

UK Hydrological Bulletin:

May – July 2018

With a weak Jet Stream tracking to the west and north of the UK throughout most of the late spring and early summer, high pressure dominated synoptic patterns, resulting in persistently dry and hot conditions over much of the country. Correspondingly, evaporative demands were exceptional, river flows generally declined steeply and the 2017/18 aquifer recharge season ended both early and abruptly. The arid landscape and soaring temperatures made comparisons with the extreme drought of 1976 inevitable. But whilst the latter was already well entrenched by the spring, the 2018 drought began with generally healthy reservoir stocks. However, runoff rates generally declined steeply from early on and the very arid conditions produced considerable agricultural stress and a much-heightened fire risk. In many impermeable catchments, previous minimum flows — for mid-summer — were eclipsed. Heavy local demands overstretched some water supply networks and a few small reservoirs (e.g. in Lancashire) ran dry. The lack of rain triggered a hosepipe ban in Northern Ireland and thence in northwest England. Generally however, stocks in most strategic reservoirs remained within the seasonal range entering July and groundwater levels were typical for the time of year. However, with soil moisture deficits at near-record levels across much of country any early termination of the drought stress is very unlikely.

May was a notably warm and dry month with rainfall less than 60% of average across much of the northern half of the country. Rainfall totals were generally healthier to the south and above average in those areas where intense thunderstorms late in the month triggered a number of flood warnings and flash flood events. On the 27/28th a 24-hr total of 93.9mm was reported from Edgbaston, Birmingham — including 53.6 in an hour; higher

accumulations may have been captured nearby. Flooding was locally severe with substantial transport disruption. Many London rivers were also in high spate. Generally however, May saw a steep decline in river flows, particularly in Northern Ireland and Scotland where estimated outflows at month-end were close to the lowest on record. This underlined the greater vulnerability of the largely impermeable northern and western catchments to rainfall deficiencies in the spring and early summer. Nonetheless, reservoir stocks — the north-west of England aside — remained well within the normal late spring range.

Although the passage of storm Hector on the 14th brought heavy rain to parts of western Scotland and Northern Ireland, June was a very warm and exceptionally dry month across most of the country (see Fig. 1). Especially arid conditions characterised parts of southern Britain — the Thames and Southern regions both registered only 3 mm of rainfall for the month and most of London reported <1 mm. England & Wales registered its driest June since 1925. Correspondingly, soil moisture deficits climbed steeply and, by month-end, closely matched the highest on record for late June, in a series from 1961 (see Fig. 2). Accordingly, irrigation demands increased while runoff rates declined markedly. For many rivers – including the South Tyne

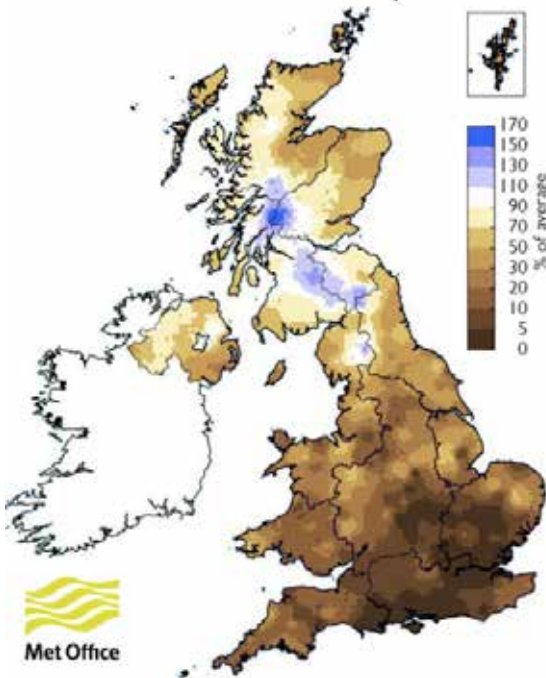


Fig 1 June 2018 rainfall as a percentage of the 1981-2010 average

(Northumbria), Yscir (south Wales), Taw (Devon) and, in Scotland, the Spey (Fig. 3) end-of-month flows were at, or around, the minimum on record for the time of year. Consequently, reservoir stocks across most of the country declined substantially. Impacts were most severe in north-west England and a few small reservoirs (e.g in the southern Pennines) were effectively dry. Generally, reservoir stocks across the UK remained within about 10% of the average for the time of year and groundwater levels were within

the normal early summer range across most major aquifer outcrop areas.

With drought conditions extending across much of northern Europe, the UK drought — whilst easing in some northern regions — further intensified through July. Many areas in central and southern England registered accumulated rainfall totals of less than 5mm over 50 or more successive days. The landscape took on an exceptionally arid complexion, moorland fire risk remained at a high level and with minimal grass growth, fodder supplies for livestock were dwindling. The contraction in the stream network accelerated and a number of fish rescues were required, for example on the Teme (Warwickshire) on the 3rd. Runoff rates in many permeable catchments

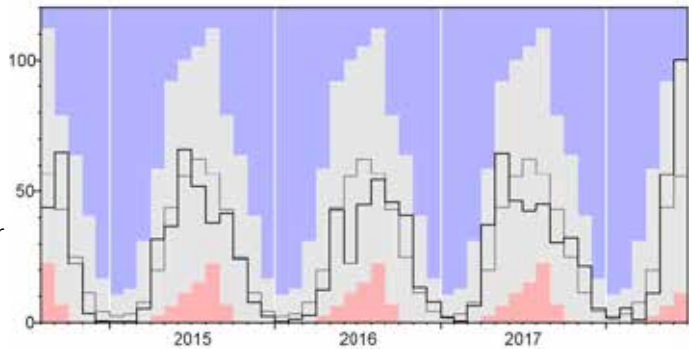


Fig. 2 End-of-month soil moisture deficits for the UK. The blue and pink envelopes define the long term maximum and minimum; the grey trace is the long term average. Data source: MORECS

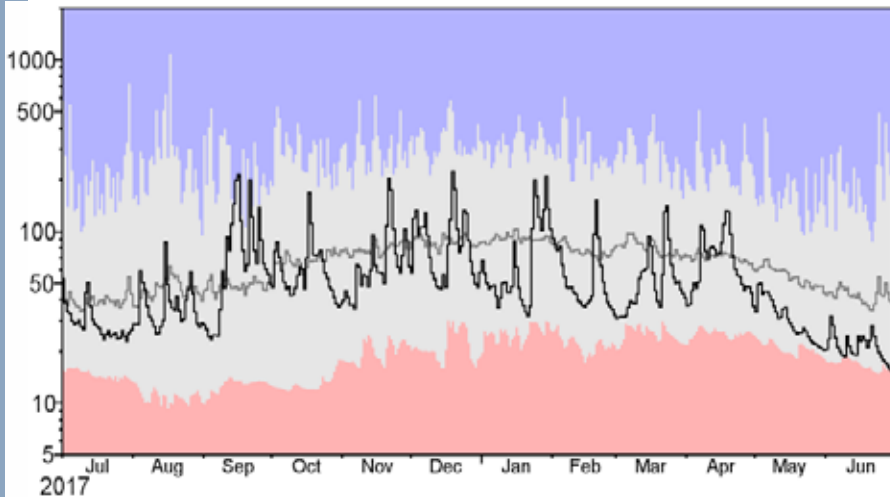


Fig 3 Daily flows in the River Spey at Boat o Brig (black trace, the blue and pink envelopes are the long term daily max. and min., the grey trace.

held up well but previous minimum July flows were widely eclipsed in rivers with little baseflow support. On the 17th, a hosepipe ban (operating from July 5th) was announced by United Utilities affecting 7 million customers in north-west England and a substantial length of the Leeds-Liverpool canal was scheduled for closure at the end of the month. Parched soils imply that runoff rates are very likely to decline further through the late summer and water resources stress will intensify in the absence of above average autumn rainfall.

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25/7/18*