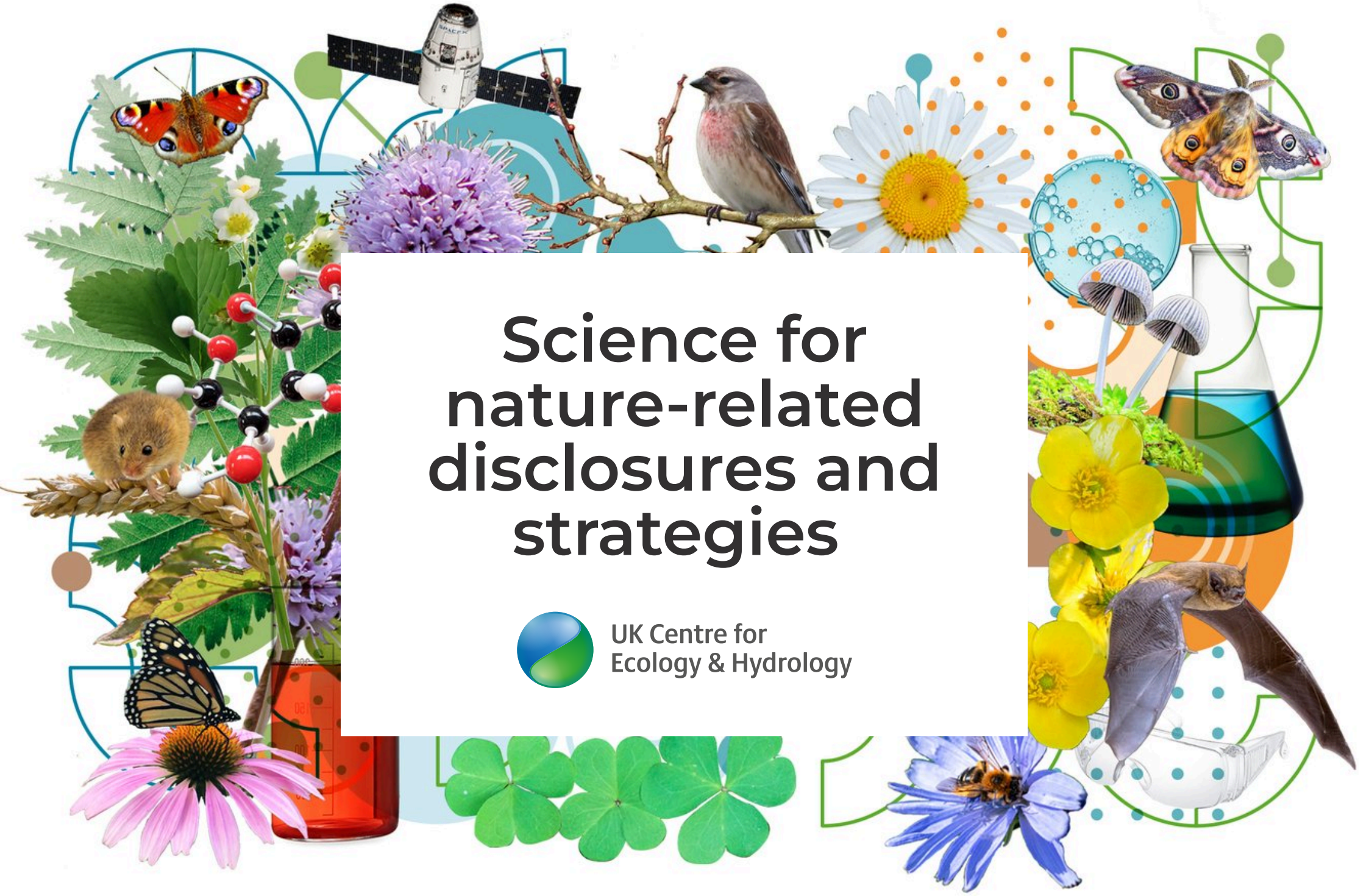

Science for nature-related disclosures and strategies

UK Centre for Ecology & Hydrology

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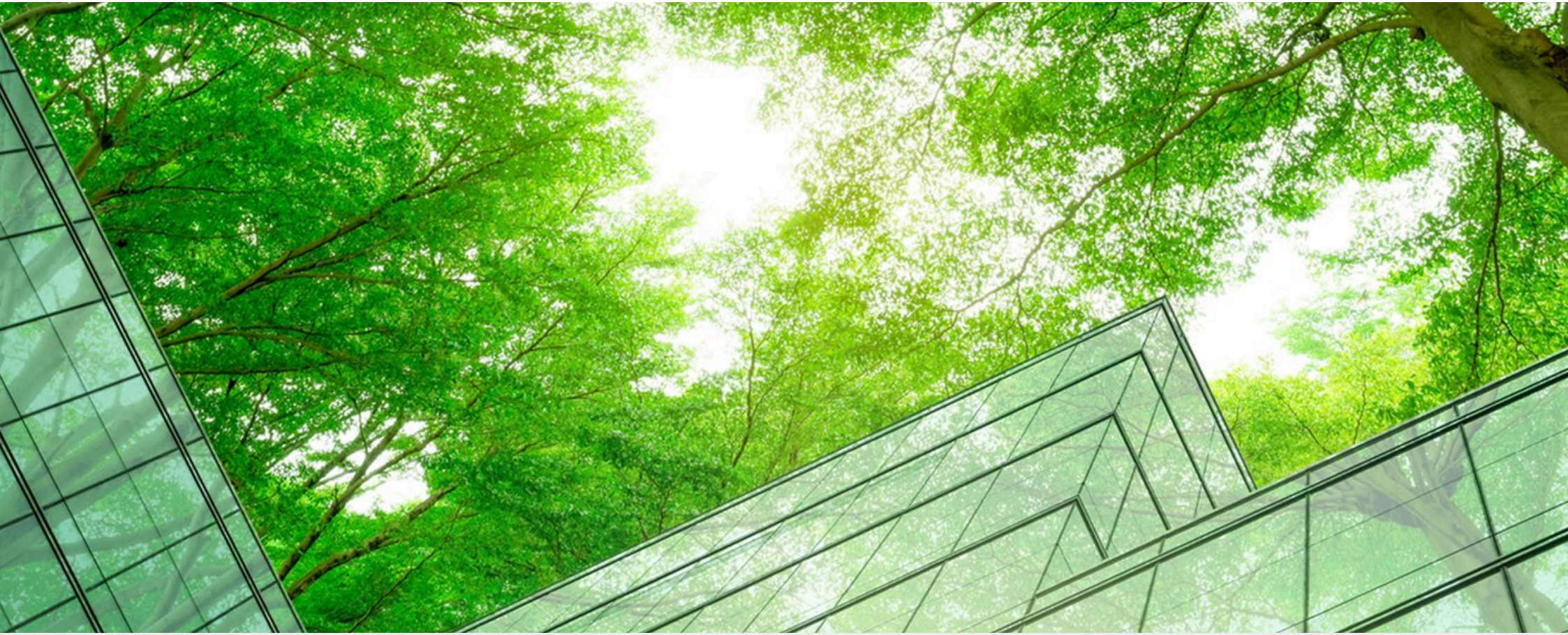

All about the E in ESG

Environmental social and governance (ESG) disclosures are evolving globally to shed light on companies' sustainability practices. This heightened interest has spurred the development of nature-related frameworks which in turn require new data.

As a world-leading centre for excellent science across water, land and air, UKCEH provides data and tools that are instrumental in exploring the "E" in ESG and integrating nature into business strategies.

Environmental social and governance (ESG) disclosure frameworks have evolved rapidly over the past few years, fueled in part by the United Nations (UN) Sustainable Development Goals (SDGs) and the imperative to address the impacts of climate change.

The establishment of the International Sustainability Standards Board (ISSB), announced at COP26, underscores the significance of sustainability disclosures. It also responds to investors' calls for greater transparency regarding companies' impacts on nature and society. Their ambitions are echoed in the work of global task forces which provide relevant frameworks and guidance to facilitate companies' transitions to fairer and greener practices.

As a world leading centre for excellent science across water, land and air, the UK Centre for Ecology & Hydrology has a long history of investigating, monitoring and modelling environmental change. Our data, tools and expertise can help to delve into the "E" in ESG disclosure frameworks and integrate nature into business strategies.

Let's discuss your needs!

Contact us at partnerships@ceh.ac.uk

Do you want to receive occasional updates on our science capabilities and solutions?

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Referencing the TNFD LEAP approach

Referencing the TNFD LEAP approach

UKCEH's expertise in investigating, monitoring and modelling environmental change naturally relates to the recommendations issued by the Taskforce on Nature-related Financial Disclosures (TNFD). We've therefore presented some of our most relevant solutions against the TNFD LEAP approach to provide a useful and accessible context.

Although the approach isn't a necessary part of the disclosure process, it constitutes a set of recommended steps for due diligence, to develop a stronger understanding of a company's impacts on nature and incorporate findings into their strategy.

Whether businesses aim to assess risks, identify opportunities, unlock new financing, or comply with regulations, using the framework will encourage them to consider their nature stewardship in a meaningful way. And UKCEH provides environmental data and develops tools to track and benchmark relevant indicators to inform business decisions.

L **Locate the interface with nature**;

E **Evaluate dependencies and impacts on nature**;

A **Assess nature-related risks and opportunities**;

P **Prepare to respond to nature-related risks and opportunities and to report on material nature-related issues**.

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Locate the interface with nature

LOCATE THE INTERFACE WITH NATURE

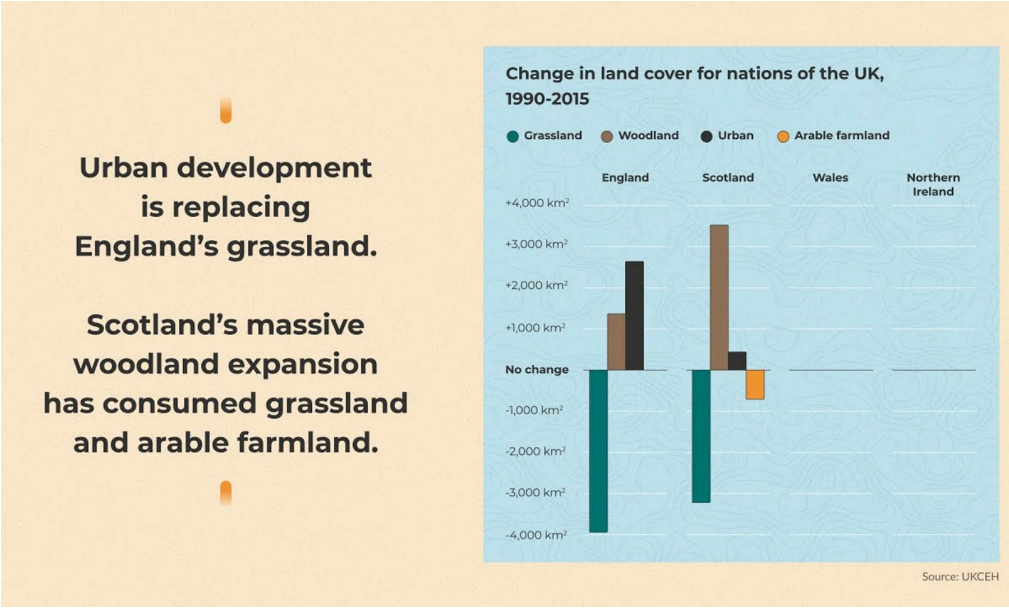
The first step in the framework involves mapping an organisation's operations across sectors and value chains to pinpoint potential dependencies and impacts on nature. Accurately identifying these requires robust, high integrity spatial data on habitats and species. That's where we can help.

- UKCEH Land Cover Maps
- Species diversity recordings

UKCEH Land Cover Maps

Using satellite data, UKCEH creates Land Cover Maps that show the habitats that exist across the UK, and how they are changing. They do this by describing the physical material on the surface of the United Kingdom, providing an uninterrupted national dataset covering land cover classes from grassland, woodland and fresh water to urban and suburban built-up areas.

These maps serve a multitude of purposes, with applications spanning research, policymaking and business, including identifying locations where a business interfaces with nature.



The map is produced annually at 10m resolution and classifies the UK land surface into 21 broad habitat types, which can be used to:

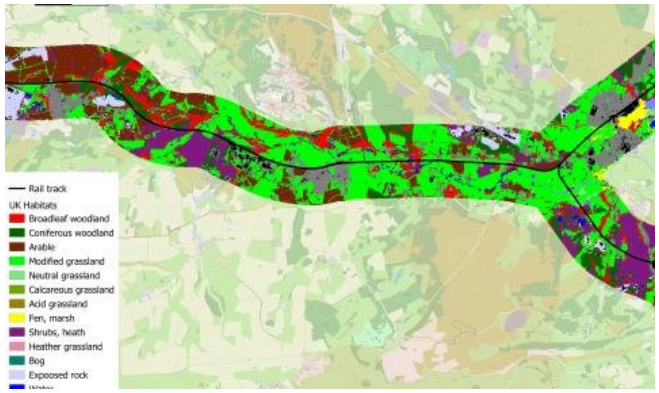
- Produce an inventory of habitats and land uses within a specified area of interest;
- Calculate landscape structure metrics to form a core input for a wide range of assessments and models . For instance, our Land Cover Maps contribute to UK nature capital accounts calculations published by the Office for National Statistics.

UKCEH Land Cover Maps are continuously improved to incorporate new data layers. They can already be enhanced with additional data on woody linear features including hedgerows and crop types. Development is also underway to produce maps at 3m resolution and include additional data layers.

More on how to access and use the maps >

Species diversity recordings

UKCEH scientists use species recordings from the Biological Records Centre to produce Species Distribution Models. These models are instrumental in estimating the diversity of priority species in targeted areas. The data generated can inform nature-related decisions in business strategies such as prioritising sites and the strategic targeting of activities to improve biodiversity.



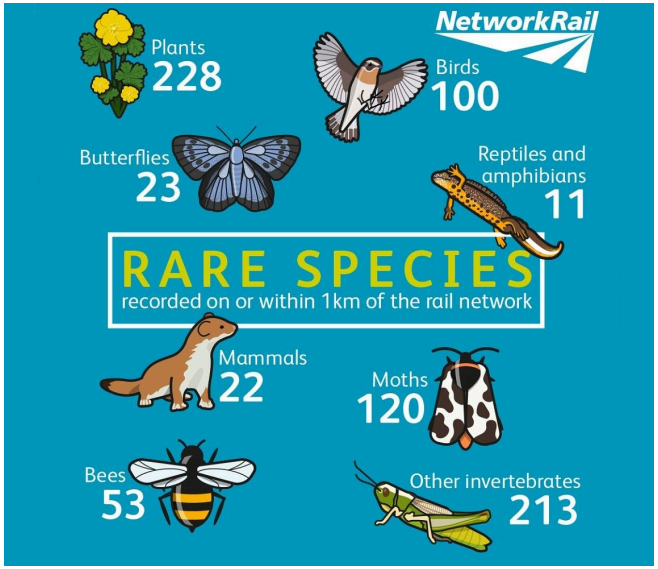
A high-resolution land cover map showing habitats adjacent to railway line

CASE STUDY: Railway industry

Our scientists worked with the International Union of Railways (UIC), the professional association representing rail companies across the world, to provide technical recommendations and key design features for incorporating and enhancing habitats within the existing European network and new line upgrades. This included providing examples of best practice.

The UIC Guidelines for Managing Railway Assets for Biodiversity form part of the European Railways: Strategy and Action Guide to ensure management for biodiversity is embedded at every level of the railway business, alongside safety, performance and sustainability.

Read the full story >



“We worked closely with railway companies across Europe to distil the best available knowledge on managing railway assets to benefit nature. For each asset, we considered the most effective measures to protect and restore biodiversity.”

Professor Richard Pywell, Head of Biodiversity at UKCEH

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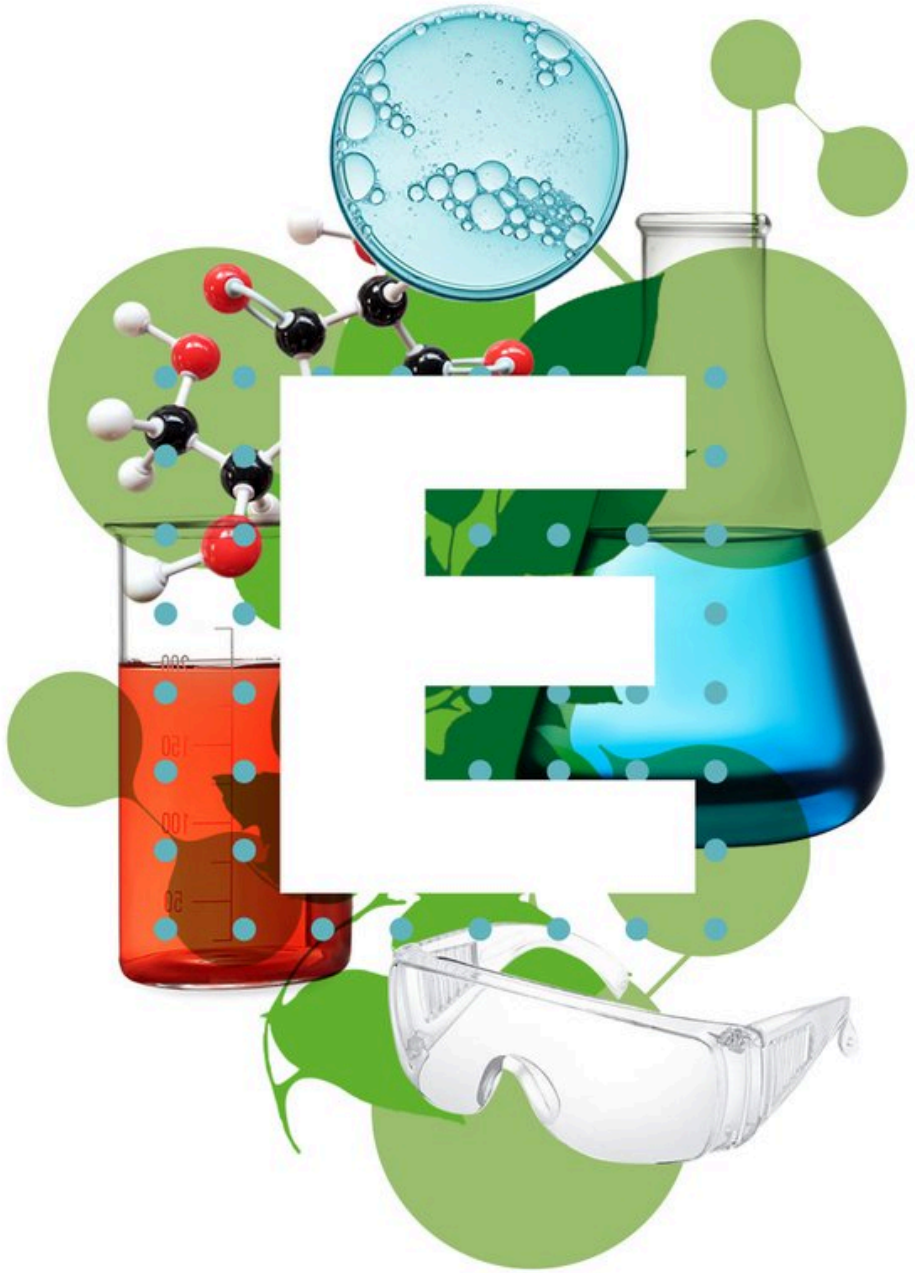
Evaluate dependencies and impacts on nature

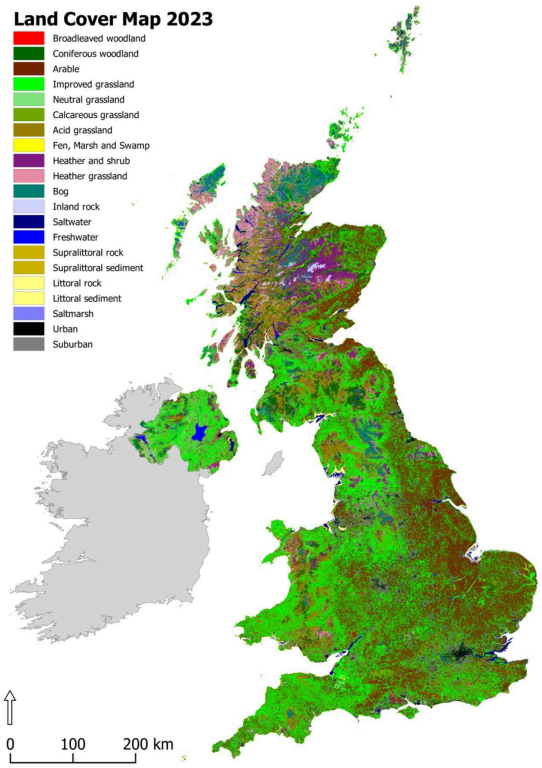


E VALUATE DEPENDENCIES AND IMPACTS ON NATURE

Our integrated and multi-scale monitoring and modelling capabilities across land, water and air enable us to produce comprehensive natural capital audits and explore future scenarios. UKCEH can not only identify organisations' dependencies and impacts on nature against established frameworks, but also gauge their severity. And our long-term environmental data can be used for benchmarking ecosystem health.

- Information products
- Laboratory services

Information products



As a major custodian of environmental datasets, UKCEH hosts a wealth of historic records and tracks the drivers of nature change over time, including greenhouse gas emissions, pollutants, water quantity and ecosystem conditions.

We incorporate some of this data into innovative information products. Our approach to licensing is flexible, tailored to meet the needs of commercial, non-commercial and academic customers. This flexibility enables use within organisations and supports the development and sale of value-added products.

Explore our information products >

DATA: Annual inventory of greenhouse gas (GHG) emissions

We produce the UK's annual Land Use, Land-Use Change and Forestry (LULUCF) inventory, which quantifies the UK's greenhouse gas (GHG) sources and sinks. The UK National Atmospheric Emissions Inventory (NAEI) is used to produce the annual inventory of greenhouse gas emissions published by the Department for Energy Security and Net Zero. The data are compiled by devolved governments and disaggregated to local authority area, providing information to local authorities and land managers on GHG pollution sources, levels, and trends.

Laboratory services

UKCEH scientists have developed expert laboratory services to support the research community and better understand how the release of pollutants impacts nature and ecosystems. These services are available to academic institutions as well as commercial and non-commercial organisations.

More about our laboratory services >

Analytical chemistry lab service

Our highly qualified and experienced staff use advanced equipment to analyse large numbers of samples for various factors. Our areas of expertise include:

Metals

Identifying and measuring a wide range of elements in a variety of matrices;

Nutrients

Analysing a range of water, soil and vegetation samples in matrices including leachates, rain, stream, river, cloud and pore waters;

Organics

Focusing on biotic and abiotic samples for a large variety of organic substances found in the environment;

Stable isotopes

Analysing biological, terrestrial and environmental materials via the National Environmental Isotope Facility (NEIF) located within UKCEH's labs in Lancaster.

Micro- and nanoplastics analysis

Through sample analysis, our scientists ascertain the concentration, type, shape, size of microplastics detected in various environments such as soil, slurry, inland waters, and treated waters, among others. Within our laboratories, our ecotoxicologists investigate the toxic impacts of these microscopic plastic pollutants.

The world-leading UK Centre for Multimodal Correlative Microscopy and Spectroscopy (CoreMiS) is the first platform in the UK dedicated to micro-spectroscopic analysis of environmental samples by RISE-EDS. CoreMiS, funded by NERC and established by UKCEH, delivers the capacity for nanoplastics analysis.

Algae in freshwater

The nutrient enrichment of rivers and lakes from human activity is one of the major problems affecting freshwater ecology. We have developed a new technique that uses flow cytometry to quantify and characterise algal populations in freshwater.

UK Centre for Ecology & Hydrology

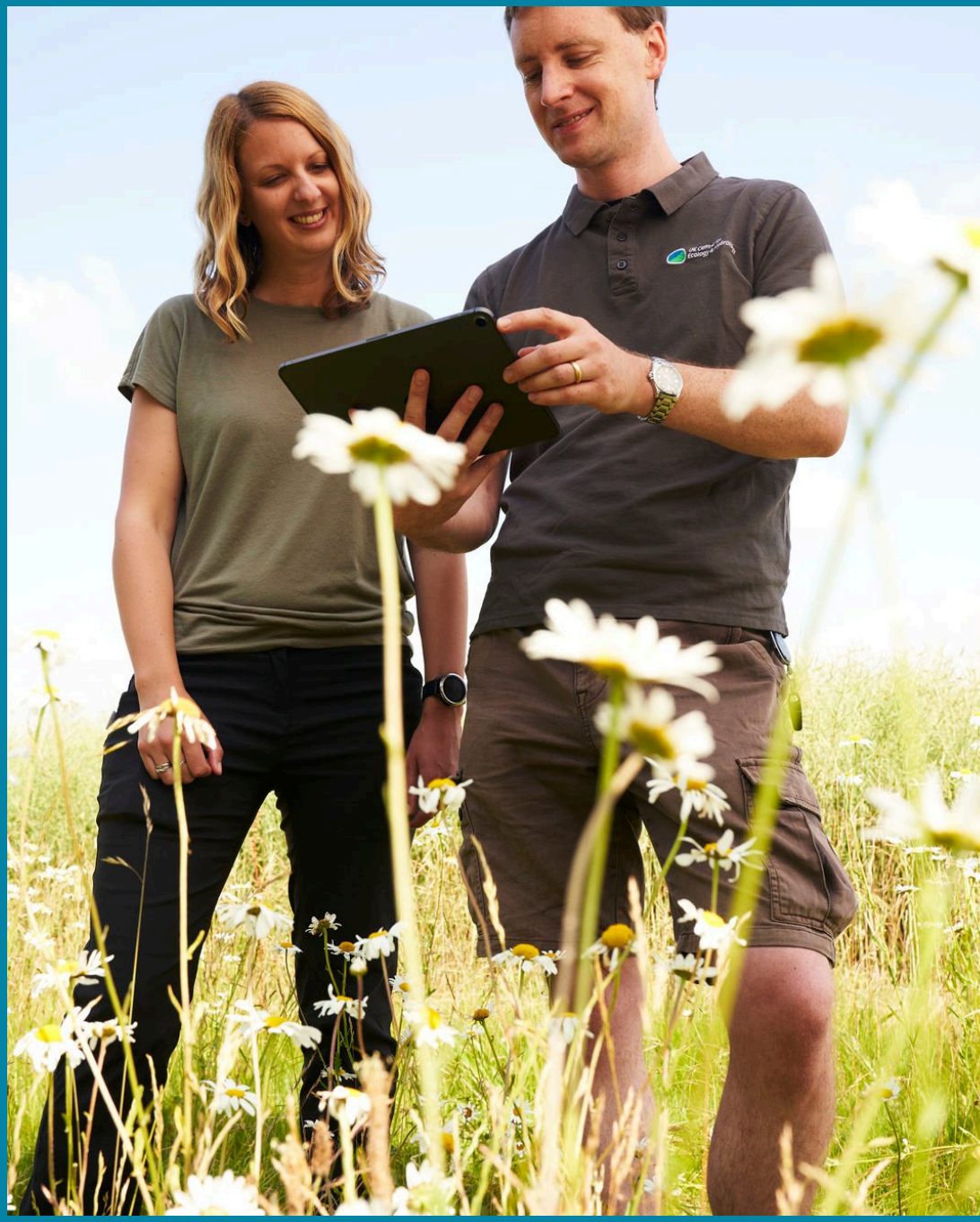
Assess risks and opportunities

A

SSESS RISKS AND OPPORTUNITIES

The third step in the TNFD approach focuses on assessing risks and opportunities to determine what an organisation should disclose. UKCEH environmental data can be used to manage nature-related physical risks and identify opportunities for ecosystem protection and restoration, whilst mitigating or minimising transition risks.

- Assessing nature-related risks
- Identifying opportunities for ecosystem protection and restoration



Assessing nature-related risks

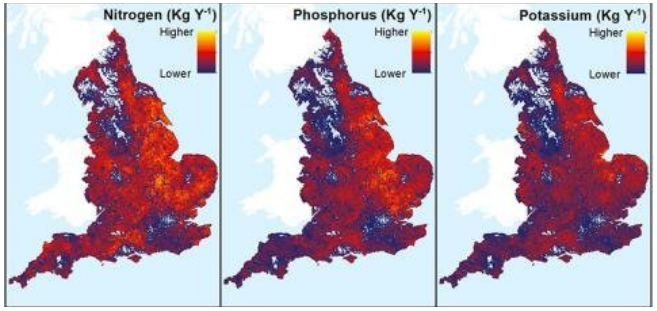
Our role in hosting trusted, robust long-term data puts UKCEH in an ideal position to inform holistic approaches to environmental sustainability. We can enhance some of our information products to combine data from multiple sources and provide solutions adapted to meet organisations' needs.

For example, data incorporated into UKCEH Land Cover plus Crops maps can help assess nature-related risks.

More on UKCEH Land Cover plus: Fertilisers and Pesticides >

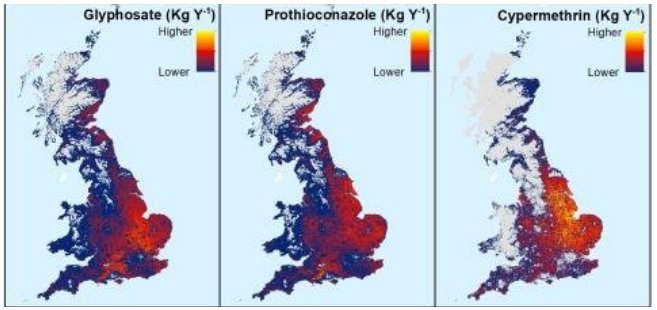
Risks to water

We have added anonymised data from the Defra and Scottish Government-sponsored British Survey of Fertiliser Practice to our Land Cover plus Fertilisers maps. The enhanced maps estimate average, total, annual application of manufactured nitrogen, phosphorus and potassium. The data can be used to predict environmental impacts, such as modelling agrochemical runoff, eutrophication and soil health.



Risks to species

Similarly, we have combined Pesticide Usage Survey data with UKCEH maps to show average, annual pesticide applications across England, Wales and Scotland. The data can be used to measure the potential impact of pesticide and their active ingredients on wildlife populations.



Identifying opportunities for ecosystem protection and restoration

UKCEH has developed a free and user-friendly tool which highlights opportunities for environmental enhancement.

E-Planner uses satellite and aerial imagery with national-scale environmental datasets to assess the relative suitability of land for different environmental outcomes, including:

- Water resource protection
- Woodland creation
- Seed-rich bird habitat
- Flower-rich pollinator habitats
- Wet grassland restoration

Access the tool >

UK Centre for Ecology & Hydrology

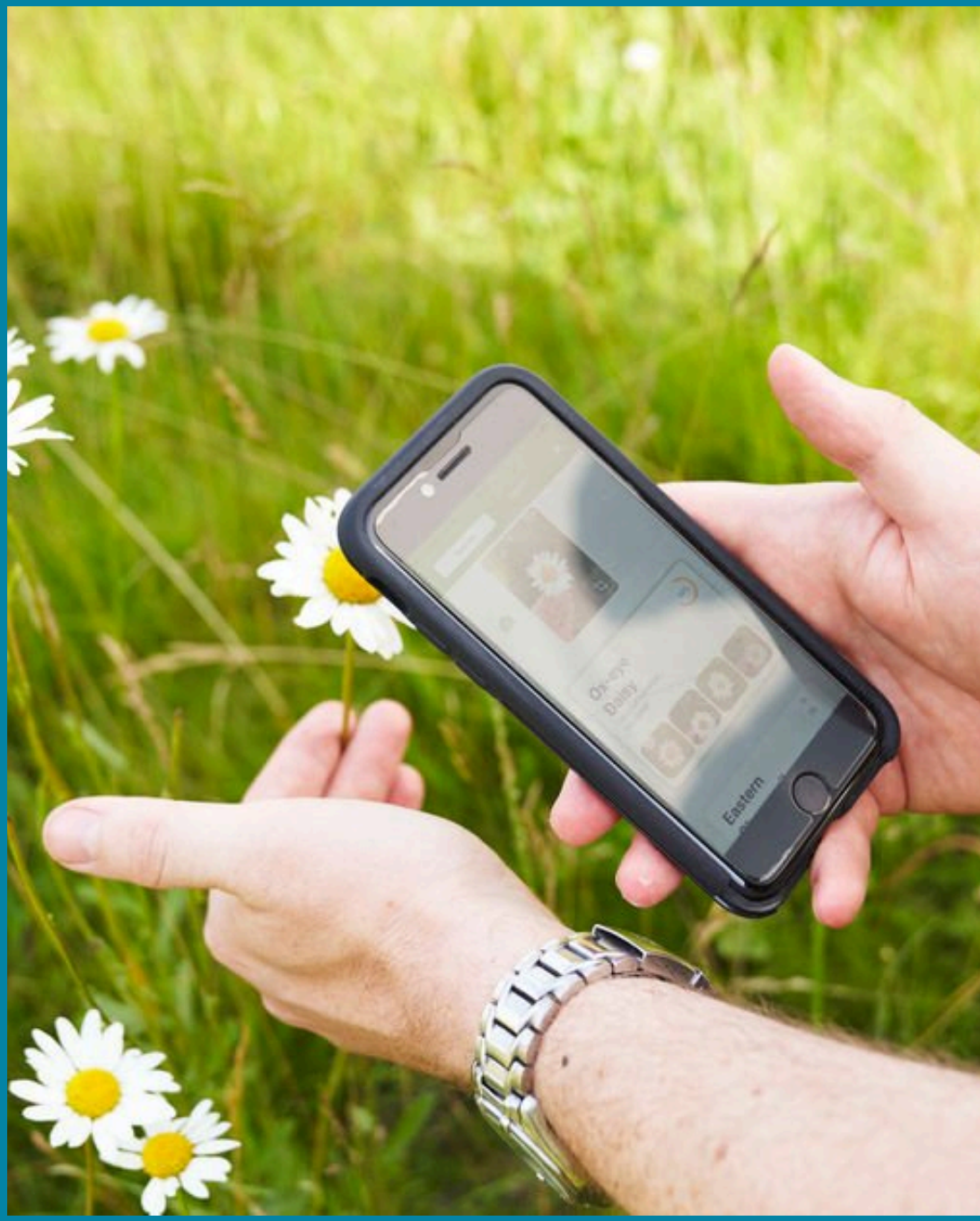
Prepare to respond and report

P REPARE TO RESPOND AND REPORT

Responding to nature-related risks and opportunities and reporting on material nature-related issues requires trusted systems to capture relevant data. UKCEH expert equipment and services can help you monitor and benchmark your performance.

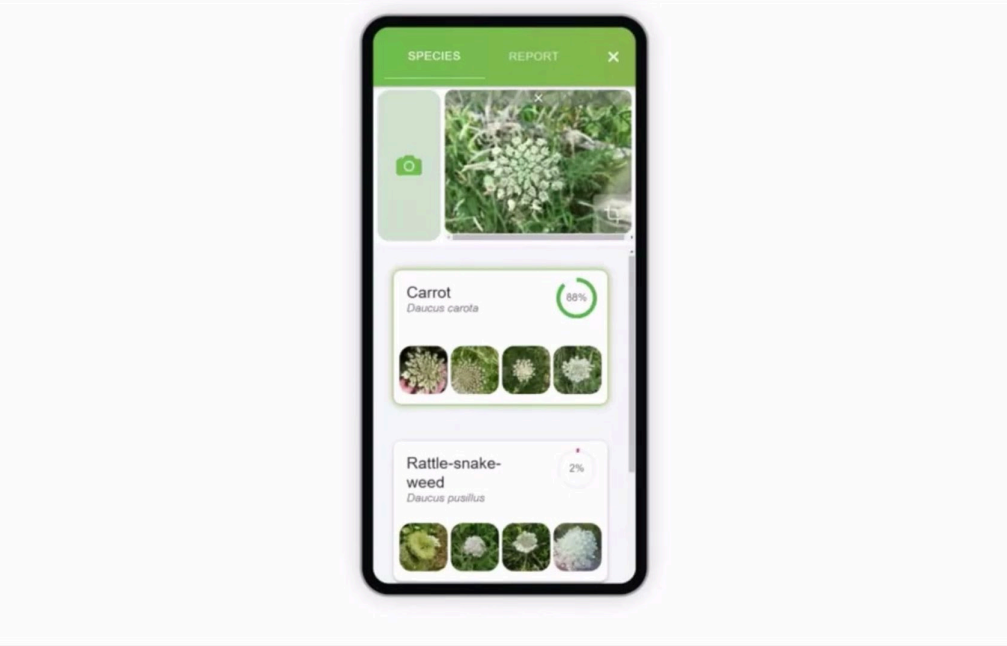
Our environmental monitoring solutions include:

- Web-based solutions for habitat monitoring
- Advanced equipment for environmental monitoring



Web-based solutions for habitat monitoring

UKCEH brings together the scientific capabilities and data necessary to understand the status of species populations, and links between biodiversity and ecosystem resilience, delivering solutions for conserving and restoring biodiversity.



Our E-Surveyor mobile app is a solution that helps farmers and landowners to assess the quality of habitats they manage. Using AI to assist with identification of plant species, the app enables users to learn which pollinators and other insects are associated with the plants in different habitats, undertake structured surveys, and compare observations with established checklists.

The app can also be used to:

- Establish natural capital baselines;
- Set and monitor performance against targets.

GET IT ON Google Play

Download on the App Store

Advanced equipment for environmental monitoring

UKCEH scientists have developed advanced research equipment which can be used for monitoring and reporting on nature-related metrics. Here are a couple of examples.

Automated Monitoring of Insects

Understanding trends in species and their drivers is key to knowing the magnitude of the challenge, its underlying causes, and how these factors vary across space and time. Effective species monitoring requires robust methods that minimise bias and maximise the quantity and quality of data collected. Combining robust lighting for attracting insects with high resolution cameras, the UKCEH Automated Monitoring of Insects (AMI) System offers practical and cost-effective solutions for standardised monitoring.

The AMI System combines computer vision and an autonomous imaging system to capture images of moths in the field, locate them in the image, and classify them to species. Work is underway to add audio and ultrasound recording, which will increase the taxonomic coverage of the System to include birds, bats and other insects. Further developments planned include edge processing for images to be analysed on the device and built-in pollinator monitoring to give 24-hour monitoring of flying insects.

Interested in testing the System? Contact us at ami-trap@ceh.ac.uk

More about the AMI >

Air sampler systems

UKCEH air sampler systems can be used to monitor concentration levels of selected non-GHG atmospheric pollutants.

The UKCEH ALPHA® sampler is designed for the measurement of the concentration of ammonia (NH3) in air. It has been used for over 10 years on the UK national ammonia monitoring network and designed for ecosystem impact assessment studies.

The UKCEH DELTA® system is a low-volume denuder air sampling method for long-term sampling of ammonia and ammonium in the atmosphere. The system can also be extended to sample acid gases (NH3, HNO3, HCl, SO2) and aerosols (NH4+, NO3-, SO42-, Cl-, Na+, Ca2+, Mg2+).

More about the air sampler systems >

About the UK Centre for Ecology & Hydrology

The UK Centre for Ecology & Hydrology (UKCEH) is an independent, not-for-profit research centre carrying out excellent environmental science with impact.

https://ceh.ac.uk/solutions