

Monthly water situation report

East Anglia area

Summary – September 2018

September was another dry month, with recorded rainfall depths below the long term average in all rainfall units. This has led to a further drop in flows across the majority of rivers with the result that a number of flows are now classified as Below Normal. Groundwater levels remain healthy across the area, although they do continue to drop at all reported sites, as would be expected at this time of year.

Rainfall

No rainfall depths across the areas were in excess of the long-term average rainfall for September. Rainfall depths in the eastern and western rainfall units were classified as Below Normal, whilst they were Normal in southern and central units. The small rainfall depths have resulted in an increase in the 12 month rainfall deficit this month from 35.4mm (August) to 65mm (September).

In the longer term the North Norfolk rainfall unit has experienced the 4th driest 3 month period (July – September) since records began in 1910 and rainfall depths for this unit are now classified as Exceptionally Low for both the last 3 and 6 month periods. Rainfall depths for the last 3, 6 and 12 months for all rainfall units are classified in or below the Below Normal category.

Soil Moisture Deficit/Recharge

Soil Moisture Deficit values remained high throughout September, particularly in the northern and western part of the area, as well as in the southern tip of Essex. Deficit values for both the area and sub-areas were considered to be Above Normal for the time of year.

River Flows

The impact of low rainfall totals in September was reflected in reduced river flows across the area. Flows in the Tove, Wissey, Wensum and Yare rivers were classified as Below Normal whilst flows in the Colne were Notably Low and flows in the Waveney remain exceptionally low. Flows recorded in the middle reaches of the Great Ouse, Chelmer, Gipping and Heacham remained in the Normal category.

Groundwater Levels

Groundwater levels at all sites that were reported on this month continued to drop in response to the low rainfall levels over previous months. All reported sites remain in the Normal band.

Reservoir Storage/Water Resource Zone Stocks

Reservoirs in Essex that have been reported on are near their normal operating curves, except Hanningfield where levels are below the operating curve and close to 1995-96 levels. Levels are expected to increase as transfer from the Ely Ouse re-starts in October. Grafham reservoir in the Ouse catchment is also below the operating curve and close to 1995-96 levels but is well above its drought curve.

Environmental Impact

No fluvial flood alerts or flood warnings were issued during September.

Forward Look

Probabilistic ensemble projections for river flows at key sites

December 2018: There is an increased probability of flow below the normal range at all sites in East Anglia with most also showing an increased probability of notably low flows.

March 2019: Most sites show an increased probability of flows below the normal range next March.

Probabilistic ensemble projections for groundwater levels in key aquifers

March 2019: There is an increased probability of levels being below the normal range at all sites apart from the slow to respond Therfield Rectory. Most sites also show an increased probability of notably low levels.

September 2019: There is an increased probability of groundwater levels being below the normal range at most sites next September.

Author:

[Hydrology & Operations](#)

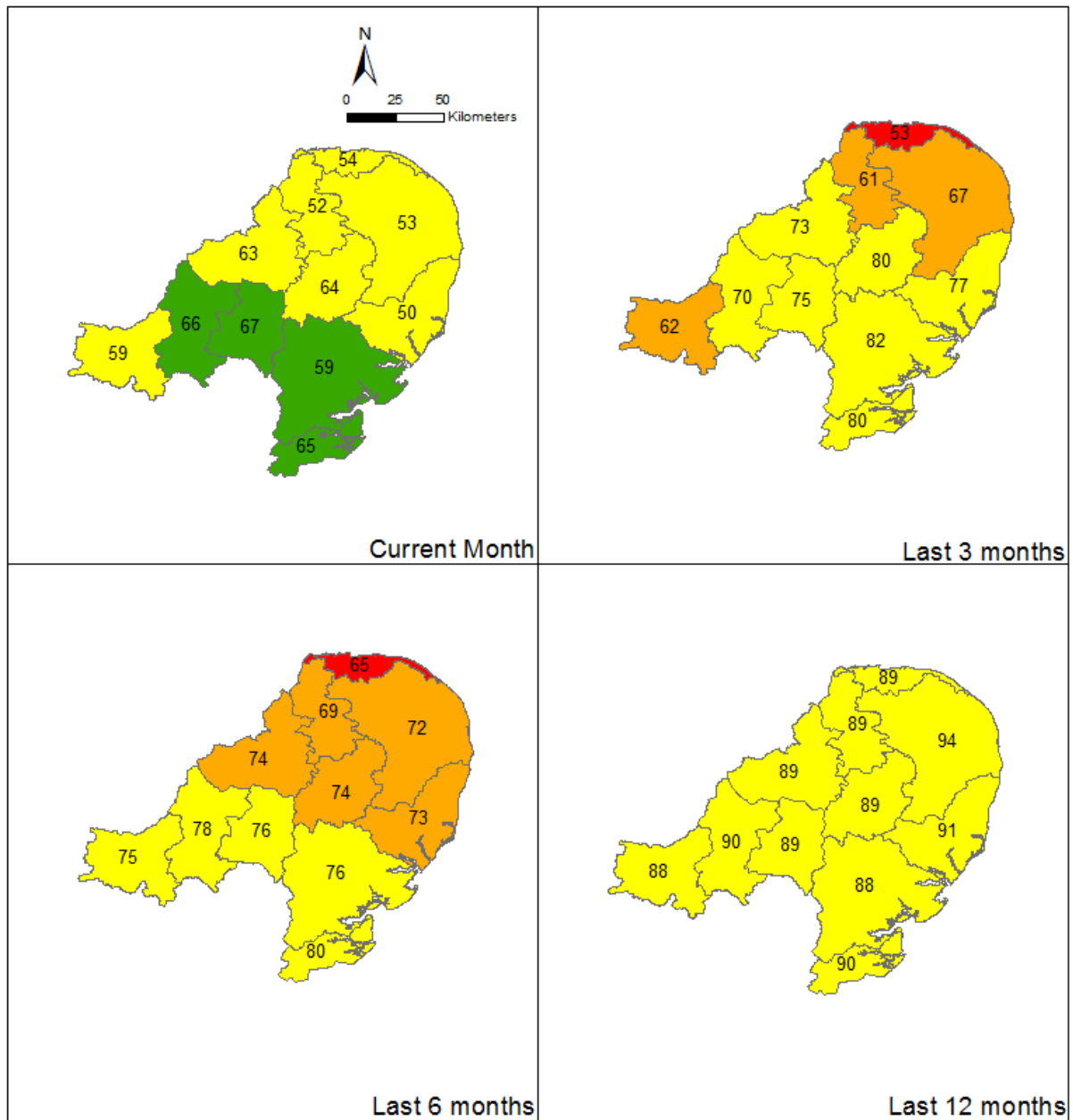
Contact details: 03708506506

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Rainfall

September 2018



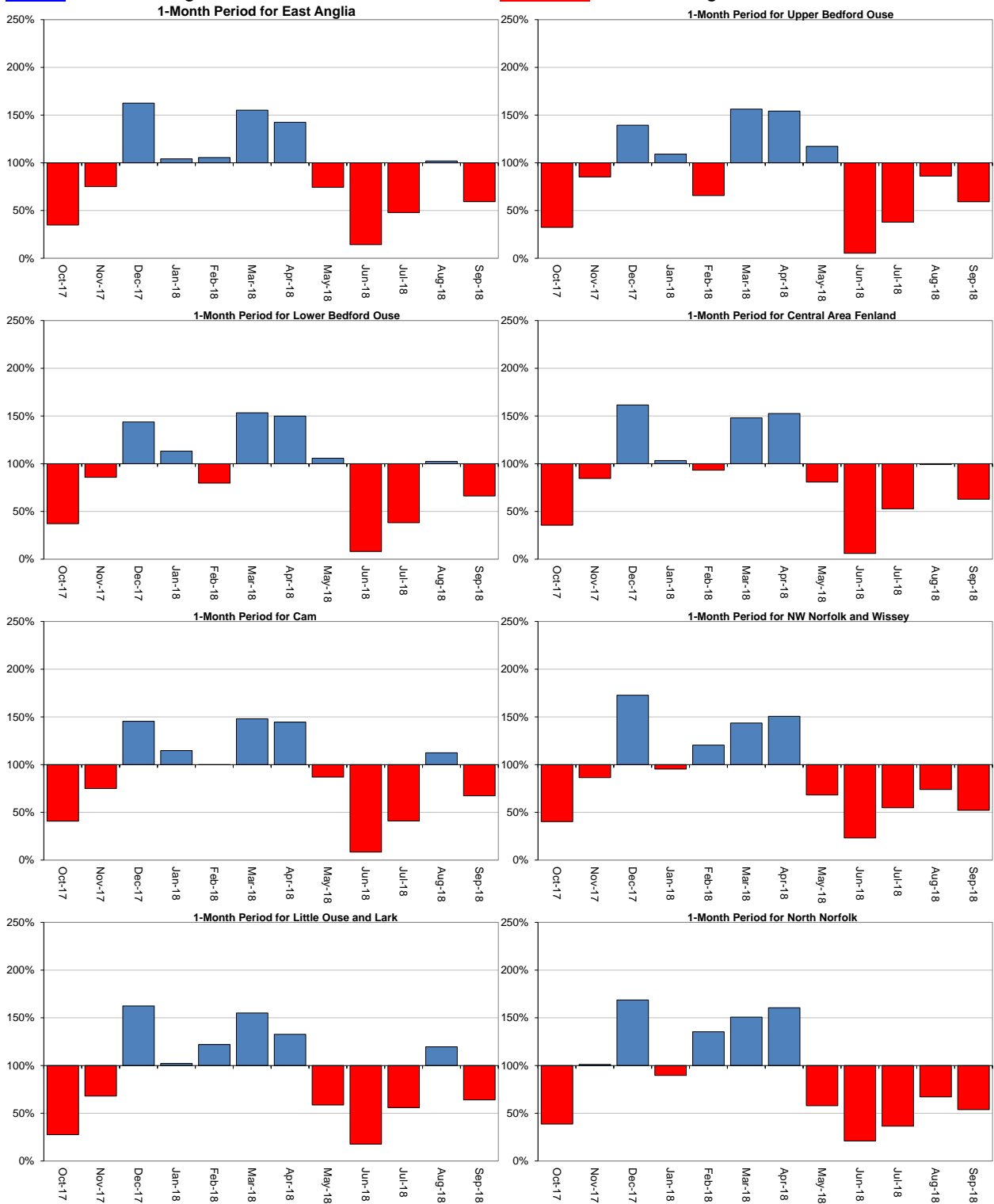
- Exceptionally high
- Notably high
- Above normal
- Normal
- Below normal
- Notably low
- Exceptionally low

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.

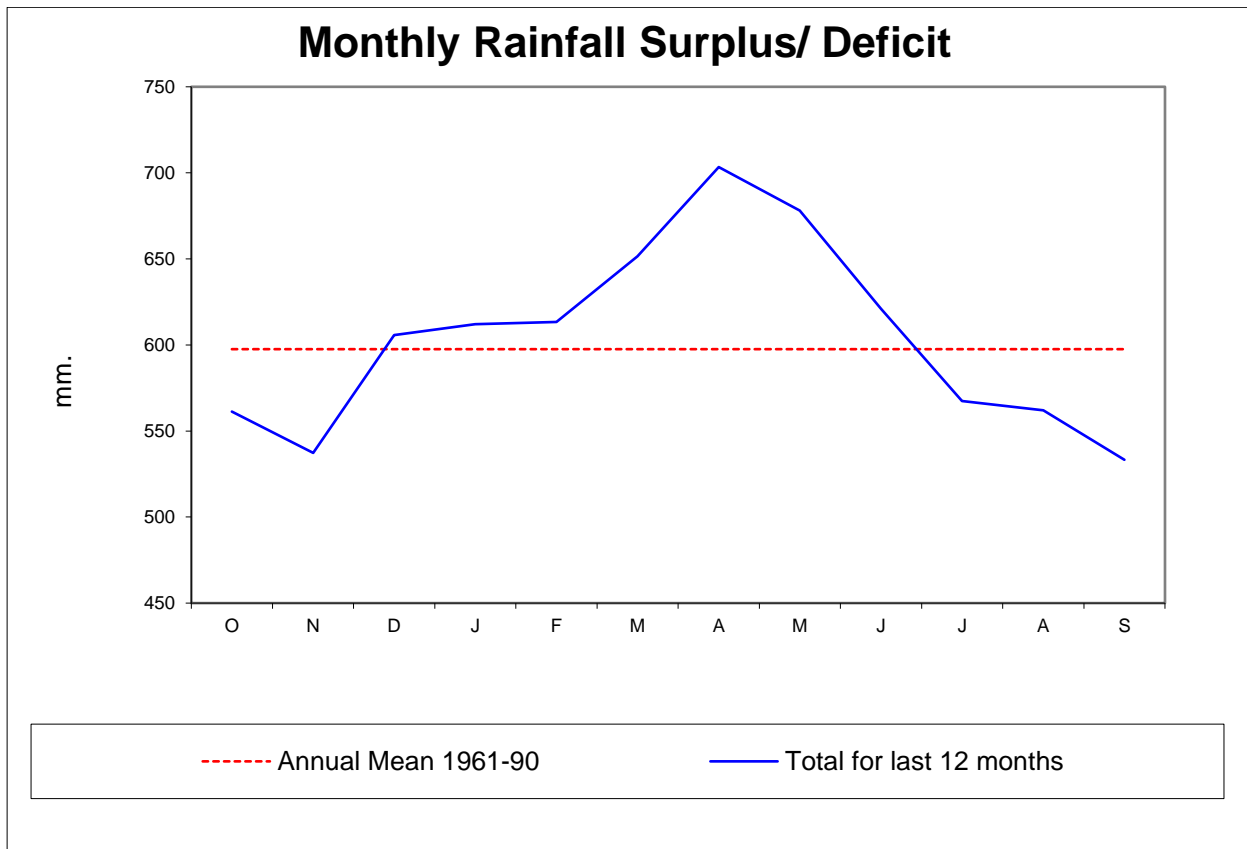
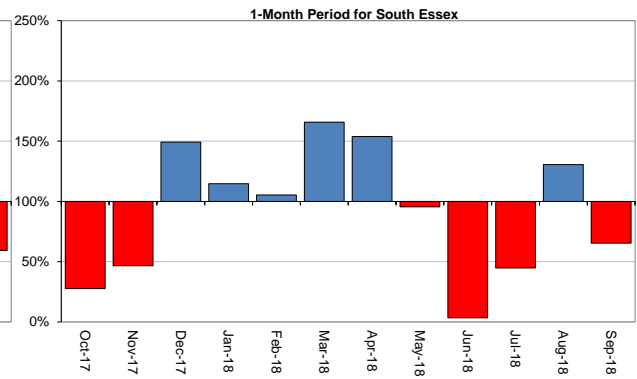
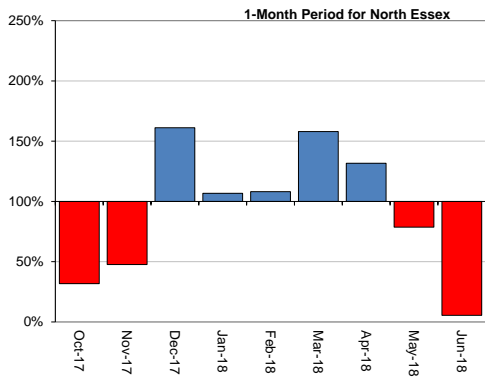
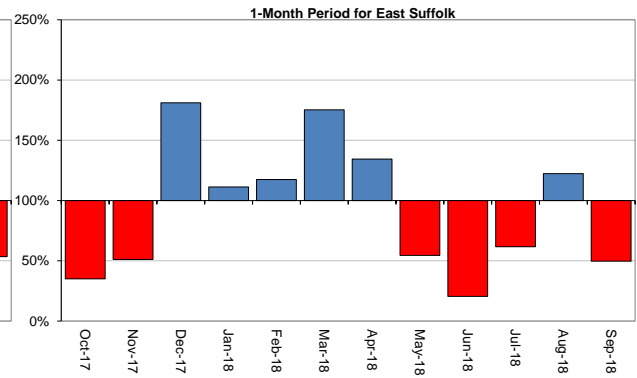
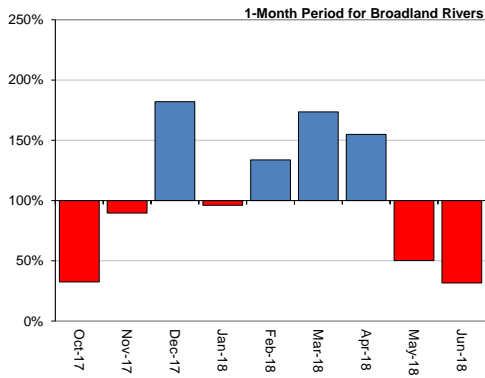
Above average rainfall

Below average rainfall



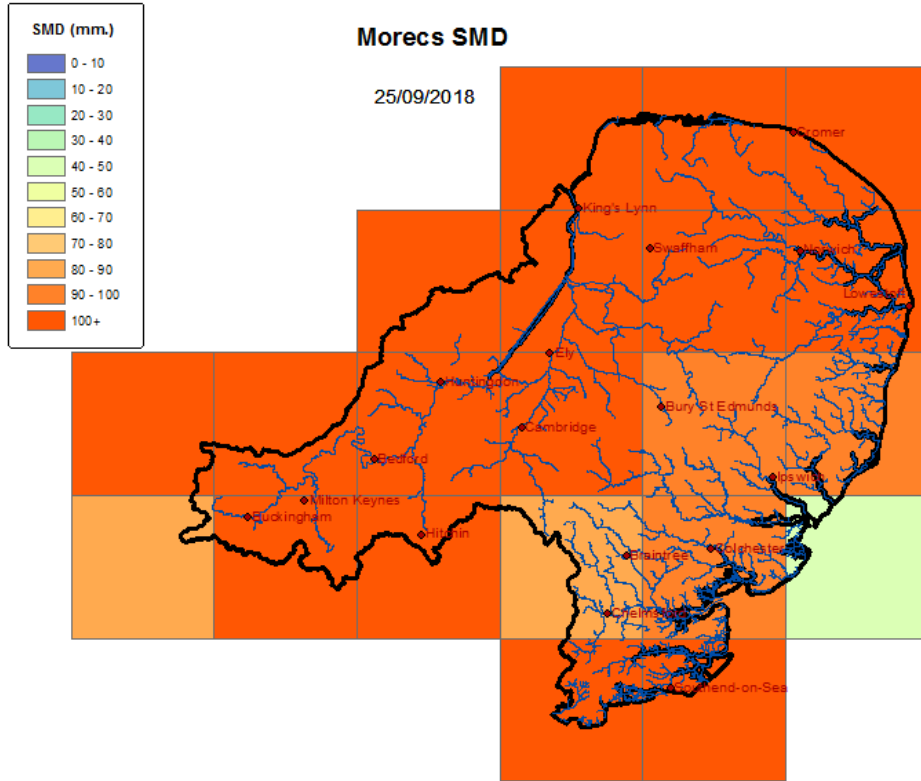
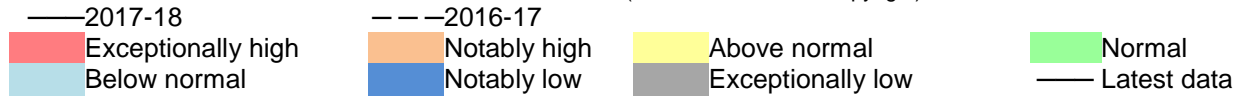
Above average rainfall

Below average rainfall

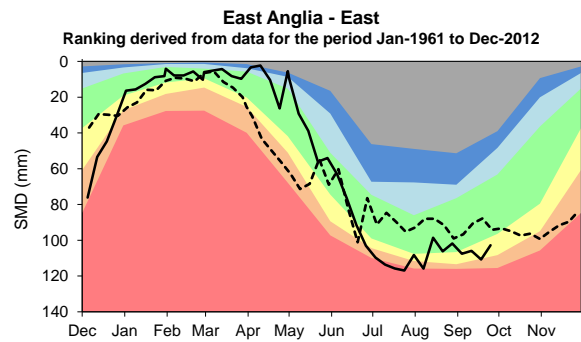
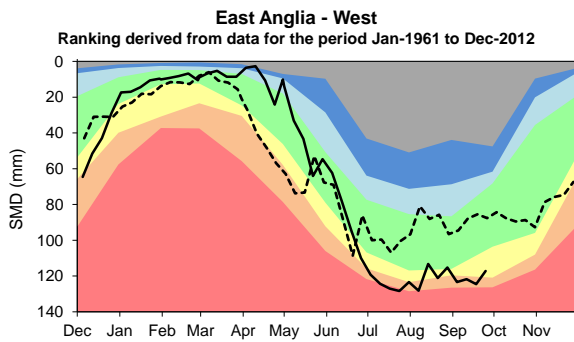


Soil Moisture Deficit

Data based on MORECS dataset (Met Office © Crown Copyright)

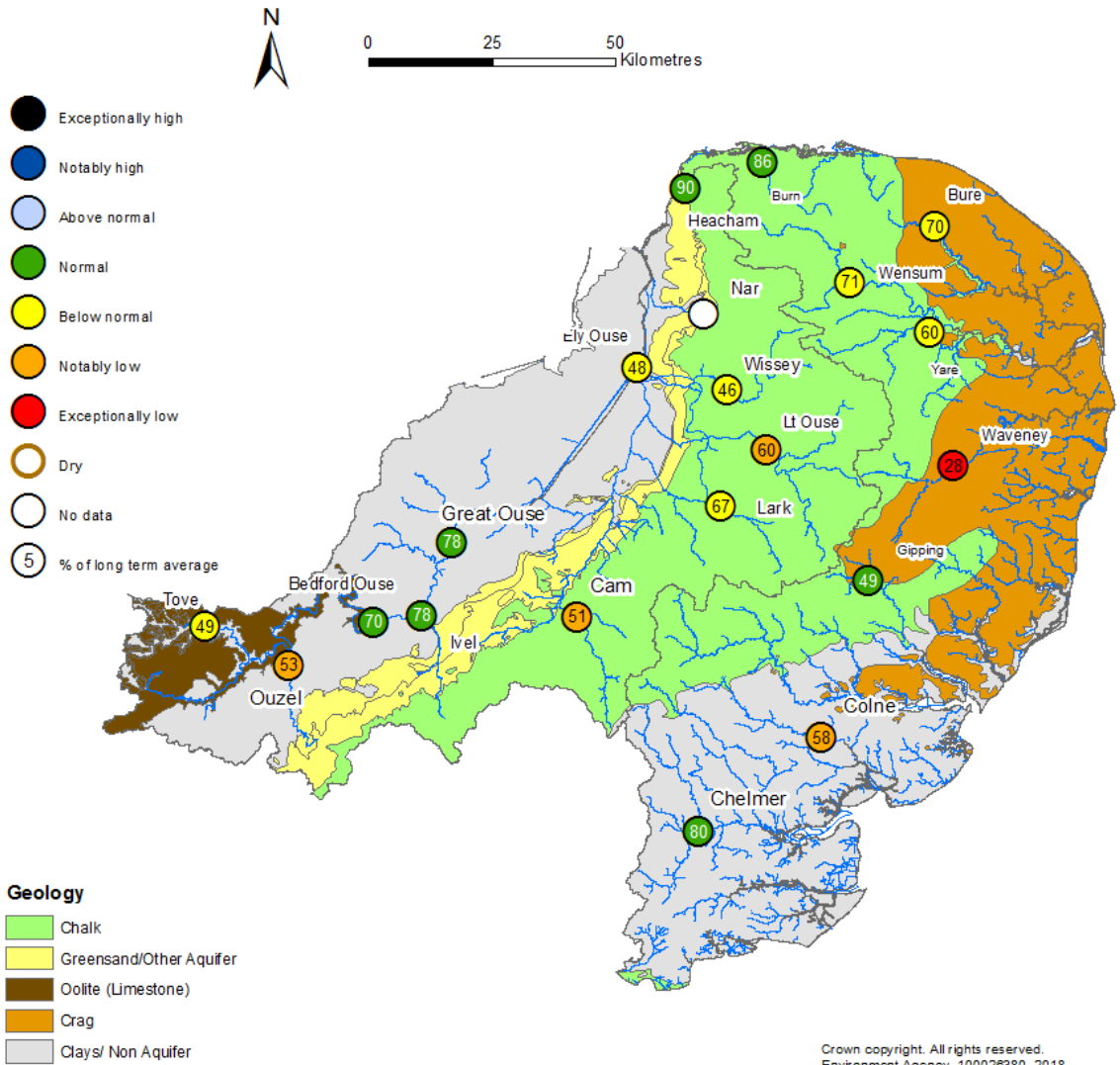


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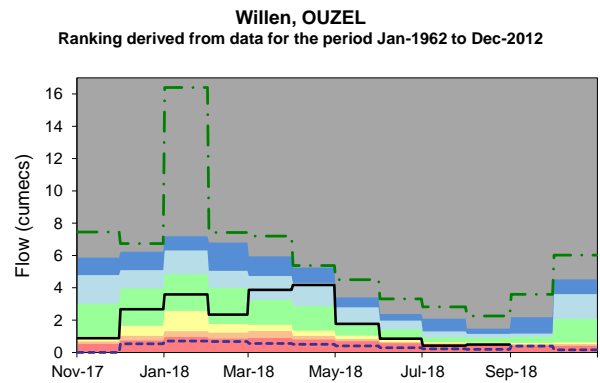
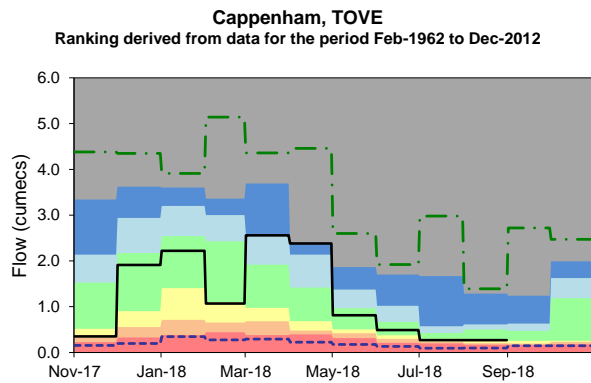
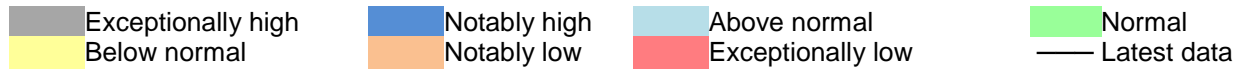


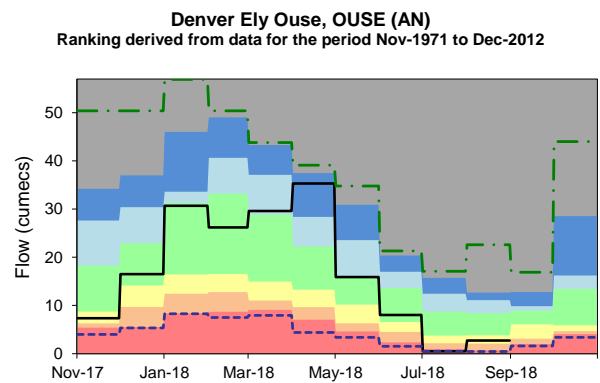
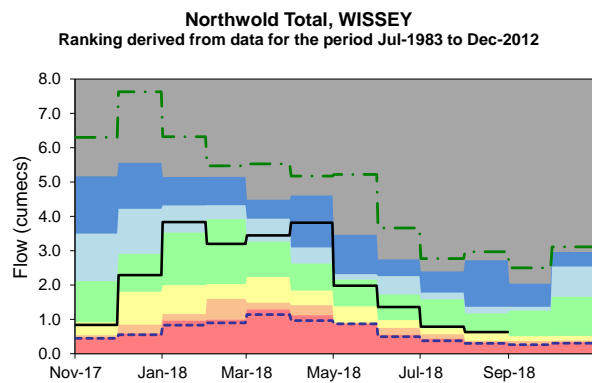
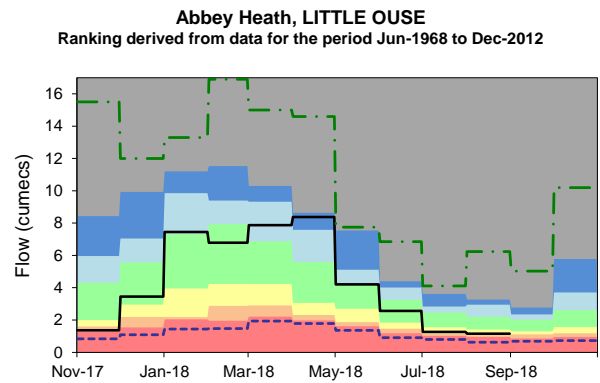
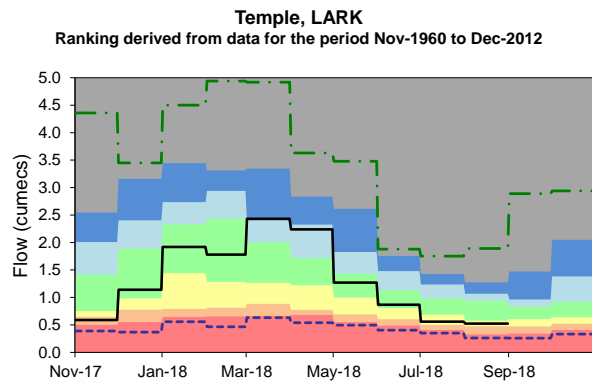
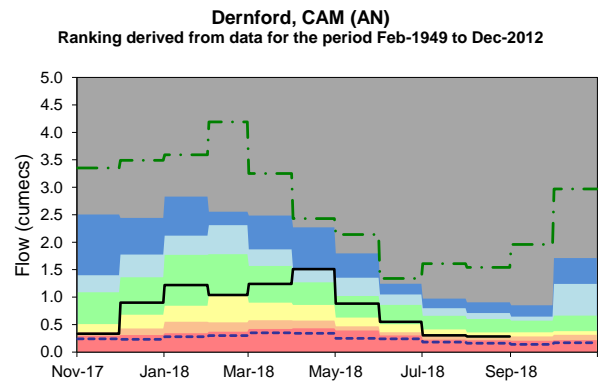
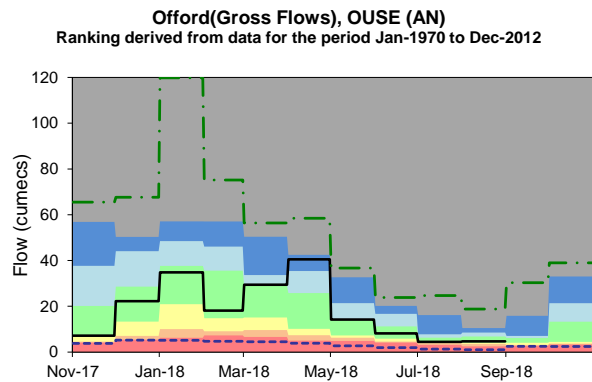
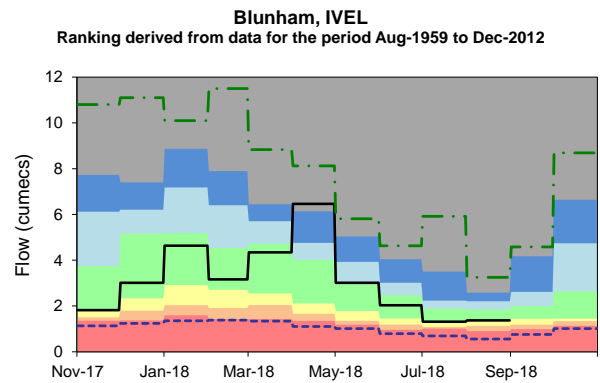
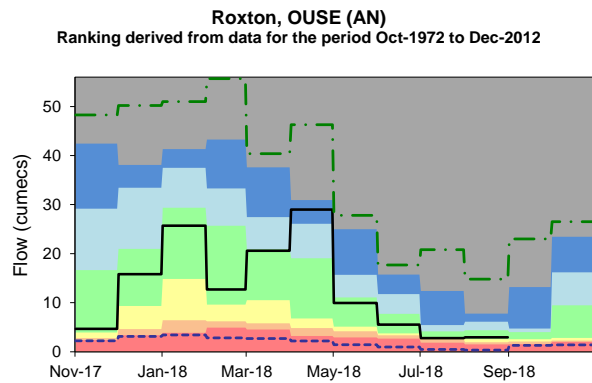
River Flow

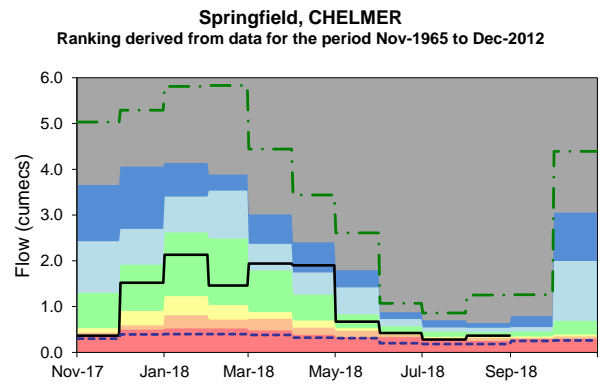
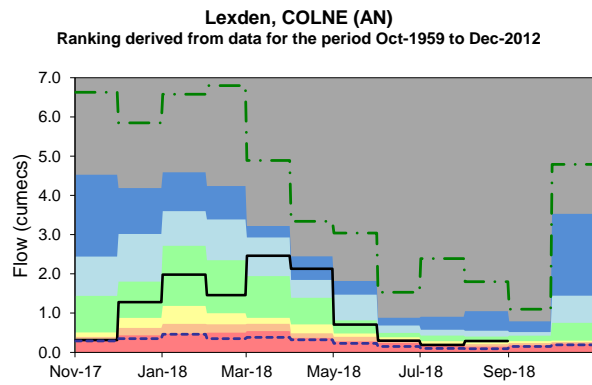
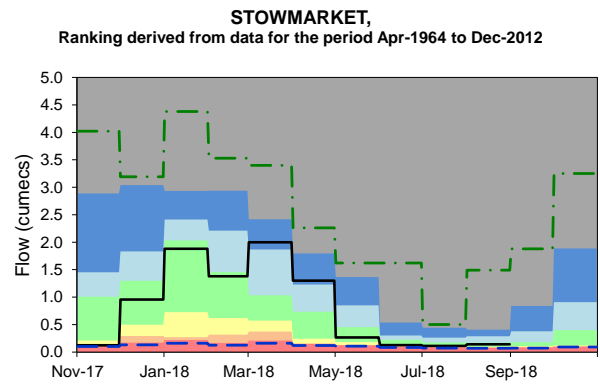
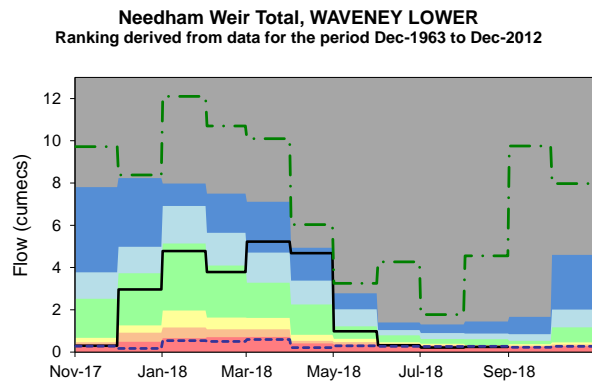
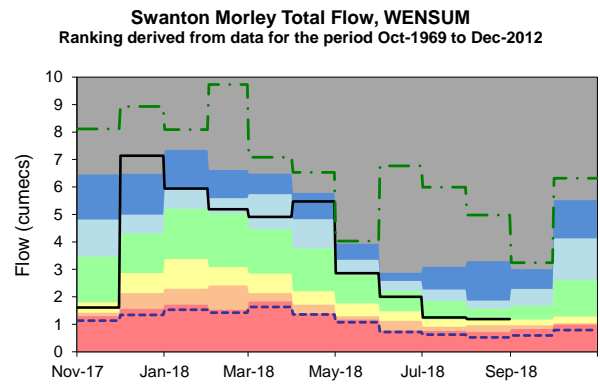
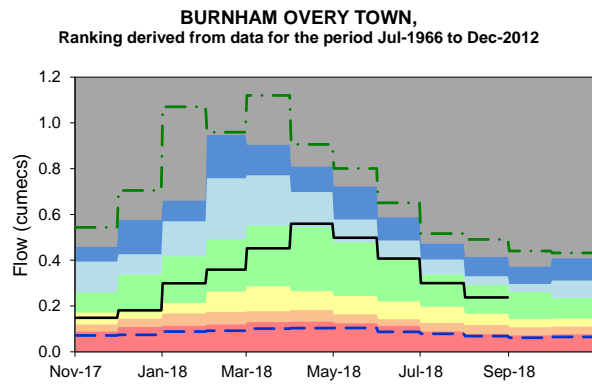
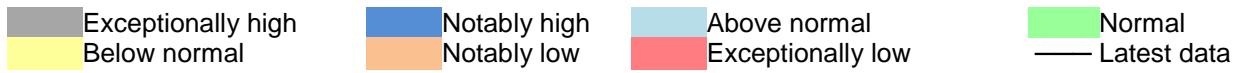
September 2018



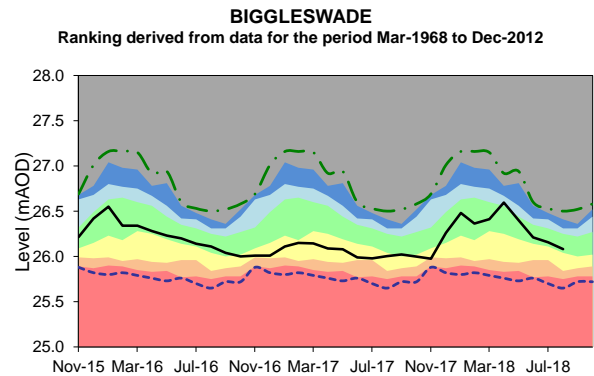
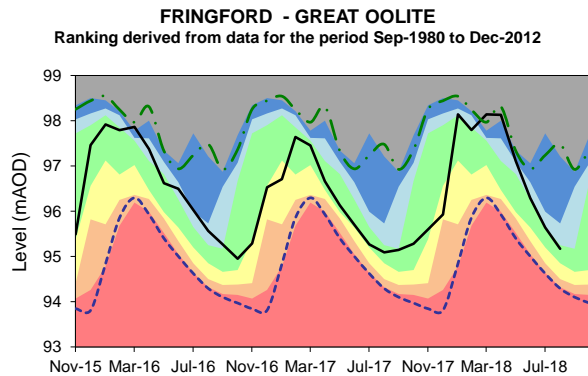
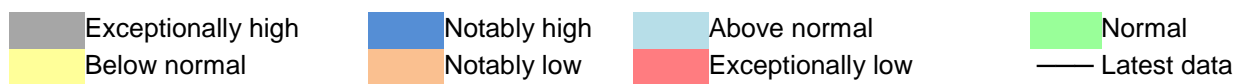
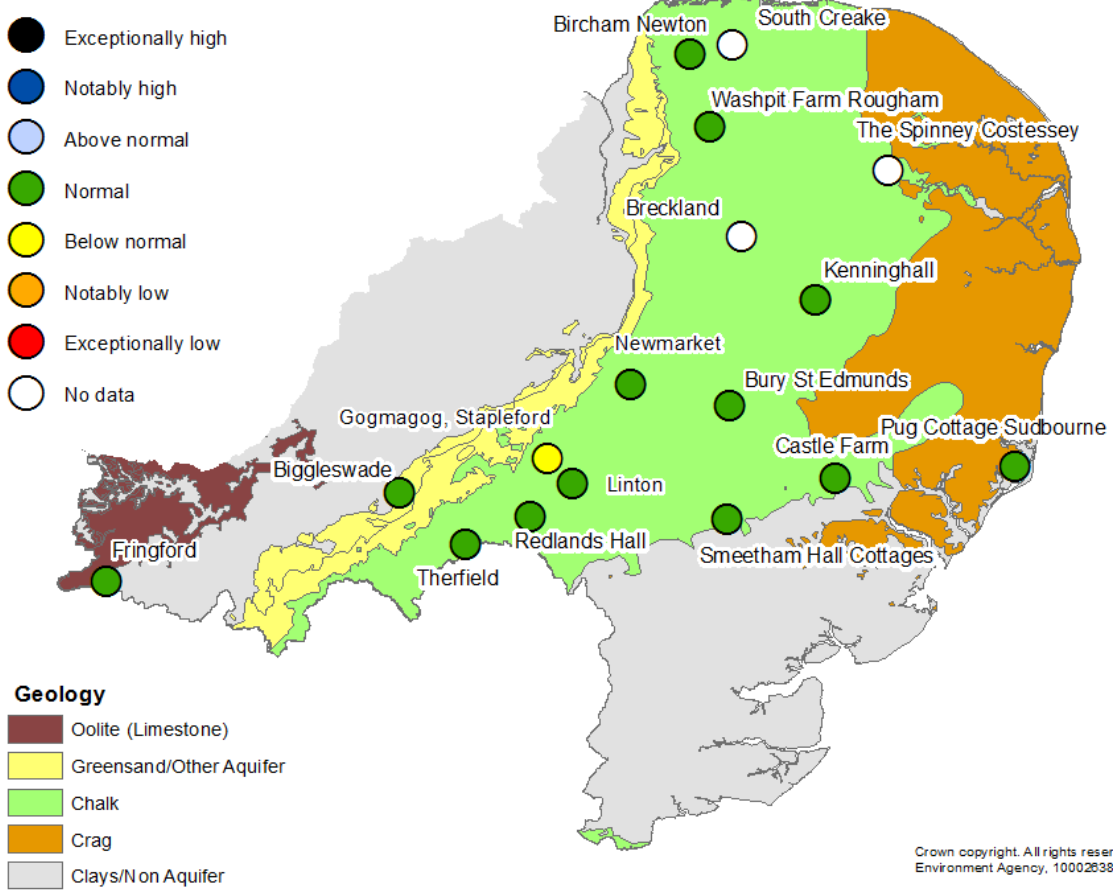
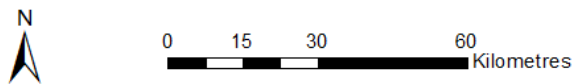
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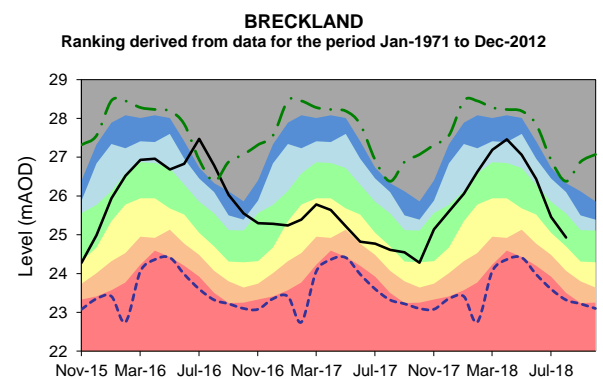
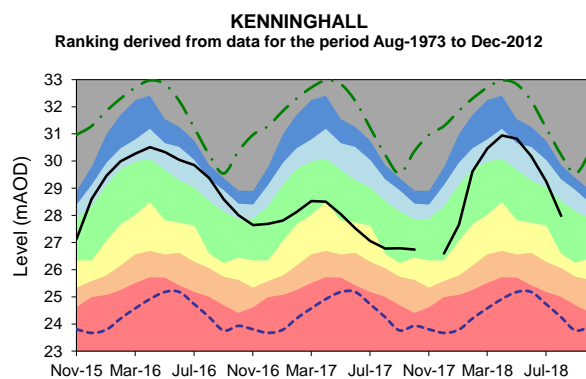
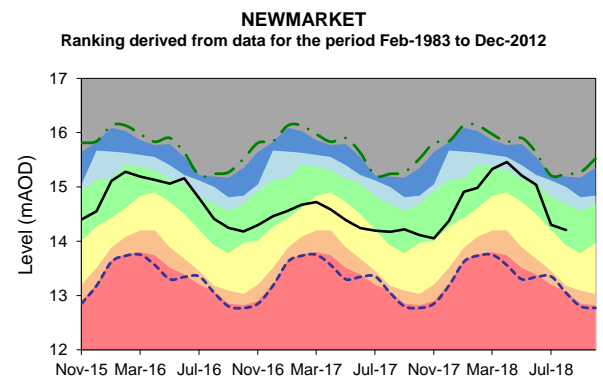
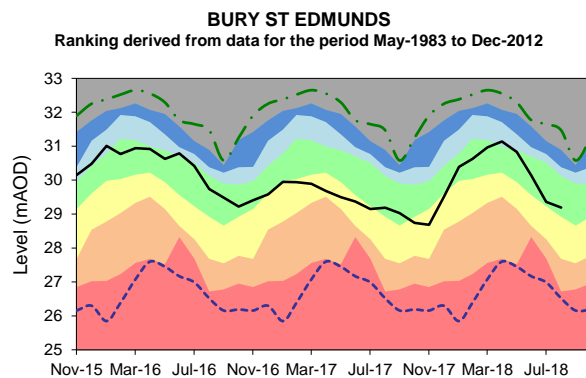
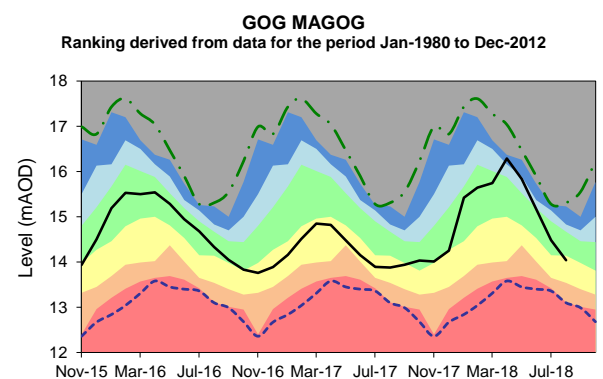
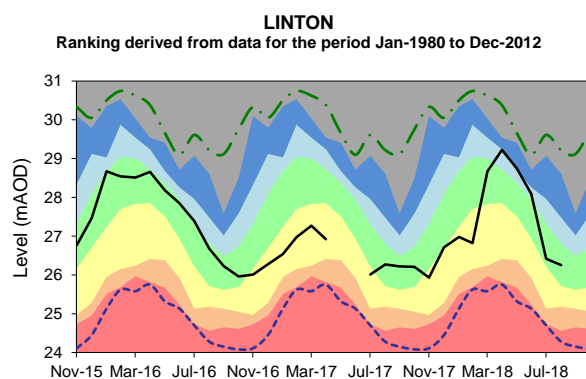
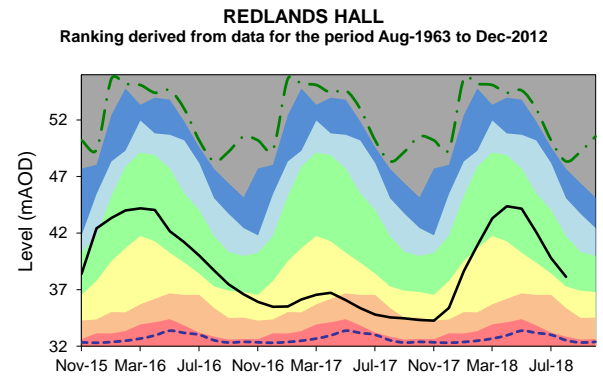
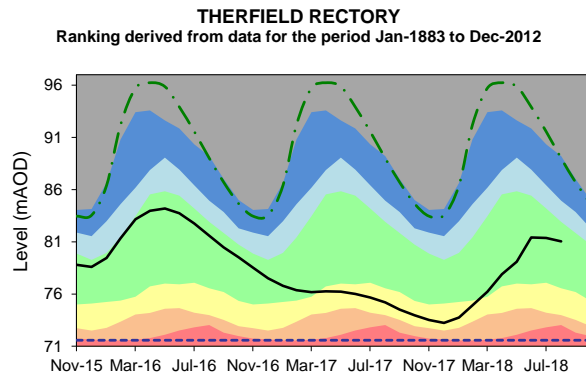
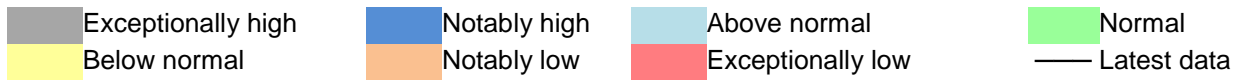


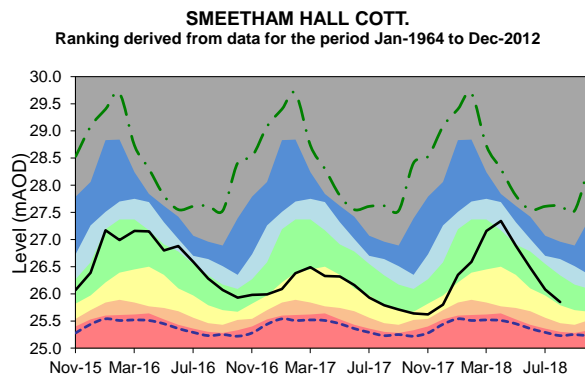
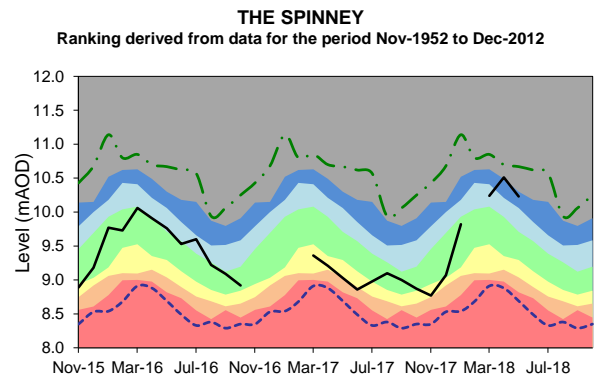
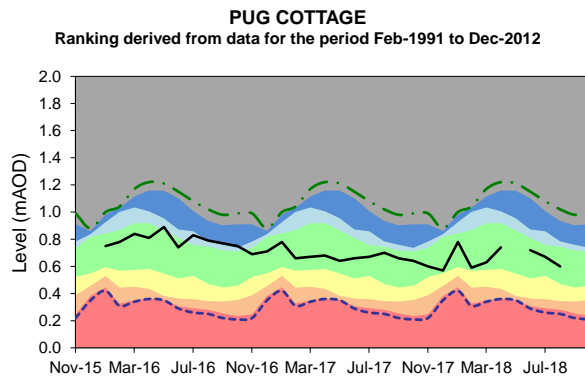
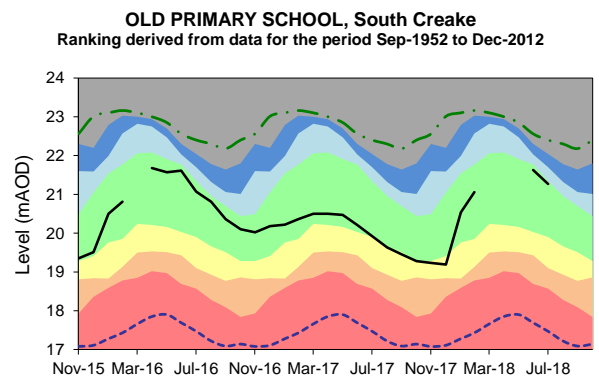
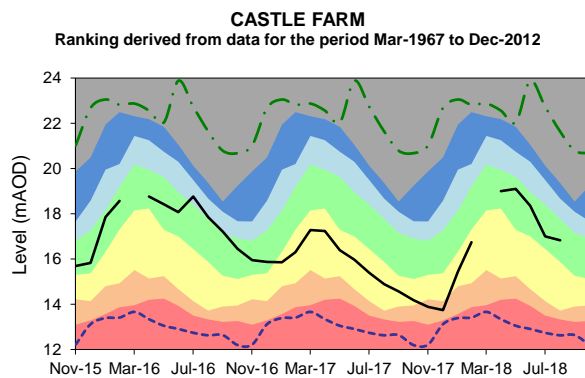
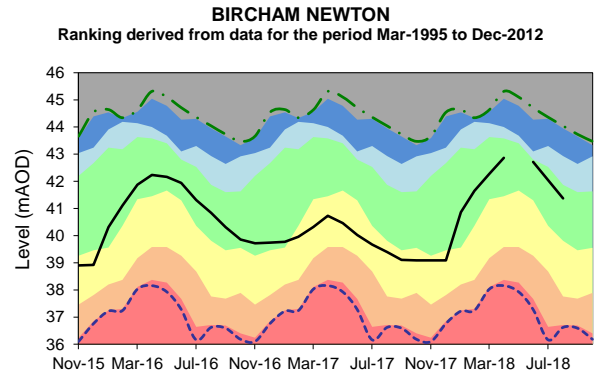
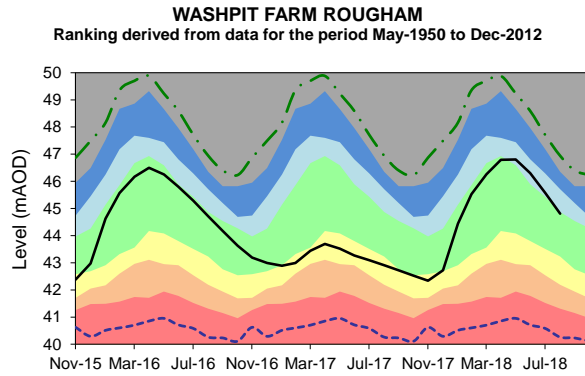
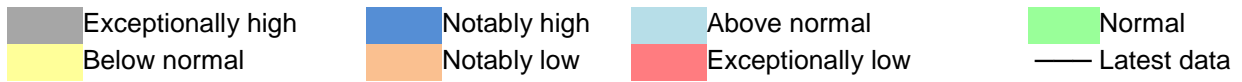




Groundwater Levels September 2018

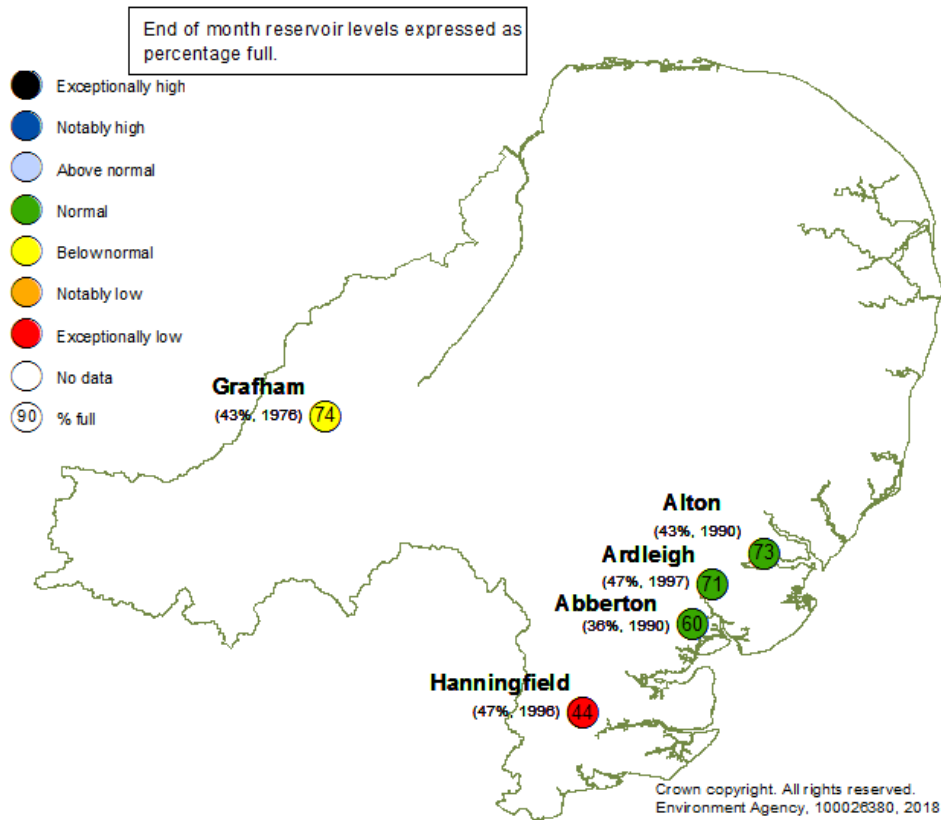




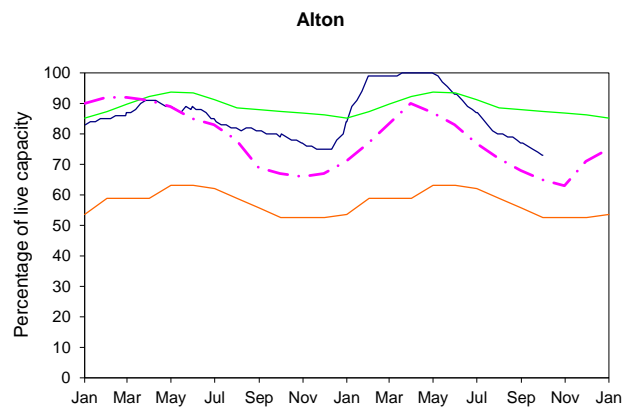
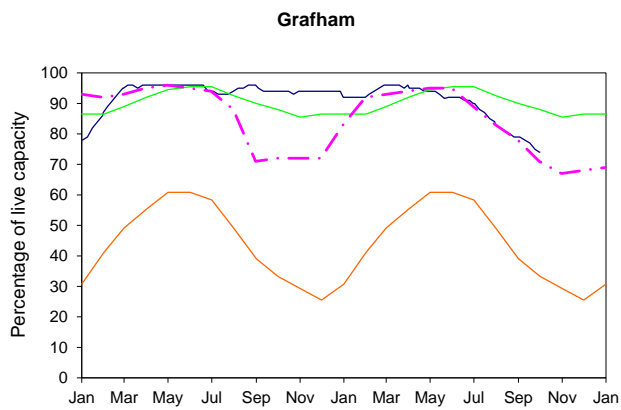


Reservoir Stocks

September 2018

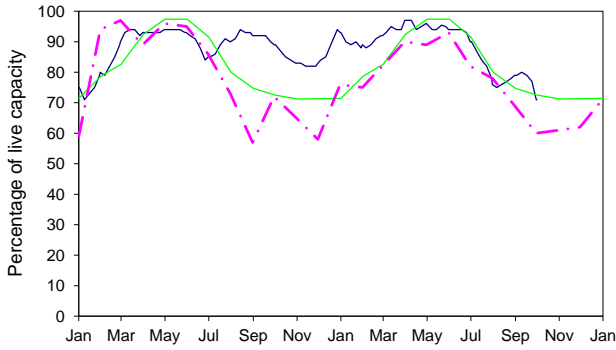


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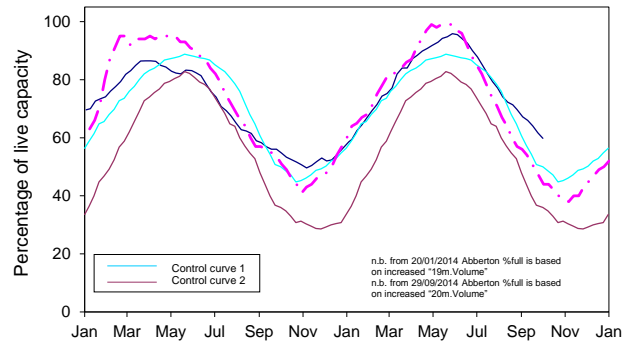


— 2017-2018
 — Normal Operating Curve
 — Drought Alert Curve
 - - - 1995-1996

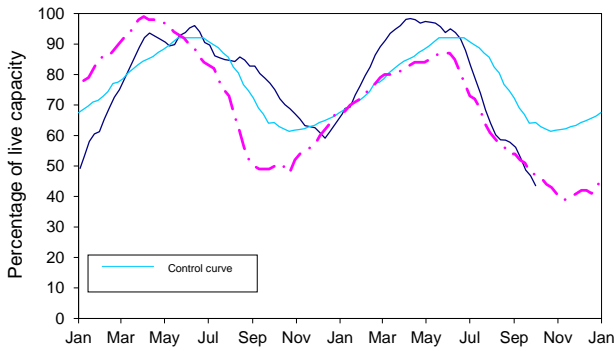
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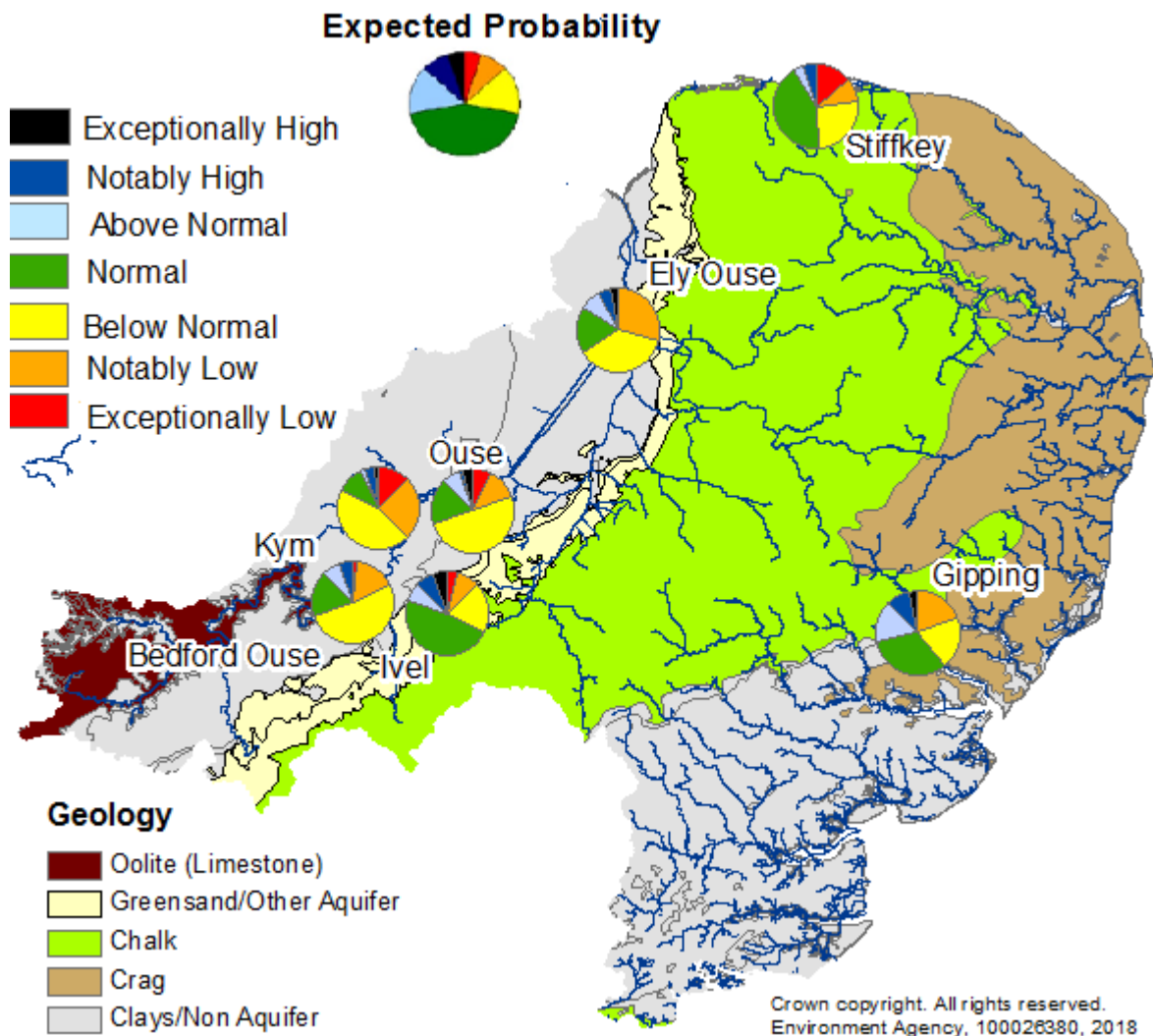
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Hanningfield



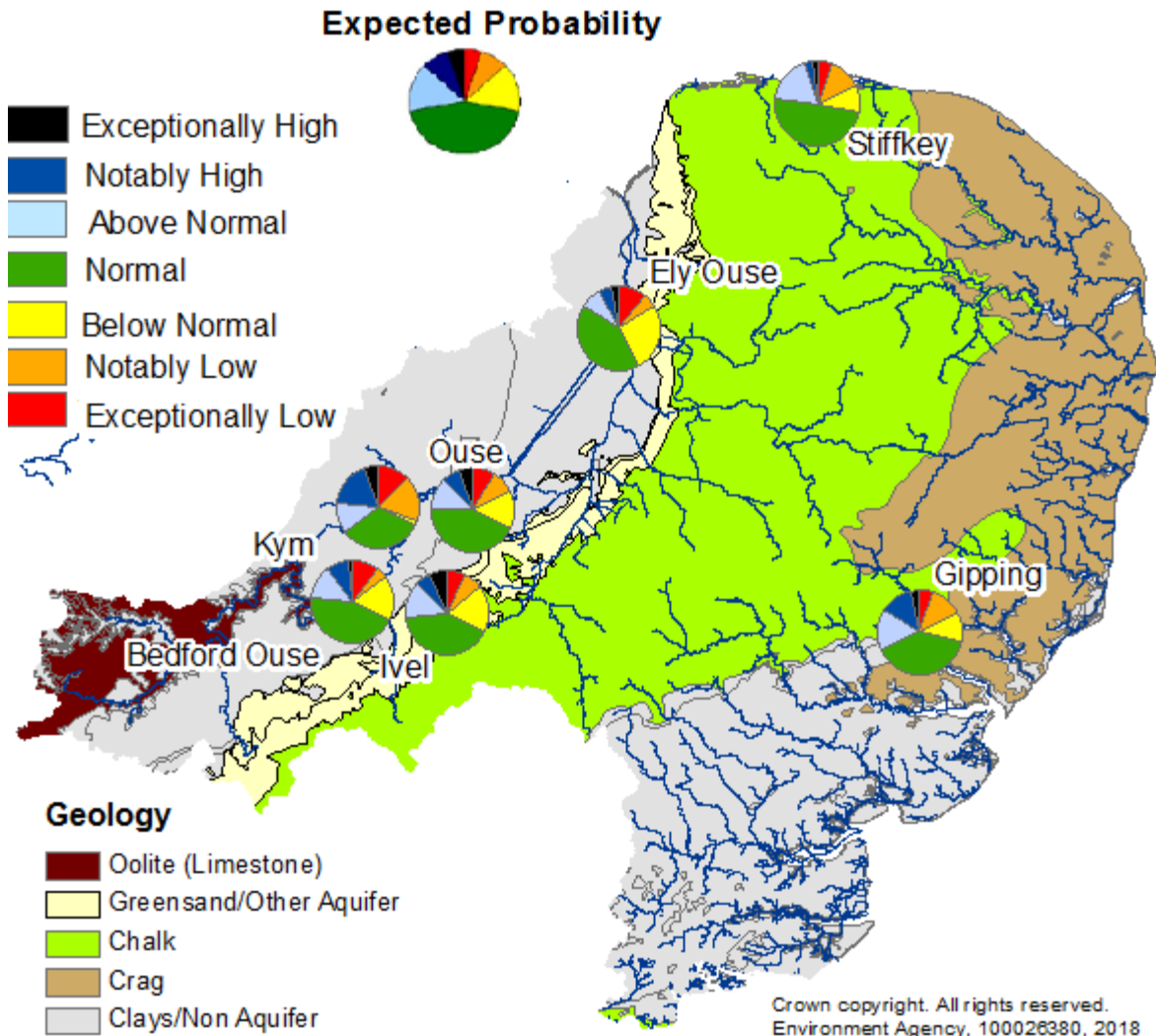
Forward Look – River Flows



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 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.

[^] "Naturalised" flows are projected for these sites'

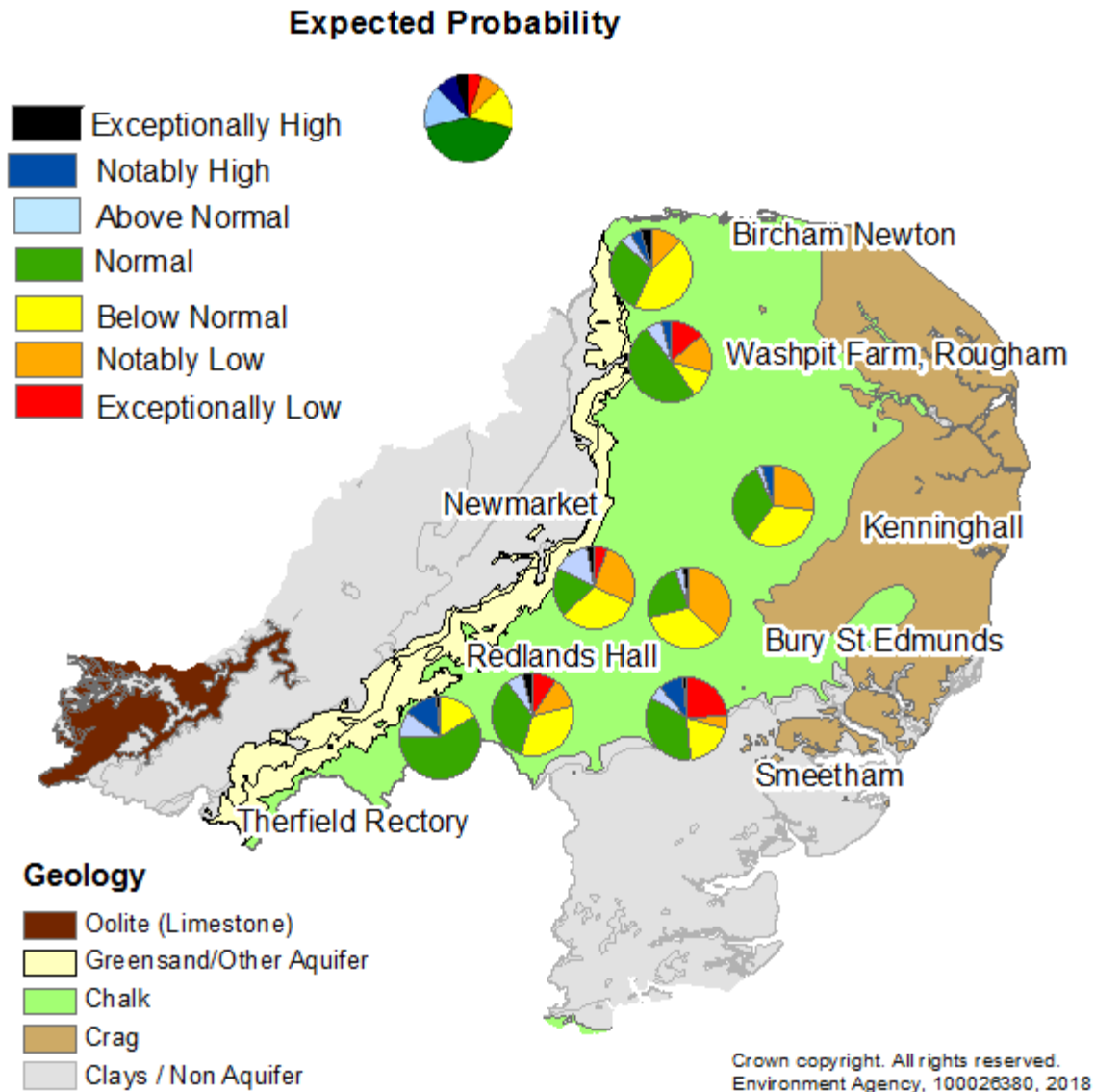


Exceptionally high or low levels are those which would typically occur 5% of the time within the historic record. Notably high or low levels are those which would typically occur 8% of the time. Above normal or below normal levels are those which would typically occur 15% of the time. Normal levels are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

Probabilistic ensemble projections of river flows at key indicator sites in March 2019. 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.

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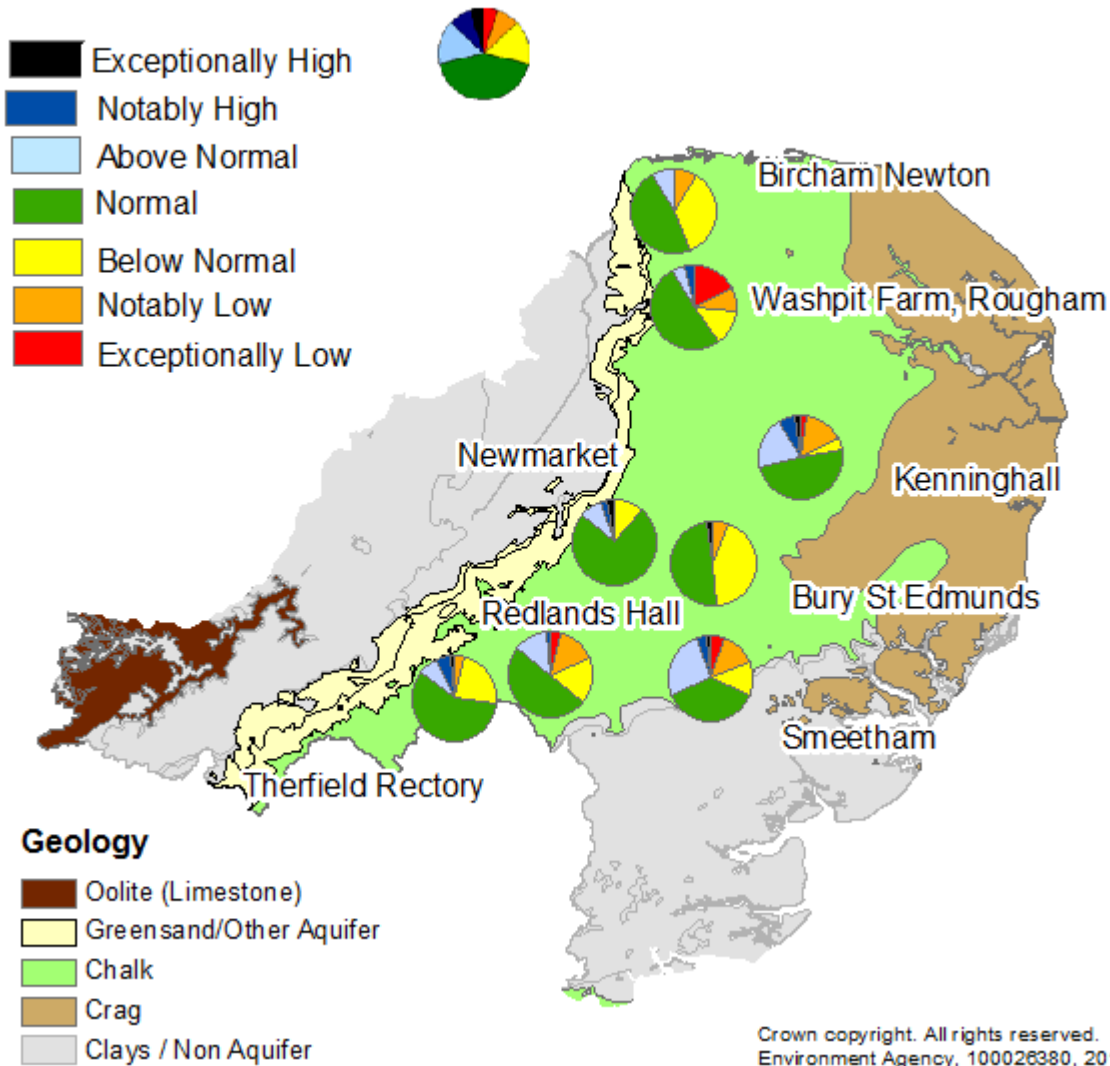
Forward Look - Groundwater



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 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.

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 September 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 ³ s ⁻¹)
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