Department
for Environment
Food & Rural Affairs

Measuring environmental change: outcome indicator framework for the 25 Year Environment Plan

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Summary

The government launched the 25 Year Environment Plan in January 2018 with a key commitment to develop a comprehensive set of indicators, which collectively describes environmental change as it relates to the 10 goals in the 25 Year Environment Plan. This document sets out a framework of outcome indicators for the 25 Year Environment Plan, developed on the concept of natural capital.

The framework contains 66 indicators, arranged into 10 broad themes. A sub-set of indicators have been identified as 16 headlines, groups of indicators which will help us communicate progress towards the goals of the 25 Year Environment Plan. The outcome indicator framework is designed to be flexible, to allow users to select indicators which support the use of the natural capital conceptual framework, identify pressures acting upon natural capital assets, assess the condition of assets, and highlight the services and/or benefits that are provided by natural capital.

We are publishing trends for the 27 indicators where data are already available and have already been published. Many indicators still require further development and we are working on these to allow a greater number of indicators to be reported on. We will continue to review and update the framework to reflect the development of new indicators.

We have consulted stakeholders extensively as we have developed this outcome indicator framework, which has been updated following the draft framework published in December 2018.

Section A: Introduction to the outcome indicator framework

The government published the 25 Year Environment Plan in January 2018[1] setting out goals for improving the environment in England.

A key commitment was to develop a comprehensive set of indicators, which collectively describes environmental change as it relates to the 10 goals in the 25 Year Environment Plan. This document sets out the indicator framework for measuring those outcomes.

[1] https://www.gov.uk/government/publications/25-year-environment-plan

We have developed the outcome indicator framework over the last year, seeking advice from a wide range of experts and stakeholders.

Purpose of the outcome indicator framework

It is the government's ambition to protect and improve the environment. We need a transparent, comprehensive framework that shows how the environment is changing and whether it is improving over time.

Information on environmental change will also help us to assess the effectiveness of policies and other interventions and show how we are delivering on domestic and international commitments. In addition, it will help inform the decisions we all take and help promote action by everyone to improve the environment.

The indicators will be used to check progress towards the long-term vision of the 25 Year Environment Plan. The framework was developed using the concept of natural capital. Natural capital is defined as the 'elements of the natural environment which provide valuable goods and services to people such as clean air, clean water, food and recreation'. The framework focuses on the outcomes and goals that we have set out to achieve. These outcomes and goals can be grouped together under: 1) reducing pressures on natural capital (e.g. pollution or plant disease); 2) improving the state of natural capital assets (including air, water, land and seas); and 3) increasing the benefits that we get from those assets[2].

In December 2018, the government published the Draft Environment (Principles and Governance) Bill. The Bill describes our ambitious new green governance system including duties on government to have a long-term plan for improving the environment, to make arrangements for obtaining data for the purpose of monitoring whether the environment is improving and to report on progress. This outcome indicator framework sets out the kinds of data about the natural environment that are appropriate for monitoring whether the natural environment as a whole is, or particular aspects of it are, improving in accordance with the current 25 Year Environment Plan.

The 25 Year Environment Plan sets out our immediate actions and long-term goals for environmental improvement relating to the pressures on natural capital assets, the condition of assets and the societal benefits they provide. The outcome indicator framework sets out the data required to monitor progress towards these goals, reflecting the long-term, national-scale effects of multiple short-term policy interventions, actions and decisions.

The indicators within this framework are not targets, and they do not have specific end points, levels or trajectories attached to them. They are a way to monitor the changes

[2] See Figure 2 on page 6.

happening in the environment and they enable us to then ensure we are taking appropriate action.

For many themes within the outcome indicator framework there are links to established or developing strategies or policies such as the Resources and Waste Strategy for England[3], the Clean Air Strategy[4] and the UK Marine Strategy[5]. This indicator framework does not attempt to reflect the breadth and depth of monitoring and evaluation required for these strategies.

The government is exploring options for including additional cross-cutting targets for environmental improvement as part of the broader governance framework that will be established through the new Environment Bill. This Bill will introduce a new statutory cycle of environmental planning, monitoring and reporting which will be integrated with existing data collection and monitoring requirements. Well-designed targets could offer greater certainty on the strength of the government's ambition and drive action by businesses and wider society. The indicators and related data will inform this work and we will continue to develop the outcome indicator framework to support the monitoring of any such targets that are adopted.

Development of the outcome indicator framework

This outcome indicator framework builds on work done over the last decade to better understand how nature and society interact. It builds upon international initiatives, such as the Millennium Ecosystem Assessment, UN Sustainable Development Goals, Intergovernmental Science-Policy Platform on Biodiversity and Ecosystems Services (IPBES) and The Economics of Ecosystems and Biodiversity (TEEB), as well as UK knowledge and expertise such as the UK National Ecosystem Assessment and the Natural Capital Committee.

The framework has been developed by technical, policy and delivery experts from across government, working with a range of other experts and interested parties. It is both backward and forward looking, building on the wealth of environmental data collected in England, but also considering where new sources of data might fill in gaps in our knowledge about our changing environment.

In developing the framework we considered the following:

- Which combination of indicators best describes how our natural capital assets and the environment as a whole system are changing.

[3] https://www.gov.uk/government/publications/resources-and-waste-strategy-for-england
[4] https://www.gov.uk/government/publications/clean-air-strategy-2019
[5] https://www.gov.uk/government/publications/marine-strategy-part-three-uk-programme-of-measures

- How best to capture and summarise the environmental changes that matter most to people.
- How to summarise assessments of change in individual indicators and bundles of indicators bearing in mind their different characteristics.
- How to make the information accessible to the widest possible audience.
- How to make the best use of existing investments and monitoring programmes, including data needed for reporting on existing international commitments.
- Which indicators are capable of detecting important changes over short to medium (1 to 6 year) time periods that are amenable to policy interventions.
- Scalability between national and local levels.
- Statistical robustness, operability and cost-effectiveness.
- Stability over time while allowing for innovation in how the environment can be measured (for example, new technologies or methods to collect or analyse data).

Structure of the outcome indicator framework

The outcome indicator framework is made up of 66 indicators. These indicators are arranged into 10 broad themes related to the goals of the 25 Year Environment Plan and commitments to protect and improve the global environment.

The 10 broad themes are topics that people will generally recognise relating to different aspects of the environment (e.g. air, freshwater, seas and estuaries, wildlife etc.). The themes are largely for convenience and ease of identification so that users can quickly find the indicators relating to the aspects of the environment with which they are familiar. Some indicators could sit within one or more themes, but have been allocated to just one of them. A full list of indicators is provided below (see Figure 3) and details of the indicators are presented in Section C.

The outcome indicator framework is designed to be multi-purpose. Two key uses that have been designed into the framework are communicating change and managing our natural capital.

(1) Communicating change – Headlines.

A sub-set of the indicators are combined into 16 headlines (see Figure 1) which will help to communicate progress towards the goals of the 25 Year Environment Plan. The intention of the headlines is to provide a high-level overview of progress and to simplify the presentation of a large amount of information. They are meant to be understandable by a wide audience. In constructing these headlines, we have sought to strike a balance. Selecting a very small number of indicators could distort the true picture of change; trying to report on everything using complex indices combining multiple data sources could create communication problems and mask important changes. The indicators chosen for

the headlines relate to key aspects of the environment which are a focus of policy intervention and should make intuitive sense to a wide range of readers. Further details on the headlines are given in section B.

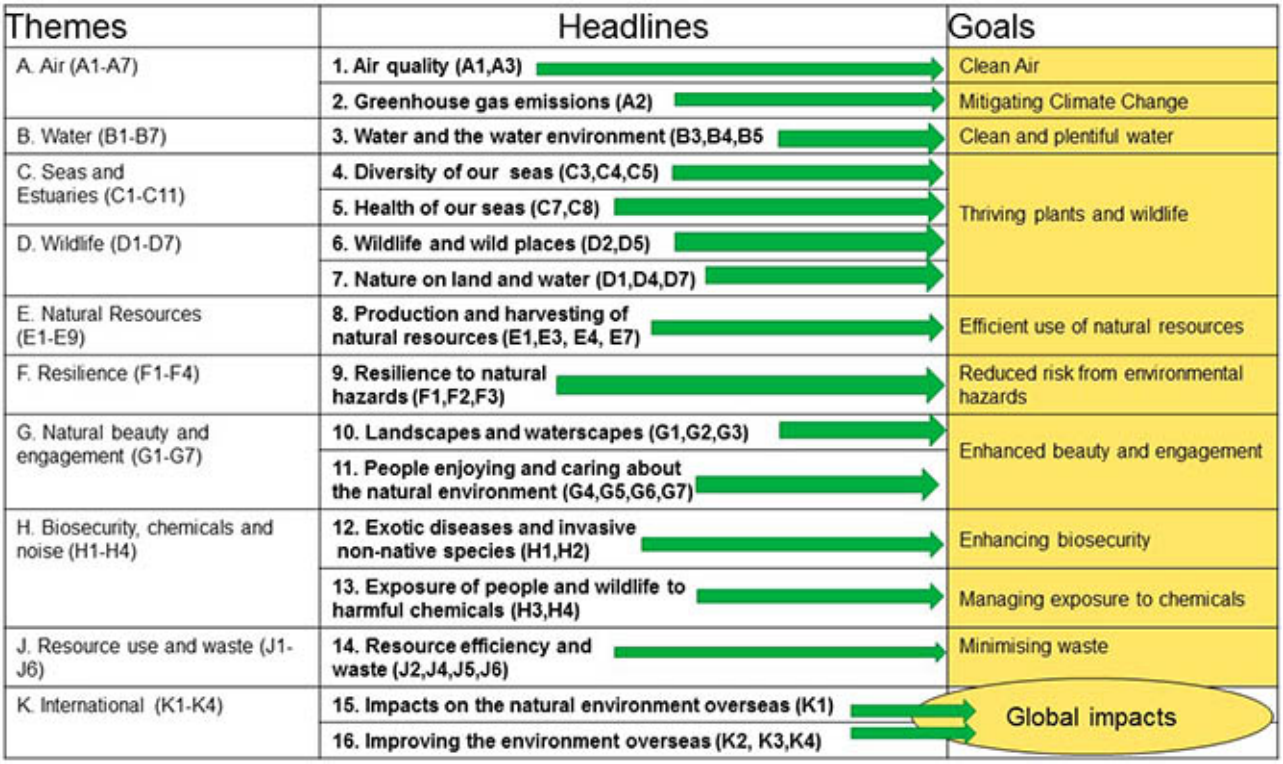


Figure 1: *A schematic diagram showing the relationship between the indicator themes and headlines and the 25 Year Environment Plan goals. Global impact is not a goal in the plan but as it is included in the indicators it is listed under the 'goals' column.*

(2) Managing natural capital

The indicators can also be arranged to support the use of the natural capital conceptual framework (see Figure 2) that underpins the 25 Year Environment Plan in decision making. In simple terms they are classified as: pressures acting upon natural capital assets; condition of natural capital assets; and, services or benefits that are provided by natural capital. This classification is not always straightforward since the condition of one natural capital asset (e.g. air quality) may place a pressure on another (e.g. wildlife habitat). Nevertheless, this provides a framework for analysis of policy interventions that may focus on reducing pressures, improving condition or maximising benefits.

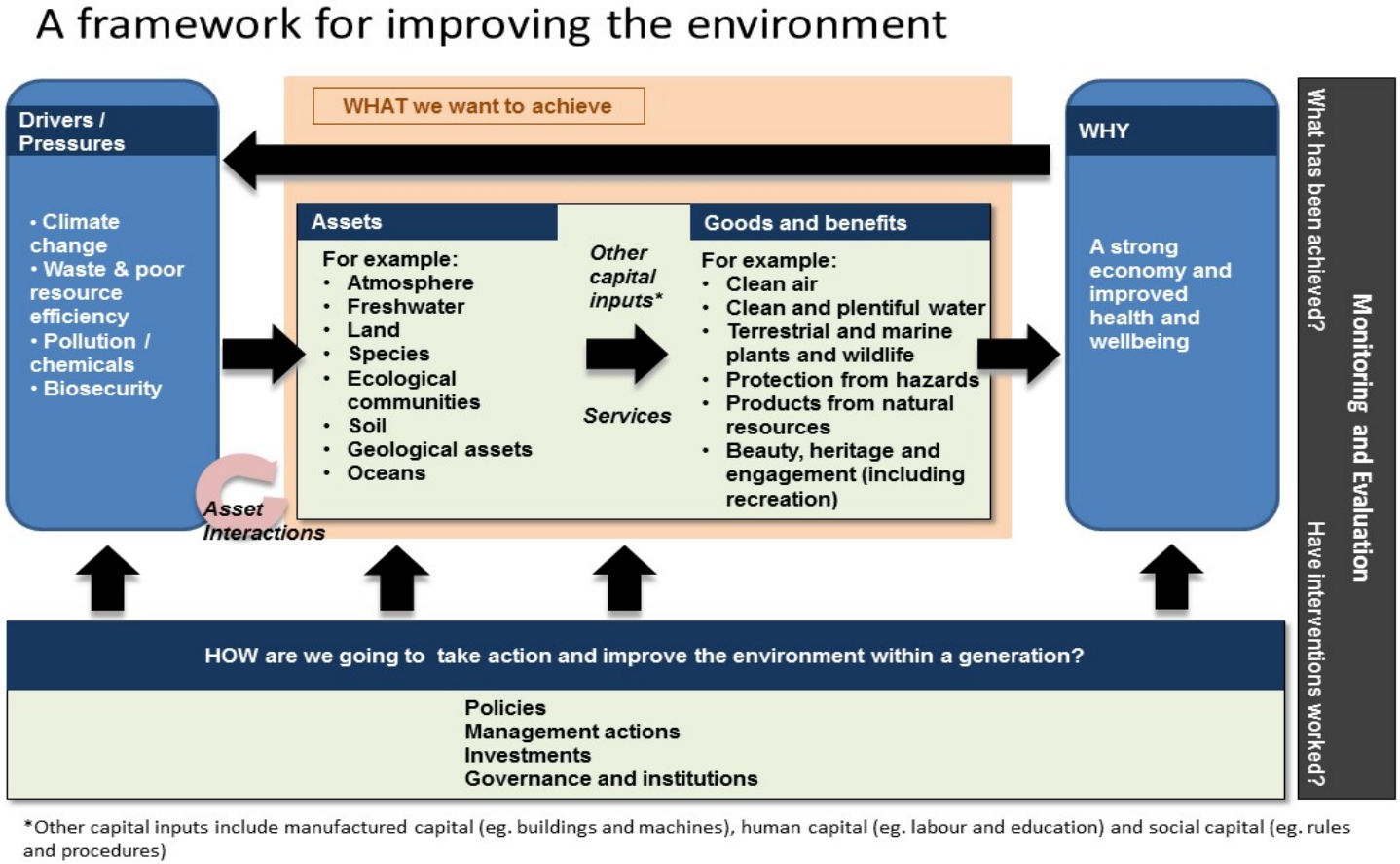


Figure 2: A conceptual framework for improving the environment[6]. *This has been a guiding principle for developing the outcome indicator framework. The framework will help us answer the top right hand question regarding monitoring and evaluation – What has been achieved? The bottom right hand question (Have interventions worked?) will be answered through the annual report on the 25 Year Environment Plan.*

[6] A Green Future: Our 25 Year Plan to Improve the Environment. Annex 1: Supplementary evidence report. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/673492/25-year-environment-plan-annex1.pdf

The National Audit Office, in its January 2019 report on '*Environmental metrics: government's approach to monitoring the state of the natural environment'*[7], highlighted that the systems approach taken by this indicator framework should help decision-makers understand whether government's actions as a whole are consistent with its ambition to improve the natural environment within a generation, and it should help to highlight potential interactions between different policy areas.

The big 'external drivers' of environmental change, such as the global economy and security; population growth and migration; emergent diseases, technological advances and climate change are not included within this framework. Information regarding external drivers will nevertheless be important in future assessment of the indicator trends. We have stated our intention to undertake a more comprehensive 'National Ecosystem Assessment' type initiative periodically, the first beginning in 2022, which will be able to explore some of these wider links more fully.

As a whole, the framework is constructed to help evaluation of policy interventions in respect of environmental change. To do this effectively, some indicators need to be included where government does not have high levels of control. These indicators provide valuable context to help understand the effectiveness of interventions.

The indicators have been developed primarily for England-level reporting. However, in line with the 25 Year Environment Plan, we have included the role of the UK internationally (e.g. with regard to UK Overseas Territories). Where possible, data to allow for assessment at more local levels will be made available.

This document does not pre-empt discussions with the devolved administrations on areas where common frameworks will need to be retained in the future. The geographical scope of each of the indicators is shown in Section C.

Data collected for the many reporting obligations to the European Commission will continue to be collected and published following our exit from the European Union.

We also have a range of international commitments that go beyond the EU. For example, the Office for National Statistics (ONS) is responsible for reporting the country's data to the United Nations to monitor progress towards achieving the Sustainable Development Goals.

This framework does not replace these reporting commitments, but draws from many of them and could help in future to deliver them efficiently, enabling meaningful international comparisons. An initial assessment of how the indicators relate to international reporting commitments is described in Section D.

[7] https://www.nao.org.uk/report/environmental-metrics-governments-approach-to-monitoring-the-state-of-the-natural-environment/

AIR	***A1***	*Emissions for five key air pollutants (headline 1)*
	A2	Emissions of greenhouse gases from natural resources (headline 2)
	A3	*Concentrations of fine particulate matter ($PM_{2.5}$) in the air (headline 1)*
	A4	*Rural background concentrations of ozone (O_3)*
	A5	*Roadside nitrogen dioxide (NO_2) concentrations*
	A6	*Exceedance of damaging levels of nutrient nitrogen deposition on ecosystems (headline 1)*
	A7	*Area of sensitive habitats exposed to damaging levels of ammonia (NH_3) in the atmosphere*

WATER	**B1**	Pollution loads entering waters
	B2	*Serious pollution incidents to water*
	B3	*State of the water environment (headline 3)*
	B4	*Condition of bathing waters (headline 3)*
	B5	Water bodies achieving sustainable abstraction criteria (headline 3)
	B6	Natural functions of water and wetland ecosystems
	B7	Health of freshwaters assessed through fish stocks

SEAS AND ESTURARIES	**C1**	Clean seas: marine litter
	C2	Seabed subject to high pressure from human activity
	C3	Diverse seas: status of mammals, birds and fish (headline 4)
	C4	Diverse seas: condition of seafloor habitats (headline 4)
	C5	Diverse seas: condition of pelagic habitats (headline 4)
	C6	Diverse seas: status of threatened and declining features
	C7	Healthy seas: fish and shellfish populations (headline 5)
	C8	Healthy seas: marine food webs functioning (headline 5)
	C9	Healthy seas: seafloor habitats functioning
	C10	Productive seas: fish and shellfish stocks safe and environmentally sustainable
	C11	Productive seas: status of sensitive fish and shellfish stocks

WILDLIFE	**D1**	Quantity, quality and connectivity of habitats (headline 7)
	D2	*Extent and condition of protected sites – land, water and sea (headline 6)*
	D3	*Area of woodland in England*
	D4	*Relative abundance and/or distribution of widespread species (headline 7)*
	D5	Conservation status of our native species (headline 6)
	D6	*Abundance and distribution of priority species in England*
	D7	*Species supporting ecosystem functions (headline 7)*

NATURAL RESOURCES	***E1***	*Area of productive agricultural land*
	E2	*Volume of agricultural production*
	E3	*Volume of inputs used in agricultural production*
	E4	*Efficiency of agricultural production measured by Total Factor Productivity (headline 8)*
	E5	*Percentage of the annual growth of trees in English woodlands that is harvested (headline 8)*
	E6	*Volume of timber brought to market per annum from English sources*
	E7	Healthy soils (headline 8)
	E8	Sustainable use of water
	E9	*Percentage of our seafood coming from healthy ecosystems, produced sustainably (headline 8)*

RESILIENCE	**F1**	Disruption or unwanted impacts from flooding or coastal erosion (headline 9)
	F2	Communities resilient to flooding and coastal erosion (headline 9)
	F3	Disruption or unwanted impacts caused by drought (headline 9)

NATURAL BEAUTY AND ENGAGEMENT	**G1**	Changes in landscape and waterscape character (headline 10)
	G2	Condition of heritage features including designated geological sites and scheduled monuments (headline 10)
	G3	Enhancement of green/blue infrastructure (headline 10)
	G4	*Engagement with the natural environment (headline 11)*
	G5	*People engaged in social action for the environment (headline 11)*
	G6	Environmental attitudes and behaviours (headline 11)
	G7	Health and wellbeing benefits (headline 11)

BIOSECURITY, CHEMICALS AND NOISE	***H1***	*Abatement of the number of invasive non-native species entering and establishing against a baseline (headline 12)*
	H2	*Distribution of invasive non-native species and plant pests and diseases (headline 12)*
	H3	Emissions of mercury and persistent organic pollutants to the environment (headline 13)
	H4	Exposure and adverse effects of chemicals on wildlife in the environment (headline 13)
	H5	Exposure to transportation noise

RESOURCE USE AND WASTE	**J1**	Carbon footprint and consumer buying choices
	J2	*Raw material consumption (headline 14)*
	J3	*Municipal waste recycling rates*
	J4	Residual waste arising by type and sector (headline 14)
	J5	Prevent harmful chemicals from being recycled (headline 14)
	J6	Waste crime (headline 14)

INTERNATIONAL	**K1**	Overseas environmental impacts of UK consumption of key commodities (headline 15)
	K2	Developing countries better able to protect and improve the environment with UK support (headline 16)
	K3	Status of endemic and globally threatened species in the UK Overseas Territories (headline 16)
	K4	Extent and condition of terrestrial and marine protected areas in the UK Overseas Territories (headline 16)

Figure 3: Full list of indicators by theme. *Those highlighted in green are part of headlines, those in italics have data trends described for them this year (based on already published data).*

Using the outcome indicator framework

Principles of assessment

Ultimately, the 25 Year Environment Plan outcome indicator framework will allow an assessment of change to be made; it will also allow us to communicate key aspects of these changes. The indicators will present trend information based on a range of quantitative and qualitative information. Statistical techniques will be used to analyse trends and detect changes over time, taking account of variability and uncertainty in the data, including spatial variability.

Where possible, a baseline near to 2018 will be used as a reference point to assess change but longer-term (historic) trends will also be presented for comparison where these data are available. Where suitable time series are available, we will assess both long-term (>5 year) and recent (latest 5 year) trends. Data series of less than 5 years are likely to show year-to-year fluctuations that are difficult to assess.

Where indicators are bundled together, such as into a headline, the individual indicator assessments will be retained to ensure transparency. Also, where possible, robust data will be made available to allow analysis at local scales, for example, in a National Park, Area of Outstanding National Beauty (AONB), local authority or catchment. An assessment of the statistical validity will be made before any data are released at local levels.

Examples of use

In this first publication of the outcome indicator framework, we present data trends for the 27 indicators with data that have already been analysed or with interim data that provide useful information pending further, planned development work. These data trends are included in section C together with the relevant indicator descriptions. In all cases these data have been published previously. Using these data trends, it is possible to demonstrate 4 distinct ways of using the framework.

Example 1: Communicating progress towards a goal in the 25 Year Environment Plan – Clean air headline.

To communicate progress towards the clean air goal, 3 indicators have been chosen to form a headline. The first indicator (A1) describes the national emissions of 5 key air pollutants that are known to have negative impacts on human and environmental health so that progress in reducing pressure at source can be charted. The second indicator (A3) tracks concentrations of one of the most damaging groups of pollutants to human health – fine particulate matter ($PM_{2.5}$). The third indicator (A6) uses an internationally agreed methodology for tracking harmful exceedances of reactive nitrogen deposition on sensitive habitats. Such exceedances are known to lead to impacts on wildlife. Taken together these 3 aspects give a clear headline message about progress towards achieving clean

air. There are a further 3 indicators within the framework describing different aspects of our air, which may be useful in understanding additional issues, and will help in relating air quality to other environmental changes.

Example 2: Assessing the state and value of a natural capital asset – Freshwater.

The state and value of a natural capital asset depends on its quality, quantity and location[8]. Combining information on the chemical and ecological status of our water bodies (B3) with the health of those waters (B7) and levels of sustainable abstraction (B5), provides information about quality and quantity of the asset. The data from some of these indicators can also be analysed locally, meaning that such an assessment can be made at a variety of more local scales. Adding in the condition of bathing waters (B4), their sustainable use (E8), and an assessment of the natural functions of waterbodies (such as natural purification and flow regulation) (B6) then allows for an assessment of how the value of this asset might be changing, locally or nationally. This is in line with the ONS methods[9].

Example 3: Evaluating the multiple impacts of policy decisions – increased tree planting

The government is committed to planting 11 million trees during this parliament and has already made significant progress towards this target. This is to support a range of functions delivered by woodlands, which include carbon sequestration, flood risk mitigation, biodiversity, access, health and wellbeing, as well as continuing to provide timber and wood products. The area of woodland in England (D3) has increased markedly over recent decades, and the proportion of that woodland that is actively managed has also increased in the past 10 years. We expect other indicators from across the framework to reflect these changes over time, in terms of landscape (G1 and G3), people's engagement with the natural environment (G4 and G5) and abundance or diversity of species (D4 and D6). Trees take time to grow, therefore monitoring the outcomes of policy interventions needs to take account of these longer timescales. We will use this outcome indicator framework to monitor and assess the success of policies in securing and growing the natural capital value of England woodlands, contributing to the 25 Year Environment Plan ambition to leave the environment in a better state than we found it.

Example 4: Understanding and managing cross-cutting environmental issues – healthy soils, development, climate change adaptation and farming

a. Healthy soils

Healthy soils underpin a wide range of valuable services provided to society. Therefore, while we develop the key indicator or indicators on healthy soils (E7) we can already use

[8] Natural Capital Committee – https://www.gov.uk/government/groups/natural-capital-committee

[9] https://www.ons.gov.uk/economy/environmentalaccounts/methodologies/principlesofnaturalcapitalaccounting

the framework to understand and manage the pressures on soils and the benefits flowing from them. Current pressures on soils include levels of nitrogen deposition (A6) and chemicals in the environment (H3 and H4); current benefits flowing from them include clean water (B1 to B7), greenhouse gas balance (A2), clean air (A1, A3, A4 and A5), and enhancement of green/blue infrastructure (G3). Communicating the state and value of our soils is important and merits further consideration once we have a firmer idea of the key facets that we might monitor and report on in the context of the 25 Year Environment Plan. This may require alteration of, or an addition to the current indicator headlines and we will wish to continue discussions with stakeholders to ensure our communication is clear.

b. Development

Development is an important issue for many people – it affects lives and economic growth. Development includes everything from new housing, to new commercial and industrial developments, and major transport infrastructure. These represent a significant land-use change and will influence environmental outcomes.

However, development is place-based and context specific. For example, some types of developments are likely to have far less environmental impact than others. Development can enable environmental improvement by incorporating green and blue infrastructure which have wider benefits such as health and wellbeing and reduced flood risk; and development is not mutually exclusive from a range of other initiatives and activities (e.g. habitat creation, peatland restoration, woodland planting) that often take place in very different locations.

The complexity of interactions means that there is no single indicator that shows the impact of development. However, many indicators in the framework are sensitive to this issue, both directly and indirectly. Therefore, looking at how the following indicator sets are changing overall can give some indication of how development is influencing environmental outcomes.

Table 1: Indicators likely to be influenced by development

Indicator type	Indicator number	Indicator title
Asset	A3	Concentrations of fine particulate matter ($PM_{2.5}$) in the air
	A5	Roadside nitrogen dioxide (NO_2) compliance
	B5	Water bodies achieving sustainable abstraction criteria
	C3	Diverse seas: status of mammals, birds and fish
	C4	Diverse seas: condition of seafloor habitats
	D1	Quantity, quality and connectivity of habitats
	D2	Extent and condition of protected sites – land, water and sea
	D3	Area of woodland in England
	D4	Relative abundance and/or distribution of widespread species
	D5	Conservation status of our native species
	E1	Area of productive agricultural land
	G1	Changes in landscape and waterscape character
	G2	Condition of heritage features including designated geological sites and scheduled monuments
	G3	Enhancement of green/blue infrastructure
Service or benefit	C11	Productive seas: status of sensitive fish and shellfish stocks
	E8	Sustainable use of water
	F1	Disruption or unwanted impacts from flooding or coastal erosion
	F2	Communities resilient to flooding and coastal erosion
	F3	Disruption or unwanted impacts caused by drought
	G4	Engagement with the natural environment
	G5	People engaged in social action for the environment
	G6	Environmental attitudes and behaviours
	G7	Health and wellbeing benefits
Pressure	A1	Emissions for five key air pollutants
	A2	Emissions of greenhouse gases from natural resources[10]
	B1	Pollution loads entering waters
	C1	Clean seas: marine litter
	C2	Seabed subject to high pressure from human activity
	H3	Emissions of mercury and persistent organic pollutants into the environment
	H4	Exposure and adverse effects of chemicals on wildlife in the environment
	H5	Exposure to transport noise
	J2	Raw material consumption
	J4	Residual waste arising by type and sector

[10] As defined in the Clean Growth Strategy 2017 this includes emissions from agriculture, land use, forestry waste management and fluorinated gases

c. Climate Change Adaptation

Climate change is altering the way that pressures on our environment interact with natural assets and the benefits or services they provide. For example, the effects of pollution on the receiving environment can be influenced by weather events either directly through heavy rain or atmospheric conditions or indirectly through changes to the water environment. Likewise, actions taken to adapt to climate change may be difficult to distinguish from actions taken for other reasons.

The complexity of interactions such as these means that there is no single indicator of how the natural system is responding to climate change impacts or adaptation. However, many indicators in the framework are sensitive to this issue. Therefore, looking at how the following indicator sets are changing overall can give some indication of progress on adaptation, the need for adaptation or the resilience of natural assets to climate change.

Table 2: Indicators which could suggest successful adaptation, the need for adaptation or resilience of natural assets to climate change

Indicator type	Indicator number	Indicator title
Indicators that could suggest successful adaptation	B5	Water bodies achieving sustainable abstraction criteria
	D1	Quantity, quality and connectivity of habitats
	F2	Communities resilient to flooding and coastal erosion
	G3	Enhancement of green/blue infrastructure
	G7	Health and wellbeing benefits
	K2	Developing countries better able to protect and improve the environment with UK support
Indicators that suggest the need for adaptation	B3	State of the water environment
	C3	Diverse seas: status of mammals, birds and fish
	C4	Diverse seas: condition of sea floor habitats
	C5	Diverse seas: condition of pelagic habitats
	C7	Healthy Seas: fish and shellfish populations
	C8	Healthy seas: marine food webs functioning
	D5	Conservation status of our native species
	D7	Species supporting ecosystem functions
	E7	Healthy soils
	F1	Disruption or unwanted impacts from flooding or coastal erosion
	F3	Disruption or unwanted impacts caused by drought
	H2	Distribution of invasive non-native species and plant pests and diseases
	H4	Exposure and adverse effects of chemicals on wildlife in the environment

	K3	Status of endemic and globally threatened species in the UK Overseas Territories
Indicators that show resilience of natural assets to climate change	B3	State of the water environment
	C3	Diverse seas: status of mammals, birds and fish
	C4	Diverse seas: condition of sea floor habitats
	C5	Diverse seas: condition of pelagic habitats
	D1	Quantity, quality and connectivity of habitats
	D7	Species supporting ecosystem functions

d. Managing trade-offs – farming

With around 70% of land under agricultural production, farming has a critical role to play in the shaping and stewardship of our diverse landscapes and patterns of land use. Land use and management are key drivers of environmental impacts from the sector, and so it is through the managers of this land that we can safeguard our natural environment and the ecosystems services it impacts and delivers, food production being one example of these.

As with Climate Change Adaptation, the interactions with other aspects of the landscape are numerous and complex, and there is no single indicator to ensure we are "using resources from nature more sustainably and efficiently – ensuring that food is produced sustainably and profitably" (25 Year Environment Plan Goal). Management practices directly influence the environmental pressures from farming including the quality, composition and availability of habitats and the impact on air, water and soils. Therefore, information from indicators of agricultural land use (E1), volume of production (E2), volume of inputs (E3) and efficiency of production (E4) will be used in concert with indicators across the entire set, to enable meaningful conclusions to be made about the environmental sustainability of crop and livestock production, and wider benefits; and to help monitor progress towards this goal.

Updating the framework

We have made changes to the draft outcome indicator framework published in December 2018 in response to feedback received. These include: restructuring the framework, splitting the marine headline in to 2 headlines in order to increase clarity, reducing duplication between 2 landscape indicators and adding indicators on exposure to transport noise (H5) and the sustainable use of water (E8).

Many of the indicators still require further development work in order to become fully operational. We are working on these and some will be ready for publication in the next annual update, for example, indicator B3 on the state of the water environment which requires a number of existing datasets to be brought together in a novel way. Others will require further research and development before they can be used, such as indicator E7 on healthy soils and K1 on overseas environmental impacts of UK consumption of key

commodities. For some indicators we will be able to use interim indicators until new ones have been developed – examples are provided in Section C. Development of indicators will be subject to the availability of resources and we will prioritise development of indicators that are used within the headlines.

We will continue to review and update the framework to reflect the development of new indicators. It will also be updated to reflect duties established under the Environment Bill. In some areas, we are aware of the need for indicators but have not yet been able to determine the best approach or methods, such as for assessing chemical impacts on human health and actions by businesses and their corporate social responsibility. We will continue to work on these in relation to regular reviews and updates for the framework.

Additionally, technologies for monitoring and assessing change in the environment are advancing rapidly and offer new cost-effective methods (e.g. earth observations, DNA methods, citizen science/mobile apps and new sensor technologies). We will look to update indicators to reflect these developments. Over the next 25 years, we can expect that new issues and policy priorities will emerge for which new indicators may be required. The outcome indicator framework will be kept under regular review so that it continues to be relevant and provide the best and most cost-effective ways of assessing progress.

Many of the current indicators are official statistics, and as such any updates to these will be bound by the rules of official statistics.

The framework will be reviewed as a minimum every 5 years and we would expect a continual assessment to be made on the relevance of all the indicators through the annual assessment process.

The next sections set out in more detail the headline indicators (section B), indicator descriptions and initial trends (section C) and international reporting (section D).

Section B: Headlines

In this section we set out how the indicators are used in headlines which will help us to communicate progress towards the goals of the 25 Year Environment Plan. See the section 'Structure of the outcome indicator framework' for further detail. The 'Goal' refers to the 25 Year Environment Plan goal, the 'Questions' indicates a range of policy questions the indicators address and the 'Indicators' lists those indicators included within the headline.

1. Changes in **air quality** that affect our health and ecosystems

Goal: Clean air.

Questions: How clean is our air? Are emissions of key pollutants declining? Is air quality improving in a way that reduces the impacts on our health and the health of our ecosystems?

Indicators:

(A1) Emissions for five key air pollutants.

(A3) Concentrations of fine particulate matter ($PM_{2.5}$) in the air.

(A6) Exceedance of damaging levels of nutrient nitrogen deposition on ecosystems.

2. Changes in **greenhouse gas emissions** from natural resources

Goal: Mitigating and adapting[11] to climate change.

Questions: Are anthropogenic greenhouse gas emissions from natural resources reducing?

Indicators:

(A2) Emissions of greenhouse gases from natural resources.

[11] Adaptation to climate change is a cross-cutting issue and key aspects of adaptation are included within other relevant headlines: (2) Quality and quantity of water; (4) Nature on land and water; (5) Landscapes and waterscapes; and, (8) Resilience to natural hazards.

3. Changes in quality and quantity of **water and the water environment** that affect our lives and livelihoods

Goal: Clean and plentiful water.

Questions: How clean is the water in our rivers, canals, aquifers and lakes? Is the water on our bathing beaches safe to swim in? Does the amount of water we use impact on the water environment? Are we adapting to impacts of climate change on the water environment?

Indicators:

(B3) State of the water environment.

(B4) Condition of bathing waters.

(B5) Water bodies achieving sustainable abstraction criteria.

4. Changes in the **diversity of our seas** that affect our lives and livelihoods

Goal: Thriving plants and wildlife.

Questions: Is the diversity of marine life and the condition of marine habitats improving?

Indicators:

(C3) Diverse seas: status of mammals, birds and fish.

(C4) Diverse seas: condition of seafloor habitats.

(C5) Diverse seas: condition of pelagic habitats.

5. Changes in the **health of our seas** that affect our lives and livelihoods

Goal: Thriving plants and wildlife; using resources from nature more sustainably and efficiently.

Questions: Are exploited fish and shellfish communities in our seas in a healthy condition? Are marine food webs functioning well?

Indicators:

(C7) Healthy seas: fish and shellfish populations.

(C8) Healthy seas: marine food webs functioning.

6. Changes in **wildlife and wild places** that we cherish

Goal: Thriving plants and wildlife.

Questions: This headline focuses on wildlife and wild places that are an essential part of our cultural heritage and identity. Has the overall status of our threatened species improved? Has the condition of our most important wildlife sites and areas on land, in water, coasts and high seas improved?

Indicators:

(D2) Extent and condition of protected sites – land, water and sea.

(D5) Conservation status of our native species.

7. Changes in **nature on land and water** that support our lives and livelihoods

Goal: Thriving plants and wildlife.

Questions: This headline focuses on the wider benefits provided to society by thriving plants and wildlife as a fundamental part of ecosystems that deliver multiple benefits, and endow resilience on natural systems. Are plants and wildlife that contribute to important ecosystem functions (e.g. pollination) thriving? Are wildlife habitats increasing in their extent, quality and connectivity? Are wildlife habitats becoming less vulnerable to climate change impacts? Are the populations of widespread species that characterise our farmland, woodlands, wetlands and coastline increasing?

Indicators:

(D1) Quantity, quality and connectivity of habitats.

(D4) Relative abundance and/or distribution of widespread species.

(D7) Species supporting ecosystem functions.

8. Changes in **production and harvesting of natural resources**

Goal: Using resources from nature more sustainably and efficiently.

Questions: Are farms becoming more efficient? Are we making the most of our woodland resources and managing our woods sustainably? Are all of our soils healthy (including soils in agricultural use and those that are not), providing multiple long-term benefits including food production, water retention and carbon sequestration? Are we harvesting our seafood in a way that is sustainable and maintains wild populations of fish and shellfish?

Indicators:

(E4) Efficiency of agricultural production measured by Total Factor Productivity.

(E5) Percentage of the annual growth of trees in English woodlands that is harvested.

(E7) Healthy soils.

(E9) Percentage of our seafood coming from healthy ecosystems, produced sustainably.

9. Changes in **resilience to natural hazards**

Goal: Reducing risk of harm from environmental hazards.

Questions: Are people experiencing less disruption from flooding, coastal erosion and drought? Are people less affected by limited water supply during droughts? Are communities becoming more resilient to flooding? Are risks of harm from natural hazards being reduced despite effects of climate change?

Indicators:

(F1) Disruption or unwanted impacts from flooding or coastal erosion.

(F2) Communities resilient to flooding and coastal erosion.

(F3) Disruption or unwanted impacts caused by drought.

10. Quality of our **landscapes and waterscapes**

Goal: Enhanced beauty, heritage and engagement with the natural environment.

Questions: Are the distinctive characteristics of our landscapes and waterscapes which impart natural beauty improving? Is the condition of our geological Sites of Special Scientific Interest (SSSIs), and of our Scheduled Monuments, improving? Can people access good quality blue and green spaces close to their homes in urban areas? Are urban areas adapted to climate change?

Indicators:

(G1) Changes in landscape and waterscape character.

(G2) Condition of heritage features including designated geological sites and scheduled monuments.

(G3) Enhancement of green/blue infrastructure.

11. **People enjoying and caring about the natural environment**

Goal: Enhanced beauty, heritage and engagement with the natural environment.

Questions: Are people becoming more engaged with the natural environment? Are people from all social backgrounds and age groups spending more time in natural spaces? Are they becoming more concerned and caring for nature? Are people engaging in more social action like environmental volunteering? Are more people gaining better health and wellbeing benefits? Are people developing more positive attitudes and behaviours towards the environment?

Indicators:

(G4) Engagement with the natural environment.

(G5) People engaged in social action for the environment.

(G6) Environmental attitudes and behaviours.

(G7) Health and wellbeing benefits.

12. Changes in the impact of **exotic diseases and invasive non-native species**

Goal: Enhancing biosecurity.

Questions: Are the number and impacts of invasive non-native species decreasing? Are the impacts of plant pests and diseases decreasing?

Indicators:

(H1) Abatement of the number of invasive non-native species entering and establishing against a baseline.

(H2) Distribution of invasive non-native species and plant pests and diseases.

13. Changes in the **exposure of people and wildlife to harmful chemicals**

Goal: Managing exposure to chemicals.

Questions: Are emissions of harmful chemicals to the environment decreasing? Is the exposure of wildlife on land, in freshwater environments and at sea to harmful chemicals decreasing? Are wildlife populations affected by harmful chemicals?

Indicators:

(H3) Emissions of mercury and persistent organic pollutants to the environment.

(H4) Exposure and adverse effects of chemicals on wildlife in the environment.

14. **Resource efficiency and waste**

Goal: Minimising waste.

Questions: Are we using resources more efficiently and reducing waste? Are we consuming less raw materials? Are there less contaminants in waste that stop us from recycling it? Are households and businesses producing less waste? Is there less waste crime and littering?

Indicators:

(J2) Raw material consumption.

(J4) Residual waste arising by type and sector.

(J5) Prevent harmful chemicals from being recycled.

(J6) Waste crime.

15. Changes in domestic consumption that has **impacts on the natural environment overseas**

Goal: There are no specific goals in the 25 Year Environment Plan for this headline.

Questions: Are we reducing the overseas environmental impact of our domestic consumption? Are the products that we import produced sustainably?

Indicators:

(K1) Overseas environmental impacts of UK consumption of key commodities.

16. Changes in UK contribution towards **improving the environment overseas**

Goal: There are no specific goals in the 25 Year Environment Plan for this headline indicator.

Questions: Is UK Overseas Development Assistance helping developing countries to mitigate climate change, halt the loss of biodiversity and alleviate poverty? Is the status and protection of wildlife in UK Overseas Territories improving?

Indicators:

(K2) Developing countries better able to protect and improve the environment with UK support.

(K3) Status of endemic and globally threatened species in the UK Overseas Territories.

(K4) Extent and condition of terrestrial and marine protected areas in the UK Overseas Territories.

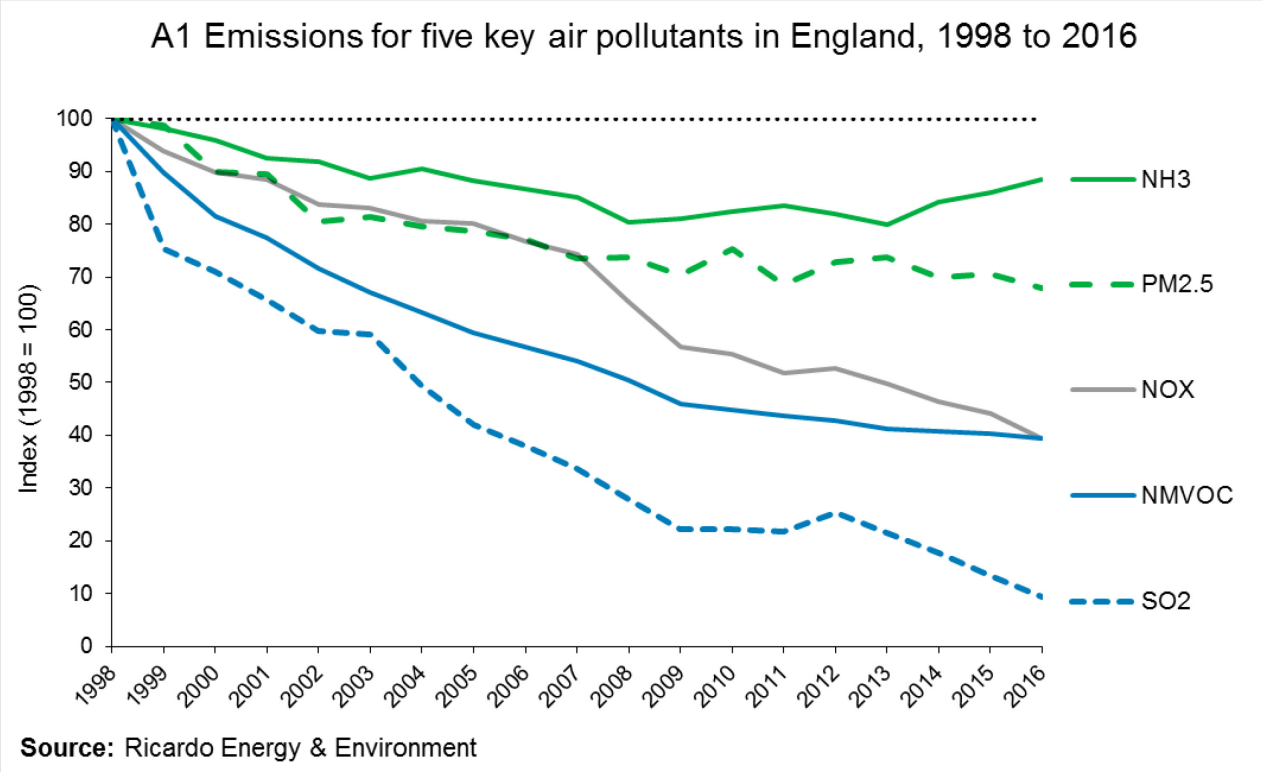
Section C: Indicator descriptions and data trends

This section provides a technical summary of each of the indicators. For each indicator the summary includes a cross-reference to relevant goals and targets in the 25 Year Environment Plan, the natural capital assets to which it relates and other relevant international reporting commitments. The readiness of each indicator is also assessed in terms of whether it is already published or whether further development is required. Links are provided to relevant data sources and data trends are presented where data are available in appropriate formats. In some instances interim indicators are presented pending further development of the indicator. The geographic scope refers to the area the dataset covers and the potential to disaggregate the data at finer resolutions.

A1 Emissions for five key air pollutants

Short description	This indicator shows changes in the emissions of the 5 key air pollutants: sulphur dioxide (SO_2), fine particulate matter ($PM_{2.5}$), nitrogen oxides (NO_x), non-methane volatile organic compounds (NMVOC) and ammonia (NH_3). Air pollution has negative impacts on human health and the environment. Long-term exposure to particulate matter contributes to the risk of developing cardiovascular diseases and lung cancer. As well as being emitted directly, particulate matter can be formed in the atmosphere from reactions between other pollutants, of which SO_2, NO_x, NMVOCs and NH_3 are the most important. NO_x and NH_3 emissions can be deposited in soils or in rivers and lakes, e.g. through rain. Resulting nutrient nitrogen deposition affects the nutrient levels and diversity of species in sensitive environments, for example, by encouraging algae growth in lakes and water courses and by producing ozone (O_3) which damages crops and leads to impacts on wildlife through enhanced nutrient levels. This indicator is an assessment of pressures on the atmosphere caused by the emissions of 5 key pollutants, which when concentrated in the air or deposited have impacts on human health and ecosystems.
Relevant goal(s) in the 25 Year Environment Plan	Clean air Thriving plants and wildlife
Relevant target(s) in the 25 Year Environment Plan	Meeting legally binding targets to reduce emissions of 5 damaging air pollutants. Restoring 75% of our one million hectares of terrestrial

	and freshwater protected sites to favourable condition, securing their wildlife value for the long term.
Position in the natural capital framework	Pressure
Related reporting commitments	EU National Emissions Ceiling Directive (NECD); Emissions Reduction Commitments.
Geographical scope	England
Readiness and links to data	Data are already published annually.
Interim indicator (where applicable)	Not applicable



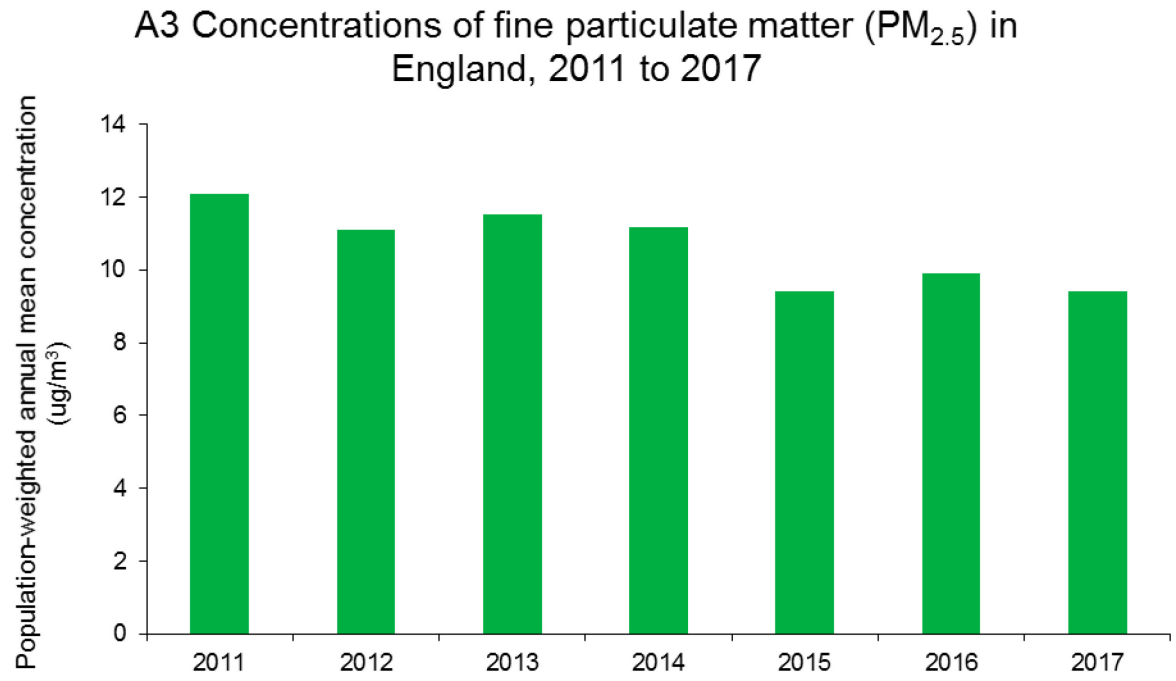
Trend description: Emissions for all 5 key air pollutants in England have fallen over the latest 18 years for which annual, country-level data are available. Emissions of SO_2 have seen the greatest reductions, falling by over 90% between 1998 and 2016. Emissions of NO_X and NMVOCs have fallen by over 60% and emissions of $PM_{2.5}$ and NH_3 have fallen by 32% and 12% respectively over the same time period. More recently, emissions of $PM_{2.5}$, NO_X, NMVOCs and SO_2 have all continued to fall, emissions of $PM_{2.5}$ and NO_X by 10% and 29% respectively since 2010.

A2 Emissions of greenhouse gases from natural resources

Short description	This indicator tracks the changes in greenhouse gas emissions from natural resources as described in the Clean Growth Strategy. Greenhouse gases contribute to global climate change which is a pressure on many aspects of our environment. The indicator shows the annual net amount of greenhouse gas emissions from land use and land use change, the forestry, agriculture and waste sectors and from the use of fluorinated gases. Net emissions from peatland are included.
Relevant goal(s) in the 25 Year Environment Plan	Mitigating and adapting to climate change
Relevant target(s) in the 25 Year Environment Plan	Continuing to cut greenhouse gas emissions including from land use, land use change, the agriculture and waste sectors and the use of fluorinated gases. The UK Climate Change Act 2008 commits us to reducing total greenhouse gas emissions by at least 80% by 2050 when compared to 1990 levels.
Position in the natural capital framework	Pressure
Related reporting commitments	UN Framework Convention on Climate Change (UNFCCC) greenhouse gas emissions inventory data for Agriculture, Land Use, Land Use Change and Forestry (LULUCF), Waste Management and Industrial Processes and reporting under the EU Effort Sharing Regulations. The UK Climate Change Act 2008 requires an annual report by the Committee on Climate Change to parliament on whether the UK is on course to meet its carbon budgets and targets.
Geographical scope	England
Readiness and links to data	This indicator is not available for reporting in 2019: the data are already published but some further work is required to develop the indicator.
Interim indicator (where applicable)	Not applicable

A3 Concentrations of fine particulate matter ($PM_{2.5}$) in the air

Short description	This indicator is a measure of the level of long-term exposure of people to harmful airborne fine particulate matter ($PM_{2.5}$). Long-term exposure to particulate matter contributes to the risk of developing cardiovascular disease and lung cancer. The main sources of $PM_{2.5}$ pollution are industrial processes, combustion in residential, public, commercial and agricultural sectors and road transport. This indicator is an assessment of clean air (i.e. the condition of the atmosphere as an asset). It can also be considered as pressure on human health. It is determined by calculating the annual population-weighted mean concentration of $PM_{2.5}$ in the air, assessed as background concentrations per 1 km square. The population-weighted mean concentration is used as a measure of the impact of $PM_{2.5}$ on the health of the total population. Greater weighting is given to concentrations of $PM_{2.5}$ in urban areas to reflect the higher population density as those concentrations will a greater number of people. In addition, people living in urban areas are generally exposed to greater levels of $PM_{2.5}$ than those living in rural areas.
Relevant goal(s) in the 25 Year Environment Plan	Clean air
Relevant target(s) in the 25 Year Environment Plan	Meeting legally binding targets to reduce emissions of 5 damaging air pollutants (including primary $PM_{2.5}$ and precursor pollutants that contribute to secondary $PM_{2.5}$ in the atmosphere).
Position in the natural capital framework	Asset condition – atmosphere
Related reporting commitments	EU Ambient Air Quality Directive.
Geographical scope	England, potential to disaggregate data to local authority level.
Readiness and links to data	The data are already published.
Interim indicator (where applicable)	Not applicable

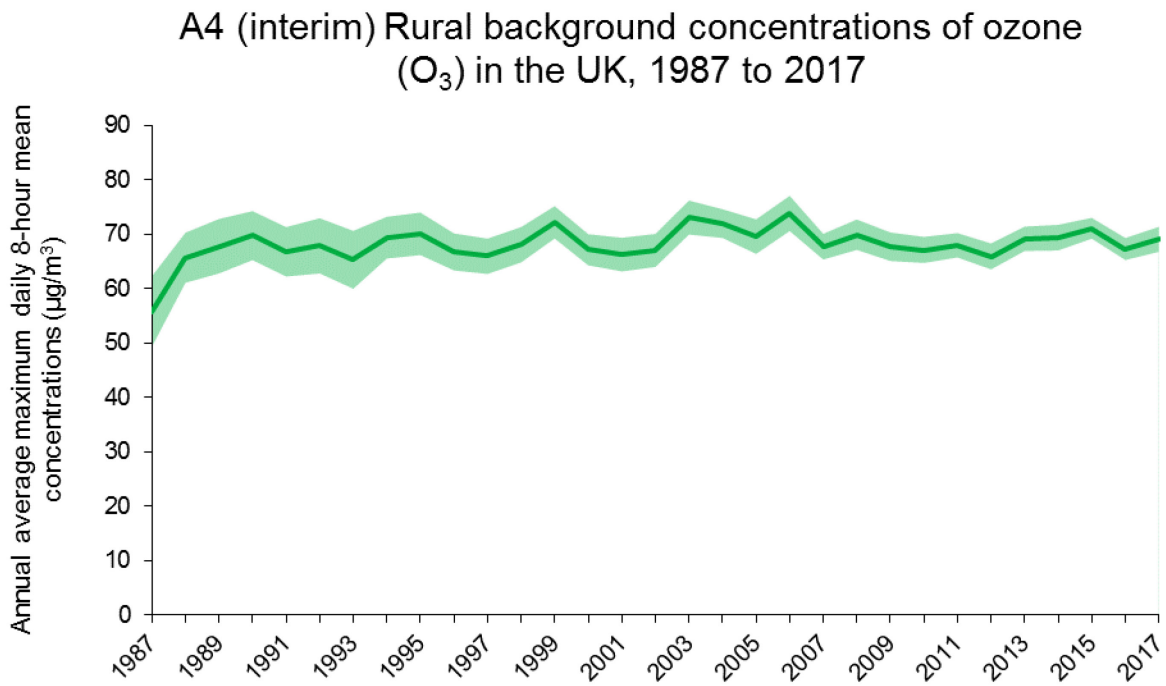


Source: Defra

Trend description: Population-weighted annual mean concentrations of $PM_{2.5}$ in England have declined from 12 µg/m^3 in 2011 to 9 µg/m^3 in 2017, a fall of 22% over the latest 6 years for which data are available.

A4 Rural background concentrations of ozone (O_3)

Short description	This indicator will track changes in rural background concentration of ozone (O_3). Chemical reactions in the air involving nitrogen oxides (NO_X) and volatile organic compounds (VOCs) produce the toxic gas O_3 which can harm health, damage wild plants, crops, forests and some materials, and is a greenhouse gas contributing to global warming. This indicator is an assessment of clean air (i.e. the condition of the atmosphere as an asset). It can also be considered as pressure on human health and thriving plants and wildlife. It is determined by calculating the annual average of the maximum daily 8-hour mean concentrations of O_3 measured at all rural measurement sites on Defra's Automatic Urban and Rural Network.
Relevant goal(s) in the 25 Year Environment Plan	Clean air Thriving plants and wildlife
Relevant target(s) in the 25 Year Environment Plan	Meeting legally binding targets to reduce emissions of 5 damaging air pollutants (some of which are O3 precursors). Restoring 75% of our one million hectares of terrestrial and freshwater protected sites to favourable condition, securing their wildlife value for the long term.
Position in the natural capital framework	Asset condition – atmosphere
Related reporting commitments	EU Ambient Air Quality Directive.
Geographical scope	England
Readiness and links to data	Although this indicator is not available for reporting in 2019 in a finalised form, an interim indicator is presented here that shows trends in rural background concentrations of O_3 in the UK. Data on rural O_3 concentrations in the UK are already published annually. Further work is required to develop an England-level indicator.
Interim indicator (where applicable)	**A4 (interim) Rural background concentrations of ozone (O_3) in the UK**

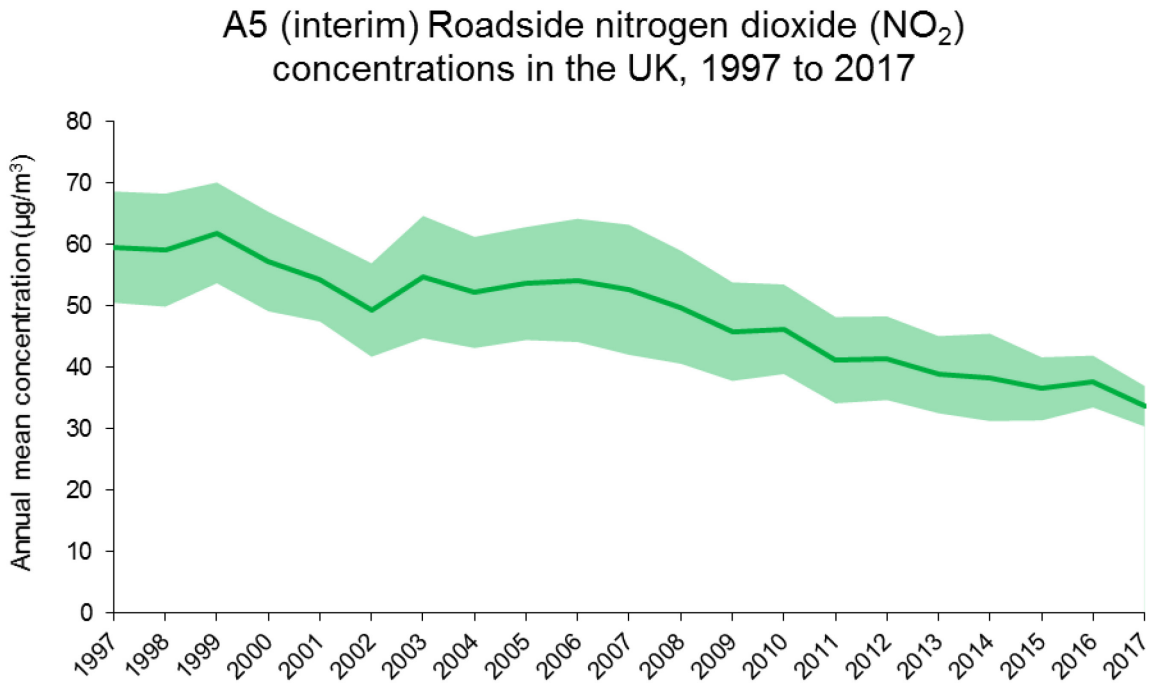


Source: Defra

Trend description: The annual average maximum daily 8-hour mean concentration of O_3 measured at rural locations in the UK has increased from 56 µg/m^3 in 1987 to 69 µg/m^3 in 2017. While this represents an increase of 24% over the latest 30 years for which data are available, concentrations of O_3 have remained relatively stable over the last 10 years. The shaded area represents the 95% confidence interval. The interval narrows over time because of an increase in the number of monitoring sites and a reduction in the variation between annual means for O_3.

A5 Roadside nitrogen dioxide (NO_2) concentrations

Short description	This indicator will track changes in average roadside concentration of nitrogen dioxide (NO_2). NO_2 arises predominantly from combustion sources such as traditionally fuelled vehicles and therefore the highest concentrations are often found at roadside locations. This indicator is an assessment of clean air (i.e. the condition of the atmosphere as an asset). It can also be considered as a pressure on human health. It is determined by calculating the average value of the annual mean concentrations measured across Defra's Automatic Urban and Rural Network at all roadside locations (with greater than 75% data capture in any one year).
Relevant goal(s) in the 25 Year Environment Plan	Clean air
Relevant target(s) in the 25 Year Environment Plan	Meeting legally binding targets to reduce emissions of 5 damaging air pollutants (including NO_2).
Position in the natural capital framework	Asset condition – atmosphere
Related reporting commitments	EU Ambient Air Quality Directive.
Geographical scope	England, data from individual monitoring sites are also available.
Readiness and links to data	Although this indicator is not available for reporting in 2019 in a finalised form, an interim indicator is presented here that shows trends in roadside concentrations of NO_2 in the UK. Indicators and data on concentrations of NO_2 are already published annually as National Statistics. Further work is required to disaggregate these data from UK to England.
Interim indicator (where applicable)	**A5 (interim) Roadside nitrogen dioxide (NO_2) concentrations in the UK**

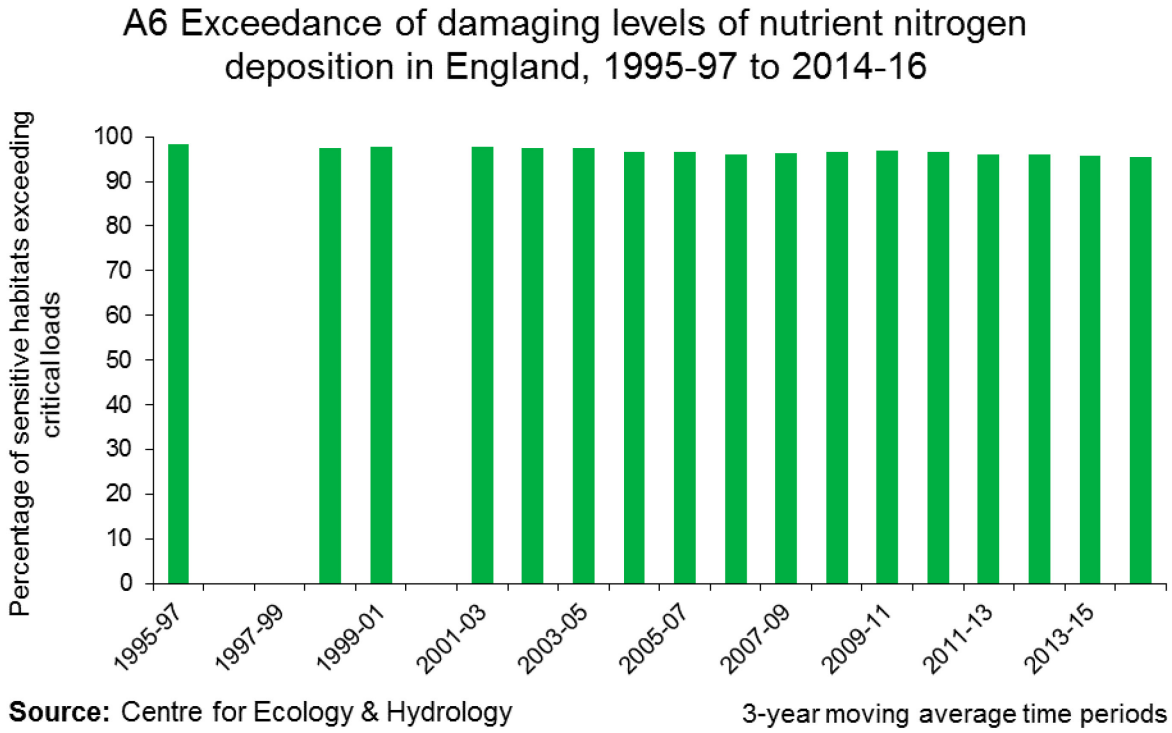


Source: Defra

Trend description: Concentrations of roadside NO_2 in the UK have fallen from 60 µg/m^3 in 1997 to 34 µg/m^3 in 2017, a drop of 43% over the latest 20 years for which data are available. More recently, concentrations of roadside NO_2 have fallen by 29% since 2010. The shaded area represents the 95% confidence interval for the annual mean concentration measured at roadside sites. The interval narrows over time because of an increase in the number of monitoring sites and a reduction in the variation between annual means for NO_2.

A6 Exceedance of damaging levels of nutrient nitrogen deposition on ecosystems

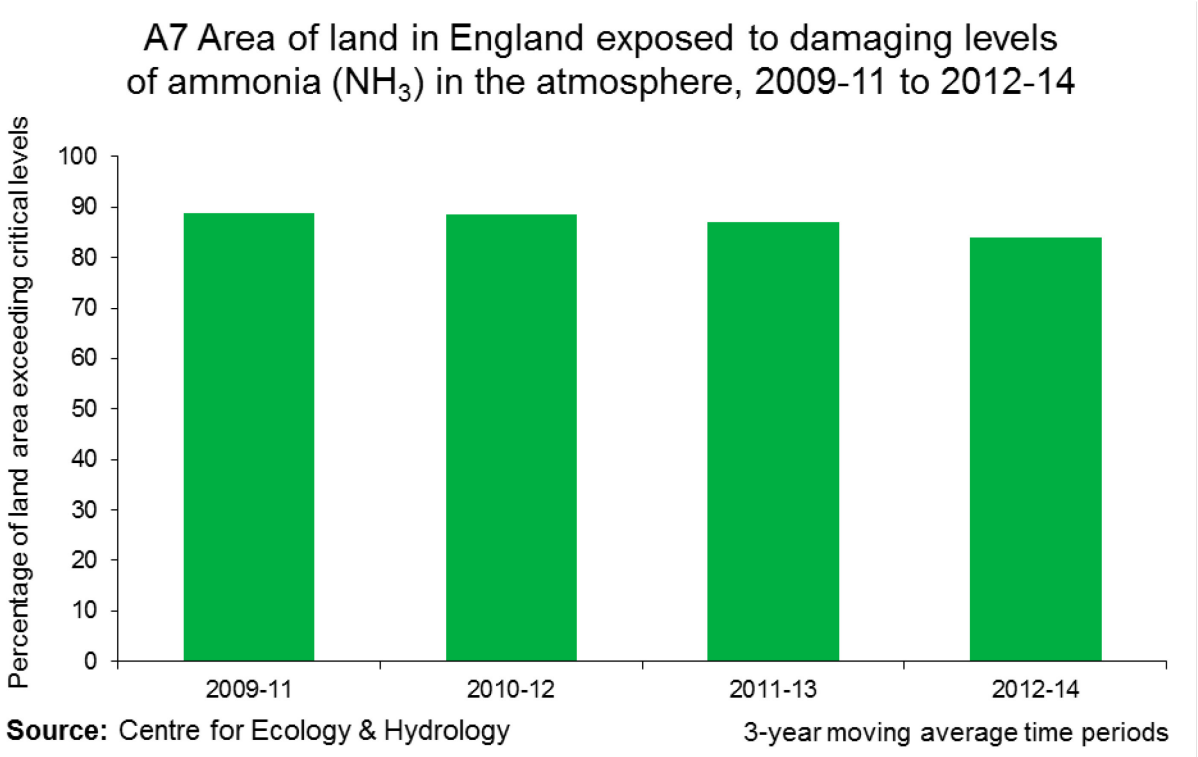
Short description	This indicator will show changes in average accumulated exceedance and percentage of sensitive areas exceeding the internationally agreed threshold for harmful effects for nutrient nitrogen deposition across sensitive habitats. The damaging nutrient nitrogen comes predominantly from ammonia (NH_3) but partly nitrogen oxides (NOx) and long-range transport of air pollutants. This indicator is an assessment of clean air (i.e. the condition of the atmosphere as an asset). It can also be considered as pressure on thriving plants and wildlife. It is determined by calculating the area of sensitive habitat exceeding the internationally agreed threshold for likely damaging effects from reactive nitrogen deposition in both oxidised and reduced forms, termed the critical load. It uses modelled interpolations of atmospheric concentrations of NOx and NH_3 and models deposition processes based on internationally agreed methodology.
Relevant goal(s) in the 25 Year Environment Plan	Clean air Thriving plants and wildlife
Relevant target(s) in the 25 Year Environment Plan	Meeting legally binding targets to reduce emissions of 5 damaging air pollutants. Restoring 75% of our one million hectares of terrestrial and freshwater protected sites to favourable condition, securing their wildlife value for the long term.
Position in the natural capital framework	Pressure
Related reporting commitments	Emissions Reductions Commitments for NO_x and NH_3 under the EU National Emissions Ceilings Directive (NECD); International Collaborative Partnership reporting under UNECE's Working Group on Effects; Convention on Biological Diversity (CBD) Aichi Target 8.
Geographical scope	England
Readiness and links to data	Assessments are undertaken and published annually using 3-year moving average data.
Interim indicator (where applicable)	Not applicable



Trend description: The percentage area of sensitive habitats in England where nutrient nitrogen deposition exceeded critical load shows little change over the latest 20 years for which data are available (98.3% in 1995-97 versus 95.4% in 2014-16). However, there have been a number of minor methodological changes in 2001-02, 2002-04 and 2004-06 which should be taken into account when interpreting this trend.

A7 Area of sensitive habitats exposed to damaging levels of ammonia (NH_3) in the atmosphere

Short description	This indicator tracks changes in land area affected by damaging levels of ammonia (NH_3) in the air. Excess deposition of NH_3 on natural ecosystems causes nutrient enrichment and changes in vegetation and soils. Agriculture is the main source of NH_3 emissions to the atmosphere. This indicator is a measure of pressure on ecosystems from air pollution. It shows the percentage of land area where interpolated measurements of ground-level air exceeds the lower critical level threshold for NH_3 of 1 $\mu g/m^3$.
Relevant goal(s) in the 25 Year Environment Plan	Clean air Thriving plants and wildlife
Relevant target(s) in the 25 Year Environment Plan	Meeting legally binding targets to reduce emissions of 5 damaging air pollutants (including NH_3). Restoring 75% of our one million hectares of terrestrial and freshwater protected sites to favourable condition, securing their wildlife value for the long term.
Position in the natural capital framework	Pressure
Related reporting commitments	UNECE National Emissions Ceiling Directive Art.9 and the Convention on Long-range Transboundary Air Pollution; Convention on Biological Diversity Aichi Target 8.
Geographical scope	England
Readiness and links to data	Assessments are undertaken and published annually using 3-year moving average data.
Interim indicator (where applicable)	Not applicable



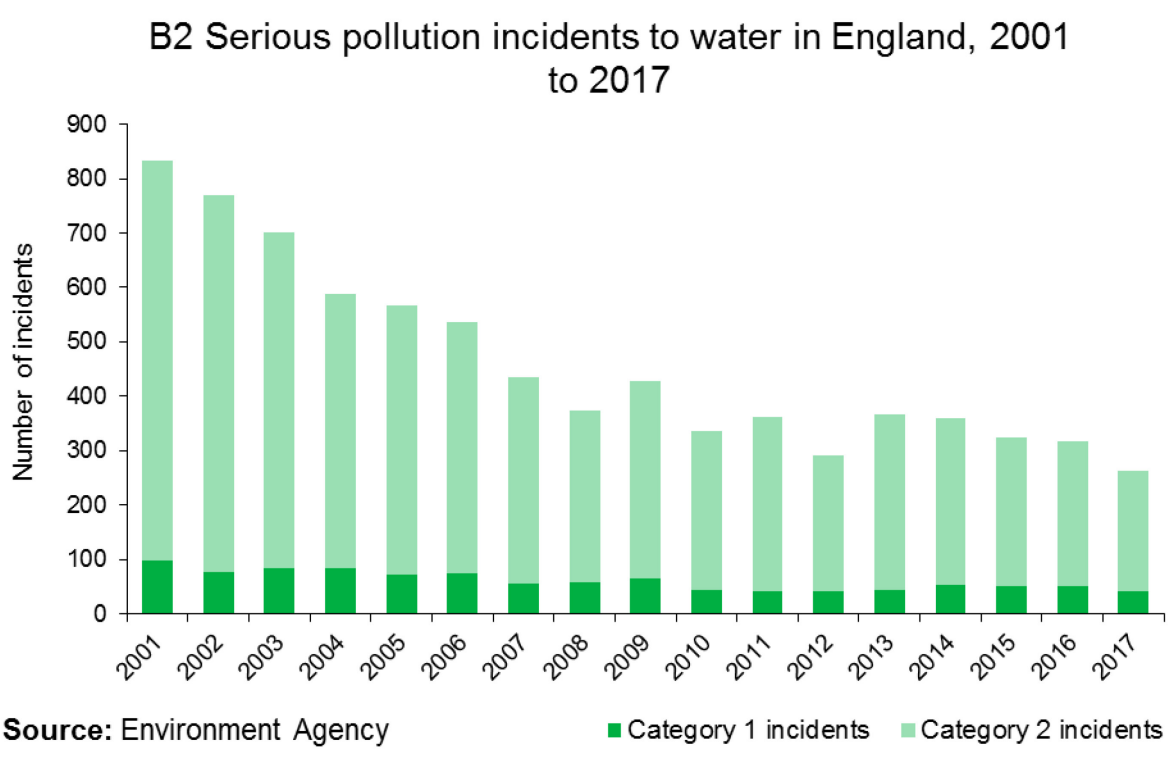
Trend description: The percentage of land area exposed to concentrations of NH_3 that exceed critical levels (1 µg/m^3) has decreased from 89% in 2009-11 to 84% in 2012-14.

B1 Pollution loads entering waters

Short description	This indicator will track changes in the inputs and discharges of selected contaminants such as nutrients and some toxic chemicals to rivers or directly to the sea, for example through sewage pipelines or activities like aquaculture inputting substances directly. Pollution is a pressure that reduces the quality of water and increases the costs of water treatment. It also affects wildlife in rivers, coastal waters and estuaries and the recreational uses of these water bodies. This indicator will be based on data from the existing Riverine Input and Direct Discharges (RID) data collected under the OSPAR Convention and the Environment Agency's Emissions Inventory.
Relevant goal(s) in the 25 Year Environment Plan	Clean and plentiful water Thriving plants and wildlife
Relevant target(s) in the 25 Year Environment Plan	Reaching or exceeding objectives for rivers, lakes, coastal water and ground waters that are specially protected, whether for biodiversity or drinking water as per our River Basin Management Plans. Restoring 75% of our one million hectares of terrestrial and freshwater protected sites to favourable condition, securing their wildlife value for the long term.
Position in the natural capital framework	Pressure
Related reporting commitments	OSPAR Convention, EU Water Framework Directive.
Geographical scope	England, data are also available for individual sites, water bodies and catchments.
Readiness and links to data	This indicator is not available for reporting in 2019: some data are already published annually (RID data, and the EA emissions inventory but further development is required to present trends for selected contaminants in an indicator.
Interim indicator (where applicable)	Not applicable

B2 Serious pollution incidents to water

Short description	This indicator shows changes in the number of pollution incidents impacting on water health, including in rivers, lakes, reservoirs, canals, coasts, estuaries and groundwater. Serious pollution incidents are a pressure on the water environment. The Environment Agency uses 4 categories to determine the severity of pollution incidents. The indicator will show the number of events in each year that are in the 2 higher categories, for example causing death of fish, potential harm to bathers, or the temporary cessation of abstraction from a river by a drinking water provider.
Relevant goal(s) in the 25 Year Environment Plan	Clean and plentiful water Thriving plants and wildlife
Relevant target(s) in the 25 Year Environment Plan	No specific target.
Position in the natural capital framework	Pressure
Related reporting commitments	Domestically under the Environment Act 1995 and also relevant under the UN's Sustainable Development Goal 6.
Geographical scope	England, also data available for individual incidents at any geographical scale.
Readiness and links to data	Data are already published annually; longer-term trends are available in the State of the environment: water quality report.
Interim indicator (where applicable)	Not applicable

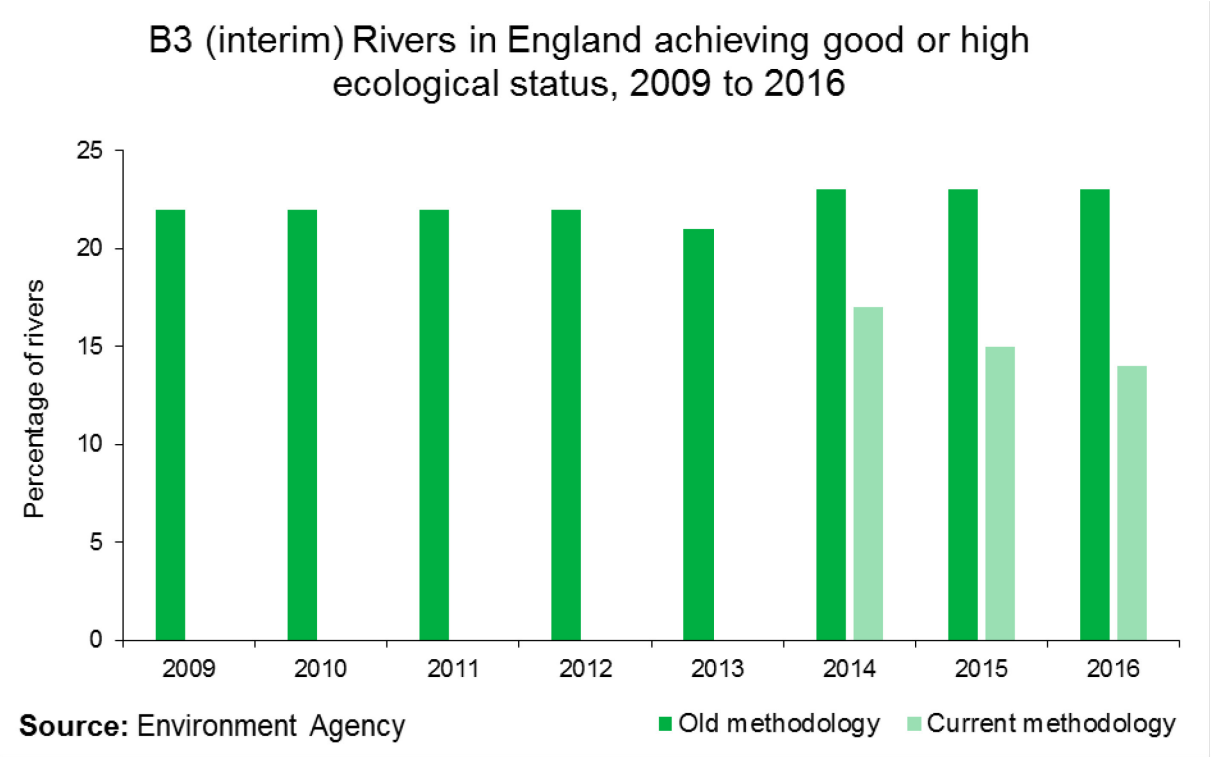


Trend description: The total number of serious pollution incidents to water in England has fallen from 834 in 2001 to a low of 262 in 2017, a drop of almost 69%. Although this decrease has largely been driven by a reduction in the number of category 2 (significant) incidents between 2001 and 2010; the numbers of category 1 (major) and category 2 incidents fell by a similar percentage (56% and 60% respectively) during this 10-year period. Both categories have remained more stable since 2010.

B3 State of the water environment

Short description	This indicator takes a broad overview of the condition of the water environment. It is composed of several metrics, including: percentage of water tests meeting good (or better) Water Framework Directive (WFD) status for ecology and chemistry; percentage of tests complying with WFD and meeting objectives for waters specially protected for specific uses such as shellfish harvesting and for nature conservation. Some of these data relating to protected sites are also included in D2. The indicator relates to freshwater bodies, wetlands, coastal waters and estuaries.
Relevant goal(s) in the 25 Year Environment Plan	Clean and plentiful water Thriving plants and wildlife
Relevant target(s) in the 25 Year Environment Plan	Improving at least three-quarters of our waters to be close to their natural state. Reaching or exceeding objectives for rivers, lakes, coastal and ground waters that are specially protected, whether for biodiversity or drinking water as per our River Basin Management Plans. Restoring 75% of our one million hectares of terrestrial and freshwater protected sites to favourable condition, securing their wildlife value for the long term.
Position in the natural capital framework	Asset condition – freshwater; marine; species and ecological communities
Related reporting commitments	The EU WFD/Water Environment Regulations 2017 contain specific requirements to monitoring and report these data, with comprehensive reporting every 6 years and progress reporting every 3 years. Also required for reports under the EU Habitats and Birds Directives for water dependent Natura 2000 sites. May also provide evidence in support of Climate Change Risk Assessment under the Climate Change Act (2008). Also relevant to the Sustainable Development Goal 6.3.2 – Proportion of bodies of water with good ambient water quality.
Geographical scope	England, data are also available at site, water body, catchment and river basin district level.
Readiness and links to data	Although this indicator is not available for reporting in 2019 in a finalised form, an interim indicator is presented here that shows trends in the status of river water bodies in England. Data are published every 3 or 6 years (WFD element status; WFD compliance; protected area data; state of the environment: water quality report). Some

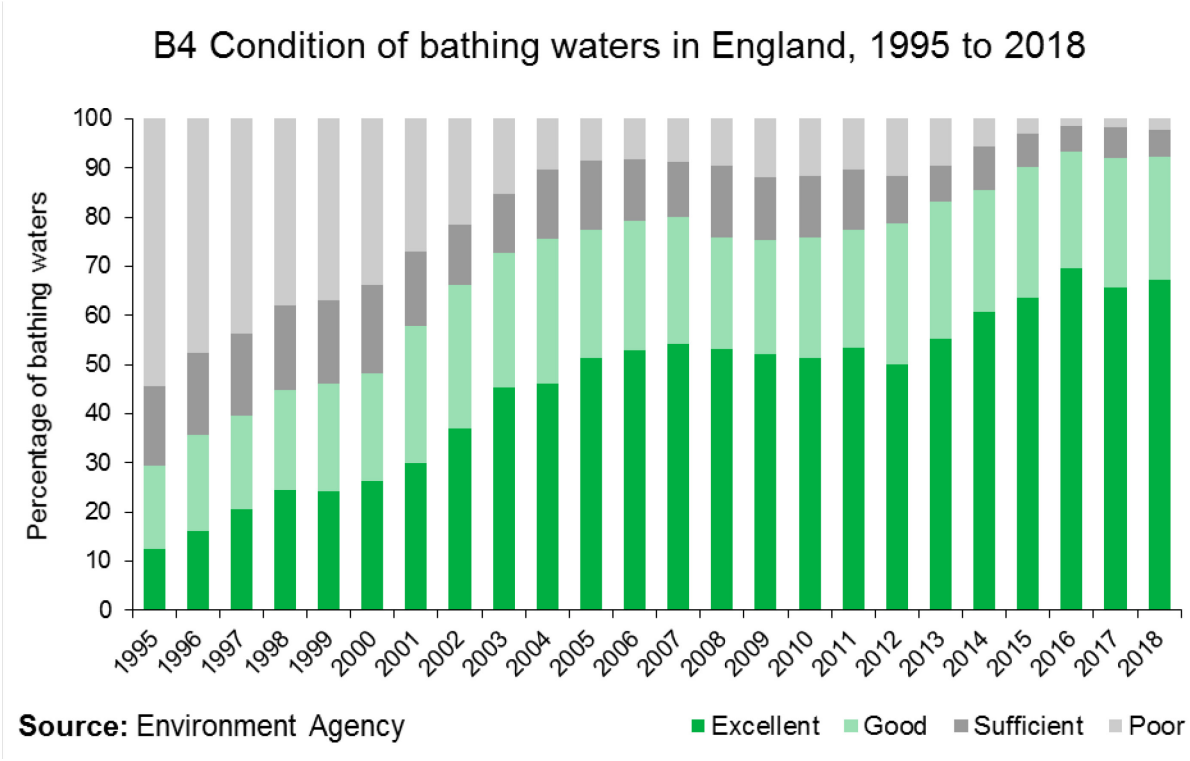
	further work is required to combine the different metrics in to an indicator.
Interim indicator (where applicable)	**B3 (interim) Rivers in England achieving good or high ecological status**. The interim indicator covers one aspect of indicator B3 relating to status of river water bodies as reported under the WFD. 'Good or high ecological status' means that a water body is close to 'undisturbed' conditions.



Trend description: In 2016, 14% of English river water bodies assessed under the WFD were in good or high ecological status. Other data show that water quality in rivers has improved markedly in recent decades. These improvements have not continued in recent years and there is evidence of a small decline in the number of rivers that were at good or high ecological status in 2016 compared to 2014. Due to the changes in assessment methodology it is not possible to make direct comparisons between the methods.

B4 Condition of bathing waters

Short description	This indicator assesses the condition of bathing waters. It shows the percentage of designated bathing waters meeting conditions sufficient to minimise the risk of harm to bathers from faecal pollution. It is based on a set of microbiological tests (measuring E.coli and intestinal enterococci) performed on waters used for bathing. The bacteria, if present, can cause severe stomach upsets and gastro-intestinal illness. Bathing waters are mainly coastal beaches but also include a number of inland freshwater lakes.
Relevant goal(s) in the 25 Year Environment Plan	Clean and plentiful water
Relevant target(s) in the 25 Year Environment Plan	Minimising by 2030 the harmful bacteria in our designated bathing waters and continuing to improve the cleanliness of our waters.
Position in the natural capital framework	Asset condition – marine; freshwater
Related reporting commitments	Statutory duty under the EU Bathing Water Directive to report annually to the EU.
Geographical scope	England, breakdown is also available for individual designated bathing waters.
Readiness and links to data	Data are already published annually; longer-term trends are available in the State of the environment: water quality report.
Interim indicator (where applicable)	Not applicable



Source: Environment Agency

Trend description: The number of designated bathing waters in England meeting at least the minimum standard (i.e. sufficient, good or excellent) has increased considerably from 45.7% in 1995 to 97.9% in 2018. The number of bathing waters achieving excellent status has also increased considerably over the same time period, with 67.1% meeting this standard in 2018.

B5 Water bodies achieving sustainable abstraction criteria

Short description	This indicator will show changes in the percentage of surface waters (rivers, lakes, reservoirs and estuaries) and groundwater (including wetlands fed by groundwater) where sustainable abstraction criteria are met. River flows and groundwater levels are sustainable when they support ecology that is only slightly impacted by human activity. The indicator is linked to reductions in water use, both in relation to leakage and personal consumption (see E8). This indicator is also sensitive to effects of future climate change on rainfall and consumption and shows the need for adaptation.
Relevant goal(s) in the 25 Year Environment Plan	Clean and plentiful water Thriving plants and wildlife
Relevant target(s) in the 25 Year Environment Plan	Reducing the damaging abstraction of water from rivers and groundwater, ensuring that by 2021 the proportion of water bodies with enough water to support environmental standards increases from 82% to 90% for surface water bodies and from 72% to 77% for groundwater bodies. Restoring 75% of our one million hectares of terrestrial and freshwater protected sites to favourable condition, securing their wildlife value for the long term.
Position in the natural capital framework	Asset condition – freshwater
Related reporting commitments	Reported every 3 years as part of the EU Water Framework Directive/Water Environment Regulations 2017. Relevant to Sustainable Development Goal 6.4.2. May also support Climate Change Risk Assessment and the Adaptation Sub-Committee's assessment of the National Adaptation Programme, under the Climate Change Act (2008).
Geographical scope	England, breakdown is also available for individual water bodies.
Readiness and links to data	This indicator is not available for reporting in 2019: data are published every 3 years, however further work is needed to develop the indicator.
Interim indicator (where applicable)	Not applicable

B6 Natural functions of water and wetland ecosystems

Short description	This indicator will track changes in the naturalness of ecosystems functioning at the catchment scale (including for example river headwaters, wetlands, standing water bodies). Restoring natural functions contributes to enhancing ecosystem services such as biodiversity, water purification, flow regulation and resilience to climate change. The indicator will help show the outcomes of actions to restore underlying hydrological and morphological processes in aquatic and wetland ecosystems. The indicator will use data from a range of sources including monitoring of waterbodies, designated sites, priority habitats, and potentially from citizen science programmes. Further methodological development will be needed to apply this approach to the full range of water and wetland habitat types and to explore new methods including Earth Observation.
Relevant goal(s) in the 25 Year Environment Plan	Clean and plentiful water Thriving plants and wildlife Enhancing biosecurity
Relevant target(s) in the 25 Year Environment Plan	Achieve clean and plentiful water by improving at least three-quarters of our waters to be close to their natural state as soon as is practicable. Restoring 75% of our one million hectares of terrestrial and freshwater protected sites to favourable condition, securing their wildlife value for the long term.
Position in the natural capital framework	Asset condition – freshwater; species and ecological communities
Related reporting commitments	EU Habitats Directive Article 17 reporting; EU Water Framework Directive/Water Environment Regulations 2017; Domestic targets under England Biodiversity Strategy 2020.
Geographical scope	England, data also available at individual water body, site and catchment levels.
Readiness and links to data	This indicator is not available for reporting in 2019: substantial further work is required to develop the indicator, building on existing monitoring methodologies and testing new approaches.
Interim indicator (where applicable)	Not applicable

B7 Health of freshwaters assessed through fish stocks

Short description	This indicator will track changes in stocks of native freshwater fish in England. Fish stocks are a good indicator of healthy freshwater environments, including sufficient water quality (including temperature) and quantity, as well as healthy and diverse river habitats, to sustain healthy juvenile populations and enable adults to migrate throughout the river to spawn. Fish are also an important recreational and economic benefit of freshwaters. This indicator will build on assessments currently undertaken for salmon adding other freshwater fish species for which consistent data are available.
Relevant goal(s) in the 25 Year Environment Plan	Thriving plants and wildlife Clean and plentiful water
Relevant target(s) in the 25 Year Environment Plan	Taking action to recover threatened, iconic or economically important species of animals plants and fungi, and where possible to prevent human induced extinction or loss of known threatened species in England and the Overseas Territories. Restoring 75% of our one million hectares of terrestrial and freshwater protected sites to favourable condition, securing their wildlife value for the long term.
Position in the natural capital framework	Asset condition – freshwater; species and ecological communities
Related reporting commitments	International Council for the Exploration of the Seas and the /North Atlantic Salmon Conservation Organisation. Also relevant to Convention on Biological Diversity Aichi Target 6.
Geographical scope	England, data also available for river basin districts.
Readiness and links to data	This indicator is not available for reporting in 2019: data on national salmon stocks are published annually, however further work is required to develop an indicator based on these data and to include other assessed species.
Interim indicator (where applicable)	Not applicable

C1 Clean seas: marine litter

Short description	This indicator shows changes in the impact of litter on the marine environment, wildlife, and seafood. It will reflect the amount of litter on coastlines and in the marine environment. Litter is a generic term that includes micro particles alongside macro items. Beach litter surveys are completed and reported annually and cover a representative number of beaches. The indicator is based on assessments of marine litter under Descriptor 10 of the EU Marine Strategy Framework Directive (MSFD). There is an ongoing monitoring programme at sea, opportunistically recording litter picked up from the seabed by survey programmes. Additional monitoring programmes are being developed to record the presence of plastic in the bodies of marine animals.
Relevant goal(s) in the 25 Year Environment Plan	Minimising waste
Relevant target(s) in the 25 Year Environment Plan	Significantly reducing and where possible preventing all kinds of marine plastic pollution – in particular material that came originally from land.
Position in the natural capital framework	Pressure
Related reporting commitments	UK Marine Strategy, EU Marine Strategy Framework Directive, OSPAR Convention. Relevant to Sustainable Development Goal 14.
Geographical scope	England
Readiness and links to data	This indicator is not available for reporting in 2019: further development is required. Analytical methods and some data are available.
Interim indicator (where applicable)	Not applicable

C2 Seabed subject to high pressure from human activity

Short description	This indicator will track changes in the distribution and intensity of human activity on the seabed. Surveys of human activities are used to create individual data layers showing the major types of human pressures impacting the seabed. For example, data from vessel monitoring systems showing fishing activity are integrated with other data to create a layer showing abrasion pressure on the seabed. The individual pressure layers are combined to create a single data layer to show the percentage of seabed subject to high pressure from human activity. The indicator is linked to the OSPAR indicator of seabed damage.
Relevant goal(s) in the 25 Year Environment Plan	Thriving plants and wildlife
Relevant target(s) in the 25 Year Environment Plan	Ensuring seafloor habitats are productive and sufficiently extensive to support healthy, sustainable ecosystems.
Position in the natural capital framework	Pressure
Related reporting commitments	OSPAR Convention, UK Marine Strategy, EU Marine Strategy Framework Directive. Relevant to Sustainable Development Goal 14.
Geographical scope	England
Readiness and links to data	This indicator is not available for reporting in 2019: some further development is needed. Analytical methods and some data are available.
Interim indicator (where applicable)	Not applicable

C3 Diverse seas: status of mammals, birds and fish

Short description	This indicator of diverse seas will track changes in the Good Environmental Status (GES) of mammals, birds and fish. These assessments are based on changes in the status of species groups using data on species distribution, population size and condition. They are being developed and delivered for Descriptors 1 (biodiversity) of the Marine Strategy Framework Directive and through the OSPAR assessment process.
Relevant goal(s) in the 25 Year Environment Plan	Thriving plants and wildlife
Relevant target(s) in the 25 Year Environment Plan	Reversing the loss of marine biodiversity and, where practicable, restoring it. Ensuring seafloor habitats are productive and sufficiently extensive to support healthy, sustainable ecosystems.
Position in the natural capital framework	Asset condition – seas
Related reporting commitments	OSPAR Convention; UK Marine Strategy, EU Marine Strategy Framework Directive, EU Habitats Directive, EU Birds Directive, International Council for Exploration of the Seas (ICES), Convention on Biological Diversity Aichi Target 6. Relevant to Sustainable Development Goal 14.
Geographical scope	UK
Readiness and links to data	This indicator is not available for reporting in 2019. The status assessments to be used in the indicator are due to be published later in 2019. Further development work will be required to adapt the data from these assessments for use in the indicator. Analytical methods and some data are available. The indicator will be kept under review during the development of D5 as some elements of this indicator may ultimately be included in D5.
Interim indicator (where applicable)	Not applicable

C4 Diverse seas: condition of seafloor habitats

Short description	This indicator of diverse seas will track changes in the distribution, extent and condition of seafloor habitats. This indicator will use multiple assessments of Good Environmental Status (GES) on habitat condition data, as well as physical damage to the seafloor, which are being developed and delivered for Descriptors 1 (biodiversity) and 6 (seafloor integrity) as part of the UK Marine Strategy (EU Marine Strategy Framework Directive) and through the OSPAR assessment process.
Relevant goal(s) in the 25 Year Environment Plan	Thriving plants and wildlife
Relevant target(s) in the 25 Year Environment Plan	Reversing the loss of marine biodiversity and, where practicable, restoring it. Ensuring seafloor habitats are productive and sufficiently extensive to support healthy, sustainable ecosystems.
Position in the natural capital framework	Asset condition – seas
Related reporting commitments	OSPAR Convention; UK Marine Strategy (EU Marine Strategy Framework Directive), EU Habitats Directive, EU Water Framework Directive. Relevant to Sustainable Development Goal 14.
Geographical scope	UK
Readiness and links to data	This indicator is not available for reporting in 2019. The assessments to be used in the indicator are due to be published later in 2019. Further development work will be required to adapt the data from these assessments for use in the indicator. Analytical methods and some data are available.
Interim indicator (where applicable)	Not applicable

C5 Diverse seas: condition of pelagic habitats

Short description	This indicator of diverse seas will track changes in the Good Environmental Status (GES) of open ocean (pelagic) habitats. The assessment is based on changes in plankton communities and changes in plankton biomass and abundance. The assessment is being developed and delivered for Descriptors 1 (biodiversity) of the UK Marine Strategy (Marine Strategy Framework Directive) and through the OSPAR assessment process. Existing analytical methods are under ongoing development to gain a better understanding of the effects of the key anthropogenic pressures and climatic drivers.
Relevant goal(s) in the 25 Year Environment Plan	Thriving plants and wildlife
Relevant target(s) in the 25 Year Environment Plan	Reversing the loss of marine biodiversity and, where practicable, restoring it. Ensuring seafloor habitats are productive and sufficiently extensive to support healthy, sustainable ecosystems.
Position in the natural capital framework	Asset condition – seas
Related reporting commitments	OSPAR Convention; UK Marine Strategy (EU Marine Strategy Framework Directive), EU Water Framework Directive. Relevant to Sustainable Development Goal 14.
Geographical scope	UK
Readiness and links to data	This indicator is not available for reporting in 2019. The GES assessments to be used in the indicator are due to be published later in 2019. Further development work will be required to adapt the data from these assessments for use in the indicator. Analytical methods and some data are available.
Interim indicator (where applicable)	Not applicable

C6 Diverse seas: status of threatened and declining features

Short description	This indicator of diverse seas shows changes in the status of vulnerable features flagged for protection, either listed in national legislation or international agreements. These features include the features of conservation interest protected in Marine Protected Areas, Natural Environment and Rural Communities Act Section 41 habitats and species of principle importance for conservation, and the OSPAR threatened and declining features, amongst others. The overall indicator will be derived from the status of the individual features.
Relevant goal(s) in the 25 Year Environment Plan	Thriving plants and wildlife
Relevant target(s) in the 25 Year Environment Plan	Reversing the loss of marine biodiversity and, where practicable, restoring it.
Position in the natural capital framework	Asset condition – seas
Related reporting commitments	OSPAR Convention, EU Marine Strategy Framework Directive, EU Habitats and Birds Directives, Convention on Biological Diversity Aichi Target 12. Relevant to Sustainable Development Goal 14.
Geographical scope	England
Readiness and links to data	This indicator is not available for reporting in 2019: further development is needed. Some data are available on Marine Protected Areas.
Interim indicator (where applicable)	Not applicable

C7 Healthy seas: fish and shellfish populations

Short description	This indicator will track the health of our seas using assessments of fish and shellfish assemblages. It will consist of multiple metrics on the size, structure and function of fish and shellfish assemblages, and can be used to assess impacts of fishing and the effects of fisheries management on fish and shellfish communities. Currently, the metrics within this indicator are being developed for the Marine Strategy Framework Directive Descriptors 1 (biodiversity) and 4 (food webs) and the OSPAR Convention.
Relevant goal(s) in the 25 Year Environment Plan	Thriving plants and wildlife
Relevant target(s) in the 25 Year Environment Plan	Making sure populations of key species are sustainable with appropriate age structures. Reversing the loss of marine biodiversity and, where practicable, restoring it. Ensuring that all fish stocks are recovered to and maintained at levels that can produce their maximum sustainable yield.
Position in the natural capital framework	Asset condition – seas
Related reporting commitments	OSPAR Convention, UK Marine Strategy, EU Marine Strategy Framework Directive, EU Water Framework Directive, International Council for Exploration of the Seas (ICES), Convention on Biological Diversity Aichi Target 6. Relevant to Sustainable Development Goal 14.
Geographical scope	UK
Readiness and links to data	This indicator is not available for reporting in 2019: several elements of this indicator are already published but further work is required to bring these elements together with new data to provide an overall assessment.
Interim indicator (where applicable)	Not applicable

C8 Healthy seas: marine food webs functioning

Short description	This indicator will track the health of our seas using metrics on the size, structure and function of different feeding (trophic) levels in marine food webs. The indicator will focus on open ocean (pelagic) habitats and populations of key species groups within the food web. These show whether ecosystems are healthy and are being used sustainably. Currently, the metrics within this indicator are being developed for the Marine Strategy Framework Directive Descriptors 1 (biodiversity), 4 (food webs) and 6 (seafloor integrity) and the OSPAR Convention.
Relevant goal(s) in the 25 Year Environment Plan	Thriving plants and wildlife
Relevant target(s) in the 25 Year Environment Plan	Making sure populations of key species are sustainable with appropriate age structures. Reversing the loss of marine biodiversity and, where practicable, restoring it. Ensuring that all fish stocks are recovered to and maintained at levels that can produce their maximum sustainable yield.
Position in the natural capital framework	Asset condition – seas
Related reporting commitments	OSPAR Convention, UK Marine Strategy, EU Marine Strategy Framework Directive, EU Water Framework Directive, International Council for Exploration of the Seas (ICES), Convention on Biological Diversity Aichi Target 6. Relevant to Sustainable Development Goal 14.
Geographical scope	UK
Readiness and links to data	This indicator is not available for reporting in 2019: significant development is required. Research is underway to further develop the food web metrics that constitute this indicator. Analytical methods and some data are available.
Interim indicator (where applicable)	Not applicable

C9 Healthy seas: seafloor habitats functioning

Short description	This indicator shows changes in the natural functionality and extent of seafloor habitats able to support a healthy and productive ecosystem. The indicator is linked to UK interpretation of EU MSFD Descriptor 6 Seafloor Integrity. The indicator will be derived from the integration of metrics of individual broad habitat types and selected vulnerable habitats. Well-functioning seafloor habitats (physically and structurally) are both productive and sufficiently extensive, to carry out natural functionality, including the necessary ecological processes which underpin ecosystem goods and services, and are capable of supporting a healthy and sustainable ecosystem for the long term.
Relevant goal(s) in the 25 Year Environment Plan	Thriving plants and wildlife
Relevant target(s) in the 25 Year Environment Plan	Ensuring seafloor habitats are productive and sufficiently extensive to support healthy, sustainable ecosystems.
Position in the natural capital framework	Asset condition – seas
Related reporting commitments	OSPAR Convention, UK Marine Strategy (EU Marine Strategy Framework Directive), EU Habitats and Birds Directives, WFD.
Geographical scope	UK
Readiness and links to data	This indicator is not available for reporting in 2019: further development is needed. Analytical methods and some data are expected to be available during 2019.
Interim indicator (where applicable)	Not applicable

C10 Productive seas: fish and shellfish stocks safe and environmentally sustainable

Short description	This indicator shows changes in the proportion of commercial fish and shellfish stocks that are within safe biological limits and fished sustainably. The indicator will be derived from assessments of individual species together with further measures assessing effects of fishing activity on wider environment. Where available, the assessment of stocks against their maximum sustainable yield will be incorporated into the overall indicator. The indicator is linked to EU MSFD Descriptor 3 (Commercial Fish) and OSPAR indicators.
Relevant goal(s) in the 25 Year Environment Plan	Using resources from nature more sustainably and efficiently
Relevant target(s) in the 25 Year Environment Plan	Ensuring that all fish stocks are recovered to and maintained at levels that can produce their maximum sustainable yield.
Position in the natural capital framework	Asset condition – seas
Related reporting commitments	OSPAR Convention, EU Marine Strategy Framework Directive, Convention on Biological Diversity Aichi Target 6. Relevant to Sustainable Development Goals 12 and 14.
Geographical scope	UK
Readiness and links to data	This indicator is not available for reporting in 2019: significant further development is required. Related information on status of fish stocks is already published and is presented as an interim indicator for E9.
Interim indicator (where applicable)	Not applicable

C11 Productive seas: status of sensitive fish and shellfish stocks

Short description	This indicator tracks changes in the abundance, distribution and condition of fish and shellfish species at risk of depletion The indicator will be derived from individual species assessments; note that some species may also be included in C6. The indicator will be assessed to account for the expected status in line with prevailing environmental conditions and not adversely impacted by human activity. The indicator is linked to the EU MSFD Descriptor 1 biodiversity and OSPAR indicators.
Relevant goal(s) in the 25 Year Environment Plan	Using resources from nature more sustainably and efficiently
Relevant target(s) in the 25 Year Environment Plan	Ensuring that all fish stocks are recovered to and maintained at levels that can produce their maximum sustainable yield.
Position in the natural capital framework	Asset condition – seas
Related reporting commitments	OSPAR Convention, UK Marine Strategy, EU Marine Strategy Framework Directive, Convention on Biological Diversity Aichi Target 6. Relevant to Sustainable Development Goals 12 and 14.
Geographical scope	UK
Readiness and links to data	This indicator is not available for reporting in 2019: further development is required. Analytical methods and some data are available.
Interim indicator (where applicable)	Not applicable

D1 Quantity, quality and connectivity of habitats

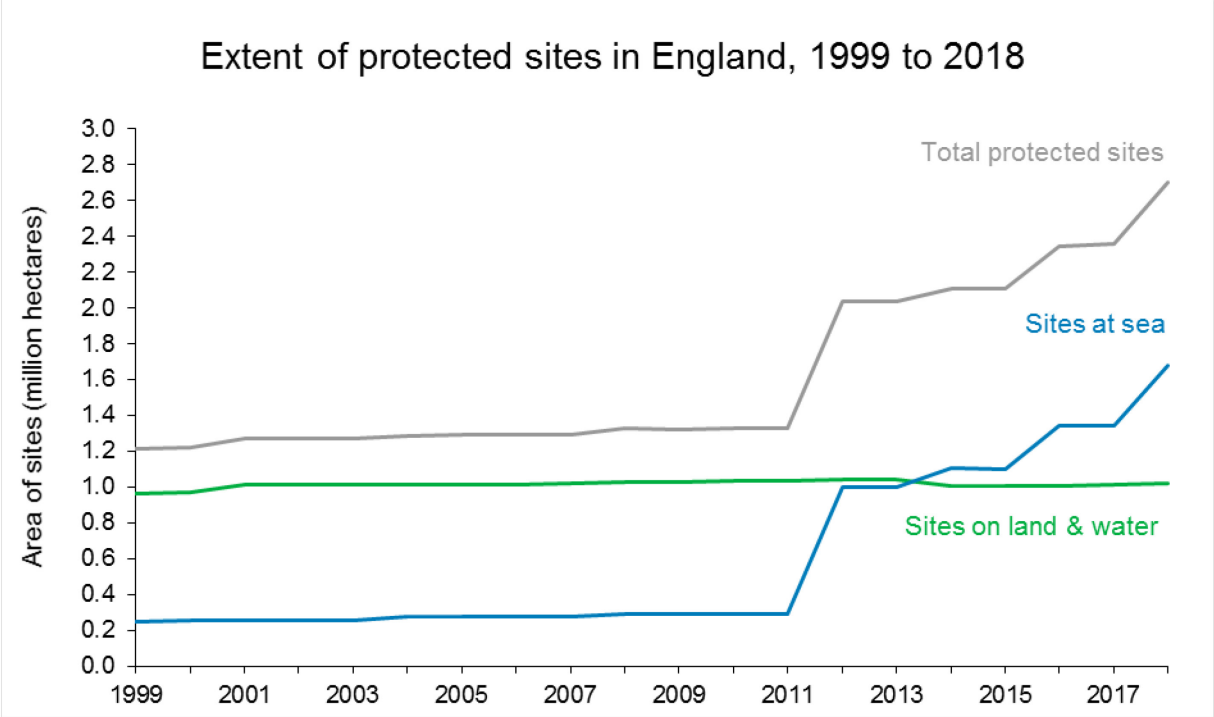
Short description	This indicator will measure changes in extent, condition, connectivity and function of terrestrial and freshwater habitats in England. 'Making space for nature', an independent review of England's wildlife sites and the connections between them by Professor Sir John Lawton, identified the need for more, bigger, better and more joined areas to build a more resilient ecological network for wildlife. Such resilience is necessary as an adaptation to pressures and drivers of change such as climate change. Data are available to measure some aspects of this indicator such as extent and condition of some habitats, but further work is required to assess habitats beyond protected sites, and reliable methods for measuring ecological connectivity need to be further tested. Some indicators of aspects of ecosystem functions and processes are available but these are not comprehensive. New methods of Earth Observation (EO) together with development of measures of favourable conservation status and long-term site-based monitoring offer good opportunities to develop this indicator.
Relevant goal(s) in the 25 Year Environment Plan	Thriving plants and wildlife Mitigating and adapting to climate change
Relevant target(s) in the 25 Year Environment Plan	Creating or restoring 500,000 hectares of wildlife-rich habitat outside the protected area network. Implementing a sustainable and effective second National Adaptation Programme.
Position in the natural capital framework	Asset condition – species and ecological communities
Related reporting commitments	Contributions to EU Habitats Directive Article 17, Convention on Biological Diversity Aichi Targets 5 and 15. May provide evidence in support of Climate Change Risk Assessment and the Adaptation Sub Committee's assessment of the National Adaptation Programme, under the Climate Change Act (2008).
Geographical scope	England. Some data, for example EO data or site assessments may be disaggregated to local sites.
Readiness and links to data	This indicator is not available for reporting in 2019: several elements of this indicator are already published (including data relating to local wildlife sites) but substantial further work is required to bring these

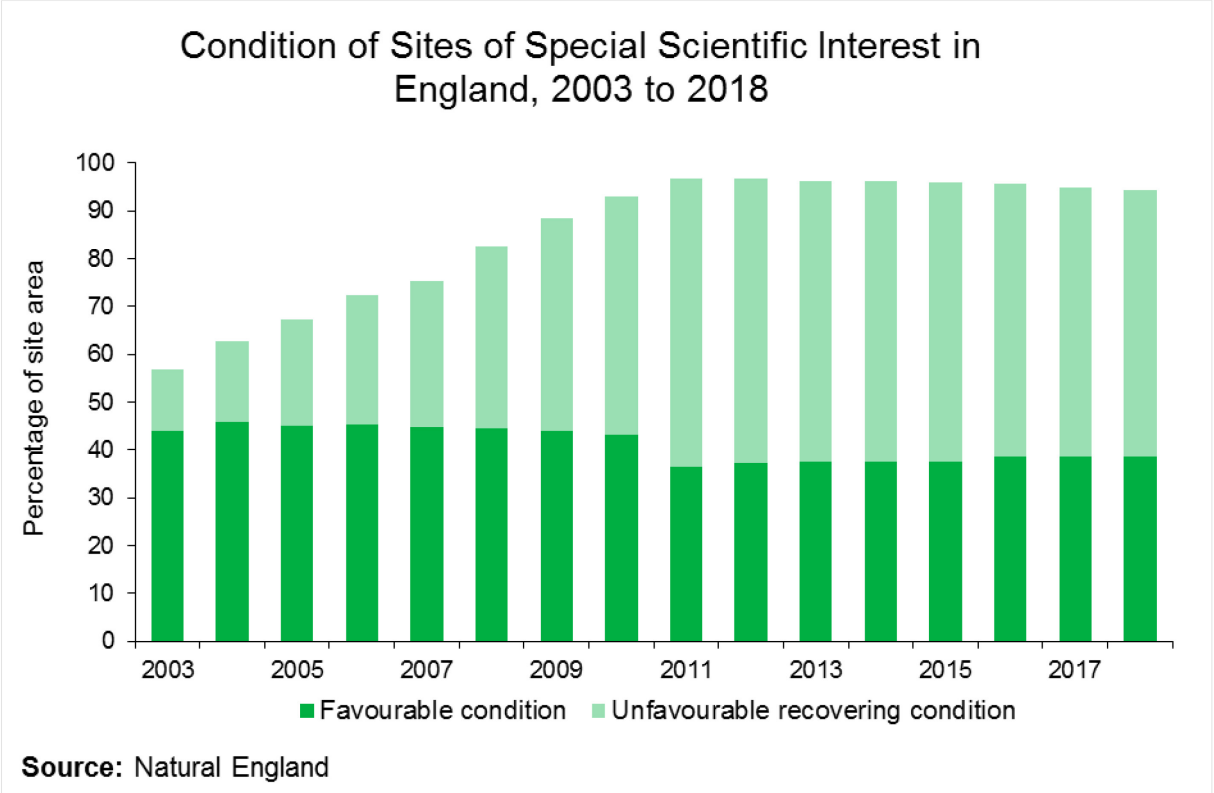
	elements together with new data to assess overall resilience.
Interim indicator (where applicable)	Not applicable

D2 Extent and condition of protected sites – land, water and sea

Short description	Protected sites are areas of land, inland water and the sea that have special legal protection to conserve important habitats and species in England. These include our Sites of Special Scientific Interest (SSSIs), Marine Protected Areas (MPAs), Special Areas of Conservation, Special Protection Areas and Ramsar sites. This indicator has 2 components: (a) extent (hectares) of protected sites on land, water and at sea and (b) condition of protected sites on land, water and at sea. Condition for terrestrial sites is assessed against relevant common standards agreed by the UK conservation agencies. Condition methodology for MPAs is currently under development.
Relevant goal(s) in the 25 Year Environment Plan	Thriving plants and wildlife
Relevant target(s) in the 25 Year Environment Plan	Increasing the proportion of protected and well-managed seas, and better managing existing protected sites. Restoring 75% of our one million hectares of terrestrial and freshwater protected sites to favourable condition, securing their wildlife value for the long term.
Position in the natural capital framework	Asset condition – species and ecological communities
Related reporting commitments	EU Habitats Directive Article 17; OSPAR; Convention on Biological Diversity Aichi Target 11.
Geographical scope	England. Data may be disaggregated to individual sites and features.
Readiness and links to data	This indicator is not available for publishing in 2019 in a finalised form: an interim indicator is presented here that shows the extent of protected areas (D2a) and condition of SSSIs (D2b) in England. Data for this interim indicator are published annually. Some further work is required to develop a methodology for assessing the condition of MPAs and to produce an indicator of condition (D2b) that includes all sites on land, on water and at sea.
Interim indicator (where applicable)	**D2 (interim) Extent of protected sites (a) and condition of Sites of Special Scientific Interest (b) in England**

D2 (interim) Extent of protected sites (a) and condition of Sites of Special Scientific Interest (b) in England, 1999 to 2018





Source: Natural England

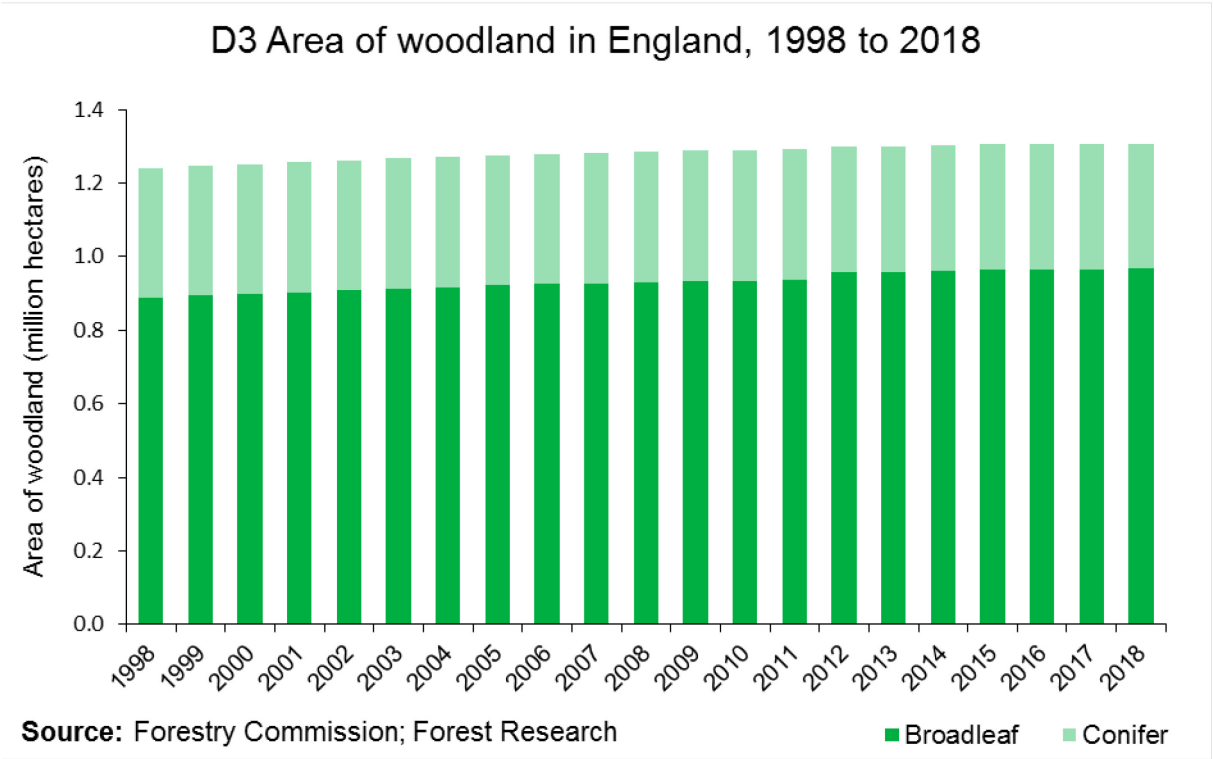
Trend description: The total extent of land, water and sea protected in England through national and international protected areas increased from 1.2 million hectares in 1999 to 2.7 million hectares in 2018. The area of sites at sea has increased substantially, by more than 5 times since the time series began in 1999 although the majority of this increase

took place between 2011 and 2018. The area of sites on land and water has remained relatively stable over time, increasing by 6% between 1999 and 2018.

There has been a net decrease in the area of SSSIs in favourable condition; down from 44% in 2003 to 38.8% in 2018. The sudden drop in the area of SSSIs in favourable condition from 43.2% in 2010 to 36.6% in 2011 was largely due to a more rigorous application of the ‘Common Standard for Monitoring’ protocols in assessing feature condition. However, over the past 7 years, there has been a small increase in the area in favourable condition, from 36.6% in 2011 to 38.8% in 2018. The area of SSSIs in unfavourable recovering condition has increased substantially from 13% in 2003 to 55.5% in 2018.

D3 Area of woodland in England

Short description	This indicator shows change in the area of broadleaved and conifer woodland in England. Woodland as defined for the National Forest Inventory is land under stands of trees with a minimum area of 0.5 hectares, a width of at least 20 metres, and a canopy cover of at least 20% or having the potential to achieve this. The definition relates to land use, rather than land cover, so integral open space and areas of felled trees that are awaiting restocking (i.e. replanting) are included as woodland. Woodland is a key natural capital asset that provides many natural capital benefits, such as the provision of timber and other wood products, carbon storage, habitats for wildlife, and opportunities for exercise and recreation.
Relevant goal(s) in the 25 Year Environment Plan	Using resources from nature more sustainably and efficiently Thriving plants and wildlife Enhanced beauty, heritage and engagement with the natural environment
Relevant target(s) in the 25 Year Environment Plan	Creating and Restoring 500,000 hectares of wildlife-rich habitat outside the protected sites network. Increasing woodland area in England in line with our aspiration of 12% cover by 2060.
Position in the natural capital framework	Asset condition – land; species and ecological communities
Related reporting commitments	Equivalent data at UK level are reported to the United Nations Food and Agriculture Organisation for its regular Forest Resources Assessment, and to Forest Europe for reporting to the Ministerial Conference on the Protection of Forests in Europe and publication in the State of Europe's Forests.
Geographical scope	England. The related National Forest Inventory woodland map geospatial Open Data can be disaggregated to any sub-national geography required.
Readiness and links to data	Updates are published annually in Forestry Statistics (Forest Research), with additional commentary on recent trends and new planting of trees in the quarterly Corporate Plan Indicators Reports (Forestry Commission).
Interim indicator (where applicable)	Not applicable

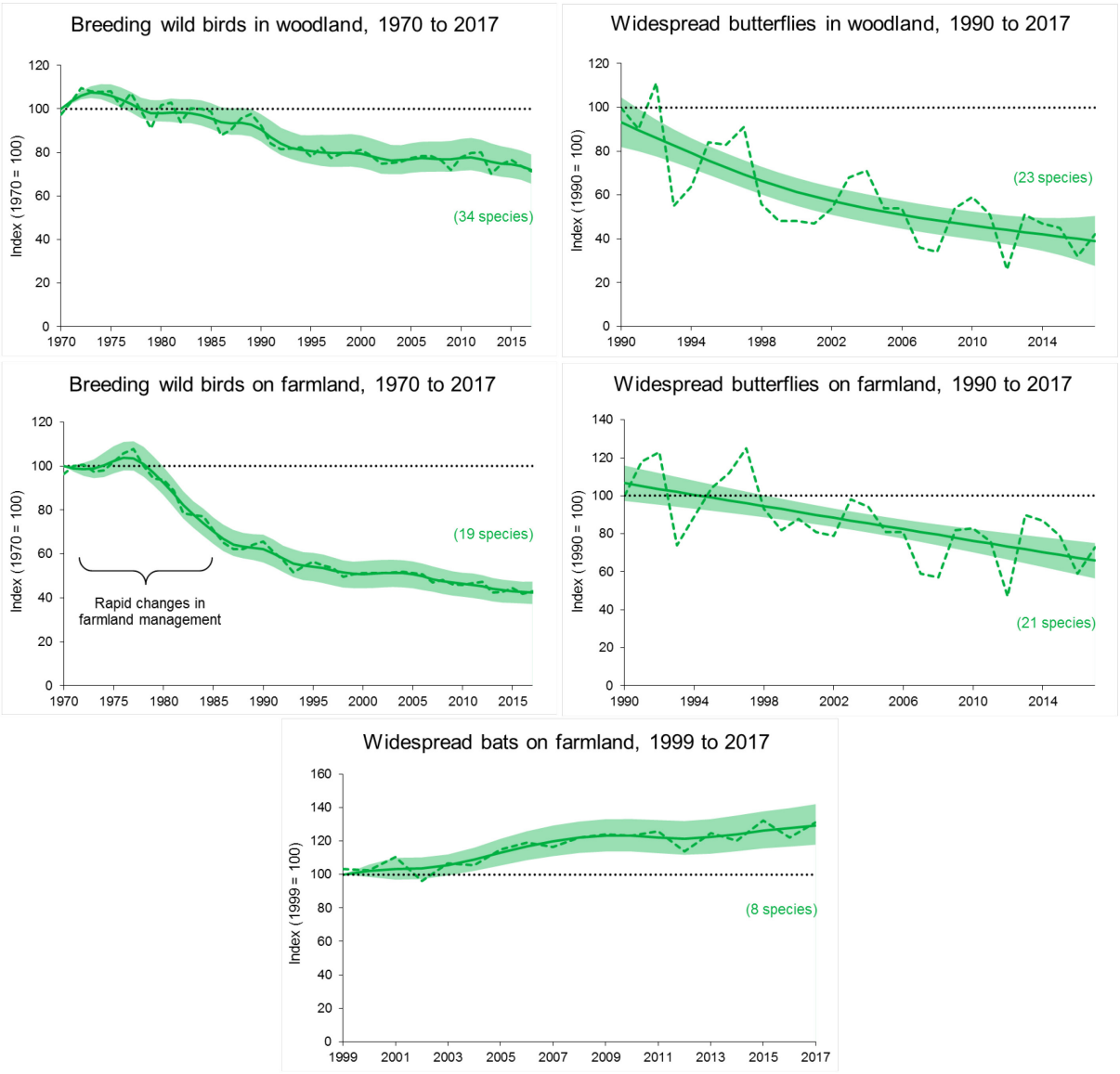


The total area of woodland in England has increased from 1.241 million hectares in 1998 to 1.307 million hectares in 2018, equating to an increase from 9.5% to 10.0% of the land area of England. This growth has been driven by an increase in broadleaf woodland; the area of conifer woodland in England has remained relatively static over the last 20 years.

D4 Relative abundance and/or distribution of widespread species

Short description	This indicator will use regularly collected data to track changes in relative abundance and/or distribution of species which are widespread and characteristic of different broad habitats in England including birds, bats, butterflies, moths and plants. The expectation is that this indicator will be expanded to include more species groups and habitat types. Trends in abundance or distribution of wild birds, bats, butterflies and moths are already published and methods for analysing trends in plants are being developed. Further work is needed to determine how best to combine and present trends for different species groups and habitats within this indicator.
Relevant goal(s) in the 25 Year Environment Plan	Thriving plants and wildlife
Relevant target(s) in the 25 Year Environment Plan	Taking action to recover threatened, iconic or economically important species of animals, plants and fungi, and where possible to prevent human-induced extinction or loss of known threatened species in England and the Overseas Territories.
Position in the natural capital framework	Asset condition – species and ecological communities
Related reporting commitments	EU Habitats Directive Article 17; Convention on Biological Diversity Aichi Targets 7, 8 and 12.
Geographical scope	England
Readiness and links to data	Although this indicator is not available for reporting in 2019 in a finalised form, an interim indicator is presented here that shows trends in the populations of breeding wild birds, widespread butterflies and bats in England. Some data are already published annually, however further work is required to combine and present these data in this indicator. Methods for analysis of plant species are in development.
Interim indicator (where applicable)	**D4 (interim) Trends in abundance of wild birds, butterflies and bats in England**

D4 (interim) Trends in abundance of wild birds, butterflies and bats in England, 1970 to 2017



Source: Bat Conservation Trust; British Trust for Ornithology; Butterfly Conservation; Centre for Ecology & Hydrology; Defra; Joint Nature Conservation Committee; Royal Society for the Protection of Birds

Trend description: The indicators for breeding wild birds in woodland and on farmland in England have both declined between 1970 and 2017; the latter experiencing steeper declines between 1975 and 1985. The indicators for widespread butterflies in woodland and on farmland in England have also declined between 1990 and 2017 but the indicator for widespread bats on farmland in England has increased since the turn of the century. Whilst these overall trends are clear from the charts, they mask the trends for individual species within each index – some farmland and woodland species trends have increased whereas others have decreased over time. The charts show the unsmoothed (dashed lines) and smoothed (solid lines) trends for each of the species indices; the shaded areas represent the 95% confidence intervals for the smoothed trends.

D5 Conservation status of our native species

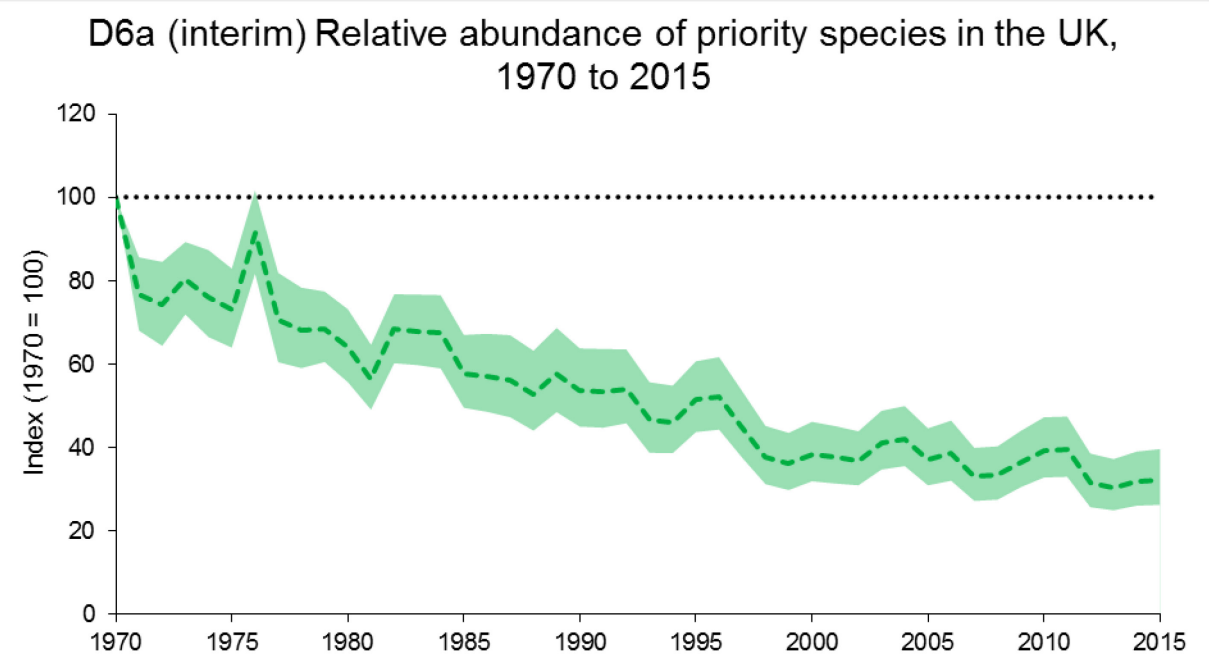
Short description	This indicator will track changes in the conservation status of terrestrial, freshwater and marine species using established international (IUCN[12]) categories and criteria. Species will be classified in several categories including: least concern; near threatened; vulnerable; endangered; critically endangered; and, regionally extinct. A simple index will be constructed to summarise the changes in numbers of species in each category. Baseline assessment data for approximately 10,000 species are available. This includes birds, mammals, reptiles, amphibians, some invertebrates, vascular plants, bryophytes, lichens and some fungi. Assessments are currently undertaken for Great Britain. Further assessments are required for a wider range of species, and will need to be repeated (4 to 6 year intervals) in order to detect change in extinction risk for individual species and native species as a whole.
Relevant goal(s) in the 25 Year Environment Plan	Thriving plants and wildlife
Relevant target(s) in the 25 Year Environment Plan	Taking action to recover threatened, iconic or economically important species of animals, plants and fungi, and where possible to prevent human-induced extinction or loss of known threatened species in England and the Overseas Territories.
Position in the natural capital framework	Asset condition – species and ecological communities
Related reporting commitments	Contributes to reporting under the Habitats and Species Conservation Regulation 2017, which meets our commitments under the EU Habitats Directive Article 17 and Convention on Biological Diversity Aichi Targets 12 and 13. Relevant to Sustainable Development Goal 15 (Life on land). May provide evidence in support of Climate Change Risk Assessment under the Climate Change Act (2008).
Geographical scope	Great Britain
Readiness and links to data	This indicator is not available for reporting in 2019: further development is required over a number of years to bring data together from a number of different sources. Available data on changes abundance and

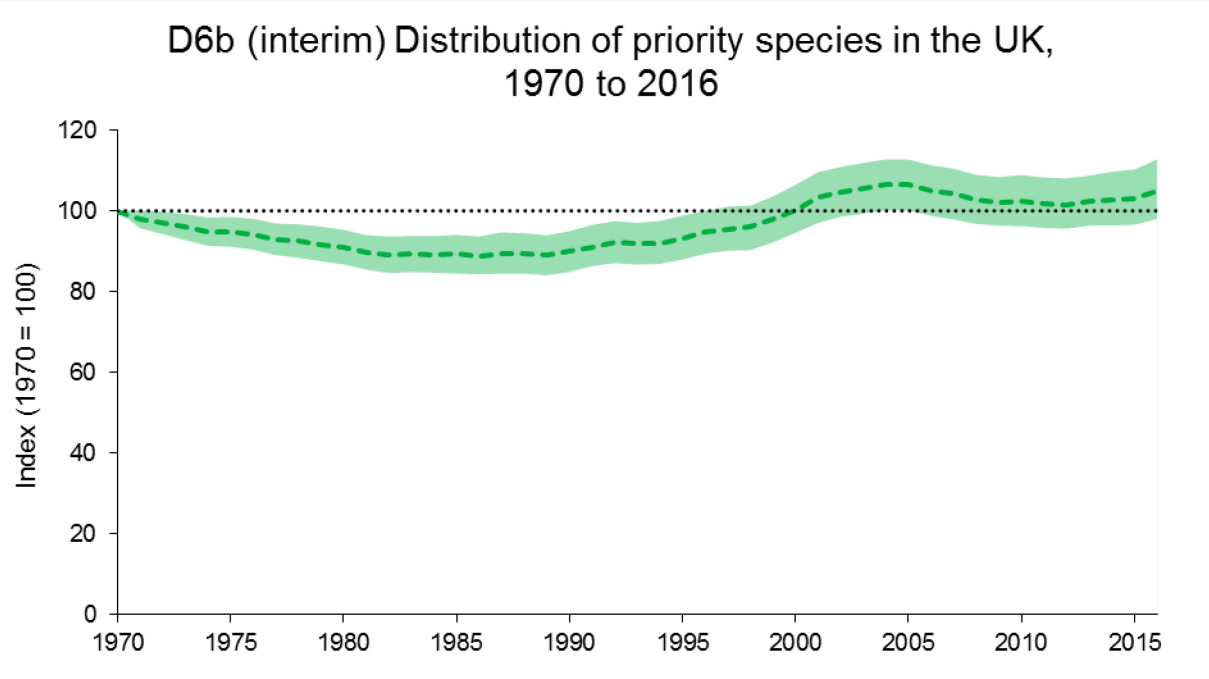
[12] International Union for Nature Conservation

	distribution of native species are presented in indicators D4, D6 and D7.
Interim indicator (where applicable)	Not applicable

D6 Abundance and distribution of priority species in England

Short description	Priority species are defined by the Secretary of State under Section 41 of the Natural Environment and Rural Communities Act 2006 as species which are of principal importance for the purpose of conserving biodiversity in England. This indicator has 2 components: (a) changes in the relative abundance of those priority species for which abundance data are available; and, (b) changes in distribution of priority species (i.e. changes in the number of one kilometre grid squares in which species are recorded in any given year) for those priority species for which only distribution data are available.
Relevant goal(s) in the 25 Year Environment Plan	Thriving plants and wildlife
Relevant target(s) in the 25 Year Environment Plan	Taking action to recover threatened, iconic or economically important species of animals, plants and fungi, and where possible to prevent human-induced extinction or loss of known threatened species in England and the Overseas Territories.
Position in the natural capital framework	Asset condition – species and ecological communities
Related reporting commitments	Relevant to Convention on Biological Diversity Aichi Target 12 and Sustainable Development Goal 15 Life on Land.
Geographical scope	England
Readiness and links to data	Although this indicator is not available for reporting in 2019 in a finalised form, an interim indicator is presented here that shows trends in the relative abundance and distribution of priority species in the UK. The development of an indicator for England is in progress.
Interim indicator (where applicable)	**D6 (interim) Abundance (a) and distribution (b) of priority species in the UK.** An interim indicator is available at the UK level based on species that are included in one or more of the statutory species lists of each administration. Currently, in the UK, 215 priority species have abundance data and 714 priority species have distribution data.





Source: Bat Conservation Trust; British Trust for Ornithology; Butterfly Conservation; Centre for Ecology & Hydrology; Defra; Joint Nature Conservation Committee; People's Trust for Endangered Species; Rothamsted Research; Royal Society for the Protection of Birds; biological records data collated by a range of national schemes and local data centres

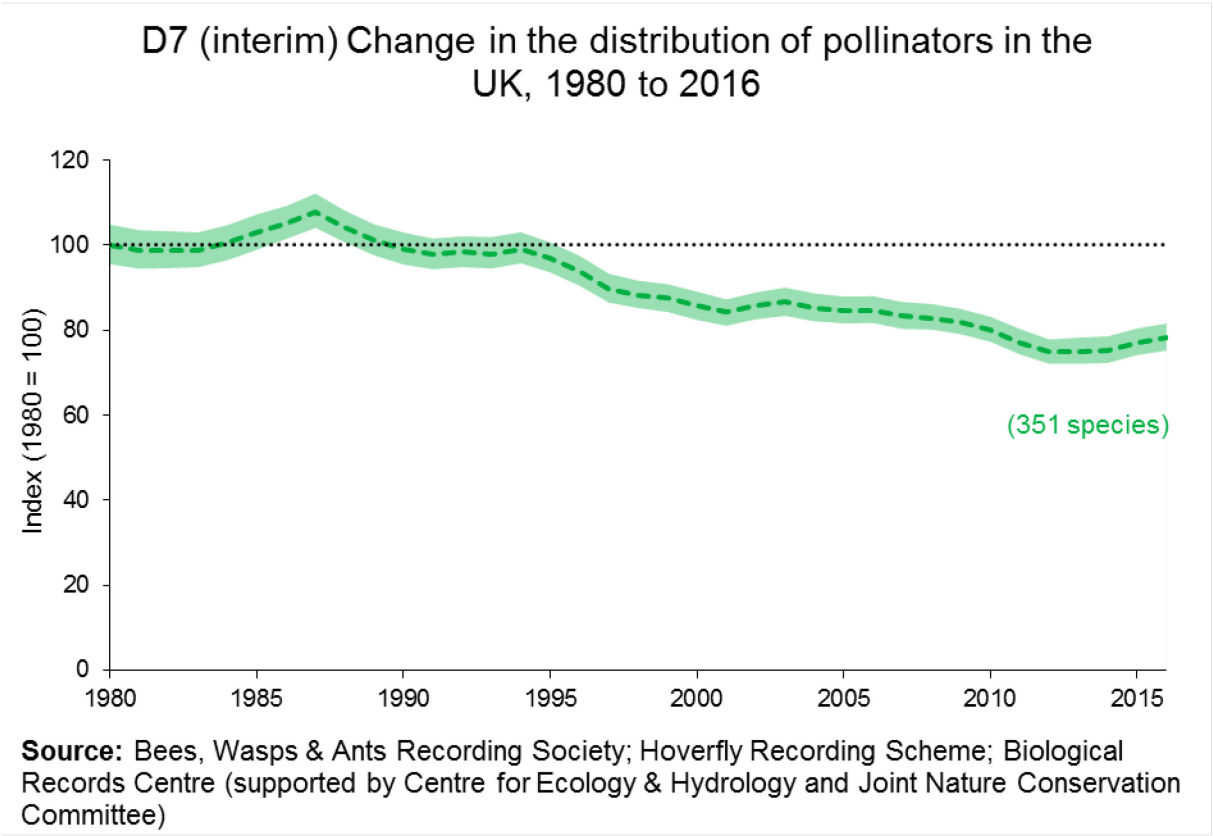
Trend description: By 2015, the index of relative abundance of priority species in the UK had declined to 32% of its value in 1970 but despite this statistically significant decrease, almost 30% of the species within the index actually increased in abundance. The shaded area represents the 95% confidence interval for the unsmoothed index.

Between 1970 and 2016, the index of distribution of priority species in the UK was relatively stable; there was an even balance of species increasing and decreasing in

distribution. The apparent slight increase over the long term is not statistically significant. The shaded area represents the 90% credible interval for the unsmoothed index.

D7 Species supporting ecosystem functions

Short description	All species have a functional role within ecosystems such as photosynthesis, respiration, decomposition, nutrient cycling, predator-prey and symbiotic relationships such as pollination. Plants, fungi, algae, invertebrates and soil micro-organisms are particularly important. The presence, abundance and diversity of species are key factors in determining the resilience of ecosystems to environmental changes, including climate change and disease, and the maintenance of ecosystem services. Further research is required to develop this indicator, building on the existing pollinator indicator and defining species groups and functions for inclusion.
Relevant goal(s) in the 25 Year Environment Plan	Thriving plants and wildlife
Relevant target(s) in the 25 Year Environment Plan	Taking action to recover threatened, iconic or economically important species of animals, plants and fungi, and where possible to prevent human-induced extinction or loss of known threatened species in England and the Overseas Territories.
Position in the natural capital framework	Asset condition – species and ecological communities
Related reporting commitments	Relevant to Convention on Biological Diversity Aichi Targets 7 and 8. May also provide evidence in support of Climate Change Risk Assessment under the Climate Change Act (2008).
Geographical scope	England
Readiness and links to data	Although this indicator is not available for reporting in 2019 in a finalised form, an interim indicator is presented here that shows trends in the distribution of UK pollinators. Significant further research and development is required to include a range of species groups important for supporting ecosystem functions in England.
Interim indicator (where applicable)	**D7 (interim) Changes in distribution of pollinators in the UK.** The interim indicator covers the changes in the distribution (occupancy of one kilometre grid squares) of bees and hoverflies in the UK.



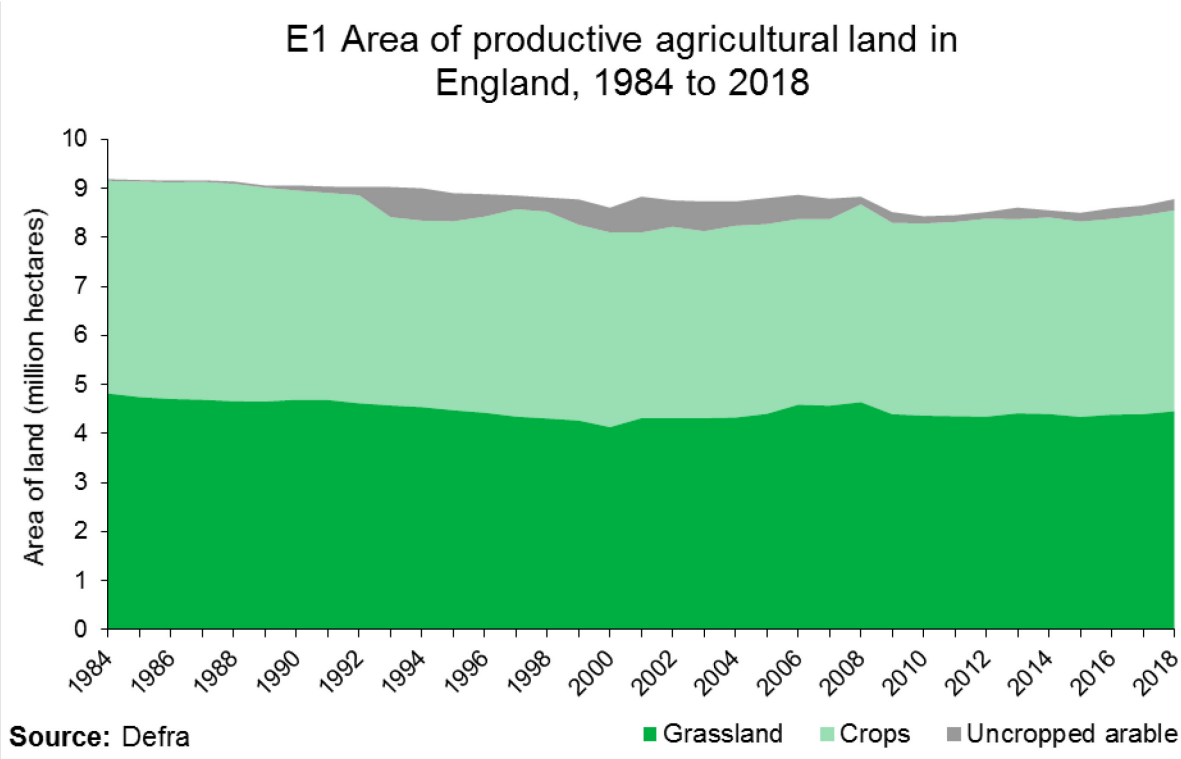
Source: Bees, Wasps & Ants Recording Society; Hoverfly Recording Scheme; Biological Records Centre (supported by Centre for Ecology & Hydrology and Joint Nature Conservation Committee)

Trend description: There was an overall decrease in the UK pollinators index from 1987 onwards. In 2016, the index had declined by 22% compared to its value in 1980. This overall decline masks the trends of the individual species within the index, 34% of which have declined, 14% of which have increased and 52% of which have remained the same since the index began in 1980. The shaded area represents the 95% confidence interval for the unsmoothed index.

E1 Area of productive agricultural land

Short description	Agriculture provides around 75% of the indigenous[13] food we eat and accounts for around 70% of land use. As well as being vital for food production, agriculture helps to shape the landscape, providing important recreational, spiritual and other cultural benefits. This indicator shows annual changes in land used for agriculture in 3 categories: grassland (including sole rough grazing); crops (including horticulture and perennial crops); and uncropped arable (land left fallow or under environmental management). Agricultural production and the associated land use and management are key drivers of the environmental impacts from the sector. A key policy challenge is to de-couple production from environmental impact. The indicator may be considered a measure of pressure on the environment, a measure of condition of the land asset, or a measure of service/benefit we derive from the land. The indicator is included in the framework to provide contextual information for other indicators and the trend is not assessed.
Relevant goal(s) in the 25 Year Environment Plan	Using resources from nature more sustainably and efficiently.
Relevant target(s) in the 25 Year Environment Plan	Ensuring that food is produced sustainably and profitably.
Position in the natural capital framework	Asset condition – land
Related reporting commitments	EU Common Agricultural Policy indicators.
Geographical scope	England
Readiness and links to data	Already published annually.
Interim indicator (where applicable)	Not applicable

[13] Food which can be produced in the climatic conditions of the UK.

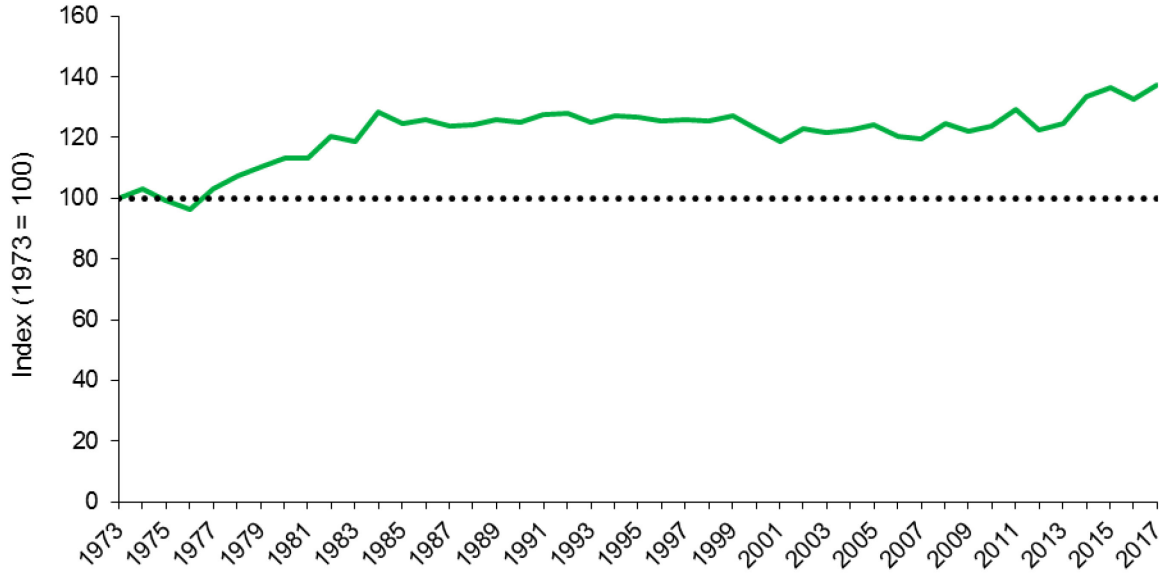


Trend description: After a period of decline in the late 1980s, land use by agriculture has remained fairly stable. The split between crops and grazing has also remained fairly constant over this time.

E2 Volume of agricultural production

Short description	Farming produces a range of food, feed and fibre commodities. This represents a valuable output from the land and other resources used. Volume of agricultural production is considered to be a provisioning service provided by a range of natural capital assets (land, water, air, species and ecological communities). This indicator shows annual changes in the index of output volume which provides an overall measure of total production across the wide range of agricultural commodities. The index is calculated using agreed international standards. Farm practices and the use of inputs (particularly fertilisers and pesticides) directly influence the environmental pressures from farming including the quality, composition and availability of habitats and impact on air, water and soils. This indicator should therefore be viewed alongside the indicator of volume of inputs (E3) and other indicators in the framework relating to the condition of natural capital assets.
Relevant goal(s) in the 25 Year Environment Plan	Using resources from nature more sustainably and efficiently
Relevant target(s) in the 25 Year Environment Plan	Ensuring that food is produced sustainably and profitably.
Position in the natural capital framework	Service/benefit
Related reporting commitments	EU Common Agricultural Policy indicators.
Geographical scope	England, but currently the index is only available at UK level.
Readiness and links to data	Although this indicator is not available for reporting in 2019 in a finalised form, an interim indicator is presented here that shows the volume of agricultural production in the UK. Indicators and data are already published annually but further work is required to disaggregate these data from UK to England level.
Interim indicator (where applicable)	**E2 (interim) Volume of agricultural production in the UK**

E2 (interim) Volume of agricultural production in the UK, 1973 to 2017

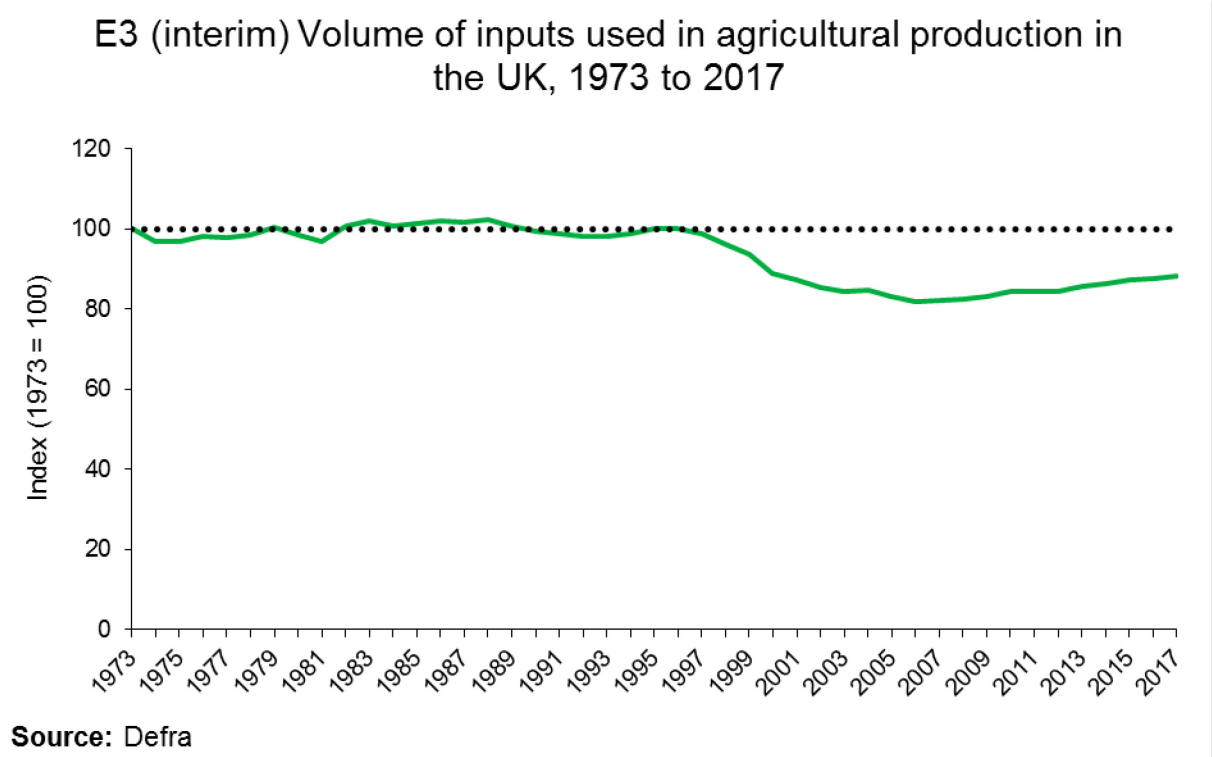


Source: Defra

Trend description: After a period of sustained increase in the 1970s, the overall volume of outputs has remained relatively stable, with some variation from year to year. Annual variations are generally driven by external factors in particular weather affecting growing and harvest and the variation in cropping driven by prices.

E3 Volume of inputs used in agricultural production

Short description	To produce food and feed, farming uses a range of inputs including fertilisers, pesticides, energy and animal feed. In addition, labour and land is required as well as depreciation of capital. Minimising the use of these inputs is an important policy driver to improve productivity and hence improve profitability whilst reducing the environmental impacts of farming. Farm practices and the use of inputs (particularly fertilisers and pesticides) directly influence the environmental pressures from farming including the quality, composition and availability of habitats and impact on air, water and soils. Volume of inputs may therefore be considered an indirect measure of pressure on a range of natural capital assets. This indicator should be viewed alongside the indicator of volume of production (E2) and other indicators in the framework relating to the condition of natural capital assets. The index of the volume of inputs is an overall measure of the total inputs used with price effects removed. This includes all inputs including intermediate consumption, land, labour and depreciation of capital.
Relevant goal(s) in the 25 Year Environment Plan	Using resources from nature more sustainably and efficiently
Relevant target(s) in the 25 Year Environment Plan	Ensuring that food is produced sustainably and profitably.
Position in the natural capital framework	Pressure
Related reporting commitments	EU Common Agricultural Policy indicators.
Geographical scope	England, but currently the index is only available at UK level.
Readiness and links to data	Although this indicator is not available for reporting in 2019 in a finalised form, an interim indicator is presented here that shows the volume of inputs used in agricultural production in the UK. Indicators and data are already published annually but further work is required to disaggregate these data from UK to England level.
Interim indicator (where applicable)	**E3 (interim) Volume of inputs used in agricultural production in the UK**

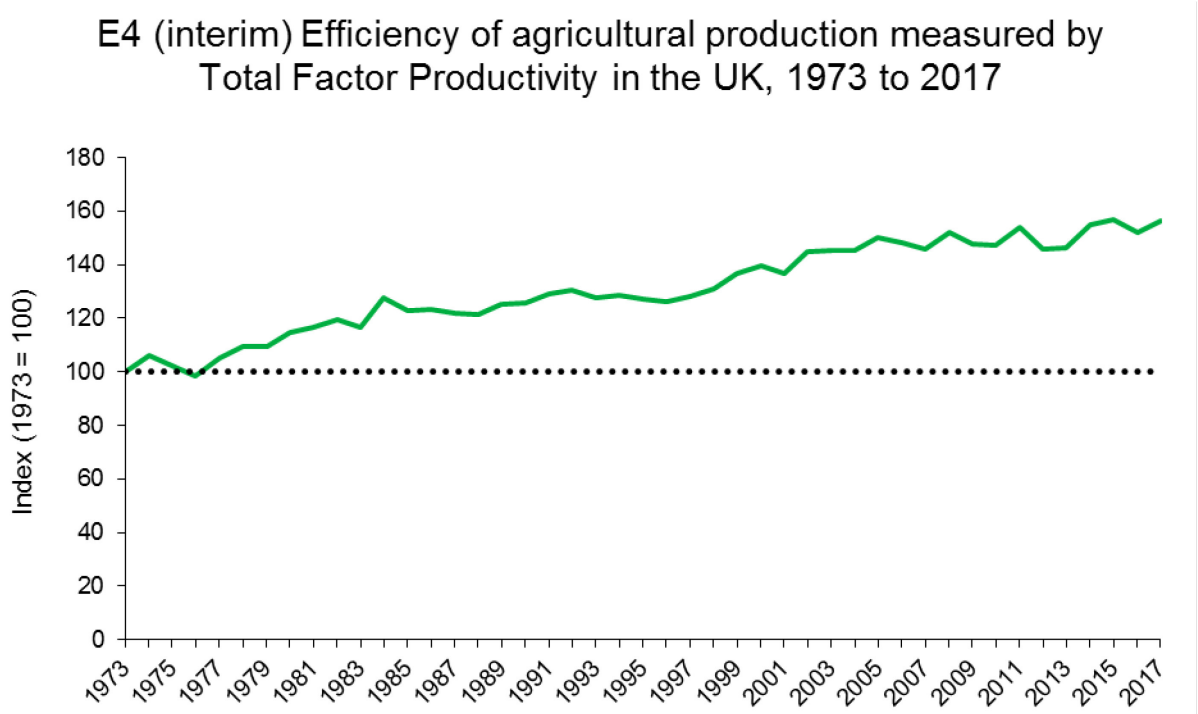


Source: Defra

Trend description: The index of volume of inputs has shown an overall decline since 1973. However, most of this decline took place between the late 1980s and 2005 and since then there has been a slight increase in the volume of inputs used in agricultural production.

E4 Efficiency of agricultural production measured by Total Factor Productivity

Short description	Total factor productivity is a well-established index of how well farming inputs (fertilisers, labour etc.) are converted into outputs (wheat, milk etc.) giving an indication of changes in the efficiency and competitiveness of the agriculture industry. It is based on the ratio of inputs (indicator E3) to outputs (indicator E2) such that the higher the value, the more efficiently inputs are converted into outputs. Data are based on volumes rather than values so that price effects are removed. The measure is known as Total Factor Productivity as it takes into account all output and input factors, including land, labour, intermediate consumption and depreciation of capital.
Relevant goal(s) in the 25 Year Environment Plan	Using resources from nature more sustainably and efficiently
Relevant target(s) in the 25 Year Environment Plan	Ensuring that food is produced sustainably and profitably.
Position in the natural capital framework	Service/benefit
Related reporting commitments	EU Common Agricultural Policy indicators.
Geographical scope	England, but currently the index is only available at UK level.
Readiness and links to data	Although this indicator is not available for reporting in 2019 in a finalised form, an interim indicator is presented here that shows the total factor productivity for the UK. Indicators and data are already published annually but further work is required to disaggregate these data from UK to England level.
Interim indicator (where applicable)	**E4 (interim) Efficiency of agricultural production measured by Total Factor Productivity in the UK**

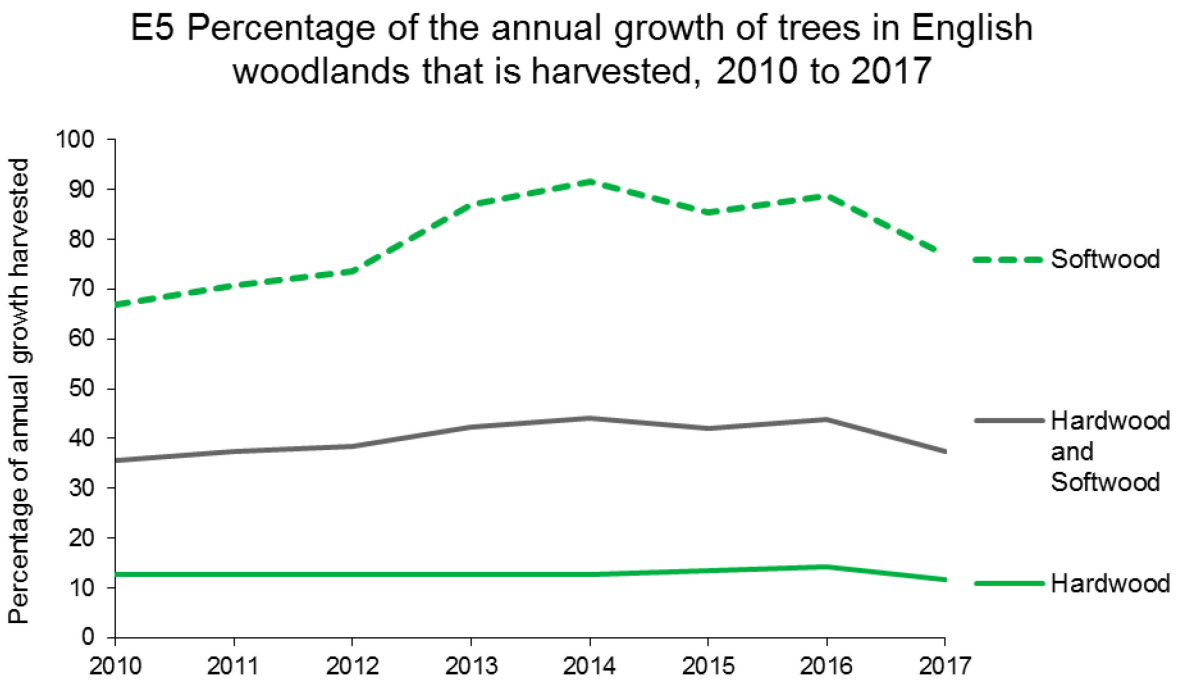


Source: Defra

Trend description: Overall productivity is driven by both the outputs and inputs components. There has been an overall long-term increase since 1973 driven by both increased outputs and a fall in inputs, although the separate trends (see indicators E2 and E3) have followed different patterns. There is considerable annual variation, this variation being mainly driven by variation in output volumes.

E5 Percentage of the annual growth of trees in English woodlands that is harvested

Short description	This indicator shows changes in the percentage of annual softwood and hardwood growth in England that is harvested annually. Separate statistics are available for softwood, hardwood, and both in total. This indicator helps us to better understand the levels of, and trends in, the economic productive utilisation of English timber resources as a part of sustainable forest management policies and practices. The underlying data sources are National Statistics from Forest Research on UK Wood Production and Trade and National Forest Inventory forecasts of increase (increment) in the volume of wood that grows in England.
Relevant goal(s) in the 25 Year Environment Plan	Using resources from nature more sustainably and efficiently
Relevant target(s) in the 25 Year Environment Plan	Increasing timber supplies.
Position in the natural capital framework	Service/benefit
Related reporting commitments	The component statistics that make up this indicator are provided, at UK level, to Forest Europe for reporting to the Ministerial Conference on the Protection of Forests in Europe and publication in the State of Europe's Forests.
Geographical scope	England
Readiness and links to data	Already published annually.
Interim indicator (where applicable)	Not applicable

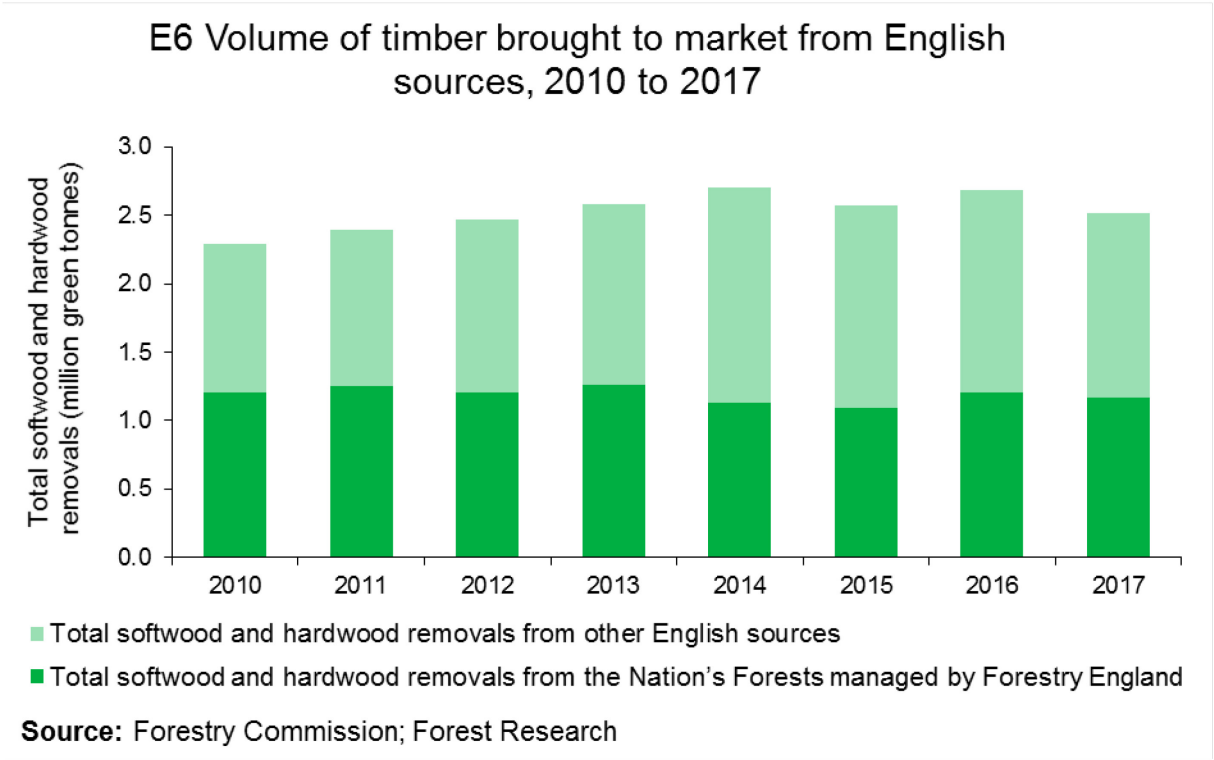


Source: Forestry Commission; Forest Research

Trend description: The percentage of softwood growth in England which is harvested has fluctuated between 67% and 92% over the 8 years for which these data are reported, reflecting sustained active management of softwood resources. The percentage of hardwood growth which is harvested remains much lower (between 12% and 14% over the same 8-year period), reflecting a lower level of active management of broadleaved woodland for timber supplies.

E6 Volume of timber brought to market per annum from English sources

Short description	This indicator shows changes in the volume of commercial timber brought to market from woodlands in England by Forestry England from the Nation's Forests, and by other owners of woodland. It is a measure of the level of active management of woodland assets for economic productive purposes. The data are National Statistics from Forest Research on UK Wood Production and Trade.
Relevant goal(s) in the 25 Year Environment Plan	Using resources from nature more sustainably and efficiently
Relevant target(s) in the 25 Year Environment Plan	Increasing timber supplies.
Position in the natural capital framework	Service/benefit
Related reporting commitments	Related statistics on total UK fellings are provided to Forest Europe for reporting to the Ministerial Conference on the Protection of Forests in Europe and publication in the State of Europe's Forests.
Geographical scope	England
Readiness and links to data	Already published annually.
Interim indicator (where applicable)	Not applicable



Trend description: The total annual volume of softwood and hardwood timber brought to market in England has increased from 2.3 million green tonnes in 2010 to 2.5 million green tonnes in 2017. Total removals from the Nation's Forests managed by Forestry England have been relatively stable over this period and removals from other English sources have increased by 25%.

E7 Healthy soils

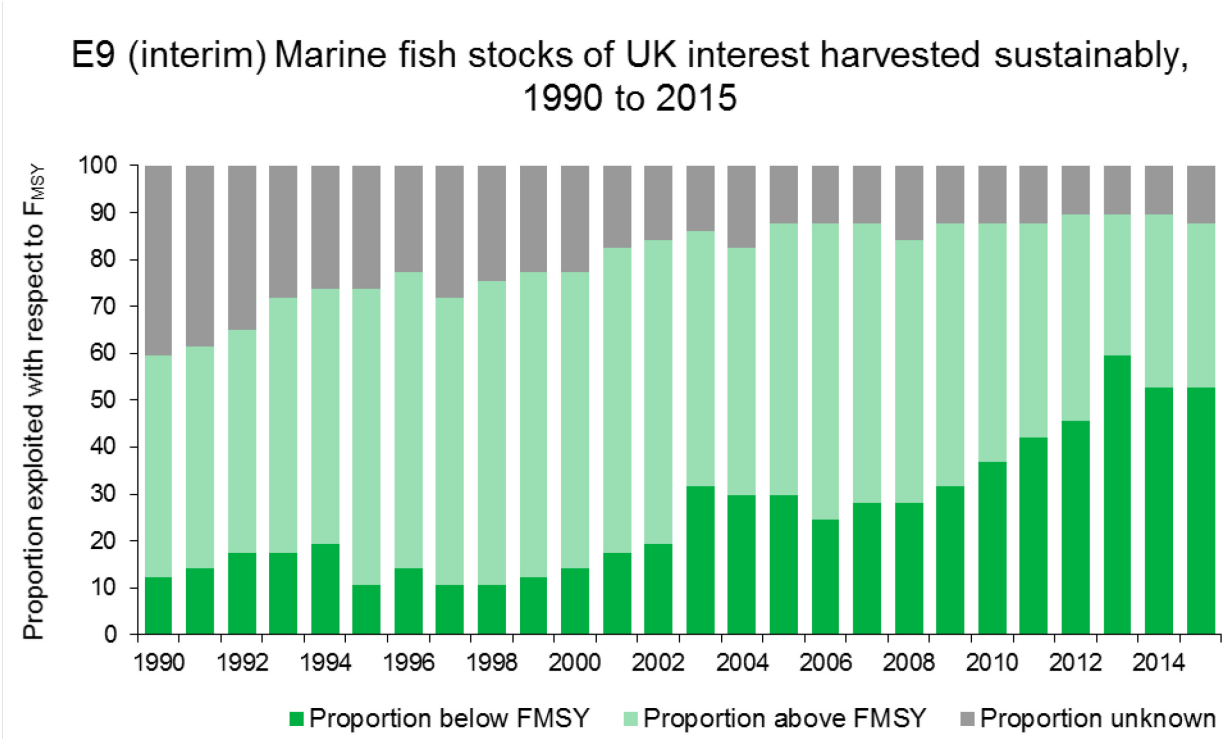
Short description	Healthy soils underpin the multiple functions of soils in food production, supporting wildlife, regulating water and regulating climate. More work is being done to define exactly what the indicator will include but it could include physical properties (such as a measure of soil structure), chemical properties (such as soil carbon, nutrients and pH), bare ground / soil and a measure of soil biological activity. This indicator is not limited to agricultural soils. Further development of statistically and scientifically robust national monitoring programmes may be needed to provide data for this indicator.
Relevant goal(s) in the 25 Year Environment Plan	Using resources from nature more sustainably and efficiently
Relevant target(s) in the 25 Year Environment Plan	Improving our approach to soil management: by 2030 we want all of England's soils to be managed sustainably, and we will use natural capital thinking to develop appropriate soil metrics and management approaches.
Position in the natural capital framework	Asset condition – land
Related reporting commitments	May provide evidence in support of Climate Change Risk Assessment under the Climate Change Act (2008).
Geographical scope	England
Readiness and links to data	This indicator is not available for reporting in 2019: significant further development work is required. Some data on aspects of soil health are already published but they do not provide a full baseline.
Interim indicator (where applicable)	Not applicable

E8 Sustainable use of water

Short description	This indicator will track changes in the efficient and sustainable use of water. It is a composite of 2 metrics. The first is a measure of water leakage reported by water companies through an existing OFWAT target. The second is a measure of the per capita household consumption of water in England, which is also an existing metric reported to OFWAT.
Relevant goal(s) in the 25 Year Environment Plan	Efficient and sustainable use of natural resources
Relevant target(s) in the 25 Year Environment Plan	Supporting OFWAT's ambitions on leakage, minimising the amount of water lost through leakage year on year, with water companies expected to reduce leakage by at least an average of 15% by 2025.
Position in the natural capital framework	Service/benefit
Related reporting commitments	Reported annually as part of a water company's statutory annual review of its water resources management plan.
Geographical scope	By water company area for those with customers wholly or mainly in England.
Readiness and links to data	This indicator is not available for reporting in 2019. Some data are already published but further work is required to develop the indicator.
Interim indicator (where applicable)	Not applicable

E9 Percentage of our seafood coming from healthy ecosystems, produced sustainably

Short description	This is a composite indicator that tracks the sustainability of seafood, fish and aquaculture products. It will combine metrics on production (covering harvesting and subsequent preparation), management and impact on the environment. The indicator will use the data collected for the management of fish stocks to assess whether harvesting rates remain within sustainable limits. It will use equivalent data for aquaculture production. These data on harvesting and production will then be integrated with data on the impact of these activities on the wider environment together with social and economic data to provide an assessment of the sustainability of our seafood.
Relevant goal(s) in the 25 Year Environment Plan	Using resources from nature more sustainably and efficiently Thriving plants and wildlife
Relevant target(s) in the 25 Year Environment Plan	Ensuring that all fish stocks are recovered to and maintained at levels that can produce their maximum sustainable yield.
Position in the natural capital framework	Service/benefit
Related reporting commitments	Oslo and Paris (OSPAR) Convention; EU Marine Strategy Framework Directive, EU Water Framework Directive, International Council for Exploration of the Seas (ICES), Convention on Biological Diversity (CBD). Relevant to Sustainable Development Goals 12 and 14.
Geographical scope	UK
Readiness and links to data	Although this indicator is not available for reporting in 2019 in a finalised form, an interim indicator is presented here that shows the proportion of marine fish (quota) stocks of UK interest that are harvested sustainably. Data on sustainably harvested fish stocks are already published annually, however further work is required to include a wider range of fish stocks and asses their maximum sustainable yield.
Interim indicator (where applicable)	**E9 (interim) Marine fish stocks harvested sustainably**



Source: Centre for Environment, Fisheries & Aquaculture Science; International Council for the Exploration of the Sea

Trend description: The percentage of fish stocks (including *Nephrops*) fished at or below levels capable of producing maximum sustainable yield (FMSY) has increased from 12% in 1990 to 53% in 2015.

F1 Disruption or unwanted impacts from flooding or coastal erosion

Short description	This indicator will track changes in the impacts of flooding and coastal erosion on people's lives. It will cover impacts on homes, businesses, communities, infrastructure, economy and people's health. This indicator will show impact of natural hazards on people and the benefits to society provided by the reduction in unwanted impacts, including through management of natural capital assets that help to regulate flooding and coastal erosion. The indicator will be sensitive to future climate change and effectiveness of adaptation. Scope and details of the indicator are subject to decisions on long-term Flood and Coastal Erosion Risk Management (FCERM) policy. In early summer 2019 the Environment Agency will publish its consultation for the revised FCERM Strategy. The long-term strategy will focus on actions to make places, infrastructure and growth more resilient to our future climate.
Relevant goal(s) in the 25 Year Environment Plan	Reducing the risks of harm from environmental hazards
Relevant target(s) in the 25 Year Environment Plan	Boosting the long-term resilience of our homes, businesses and infrastructure.
Position in the natural capital framework	Service/benefit
Related reporting commitments	May provide evidence in support of Climate Change Risk Assessment under the Climate Change Act (2008). Relevant to Sustainable Development Goals 11 and 13.
Geographical scope	England
Readiness and links to data	This indicator is not available for reporting in 2019: significant further development is required. The Environment Agency does not routinely carry out economic cost analysis of all floods. However, it has published cost of flooding reports following the winter 2013/14 and winter 2015/16 floods. The managing flood and coastal erosion risk annual reports (from 1 April 2011) provide further context and statistics about the impacts of recent major flood events.
Interim indicator (where applicable)	Not applicable

F2 Communities resilient to flooding and coastal erosion

Short description	This indicator will show changes in the resilience of communities that are at risk of flooding and coastal erosion. This indicator, which requires development, will be sensitive to future climate change and show the need for adaptation. The scope of this indicator, particularly for coastal erosion, is contingent on data being available to track broader community resilience beyond that of property. Scope and details of this indicator are subject to decisions on long-term Flood and Coastal Erosion Risk Management (FCERM) policy. In early summer 2019 the Environment Agency will publish its consultation for the revised FCERM Strategy. The strategy is proposing to develop a framework of resilience activities to work with local partners, other risk management authorities and communities to identify the options available to increase resilience at a community level. These options will be a combination of asset management, catchment solutions, socio-economic activities and spatial planning.
Relevant goal(s) in the 25 Year Environment Plan	Reducing the risks of harm from environmental hazards
Relevant target(s) in the 25 Year Environment Plan	Boosting the long-term resilience of our homes, businesses and infrastructure.
Position in the natural capital framework	Service/benefit
Related reporting commitments	May provide evidence in support of Climate Change Risk Assessments and the ASC's assessment of the National Adaptation Programme, under the Climate Change Act (2008). Relevant to Sustainable Development Goals 11 and 13.
Geographical scope	England
Readiness and links to data	This indicator is not available for reporting in 2019: significant further development is required. No data are currently available but more information on the consultation for the revised FCERM Strategy is published here.
Interim indicator (where applicable)	Not applicable

F3 Disruption or unwanted impacts caused by drought

Short description	This indicator will either show changes in the number of people living in water resource zones that do not have sufficient water supplies under the Environment Agency's Environmental Performance Assessment – Security of Supply Index, or the extent to which the use of emergency drought order restrictions on customers are expected by water companies in a time period (water company level of service). This indicator will show the impact of natural hazards on people and the benefits from a reduction in unwanted impacts. The indicator is sensitive to future climate change and shows the need for adaptation. The Security of Supply Index (SOSI) data are routinely reported each year to the Environment Agency via its Environmental Performance Assessment report. Currently this is restricted to the water and sewage companies. From 2021, all water companies will report a new drought vulnerability metric which is in development. The water company level of service is reported as part of Water Resource Management Plans.
Relevant goal(s) in the 25 Year Environment Plan	Reducing the risks of harm from environmental hazards
Relevant target(s) in the 25 Year Environment Plan	Boosting the long-term resilience of our homes, businesses and infrastructure.
Position in the natural capital framework	Service/benefit
Related reporting commitments	May provide evidence in support of Climate Change Risk Assessments under the Climate Change Act (2008). Relevant to Sustainable Development Goals 11 and 13.
Geographical scope	England
Readiness and links to data	This indicator is not available for reporting in 2019: significant further development is required (see above). Level of service data are provided within each water company published water resources management plan. The SOSI has been published within the Environmental Performance Assessment report by the Environment Agency for water and sewage companies.
Interim indicator (where applicable)	Not applicable

G1 Changes in landscape and waterscape character

Short description	This is a composite indicator of changes in landscape and waterscape character in England. It includes 3 key aspects: changes in landscape character in National Character Areas across all of England; changes in the public's perceptions of landscape character and quality; and, changes in environmental outcomes from our Designated Landscapes (National Parks and Areas of Outstanding Natural Beauty). The indicator will build on an approach that has been developed to assess the impacts of agri-environment schemes on landscape in 159 National Character Areas, including aspects such as field patterns and boundaries, traditional farm buildings, semi-natural habitats, agricultural land use, dark skies, historic features and woodland/tree cover. National Character Area profiles include Statements of Environmental Opportunity, which can be utilised to monitor changes in landscape character. Further work is required to include the consideration of waterscapes in this approach. We will also develop the ability to assess designated landscapes using this method. Information on changes in the public's perceptions of landscapes will be gathered by Natural England using a new people and nature survey that will begin collecting data in 2019/20. This will build on the Monitor of Engagement with the Natural Environment (MENE) and incorporate feedback from stakeholders as part of a strategic review. Extent and condition of Designated Landscapes will be monitored through the Monitoring Environmental Outcomes in Protected Landscapes dataset.
Relevant goal(s) in the 25 Year Environment Plan	Enhancing beauty, heritage and engagement with the natural environment
Relevant target(s) in the 25 Year Environment Plan	Safeguarding and enhancing the beauty of our natural scenery and improving its environmental value while being sensitive to considerations of its heritage.
Position in the natural capital framework	Asset condition – land; freshwater; marine
Related reporting commitments	Reporting under the European Landscape Convention.
Geographical scope	England
Readiness and links to data	This indicator is not available for reporting in 2019: substantial further development work is required to build

	on existing methods and information sources to assess changes in landscape and waterscape character.
Interim indicator (where applicable)	Not applicable

G2 Condition of heritage features including designated geological sites and scheduled monuments

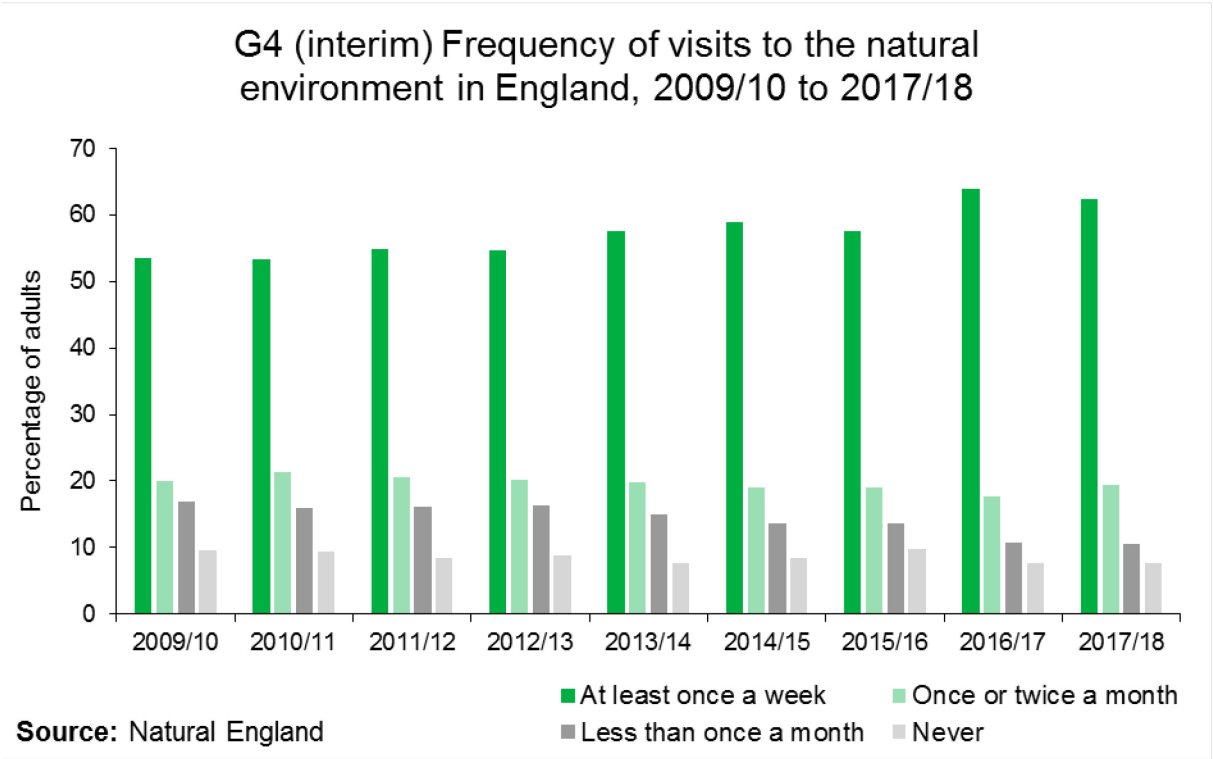
Short description	This indicator is a composite of 2 measures that will assess the changes in the condition of geological and geomorphological heritage features of Sites of Special Scientific Interest (SSSIs) and the condition of scheduled monuments. Heritage features enable us to understand how our landscapes have been formed and are an important aspect of landscape character that significantly contribute to our enjoyment and appreciation of the natural beauty. We have a particular responsibility to conserve heritage features of designated sites and scheduled monuments. The indicator will use information from SSSI condition assessments and information from the Heritage at Risk Register.
Relevant goal(s) in the 25 Year Environment Plan	Enhancing beauty, heritage and engagement with the natural environment
Relevant target(s) in the 25 Year Environment Plan	Safeguarding and enhancing the beauty of our natural scenery and improving its environmental value while being sensitive to considerations of its heritage.
Position in the natural capital framework	Asset condition – land; freshwater; marine
Related reporting commitments	Reporting under the European Landscape Convention.
Geographical scope	England, data are available for individual sites which may be presented at various geographical scales, including National Character Areas.
Readiness and links to data	This indicator is not available for reporting in 2019: some data are available (e.g. SSSI condition assessments and scheduled monuments at risk) but the indicator needs some further development.
Interim indicator (where applicable)	Not applicable

G3 Enhancement of green/blue infrastructure

Short description	This indicator will show changes in the quantity, quality, accessibility and functioning of green and blue infrastructure. Green and blue spaces in and around our built environment, including within Green Belts, are essential to health and happiness. This indicator will be developed from work on a new framework of standards for green and blue infrastructure. These standards aim to ensure that new developments include accessible green space and that any area with little or no green space can be improved for the benefit of the community. Green and blue infrastructure can also make an important contribution towards adaptation to climate change. The indicator will use information gathered through implementation of the framework of standards and by Natural England using a new people and nature survey that will begin collecting data in 2019/20. This will build on the Monitor of Engagement with the Natural Environment (MENE) and incorporate feedback from stakeholders as part of a strategic review.
Relevant goal(s) in the 25 Year Environment Plan	Enhancing beauty, heritage and engagement with the natural environment Thriving plants and wildlife
Relevant target(s) in the 25 Year Environment Plan	Making sure that there are high quality, accessible, natural spaces close to where people live and work, particularly in urban areas. Creating or restoring 500,000 hectares of wildlife-rich habitat outside the protected area network.
Position in the natural capital framework	Asset condition – land; freshwater; species and ecological communities
Related reporting commitments	Reporting under European Landscape Convention. May provide evidence in support of Climate Change Risk Assessment and the Adaption Sub-Committee's assessment of the National Adaptation Programme, under the Climate Change Act (2008).
Geographical scope	England
Readiness and links to data	This indicator is not available for reporting in 2019: work to develop standards, methods and monitoring is in progress.
Interim indicator (where applicable)	Not applicable

G4 Engagement with the natural environment

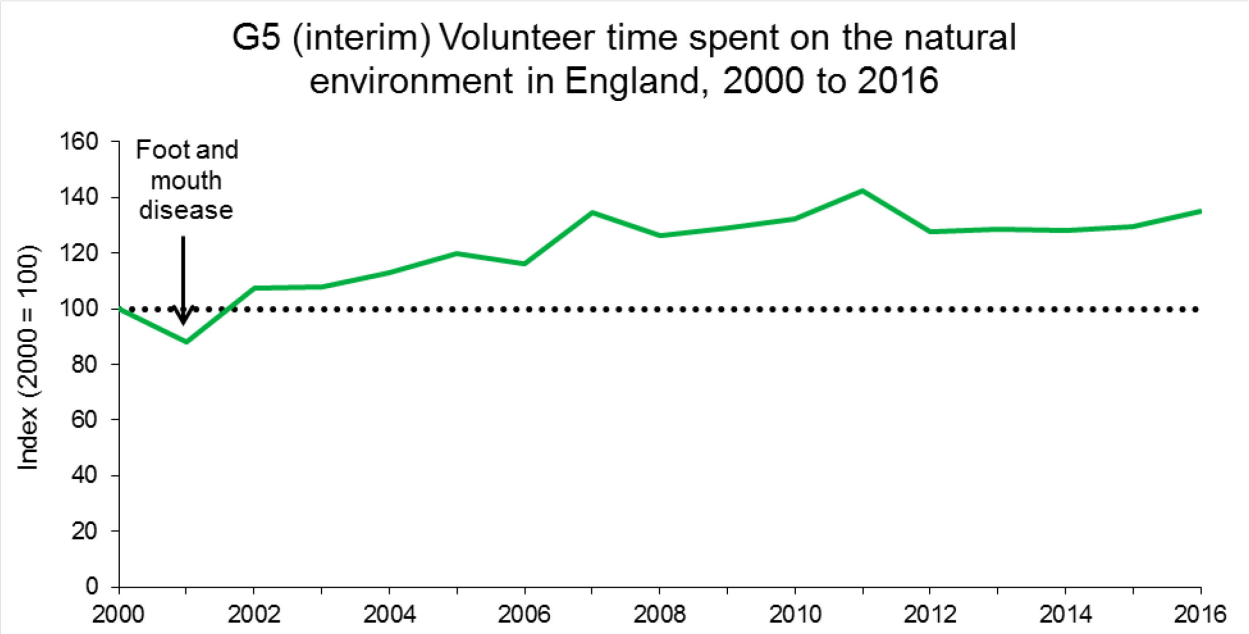
Short description	This indicator will track changes in people's engagement with the natural environment. Spending time in the natural environment improves our health and wellbeing. This indicator will measure time spent in natural spaces (woodland, parks, coasts and freshwaters, alongside other natural places), people's levels of care and concern, and other ways in which people enjoy and relate to the environment. It will be measured by Natural England using a new people and nature survey that will begin collecting data in 2019/20. This will build on the Monitor of Engagement with the Natural Environment (MENE) and incorporate feedback from stakeholders as part of a strategic review.
Relevant goal(s) in the 25 Year Environment Plan	Enhancing beauty, heritage and engagement with the natural environment
Relevant target(s) in the 25 Year Environment Plan	Making sure that there are high quality, accessible, natural spaces close to where people live and work, particularly in urban areas, and encouraging more people to spend time in them to benefit their health and wellbeing.
Position in the natural capital framework	Service/benefit
Related reporting commitments	Relevant to Convention on Biological Diversity Aichi Target 1.
Geographical scope	England
Readiness and links to data	Although this indicator is not available for reporting in 2019 in a finalised form, an interim indicator is presented here that shows frequency of visits to natural spaces. These data from the existing MENE survey are published annually. Further work is required to develop a more comprehensive indicator on engagement.
Interim indicator (where applicable)	**G4 (interim) Frequency of visits to the natural environment**



Trend description: There has been an increase in the proportion of adults visiting the natural environment at least once a week, from 54% in 2009/10 to 62% in 2017/18. Most of this increase has been driven by more frequent visits by occasional visitors (i.e. those taking visits at least once a month but less than weekly). The proportion of the population never taking visits has stayed at a similar level over the period.

G5 People engaged in social action for the environment

Short description	This indicator will track the extent of people's social action for the environment such as environmental volunteering, participation in conservation work and donations to environmental organisations. The indicator will assess how well people from all sectors of society are taking action to improve the environment. It will be measured by Natural England using a new people and nature survey that will begin collecting data in 2019/20. This will build on the Monitor of Engagement with the Natural Environment (MENE) and incorporate feedback from stakeholders as part of a strategic review. Additional information will also be collected by voluntary bodies.
Relevant goal(s) in the 25 Year Environment Plan	Enhancing beauty, heritage and engagement with the natural environment
Relevant target(s) in the 25 Year Environment Plan	Focusing on increasing action to improve the environment from all sectors of society.
Position in the natural capital framework	Service/benefit
Related reporting commitments	None
Geographical scope	England
Readiness and links to data	Although this indicator is not available for reporting in 2019 in a finalised form, an interim indicator is presented here that shows volunteer time spent on the natural environment in England. Some data on time spent volunteering are published annually. Further work is planned to develop an indicator of a wider range of social action within the new MENE survey.
Interim indicator (where applicable)	**G5 (interim) People engaged in environmental volunteering.** The interim indicator covers information on time spent volunteering for a number of environmental organisations in England.



Source: Bat Conservation Trust; Botanical Society of Britain & Ireland; British Trust for Ornithology; Canal & River Trust; National Parks England; Natural England; Plantlife; Royal Society for the Protection of Birds; The Conservation Volunteers; The Wildlife Trusts

Trend description: Between 2000 and 2016, the index of the amount of time contributed by environmental volunteers in England has increased by 35%.

G6 Environmental attitudes and behaviours

Short description	This indicator will track changes in people's attitudes and behaviours relating to the environment, covering different sectors of the population. It will track attitudes such as willingness to change lifestyle and behaviours in key policy areas relating to sustainable use of natural resources, such as waste, water and energy. It will be measured by Natural England using a new people and nature survey that will begin collecting data in 2019/20. This will build on the Monitor of Engagement with the Natural Environment (MENE) and incorporate feedback from stakeholders as part of a strategic review.
Relevant goal(s) in the 25 Year Environment Plan	Enhancing beauty, heritage and engagement with the natural environment
Relevant target(s) in the 25 Year Environment Plan	Focusing on increasing action to improve the environment from all sectors of society.
Position in the natural capital framework	Service/benefit
Related reporting commitments	Relevant to Convention on Biological Diversity Aichi Target 1.
Geographical scope	England
Readiness and links to data	This indicator is not available for reporting in 2019. Some data on environmental attitudes and behaviours are provided by the existing MENE survey but further work is required to develop this indicator.
Interim indicator (where applicable)	Not applicable

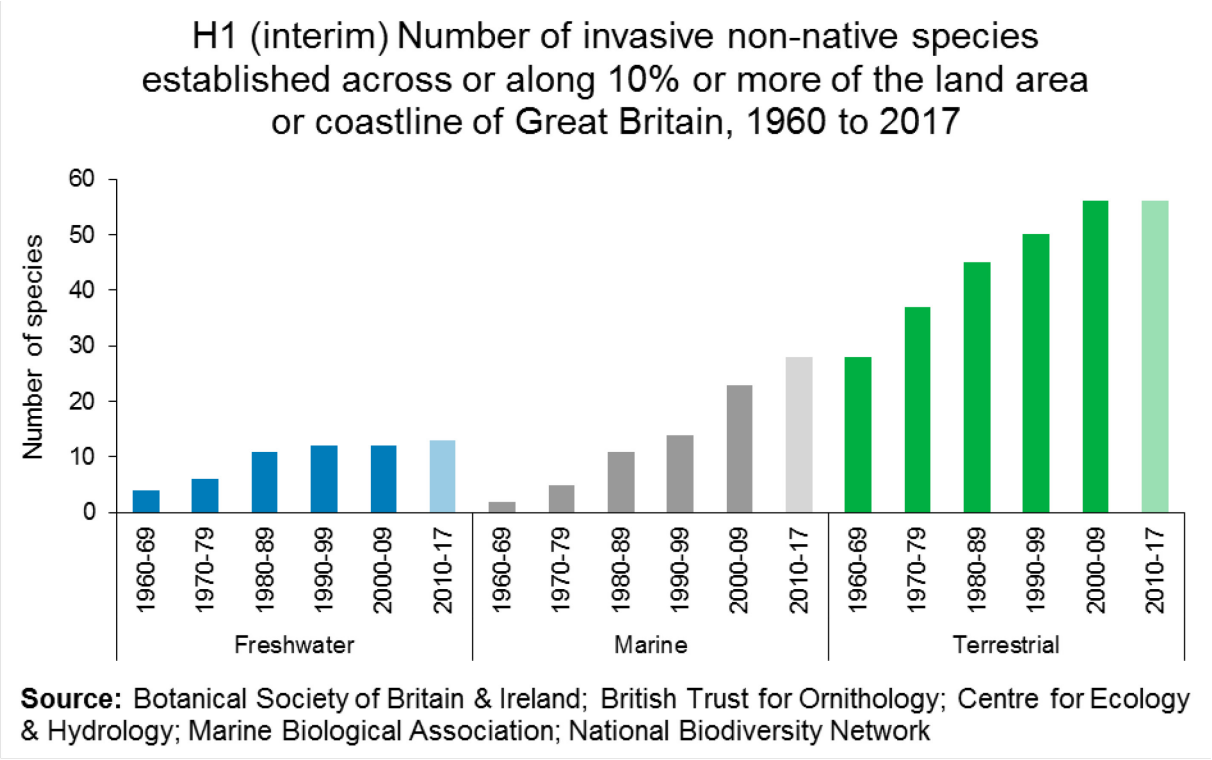
G7 Health and wellbeing benefits

Short description	This indicator will show changes in the health and wellbeing benefits that the natural environment provides for people. These will include benefits for mental and physical health that are gained from accessing nature, but also benefits such as improvements in air quality, climate regulation (e.g. urban cooling) and noise mitigation that people obtain whether they access nature or not. The indicator will track changes for people in disadvantaged groups and others who may benefit the most. Part of this indicator will be measured by Natural England using a new people and nature survey that will begin collecting data in 2019/20. This will build on the Monitor of Engagement with the Natural Environment (MENE) and incorporate feedback from stakeholders as part of a strategic review. Further research on health and wellbeing benefits is in progress.
Relevant goal(s) in the 25 Year Environment Plan	Enhancing beauty, heritage and engagement with the natural environment
Relevant target(s) in the 25 Year Environment Plan	Making sure that there are high quality, accessible, natural spaces close to where people live and work, particularly in urban areas, and encouraging more people to spend time in them to benefit their health and wellbeing.
Position in the natural capital framework	Service/benefit
Related reporting commitments	May provide evidence in support of Climate Change Risk Assessment and the ASC's assessment of the National Adaptation Programme, under the Climate Change Act (2008).
Geographical scope	England
Readiness and links to data	This indicator is not available for reporting in 2019. Some estimates of health benefits are provided in the ONS Natural Capital Accounts and the existing MENE survey but substantial further work is required to develop this indicator.
Interim indicator (where applicable)	Not applicable

H1 Abatement of the number of invasive non-native species entering and establishing against a baseline

Short description	Biosecurity measures to prevent the establishment of invasive non-native species are a key element of protecting against their significant economic, environmental and social impacts. This indicator will show how the number of invasive non-native species entering Great Britain has been abated (i.e. reduced) by comparing a predicted trend for establishment of invasive non-native species against actual establishment. Establishment of invasive species depends on factors such as trade and climate change. The difference to the trend in actual establishment then provides a measure of the success of biosecurity measures. The indicator will draw on data from the Non-Native Species Information Portal, overseen by the GB Non-Native Species Secretariat, which maintains an early detection, surveillance and monitoring mechanism that facilitates management, including rapid response. This indicator requires significant development, including deciding on which species to include and establishing a baseline for the predicted and established trend.
Relevant goal(s) in the 25 Year Environment Plan	Enhancing biosecurity
Relevant target(s) in the 25 Year Environment Plan	Managing and reducing the impact of existing plant and animal diseases; lowering the risk of new ones and tackling invasive non-native species.
Position in the natural capital framework	Pressure
Related reporting commitments	Relevant to Convention on Biological Diversity Aichi Target 9. May provide evidence in support of Climate Change Risk Assessments under the Climate Change Act (2008).
Geographical scope	Great Britain
Readiness and links to data	Although this indicator is not available for reporting in 2019 in a finalised form, an interim indicator is presented here that shows trends in the number of established non-native species in Great Britain. Further development is required to compare these data against a predicted trend.
Interim indicator (where	**H1 (interim) Number of established invasive non-native species in Great Britain.** The interim indicator

applicable)	shows the change in number of invasive non-native species established across or along 10% or more of the land area or coastline of Great Britain.

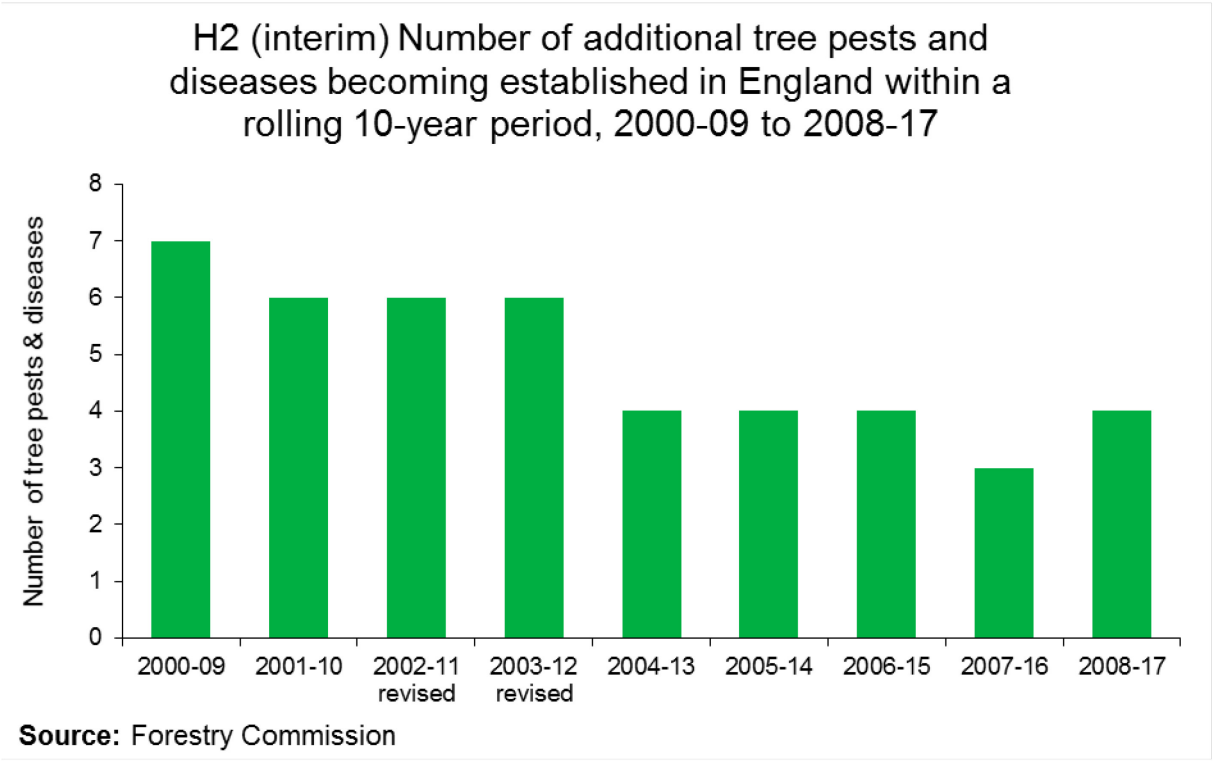


Source: Botanical Society of Britain & Ireland; British Trust for Ornithology; Centre for Ecology & Hydrology; Marine Biological Association; National Biodiversity Network

Trend description: Between the periods 1960-69 and 2010-17, the number of invasive non-native species established in or along 10% or more of Great Britain's land area or coastline has increased in the freshwater, terrestrial and marine (coastal) environments, with the greatest increases having been observed in the marine and terrestrial environments.

H2 Distribution of invasive non-native species and plant pests and diseases

Short description	This indicator will show changes in the distribution of non-native invasive species and plant pests that have already established in England. Preventing the spread of invasive non-native species limits their ability to disrupt ecosystems and cause economic damage. Plant pests and diseases cause significant negative impacts and it is often more difficult to prevent their entry and establishment, therefore limiting spread is critical in preventing negative impact on native species and ecosystems. This indicator will utilise distribution data for a reference subset of priority invasive species and plant pests and diseases as an indication of the success of biosecurity measures in controlling their spread.
Relevant goal(s) in the 25 Year Environment Plan	Enhancing biosecurity
Relevant target(s) in the 25 Year Environment Plan	Managing and reducing the impact of existing plant and animal diseases; lowering the risk of new ones and tackling invasive non-native species. Reaching the detailed goals set out in the Tree Health Resilience Strategy.
Position in the natural capital framework	Pressure
Related reporting commitments	Relevant to the Convention on Biological Diversity Aichi Target 9. May provide evidence in support of Climate Change Risk Assessments under the Climate Change Act (2008).
Geographical scope	England
Readiness and links to data	Although this indicator is not available for reporting in 2019 in a finalised form, an interim indicator is presented here that shows trends in the number of additional tree pests and diseases becoming established in England since the year 2000. These data are published annually in the Forestry Commission's Corporate Plan Performance Indicators Report. Further development is required to identify species for inclusion and develop the indicator drawing on existing data.
Interim indicator (where applicable)	**H2 (interim) Number of additional tree pests and diseases becoming established.** This interim indicator enumerates those additional tree pests and diseases formally considered as becoming 'established' by the UK Plant Health Risk Group within a rolling 10-year period.



Source: Forestry Commission

Trend description: The number of additional tree pests and diseases becoming established in England has fallen from a peak of 7 in the 10-year period 2000-09 to 4 in the most recent 10-year period for which data are available (2008-17). In all, 10 pests and diseases became established in the 18 year period from 2000 to 2017.

H3 Emissions of mercury and persistent organic pollutants to the environment

Short description	This indicator shows changes in emissions of mercury and persistent organic pollutants (POPs) to air, land and water from measured, calculated and modelled sources. POPs refers to pollutants listed under the Stockholm Convention. These are industrial, pesticide and unintentionally produced substances. POPs are chemicals that remain intact in the environment for long periods, become widely distributed geographically, accumulate in the fatty tissue of humans and wildlife, and have harmful impacts on human health or on the environment. Mercury is toxic and can cause damage to human health and accumulates in the environment and the food chain. For mercury, which is covered by the Minamata Convention, combustion sources are particularly significant, and information on emissions is provided annually by larger industrial sites. Other sources of mercury to air will be gathered from different data sources.
Relevant goal(s) in the 25 Year Environment Plan	Managing exposure to chemicals
Relevant target(s) in the 25 Year Environment Plan	Reducing land-based emissions of mercury to air and water by 50% by 2030.
Position in the natural capital framework	Pressure
Related reporting commitments	Stockholm Convention, UN Economic Commission for Europe European Monitoring and Evaluation Programme and the EU Regulation on Pollutant Release and Transfer Registry.
Geographical scope	UK
Readiness and links to data	This indicator is not available for reporting in 2019: further development is required to bring data together from a number of different sources. Some information is already published: Persistent Organic Pollutants Multimedia Emissions Inventory, National Atmospheric Emissions Inventory and Pollutant Release and Transfer Registry.
Interim indicator (where applicable)	Not applicable

H4 Exposure and adverse effects of chemicals on wildlife in the environment

Short description	This indicator will track changes in the exposure of wildlife to harmful chemicals in freshwater, marine, coastal and terrestrial ecosystems. Data are currently available for some chemicals and some invertebrates, fish, shellfish, crustaceans, mammals, and birds of prey. Data for exposure of other species groups to chemicals may become available in the future. Further work is needed to develop indicators of the adverse effects of chemicals on wildlife populations which may be included in future.
Relevant goal(s) in the 25 Year Environment Plan	Managing exposure to chemicals Thriving plants and wildlife
Relevant target(s) in the 25 Year Environment Plan	None
Position in the natural capital framework	Pressure
Related reporting commitments	Oslo and Paris (OSPAR) Convention; EU Marine Strategy Framework Directive Descriptor 8, EU Water Framework Directive.
Geographical scope	England (UK for some marine components).
Readiness and links to data	This indicator is not available for reporting in 2019. Significant further development is required. Research work is in progress to develop this indicator. Data are available for some species (fish, shellfish, crustaceans, mammals, birds of prey): Some data relevant to this indicator are published: OSPAR; Pesticide Usage Survey; Pesticide application maps; Predatory Bird Monitoring Scheme – contaminant exposure.
Interim indicator (where applicable)	Not applicable

H5 Exposure to transport noise

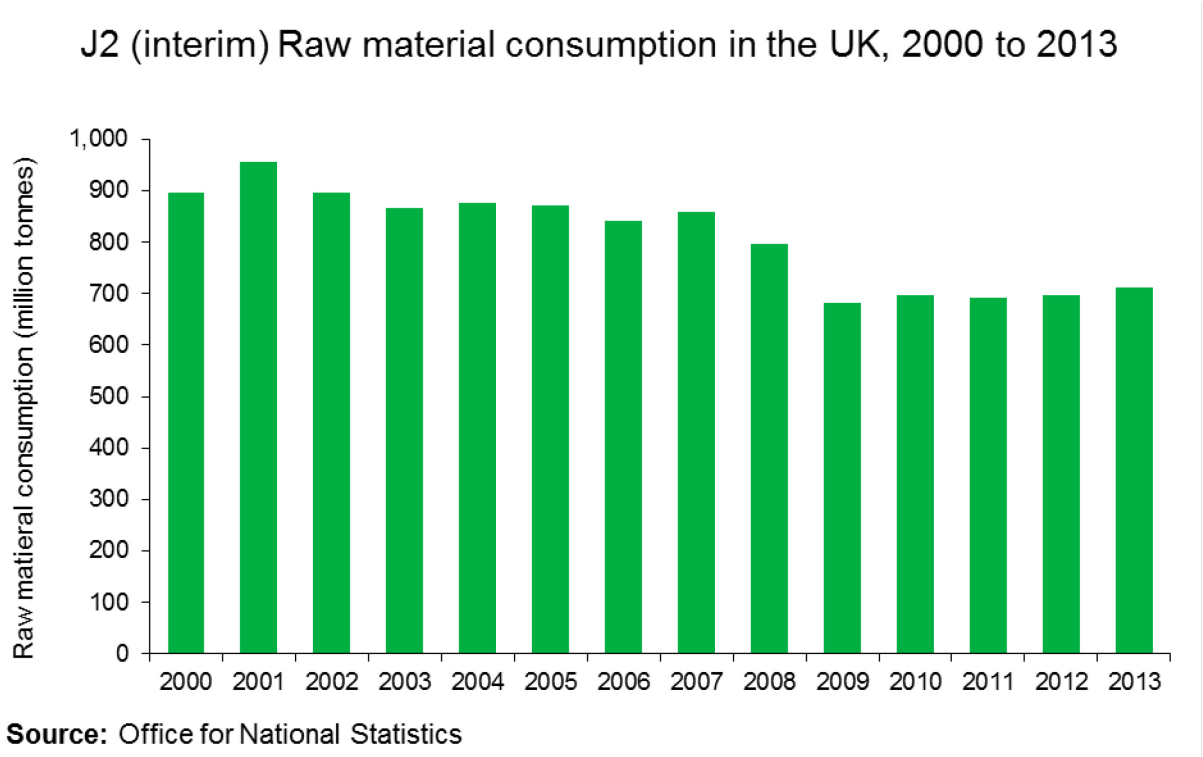
Short description	This indicator will track changes in the exposure of people to noise from transportation sources. It does not include neighbour and neighbourhood noise. The indicator will show the estimated number of people exposed to noise levels (in 5dB bands) from the most significant road, rail and air sources. Health costs (and hence burden to the economy) of noise can be estimated from health outcomes associated with noise exposure (such as annoyance, sleep disturbance, and cardiovascular effects). The data used for this indicator are currently derived through strategic noise mapping undertaken at 5-year intervals.
Relevant goal(s) in the 25 Year Environment Plan	Enhanced beauty, heritage and engagement with the natural environment
Relevant target (s) in the 25 Year Environment Plan	None
Position in the natural capital framework	Pressure
Related reporting commitments	Environmental Noise Directive (2002/49/EC) as transposed by the Environmental Noise (England) Regulations (as amended) 2006.
Geographical scope	England; the data have potential for regional disaggregation.
Readiness and links to data	This indicator is not available for reporting in 2019: data for noise exposure are published here and an update is expected in 2019. Further work is required to develop the indicator.
Interim indicator (where applicable)	Not applicable

J1 Carbon footprint and consumer buying choices

Short description	This indicator will track changes in consumer buying choices as they impact on carbon footprint by looking at the national consumption-based carbon footprint and the carbon footprint of a basket of consumer goods or individual products. The indicator will show how consumer preferences and behaviour are impacting on the overall national carbon footprint and the carbon footprint of typical consumer buying choices.
Relevant goal(s) in the 25 Year Environment Plan	Minimising waste
Relevant target(s) in the 25 Year Environment Plan	Working towards our ambition of zero avoidable waste by 2050.
Position in the natural capital framework	Pressure
Related reporting commitments	None
Geographical scope	England.
Readiness and links to data	This indicator is not available for reporting in 2019. The indicator based on a basket of consumer goods will require significant development. Some data on the national carbon footprint have been published at the UK level.
Interim indicator (where applicable)	Not applicable

J2 Raw material consumption

Short description	This indicator shows trends in the amount of raw material consumption per capita and per unit Gross Value Added (GVA). It will help to show the extent which the consumption of materials is de-coupled from wealth creation and how efficiently natural resources are being used in terms of raw materials.
Relevant goal(s) in the 25 Year Environment Plan	Using resources from nature more sustainably and efficiently
Relevant target(s) in the 25 Year Environment Plan	Maximising the value and benefits we get from our resources, doubling resource productivity by 2050.
Position in the natural capital framework	Pressure
Related reporting commitments	Links to the UN Sustainable Development Goals 8 and 12.
Geographical scope	UK
Readiness and links to data	Although this indicator is not available for reporting in 2019 in a finalised form, an interim indicator is presented here that shows trends in raw material consumption in the UK. Data on raw material consumption have previously been published by the Office for National Statistics (ONS). Further work on raw material consumption ('material footprint') is underway at the University of Leeds, also raw material consumption per unit of Gross Domestic Product (GDP) or GVA ('material intensity'), and has been published in resource efficiency metrics.
Interim indicator (where applicable)	**J2 (interim) Raw material consumption.** The interim indicator shows raw material consumption for the UK, as published by ONS, although the latest data are for 2013.

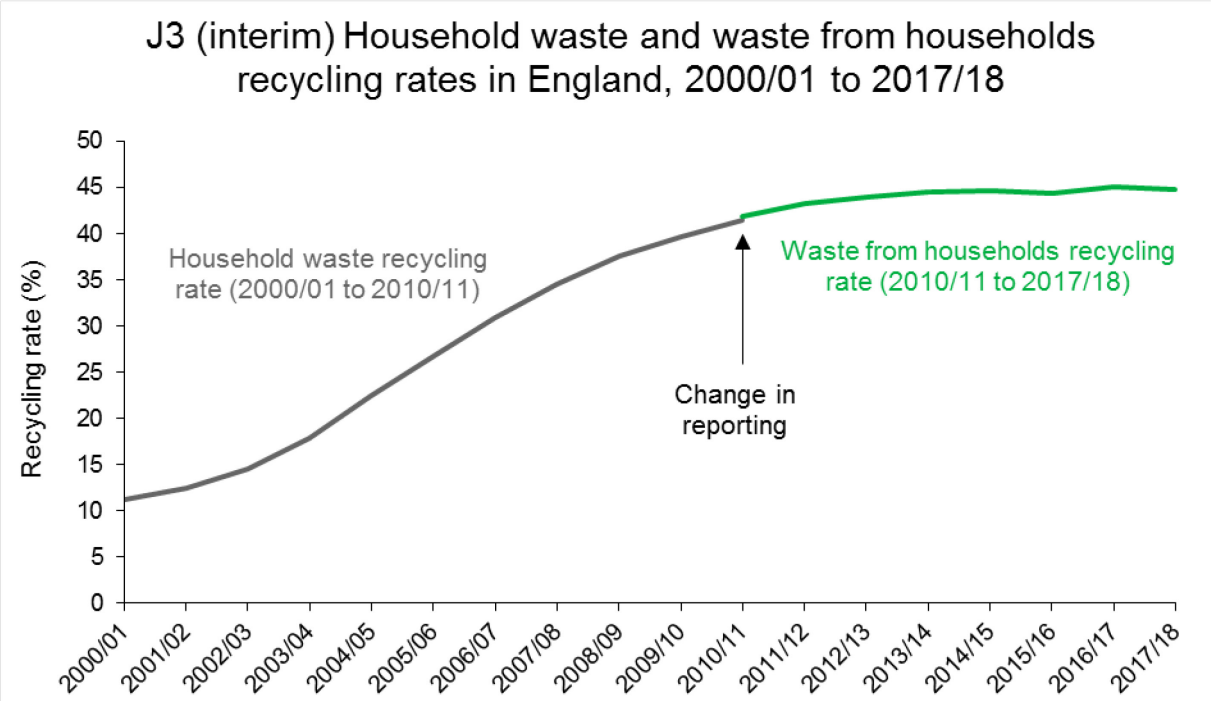


Source: Office for National Statistics

Trend description: The amount of raw material consumed in the UK fell from a peak of 955 million tonnes in 2001 to 712 million tonnes in 2013.

J3 Municipal waste recycling rates

Short description	This indicator shows changes in municipal waste recycling rates in England. The municipal waste recycling rate is the fraction of waste that is collected by local authorities that is recycled. Municipal waste consists of waste collected from households and other activities such as street cleansing and emptying litter bins. The indicator reflects levels of everyday waste that is recycled and not sent for final disposal. Development of the waste tracking tool and further integration with data collected by local authorities will close some of the data gaps and will enable collection of more comprehensive data.
Relevant goal(s) in the 25 Year Environment Plan	Minimising waste
Relevant target(s) in the 25 Year Environment Plan	Working towards our ambition of zero avoidable waste by 2050.
Position in the natural capital framework	Pressure
Related reporting commitments	EU Waste Framework Directive.
Geographical scope	England; some data are available for local authorities.
Readiness and links to data	Although this indicator is not available for reporting in 2019 in a finalised form, an interim indicator is presented here that shows trends in household waste and waste from households recycling rates. These data are already published but further development is required to include commercial waste that is similar in composition to household waste.
Interim indicator (where applicable)	**J3 (interim) Household waste and waste from households recycling rates.**



Source: Defra

Trend description: In 2017/18, the recycling rate for ‘waste from households’ was 44.8%, up 2.9 percentage points on the equivalent figure for 2010/11 when this measure was first reported. While this current measure of household waste recycling is based on a broader definition of waste and is not directly comparable to the previously reported 'household waste' recycling rate, there has been a 33.6 percentage point increase in the waste recycling rate across the 2 measures between 2000/01 and 2017/18.

J4 Residual waste arising by type and sector

Short description	This indicator shows how much (residual) waste goes for disposal as opposed to recycling, reuse and other recovery. Data on this are captured through returns made by facilities that are permitted, local authority data submitted and also via non-site based regulation activity. There are still gaps in the data and these will need to be addressed in order to provide more comprehensive reporting.
Relevant goal(s) in the 25 Year Environment Plan	Minimising waste
Relevant target(s) in the 25 Year Environment Plan	Working towards our ambition of zero avoidable waste by 2050. Working to a target of eliminating avoidable plastic waste by end of 2042. Meeting all existing waste targets – including those on landfill, reuse and recycling – and developing ambitious new future targets and milestones.
Position in the natural capital framework	Pressure
Related reporting commitments	EU Waste Framework Directive.
Geographical scope	England
Readiness and links to data	This indicator is not available for reporting in 2019: some data are already published. Further work is required to develop the indicator.
Interim indicator (where applicable)	Not applicable

J5 Prevent harmful chemicals from being recycled

Short description	This indicator will track the amount of waste containing banned or restricted chemicals which is being destroyed. The removal and proper destruction of such waste is necessary to prevent these chemicals contaminating recycled products or being released into the environment. Initially the indicator will use data on the amount of waste containing persistent organic pollutants (POPs) being sent for destruction. This is in line with the goal to substantially increase the amount of POPs material being destroyed or irreversibly transformed by 2030. Similar data on elimination of the use of polychlorinated biphenyls (PCBs) will be included once those data become available.
Relevant goal(s) in the 25 Year Environment Plan	Managing exposure to chemicals
Relevant target(s) in the 25 Year Environment Plan	Fulfilling our commitments under the Stockholm Convention as outlined in the UK's most recent National Implementation Plan. Substantially increasing the amount POPs material being destroyed or irreversibly transformed by 2030, to make sure there are negligible emissions to the environment. Seeking in particular to eliminate the use of PCBs by 2025, in line with our commitments under the Stockholm Convention.
Position in the natural capital framework	Pressure
Related reporting commitments	Persistent Organic Pollutants Regulation (Article 12).
Geographical scope	UK and is available at regional level, and by local and waste planning authority.
Readiness and links to data	This indicator is not available for reporting in 2019: some data are already published. Further work is required to develop the indicator, initially for POPs and subsequently for PCBs.
Interim indicator (where applicable)	Not applicable

J6 Waste crime

Short description	This indicator will track changes in the main types and scale of waste crime. Waste crime is the illegal management of all forms of waste. If not handled properly, waste can cause serious pollution of the environment – air, land and water, which can be harmful to health. Current data reported covers illegal waste sites. These current data can be used to establish main waste types, level of criminal activity and geographic distribution. Options for further development will be considered including the impacts and behavioural aspects of waste crime and to reflect the need for targeting and effective enforcement to deliver reductions in the level of criminal activities.
Relevant goal(s) in the 25 Year Environment Plan	Minimising waste
Relevant target(s) in the 25 Year Environment Plan	Seeking to eliminate waste crime and illegal waste sites over the lifetime of this Plan, prioritising those of highest risk.
Position in the natural capital framework	Pressure
Related reporting commitments	None
Geographical scope	England and at individual site or facility level.
Readiness and links to data	This indicator is not available for reporting in 2019: some data are already published but further work is required to develop the indicator.
Interim indicator (where applicable)	Not applicable

K1 Overseas environmental impacts of UK consumption of key commodities

Short description	This indicator will track the impact on the environment overseas resulting from our domestic consumption, linked to the sustainability of the products we import such as beef and leather; cocoa; palm oil; pulp and paper; rubber; soy; and timber. We are exploring methods and data for this indicator that could include a measure of the environmental impact of some of the commodities we import (for example, on deforestation and/or water stress); or a measure of the proportion of products imported that are certified as being from sustainable sources.
Relevant goal(s) in the 25 Year Environment Plan	There are no specific goals in the 25 Year Environment Plan for this indicator, however the Plan commits us to leaving a lighter footprint on the global environment by enhancing sustainability and supporting zero deforestation supply chains.
Relevant target(s) in the 25 Year Environment Plan	None
Position in the natural capital framework	Service/benefit
Related reporting commitments	The indicator is relevant to the Convention on Biological Diversity Aichi Target 4 and the Sustainable Development Goals 12, 14 and 15.
Geographical scope	UK
Readiness and links to data	This indicator is not available for reporting in 2019: we are undertaking research to support development of this indicator, including review of existing methodologies on global impacts indicators, and to test whether Earth Observation data can be used to identify environmental impacts linked to specific commodities.
Interim indicator (where applicable)	Not applicable

K2 Developing countries better able to protect and improve the environment with UK support

Short description	The poorest people and countries in the world are often the most vulnerable and likely to be hardest hit by the degradation of natural environments. Climate change and the deterioration of natural environments are prime drivers of poverty, food insecurity and instability, and can trigger conflict and migration. This indicator will report outcomes of UK investment programmes (such as International Climate Finance, the Darwin Initiative and the Illegal Wildlife Challenge Fund) that support developing countries to protect and improve the environment, address illegal wildlife trade, mitigate and adapt to climate change and alleviate poverty.
Relevant goal(s) in the 25 Year Environment Plan	There are no specific goals in the 25 Year Environment Plan for this indicator; however the Plan commits us to helping developing nations protect and improve the environment.
Relevant target(s) in the 25 Year Environment Plan	None
Position in the natural capital framework	Service/benefit
Related reporting commitments:	None
Geographical scope	International
Readiness and links to data	This indicator is not available for reporting in 2019: Further development is needed to identify how to assess outcomes of UK overseas investment building on existing evaluation schemes for International Climate Finance, The Darwin Initiative, and the Illegal Wildlife Trade Challenge Fund.
Interim indicator (where applicable)	Not applicable

K3 Status of endemic and globally threatened species in the UK Overseas Territories

Short description	UK Overseas Territories are home to rich, globally important biodiversity, with many species found nowhere else in the world. This indicator will track change in the status of key endemic and globally threatened species found in the Overseas Territories.
Relevant goal(s) in the 25 Year Environment Plan	There are no specific goals in the 25 Year Environment Plan for this indicator, but the Plan commits us to taking action to recover threatened, iconic or economically important species of animals, plants and fungi, and where possible to prevent human-induced extinction or loss of known threatened species, in the Overseas Territories.
Relevant target(s) in the 25 Year Environment Plan	None
Position in the natural capital framework	Asset condition – species and ecological communities
Related reporting commitments	The indicator is relevant to the Convention on Biological Diversity Aichi Target 12 and Sustainable Development Goals 14 and 15.
Geographical scope	UK Overseas Territories
Readiness and links to data	This indicator is not available for reporting in 2019: significant further work required to develop the indicator.
Interim indicator (where applicable)	Not applicable

K4 Extent and condition of terrestrial and marine protected areas in the UK Overseas Territories

Short description	The UK Overseas Territories are home to a variety of spectacular and often unique marine and terrestrial ecosystems. This indicator will show changes in the area of protected areas in the Overseas Territories, and aspects of their condition that can be assessed cost-effectively.
Relevant goal(s) in the 25 Year Environment Plan	There are no specific goals in the 25 Year Environment Plan for this indicator, but the Plan commits us to develop new techniques to manage protected areas in the Overseas Territories, and work with the Overseas Territories governments to implement the Blue Belt programme.
Relevant target(s) in the 25 Year Environment Plan	None
Position in the natural capital framework	Asset condition – seas; woods; mountain, moor and heath; coasts
Related reporting commitments	This indicator is relevant to the Convention on Biological Diversity Aichi Target 11 and Sustainable Development Goals 14 and 15.
Geographical scope	UK Overseas Territories
Readiness and links to data	This indicator is not available for reporting in 2019: research has been commissioned to support development of this indicator, including exploring the feasibility of Earth Observation data to assess the condition of protected areas.
Interim indicator (where applicable)	Not applicable

Section D: International reporting commitments relating to the Environment System

The UK will continue to meet its international commitments and many of these will be through the outcome indicator framework. The table below sets out, for each of the themes within the framework, the related international commitments where reporting of environmental data and statistics is required. Within the indicator descriptions (in Section C) there is information on the specific international reporting commitments relevant to each indicator.

25 Year Environment Plan Indicator Theme	International Commitment	Reporting	Link
Air	Ambient Air Quality Directive (2008/50/EC) and Fourth Daughter Directive (2004/107/EC):	Various pollutant concentrations and 3 forestry reports	https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32008L0050 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32004L0107
Air	Convention on Long-range Transboundary Air Pollution	25 reports on emissions, air quality and impacts	https://rod.eionet.europa.eu/instruments/578
Air	Montreal Protocol on substances that deplete the ozone layer	Report on activity and outcomes	http://ozone.unep.org/new_site/en/vienna_convention.php http://ozone.unep.org/en/treaties-and-decisions/montreal-protocol-substances-deplete-ozone-layer
Air	United Nations Framework Convention on Climate Change	GHG inventories	http://unfccc.int/key_documents/the_convention/items/2853.php

Water	Protocol on Water and Health to the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes	2 Reports on water and health	https://www.unece.org/fileadmin/DAM/env/water/pdf/watercon.pdf
Wildlife	Convention on Wetlands of International Importance Especially as Waterfowl Habitat	11 reports on status of sites	http://portal.unesco.org/en/ev.php-URL_ID=15398&URL_DO=DO_TOPIC&URL_SECTION=201.html
Wildlife	CITES	9 reports on implementation	https://www.cites.org/eng/disc/text.php
Wildlife	Agreement on the Conservation of African-Eurasian Migratory Waterbirds	2 reports	https://www.unep-aewa.org/sites/default/files/basic_page_documents/aewa_agreement_text_2019_2021_final.pdf
Wildlife	Convention on the Conservation of Migratory Species of Wild Animals	National report incl. marine	https://www.cms.int/en/convention-text
Wildlife	Convention on the Conservation of European Wildlife and Natural Habitats (Bern)	10 reports on habitats, species & implementation	https://www.coe.int/en/web/conventions/full-list/-/conventions/treaty/104
Wildlife	Agreement on the Conservation of Populations of European Bats	National Report	https://www.eurobats.org/official_documents/agreement_text
Wildlife	Convention on	National and	https://www.cbd.int/doc/legal/cb

	Biological Diversity	thematic reports	d-en.pdf
Wildlife	Protocol Concerning Specially Protected Areas and Wildlife	2 reports	http://www.widecast.org/Resources/Docs/SPAW_Protocol_ENG.pdf
Wildlife	Agreement on the Conservation of Small Cetaceans of the Baltic, North East Atlantic, Irish and North Seas	5 reports on pressures	https://www.ascobans.org/en/documents/agreement-text
Seas and estuaries	International Convention for the Regulation of Whaling	7 reports on implementation	https://archive.iwc.int/pages/view.php?ref=3607&k
Seas and estuaries	Convention for the Protection of the Marine Environment of the North-East Atlantic	18 reports on pressures and status	https://www.ospar.org/convention/text
Seas and estuaries	Convention on the Protection of the Marine Environment of the Baltic Sea Area	Mercury reduction	http://www.helcom.fi/Documents/About%20us/Convention%20and%20commitments/Helsinki%20Convention/1992_Convention_1108.pdf
Seas and estuaries	Conventions establishing the International Maritime Organisation	Maritime pollution report	https://treaties.un.org/Pages/ViewDetails.aspx?src=IND&mtdsg_no=XII-1&chapter=12&clang=_en
Seas and estuaries	The International Convention for the Prevention of Pollution from	Waste from ships	http://www.imo.org/en/KnowledgeCentre/ReferencesAndArchives/HistoryofMARPOL/Documents/MARPOL%201973%20-

	Ships, 1973		%20Final%20Act%20and%20Convention.pdf
Seas and estuaries	International fisheries agreements with EU, UN and other organisations	16 reports on economics and conservation goals	http://www.fao.org/fishery/about/programme/agreements/en
Seas and estuaries	Agreement for cooperation in dealing with pollution of the North Sea by oil and other harmful substances, 1983	3 pollution reports	https://www.bonnagreement.org/site/assets/files/1080/chapter29_text_of_the_bonn_agreement.pdf
Seas and estuaries	Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region	Report on implementation	http://www.car-spaw-rac.org/IMG/pdf/cartagena-convention.pdf
Seas and estuaries	Convention on the Conservation of Antarctic Marine Living Resources	Report on implementation	https://www.ccamlr.org/en/organisation/camlr-convention-text
Seas and estuaries	UN Convention on the Law of the Sea (UNCLOS)		http://www.un.org/Depts/los/convention_agreements/texts/unclos/unclos_e.pdf
Seas and estuaries	International Plan of Action for the Conservation and Management of Sharks (IPOA-Sharks)	Implementation report	http://www.fao.org/3/a-x3170e.pdf
Seas and estuaries	International Coral Reef Initiative		https://www.icriforum.org/icri-documents/ICRI-Key-

			Documents
Seas and estuaries	OECD Fisheries Committee	Questionnaires	http://www.oecd.org/agriculture/topics/fisheries-and-aquaculture/
Seas and estuaries	FAO Code of Conduct for Responsible Fisheries (CCRF)		http://www.fao.org/3/a-v9878e.htm
Seas and estuaries	FAO Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas (FAO Compliance Agreement)		FAO Compliance Agreement
Seas and estuaries	The International Council for the Exploration of the Sea (ICES)		https://www.ices.dk/explore-us/who-we-are/Documents/ICES_Convention_1964.pdf
Natural resources	Global Forest Resources Assessment	National report	http://www.fao.org/forest-resources-assessment/en/
Natural beauty and engagement	Convention concerning the Protection of the World Cultural and Natural Heritage	National report and reactive monitoring	https://whc.unesco.org/archive/convention-en.pdf
Biosecurity, chemicals and noise	Environmental Noise Directive reports	Reporting on noise control programmes	http://ec.europa.eu/environment/noise/directive_en.htm

Biosecurity, chemicals and noise	Stockholm convention on persistent organic pollutants (POPs)	Annual UK report to EU and Stockholm Convention	http://www.pops.int/TheConvention/Overview/TextoftheConvention/tabid/2232/Default.aspx
Biosecurity, chemicals and noise	UNECE Convention on the Transboundary Effects of Industrial Accidents	One report	https://www.unece.org/fileadmin/DAM/env/documents/2006/teia/Convention%20E%20no%20annex%20I.pdf
Biosecurity, chemicals and noise	Basel Convention on the control of transboundary movements of hazardous wastes and their disposal	Yearly report	https://www.basel.int/portals/4/basel%20convention/docs/text/baselconventiontext-e.pdf
International	Protocol on Environmental Protection to the Antarctic Treaty	7 reports on implementation	https://www.ats.aq/documents/recatt/Att006_e.pdf
Various	Resolution adopted by the General Assembly on 25 September 2015 70/1. Transforming our world: the 2030 Agenda for Sustainable Development	Voluntary National Review. Multiple metrics, reported through ONS	http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E

Annex 1: Official Statistics

The term official statistics comprises National Statistics, official statistics and experimental statistics.

All official statistics are produced by crown bodies, those acting on behalf of crown bodies, or those specified in statutory orders, as defined in the Statistics and Registration Service Act 2007.

National Statistics have been assessed by the Office for Statistics Regulation, the regulatory arm of the UK Statistics Authority, as fully compliant with the Code of Practice for Statistics. Accredited National Statistics are identified by the following quality mark:

Official statistics are produced in accordance with the Code of Practice for Statistics and its key principles of: trustworthiness, quality and value.

Experimental statistics are newly developed or innovative statistics published so that users and stakeholders can be involved in the assessment of their suitability and quality at an early stage.

Measuring environmental change: outcome indicator framework for the 25 Year Environment Plan

Statement of Voluntary Application of the Code of Practice for Statistics

Although this report is not in itself an official statistic or National Statistic, where possible we follow the UK's Code of Practice for Statistics in its production and in the compilation of the indicator framework within it

The code is built around 3 main concepts, or pillars:

Trustworthiness – *The focus of this principle is about building and maintaining confidence in the people and the organisations that publish information including that derived from National and official statistics.*

Quality – *The focus of this principle is on ensuring that we use data and methods that produce assured statistics.*

Value – *The focus of this principle is on publishing statistics that support society's need for information, addressing the questions that external users wish to have answered.*

The following explains how these pillars have been applied in a proportionate way to enable us to demonstrate voluntary compliance with many parts of the code, in line with the Guide for Voluntary Application of the Code.

Trustworthiness

Measuring environmental change: outcome indicator framework for the 25 Year Environment Plan provides references on the sources of all of the quoted information. For the most part, the report draws on formally published National or official statistics – either produced by Defra or by the department's Arms' Length Bodies, often with input from external environmental partners.

This release is not covered by the normal orderly release process required for all new National and official statistics – primarily because it draws upon already published information. This different release process is also appropriate in that this is in essence an operational performance report, used within Defra Group to identify the outcomes of delivery to date and to prioritise areas for further action. Hence the draft report is circulated internally in advance of publication.

Quality

Where the statistics used in this report are National or official statistics, they have an existing quality assessment process. Details on the methodologies used in constructing the underlying statistics are set out in the original publications, which are referenced.

Where there are new indicators in development, these are clearly flagged. Where possible we will use the processes for 'experimental' statistics set out in the Code of Practice to govern the development and any future confirmation of these indicators.

Value

The indicators presented within this report were identified by a cross-disciplinary and cross-organisational team and views were sought from a range of external stakeholders and acted upon.

The overall annual report meets a government commitment (to produce an annual assessment of the progress in meeting the objectives set out in the 25 Year Environment Plan). A process has been put in place to ensure that the suite of indicators continues to be informed by and responsive to views from outside government as well as tracking commitments made inside government.