Summary – July 2020
East Anglia received a normal amount of rainfall in July with an average total rainfall of 53mm (105% of the Long Term Average (LTA)). Despite the normal amount of rainfall the groundwater levels and river flows has continued to decrease in majority of the key sites. The soil moisture deficit (SMD) has reduced this month falling in the normal category and ended the month with 110 mm SMD. The reservoir levels have decreased at all the sites and the groundwater support schemes have been operating to support river flows.

Rainfall
East Anglia received a total averaged rainfall of 53 mm in the month of July resulting in 105% of the Long Term Average (LTA). The rainfall totals throughout the catchments were in the normal category (relative to the monthly LTA); with the lowest rainfall amount in South Essex recording a total rainfall of 36 mm (77% of LTA). The 12-months accumulation of rainfall surplus has increased to 641 mm.

Soil Moisture Deficit/Recharge
Soil Moisture Deficit (SMD) across East Anglia is in the normal category this July and ended the month with an averaged SMD of 110 mm. The SMD is fairly consistent across East Anglia, although slightly lower in the North West Norfolk & Wissey and the Lower Bedford Ouse areas.

River Flows
Monthly mean river flows in July has decreased at all sites in the area; except the River Wensum at Swanton Morley where the flow has increased. New sites at Burnt mill has been added in the report to represent flow at the River Rhee. Out of the 21 reported sites, 48% are reporting normal category of flows, 38% are reporting below normal flows and 14% reporting notably low category of flow.

Groundwater Levels
The groundwater levels has continued to decrease in majority of the indicator sites across East Anglia. Out of the 20 indicator sites 55% are classified to be in the normal category or higher with an above normal flow at the Suffolk crag of Hazlewood Common. 30% of the sites are reporting below normal or lower category of flow with a notably low flow at the Suffolk chalk of Rook Hall. There are 3 new sites added to the key reported sites in July.

Reservoir Storage/Water Resource Zone Stocks
The reservoir storage levels have decreased in all the indicator sites with a normal storage level in all the sites. Most of the sites has the storage level below their normal operating curve except Ardleigh and Hanningfield.

Environmental Impact
The Lodes-Granta groundwater support scheme has 4 out of 6 pumps operating with 2 of the pump operating 24 hours. The Rhee groundwater support scheme has 3 out of 8 pumps operating with 2 of these operating 24 hours a day. The Thet and the Little Ouse has 1 pump operating 24 hours and there are no pumps operating on the Hiz in July.
Forward Look
Probabilistic ensemble projections for river flows at key sites

**September 2020:** There is a reduced probability of notably low flows in majority of the key sites except at Ely Ouse with an increased probability of below normal flows at Stiffkey and Ely Ouse this September.

**December 2020:** There is a reduced probability of normal flow in all the key sites with an increased probability of below normal or lower flows in majority the sites except the River Ivel in December.

Probabilistic ensemble projections for groundwater levels in key aquifers

**September 2020:** There is an increased probability of normal groundwater levels at all the key sites except at Redlands Hall where there is an increased probability of below normal level in September.

**March 2021:** There is an increased probability of below normal or lower groundwater levels in majority of the key sites except at Therfield Rectory and Washpit Farm where there is an increased probability of normal or higher groundwater levels next March.

Author: Hydrology & Operations
Contact details: 03708506506
Above average rainfall

Below average rainfall
Soil Moisture Deficit

Data based on MORECS (Met Office © Crown Copyright)

- 2019-20
- 2018-19
- Exceptionally high
- Notably high
- Above normal
- Notably low
- Below normal
- Exceptionally low
- Normal
- Latest data

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

East Anglia

Customer service line 03708 506 506
incident hotline 0800 80 70 60
floodline 0845 988 1188
www.gov.uk/environment-agency
River Flow July 2020

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

Geology
- Chalk
- Greensand/Other Aquifer
- Oolite (Limestone)
- Crag
- Clay/Non Aquifer

Cappenham, TOVE
Ranking derived from data for the period Feb-1962 to Dec-2017

Willen, OUZEL
Ranking derived from data for the period Jan-1962 to Dec-2017

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

Incident hotline
0800 80 70 60

Floodline
0845 988 1188
© Environment Agency 2020
Groundwater Levels  July 2020

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

Fringford - GREAT OOLITE
Ranking derived from data for the period Sep-1980 to Dec-2017

Bath Spring, Charlton - IVEL CHALK
Ranking derived from data for the period Mar-1993 to Dec-2017

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

Incident hotline
0800 80 70 60

Floodline
0845 988 1188

© Environment Agency 2020
Hindolveston - NORFOLK CHALK
Ranking derived from data for the period Sep-1984 to Nov-2017

Rook Hall, Braiseworth - SUFFOLK CHALK
Ranking derived from data for the period Jan-1980 to Dec-2017
Forward Look – River Flows

Expected Probability

- Exceptionally High
- Notably High
- Above Normal
- Normal
- Below Normal
- Notably Low
- Exceptionally Low

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 September 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*
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 December 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.
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 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.
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 groundwater levels at key indicator sites for end of March 2021. 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 (m³s⁻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>
</tr>
</tbody>
</table>

**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
- **Above normal**: Value likely to fall within this band 15% of the time
- **Normal**: Value likely to fall within this band 44% of the time
- **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
- **Exceptionally low**: Value likely to fall within this band 5% of the time