

- Biosphere-Atmosphere Interactions
- Ecological Processes & Resilience
- Environmental Informatics
- Monitoring & Observation Systems
- Natural Hazards
- Pollution & Environmental Risk
- Soil
- Sustainable Land Management
- Water Resources

NATURAL CAPITAL

Assessing the state of our natural assets and their benefits to people.

Context

Humans are dependent on goods and services provided by the natural environment, including soils, insect pollinators and water. We use the term natural capital to recognise the importance of nature's assets and the benefits that flow from them. This gives natural capital equal status in decision-making alongside: manufactured capital (e.g. buildings), human capital (e.g. knowledge), financial capital (e.g. loans) and social capital (e.g. relationships). It is often the combination of natural and other capital that delivers society's needs.

Our Research

CEH has unrivalled expertise and experience in the science of the natural environment that underpins natural capital. The Natural Capital Science Area brings this together, such that the new whole is more than a sum of the existing and future parts of CEH. We will use surveys, experiments, analysis and modelling to produce detailed knowledge of water, soils, plants, animals and atmosphere provided by the UK environment. We will assess the amount and character of living and non-living resources, how they relate to each other and how they produce goods and services for us. With this knowledge we will work with other experts in economics, health and sociology to evaluate the benefits of natural capital to human well-being, how to balance exploitation with protection and where management and restoration efforts should be targeted.

Research activity in the UK and overseas, in rural and in urban areas, will include:

- interpretation of our UK-wide surveys and monitoring datasets, including soil, water, air, plants and animals, in terms of stocks and change in natural capital.
- identification of key indicators for natural capital that inform stocks and change.
- production of tools for measurement, assessment, mapping and accounting of natural capital.
- detection of past and projection of likely future changes in natural capital under external drivers and pressures.
- definition of levels of sustainable utilisation of natural capital and identification of irreversible thresholds.
- identification of natural capital at risk.
- delivery of strategies for sound natural capital restoration and management.



Science Excellence to Impact



- 1964: Biological Records Centre (BRC) established as UK focus for recording terrestrial and freshwater species distribution.
- 1968: Surveillance monitoring of Loch Leven begins.



- 1982: National River Flow Archive established to collate, manage and disseminate UK water resources data.
- 1992: Environmental Change Network established to collect, analyse and interpret long-term data to identify trends in the environment.



<1950s

1960s

1970s

1980s/1990s

2000s

- 1945: Surveillance monitoring of Cumbrian Lakes begins.



- 1976: UK Butterfly Monitoring Scheme established for standardised population monitoring.
- 1978: CEH initiated the Countryside Survey to "audit" the natural resources of the UK's countryside. Further surveys undertaken in 1984, 1990, 1998 and 2007.



- 2008: River Lambourn observatory established.
- 2009: CEH established Natural Capital Initiative with partners.
- 2010s: CEH produced inventory of ecosystem services in wetland and shallow lake systems. CEH contributed to natural capital asset checks and state of natural capital report for the UK Natural Capital Committee.

Future Research Objectives

Defining the status of (UK) natural capital.

By 2019, we will:

- establish a knowledge base and hub on natural capital.
- report on the inventory, value and trends in soil carbon stocks in UK Coastal Margin habitats.
- develop metrics and accounting units to measure extent and condition of natural capital.
- produce an inventory of natural capital quantity and quality and how this influences the provision of ecosystem services.

Recording how natural capital is changing and identifying causes of change.

By 2019, we will:

- quantify short and long-term trends and natural variations and how these vary at local and national scales.
- explain the causes of observed variations and trends and the sensitivity of natural capital to different drivers.
- produce a framework for projecting future trends.

Defining sustainable levels of natural capital exploitation.

By 2019, we will:

- review the evidence for thresholds of change or tipping points.
- examine the links between resource exploitation targets and sustainable management.
- produce a framework for assessing sustainable exploitation.
- develop a register of natural capital at risk.

Guiding management and restoration of natural capital.

By 2019, we will:

- review evidence and identify options for restoration of specific ecosystems.
- produce a framework for assessing trade-offs in ecosystem services for management options.
- evaluate the role of off-setting to mitigate loss of natural capital.
- produce guidance on the size and configuration requirements for key elements of our natural capital.



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Links to other CEH Science Areas

Natural Capital embraces much of the research that CEH undertakes, thus strong links with the other CEH Science Areas are crucial, including data from Monitoring & Observation Systems and Soils and environmental processes understanding from Water Resources, Biosphere-Atmosphere Interactions and Ecosystem Processes & Resilience.

CEH's Environmental Informatics programme will develop tools to link data, analysis and dissemination to support the CEH and wider research community. A prime example is a web-based semantic catalogue to translate information on available datasets to natural capital language, thus enabling discovery of suitable data.

Partnerships

CEH has a unique capability in the UK, integrating science in terrestrial and freshwater environments that underpins the UK's ability to report on stocks and change in the components of natural capital. We will work collaboratively with other organisations particularly with expertise in economic and social aspects of natural capital to deliver knowledge of the flow of benefits from natural capital to people.

Examples of our existing collaborations are:

- CSIRO, Australia – ecosystem services and natural capital accounting
- University of East Anglia – economic valuation
- University of Cambridge – evidence to underpin natural capital stewardship

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