

UK Hydrological Bulletin: February – April 2019

The UK climate is inherently variable but weather patterns through the early months of 2019 have been especially capricious with large spatial and temporal variations in both rainfall patterns and in river flows. A number of notable flood interludes, culminating in mid-March, contrasted with seasonally depressed river flows and groundwater levels — in eastern Britain particularly. For the UK as a whole, the May 2018 to February 2019 rainfall was the second lowest (for that 10-month timespan) since 1972/73. Fortunately in a water resources context, March precipitation was the highest for twenty years at the national scale. This provided a very timely boost to reservoir stocks across much of the country and, in many areas, provided impetus to the seasonal recovery in groundwater levels. April was exceptionally mild with seasonally high evaporative demands — the latter restricting groundwater recharge particularly in eastern England where, in the absence of exceptional May rainfall, very moderate summer flows may be anticipated in spring-fed rivers and streams.

A wintry start to February was accompanied by significant snowfall across most of the country. Subsequently, very mild conditions prevailed: for the UK it was the second warmest February on record. A cyclonic episode, culminating on the 9th (when a 48-hr rainfall total of 82 mm was recorded at Shap, Cumbria), triggered a steep recovery in river flows (see Fig 1). Flood alerts were widespread, from central Scotland to South East England. A continental high pressure cell then extended westwards bringing notably dry and mild conditions. As a consequence, both evaporation demands and soil moisture deficits were well above the seasonal average. One consequence was a notable decline in river flows; month-end outflows from Great Britain

were the second lowest since 2003. Particularly low flows characterised rivers in south-east Scotland and north-east England where January-February runoff for the River Coquet eclipsed the previous minimum in a series from 1964. This, together with notable rainfall deficiencies over the May 2018-February 2019 period and the delayed recoveries in groundwater levels in much of southern and eastern England, resulted in some concern for the water resources outlook.

A major synoptic change in early March heralded a notably wet fortnight, particularly in Wales, northern England, southern Scotland and, especially, Northern Ireland where the previous maximum March rainfall total (in a series from 1910) was eclipsed.

A sequence of deep Atlantic low pressure systems crossed the country resulting in very large rainfall accumulations in, mostly, western areas. In mid-month a five-day rainfall total of 264 mm was recorded at Capel Curig in north Wales. Correspondingly, flood alerts were widespread and, in Northern Ireland, several rivers registered more than twice their average March runoff, such that for the river Mourne the previous maximum runoff for March, in a series from 1982, was eclipsed.

Daily outflows from the UK as a whole also exceeded the previous maximum for mid-March but subsequent recessions were very steep as

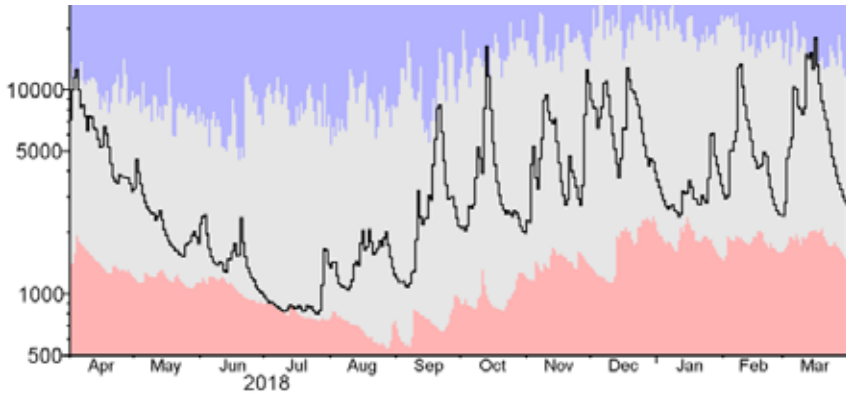


Fig 1 Daily outflows (m³s⁻¹) from Great Britain (black trace), the blue and pink envelopes are the daily max. and min. flows in a series from 1961

much of the country registered virtually no rainfall over the last fortnight. Consequently, many rivers in southern England and East Anglia reported well below average flows and groundwater level recoveries had yet to gather any momentum across much of the slower-responding Chalk outcrop

Entering April, and notwithstanding below average rainfall over the winter half-year,

estimated overall reservoir stocks for England & Wales were marginally above average for the time of year. Stocks in almost all index reservoirs were within 15% of capacity; Roadford in Devon was a significant exception.

Groundwater levels in wells and boreholes exhibited large regional and more local contrasts — reflecting differences in rainfall patterns and the responsiveness of individual aquifer units. Exceptionally high levels characterised the Permo-Triassic sandstones of south-west

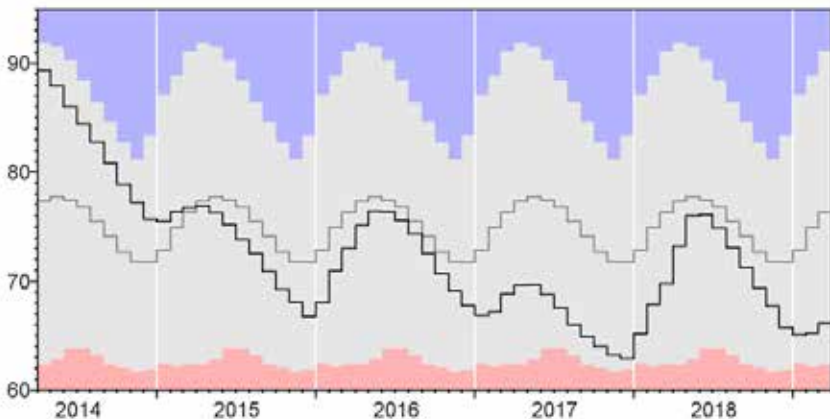


Fig 2 Monthly groundwater levels (black trace) for the Stonor (Oxfordshire) well in the Chalk of the Chilterns. The blue and pink envelopes are the max. and min. monthly levels and the grey trace in the long term monthly average

Scotland whilst, in contrast, levels in some eastern and southern Chalk wells and boreholes remained depressed; at Dial Farm (Suffolk) levels were the lowest for mid-spring for twenty years.

After an unsettled first week, with significant snowfall on northern hills — meltwaters contributing to spates in Scotland particularly — high pressure centred over Scandinavia dominated synoptic patterns bringing seasonally cold and dry conditions across the UK;

thence succeeded by very warm conditions over the Easter period. Flow recessions became re-established and were of most concern in groundwater-fed streams in eastern England where well above average soil moisture deficits are likely to delay any sustained recovery until the autumn.

Terry Marsh
25/4/19