Summary – January 2020
After a record breaking wet autumn January has seen a continuation of December’s more normal rainfall totals. Soil Moisture Deficits (SMDs) have remained near zero. Rase Bishopbridge is the only river flow site still considered exceptionally high with all other river flows lowering to above normal and normal. Groundwater levels, however, aren’t falling as quickly with most sites being exceptionally high. All reservoirs are operating above their normal operating curves. Flood warnings and flood alerts were issued throughout January, all associated with the Barlings and Witham catchments.

Rainfall
The rainfall in January fell mostly in the first two weeks with a drier end to the month. The rainfall totals are considered normal in all but the two northern catchments which are considered below normal; with the lowest rainfall being 64% of the catchment’s LTA. The largest amount of rainfall recorded came from the Upper Welland and Nene catchment which showed 95% of the catchment’s LTA (50mm of rain). The record breaking rainfall total of the 2019 winter is still having an effect on the last 6 months and last 12 month’s rainfall with all catchments still being exceptionally high. However, the last 3 month rainfall has shown recovery from the record high rainfall totals with all but 2 catchments being ‘above normal’.

Soil Moisture Deficit/Recharge
Continuing on from the above average rainfall in December soil moisture deficits (SMDs) are near zero throughout the area.

River Flows
The below normal and normal rainfall totals for January has allowed the river flows to continue to drop. Only Rase Bishopbridge is considered exceptionally high still. All the other sites are considered ‘above normal’; apart from Partney, Fulsby, and Langworth which are considered ‘normal’.

Groundwater Levels
Across both the chalk and Oolitic limestone there has been a decrease in groundwater levels. Despite this, all sites but Horkstow Rd, Leasingham Exploratory, Dunholme Rd, and Castlethorpe Bridge are still considered exceptionally high.

Reservoir Storage/Water Resource Zone Stocks
Pitsford is operating at 100% capacity, all other reservoirs are operating above their normal operating curves.

Environmental Impact
All transfer schemes have been turned off until next operational season. January saw 8 Flood Alerts from the 7th to the 10th and then 8 Flood Alerts and 2 Flood Warnings from the 14th to the 15th, all along the Barlings and Witham catchments.

Forward Look
Probabilistic ensemble projections for river flows at key sites
March 2020: There is a decreased probability of flows below the normal range on the Nene in March. June 2020: There is a decreased probability of exceptionally low flows on the Nene in June.

Probabilistic ensemble projections for groundwater levels in key aquifers
March 2020: There is an increased probability of exceptionally high groundwater levels in March. September 2020: There is a reduced probability of exceptionally low groundwater levels in September.

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Rainfall

Total rainfall for hydrological areas across England for the current month, the last three months, the last six months, and the last 12 months, classed relative to an analysis of respective historic totals. HadUK data based on the Met Office 1 km gridded rainfall dataset derived from rain gauges (Source: Met Office © Crown Copyright, 2019). Provisional data based on Environment Agency 1 km gridded rainfall dataset derived from Environment Agency intensity rain gauges. Crown copyright. All rights reserved. Environment Agency, 100026380, 2019.
Soil Moisture Deficit

Anholme Grimsby Louth
Ranking derived from data for the period Jan-1961 to Dec-2012

Steeping Great Eau and Long Eau
Ranking derived from data for the period Jan-1961 to Dec-2012

Witham to Chapel Hill
Ranking derived from data for the period Jan-1961 to Dec-2012

South Forty Foot and Hobhole
Ranking derived from data for the period Jan-1961 to Dec-2012

Upper Welland and Nene
Ranking derived from data for the period Jan-1961 to Dec-2012

Lower Welland and Nene
Ranking derived from data for the period Jan-1961 to Dec-2012

Exceptionally low
Above normal
Normal
Below normal
Notably low
Notably high
Exceptionally high
Latest data
Groundwater Levels

Groundwater Sites

Class

- Exceptionally high
- Notably high
- Above normal
- Normal
- Below normal
- Notably low
- Exceptionally low
- No data

Dunholme Road, Scothern
Ranking derived from data for the period Nov-1979 to Dec-2017

Castlethorpe Bridge
Ranking derived from data for the period Nov-1996 to Dec-2017
Reservoir Stocks

Rutland

Pitsford

Combined Ravensthorpe and Hollowell

Covenham

<table>
<thead>
<tr>
<th>Normal Operating Curve</th>
<th>Drought Curve</th>
</tr>
</thead>
</table>

Customer service line
03708 506 506
www.gov.uk/environment-agency

Incident hotline
0800 80 70 60

Floodline
0845 988 1188
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Exceptionally high or low levels are those which would typically occur 5% of the time within the historic record. Notably high or low levels are those which would typically occur 8% of the time. Above normal or below normal levels are those which would typically occur 15% of the time. Normal levels are those which would typically occur 44% of the time within the historic record.

** Probabilistic ensemble projections of river flows at key indicator sites in March 2020. ** Pie charts indicate probability, based on climatology, of the surface water flow at each site being e.g. exceptionally low for the time of year. (Source: Centre for Ecology and Hydrology, Environment Agency) Geological map reproduced with kind permission from UK Groundwater Forum, BGS © NERC. Crown copyright. All rights reserved. Environment Agency, 100026380, 2020.

"Naturalised" flows are projected for these sites"
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Probabilistic ensemble projections of river flows at key indicator sites in June 2020. Pie charts indicate probability, based on climatology, of the surface water flow at each site being e.g. exceptionally low for the time of year. (Source: Centre for Ecology and Hydrology, Environment Agency) Geological map reproduced with kind permission from UK Groundwater Forum, BGS © NERC. Crown copyright. All rights reserved. Environment Agency, 100026380, 2020.

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Probabilistic ensemble projections of groundwater levels at key indicator sites for end of March 2020. Pie charts indicate probability, based on climatology, of the groundwater level at each site being e.g. exceptionally low for the time of year. (Source: Environment Agency) Geological map reproduced with kind permission from UK Groundwater Forum, BGS © NERC. Crown copyright. All rights reserved. Environment Agency, 100026380, 2020.
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Probabilistic ensemble projections of groundwater levels at key indicator sites for end of September 2020. Pie charts indicate probability, based on climatology, of the groundwater level at each site being e.g. exceptionally low for the time of year. (Source: Environment Agency) Geological map reproduced with kind permission from UK Groundwater Forum, BGS © NERC. Crown copyright. All rights reserved. Environment Agency, 100026380, 2020.
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aquifer</td>
<td>A geological formation able to store and transmit water.</td>
</tr>
<tr>
<td>Areal average rainfall</td>
<td>The estimated average depth of rainfall over a defined area. Expressed in depth of water (mm).</td>
</tr>
<tr>
<td>Artesian</td>
<td>The condition where the groundwater level is above ground surface but is prevented from rising to this level by an overlying continuous low permeability layer, such as clay.</td>
</tr>
<tr>
<td>Artesian borehole</td>
<td>Borehole where the level of groundwater is above the top of the borehole and groundwater flows out of the borehole when unsealed.</td>
</tr>
<tr>
<td>Cumecs</td>
<td>Cubic metres per second (m(^3)/s(^{-1}))</td>
</tr>
<tr>
<td>Effective rainfall</td>
<td>The rainfall available to percolate into the soil or produce river flow. Expressed in depth of water (mm).</td>
</tr>
<tr>
<td>Flood Alert/Flood Warning</td>
<td>Three levels of warnings may be issued by the Environment Agency. Flood Alerts indicate flooding is possible. Flood Warnings indicate flooding is expected. Severe Flood Warnings indicate severe flooding.</td>
</tr>
<tr>
<td>Groundwater</td>
<td>The water found in an aquifer.</td>
</tr>
<tr>
<td>Long term average (LTA)</td>
<td>The arithmetic mean calculated from the historic record, usually based on the period 1961-1990. However, the period used may vary by parameter being reported on (see figure captions for details).</td>
</tr>
<tr>
<td>mAOD</td>
<td>Metres Above Ordnance Datum (mean sea level at Newlyn Cornwall).</td>
</tr>
<tr>
<td>MORECS</td>
<td>Met Office Rainfall and Evaporation Calculation System. Met Office service providing real time calculation of evapotranspiration, soil moisture deficit and effective rainfall on a 40 x 40 km grid.</td>
</tr>
<tr>
<td>Naturalised flow</td>
<td>River flow with the impacts of artificial influences removed. Artificial influences may include abstractions, discharges, transfers, augmentation and impoundments.</td>
</tr>
<tr>
<td>NCIC</td>
<td>National Climate Information Centre. NCIC area monthly rainfall totals are derived using the Met Office 5 km gridded dataset, which uses rain gauge observations.</td>
</tr>
<tr>
<td>Recharge</td>
<td>The process of increasing the water stored in the saturated zone of an aquifer. Expressed in depth of water (mm).</td>
</tr>
<tr>
<td>Reservoir gross capacity</td>
<td>The total capacity of a reservoir.</td>
</tr>
<tr>
<td>Reservoir live capacity</td>
<td>The capacity of the reservoir that is normally usable for storage to meet established reservoir operating requirements. This excludes any capacity not available for use (e.g. storage held back for emergency services, operating agreements or physical restrictions). May also be referred to as ‘net’ or ‘deployable’ capacity.</td>
</tr>
<tr>
<td>Soil moisture deficit (SMD)</td>
<td>The difference between the amount of water actually in the soil and the amount of water the soil can hold. Expressed in depth of water (mm).</td>
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**Categories**
- Exceptionally high: Value likely to fall within this band 5% of the time
- Notably high: Value likely to fall within this band 8% of the time
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- Below normal: Value likely to fall within this band 15% of the time
- Notably low: Value likely to fall within this band 8% of the time
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