Habitat extent and condition methodology, natural capital, UK: 2022

Methodology for estimating the extent and condition of UK habitats. Uses the broad habitat classifications as defined by the UK National Ecosystem Assessment and Land Cover Maps produced by the UK Centre for Ecology and Hydrology.

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1 . Extent of habitats in the UK

This methodology uses the broad habitat classifications as defined by the [UK National Ecosystem Assessment](). The data in this methodology use the [Land Cover Maps]() produced by the UK Centre for Ecology and Hydrology (UKCEH).

Each of the 21 Land Cover Map habitat classes are assigned to the following eight broad habitat classes.

Enclosed farmland

Most enclosed farmland is managed for cereal, cattle, and sheep production. Improved grassland is nutrient-rich and is often used as pastures for livestock.

Woodland

This includes managed plantations as well as ancient, semi-natural woodlands. It includes both coniferous and deciduous (broadleaf) woodland.

Mountain, moorland, and heath

This includes heather, heather grassland and inland rock. These are mountainous, open and rugged habitats.

Semi-natural grasslands

Includes acid grassland, calcareous grassland, and neutral grassland. These are acidic, alkaline, and neutral habitats, respectively, with low levels of plant species diversity.

Urban

This includes suburban and urban habitats, consisting of built structures and other infrastructure.

Freshwater, wetlands, and floodplain

This includes fen, bog and freshwater. Freshwater bogs are partly drained habitats, including ericaceous and herbaceous mosses which form over peat rich soils.

Coastal margins

This includes saltmarsh, littoral rock, littoral sediment, supralittoral rock, and supralittoral sediment.

Marine

This broad habitat is saltwater.

In this methodology, the UKCEH Land Cover Maps are used to calculate habitat extent. Other data sources, such as the National Forest Inventory and Ordnance Survey mapping, have been used in our other natural capital accounts publications. We have used Raster data from UKCEH to produce a Sankey diagram and to estimate habitat extents.

Across the various time series presented in our Habitat extent and condition, natural capital, UK: 2022 bulletin, there are methodological differences in how each Land Cover Map was calculated. There is also variation, across these time series, in the total land extent for each country. Therefore, the percentage land cover values, and comparison of these values to one another, should be used with caution.

2 . Condition indicators for UK habitats

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)](#) 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. In addition, 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.

Ancillary indicators

Some environmental pressure indicators, for example, wildfires and access, 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 not suitable for use in ecosystem condition accounts, they are classed as ancillary indicators.

Indicators of protection status (for example, Sites of Special Scientific Interest (SSSI) and Special Areas of Conservation (SACs)) are classed as ancillary indicators as they can be used as proxy measures for condition in cases where no other information is available. Protected sites information could be thought of as a rough proxy for reduced environmental pressures, especially reduced overexploitation (for example, indicating lower management intensities). However, indicators describing policy interventions performed in response to management or conservation objectives are not considered appropriate as condition indicators.

3 . Abiotic ecosystem characteristics - physical and chemical

The physical state characteristics include the physical descriptors of the abiotic (physical rather than biological) components of the ecosystem, such as water and soil. These stocks are subject to degradation from human pressures and therefore sensitive to change.

The chemical state characteristics include descriptors of the chemical composition of the abiotic ecosystem components, such as water. This looks at the accumulated stocks of pollutants or nutrients in soil and water. This indicator should describe the state of the components of the ecosystem rather than the emission of pollutants.

Water quality from the Water Framework Directive

Poor ecological and chemical condition of a surface water body can cause a range of damage, including:

- drinking and bathing water quality

- biodiversity

- marine life health

The Water Framework Directive (WFD) is an important tool for assessing the water environment for several types of water bodies, including rivers, lakes and canals. The WFD operates in six-year cycles. This framework helps to classify the quality of water bodies by measuring their ecological and chemical status.

Uplands water quality

The UK Acid Waters Monitoring Network was set up in 1988 to investigate the chemical and biological responses of acidified streams and lakes to changes in air quality and "acid rain". In 2013 it became the UK Uplands Water Monitoring Network (UWMN), with a wider remit to also investigate the impact of climate change and land management on uplands water.

UWMN variables measured include the acidity and acid neutralising capacity (ANC), dissolved organic carbon (DOC), nitrate and non-marine sulphate of uplands waters.

ANC is a measure of the capacity of water to resist changes in pH levels. Catchments whose drainage waters have higher levels of ANC have a greater ability to neutralise acid deposition.

Non-marine sulphate in upland surface waters is mostly derived from the burning of fossil fuels by power stations and heavy industry.

DOC is derived largely from the degradation of plant and soil organic material. It forms a substantial part of dissolved organic matter (DOM) that often causes a brown staining to upland waters. Concentrations of DOC tend to be particularly high in waters draining from peatlands.

Year-on-year changes in these metrics across a wide range of sites provide a strong indication of how the water quality of our upland streams and lakes has been evolving over recent decades.

Currently the UWMN samples around 26 sites regularly for water quality assessment. Sites from mountain, moorlands and heath areas were extracted and data upscaled to a UK level for the purpose of this report. While the number of sites is limited, they show highly consistent behaviour in the metrics presented. This indicates that the changes observed should be broadly representative of changes in acid-sensitive upland waters more widely.

Soils

Soil is important for providing many essential ecosystem services, such as food production, water purification and greenhouse gas regulation. Monitoring trends in specific soil indicators over time provides a suitable physical state condition indicator. The Environment Agency's 2019 report on soil states that soil holds three times as much carbon as the atmosphere and absorbs water, therefore reducing the risk of flooding. Soils are also a wildlife habitat and provide 95% of global food supplies.

Soil data are taken from the Countryside Survey 1978, 1998 and 2007. Since then the UK Centre for Ecology and Hydrology (UKCEH) Countryside Survey has been monitoring soil samples in a rolling five-year survey to understand the state of topsoil (up to 15 centimetres depth), with interim data to be published during 2022.

Acidity

High levels of soil acidity, low pH level, can be damaging for some habitats.

Carbon

Organic carbon plays a critical role in maintaining the structure of and water retention in soils and is an important indicator of soil quality.

Organic matter content

Plant and animal residues in different stages of composition, organic matter content, is another important indicator of soil condition.

Ideally, soils would slowly increase levels of organic matter content over time, as has generally occurred since the last ice age around 11,000 years ago. However, climate change, grazing pressure, crop burning or increased cutting intensity can lead to a loss of organic matter content. This is because of increased decomposition rates of soil organic matter and/or increased erosion of the organic-rich top layer of soil.

Bulk density

Compaction of soil prevents plant growth and increases erosion. Bulk density is another useful indicator of soil compaction and is calculated as the dry weight of soil in a given volume. A high bulk density can restrict root growth and increase soil erosion.

4 . Biotic ecosystem characteristics – compositional, structural, and functional

According to the UK Biodiversity indicators, biodiversity supports the vital benefits humans get from the natural environment, which in turn contributes to the economy, health and well-being, and enriches our lives.

Bees

Bees provide a range of ecosystem services as well as being useful indicators of wider ecological health. In particular, bees are one of the main groups of insects responsible for pollination of wildflowers, berries, orchards and crops. As 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, so is 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 bees per kilometre were counted and reported over time. The total number of bees per kilometre per BeeWalk is an indicator of the condition of six broad habitats in this report, including:

- coastal

- mountains, moorland, and heath

- woodland

- enclosed farmland

- semi-natural grassland

- freshwater, wetlands, and floodplains

Bats

Bats depend on a range of habitats, and in the UK are reliant on insect prey. They are sensitive to changes in land use, habitat fragmentation, climate and site management.

The National Bat Monitoring Programme (NBMP), run by the Bat Conservation Trust (BCT), coordinates annual bat surveys. Volunteers monitor bats at survey points and along walks by listening for their vocalisations using specialised equipment. The monitoring sites and walks have been mapped against habitat maps to enable us to break it down by broad habitat.

The detection distance of bats means that the bats recorded may not be at the exact location of the recording point. A "buffer" is placed around each recording point based on the approximate maximum detection distance for each species. These are:

- Daubenton's bat - 10 metres (m)

- common pipistrelle and soprano pipistrelle - 25m

- noctule - 100m

Indices for each species are based on spots or walks where at least 50% of the buffer area was of the relevant habitat.

Generalised Additive Models (GAM) are used to fit a smoothed line to each bat dataset, with full details on the statistical methods used in NBMP's Annual Report. The urban, woodland and enclosed farmland index is a composite of three bat species trends, including:

- common pipistrelle

- soprano pipistrelle

- noctule

The freshwater index is calculated using the Daubenton's bat data (a freshwater specialist). Increases in the urban (not statistically significant), woodland, and enclosed farmland indices are largely driven by significant increases in common pipistrelle numbers. While soprano pipistrelles are considered by the BCT to be increasing, this is not yet clearly statistically significant, while noctules and Daubenton's bat remain stable. Freshwater figures only include Daubenton's bat which explains the stable index. A limitation of the bat indicators is that some habitat specialist bat species that are more challenging to monitor are not included; for example, the woodland indicator lacks data on some key woodland habitat specialists.

Birds

Bird populations provide a useful indicator of the state of UK nature, as they occupy a wide range of habitats and respond to environmental pressures.

Many of the habitat-based bird population indices are official statistics and produced by the Royal Society of the Protection of Birds (RSPB) and British Trust for Ornithology (BTO).

Species are selected for the index 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, please visit the Breeding Bird Survey, British Trust for Ornithology (BTO) website.

These are not available for all habitats, so we build new indices for those by using earlier papers on potential species. These indices are presented as experimental statistics for information and should not be confused with the official indexes.

The moorland bird index is an unsmoothed index we have calculated using a species list we developed in the early stages of development of a potential official index in UK natural capital: mountains, moorland and heath accounts in 2019. There is a noticeable drop in the index in 2001; this is because of reduced monitoring as a result of the foot and mouth outbreak that year when moorland footpaths were closed and the number of surveys reduced.

Butterflies

The UK Butterfly Monitoring Scheme states that butterflies are good indicators of environmental change as they have short life cycles and react quickly to weather and climate change.

The butterfly habitats included in this publication are:

- wider countryside in woodland

- wider countryside in farmland

- habitat specialist (semi-natural grassland)

Moths

Moths hold vital roles in the ecosystems with more than 2,500 moth species present in Britain in a range of habitats. Moths and caterpillars are very important for feeding bird chicks, so declines could have major knock-on effects for bird species. They also carry out an important role in pollinating many crops and wildflowers.

According to the Butterfly Conservation, more than 60 individual species became extinct in the 20th century.

The State of Britain's Larger Moths 2021 report showed the total number of larger moths declined by 33% over the 50 years from 1968 to 2017, as recorded through in the Rothamsted traps national network.

The moth habitats included in this publication are:

- woodland

- coastal

- farmland

- moorland and scrubland

- urban

Freshwater salmonids

Freshwaters in the UK provide [extensive recreational fisheries](#) on rivers and lakes. In 2006, the UK was estimated to have at least [three million recreational anglers](#).

The Environment Agency and Natural Resources Wales use catch return data to assess and manage salmon and sea trout stocks, as seen in [Salmonid and fisheries statistics for England and Wales 2020.](#)

Sustainable sea fish

Fish are important for marine biodiversity. They are an important food source for seabirds and aquatic mammals, as well as a source of food and employment for people.

This indicator looks at fish stocks that are fished in acceptable mortality range using the Maximum Sustainability Yield (F_{MSY}) as a fishing pressure indicator for marine fish stocks. This is based on a consistent set of 57 population species since 1990. Read the [full methodology on sustainable fisheries from the Joint Nature Conservation Committee (JNCC).](#)

National Forest Inventory

Changes in land use practices, woodland management and effects from drivers such as climate change affect the ecological condition of woodlands.

The [National Forest Inventory](#) (NFI) survey is based on data collected between 2009 and 2015 in Great Britain. More than 15,000 one hectare squares were sampled, recording data for 15 [woodland ecological condition indicators](#) at each survey site. These are then classed as favourable, intermediate, or unfavourable. For full details, see [Forest Research's NFI survey methods](#).

NFI indicators used in this publication include:

- tree health

- invasive species

- regeneration at component level

- number native trees and/or shrub species

- deadwood volume (metres cubed per hectare)

- vertical structure

- veteran trees

- age distribution trees

- proportion open space

A variety of ages of trees in woodlands benefits biodiversity, as they provide different ecological habitats. To be classified as favourable, woodlands need to have young, intermediate, and old trees present. The NFI defines a veteran tree as a tree that is of interest biologically, culturally, or aesthetically because of its age, size, or condition.

The vertical structure is defined as the number of "storeys" in the tree canopy. Woodlands with greater structural diversity (more storeys) provide a wider range of microhabitats and conditions.

Regeneration is an assessment of seedlings, saplings, and young trees. It is an important indicator of biodiversity for predicting the future health of woodlands. To be classed as favourable, the woodland needs to have trees with 4 to 7 centimetres diameter, as well as having saplings and seedlings present.

Tree diseases and pests have a negative impact on woodland biodiversity. Dead and decaying wood enable light to reach the forest floor, which is an important micro-habitat. The rapid and widespread death of trees can harm ecological health.

Areas of open space within, and adjacent to, woodlands provide increased light for some shade-intolerant species, improving environmental and structural heterogeneity. The UK Forestry Standard requires for woodlands to have a minimum of 10% open ground.

Invasive species

Invasive species are non-native species which have reached Great Britain by accident either by transport, deliberate human introduction or arrived by natural dispersal from Europe.

The United Nations Convention on Biological Diversity (CBD) identifies invasive species as a major threat to biodiversity. Some non-native species have a negative impact and spread disease and compete for resources.

Of the 3,248 non-native species identified in Great Britain, 194 (6%) are considered to have a negative impact on biodiversity. This includes 47 freshwater species, 39 marine species, and 108 terrestrial species.

The JNCC's invasive species indicator for freshwater and marine measures the number of non-native species which have arrived since 1500 that are established across 10% or more of Great Britain's land area, or along 10% or more of the coastline extent. This is based on an area of extent calculated using a method developed by the England Vascular Plant Red List. There are three methods used to determine extent of occurrence of such species.

1. Determining the number of distinct 10 kilometre (km) squares the species has been recorded within and then calculating the total area of these 10 km squares.

2. The minimum convex polygon (MCP) is defined as the smallest polygon in which no internal angle exceeds 180 degrees and contains all the sites of occurrence. To reduce problems in using polygons, a secondary polygon is created by intersecting the MCP polygon with the land mass of Great Britain (or 50 km wide coastal region in the case of marine species) and the area (in squared kilometres and also as a percentage of the total land or marine buffer area of Great Britain).

3. The alpha hull – using occurrence data for each decade. Alpha hulls are created by a Delaunay triangulation of the data points, joining all points so that no lines intersect between points, and then selectively removing lines from this triangulation based on the value of a parameter.

Organic farming

Organic farming requires farmers to operate to a system based on ecological principles in order to minimise environmental and wildlife damage, with strict limitations on the inputs that can be used. Emphasis is placed on natural production and pest control methods.

The main components of an organic farming system are the avoidance of artificial fertilisers and pesticides, and the use of crop rotation and other forms of husbandry to maintain soil fertility and control weeds, pests and diseases. Livestock form an integral part of the majority of organic farms, although some systems do not have livestock. Intensively-housed stock, or systems where a large amount of total feed has to be bought in, are not permitted. Pigs and poultry must be managed with extensive outdoor access.

5 . Landscape-level characteristics

Habitat connectivity

Habitat connectivity measures the ease of different species' movement between landscape habitats. One definition is "the degree to which the landscape facilitates or impedes movement among resource patches", which we have used here.

Connectivity can be structural – about the distribution of patches of habitat across a landscape, or functional – about the ability of species to move around different habitat patches. For example, birds might functionally move across a naturally structurally fragmented set of habitats many miles or even thousands of miles apart, while some terrestrial mammals may struggle if a single road crosses their habitat.

Habitat connectivity in England

Forest Research and the UK Centre for Ecology and Hydrology (UKCEH) developed a connectivity indicator for England looking at bird and butterfly species and their ability to move between patches. This used Countryside Survey data for 1990, 1998, and 2007.

Habitat connectivity in Scotland

NatureScot has developed a method to assess functional habitat connectivity at a national and regional scale, applying this to calculate a habitat connectivity indicator for Scotland.

The Equivalent Connected Area (Probability of Connectivity) or ECA(PC) metric is defined as "the size that a single habitat patch would need to be, to produce the same probability of connectivity as the actual habitat pattern in the landscape under consideration."

The ECA(PC) has been created for 10 catchment areas, with higher values meaning greater connectivity. The ECA(PC) as a percentage of the total amount of habitat in the region was selected as the most meaningful way to present connectivity. This method can measure changes in connectivity at a local level over time. However, comparisons of national-scale connectivity over time are not currently possible because of inconsistent land cover data over time.

River naturalness

River naturalness refers to the extent to which a river differs from its original state.

By examining chemical, biological, hydrological, and physical habitat change indicators, we can begin to assess the overall condition of the river. This is particularly important because the quality of surface water bodies can affect many of the ecosystem services that humans and other natural life derive from them.

A natural river may not create the largest ecosystem service flows and benefits to humans. Alterations, such as dams and weirs (a morphological change), may provide benefits to humans, but may reduce the overall naturalness of the river, for example, disrupting the migratory flow of fish upstream.

Examining the naturalness of rivers assesses their ecological integrity: their ability to maintain and support their own ecological processes. Measures that quantify the overall naturalness of a river have been developed for England, Scotland, and Wales.

River naturalness in England

Natural England has developed the [Priority River Habitat Map](#) to [assess the condition of a river](#). An aggregate score is comprised of hydrological, physical habitat, biological and chemical integrity scores.

River naturalness in Wales

In Wales the naturalness of rivers was assessed using the Hydromorphological Impact Ratio. This looks at the channel substrate, flow regime, channel vegetation and geomorphic activity. These data were derived from the [2007 to 2008 baseline survey of Welsh rivers.](#)

River naturalness in Scotland

Data on the physical status and ecological potential of all Scottish surface water bodies are presented in [The River Basin Management Plan for Scotland 2021 - 2027](#).

River naturalness in Northern Ireland

There are no data on the naturalness of the [450 rivers and water bodies in Northern Ireland](#). We are looking at how to provide statistics in future.

Hedgerows

A hedgerow, or hedge, is a line of woody or shrubby vegetation which is managed to alter its natural shape. Hedgerows:

- provide windbreaks which prevent soil erosion and protect crops

- provide habitats for wildlife especially pollinators such as bumblebees, butterflies and insects which need hedge banks

- provide shelter for wildlife such as birds

- reduce flooding

- improve air quality; a hectare of hedgerows between 3.5 metres (m) and 6 m wide could sequester as much as 131.5 tonnes of carbon per year

The Department for Environment, Food and Rural Affairs' (Defra's) Hedgerow survey handbook defines a hedgerow as any boundary line of trees or shrubs over 20 metres long and less than 5 metres wide at the base.

The Woodland Trust estimates that half of all hedgerows were lost from the countryside during the 20th century.

Hedgerows are very important to birds and there are 21 priority Biodiversity Action Plan (BAP) bird species, with 10 species using them as a primary habitat.

The Countryside Survey provides hedgerow data for 1984, 1990, 1998, and 2007, covering:

- coastal

- farming

- mountains, moorland, and heath

These data are presented as mean lengths for seven different feature categories based on the Institute of Terrestrial Ecology (ITE) Land Classification. Those featured in our report are:

- hedges

- line of trees and fence

- line of trees

- bank and grass strip

6 . Ancillary condition indicators

Additional indicators include:

National Forest Inventory (NFI) herbivore damage

Herbivore damage negatively affects the ecological condition of woodland. The NFI survey data collected on "browsing damage" and "bark stripping damage" are indicators of this.

Pressure indicator - wildfires

Pressure indicators are defined here as damage inflicted on the landscape by humans.

Wildfires can be a pressure indicator. Most are anthropogenic in origin, with or without intent.

There are two main sources of wildfires data: reports and satellite data. Reported fires include wildfires of all sizes attended by Fire and Rescue Services but may miss some remote fires that are addressed by land managers. Satellite data capture fires in both built-up and remote places, but can miss smaller fires under 30 hectares.

Wildfires in England

The [England wildfire statistics](#) were compiled by Forestry England for 2009 to 2010 to 2016 to 2017 from analysis of all wildfire incidents attended by the Fire and Rescue Services. The analysis uses the Home Office's Incident Recording System data, compared using a geographical information system with geospatial data from Forest Research's National Forest Inventory woodland map and the UK Centre for Ecology and Hydrology's Land Cover Map.

Wildfires in Scotland

Wildfire data for Scotland are from [climateXchange](#), using data from the Incident Recording System and only represent wildfires responded to by the Scottish Fire and Rescue Service. These exclude wildfires extinguished by landowners alone.

Wildfires in Wales

The Welsh Government reports annually on wildfires with data from the three Fire and Rescue Services in Wales.

Fires are classed as [primary or secondary fires](#). Primary includes any fire in non-derelict buildings, vehicles, or outdoor structures, any fire involving casualties or rescues and any fire attended by five or more appliances. Secondary fires are mainly outdoor fires including grassland and refuse fires unless they involve casualties or rescues or are attended by five or more appliances.

Grassland, woodland and crop locations include primary fires in allotments, gardens, crops, woods and other agricultural locations, and secondary fires on heathland and as a result of intentional straw and stubble burning, as well as fires on grassland.

Green space in urban environments

Green spaces are areas used for particular functions, for example, public parks or gardens, playing fields, golf courses, and allotments. These contain natural land cover, and can also include blue space, for example, a park that has a lake within it.

We have collaborated with the Ordnance Survey (OS) to develop estimates of the extent of green space in urban areas used in the [UK natural capital urban accounts](#).

The OS Open Green Space Map (2019) and OS Mastermap Topography Layer were used with a modified Office for National Statistics (ONS) Built-Up Area map (2011) to calculate these areas.

Fertiliser use

Three main fertilisers - nitrogen, phosphate and potash - are used in non-organic agriculture production in the UK. These are absorbed by plants from the soil. Surpluses of phosphorus and nitrogen can lead to environmental pollution, such as eutrophication of surface water, as identified in the [Eurostat agri-environmental indicator of mineral fertiliser consumption](#). More efficient use of fertiliser per tonne of food produced is better for both farm businesses and the environment.

The [British Survey of Fertiliser Practice](#) (BSFP) estimates the average application of the three main fertilisers used for agricultural crops and grassland.

[The BSFP annual report (.docx, 1.30MB)](#) states that these data are based on trade and sales data. These are compiled by the Agricultural Industries confederation (AIC) in conjunction with the Department for Food, Environment and Rural Affairs (Defra) using methodology described in the report on fertiliser use.

To calculate use of fertiliser per tonne of food produced, we use biomass data (total biomass less grazed biomass) from the [UK natural capital accounts: 2021](#). Tonnes of fertiliser used was divided by crop biomass to calculate fertiliser use per tonne of crop biomass to indicate fertiliser use efficiency.

Pesticide usage

Pesticides are used to support UK plant health and crop production. Targeted use protects crops from native and non-native species, but such use can pose risks to both humans and the wider environment.

In Fera's Arable Crops in the United Kingdom 2020 report, data on pesticide usage are collected from 20,383 fields or arable crops grown on 1,102 holdings throughout the UK. As no site visits were conducted in 2020, because of the coronavirus (COVID-19) pandemic, data were collected by phone, post or email. The data survey cycle is split over two years, with the arable, potato storage, soft fruit and orchards being conducted in even years and outdoor vegetable and edible protected crops in odd years.

Data are collected for:

- arable crops including wheat, barley, oats, rye, triticale, oilseed rape, linseed, ware and seed potatoes, dry harvest peas, field beans and sugar beet

- soft fruits including strawberries, blackcurrants, redcurrants and whitecurrants, gooseberries, blueberries, raspberries, blackberries, hybrid berries and grapevines

- edible protected crops including tomatoes, cucumbers, lettuce, poppers and other vegetables, edible plants, strawberries, and other fruit

outdoor vegetables including brassicas, roof crucifers, peas and beans, onions and leeks, carrots, parsnips and celery, lettuce, endive and radicchio, sweetcorn, other root vegetables, cucurbits, and other vegetables

Sewerage pollution

Sewerage pollution incidents are pollution caused by discharges or escape of contaminants from water company sewerage assets. These include:

- combined sewer overflows

- foul sewers, including private sewers transferred to water companies

- other water industry premises

- pumping stations

- rising mains

- sewage treatment works

- surface water outfalls

The category levels are:

- category 1 – high (major)

- category 2 – high (significant)

- category 3 – low

Sea litter

The Marine Conservation Society (MCS) has collected data from beach cleans across the UK since 1995. We use data from their large citizen science project, the Great British Beach Clean (GBBC), conducted on a single weekend each year.

Organisers of beach cleans are given guidance on best practice by MCS. Transects along beaches are carried out between the back of the beach and the strandline. Best practice guidelines indicate that 100 metre transects are preferred, however this is not always the case. The litter collected is classified, recorded, and reported to MSC.

We restricted the data to 100 metre cleans between 2008 and 2020 and included only litter types containing plastic. We excluded small items under 2.5 centimetres, however, some counts of small items remain in the dataset under "other" categories.

A key strength of the GBBC data is the large sample size, which may give more representative and precise estimates than datasets with a smaller sample. However, inconsistencies remain in:

- the number of volunteers

- the composition of beaches across years

- the frequency of cleans prior to GBBC

- how small items are recorded

For each year we calculated the median number of items.

Protected sites

There are several formal designations, including Special Areas of Conservation (SACs) in the UK, a Site of Special Scientific Interest (SSSIs) in Scotland, Wales and England, or Areas of Special Scientific Interest (ASSIs) in Northern Ireland. The rare fauna or flora present, or important geological or physiological features, make it an area of interest to science.

The England and Wales data were recorded by habitat. The Scottish data were recorded by feature category and therefore sites were only included if they had the habitat as the feature. For example, if the site had been recorded as a feature for birds, invertebrates or earth sciences, we were not able to assign it to a habitat.

Certified woodland area

Certified woodland in the UK has been independently audited against the UK Woodland Assurance Standard which promotes good forest practice. They offer product labels that demonstrate that wood or wood products come from well-managed forests.

Green Flag Awards

According to a 2016 Heritage Lottery Fund report on the State of UK Public Parks, there are more than 27,000 parks and green spaces across the UK.

The Green Flag Award recognises and rewards well-managed parks and green spaces, setting the benchmark standard for the management of recreational outdoor spaces across the UK. Any freely-accessible green space that has a site-specific management can apply. Applicants are judged against 27 different criteria and must submit their active management plan to show understanding of:

- users – who they are, who they could be, what they want and how they are informed and involved

- the site – any special history, biodiversity, landscape, social and physical settings and what they are trying to achieve

- management – what they have is safe, in line with legislation and policy, well maintained, and any plans for the future

This is a useful measure, but only parks which apply to be reviewed are included. This does not provide a national statistically-representative picture of the state of parks.

Blue Flag Awards

The Blue Flag certification includes a guarantee of bathing water quality for resort beaches with facilities. For a full list of criteria, please see the Blue Flag Global website.

Blue Flag is a regulated certification and as such all beaches are included in the scheme. Water samples must be taken no longer than 31 days apart throughout the Blue Flag season.

The main categories are:

- environmental education and information

- water quality

- environmental management

- safety and services

7 . Related links

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.

UK natural capital accounts: 2021
Bulletin | Released 12 November 2021
Estimates of the financial and societal value of natural resources to people in the UK.

Semi-natural habitat natural capital accounts, UK: 2021
Bulletin | Released 10 February 2021
Exploring the size, condition, quantity and value of semi -natural habitats and ecosystem services, as part of the UK Natural Capital accounts. These are our most natural spaces, although they have been altered by human activity.

Woodland natural capital accounts: ecosystem services for England, Scotland, Wales and Northern Ireland, 2020
Bulletin | Released 11 May 2021
Additional information splitting down UK data in the Woodland natural capital accounts, UK: 2020 publication for England, Scotland, Wales and Northern Ireland. Extra data on summary ecosystem services and asset value.