

NC-UK: a new national monitoring & modelling programme to support UK environmental science

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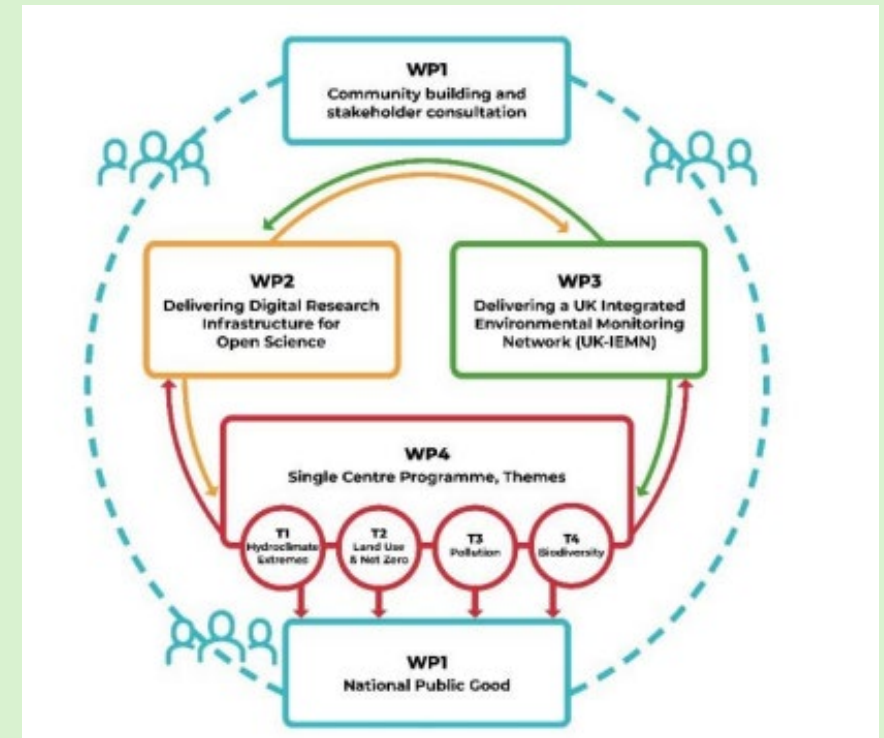
UK Centre for
Ecology & Hydrology

NATIONAL CAPABILITY
FOR UK CHALLENGES

Understanding the UK environment

A new National Capability programme

- Integrated monitoring, modelling and data for the UK environment (2024 – 2029).
- Four science Themes: Hydroclimate Extremes, Land Use & Net Zero, Pollution, Biodiversity.
- Emphases on community engagement and digital tools to enable UK research.
- See: <https://www.ceh.ac.uk/our-science/projects/national-capability-uk-challenges>



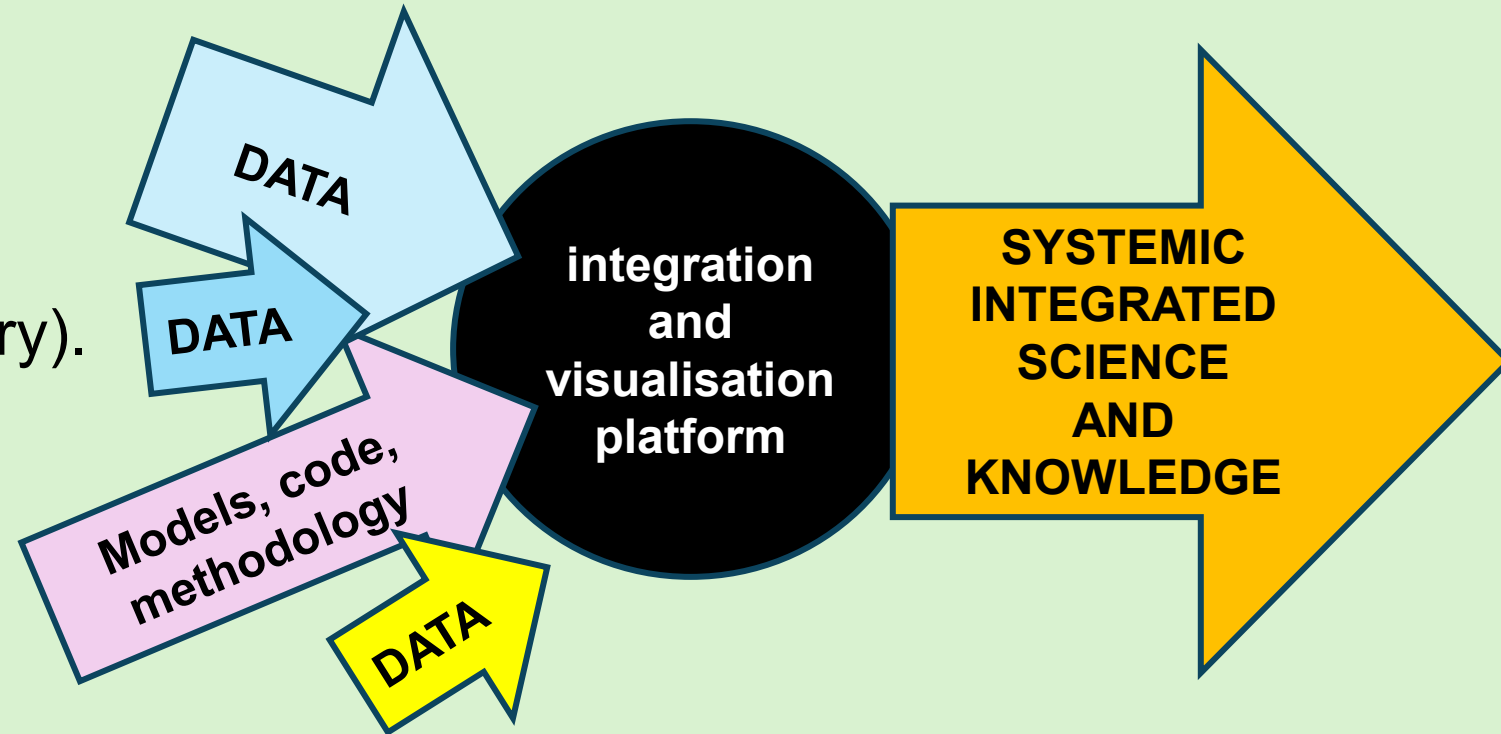
Overall goal of the Pollution Theme

*“To provide data, samples, and models of the fate of diverse pollutants in air, **water**, and soils, including their individual and combined impacts on ecosystems, to inform strategies for achieving clean air, **water** and soil”*



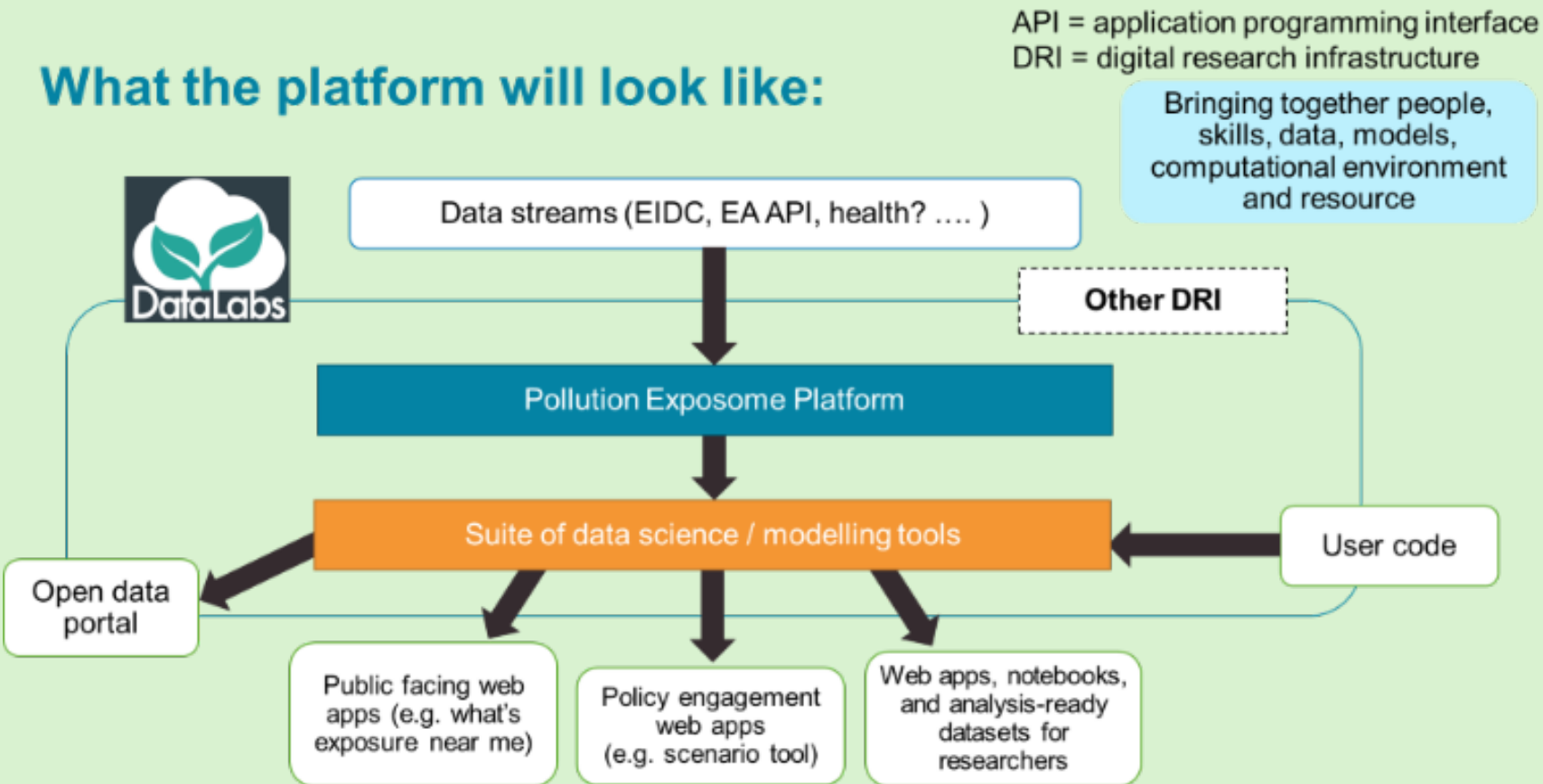
UK knowledge hub for pollution

- Community engagement platform.
- Co-designed with stakeholders (universities, regulators, industry).
- Aquatic, atmospheric and terrestrial pollution data.
- Enabling exploration of the chemical state of the UK environment.



UK knowledge hub for pollution

What the platform will look like:

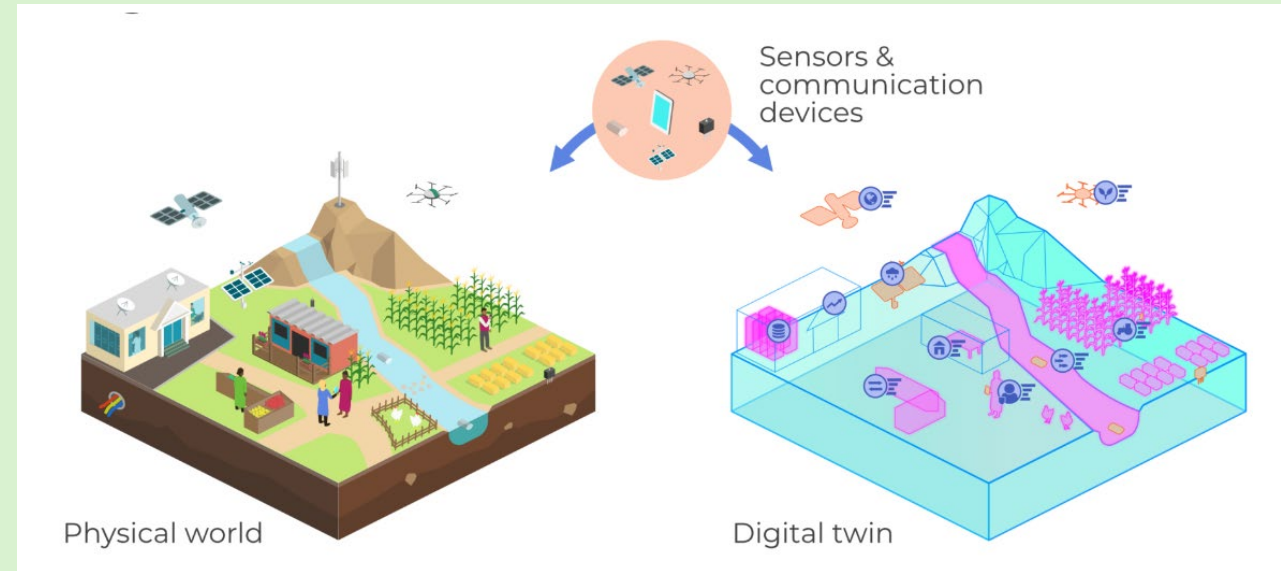


What could a tool like this do for you and your stakeholders?

Contact Jacky Chaplow (jgar@ceh.ac.uk) to get involved in stakeholder workshops next year!

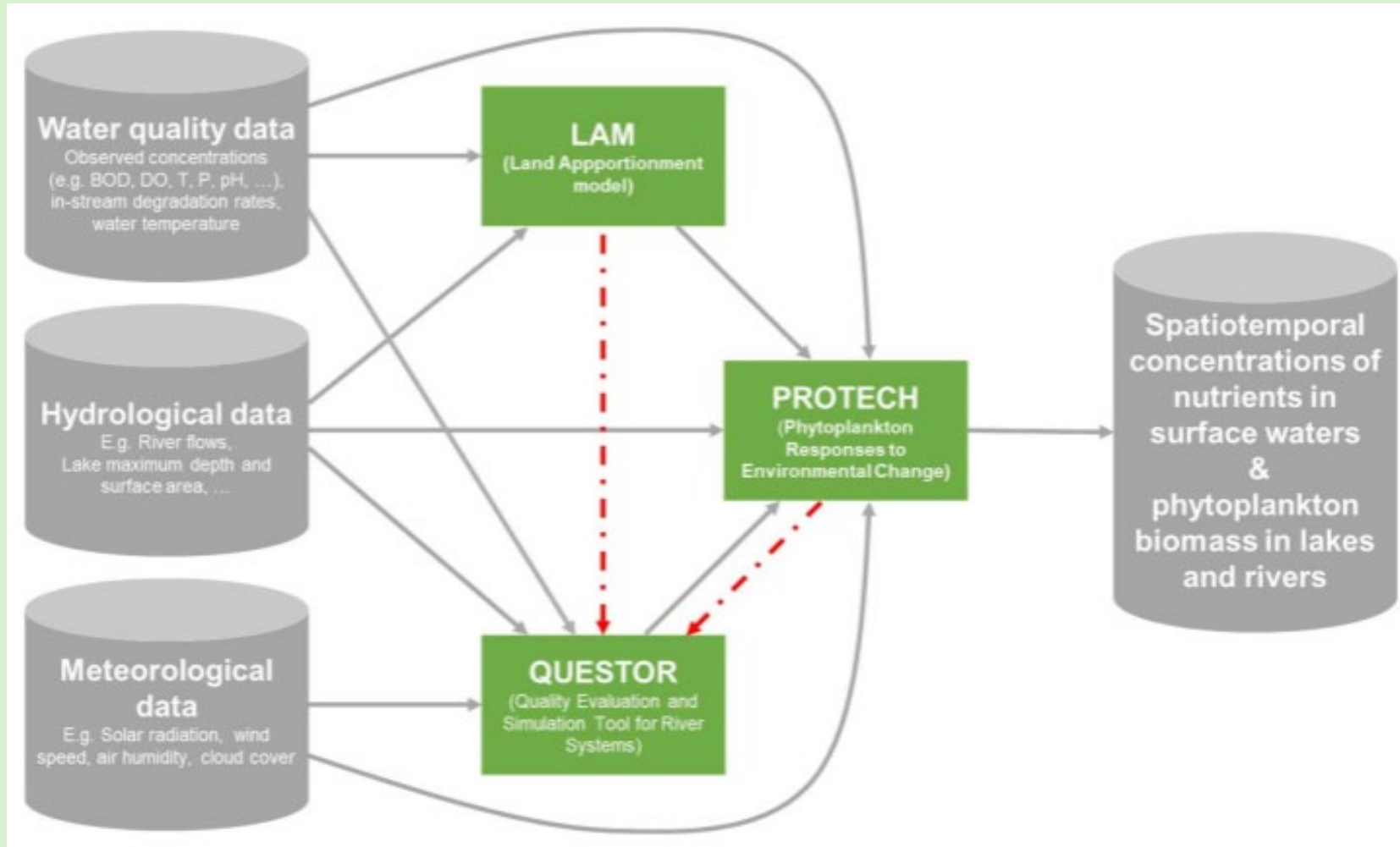
Water Quality Digital Twin

- “A virtual representation of a system that is constantly updated to accurately represent the current state and behaviour of the system”
- Bringing together data from multiple sources and (data-driven, process-based) models.
- Scoped with stakeholders (which time and space scales, ecosystem properties?).
- See our reports:
 - <https://nora.nerc.ac.uk/id/eprint/538010/>
 - <https://nora.nerc.ac.uk/id/eprint/536363/>



<https://www.iwmi.cgiar.org/blogs/can-digital-twins-help-river-basin-management-in-developing-countries/>

Water Quality Digital Twin



Fresh waters within the Pollution Theme

UK freshwater observatory

*“The River Thames catchment, **Cumbrian Lakes** and Loch Leven catchment will provide data on how nutrient pollution, climate warming and changes in land use influence freshwater biodiversity, including species-rich plankton communities (algae, cyanobacteria, grazers), and eDNA analysis of wider taxa”.*



What we monitor

Physical: water temperature, transparency

Chemical: pH, alkalinity, oxygen, soluble and total P, ammonium and nitrate, silica

Biological: chlorophyll-a, phytoplankton, zooplankton



New! eDNA sampling and development of image analysis approaches.



What we monitor

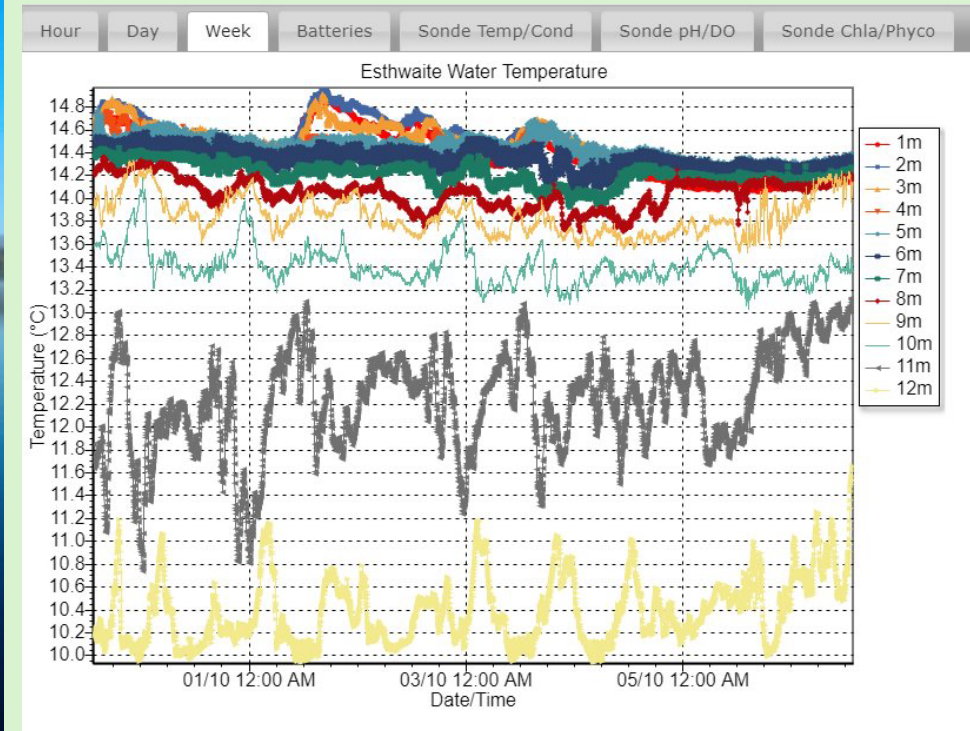
Physical: air and water temperature, irradiance, wind speed and direction, relative humidity

Chemical: pH, oxygen, conductivity, GHG fluxes

Biological: chlorophyll-*a*, phycocyanin

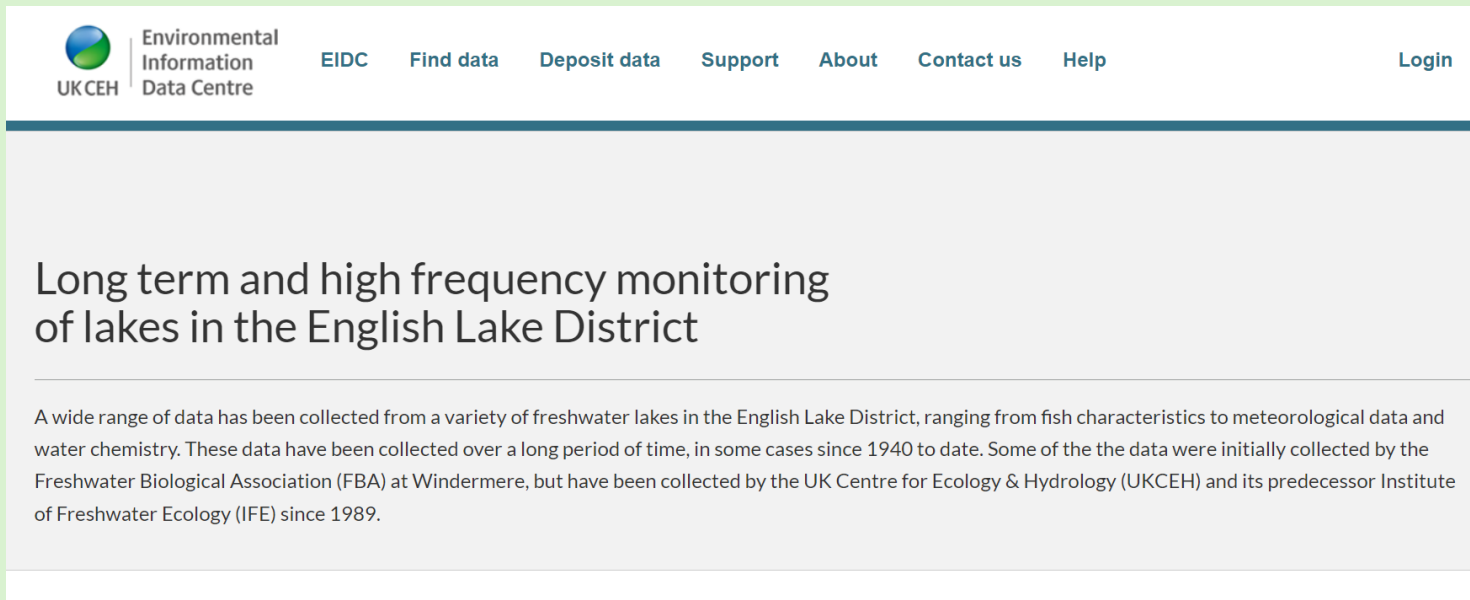


New opportunity! Developing near real-time data checking and visualisation.



Data availability

- NC-UK delivers data to the wider community
- Cumbrian Lakes data will continue to be published via the Environmental Information Data Centre



The screenshot shows the top navigation bar of the Environmental Information Data Centre (EIDC) website. The logo for UKCEH is on the left, followed by the text 'Environmental Information Data Centre'. The navigation menu includes links for 'EIDC', 'Find data', 'Deposit data', 'Support', 'About', 'Contact us', and 'Help'. A 'Login' link is located on the right side of the header.

Long term and high frequency monitoring of lakes in the English Lake District

A wide range of data has been collected from a variety of freshwater lakes in the English Lake District, ranging from fish characteristics to meteorological data and water chemistry. These data have been collected over a long period of time, in some cases since 1940 to date. Some of the the data were initially collected by the Freshwater Biological Association (FBA) at Windermere, but have been collected by the UK Centre for Ecology & Hydrology (UKCEH) and its predecessor Institute of Freshwater Ecology (IFE) since 1989.



Working together

- Do you see opportunities to collect new samples and data, and test new approaches?
- For example:
 - PML drone trial
 - UKCEH GHGAQUA ArcBoat trials
 - Newcastle University undergrad projects



Summary

- NC-UK is a new 5-year programme, delivering data and models to the UK community.
- Data will be made available.
- You can get involved – look out for engagement opportunities!



Thank You!

Find out more about
NC-UK:

<https://www.ceh.ac.uk/our-science/projects/national-capability-uk-challenges>

