

Monthly Water Situation Report

East of England

Summary – November 2021

November was a very dry month with an average of 28mm of rainfall falling across the region, with much of this rainfall falling in the later end of the month. Catchments in the west and south of the area received less rainfall (exceptionally low levels) than those in the north and east of the area (below normal levels). The South Essex catchment only received 8.5mm in November, making it the driest November on record. Despite the low levels of rainfall, SMD, river flows and groundwater levels are mostly at normal levels for the time of year (a slight reduction from the October report). Impacts of the dry November may be seen further down the line in groundwater due to the limited recharge that occurred this month. Elsewhere, reservoir levels across the region are generally healthy, with all sites other than Alton operating at or above the normal operational curve.

Rainfall

Average rainfall across the area was 28mm for November 2021, which is 48% of the LTA, meaning rainfall for the area is classified as notably low for the time of year. Rainfall varied between 16-72% of the LTA across the catchments, with the southern and western catchments being classified as exceptionally low whilst the eastern and northern catchments received below normal levels of rainfall. The record for driest November on record was broken in the South Essex catchment with only 8.5mm of rainfall being recorded (The previous record was 10.7mm in 1945). Elsewhere, the Lower and Upper Bedford Ouse received the 2nd and 3rd driest November on record respectively, whilst the Cam and Central Area Fenland received the 4th driest November on record. Most of the rainfall fell at the later end of the month, without this rainfall, more than one record for driest November would have been broken. Both the 3-month and 6-month totals show that all catchments have received normal levels of rainfall during these periods. The 12-month total shows that most catchments have received above normal levels of rainfall, other than two catchments on the East coast which have received normal levels of rainfall during this period.

Soil Moisture Deficit/Recharge

Despite the low levels of rainfall, SMD slightly decreased across the area. The observed decrease was caused by the decreasing temperatures resulting in less water being lost via evaporation/evapotranspiration. The levels across the region are classified as normal for the time of year.

River Flows

Most river flow sites across the area are currently at normal levels for the time of year (albeit low end of normal for most sites). The only exceptions to this are the Rivers Toye, Cam and Waveney which are currently at below normal levels and the River Burn which is at above normal levels. The overall classification of several sites has gone down from the October report (where all sites were at normal to notably high levels) – this is due to the low levels of rainfall in November.

Groundwater Levels

Most groundwater sites are currently at normal levels for the time of year. There are five groundwater sites which are currently at above normal levels across the area. The overall classification of a few sites has dropped from the October report where there were 10 sites were at above normal levels and 1 site at notably high levels (rest at normal levels). These drops in classification are due to the low levels of rainfall in November and thus limited groundwater recharge (particularly compared to the normal levels of recharge at this time of year). A few sites have showed limited recharge from the October report, whilst most sites levels have remained stable or even dropped slightly.

Reservoir Storage/Water Resource Zone Stocks

All reservoirs other than Alton are currently operating at or above their normal operational curves. Alton is slightly below its normal operational curve, but levels were on the rise towards the end of the month. The levels at Grafham and Hanningfield are classified as above normal for the time of year whilst the levels at Abberton and Alton are classified as normal. Current levels at Ardleigh are classified as below normal for the time of year.

Environmental Impact

Groundwater support scheme operations slightly decreased in November with one pump being turned off in the Rhee scheme. The Lodes-Granta groundwater support scheme currently has 4 of the 6 pumps operating whilst the Rhee groundwater support scheme currently has 3 of the 8 pumps operating. The Hiz and Thet-Little Ouse schemes both remained with no pumping. There was 32 flood alerts and 10 flood warnings issued across East Anglia in November 2021. No HOFs were issued.

Forward Look

Probabilistic ensemble projections for river flows at key sites

December 2021: The level is showing an increased probability of above normal flows. Both Gipping and Stiffkey are showing an increased probability of normal flows. Sites along the Ouse are all showing a slightly increased probability of below normal flows whilst the Kym is showing a slightly increased probability of notably low flows.

March 2022: Most sites are showing a slightly increased probability of greater than normal flows except for the Ely Ouse which is showing an increased probability of normal flows.

Probabilistic ensemble projections for groundwater levels in key aquifers

March 2022: All sites are showing a greatly reduced probability of notably low/exceptionally low levels. Five of the eight GW sites are showing a significantly increased probability of greater than normal levels.

September 2022: Most sites are showing an increased probability of normal levels. Only exceptions are Smeetham and Therfield Rectory which are showing an increased probability of above normal levels.

Author:

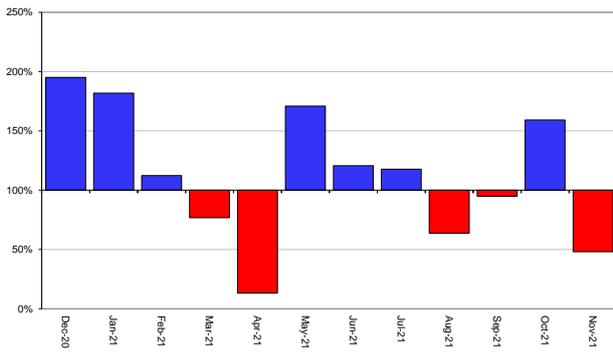
[ANG-Hydrology](#)

Contact details: 03708506506

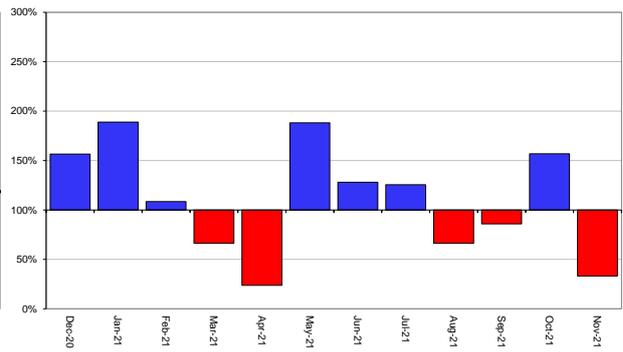
Above average rainfall

Below average rainfall

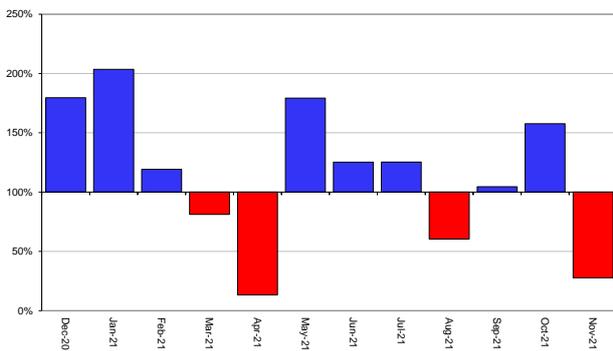
1-Month Period for East Anglia



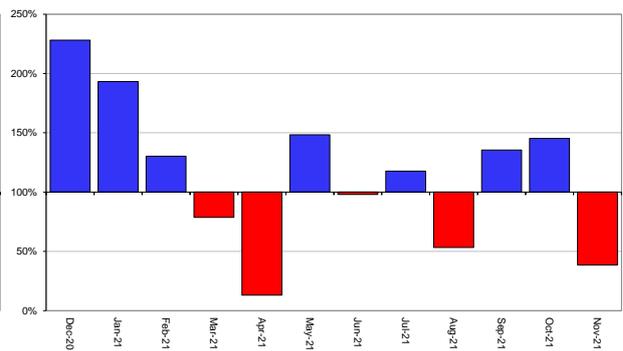
1-Month Period for Upper Bedford Ouse



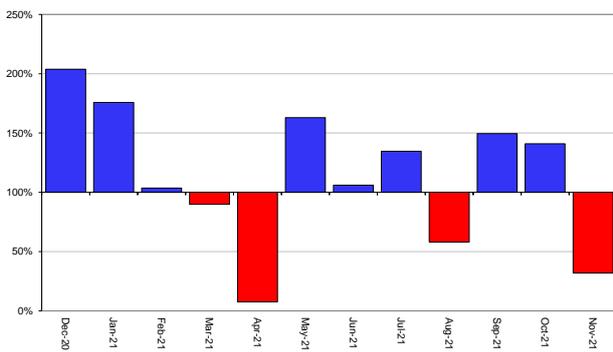
1-Month Period for Lower Bedford Ouse



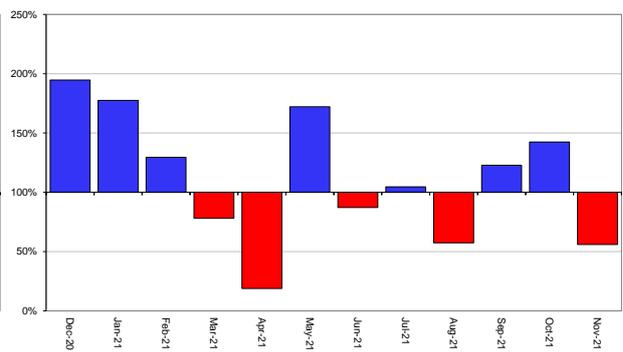
1-Month Period for Central Area Fenland



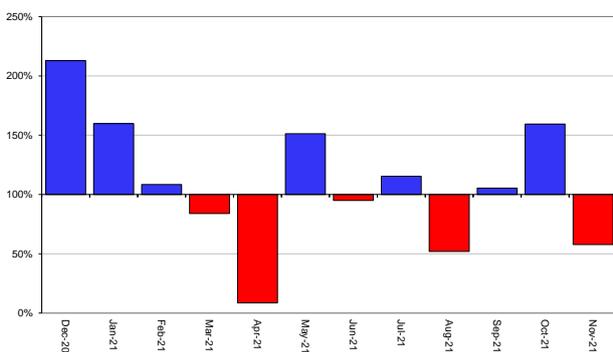
1-Month Period for Cam



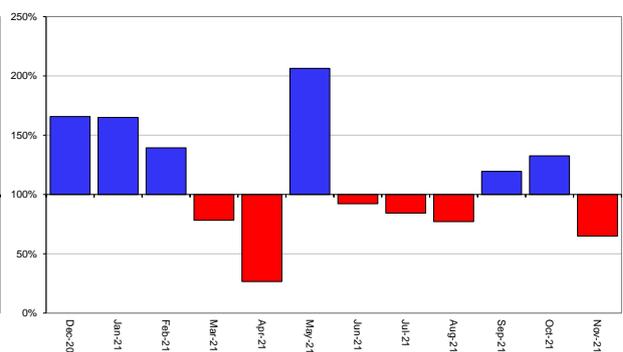
1-Month Period for NW Norfolk and Wissey



1-Month Period for Little Ouse and Lark

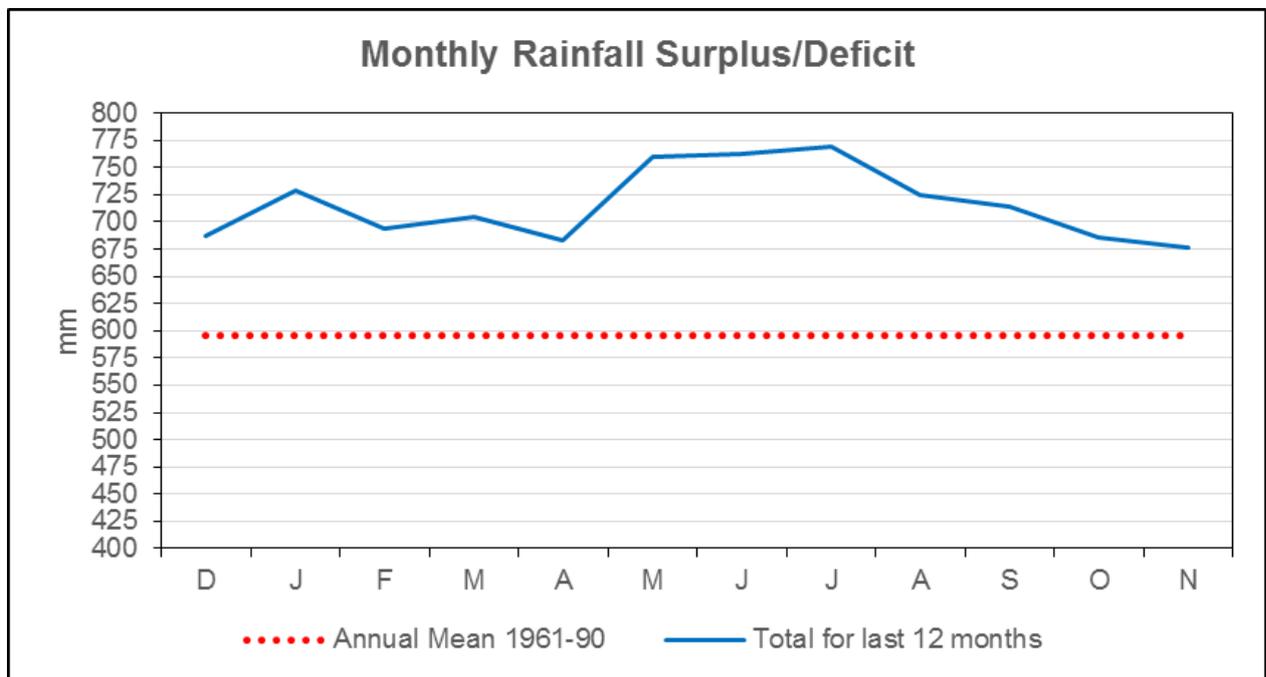
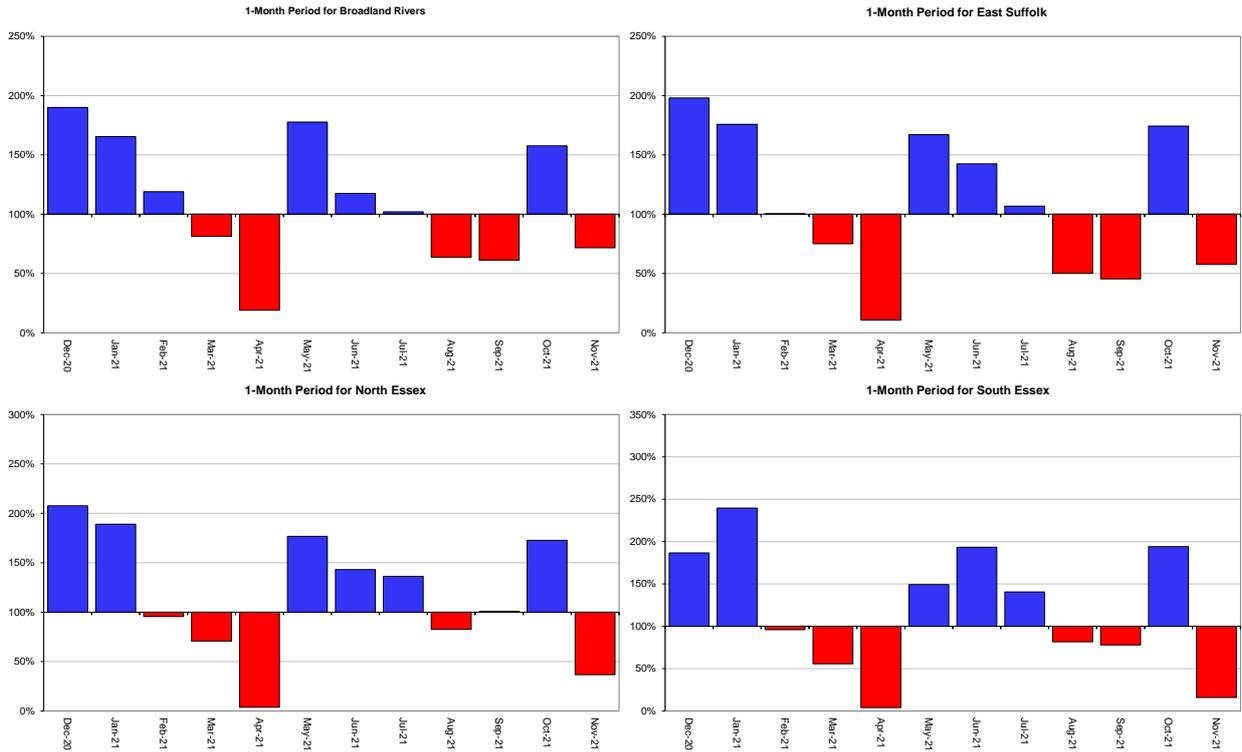


1-Month Period for North Norfolk

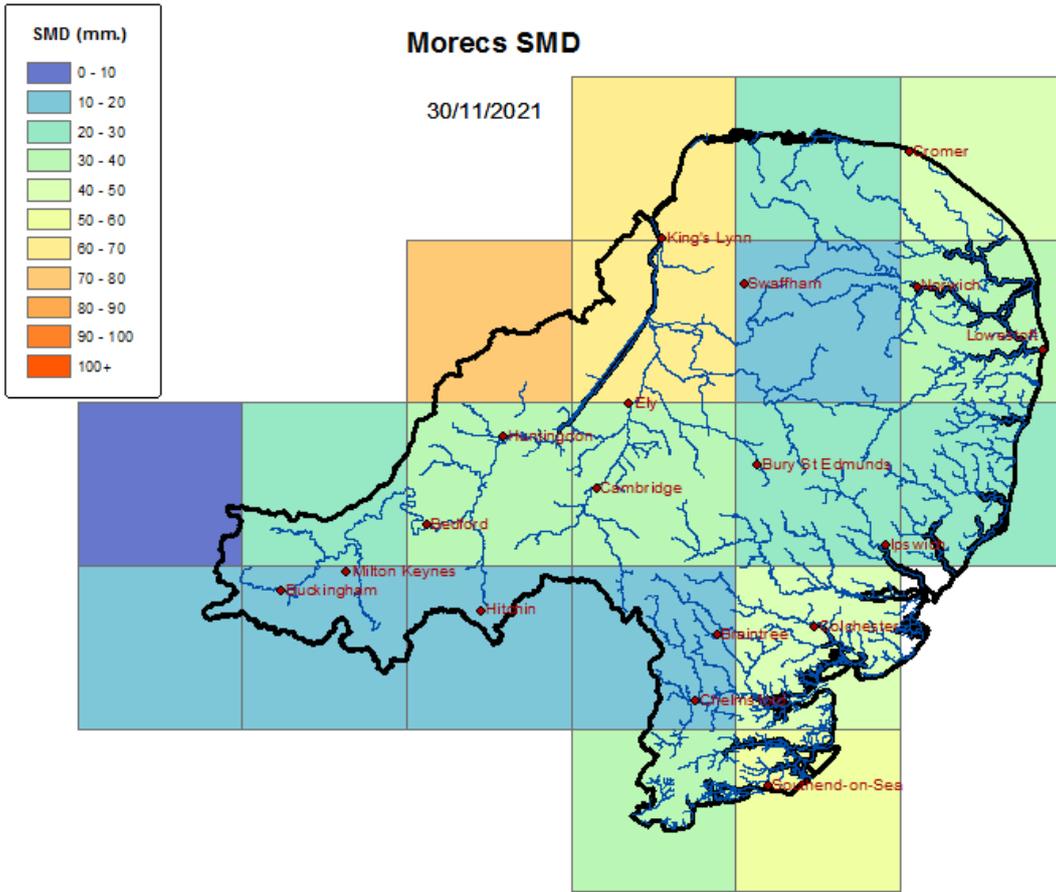


Above average rainfall

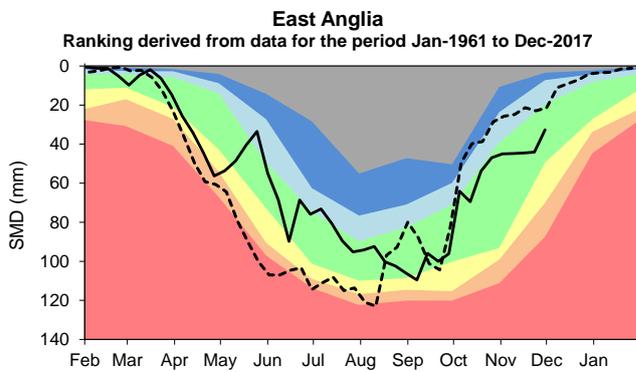
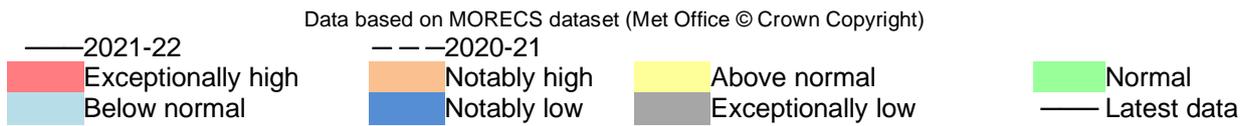
Below average rainfall



Soil Moisture Deficit

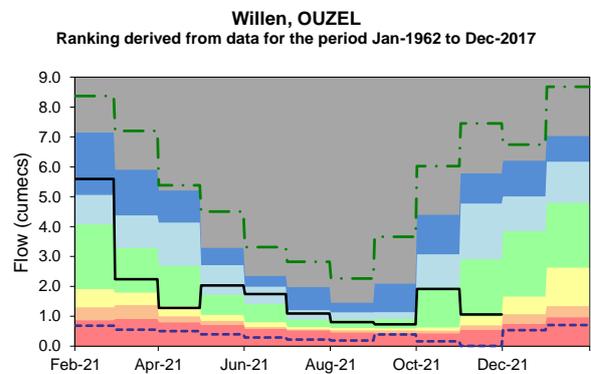
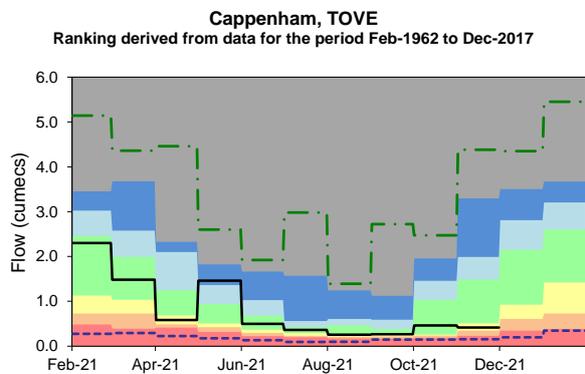
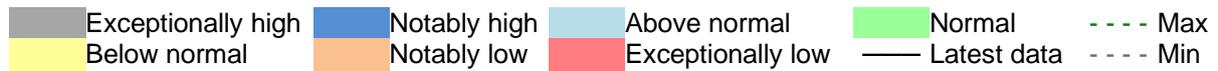
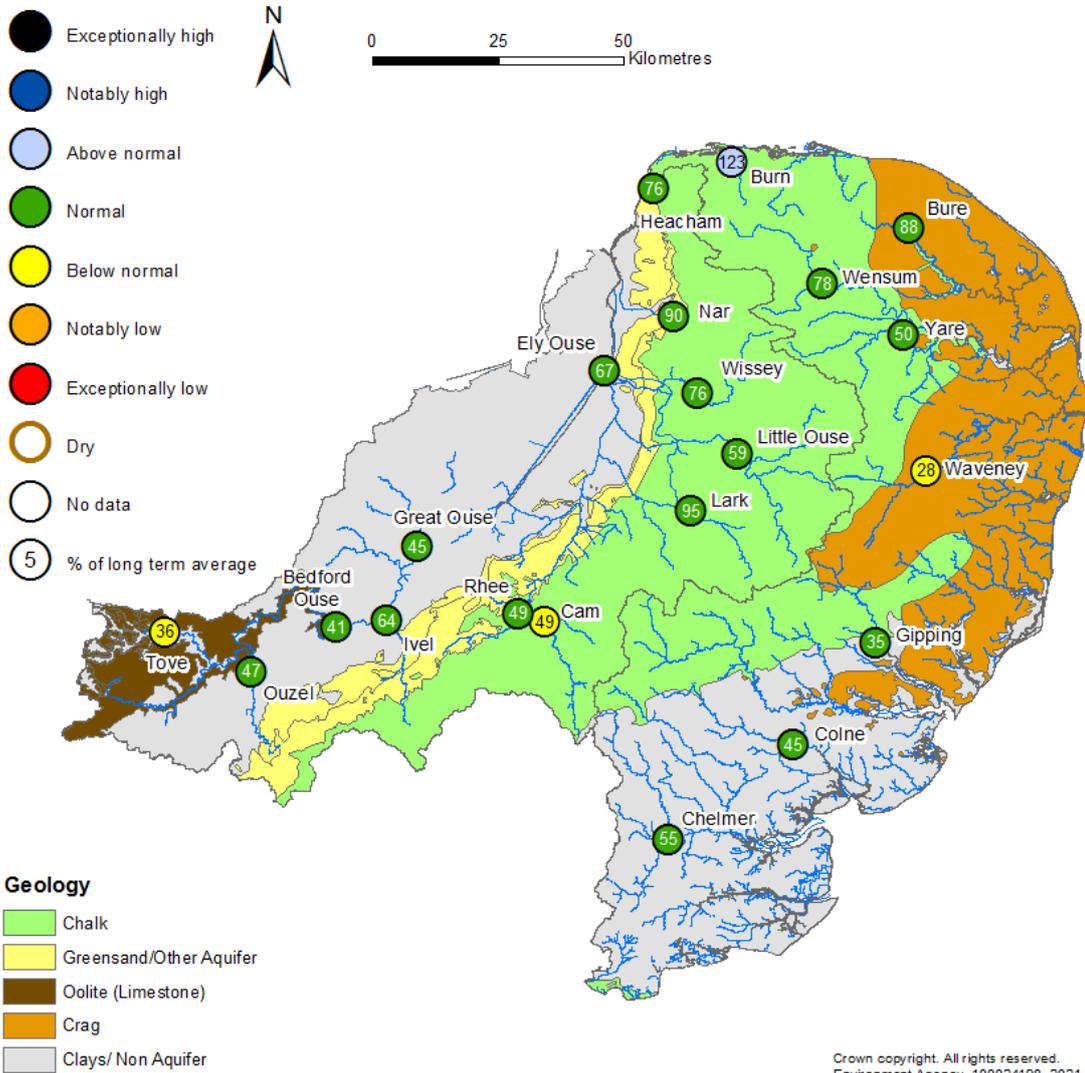


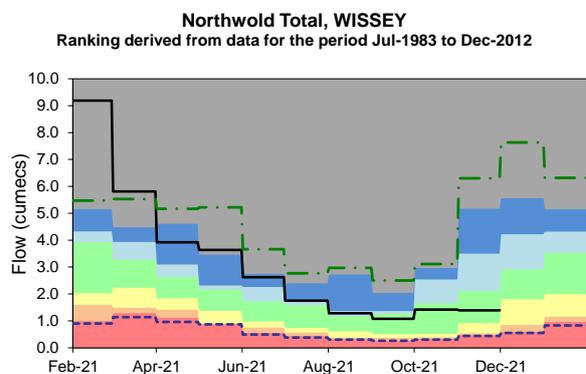
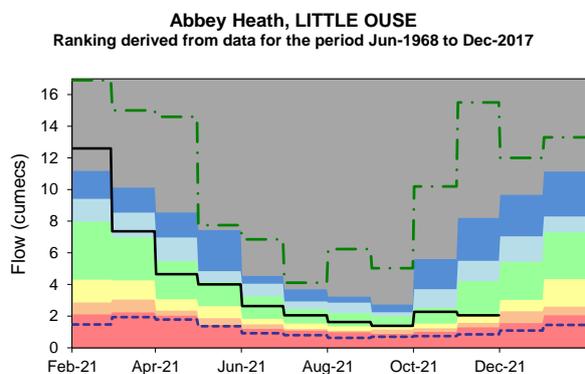
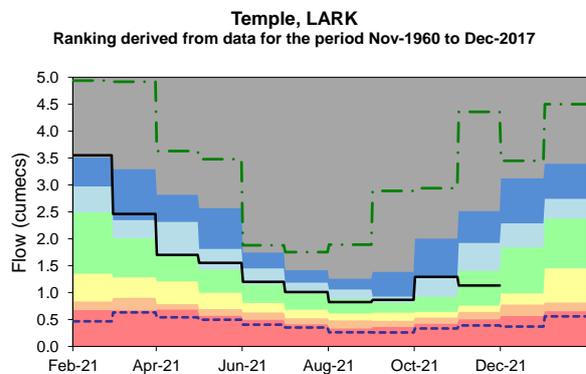
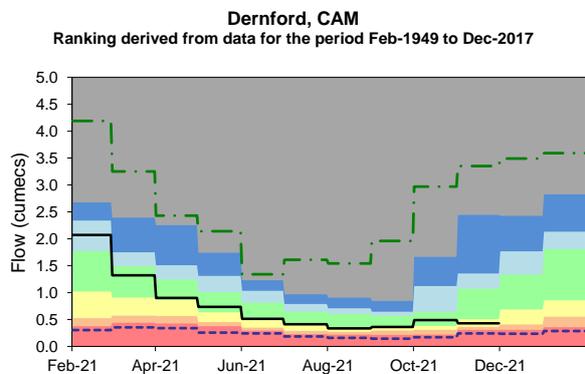
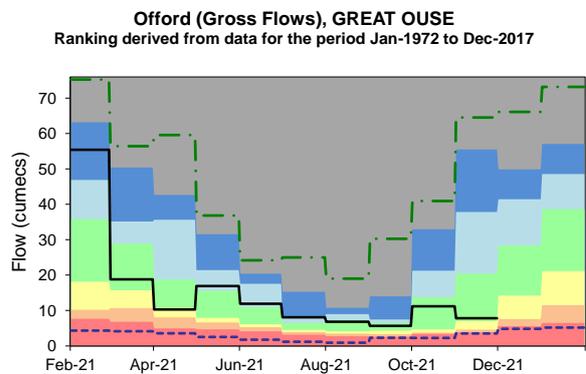
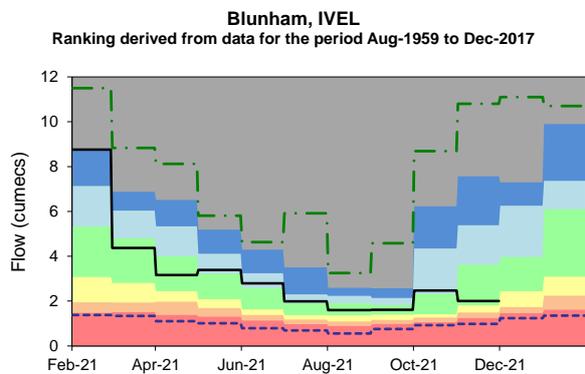
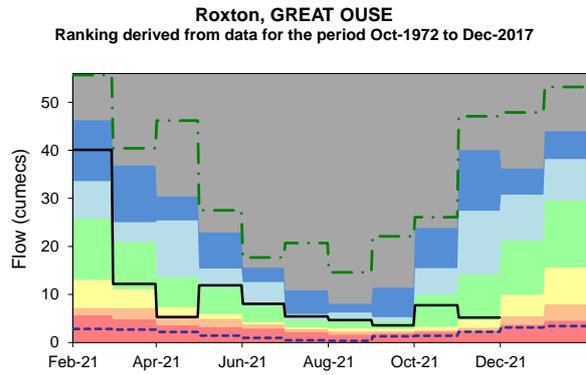
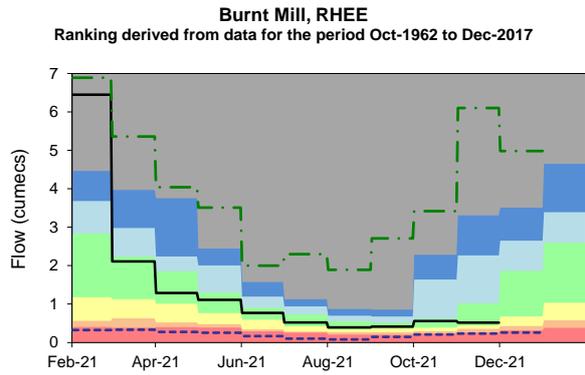
Data based on MORECS (Met Office © Crown Copyright)

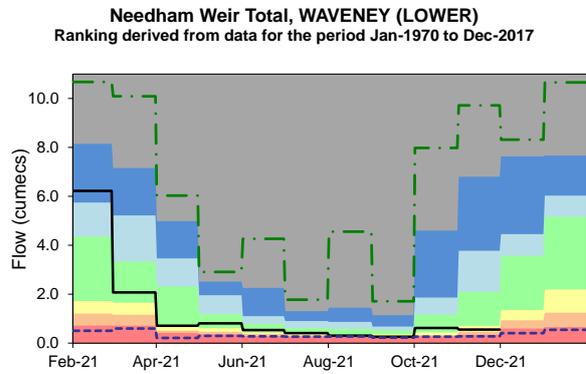
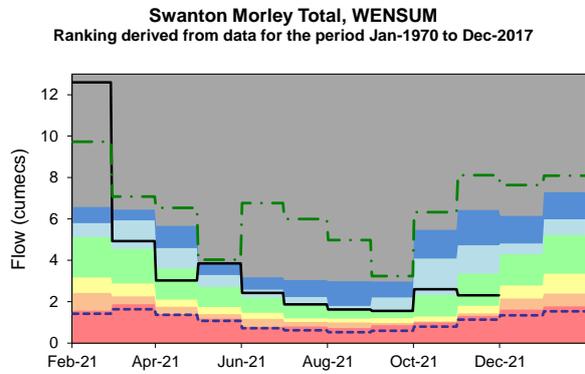
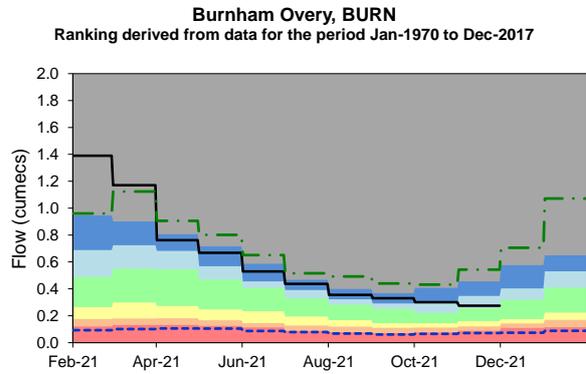
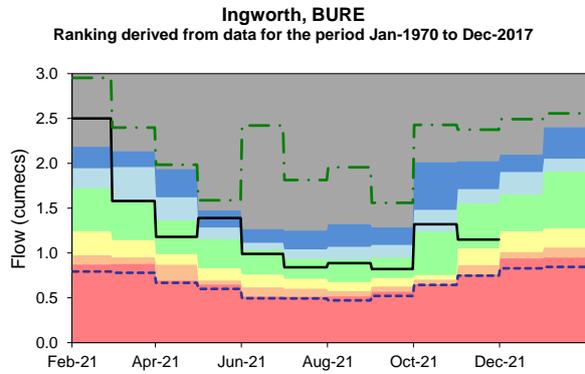
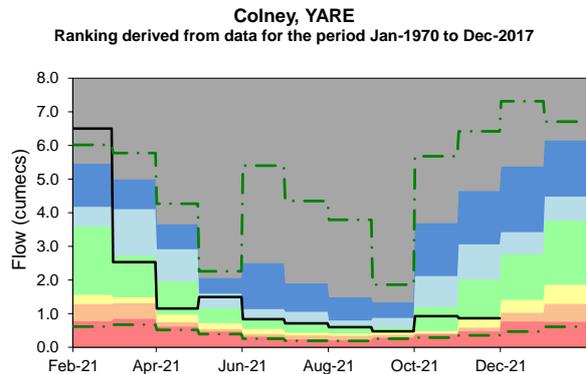
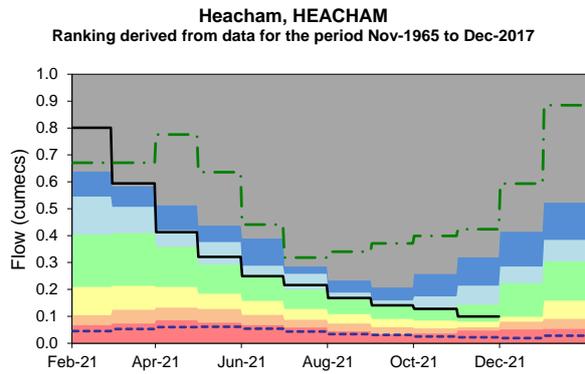
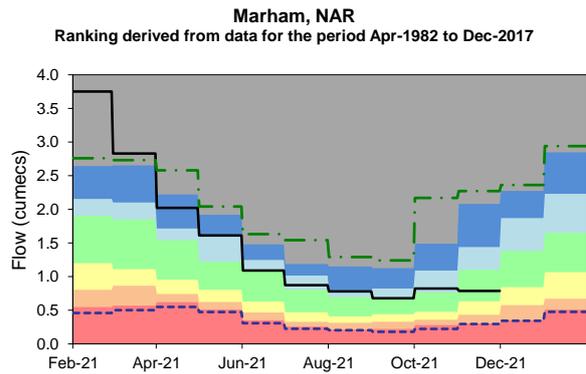
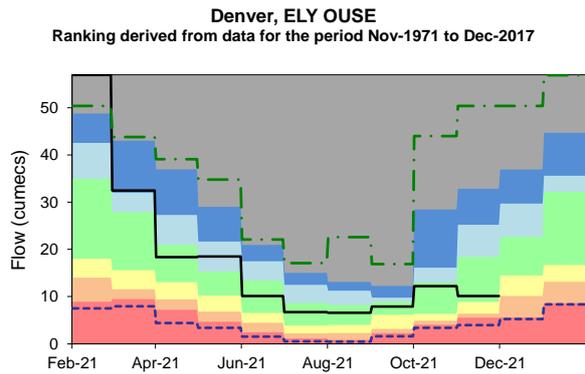


River Flow

November 2021



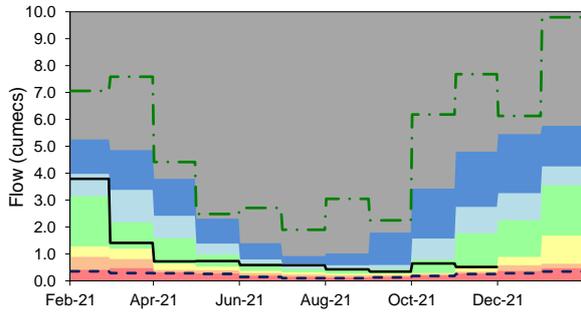






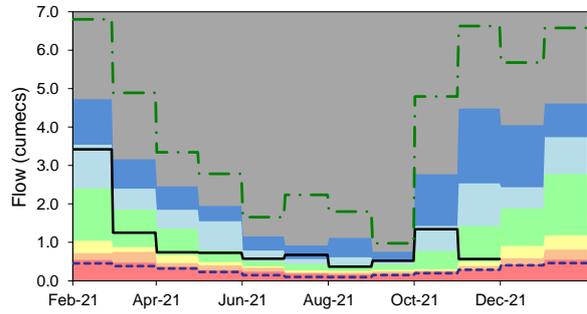
Bramford, GIPPING

Ranking derived from data for the period Jan-1970 to Dec-2017



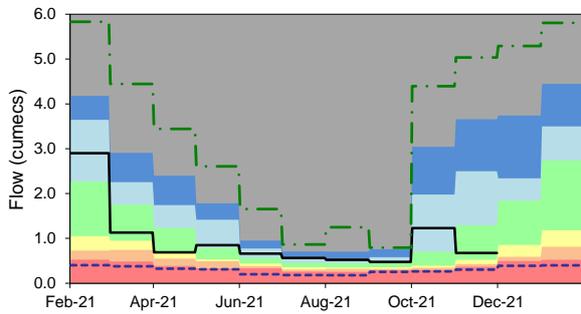
Lexden, COLNE

Ranking derived from data for the period Jan-1970 to Dec-2017



Springfield, CHELMER

Ranking derived from data for the period Jan-1970 to Dec-2017



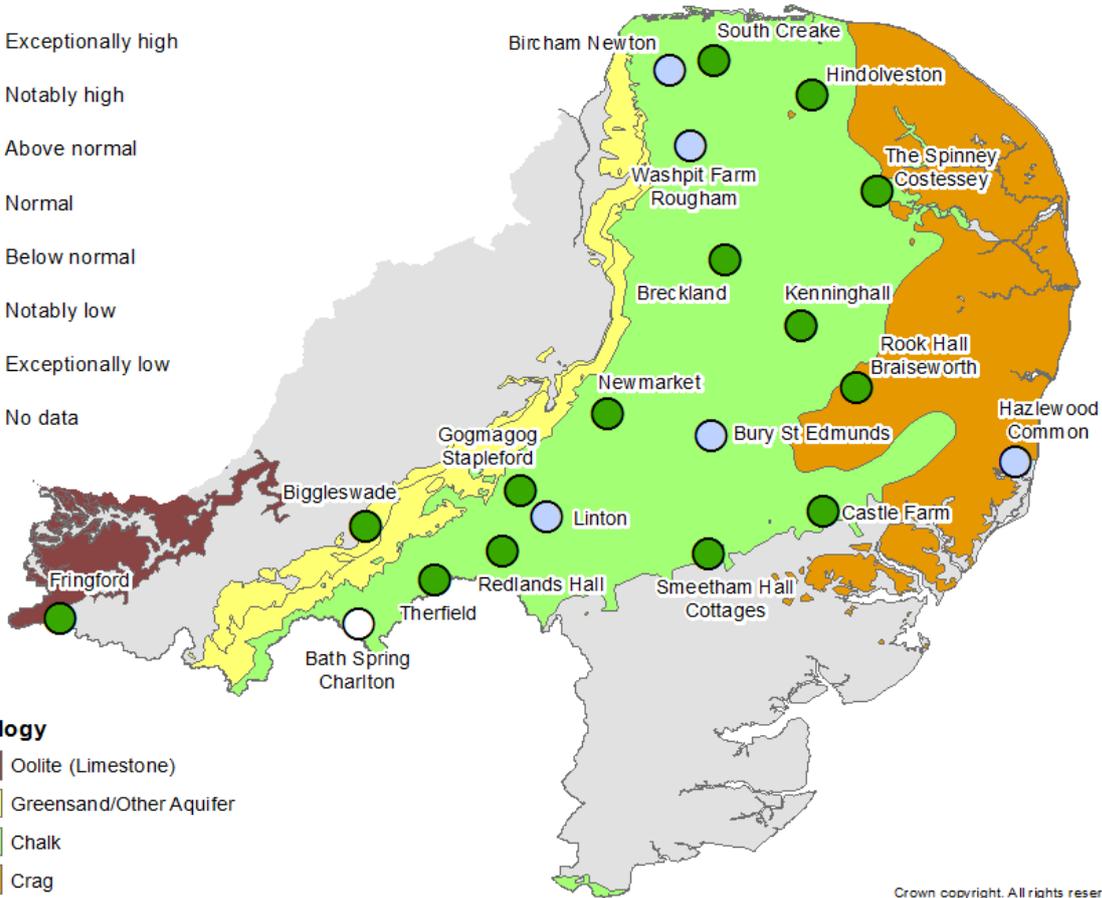
Groundwater Levels November 2021



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

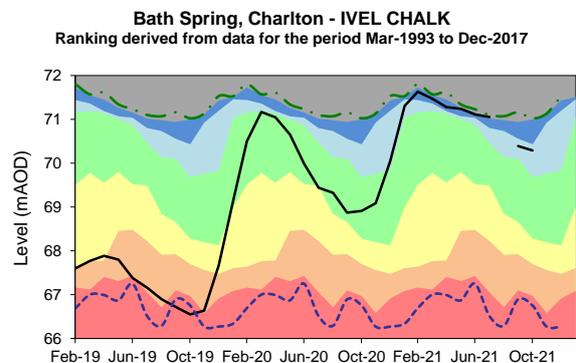
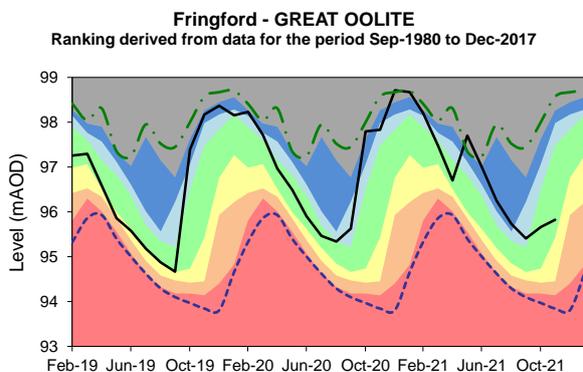
Geology

- Oolite (Limestone)
- Greensand/Other Aquifer
- Chalk
- Crag
- Clays/N on Aquifer



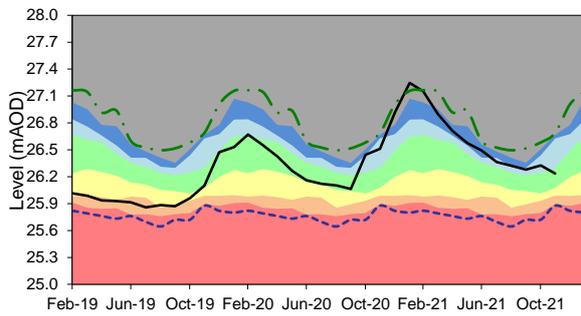
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|---|--|--|--|---|
| Exceptionally high | Notably high | Above normal | Normal | Max |
| Below normal | Notably low | Exceptionally low | Latest data | Min |

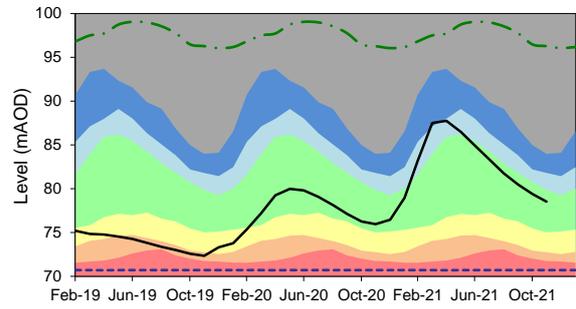




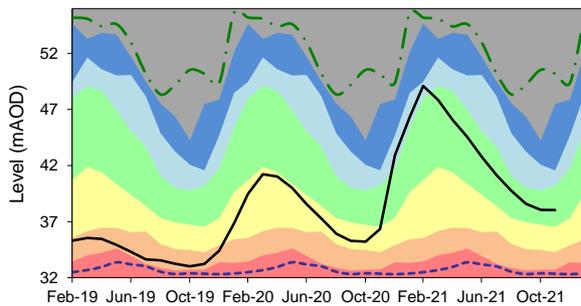
Biggleswade - IVEL SANDSTONE
Ranking derived from data for the period Mar-1968 to Dec-2017



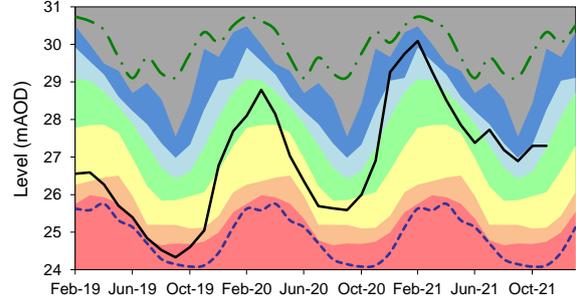
Therfield Rectory - N HERTS CHALK
Ranking derived from data for the period Jan-1883 to Dec-2017



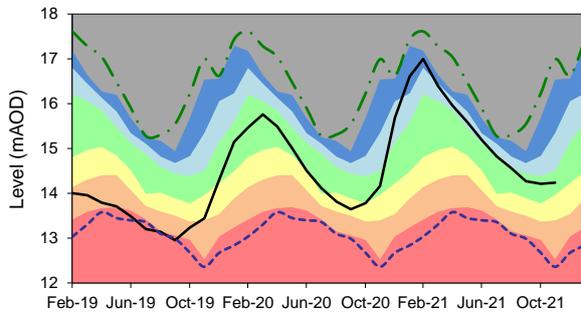
Redlands Hall, Ickleton - CAM CHALK
Ranking derived from data for the period Aug-1963 to Dec-2017



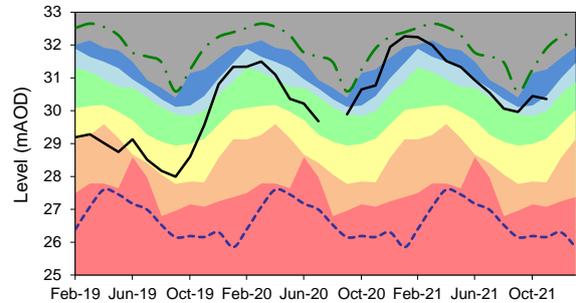
Linton - CAM CHALK
Ranking derived from data for the period Jan-1980 to Dec-2017



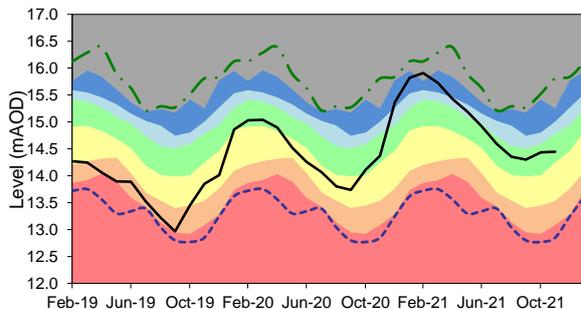
Gog Magog, Stapleford - CAM CHALK
Ranking derived from data for the period Jan-1980 to Dec-2017



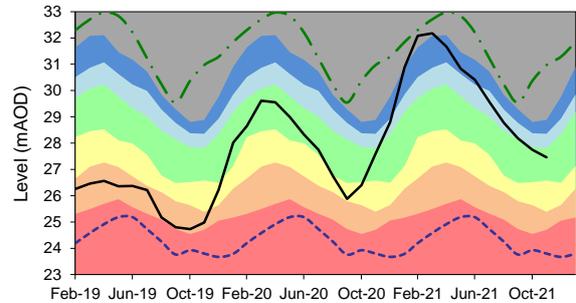
Bury St Edmunds - UPPER LARK CHALK
Ranking derived from data for the period May-1983 to Dec-2017

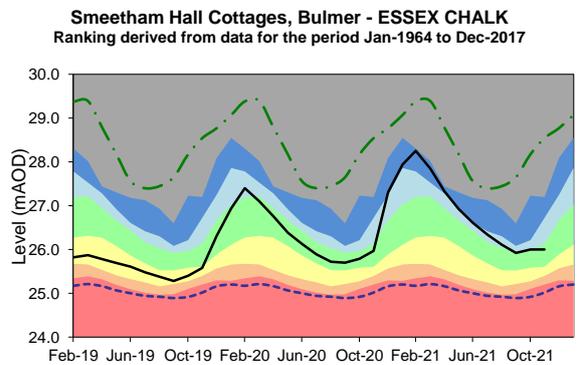
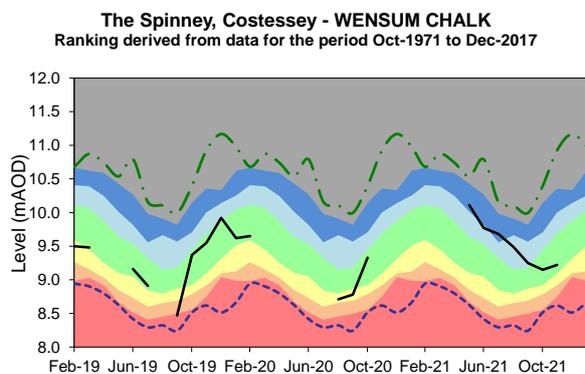
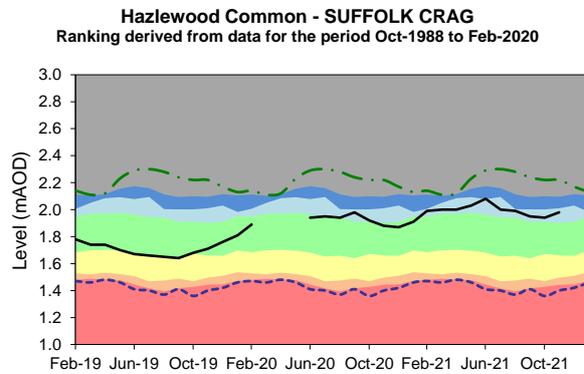
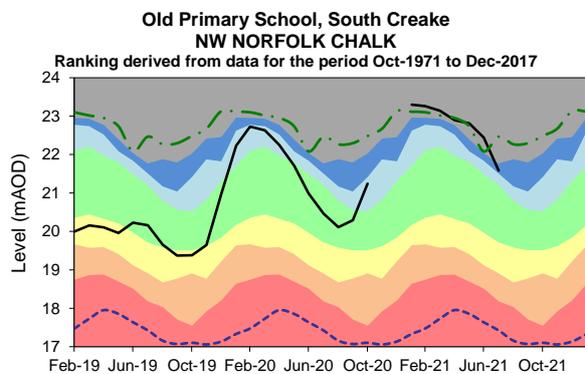
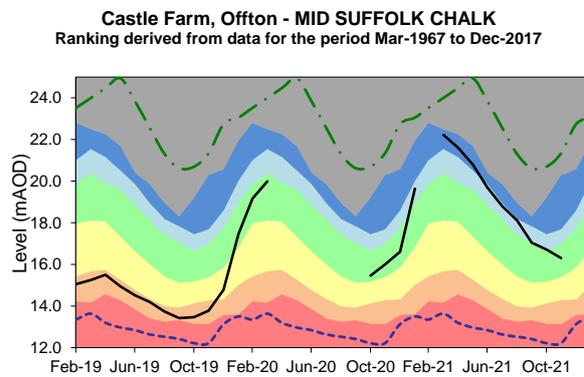
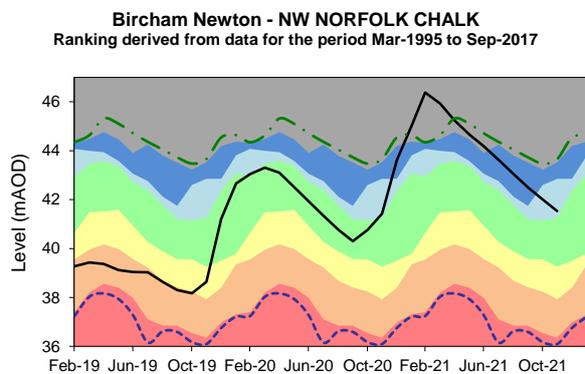
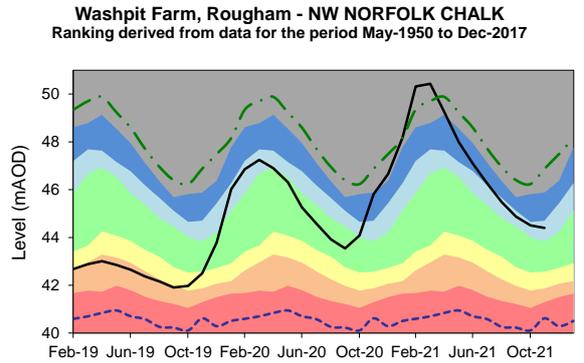
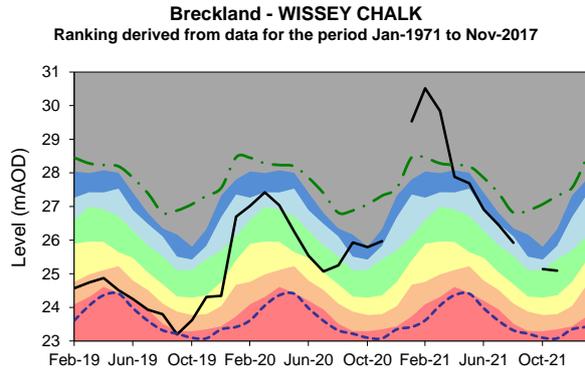


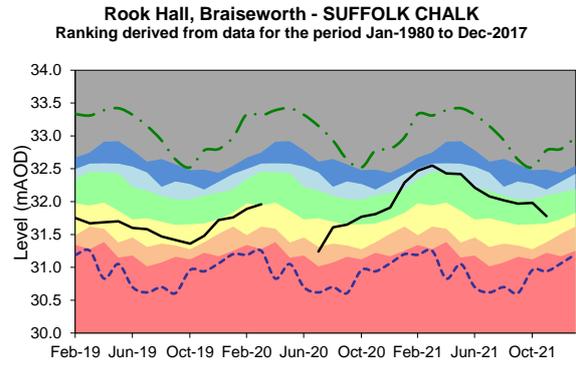
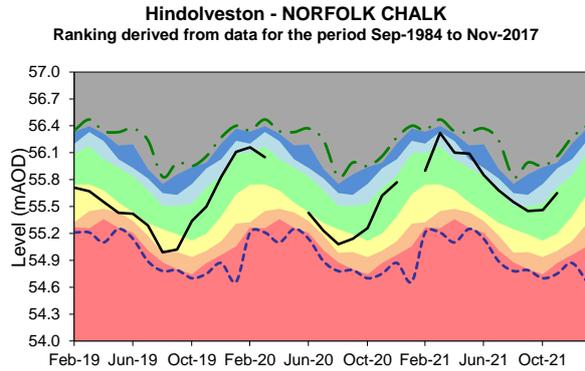
Newmarket - SNAIL CHALK
Ranking derived from data for the period Feb-1983 to Dec-2017



Kenninghall - LITTLE OUSE CHALK
Ranking derived from data for the period Aug-1973 to Dec-2017







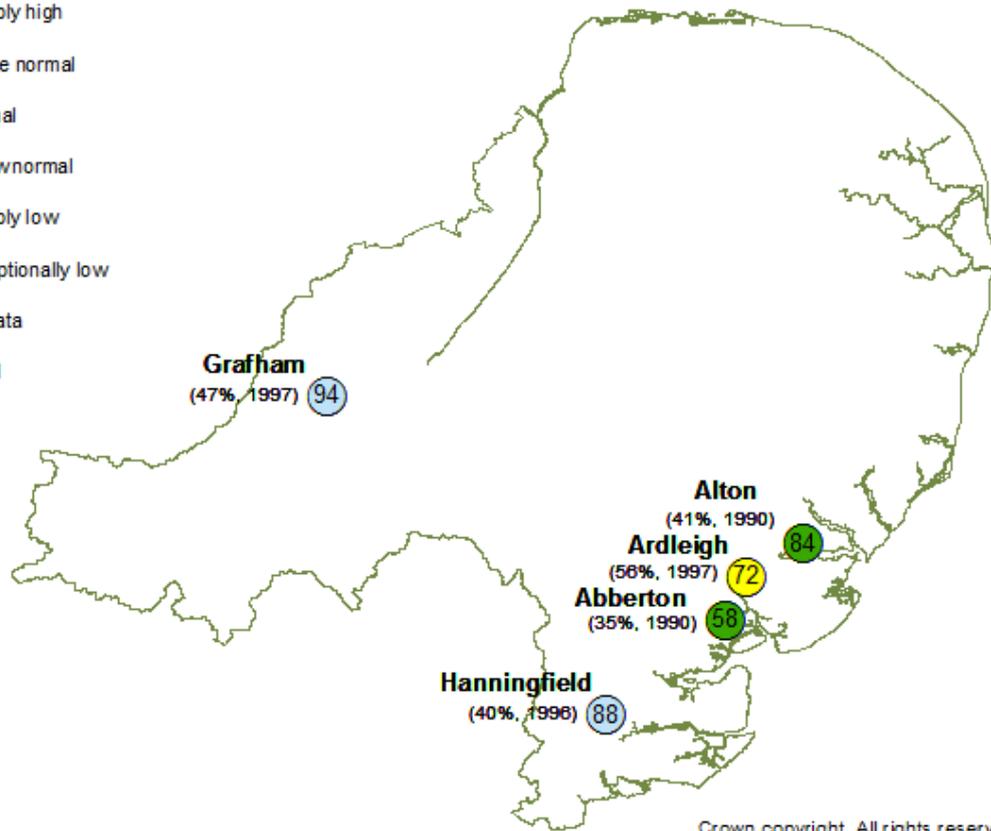
Reservoir Stocks

November 2021

November 2021

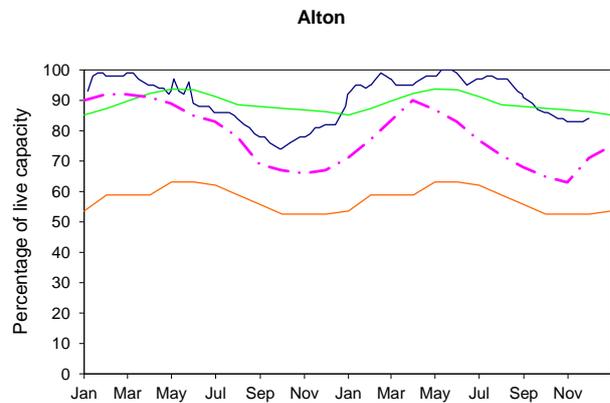
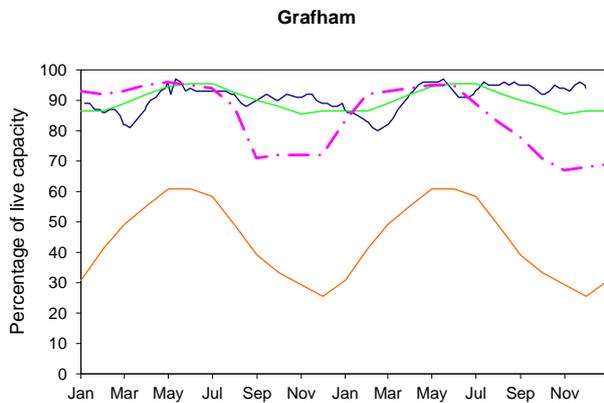
End of month reservoir levels expressed as percentage full.

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

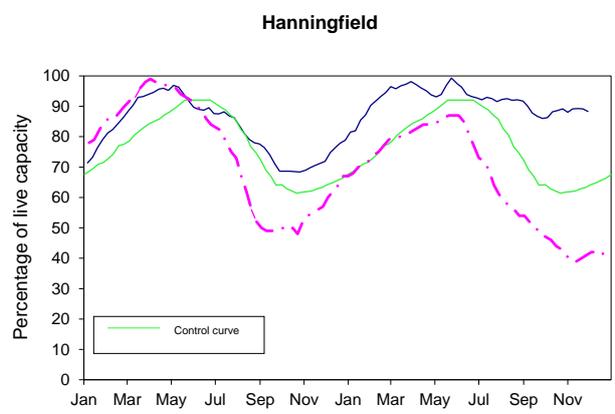
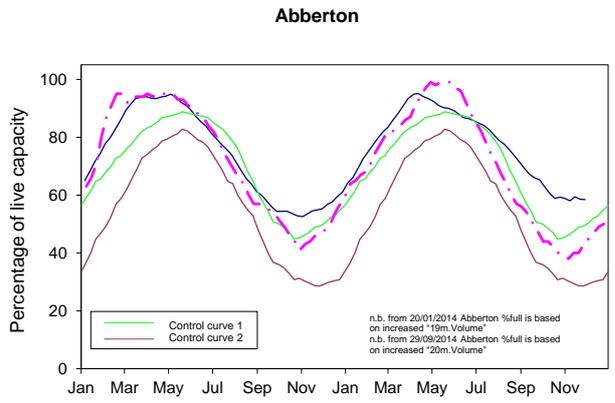
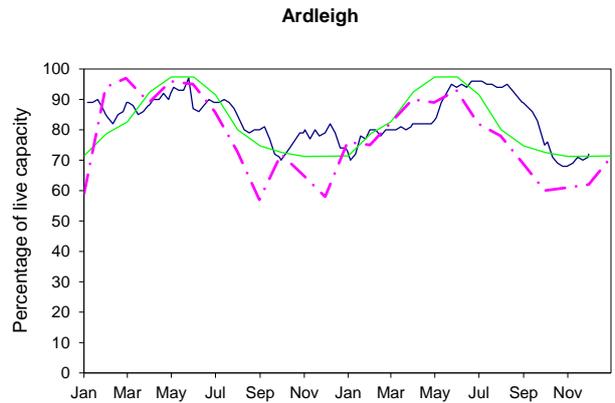


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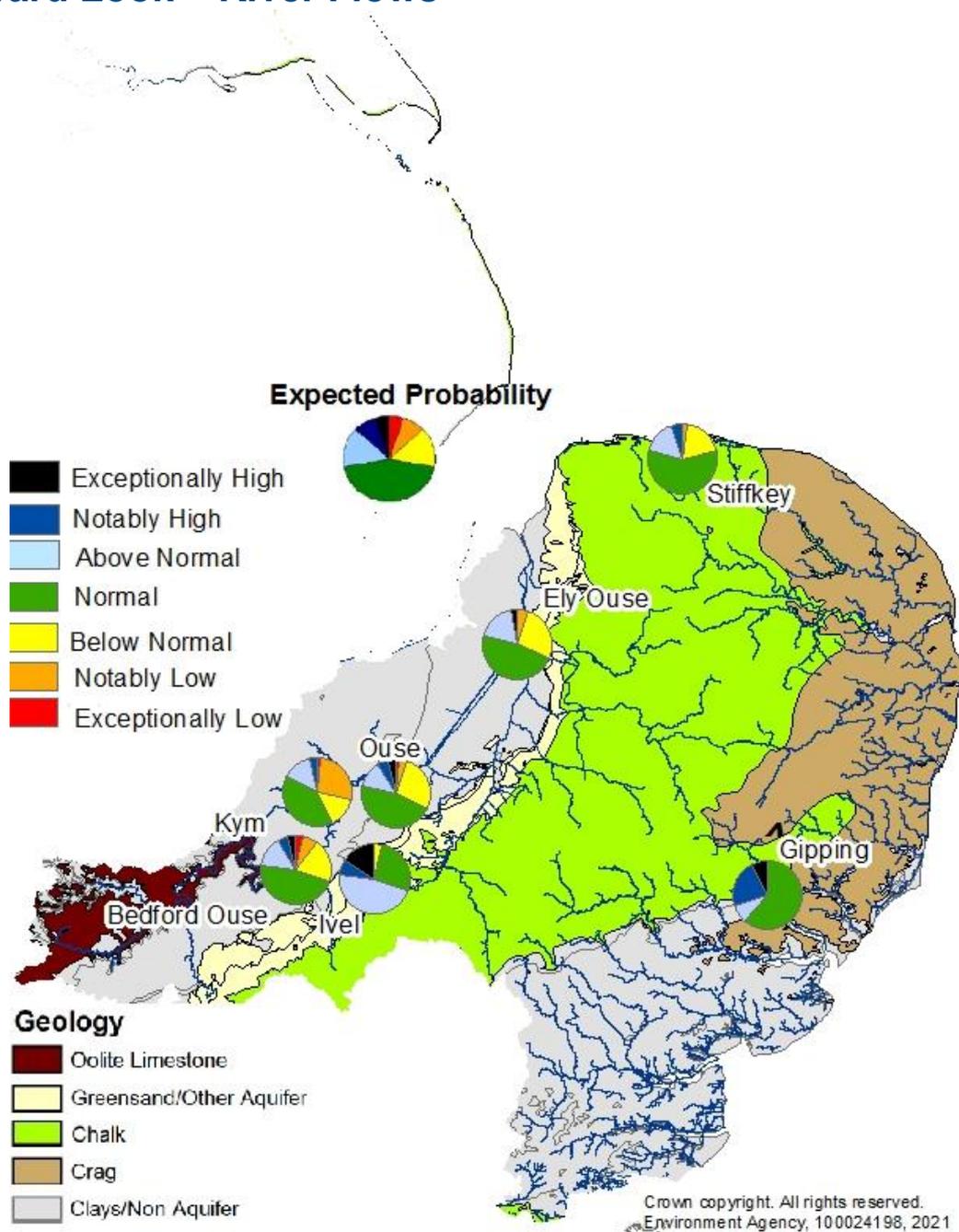
— 2020-2021 — Normal Operating Curve — Drought Alert Curve - - - 1995-1996



— 2020-2021
 — Normal Operating Curve
 — Drought Alert Curve
 - - - 1995-1996



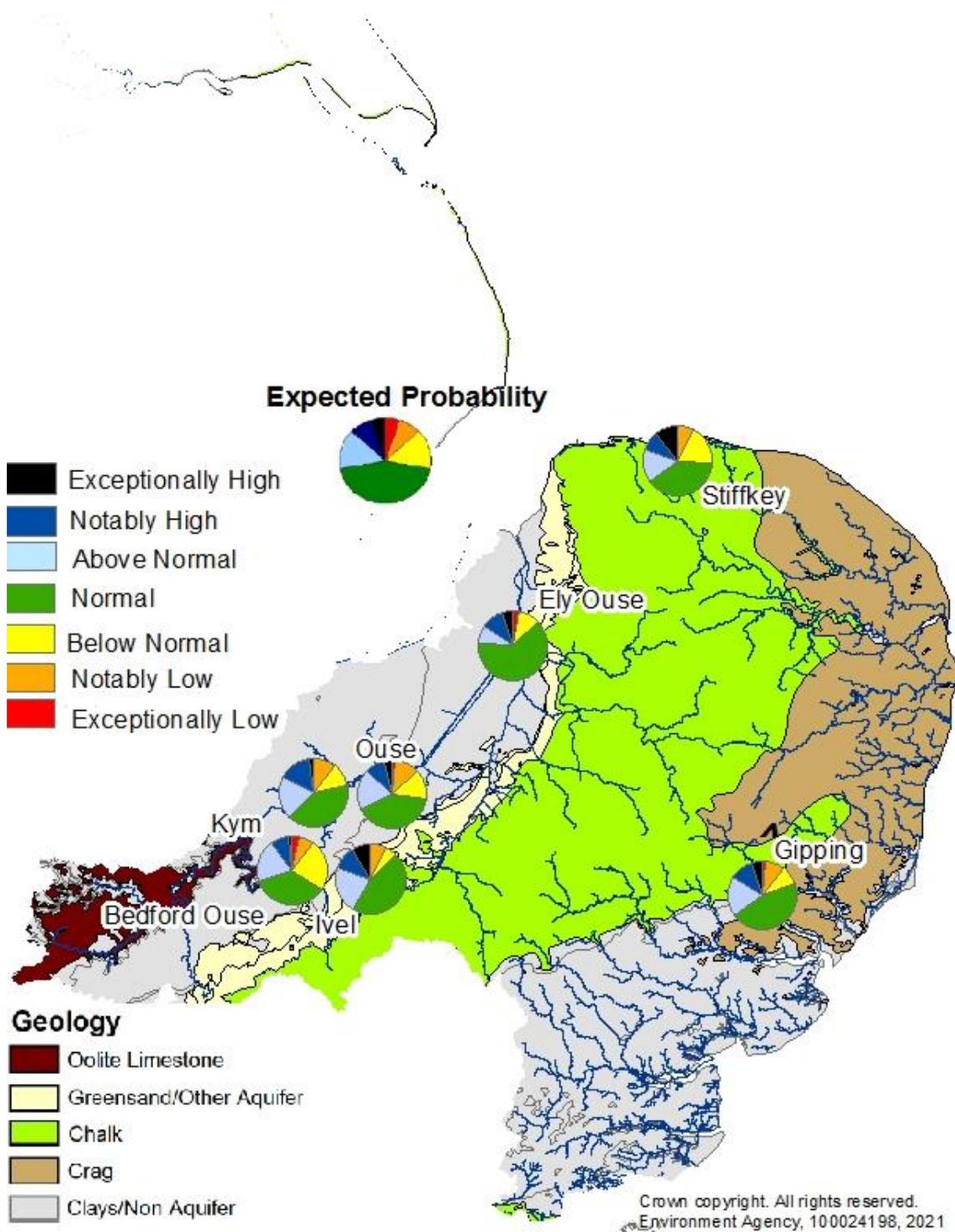
Forward Look – River Flows



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 December 2021. 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, 2021.

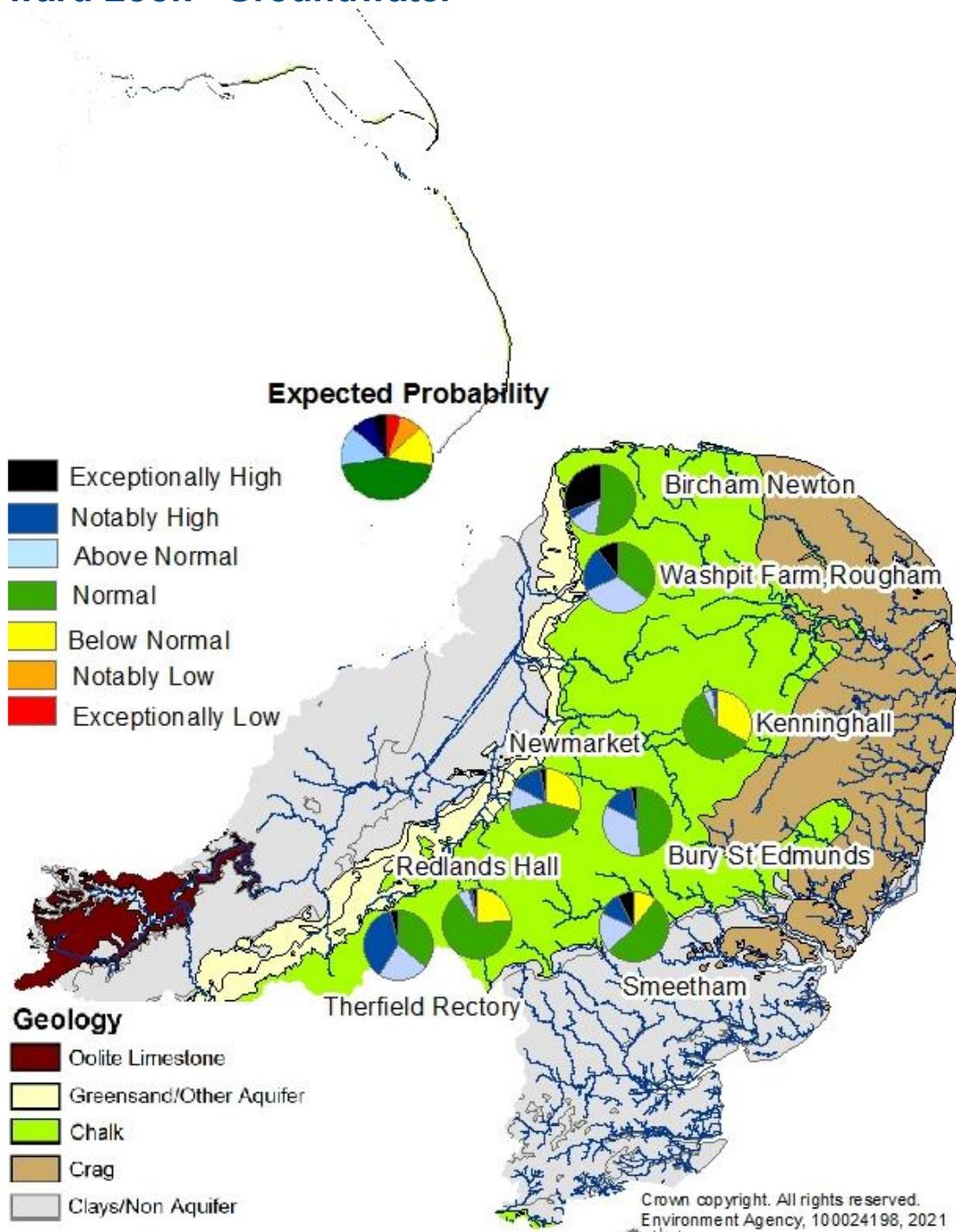
[^] "Naturalised" flows are projected for these sites'



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.

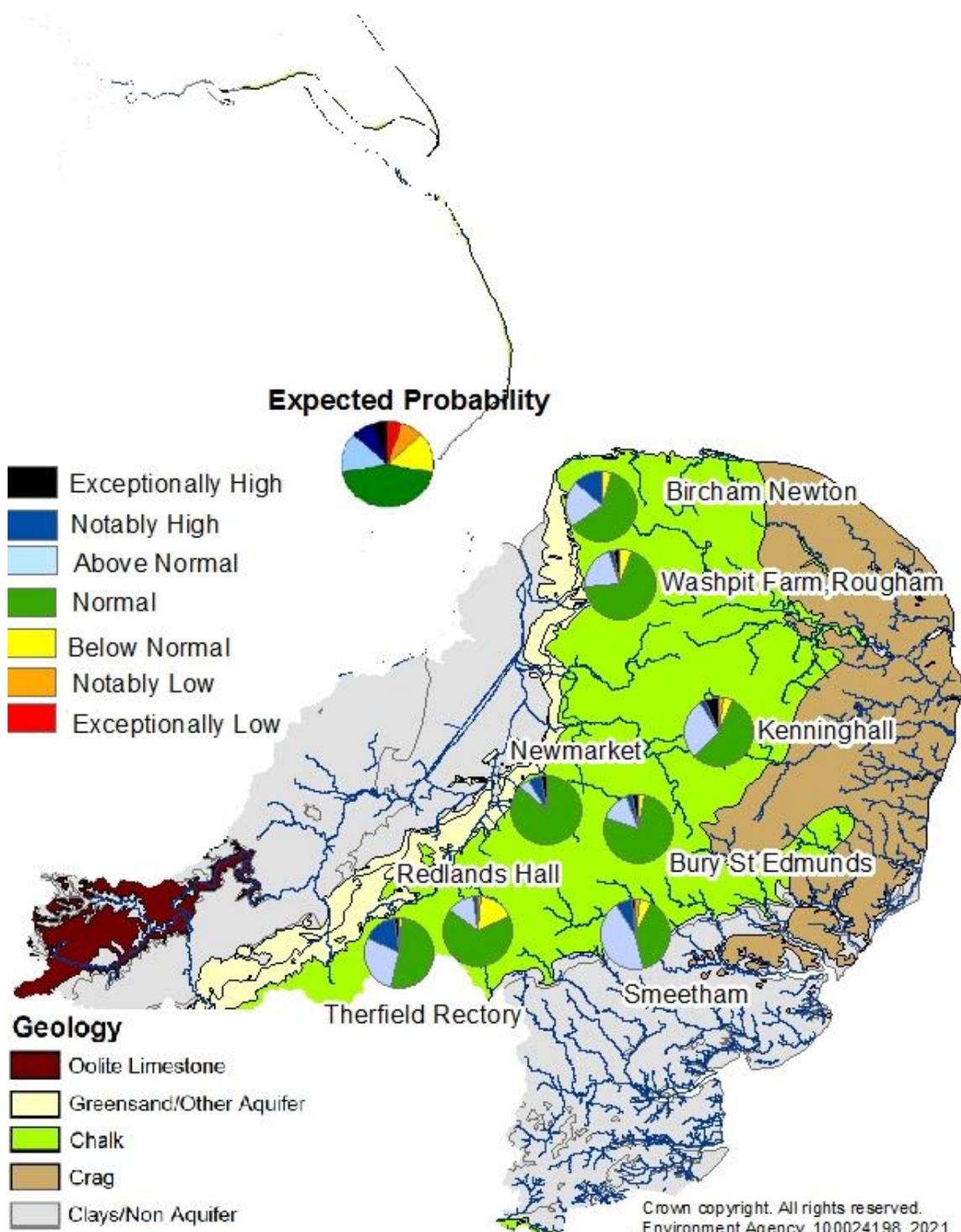
Probabilistic ensemble projections of river flows at key indicator sites in March 2022. Pie charts indicate probability, based on climatology, of the surface water flow at each site being e.g. exceptionally low for the time of year. (Source: [Centre for Ecology and Hydrology](#), Environment Agency) Geological map reproduced with kind permission from UK Groundwater Forum, BGS © NERC. Crown copyright. All rights reserved. Environment Agency, 100026380, 2021

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 2022. 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, 2021.



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Probabilistic ensemble projections of groundwater levels at key indicator sites for end of September 2022. 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, 2021.

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.
Groundwater level	The water level measured in the aquifer at a borehole, which may include the impacts of artificial influences.
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.
River Flow	The flow in the river measured at a gauging station which includes the upstream impact of artificial influences.
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 within the historic record.
Notably high	Value likely to fall within this band 8% of the time within the historic record.
Above normal	Value likely to fall within this band 15% of the time within the historic record.
Normal	Value likely to fall within this band 44% of the time within the historic record.
Below normal	Value likely to fall within this band 15% of the time within the historic record.
Notably low	Value likely to fall within this band 8% of the time within the historic record.
Exceptionally low	Value likely to fall within this band 5% of the time within the historic record.