

Monthly water situation report

East of England

Summary – December 2021

Increased rainfall in December resulted in normal or above normal classification for rainfall across East Anglia which had an average of 68 mm, 123% of the Long Term Average (LTA). As a result, Soil Moisture Deficit (SMD) continued to decrease, river flows increased at all indicator sites and groundwater levels at the majority of sites also showed signs of recharge. Reservoir levels remained stable and the groundwater support schemes had reduced operations.

Rainfall

East Anglia experienced an average of 68 mm precipitation, classified as normal for December based on the LTA of 123%. Across all catchments rainfall was fairly spatially consistent with either normal or above normal amounts ranging from 114% to 135% of the LTA (North Norfolk and NW Norfolk and Wissey respectively). The accumulated rainfall for the past 3 months, 6 months and 12 months were also classified as normal across East Anglia.

Soil Moisture Deficit/Recharge

SMD remained normal for December with the overall value decreasing from 22mm to 8mm by the end of December in response to the rainfall. SMD levels remained mostly similar across the area with the exception of a few slightly higher levels around the coast.

River Flows

East Anglia experienced increased river flow at all indicator sites. 57% of the sites were classified as normal, 33% of sites experienced river flows which were above normal and 10% of the sites experienced notably high flows. The notably high flows were recorded in the river Lark at Temple and the river Wensum at Swanton Morley where flows were 2.39 m³/s and 5.92 m³/s respectively.

Groundwater Levels

Groundwater levels for most indicator sites (76%) in East Anglia remained stable and were therefore classified as normal for December. 18% sites were classified as above normal while 6% of the sites had notably high groundwater levels. Although the change was negligible, most (70%) groundwater sites continued recharging at the end of December. However, 18% of the sites including Therfield Rectory, Bircham Newton and Castle Farm, Offton experienced slightly decreasing levels.

Reservoir Storage/Water Resource Zone Stocks

Most reservoir levels (4/5) were classed as normal based on the Normal Operating Curve and the historical records. However, Ardleigh with lower capacity value was classified as below normal for the time of year. In addition, Abberton levels had decreased but appeared to be recovering by the end of December.

Environmental Impact

Groundwater support schemes operations decreased considerably by the end of December; the Rhee groundwater support scheme had 1 of the 8 pumps operating. The Lodes-Granta groundwater support scheme had 4 of the 6 pumps operating. All other pumping operations including the Thet and Little Ouse and the Hiz were not operating.

Forward Look

Probabilistic ensemble projections for river flows at key sites

March 2021: There is a highly reduced probability for notably low and below normal flows for Ely Ouse and Stiffkey. In contrast, Ouse, Kym, Bedford Ouse and Ivel have a reduced probability of exceptionally high flows.

June 2021: There is a reduced probability of exceptionally low flows at Ely Ouse, Gipping and Stiffkey.

Probabilistic ensemble projections for groundwater levels in key aquifers

March 2021: There is a greatly increased probability of normal groundwater levels at all indicator sites and an increased probability of above normal for the Bircham Newton, the Washpit Farm Rougham and the Bury St Edmunds.

September 2021: There is a greatly reduced probability of exceptionally low groundwater levels at majority of the key sites and an increased probability of normal groundwater levels for all sites.

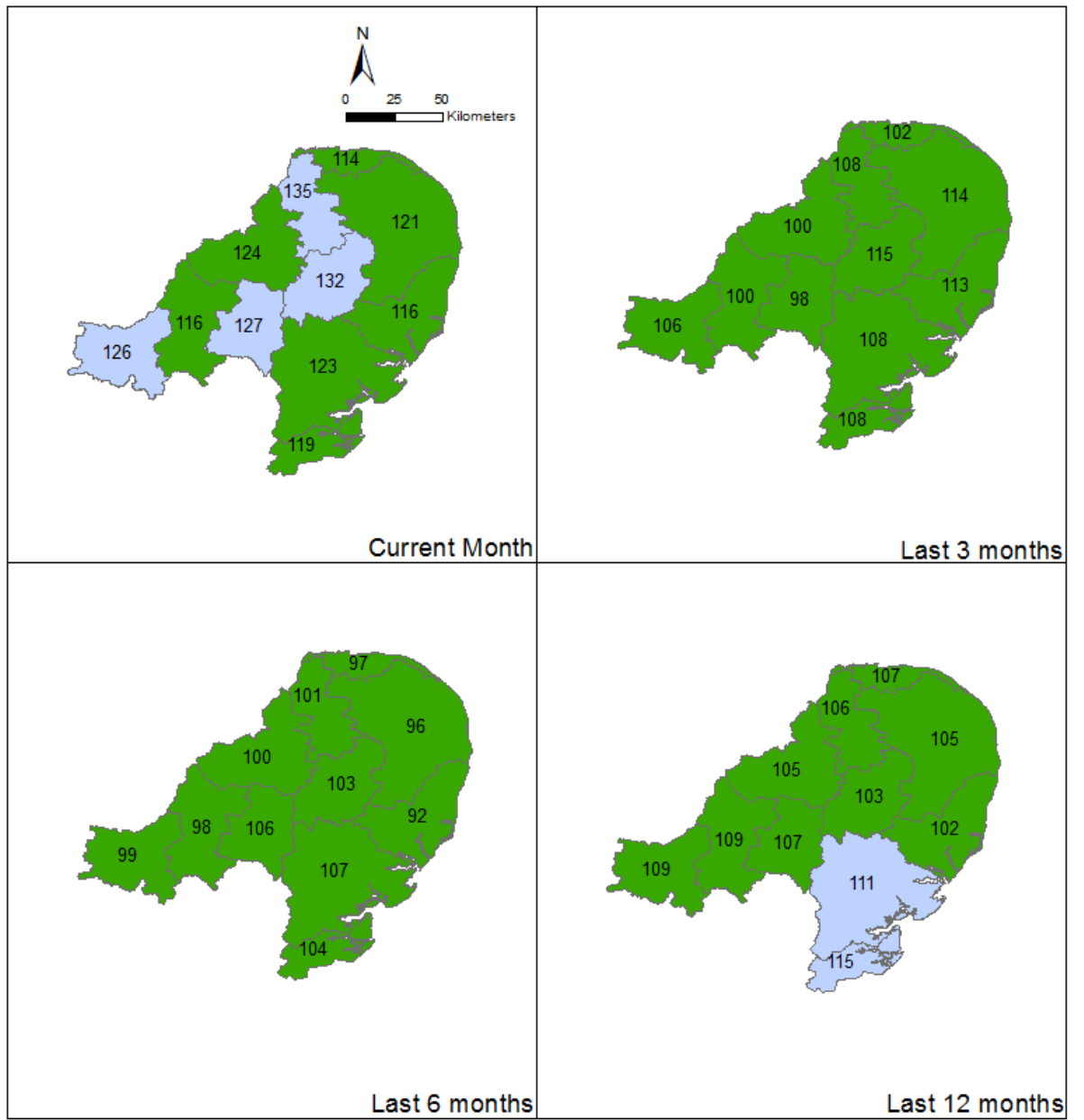
Author:

[ANG-Hydrology](#)

Contact details: 03708506506

Rainfall

December 2021



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

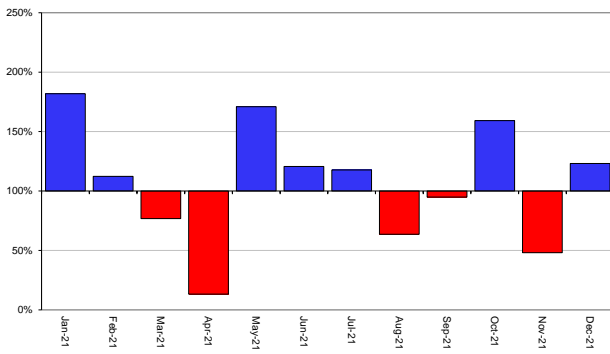
Rainfall expressed as percentage of 1961-1990 Long Term Average for the specified duration. Classes derived from data for the period 1891 to 2017 based on the HadUK dataset (Met Office © Crown Copyright)

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 HadUK data based on the Met Office 1 km gridded rainfall dataset derived from rain gauges (Source: Met Office © Crown Copyright, 2021). Provisional data based on Environment Agency 1 km gridded rainfall dataset derived from Environment Agency intensity rain gauges. Crown copyright. All rights reserved. Environment Agency, 100024198, 2021.

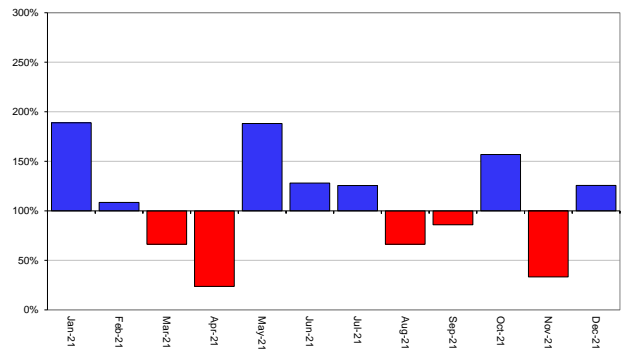
Above average rainfall

Below average rainfall

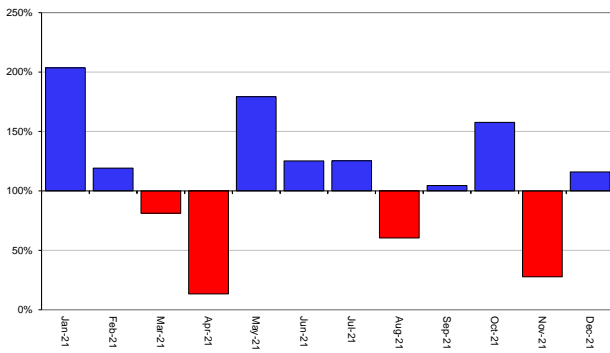
1-Month Period for East Anglia



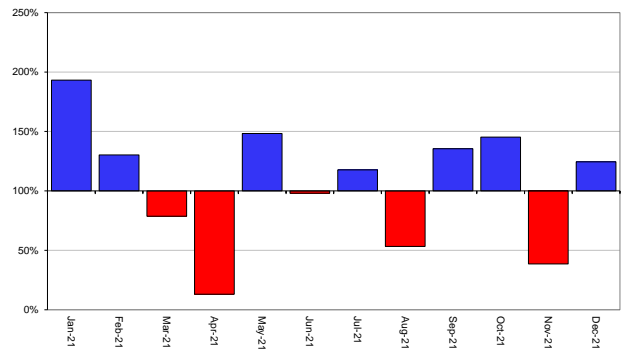
1-Month Period for Upper Bedford Ouse



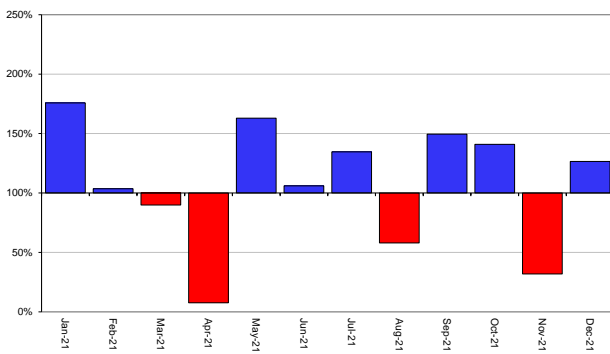
1-Month Period for Lower Bedford Ouse



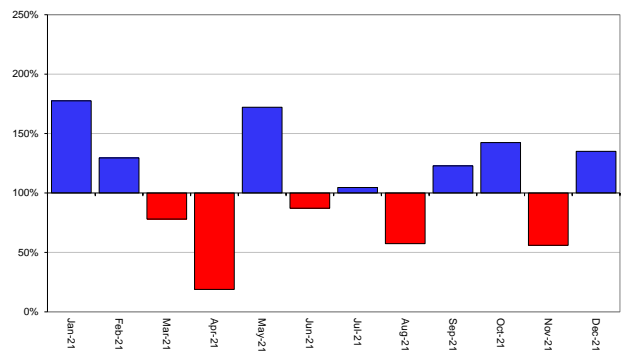
1-Month Period for Central Area Fenland



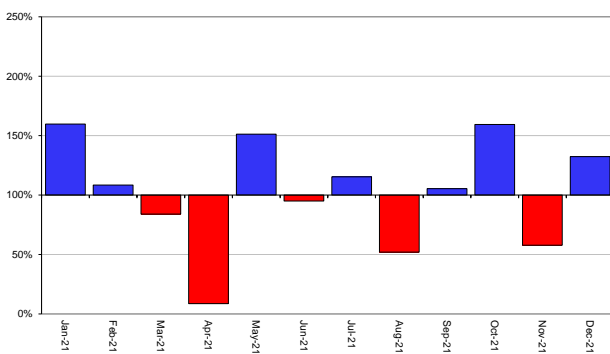
1-Month Period for Cam



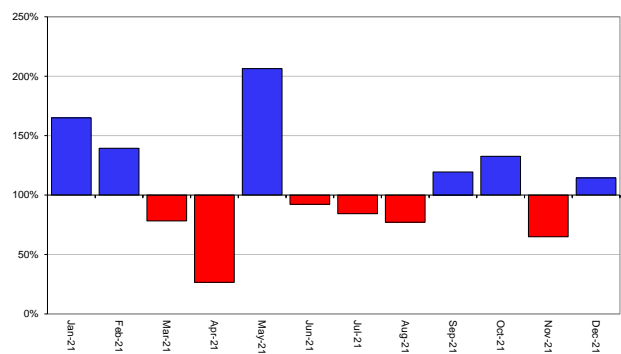
1-Month Period for NW Norfolk and Wissey



1-Month Period for Little Ouse and Lark



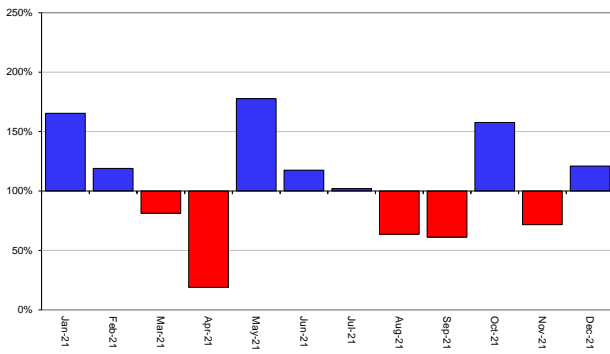
1-Month Period for North Norfolk



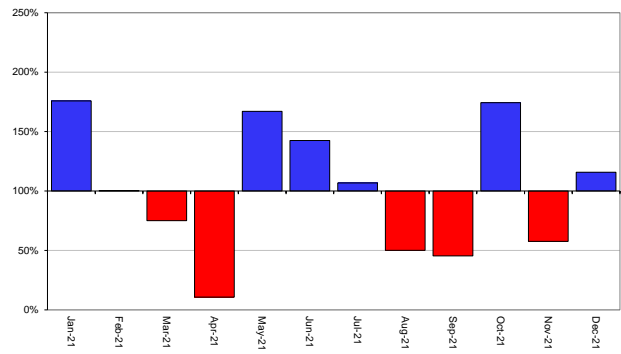
Above average rainfall

Below average rainfall

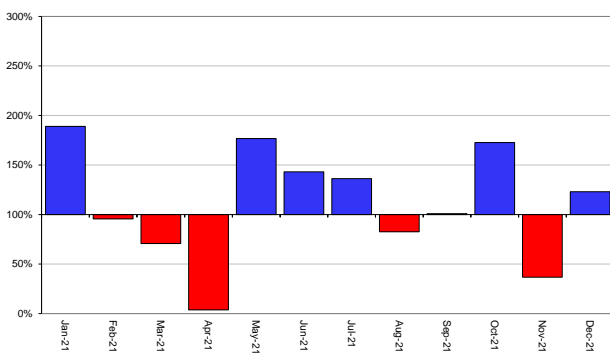
1-Month Period for Broadland Rivers



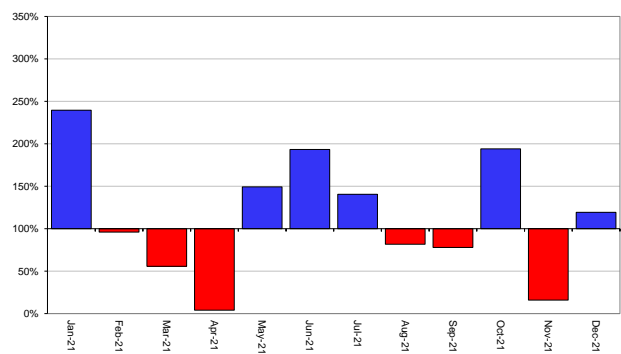
1-Month Period for East Suffolk



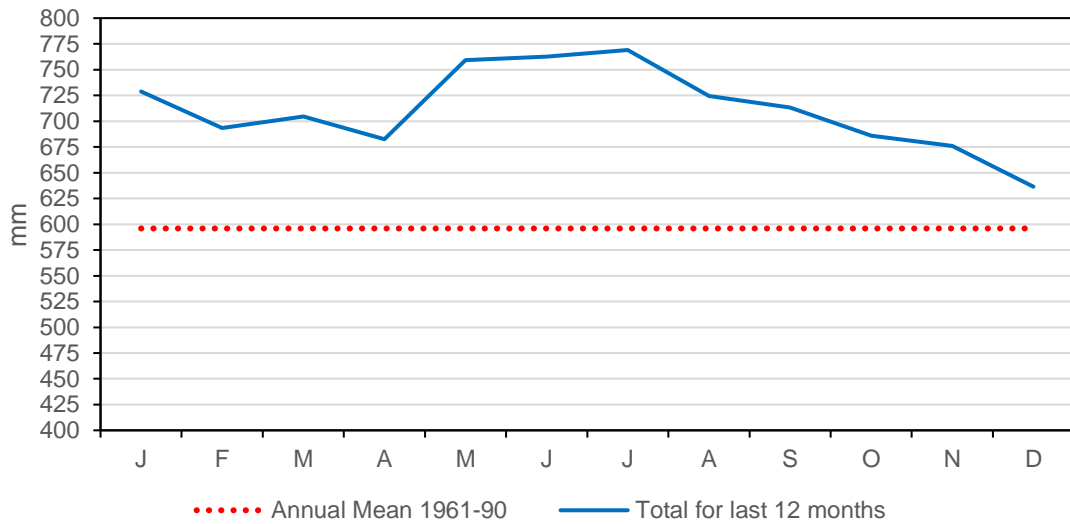
1-Month Period for North Essex



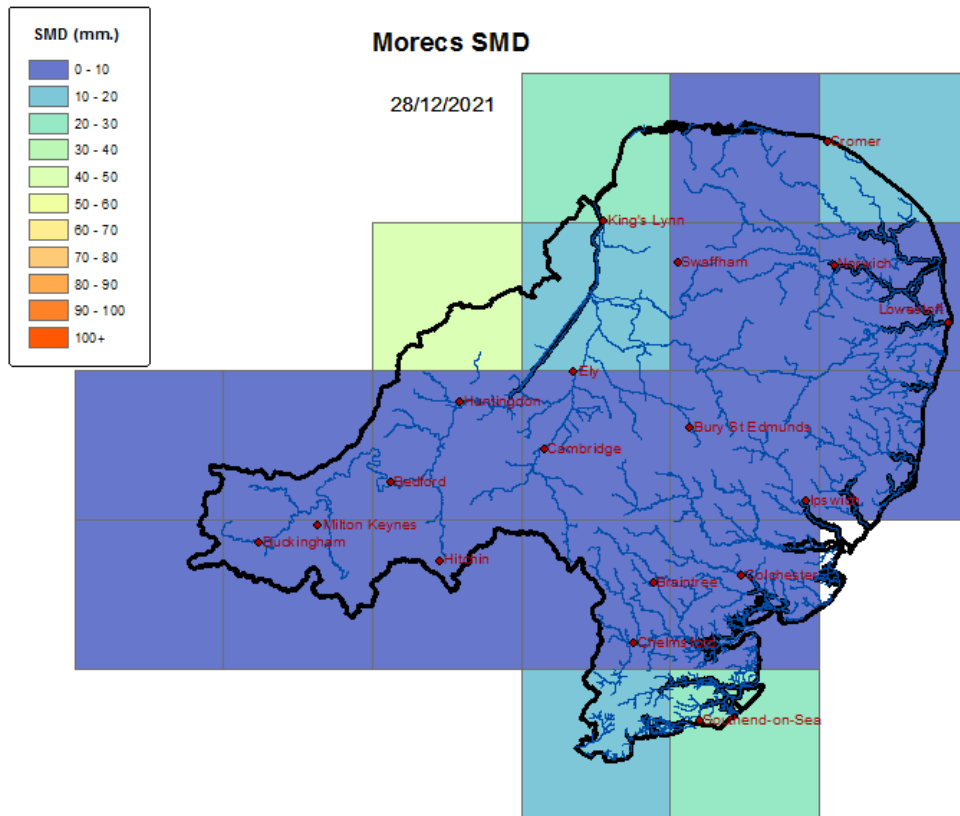
1-Month Period for South Essex



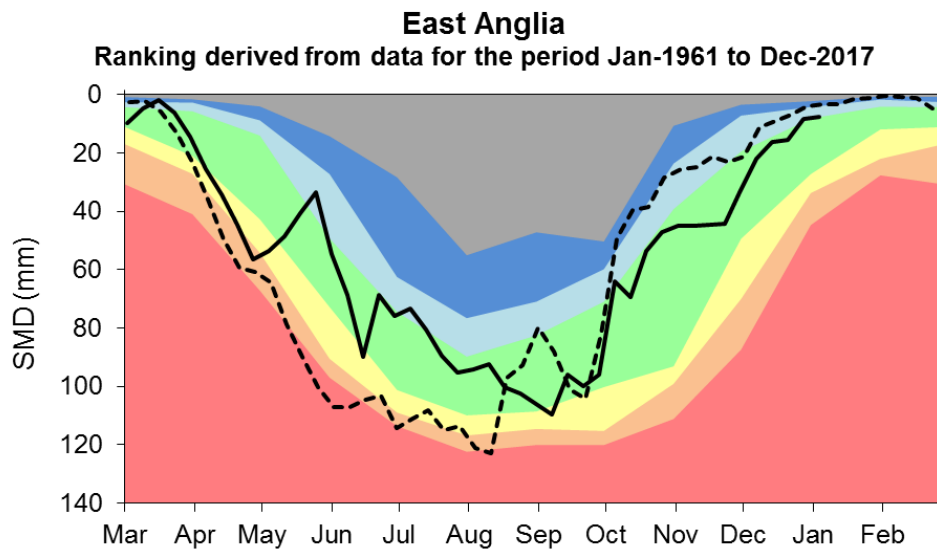
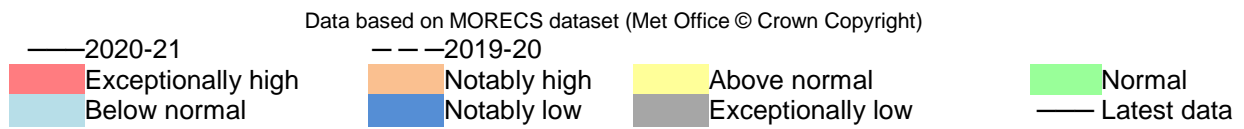
Monthly Rainfall Surplus/Deficit



Soil Moisture Deficit



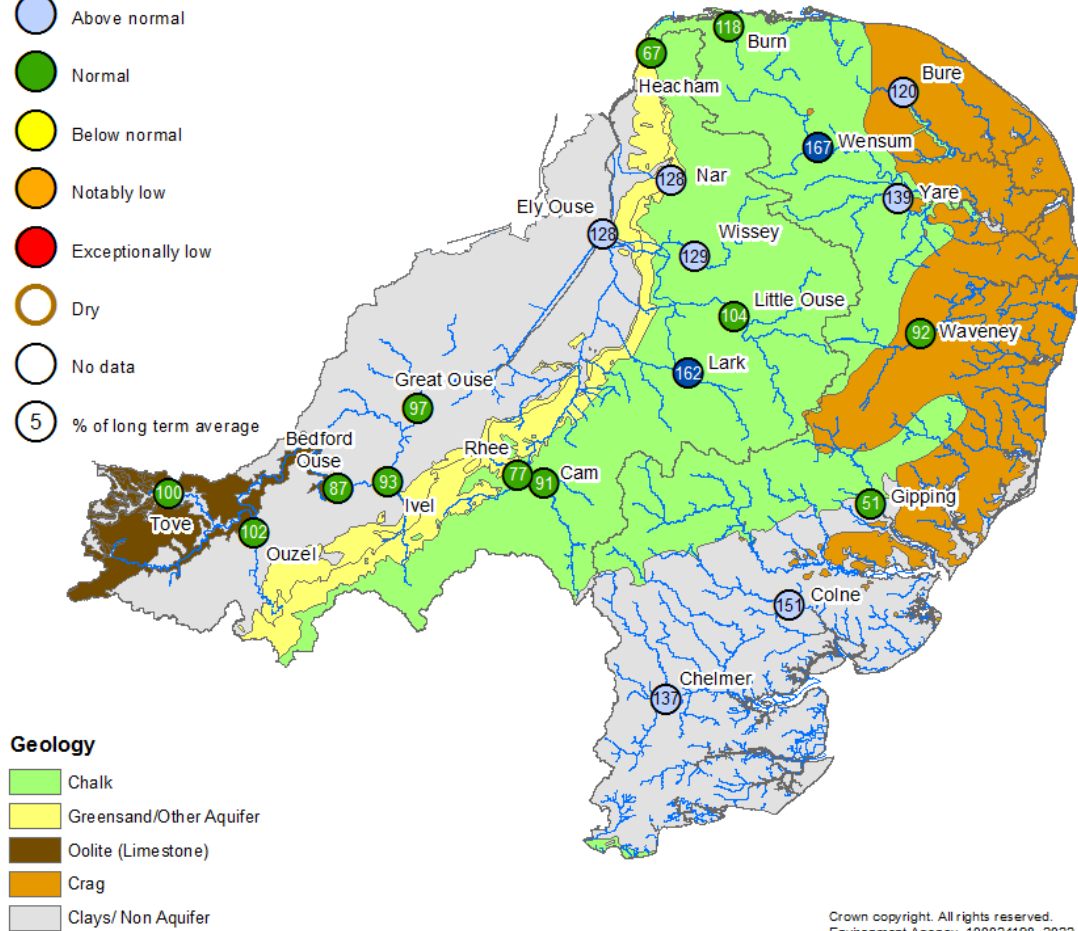
Data based on MORECS (Met Office © Crown Copyright)



River Flow

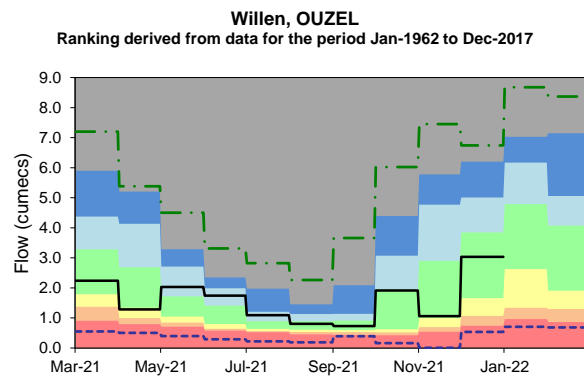
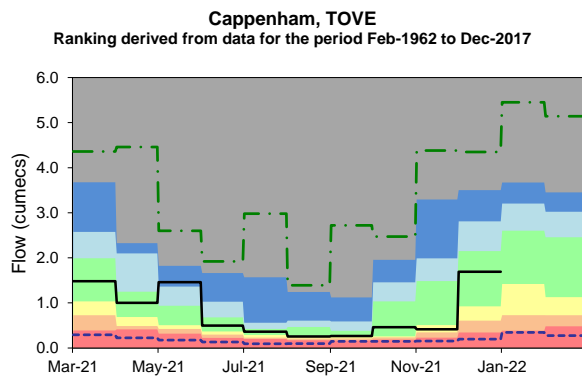
December 2021

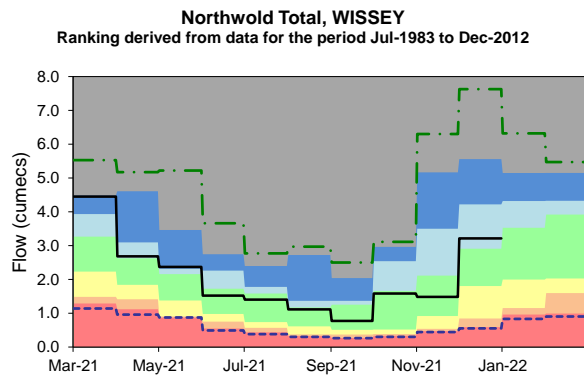
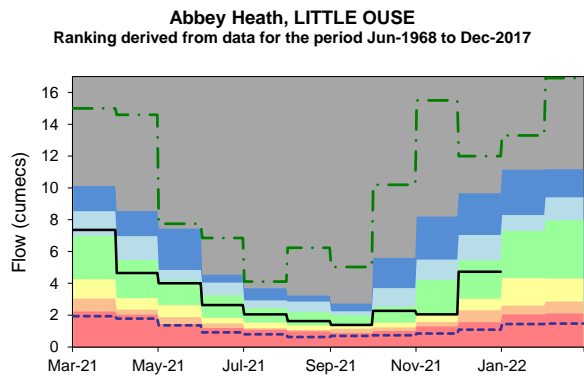
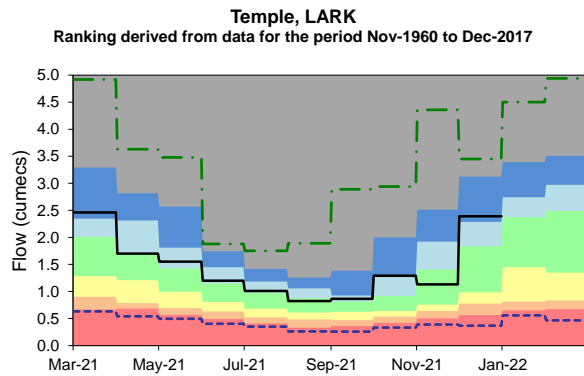
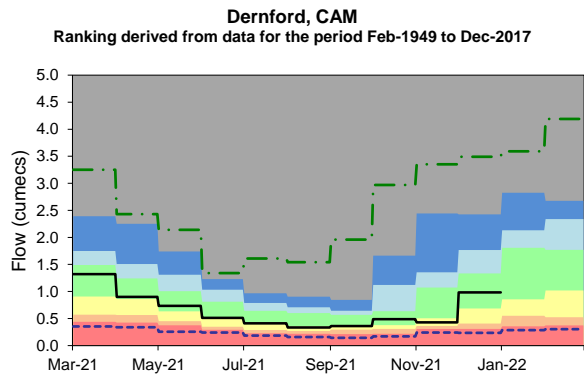
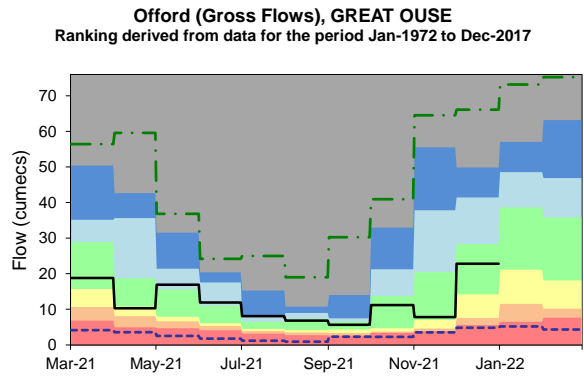
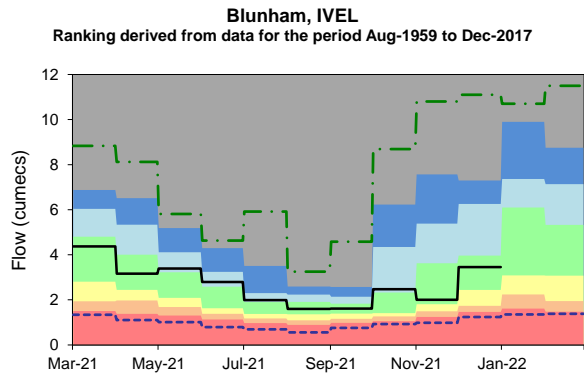
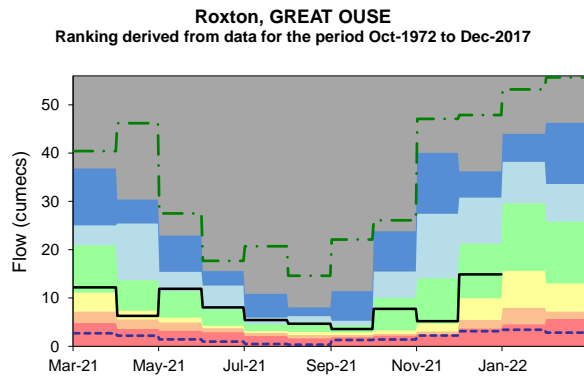
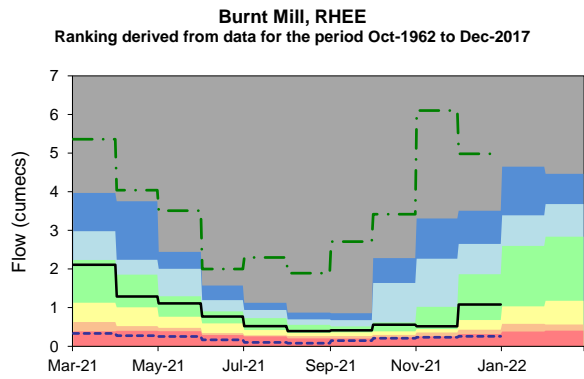
- Exceptionally high
- Notably high
- Above normal
- Normal
- Below normal
- Notably low
- Exceptionally low
- Dry
- No data
- 5 % of long term average

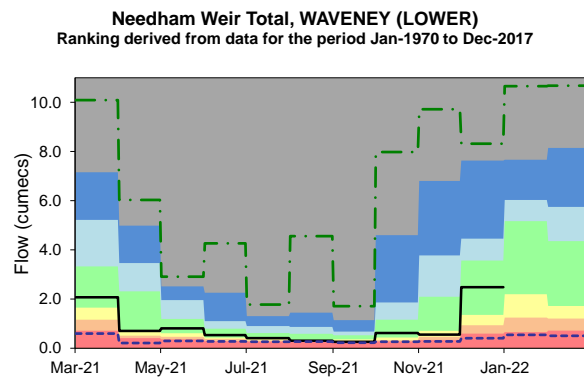
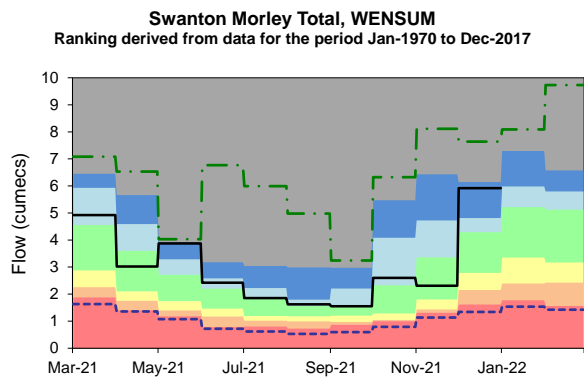
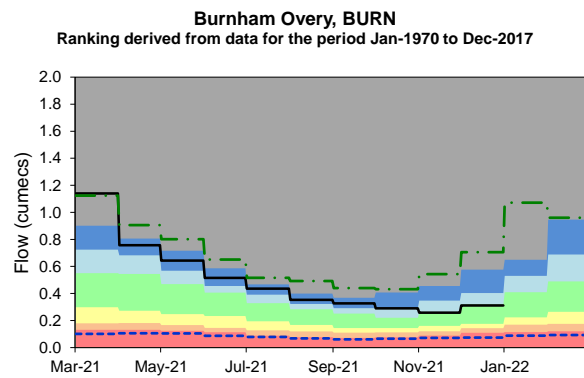
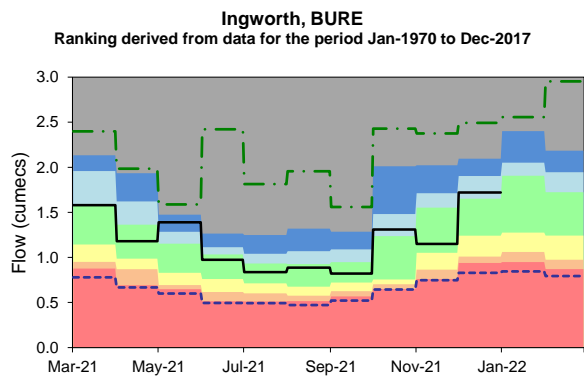
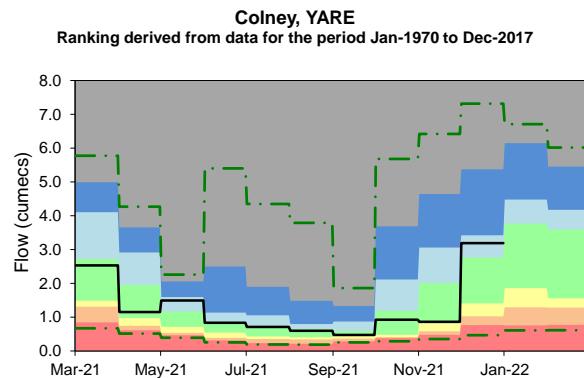
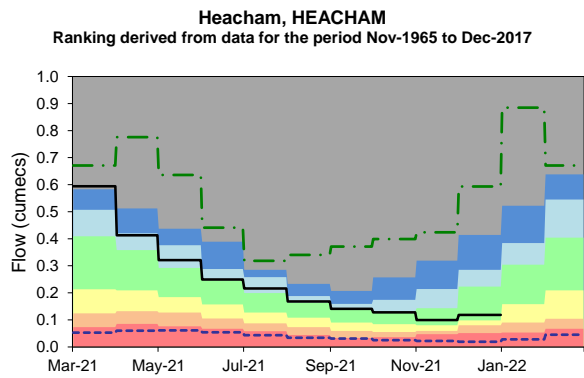
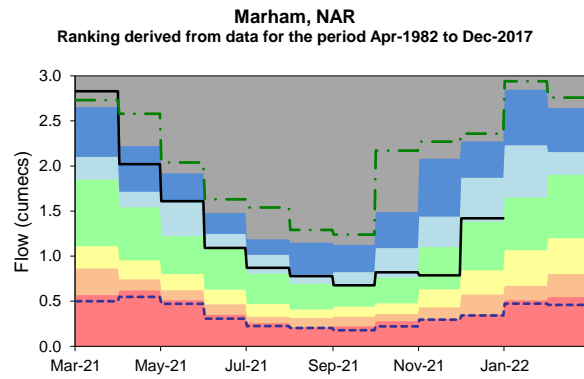
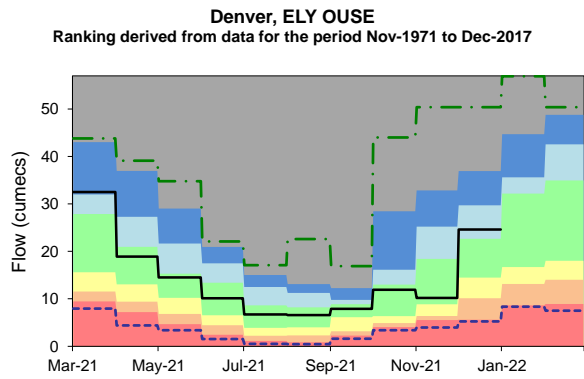


Crown copyright. All rights reserved. Environment Agency, 100024198, 2022

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



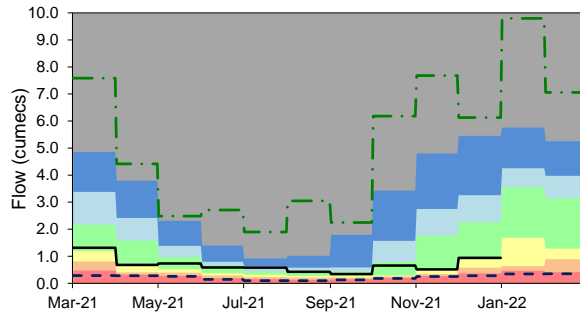






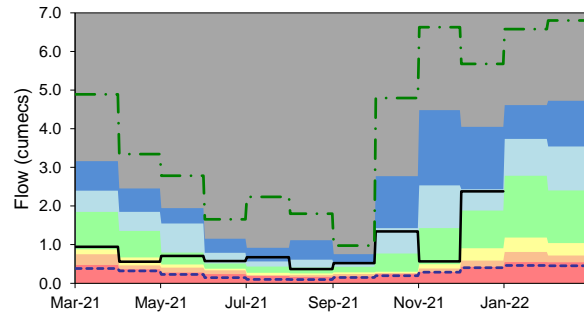
Bramford, GIPPING

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



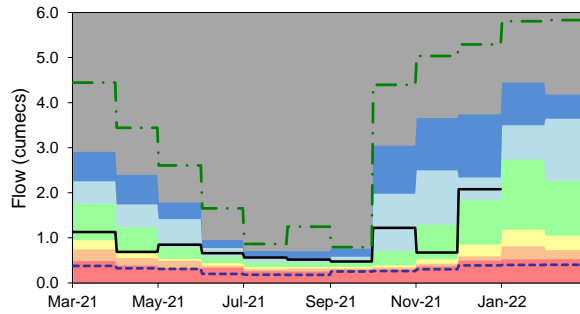
Lexden, COLNE

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

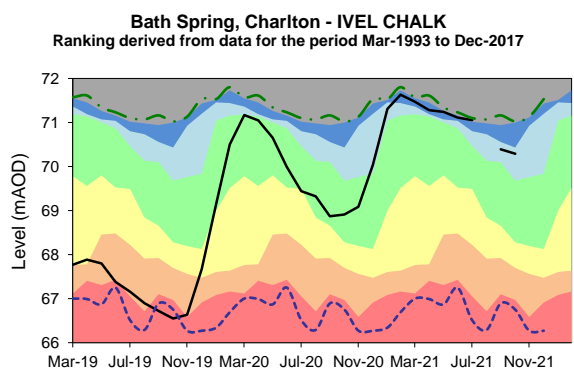
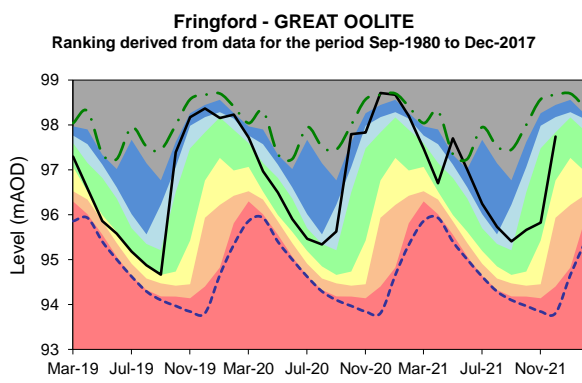
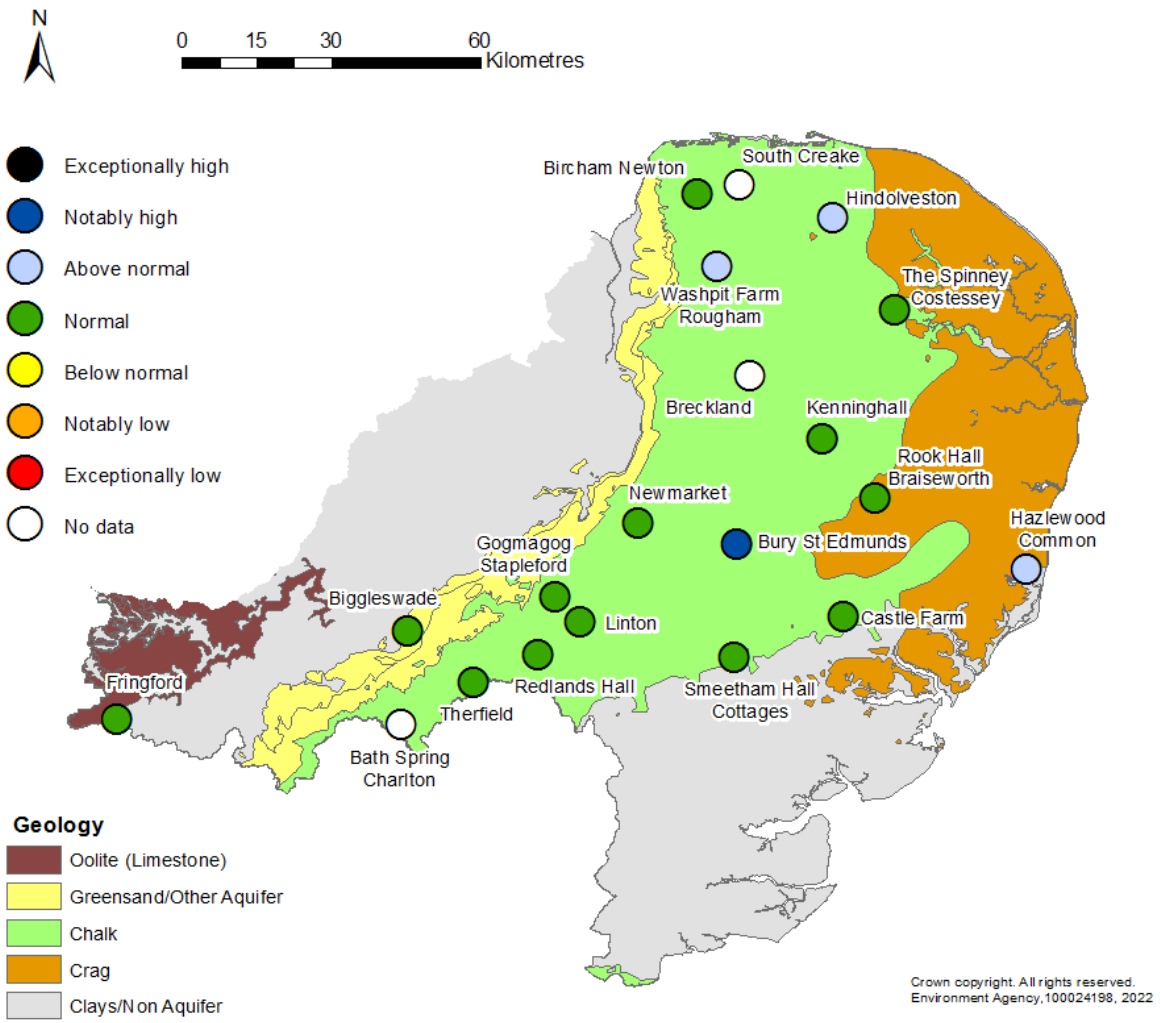


Springfield, CHELMER

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

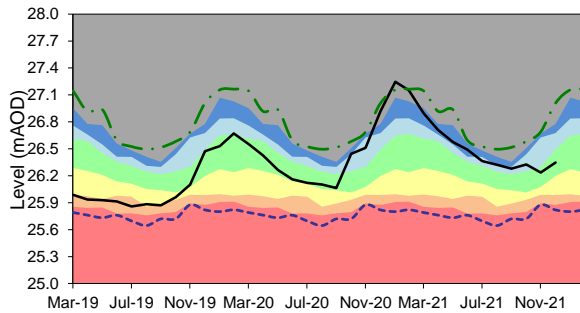


Groundwater Levels December 2021

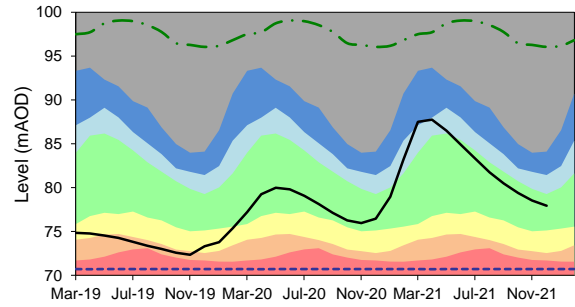




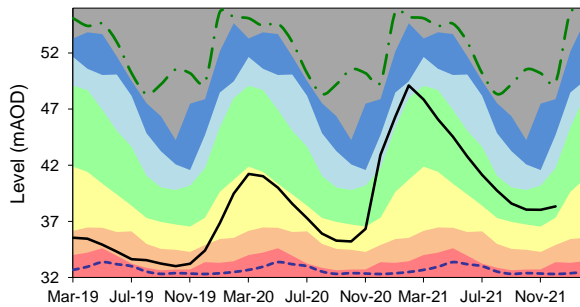
Biggleswade - IVEL SANDSTONE
Ranking derived from data for the period Mar-1968 to Dec-2017



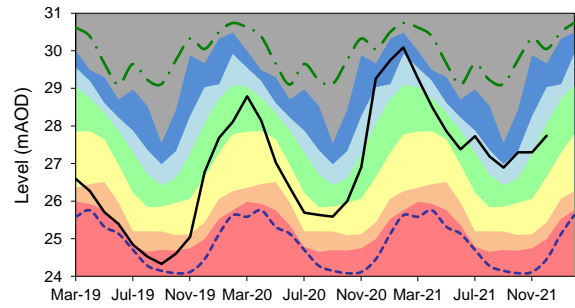
Therfield Rectory - N HERTS CHALK
Ranking derived from data for the period Jan-1883 to Dec-2017



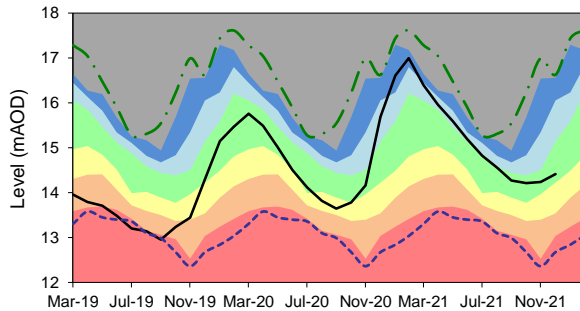
Redlands Hall, Ickleton - CAM CHALK
Ranking derived from data for the period Aug-1963 to Dec-2017



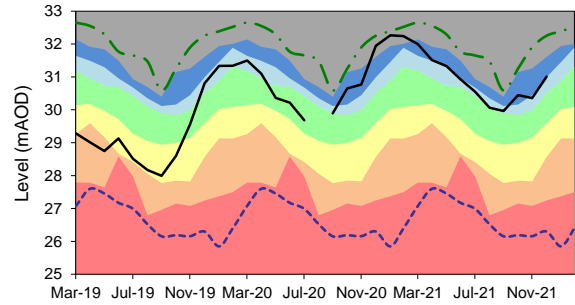
Linton - CAM CHALK
Ranking derived from data for the period Jan-1980 to Dec-2017



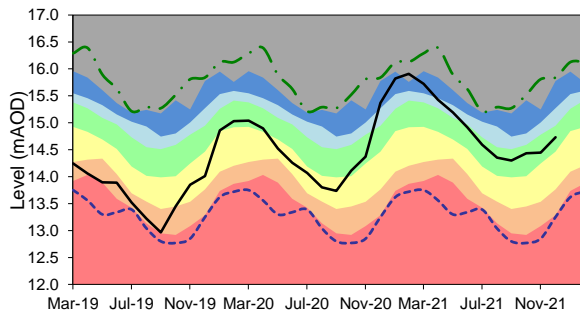
Gog Magog, Stapleford - CAM CHALK
Ranking derived from data for the period Jan-1980 to Dec-2017



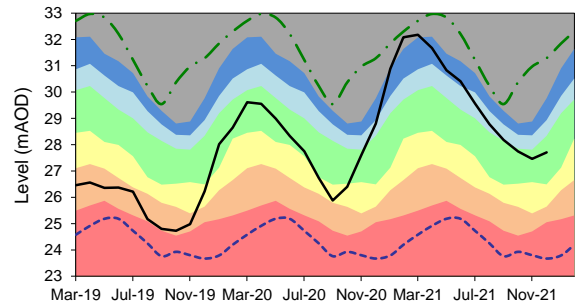
Bury St Edmunds - UPPER LARK CHALK
Ranking derived from data for the period May-1983 to Dec-2017



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

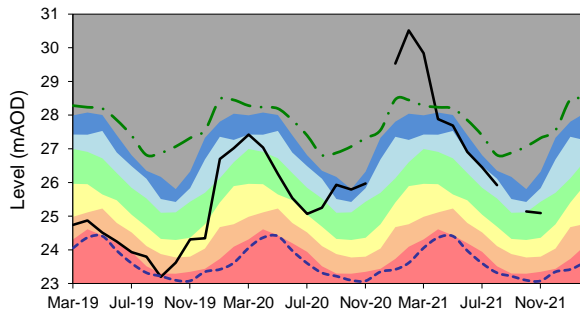


Kenninghall - LITTLE OUSE CHALK
Ranking derived from data for the period Aug-1973 to Dec-2017

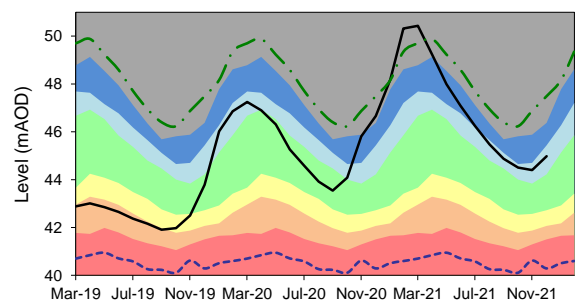




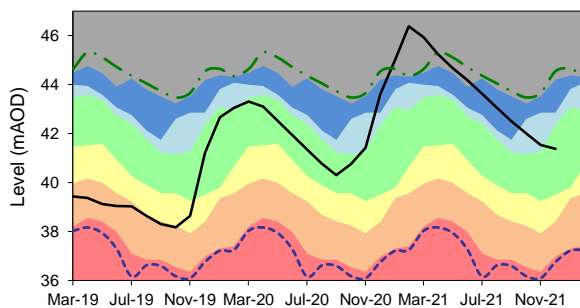
Breckland - WISEY CHALK
 Ranking derived from data for the period Jan-1971 to Nov-2017



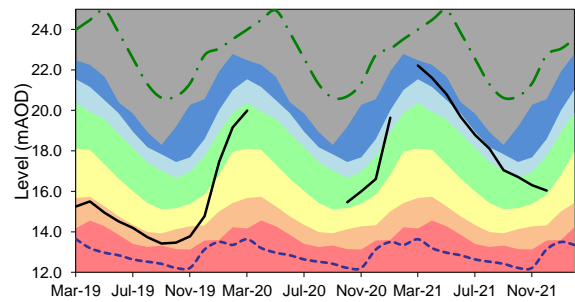
Washpit Farm, Rougham - NW NORFOLK CHALK
 Ranking derived from data for the period May-1950 to Dec-2017



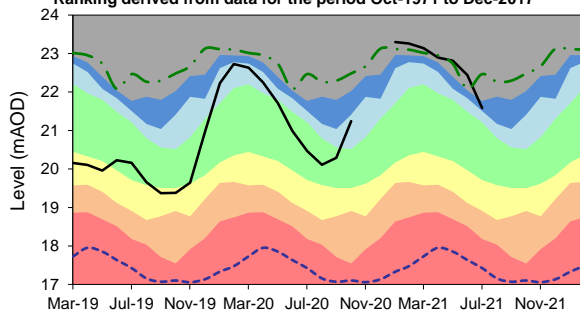
Bircham Newton - NW NORFOLK CHALK
 Ranking derived from data for the period Mar-1995 to Sep-2017



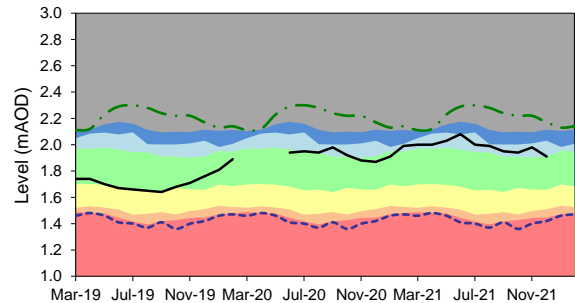
Castle Farm, Offton - MID SUFFOLK CHALK
 Ranking derived from data for the period Mar-1967 to Dec-2017



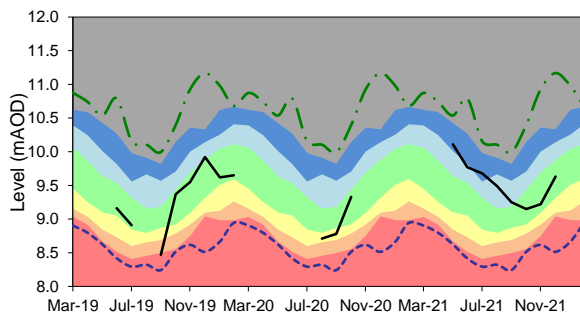
**Old Primary School, South Creake
 NW NORFOLK CHALK**
 Ranking derived from data for the period Oct-1971 to Dec-2017



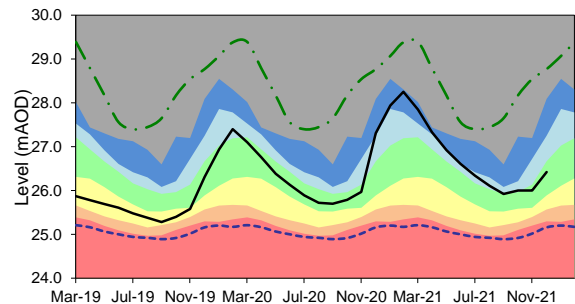
Hazlewood Common, SUFFOLK CRAG
 Ranking derived from data for the period Oct-1988 Feb-2020



The Spinney, Costessey - WENSUM CHALK
 Ranking derived from data for the period Oct-1971 to Dec-2017

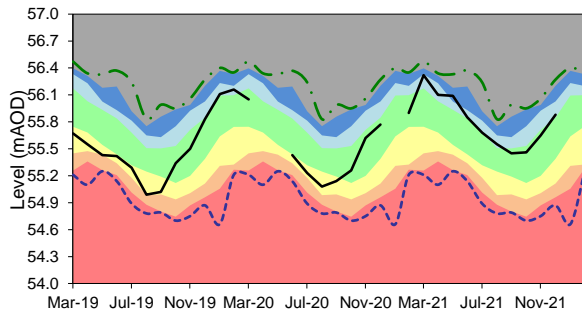


Smeetham Hall Cottages, Bulmer - ESSEX CHALK
 Ranking derived from data for the period Jan-1964 to Dec-2017

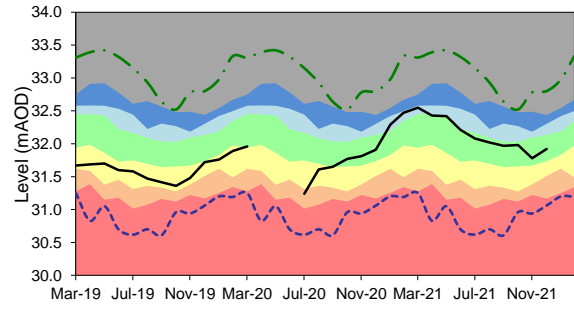




Hindolveston - NORFOLK CHALK
 Ranking derived from data for the period Sep-1984 to Nov-2017



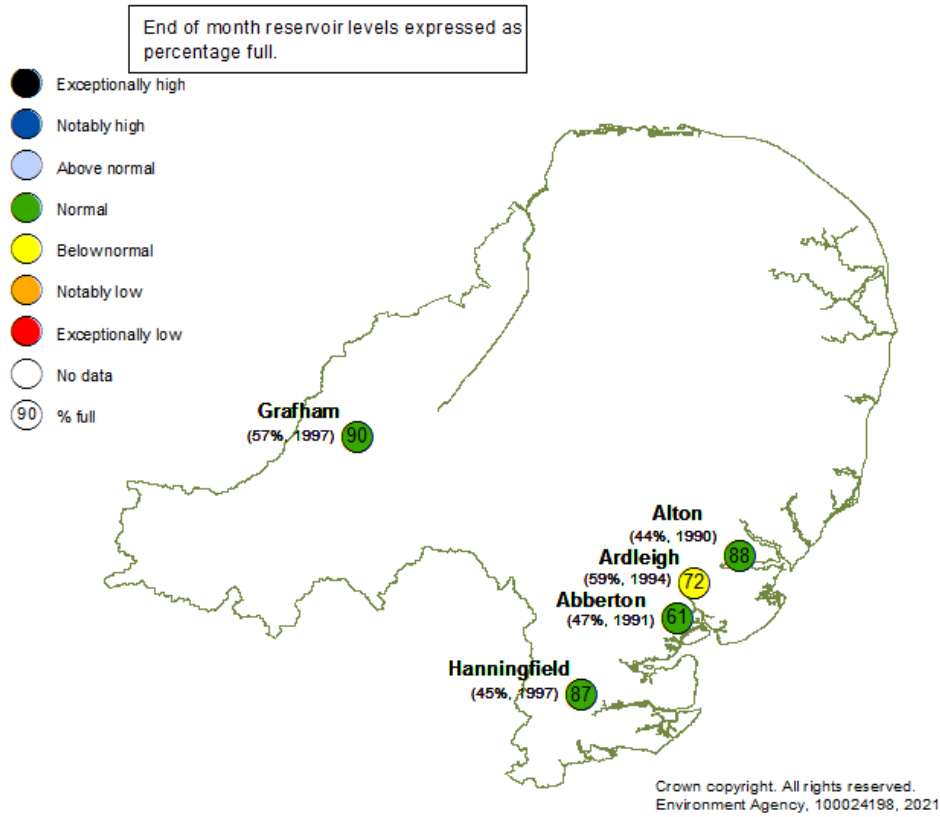
Rook Hall, Braiseworth - SUFFOLK CHALK
 Ranking derived from data for the period Jan-1980 to Dec-2017



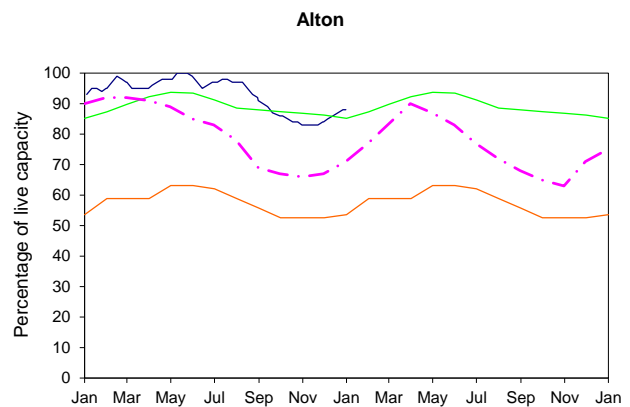
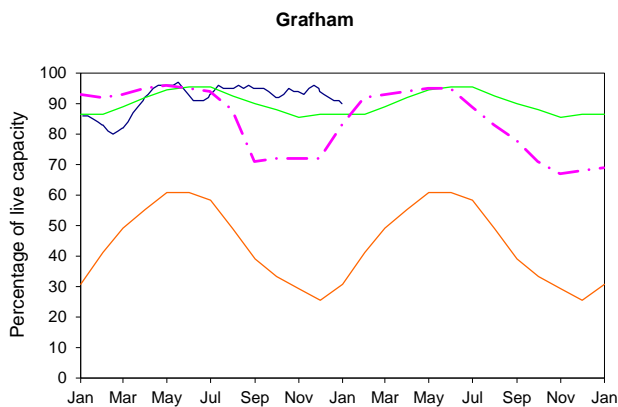
Reservoir Stocks

December 2021

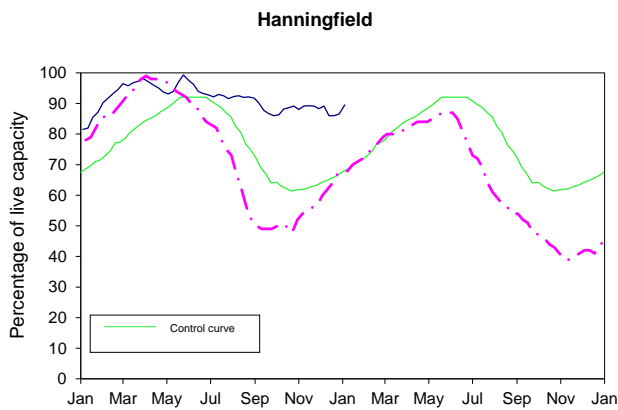
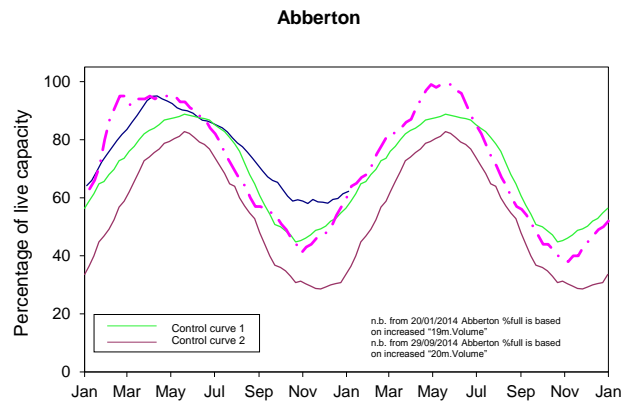
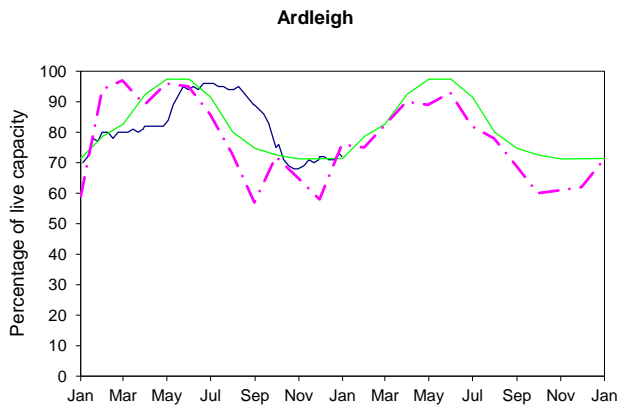
December 2021



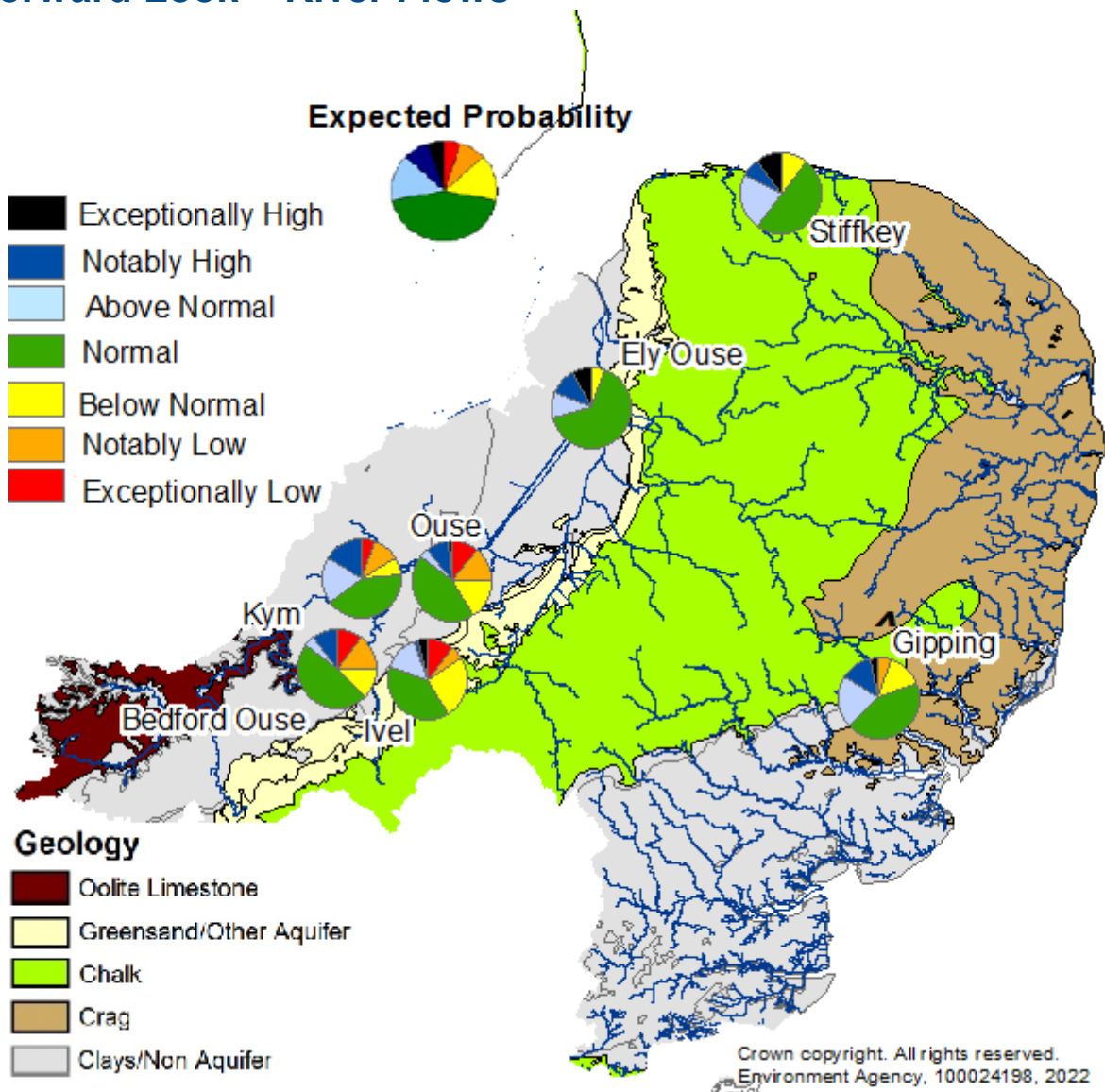
— 2020-2021 — Normal Operating Curve — Drought Alert Curve - - - 1995-1996



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



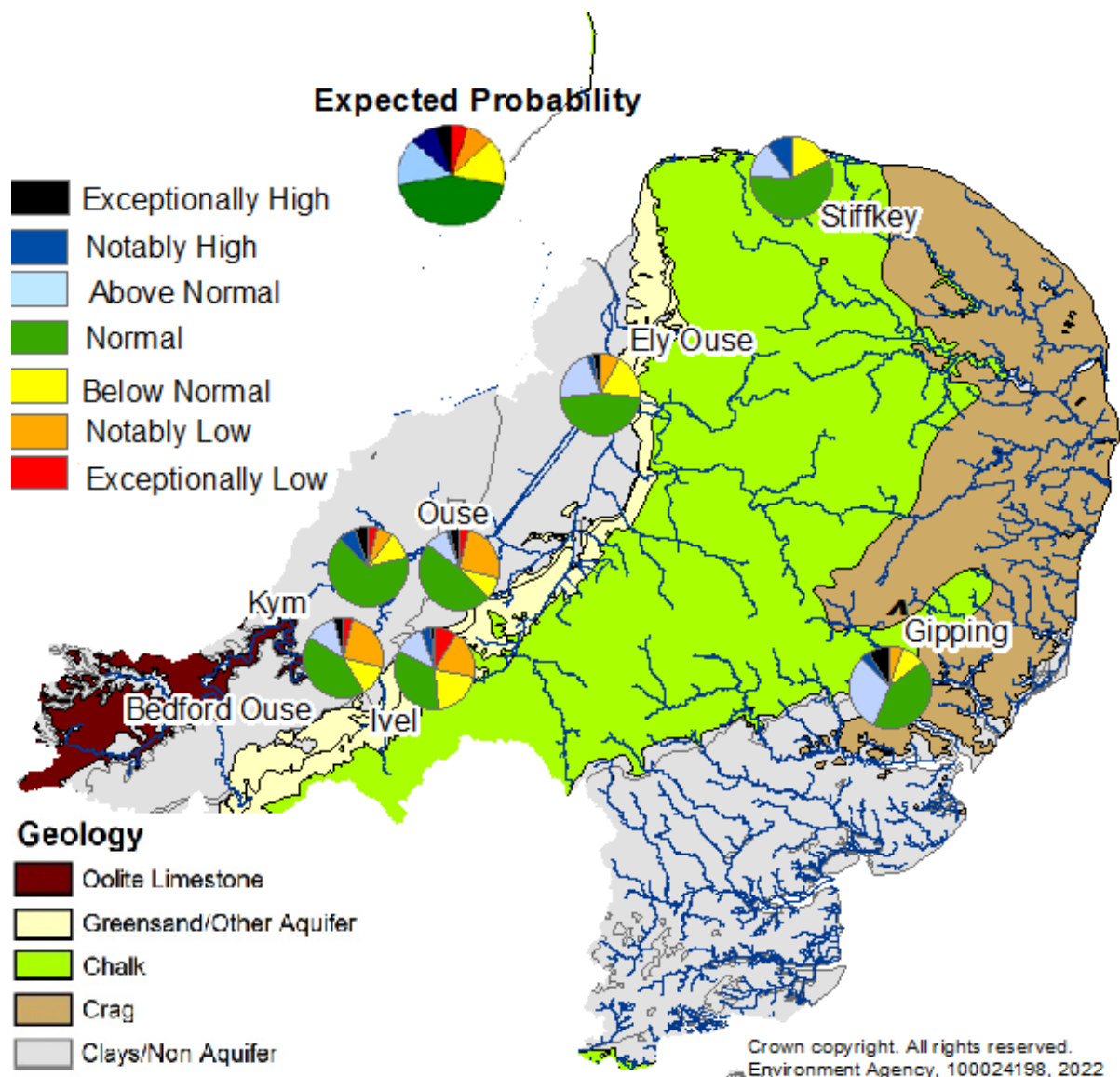
Forward Look – River Flows



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 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, 2022.

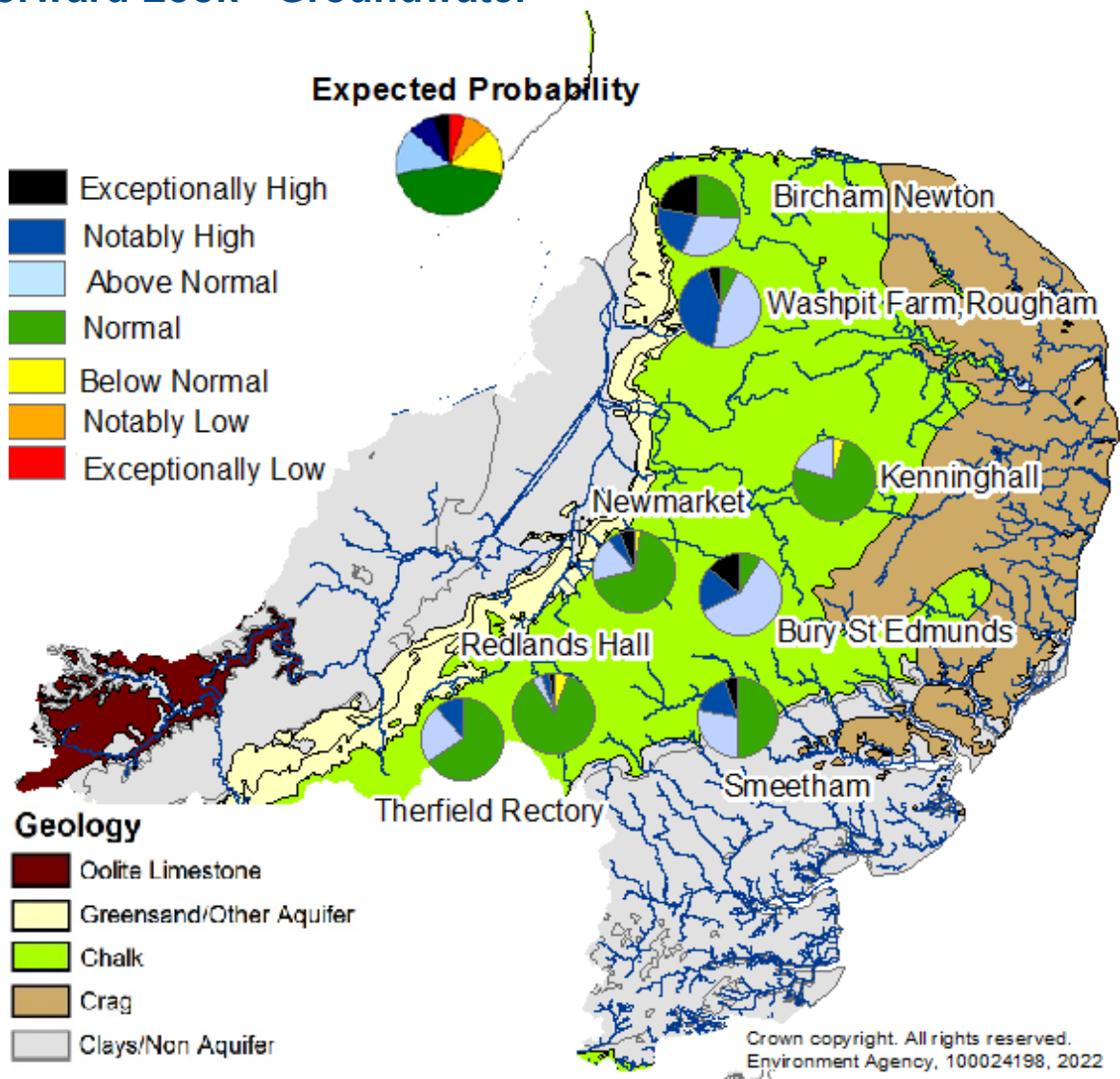
[^] "Naturalised" flows are projected for these sites'



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.

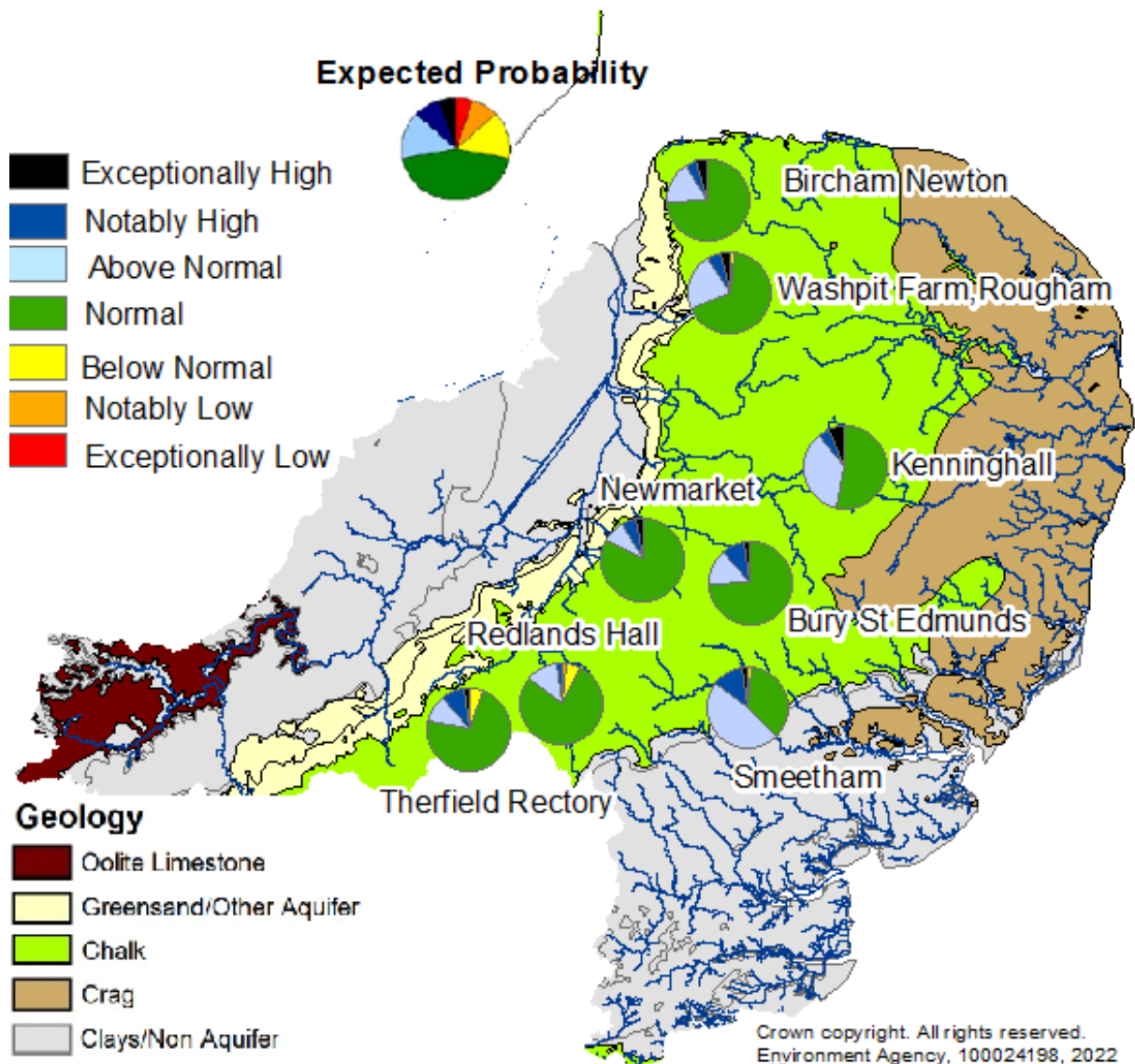
Probabilistic ensemble projections of river flows at key indicator sites in June 2022. Pie charts indicate probability, based on climatology, of the surface water flow at each site being e.g. exceptionally low for the time of year. (Source: [Centre for Ecology and Hydrology](#), Environment Agency) Geological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

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, 2022.



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 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, 2022.

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.