

# Monitoring in Natural England 2023-2026

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Natural England

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# Acknowledgements

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# Introduction

This strategic plan sets out how we will improve Natural England's monitoring between 2023 and 2026 in terms of how effectively our monitoring provides evidence for nature's recovery and how efficiently we do it. It describes the high-level priorities and principles that we will use to monitor the natural environment on land, in our freshwaters and at sea, including the engagement of people with nature over the next three years. It contributes to delivering our Science, Evidence and Evaluation Strategy and meeting our Evidence Standard. It will guide and support more detailed plans such as those for marine monitoring and protected sites.

## Our role

Natural England is the Government's adviser for the natural environment in England, helping to protect and restore our natural world. Our statutory purpose, enacted within the Natural Environment and Rural Communities (NERC) Act 2006, is to help conserve, enhance and manage the natural environment for the benefit of present and future generations.

We have a wide remit, covering biodiversity, geodiversity, economics, natural capital approaches, soils and landscape, as well as understanding how people use and value the natural environment. High quality evidence products will ensure that the actions taken by us, as well as by our partners, drive forward nature recovery. We are in a unique position to use interdisciplinary evidence to support decisions and advice because of our expertise in applied environmental science, wide remit, focus on building partnerships and national and local presence.

## Why we monitor

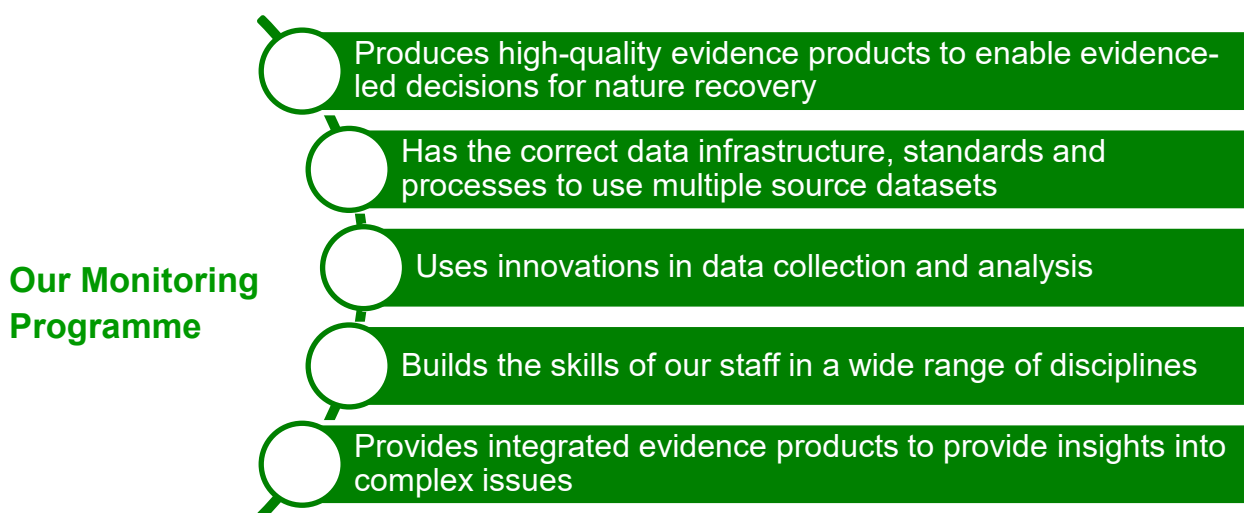
Our monitoring programme is designed to answer key questions relating to the state of the environment, access, and enjoyment of people to nature and its benefits for society (Appendix 1). The evidence that we gather through our own monitoring activities, combined with additional data collected by partners enables us to make evidence-led decisions to deliver environmental policy, and to evaluate our success.

The Government has set binding targets to restore nature through the Environment Act 2021. It has committed to protect 30% of land and sea for nature by 2030 and create a Nature Recovery Network - a national network of wildlife rich places. The Government's Environmental Improvement Plan sets out additional interim targets and an Outcome Indicator Framework.

Reporting on the progress of these policies is an important purpose for our monitoring. However, to make meaningful steps towards recovering nature, we need to collect data

and evidence that will enable us to make evidence-led decisions on complex issues that drive change on the ground. For example, developing new ways of understanding ecosystem health and the resilience of nature networks, including their value to people and society, should help us be more dynamic in our response to the multiple pressures on these systems and be more effective recovering nature.

## Our vision for monitoring



## Framing our monitoring programme

We can broadly class the data that we collect as either sentinel surveillance or targeted monitoring based on the characteristics outlined below, with examples given in Table 1.

**Sentinel surveillance programmes** are typically long-term programmes of survey and data collection that provide fundamental datasets which describe the state of the natural environment and how it is changing, pressures on it, benefits from it and how people use and value it. Data from sentinel surveillance programmes form the foundation of our evidence products and are used to answer key evidence questions at national and local scales.

**Targeted monitoring** is designed for specific purposes. These include the monitoring and evaluation of our interventions and activities. These can be over long periods and at national scales or be more local and time limited. Targeted monitoring will also be carried out in response to opportunities and risks. They may be exploratory or developmental, including research and development to test new ideas or approaches, or may include important one-off investigations or in response to a steadily mounting risk.

**Table 1: Examples of sentinel surveillance and targeted monitoring programmes**

Sentinel Surveillance examples might include:	Targeted Monitoring examples might include:
Supporting national and GB species surveillance and recording activities	Monitoring as part of Net Gain and Licencing
Natural Capital Ecosystem Assessment Programme	Evaluation of national Agri-Environment and Environmental Land Management programmes
Long Term Monitoring Network	Targeted survey and monitoring to inform national and international reporting
Monitoring engagement with the natural environment	Monitoring of Protected Sites and Landscapes on land and at sea
	Monitoring to collect baseline data for new Highly Protected Marine Areas

## Resources

Natural England is committed to making the data generated from our monitoring programme publicly available under an open government licence. Collecting this data can be costly, and we need to collaborate with partners as much as we can to ensure we are using our resources to the best effect. The outputs – the evidence products - form part of an important public resource of data relating to the state of the environment, and the value of this for people. The data can be used for multiple reasons, for example to report on the Government’s species targets, for a farmer to understand where the most important habitats and species are on their land, for regulators to use for terrestrial and marine strategic planning or for community groups to engage the public with species they can find in their local area.

Over the next three years we will explore how we can sustainably fund our future needs for monitoring. This could be through green finance initiatives and business relationships, through better interaction with scientific research partnerships or exploring the viability of producing some commercial products while still committing to making all data publicly available under an open government licence.

## Our evidence products

Appendix 1 lists the questions that we use to design our evidence products. These are fundamental questions about nationally important features and functions of the natural environment and landscapes, their benefits to society and how people use and value them. As well as gathering data to answer these specific questions, we want to combine these data with other datasets to provide integrated evidence products.

**Specific evidence products** are created from one or more datasets to produce a comprehensive product on a single subject. Examples are the England Peat Map, or the People and Nature Survey data.

**Integrated evidence products** are created by combining several evidence products and datasets with further analysis. Examples of these might be a State of Natural Capital report or the creation of new metrics to track environmental change at a whole ecosystem level.

### **Specific evidence product: England Peat Map**

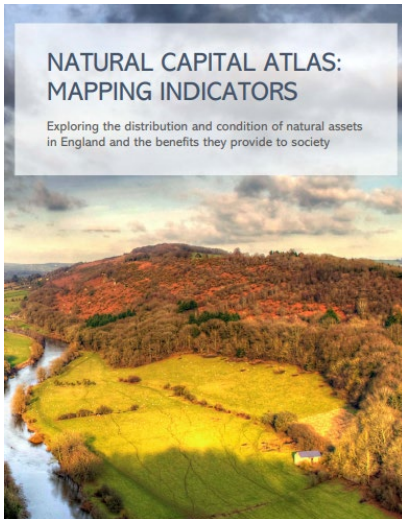
**Output:** a set of maps describing the extent, depth and condition of peat in England.

**Source data:** new and existing field data obtained from Natural England staff and partners, combined with satellite data.

**Use:** open access new national baseline evidence to support improved greenhouse gas emission reporting and peat restoration projects. The maps will also feed into integrated evidence products, such as the natural capital atlas.



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## Integrated evidence product:

### Natural Capital Atlas

**Output:** a baseline assessment of the state of natural capital in England

**Source data:** many different datasets used to inform measurable indicators on the quantity, quality and location of environment assets that supply ecosystem services. Some datasets are from Natural England specific evidence products, but many are from other organisations.

**Use:** to understand the flow of different ecosystem assets across England, and how these change over time, to inform decision making around land use and planning.

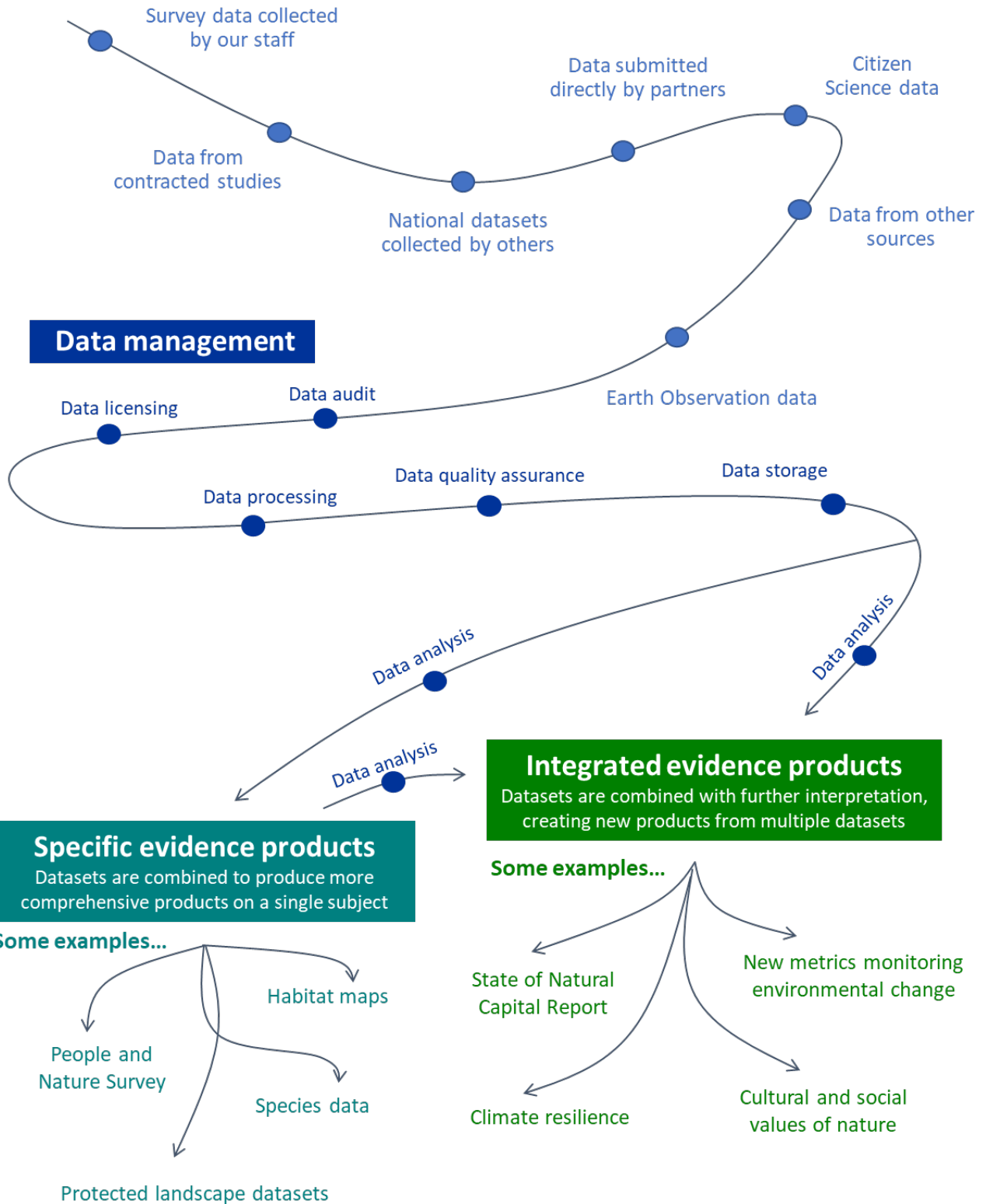
## Our data journey

When data is collected, it needs to go through several steps before it can be turned into evidence products. Data may be collected in different ways, but must then be audited, licensed, processed and stored before it can be analysed to create evidence products. This journey is illustrated in Figure 1 but does not end with the evidence products. Evaluation of any project will follow, understanding how the evidence products are used and how they could be improved. This knowledge will be used to improve the next cycle of data collection and analysis.



## Input Source data

including sentinel surveillance and targeted monitoring data



**Figure 1: Schematic of data journey from source data, the steps in managing the data and how it may be input into specific and integrated evidence products.**

# Principles of our Monitoring Programme

Our resources are not infinite. In this strategic plan we set out the high-level areas of work that we will undertake over the next three years, and the key questions we are seeking to answer, but we will need to prioritise to ensure we have collected robust monitoring data collected at an appropriate scale. To help us with this, we will focus our work over the next three years around a set of six principles that will set a structure to our monitoring programme. Our Monitoring Programme will be:

## Outcome focussed

We will set out the medium and long-term outcomes for our programme, mapping the contribution of our different monitoring projects to enable more integration. Our data collection is designed to meet new and emerging needs, using the best methods at the correct scale, and recognising the importance of long-term datasets. Our data collection and management allows reuse, sharing and interpretation to produce integrated evidence products.

We will evaluate our monitoring programme and ensure that evaluation is built into the separate programmes to ensure we are continually learning from them and increasing the impact of the evidence products produced.

Our integrated evidence products are designed to address broader questions. For example, there is increasing awareness of how society relies on nature to provide us with clean air, healthy soils, to produce food and provide natural spaces to enable people to connect with the natural world. We rely on the evidence gathered on the location, quality and quantity of environmental assets to produce integrated natural capital evidence and ensure their value is considered in decision making.

## Collaborative

There are many organisations and individuals involved in monitoring the natural environment. Natural England cannot and should not do all of this. For our activities to have the maximum impact on decision making and action, we need to work as a community and build partnerships. This includes how we gather monitoring data, how we analyse and interpret it and how we share and make it available. This is part of Natural England's mission of building partnerships for nature's recovery.

The data we use in our evidence products is often collected by our partners, rather than our own staff. For a monitoring partnership to be successful, we need standardised approaches in areas such as data collection and sharing, as well as areas such as the development of capacity in the community. Table 2 lists these areas, giving some examples of how we are working in this way.

**Table 2: Collaborative approaches to monitoring**

Approach	Partnership example	Impact
Develop common aims	The GenePools project, part of the Natural Capital and Ecosystem Assessment Programme (NCEA) developed common aims between Defra partners and the Natural History Museum to understand the biodiversity in urban ponds and engage the public in management.	Data will contribute to blue infrastructure mapping and urban species databases, as well understanding the engagement of participants.
Standardised data collection	The NCEA is working with partners to standardise data collection across its work, for example creating a Peat Data standard for surveying peat.	All peat data collected using the standard can be included in the England Peat Map.
Data sharing	Through the Local Nature Recovery Strategies (LNRS), we have been building local partnerships with multiple stakeholders sharing data to create maps of the local area on habitats, species and activities.	Partners have access to a comprehensive map to use in decision making. These maps will also contribute to the larger Nature Recovery Network.
Building community capacity	Through our community science work within the NCEA, we are developing local pilot hubs to co-ordinate local community science, build knowledge and collect data.	Local hubs boost volunteer engagement and evidence gathering, using standardised methods that enable the wider use of the evidence.
Joint projects with shared resources	The LNRS schemes bring together the local authority(s) with Natural England and a wide range of local stakeholders, to identify joint opportunities for habitat restoration and creation.	LNRS partnership provides a framework to collect the required evidence to build business cases that help to attract funding and apply resources where they would have the most impact for nature recovery, with buy-in from all partners.
Creating joint evidence products	Through the NCEA Programme, we have partnered with the Botanical Society of Britain and Ireland (BSBI) to create botanical heat maps based on BSBI plant records.	The heatmaps provide insights into the locations and types of high value habitat present, to assist spatial planning and land management decisions.

However, there is still a lot of data collected which could be usefully integrated into our evidence products. We will expand the work given as examples in Table 2 across our monitoring programmes to ensure that we can more easily bring in the best available data to our evidence products which will be open access and freely available as far as possible. We also want to further develop methods by which we can more easily bring in data collected by our partners in non-standard ways, such as citizen science or from new technologies.

One such example are the local nature recovery strategies, where we are actively seeking ways to bring together data collected by partners with our national datasets as part of England's Nature Recovery Network. At a local scale we can work with partners to provide the standards and structure needed to collect datasets that will inform local management and success. We can then build on this data at a national scale by integrating datasets to understand the network components and look to fill gaps strategically.

## **Delivering impact**

We want to increase the impact of our evidence. Many of our datasets have multiple uses, and we need to understand these to improve impact more widely. For example, saltmarsh habitat mapping may not only inform reporting on the condition of saltmarsh within protected sites, but also for how it provides services such as food and shelter to species such as birds and fish, and carbon storage for climate mitigation. The data can be used for decisions on local planning, flood risk mapping, and have a value placed upon it using natural capital approaches. Its condition may form part of a metric which gives an indicative measure of the health of the coast where it is placed. It may form part of a local nature recovery scheme, and the map may be used to contribute to the national Nature Recovery Network.

To show the impact of our evidence we firstly need to understand who is using it, and why. We need to evaluate the use of our evidence products and if there are any barriers currently preventing further use. We need to then design our projects with these uses in mind from the outset. We need to build in methods to assess impact into our evaluation processes for our evidence products, how these projects contribute towards the overarching outcomes of our monitoring programme.

## **Innovative**

The scale of ambition to halt the decline in biodiversity loss by 2030, as well as respond to the changing climate means that we need to develop new ways of collecting and interpreting environmental data. New methods of collecting data at scale that can be used easily and cost effectively could form part of a future surveillance programme that would enable us to track the status of the environmental assets at a broad scale and intervene at an early stage.

New methods offer us an opportunity to understand the environment in different ways. For example, our Moorland Change Map used satellite imagery to show annual changes in moorland vegetation which has enabled targeted engagement and management. Our monitoring team are developing innovative methods using DNA and eco-acoustics for species monitoring.

To answer our key monitoring questions, we are particularly interested in how new methods can be integrated with other datasets and paired with new analytical methods to create new environmental indicators and metrics. We are already testing the use of

approaches such as natural ecosystem function indicators in our protected sites work. We will build on, and operationalise, approaches such as these to embed them into our ongoing monitoring programmes. We will continue to collaborate with many partners to develop and test new technologies and how they might be applied to our work. We will support our staff to explore the use of innovation within their work areas.

As an example, we currently survey thousands of ponds each year for Great Crested Newts as part of our District Level Licensing scheme. The surveys use environmental DNA (eDNA) to detect the presence or absence of Great Crested Newts in ponds, but we obtain little other information. We are exploring what other species data we can collect from the same eDNA sample, and if we can use this information to understand the quality of the pond from the sample, maximising the benefits of the field survey.

We cannot drive forward innovation in an effective way without considering how we might monitor the environment in the future. Over the next three years, we will develop a vision of what our monitoring programme could look like in twenty years' time. We will use this to help steer our priorities in developing new and innovative methods to a common goal, and it will help us to influence research by clearly articulating the outcomes that we need.

## **Developing staff capabilities**

Our reputation depends upon us being trusted and recognised for our expertise. We are a leader in applied environmental sciences, especially through the integration of evidence from across disciplines and across our broad remit. An effective monitoring programme enhances our expert capability and reputation, with activities that support integration within Natural England and across the Defra group.

In order to deliver such a programme, we need to maintain and build the skills and capability of our people. These will include a wide range of environmental, analytical, project management and social science disciplines, as well interdisciplinary skillsets such as systems thinking. Through a learning needs assessment, we will identify the skills that we need now, those that we will need in the future and match these with what we currently have. We support the development of these technical, professional and interdisciplinary skills.

## **Mobilising data**

We need data management systems and analysis platforms that are able to support our monitoring programme. We need to help our staff to understand the full journey of the data their projects generate and provide training on new processes and standards to ensure the final products can be used in as many ways as possible. We need to be able to process, store and share data from all our monitoring activity in a timely fashion and consistently in line with our Open Data position. We need to make it easier to bring in data from third parties through a robust quality checking process, and easier to pull out and integrate different datasets for distinct needs and objectives, such as our reporting commitments.

To achieve this, we will need to work across the community to develop standards where these don't currently exist, and to map our ability to integrate current datasets, developing methods for integration as needed. We will build on the data mobilisation work that has been started by the Natural Capital and Ecosystem Assessment Programme to mobilise third party data, promoting the use of the FAIR data principles (Wilkinson et al., 2016), and ensure that we have the correct agreements in place in any partnerships or contracts to license the use of the data appropriately. Throughout this work, we will consider how we can incorporate automation within processing, as well as considering innovation in analytical and processing methods. We need to ensure we have the correct digital infrastructure in place to enable us to achieve the goals of our monitoring programme.

## **Implementing our proposals**

An implementation plan is being developed with a programme of activity under each of the six principles to deliver this strategy and improve our monitoring programme. We will implement these across Natural England and work with partners where we have common interests and objectives.

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## Appendix 1: Key monitoring questions

<b>Assets</b>	<p>How much do we have and where is it?</p> <p>How are important natural environment features and landscapes distributed across England?</p>	To understand our assets; location and quantity of the natural environment and landscapes
<b>Condition</b>	<p>What condition is it in?</p> <p>What condition are important natural environment features, functions and landscapes in and how resilient are they?</p>	To establish the state, quality and durability of the natural environment and landscapes.
<b>Benefit</b>	<p>What services do they underpin?</p> <p>What services do natural environment features and functions underpin and how do we benefit?</p>	To establish their worth; benefit and value to society and identify Natural Capital benefits.
<b>Enjoyment</b>	<p>How are they used and enjoyed?</p> <p>How is people's use and enjoyment of the natural environment and landscapes of England, and associated social well-being, changing?</p>	To understand how people engage with and put value on the distribution of benefits from the natural environment and landscapes.
<b>Accessibility</b>	<p>How accessible are they to people?</p> <p>How accessible are landscapes and the natural environment to people across England?</p>	To understand the distribution of accessibility to people across England.
<b>Pressures</b>	<p>What is harming them?</p> <p>What pressures are harming the asset, condition, benefit, enjoyment and accessibility of our natural environment features and landscapes?</p>	To understand what is harming the natural environment and/or limiting our success?
<b>Trends</b>	<p>How are they changing?</p> <p>How does quantity, quality and durability of important features, assets and functions change over space and time?</p>	To determine change; variation and transformation.
<b>Priorities</b>	<p>What is most important to focus on?</p> <p>What are the most important natural environment features, functions and landscapes to focus on within the land and sea of England?</p>	An overall assessment of what we know about their benefit, condition, pressures and effectiveness of interventions so far, to establish relative importance, urgency and prioritise intervention.
<b>Intervention</b>	<p>What should we do?</p> <p>How and where do we act to protect, enhance and strengthen important features, assets &amp; functions?</p>	To inform intervention; target and prescribe.
<b>Success</b>	<p>How successful are we?</p> <p>This is all about evaluation. Have we achieved our objectives? How effective have our interventions been? What might we do to improve them?</p>	To determine our effectiveness in achieving a clear objective, to understand what works, what doesn't, learn and adapt.



# About Natural England

Natural England is here to secure a healthy natural environment for people to enjoy, where wildlife is protected and England's traditional landscapes are safeguarded for future generations.

## Further Information

This report can be downloaded from the [Natural England Access to Evidence Catalogue](#). For information on Natural England publications or if you require an alternative format, please contact the Natural England Enquiry Service on 0300 060 3900 or email [enquiries@naturalengland.org.uk](mailto:enquiries@naturalengland.org.uk).

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