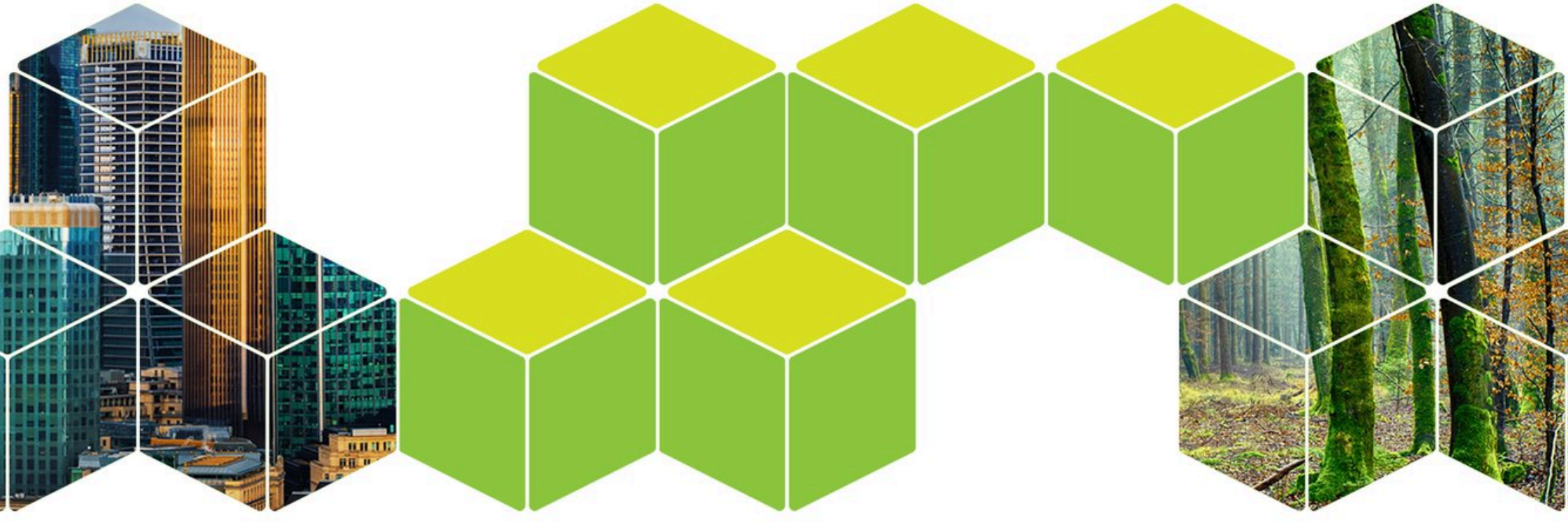
Innovative science for the green transition

UKCEH

Bringing environmental solutions to where they are needed

The green transition requires a significant system shift to prioritise climate and nature-related matters in all aspects of our society. Work is underway to assess the impacts on nature, and rethink energy sources, transport, infrastructure, finance and more. As a world leading centre for excellent science across water, land and air, UKCEH plays a vital role in informing the transition.



Science-driven actions towards net zero

The UK Centre for Ecology & Hydrology (UKCEH) has a long history of investigating, monitoring and modelling environmental change.

For example, we manage a UK-wide network of flux towers which measure the movement of carbon and greenhouse gases (GHG). The flux towers collect detailed data on gas exchanges between the land and the atmosphere throughout the year. This helps us to locate GHG emission hotspots and carbon sinks, so that we can develop new practical approaches that support progress towards net zero targets across all sectors.

CASE STUDY: Land-based solutions to achieve net zero

UKCEH is part of the Land Use for Net Zero (LUNZ) Hub launched in January 2024, which brings together soil scientists, climate modellers, farmers, advisory organisations, NGOs and experts in afforestation, green finance, renewable energy and planning from across the four nations of the UK. This approach recognises that pathways for achieving net zero may differ depending on policies and land use across the UK.

Over the next three years, partners will work collaboratively to devise a range of solutions to making UK land use carbon neutral, including outlining financial costs associated with solutions and predicting their impacts on the environment and people.

Read more >

“Advanced modelling methodologies can predict the impacts of different interventions by governments and land managers. By involving a wide range of stakeholders, we will develop solutions that are fair and realistic, able to work in practice as well as theory.”

Professor Paula Harrison, Principal Natural Capital Scientist at UKCEH

An interdisciplinary approach

UKCEH takes a whole systems approach to understanding the environment, how it sustains life, and the human impact on it. We consider the wider implications and opportunities of nature-related actions to safeguard against unintended consequences. We also create clear co-benefits for biodiversity, soil health, water and air quality, as well as social and health improvements.

CASE STUDY: Essential science for sustainable cities

The work we are carrying out to support sustainable cities exemplifies our approach. We are informing better ways to develop and manage cities all around the world, so they enable people and nature to thrive. We provide solutions to tackle a wide range of urban environmental challenges, including net zero and green infrastructure targets, biodiversity net gain, air pollution, flood risk, heat risk, natural capital accounting, noise impacts and water quality.

Read more >

Creating science-led opportunities for green financing

Nature markets serve as a platform to unlock new funding and finance options, capitalising on ecosystem services such as carbon sequestration, improved water quality, enhanced biodiversity and reduced flood risk. UKCEH scientists are well placed to identify new opportunities for nature restoration, from which services and marketable units can be derived.

Development of codes for nature markets

Our scientists have contributed to and led the development of codes which provide the scientific rigour needed to build trust in nature markets. These codes provide a robust framework for market operations, supporting measuring, selling, buying and monitoring ecosystem services.

CASE STUDY:
Leading the development of the UK Saltmarsh Code

UKCEH is leading a cross-sector consortium to develop and launch a UK Saltmarsh Code, similar to the existing Peatland and Woodland Codes. This will support a rigorous and scientifically-based voluntary certification standard for saltmarsh carbon to be marketed and traded by UK companies; and will assure buyers of carbon credits that the benefits being sold are real, quantifiable, additional and permanent.

Find out more about the code >

The secrets of the saltmarsh: 450 Counting the Earth podcast episode

Listen to our podcast episode to learn more about the project and the benefits of saltmarshes, from providing wildlife habitat to storing carbon.

> “The introduction of a Saltmarsh Code would pave the way for private investment to support projects that have some public financing but would not otherwise happen.”

Annette Burden, Wetland and Coastal Biogeochemist at UKCEH

CASE STUDY:
Updating and expanding the UK Peatland Code

UKCEH scientists led a major evidence review and developed new methods to update and expand the UK Peatland Code. The Peatland Code, supported by Defra and operated by the IUCN Peatland Programme, is the primary mechanism for private funding and generation of carbon credits for UK peat restoration.

The new method uses data from UKCEH's flux tower network and elsewhere to update estimates of greenhouse gas emissions and removals for different peatland categories. It also extends the Peatland Code to cover lowland fen peats for the first time. The new method enables project developers to estimate emissions reductions that could be achieved by raising water levels, based on data analysis published in Nature in 2021.

Read the full story >

Monitoring at East Anglia Skirtland Fen as part of UKCEH's UK Land Flux Network. Photo by Hollie M Cooper/UKCEH.

Essential partnerships

UKCEH works with partners to deliver world-leading science, which brings governments, policy makers, regulators, NGOs, businesses, think tanks and investors together to tackle environmental challenges and meet sustainability goals.

Partnerships in nature finance

Our scientific projects are often delivered in partnership with government bodies, private institutions and non-governmental organisations. The impact of our research in addressing key environmental challenges has enabled us to develop strong relationships in nature finance.

COLLABORATION:
The Nature Investment Standards Programme

We are contributing to the Nature Investment Standards Programme led by BSI in partnership with Defra, the devolved administrations and industry.

The Programme will establish a standards framework to address barriers to investing in nature and support the development of high-integrity nature markets. UKCEH is part of the Nature Markets – Natural Carbon Benefits – Specification Advisory Group.

The group is working towards defining a standard for the natural carbon market based on overarching principles set out by other groups within the Programme.

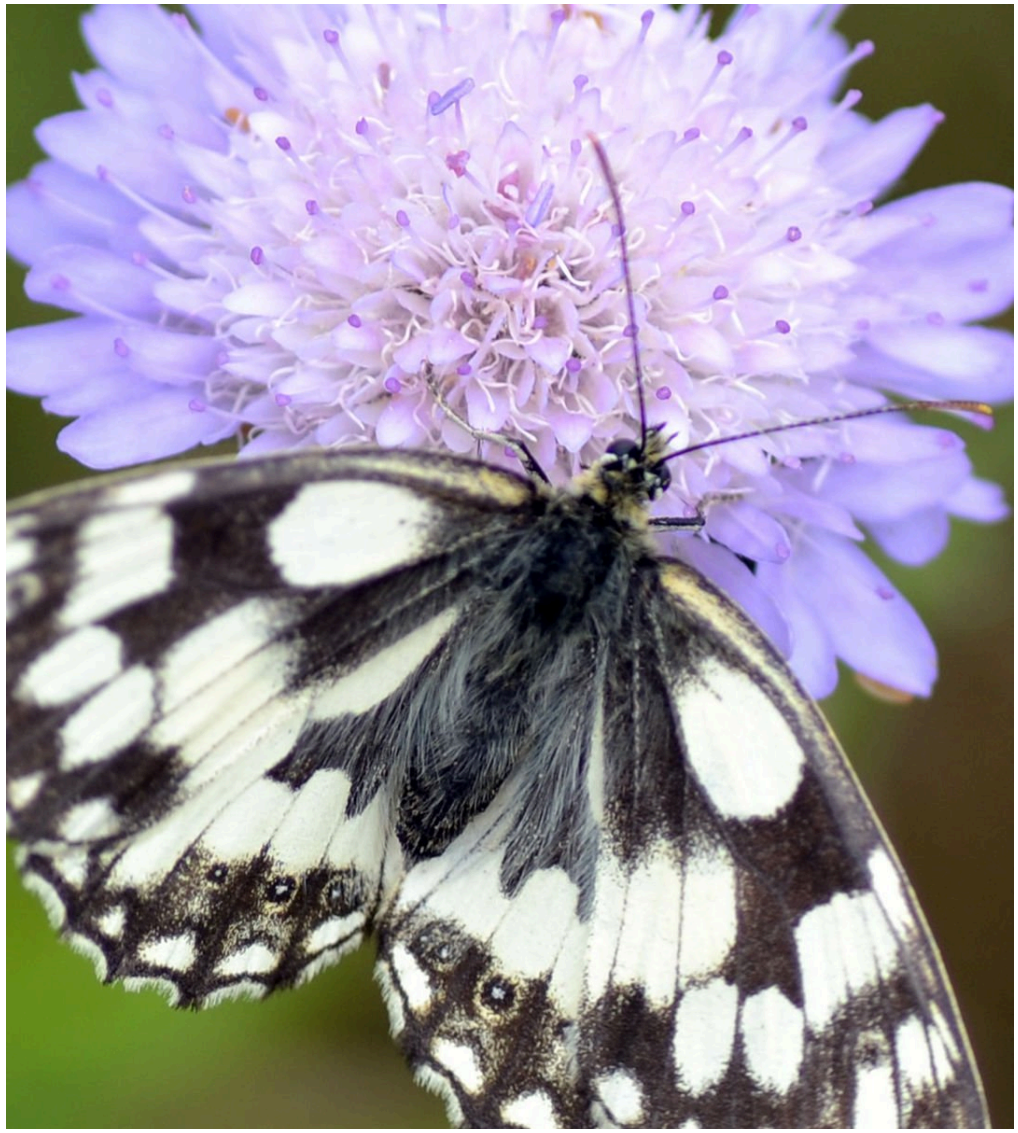
More about the programme >

COLLABORATION:
Integrating Finance and Biodiversity (IFB) Programme

UKCEH is coordinating the Integrating Finance and Biodiversity (IFB) for a Nature Positive Programme, co-led by NERC and Innovate UK to develop the solutions needed to embed the values of biodiversity in financial decision making. UKCEH scientists are working on several projects as part of the programme.

Our scientists contributed to a new inventory setting out domestic and international nature-related risks to our economy published by the Green Finance Institute. These include soil health decline, water shortages, global food security repercussions, zoonotic diseases that pass from animals to humans like bird flu, swine flu and Covid-19, as well as antimicrobial resistance and litigation risks. Findings will inform decision-making and provide much-needed impetus to integrate nature-related thinking into the risk analyses carried out by companies, central banks and supervising authorities.

Read more >



Partnerships in innovation

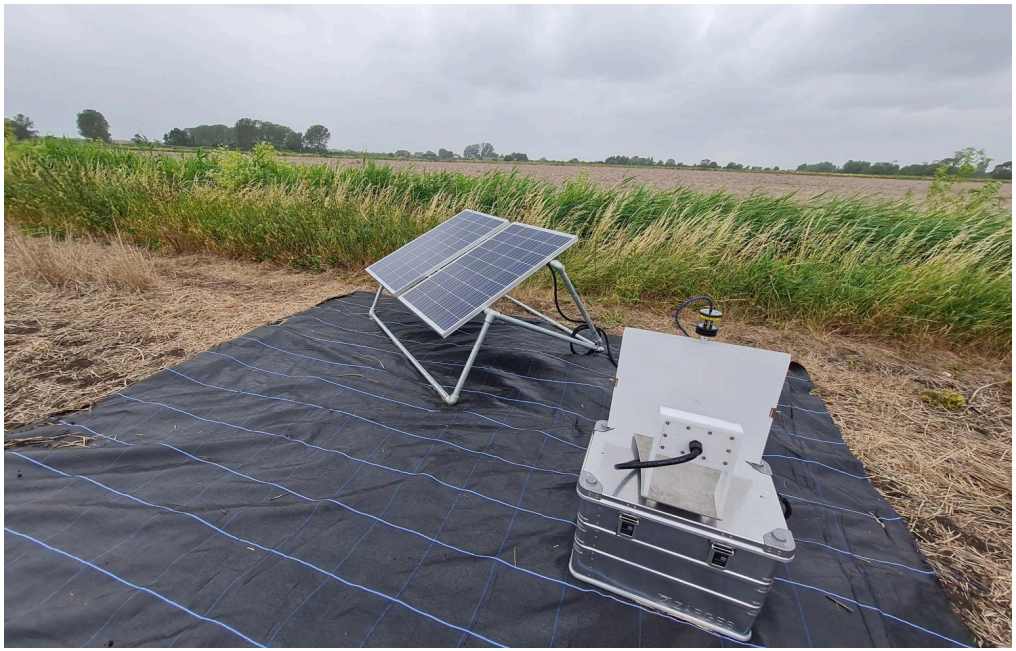
UKCEH has entered the Gaia Sciences Innovation partnership formed with sustainability investor Greensphere and other science institutes and organisations, with the potential to expand the impact of our science through nature-based solutions.

Greensphere Capital will raise a £150 million fund designed to invest in and expand world-leading start-up and spin-out businesses that successfully commercialise solutions which mitigate against the dual crises of climate change and biodiversity loss in the UK and internationally.

UKCEH will identify, assess and progress viable potential new investment opportunities arising from our research and develop these as spin-out companies.

Alongside UKCEH, the partnership brings together leading institutions that are home to more than 4,000 researchers and conservationists, including Royal Botanic Gardens Kew, ZSL, University of York, and via the Anglia Innovation Partnership, the Earlham Institute, John Innes Centre, Norfolk and Norwich University Hospitals NHS Foundation Trust, Quadram Institute, The Sainsbury Laboratory, and the University of East Anglia.

Read more >

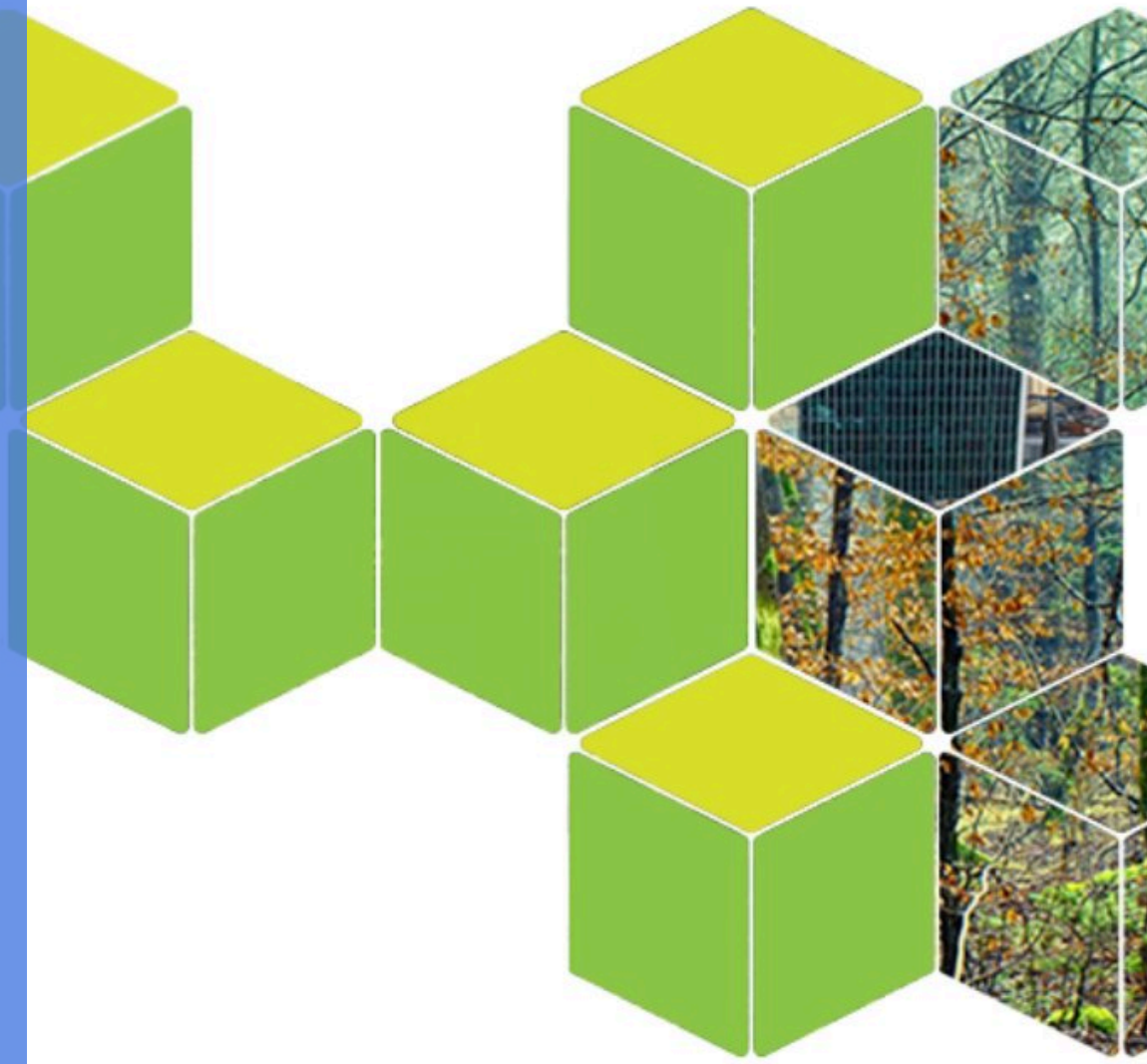


Advances in technology that benefit biodiversity monitoring include using AI to identify species from images taken by remote autonomous stations.

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



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