

Monitoring and early warning to support enhanced resilience to drought in the UK: recent advances, challenges and prospects

Stephen Turner With thanks to Jamie Hannaford, Lucy Barker & the NHMP and ENDOWS teams





National Hydrological Monitoring Programme

- Provides the authoritative voice of hydrological reporting for the UK
- Jointly undertaken by the Centre for Ecology & Hydrology (CEH) and the British Geological Survey (BGS)

Hydrological Summary for the United Kingdom

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British Geological Servey



The winter floods of 2015/2016 in the UK - a review

by Terry Marsh, Celia Kirby, Katle Muchan, Lucy Barker, Ed Henderson & Jamle Harmalant



https://nrfa.ceh.ac.uk/nhmp

UK Status, Change and Projections of the Environment



Submitted by Mr. Jumie Hannaford on Thu, 05/07/2018 - 14.41

An update on the UKs water situation during the current dry neither from Jame Hanneford and colleagues in CEHs. Hydrological Status and Outlooks group

Our previous blog posts discussed the dryness of late 2016 and early 2017, along with a damper interlude in summer 2017, culminating in a December 2017 update which highlighted the potential for drought and water resources stress in 2048

This was prompted by the successive dry autumniwater penods, which had reduced groundwater resources in much of southern and eastern England, increasing the chances of low groundwater levels and river flows in 2018. In the event, drought and water scaredy have indeed become discussion topics for summer 2018 - but not necessarily for the reasons we set out in the winter

Weather conditions in spring and summer 2018 (so far)

Spring 2018 changed the water situation dramatically, as illustrated below. A very well spring in the south and east of England regionished droundwater reserves, at the time largely assuaging lears of water resource stress in these areas.

So why are people failing about potential for hosepipe bans in summer 2018?

What happened at the end of 2017?



Met Office

2018: As a whole – Rainfall

UK as a whole received **95%** of the long-term average (LTA) rainfall.

Areas of northern and eastern Scotland received less than **75%** of LTA rainfall.





2018: As a whole – River flows

Below, and in some cases notably below river flows in northern and eastern Scotland.

Some above normal river flows in the south-west of England.





2018: Summer

June 2018 - July 2018 rainfall as % of 1981-2010 average





2018: Summer





2018: Summer







Impacts

Fire crews continue to battle three large wildfires in the Highlands

BBC NEWS

Waterbombs have been used to try to tackle the fire at Tor



Stroke can be seen rising from the heath fire near Sligachan on Skye

Impacts



BUSINESS / FARMING / FARMING NEWS

Potato fields under pressure as drought conditions continue

By Nancy Nicolson ③ July 11 2018, 7.45am

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Conditions in Scotland's potato fields are rapidly approaching those experienced during the drought of 1976, when yields crashed, scarcity created demand and prices rocketed to an unprecedented £300/tonne.



③ 4 July 2018



Farmers have warned of an impending crisis amid drought conditions in parts of Scotland.



Joyce Campbell said this silage field should be getting cut but it is brown and burned rather than lush and green.

Impacts



Bruce McConachie said he has never seen this ford with less than six inches (15cm) of water in it.



NEWS / ABERDEEN

Hundreds of communities across Scotland urged to conserve their water as dry conditions continue

🕥 by Kieran Beattie 👘 🔿 July 6, 2018, 6.37 am

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Drought conditions have led to an unprecedented water shortage warning for the north and north-east.



Outlook for 2019



Hydrological Outlook UK



"Notwithstanding healthy reservoir stocks and a wet start to March, further rain is needed over the next six weeks to counter long-term rainfall deficits and reduce the risk of pressure on water resources later in the year..."

(Hydrological Summary, February 2018)

http://www.hydoutuk.net/

March 2019



The UK Drought Portal

A web-based tool for high-resolution drought mapping and time series plotting in near-real-time

- Gridded drought indicators (SPI)
- 5km resolution or catchment data
- Data from 1961
 with monthly
 updates of SPI
- Free data downloads (to 2015)





www.eip.ceh.ac.uk/droughts



Using the UK Drought Portal

- Used by stakeholders in summer 2018 to communicate the drought situation internally
- Used by Yorkshire Water to support drought permit applications









YorkshireWater





Extending the UK Drought Portal

Coming soon (early 2019) Demonstrator portal for SW England (featuring daily real-time river flow and customised visualisation options)



Next: Anglian demonstrator

(featuring Earth Observation and COSMOS-UK soil moisture)



Real-time, wide area soil moisture <u>https://cosmos.ceh.ac.uk/</u>

These innovations will be tested iteratively with stakeholders through 2019 and then will feature in a future version of the national UK Drought Portal

Seasonal Forecasting - ENDOWS **About Drought**

Aim: Work with water managers to demonstrate the benefits of drought forecasts and overcome barriers to uptake

Co-evaluation: How do we co-design and evaluate the forecast reliability, uncertainties, spatial/temporal scales?

Case Studies: on application of streamflow forecasts in ongoing dry weather



Jamie Hannaford, Maliko Tanguy, Nikos Mastrantonas, Katie Smith





Engaging potential users with live forecasts during summer/autumn 2018





Operational Outputs





Providing Reasonable Worst Case Scenarios for the EA

Maliko Tanguy, Nikos Mastrantonas



How much rainfall is required to end the drought? How likely is that to occur?

Ali Rudd, Rhian Chapman, Vicky Bell

SUMMARY: During November, limited areas in south-east England would require rainfall with a return period of 5 to 10 years in order to

overcome the dry conditions.

Over the next 6 months the majority of the country would not require particularly unusual rainfall (0 to 5 year return periods) to return to average conditions for this time of year.



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National Hydrological Monitoring Programme: https://nrfa.ceh.ac.uk/nhmp UK Drought Portal: www.eip.ceh.ac.uk/droughts/ About Drought: www.aboutdrought.info



