River Kennet, United Kingdom

Location
The River Kennet is located in southern England. It is a tributary of the River Thames which flows into the North Sea through London.

Catchment description
A mainly pervious catchment (Chalk with significant Drift cover), but the lowest quarter is largely impermeable. A primarily rural catchment with scattered settlements (Newbury is the largest town); there is significant urban growth along the Kennet valley with a number of smaller towns including Hungerford and Marlborough.

Key descriptors:

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catchment Area</td>
<td>1033.4 km²</td>
</tr>
<tr>
<td>Level of Station</td>
<td>43.4 m a.s.l.</td>
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<tr>
<td>Maximum Altitude</td>
<td>297.0 m a.s.l.</td>
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<tr>
<td>Mean flow</td>
<td>9.80 m³s⁻¹</td>
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<tr>
<td>95% exceedance (Q95)</td>
<td>3.77 m³s⁻¹</td>
</tr>
<tr>
<td>10% exceedance (Q10)</td>
<td>17.5 m³s⁻¹</td>
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<tr>
<td>1961-90 Average annual rainfall</td>
<td>759 mm</td>
</tr>
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</table>

Hydrological summary
The flow regime is dominated by the slow response of the groundwaters held within the catchment’s chalk aquifers (see flow hydrograph). The featured year, 2007, contains a flow peak that is atypical of the recent record, but not unprecedented in the hydrology of the region. The River Enbourne, a tributary in the lower part of the catchment is more responsive because of the underlying clay geology.

There is little net impact of abstractions and discharges (e.g. a minor contribution to Kennet & Avon canal, some groundwater abstraction for public water supply, and abstraction for agriculture and industry).
**Data availability**

Flow data are measured at the catchment outlet and at a network of additional stations by the Environment Agency of England and Wales. Monthly and daily flow, and information on flow peaks are available from the National River Flow Archive maintained by the Centre for Ecology and Hydrology. Information describing these sites and the period of record are shown below.

The flow monitoring at Theale is at a Crump profile weir (15.9m broad) equipped with pressure tapping (not used) & d/s recorder. A cableway was installed in 1999 but subsequently removed. Flow over the weir is modular up to 24 m$^3$s$^{-1}$ and all but highest flows are contained within the structure of the weir. Bypassing occurs above 29 m$^3$s$^{-1}$, hence flood flows may be underestimated.

Data can be downloaded from [http://www.ceh.ac.uk/data/nrfa/index.html](http://www.ceh.ac.uk/data/nrfa/index.html).
Hydrological Observatory description

Supporting data are also available, for example hydro-geological maps.
Research Activity and Outputs

- Catchment scale nutrient balances
- Nutrient loss from agriculture
- Macrophyte growth and management
- Sediment and nutrient dynamics

Facilities

Because of the long running research activity in the Kennet catchment, CEH can provide access to many field sites through established relationships with landowners.
In addition to this, CEH owns a 600m stretch of the River Lambourn near Boxford and an associated 10 hectare wetland. Groundwater-fed chalk streams drain large areas of southern and eastern England and the River Lambourn is an excellent example as it drains one of the least modified catchments, with high biological and chemical classifications. Water meadows adjacent to the Lambourn have been designated Sites of Special Scientific Interest (SSSI) and the river is nationally important for the diversity of its invertebrates.

In April 2008 an automatic water quality monitoring station was set up to measure water level, pH, electric conductivity, dissolved oxygen, water temperature and turbidity at 15 min resolution. A water sampler is also at the site and is triggered by water level to obtain samples for suspended sediment concentration analysis.

The site is also instrumented with boreholes and river piezometers. Chemistry samples are taken from the site on a weekly basis for nutrient and metal analysis (water and sediment phase). Water sampling will be reviewed after 1 year.

A weather station will be installed at the site in the summer of 2009, as will telemetry links for all automatically sampled data.

New technologies such as in situ spectrophotometers will be tested at the site during Autumn 2009.

**Institutional support**

Despite changes to the organisations that monitor and curate the data, the lengths of the records demonstrate the commitment of all those involved at the observatory. Within CEH, the NRFA has maintained the national hydrological archives on behalf of the monitoring agencies since the 1980s and this is now recognised as part of CEH’s National Capability.

The Boxford site is also part of CEH’s national capability and its purchase demonstrates CEH’s commitment to lowland catchment research. This complements upland monitoring and research established at Plynlimon in the 1960s and maintained to the present day.

**Value to network**

The River Kennet is located in a region of low rainfall and high demand leading to pressures on the available water resources. Predicted impacts of climate change will exacerbate this situation.
Hydrological Observatory description

The Kennet Observatory provides data for hydrological conditions that are common in its region but which are quite different from those monitored by many other observatories in the network. Some important distinguishing features of the Kennet catchment in the European context are: very permeable aquifers, low precipitation combined with a temperate climate, and high water abstraction for households and industry.

Contact for further information

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Hydrological Observatory description


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