 3.88MB). This affects our ability to calculate annual expenditure values as we replace reported fuel costs with our calculated running costs, while also subtracting money spent on food and drink. We address this by calculating the proportion of total expenditure spent on different types of expenditure in the MENE survey for the years of 2016 and 2017.

Again, these are used as proxy variables for NSW and the years of 2016 and 2018 respectively. We multiply the proxy variables by the total expenditure reported in NSW, to produce estimates for the amount spent on food and drink and fuel, the former removed, and the latter replaced by our calculated running costs.

These surveys focus on short day trips from home and miss out potentially large amounts of spending on outdoor activity from domestic tourism, which future reports will aim to include.

Habitat disaggregated estimations of expenditure and time spent may not sum to overall time spent. This is because habitat estimates may be based upon a different sample - those answering a question on habitats visited.

Broad habitat classifications by country

England survey habitats

(From Monitor of Engagement with the Natural Environment Survey habitats.)

Built-up areas and gardens:

- village
- path, cycleway or bridleway
- country park
- park in a town or city
- allotment or community garden
- children's playground
- playing field or other recreation area
- another open space in a town or city

Coastal margins:

- a beach
- other coastline

Woodland:

- woodland or forest

Farmland:

- farmland
- another open space in the countryside

Mountain, moorland and hill:

- mountain, hill or moorland

Freshwater:

- river, lake or canal

Other:

- other places not in the list
- do not knows

Scotland survey habitats

(From Scottish Recreation Survey and Scotland's People and Nature Survey habitats.)

Built-up areas and gardens:

- village
- local park or open space
- towns
- golf course or football stadium
- local urban
- local area
- city
- country lanes
- castle or historical building
- garden or gardening
- local show or festival
- leisure or sports centre
- streets and roads

Coastal margins:

- sea or sea loch
- beach or cliff
- beach
- cliff
- wildlife area

Woodland:

- woodland or forest - managed by Forestry Commission or Forest Enterprise
- woodland or forest - other type of owner
- woodland or forest - do not know owner
- wildlife area

Farmland:

- farmland - fields with crops
- farmland - fields with livestock
- farmland - mixed crops and livestock
- wildlife area
- farmland unspecified
- country or countryside

Mountain, moorland and hill:

- mountain or moorland
- mountain or hill
- moorland
- wildlife area

Freshwater:

- loch
- river or canal
- river
- canal
- wildlife area
- reservoir

Other:

- others
- none of these
- do not know or not stated

Note: wildlife area habitats in Scotland are apportioned across various broad habitats.

Wales survey habitats

(From National Survey for Wales habitats.)

Built-up areas and gardens:

- local park
- other local open space
- roadside pavement or track
- village

Coastal margins:

- beach
- sea
- other coastline

Woodland:

- woodland or forest

Farmland:

- farmland

Mountain, moorland and hill:

- hills, mountains or moorland

Freshwater:

- river, lake or canal

Other:

- other

For the asset valuation of outdoor recreation, projected population growth calculated from the ONS population statistics and an income uplift assumption, were implemented into the estimation. The income uplift assumptions are 1%, declining to 0.75% after 30 years and 0.5% after a further 45 years. These assumptions project the annual value to increase over the 100 years.

It is acknowledged that the expenditure-based method provides an underestimation of the value provided by visits to the natural environment. Primarily, this is because there are several benefits that are not accounted for including scientific and educational interactions, health benefits and aesthetic interactions. Currently, there is no method in use that incorporates these considerations. Additionally, the time spent by people in the natural environment is not itself directly valued because of the accounting and methodological challenges involved.

A significant number of outdoor recreation visits have no expenditure as people take local visits, such as walking to a local park. The value of local recreation and the aesthetic benefit from living near green and blue spaces is estimated through house prices.

Amenity value of sea views

There is a detailed methodology note on how the recreation and aesthetic value in house prices was produced in this 2019 House pricing methodology article.