UK Hydrological Bulletin: May 2014 – July 2014

Late spring and early summer rainfall in 2014 has been well within the normal range but the legacy of the exceptionally wet winter is still evident in river flow patterns and groundwater levels across parts of the country. Overall reservoir stocks remained considerably above the seasonal average throughout May and June and in many slower-responding aquifers groundwater levels were close to, or above, seasonal maxima; groundwater flooding (of cellars particularly) continued well into the summer in a few vulnerable localities. Soil moisture deficits remained seasonally modest during May but, although convective storms made for large local variations, they climbed steadily in June and July.

The hot and humid conditions contributed to a high frequency of convective storms, often accompanied by substantial flash flooding and transport disruption. Short-lived spates were common but, by August, most major rivers were following typical summer recessions. With reservoir stocks close to, or above, average in most parts of the country the water resources outlook remain generally healthy.

May was a very unsettled month; parts of western Scotland and England recorded more than twice the average rainfall. The latter contributed to a national total for the December 2013 – May 2014 period which is, provisionally, the highest for any six-month sequence in a series beginning in 1910. There were however marked spatial variations in the May rainfall; north-east Scotland received below average rainfall, continuing a relatively dry spell that persisted throughout the spring. Elsewhere, a significant proportion of the rainfall fell in intense storm events triggering many pluvial and some fluvial flood events. Weather patterns late in the month were more typical of March and sustained rainfall, particularly in the Midlands and East Anglia, triggered a number of Flood Alerts (on the Great Ouse and Witham for example) and one Flood Warning (on the lower Nene in Northamptonshire; tidal blocking was an aggravating factor). Notwithstanding its cool conclusion, the spring of 2014 was the third warmest on record for the UK. Spring rainfall totals were moderately above average in most regions and runoff totals were generally above average, and the highest on record for a few rivers supported primarily by groundwater outflows (e.g. the Lambourn). By contrast, the Deveron in north-east Scotland reported its second lowest spring runoff since 1961; flows approached the lowest on record on several occasions (see Figure 1)

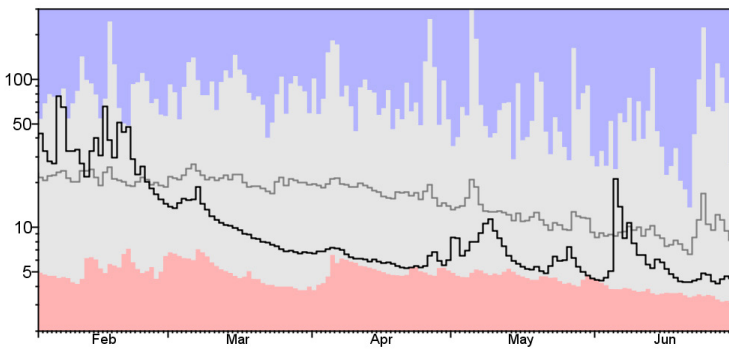

Fig 1 *February-June 2014 daily flows in the river Deveron at Muiresk (blue and pink envelopes are the highest and lowest flows on record; the grey trace is the long term daily average)*

June was a warm and relatively dry month; for many areas the first since last November to register above average rainfall. Regional and local variations in June rainfall totals were however large. A few areas, e.g. adjacent to the Moray Firth were notably wet but well below average rainfall characterised much of north west Britain and the South East where totals fell below 30% of average; parts of Kent registering less than 10mm. The limited spatial coherence reflects the impact of convective storms – facilitated in part by the convergence of Atlantic and sub-tropical air masses. Flash flooding events were widely reported (e.g. following a five-hour, 57mm storm at Boughton-under-Blean in Kent on the 28th) and a number of fluvial flood warnings were also issued (e.g. in the Midlands at the end of the first week and in the South in mid-month). Generally however sustained recessions became established after spate conditions early in the month and flows had fallen considerably below average by month end. Exceptions included flows in many groundwater-fed rivers and streams, particularly those draining the central southern Chalk, where groundwater levels at Stonor Park were the 2nd highest for June (after 2001) in a 55-year series, and, less extensively, the Permo-Triassic sandstones outcrops of north-west England and southern Scotland where groundwater level recessions continued to track considerably above any previously recorded.

For much of July, ridges of high pressure restricted

Plate 1 *Spring outflows coalescing at Watery Lane, near Skirmett in the Chilterns 4/7/2014*

the passage of Atlantic frontal systems but convective rainfall again remained a threat particularly over the latter half of the month as heatwave conditions developed – most obviously in southern and eastern areas. Some exceptional storm events were reported: at Westonbirt (Gloucestershire), 34.2mm fell in a single hour on the 19th contributing to a 25-hour total of 66 mm – exceeding the July average for this location. Many localities registered storm totals >25mm and local flash flooding events, with associated transport disruption, were common. The number of Groundwater Flood Alerts had dwindled substantially through the early summer and only a handful remained extant entering July. However, outflows from middle-level springs remained notably heavy in some aquifer outcrop areas (e.g. the Chilterns) and groundwater flooding persisted in a localities (see Plate 1). Such circumstances aside, river flow patterns during July remained with the typical summer range across most of the country.

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