

Case study: UKCEH Water Resources Portal

Leadership and transformation

The UK Water Resources Portal (UKWRP) represents a step-change in data access and real-time status information for anyone with a stake in water in the natural environment. It is an interactive portal that brings together rainfall, river flow, soil moisture and groundwater level data in one place, and makes them easily accessible at a national scale.

For the first time, government agencies, water companies, farmers, river trusts, researchers, and members of the public all have access to the same data.

The Portal does not just make data available but presents it visually through an intuitive interface. Any user can compare current conditions to those of the past, explore the severity and extent of past floods and droughts, and browse a full time-series of standardised indices.

The Portal has ambitions to embrace other datasets as they become available, and to further integrate historical data and model outputs.

www.eip.ceh.ac.uk/hydrology/water-resources



Did you know?

The Portal draws on data from:

- Over 1000 gauging stations in England
- 12 gauging stations in Wales
- Over 300 gauging stations in Scotland

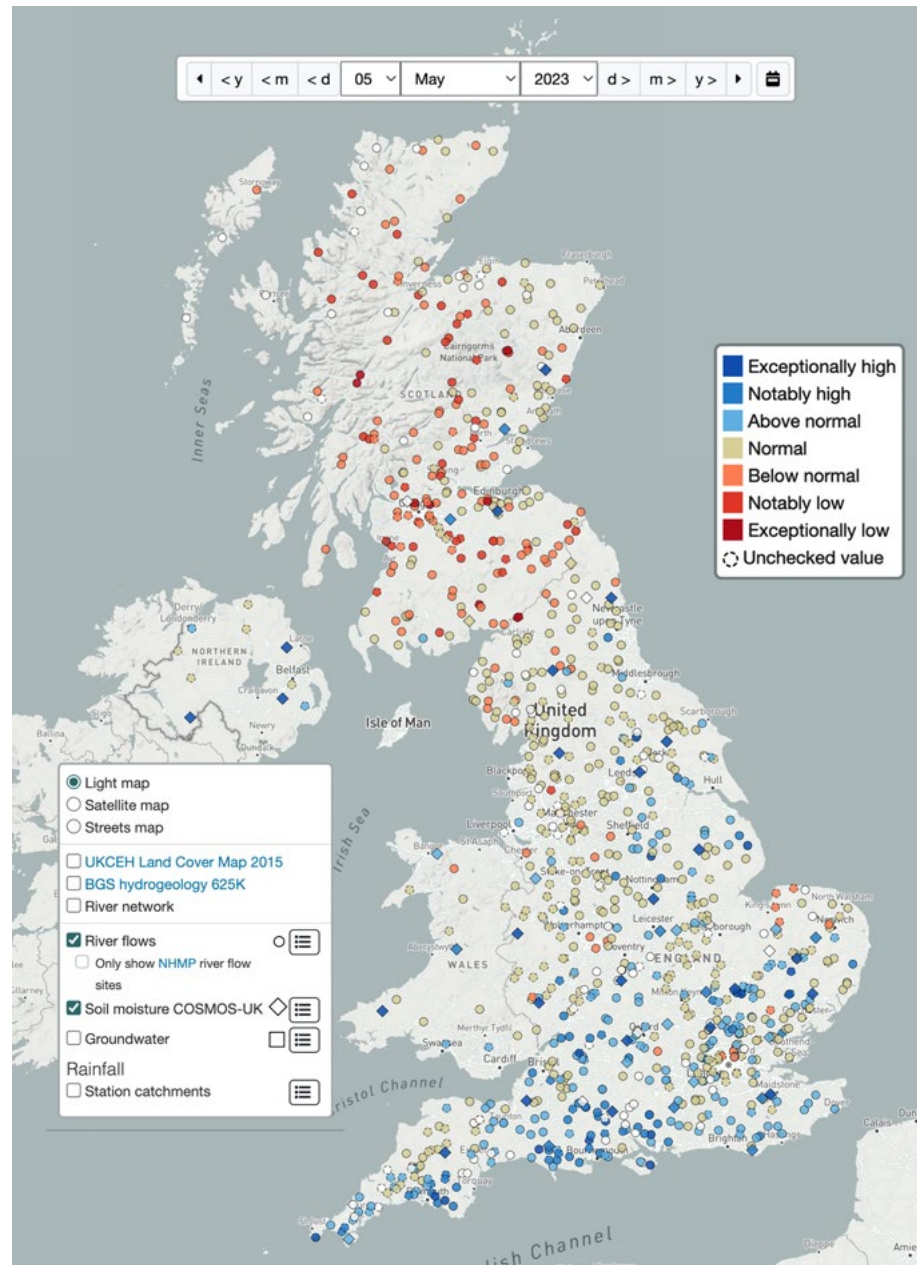
Integration

The UK Water Resources Portal integrates rainfall, river flow, groundwater, and soil moisture data, plus standardised indices for precipitation, stream flow, and groundwater. These come directly from a number of organisations including the Environment Agency, the UK Met Office, the British Geological Survey, and from UKCEH's environmental monitoring programmes.

Daily rainfall data is available for gauged catchments, whilst monthly data is catchment- and region-based. Daily river flow data from gauging stations in England and Wales is made available in near-real time.

The architecture of the Portal will allow the integration of different types of data in the future. This will include earth observations from satellites, and gridded model outputs, for example from Hydro-JULES.

A further plan is to embrace the power of citizen science to capture the impacts of extreme events. Members of the public will be asked to use a phone-based app – similar to that employed by UKCEH for the Biological Records Centre – to record video and images. These will be place- and time-stamped and would allow portal users to see the reality of rainfall and river flow at a particular location, and to view the impact on the ecology and the environment in that area.



Example of the UK Water Resources Portal

Did you know?

The Portal brings together

- River flows from the National River Flow Archive (NRFA, updated monthly), Environment Agency (EA, updated daily) and Scottish Environmental Protection Agency (SEPA, updated daily).
- Rainfall from the Met Office (updated daily).
- Soil moisture from UKCEH's COSMOS-UK soil moisture network (updated daily).
- Groundwater levels from the British Geological Survey (updated monthly).

Co-development, dialogue and engagement

The foundations for the Portal have been laid over many decades, and it builds on decades of inter-agency co-operation and data sharing to produce the Hydrological Summary, a monthly retrospective look at rainfall, river flows and groundwater levels across the UK. The ongoing value of these long-term relationships with agencies was highlighted in 2018 when the Environment Agency gave UKCEH early access to a suite of its APIs, providing near real-time access to EA data.

During the trial period, data availability was limited to Devon and Cornwall, so the Portal prototype focused on this area. Collaboration with South West Water helped to improve functionality and drove the development of new approaches to visualisation. This ensured that

graphical presentation was delivered in a way that was familiar and meaningful to water industry and regulatory users. This went down to a level of detail that included the colour-bandings used on hydrographs.

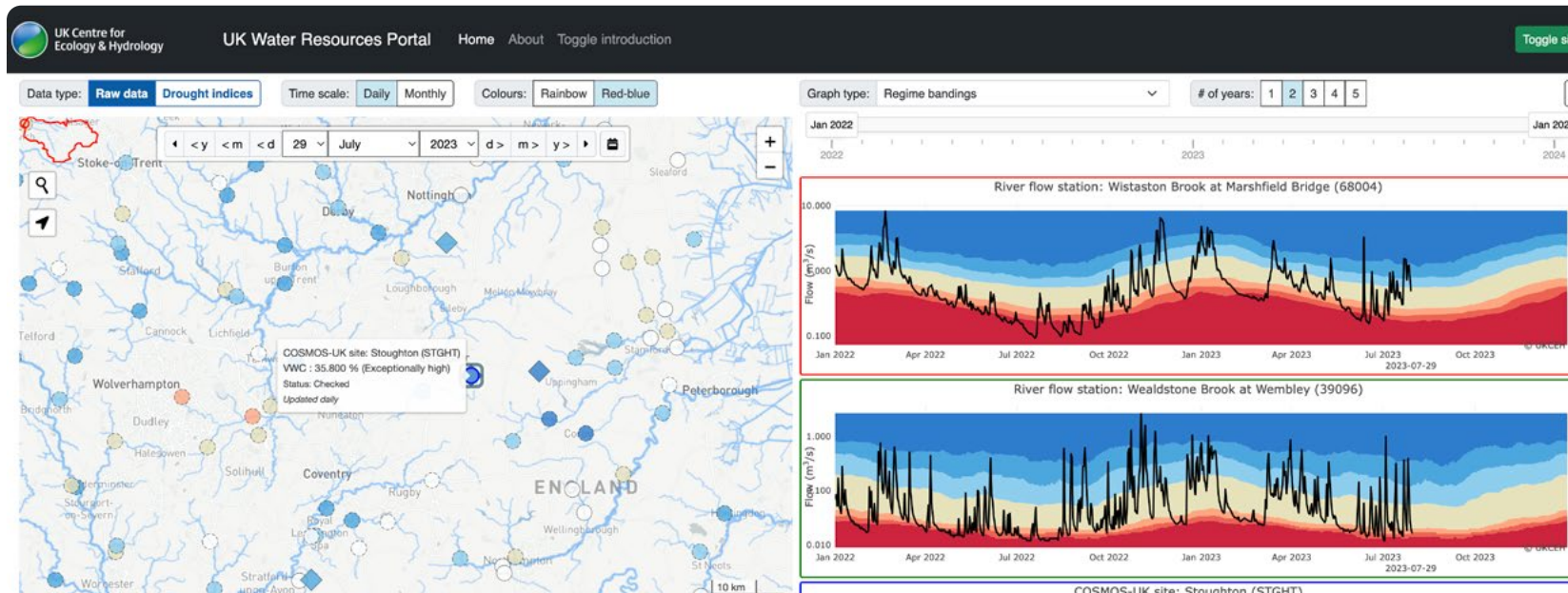
When data for the rest of England became available, a series of workshops were held to engage users from the water and energy sectors across the UK. Focused events were also held with specific organisations, such as at the National Farmers' Union. This meeting brought together farmers and abstractors. The Rivers Trust was another group that provided valuable feedback that further improved the usability of the system.

Engagement with existing and new audiences, including the media and citizen science groups, will continue to support the development of the Portal.

Did you know?

Data available in the UK Water Resources Portal include:

- Rainfall – 5km grid – 1862 to the present
- Rainfall – catchments – 1891 to the present
- Rainfall – hydrological units – 1862 to the present
- River flows – start of record for each site to the present
- Soil moisture – start of record for each site to the present
- Groundwater levels – start of record for each site to the present



Impacts

The UK Water Resources Portal provides seamless access to data at a national scale, but its ability to “zoom in” makes it extremely usable for local applications. For example, abstractors can access the same data that is used by the Environment Agency to monitor abstraction license conditions. This gives an abstractor greater confidence in deciding when they can take water from a river. It also helps them to plan for potential restrictions in the future.

At a regional level, the standardised indices within the Portal support water companies in their monitoring duties. Anglian Water uses them for drought management triggers within its operational activities. The indices are also routinely used as evidence of exceptional rainfall shortages to support statutory drought permit applications by other companies.

At the national level, the Environment Agency, Natural Resources Wales, and the Scottish Environment Protection Agency all use outputs from the Portal in their regular formal reporting.

A key feature of the Portal is that it can map the full range of variability – from extreme drought to extreme floods. Furthermore, it provides the tools for a user to map the transition to and from these states. This, coupled with the long-term nature of the data records, means that it is



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ideally positioned to answer questions of public interest such as, ‘How does the current situation compare to 1976?’ It is this type of pragmatic usability that will make the Portal increasingly valuable in building resilience to climate change.

The UK Water Resources portal can be accessed on the NRFA website

Behind the science: meet the experts

Jamie Hannaford

Principal Hydrologist



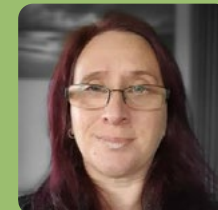
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