

# Monthly water situation report

## East Anglia

### Summary – June 2018

June 2018 was a very dry month, with between 3 and 45% of average rainfall levels recorded this month and this has led to notably high SMD values across the area. The greatest impact on flows has been experienced in those rivers in the south and east of the area, with flows considerably below average for the time of year. Flows in the rest of the area remain in, or above, the Normal band. Groundwater levels and reservoir stocks remain healthy for the time of year.

### Rainfall

June began with thunderstorms across the area, leading to localised heavy rainfall events. One such event, on the 2 June, led to the Morley St. Botolph rain gauge recording a rainfall depth of 70.2mm in one day. Despite the wet start to the month, records indicate that, for the area as a whole, this June was the second driest since records began in 1910. At the scale of individual rainfall units it was the driest month on record for Central Fenland, North and South Essex. No rainfall unit ranked below 8<sup>th</sup> driest on record. Overall, rainfall totals were between 3 and 45% of the Long Term Average for the month and so all rainfall units were classified in the exceptionally low category, except for the Broadlands Rivers rainfall unit where rainfall levels were Notably Low. Longer term, rainfall levels over the last three months were classified as Normal in both the east and the west of the area, but were Below Normal in the centre. At both the 6 and 12 month period, rainfall depths were within the normal band. The rainfall surplus for the last 12 months has now reduced to 28mm, from 86mm at the end of May.

### Soil Moisture Deficit/Recharge

Soil moisture deficit values had exceeded 100mm in all MORECS square across the area by the end of the month. These were all classified as Notably High.

### River Flows

Flows in both the Ely Ouse and Great Ouse rivers, as well as the rivers in the north east of the area, where rainfall levels were highest, remain healthy for the time of year and flows at all monitoring points were classified in, or above the Normal band. Flows were lower in the rivers in the south and east of the area with the flows in the Waveney being Exceptionally Low, the Colne Notably Low and the Chelmer and Gipping rivers Below Normal.

### Groundwater Levels

Water levels remain healthy across the area, with levels in, or above the normal range at all sites although levels are now receding at all sites, except for Therfield Rectory where levels continue to rise.

### Reservoir Storage/Water Resource Zone Stocks

Despite the dry and hot conditions reservoir levels remain healthy and are in, or above, the Normal band at all sites.

### Environmental Impact

Two flood alerts were issued across the area in June, but no flood warnings were issued.

## Forward Look

### Probabilistic ensemble projections for river flows at key sites

**September 2018:** There is a decreased probability of flows being below the normal range across the area except in the Ely Ouse where there is an increased probability of flows being in the below normal category.

**December 2018:** The probability of flows being in the normal range is broadly as expected across the area except in the Ely Ouse and the Kym where there is an increased probability of flows being below the normal range.

### Probabilistic ensemble projections for groundwater levels in key aquifers

**September 2018:** It is likely that groundwater levels will be within the normal or above normal range across the area.

**March 2019:** The probability of groundwater levels being in the normal range is broadly as expected in the far north and far south of the area; there is an increased probability of flows being below the normal range across the centre of the area.

Author:

[Hydrology & Operations](#)

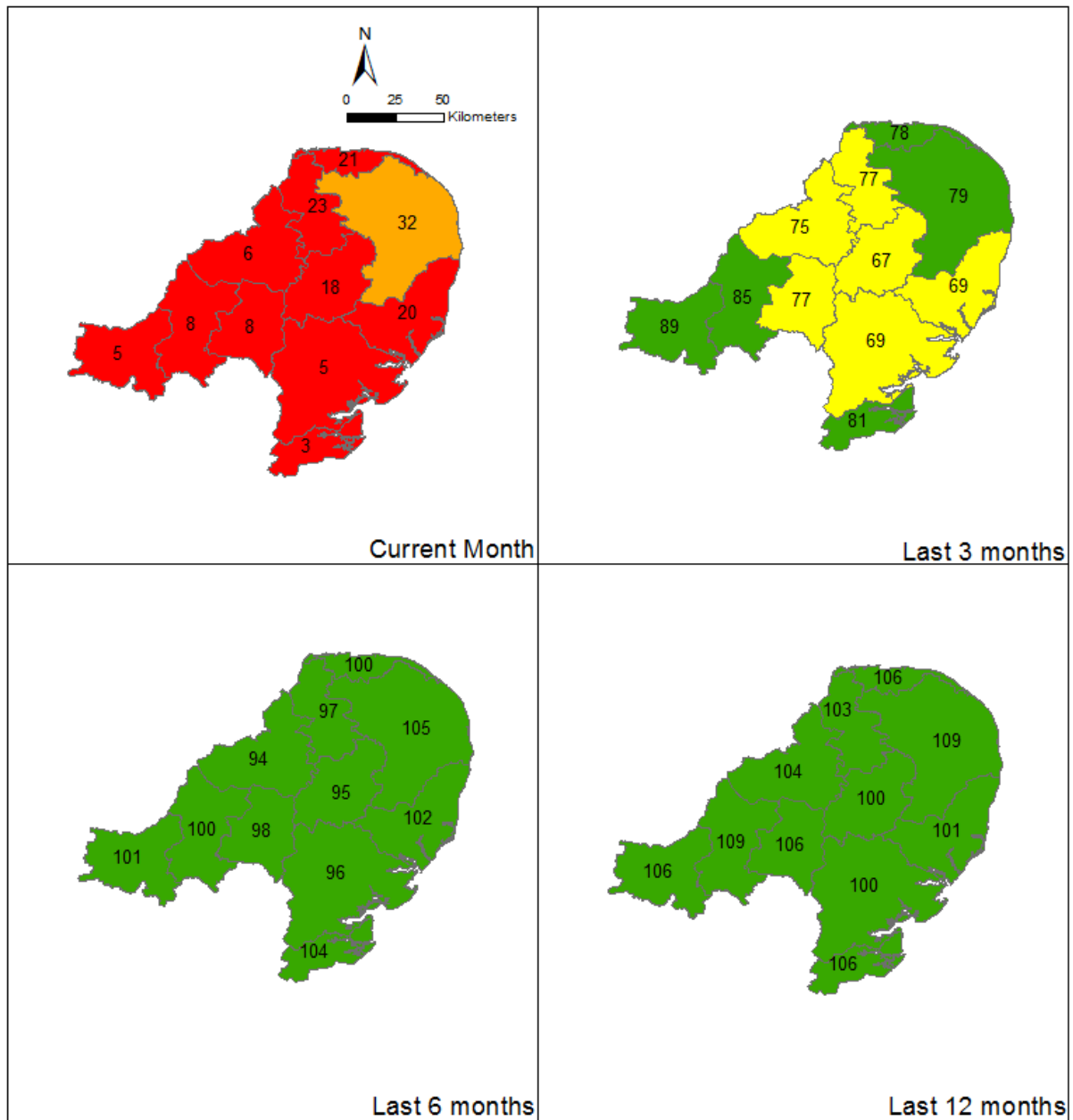
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# Rainfall

June 2018

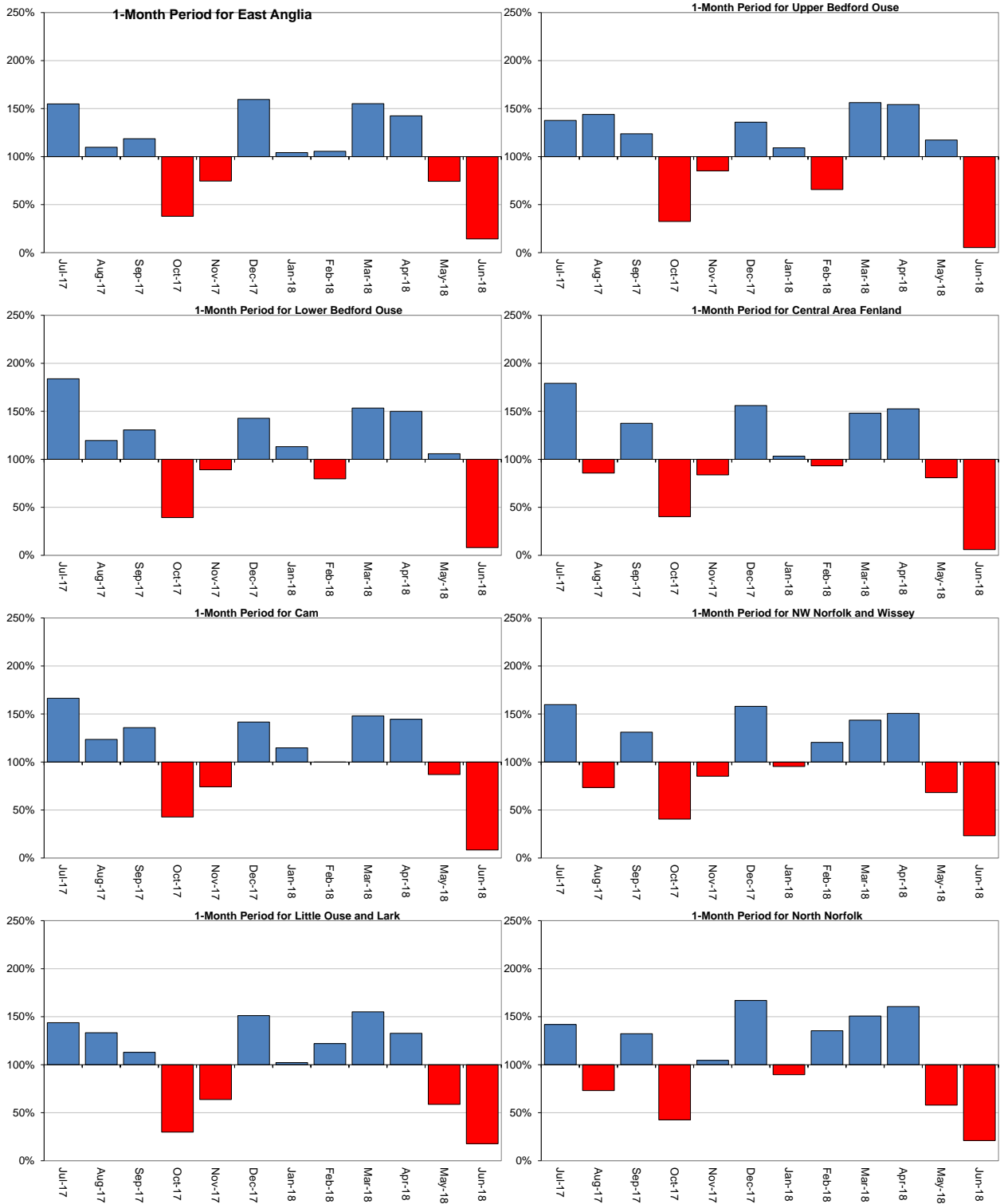


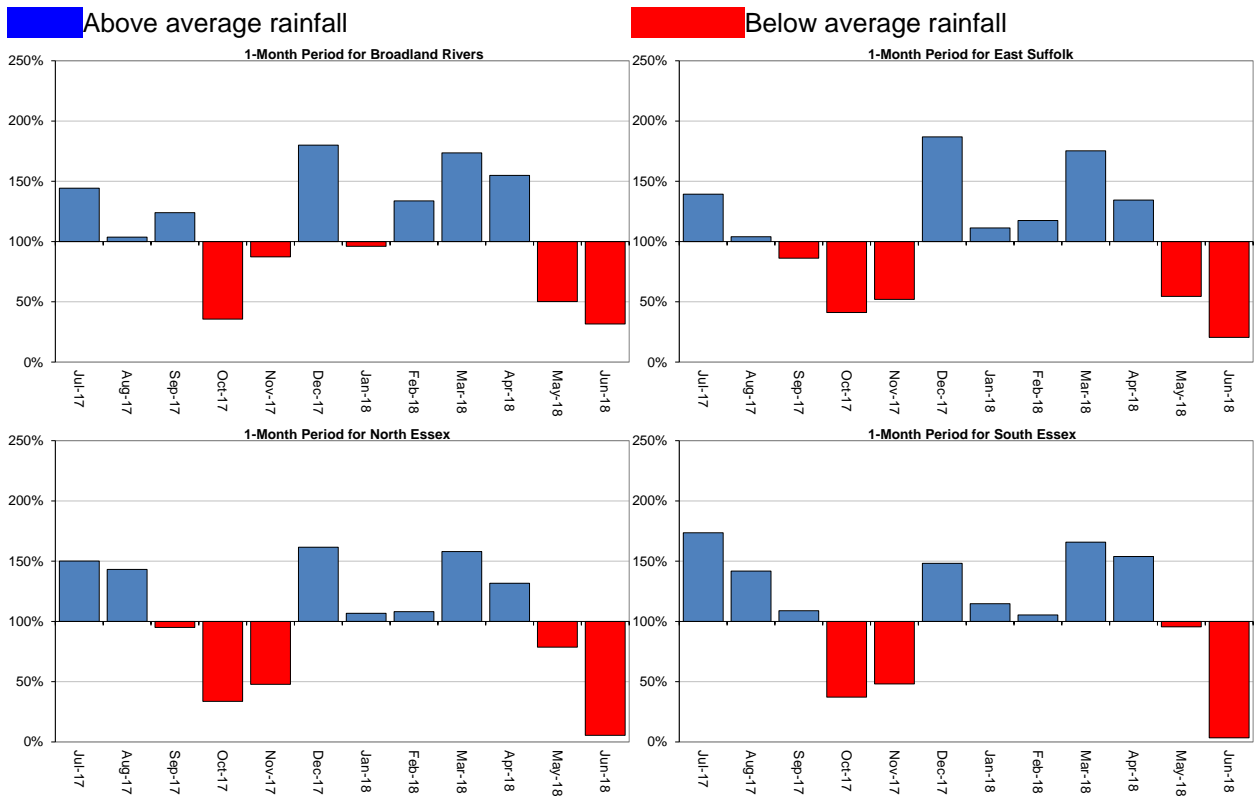
Rainfall expressed as percentage of 1961-1990 Long Term Average for the specified duration. Classes derived from data for the period 1910 to 2012 based on NCIC dataset (Met Office © Crown Copyright)

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. Final NCIC (National Climate Information Centre) data based on the Met Office 5km gridded rainfall dataset derived from rain gauges (Source: Met Office © Crown Copyright, 2017). Provisional data based on Environment Agency 1km gridded rainfall dataset derived from Environment Agency intensity rain gauges. Crown copyright. All rights reserved. Environment Agency, 100026380, 2018.

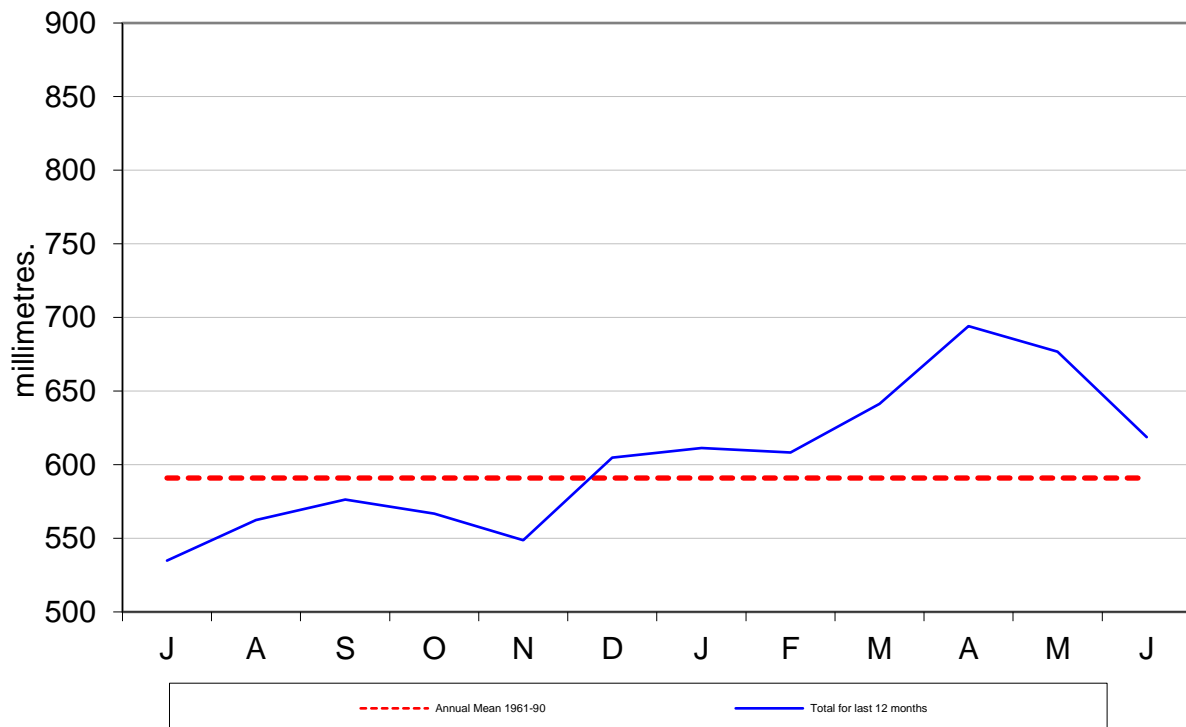
**Above average rainfall**

**Below average rainfall**

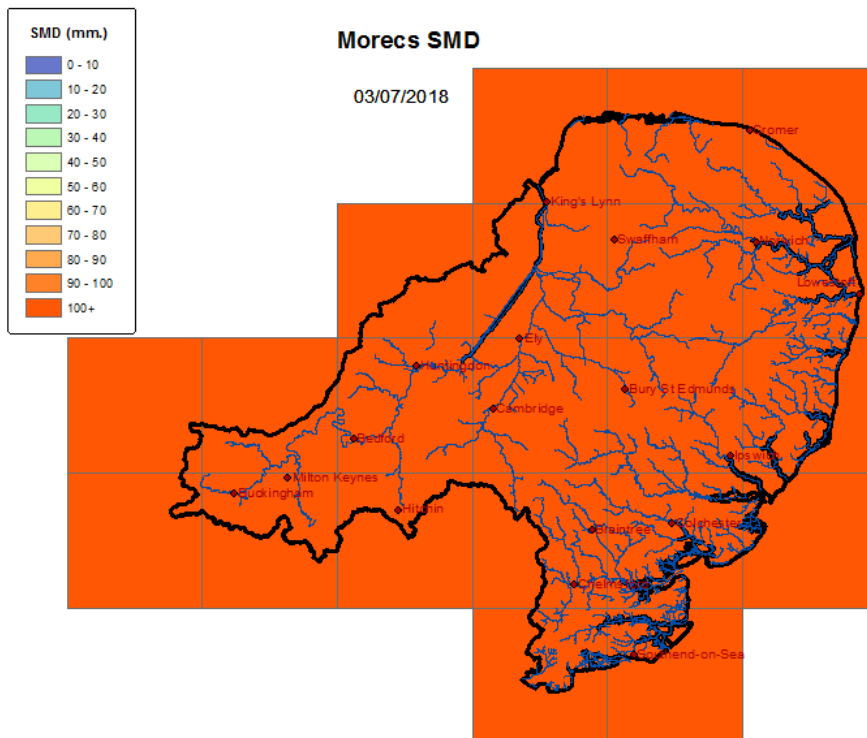




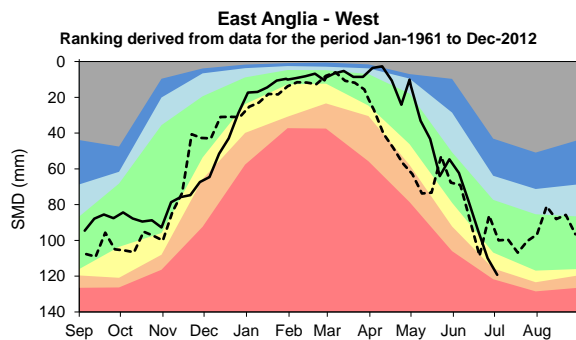
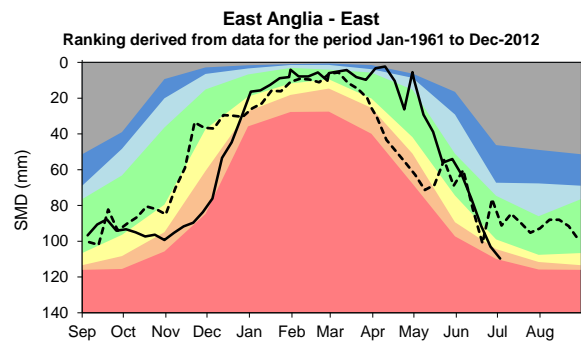
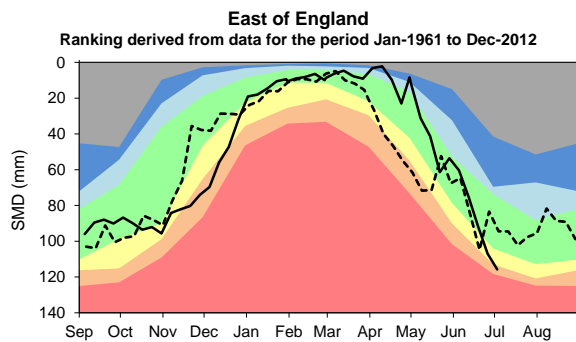
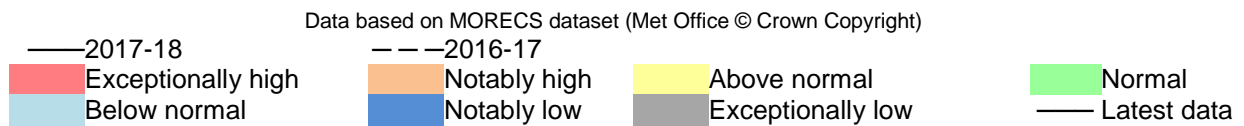
### Monthly Rainfall Surplus/ Deficit



# Soil Moisture Deficit

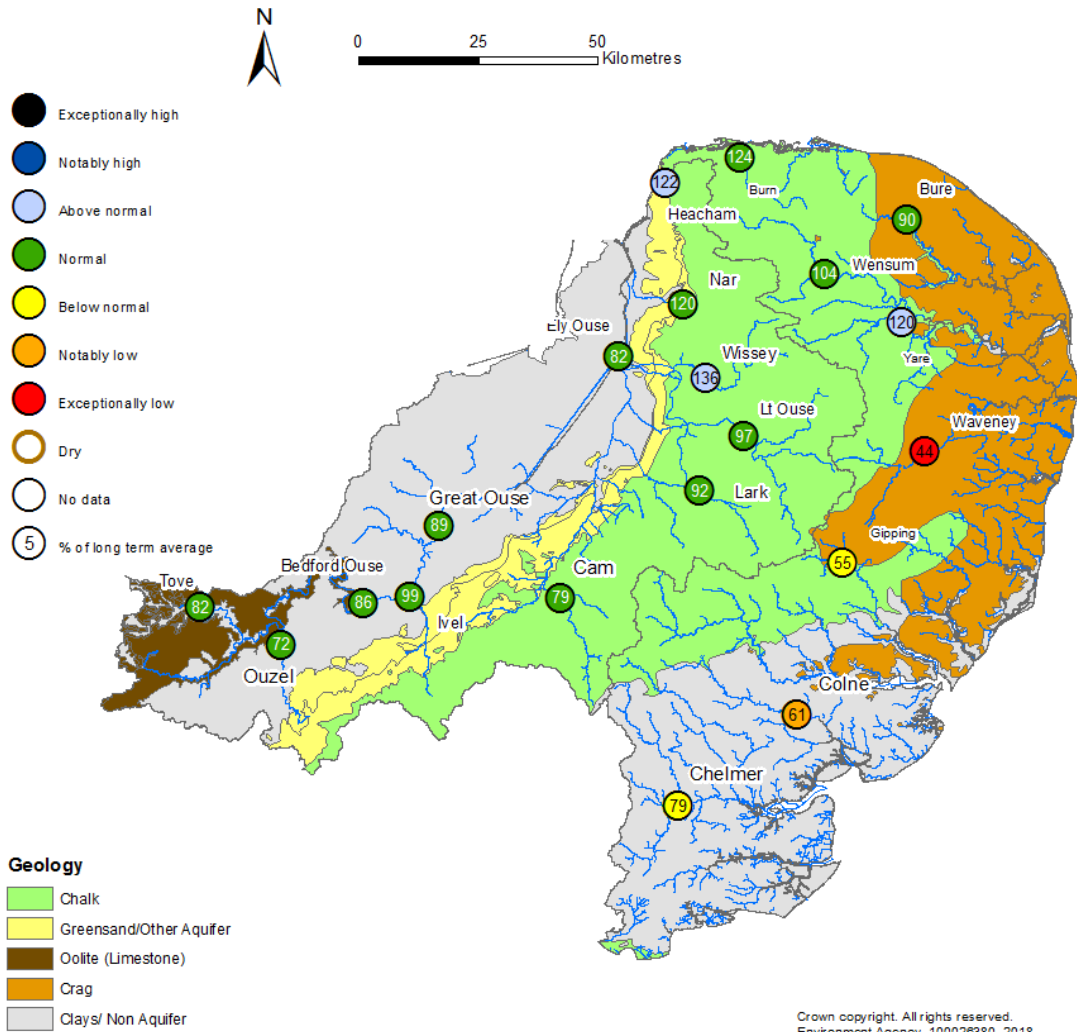


Data based on MORECS (Met Office © Crown Copyright)

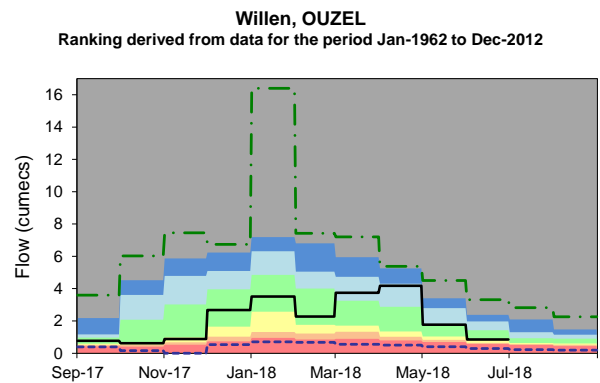
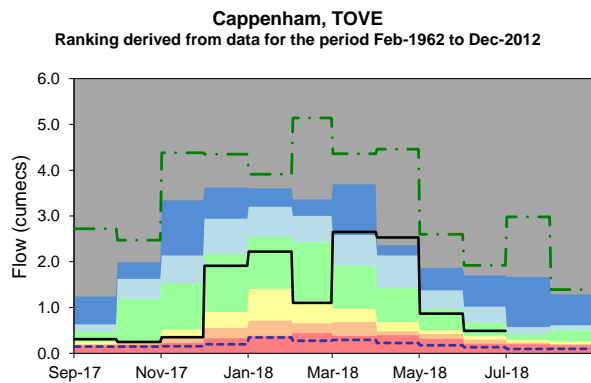
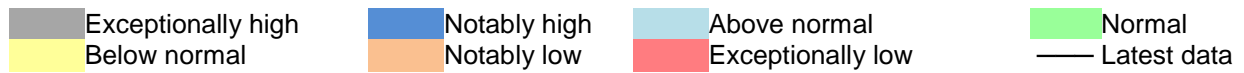


# River Flow

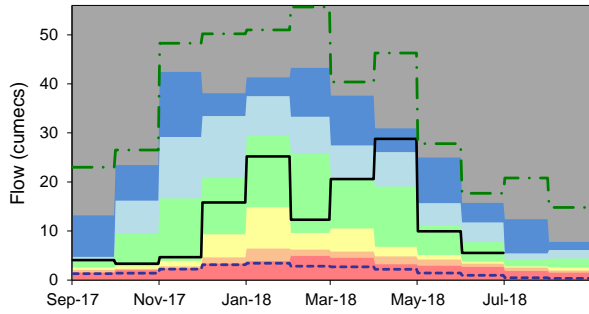
June 2018



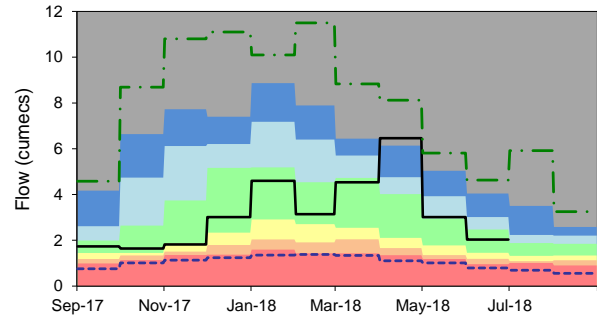
Crown copyright. All rights reserved. Environment Agency, 100028380, 2018



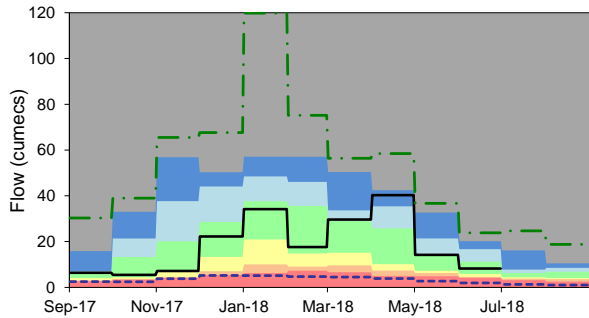
**Roxton, OUSE (AN)**  
 Ranking derived from data for the period Oct-1972 to Dec-2012



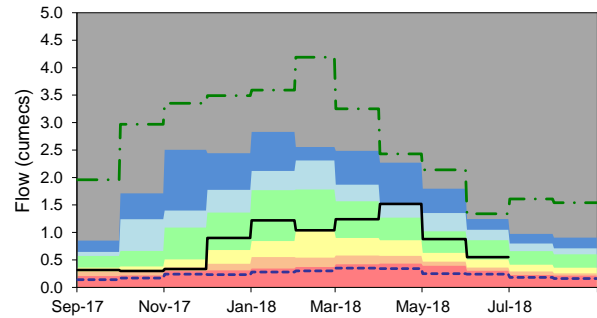
**Blunham, IVEL**  
 Ranking derived from data for the period Aug-1959 to Dec-2012



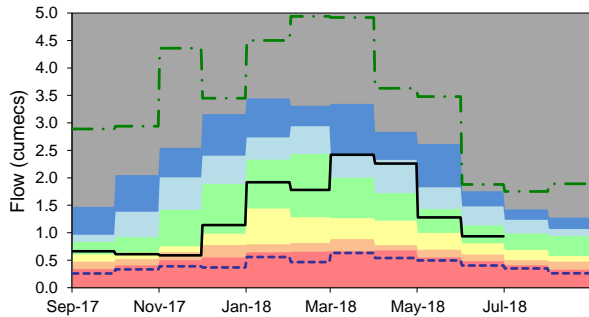
**Offord(Gross Flows), OUSE (AN)**  
 Ranking derived from data for the period Jan-1970 to Dec-2012



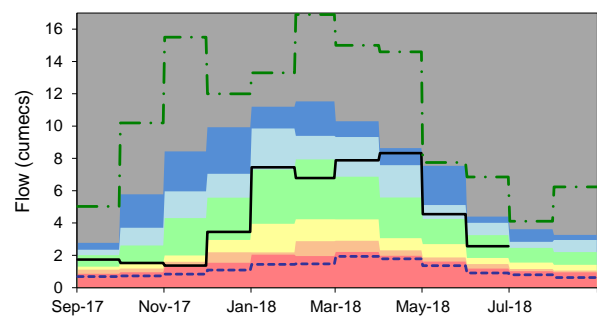
**Dernford, CAM (AN)**  
 Ranking derived from data for the period Feb-1949 to Dec-2012



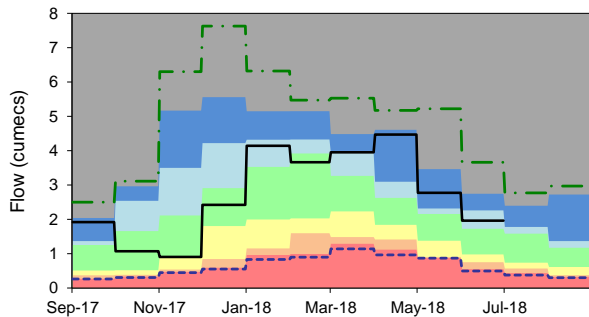
**Temple, LARK**  
 Ranking derived from data for the period Nov-1960 to Dec-2012



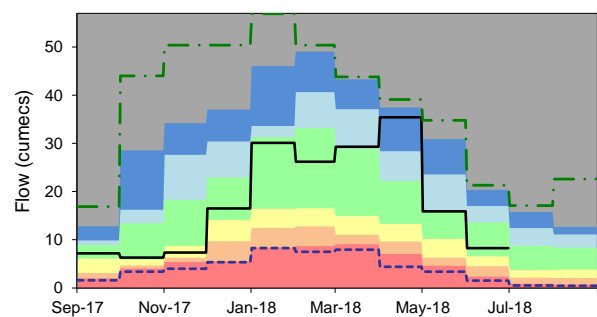
**Abbey Heath, LITTLE OUSE**  
 Ranking derived from data for the period Jun-1968 to Dec-2012



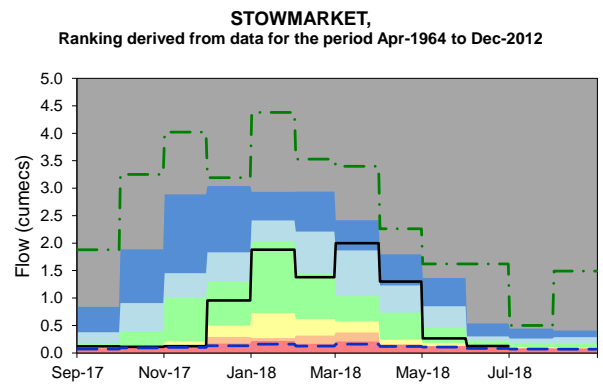
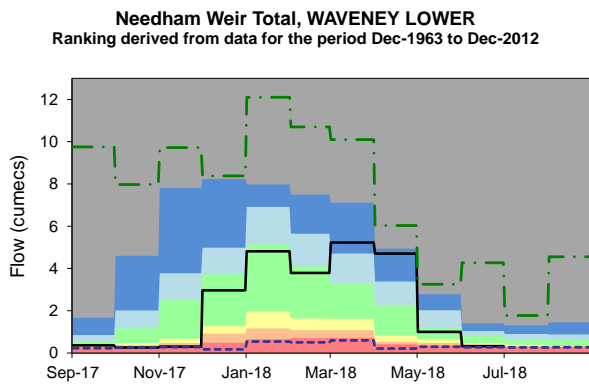
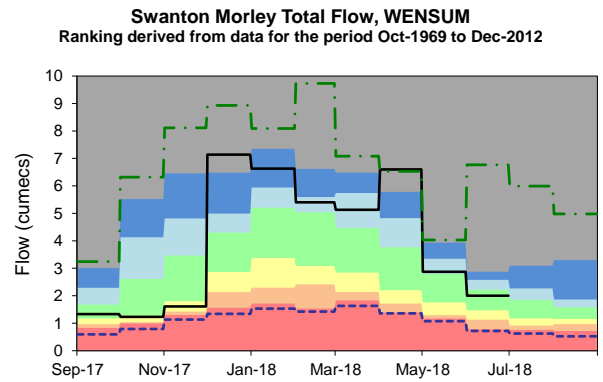
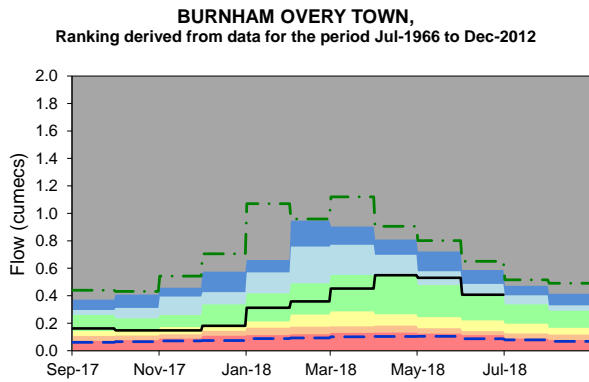
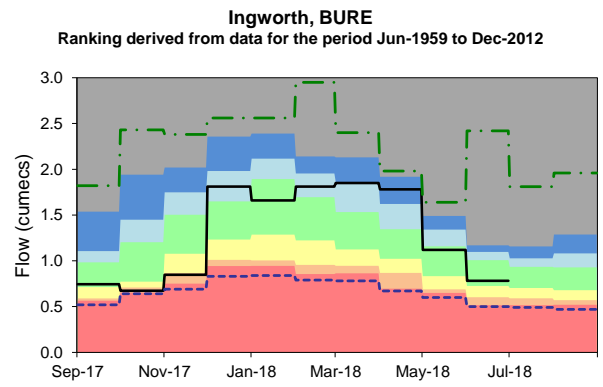
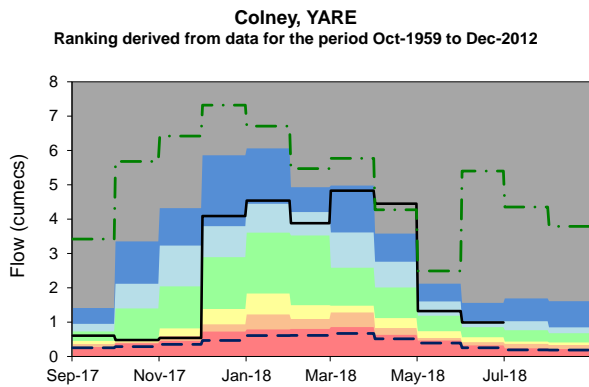
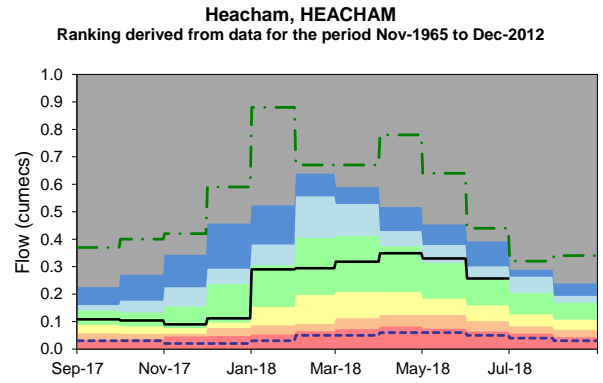
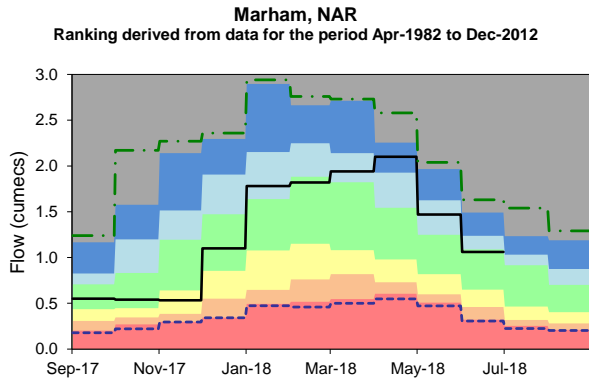
**Northwold Total, WISSEY**  
 Ranking derived from data for the period Jul-1983 to Dec-2012



**Denver Ely Ouse, OUSE (AN)**  
 Ranking derived from data for the period Nov-1971 to Dec-2012

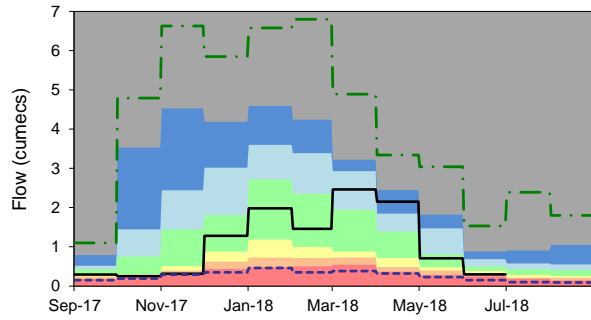






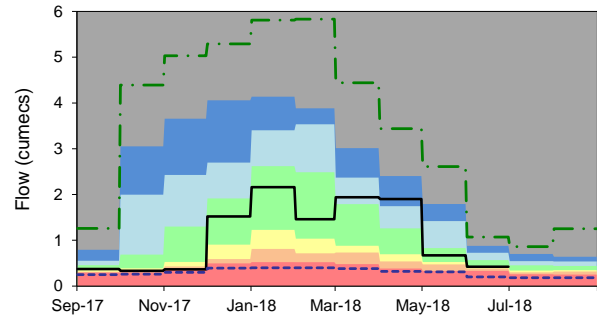
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Ranking derived from data for the period Oct-1959 to Dec-2012

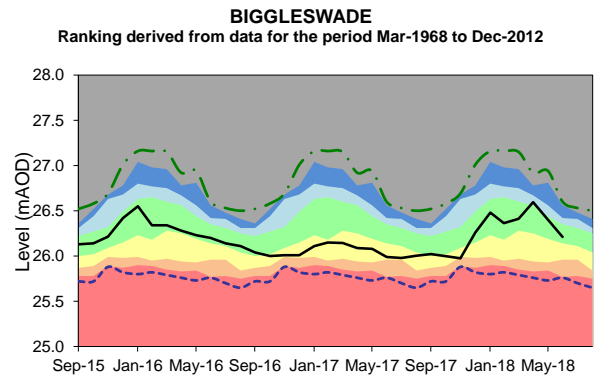
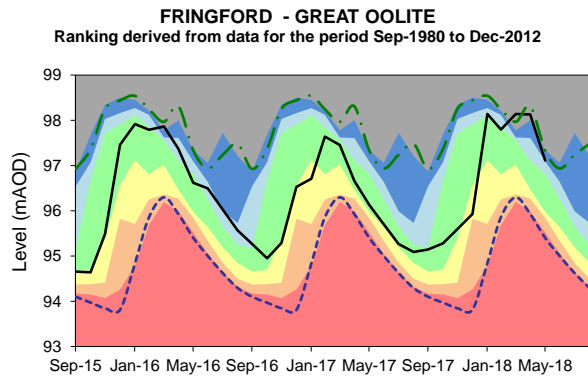
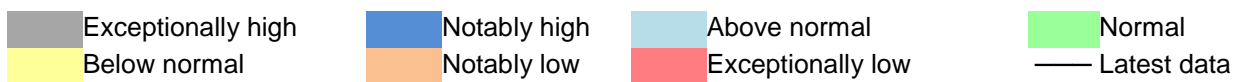
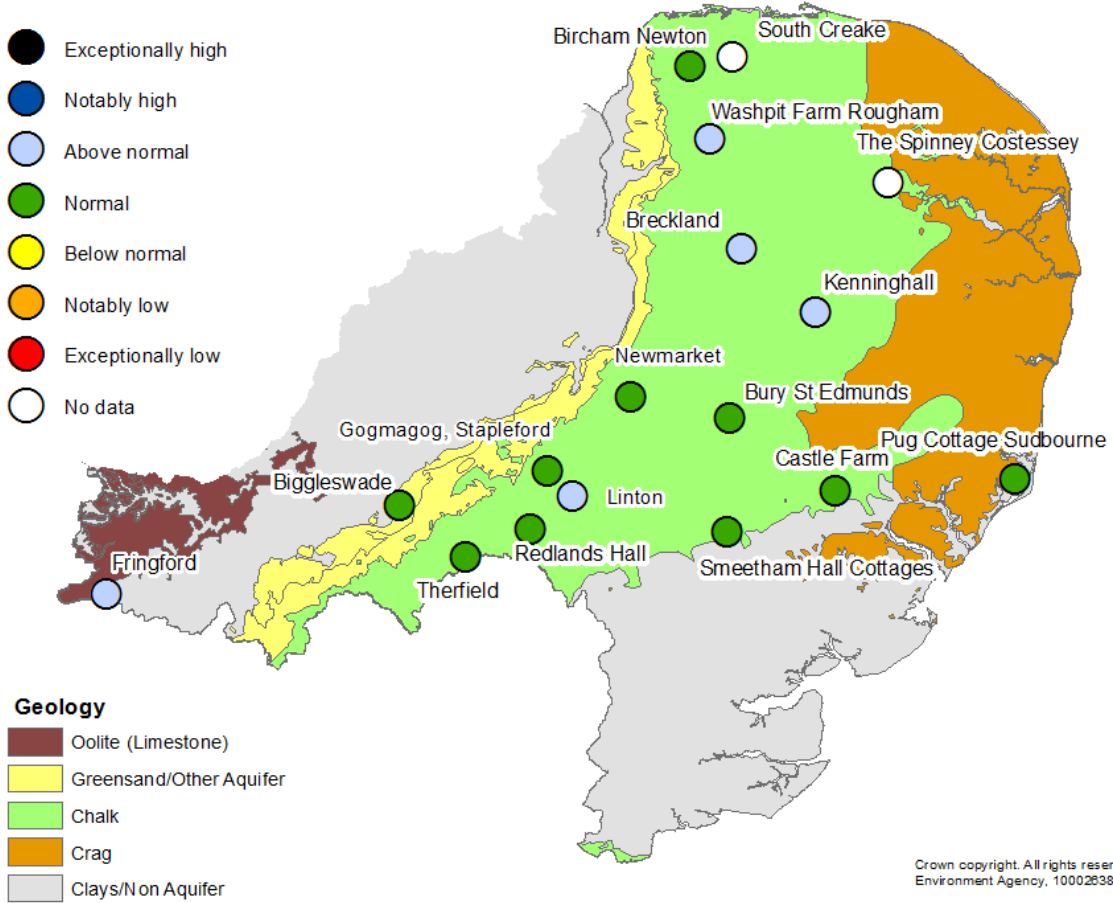
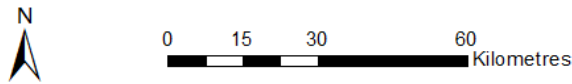


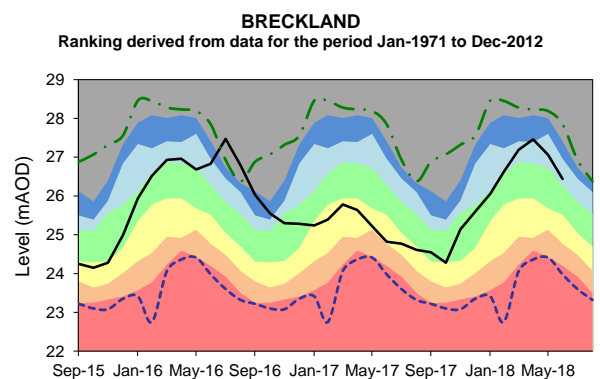
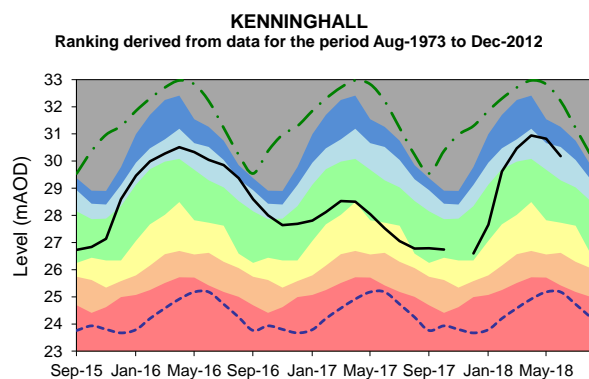
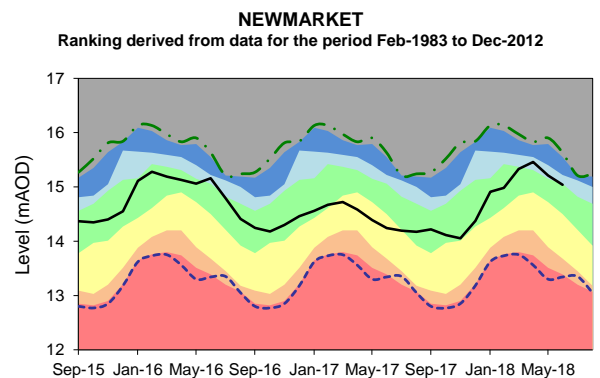
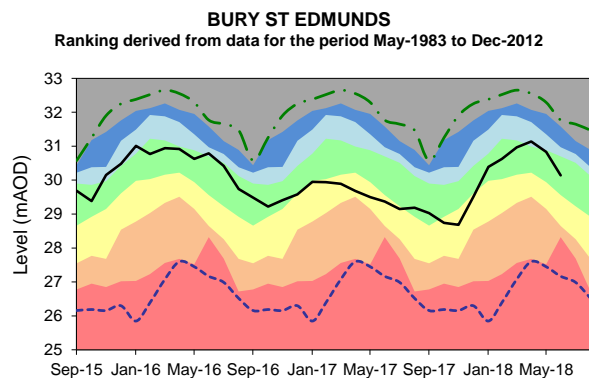
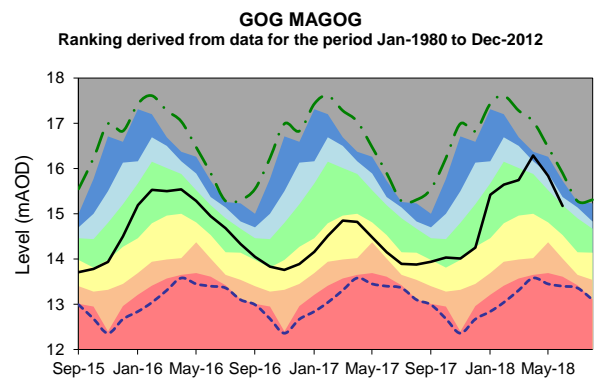
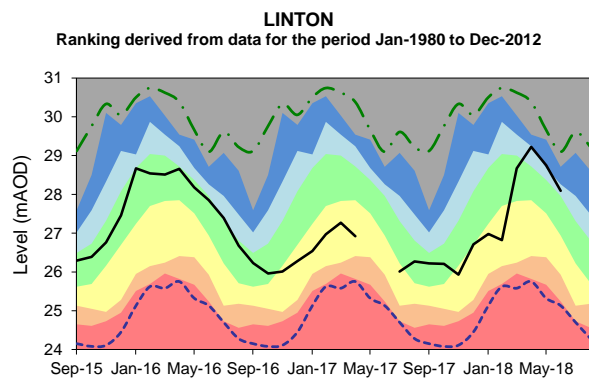
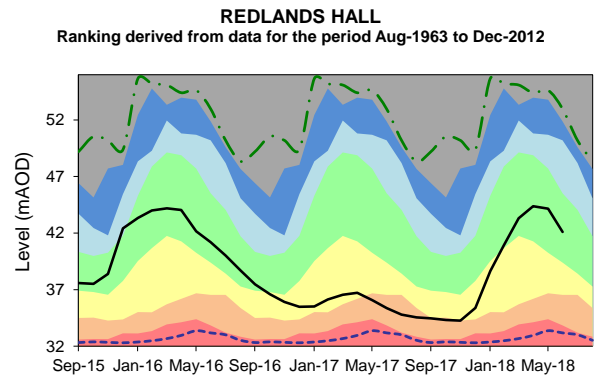
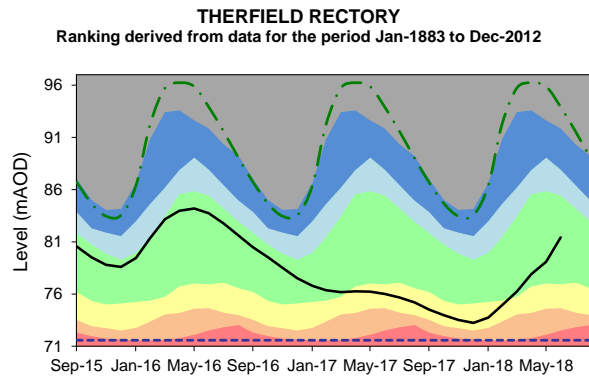
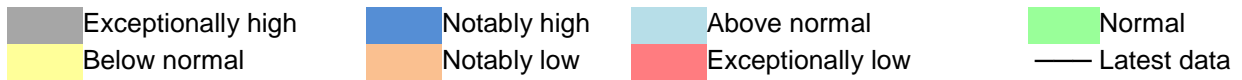
### Springfield, CHELMER

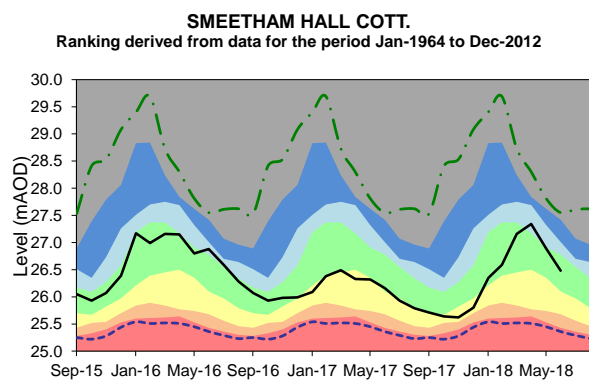
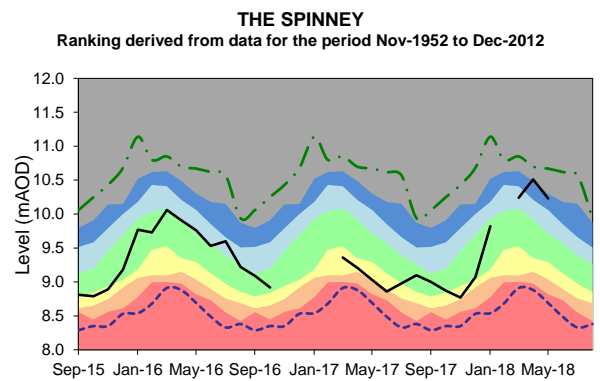
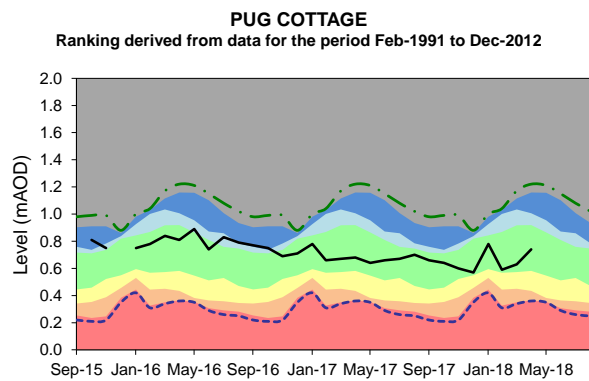
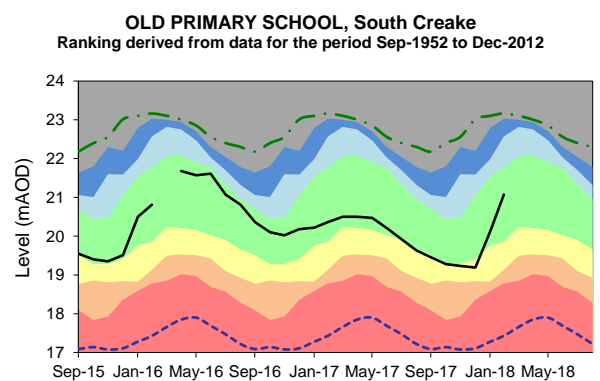
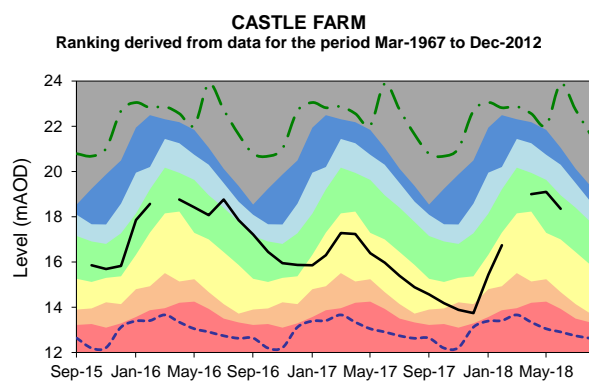
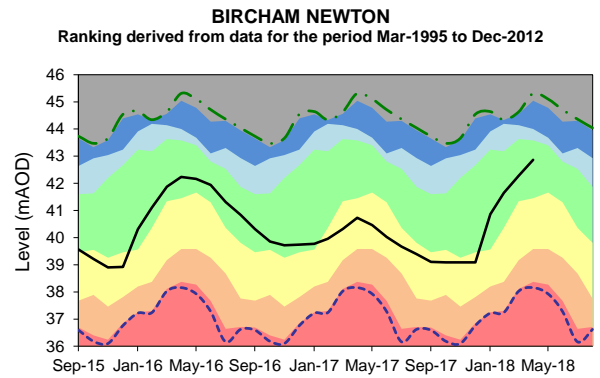
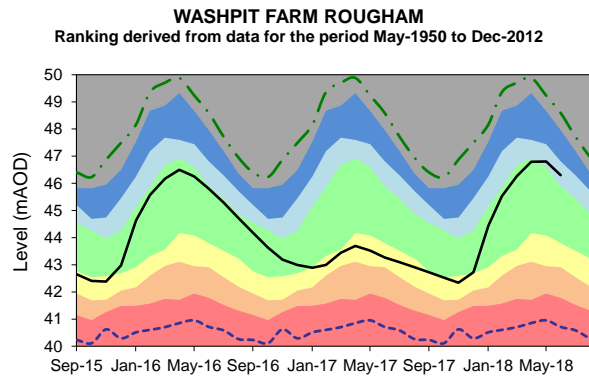
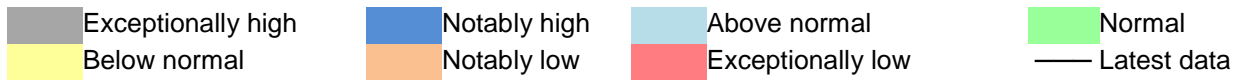
Ranking derived from data for the period Nov-1965 to Dec-2012



# Groundwater Levels June 2018



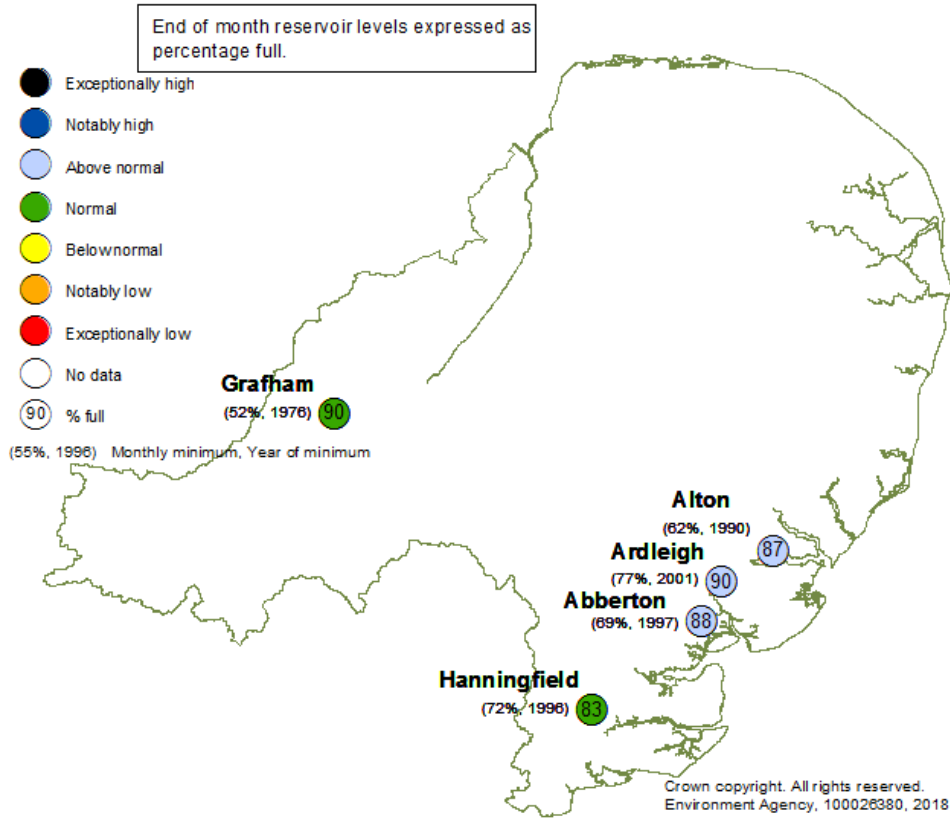




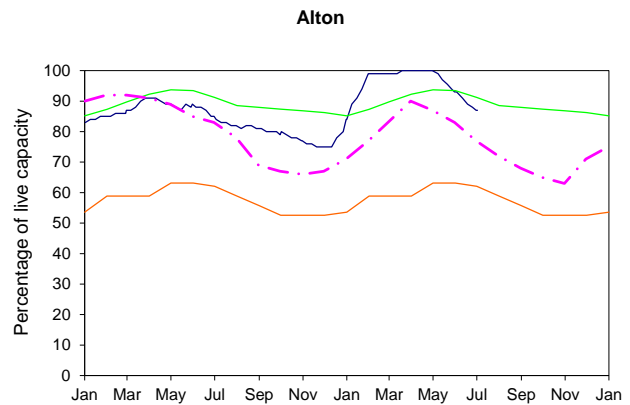
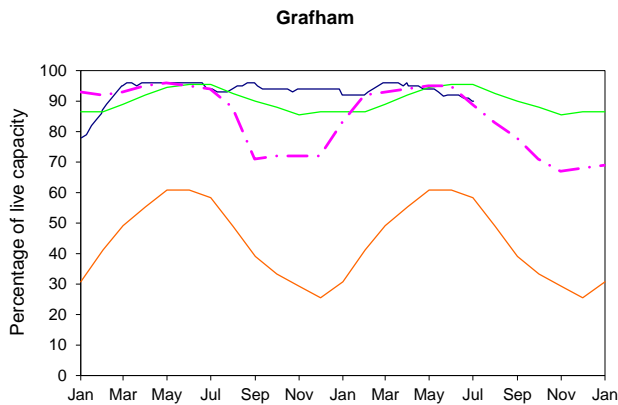
# Reservoir Stocks

June 2018

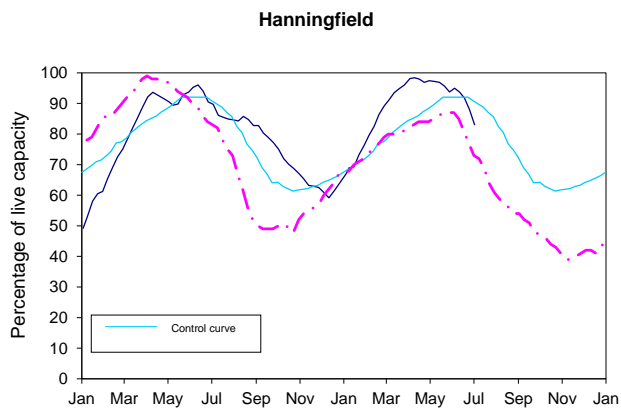
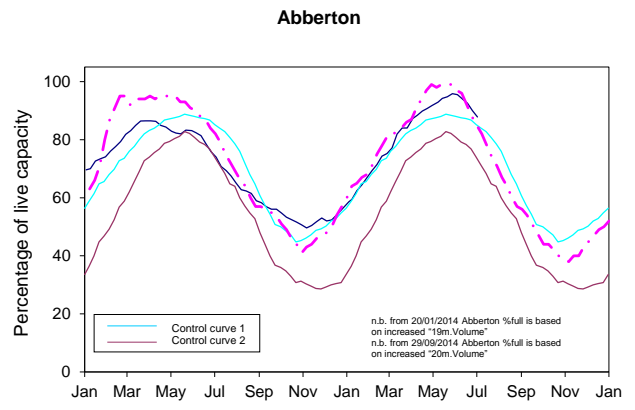
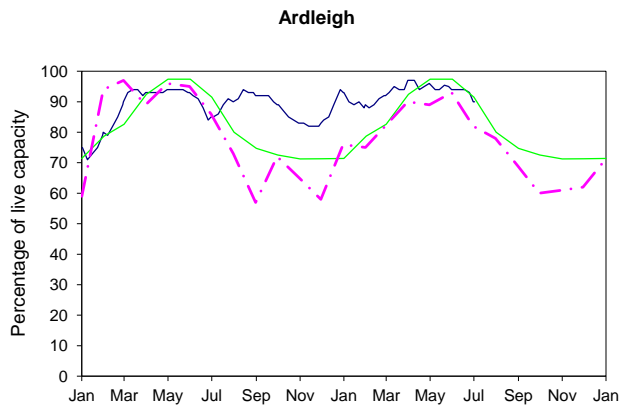
June 2018



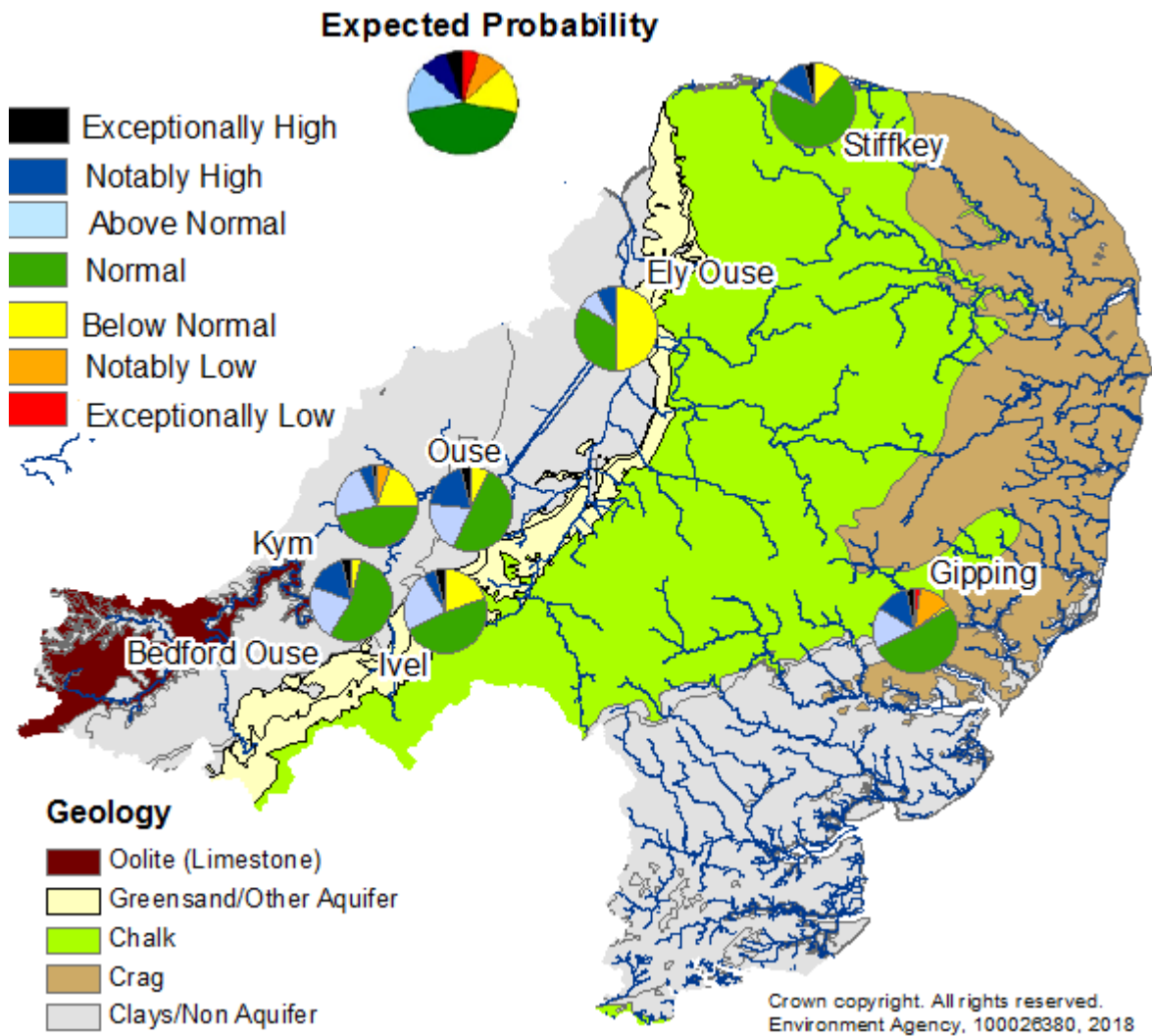
— 2015-2016      — Normal Operating Curve      — Drought Alert Curve      - - - 1995-1996



— 2015-2016      — Normal Operating Curve      — Drought Alert Curve      - - - 1995-1996



# Forward Look – River Flows

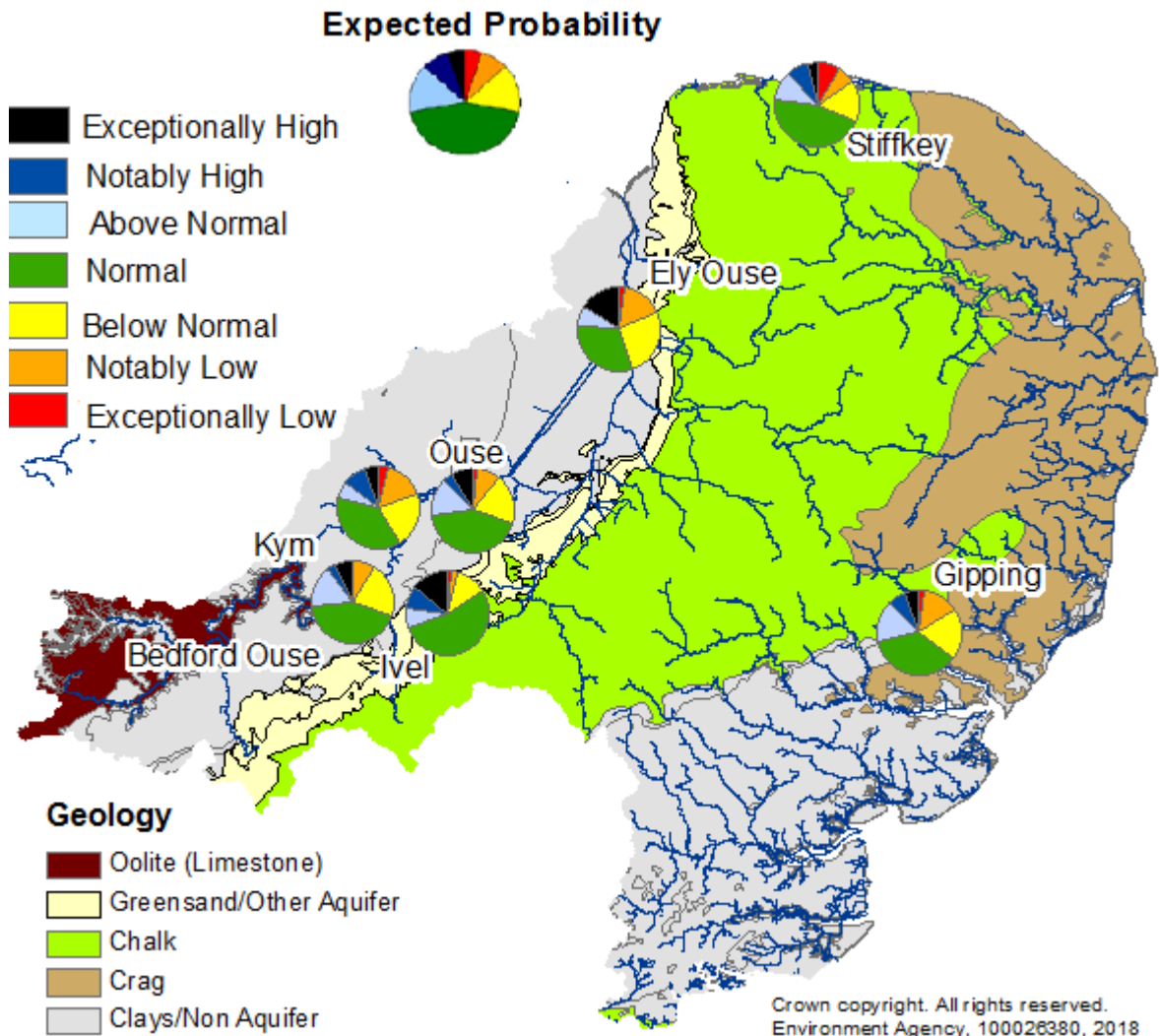


Exceptionally high or low levels are those which would typically occur 5% of the time within the historic record. Notably high or low levels are those which would typically occur 8% of the time. Above normal or below normal levels are those which would typically occur 15% of the time. Normal levels are 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 2018.** 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, 2018.

^ "Naturalised" flows are projected for these sites'



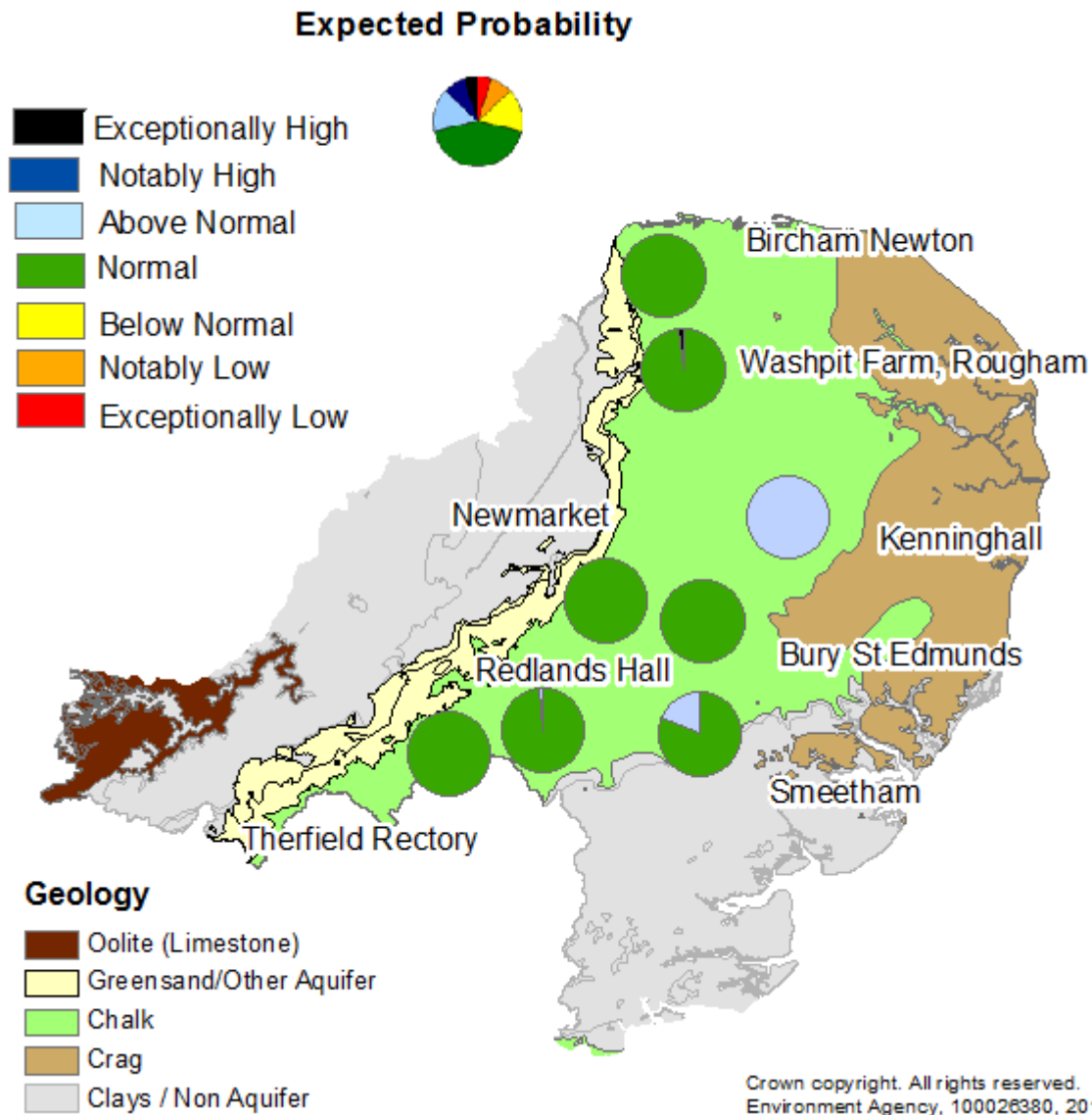


Exceptionally high or low levels are those which would typically occur 5% of the time within the historic record. Notably high or low levels are those which would typically occur 8% of the time. Above normal or below normal levels are those which would typically occur 15% of the time. Normal levels are 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 2018.** 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, 2018.

<sup>^</sup> "Naturalised" flows are projected for these sites'

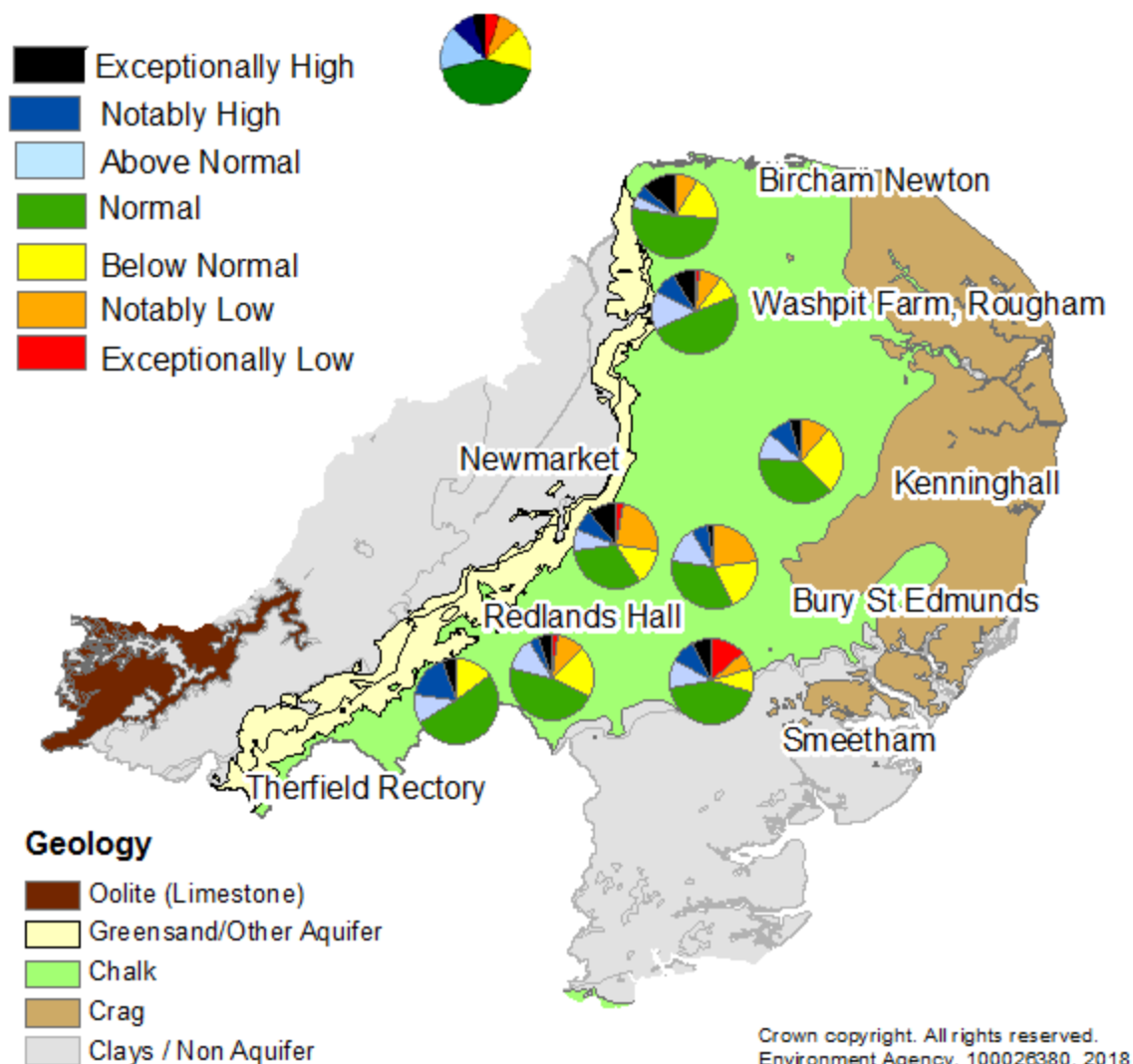
# Forward Look - Groundwater



*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 2018.** 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, 2018.

## Expected Probability



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 2019.** 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, 2018.

## Glossary

### Term

### Definition

Aquifer	A geological formation able to store and transmit water.
Areal average rainfall	The estimated average depth of rainfall over a defined area. Expressed in depth of water (mm).
Artesian	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.
Artesian borehole	Borehole where the level of groundwater is above the top of the borehole and groundwater flows out of the borehole when unsealed.
Cumecs	Cubic metres per second (m <sup>3</sup> s <sup>-1</sup> )
Effective rainfall	The rainfall available to percolate into the soil or produce river flow. Expressed in depth of water (mm).
Flood Alert/Flood Warning	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.
Groundwater	The water found in an aquifer.
Long term average (LTA)	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).
mAOD	Metres Above Ordnance Datum (mean sea level at Newlyn Cornwall).
MORECS	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.
Naturalised flow	River flow with the impacts of artificial influences removed. Artificial influences may include abstractions, discharges, transfers, augmentation and impoundments.
NCIC	National Climate Information Centre. NCIC area monthly rainfall totals are derived using the Met Office 5 km gridded dataset, which uses rain gauge observations.
Recharge	The process of increasing the water stored in the saturated zone of an aquifer. Expressed in depth of water (mm).
Reservoir gross capacity	The total capacity of a reservoir.
Reservoir live capacity	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.
Soil moisture deficit (SMD)	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).

### 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