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Drought Returns to the United Kingdom*

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The privatization of the water industry in 1989 heralded a new era in water management in England and Wales, but it also coincided with the beginning of a period of volatile climatic patterns that have served to strongly underline a continuing vulnerability to unusual weather patterns. Following the very protracted drought that lasted until late 1992 in parts of eastern England, the resilience of water supply arrangements in the United Kingdom was again severely tested during a remarkably dry five-month spell beginning in the early spring of 1995. The water resources outlook at the beginning of this period was exceptionally healthy—reservoirs were at capacity and ground water levels were close to seasonal maxima following the wettest 30-month sequence in the entire British rainfall series, which extends back to 1869. However, the subsequent transformation in hydrological conditions has few, if any, modern parallels. For much of the spring and most of the summer, a northward extension of the Azores high pressure cell served to deflect most rain-bearing frontal systems and bring subtropical air masses across the British Isles. Rainfall deficiencies built up quickly and a heat wave throughout much of July and August produced a marked intensification in drought conditions. August rainfall totals were less than 15% of average over wide areas, and the mean temperature established the month as the second warmest in the 337-year Central England Temperature series.

Rainfall figures for the drought period indicate that the summer (June–August) failed only marginally to eclipse 1976 as the driest in the full England and Wales series (from 1767). However, with Scotland registering its second driest summer on record, the June–August rainfall total for Britain has established a new summer minimum. In the five-month time frame, the aridity of England and Wales was even more exceptional: the April–August rainfall total is the lowest for any five-month sequence in more than 200 years. This, coupled with the hot sunny conditions, which resulted in evaporation demands exceeding the average (typically by 20%), meant that some stress on water resources was inevitable.

During the early summer, the drought was primarily of the water supply variety, the distribution network being unable to ship sufficient water from source to tap in the face of unprecedented demands—often associated with surges in garden watering. Around mid-July, the drought entered a transitional phase as the mismatch between resource depletion and replenishment produced rapidly dwindling reservoir stocks. This was most evident in those areas supplied from small reservoirs not yet integrated into regional networks. By late August, the drought had intensified markedly and overall reservoir stocks had declined to below the corresponding total for the drought years of l989 and l990. In some areas (mostly western and northern), a real threat to resources thus became established, and concern focused on water supply prospects for 1996. Fortunately, ground water levels in the Chalk limestone, England's most important aquifer, remained mostly within the normal range (a consequence of the abundant rainfall throughout the winter of 1994–95), providing an important buffer against the effects of the exceptionally dry summer.

Early September witnessed a further dramatic change in weather patterns with a sequence of active frontal systems sweeping across most regions. Several areas recorded more rainfall over the first 10 days of September than in the preceding 10 weeks, and localized flooding was widely reported. This encouraging transformation—and the decline in evaporation demands as the growing season came to an end—greatly eased the water supply stress. However, some strategically important reservoir systems failed to benefit from the early autumn rainfall and, with soils still dry in some catchments, the post-drought recovery has been patchy. Having just survived a repeat of the 1976 summer, any repetition of the 1975–76 winter rainfall pattern would be particularly unwelcome—it would provide only a very narrow window of opportunity for reservoir restocking and aquifer replenishment before evaporation rates and water demand pick up again in the spring of 1996.

In 1995, almost 18 million people have been affected by hose/sprinkler bans and, in a few areas, the threatened introduction of rota cuts or standpipes. This produced considerable consumer resentment, but the use of some measures to restrict demand is not surprising, given the inordinate nature of the recent rainfall deficiency. The perspective provided by historical rainfall and temperature records appears to suggest that the level of risk adopted for resource management purposes is of the right order. However, consumer tolerance of demand management measures may be changing; importantly, the climatological backcloth may also be changing. Summer rainfall and temperature anomalies plotted for England and Wales over the last 20 years show a distinct clustering in the warm/dry quadrant. Singular as the conditions experienced in the spring and summer of 1995 have been, passable rehearsals occurred in 1994 (briefly), 1990, 1989, and 1983, suggesting that the historical rarity of drought events may no longer be a reliable guide to their contemporary frequency.

Note: For the last seven years, the Institute of Hydrology (IH) and the British Geological Survey (BGS) (both component bodies of the Natural Environment Research Council) have maintained a national hydrological monitoring program. The National River Flow and National Groundwater Archives (maintained by IH and BGS, respectively) provide the necessary historical perspective within which to examine contemporary variability. Hydrological summaries for Great Britain are published on a monthly basis and are available, on subscription, through the National Water Archive Office. For further details, see the World Wide Web site at http//wlcomms.nwl.ac.uk/ih.

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